City of Barrie
Fleet Asset Management Plan

2024

Prepared by the Corporate Asset Management Department

Executive Summary

The Fleet Asset Management Plan (AMP) serves as an update to the City of Barrie's (the City) previous asset management plan, completed in 2011. The Fleet AMP summarizes the current state, risk profile, levels of service, and funding needs of the City's fleet. This update addresses the requirements in O.Reg 588/17: Asset Management Planning for Municipal Infrastructure in respect of the City's fleet assets, including the mandatory content requirements for both the 2024 and 2025 deadlines in the regulation.

The City owns a total of 534 fleet assets with a current replacement value of $75 million (2023). About 52% of these assets are in fair or better condition, but 33% are older than their optimal service lives, resulting in excessive repair costs, service delivery risks, and financial inefficiencies.

Approximately 10% of fleet assets are classified as very high-risk, including critical firefighting apparatus. Another 5% are high-risk assets that need replacement to avoid service disruptions. Collectively, these aging assets pose significant risks to the City's operations.

In 2019, the capital Fleet Replacement Program was established along with the Fleet Management Reserve to pro-actively plan and manage replacement of fleet assets and ensure reliable funding to do so. The goal of this program is to bring the City's fleet replacements in-line with industry best practices to minimize the total cost of ownership for fleet assets and ensure the reliability and safety of the City's fleet.

The Fleet AMP provides a forward-looking plan to continue the Fleet Replacement Program from 2024-2033.The AMP summarizes the current and proposed levels of service (LOS) for the City's fleet, along with the lifecycle and financial strategies to meet the proposed LOS. To achieve the proposed LOS, the City needs to invest an average of $5.6 million per year in fleet replacements over the next ten (10) years.

The Fleet Management Reserve, funded by water and wastewater rates and tax revenues, currently faces a projected annual average shortfall of $1.9 million. To address the shortfall, the City must increase contributions to the Fleet Management Reserve or consider alternative funding sources such as additional debt issuance. Increased reserve contributions from water and wastewater revenues can partially mitigate this shortfall, and further funding from tax revenue and/or debt will be necessary to achieve proposed LOS.

The AMP is a dynamic document that will be updated regularly to reflect the City's data and analysis capabilities, evolving market conditions, technology advancements, and service expectations.

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1. Introduction

The purpose of the Fleet Asset Management Plan (AMP) is to provide a rational understanding of the fleet of vehicles and equipment used by the City of Barrie to provide services to the community, the levels of service being provided, and the lifecycle and financial strategy to achieve proposed levels of service for the period from 2024-2033. The AMP will focus on the content required by Ontario Regulation (O. Reg.) 588/17 Asset Management Planning for Municipal Infrastructure.

The Fleet Asset Management Plan summarizes the following:

a) The vehicles and equipment owned by the City.
b) The current levels of service provided by these assets, and the levels of service proposed to be achieved over the period from 2024-2033.
c) The lifecycle and financial strategies to achieve the proposed levels of service, including capital expenditures and significant operating costs.
d) The risks associated with implementation of the asset management plan and any actions proposed in response to those risks.
e) The recommended actions to improve the City's asset management capabilities as they relate to fleet vehicles and equipment.

2. State of Fleet Assets

This section describes the current state of the City's fleet, based on data up to the end of 2023. For the purposes of this AMP, fleet assets are defined using the definitions in the City's draft Fleet Management Policy, as follows:

Fleet Vehicle – any of the following, that are owned by the City:

a) a vehicle licensed for the road under the Highway Traffic Act (HTA) with a value exceeding $10,000.
b) A motorized piece of equipment not licensed for the road, where the movement of the unit is controlled by an operator, with a value exceeding $10,000.
c) A trailer that is licensed for the road under the HTA.
d) An attachment to a vehicle or equipment that is dependent on an operator-controlled asset to function.

Fleet Equipment – any motorized unit not required to be licensed under the HTA; and where the movement of the unit is controlled by a driver/operator and owned by the City; and where the value exceeds $10,000.

Attachments - any attachment that is permanently secured to the vehicle and not easily removed and transferable to another vehicle will be considered part of the fleet asset. The value of attachments will be added to the purchase price of the vehicle/equipment. Attachments will be procured by Fleet Strategy when purchasing the vehicle/equipment.

Trailers- licensed for the road under the HTA and drawn, propelled, or moved by a vehicle or equipment. A trailer is considered a separate vehicle and not part of the motor vehicle by which it is drawn. Trailers will be exempt from the $10,000 minimum cost requirement to be a fleet asset.

The City owns a number of small engine and/or handheld equipment which aren't classified as fleet vehicles or equipment under the Fleet Management Policy, and which are not captured in this AMP. Examples include chain saws, leaf blowers, and similarly sized/valued items. Discussions around future asset management efforts for these items will continue, and consideration will be given to inclusion in a future AMP depending on resourcing and value for effort. This AMP does not include the City's transit bus fleet, nor the Barrie Police Service fleet; those vehicles are managed by Access Barrie and Barrie Police respectively and are covered under separate AMPs.

The City also relies on a number of rented vehicles, primarily to deliver seasonal services where there is no need for a vehicle all year round. Those assets are not included in this AMP as the City doesn't own them, and they are funded through departmental operating budgets.

In this AMP, fleet vehicle and equipment assets are presented in sub-categories as follows:

Table 1: Fleet Asset Sub-categories

Category	Sub-category	Description
Vehicles	Light-duty Vehicles	SUVs, small trucks, and cargo vans used for administrative purposes and light transportation of materials, tools, or equipment. Includes trucks up to 5500 series.
	Medium-duty Vehicles	Vehicles such as medium-sized trucks and vans with a gross vehicle weight rating (GVWR) higher than light-duty vehicles but lower than heavy-duty vehicles. Includes 6500 series trucks and cube vans as well as street sweepers.
	Heavy-duty Vehicles	Includes large trucks and specialized vehicles with a GVWR exceeding a certain threshold. This category includes the City's single and tandem axle snow plows.
	Firefighting Apparatus	Consists of fire trucks, pumpers, ladder trucks, and other specialized vehicles equipped for firefighting and emergency response purposes. Excludes light-duty vehicles used by Barrie Fire & Emergency Services.
Equipment	Trailers	Refers to units that are licensed for road use and are drawn, propelled, or moved by a vehicle or equipment. Trailers serve various purposes including transportation of materials, tools, or equipment.
	Light Equipment	Includes small motorized equipment such as lawnmowers and small utility vehicles used for maintenance, landscaping, or light construction tasks.
	Medium Equipment	Mid-sized motorized equipment such as lawn mowers 11 ft or larger, ice resurfacing machines, and sidewalk plows.
	Heavy Equipment	Large motorized equipment such as excavators, bulldozers, loaders, and other specialized equipment.

The City currently owns a total of 534 fleet assets, including vehicles and equipment. The current replacement value (CRV) of the City's fleet is approximately $75 million (2023).

Table 2: Fleet Asset Summary and Current Replacement Value

Asset Class	Category	Sub-Category	Count	CRV ($2023 Millions)
Fleet	Vehicles	Light-duty Vehicles	217	$15.3
		Medium-duty Vehicles	14	$3.6
		Heavy-duty Vehicles	42	$16.4
		Firefighting Apparatus	17	$18.2
	Equipment	Trailers	83	$1.5
		Light Equipment	101	$4.5
		Medium Equipment	45	$6.9
		Heavy Equipment	15	$8.5
	TOTAL		**534**	**$74.8**

Typically, after a certain age the maintenance cost for fleet assets rises sharply as more expensive repairs are needed to keep the asset working. At the same time, the resale or trade-in value of fleet assets decreases over time. The goal when setting service lives for fleet assets is to minimize the total cost of ownership by optimizing the capital purchase cost, maintenance cost, and resale value of each asset. For this reason, the term “optimal service life” has been used throughout this report to represent ideal conditions. Optimal service lives for fleet assets have been established based on industry best practices.

Actual service lives for fleet assets may vary based on the type and quantity of use. The optimal service lives provided in this AMP are based on the best available information and are in alignment with industry standards such as those published by the American Public Works Association. Fleet service lives will be adjusted in the future as the City continues to optimize its fleet strategy.

