

To: Finance Committee

From: Stephanie Sinnott, Commissioner,
Finance Services

Report Number: FIN-21-92

Date of Report: October 13, 2021

Date of Meeting: October 18, 2021

Subject: 2021 Oshawa Asset Management Plan

File: 03-05

1.0 Purpose

The purpose of this report is to present the Updated Oshawa Asset Management Plan for Council endorsement.

2.0 Recommendation

That the Finance Committee recommend to City Council:

That the 2021 Oshawa Asset Management Plan dated October 25, 2021, as set out in Attachment 1 to Report FIN-21-92 dated October 13, 2021 be endorsed.

3.0 Executive Summary

In many Ontario municipalities, existing infrastructure is degrading faster than it is being restored or replaced, putting service delivery at risk. To assist with this issue, the Province implemented the Asset Management Planning for Municipalities, Regulation 588/17, effective January 1, 2018.

This regulation is meant to improve the approach to infrastructure planning, building on the progress municipalities have made.

The Regulation includes a number of deadlines that municipalities must meet. The first deadline of July 1, 2019 required the City to have a Council endorsed Strategic Asset Management Policy (S.A.M.P.), which Council endorsed on May 21, 2019 through report FIN-19-35.

The next deadline for municipalities to develop an enhanced asset management plan covering core infrastructure assets was originally July 1, 2021 however on March 15, 2021, the Province of Ontario filed Regulation 193/21 which extended all future timelines in O. Reg. 588/17 by one-year. The revised Phase 1 deadline was amended to July 1, 2022.

City staff have developed the Phase 1 Asset Management Plan for Core Assets (Attachment 1) which is specific to Roads, Structures and Stormwater Assets. This plan includes the state of the infrastructure, the current levels of services and the costs to maintain the current levels of service.

4.0 Input From Other Sources

The following have been consulted in the preparation of this report:

- Asset Management Steering Committee (A.M.S.C.)
- Corporate Leadership Team (C.L.T.)

5.0 Analysis

Asset Management is a process used in decision-making related to capital infrastructure. It helps municipalities plan for the infrastructure that is needed to deliver services to the community in a way that considers the services needed by the community, manages risks and opportunities, and helps use resources wisely.

Asset Management Plans are usually 10 to 20 year long-term plans for infrastructure assets that look at the future needs including levels of services and the risks associated with providing services.

In 2015, the Infrastructure for Jobs and Prosperity Act, 2015, W.O. 2015, c. 15, directed that municipalities are required to have an Asset Management Plans (A.M.P.). On December 9, 2016, Council approved the City's preliminary A.M.P. as set out in Report [CM-16-35](#).

The Province expanded on the requirements for Asset Management with the creation of the Asset Management Planning for Municipal Infrastructure Regulation, O. Reg. 588/17 effective January 1, 2018. This regulation sets out the timelines that must be met in order for the City to be eligible for federal and provincial funding related to capital infrastructure.

The first deadline of July 1, 2019 required the City to have a Council endorsed Strategic Asset Management Policy (S.A.M.P.), which Council endorsed on May 21, 2019 through report FIN-19-35.

The next three deadlines require municipalities to develop enhanced asset management plans in the following phases, which, through Regulation 193/21 extended the deadlines by one year:

July 1, 2022 (originally July 1, 2021) – Asset Management Plan – Phase I

- Municipalities to develop an enhanced asset management plan covering core infrastructure assets, which are comprised of roads, bridges, culverts and stormwater.

July 1, 2024 (originally July 1, 2023) - Asset Management Plan – Phase II

- Municipalities are required to expand their enhanced asset management plan to include all non-core assets such as Buildings, Vehicles, Parks, Trails, etc.

July 1, 2025 (originally July 1, 2024) – Asset Management Plan - Phase III

- Municipalities are required to expand asset management plans to include proposed levels of service, lifecycle strategies and financial strategies for all assets.

Staff have developed the Phase 1 Asset Management Plan for Core Assets (Attachment 1) which is specific to Roads, Structures and Stormwater Assets. This plan includes the state of the infrastructure of core assets, the current levels of services and the costs to maintain the current levels of service. Once this A.M.P. has been endorsed by Council, it will be posted on the City’s website.

Below is a summary of the key statistics identified in the report:

Key Statistic	Total Assets	Core Assets
Estimated Replacement Cost of Assets	\$2.6 billion	\$1.8 billion
Estimated Replacement Cost of Assets per household	\$38,762 per household	\$27,071 per household
Percentage of Assets in Good or Better Condition	T.B.D.	51.5%
Percentage of Assets with Observed Condition Data	T.B.D.	84.7%
Annual Capital Funding Gap Estimate	\$25.0 million	\$15.4 million

The average historical investment in replacement assets (not including growth-related assets), based on the past six years approved budget, was \$20.0 million. This includes annual capital tax levy, utilizing tax levy funded reserves as well as approximately \$6.3 million from the Canada Community Benefit Funding (previously known as Federal Gas Tax Funding). Based on lifecycle activities required for the core assets and including the 2021 10-year capital budget forecast for all other assets, the average annual investment required is \$45.0 million. This results in an estimated annual capital funding gap of \$25.0 million.

If the capital investment funding continues to be significantly lower than what is required, the assets will continue to deteriorate, which will affect the levels of service provided and expected by residents.

The City owns and maintains 1,216.9 lane kilometers of roads, with a total estimated replacement cost of \$1.4 billion. The average age of the road network is 35.2 years, with a service life as a whole asset (including the road base and surface) is 80 years. Based on visual inspections of the roads, the total road network is in FAIR condition, with an average Pavement Condition (P.C.I.) Index of 74.49. Based on a 10-year lifecycle analysis, the estimated annual funding gap for all roads is \$8.8 million.

Staff completed an in-depth 50-year analysis of the future implications of maintaining the current funding levels for the investments in roads. Currently, the level of service (L.O.S.) for maintaining the paved roads at a condition of good or better is 56.2%. If the annual investment were to be maintained at \$4.5 million, the L.O.S. would steadily decline to a projected road network of 29% by the year 2070. In order to maintain a L.O.S. at 56.2%, the annual investment would need to be increased to \$8.5 million.

The City owns and maintains 115 structures, which consists of road bridges, road culverts and pedestrian structures, having a total estimated replacement cost of \$75.0 million. The average age of the structures is 37.2 years, with a service life estimated at 80 years. Based on visual inspections, overall the structures are in GOOD condition. The 10-year lifecycle analysis shows an estimated annual funding gap for all structures of \$5.9 million.

Another significant asset class is stormwater assets. The City owns and maintains 602 kilometers of storm sewer lines, and 31 stormwater management facilities (S.W.M.F.), with a total estimated replacement cost of \$276.1 million. The average age of the stormwater assets is 30.8 years, with a service life estimated at 80 years. Based on the estimated remaining life, the stormwater assets are in FAIR condition. The 10-year lifecycle analysis, estimates an annual funding gap of \$0.7 million, with an estimated annual investment of \$1.0 million. As a significant portion of the stormwater assets, such as the S.W.M.F. and the Foundation Drainage Collection system, are fairly new there is a significant increase in investments required over the next 80 years. Based on an 80-year analysis, the investment required triples to approximately \$3.0 million per year.

The main focus of this version of the A.M.P. was the core assets. The next iteration of the A.M.P. will include a detailed analysis of all the non-core assets. This will assist in refining the total lifecycle costs of the City's assets.

6.0 Financial Implications

There are no financial implications resulting from the recommendation of this report.

7.0 Relationship to the Oshawa Strategic Plan

The recommendation of this report will advance the Oshawa Strategic Plan goal of Economic Property and Financial Stewardship, ensuring Safe and Reliable Infrastructure.



Stephanie Sinnott, Commissioner,
Finance Services

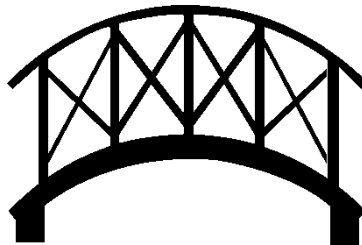


City of Oshawa

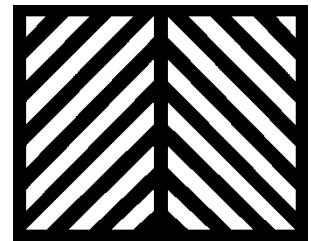
2021 Asset Management Plan



Roads



Structures



Stormwater

October 25, 2021

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Glossary of Terms

A.M. – Asset Management

A.M.P. – Asset Management Plan

B.C.I. – Bridge Condition Index

F.D.C. – Foundation Drainage Collection

G.I.S. – Geographic Information System

K.P.I. – Key Performance Indicator

L.O.S. – Levels of Service

M.F.O.A. – Municipal Finance Officers Association

O. Reg. – Ontario Regulation

O.S.I.M. – Ontario Structure Inspection Manual

N.P.V. – Net Present Value

P.C.I. – Pavement Condition Index

P.S.A.B. – Public Sector Accounting Board

S.W.M.F. – Stormwater Management Facilities

T.B.D. – To Be Determined

T.C.A. – Tangible Capital Assets

Executive Summary

Maintaining existing assets in a state of good repair and building new infrastructure which meets current and future needs is critical to the success of the City of Oshawa. The City's infrastructure is a vital part of delivering the services that the public expects.

The City of Oshawa owns, operates and maintains \$2.6 billion (estimated 2020 replacement cost) for all infrastructure which services the needs of residents, local business and visitors to the City. This Asset Management Plan (A.M.P.) includes all City owned assets, but focuses on the core assets consisting of roads, structures and stormwater assets.

What is Asset Management

Asset management is a process of making the best possible decisions regarding the commissioning, operating, maintaining, renewing, replacing and disposing of infrastructure assets. It is a journey that will be achieved over time.

This A.M.P. supports the City's corporate strategic direction found in the Oshawa Strategic Plan, the Financial Strategy and the Official Plan. It is a key step to put in place a more mature business management framework to:

- collect infrastructure data
- integrate the management of assets across all services and departments
- report on the replacement cost, condition and lifecycle costs of assets
- support a long-term approach to investing in the City's assets
 - operate, maintain, renew, replace and dispose of City assets as effectively and efficiently as possible
- move the City from historical-based budgeting to asset needs budgeting

Utilizing this framework will assist in providing the infrastructure required to help ensure the health and prosperity of the City of Oshawa and its residents, maintain a high quality of life, support evidence-based decision-making, help to manage risk and provide satisfactory levels of service to the public in a sustainable manner.

Although this A.M.P. includes all City owned assets, a detailed analysis and summary of the City's core assets. This includes condition, lifecycle costs and investment needs to support the services delivered today and into the future. The goal is to enable safe and reliable infrastructure in order to provide the current levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost.

Oshawa, like other municipalities, is facing aging infrastructure with an associated increase in operating, maintenance, renewal and replacement costs, along with the physical and financial impacts of climate change. Building a sound knowledge base across the organization in regard to the need for and the complexity of asset management will serve to integrate the required practices into the overall culture of the City. This will position Oshawa for successfully making more informed decisions about managing its assets. This A.M.P. will also allow the City to utilize available Federal and Provincial government funding as an A.M.P. is a requirement to receive infrastructure funding and it is anticipated that the Province will use the A.M.P. to inform the distribution of funding.

Oshawa’s population growth needs to be considered and planned for within operating and capital budgets in a way that is efficient and transparent. Asset management is an efficient tool that can be utilized to achieve this.

O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure came into effect on January 1, 2018 and requires municipalities to have a Council approved Asset Management Plan for core infrastructure assets by July 1, 2022. Core infrastructure assets for the City of Oshawa include roads, structures and stormwater assets and are the main focus of this A.M.P. These core assets represent approximately 70% of all City assets, with an estimated replacement cost of \$1.8 billion. Regulatory compliance status for the City’s core assets, which is due by July 1, 2022, is shown below in Figure 1.

Figure 1 – Regulatory Compliance Status – Phase 1 Core Assets

Asset Class	State of the Infrastructure	Current Levels of Service	Lifecycle Management Strategy	Managing Growth
Roads	Compliant (pg. A-3)	Compliant (pg. A-10)	Compliant (pg. A-15)	Compliant (pg. A-20)
Structures	Compliant (pg. B-3)	Compliant (pg. B-7)	Compliant (pg. B-14))	Compliant (pg. B-16)
Stormwater	Compliant (pg. C-3)	Compliant (pg. C-14)	Compliant (pg. C-19)	Compliant (pg. C-22)

Details of the core assets can be found in Appendix A – Roads, Appendix B – Structures and Appendix C –Stormwater Assets.

There are two other phases required in the regulation. Phase 2 requires the same information to be included in the A.M.P., but includes all other municipal assets, such as buildings, vehicles, sports fields, etc. Staff have begun this process and plan to update the A.M.P. in the next two years to be compliant with the deadline of July 1, 2024.

Phase 3, the final phase of the regulation, builds on Phase 1 and 2 by including proposed levels of service along with a lifecycle management and financial strategy. This portion is due by July 1, 2025 and will require a significant amount of analysis, as well as public consultation to determine what the proposed levels of service will be for all City provided services.

Figure 2 -Summary of Key Statistics

Key Statistic	Total Assets	Core Assets
Estimated Replacement Cost of Assets	\$2.6 billion	\$1.8 billion
Estimated Replacement Cost of Assets per household	\$38,762 per household	\$27,071 per household
Percentage of Assets in Good or Better Condition	T.B.D.	51.5%
Percentage of Assets with Observed Condition Data	T.B.D.	84.7%
Annual Capital Funding Gap Estimate	\$25.0 million	\$15.4 million

1. Introduction

1.1 Purpose

This Asset Management Plan reports on the state of the City’s assets, how the City manages those assets at the current levels of service and what investment is required to maintain the current levels of service. Although the A.M.P. includes all City assets, the focus on this iteration is on the core assets (roads, structures and stormwater assets). It has been prepared under the guidance of Ontario Regulation 588/17 Asset Management Planning for Municipal Infrastructure and thus will inform the current budget and the nine-year capital forecast.

This document, and the analysis contained within, are dynamic and the quality of the content will continue to improve over time, as the City’s asset management, data, information, and processes mature.

The A.M.P. will be updated regularly, monitored and reported on to Council, as required, but a minimum of every 5 years as per Ontario Regulation 588/17. The result over time will be more comprehensive data, better analysis and, in turn, better decision-making, financial/investment planning and long-term sustainability.

As the City’s asset inventory and condition assessment, and for proposed levels of service and risk management matures, the City’s asset management analysis and decisions will mature and more significantly inform the long-term budget forecast.

Why Are We Doing Asset Management?

Not only does asset management make good business sense but the legislation and regulations require municipalities to create an Asset Management Plan.

Asset management leading practices includes evidence- based decision-making, transparency, risk management and public engagement.

1.2 Importance of Infrastructure

The City of Oshawa is responsible for a diverse array of capital assets essential to the delivery of services to residents, businesses and visitors. The commissioning, operation, maintenance, renewal and eventual replacement of such infrastructure has always been and currently is a very important responsibility essential for any successful community. Asset management is vitally important as municipalities address their infrastructure challenges.

1.3 Link to Strategic Documents

The City of Oshawa Council approved a Strategic Asset Management Policy in May 2019. The policy establishes formal management controls for the responsible stewardship of capital infrastructure. The policy framework is divided into the following key areas:

- Policies and procedures supported by the A.M.P.
- Principles to be followed in the asset management planning process
- Governance and accountability

Both the Oshawa Strategic Plan and the Financial Strategy respond to the Council-endorsed principles of sustainability and financial stewardship. Oshawa's A.M.P. supports the Oshawa Strategic Plan, Our Plan for Success, 2020-2023 and, in particular, the goal of Economic Prosperity and Financial Stewardship, and the theme of Safe and Reliable Infrastructure. It also supports the Oshawa Financial Strategy, 2016-2019, which contains a number of recommendations that support asset management. The A.M.P. will help the City achieve both principles and improve the information necessary to implement both strategic documents.

The A.M.P. also supports the City's Official Plan, which sets out land use policy, by helping to facilitate growth and intensification, and support transportation, storm water

What are the Benefits of Asset Management?

The key benefits of asset management include:

- Defined and cost effective levels of service
- Optimized operations and maintenance for reduced life cycle costs
- Reduced risk
- Avoidance of unexpected problems related to City assets
- Evidence-based financial planning guides investment decisions
- Performance-monitoring system

management and environmental protection.

Finally, the A.M.P. also supports other key documents. For example, the City's departments undertake annual departmental business plans, which align with the Oshawa Strategic Plan and Financial Strategy. Other high-level documents provide context and perspective to help manage and deliver the City's assets and services. Some of these key planning documents are:

- Arts, Culture and Heritage Plan
- Customer Service Strategy
- Development Charge Background Study
- Downtown Oshawa - Plan 20Twenty
- Economic Development - Sector Analysis and Cluster Development Strategy
- Emergency Master Plan
- Fire Master Plan
- Oshawa Executive Airport Business Plan
- Outdoor Sports Facility Study
- Parks, Recreation and Culture Strategy: Vision 2020
- Parks, Recreation, Library, and Culture Facility Needs Assessment
- Information Technology Strategic Plan
- Integrated Transportation Master Plan/Active Transportation Master Plan

1.4 Asset Management Framework

Asset management activities/initiatives are proposed to occur within the context established by an asset management framework. The development of this A.M.P. is premised on the following vision, mission, goal and objectives:

Vision

To proactively manage Oshawa's significant and varied assets over their lifecycle in order to maintain service excellence.

Mission

To have corporate asset management become part of the City's culture through:

- The integration of policy, practices, business processes, data, technology, people and finances

- The preservation of assets while protecting the environment, and promoting health and safety
- Financial stewardship that supports evidence-based decision making for operations, maintenance, renewal and replacement of assets

Goal

To enable safe and reliable infrastructure in order to provide the current level of service in a sustainable way, while managing risk, at the lowest lifecycle cost.

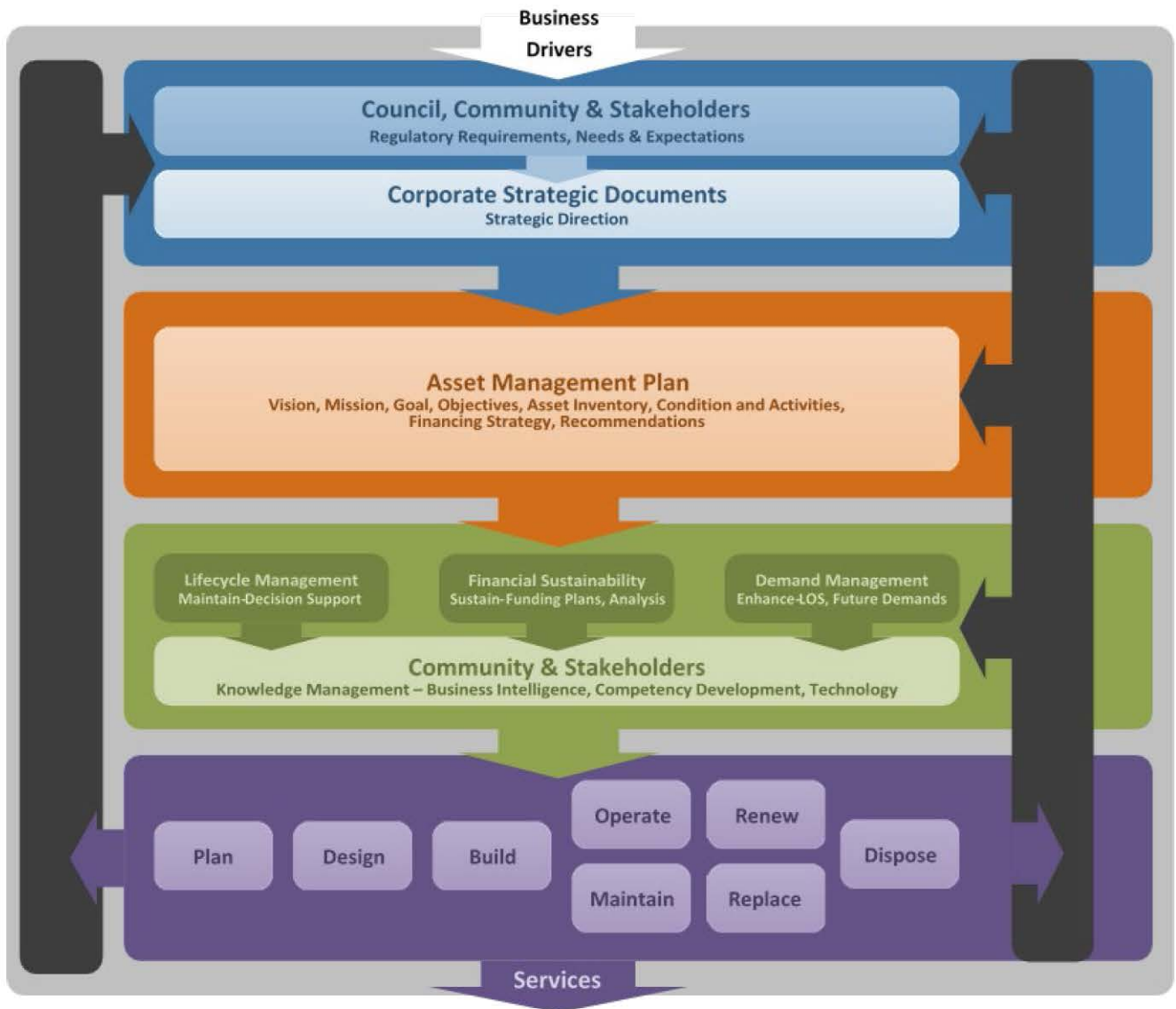
Objectives

- Foster a whole-of-business asset management framework based on achievable leading industry practices, which supports transparent and evidence-based decision making across all asset classes
- Establish appropriate levels of service that respond to community needs and desires while minimizing risk
- Wise application of limited human and financial resources to ensure long-term financial sustainability of the City's capital assets
- Continuous improvement in asset planning and management through performance monitoring

Figure 3 outlines the City's proposed asset management process that involves visioning, strategic, tactical and operational stages. The process includes Council direction and community input, guidance provided by corporate strategic documents, development of an A.M.P., lifecycle management, financial sustainability, demand management, and front-line commissioning, operation, maintenance, renewal, replacement and disposal of assets.

Performance monitoring occurs at all stages of the process which allows for regular reporting.

Figure 3 – Asset Management Process



1.5 Asset Management Roadmap

The City retained Watson & Associates Economists Ltd. (Watson) in the fall of 2020 to assist staff with developing an asset management roadmap. The Asset Management Steering Committee worked with Watson to develop the roadmap as shown in Figure 4 below, based on the original timelines in O. Reg. 588/17. As the timelines in the regulation have now been extended by one year, the estimated completion timelines allows for flexibility for tasks to be moved out, if required.

Figure 4 – Asset Management Roadmap

Task #	Corporate Planning and Decision-making Framework	Estimated Timelines	
1	Review Strategic A.M. Policy	2024-Q2	2024-Q3
2	Define role of A.M.P.	2021-Q2	2021-Q3
Task #	Asset Summary for Non-Core Assets	Estimated Timelines	
3	Determine which assets need to include	2021-Q2	2021-Q3
4	Summary of assets	2021-Q4	2022-Q3
5	Replacement cost	2021-Q4	2022-Q3
6	Average age	2021-Q4	2022-Q3
7	Condition	2021-Q4	2022-Q3
8	Approach to condition assessment	2021-Q4	2022-Q3
Task #	Levels of Service	Estimated Timelines	
9	Define approach – service vs asset	2021-Q2	2021-Q3
10	Develop levels of service statements	2021-Q2	2022-Q4
11	Performance measures (technical L.O.S.)	2021-Q2	2022-Q4
12	Set targets for performance measures	2022-Q2	2023-Q1
Task #	Lifecycle Management Strategy	Estimated Timelines	
13	Define lifecycle activities (generalized models)	2021-Q2	2022-Q2
14	Costing	2021-Q2	2022-Q2
15	Alternative options	2021-Q2	2022-Q2
16	Decision-making process	2022-Q2	2023-Q3
Task #	Financial Strategy	Estimated Timelines	
17	Define role of financial strategy in A.M.P.	2023-Q1	2023-Q1
18	Identify funding needs	2023-Q1	2023-Q4
19	Identify funding sources	2023-Q1	2023-Q4
20	Consider alternative funding sources	2023-Q1	2023-Q4
21	Measure funding needs against funding sources	2023-Q1	2023-Q4
22	Gap identification and mitigation strategy	2023-Q1	2023-Q4
Task #	Asset Management Manual	Estimated Timelines	
23	Systems supporting A.M.	2021-Q3	2022-Q3
24	Data improvement plans	2021-Q3	2022-Q3
25	Data update protocols	2021-Q3	2022-Q3
26	“How Do I?”	2021-Q3	2022-Q3
27	Establish review of progress	2021-Q3	2022-Q3
Task #	Review, Reporting and Audit	Estimated Timelines	
28	Annual review of progress	2025-Q1	2025-Q2

Task #	People	Estimated Timelines	
29	Governance structure	2021-Q3	2022-Q3
30	Capacity	2024-Q1	2024-Q2
31	Training	2021-Q1	2025-Q4
Task #	Stakeholder Engagement	Estimated Timelines	
32	Identify stakeholders	2021-Q2	2021-Q3
33	Development engagement plan	2021-Q2	2021-Q3

2. State of the City's Infrastructure

Ontario Regulation 588/17 requires that each asset category in the asset management plan for Core Assets (roads, structures and stormwater assets) includes the following information:

- Summary of the assets in the category
- Replacement cost of the assets
- Average age of the assets, determined by assessing the average age of the assets
- Information available on the condition of the assets
- Description of the approach to assessing the condition

2.1 Inventory Summary

The City of Oshawa maintains several asset inventories at varying levels of detail, summarized as follows:

1. Tangible Capital Asset (T.C.A.) Inventory listing – this registry is maintained in Microsoft Excel and includes all of the assets owned by the City. This was developed in 2009 to achieve the requirements of the Public Sector Accounting Board (P.S.A.B.) 3150 regulation to include a full accrual accounting of assets. While this register is comprehensive, the level of detail on the linear assets (roads, stormwater, sidewalks, streetlights, etc.) is not ideal to complete the analysis in this report. In order to simplify financial reporting, the linear assets and a few other asset categories have been pooled together based on year, asset category and useful life. Where no other registry was available, the T.C.A. inventory listing was used.
2. G.I.S. (Geographic Information System) – this asset registry includes very detailed information on all of the linear assets, including the active transportation network. There is a significant amount of attributes that is tracked and maintained for each asset, broken out into segments. Staff utilize this information in a database that assists with analyzing the future needs and timing of activities required to maintain the assets. The majority of detail in this A.M.P. is based on the inventory maintained in the G.I.S.
3. V.F.A. Facility Software – this software is used to catalogue both vertical assets, such as buildings, as well as Park's assets within the City's portfolio. Assets are

broken into components that are primarily categorized by function and lifecycle. The V.F.A. facility software is aligned to assist with Capital Planning and Asset Management by recording condition assessments, tracking replacement costs, identifying system lifecycles and anticipated replacements, by utilizing industry standards set by Building Owners and Managers Association.

4. Microsoft Office Applications – various departments maintain inventory listings with additional detail for the assets managed in their respective department. This is typically maintained in Excel, but may also include Word and Access.
5. Maximo – this work management system includes the inventory for the fleet assets and draws information from other software for the other City’s asset. The software went live in 2021 and is anticipated to be utilized in the future to be able to report on the maintenance costs of specific asset classes.

Figure 5 – Inventory of Assets included in this A.M.P.

Asset Class	Type of Assets Included	Source	Inventory
Land Improvements	Airport runways, parking lots, sports fields, splash pads, watercourse improvements	G.I.S. V.F.A. Excel T.C.A.	T.B.D.
Buildings	Fire halls, community centres, administration, buildings, etc.	V.F.A.	92
Machinery & Equipment	Playground equipment, software, fire equipment, parking meters, etc.	T.C.A V.F.A.	T.B.D.
Vehicles	Fire vehicles, dump trucks, garbage trucks, snow plows, operations vehicles, etc.	Excel	303
Furniture	Furniture, other assets	T.C.A.	T.B.D.
Other Assets	Walkways, trails, multi-use paths, shade structures	G.I.S. Excel	T.B.D.
Linear Assets Roads	Roads	G.I.S.	1,216.9 lane kms
Structures	Bridges, culverts, pedestrian bridges	G.I.S.	26 road bridges, 50 road culverts and 39 pedestrian structures
Stormwater	Storm sewers, manholes, catch basins, stormwater management facilities	G.I.S.	Storm – 499.1 kms F.D.C. Storm – 103.2 kms S.W.M.F. - 31
Other Linear Assets	Streetlights, lighting, traffic control signals, barriers, geo controls	G.I.S.	T.B.D.

