

**Calgary**



# **2017 Infrastructure Status Report**





## Preface

Infrastructure Status Report (ISR) is a key component of The City of Calgary's asset management system. It is produced every business cycle to enable sustainable management of corporate infrastructure. The report highlights the status of all City-owned assets and identifies areas of short- and long-term infrastructure risk. This information helps The Corporation maintain its ability to deliver the required services to the residents of Calgary.

The 2017 report is the fifth iteration of the document. It serves as a guide for City Council to make informed infrastructure investment decisions by highlighting the needs and performance of its infrastructure ahead of the development of 2019-2022 service plans and budget – "One Calgary."

The data for the 2017 Infrastructure Status Report is based on The City's portfolio of assets as of Jan. 1, 2017 and is reflective of post-2013 flood data.

The following key principles guide the development of the ISR:

- The ISR benchmarks future infrastructure needs over a 10-year horizon.
- Infrastructure needs include operating, capital maintenance and capital growth costs.
- Operating and capital maintenance costs relate to maintenance and upgrade of existing infrastructure, and capital growth costs relate to investments required to support the City's expansion.
- Information used in this report was collected from 11 business units that own 99 per cent of the assets as well as Calgary Police Service, Calgary Parking Authority and Calgary Public Library. The data was rolled up to present an overall corporate picture.

- Since 2015, The City has been working with the Calgary Public Library and seven civic partners (Arts Commons, Calgary TELUS Convention Centre, The Calgary Zoological Society, Fort Calgary Preservation Society, Heritage Park Society, Lindsay Park Sports Society, and Calgary Science Centre Society) to support partner-specific asset studies and tools. Work with most civic partners is underway and will be complete for inclusion in the next report.
- The City of Calgary also reports the value of its infrastructure assets in its annual financial statements. These statements, however, report depreciated asset values in compliance with the Public-Sector Accounting Board's, PS3150 Tangible Capital Asset reporting requirements. Depreciated asset value<sup>1</sup> is an accounting concept which differs significantly from the current replacement value (CRV)<sup>2</sup>. CRV, as used in this report, is the cost to replace an asset at the current price.

<sup>1</sup> Depreciated asset value is calculated by depreciating the original purchase cost over the useful life of the asset.

<sup>2</sup> Current replacement value is calculated by appreciating the original purchase cost using escalation rates that depend on market conditions and inflation.



# Table of Contents

<b>Preface</b> .....	1
<b>Executive Summary</b> .....	5
<b>1.0 Introduction</b> .....	9
1.1 History .....	9
1.2 Advancement of Asset Management System.....	9
1.3 Role of Infrastructure Status Report.....	10
1.4 Purpose.....	10
1.5 Report overview .....	11
1.6 Methodology.....	11
<b>2.0 Five Questions – Corporate Level Overview</b> .....	14
2.1 What do we own?.....	14
2.2 What is it worth? .....	15
2.3 What condition is it in?.....	16
2.4 What is the remaining asset life? .....	17
2.5 What is the infrastructure gap? .....	18
<b>3.0 Trends</b> .....	20
3.1 Asset value.....	20
3.2 Physical condition .....	22
3.3 Age of assets .....	23
3.4 Infrastructure gap .....	24
<b>4.0 Asset Portfolio Overview</b> .....	25
4.1 Engineered structures .....	25
4.2 Buildings.....	26
4.3 Land improvements.....	29
4.4 Vehicles .....	31
4.5 Machinery and equipment.....	33
<b>5.0 Conclusions</b> .....	35
<b>Appendix 1</b> Total asset replacement value by business unit/civic partner/related authority .....	36
<b>Appendix 2</b> Physical condition by business unit/civic partner/related authority (percentage) .....	37
<b>Appendix 3</b> Remaining average asset life by business unit/civic partner/related authority (years).....	38

