

City of Barrie

**Corporate Asset Management Strategy
Asset Management Plan
Appendix E: Fleet**

**Note that this appendix is part of the
Whole of Government Asset Management Plan for the City of Barrie**

November 2011

Final

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1. Introduction

1.1 Content of this Asset Management Plan

This document forms Appendix E of the City of Barrie's Asset Management Plan (AM Plan) and addresses the City's Fleet Assets only. Assets included in this AM Plan are:

- General vehicles (corporate)
- Protection vehicles (fire, police, POA)
- Transportation vehicles
- Environmental vehicles
- Recreation and Culture vehicles

The body of the AM Plan details the approach and methodology taken in determining the framework for the AM Plan and discusses results at the corporate level. Each Appendix describes the specific results of the study for each asset service area including Environmental (Appendix A), Transportation (Appendix B), Recreation and Culture (Appendix C), Facilities (Appendix D) and Fleet (Appendix E).

1.2 Purpose of this Asset Management Plan

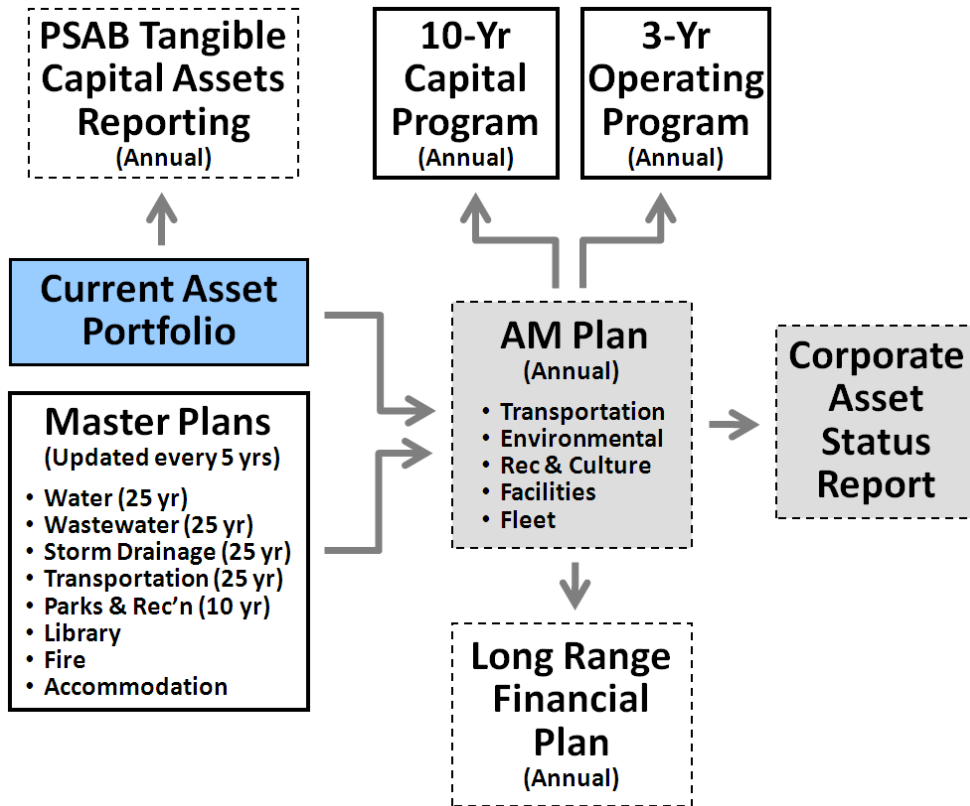
This AM Plan is intended to improve the City of Barrie's ability to achieve its corporate goals and objectives in a way that best services its customers. It provides a rational framework that enables systematic and repeatable processes to manage costs, risks and levels of service for the City's asset portfolio. The AM Plan identifies expected future costs and assists in predicting future barriers to efficient and effective service delivery. With this understanding, the City's asset managers and operators will be better equipped to remove physical, financial and political barriers before they negatively impact customer levels of service.

This is the second set of AM Plans for the City of Barrie. Additional data has been amended to the original set of plans which improves the confidence in the results. It is intended that the continual improvement of asset management practices within the City of Barrie will result in further updates to this document. As such, this AM Plan is a living document that will require ongoing refinement to reflect the evolution of asset management maturity within the City of Barrie over time.

1.3 Relationship to Other City Documents/Outputs

The relationship this AM Plan has with other City Documents and planning outputs is illustrated in the figure below. The AM Plan is the base framework (tool) to assist the City in developing appropriate direction and inputs to budget forecasts, master plans and associated studies/outputs.

Figure 1-1 AM Plan Relationship to other City Documents



2. Asset Portfolio

2.1 Overview of Fleet Service Delivery

The City of Barrie is responsible for a broad portfolio of fleet assets that support City-wide service delivery. The Fleet Services Branch provides corporate fleet management, including vehicles and other equipment to support:

- Corporate employees
- Environmental Department, including water, wastewater, storm drainage and solid waste staff
- Transportation Department including roads and transit staff
- Recreation and Culture Department including parks and recreation staff
- Facilities Department staff.
- As Fleet provide services to all other City departments, increases in demand or levels of service from these other departments will directly impact the services provided by Fleet.

2.2 Hierarchy of Assets

Asset information is needed to support decision-making. The asset hierarchy provides the framework for segmenting the City asset portfolio into appropriate classifications and describing the linkages. The asset hierarchy used for this AMP is shown below.

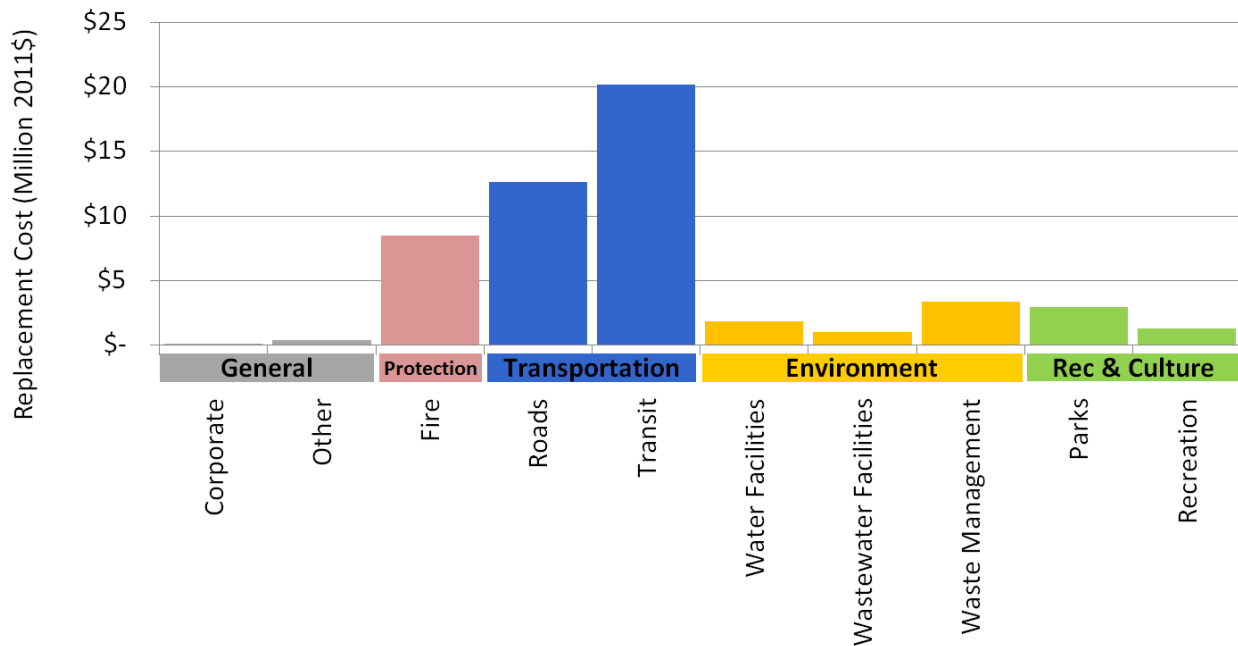
Table 2-1 Asset Hierarchy – Fleet Services

Level 1	Level 2	Level 3
Fleet	General	Corporate
	General	Other
	Protection	Fire
	Transportation	Roads
	Transportation	Transit
	Environmental	Waste Management
	Environmental	Wastewater Facilities
	Environmental	Water Facilities
	Recreation & Culture	Parks
	Recreation & Culture	Recreation

2.3 Replacement Cost of Asset Inventory

To focus needs for investments, it is important to understand the number of assets and replacement value of assets against the hierarchy. Figure E1-1 portrays the make-up of the fleet asset portfolio.

Figure 2-1 Fleet Asset Portfolio Replacement Cost, 2011\$



On-Road Vehicle and Engine Emission Regulations

New federal engine emission regulations align Canadian vehicle and engine certification requirements with those of the US federal EPA requirements. The emission requirements for heavy duty diesel vehicles were phased in over the 2004 to 2010 model years, and could increase the capital and maintenance costs of heavy duty diesel vehicles in the order of 5-10%. These increases have not been accounted for in this AM Plan, but should be considered in the next Plan.

2.4 Installation Profile of Assets

To assist the City with future funding needs analysis, it is helpful to understand the installation profile of the asset profile portfolio. The following graphs show the replacement value of the assets by year of installation, in 2011\$.

The story these graphs tell is that the majority of City fleet assets were purchased between 1996 and 2008. This implies, knowing the relatively short life cycle of vehicles, that many fleet assets are due for renewal or replacement.

Figure 2-2 Asset Installation Profile – Fleet (Total)