The asset classes used in this A.M.P. are aligned with the financial reporting asset classes, excluding Land Assets. The total replacement cost for the City assets is estimated at \$2.6 billion in 2020 dollars, as identified in Figure 6 below.

Figure 6 – Estimated Replacement Cost by Asset Class

Asset Class	Estimated Replacement Cost
Land Improvements	\$125,081,978
Buildings	\$405,852,373
Machinery & Equipment	\$50,872,021
Vehicles	\$37,053,951
Furniture	\$5,194,712
Other Assets	\$19,067,556
Linear Assets	
Roads	\$1,447,427,063
Structures	\$75,320,161
Stormwater	\$220,064,078
Other Linear Assets	\$189,769,480
Total	\$2,575,703,373

Unless otherwise stated, all financial figures in this A.M.P are described in current year (2020) Present Value dollar values. This includes values associated with the asset replacement costs, and the forecast replacement, renewal, maintenance and growth costs.

With respect to the current replacement costs, if a recently prepared estimate was not provided, the value available was inflated to 2020 dollars using information published by M.F.O.A. (Municipal Finance Officers Association) based on the historical rates for the Consumer Price Index.

It is important to note that historical cost, as presented in the financial statements, does not reflect the true replacement cost of an asset, but is what is required to be reported based upon historical purchase or acquisition cost less depreciation. The estimated replacement cost is the cost the City would incur to completely replace an asset in today’s dollars.

The focus of this iteration on the A.M.P. was on the City’s core assets, such as roads, structures and stormwater. While the City does track and maintain significant data on other assets classes, the specific details on quantity will be included in the next iteration of the A.M.P.

2.2 Asset Condition

Understanding the current condition of the assets can provide the City with a more complete picture of its infrastructure portfolio and can also assist in determining the future needs.

Currently, observed condition data is collected for roads, structures, facilities, and fleet. It is the ideal way to assess condition.

In other areas, condition needs to be assessed using an alternate method as observed condition may not be feasible for other asset classes. Where observed condition is not available, the condition was determined using the age and remaining useful life of the asset.

Figure 7 below shows the City’s asset classes and how they are currently assessed for condition. Condition is further detailed in the attached Appendices A, B and C for the core assets.

Figure 7 – Condition

Asset Class	Methodology	Current Condition
Land Improvements	Aged Based	T.B.D.
Buildings	Observed	T.B.D.
Machinery & Equipment	Observed	T.B.D.
Vehicles	Age Based	T.B.D.
Furniture	Age Based	T.B.D.
Other Assets	Age Based	T.B.D.
Linear Assets		
Roads	Observed	Fair (C)
Bridges & Culverts	Observed	Good (B)
Storm Assets	Aged Based	Fair (C)
Other Linear Assets	Aged Based	T.B.D.

Asset classes are assessed using unique rating scales. For example, roads are assessed using a pavement condition index (P.C.I.) and structures are assessed using a bridge condition index or (B.C.I.). These assessments are then translated into a standard condition rating scale so that the evaluation across asset classes may be compared across the organization. Oshawa follows a standard 5 grade scale that is standard in asset management and is shown in Figure 8 below.

Figure 8 – Condition Scale

Grade	Category	Description
A	Very Good	The assets are functioning as intended. Limited, if any, deterioration observed.
B	Good	The assets are functioning as intended. No major maintenance is anticipated within the next 5 years.
C	Fair	The assets are functioning as intended. Normal deterioration and minor distress observed. Maintenance will be required within the next 5 years to maintain functionality.
D	Poor	The assets are starting to not function as intended. Significant distress observed. Maintenance and some repair required within the next few years to restore functionality.
E	Very Poor	The assets are not functioning as intended. Significant deterioration and major distress observed, with possible damage to the base. Requires immediate attention.

3. Current Levels of Service

The focus of public sector asset management are three fundamental considerations: providing satisfactory levels of service (L.O.S.) to the public, ensuring the sustainability of infrastructure assets over the long term, and managing an acceptable level of risk.

Asset management ultimately has a service-based focus, as the purpose of assets are to be used to deliver services. This focus leads to the discussion of L.O.S., which are a measure of the quality, quantity and/or reliability of a City service from the perspective of residents, businesses and other customers. Council then establishes quality thresholds at which municipal services should be provided to the community. L.O.S. can also be established by legislation and related regulations. L.O.S. should be measurable so they can be tracked and performance can be determined. The levels of service associated with the roads, structures and stormwater assets are contained in the appendices attached. Future iterations of the A.M.P. will report on the levels of service for all assets in the City's portfolio.

The City of Oshawa is in the business of delivering services at certain L.O.S., both internally and externally. The delivery of services is made possible, either directly or indirectly, via the assets owned by the City. L.O.S. provided by the City are affected by several factors including:

- legislated requirements
- affordability and fiscal constraints
- internal strategic documents that establish desired outcomes
- Council direction
- leading municipal practices
- climate change impacts
- expected asset performance
- rate of growth
- customer expectations

For example, Ontario Regulation 239/02, sets out minimum maintenance standards for municipal roads; Ontario Structure Inspection Manual (O.S.I.M.), which sets the standards for detailed bridge inspections; Water Opportunities Act, 2010, which sets the framework for a performance measurement regime and sustainability for stormwater over the lifetime of the infrastructure assets; and the Accessibility for Ontarians with Disabilities Act, 2005, which develops, implements and enforces accessibility standards.

The current legislation O. Reg. 588/17, requires municipalities to link the services it provides and the L.O.S. it delivers to risk-based asset management. Two L.O.S. come into consideration for asset management. The most common is the community L.O.S. provided to residents, businesses and other customers. This L.O.S. is the standard expected of the service being provided. To ensure ease of understanding by taxpayers, such L.O.S. are normally clearly defined, for example:

- Residential street snow clearing - The minimum standard to address snow accumulation on a class 4 road (residential) is to provide a centre bare total lane width of at least (5) five metres within 16 hours while not exceeding a snow depth of 8cm.
- Potholes - If a pothole on class 4 road (residential) exceeds 1,000 square centimetres and a depth of 8cm the pothole must be repaired within 14 days.
- Sidewalks - If a surface discontinuity (trip hazard) on a sidewalk exceeds (2) two centimetres, the minimum standard to treat the surface discontinuity (trip hazard) is within 14 days.
- Street Sweeping - The minimum frequency for street sweeping Arterial and Collector roads is once every (6) six weeks.

The second L.O.S. is the technical L.O.S., which is what an asset is expected to provide in the way of performance. This L.O.S. is of more relevance internally to the City. For example, a stormwater pipe that has the capacity to convey a two-year storm. Technical L.O.S. support the delivery of City services.

L.O.S. standards are typically categorized into service attributes shown in Figure 9, which are the basis for understanding the impact of risk on L.O.S.

Figure 9 – Service Level Attributes

Service Level Attribute	Description
Available	Services provided at a level of acceptable capacity, convenience and accessibility for the whole community
Cost Effective	Services are affordable and provided at the lowest possible cost for both current and future customers

Reliable	Services provided at a predictable and continuous level
Responsive	Opportunities for community involvement in decision-making. Customers are dealt with fairly and consistently within acceptable timeframes with respect, empathy and integrity.
Safe	Services provision that minimizes health, safety and security risks
Suitable	Services are suitable for the intended function (fit with purpose)
Green	Services that take into account the natural environment

4. Lifecycle Management Strategy

The purpose of this section is to establish a set of planned actions to achieve the City's goal of providing L.O.S. in a sustainable way, while managing risk, at the lowest lifecycle cost.

At the City of Oshawa, asset management begins the moment the City plans for an asset. The City's approach has evolved over time and is still evolving. However, not unlike other municipalities, Oshawa's approach remains largely "greatest need first", which is designed to fix or replace assets in a priority sequence based on the condition and age of the asset.

This approach, coupled with aging infrastructure and increasing funding requirements to operate, maintain, renew and replace the City's assets, generally incurs the highest lifecycle costs.

Going forward, the City plans to achieve a more comprehensive and sustainable approach to asset management to improve decision-making, and reduce both risk and cost over the lifecycle of capital assets.

The following is a description of activities and practices currently used to assess asset condition, support lifecycle analysis, decide interventions and prioritization, determine risk and inform the City's capital and operating expenditures, and annual budgeting process.

Understanding Costs in Asset Management

Commissioning Cost – these are incurred at the beginning of the asset lifecycle, to obtain the asset and put it into operation.

Operational Cost – these are incurred during normal business operations of the asset.

Maintenance Cost – these are the result of maintaining the asset in order to keep it functioning and achieve the levels of service. It is a type of recurrent expenditure throughout the entire life cycle of the asset.

Renewal Cost – these are above and beyond every day maintenance including retrofits and upgrades that extend the life of the asset.

Replacement Cost – these are estimates related to the replacement of an asset at the end of its lifecycle.

Disposal Cost – these are for disposing or decommissioning the asset at the end of the asset lifecycle.

4.1 Lifecycle Management

Assets need to be managed over their lifetime. Infrastructure assets typically have a maximum service life after which costly capital renewal or replacement can be expected. As a result, it is possible to anticipate waves of capital renewal needs by reviewing the installation year of different asset classes. In addition to costly capital replacement and renewals, maintenance is also included in the planning for assets.

In the attached appendices, the lifecycle activities and expenditures associated with undertaking those activities, required over the next 10 years are detailed for the core assets. Future iterations of the A.M.P will show lifecycle activities for the entire portfolio of assets.

4.2 Non-Infrastructure Solutions

The following non-infrastructure solutions are in use at the City of Oshawa to help lower costs or extend the life of City assets:

- Oshawa Strategic Plan, Our Focus, Our Future, 2020-2023
- Financial Strategy, 2016-2019
- Official Plan
- Other master plans that provide for the comprehensive future planning of the City's infrastructure (e.g. Integrated Transportation Master Plan and the Active Transportation Master Plan)
- Use of Lean methodologies to improve efficiencies, effectiveness and control costs at the operational level
- Observed condition assessments (e.g. roads, bridges, culverts, and facilities)
- Public consultation on municipal projects, land use developments and budget priorities
- Use of design standards
- Inspections
- Coordination of efforts between governments and agencies regarding timing of construction
- Employee training and education programs
- Ongoing efforts to identify additional funding sources

4.3 Asset Management Activities

Applicable to all asset classes, the City has identified subject matter experts. Finance

staff plays an active role in all aspects of asset management. As well, in an effort to minimize redundancy, the City has identified who is accountable and responsible for the maintenance of assets at the strategic, tactical and operational levels. Figure 10 provides an example of this level of information specific to roads, one of the City’s core assets.

Figure 10 – Asset Managers - Roads

Level	Function	Who	What
Strategic (Long-term)	Set the asset strategy and plans and ensure cost and performance meets the wider business requirements	Director, Engineering Services Director, Planning Services	Big Picture Growth Plans
Tactical (medium-term)	Systematic responders, condition, cost effectiveness, safety, LOS	Engineering Program Technologist	Annual Overlay and Reconstruction
Operational (short-term)	Responds to operational demands of maintenance (primarily reactive and preventative decisions)	Works Supervisor, Road Maintenance	Reactive daily work and preventive maintenance

The City also currently undertakes various activities to manage assets throughout their lifecycle. A registry of activities by asset class is presented in Figure 11.

Figure 11 – Registry of Oshawa Activities by Asset Class

Asset Class	Activities
Land	Official Plan, Master Planning, Environmental Assessments, Central Lake Ontario Conservation Authority (CLOCA) Natural Heritage Mapping, Bylaws, Real Estate Policies, Condition Assessments, Budgeting, Capital Planning, Municipal Consent, Change Management (General Real Estate and Development Transactions)
Land Improvements	Master Plan Update, Connectivity Analysis, Official Plan Review, Active Transportation Master Plan Update, Growth & Development Review, Design Criteria Review, Design, Grading Review, Width Analysis, Amenity Coordination, Candidate Identification, Budgeting/Forecasting, Inspection, Vegetative Studies, Infill, Maintenance, Renewal, Replacement, Expansion, Snow Removal, Brush/Grass Trimming, Line Painting
Buildings	Master Plan Update, Budgeting/Forecasting, Inspection, Maintenance Renewal, Replacement, Aesthetic Upkeep
Machinery & Equipment	Master Planning, Budgeting/Forecasting, Needs Assessment, Condition Assessment, Daily Operations, Testing and Certification, Planned/Unplanned Maintenance, Renewal, Replacement, Expansion, Disposal
Vehicles	Budgeting/Forecasting, Inspection, Maintenance, Renewal, Replacement, Disposal, Periodic Mandatory Commercial Vehicle Inspection
Furniture	Master Planning (space planning), Budgeting/Forecasting, Procurement, Aesthetic Upkeep, Maintenance, Ergonomic Assessment, Accessibility Requirements, Customization

Linear Assets Official Plan Review, Transportation Master Plan Update, Growth & Development Review, Design Criteria Review, Design, Observed Data Collection, Needs Analysis, Budgeting/Forecasting, Inspection, Maintenance, Renewal, Replacement, Expansion Snow/Refuse Removal, Brush/Grass Trimming, Road Occupancy Permits, Line Painting, Brush/Grass Trimming, Animal Control & Removal

Other Assets Master Planning, Budgeting/Forecasting, Needs Assessment, Condition Assessment, Daily Operations, Testing and Certification, Planned/Unplanned Maintenance, Renewal, Replacement, Expansion, Disposal

Additional opportunities also exist, including possible procurement methods. These are presented under the following five categories:

Maintenance

- More inter-municipal bundling of existing contracted maintenance services

Renewal/Rehabilitation

- More inter-municipal bundling of renewal/rehabilitation contracts
- Early tender approval for all capital related projects
- Approval of multi-year projects for renewal/rehabilitation contracts
- Increase the use of renewal and rehabilitative strategies over reactive and replacement strategies using lifecycle cost analysis

Replacement

- More inter-municipal bundling of replacement contracts
- Early tender approval for all capital related projects
- Treatment timing and optimization of the investment and coordination of work among asset classes internally and with external agencies

Expansion

- Comply with legislation to include all Development Charges By-law listed projects into the A.M.P., including whole lifecycle costing

- Continue to align expansion plans to the City's Official Plan, Oshawa Strategic Plan and Financial Strategy

Disposal

- Analyze entire asset registry for surplus/redundant assets

4.4 Procurement

The City's Purchasing By-law 45-2016, which underwent an update and revision in 2020, is publically available on the City's website at <http://www.oshawa.ca/city-hall/Purchasing-Information.asp>.

The By-law provides the authority and guidelines to conduct purchasing transactions to satisfy the needs of the City ensuring fair and open competition and using a variety of source selection methods under varying market conditions. In future, the City should, for example, investigate joint co-operative purchasing with purchasing co-operatives, as well as alternative financing and procurement options with regard to capital purchases.

4.5 Risk Management

The City updated the Corporate Risk Management Policy and process in 2017 including a corporate risk management framework which provides guidance and support for risk-based asset management.

Infrastructure risk management is the process of identifying and mitigating risks for existing infrastructure that may affect the ongoing delivery of services at specified L.O.S. Risk management is an integral part of leading-practice lifecycle asset management as it enables fair and equal analysis of different assets with different needs and priorities.

Risks associated with asset management include, for example:

- A.M.P. is not kept up-to-date or followed
- Infrastructure failure and associated liability
- Inadequate funding
- Inadequate or poor quality asset information
- Incorrect assumptions
- Unaware of regulatory requirements or changes
- Climate change

- Growth projections do not meet expectations

Any approach that the City takes with respect to the management and maintenance of its assets involves the acceptance of a level of risk. Rarely, if ever, can an organization mitigate all risks. Risk management entails understanding the risk profile in the asset portfolio and establishes strategies to manage the risk at acceptable levels. It is common for municipalities to keep costs low or constant and unwittingly assume more and more risk over time. Risk assessment is a valuable tool for asset investment prioritization and informed decision-making.

Asset risk arises from the potential of events or failures to occur, and will vary depending on the location, capacity, age and condition of the asset, and other factors. Risk is managed via processes in place that ensure maintenance and renewal intervention occur in an appropriate and timely manner. The calculation of risk exposure is a combination of two factors – likelihood of asset failure and impact of asset failure.

The likelihood of failure is the probability that an asset may fail within a year. Likelihood of failure can be determined based on capacity, efficiency, age, condition and L.O.S. The City estimates likelihood on a scale of one to five.

The second factor is the impact of failure on the City, which is the direct and indirect consequence if an asset failure were to occur. The City estimates impact using a one to five scale against a number of criteria including legal, environmental, reputation, health and safety, financial, etc. Where more than one criterion is applicable to an asset for a particular failure mode, the City will use the highest consequence of failure. This will take into account the greatest impact to the asset.

The risk score helps to prioritize where and how to focus City resources, including staff time for developing processes, collecting and analyzing data, and/or financial investment in assets and supporting systems. In prioritizing maintenance and renewal projects, generally preventive work should be prioritized over corrective work because preventive action will help delay the need for costly corrective maintenance. This reduces the risk of increased lifecycle costs.

Budgeting constraints must also be taken into consideration when determining what priority projects can be executed in any given year. If funding is limited, the decision regarding which project to undertake should be based on risk of not meeting L.O.S. standards.

5. Funding Requirements

Asset management is closely integrated with the City's Financial Strategy and the annual budgeting process. The Oshawa Financial Strategy 2016-2019 identifies "Infrastructure Investment" as one of five strategic areas.

5.1 Infrastructure Investment

Goal

Ensure long-term planning and commitment of adequate funds to build, maintain and renew City infrastructure including addressing the existing infrastructure funding gap to protect the City's investments and ensure infrastructure continues to meet the needs of the community within the financial capacity of residents and businesses.

It also contains many strategies found within the other four strategic areas dealing with reserve funds, debt management, revenue sources and operating costs that directly or indirectly relate to asset management.

Sustainable financing strategies are a key component of an A.M.P. As such, this section discusses capital expenditures, revenue sources and funding shortfalls.

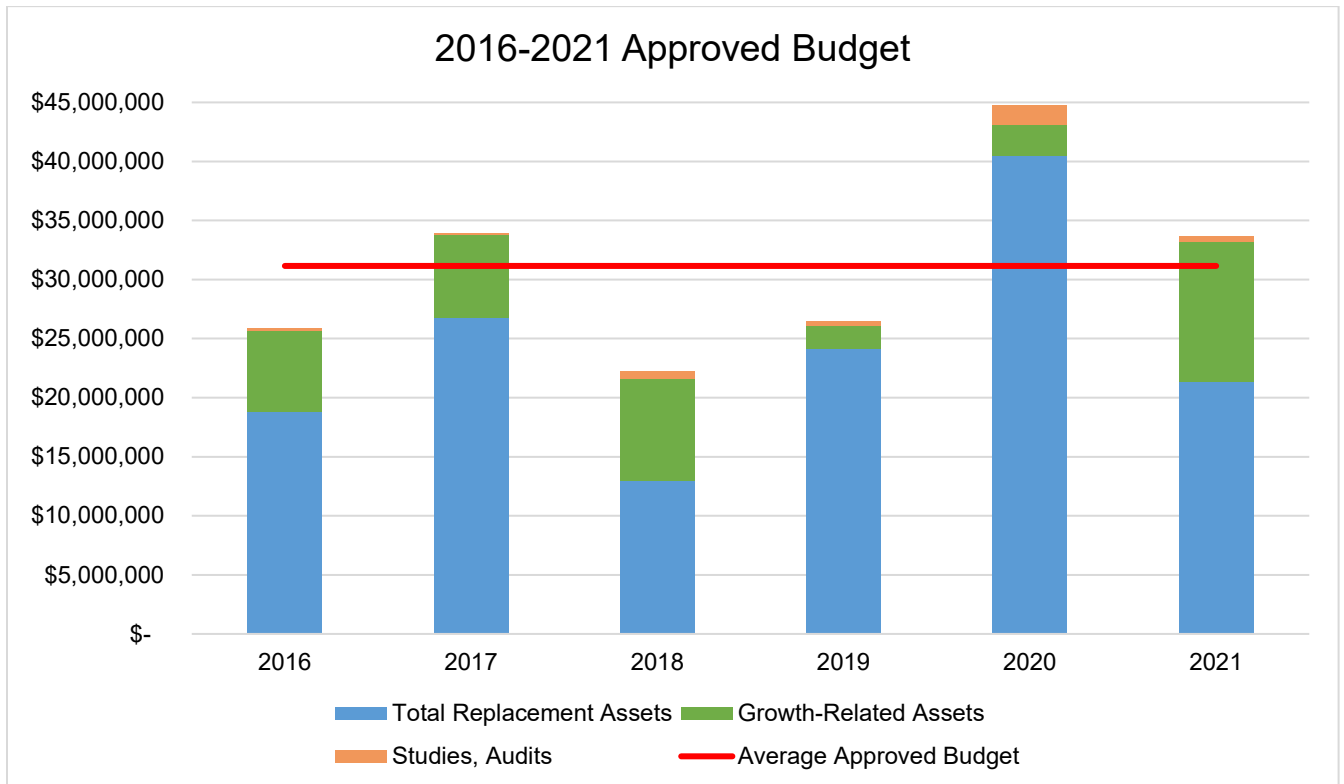
5.1 Expenditures

The annual capital budget submission to Council, including a nine-year expenditure forecast, is created as a result of extensive analysis of capital infrastructure needs. Projects are identified by staff and then are prioritized using the Capital and Major Initiative Prioritization Model within the available funding.

The prioritization model is used to objectively evaluate and prioritize projects to ensure the City's limited financial resources are allocated to the City's highest priority projects. The model aligns with the City's strategic goals, risk management framework and sound financial principles. The model includes the following scoring criteria: project category; alignment with the Oshawa Strategic Plan; operating budget impact; risk assessment; financing; cost/benefit; service levels and community/corporate economic impact. The model will be further revised with the completion of this A.M.P. and utilized to assist in determining future budgets.

The average total approved budget from the past six years is \$31.2 million. This not only includes the costs for replacement assets, but also includes growth-related assets, as well as various studies and condition audits. This may not be indicative of the future investments required, as past approved budgets have included financial and human resource constraints. Figure 12 below represents the approved annual budget for 2016 to 2021.

Figure 12 – 2016 to 2021 Approved Budget Summary



5.2 Revenues

Infrastructure service levels must be balanced against the availability of funding. Presently, Oshawa’s infrastructure investment is funded by internal sources for all asset classes (tax levy dollars, reserves and reserve funds, as well as debt) and external sources (federal and provincial grants, federal gas tax, development charges, as well as user fees). As most funding comes from the community via property taxation, increases must be kept within reasonable levels. For this reason, a long-term outlook is essential, including a clear understanding and further development of financial policies that support long-term planning and sustainable funding of the City’s infrastructure.

This issue has recently been clarified by the Association of Municipalities of Ontario

(AMO), which, as a result of polling, says that 76% of Ontarians are concerned or somewhat concerned property taxes will not cover the cost of infrastructure while maintaining municipal services. In addition, 90% of Ontarians agree maintaining safe infrastructure is an important priority for their communities. AMO goes on to say that a ten-year projection (2016-2025) of municipal expenditures against inflationary property tax and user fee increases shows there to be an unfunded average annual need of \$3.6 billion to fix local infrastructure and provide for municipal operating needs. AMO's goal is to close the fiscal gap so that all municipalities can benefit from predictable and sustainable revenue to finance the pressing infrastructure and municipal service needs faced by all municipal governments.

The Province is encouraging municipalities to be “open to all available revenue and financing tools and to revisit their policies regarding user fees.” In response, the City will need to give consideration to new user-fee based initiatives. For example, some municipalities have successfully transferred the storm water management function from a property tax funded program to a user based funded program. This funding model allows the municipality to fund a service directly that is typically underfunded.

There are several revenue sources that the City's utilizes to fund replacement and rehabilitation of existing capital infrastructure:

5.2.1 - Tax Levy Funding

Tax levy funding for existing capital can be levied in the current budget year to be used directly to fund capital projects. The six year historical average annual contribution from tax levy funding is approximately \$1.4 million (includes D.C. leveraging). It is important to note that the reliance on this funding source has continued to decrease since 2018, with 2021 approved tax levy funding of only \$350,000.

5.2.2 – Tax Levy Funded Reserves

The City of Oshawa does annually contribute to reserves to fund current and future capital investments. The 2021 budget included a contribution to infrastructure reserves in the amount of \$8,146,100. These reserves can be utilized to fund current year capital projects or remain in the reserve for future use. With the process of contributing amounts annually, instead of utilizing tax levy funding for capital directly, this assists with a providing stable amount to be levied in the budget.

5.2.3 – Canada Community-Building Fund

The Canada Community-Building Fund (C.C.B.F.), previously known as the Federal Gas Tax Fund is a permanent source of funding provided to municipalities to support local infrastructure priorities. Municipalities determine how best to direct funds to make strategic investments across several different project categories, such as local roads and bridges, stormwater, sport and recreation, community energy systems, and capacity building. The current agreement with the Government of Canada is up to March 31, 2024 with the average annual payment just above \$5.0 million. Although this has been a stable source of funding historically, it is important to note that the agreement includes a clause that the agreement may be terminated with two years written notice. Therefore, there is an element of risk if the C.C.B.F. funding is included as a funding source to support the sustainable investment of the City's assets.

5.2.4 – Development Charges

In addition to maintaining the City's existing infrastructure, the City needs to build new infrastructure including roads, bridges, parks, trails, recreation facilities and fire halls to service growth related needs. While development charges paid by developers cover a large portion of the City's growth related capital costs there is still a significant portion that municipalities must fund, in addition to the operating costs required to service new growth.

5.2.5 - Grants

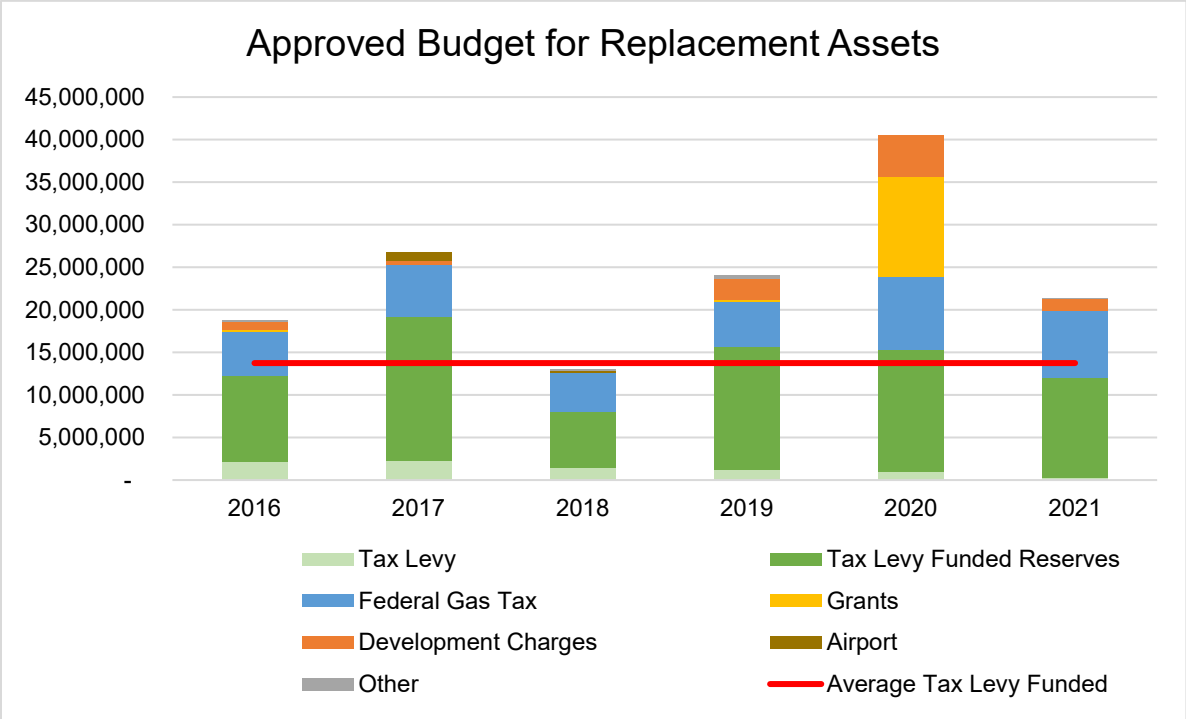
Both the Provincial and Federal Governments have grant programs available to assist local government sustain their infrastructure needs. When opportunities become available, the City will apply to grant programs for specific capital projects that fall within the criteria of the grant program. Although when grant funding is awarded to the City, this does assist with investing in the City's assets, it is considered to be a one-time funding source that cannot be relied upon for future funding.