The table below shows the average optimal service lives for each sub-category of fleet asset along with the average actual age at the end of 2023, the total number of assets that are older than their optimal service life, and also the age of the oldest individual asset in each sub-category. A more detailed breakdown of the optimal service lives and current age of fleet assets is included in Appendix A.

Table 3: Fleet Asset Age and Service Life

Category	Sub-Category	Average Optimal Service Life (years)*	Average Age (years)	Assets Beyond Their Optimal Service Life	Oldest Individual Asset (years)
Vehicles	Light-duty Vehicles	7	4.9	67	32
	Medium-duty Vehicles	11	10.2	6	20
	Heavy-duty Vehicles	11	12.0	22	27
	Firefighting Apparatus	16	10.5	4	32
Equipment	Trailers	15	9.1	9	49
	Light Equipment	13	12.8	49	38
	Medium Equipment	9	8.8	17	21
	Heavy Equipment	11	7.7	4	19
TOTAL Fleet		**10.4**	**8.3**	**178**	**49**

*Optimal service lives vary for different specific assets in each subcategory. Values in this table represent the average for the sub-category. Total fleet average is the weighted average of all fleet assets.

There are currently 99 vehicles and 79 pieces of equipment that are past their optimal service lives. This situation results in challenges for the City as Fleet Operations must keep a large number of aging vehicles and equipment in working order to sustain services such as snow plowing, water and wastewater operations, and maintenance of the City's parks and recreational facilities. Further discussion around the impacts of this age profile on service, risk and budgets are covered in future chapters of this report.

The City does not currently have a program for assessing the overall condition of fleet assets. However, condition ratings can be estimated based on the age of each asset compared to its optimal service life to give an overall indication of the condition of the City's fleet. The table below defines how condition ratings were assigned for this AMP.

Table 4: Condition Ratings Based on Age

% Remaining Life	Condition Rating
>75% to 100%	Very Good
>50% to 75%	Good
>25% to 50%	Fair
>0% to 25%	Poor
<0%	Very Poor

Approximately 52% the City's fleet is in fair or better condition, as estimated based on age. Fleet assets that are older than their optimal service lives are considered to be in very poor condition.

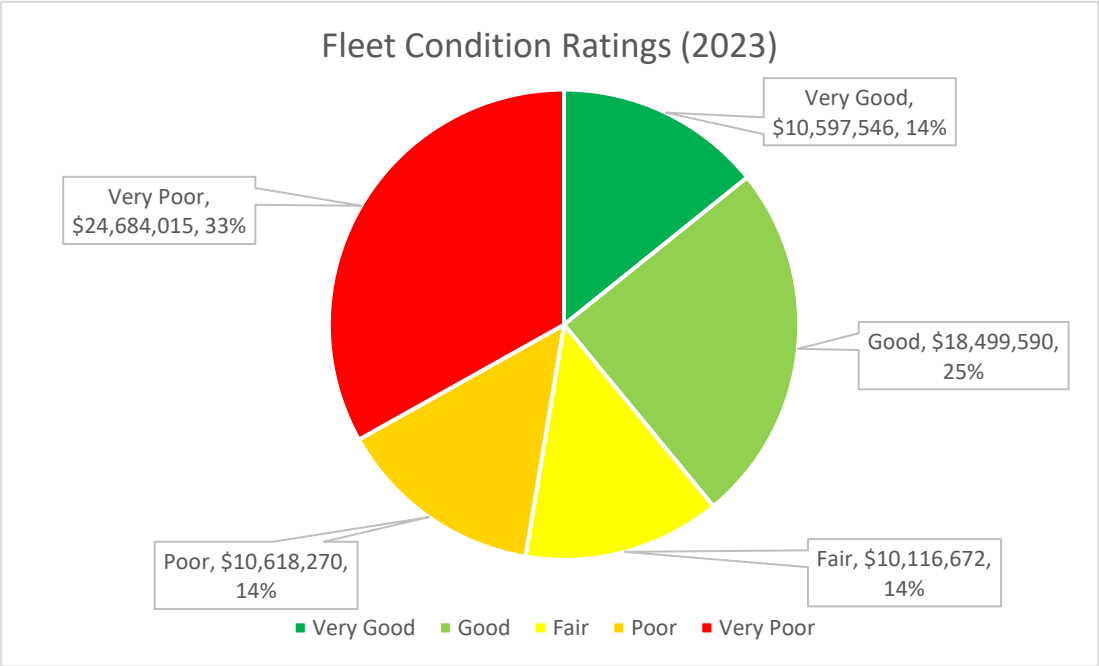

Figure 1: Fleet Condition

The City is implementing a new fleet management system which will enable more sophisticated methodologies for assessing fleet asset condition, incorporating additional data such as mileage and maintenance history. These will be implemented in future iterations of this AMP.

2.1 Alternative-fuel Fleet Conversion

The City is in the early stages of converting the fleet to electric and alternative-fuel vehicles. The City has one (1) electric vehicle (EV), two (2) ice resurfacing machines, one (1) six-foot lawn mower, one (1) baseball groomer, and various small electric equipment. Seven (7) electric pickup trucks will be delivered in 2024, and procurement of additional EVs is planned for later in 2024.

Charging infrastructure will be installed at three (3) City locations in 2024 to support the expansion of the EV fleet.

Staff are developing plans to complete the conversion of light-duty vehicles to EVs. Vehicles are planned to be replaced at the end of their lifecycle, when operationally feasible and when charging infrastructure is available. Additional charging infrastructure is included in the Phase 2 plans for the Operations Centre redevelopment and at the new Wastewater Innovation Centre. Staff are investigating the feasibility of installing further charging infrastructure at other City facilities.

Heavy-duty and specialized vehicles and equipment are planned to be converted to alternative fuels when a proven technology is available. Staff continue to investigate the use of alternative fuels when planning to procure new and replacement assets.

2.2 Fleet Risk Profile

A key goal of asset management planning is to enable decisions that minimize risks to the City. To summarize the risk profile of the City's fleet, each asset was assigned probability-of-failure and consequence-of-failure ratings. These ratings are then combined to calculate an overall risk rating for each asset.

Risk Rating = Probability of Failure x Consequence of Failure

Probability of Failure (POF)
POF ratings are based on the estimated condition of each asset. This approach is based on the principle that assets in poorer condition are more likely to fail.

Table 5: PoF Ratings

POF Rating	Corresponding Asset Condition
1	Very Good
2	Good
3	Fair
4	Poor
5	Very Poor

Consequence of Failure (COF)

COF ratings are based on the replacement value of each asset. This approach is based on the fact that the more costly a fleet asset is, the more likely it is to be used for specialized work and the more difficult it is to repair or replace in the event of a failure. Furthermore, Firefighting Apparatus were assigned a COF rating of 5 to reflect the criticality of the service they provide, in addition to their high replacement cost.

Table 6: CoF Ratings

COF Rating	Replacement Cost
1	Up to $100,000
2	$100,000 to $500,000
3	$500,000 to $1,000,000
4	Over $1,000,000
5	Firefighting Apparatus

Risk Maps

Risk maps show a graphic representation of the current risk ratings for the City's fleet. The colours on the map help to visualize the highest risk assets; where the City should focus its resources, time, effort, and dollars.

Table 7: Risk Ratings

Risk Rating (Product of COF and POF)	Risk Category
1 to 4	Negligible Risk
5 to 9	Low Risk
10 to 14	Medium Risk
15 to 19	High Risk
20 to 25	Very High Risk

The following risk maps show the current risk profile of the City's fleet. The first table shows the total current replacement value of the assets in each risk category. The second table shows the same information as a percentage of the total replacement value of the fleet.