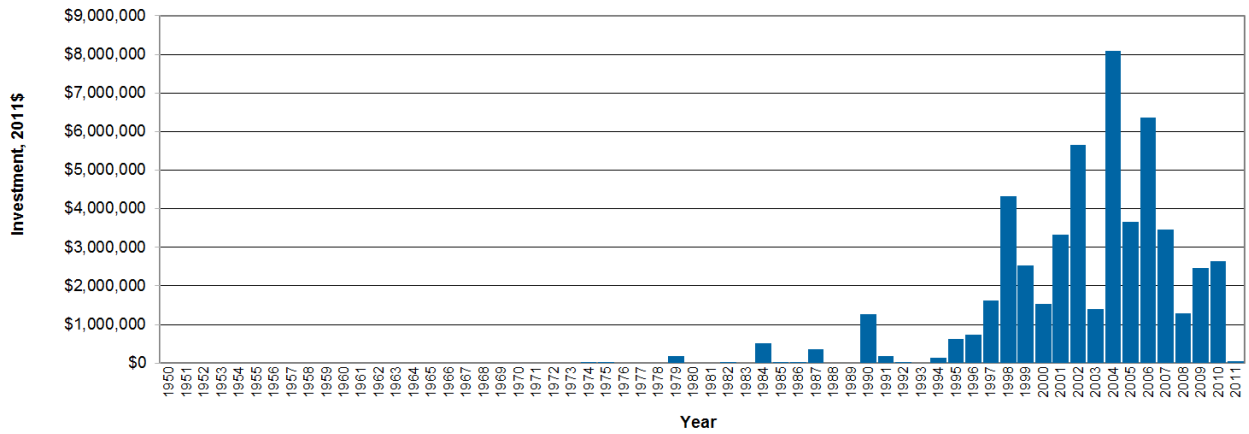


Figure 2-3 Asset Installation Profile – General – Corporate

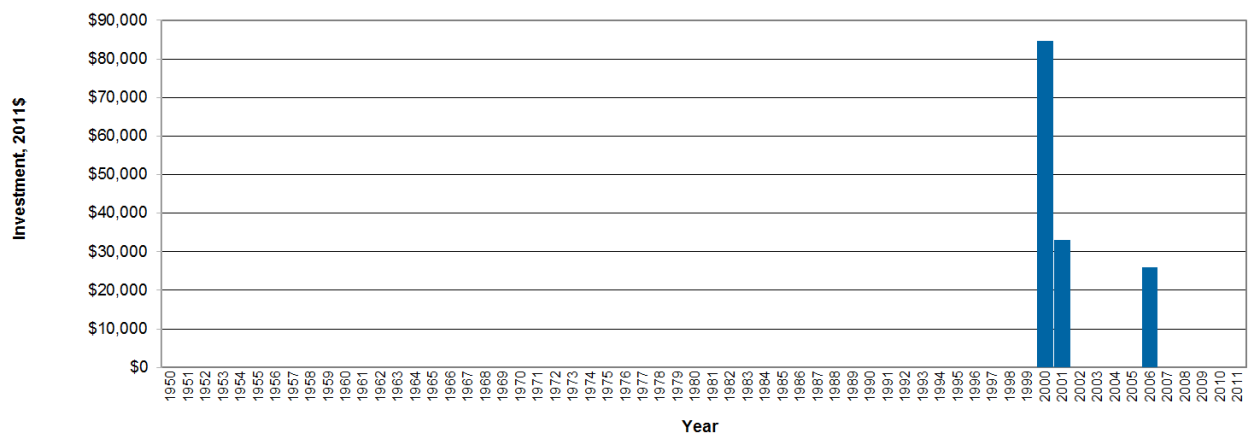


Figure 2-4 Asset Installation Profile – General – Other

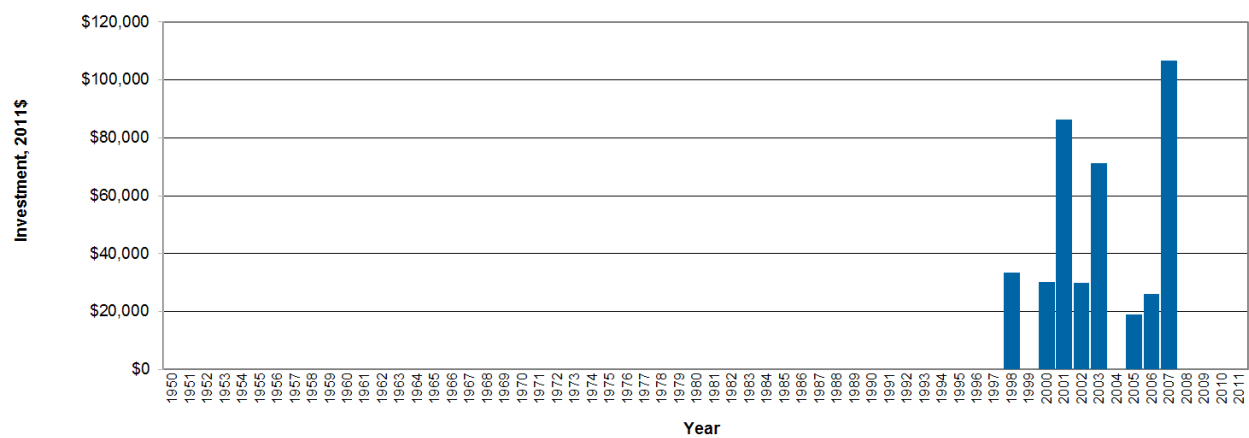


Figure 2-5 Asset Installation Profile – Protection – Fire

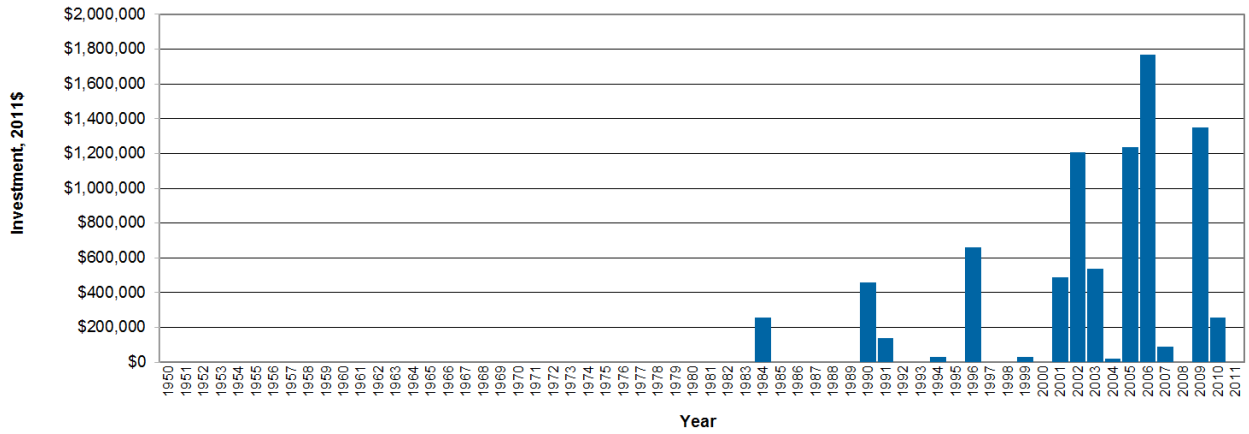


Figure 2-6 Asset Installation Profile – Transportation – Roads

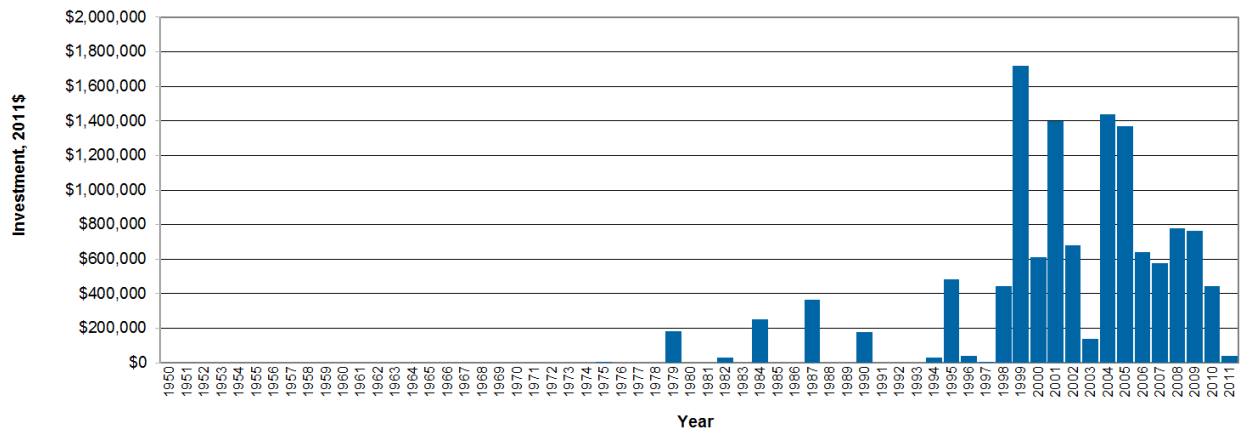


Figure 2-10 Asset Installation Profile – Transportation – Transit

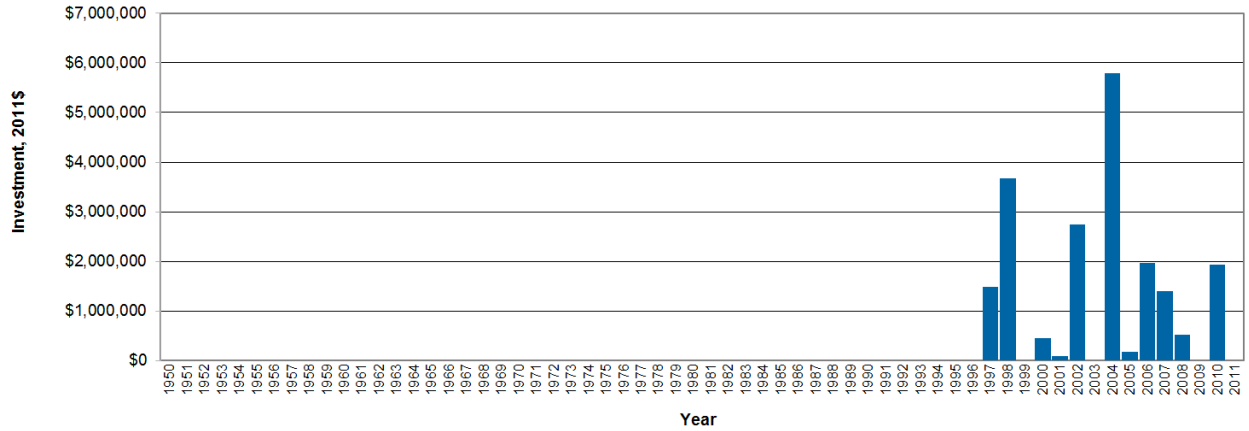


Figure 2-7 Asset Installation Profile – Environmental – Water

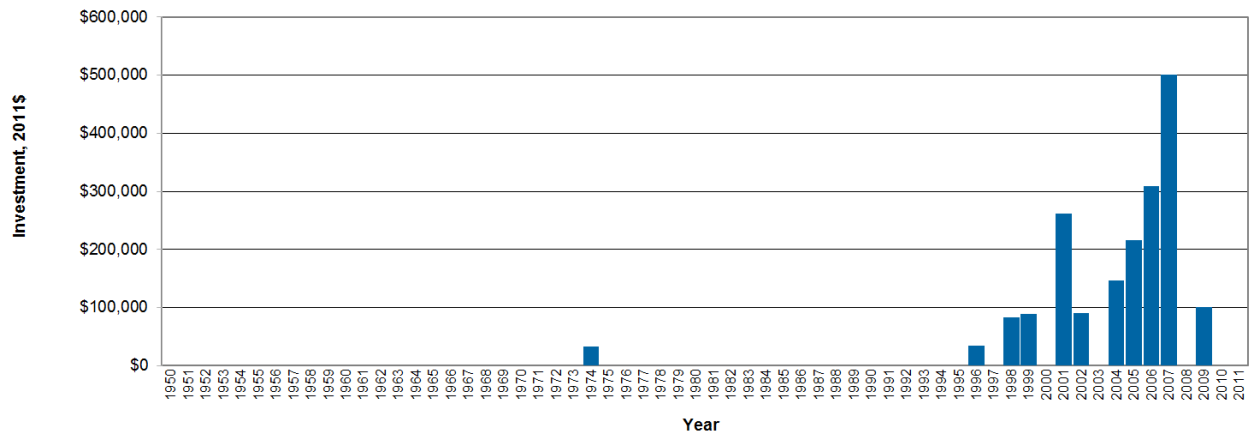


Figure 2-8 Asset Installation Profile – Environmental – Wastewater

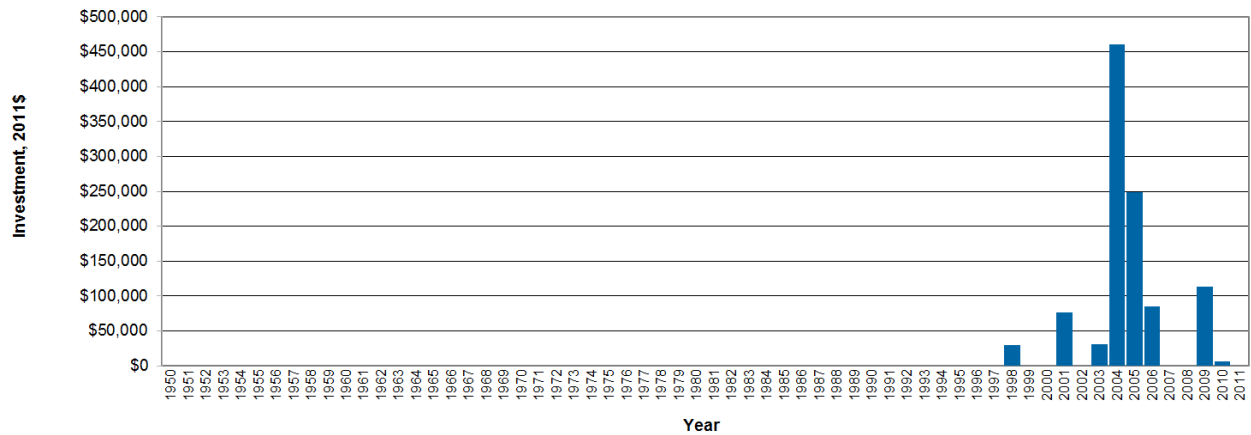


Figure 2-9 Asset Installation Profile – Environmental – Waste Management

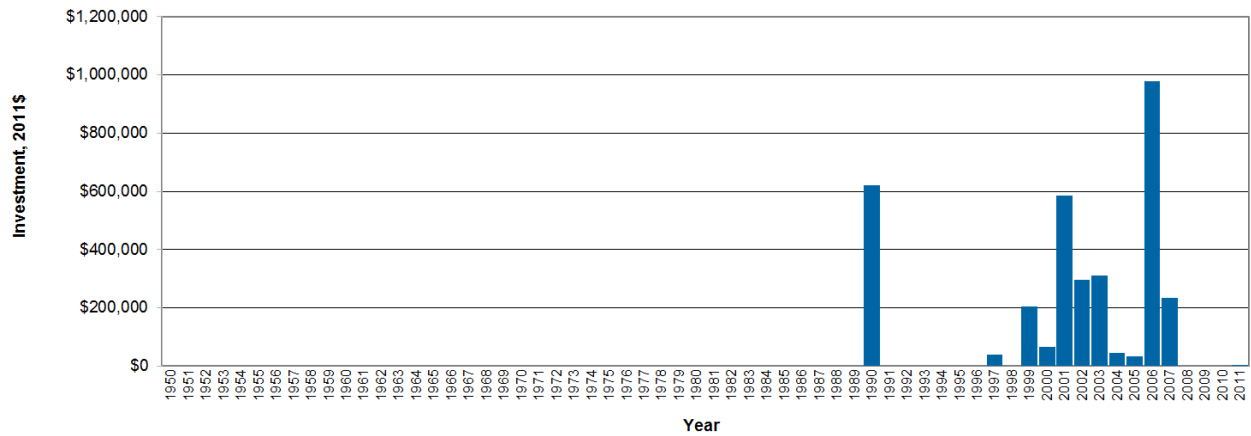


Figure 2-10 Asset Installation Profile – Recreation & Culture – Parks

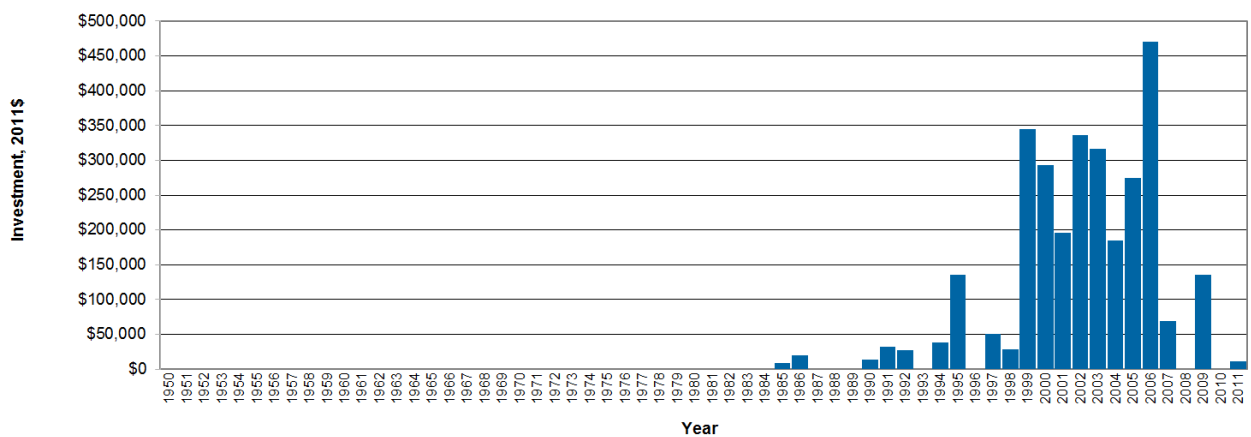
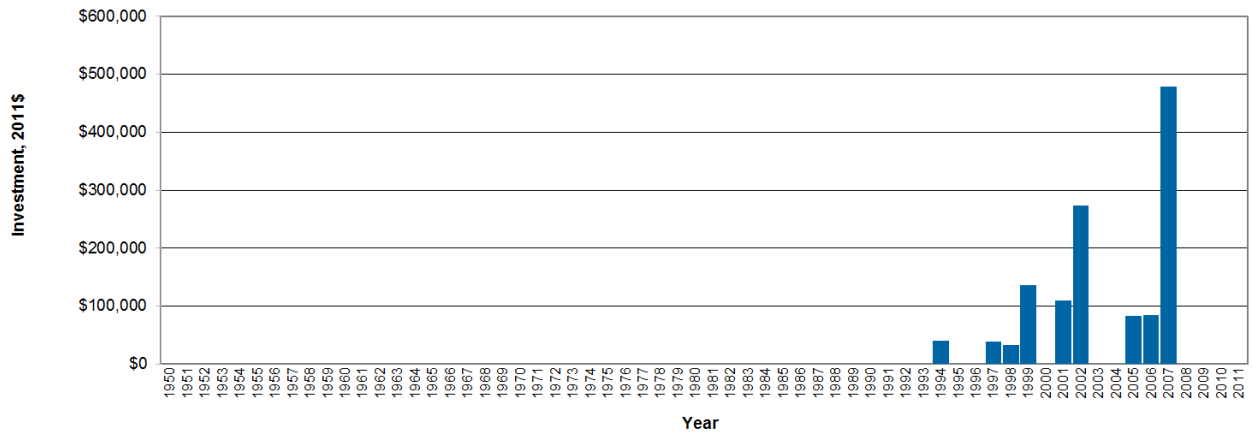


Figure 2-11 Asset Installation Profile – Recreation & Culture – Recreation



3. Levels of Service

3.1 Customer Surveys

3.1.1 Corporate Citizenship Satisfaction Survey

The City gathers information on customer expectations and satisfaction through customer surveys – the most recent corporate-wide survey being conducted from November 17 to 25, 2008. Information on the results of this City of Barrie 2008 Citizen Satisfaction Report was summarized in the AM Plan 2009, and are not repeated in this Plan.

3.2 Current Levels of Service – Performance Measures

3.2.1 Corporate Balanced Scorecard

The City of Barrie Balanced Scorecard includes four quadrants: Community Services, Finance, Process, and People. The scorecard reports Target, Previous Year, and Current Year for a number of indicators, including the following indicators related to fleet services:

Table 3-1 Corporate Balanced Scorecard – Fleet Services

Quadrant	Indicator	2008 Actual	2009 Actual	Current Year	Current Year Target
Community Service	10 fire fighters on scene within 10 mins. - 90% of the time	80.70%	86.58%	88.66%	90.00%
Community Service	4 to 6 min. road response - 90% of the time	90.81%	93.36%	92.01%	90.00%
Community Service	Winter Control Service Level Compliance (to Mun. Act regs)	93.40%	97.00%	98.50%	97.00%
Process	Emergency Response Call Volumes for Barrie	6,584	6,695	6,352	6,600

Figure 3-1 Community Service Indicators, Corporate Balanced Scorecard

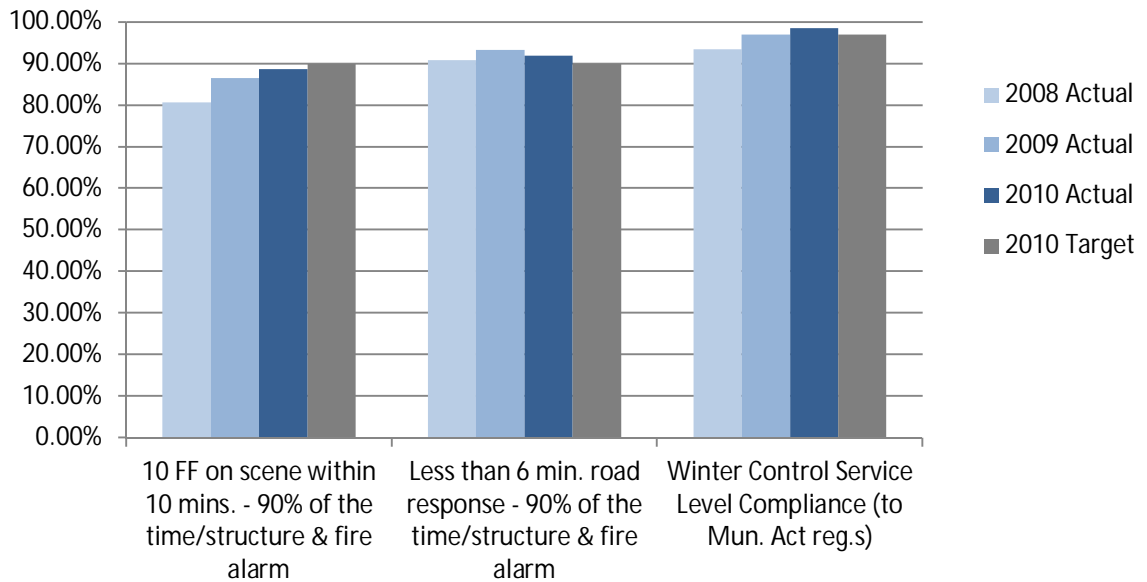
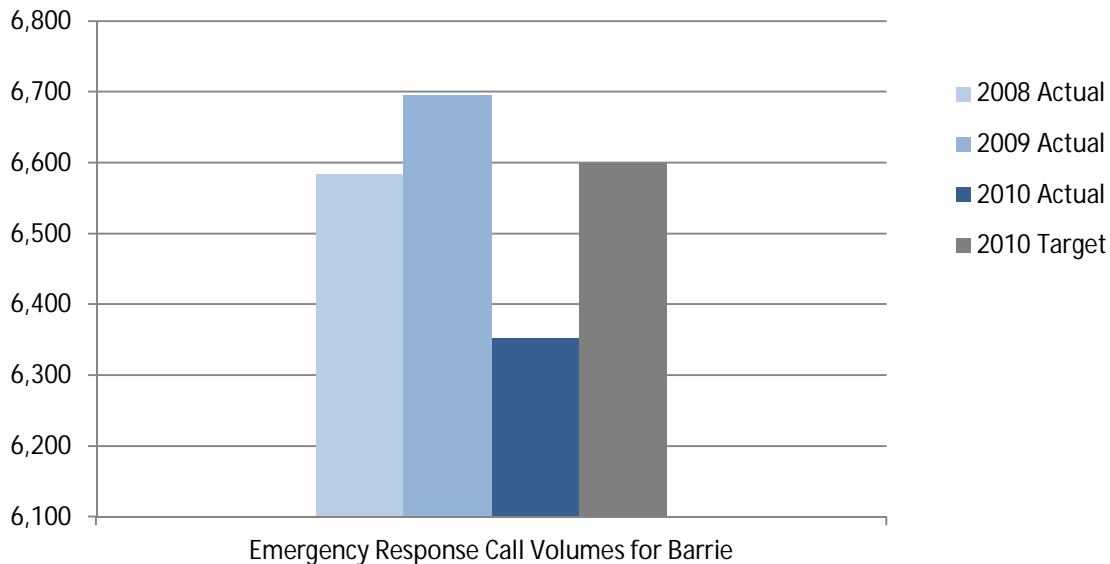


Figure 3-2 Process Indicators, Corporate Balanced Scorecard



3.2.2 Provincial Municipal Performance Measures

There are no MPMP measures, objectives and indicators relating directly to fleet.