5.2.6 – Other Funding Sources

There are various other funding sources that can be utilized to assist with funding infrastructure projects. The majority would be contribution from others, such as developers, property owners, partners and the projects delivered jointly with the Region of Durham. These sources are also considered to be one-time funding sources and cannot be used in future planning of funding infrastructure.

Figure 13 shown below provides a summary of the approved budget from 2016-2021 for replacement assets by funding source. The average tax levy funded portion over these six years was \$13.7 million. This includes annual capital tax levy funding, as well as utilizing tax levy funded reserves.

Figure 13 – 2016-2021 Approved Budget for Replacement Assets



5.3 Funding Shortfall

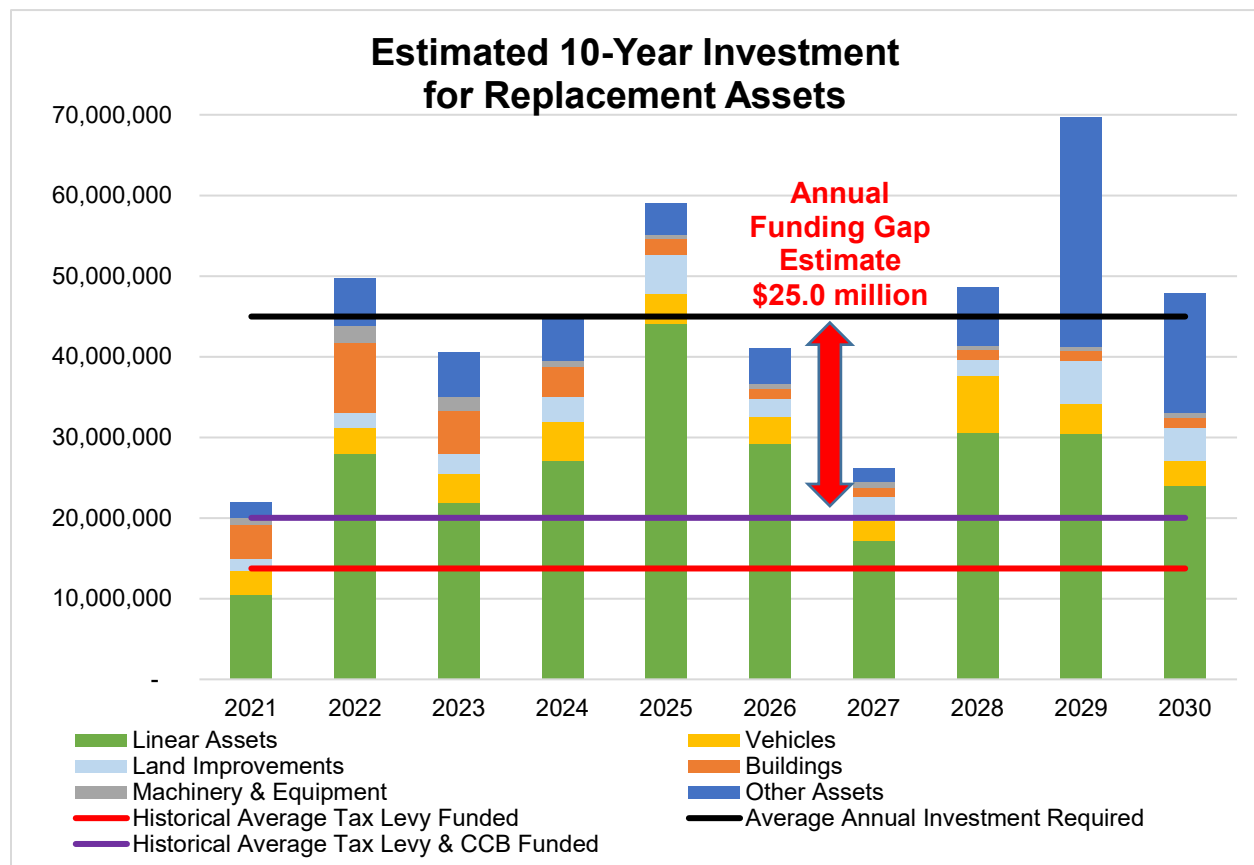
Oshawa has a practice of making annual contributions to the capital program for asset replacement. This contribution only partially satisfies capital infrastructure needs. Further, in accordance with the Development Charges Act 1997, Regulation 82/98 as amended in 2015, the City will need to respond to the requirement to demonstrate that all the assets mentioned in the City’s Development Charge Background Study are financially sustainable over their full lifecycle. This will provide an opportunity to better plan for the City’s long-term infrastructure investments.

Based on the lifecycle activities required for the core assets and including the 2021 10-year capital budget forecast for all other assets, the average annual investment required is \$45.0 million, represented by the black line in Figure 14.

The past six year approved budgets has provided an average annual investment from Tax Levy Funding and Tax Levy Supported Reserves in the amount of \$13.7 million. Canada Community Benefit (C.C.B.F.) funding is also a significant funding source for capital. The City has utilized approximately \$6.3 million per year for a total average annual funding of just over \$20.0 million when C.C.B. is included. This federal funding has been a stable funding source in the past, but it needs to be noted that the C.C.B. funding program could be cancelled at any point in the future. Therefore, caution should be taken if this funding is included with planning for infrastructure sustainability.

The estimated annual funding gap over the 10-year period based on historical funding is \$31.2 million when utilizing City only funds and \$25.0 million when the C.C.B.F. funding is taken into consideration.

Figure 14 – Estimated 10-Year Investment for Replacement Assets



6. Conclusion

The City proudly manages its assets in a responsible manner. This level of responsibility has been enhanced with the new provincial requirement for municipalities to develop A.M.P.s under O. Reg. 588/17 - Asset Management Planning for Municipal Infrastructure. Asset management requires a thorough understanding of the characteristics and condition of infrastructure assets, as well as the service levels expected from them. It also involves setting strategic priorities to optimize decision making about when and how to proceed with investments. Finally, it requires the development of a financing strategy, critical to putting the A.M.P. into action.

This A.M.P. is a living document, which is based on currently available information with improvements expected in future updates. To maintain existing momentum around asset management, a key focus in the short-term will be on improving staff, Council and the community's overall understanding and value of asset management. This will go a long way to incorporating asset management into the City's culture. Attention will be given to sharing and progressing on the detailed asset management roadmap, recognizing and responding to the changes required to processes, policies and procedures, and improving asset management data and information, including observed condition data.

There will also be significant effort engaging the public and City Council on determining the proposed levels of service related performance measures and developing more fulsome A.M.P.s that provide the required analysis for the most efficient decisions per asset class. A full asset management analysis will be completed at least every five years.

As the City's asset management capability improves, the City will gain an enhanced ability to make informed decisions, and be able to support requests for senior government infrastructure funding. Achieving this will go a long way to support Oshawa as a prosperous, collaborative, vibrant, inclusive and green city where people and businesses are proud to live, work, learn and play.

7. Recommended Actions

This is the City's second comprehensive asset management plan covering the City's assets. As the A.M.P. is a living document, it will continually be updated and built upon.

This version is considered to be Phase 1, which focuses on the City's core assets, consisting of roads, structures and stormwater assets. The scope and depth of the A.M.P. will need to increase to include an in-depth report on all of the non-core assets in phase 2. The final and most significant phase builds on the A.M.P. to include the proposed levels of service, which includes a lifecycle management and financial strategy that supports the proposed levels of service.

To ensure that these future phases of the A.M.P. are meaningful documents that support the City's ability to build a strong asset management program, the following items should be considered:

1. Investigate the efficiencies of combining all inventory listings across the City into one central asset repository. The inventory listing and detail for financial reporting purposes should be combined with the detail for A.M.P. to avoid duplication of work. Growth related assets should be added to the central asset repository.
2. The City should investigate options to implement an asset management/decision support software that can be utilized for all City assets.
3. Develop and document reliable replacement values for all assets, as well as a processes to calculate and update estimated replacement costs.

The replacement cost for several groups of assets have been estimated based on historical cost of construction/acquisition and inflated to the current year. This may not be an accurate reflection of current replacement cost due to changes beyond inflation, such as changes in construction costs or technology. Replacement costs should be updated based on current benchmark costs for similar assets. The asset groups required to be updated are: airport runways, watercourse improvements, software, equipment, parking meters, furniture, library collection, streetlights, lighting, traffic control signals, and barriers.

4. Develop a method for assessing the condition of all assets. The condition of some asset groups have been estimated based on age, where direct observation was not available, such as stormwater assets. Future iterations of the A.M.P. will strive to have more observed condition assessments. E.g. use of C.C.T.V. inspections for assessing stormwater mains.

5. Develop a methodology for tracking and reporting on the performance metrics of:
 - Percentage of properties in the City resilient to a 100-year storm, and
 - Percentage of the City stormwater management system resilient to a 5-year storm
6. Investigate best practices of including natural and green infrastructure, such as the major drainage system for overland flow routes within creeks, ditches, open spaces and parkland channels.
7. Further revise the Capital and Major Initiative Prioritization Model as the City's A.M.P. evolves in order to provide more information for scoring and prioritizing capital projects, based on the efficient use of funds.
8. Expand the asset management program to identify the steps being taken to ensure climate change strategies have been considered to assist with the resiliency of the infrastructure.
9. Develop and implement a change management framework for implementation across the organization, inclusive of Council, to further an understanding of the importance of asset management.
10. Establish a process to capture the expenditure break-down of non-infrastructure solutions, maintenance, renewal, replacement, expansion and disposal activities in the A.M.P.
11. Identify legislated and proposed levels of service (LOS) for asset classes and create a central LOS database with appropriate key performance indicators (KPIs).
12. Ensure the importance and value of the City's A.M.P. are communicated to the community on an on-going basis as a direct input to the Financial Strategy and annual budgeting process.
13. Review the alignment of the T.C.A. useful life for financial reporting purposes compared to the asset service life (lifecycle) and make revisions where required.
14. Further the use of net present value analysis of asset renewal options.
15. Continue to ensure asset management is aligned with the implementation of the Financial Strategy.
16. Continue to seek senior government funding for infrastructure projects and develop a list of shovel ready projects in order to be prepared when grant opportunities arise.
17. Continue to develop the asset management program by documenting and

formalizing roles and responsibilities within the various levels of the organization. Begin to incorporate the responsibilities into the job descriptions of the applicable staff.

18. Continue to develop, document and implement lifecycle operations, maintenance and renewal programs and strategies for asset classes to develop a consistent and proactive approach and incorporate into future investment needs forecasts.
19. Continue to align the reporting of assets between the Development Charge Background Study and the A.M.P., as per the Development Charges Act 1997, Regulation 82/98 as amended in 2015.
20. Continue to integrate Asset Management outputs into key planning documents to ensure the documents are used in the preparation of the A.M.P.
21. Continue the staff-based Asset Management Team to further collaboration and communication between departments.
22. Continue to investigate joint co-operative purchasing, as well as alternative financing and procurement options with regard to capital purchases.
23. Continue to improve the accuracy and replicability of the City's asset management data.
24. Review staffing levels required to support Asset Management.



Appendix A

City Roads



October 25, 2021

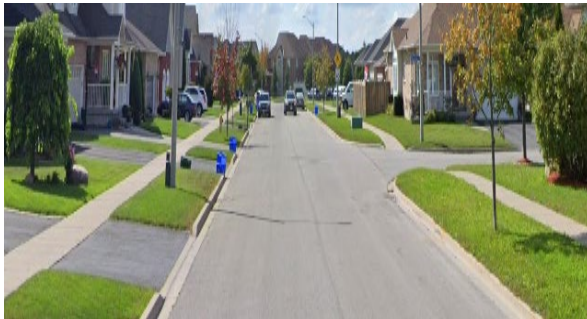
Roads

Description of City Roads

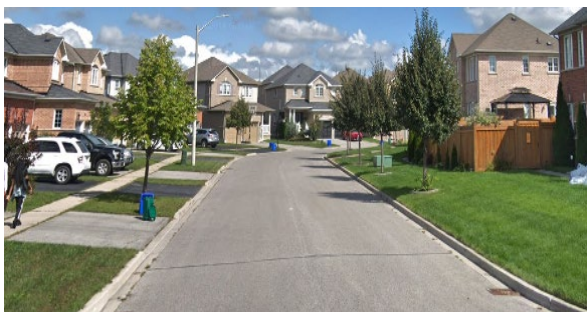
Arterial Road Example



Collector Road Example



Local Road Example



The City owns and maintains a network of arterial, collector, and local roads which provide the service of transportation and connect to the transportation networks of the Region of Durham and the Province. The goal is to have a sustainable transportation system through:

- Improving mobility through connectivity, efficiency and safety
- Alleviating congestion
- Encouraging sustainability to both the long-term environmental and economic conditions

Table 5 of the City's Official Plan sets out the criteria for the classification of roads:

- Arterial Roads carry large volumes of traffic with a 2-4 lane cross-section that generally only intersect with collector roads and other arterial roads
- Collector Roads carry moderate volumes of short distance traffic and intersect with arterial and local roads
- Local Roads carry light volumes between points of origin and the collector roads systems

City staff strive to manage the roads as a complete street approach with respect to the rehabilitation and reconstruction of City owned assets in the road right-of-way. This means less disruption to residents by completing works for sidewalk, curbs and gutters at the same time as completing the road work.

Roads

Inventory and Estimated Replacement Cost

Road Network by Class	Quantity (lane kilometers) ¹	Estimated Replacement Cost ¹
Arterial	223.2	\$301,118,339
Collector	154.7	\$228,433,981
Local	839.0	\$917,874,743
Total Roads	1,216.9	\$1,447,427,063

Road Network by Surface Type	Quantity (lane kilometers) ¹	Estimated Replacement Cost ¹
Hard Surfaces	1,119.6	\$1,301,261,531
L.C.B.	89.6	\$137,580,252
Unpaved	7.7	\$8,585,280
Total Roads	1,216.9	\$1,447,427,063

¹ As per the boundary road agreements currently in place, all boundary roads have been included at 50% of both the lane kilometer and estimated replacement cost. The municipality that shares the boundary reports the remaining 50%.



Inventory is collected, tracked and maintained through the Geographic Information System (G.I.S).

The City owns a total of 1,216.9 lane kilometers of roads, comprising of:

- 223.2 lane kilometers of arterial roads
- 154.7 lane kilometers of collector roads
- 839.0 lane kilometers of local roads

Estimated replacement values are based on a 3-year rolling average of unit costs, reflecting recent road construction contract costs that considers inflation, quantities, type of material, environment or location, type of construction/installation method and various other factors.

The total estimated replacement cost of the road network is \$1,447,427,063 based on 2020 dollars.

The City also tracks the roads by surface type:

1. Hard Surfaces, which includes H.C.B. (high class bituminous) which represents 75% of the road network and I.C.B. (intermediate class bituminous)
2. L.C.B. (low class bituminous, also known as surface treated)
3. Unpaved Roads, such as gravel roads

Roads

Average Age and Asset Installation Profile

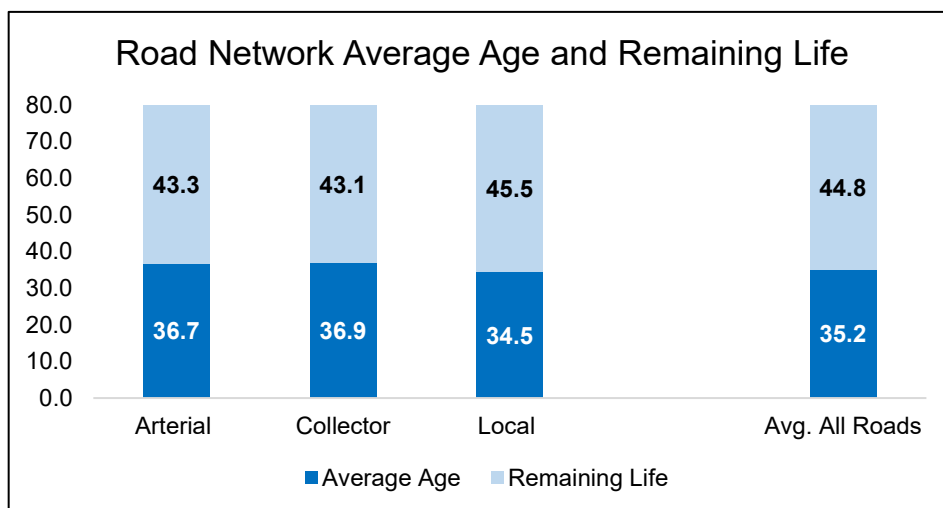


Age is based on initial construction year and tracked by the different components within the road network. The average age of the City’s road network, based on the granular road base year, is 35.2 years and is broken down by Road Class:

- 36.7 years for Arterial Roads
- 36.9 years for Collector Roads
- 34.6 years for Local Roads

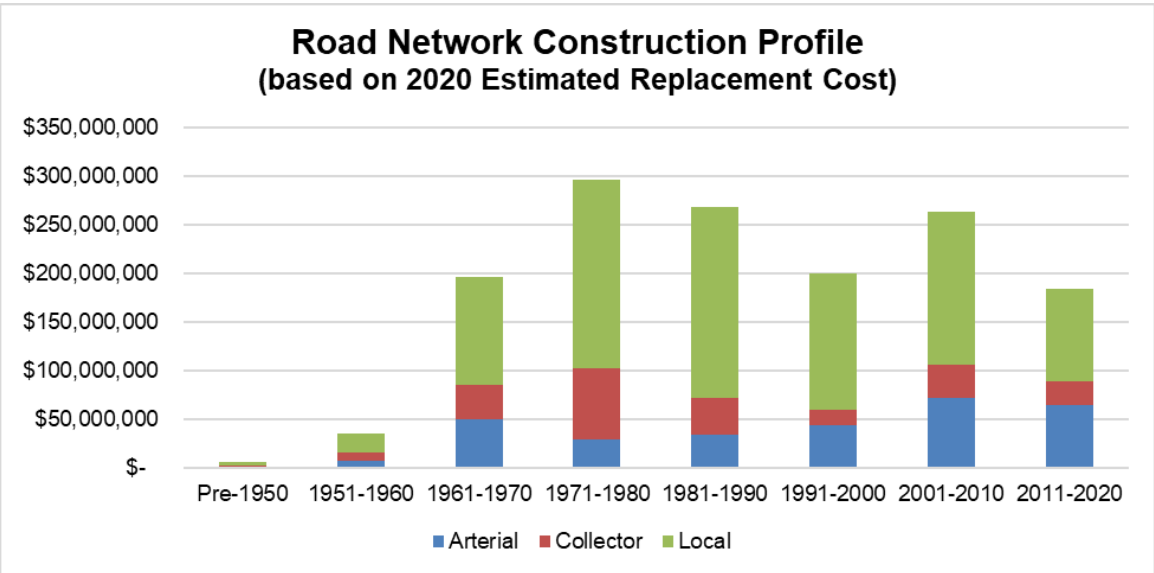
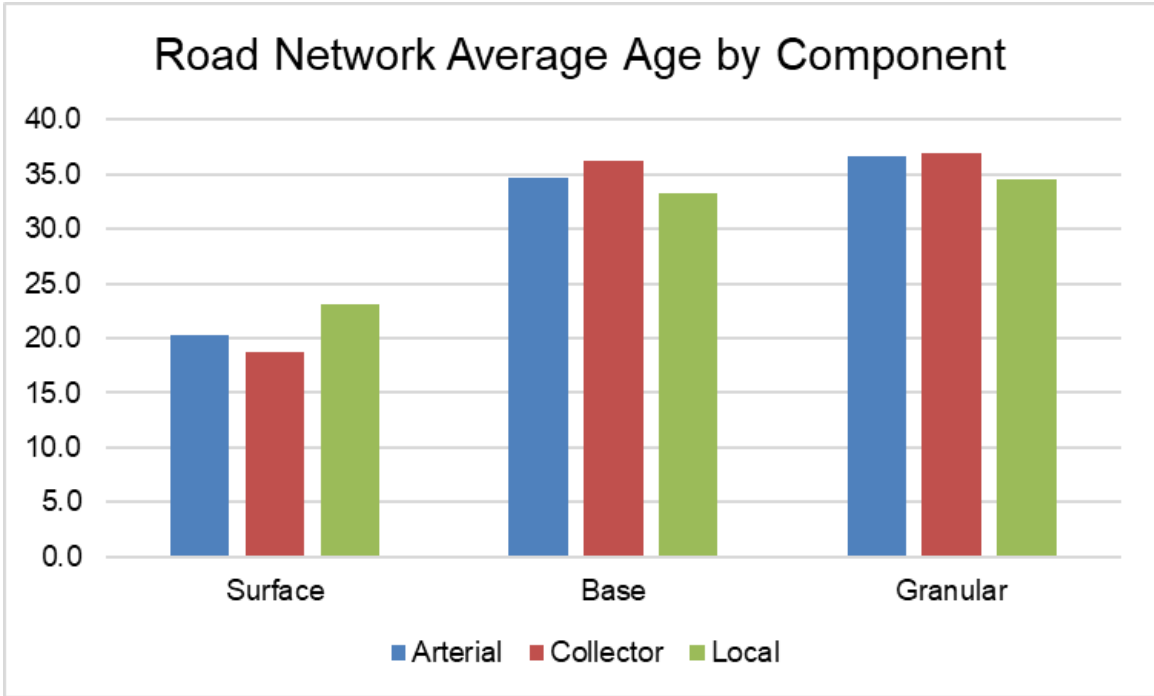
The service life of roads as a whole asset is estimated at 80 years, The target of 80 years includes applying asset management lifecycle maintenance and renewal treatments at the appropriate time during the lifecycle of the road (see lifecycle section).

If funding limitations exist and the lifecycle activities are not able to be completed, the road would have an estimated life of 50 years. This would not only reduce the life of the asset, but would also involve a more invasive and costly treatment for the eventual replacement of the road. It would also reduce the level of service, have more frequent replacements and result in higher total costs of ownership over the lifetime of the roads.



Roads

Average Age and Asset Installation Profile



Roads

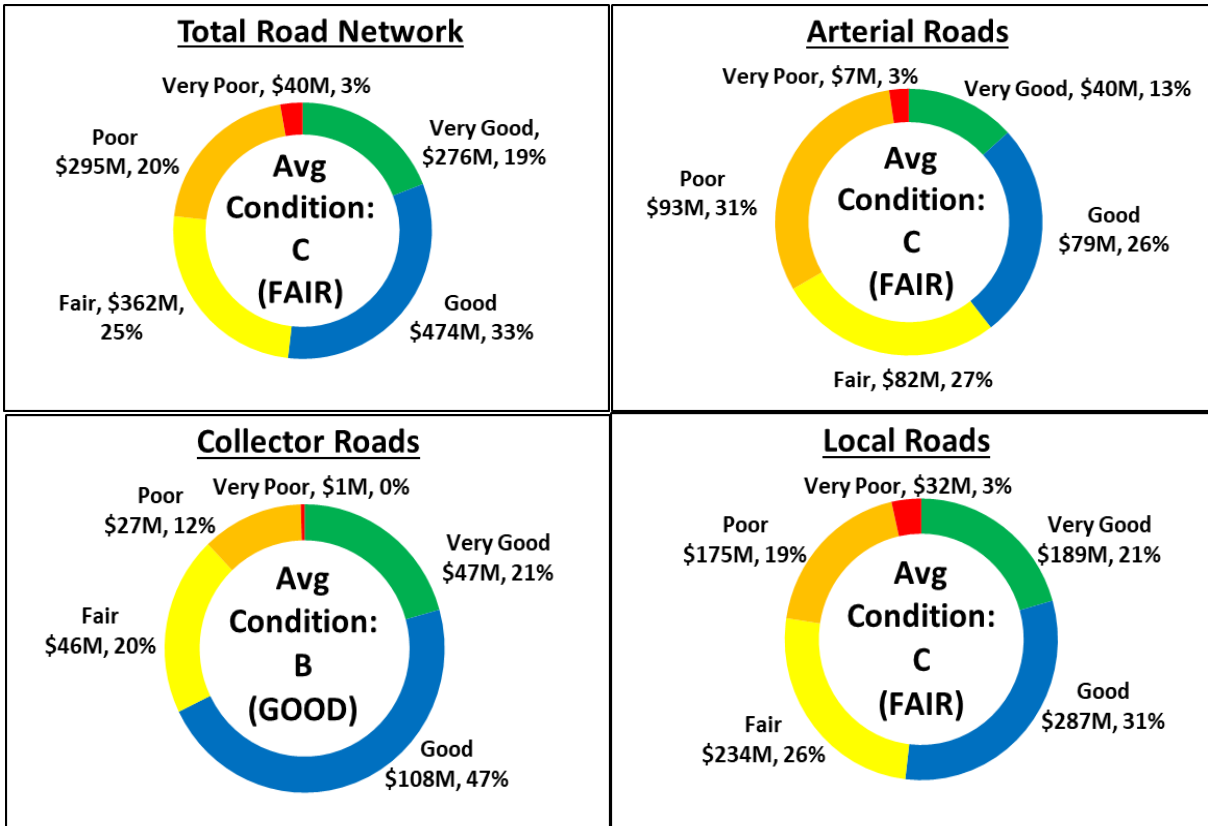
Condition

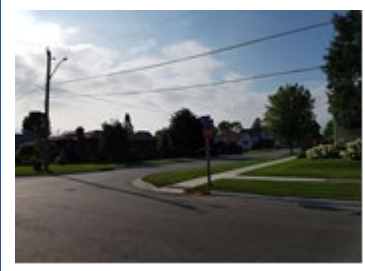





The condition of the City’s roads are assessed for structural adequacy and pavement surface condition. One-third of all the City’s roads are inspected annually. Condition assessment results are calculated into a Pavement Condition Index (P.C.I.) and then translated into a condition grade. The higher the index rating, the better the condition.