Table 8: Fleet Risk Map – Current Replacement Value

Probability of Failure	C1	C2	C3	C4	C5
P5	$7,922,800	$10,909,300	$2,293,500	$0	$3,558,415
P4	$680,600	$5,131,000	$1,114,600	$0	$3,692,070
P3	$1,361,600	$4,744,500	$2,830,200	$0	$1,180,372
P2	$9,126,180	$4,207,200	$674,200	$0	$4,492,010
P1	$1,657,780	$1,940,700	$514,200	$1,239,200	$5,245,666
	Consequence of Failure				

Table 9: Fleet Risk Map – Percentage of Total Fleet

Probability of Failure	C1	C2	C3	C4	C5
P5	11%	15%	3%	0%	5%
P4	1%	7%	1%	0%	5%
P3	2%	6%	4%	0%	2%
P2	12%	6%	1%	0%	6%
P1	2%	3%	1%	2%	7%
	Consequence of Failure				

Very High Risk Fleet Assets

Approximately 10%, or $7.3 million worth, of the City's fleet are identified in the very high-risk category. This includes seven (7) Firefighting Apparatus that are near, at, or past their estimated service lives. These trucks are scheduled for replacement over the next few years, with funding approved in the 2023 and 2024 Capital Plans, and further capital requests forecasted for 2025 and 2026.

High Risk Fleet Assets

Approximately 5%, or $3.5 million worth, of the City’s fleet assets are identified in the high risk category. These include firefighting apparatus, heavy-duty vehicles, and heavy equipment of which most are planned for replacement through the capital Fleet Replacement Program, pending approval of forecasted budget requests from 2025-2027. There is one front-end loader in this category which is not planned for replacement and will be disposed of in 2026.

Moderate Risk Fleet Assets

Approximately 22%, or $16.5 million, of the City's fleet assets fall into the moderate risk category. This group consists of forty-nine (49) assets across various categories, primarily medium and heavy-duty trucks and equipment, all of which have reached or exceeded their optimal service lives.

Individually each asset in this category presents a moderate risk to the City however, when considered collectively, these aging assets, many performing identical functions, pose a greater risk. The group includes fifteen (15) snow plows, seven (7) lawnmowers, and six (6) ice resurfacing machines, all requiring more frequent maintenance and repairs to avoid interruptions in service. Specifically, the City has been forced to keep extra snow plows on-hand as spares to ensure that replacements are available when one or more are frequently out of service for repairs.

To date, fourteen (14) snow plows have been purchased. However, there is currently a two (2) year wait for the delivery of new snow plows after ordering. Deliveries of these snow plows are expected in 2024 and 2025. Replacement of these aging assets will mitigate much of the risk in this category, and also avoid further expensive repairs, reduce the number of spares needed, and prevent service disruptions.

3. Levels of Service

O. Reg. 588/17 requires that the City track and report levels of service (LOS), including qualitative descriptions (community LOS) and technical metrics (technical LOS).
Fleet assets enable City staff to deliver services to the community. Therefore, a key focus for managing the City's fleet is to ensure that the fleet has the capacity, functionality, and reliability to ensure that those services can be delivered at appropriate levels. Additionally, the City's fleet needs to be managed safely to protect both the public and City employees and comply with regulation. These service attributes (capacity, function, reliability, and safety) form the basis for measuring the LOS provided by the City's fleet.

3.1 Community LOS

Community LOS are qualitative descriptions, in plain language, of what the community can expect from City services.

Table 10: Community LOS

Service Attribute	Community LOS
Capacity and Function	The City's fleet has enough vehicles and equipment, and they're suitable for the tasks needed to provide services to the community.
Reliability and Safety	The City ensures that its fleet is well-maintained and managed to provide dependable services while prioritizing the safety of both the community and City staff.

3.2 Technical LOS

Technical LOS are specific, measurable standards or criteria that describe how well the City's assets should perform in order to meet their intended purpose. These levels are set based on technical considerations and are used to guide the lifecycle strategies needed to achieve the community LOS.

Table 11: Technical LOS

Service Attribute	Technical LOS
Capacity and Function	Inventory count of fleet assets owned by the City.
	Functional descriptions of vehicles and equipment owned by the City.
Reliability and Safety	% of fleet assets that are past their optimal service lives.
	% of fleet assets in fair-or-better condition.

3.3 Performance

O. Reg. 588/17 requires that the City track and report any performance measures that have been established by the municipality, including those that would measure energy usage and operating efficiency. This AMP will focus on the LOS measures identified in the previous section and no additional performance measures around energy usage and operating efficiency have been identified for inclusion at this time.

The City has recently implemented a new and upgraded fleet automated vehicle locator (AVL) system and is in the process of implementing a new and upgraded fleet management software system. These two systems will enable the development of new performance metrics for future iterations of this AMP. Additionally, as the City makes further progress implementing plans and policies for climate change mitigation and fleet electrification, new performance measures will be developed.

3.4 Current Levels of Service – 2023

The current levels of service being provided in respect of the City's fleet assets are summarized below, organized by the service attributes they support.

Capacity & Function

LOS Measure: Inventory count of fleet assets owned by the City.

LOS Measure: Functional descriptions of vehicles and equipment owned by the City.

Table 12: Current LOS - Capacity & Function

Category	Sub-Category	Count
Vehicles	Light-duty Vehicles	217
	Medium-duty Vehicles	14
	Heavy-duty Vehicles	42
	Firefighting Apparatus	17
Equipment	Trailers	83
	Light Equipment	101
	Medium Equipment	45
	Heavy Equipment	15
TOTAL		**534**

More detailed breakdowns of the fleet inventory, by vehicle/equipment description, are provided in Appendix A.

Reliability and Safety

LOS Measure: % of fleet assets that are past their optimal service lives.

Table 13: Current LOS - Fleet Assets Past their Optimal Service Lives

Category	Sub-Category	%
Vehicles	Light-duty Vehicles	32%
	Medium-duty Vehicles	29%
	Heavy-duty Vehicles	49%
	Firefighting Apparatus	20%
Equipment	Trailers	12%
	Light Equipment	51%
	Medium Equipment	38%
	Heavy Equipment	24%
Overall		**33%**

LOS Measure: % of Fleet Assets in fair-or-better condition.

Table 14: Fleet Assets in Fair-or-better Condition

Category	Sub-Category	%
Vehicles	Light-duty Vehicles	66%
	Medium-duty Vehicles	61%
	Heavy-duty Vehicles	33%
	Firefighting Apparatus	60%
Equipment	Trailers	68%
	Light Equipment	30%
	Medium Equipment	53%
	Heavy Equipment	54%
Overall		**52%**

3.5 Proposed Levels of Service – 2024-2033

This section will describe the LOS that the City proposes to achieve during the period from 2024-2033.

Proposed Capacity and Function LOS

No changes are proposed for the City's current LOS related to fleet capacity and function. However, as the City continues to develop, intensify, and expand infrastructure, additional fleet complement will be required to maintain current LOS.

The specific timing of additional fleet requirements to align with asset and population growth can be difficult to predict. This AMP does not include a detailed annual plan for additional fleet complement needed to maintain service levels as the population grows. To provide an estimate of fleet growth over the next 10 years, approximate growth rates have

been established based on approved new fleet complement during the five (5) year period from 2020-2024. This results in the total fleet complement increasing from five hundred and thirty-four (534) assets in 2023, to six hundred and twelve (612) assets by 2033. A breakdown of this estimate by functional class is provided below.

Table 15: Proposed LOS – Fleet Capacity & Function

Category	Sub-Category	2023 Current LOS	2033 Proposed LOS
Vehicles	Light-duty Vehicles	217	248
	Medium-duty Vehicles	14	16
	Heavy-duty Vehicles	42	48
	Firefighting Apparatus	17	19
Equipment	Trailers	83	96
	Light Equipment	101	116
	Medium Equipment	45	52
	Heavy Equipment	15	17
TOTAL		**534**	**612**

Proposed Reliability and Safety LOS

Currently, 33% of fleet assets are older than their optimal service lives. This represents a replacement backlog of more than $24 million. This backlog is the result of underinvestment in fleet replacements.

With five hundred and thirty-four (534) assets in the City's current fleet, and an average service life of ten (10) years for fleet assets, the City should be replacing approximately fifty-three (53) end-of-life fleet assets per year on average in order to be sustainable. From 2010 to 2019, the City purchased an average of twenty-three (23) fleet assets per year.

Since the implementation of the Fleet Replacement Program in 2019, the City has purchased an average of forty-six (46) fleet assets per year, which includes additional fleet complement not just end-of-life replacements. This means that the City has been underinvesting in the replacement of fleet assets, and a backlog of necessary replacements has accumulated. This underinvestment results in the following risks and impacts for the City:

- Increased down time and service disruptions,
- Increased maintenance and repair costs due to the need to keep aging vehicles and equipment working,
- Increased rental costs when fleet assets fail and must be removed from service/are cost prohibitive to repair, and
- Decreased re-sale value for fleet assets that have been used past their optimal service life.