3.2.3 OMBI Benchmarking

The Ontario Municipal Benchmarking initiative (OMBI) is a collaboration of 15 Ontario municipalities that represent 9.3 million citizens or 73% of the population of Ontario. This initiative is led by the Chief Administrative Officers (CAOs) and City Managers in each participating municipality. OMBI is intended to

foster a culture of service excellence in municipal government by creating new ways to measure, share and compare performance statistics and allow experts in participating municipalities to share ideas on operational practices.

The City of Barrie recently joined the OMBI initiative. The following performance measures are relevant to fleet services.

Table 3-2 OMBI Performance Measures – Fleet

No.	Type	Measure	Type
FLET205	Service Level	Total Number of Vehicles (EMS)	Publicly Reportable
FLET206	Service Level	Number of Light Vehicles (EMS)	Publicly Reportable
FLET207	Service Level	Number of Medium Vehicles (EMS)	Publicly Reportable
FLET208	Service Level	Number of Heavy Vehicles (EMS)	Publicly Reportable
FLET226	Service Level	Total Number of Vehicles – Municipal Equipment	Publicly Reportable
FLET226A	Service Level	Average Age of Municipal Equipment (Years)	Publicly Reportable
FLET227	Service Level	Number of Light Vehicles – Municipal Equipment	Publicly Reportable
FLET227A	Service Level	Average Age of Light Vehicles – Municipal Equipment (Years)	Publicly Reportable
FLET228	Service Level	Number of Medium Vehicles (Municipal Equipment)	Publicly Reportable
FLET228A	Service Level	Average Age of Medium Vehicles – Municipal Equipment (Years)	Publicly Reportable
FLET229	Service Level	Number of Heavy Vehicles (Municipal Equipment)	Publicly Reportable
FLET229A	Service Level	Average Age of Heavy Vehicles – Municipal Equipment (Years)	Publicly Reportable
FLET230	Service Level	Total Number of Vehicles (Off Road Construction)	Publicly Reportable
FLET231	Service Level	Number of Light Vehicles (Off Road)	Publicly Reportable
FLET232	Service Level	Number of Medium Vehicles (Off Road)	Publicly Reportable
FLET233	Service Level	Number of Heavy Vehicles (Off Road)	Publicly Reportable
FLET239	Service Level	Number of Miscellaneous Fleet Equipment	Publicly Reportable
FLET240A	Service Level	Number of Vehicles (Total)	Publicly Reportable CAO Measure
FLET323	Efficiency	Cost per Heavy km – all in Cost (Fire)	Publicly Reportable
FLET326	Efficiency	Total Cost per Vehicle km – all in Cost (Municipal Equipment)	Publicly Reportable
FLET327	Efficiency	Cost per Light Vehicle km – all in Cost (Municipal Equipment)	Publicly Reportable
FLET328	Efficiency	Cost per Medium Vehicle km – all in Cost (Municipal Equipment)	Publicly Reportable
FLET329	Efficiency	Cost per Heavy km – all in Cost (Municipal Equipment)	Publicly Reportable
FLET330H	Efficiency	Total Cost per Vehicle km – all in Cost (Off Road Construction)	Publicly Reportable
FLET331H	Efficiency	Cost per Light Vehicle km – all in Cost (Off Road Vehicles)	Publicly Reportable
FLET332H	Efficiency	Cost per Medium Vehicle km – all in Cost (Off Road Vehicles)	Publicly Reportable

3.2.4 Legislative Requirements

The procedures, policies, guidelines, and regulations used for inventory control and maintenance of assets that support transportation services are provided in the AM Plan 2009, and are not repeated in this Plan.

3.3 Current Levels of Service – Preventative Maintenance

Preventative maintenance requirements for Fleet assets are detailed in the Vehicle and Equipment Information binder. These were itemized in the 2009 asset management plan and will not be repeated here.

3.4 Current Levels of Service – Minimum Maintenance Standards

The minimum maintenance standards for the City of Barrie's fleet are defined by "National Safety Law (NSC)" and "Highway Traffic Act". These were itemized in the 2009 asset management plan and will not be repeated here.

4. Growth & Demand

The City of Barrie expects to enter a period of growth over the coming years with the addition of annexed lands to the south of the City and new employment lands coupled with a prioritized expansion of transit options. This section documents how the City of Barrie is working towards understanding and preparing for this coming period of growth. This includes:

- Future Levels of Service
- Future Demand for Fleet Assets

4.1 Future Levels of Service

Fleet provides services to other departments. As levels of service increase within these departments, the level of service provided by fleet will also increase. For example, the Fire Master Plan (June, 2009) as part of its Short Term Goals, states that the Fleet Services should review current staffing levels, service levels and training to make recommendations to ensure fire apparatus is maintained and repaired.

Future levels of service are also driven by new regulatory requirements. For example, new federal emission requirements for heavy duty diesel vehicles are expected to be implemented in 2010. To meet these requirements, the capital and maintenance costs of heavy duty diesel vehicles will be increased in the order of 5-10%.

The Accessibility for Ontarians with Disabilities Act will also impact on Fleet assets. During 2010, this Act requires the installation of “automated next stop calls” for buses. This requirement will cost approximately \$10,000 per bus.

4.2 Future Demand for Fleet Assets

The future demand for fleet assets has been defined in the 10-year capital budget provided by the City. For the purpose of this AM Plan, all future demand is based on this 10-year capital budget and, beyond 2018, on population growth of the City. The City should reach build out in 2030, at which time the size of the fleet portfolio is forecast to remain constant. See Table 4-1 below.

Table 4-1 Forecast Future Capital Growth & Levels of Service Investments

Year	Population Growth	Fleet Growth
2010	1.06	2.0
2011	1.13	1.4
2012	1.17	0.8
2013	1.20	0.9
2014	1.21	0.8
2015	1.22	0.9
2016	1.23	0.8
2017	1.24	0.9
2018	1.25	0.0

Year	Population Growth	Fleet Growth
2019	1.26	2.6
2020	1.27	2.6
2021	1.28	2.6
2022	1.29	2.6
2023	1.30	2.6
2024	1.31	2.6
2025	1.32	2.6
2026	1.33	2.6
2027	1.34	2.6
2028	1.35	2.6
2029	1.36	2.6
2030	1.36	1.0

5. Lifecycle Analysis

This section of the AM Plan describes the Fleet assets for which the City of Barrie is responsible. Information is provided about the maintenance plan, renewal and replacement plan and creation/acquisition/augmentation plan works. This includes

- Estimated Remaining Life
- Maximum Potential Life
- Asset Consumption by Asset Type
- Consequence of Failure Values by Asset Type
- Probability of Failure
- Redundancy
- Business Risk Exposure

5.1 Estimated Remaining Life

The imminent failure mode for an asset is defined as the failure mode with the lowest estimated remaining life. Best practice asset management considers all failure modes (i.e. physical mortality, capacity, level of service and financial efficiency). However, for this AM Plan, the remaining life of Fleet assets was determined considering the physical mortality failure mode only, based on year of acquisition and estimated maximum potential life.

5.2 Maximum Potential Life (MPL)

The MPL's used in this AM Plan for Fleet assets were those provided by the Fleet Services Branch, and the same as the useful lives considered for PSAB PS 3150 Tangible Capital Asset compliance. Generally, the MPL's for fleet assets are between 8 and 15 years.

5.3 Asset Consumption by Asset Type

Based on the failure modes and remaining life predictions described above, the consumption of each asset in the hierarchy has been calculated. Figures 5-1 to 5-15 illustrate where fleet assets are within their lifecycle and how much they have been consumed.

The asset consumption graphs illustrate the value of assets that are new (0% consumed) through to assets that have reached their maximum potential life (100% consumed). These graphs provide a good indication of which assets are at the end or nearing the end of their life and which assets will require replacement in the near future.

As the failure mode for fleet assets is physical mortality, based on date of acquisition and estimated maximum potential life, the consumption of the assets reflects the age of the assets. As the City collects and stores additional data such as physical condition, mileage and maintenance cost data, consumption will reflect the remaining life based on other imminent failure mode. Note that the City currently has some of this data stored, for some fleet assets, but cannot readily access or analyse the data with the current maintenance management system.

Figure 5-1 Asset Consumption Distribution – Fleet (Total)