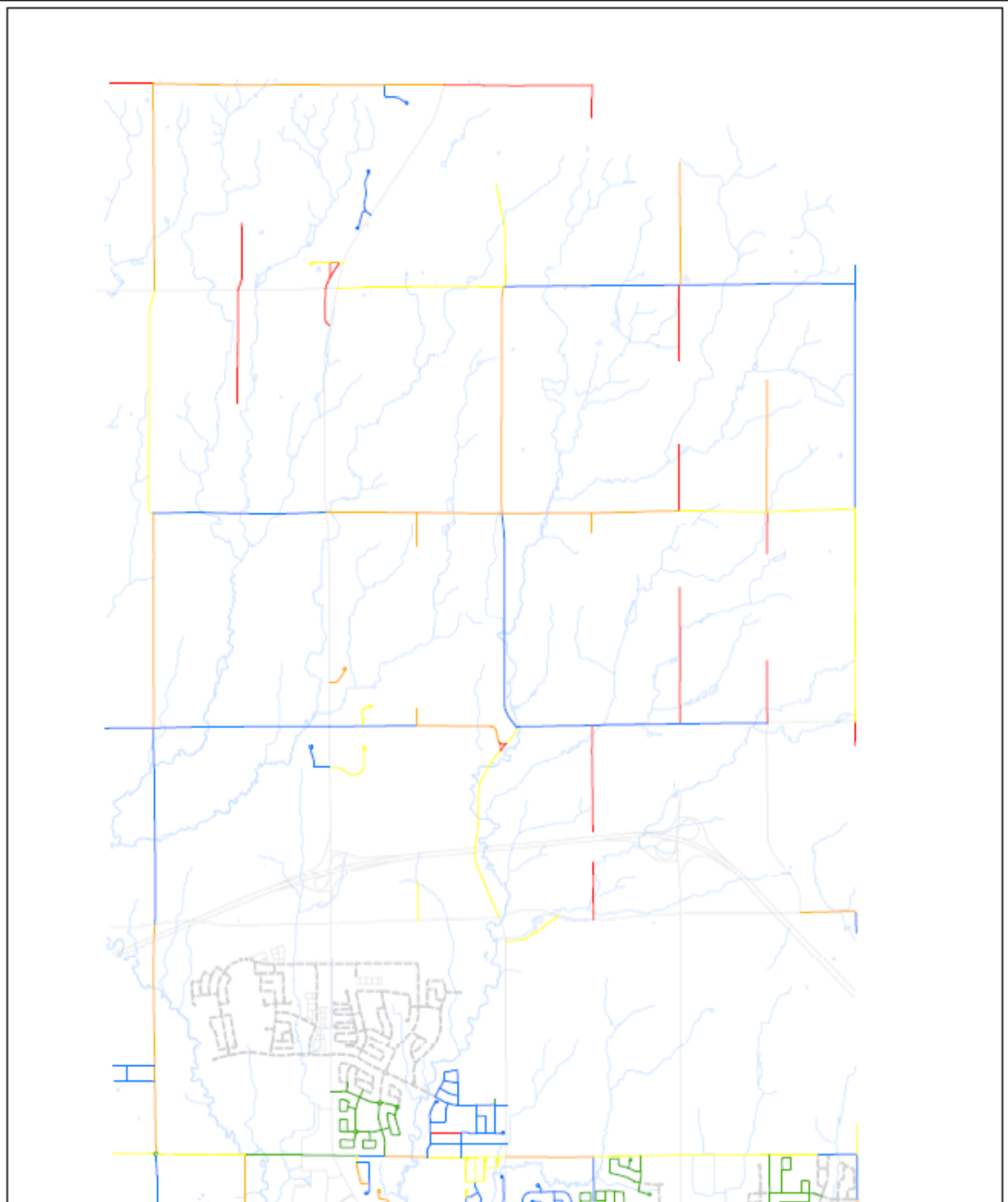
Overall, the City’s road network is at the very top end of FAIR condition (C Grade) with an average P.C.I. of 74.49

- C – Fair – Arterial Roads (P.C.I. of 69.58)
- B – Good – Collector Roads (P.C.I. of 80.58)
- C – Fair – Local Roads (P.C.I. of 74.59)



Roads				
Condition	Condition Rating	Grade	Category	Description
	90-100	A	Very Good	The roads are functioning as intended. Limited, if any, deterioration observed.
	75-90	B	Good	The roads are functioning as intended. No maintenance is anticipated within the next 5 years.
	60-75	C	Fair	The roads are functioning as intended. Normal deterioration and minor distress observed. Maintenance will be required within the next 5 years to maintain functionality.
	35-60	D	Poor	The roads are starting to not function as intended. Significant distress observed. Maintenance and some repair required within the next few years to restore functionality.
	0-35	E	Very Poor	The roads are not functioning as intended. Significant deterioration and major distress observed, with possible damage to the base. Requires immediate attention.

City of Oshawa Roads Network by Condition Map – North Extent



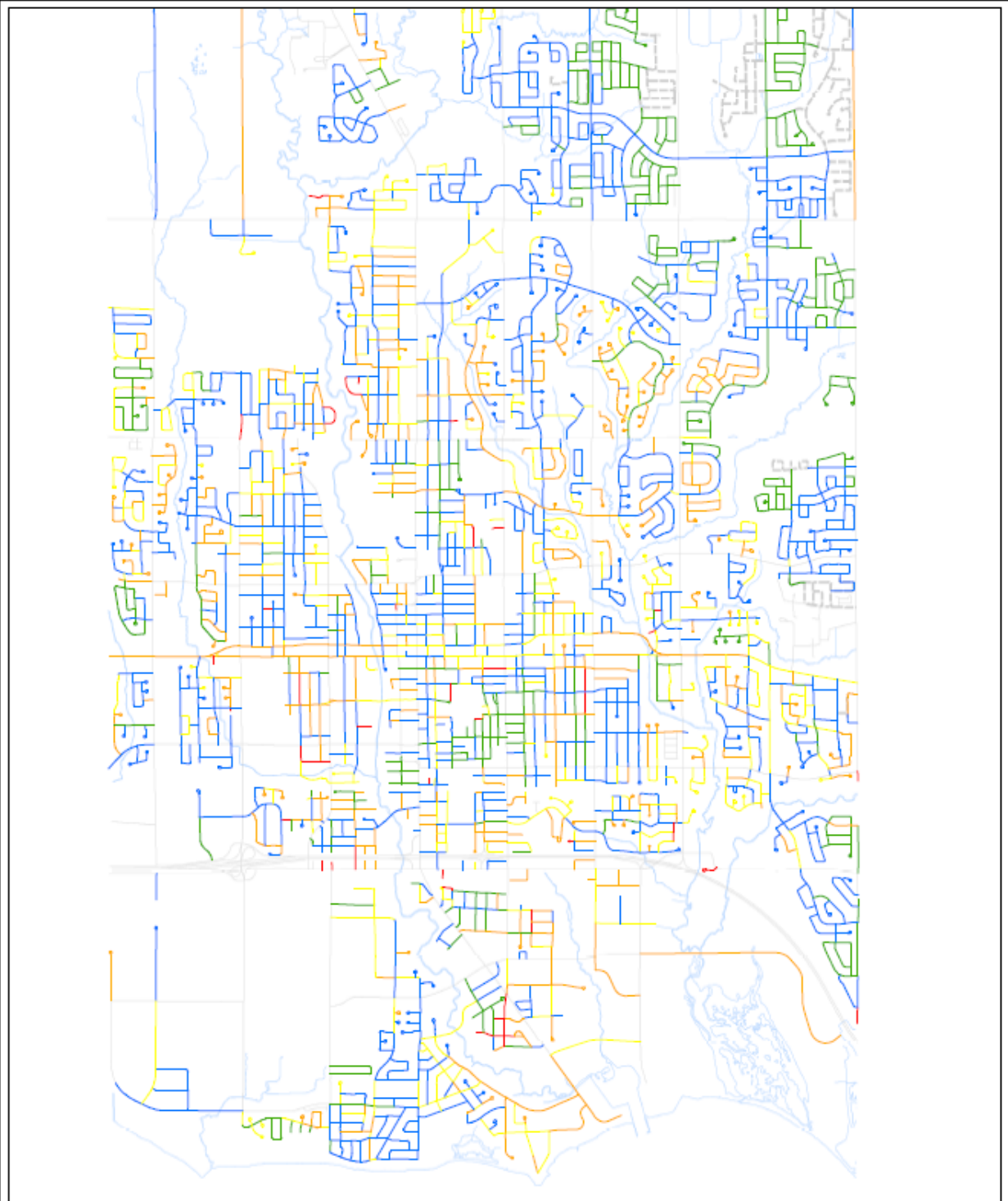
Road Asset Condition

August 2021
City of Oshawa
Development Services

Note: Road section may be partially assumed and partially unassumed. Road condition applies to assumed length.

0 0.5 1 2 Km

City of Oshawa Roads Network by Condition Map– South Extent



— Very Good	— Good	Road Asset Condition	August 2021 City of Oshawa Development Services
— Fair	— Poor		
— Very Poor	— No Condition		

— Unassumed Roads

Note: Road section may be partially assumed and partially unassumed. Road condition applies to assumed length.

0 0.5 1 2 Km

Roads

Current Levels of Service



Preliminary levels of service for the City’s roads are below. These were established based on:

- The Council approved Oshawa Strategic Plan 2020-2023
- Oshawa Financial Strategy 2016-2019
- Development Services Business Plan 2021
- Integrated Transportation Master Plan (2015)
- Ontario Regulation 588/17 and
- Other regulatory requirements and guidelines

Technical and Community based specific service levels and current performance are highlighted in the subsequent tables and sections below. City staff continually measure and monitor performance.

Moving forward, City staff will update levels of service and performance for the road network as a new Transportation Master Plan is contemplated, as well as other plans and studies are updated over time.

Road Network Levels of Service ¹	Business Plan Strategy ²	Oshawa Strategic Plan Theme ³	Oshawa Financial Strategy ⁴
Improve mobility (connectivity, efficiency and safety), alleviate congestion and encourage sustainability Planning and protecting for transportation infrastructure Safe and maintained roads with a smooth, safe riding surface Inspect, clean and maintain road network	Provide a safe, reliable and connected active and transportation network	Active, healthy and safe community Safe and reliable infrastructure	Infrastructure Investment Reserve Fund Operating Cost

Notes:

¹ Various Sources

² Development Services Department Business Plan 2021

³ 2020-2023 Oshawa Strategic Plan – Our Plan for Success

⁴ Oshawa Financial Strategy 2016-2019

Roads

Technical Levels of Service and Current Performance

Service Attribute	Technical Levels of Service ¹	Current Performance
Scope	Number of lane-kilometers of <u>arterial roads</u> as a proportion of square kilometers of land area for the City of Oshawa ²	1.6
Scope	Number of lane-kilometers of <u>collector roads</u> as a proportion of square kilometers of land area for the City of Oshawa ²	1.1
Scope	Number of lane-kilometers of <u>local roads</u> as a proportion of square kilometers of land area for the City of Oshawa ²	5.9
Quality	Average pavement condition index (P.C.I.) for <u>paved roads</u>	74.7
Quality	Average pavement condition index (P.C.I.) for <u>unpaved roads</u>	34.4
Quality	Percentage of Hard Surface roads that are in good or better condition (P.C.I. greater than 75)	56.2%

Note:

¹ Ontario Regulation 588/17, Asset Management Planning for Municipal Infrastructure

² Total land area for Oshawa is 143km²

Roads

Community - Current Levels of Service



One of the key customer focused community service levels the City provides is to improve mobility (connectivity and efficiency) and alleviate congestion on its road network.

The City strives to ensure the road network is a dynamic system whose connectivity is constantly evolving to meet the needs of the community. Connectivity throughout the City is managed and improved upon by assessing the density of connections, directness of links and identifying opportunities for creating a more accessible and resilient system.

Another key customer focused community service level is the provision of a smooth and safe riding surface through maintained roads.

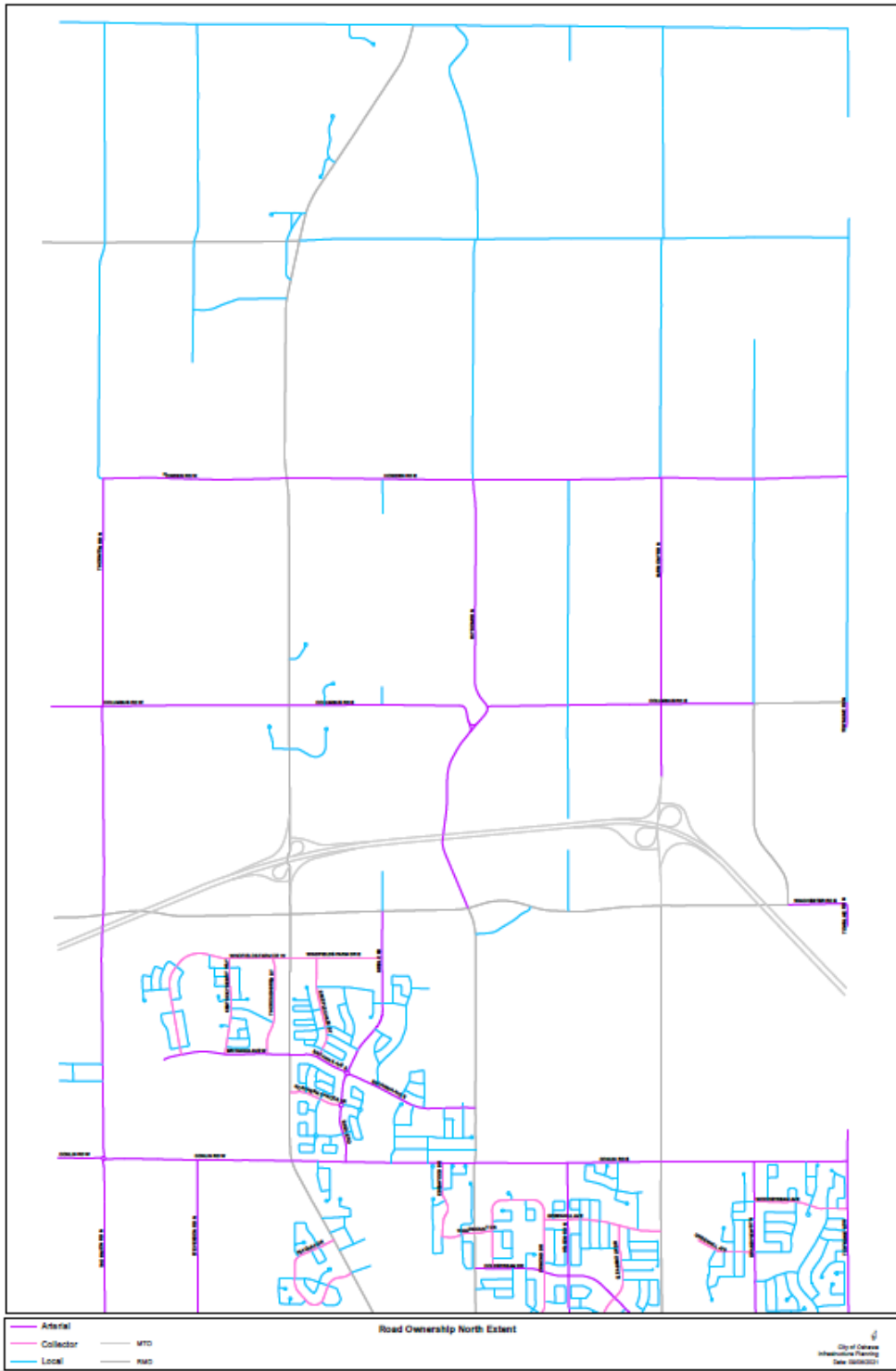
The City's road network has an average pavement condition index (P.C.I.) of 74.49 (out of 100), indicating an average condition rating of FAIR overall for the entire road network. This condition is bordering the line to be an average of GOOD overall. A description and images illustrating the different pavement conditions for the roads is identified under the condition section.

A map highlighting the City's road network and its level of connectivity is below. Also, the number of lane kilometers by type of road as a proportion of the City's land area is reported above.

Roads

Community - Current Levels of Service

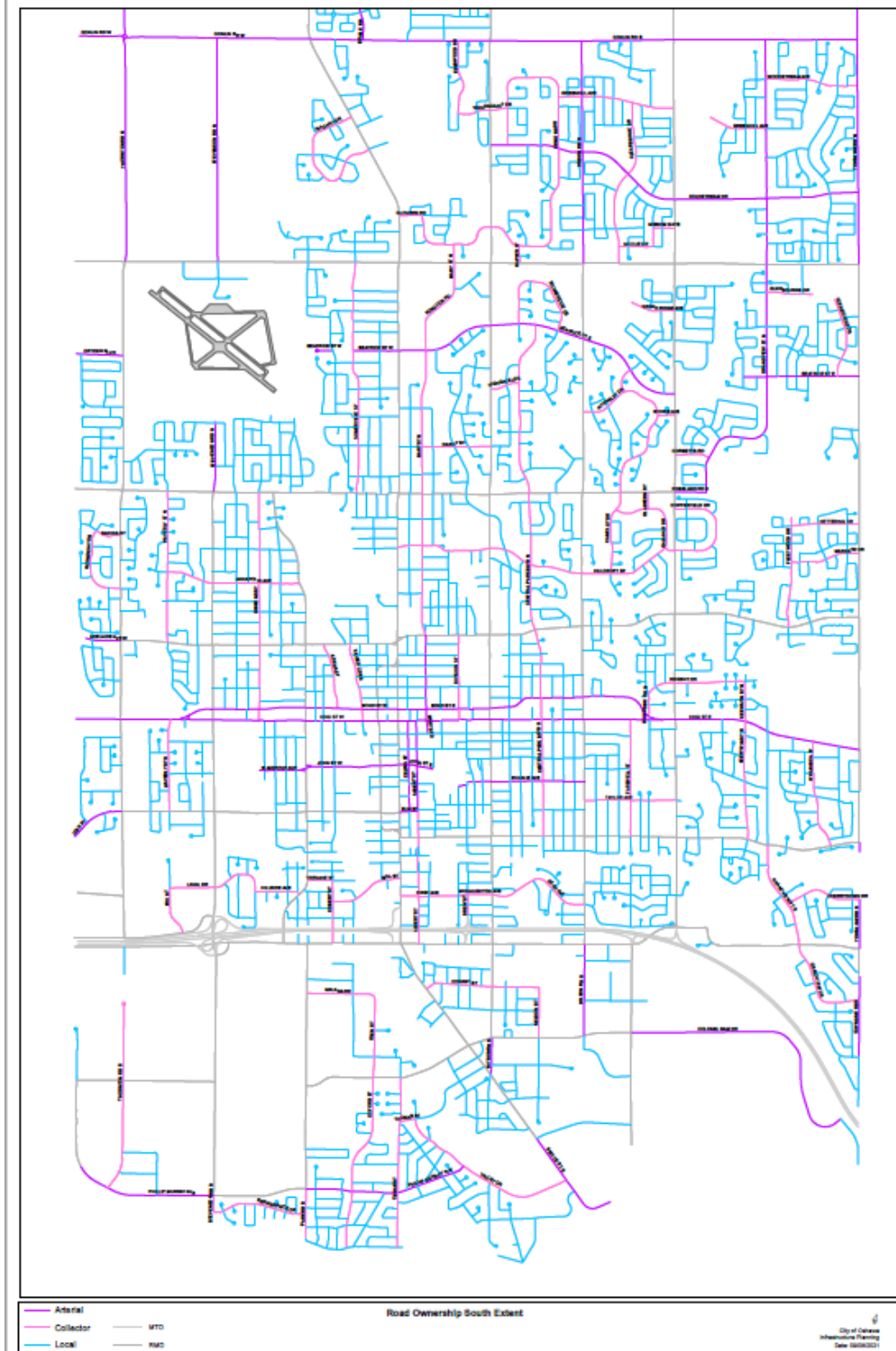
City of Oshawa Roads Network Map– North Extent



Roads

Community - Current Levels of Service

City of Oshawa Road Network Map– South Extent



Roads

Lifecycle Management Strategies

The City applies systematic processes that facilitates decision making for the construction, acquisition, operation, maintenance, renewal, replacement and disposition in the most cost-effective manner while considering whole life costs, climate change and adaptation and potential risks.

Statistical regression algorithms are utilized extensively in pavement engineering. Pavement deterioration is an important factor in evaluating and prioritizing pavement management and preservation projects. Using deterioration models generated by historical condition, can predict future condition and evaluate the effect of potential treatments showing the benefit over the whole life of the road. Focus is on advancing or refining life-cycle costing analysis, optimization algorithms and performance prediction methods.

Oshawa's roads are inspected for condition every 3 years, typically a third of the City is inspected annually. The condition data drives the candidate identification process where candidates (specific road segments) are grouped into intervention strategies of preventative, restorative, rehabilitative and replacement. Selection of candidates to build programs are a result of the City's in-house decision-support system which analyzes the best return on investment across all the strategies for all the candidates. The parameters of the analysis include condition, age, cost, budget constraints and level of service based on percentage of roads in adequate condition. The focus of the system's prioritization is on the benefit in years and cost impacts with the goal to catch roads before roads shift into the next more expensive and invasive strategy (i.e. From a Rehabilitative \$90 per square meter full depth removal to a Replacement that costs \$300 per square meter).

Oshawa does have an Arterial Roads Program which focuses on maintaining condition and serviceability of the arterial roads. This road program focuses on supporting the increase demands of growth, as the additional demand/use does accelerate deterioration of the road network.

The lifecycle management strategies that are currently used are:

- Preventative
- Restorative
- Rehabilitative
- Replacement

Roads

Lifecycle Management Strategies

1. Preventative – the strategy of preventative treatment is to prevent and/or minimize deterioration of the Roadway. The City plans on preventative lifecycle events primarily based on time.

Crack seal is practiced at 7 & 14 years to new paved surfaces (wearing course of asphalt). This treatment holds the roads condition on average for 2 years, extending the life. However, candidates can also be proposed by advancing preventative treatments based on in-field observations. Another preventative treatment is microsurfacing, this treatment holds the condition on average for 7 years. Microsurfacing is not a routine practice for Oshawa as it does costs significantly more since it treats the pavement with more of a blanketed approach, however this treatment will remain available.

2. Restorative – the strategy of Restorative treatments are to restore the right-of-way and improve serviceability using the existing design and standards.

The City plans on restorative lifecycle events primarily by condition, however age, roadside environment, demand/use and material play a factor. Mill and overlay is practiced when the road's condition falls between 55-70 P.C.I. which restores condition to a 90 P.C.I. This treatment replaces the wearing surface entirely, restores 10% of the base and typically yields a benefit of 20 years extending the life. There are other treatments that fall into this strategy however mill and overlay is the predominant treatment at this time. The City does monitor the pavement and engineering industries for innovation in materials and treatments. With restorative treatments 30% of ancillary assets are addressed (concrete curbs, sidewalks etc.). Currently 30% of Oshawa's road program is focused on Restorative Treatments. The City is striving to increase this percentage to achieve greater value of assets.

3. Rehabilitative – the strategy of Rehabilitative treatments are to restore a right-of-way to like new condition and improve serviceability by improving some of the design and standards.

The City plans on rehabilitative lifecycle events primarily by condition, however age, roadside environment, demand/use and material play a factor. Mill and overlay is practiced when the road's condition falls between 40-55 P.C.I. This treatment restores condition to a 90 P.C.I. This treatment replaces the wearing surface entirely, restores 30% of the base and typically yields a benefit of 20 years extending the life. Full depth

Roads

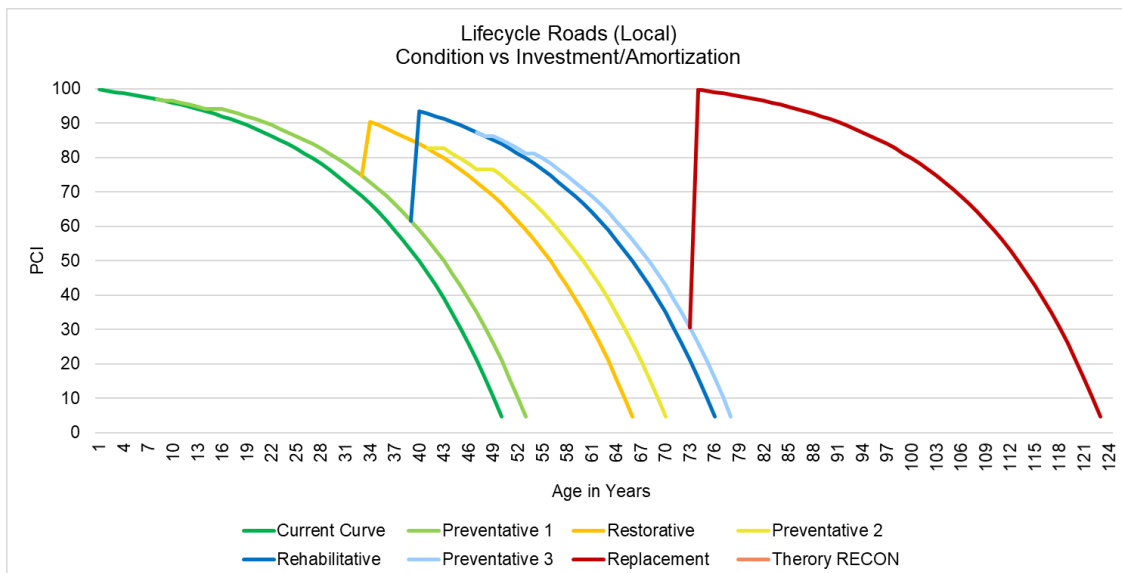
Community - Current Levels of Service

removal is another treatment within this strategy and is an option when the condition falls between 40-55 P.C.I., which restores the condition to 95 P.C.I. This treatment replaces the wearing surface entirely, restores 100% of the base and typically yields a benefit of 25 years. The City does monitor the pavement and engineering industries for innovation in materials and treatments. With rehabilitative treatments 45% of ancillary assets are addressed (concrete curbs, sidewalks etc.). Currently 70% of Oshawa's road program is focused on Rehabilitative Treatments. The City is striving to decrease this percentage to achieve greater value of assets.

4. Replacement

The City plans on replacement lifecycle events primarily by condition and coordination with other stakeholders (i.e. Region of Durham), however, age, roadside environment, demand/use and material play a factor.

Below is a figure that illustrates the lifecycle degradation curves of local roads using the various lifecycle management strategies:



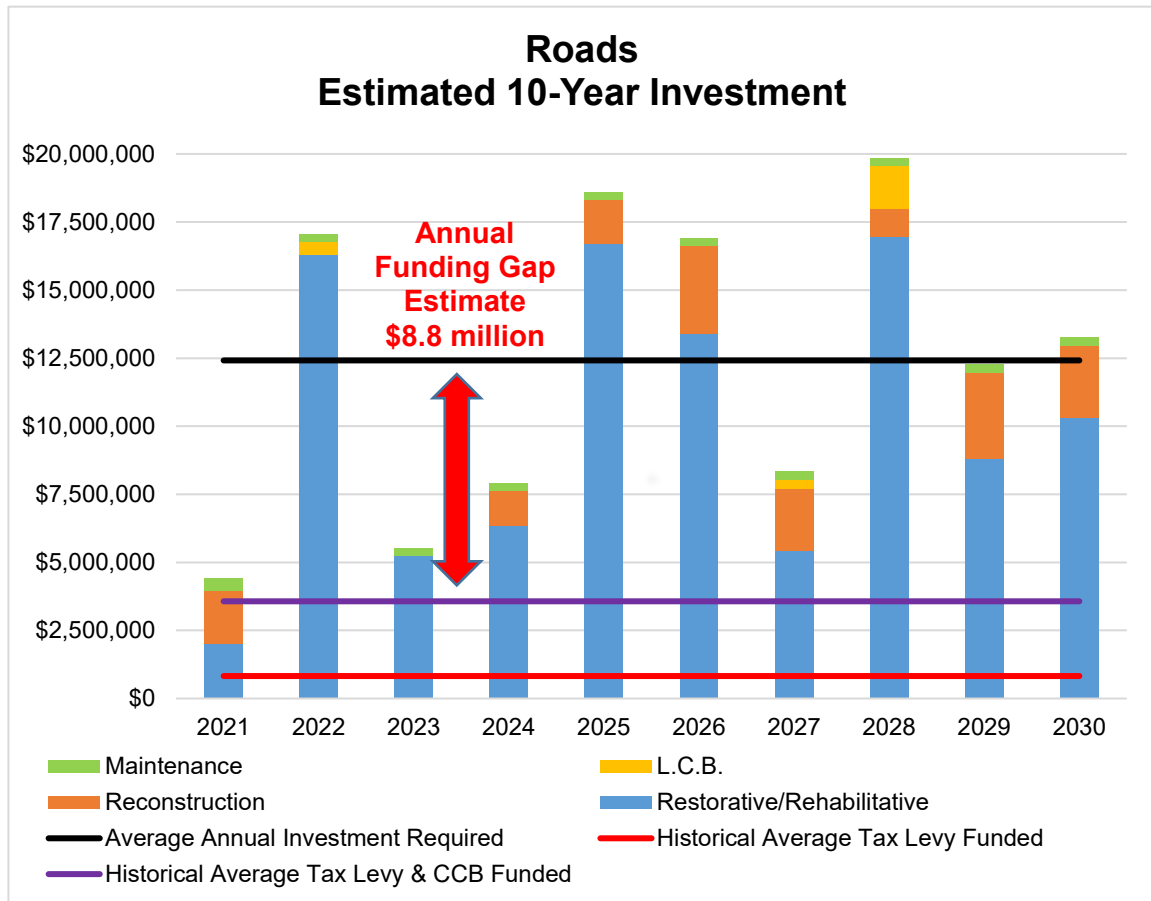
Roads

Lifecycle Management Strategies

Below is a diagram showing the estimated 10-year investment for roads, not accounting for any budget constraints. The average annual investment required is estimated at \$12.4 million (in 2020 \$).

The restorative and rehabilitative estimates have been identified through the City’s decision support system. The reconstruction and L.C.B. projects have been identified in the 2021 capital budget long-term forecast. Included in the annual maintenance cost are asphalt paving and patching, crack sealing and other maintenance costs, such as gravel and grading, and line painting.

Based on the past six years of approved budget, the annual investment in roads from tax levy and Canada Community Benefit Fund (previously Federal Gas Tax Funding) is \$3.6 million. This results in an estimated annual funding gap of \$8.8 million.