The capital Fleet Replacement Program (project numbers RP1188 and 001267) was created to increase the rate of fleet replacements and bring the City's fleet service lives

more in line with industry best practices and optimal lifecycles. Continuing this program through 2033, as forecast in the 2024-2033 capital plan, results in an increase to the current LOS for fleet reliability.

As shown below, approval of funding forecasts for the Fleet Replacement Program through 2033 will decrease the percentage of fleet assets that are past their estimated service lives from 35% to 20% and increase the percentage of assets in fair-or-better condition from 52% to 68%.

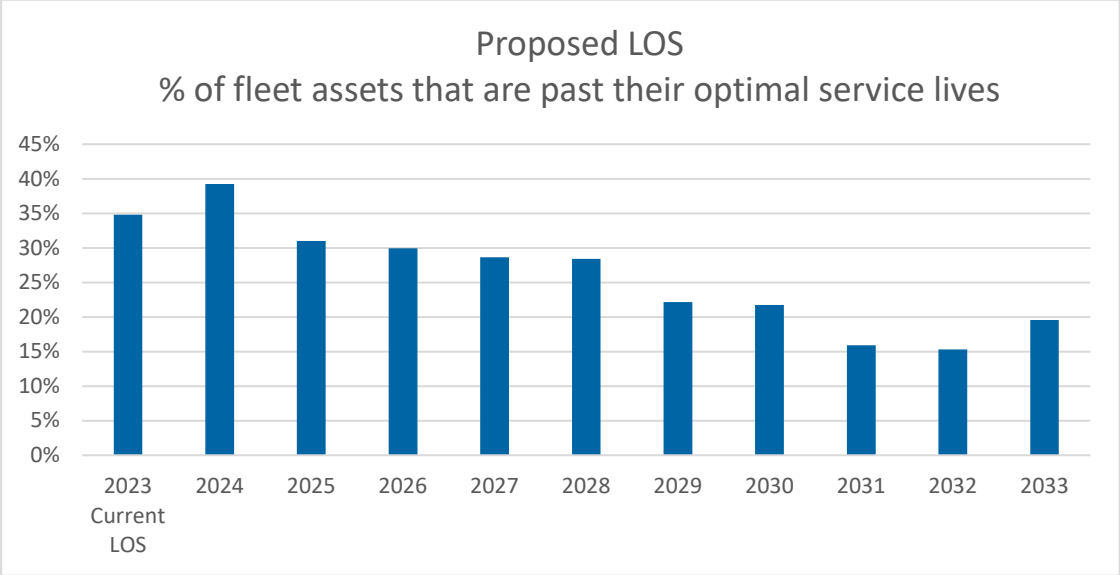

Figure 2: Proposed LOS - Fleet Assets Past their Optimal Service Lives

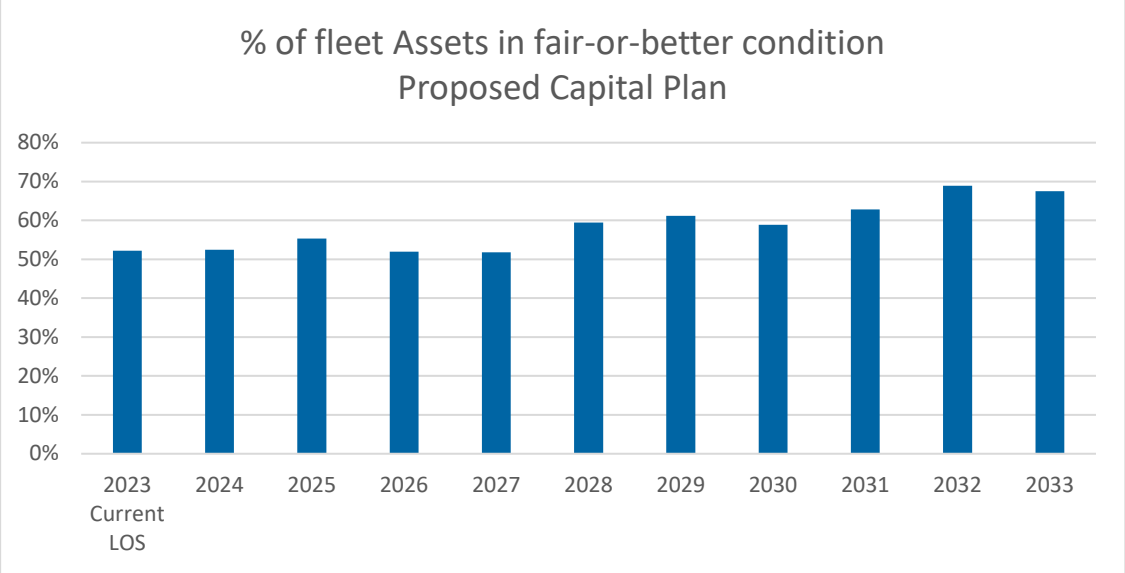

Figure 3: Proposed LOS - Fleet Assets in Fair-or-better Condition

While the proposed LOS represents a substantial improvement over the current LOS, it still doesn't achieve optimal service lives for the City. Many fleet assets will still be kept in service beyond their optimal service lives. The proposed LOS and associated Fleet Replacement Program are intended to reduce the backlog and bring the City's fleet closer to optimal service lives while also mitigating budget impacts and in consideration of resourcing available to deliver a large capital plan. Over time, it should be the City's goal to increase investment in fleet replacements and achieve optimal service lives for all fleet assets.

4. Lifecycle Strategy

This section will describe the lifecycle strategy that is proposed for the City's fleet, including options available for lifecycle activities to achieve current and proposed LOS, risks associated with different lifecycle strategies, and the lifecycle activities that can be undertaken for the lowest cost to achieve LOS targets.

In this AMP, lifecycle activities are separated into the following categories:

- Capital growth – new fleet assets which would be added to the fleet inventory to be used by City employees in order to maintain current service levels as the City's population, and non-fleet asset inventories, grow.
- Capital renewal – replacement of existing fleet assets in order to meet reliability and safety service levels.
- Operations and maintenance – Activities to operate and maintain the City's fleet in order to maintain reliability and safety service levels.

4.1 Fleet Growth Strategies

As the City grows, new and expanded infrastructure is required to ensure provision of services. To have a fleet with sufficient capacity and functionality to continue to provide high quality services to the community, the City will inevitably need additional vehicles and equipment. The following options are available to enable the City to efficiently manage its fleet to achieve LOS targets as the City grows:

- **Purchasing vehicles and equipment -** In most cases, where a fleet asset will be used full-time over a period of years, purchasing and maintaining City-owned vehicles and equipment will be the most financially efficient option.
- **Renting or leasing vehicles and equipment -** The City can rent or lease vehicles and equipment needed to provide services. This approach is considered based on the period of time that the asset may be needed, and the total lifecycle costs, to ensure that the City is making the most financially efficient decision. This option is available for many vehicles and equipment, but some assets are so specialized that renting or leasing is not feasible.
- **Increase or decrease the use of contracted services -** For some services, the City has the option to hire contracted services to complete needed work. This can result in fewer fleet assets being needed for use by City employees. In some cases, it is optimal to insource services that were previously contracted. These options should continue to be considered on a case-by-case basis to ensure an optimal balance between costs, levels of service, and risks to the City.
- **Non-asset solutions -** There may be opportunities to increase the efficiency of the City's fleet by optimizing the utilization of fleet assets. This may include increased use of outsourcing, as well as sharing or pooling fleet assets within and between departments, or even reducing fleet complement in some areas as business processes change over time. These options are being explored by the City's Fleet Strategy team.

In general, a combination of the above options are recommended in order to manage the total costs of providing services to the community.

4.2 Fleet Renewal Strategies

To maintain the reliability of the City's fleet, City-owned vehicles and equipment must be replaced at the end of their service lives. The lifecycle strategy for fleet renewal will focus on optimizing asset lifecycles to minimize the total cost of ownership.