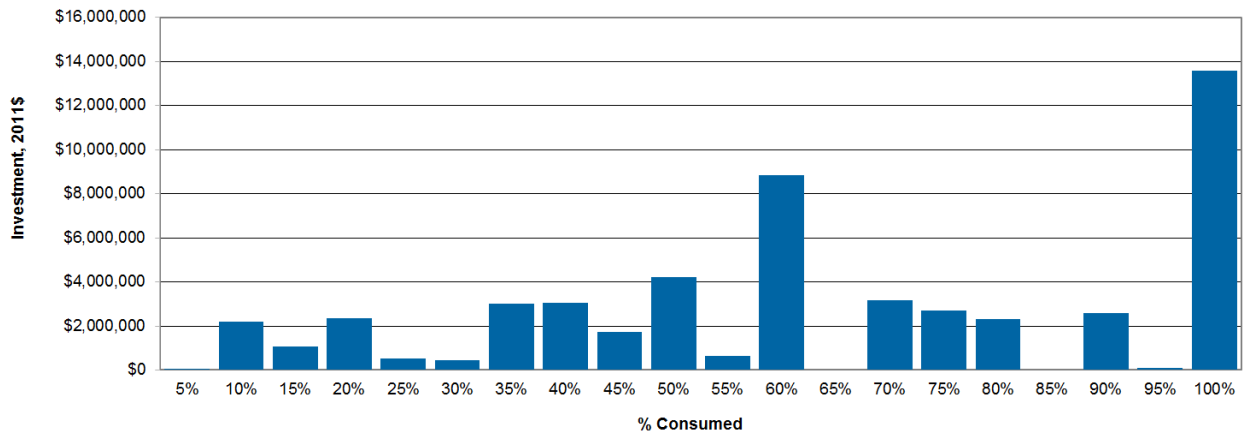


Figure 5-2 Asset Consumption Distribution – General – Corporate

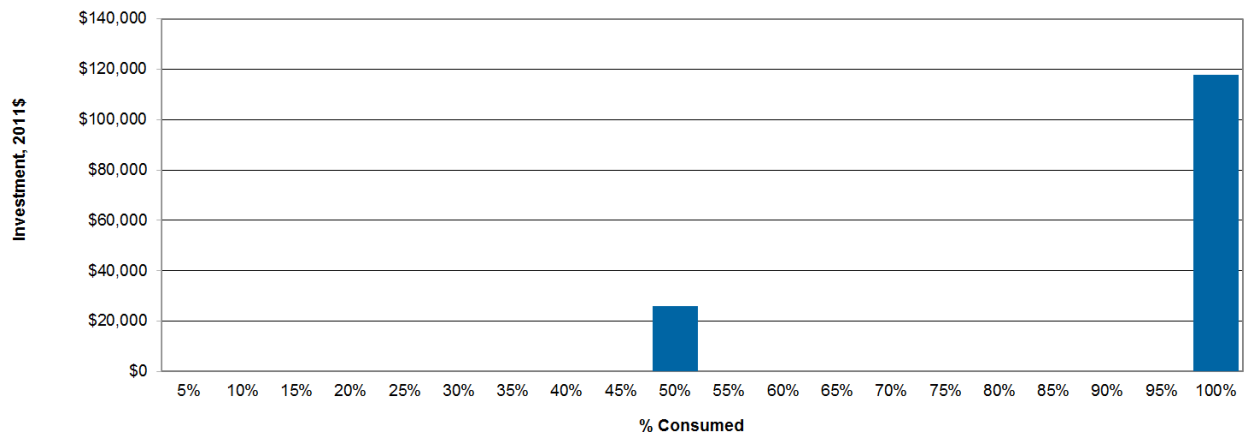


Figure 5-3 Asset Consumption Distribution – General – Other

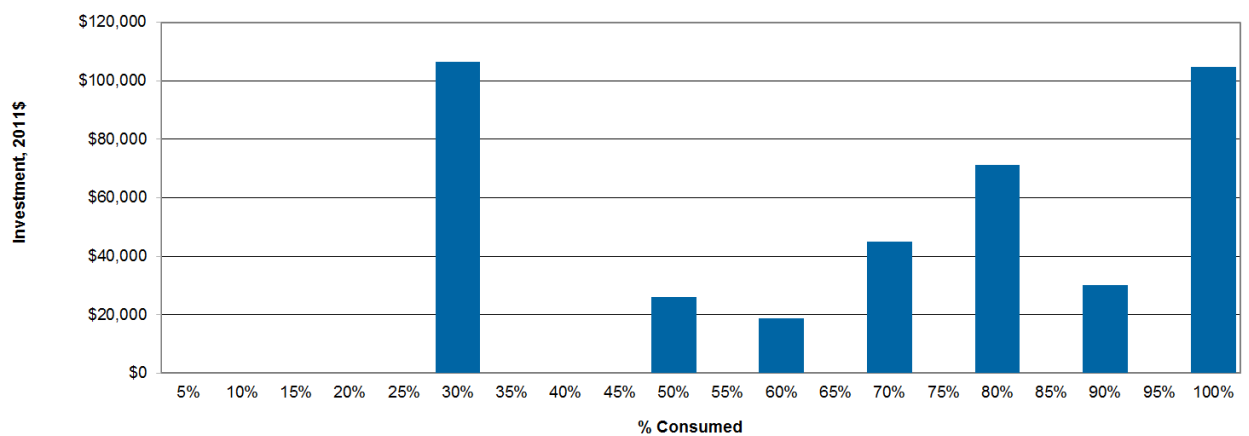


Figure 5-4 Asset Consumption Distribution – Protection – Fire

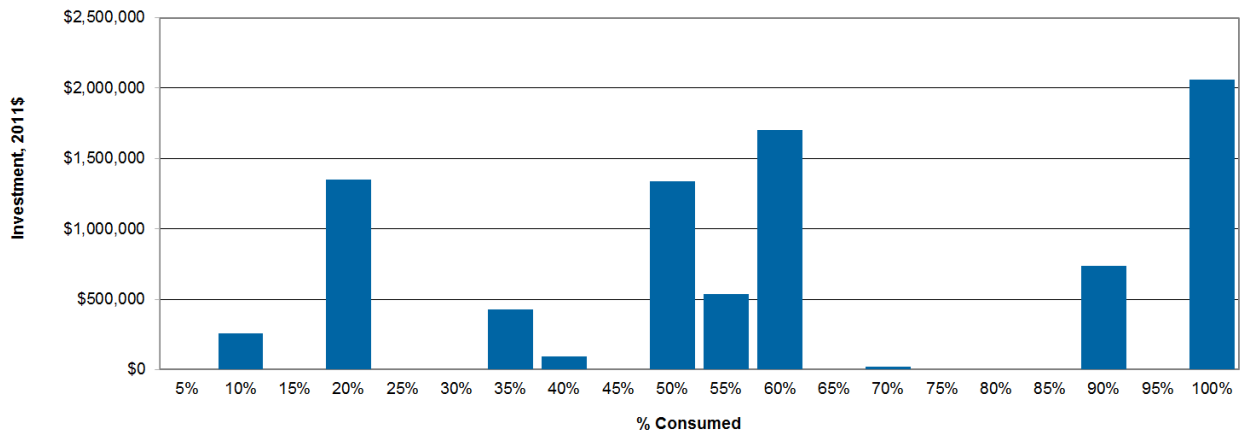


Figure 5-5 Asset Consumption Distribution – Transportation – Roads

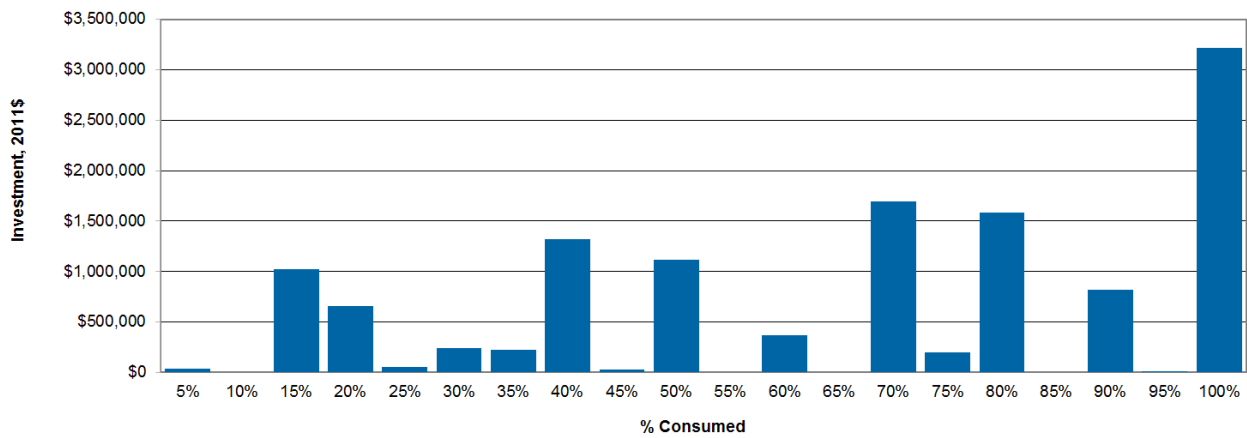


Figure 5-6 Asset Consumption Distribution – Transportation – Transit

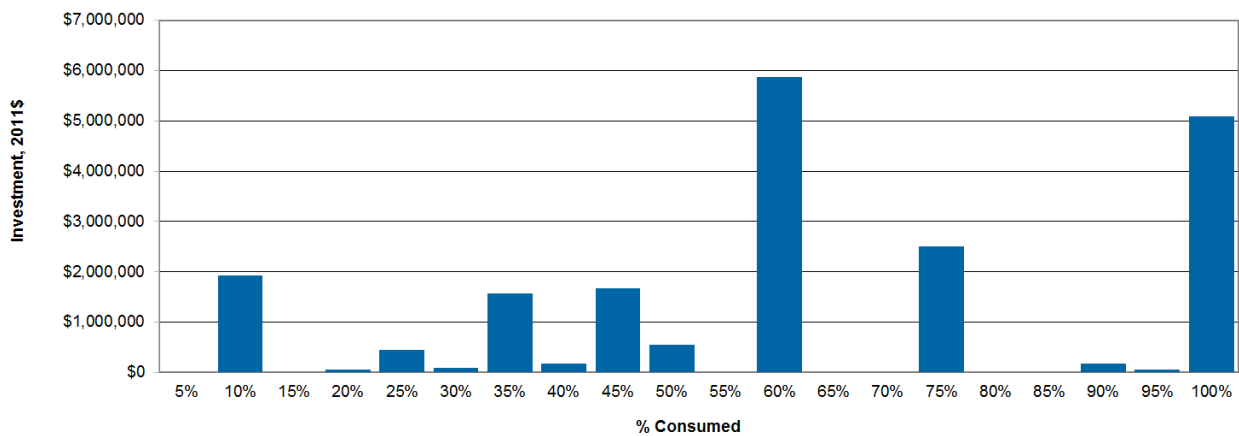


Figure 5-7 Asset Consumption Distribution – Environmental – Water

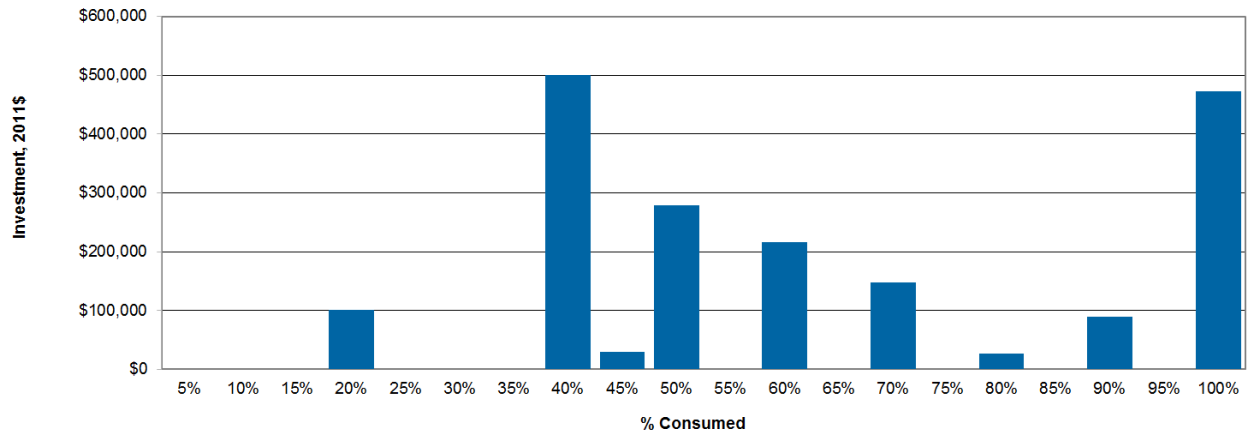


Figure 5-8 Asset Consumption Distribution – Environmental – Wastewater

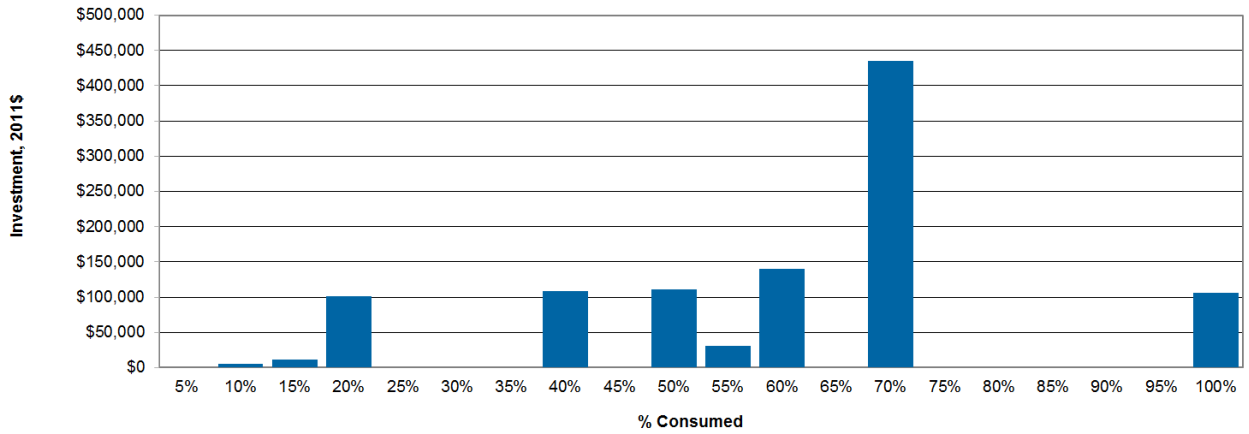


Figure 5-9 Asset Consumption Distribution – Environmental – Waste Management

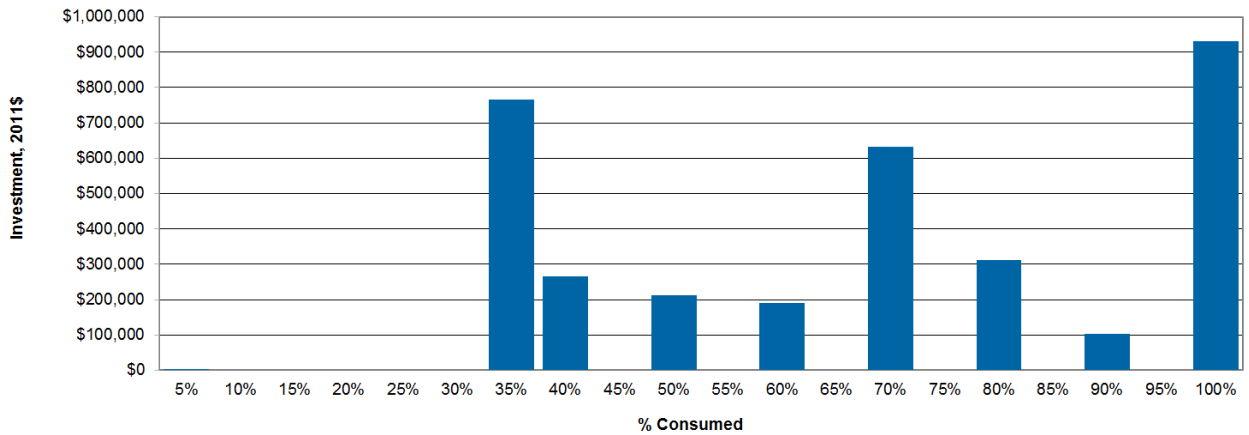


Figure 5-10 Asset Consumption Distribution – Recreation & Culture – Parks

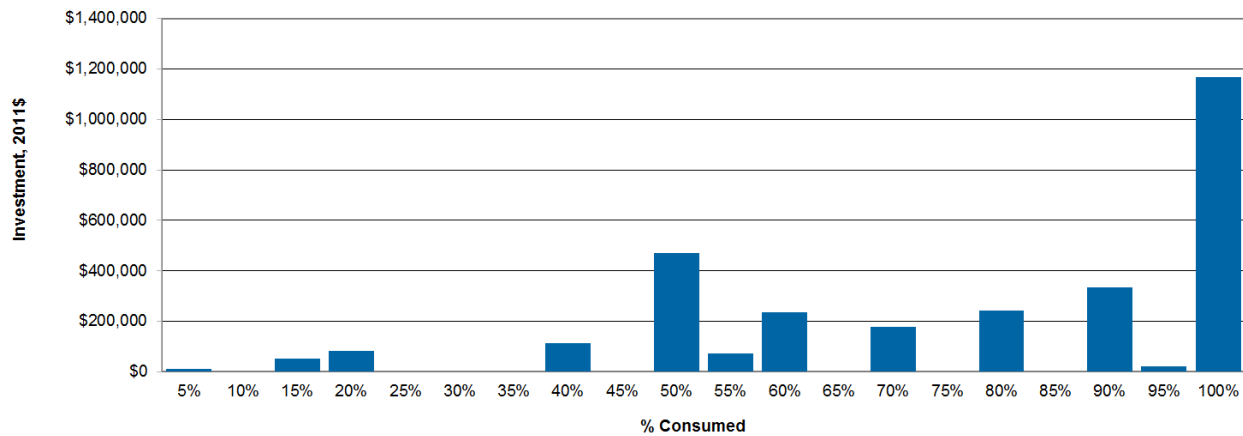
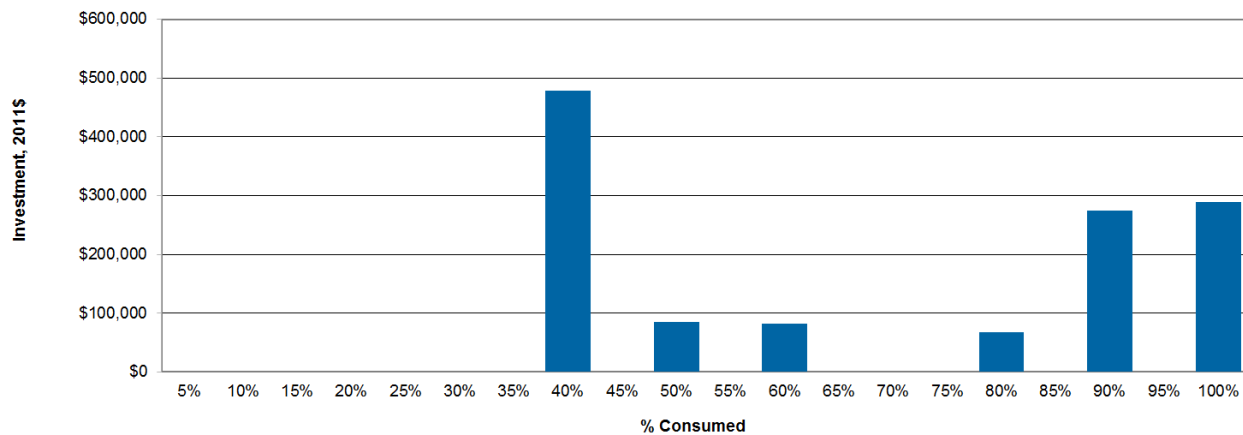


Figure 5-11 Asset Consumption Distribution – Recreation & Culture – Recreation



5.4 Consequence of Failure (CoF)

The consequence of failure ratings, established at AM Plan workshops, applied to Fleet assets was based on the following:

- Fleet assets related to fire and transit have the highest consequence of failure
- Heavy duty assets also have high consequence of failure.

For this AM Plan, it has been assumed that any asset costing more than \$50,000 (2011\$) is a heavy duty vehicle. Table 5-1 below provides the criteria that were applied to determine the CoF of fleet assets. The CoF methodology and its application are described in Section 5 of the main body of this report.

Table 5-1 CoF for Fleet Assets

Criteria	Redundancy Factor
Fire and transit fleet assets with a replacement cost (2009) \geq \$50,000	C4
Other fleet assets with a replacement cost (2009) \geq \$50,000	C3
All the other fleet assets	C2

5.5 Probability of Failure (PoF)

The PoF for this AM Plan has been derived from the age of the asset only. In future, the City should include information such as utilization, mileage, condition and repair history to assess other failure modes.

5.6 Redundancy

Redundancy for fleet assets less than 4500 kg are considered high as additional vehicles can be easily rented from outside sources. Fleet assets such as transit and fire vehicles; however have little to no redundancy as spare transit and fire vehicles are difficult to obtain. These factors have resulted in the following redundancy factors being applied.

Table 5-2 Redundancy Factors

Criteria	Redundancy Factor
Value of asset \geq \$300,000	1.0
Value of asset \geq \$100,000 and $<$ \$300,000	0.8
Busses	0.8
Other, including BACTS (transit vans)	0.1

5.7 Business Risk Exposure

The following section provides risk maps showing the total replacement value of assets for Business Risk Exposure by asset type, based on the risk methodology and criteria described in the body of this AM Plan. The risk maps show the value of assets by asset type (in 20011\$) at extreme, high, moderate, or low risks of failure. The assets falling in the extreme and high categories will generally be those assets that are most consumed, as illustrated in the consumption graphs and therefore have a high probability of failure, and those that have a high consequence.

The risk maps have enabled the identification and prioritization of high risk assets that need to become candidates for closer inspection (to verify if they truly are high risk), renewal or replacement.

The risk map for fleet assets is as follows. Approximately 44% of fleet assets are an extreme business risk, with a further 23% of assets being a high business risk.

Table 5-3 Asset Business Risk Exposure – Fleet (Total)

PoF	P4	\$5,842,896	\$0	\$4,962,250	\$7,452,190
	P3	\$2,099,359	\$0	\$2,702,810	\$10,530,297
	P2	\$3,100,544	\$0	\$4,211,396	\$5,125,910
	P1	\$1,332,404	\$0	\$1,055,969	\$3,750,364
	C1	C2	C3	C 4	

CoF

The assets that comprise the extreme/high BRE for fleet assets are as follows. These are discussed in more detailed in Appendix E, Section 5.

- ▶ Plated Fire (9) Unplated Fire (2)
- ▶ Plated Environmental (1) Unplated Environmental (2)
- ▶ Plated Recreation and Culture (1) and Unplated Recreation and Culture (2)
- ▶ Plated Transportation (44) and Unplated Transportation (4)

Table 5-4 Asset Business Risk Exposure – General – Corporate

PoF	P4	\$117,643	\$0	\$0	\$0
	P3	\$0	\$0	\$0	\$0
	P2	\$25,936	\$0	\$0	\$0
	P1	\$0	\$0	\$0	\$0
	C1	C2	C3	C 4	

CoF

There are no General Corporate vehicles that are at a high/extreme business risk.

Table 5-5 Asset Business Risk Exposure – General – Other

PoF	P4	\$206,060	\$0	\$0	\$0
	P3	\$63,883	\$0	\$0	\$0
	P2	\$25,936	\$0	\$106,594	\$0
	P1	\$0	\$0	\$0	\$0
	C1	C2	C3	C4	

CoF

There are no General Other vehicles that are at a high/extreme business risk.

Table 5-6 Asset Business Risk Exposure – Protection – Fire

PoF	P4	\$267,268	\$0	\$0	\$2,533,548
	P3	\$19,260	\$0	\$0	\$2,238,761
	P2	\$147,729	\$0	\$0	\$1,710,838
	P1	\$160,244	\$0	\$0	\$1,449,720
	C1	C2	C3	C4	

CoF

Protection vehicles that are a high/extreme business risk are plated fire vehicles (16) and one other (1).