Roads

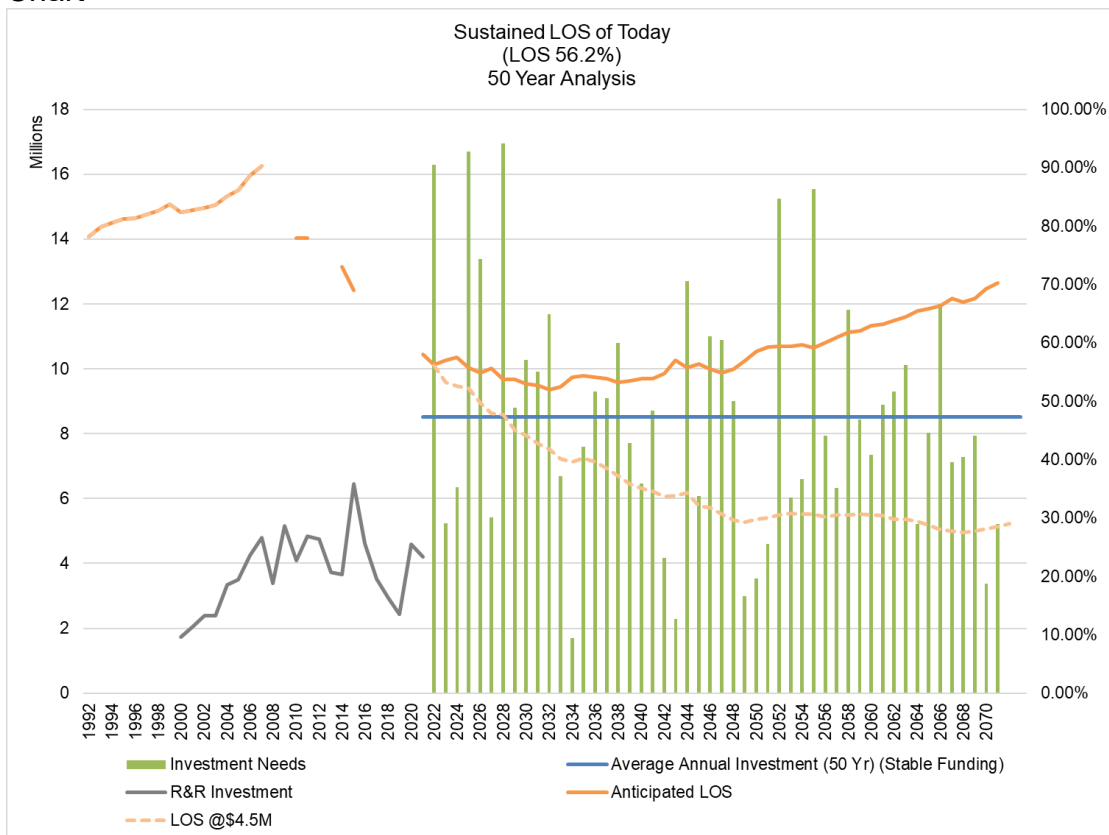
Lifecycle Management Strategies

In order to maintain the current levels of service of 56.2% of H.C.B. roads at good or better the average annual investment of \$8,520,000 is required. This stable investment strategy is represented by the blue line in the figure below, while the green bars are the estimated needs for each year.

The average investment includes restorative and rehabilitative strategies only, based on a 50-year forecast. Reconstruction candidates currently are not included as it is a current limitation of the decision support system.

The 20-year historical investment in roads has also been included to provide context of available funding. For the purposes of this analysis, an annual investment of \$4.5 million was used for the projection based on the approved 2020 capital budget. If this investment remains constant in the future, the levels of service provided would steadily decline to a projected road network of 29% of paved roads in good or better condition.

Chart



Roads

Managing Growth – Capital and Operating Expenditure Forecast

The 2016 population for the City of Oshawa was 153,585 and is anticipated to increase to 197,000 by 2031.

City of Oshawa ¹	2016	2021	2026	2031
Total Population	153,585	165,390	184,460	197,000
Total Households	64,535	70,415	75,655	82,590
Total Employment	68,270	75,305	84,660	90,790

¹ Note: Per 2020 Durham Regional Official Plan

The population growth is expected to result in incremental service demands that may impact the current level of service. In order to accommodate the projected increases in demand caused by growth, the City has undertaken a number of master planning studies which identify the need for new infrastructure and infrastructure upgrades. These growth-related needs have been included in the City's 2019 Development Charges Background Study and the 10-year capital forecast. Utilizing development charges to fund the growth-related initial capital costs helps to ensure the results of future growth do not increase the cost of maintaining levels of service for existing tax payers.

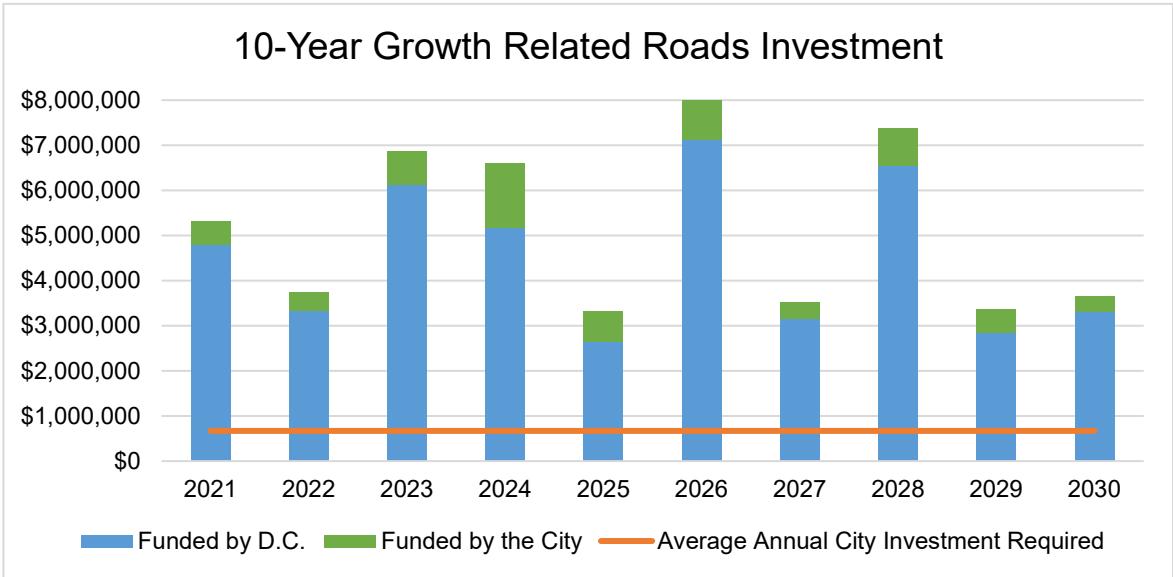
There are no significant maintenance costs in the next 10 years for growth-related infrastructure upgrades or assets acquired through subdivision assumptions. The first significant capital activity would occur approximately 35 years after construction and will eventually need to be funded by the City.

The City's Official Plan references that build-out is estimated to occur in 2031. The operating costs related to assumed assets are difficult to estimate and is really dependent on what future proposed levels of service is approved by Council. As asset management practices continue to mature and better information is gathered, more specific information relating to operating costs will be determined.

The majority of growth related capital projects include a small proportion of improvements that benefit the existing residents. These costs are required to be funded by the City, while development charges pay for the majority of the cost. Over the 10-year forecast, the average annual contribution required for the non-growth related capital portion is \$670,000. Annually, the City budgets a contribution from operating to a Growth Related Non-D.C. reserve to fund the City's portion of growth related capital investments.

Roads

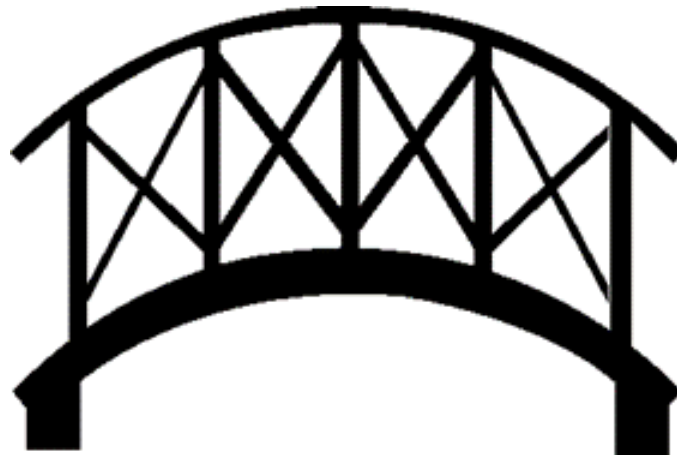
Managing Growth – Capital and Operating Expenditure Forecast





Appendix B

Structures



October 25, 2021

Structures

Description of Structures Assets

Bridge



Culvert



Pedestrian Bridge



- The City owns and maintains bridges and culverts to support the service of transportation and the movement of goods and people throughout the City.
- The City's structures inventory is collected and tracked through the City's corporate Geographic Information System (G.I.S.).
- Road bridges, road culverts and pedestrian structures are the three primary classification of the structures assets.
- Structures support vehicular and active transportation. Additionally, the City's structures serve to provide service connection for overland drainage and watercourses within the City.
- The City engages a professional structural engineer to complete legislated inspections on a biennial basis. This inspection provides the City with a 10-year renewal and replacement forecast which the City attempts to implement through the Capital Budget process.
- Expansion of current and construction of new structures is undertaken as part of the Capital Budget process and are identified in the City's Development Charges Background Study.

Structures

Inventory and Estimated Replacement Cost

Structures	Quantity (each)	Estimated Replacement Cost
Road Bridges	26	\$36,624,823
Road Culverts	50	\$29,627,163
Pedestrian Structures	39	\$9,068,175
Total Structures	115	\$75,320,161



Inventory is collected, tracked and maintained through the G.I.S.

The City owns a total of 115 structures, which consists of 26 road bridges, 50 road culverts and 39 pedestrian structures.

The total estimated replacement cost of these structures is \$75,320,161 based on 2020 dollars.

Estimated replacement costs are unique to each structure and are an important part of the Biennial Municipal Structure Inspection Report. The estimated replacement costs are based on reproduction costs (replacing like for like). When a structure is replaced, typically the structure is upgraded to accommodate for growth and current standards.

The last inspection report was completed in 2019, and as such, the estimated replacement costs were indexed using the Non-Residential Building Construction Price Index (NRBCPI). For 2020, this amounted to an inflationary factor of 2.62%.

It should be noted that one bridge structure and one pedestrian bridge structure have been excluded from this A.M.P. Both structures are within the geography of the City, however are not owned by City, as they are owned by Canadian Pacific Railway.

Structures

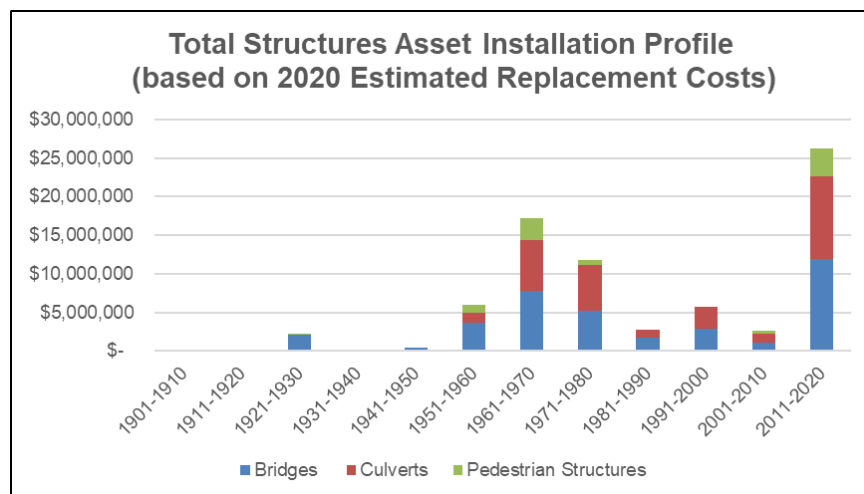
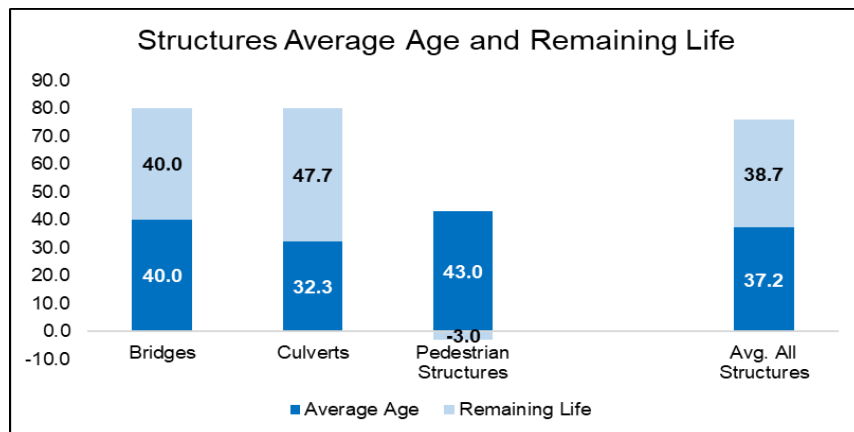
Average Age and Asset Installation Profile



Age is based on initial construction year and tracked separately for each type of structure. The average age of the City’s road bridges, road culverts and pedestrian structures is 37.2 years and is broken down by:

- 40.0 years for Road Bridges
- 32.3 years for Road Culverts
- 43.0 years for Pedestrian Structures

The service life of Structures is estimated at 80 years for bridges and culverts and 40 year for pedestrian structures. Although the average life span of a pedestrian structure is 40 years and the average age currently is 43 years, for the most part the structures are still functioning well and several will far exceed the average based on construction type and materials. Condition is a function of observation, not age.



Structures

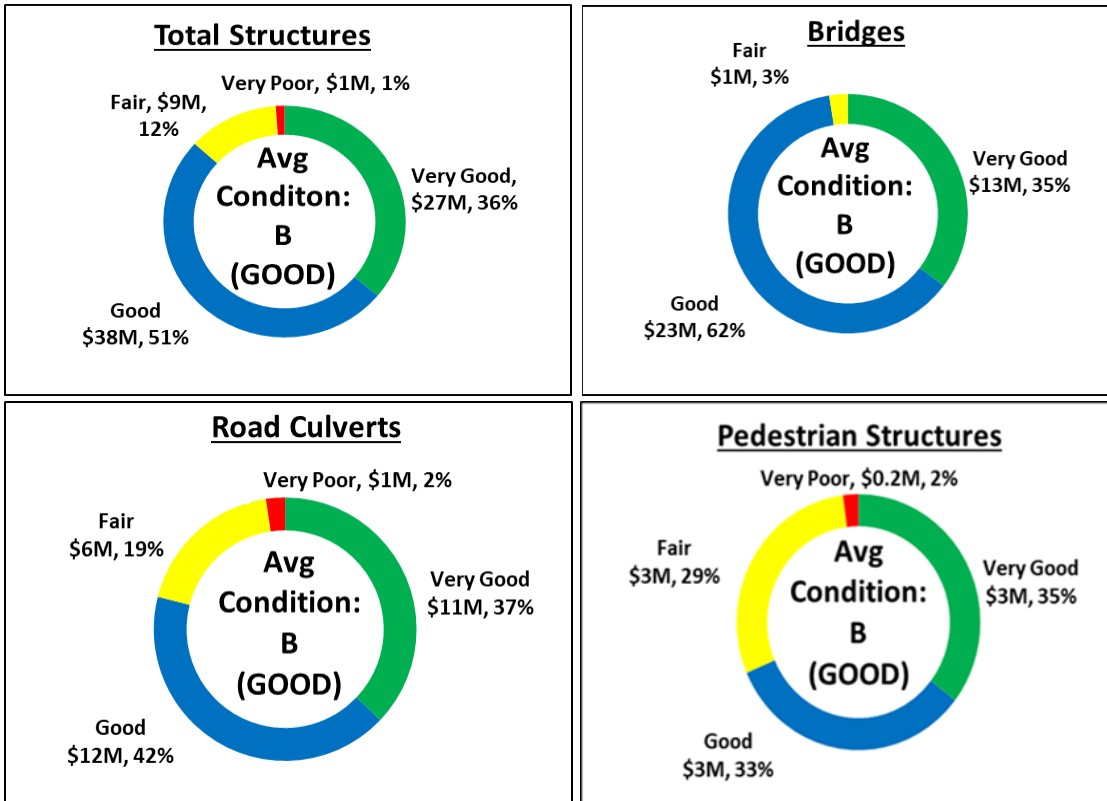
Condition




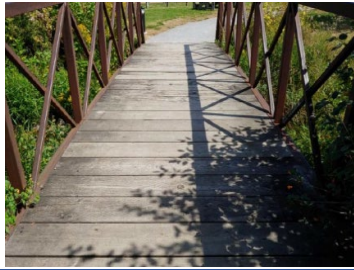

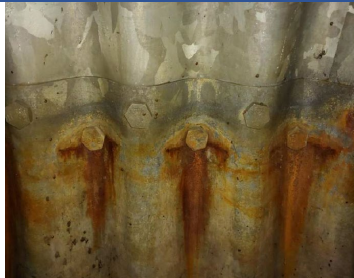

Ontario Regulation 104/97 requires all Structures to be inspected on a biennial basis. The results are reported a Biennial Municipal Structure Report. Each structure is assessed for condition using the Bridge Condition Index (B.C.I.). As the B.C.I. conveys the condition, but does not look into the future of what the structures will experience, City staff enhances the B.C.I. using a formula of 90% of B.C.I. + 10% based on the remaining service life in relation to the estimated service life.

Overall, the City's structures assets are in GOOD condition (B Grade)

- B – Good – Road Bridges
- B – Good – Road Culverts
- B – Good – Pedestrian Structures



•

Structures				
Condition	Condition Rating (BCI)	Grade	Category	Description
	80-100	A	Very Good	The structures are functioning as intended. Limited, if any, deterioration observed.
	60-80	B	Good	The structures are functioning as intended. No major maintenance is anticipated within the next 5 years.
	40-60	C	Fair	The structures are functioning as intended. Normal deterioration and minor distress observed. Maintenance will be required within the next 5 years to maintain functionality.
	20-40	D	Poor	The structures are starting to not function as intended. Significant distress observed. Maintenance and some repair required within the next few years to restore functionality.
	0-20	E	Very Poor	The structures are not functioning as intended. Significant deterioration and major distress observed. Requires immediate attention.

Structures

Current Levels of Service



Preliminary levels of service for the City’s structure assets are below. These were established based on:

- The Council approved Oshawa Strategic Plan 2020-2023
- Oshawa Financial Strategy 2016-2019
- Development Services Business Plan 2021
- Oshawa Quality Standards
- Ontario Regulation 588/17 requirements and guidelines

Technical and Community based specific service levels and current performance are highlighted in the subsequent tables and sections below. City staff continually monitor performance.

Engineering and Operations Services Branches ¹	Business Plan Strategy ²	Oshawa Strategic Plan Theme ³	Oshawa Financial Strategy ⁴
Keep the transportation systems in Oshawa in good, safe, working order by following internally developed quality standards for maintenance.	Provide a safe, reliable and connected active and transportation network	Active, healthy and safe community Safe and reliable infrastructure Proactive environmental management	Infrastructure Investment Reserve Fund Operating Cost

Notes:

¹ Various Sources

² Development Services Department Business Plan 2021

³ 2020-2023 Oshawa Strategic Plan – Our Plan for Success

⁴ Oshawa Financial Strategy 2016-2019

Structures

Technical Levels of Service and Current Performance

Service Attribute	Technical Levels of Service ¹	Current Performance
Scope	Percentage of <u>vehicular</u> bridges in the City with loading or dimensional restrictions.	0% ²
Scope	Percentage of <u>pedestrian</u> bridges in the City with loading or dimensional restrictions.	31%
Quality	For <u>bridges</u> in the City, the average bridge condition index value.	77.3
Quality	For <u>structural culverts</u> in the City, the average bridge condition index value.	75.2
Quality	For <u>pedestrian structures</u> in the City, the average bridge condition index value.	71.9

Notes:

¹ Ontario Regulation 588/17, Asset Management Planning for Municipal Infrastructure

² There is one bridge within the City with a load restriction, but is owned by Canadian Pacific Railway

Structures

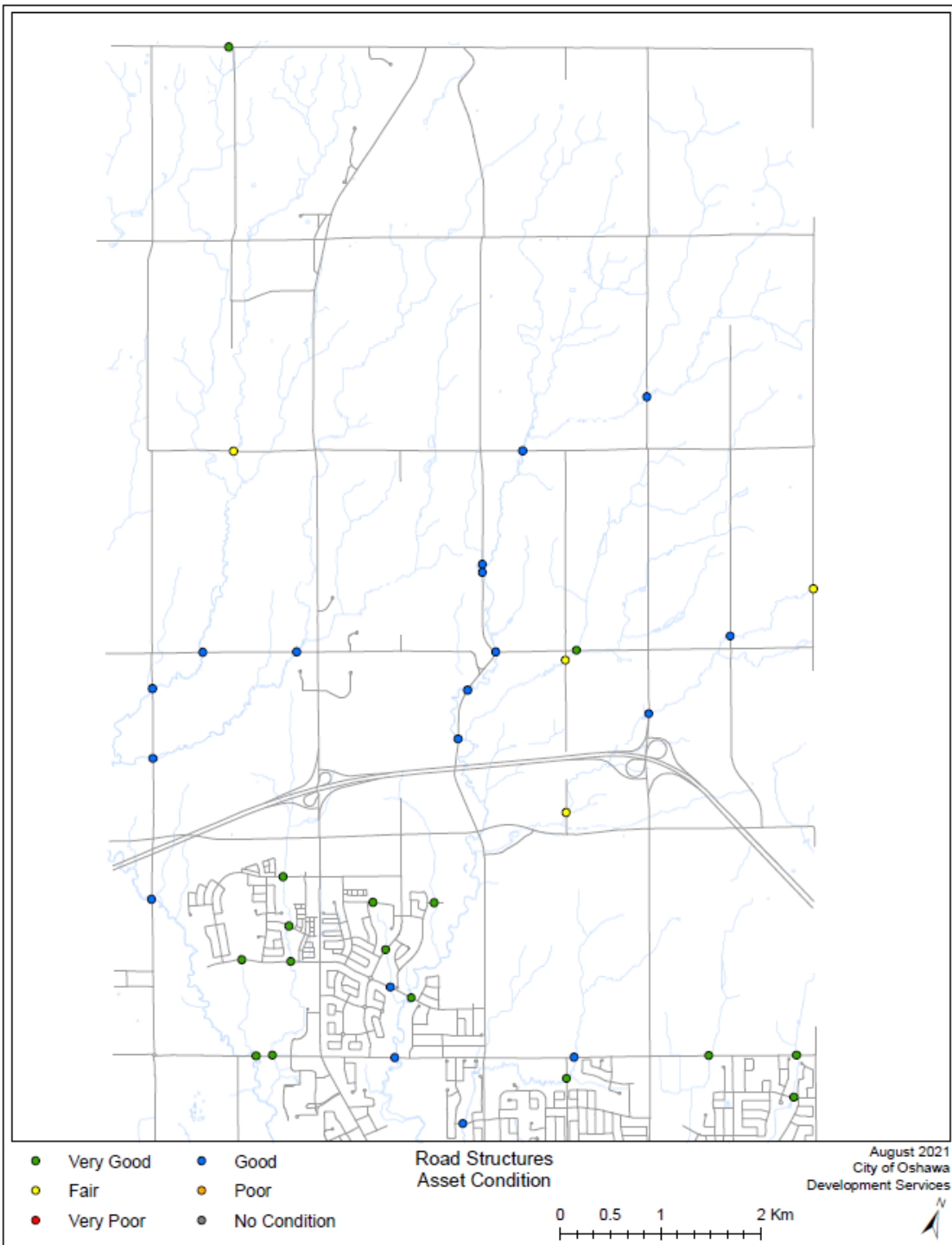
Community - Current Levels of Service

Service Attribute	Technical Levels of Service ¹	Current Performance
Scope	Description of the traffic that is supported by municipal bridges (e.g. heavy, transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	Bridges and structural culverts support the movement of motor vehicles, heavy transport vehicles, emergency vehicles, pedestrians, and cyclists throughout the City's road network.
Quality	Description or images of the condition of bridges and how this would affect use of the bridges. Descriptions or images of the condition of bridges and how this would affect use of the culverts.	See following maps showing locations.