Optimized Fleet Life Cycles
The total cost of ownership is the lifetime cost of owning an asset which includes acquisition, maintenance, and disposal costs. There is a point in the lifecycle of each asset where the total cost of ownership is minimized; this defines the optimal service life or replacement age.
For fleet assets, the total cost of ownership is impacted by the following factors:

- Capital purchase costs - the impact of initial capital purchase costs decreases the longer vehicles or equipment are owned.
- Maintenance and repair costs - as each asset ages, maintenance and repair costs increase.
- Re-sale or trade-in value - fleet assets are usually sold or traded-in at the end of their service life, recovering some of the overall cost. The resale value of vehicles and equipment decreases over time based on the age and usage (typically mileage or hours) of the asset.

To optimize the total cost of ownership for each fleet asset, all three (3) of the above factors must be considered.
At this time, the City has not conducted an empirical analysis to determine the optimal life cycles based on Barrie specific data. It is anticipated that the City's new fleet management system will provide improved tracking of maintenance data to enable this analysis in the future.

In the meantime, the City has identified recommended service lives for fleet assets based on industry standards including data published by the American Public Works Association. Optimal service lives for fleet assets may vary by geography, climate, economic conditions, usage, and other factors and therefore relying on industry standards may not always be optimal in Barrie's context. That said, they are reasonable assumptions to use under the circumstances. The estimated service lives used in this AMP are expected to bring the City closer to optimal lifecycles than past practices, and should reduce the total cost of ownership for the City's fleet assets. In the future the City intends to revise its optimal service lives based on data and analysis from the new fleet management system which is being implemented in 2024.

4.3 Fleet Operation and Maintenance Strategies

The reliability and safety of the City's fleet are supported by the Fleet Operations team, who are responsible for regular inspections, preventative maintenance, and repairs of fleet assets, and the Coordinator of Vehicle and Equipment Training, who oversees the training, certification, licensing, and monitoring of staff who operate City vehicles and equipment. Inspection and preventative maintenance programs are generally established based on manufacturers' recommendations, industry best practices, and regulatory guidelines.

Employee and operator training and certification requirements are generally set by regulations or by City policy. However, there are some options the City can choose to exercise in order to enhance the safety and reliability of the fleet, or to reduce the overall costs of the fleet service:

Preventative Maintenance
Appropriate preventative maintenance activities can reduce the amount of downtime, decrease risks and costs related to repairs, and increase the service life of fleet assets. The ability to complete preventative maintenance work depends on two factors:

- Capacity, resources, and funding of Fleet Operations – Fleet Operations have identified a need for increased space and equipment, as well as staff including technicians in order to keep up with preventative maintenance activities. As the fleet continues to grow, Fleet Operations resources and facilities need to grow proportionally.
- Capital fleet renewal strategy adopted by the City – by moving toward optimized lifecycles for fleet assets, it is expected that the City's emergency and reactive repairs will be reduced, which will free up capacity within Fleet Operations to increase preventative maintenance activities.

Use of External Services
Due to limited in-house Fleet Operations resources, $2 million is budgeted in 2024 for contracted and other services to repair and maintain fleet assets. It is estimated that outsourcing fleet maintenance and repairs can cost up to twice as much as inhouse services. By increasing the Fleet Operations staff complement, the City may be able to reduce overall costs by decreasing the use of external services for fleet maintenance and repairs.

4.4 Lifecycle Activities to Maintain Current LOS

The lifecycle activities that would be required to maintain the current levels of service from 2024 to 2033 are described below.

Capital Growth
The additional fleet assets projected to be required to maintain service levels as the City's population grows are estimated to result in approximately **$1 million (2023$) in annual expenditures from 2024-2033.** The actual need for additional fleet assets can be expected to vary substantially from year-to-year based on the timing of development and infrastructure projects, and the services and assets required. These will continue to be proposed as individual projects for approval through the City's Capital Plan.

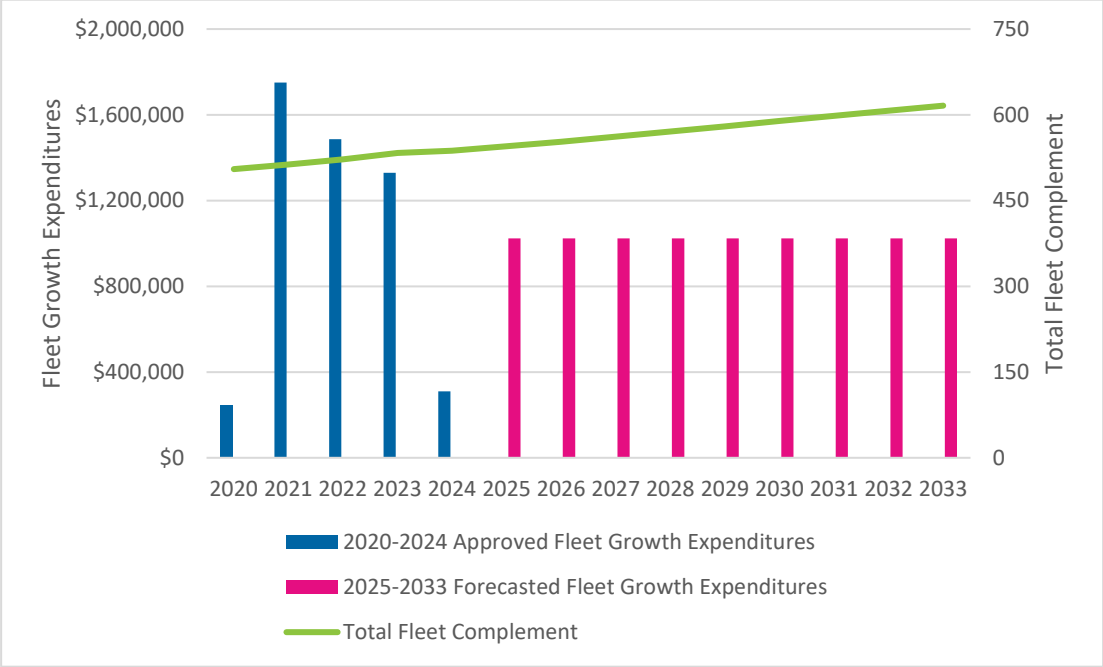

Figure 4: Current LOS - Fleet Growth Forecast

Capital Renewal

A capital fleet replacement budget has been developed that would maintain the City's current LOS for fleet reliability. In this scenario approximately 52% of fleet assets are in fair-or-better condition as estimated based on age, and approximately 30% of fleet assets are past their estimated service lives throughout the ten (10) year period. **The average capital renewal expenditure required to maintain the current LOS is approximately $4.6 million per year.**

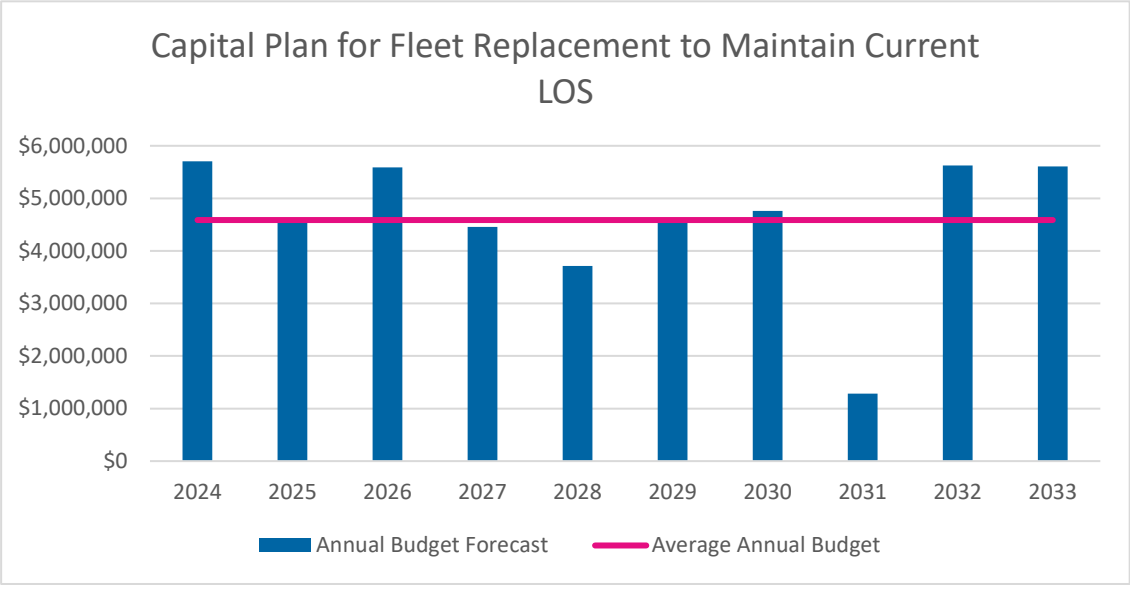

Figure 5: Current LOS - Fleet Replacement Forecast

Operations and Maintenance
It is assumed that operating budgets will continue to increase at forecasted rates shown in the City's 2024 Budget. Based on this, **the City's annual operating budget needed for Fleet Operations is expected to increase from approximately $5.9 million in 2024 to $7.4 million by 2033**.