Table 5-7 Asset Business Risk Exposure – Transportation – Roads

PoF	P4	\$1,869,376	\$0	\$3,764,866	\$0
	P3	\$826,306	\$0	\$1,441,637	\$0
	P2	\$576,460	\$0	\$2,366,602	\$0
	P1	\$682,397	\$0	\$1,055,969	\$0
	C1	C2	C3	C4	

CoF

Roads vehicles that are a high/extreme business risk are:

- 1995 GHC – TOPKICK (3 of; 693 2KC, 311 5A0, 389 8NC)
- 1998 FREIGHT – FL-80 (501 0DE)

- 1998 VOLVO – WG-64 (578 8DE)
- 1999 FORD – F550 XL (968 5MP)
- 1999 VOLVO – WG-64 (149 5EH)
- 1999 VOLVO – WG-42 (2 of; 170 2EH, 170 1EH)
- 1999 FREIGHT – FL-80 (3 of; 225 8TB, 159 6EH, 170 0EH)
- 2002 FREIGHT – FL-80 (ET9 765)
- 2000 VOLVO – VE-D7 (839 8MB)
- 2003 INT – DT 466E (839 9MB)
- 1979 SICARD
- 1984 4” PUMP
- 1990 PELI – DIESEL
- 1987 TIPPING TRAILER

Table 5-8 Asset Business Risk Exposure – Transportation – Transit

PoF	P4	\$410,803	\$0	\$0	\$4,918,642
	P3	\$89,588	\$0	\$0	\$8,291,536
	P2	\$641,019	\$0	\$0	\$3,415,072
	P1	\$142,104	\$0	\$0	\$2,300,644
	C1		C2	C3	C 4
			CoF		

Transit vehicles that are a high/extreme business risk are:

- 1997 ORION BUS (3 of; BH7 779, BH7 780, BH7 781)
- 1998 ORION BUS (7 of; BL4 670, BL5 431, BH7 775, BL5 429, BL5 430, BL6 659, BH7 704)
- 1998 NOVA BUS (BK4 797)
- 2000 ORION BUS (BK5 530)
- 2002 NEWFLYER BUS (5 of; BL2 980, BL2 981, BL2 982, BL2 983, BL2 984)
- 2004 NEWFLYER BUS (12 of; BL5 428, BH7 778, BJ8 772, BL5 432, BL7 560, BL7 561, BL7 562, BL7 571, BL7 570, BL7 569, BL7 568, BL6 663)

Table 5-9 Asset Business Risk Exposure – Environmental – Waste Management

PoF	P4	\$323,477	\$0	\$1,022,591	\$0
	P3	\$44,828	\$0	\$777,550	\$0
	P2	\$32,274	\$0	\$1,211,501	\$0
	P1	\$0	\$0	\$0	\$0
	C1	C2	C3	C4	

CoF

Solid waste vehicles that are a high/extreme business risk are:

- 1999 JOHN DEERE – LOADER (unplated)
- 1990 CAT (unplated)
- dfg
- 2003 INT – 700 (594 4LP)

Table 5-10 Asset Business Risk Exposure – Environmental – Wastewater Facilities

PoF	P4	\$106,188	\$0	\$0	\$0
	P3	\$122,217	\$0	\$483,623	\$0
	P2	\$111,082	\$0	\$108,305	\$0
	P1	\$112,847	\$0	\$0	\$0
	C1	C2	C3	C4	

CoF

There are no Wastewater fleet assets that are high/extreme business risk.

Table 5-11 Asset Business Risk Exposure – Environmental – Water Facilities

PoF	P4	\$590,470	\$0	\$0	\$0
	P3	\$363,359	\$0	\$0	\$0
	P2	\$391,217	\$0	\$418,393	\$0
	P1	\$100,871	\$0	\$0	\$0
	C1	C2	C3	C4	

CoF

There are no Water fleet assets that are high/extreme business risk.

Table 5-12 Asset Business Risk Exposure – Recreation and Culture – Parks

PoF	P4	\$1,320,749	\$0	\$450,241	\$0
	P3	\$487,442	\$0	\$0	\$0
	P2	\$585,103	\$0	\$0	\$0
	P1	\$133,941	\$0	\$0	\$0
	C1	C2	C3	C4	

CoF

Park fleet assets that are high/extreme business risk are:

- 1999 FORD – F-700 (128 1HJ)
- 1995 BILLY GOAT
- 2000 JACAB - HR9016 16'

Table 5-13 Asset Business Risk Exposure – Recreation

PoF	P4	\$630,863	\$0	\$0	\$0
	P3	\$82,476	\$0	\$0	\$0
	P2	\$563,787	\$0	\$0	\$0
	P1	\$0	\$0	\$0	\$0
	C1		C2	C3	C 4
			CoF		

No recreation fleet assets are high/extreme business risk.

6. Lifecycle Activities

6.1.1 Introduction

The City's current guideline for vehicle replacement timing is at the end of the vehicle's expected life which generally varies from ten years for cars and light trucks, to 12 years for buses and to 15 years for plows and heavy duty specialty trucks. Due to lack of approved funding, the age when vehicles are replaced tends to be later than the guideline. There is concern that, at this age, the maintenance and operating costs are significant and that the City's guideline and/or current practice may not be the lowest lifecycle strategy.

This section of the AM Plan provides a summary of the data, analysis and recommendations for the following basic question:

- ▶ What is the optimal time for the City to replace its motorized vehicles?

The analysis tests various replacement timing options for light-duty vehicles, medium-duty vehicles, heavy-duty vehicles, and heavy duty plows. The timing options vary from two years to 16 years for each of these vehicle types. The option to lease light duty vehicles for a three year term is also considered. The recommendations are made based on the lowest lifecycle cost as the best option, given approximately equal levels of service and risk – therefore, benefits are not considered in the analysis (they are all deemed to be about the same).

This section of the AM Plan is organized in the sequence of the analysis, namely:

- **Introduction:** Outlines the business case
- **Feasible Lifecycle Options:** Describes each of the options considered
- **Analysis:** Describes the results of the analysis
- **Recommendations:** Provides a summary of the recommendations based on the analysis.

6.2 Feasible Lifecycle Options

6.2.1 Overview of Vehicles

The four types of vehicles included in the analysis are as follows:

- **Light-Duty Vehicles:** These include all cars and light pickup trucks (i.e., up to and including ¾ ton trucks such as Ford F250, Dodge 2500 and GMC 2500).
- **Medium-Duty Vehicles:** These include medium duty pickup trucks (i.e., from 1 ton, up to and including 2 ton trucks such as for Ford F350, GMC 3500, and Ford F550).
- **Heavy-Duty Vehicles:** These include heavy duty trucks over 2 tons (i.e., Sterling L8500, Freight FL-80, Int 7400) and Fire vehicles.
- **Heavy-Duty Plows:** These are heavy duty trucks fitted with plows.

The vehicles owned by the City vary in age from 27 years old to new, with the majority of vehicles being less than 15 years old.

As there is concern that maintenance and operating costs may be contributing to high total lifecycle costs, the average cost to operate and maintain the vehicles within each of the four vehicle types was calculated based on trends in actual operations and maintenance costs for City vehicles. The maintenance and operations costs are summarized in Table 6-1 and Table 6-2 below.

Table 6-1 Maintenance Costs Summary

Vehicle Type	0	1	2	3	4	5	6	7	8	9	10	11
Light Duty-Active	\$482	\$1,616	\$3,227	\$4,513	\$6,762	\$7,559	\$9,313	\$11,255	\$10,594	\$10,423	\$16,703	\$11,618
Medium Duty-Active	\$1,893	\$1,727	\$3,577	\$5,083	\$8,927	\$9,095	\$10,265	\$10,454	\$14,701	\$13,307	\$12,998	\$22,629
Heavy Duty-Active	\$1,542	\$2,253	\$6,741	\$11,709	\$15,315	\$19,746	\$35,568	\$28,411	\$35,868	\$35,293	\$34,929	\$41,375
Heavy Duty-Plow	\$1,262	\$3,112	\$3,005	\$6,427	\$13,292	\$19,012	\$17,605	\$25,248	\$19,863	\$16,800	\$17,031	\$27,999

Table 6-2 Operations Costs Summary

Vehicle Type	Ave Fuel Consumption (\$/km)	Ave Distance (km)	Ave Fuel Costs (2011\$)	Ave Other Operations Costs (2011\$)	Ave Annual Fuel Cost Growth (%)
Light Duty-Active	\$0.10	12,353	\$1,430	\$1,431.99	7.0%
Medium Duty-Active	\$0.10	2,821	\$1,525	\$1,524.76	5.1%
Heavy Duty-Active	\$0.21	15,196	\$3,680	\$3,678.99	2.6%
Heavy Duty-Active (Plow)	\$0.27	6,867	\$2,160	\$2,157.20	1.8%

6.2.2 Overview of Options

As the central question of this analysis is: *When should the City replace its motorized vehicles?*, the analysis will test the total lifecycle costs of various replacement timing options. For each of the vehicle types, the analysis will test various replacement timing options:

- Option 1: Own for 2 Years
- Option 2: Own for 4 Years
- Option 3: Own for 6 Years
- Option 4: Own for 8 Years
- Option 5: Own for 10 Years
- Option 6: Own for 12 Years
- Option 7: Own for 14 Years
- Option 8: Own for 16 Years

Once the optimal time to replace the vehicles is determined, it will be compared to an option to lease the vehicles for a three year term. Note that this option is only applicable to light duty vehicles. After the above listed analysis was completed, an additional option, Option 0.5: Own for 1 Years, was also considered for light duty vehicles.

6.2.3 Analysis Inputs for Options

The inputs to the analysis, including the discount rate, estimated lifecycle costs and timing for the above options, for the four vehicle types, are provided in the Options Summary tables below (Table 6-3 to Table 6-6). Note that to simplify the analysis, all options are assumed to provide equal levels of service and expose the City to equal amounts of risk. Therefore, benefits are not considered in the analysis (they are all deemed to be about the same).

Table 6-3 Light-Duty Vehicles Options Summary

**Fleet Lifecycle Cost Analysis #1
Light Duty Vehicles**

Discount Rate	3.66%							
Options Summary								
Expected life	Option 1 Own for 2 Yrs 2 years	Option 2 Own for 4 Yrs 4 years	Option 3 Own for 6 Yrs 6 years	Option 4 Own for 8 Yrs 8 years	Option 5 Own for 10 Yrs 10 years	Option 6 Own for 12 Yrs 12 years	Option 7 Own for 14 Yrs 14 years	Option 8 Own for 16 Yrs 16 years
COSTS								
Create / Acquire	\$35,000 @ yr 0	\$35,000 @ yr 0	\$35,000 @ yr 0	\$35,000 @ yr 0	\$35,000 @ yr 0	\$35,000 @ yr 0	\$35,000 @ yr 0	\$35,000 @ yr 0
Operations	\$2,000 annually @ 7.0%	\$2,000 annually @ 7.0%	\$2,000 annually @ 7.0%	\$2,000 annually @ 7.0%	\$2,000 annually @ 7%	\$2,000 annually @ 7.0%	\$2,000 annually @ 7.0%	\$2,000 annually @ 7.0%
Maintenance	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis
Refurbish	\$0 @ yr	\$0 @ yr	\$0 @ yr	@ yr	@ yr	@ yr	\$0 @ yr	\$0 @ yr
Disposal	\$350 @ yr 2	\$350 @ yr 4	\$350 @ yr 6	\$350 @ yr 8	@ yr 10	@ yr 12	\$0 @ yr 14	\$0 @ yr 16
BENEFITS								
Revenue / LOS	\$0 annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%	annually @ 0.0%	annually @ 0%	annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%
Salvage	\$28,000 @ yr 2	\$21,000 @ yr 4	\$14,000 @ yr 6	\$7,000 @ yr 8	\$0 @ yr 10	\$0 @ yr 12	\$0 @ yr 14	\$0 @ yr 16
O&M Efficiencies	\$0 annually @	\$0 annually @	\$0 annually @	annually @	annually @	annually @	\$0 annually @	\$0 annually @
Risk Avoidance	\$0 annually @	\$0 annually @	\$0 annually @	annually @	annually @	annually @	\$0 annually @	\$0 annually @

Table 6-4 Medium-Duty Vehicles Options Summary

**Fleet Lifecycle Cost Analysis #2
Medium Duty Vehicles**

Discount Rate	3.66%							
Options Summary								
Expected life	Option 1 Own for 2 Yrs 2 years	Option 2 Own for 4 Yrs 4 years	Option 3 Own for 6 Yrs 6 years	Option 4 Own for 8 Yrs 8 years	Option 5 Own for 10 Yrs 10 years	Option 6 Own for 12 Yrs 12 years	Option 7 Own for 14 Yrs 14 years	Option 8 Own for 16 Yrs 16 years
COSTS								
Create / Acquire	\$48,000 @ yr 0	\$48,000 @ yr 0	\$48,000 @ yr 0	\$48,000 @ yr 0	\$48,000 @ yr 0	\$48,000 @ yr 0	\$48,000 @ yr 0	\$48,000 @ yr 0
Operations	\$2,000 annually @ 5.1%	\$2,000 annually @ 7.0%	\$2,000 annually @ 7.0%	\$2,000 annually @ 7.0%	\$2,000 annually @ 7.0%	\$2,000 annually @ 7.0%	\$2,000 annually @ 7.0%	\$2,000 annually @ 7.0%
Maintenance	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis
Refurbish	\$0 @ yr	\$0 @ yr	\$0 @ yr	@ yr	@ yr	@ yr	\$0 @ yr	\$0 @ yr
Disposal	\$480 @ yr 2	\$480 @ yr 4	\$480 @ yr 6	\$480 @ yr 8	@ yr 10	@ yr 12	\$0 @ yr 14	\$0 @ yr 16
BENEFITS								
Revenue / LOS	\$0 annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%	annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%
Salvage	\$38,400 @ yr 2	\$28,800 @ yr 4	\$19,200 @ yr 6	\$9,600 @ yr 8	\$0 @ yr 10	\$0 @ yr 12	\$0 @ yr 14	\$0 @ yr 16
O&M Efficiencies	\$0 annually @	\$0 annually @	\$0 annually @	annually @	annually @	annually @	\$0 annually @	\$0 annually @
Risk Avoidance	\$0 annually @	\$0 annually @	\$0 annually @	annually @	annually @	annually @	\$0 annually @	\$0 annually @

Table 6-5 Heavy-Duty Vehicles Options Summary

**Fleet Lifecycle Cost Analysis #3
Heavy Duty Vehicles**

Discount Rate	3.66%							
Options Summary	Option 1 Own for 2 Yrs	Option 2 Own for 4 Yrs	Option 3 Own for 6 Yrs	Option 4 Own for 8 Yrs	Option 5 Own for 10 Yrs	Option 6 Own for 12 Yrs	Option 7 Own for 14 Yrs	Option 8 Own for 16 Yrs
Expected life	2 years	4 years	6 years	8 years	10 years	12 years	14 years	16 years
COSTS								
Create / Acquire	\$253,000 @ yr 0	\$253,000 @ yr 0	\$253,000 @ yr 0	\$253,000 @ yr 0	\$253,000 @ yr 0	\$253,000 @ yr 0	\$253,000 @ yr 0	\$253,000 @ yr 0
Operations	\$5,000 annually @ 2.6%	\$5,000 annually @ 2.6%	\$5,000 annually @ 2.6%	\$5,000 annually @ 2.6%	\$5,000 annually @ 2.6%	\$5,000 annually @ 2.6%	\$5,000 annually @ 2.6%	\$5,000 annually @ 2.6%
Maintenance	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis
Refurbish	\$0 @ yr	\$0 @ yr	\$0 @ yr	@ yr	@ yr	@ yr	@ yr	@ yr
Disposal	\$2,530 @ yr 2	\$2,530 @ yr 4	\$2,530 @ yr 6	\$2,530 @ yr 8	@ yr 10	@ yr 12	\$0 @ yr 14	\$0 @ yr 16
BENEFITS								
Revenue / LOS	\$0 annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%	annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%
Salvage	\$202,400 @ yr 2	\$151,800 @ yr 4	\$101,200 @ yr 6	\$50,600 @ yr 8	\$0 @ yr 10	\$0 @ yr 12	\$0 @ yr 14	\$0 @ yr 16
O&M Efficiencies	\$0 annually @	\$0 annually @	\$0 annually @	annually @	annually @	annually @	\$0 annually @	\$0 annually @
Risk Avoidance	\$0 annually @	\$0 annually @	\$0 annually @	annually @	annually @	annually @	\$0 annually @	\$0 annually @

Table 6-6 Heavy-Duty Plows Options Summary

**Fleet Lifecycle Cost Analysis #4
Heavy Duty Plows**

Discount Rate	3.66%							
Options Summary	Option 1 Own for 2 Yrs	Option 2 Own for 4 Yrs	Option 3 Own for 6 Yrs	Option 4 Own for 8 Yrs	Option 5 Own for 10 Yrs	Option 6 Own for 12 Yrs	Option 7 Own for 14 Yrs	Option 8 Own for 16 Yrs
Expected life	2 years	4 years	6 years	8 years	10 years	12 years	14 years	16 years
COSTS								
Create / Acquire	\$140,000 @ yr 0	\$140,000 @ yr 0	\$140,000 @ yr 0	\$140,000 @ yr 0	\$140,000 @ yr 0	\$140,000 @ yr 0	\$140,000 @ yr 0	\$140,000 @ yr 0
Operations	\$3,000 annually @ 2.0%	\$3,000 annually @ 2.0%	\$3,000 annually @ 2.0%	\$3,000 annually @ 2.0%	\$3,000 annually @ 2.0%	\$3,000 annually @ 2.0%	\$3,000 annually @ 2.0%	\$3,000 annually @ 2.0%
Maintenance	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis	Inserted in Analysis
Refurbish	\$0 @ yr	\$0 @ yr	\$0 @ yr	@ yr	@ yr	@ yr	@ yr	@ yr
Disposal	\$1,400 @ yr 2	\$1,400 @ yr 4	\$1,400 @ yr 6	\$1,400 @ yr 8	@ yr 10	@ yr 12	\$0 @ yr 14	\$0 @ yr 16
BENEFITS								
Revenue / LOS	\$0 annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%	annually @ 0.0%	\$0 annually @ 0.0%	\$0 annually @ 0.0%
Salvage	\$112,000 @ yr 2	\$84,000 @ yr 4	\$56,000 @ yr 6	\$28,000 @ yr 8	\$0 @ yr 10	\$0 @ yr 12	\$0 @ yr 14	\$0 @ yr 16
O&M Efficiencies	\$0 annually @	\$0 annually @	\$0 annually @	annually @	annually @	annually @	\$0 annually @	\$0 annually @
Risk Avoidance	\$0 annually @	\$0 annually @	\$0 annually @	annually @	annually @	annually @	\$0 annually @	\$0 annually @