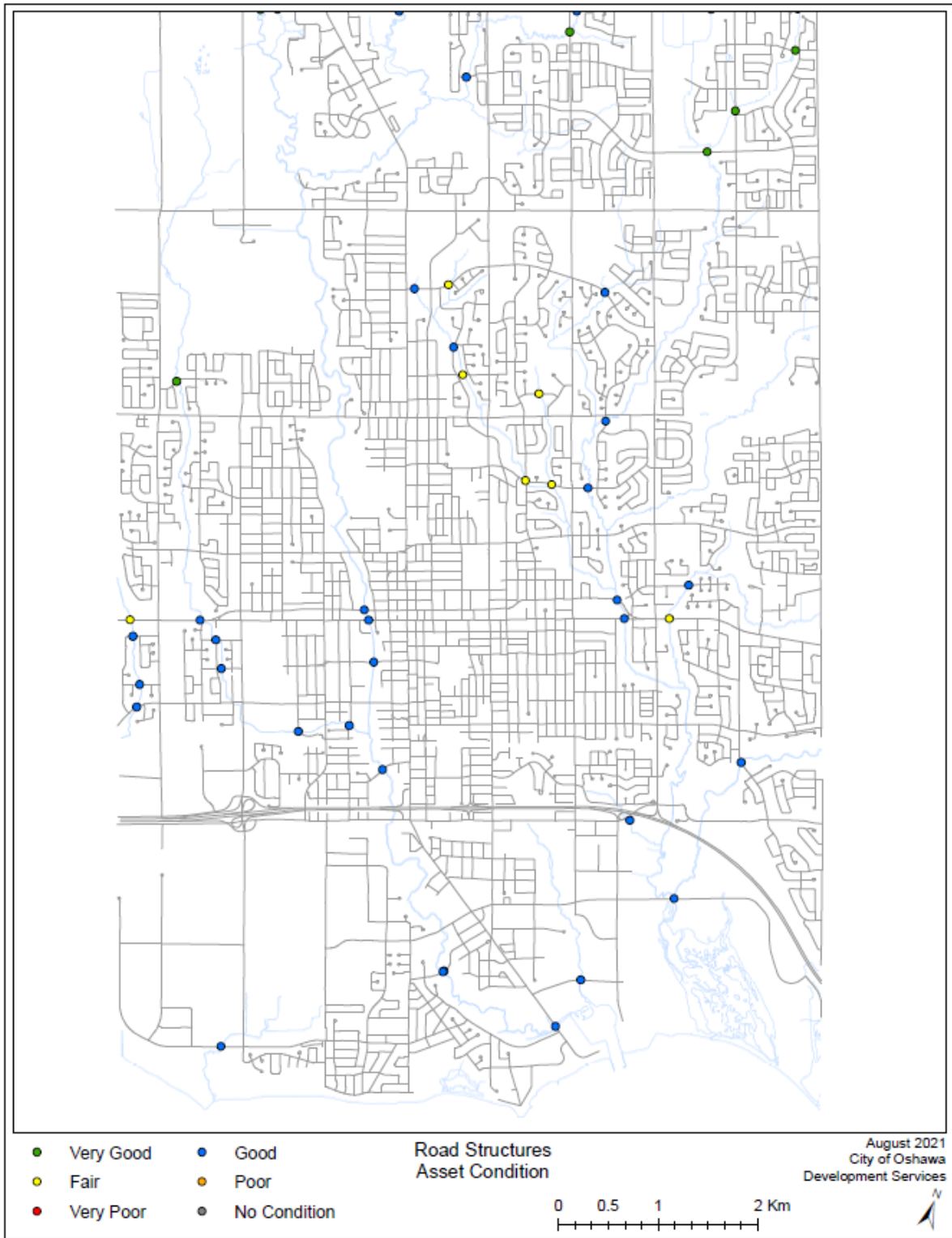
Note:

¹ Ontario Regulation 588/17, Asset Management Planning for Municipal Infrastructure

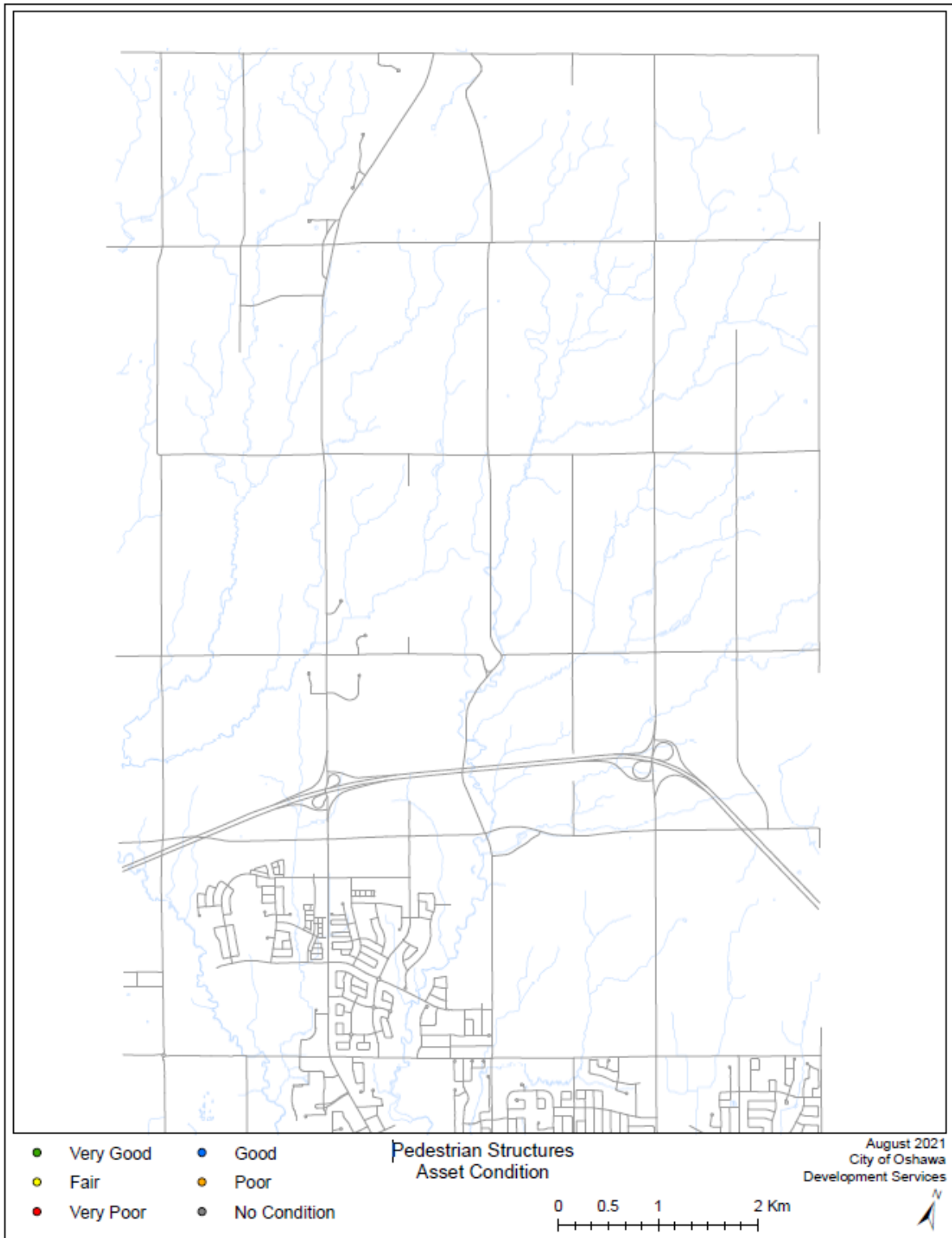
City of Oshawa Road Structures by Condition Map – North Extent



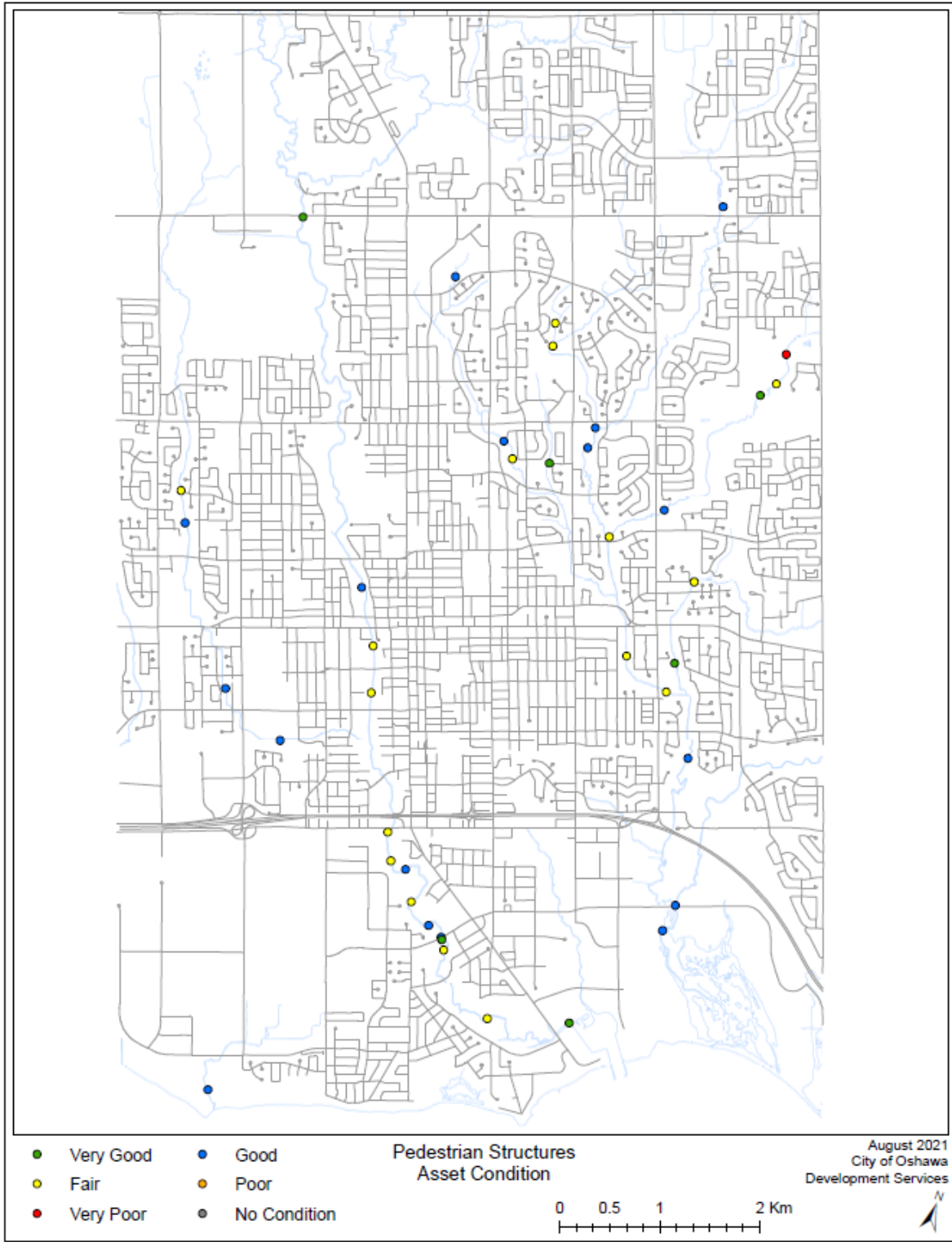
City of Oshawa Road Structures by Condition Map– South Extent



City of Oshawa Pedestrian Structures by Condition Map – North Extent



City of Oshawa Pedestrian Structures by Condition Map– South Extent



Structures

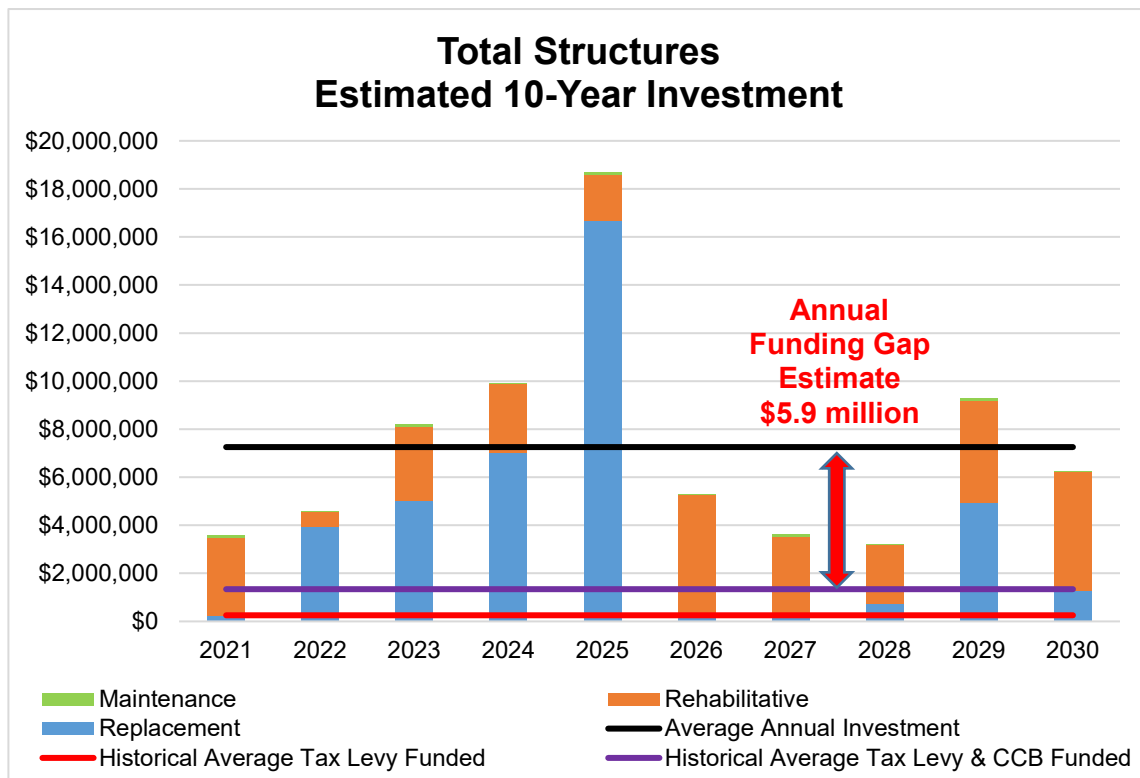
Lifecycle Management Strategies

The Biennial Municipal Structure Inspection Report outlines the required expenditures required to maintain the City’s portfolio of structures. Each structure is inspected and recommendations are detailed for replacement, major rehabilitation, minor rehabilitation, as well as specific maintenance by structure.

Staff prepare the City’s capital budget, using information from the Biennial Municipal Structure Inspection Report, along with professional judgement on the timing. The capital scoring model is used to prioritize risk and the needs of the structures, along with the needs of other areas requiring capital.

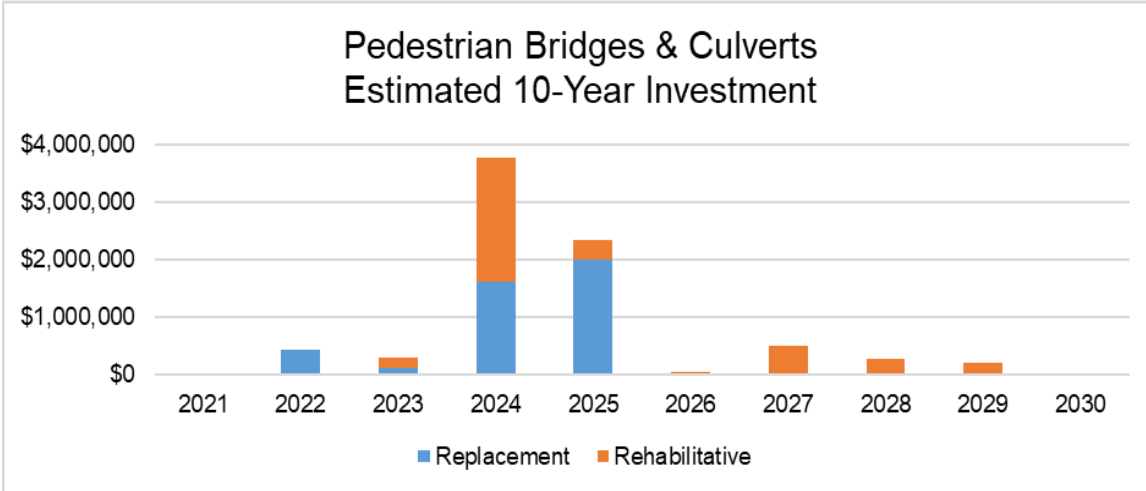
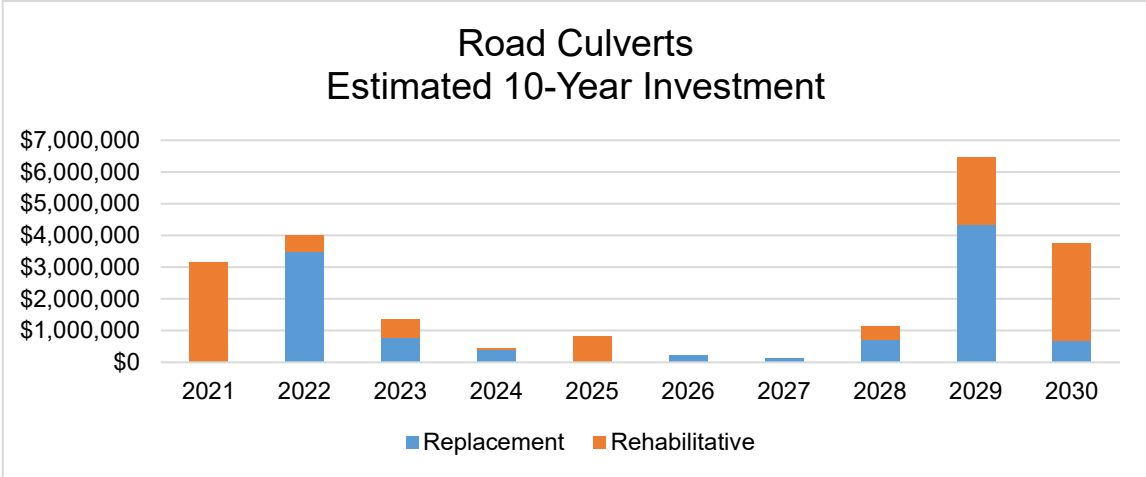
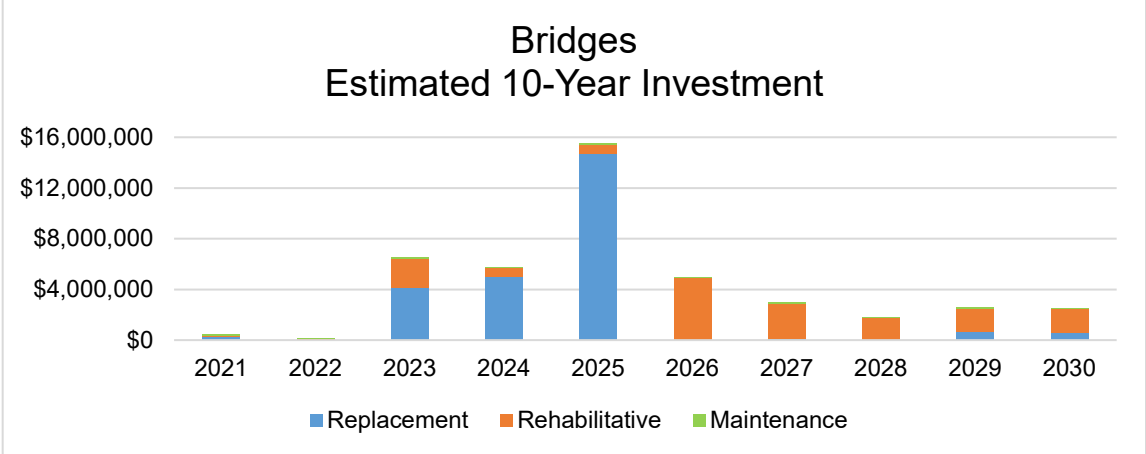
The following 10-year lifecycle forecast is shown below and does not account for any budget constraints. The average annual investment required is estimated at \$7.2 million (in 2020 \$).

Based on the past six years of approved budget, the annual investment in structures from tax levy and Canada Community Benefit Fund (previously Federal Gas Tax Funding) is \$1.3 million. This results in an estimated annual funding gap of \$5.9 million.



Structures

Lifecycle Management Strategies



Structures

Managing Growth – Capital and Operating Expenditure Forecast

The 2016 population for the City of Oshawa was 153,585 and is anticipated to increase to 197,000 by 2031.

City of Oshawa ¹	2016	2021	2026	2031
Total Population	153,585	165,390	184,460	197,000
Total Households	64,535	70,415	75,655	82,590
Total Employment	68,270	75,305	84,660	90,790

Note:¹ Per 2020 Durham Regional Official Plan

The population growth is expected to result in incremental service demands that may impact the current level of service. In order to accommodate the projected increases in demand caused by growth, the City has undertaken a number of master planning studies which identify the need for new infrastructure and infrastructure service expansion. These growth-related needs have been included in the City's 2019 Development Charges Background Study and the 10-year capital forecast. Utilizing development charges to fund the growth-related initial capital costs helps to ensure the results of future growth do not increase the cost of maintaining levels of service for existing tax payers.

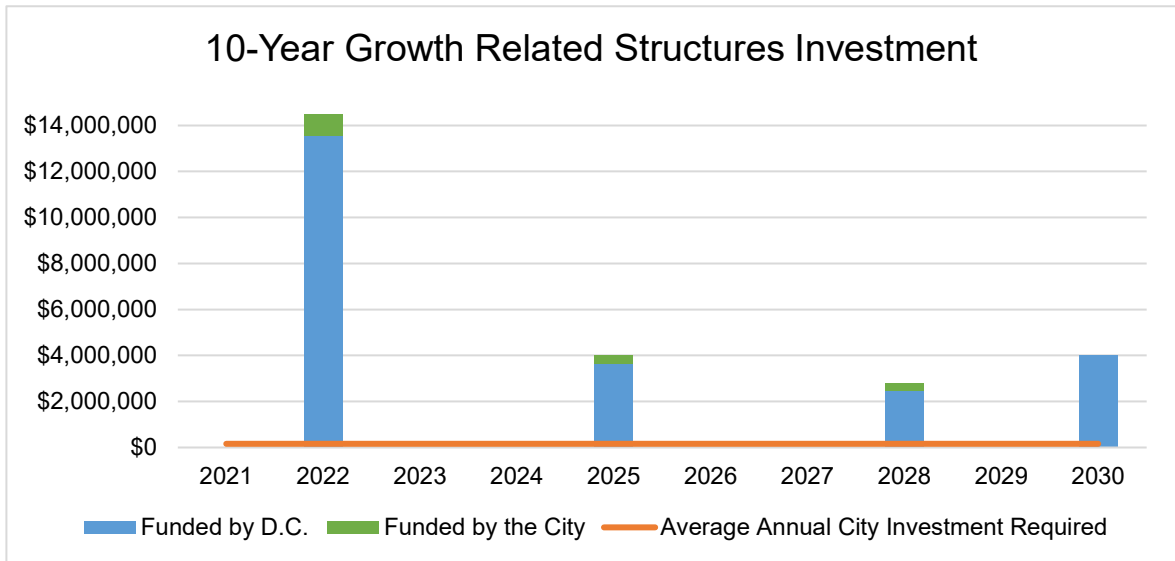
There are no significant maintenance or capital costs in the next 10 years related growth-related infrastructure service expansion or assets acquired through subdivision assumptions. As the average useful life of structures are 80 years, the eventual replacement cost of the growth assets are not included in this plan, but will eventually need to be funded by the City.

The City's Official Plan references that build-out is estimated to occur in 2031. The operating costs related to assumed assets are difficult to estimate and is really dependent on what future proposed levels of service are approved by Council. As asset management practices continue to mature and better information is gathered, more specific information relating to operating costs will be determined.

Structures

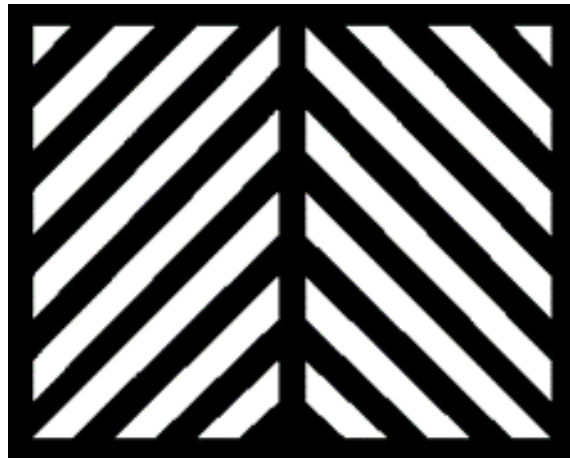
Managing Growth – Capital and Operating Expenditure Forecast

The 10-year forecast includes \$25.3 million for new structures and the majority of these growth related capital projects include a small proportion of improvements that benefit the existing residents. These costs are required to be funded by the City, while development charges pay for the majority of the cost. Over the 10-year forecast, there are 5 structures anticipated to be built which requires a total contribution from the City in the amount of \$1.61 million (or an average annual amount of \$161,000). Annually, the City budgets a contribution from operating to a Growth Related Non-D.C. reserve to fund the City’s portion of growth related capital investments



Appendix C

Stormwater Assets



October 25, 2021

Stormwater Assets

Description of Stormwater Assets

Storm Sewer Line Example



Catch Basin Example



Stormwater Management Facility



- The ultimate goal of stormwater management is to maintain the health of streams, lake and aquatic life - the Municipal Act requires management of the collection of stormwater and other drainage from land
- The City owns and maintains a 2 layered system – minor and major, which in combination are designed to manage a 100 year storm
- In addition to managing the minor and major systems, the City also provides these services related to land drainage:
 - Channel work (quality, erosion)
 - Water conveyance
 - Drainage
 - Flood prevention and control
 - Monitoring & Assessment (quality & quantity)
- Storm sewers are designed to convey flows during the most frequent rainfall events and are designed for a certain magnitude of storm events and thus make up what is called the “minor” drainage system
- Flows that exceed the capacity of the storm sewers are conveyed along the ground surface (i.e. “overland”). The overland system makes up what is called the “major” drainage system since it conveys flows in excess of the minor system during larger magnitude, infrequent storm events.

Stormwater Assets

Inventory and Estimated Replacement Cost

Storm Sewer Assets	Qty	Estimated Replacement Cost
Sewer lines (kilometers)	499	\$144,228,129
Manholes (each)	6,594	\$37,167,593
Catch Basins (each)	11,843	\$30,027,910
Inlets/Outlets (each)	370	\$3,777,519
Services (kilometers)	6	\$4,862,927
Total Storm Sewer		\$220,064,078

F.D.C. Storm Sewer Assets	Qty	Estimated Replacement Cost
Sewer lines (kilometers)	103	\$13,373,245
Manholes (each)	1,706	\$9,312,121
Services (kilometers)	102	\$10,756,144
Total F.D.C. Storm Sewer		\$33,441,510

S.W.M.F. Assets	Qty	Estimated Replacement Cost
Stormwater Management Facilities (each)	31	\$22,592,471

Asset	Estimated Replacement Cost
Total Stormwater Assets	\$276,098,059



Inventory is collected, tracked and maintained through the G.I.S.

The City owns a total of 602 kilometers of storm sewer lines and 31 Stormwater Management Facilities. The Stormwater Assets included in this plan have a total estimated replacement cost of \$276,098,059, based on 2020 dollars.

Estimated replacement costs are based on a 3-year rolling average of unit costs, reflecting recent road construction contract costs and development costs from assumed subdivision assets.

The minor drainage system consists of assets within roads, park and parking lots.

1. Storm Sewer Assets – used to collect and convey stormwater directly to streams, rivers and waterways
2. Foundation Drainage Collection (F.D.C.) Storm Sewer Assets – collect and convey groundwater from private weeping systems directly to streams, creeks, rivers and waterways
3. Stormwater Management Facilities (S.W.M.F.) - also known as stormwater management ponds, provide water quantity, quality and/or erosion control for the majority of recently developed areas

Although a significant component of the stormwater system, the major drainage system for overland flow routes within creeks, ditches and open spaces are not included in this A.M.P. as there is no reasonable process to estimate the replacement cost.