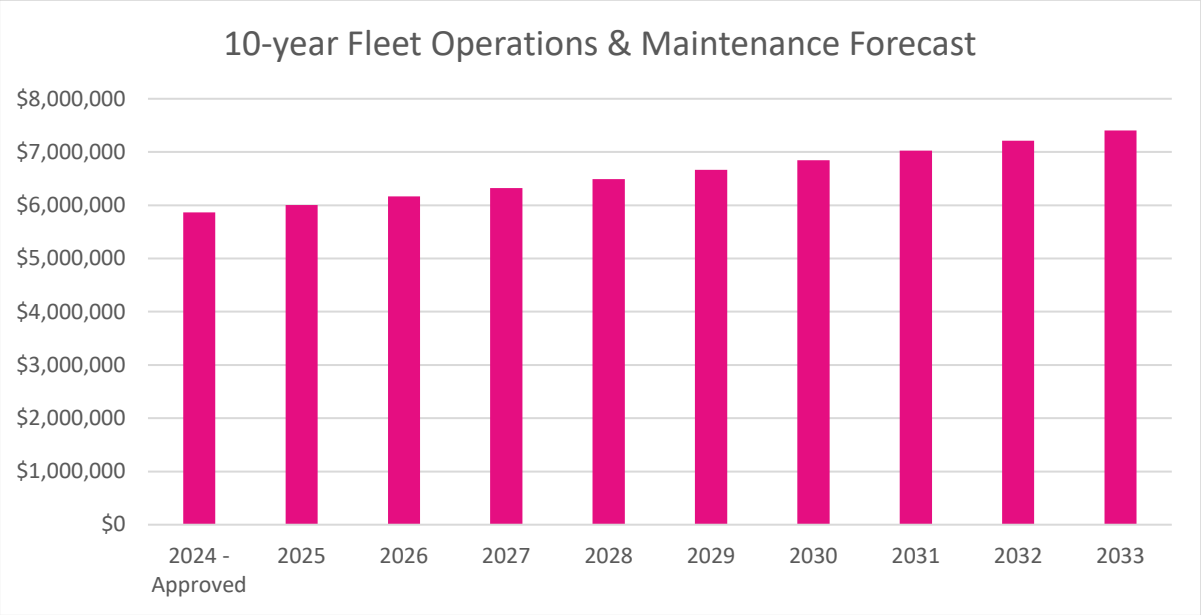

Figure 6: Current LOS - Fleet Operations & Maintenance Forecast

4.5 Lifecycle Activities to Achieve the Proposed LOS

The activities to achieve the proposed LOS from 2024 to 2033 are described below. The proposed LOS relating to capacity and function of the City's fleet are the same as the current LOS. Therefore, the proposed lifecycle activities and related expenditures for capital growth, operations, and maintenance are the same as those identified to maintain the current LOS.

The improved LOS proposed for the reliability of the City's fleet will be achieved through planned capital renewal expenditures, through the Fleet Replacement Program, over the next ten (10) years. **The average capital renewal expenditure required to achieve the proposed LOS is approximately $5.6 (2023$) million per year.**

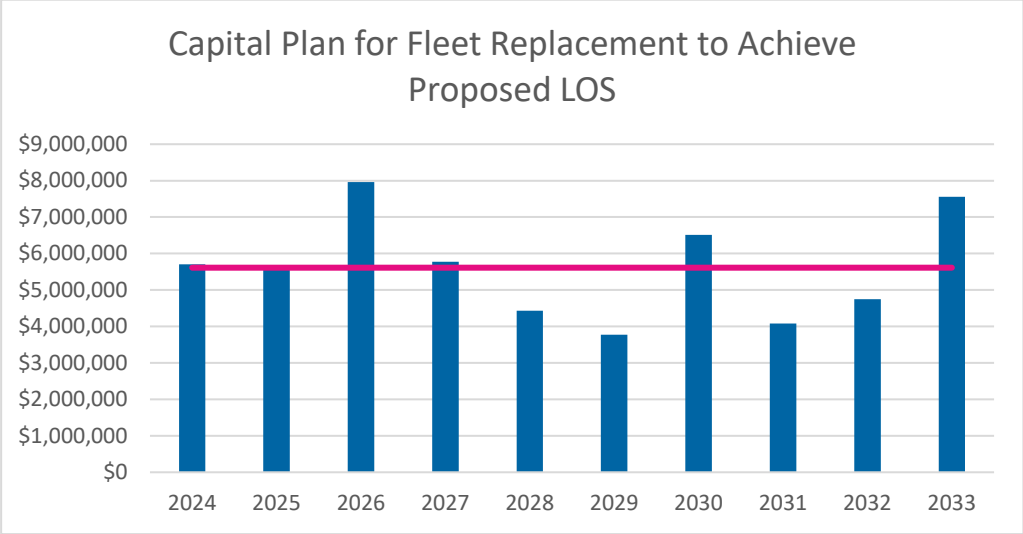

Figure 7: Proposed LOS - Fleet Replacement Forecast

The Capital Fleet Replacement program (project numbers RP1188 and 001267) proposed by the City's Fleet Strategy team is designed to reduce the fleet replacement backlog by progressing toward optimized service lives for fleet assets gradually over the next ten (10) years. This is intended to be a compromise between unsustainable past practices and the resourcing and financial challenge that would be created by trying to rapidly clear the replacement backlog. As the City progresses toward sustainable levels of fleet replacement, additional resources may be needed to meet procurement demands and administration associated with managing the fleet, AVL and fleet management system, as well as the ongoing training and monitoring of drivers and operators.

4.6 Lifecycle Strategy Summary

The proposed lifecycle strategy, and associated costs, to achieve the proposed LOS is summarized in the table below along with a comparison to the lifecycle strategy that would be required to maintain the current LOS. The lifecycle strategy to achieve the proposed LOS results in average forecasted annual expenditures approximately $1 million higher than the strategy to maintain the current LOS.

Table 16: Lifecycle Strategy Summary

Lifecycle Activity	Proposed Strategy	Proposed LOS	Current LOS
Capital Growth	Forecast based on historic fleet growth	**$1.0 M/yr***	
Capital Renewal	Continuation of the Fleet Replacement Program to bring fleet assets in-line with optimal service lives	**$5.6 M/yr***	**$4.6 Myr***
Operations and Maintenance	Extended operating budget forecast to accommodate growth	**$5.9 M in 2024, increasing to $7.4 M by 2033**	

*Average annual needs over ten (10) year forecast

Achieving the proposed LOS will substantially improve the reliability of the City's fleet by decreasing the percentage of assets that are past their estimated service lives and improving the overall condition of the fleet. Furthermore, the proposed LOS will bring the City's fleet service lives closer to industry standards and optimal lifecycles which is expected to decrease the total cost of ownership for fleet assets in the long term. By optimizing the total cost of ownership, the City expects to be able to reduce emergency and reactive repairs, which are costly. Reducing reactive work creates capacity within Fleet Operations to increase preventative maintenance, reduce reliance on external services, and/or mitigate the need for additional Fleet Operations resources as the fleet grows.

5. Financial Strategy

The lifecycle strategies in the previous section have presented estimates of the funding that will be needed to achieve the proposed LOS from 2024-2033. This section will describe the funding sources that support capital growth, capital renewal, and operations and maintenance of the City's fleet. Particular attention is given to funding of the Fleet Management Reserve, which is critical to achieving the proposed LOS.