Table 6-7 Light Duty Vehicles – Own versus Lease Options Summary

**Fleet Lifecycle Cost Analysis #5
Light Duty Vehicles - Own vs Lease**

Discount Rate	3.66%							
Options Summary	Option 1 Own for 2 Yrs		Option 2 Own for 4 Yrs		Option 3 Lease for 3 Yrs		Option 0.5 Own for 1 Yr	
Expected life	2 years		4 years		3 years		1 years	
COSTS								
Create / Acquire	\$35,000 @ yr	0	\$35,000 @ yr	0	\$0 @ yr	0	\$35,000 @ yr	0
Lease	\$0 annually @ 0.0%		\$0 annually @ 0.0%		\$750 monthly		\$0 annually @ 0.0%	
Operations	\$2,000 annually @ 7.0%		\$2,000 annually @ 7.0%		\$2,000 annually @ 7.0%		\$2,000 annually @ 7.0%	
Maintenance	Inserted in Analysis		Inserted in Analysis		Inserted in Analysis		Inserted in Analysis	
Refurbish	\$0 @ yr		\$0 @ yr		\$2,000 @ yr 3		\$0 @ yr	
Disposal	\$350 @ yr	2	\$350 @ yr	4	\$0 @ yr	3	\$350 @ yr	1
BENEFITS								
Revenue / LOS	\$0 annually @ 0.0%		\$0 annually @ 0.0%		\$0 annually @ 0.0%		\$0 annually @ 0.0%	
Salvage	\$28,000 @ yr	2	\$21,000 @ yr	4	\$0 @ yr	3	\$29,000 @ yr	1
O&M Efficiencies	\$0 annually @		\$0 annually @		\$0 annually @		\$0 annually @	
Risk Avoidance	\$0 annually @		\$0 annually @		\$0 annually @		\$0 annually @	

6.3 Lifecycle Activities Analysis

6.3.1 Overview of Analysis

The output of the lifecycle cost analysis is the estimated total lifecycle cost of the asset or **Net Present Value (NPV)**, which is the sum of all annual expenditures and benefits for the expected life of the asset, but with the expenditure or benefit for each year discounted by the appropriate rate (provided by the Finance Department as 3.66%). NPV evaluations should not be used when options with different investment sizes and/or lives are being compared. Other economic measures include:

- **Annuity of NPV:** Suitable for use when investment sizes are the same, but the lives are unequal
- **Present Value Index (PVI):** Suitable when the lives are the same, but investment sizes are unequal

Once the decision model was formulated based on the inputs provided in the previous section, it was analyzed using a spreadsheet. See Table 6-8 below for a sample of the analysis.

Table 6-8 Lifecycle Cost Analysis Sample

Fleet Lifecycle Cost Analysis #1														
Light Duty Vehicles				Mtce Costs (annual)										
				\$500	\$1,830	\$3,220	\$4,670	\$6,180	\$7,750	\$9,380	\$11,070	\$12,820		
Annuity of NPV (highest +ve)				-\$10,801										
Option 4 - Own for 8 Yrs														
Life -->	8	Discount Rate -->	3.66%	0	1	2	3	4	5	6	7	8		
				(Current Yr)										
COSTS				PV	-\$37,500	-\$3,970	-\$5,510	-\$7,120	-\$8,802	-\$10,555	-\$12,381	-\$14,282	-\$37,850	
Create or Acquire (pt in time)	\$35,000 @ yr	0	\$121,339	\$35,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$35,000	
Operations (annual)	\$2,000 annually @ 7%		\$60,055	\$2,000	\$2,140	\$2,290	\$2,450	\$2,622	\$2,805	\$3,001	\$3,212	\$2,000		
Maintenance (annual)	Inserted in Analysis		\$124,098	\$500	\$1,830	\$3,220	\$4,670	\$6,180	\$7,750	\$9,380	\$11,070	\$500		
Refurbish (pt in time)	\$0 @ yr	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Dispose & Replace (pt in time)	\$350 @ yr	8	\$863	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$350		
BENEFITS				\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,000	
Revenue / LOS (annual)	\$0 annually @ 0%		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Salvage (pt in time)	\$7,000 @ yr	8	\$17,268	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,000	
O&M Efficiencies (annual)	\$0 annually @ 0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Risk Avoidance (annual)	\$0 annually @ 0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
NPV (highest +ve)				-\$289,088										
PVI (highest > +1.0)				-1.382										
Annuity of PVI (highest > hurdle rate)				-\$12,235										

6.3.2 Analysis Results

The outputs of the lifecycle cost analysis are the four economic measures, for each of the eight options, for each of the four vehicle types. These outputs are shown in the following graphs. In addition, the own versus lease option for Light Duty Vehicles is also shown.

Figure 6-1 Lifecycle Cost Analysis Results – Light-Duty Vehicles

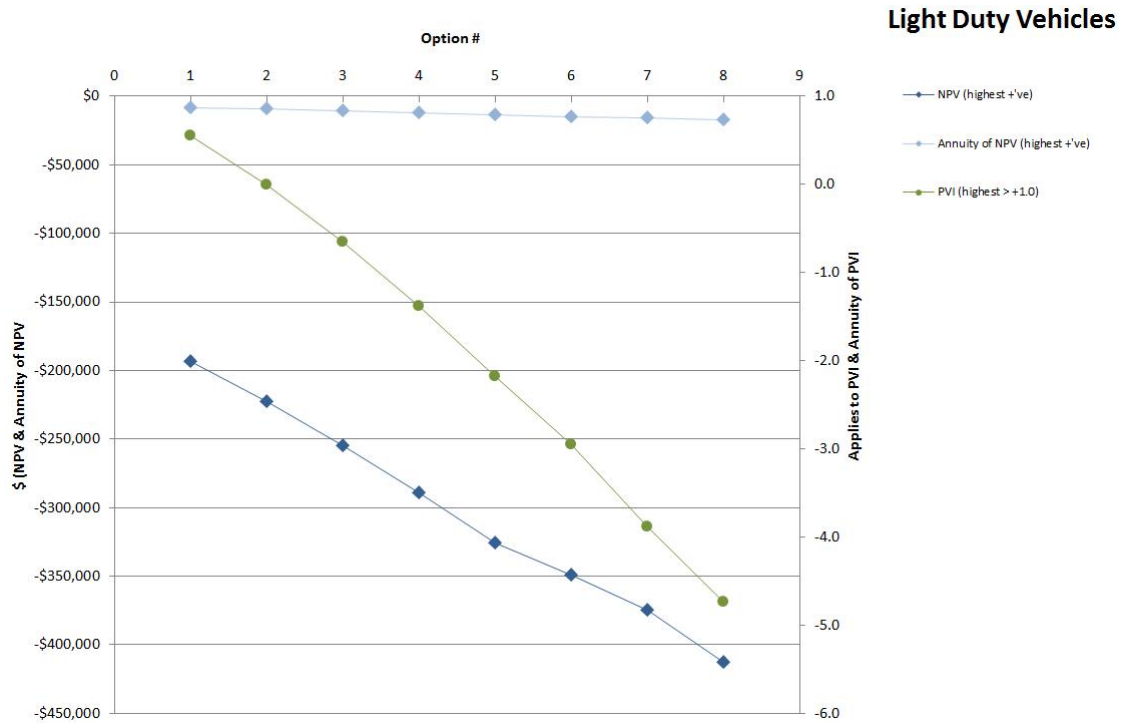


Figure 6-2 Lifecycle Cost Analysis Results – Medium-Duty Vehicles

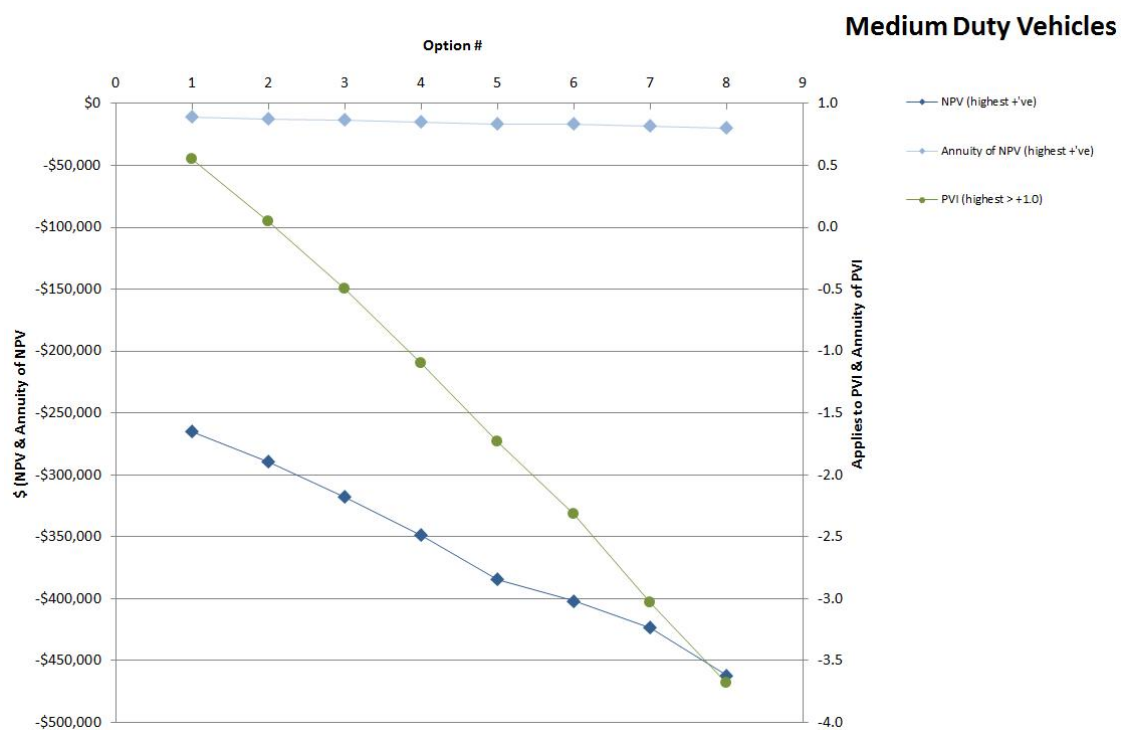


Figure 6-3 Lifecycle Cost Analysis Results – Heavy-Duty Vehicles

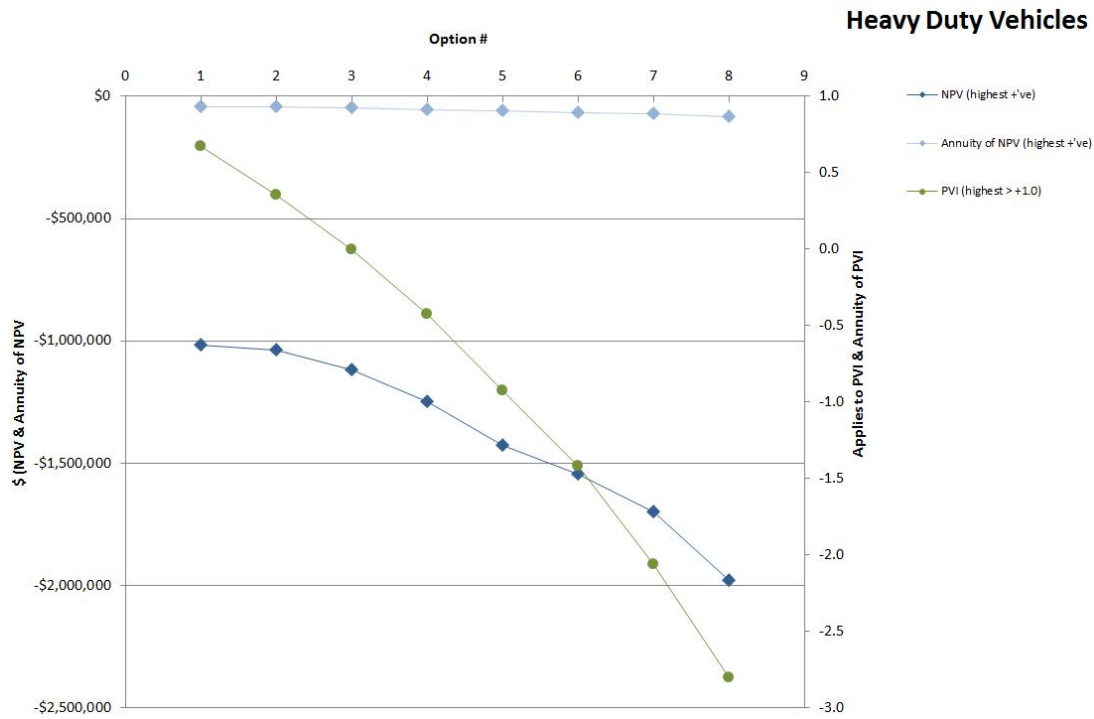


Figure 6-4 Lifecycle Cost Analysis Results – Heavy-Duty Plows

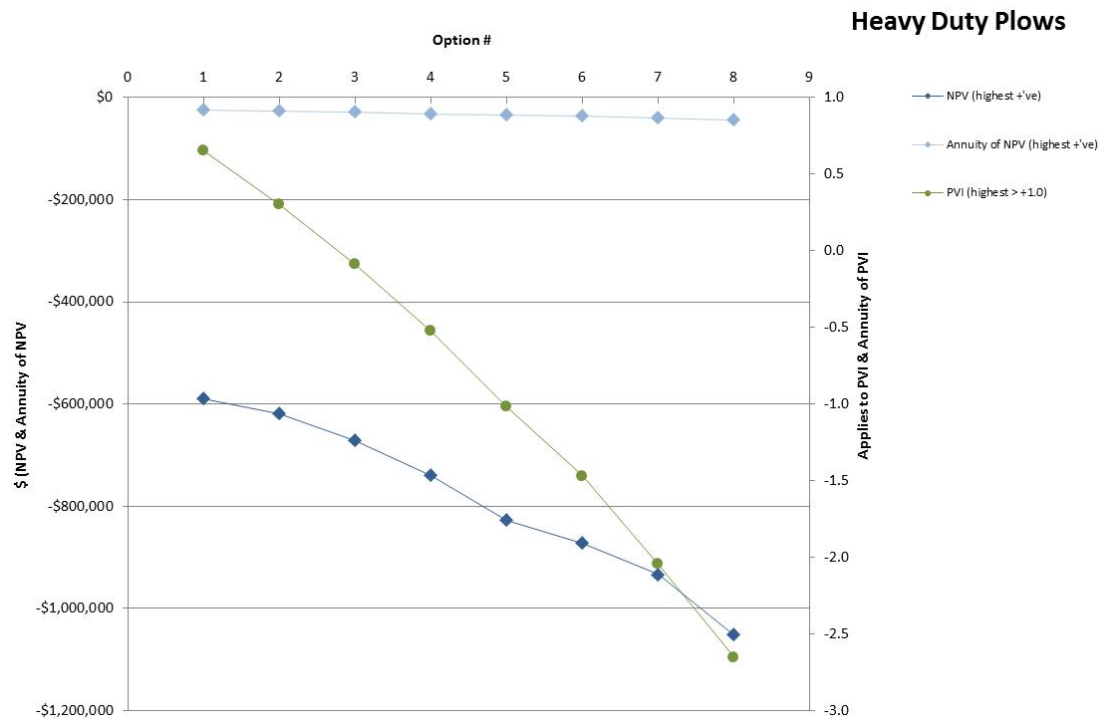
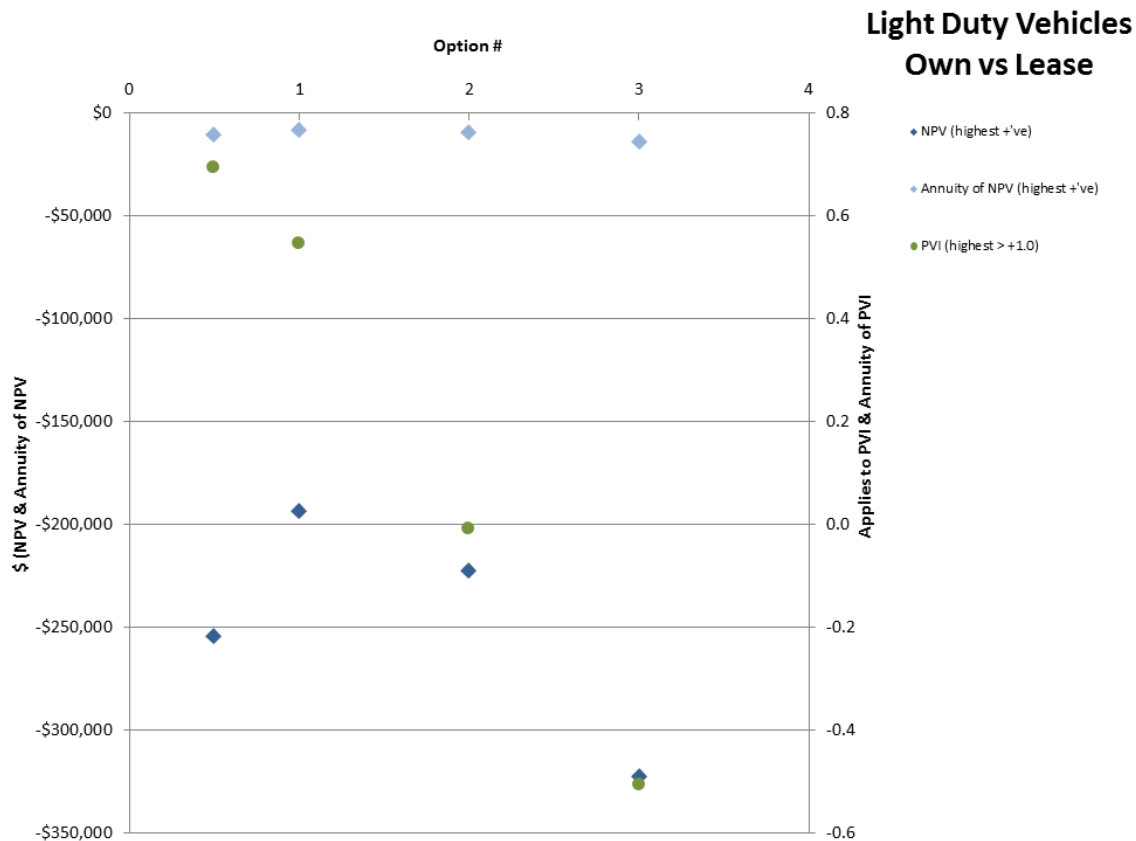


Figure 6-5 Lifecycle Cost Analysis Results – Light Duty Vehicles: Own versus Lease



The lowest lifecycle cost for each of the vehicle types, for all of the economic measures is the Own for 2-Years Option. This option is also the optimal lifecycle cost option for light duty vehicles, when the Lease and the Own for 1-Years Options are considered.