Stormwater Assets

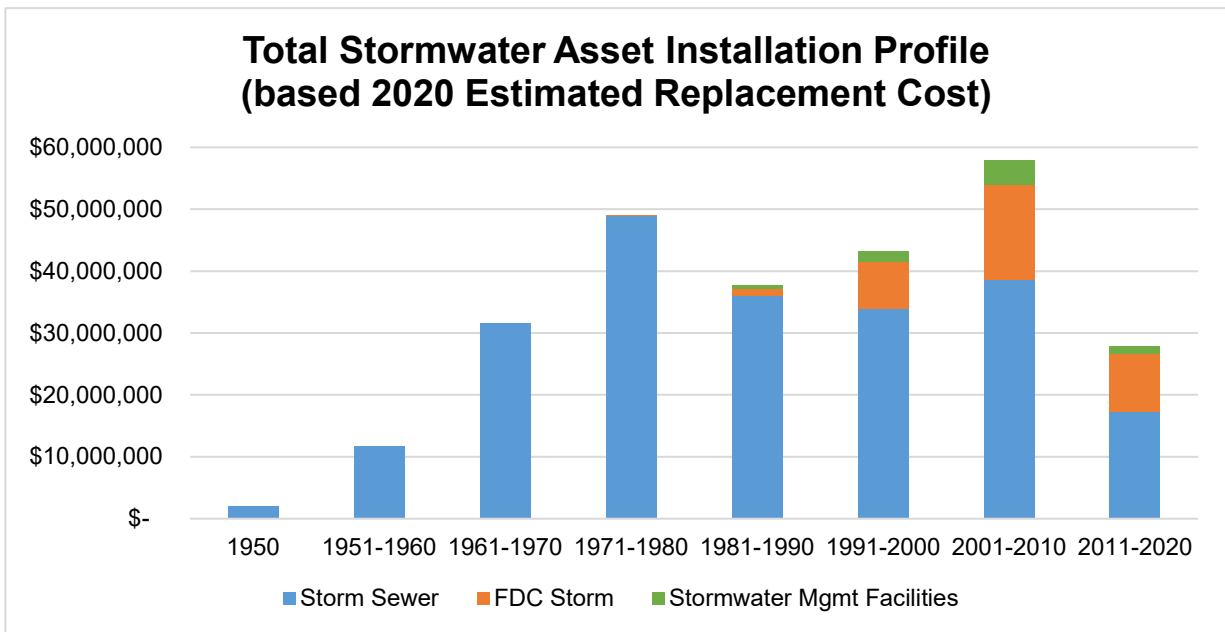
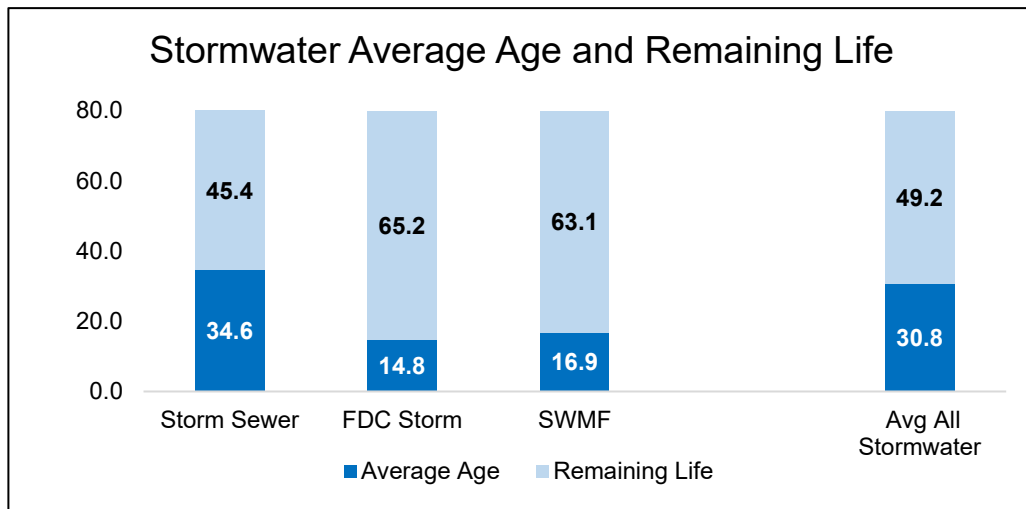
Average Age and Asset Installation Profile



Age is based on initial construction year and tracked by the different components within the stormwater system. The average age of the City's stormwater network is 30.8 years and is broken down by:

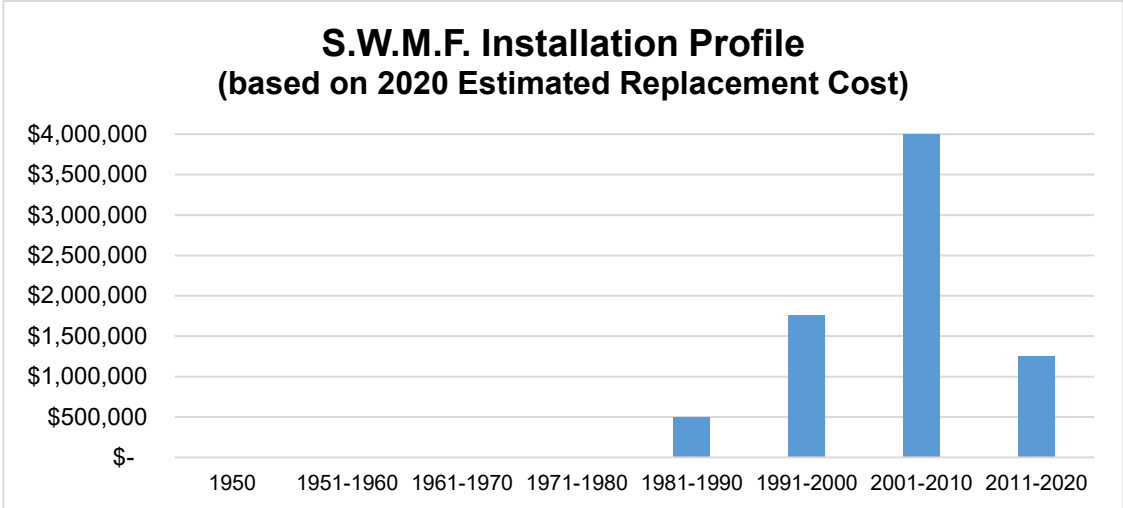
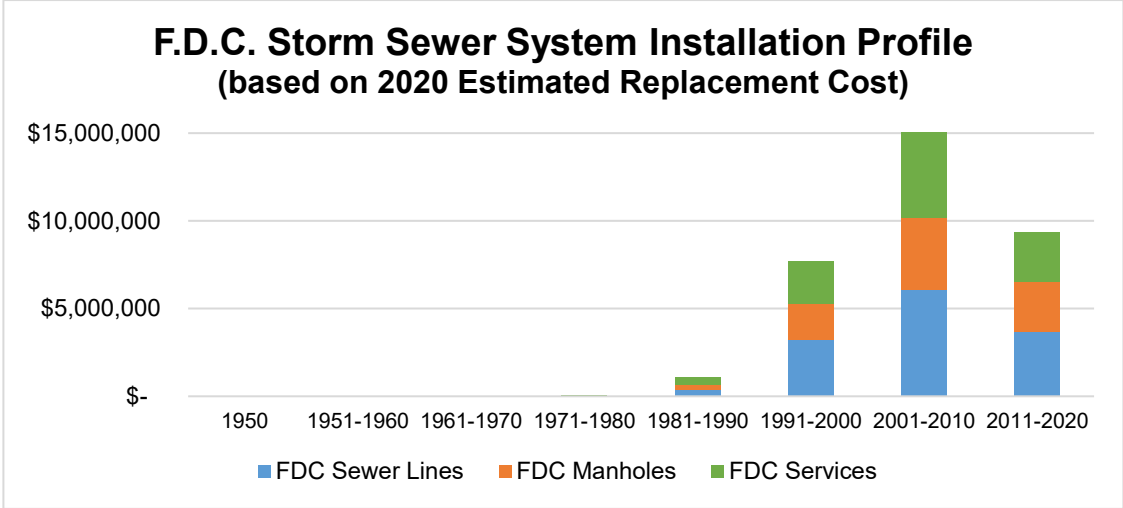
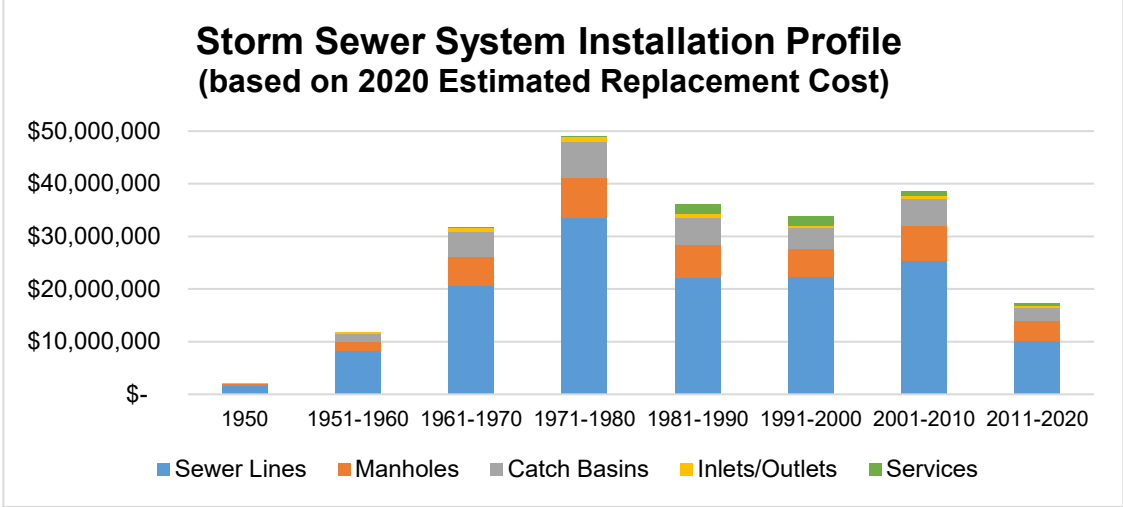
- 34.6 years for Storm Sewers
- 14.8 years for F.D.C. Storm Sewers
- 16.9 years for Stormwater Management Facilities

The service life of stormwater assets is estimated at 80 years, per industry standards.



Stormwater Assets

Average Age and Asset Installation Profile



Stormwater Assets

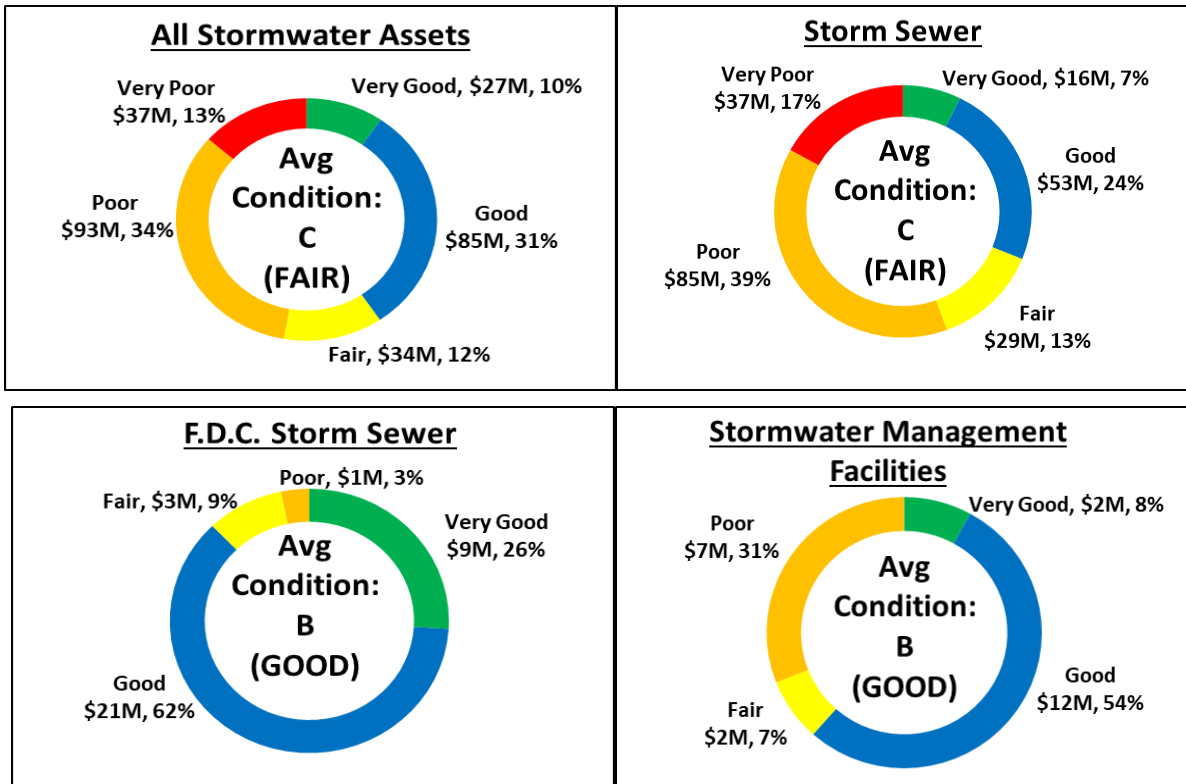
Condition



For the purposes of this asset management plan, age has been used to determine the condition, based on the estimated useful life of the assets. The measure used is the percentage of the estimated useful life consumed (UL %) based on each asset's age and the average life expectancy based on industry standards. Assets do undergo regular inspection, which identifies maintenance and repairs needs, but does not provide an overall condition rating of the asset.

Overall, the City's stormwater assets are in FAIR condition (C Grade)

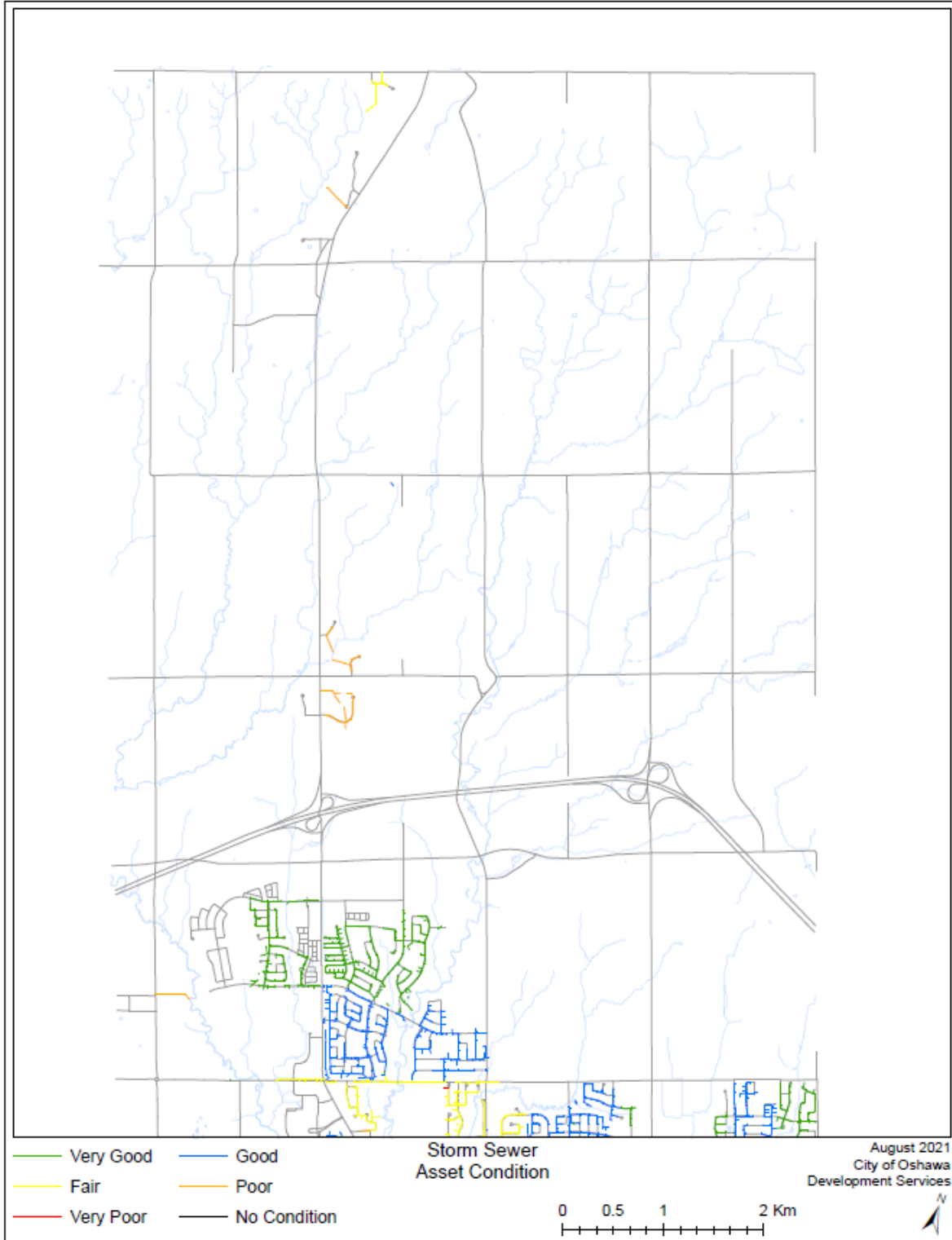
- C – Fair – Storm Sewer System
- B – Good – F.D.C. Storm Sewer System
- B – Good – Stormwater Management Facilities

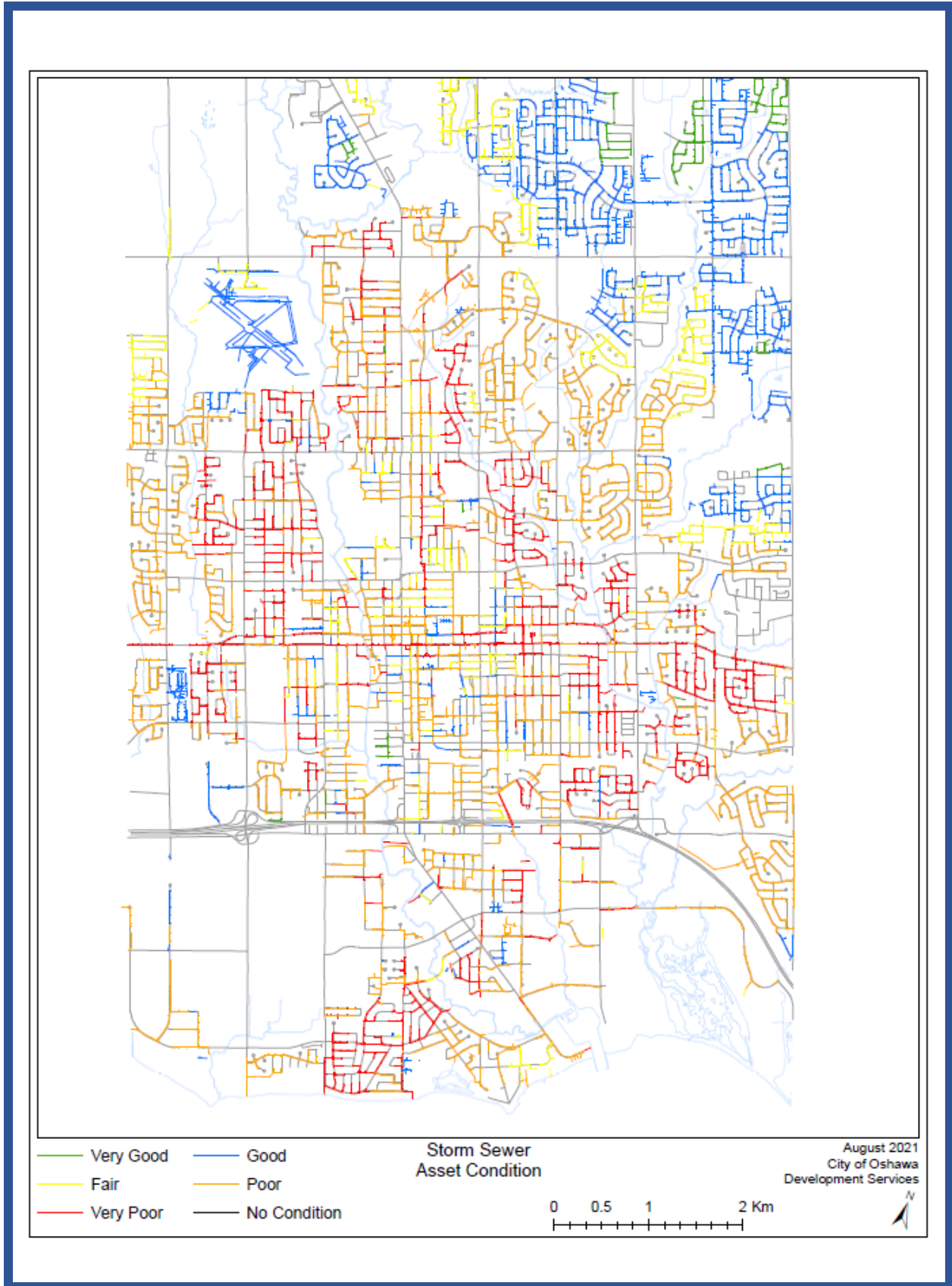


Stormwater Assets				
Example of Sewer lines	Condition Rating	Grade	Category	Description
	90-100	A	Very Good	The stormwater assets are functioning as intended. Limited, if any, deterioration observed.
	70-90	B	Good	The stormwater assets are functioning as intended. No maintenance is anticipated within the next 5 years.
	60-70	C	Fair	The stormwater assets are functioning as intended. Normal deterioration and minor distress observed. Maintenance will be required within the next 5 years to maintain functionality.
	35-60	D	Poor	The stormwater assets are starting to not function as intended. Significant distress observed. Maintenance and some repair required within the next few years to restore functionality.
	0-35	E	Very Poor	The stormwater assets are not functioning as intended. Significant deterioration and major distress observed. Requires immediate attention.

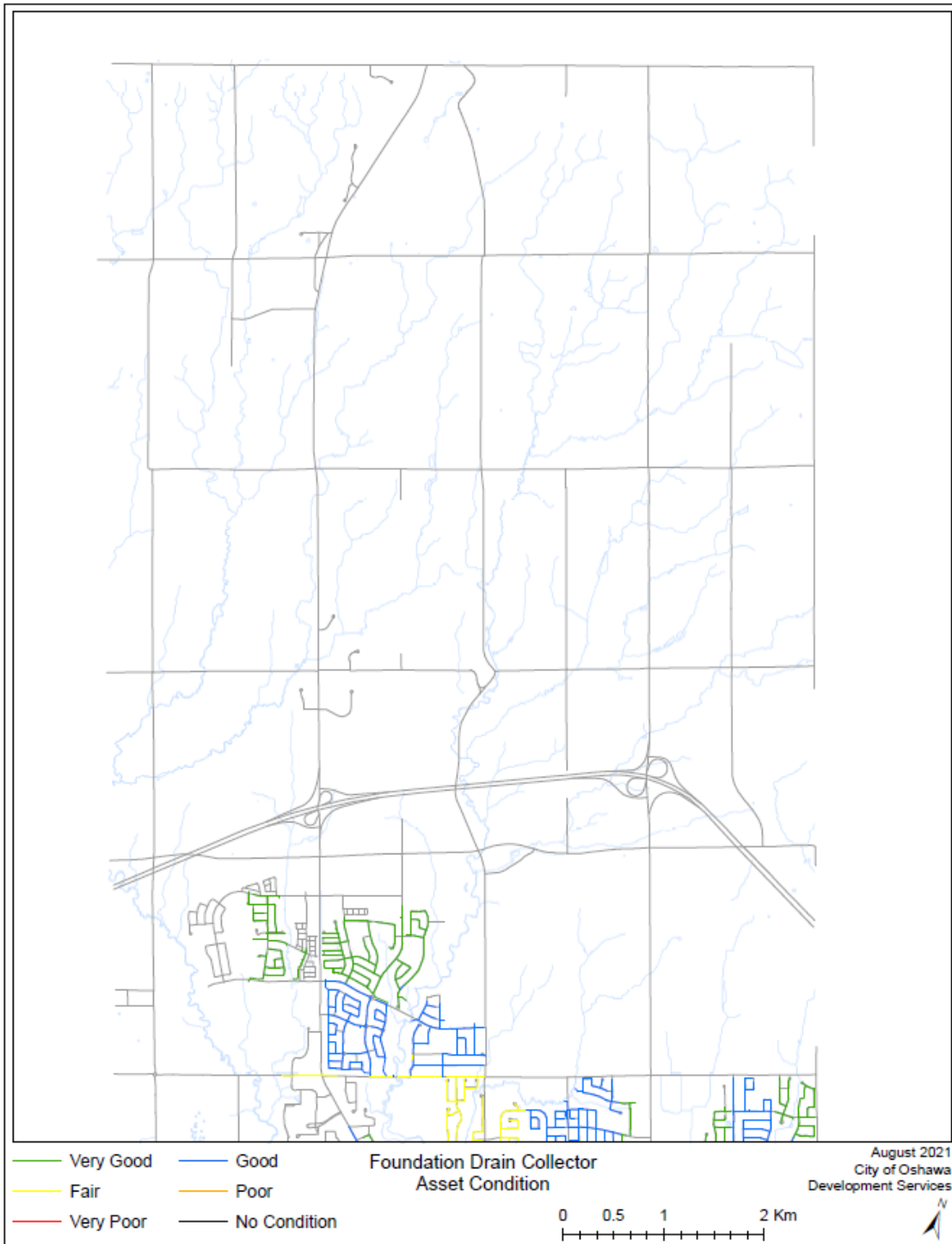
Stormwater Assets

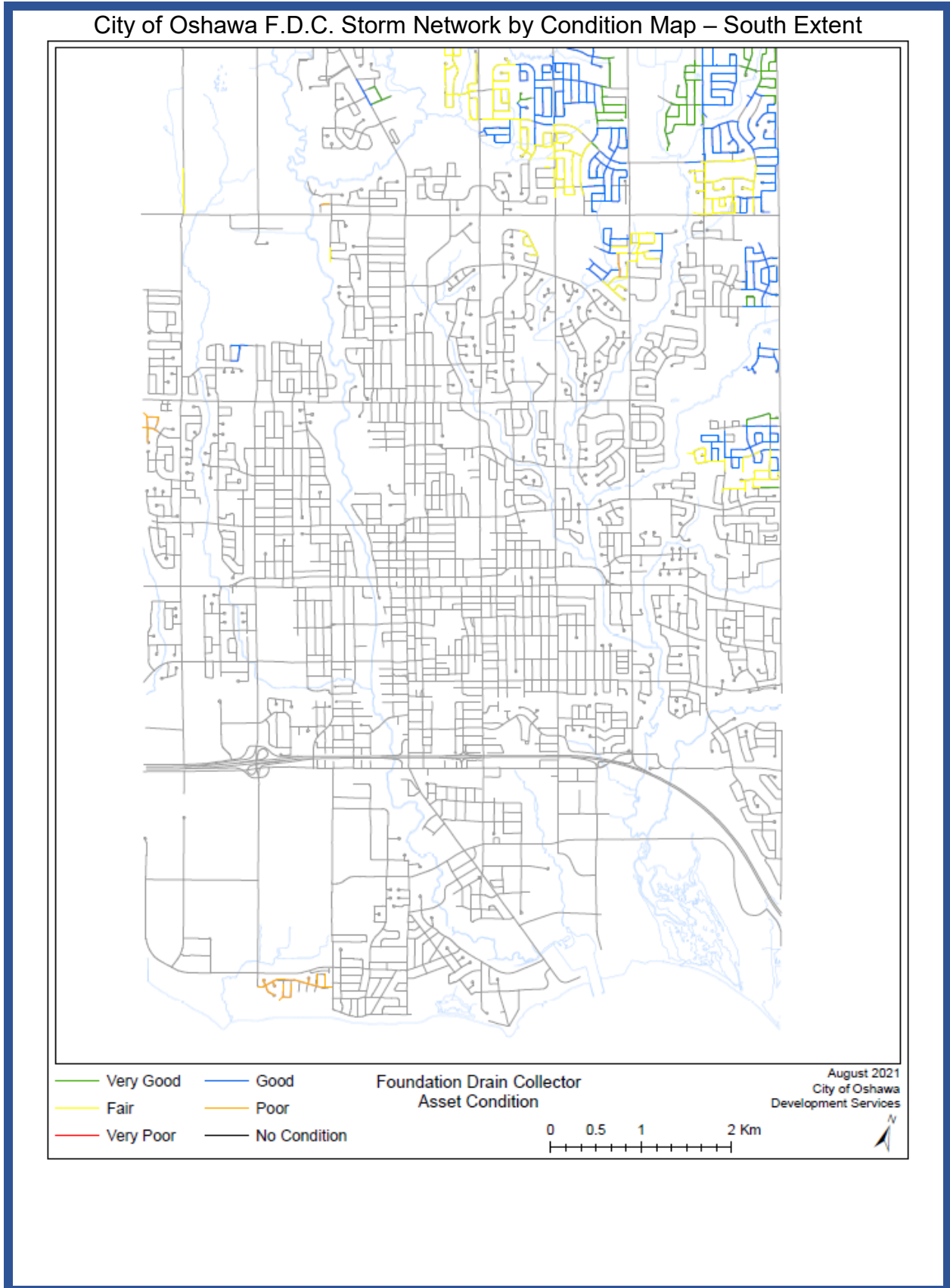
City of Oshawa Storm Sewer Network by Condition Map – North Extent