In general, recommendations in this section need to be considered in the context of the City's needs and priorities across its many services and over $8 billion worth of assets.

5.1 Capital Growth

Funding for additional fleet complement is approved through the City's annual budget process, typically associated with new staff positions or service level change requests, or through stand-alone capital requests. These requests are typically funded from Development Charges related reserves and do not impact the Fleet Management Reserve.

The funding for Development Charges reserves are mainly dependant on the population growth of the City, and so slower growth may lead to deferal of growth projects; in the same way, faster growth may lead to growth projects being brought forward.

Recommendations for new fleet assets to service growth will continue to be considered on a case-by-case basis based on the City's strategic priorities and overall financial capacity.

5.2 Capital Renewal

The City's Fleet Replacement Program is funded from the Fleet Management Reserve, which receives annual contributions from water and wastewater rates as well as tax revenues. Additionally, $9 million in debt issuance has been approved to support the Fleet Replacement Program since 2019. Currently, the forecasted expenditures for the Fleet Replacement Program from 2024-2033 are substantially larger than the projected contributions to the reserve. The Fleet Management Reserve is forecasted to have a negative balance starting in 2025.

Including current balances, forecasted reserve contributions, and debt servicing from the Fleet Management Reserve, a total of approximately **$37 million** is projected to be available to support the Fleet Replacement Program from 2024-2033. This results in an average shortfall of **$1.9 million per year**.

In order to achieve the proposed LOS, the City will need to increase funding to the Fleet Management Reserve, or additional debt must be issued. The following options are available to provide the needed funding to the Fleet Management Reserve:

- Increase contributions from tax revenues.

- Increase contributions from water and wastewater rates.

Tax Funding
The City faces several pressures which make the allocation of capital budgets a challenge. Management of much of the City's over $8 billion asset portfolio relies on tax revenue in order to provide services for the community. Aging assets and the need for new infrastructure to meet growing demands necessitate a strategic approach to capital planning, guided by asset management principles.

The City prioritizes competing needs when developing its ten (10) year Capital Plan and Outlook using a risk-based approach. These priorities are reviewed and refined on an annual basis to ensure that limited resources are used in the most efficient way. As part of the annual budget process, staff and City Council must continue to ensure that the City's fleet is managed in an efficient way while also managing risks and service levels across all City services.

Water and Wastewater Rate Funding
Currently, a portion of the annual contributions to the Fleet Management Reserve are funded from water and wastewater rates.

Table 17: Current Water & Wastewater Fleet Reserve Contributions

Funding Source	Annual Contributions
Wastewater	$215,000
Water	$345,000

There are ninety-one (91) fleet assets used by the City's Infrastructure department to support Water and Wastewater Operations with a total replacement value of approximately $8 million. Based on optimal service lives, the average annually amortized replacement costs for these assets are summarized below.

Table 18: Water & Wastewater Fleet Replacement Summary

Service Area	Fleet Assets (#)	Current Replacement Value ($2023)	Average Annual Replacement ($2023)
Wastewater Operations	34	$3,078,880	$313,419
Water Operations	57	$4,900,080	$543,394

In order to maintain the principle of total cost recovery for replacement of fleet assets used for water and wastewater operations, Fleet Management Reserve funding from water and wastewater rates should be increased as shown below.

Table 19: Proposed Water & Wastewater Fleet Reserve Contributions

Funding Source	Current Annual Contributions	Proposed Annual Contributions ($2023)	Annual Proposed Funding Increase ($2023)
Wastewater	$215,000	$315,000	$100,000
Water	$345,000	$545,000	$200,000

It must be noted that the above values are presented based on 2023 replacement costs for fleet assets. These values will change over time as a result of market conditions and inflation. The reserve contribution levels should be re-evaluated on a regular basis to ensure equitable and sustainable funding for replacement of these assets.

If the above funding increases from water and wastewater rates are implemented, the remaining shortfall is approximately $1.6 million per year.

Debt Financing

Since the initiation of the Fleet Replacement Program in 2019, the City has approved $9 million in debt issuance to support the program. This debt is currently being serviced from the Fleet Management Reserve and is forecasted to be paid off by 2029. Issuing additional debt to support the Fleet Replacement Program must be considered in the context of the City's total debt load, current interest rates, available funding from other sources, and maintenance of the City's credit rating.

5.3 Operations and Maintenance

Fleet operations and maintenance activities are funded primarily from tax revenues. The operations and maintenance budget forecast shown in this AMP are based on the forecasts presented in the approved 2024 budget. The Fleet Operations operating budget is forecasted to increase by an average of approximately 2% per year. These annual increases do not necessarily address the growth of the City's fleet, as inflation impacts the cost of parts, fluids, equipment, fuel, and other expenses that are covered by the Fleet Operations budget. Further increases to the Fleet Operations budget may be needed to maintain service levels as the fleet grows.

6. Risks Associated with Implementing the Fleet AMP

Even with the successful implementation of the proposed levels of service (LOS) for the City's fleet, certain residual risks will remain. These risks must be continually monitored and managed to ensure long-term reliability, safety, and cost-efficiency.

Table 20: Risk and Mitigation Summary

Risks	Description	Mitigation Strategies
Economic and Budgetary Constraints	Unexpected economic conditions or financial challenges could lead to budget cuts or reduced funding availability, affecting the City's ability to sustain the proposed LOS. Rising costs of vehicles, equipment, maintenance, and fuel could exceed projections, increasing pressure on budgets and potentially leading to deferred maintenance or delayed asset replacements.	Develop robust financial plans including reserve funding strategies and risk management plans to accommodate economic fluctuations and cost inflation.
Technological Developments	Technological advancements in fleet management, vehicle automation, EVs, and alternative fuels may require additional investments to stay current. Integrating new technologies into existing systems can be complex and may result in transitional challenges, such as interoperability issues or the need for staff training.	Create a technology roadmap to guide investments in new technologies and ensure smooth integration with existing systems. Enhance workforce development programs to ensure that staff are well-trained and equipped to handle evolving fleet technologies and maintenance practices.
Regulatory Changes	Changes in regulatory standards for emissions, safety, and operator qualifications can introduce new compliance requirements, necessitating further investments and adjustments to fleet operations.	Staff must continue to monitor upcoming regulatory changes and compliance requirements.

Risks	Description	Mitigation Strategies
Operational Risks	Ensuring that sufficient resources are allocated for fleet operations, including staffing and equipment, remains a challenge. Under-resourcing can lead to maintenance backlogs, reduced service quality, and higher long-term costs. While achieving the proposed LOS should increase preventative maintenance capacity, there remains a risk that unexpected surges in maintenance needs or insufficient staffing could lead to lapses in maintenance schedules, impacting fleet reliability.	Continuously assess and optimize resource allocation for fleet operations, ensuring adequate staffing and equipment.
Environmental and Climate Risks	Meeting environmental sustainability goals, such as reducing carbon emissions, may require investments in green technologies and alternative fuel vehicles which are higher than the forecasts presented in this AMP. These expenses may further strain the City's budget and operational capacity.	Continue the development of detailed plans to ensure that conversion to EVs and alternative fuels is accomplished while continuing to ensure reliable services and financial efficiency.

By implementing the above strategies, the City can better manage ongoing risks and ensure that the proposed LOS for the fleet are achieved sustainably and effectively.

7. Conclusion and Recommendations

The 2024 Fleet AMP provides a summary of the current state of the City's fleet, the LOS it provides, the lifecycle strategies recommended to achieve proposed LOS over the next ten (10) years, and the funding challenges that must be resolved in order to deliver the recommended lifecycle strategies. The analysis presented in this AMP represents a snapshot in time. The City must continue to monitor and update the needs of the fleet to ensure that lifecycle and financial strategies stay current as market conditions, technology, and the City's service expectations evolve over time. In accordance with O.Reg. 588/17, the Fleet AMP will be updated at least every five years.

Development of asset management plans is an iterative process that includes improving data, processes, systems, staff skills, and organizational culture over time. The Fleet AMP has been developed using available data and the expertise of City staff. The City is continuously striving to improve its fleet asset management capabilities, including the implementation of a new fleet management system that will enable better tracking of assets and maintenance activities, as well as better analysis capabilities. This system will be used to improve the prioritization and timing of fleet asset replacements, and further enhance the City's ability to minimize the total cost-of-ownership for fleet assets.