6.3.3 Sensitivity Analysis

A sensitivity test of the analysis was undertaken by systematically varying a range of scenarios for each parameter in turn to determine the factors that were most influential on the results

- Cost estimates ($\pm 20\%$)
- Variations in opportunity cost of capital (i.e., discount rate) ($\pm 20\%$)

The influences of these factors on the results are not significant. However, the analysis is sensitive to the Salvage value of the vehicles, which is subject to the market for the vehicles.

6.3.4 Final Comparison of Options

It should be noted that the above analyse was conducted as a means to compare alternatives and does not necessarily provide the total cost of an option – benefits and risk were assumed to be consistent

across all options. Hence, the use of the calculated amounts for any other purpose would need to be logically reasoned and justified.

In the comparison of options, the present value amounts calculated must be significantly different for a final decision to be made on economic grounds only. All aspects, including technical, economic, social and environmental factors, need to be considered as part of the evaluation process before a decision can be made for implementation.

6.4 Lifecycle Activities Recommendations

This analysis investigated the following basic question:

- What is the optimal time for the City to replace its motorized vehicles?

The analysis tested various replacement timing options for four vehicle types: light-duty vehicles, medium-duty vehicles, heavy-duty vehicles, and heavy duty plows. Based on the above analysis, the recommended optimal timing for replacement of the four types of vehicles is summarized in Table 6-9 below.

Table 6-9 Recommendations on Vehicle Replacements

Vehicle Type	Recommended Vehicle Replacement Timing (Years)	Ave Acquisition Cost (2011\$)	Ave Annual Acquisition Cost (2011\$)	Ave Annual Maintenance Cost (2011\$)	Ave Annual Operations Cost (2011\$)	TOTAL Ave Annual Lifecycle Cost (2011\$)
Light Duty-Active	2	\$35,000	\$5,140	\$1,200	\$2,160	\$8,500
Medium Duty-Active	2	\$48,000	\$6,900	\$2,200	\$2,500	\$11,600
Heavy Duty-Active	2	\$253,000	\$37,200	\$2,100	\$5,300	\$44,600
Heavy Duty-Active (Plow)	2	\$140,000	\$20,500	\$2,200	\$3,200	\$25,900

It should be noted that the recommendations are sensitive to the salvage value received for vehicles. The actual salvage values for vehicles should be input into the analysis, with particular attention to the Heavy-Duty and Heavy-Duty Plows as the market for these vehicles is assumed not to be as liquid as for Light-Duty and Medium-Duty Vehicles.

7. Long-Term Funding Analysis

7.1 Predicted Future Renewal

Figures 7.1 to 7.15 illustrate the estimated long term investment needs to sustain the City's existing fleet asset portfolio. That is, the estimated amount of money the City needs to reinvest in its existing asset portfolio on an annual basis to sustain the current level of service to the City's citizens. The dollar amounts in these figures are in 2011 dollars.

These figures only represent investment needed to replace these assets – they do not include the cost to maintain or rehabilitate them throughout their lives (these costs are addressed in Section 7.2). All costs are order of magnitude estimates only and are based on cost data provided by the City of Barrie. The figures illustrate the long term funding needs at the levels detailed in the asset hierarchy.

The figures indicate that the City needs to be reinvesting approximately \$4.6 million in its fleet assets on an annual basis to sustain its existing asset portfolio.

Figure 7-1 Forecast Asset Renewal Investment – Fleet (Total)