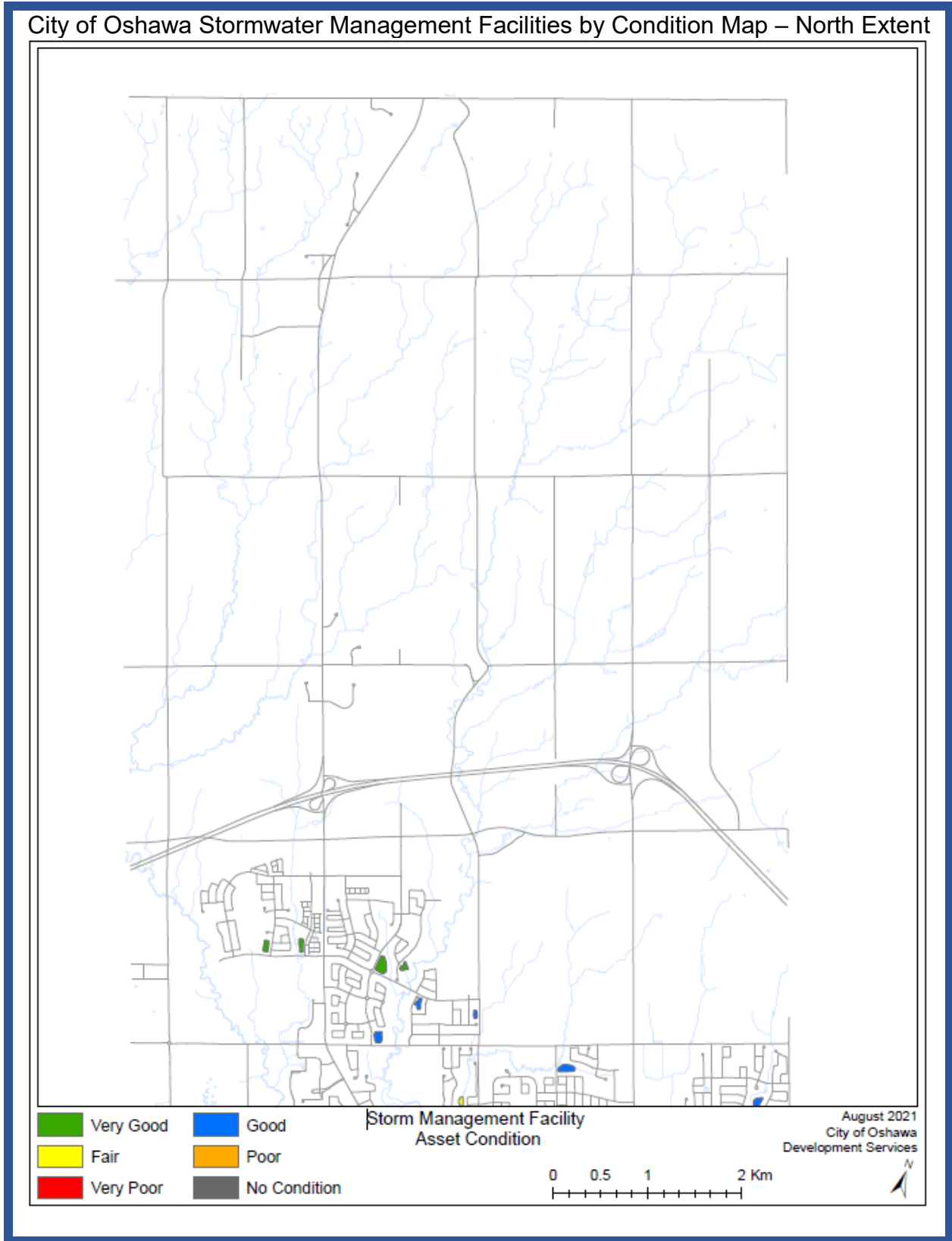




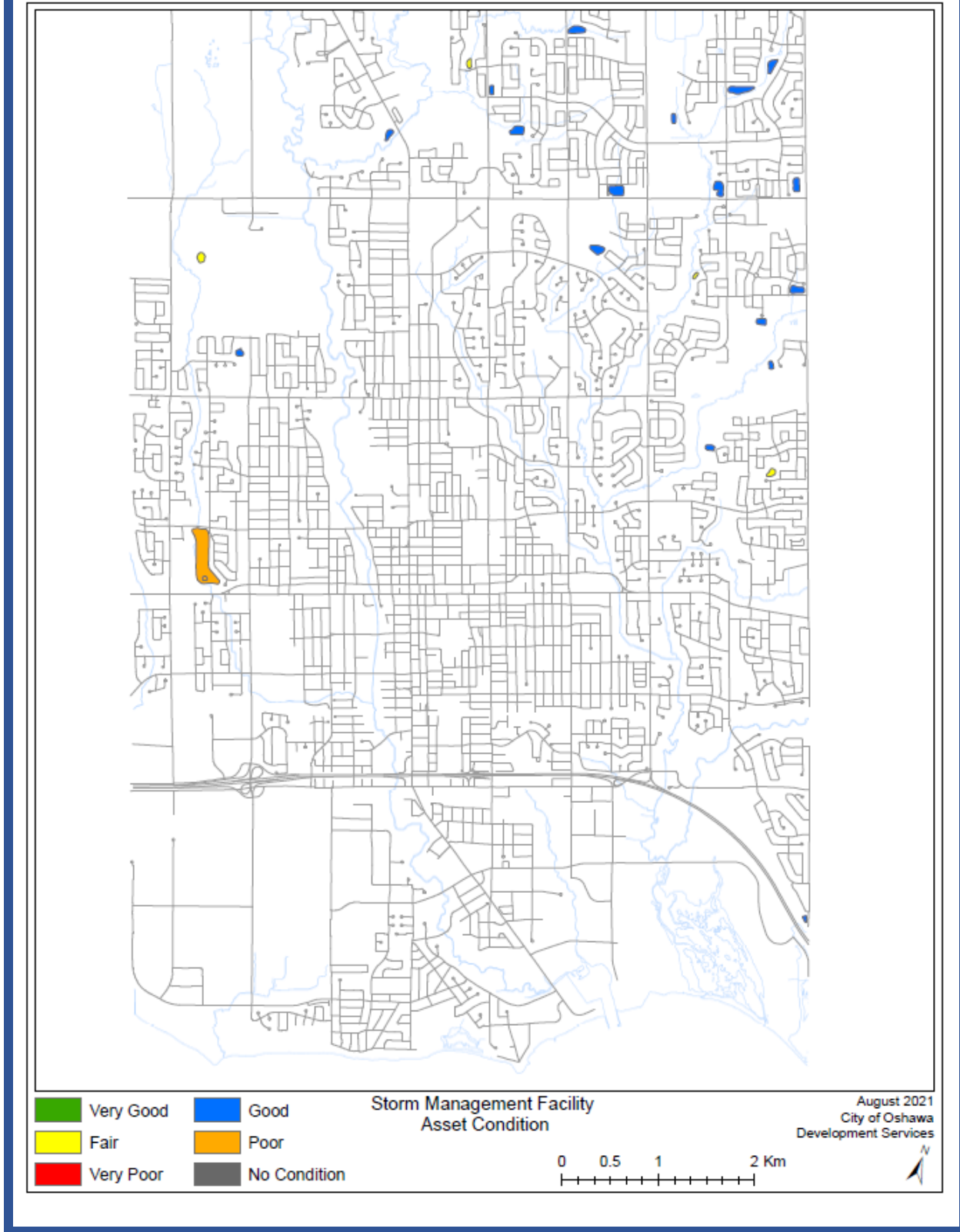
City of Oshawa F.D.C. Storm Network by Condition Map – North Extent







City of Oshawa Stormwater Management Facilities by Condition Map – South Extent



Stormwater Assets

Current Levels of Service



Preliminary levels of service for the City’s stormwater assets are below. These were established based on:

- The Council approved Oshawa Strategic Plan 2020-2023
- Oshawa Financial Strategy 2016-2019
- Development Services Business Plan 2021
- Ontario Regulation 588/17 requirements and guidelines

Technical and Community based specific service levels and current performance are highlighted in the subsequent tables and sections below. City staff continually monitor performance.

Moving forward, City staff will update levels of service and performance for the stormwater assets as a new Stormwater Master Plan is completed, as well as other plans and studies are updated over time.

Stormwater Management Levels of Service ¹	Business Plan Strategy ²	Oshawa Strategic Plan Theme ³	Oshawa Financial Strategy ⁴
Adequate infrastructure for collection and discharge of stormwater Minimize blockages and flooding events	Provide a safe, reliable and connected active and transportation network	Active, healthy and safe community Safe and reliable infrastructure Proactive environmental management	Infrastructure Investment Reserve Fund Operating Cost

Notes:

¹ Various Sources

² Development Services Department Business Plan 2021

³ 2020-2023 Oshawa Strategic Plan – Our Plan for Success

⁴ Oshawa Financial Strategy 2016-2019

Stormwater Assets

Technical Levels of Service and Current Performance

Service Attribute	Technical Levels of Service ¹	Current Performance ²
Scope	Percentage of <u>properties</u> in the City resilient to a 100-year storm.	96%
Scope	Percentage of the City <u>stormwater management system</u> resilient to a 5-year storm.	90-95%

Note:

¹ Ontario Regulation 588/17, Asset Management Planning for Municipal Infrastructure

² Current performance is based on the City's subject matter expert opinion

Stormwater Assets

Community - Current Levels of Service



Stormwater management includes grey infrastructure and green infrastructure. Grey infrastructure includes assets such as storm sewers, roadway culverts, inlets, outfalls and ponds, while green infrastructure includes open spaces and parkland that is designed to be a part of the City's overland flow routes (designed to convey stormwater from the right of way to creeks). This includes low impact development features, and natural heritage components such as forests and wetlands.

Urban flooding refers to the surcharging of the minor storm sewer system, and often results in basement flooding, while riverine flooding occurs when the major stormwater management system is unable to protect against flooding and damage to buildings and infrastructure. Oshawa's system uses the traditional engineering methods to determine sizing of sewer, however with shorter inlet entry time. Oshawa's sewer design maintains an adequate level of service when coupled with the city's major system that is designed to manage flows in excess of the storm sewer capacity. This approach has proven to effectively reduce risk of flooding in basements and private property.

To achieve the ultimate goal of stormwater management is to maintain the health of streams, lakes and aquatic life, as well as provide opportunities for human uses of water by mitigating the effects of urban development. The City strives to:

- Maintain the natural hydrologic cycle
- Prevent an increased risk of flooding
- Prevent undesirable stream erosion
- Protect water quality

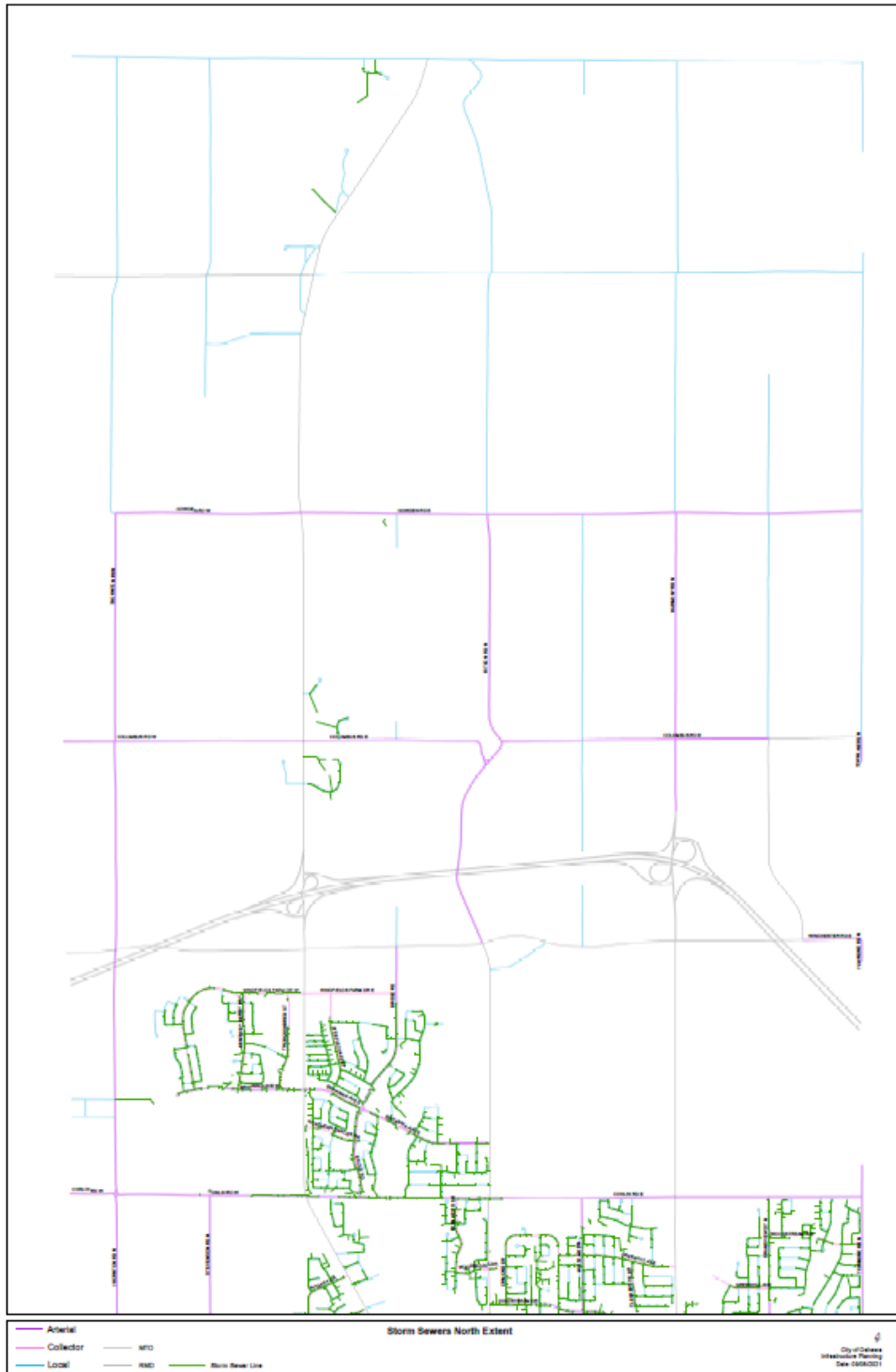
The City's upcoming Stormwater Management Master Plan will help the City of Oshawa to see opportunities for improving the knowledge of the risks, methods for planning that support growth and intensification, and decision-making regarding municipal stormwater infrastructure, grey, green and even our natural assets. The City will also work with partners on ensuring the City is resilient to climate change and continue to shift towards a focus on environmental sustainability across the larger watershed.

A map highlighting the City's stormwater network is below.

Stormwater Assets

Community - Current Levels of Service

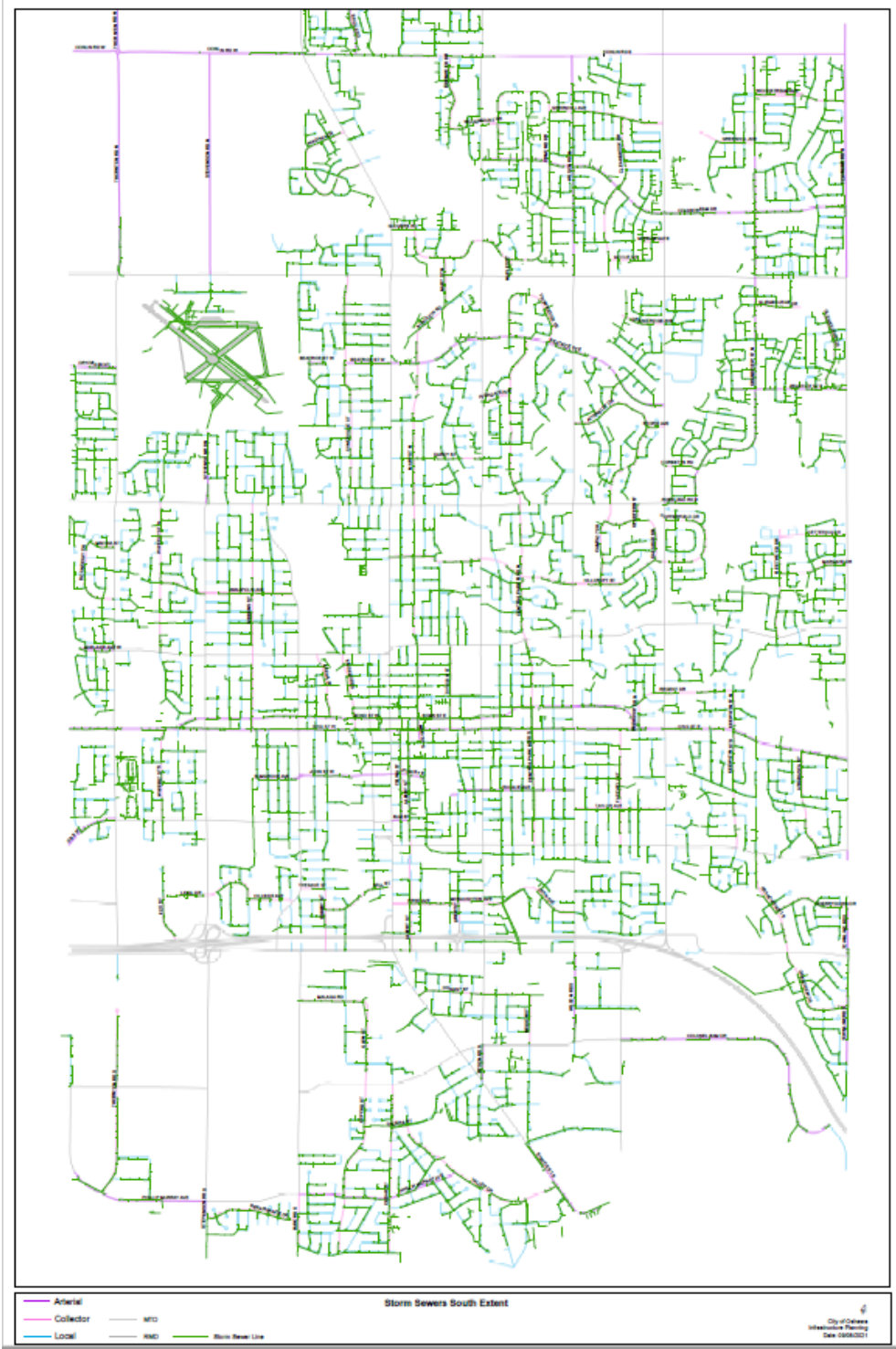
City of Oshawa Stormwater Network – North Extent



Stormwater Assets

Community - Current Levels of Service

City of Oshawa Stormwater Network – South Extent



Stormwater Assets

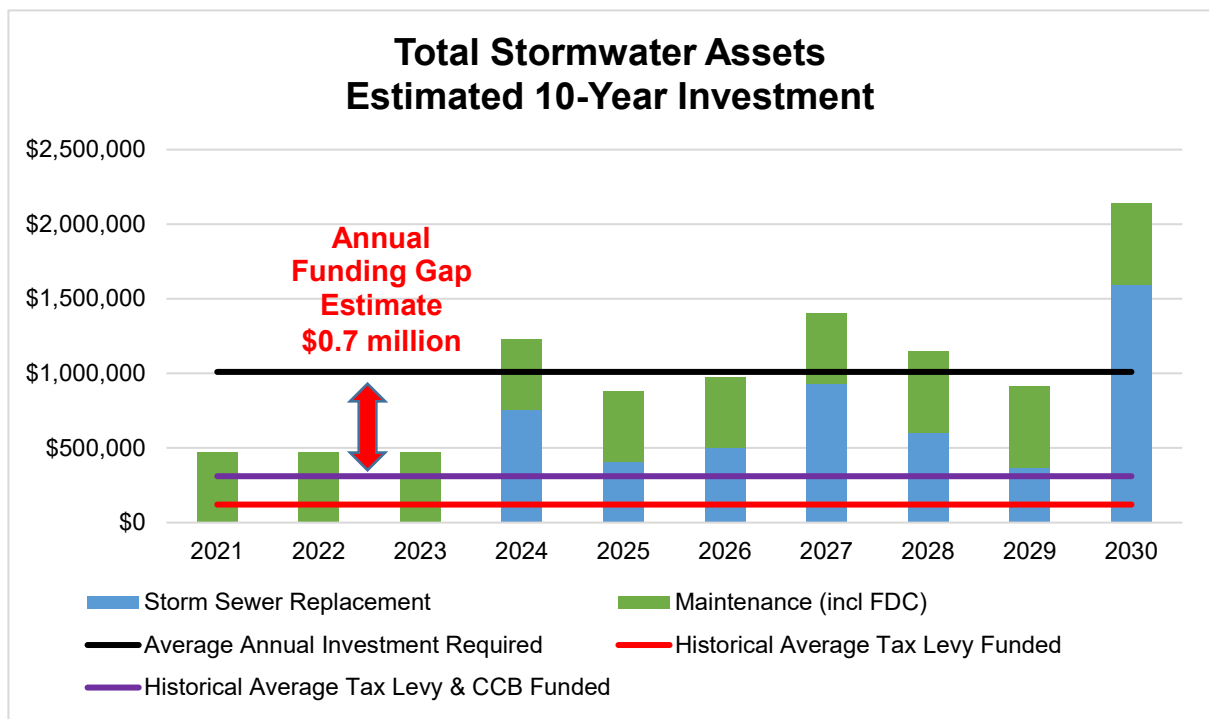
Lifecycle Management Strategies

Storm sewer assets undergo regular cleaning and inspection which identify proactive and reactive maintenance and repair requirements. C.C.T.V. (Closed Circuit Television) inspections are performed annually which includes approximately 25 kilometers or 1/20th of the storm sewer network.

The City currently only performs replacement lifecycle activities for the storm sewer and F.D.C. storm sewer assets. The replacement forecast determined for the purposes of this asset management plan, is solely based on replacing the asset at the end of its useful life. As the F.D.C. storm sewer assets are relatively new, there are not anticipated capital replacements in the next 40 years.

There are other factors that influence the timing of replacement, such as the timing of the reconstruction of the road in the existing right of way, coordination with the Region of Durham for replacement of water and sewer assets, as well as any inspections that show significant deterioration of the assets.

The 10-year estimated forecast show an average annual investment of just over \$1.0 million to maintain the current levels of service. Based on the past six years of approved budget, the annual investment in stormwater assets from tax levy and the Canada Community Benefit Fund (previously Federal Gas Tax Funding) is \$0.3 million. This results in an estimated annual funding gap of \$0.7 million.

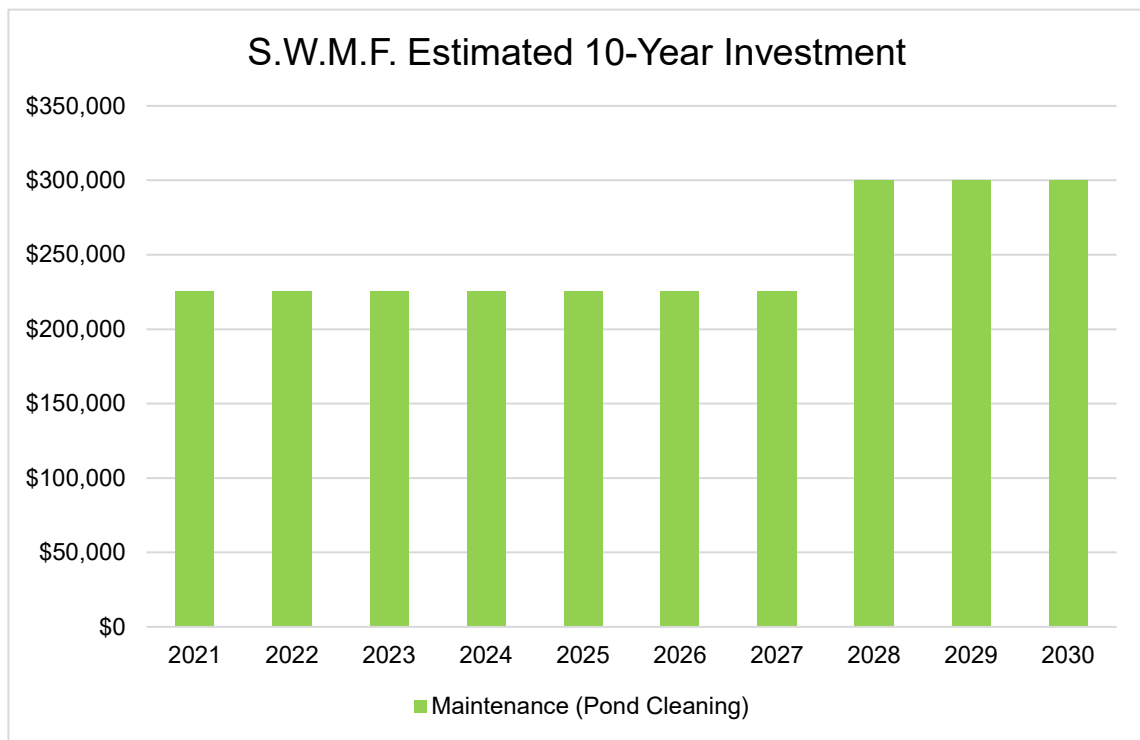


Stormwater Assets

Lifecycle Management Strategies

Stormwater Management Facilities (S.W.M.F.) are relatively new and are expected to have long lives. The majority of the S.W.M.F. construction costs originate from excavating the initial basin. As such, the initial capital expenditure is a one-time only cost. The ongoing expense will occur as it relates to maintenance and sediment control through a cleaning process. Each facility should be cleaned approximately every 10 years, to maintain full serviceability of these critical components.

Visual inspections are completed several times a year to determine the facilities that are required to be cleaned. In order to assist with the future lifecycle costs, City Council endorsed a Stormwater Pond Maintenance Fee Policy in 2016 that requires developers to pay a fee that will be used for one future clean-out of a pond.

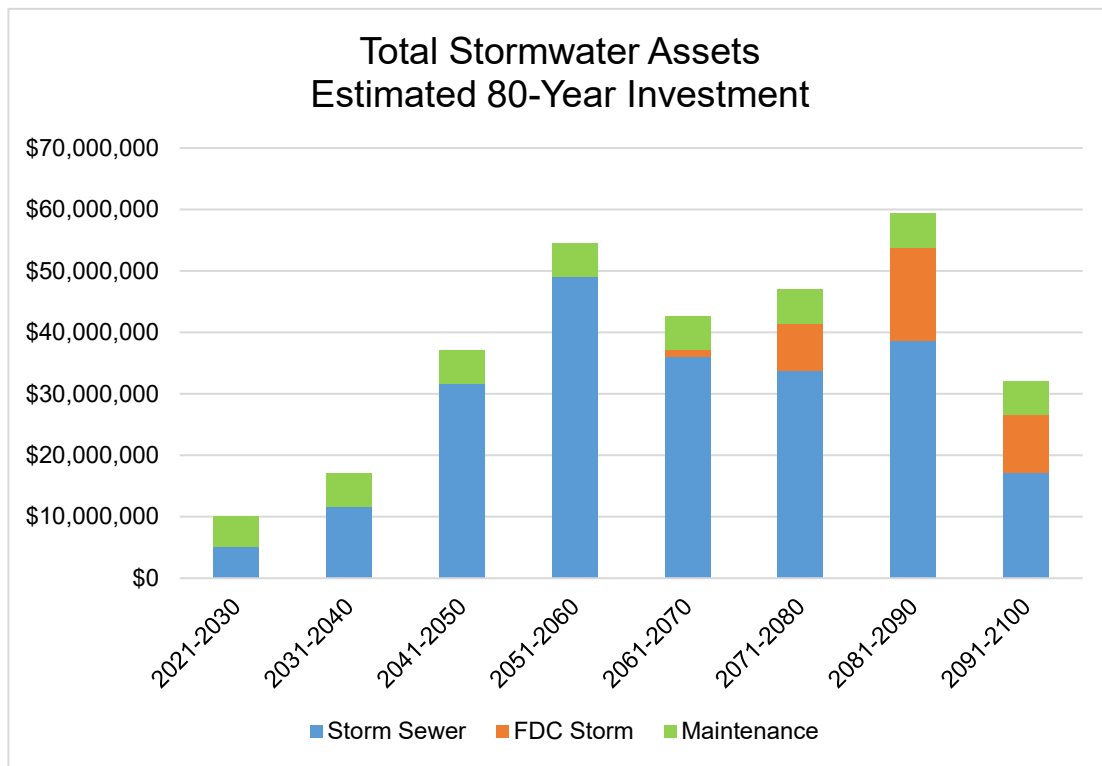


Stormwater Assets

Lifecycle Management Strategies

Ontario Regulation 588/17 requires municipalities to include the costs required to maintain the current levels of service for the next 10-year period. Best practices are recommend including a long-range forecast up to 100 years.

The figure below represents the long-range forecast of estimated expenditures required for stormwater assets, which aligns with the full 80 year estimated useful life. As asset management plans are to be updated every five years, these amounts will continue to be refined based on new information and potentially new technology.



Stormwater Assets

Managing Growth – Capital and Operating Forecast

The 2016 population for the City of Oshawa was 153,585 and is anticipated to increase to 197,000 by 2031.

City of Oshawa ¹	2016	2021	2026	2031
Total Population	165,390	174,695	184,460	197,000
Households	64,535	70,415	75,655	82,590
Employment	75,305	84,660	86,835	90,790

Note: ¹ Per 2020 Durham Regional Official Plan

The population growth is expected to result in incremental service demands that may impact the current level of service. In order to accommodate the projected increases in demand caused by growth, the City has undertaken a number of master planning studies which identify the need for new infrastructure and infrastructure service expansions. These growth-related needs have been included in the City's 2019 Development Charges Background Study and the 10-year capital forecast. Utilizing development charges to fund the growth-related initial capital costs helps to ensure the results of future growth do not increase the cost of maintaining levels of service for existing tax payers.

There are no significant maintenance or capital costs in the next 10 years for growth-related infrastructure service expansions or assets acquired through subdivision assumptions. As the average useful life of stormwater assets are 80 years, the eventual replacement cost of the growth assets are not included in this plan, but will eventually need to be funded by the City.

The City's Official Plan references that build-out is estimated to occur in 2031. The operating costs related to assumed assets are difficult to estimate and is really dependent on what future proposed levels of service are approved by Council. As asset management practices continue to mature and better information is gathered, more specific information relating to operating costs will be determined.

The majority of growth related capital projects include a small proportion of improvements that benefit the existing residents. These costs are required to be funded by the City, while development charges pay for the majority of the cost. Over the 10-year forecast, the average annual contribution required for the non-growth related capital portion of stormwater assets is \$337,000. Annually, the City budgets a contribution from operating to a Growth Related Non-D.C. reserve to fund the City's portion of growth related capital investments.

Stormwater Assets

Managing Growth – Capital and Operating Forecast