Asset management decisions are made by staff in all areas of the City and by Council. The value of asset management planning is in providing data to inform these decisions, identifying areas for improvement, documenting risks, and outlining the requirements for long term sustainability. As the City continues to focus on supporting the services our community needs, while keeping tax increases low, staff and Council will face increased pressure to innovate and find efficient ways to deliver services. In addition to regular AMP updates, the City must continue to build and enhance the capabilities of its fleet program in order to support informed decisions about how to provide a safe, reliable, sustainable, and efficient fleet program to support City services.

Summary of Recommendations
The below recommendations summarize the conclusions of this AMP. These recommendations should be used to guide financial decisions, work plans, and priorities for City staff and leadership.

Prioritizing Fleet Replacements:

- Continue to focus on optimizing asset service lives to minimize the total cost of ownership for the City's fleet.
- Address the annual shortfall of $1.9 million in the Fleet Management Reserve by increasing contributions from tax revenues and water/wastewater rates.
- Explore additional debt issuance to support the Fleet Replacement Program while balancing the city's overall debt load and maintaining a strong credit rating.

Managing Growth:

- Regularly assess population and economic growth and associated infrastructure to ensure fleet and staffing resources are appropriately scaled to the City's needs.

- Develop detailed plans for new fleet complement needed to sustain service levels as the City grows.

Fleet Management, Operations, and Maintenance:

- Enhance preventative maintenance programs as needed to reduce downtime and repair costs.
- Ensure sufficient resources are allocated for fleet operations, including adequate staffing and equipment to prevent maintenance backlogs and minimize reliance on external services.
- Continuously update workforce development plans to equip staff with the skills needed to handle evolving fleet technologies and maintenance practices.

Strategic Financial Planning:

- Develop robust financial plans and risk management strategies to accommodate economic fluctuations and cost inflation.

Improving Fleet Efficiency:

- Staff are exploring opportunities to increase fleet efficiency through asset pooling, sharing within and between departments, and optimizing the utilization of fleet assets. These will be implemented through fleet management policies.

Risk Management:

- Continue to monitor the risk profile of the fleet and prioritize fleet replacements with the goal of minimizing risks.

Environmental Sustainability:

- Continue to develop plans to support the smooth transition of the fleet to electric and alternative fuels, including the conversion of light-duty vehicles to EVs as charging infrastructure becomes available. Continue monitoring technological and market developments regarding alternative fuels for heavy-duty vehicles.

Continuous Improvement

This Asset Management Plan complies with Ontario Regulation 588/17 Asset Management Planning for Municipal Infrastructure. The following improvement activities are planned to enable the City to continue to comply with Ontario Regulation 588/17 and improve its asset management practice:

- **Implement the new Fleet Management System -** Full implementation and integrations of the new fleet management system will enable the City to track maintenance data, mileage, and other critical metrics for more accurate lifecycle and condition assessments.
- **Enhanced fleet condition assessment -** Development of improved methodologies for assessing fleet asset condition, incorporating additional data beyond age, such as maintenance history and mileage.
- **Empirical analysis to support lifecycle strategies -** Undertaking analysis to determine the optimal lifecycle for each category of fleet asset based on City specific data, rather than relying on industry standards.

- **Development of performance metrics -** Establishing new performance metrics for energy usage and operating efficiency, leveraging the new fleet management system and AVL system.

Appendix A

Table 21: Fleet Inventory and Age Summary by Asset Description - Vehicles

Sub-Category	Description	Count	CRV ($2023)	Optimal Service Life (years)	Average Age (years)
Light-duty Vehicles	1/2 Ton Cargo Van	11	$783,200	7	6
	3/4 Ton Cargo Van	7	$519,400	7	2
	1 Ton Cargo Van	2	$154,400	7	0
	Compact Pickup	11	$623,700	7	3
	1/2 Ton Pickup	60	$4,002,000	7	4
	3/4 Ton Pickup	43	$3,298,100	7	5
	1 Ton Pickup	14	$1,143,800	7	10
	4500 Truck	11	$931,700	7	10
	5500 Truck	26	$2,462,200	7	4
	SUV - Large	1	$100,000	7	3
	SUV - Medium	20	$874,000	7	6
	SUV - Small	11	$370,700	7	3
Medium-duty Vehicles	Cube Van	2	$151,400	7	7
	Medium Duty Truck	4	$603,600	12	18
	Street Sweeper	8	$2,807,200	12	7
Heavy-duty Vehicles	Vacuum Truck	3	$2,252,700	10	7
	Heavy Duty Truck	7	$1,406,300	10	12
	Single Axle Plow	14	$5,052,600	10	16
	Tandem Axle Plow	18	$7,666,200	12	10
Firefighting Apparatus	Brush Truck	1	$620,000	15	17
	Hazmat	3	$3,297,477	20	16
	Heavy Duty Truck - Tanker	1	$200,900	20	13
	Aerial Ladder	4	$6,214,383	15	5
	Pumper	8	$7,835,772	15	10

Table 22: Fleet Inventory and Age Summary by Asset Description – Equipment

Sub-Category	Description	Count	CRV ($2023)	Optimal Service Life (years)	Average Age (years)
Trailers	Valve Maintenance Trailer	2	$230,800	20	14
	Boat Trailer	2	$20,800	20	19
	Fire Training Trailer	1	$200,000	15	8
	Float	3	$151,200	15	24
	Trailer - Dump	3	$41,200	15	8
	Trailer	60	$624,000	15	8
	Trailer - Enclosed	12	$184,800	15	7
Light Equipment	Aerator	3	$60,000	20	13
	Aerator - Small	7	$72,800	20	18
	Boat	2	$60,000	20	21
	Brush Chipper mini	1	$15,400	12	2
	Compressor	1	$50,400	15	24
	Forklift	9	$480,660	10	14
	Groomer	6	$214,200	10	10
	Irrigation Water Reel	1	$18,900	15	16
	Large Generator	1	$400,000	22	19
	Litter Vacuum	1	$20,400	10	7
	Mower - 6 ft	13	$834,600	7	12
	Overseeder	3	$121,200	15	13
	Portable Sign	6	$182,400	15	13
	Pressure Washer Trailer	1	$10,400	10	8
	Road Closed Sign	2	$30,800	15	8
	Roller	1	$35,400	15	3
	Scissor Lift	6	$120,000	12	17
	Sidewalk Mini Vac	1	$93,100	10	3
	Skid Steer	3	$270,600	15	11
	Snow Machine	1	$20,700	8	5
	Steamer	1	$30,400	15	19
	Stump Grinder	1	$53,400	15	21
	Top Dresser	3	$106,200	15	10
	Tractor - 40 Hp	6	$325,200	15	18
	Tractor - 60 Hp	5	$371,000	15	15
	Turf Rake	1	$45,400	15	9
	Utility Vehicle	13	$379,600	10	9

Sub-Category	Description	Count	CRV ($2023)	Optimal Service Life (years)	Average Age (years)
	Vac Trailer	1	$95,400	12	5
	Verticutter	1	$20,400	15	33
Medium Equipment	Backhoe Loader	2	$508,400	8	3
	Brush Chipper	2	$200,800	12	4
	Hot Box	2	$230,800	8	3
	Ice Resurfacer	13	$2,004,600	10	12
	Infrared Asphalt Heater	1	$100,400	8	3
	Mower - 11 ft	8	$1,041,600	7	7
	Mower - 16 ft	4	$676,800	7	14
	Sidewalk Machine	6	$1,135,200	10	9
	Stacker	2	$300,800	15	11
	Tool Cat	3	$497,100	8	5
	Tractor - 100 Hp	1	$114,200	15	6
	Turf Sweeper	1	$100,700	10	13
Heavy Equipment	Articulated Dump Truck	1	$674,200	15	4
	Asphalt Patcher	1	$600,400	12	11
	Compactor	1	$1,239,200	10	0
	Dozer - D6	1	$814,200	10	5
	Excavator	1	$454,200	12	4
	Hovercraft	1	$400,000	12	5
	Screener	1	$300,400	15	12
	Snow Melter	1	$400,000	20	19
	Wheel Loader	7	$3,599,400	8	8