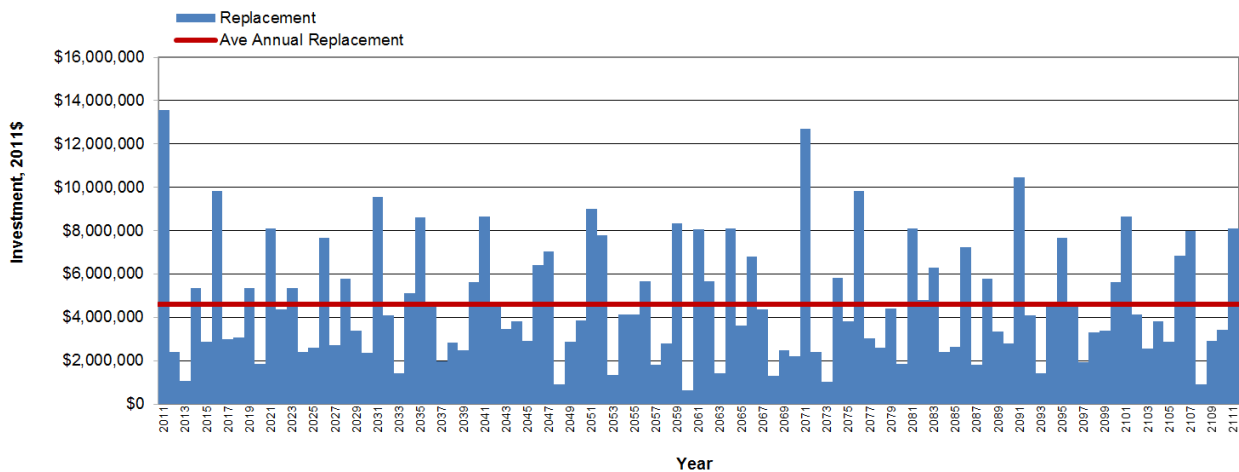


Figure 7-2 Forecast Asset Renewal Investment – General – Corporate

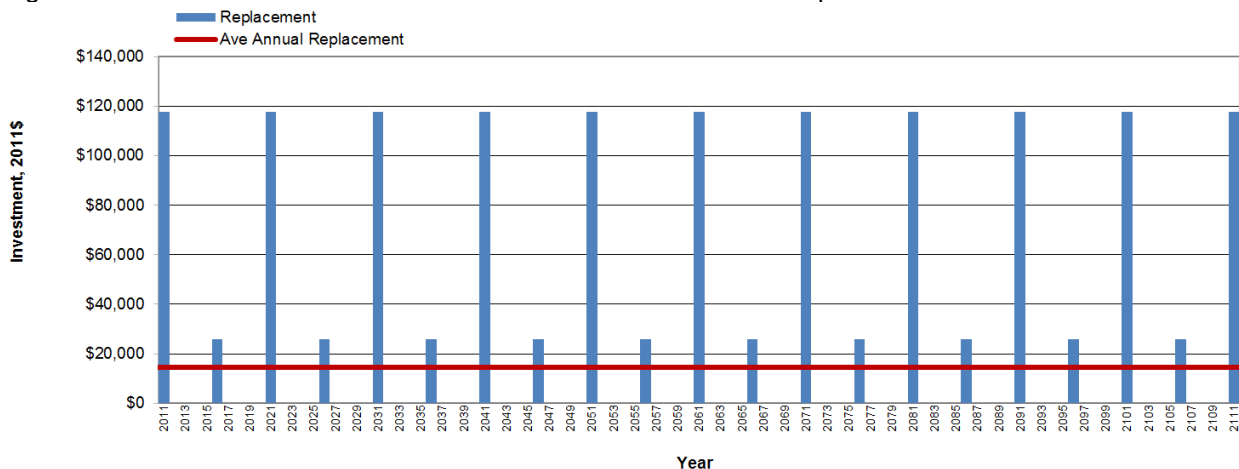


Figure 7-3 Forecast Asset Renewal Investment – General – Other

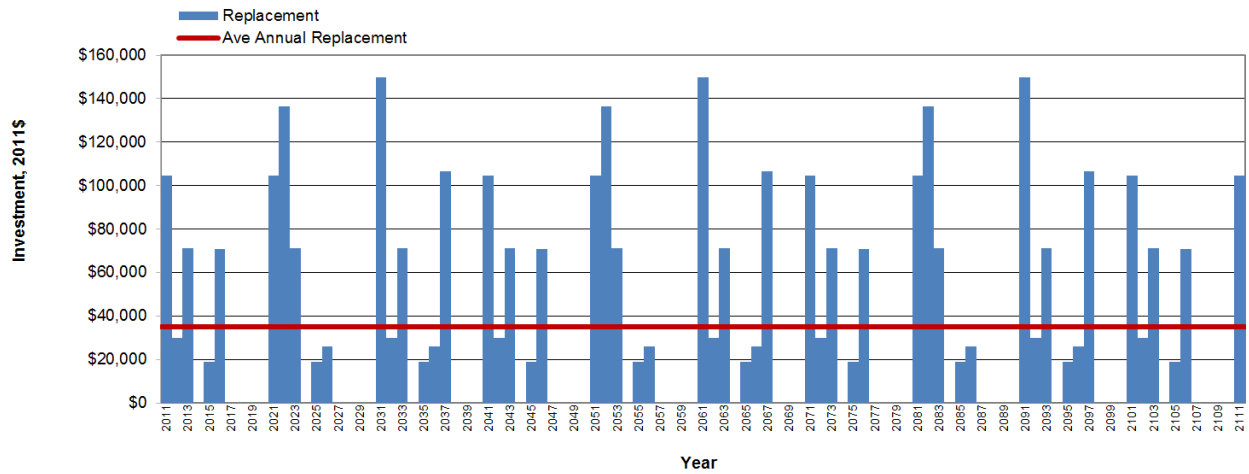


Figure 7-4 Forecast Asset Renewal Investment – Protection – Fire

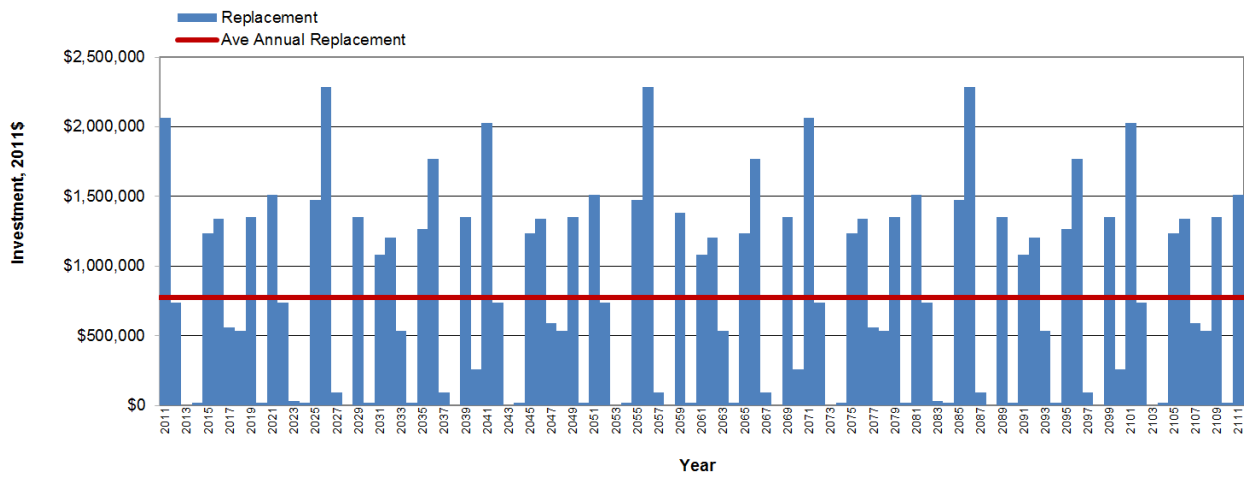


Figure 7-5 Forecast Asset Renewal Investment – Transportation – Roads

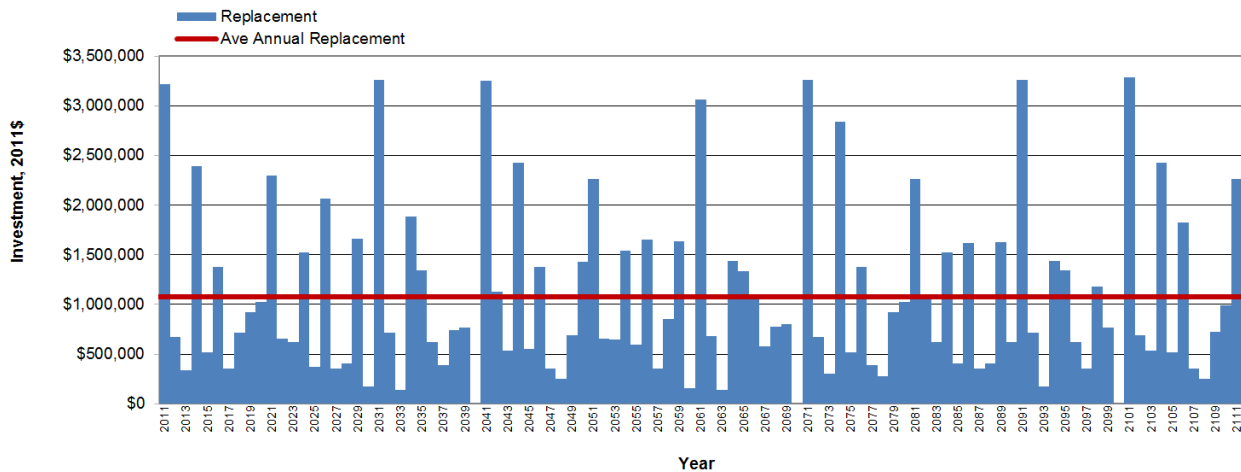


Figure 7-6 Forecast Asset Renewal Investment – Transportation – Transit

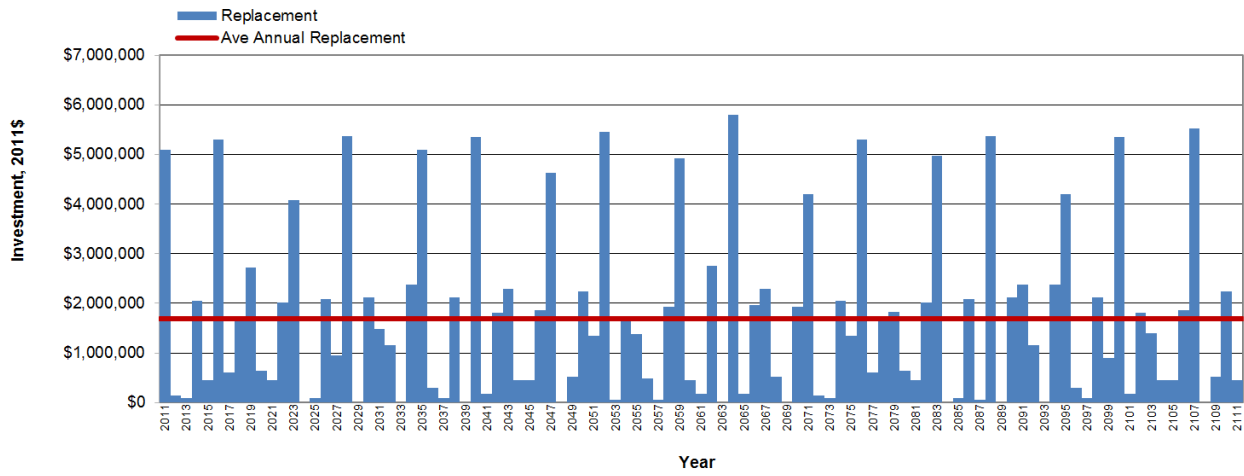


Figure 7-7 Forecast Asset Renewal Investment – Environmental – Water

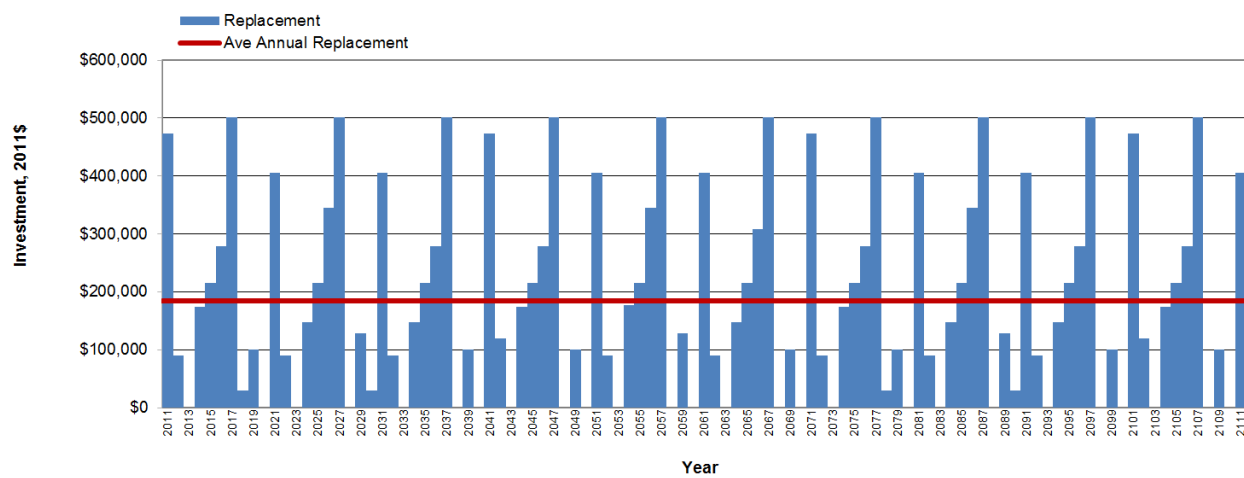


Figure 7-8 Forecast Asset Renewal Investment – Environmental – Wastewater

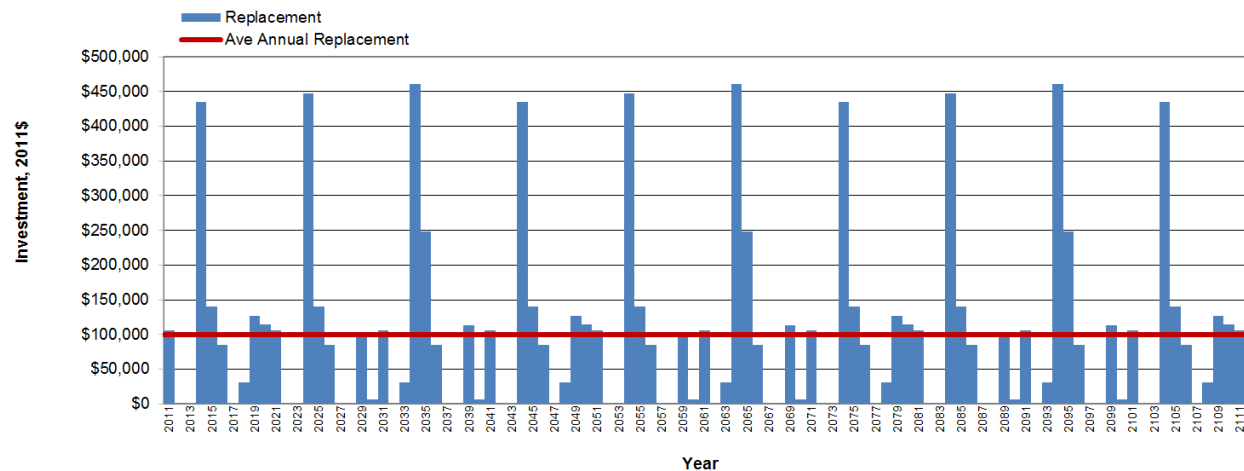


Figure 7-9 Forecast Asset Renewal Investment – Environmental – Waste Management

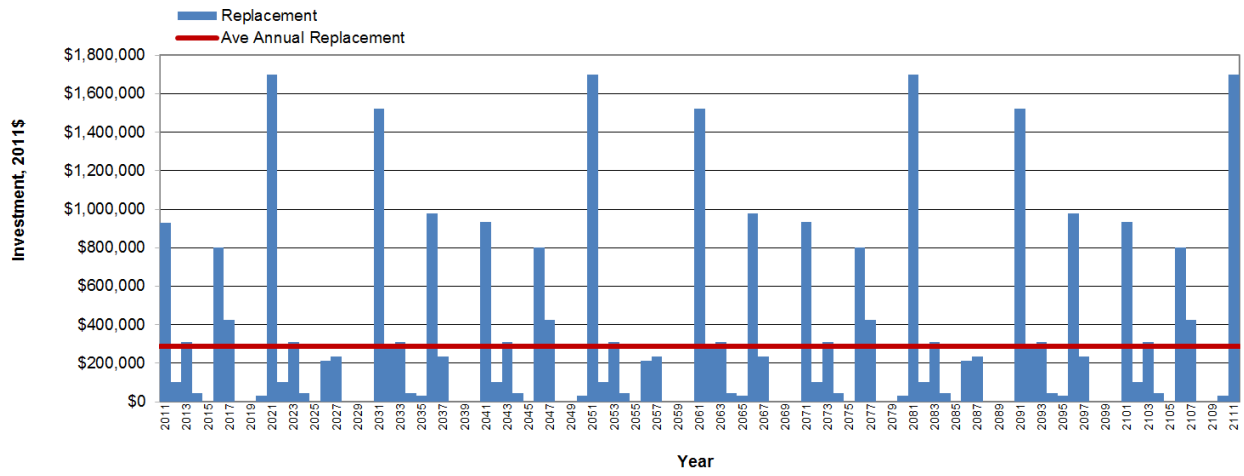


Figure 7-10 Forecast Asset Renewal Investment – Recreation & Culture – Parks

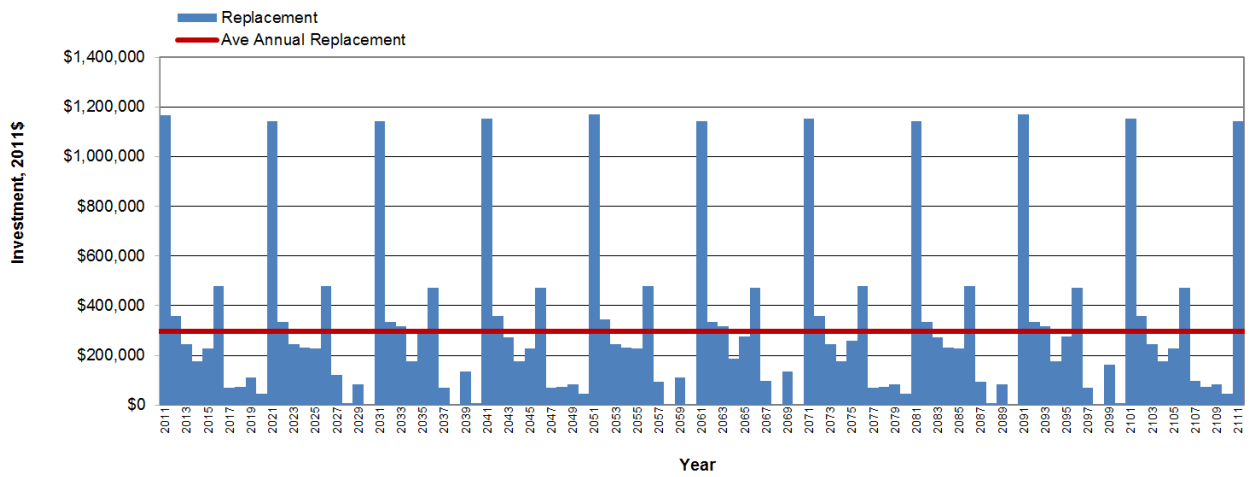
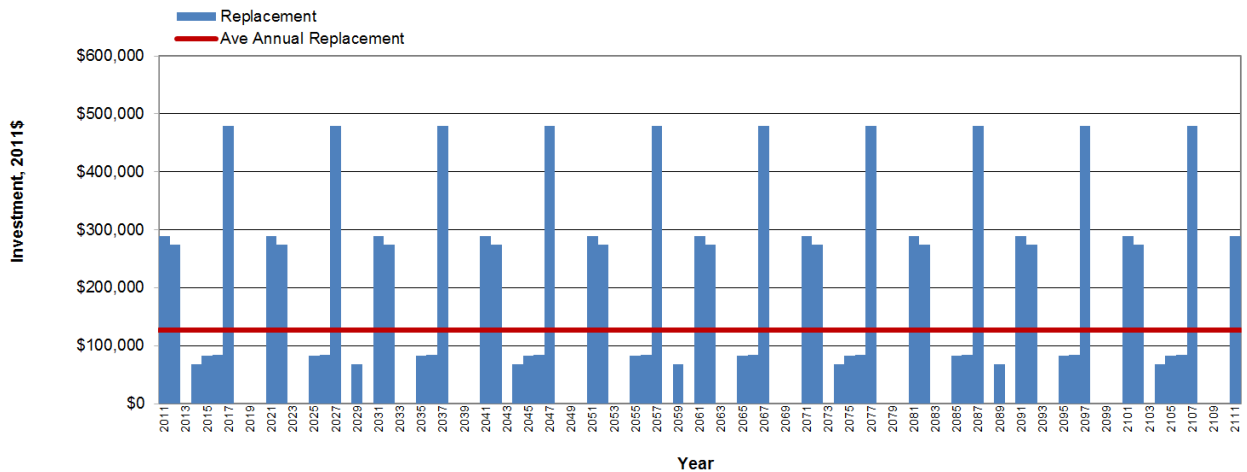


Figure 7-11 Forecast Asset Renewal Investment – Recreation & Culture – Recreation



The City reinvested approximately \$0 million to replace facility assets within the portfolio in 2008, \$0.4 million in 2009, \$0.1 million in 2010, and approximately \$0.2 million in 2011 (all in 2011\$). The average reinvestment over the past four years is \$0.16 million, which is only 4% of the forecast average annual sustainable renewal amount of \$4.6 million. **Thus the historic rate of replacement is not sustainable.** For future asset management plans, the expenditures should be clearly defined as Additional Capacity / Capability or Renewal.

Table 7-1 below shows the level of expenditures over the past three years and the estimated budget for 2011 compared to the forecast average annual sustainable renewal amount (all in millions of 2011\$).

Table 7-1 Comparison of Past Expenditures / Budget to Sustainable Renewal Amounts

	Expenditures (in 2011\$)			Estimate	Forecast Sustainable
	2008	2009	2010	2011	Renewal Amount
Fleet (Total)		\$0.41	\$0.08	\$0.15	\$4.59
Corporate					\$0.01
Other					\$0.03
Fire		\$0.24			\$0.77
Roads					\$1.07
Transit		\$0.11	\$0.08	\$0.07	\$1.69
Waste Management					\$0.29
Wastewater Facilities					\$0.10
Water Facilities					\$0.18
Parks		\$0.06		\$0.08	\$0.30
Recreation					\$0.13

8. Short-Term Investments

8.1 Corporate 10-Year Capital Program Needs

An important part of the City asset management decision-making is developing specific work or projects in the short term. Much of the City's investment in assets should be to reduce risk. The City's highest risk (BRE) assets are shown in Table 8.1 below with replacement cost in 2011 dollars. The City should confirm if these assets do indeed represent a high/extreme business risk to the City and, if they do, develop business cases to include them in the 10-year capital program.

Table 8-1 Extreme BRE Assets – Risk Reduction Program

Level 1	Level 2	ID	Name	Description	Replacement Yr	Replacement Cost (2011\$)
Environmental	Waste	90-810	CAT		2011	\$620,359
Environmental	Waste	99-815	JOHN DEERE	LOADER	2011	\$205,588
Environmental	Waste	03-1022	INT	7400	2013	\$196,643
Environmental	Waste	01-808	CAT		2016	\$586,552
Environmental	WW	04-4001	STERLING	VACTOR	2014	\$357,670
Protection	Fire	90-534	PIER	PUMPER	2011	\$458,216
Protection	Fire	96-545	FREIGHTLIN.	LADDER	2011	\$658,654
Protection	Fire	01-557	SPARTON	FORWARD	2011	\$389,272
Protection	Fire	84-407	GMC	MOT/HOM	2011	\$256,300
Protection	Fire	91-413	GMC	TOPKICK	2011	\$138,419
Protection	Fire	02-544	E-ONE	TYPHOON	2012	\$632,687
Protection	Fire	05-5006	SPARTON	FIRETRUCK	2015	\$1,092,633
Protection	Fire	05-6029	GMC	AIR BOAT	2015	\$141,894
Protection	Fire	02-5001	HME	CUSTOM CAB	2017	\$468,652
Protection	Fire	03-5003	E-ONE	TYPHOON	2018	\$432,747
Protection	Fire	03-3001	FORD	F-350	2018	\$102,835
Rec & Culture	Parks	99-404	FORD	F-700	2011	\$212,490
Rec & Culture	Parks	95-995	BILLY GOAT		2011	\$135,780
Rec & Culture	Parks	00-249	JACAB	HR9016 16'	2011	\$101,972
Transportation	Roads	95-541	GMC	TOPKICK	2011	\$157,560
Transportation	Roads	95-542	GMC	TOPKICK	2011	\$157,560
Transportation	Roads	95-542	GMC	TOPKICK	2011	\$157,560
Transportation	Roads	98-546	FREIGHT	FL-80	2011	\$154,742
Transportation	Roads	00-553	VOLVO	VE-D7	2011	\$225,869
Transportation	Roads	87-659	TIPPING	TRAILER	2011	\$275,449
Transportation	Roads	79-705	SICARD		2011	\$180,857
Transportation	Roads	84-629	4" PUMP		2011	\$254,107
Transportation	Roads	90-707	PELI	DIESEL	2011	\$113,241

Level 1	Level 2	ID	Name	Description	Replacement Yr	Replacement Cost (2011\$)
Transportation	Roads	02-416	FREIGHT	FL-80	2012	\$393,454
Transportation	Roads	98-547	VOLVO	WG-64	2013	\$163,827
Transportation	Roads	03-5004	INTL	DT 466E	2013	\$102,835
Transportation	Roads	99-414	FREIGHT	FL-80	2014	\$387,953
Transportation	Roads	99-415	FORD	F550 XL	2014	\$131,507
Transportation	Roads	99-548	FREIGHT	FL-80	2014	\$151,752
Transportation	Roads	99-549	FREIGHT	FL-80	2014	\$167,949
Transportation	Roads	99-550	VOLVO	WG-64	2014	\$196,215
Transportation	Roads	99-551	VOLVO	WG 42	2014	\$196,215
Transportation	Roads	99-552	VOLVO	WG 42	2014	\$196,215
Transportation	Roads	04-6005	TRECAN	SNOWMELT	2014	\$467,813
Transportation	Transit	97-642	ORION	BUS	2011	\$447,149
Transportation	Transit	97-643	ORION	BUS	2011	\$447,149
Transportation	Transit	97-644	ORION	BUS	2011	\$447,149
Transportation	Transit	98-645	ORION	BUS	2011	\$447,149
Transportation	Transit	98-646	ORION	BUS	2011	\$447,149
Transportation	Transit	98-647	ORION	BUS	2011	\$447,149
Transportation	Transit	98-648	ORION	BUS	2011	\$447,149
Transportation	Transit	98-649	ORION	BUS	2011	\$447,149
Transportation	Transit	98-650	ORION	BUS	2011	\$447,149
Transportation	Transit	98-651	ORION	BUS	2011	\$447,149
Transportation	Transit	98-655	NOVA	BUS	2011	\$447,149
Transportation	Transit	02-662	NEWFLYER	BUS	2014	\$514,111
Transportation	Transit	02-663	NEWFLYER	BUS	2014	\$514,111
Transportation	Transit	02-664	NEWFLYER	BUS	2014	\$514,111
Transportation	Transit	02-665	NEWFLYER	BUS	2014	\$514,111
Transportation	Transit	00-654	ORION	BUS	2015	\$447,149
Transportation	Transit	04-668	NEWFLYER	BUS	2016	\$439,486
Transportation	Transit	04-669	NEWFLYER	BUS	2016	\$439,486
Transportation	Transit	04-670	NEWFLYER	BUS	2016	\$439,486
Transportation	Transit	04-671	NEWFLYER	BUS	2016	\$439,486
Transportation	Transit	04-672	NEWFLYER	BUS	2016	\$439,486
Transportation	Transit	04-673	NEWFLYER	BUS	2016	\$439,486
Transportation	Transit	04-674	NEWFLYER	BUS	2016	\$439,486
Transportation	Transit	04-675	NEWFLYER	BUS	2016	\$439,486
Transportation	Transit	04-676	NEWFLYER	BUS	2016	\$439,486
Transportation	Transit	04-677	NEWFLYER	BUS	2016	\$439,486
Transportation	Transit	04-678	NEWFLYER	BUS	2016	\$439,486

Level 1	Level 2	ID	Name	Description	Replace-ment Yr	Replacement Cost (2011\$)
Transportation	Transit	04-679	NEWFLYER	BUS	2016	\$439,486
Transportation	Transit	02-661	NEWFLYER	BUS	2017	\$514,111



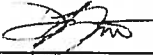
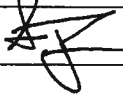
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