<b>Appendix 4</b> 10-year infrastructure funding gap by business unit/civic partner/related authority .....	39
<b>Appendix 5</b> Business unit (BU), civic partner and related authority narratives .....	40
Chief Financial Officer.....	41
Information Technology (IT) .....	41
Community Services .....	43
Calgary Fire Department .....	43
Calgary Parks .....	46
Calgary Recreation .....	48
Calgary Housing.....	51
Calgary Housing Company (CHC).....	54
Deputy City Manager’s Office .....	55
Facility Management .....	55
Fleet Services .....	57
Transportation.....	58
Roads.....	58
Calgary Transit .....	62
Utilities & Environmental Protection.....	65
Waste & Recycling Services .....	65
Water Resources and Water Services.....	70
Calgary Police Service (CPS) .....	73
Related Authority & Civic Partners .....	75
Calgary Parking Authority .....	75
Calgary Public Library .....	80
Other civic partners .....	82
<b>Appendix 6</b> Acronyms and abbreviations .....	83

## Executive Summary

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The City of Calgary owns, operates and maintains a wide range of infrastructure assets. These assets support social, economic and environmental services that The City provides. To continue to provide these services, it is important to know the state of its current assets. This information helps The Corporation effectively and efficiently manage its infrastructure. With proper asset management, The City can play its role in fostering the local economy through ongoing investments in infrastructure. In addition, this information also helps us effectively plan quality services for the citizens of Calgary.

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Infrastructure Status Report (ISR)  
is a key component of The City  
of Calgary's asset management system.  
It benchmarks future infrastructure  
needs over a 10-year horizon.

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This report provides a snapshot of The City of Calgary's current infrastructure inventory. It informs and guides the decision makers as they plan for the next four-year business cycle. Information used in this report is based on the best available data, as of Jan. 1, 2017, supplied by various business units/service areas.

An analysis of corporate asset data shows that, over the past four years, The City's infrastructure assets have grown in value from \$60.48 billion to \$84.70 billion. This increase has been a result of the following:

- **Addition of new assets:** The City's asset base has expanded over the last business cycle to meet the growing demand. Assets created in the last four years include Airport Tunnel, new interchanges, new Treated Effluent Water Facility, Valleyfield Station, new Fats, Oils and Grease Facility, new Headworks Facility, capacity upgrades at the Bonnybrook Wastewater Treatment Plant and upgrade of its electrical system, as well as the addition of a Carbon Dioxide System, and Sodium Hypochlorite Facilities at Water Treatment Plants.
- **Asset management maturity:** The City's asset management practices have matured which has led to a better understanding of its asset base. This has resulted in an improved and more detailed inventory recording and subsequent reporting.

- **Cost escalation factor:** Current replacement value is calculated by using the inflationary index against the cost.
- **New cost evaluation methods:** New methods have been developed for certain asset types to help standardize the methodology going forward. These include the new unit rate for pavement and concrete and unit cost increase for water/sanitary services (e.g. pipe and valve replacements).

It should be noted that the asset value stated above does not include land holdings that The City owns. This is because land does not depreciate like other assets and, hence, does not require the same level of maintenance.

Asset condition is another useful indicator for The City because it helps us understand when interventions may be required to improve or maintain our levels of service. Analysis of past data shows a general upward trend over the last decade as efforts have been consistently made to improve the state of the assets. While the overall asset health is good (at 88 per cent), it is also seen that the condition profile has deteriorated since 2013 from 95 per cent. This indicates The City should consider additional expenditure on asset replacement, lifecycle maintenance and upgrades in order to maintain the desired service standards.





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Since 2013, The City's infrastructure assets have grown in value from \$60.48 billion to \$84.70 billion.

The 10-year infrastructure funding gap has been identified as \$5.67 billion.

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## Executive Summary

It is also estimated that The City's total infrastructure needs, funded and unfunded, over the next 10 years is approximately \$25.87 billion. The City forecasts the ability to fund approximately \$20.2 billion during this time. The remaining \$5.67 billion has been identified as the 10-year infrastructure funding gap. In the 2013 report, the 10-year gap was reported as \$7.04 billion. Narrowing of this gap is an indication that The City is maturing in its asset management practices. This also reflects a dedication by City Council to invest in infrastructure.

To help close the infrastructure gap, Corporate Asset Management has continued its work with the business units. Focus has been to align condition assessments with a risk management strategy and well-defined levels of service. This integrated approach to asset management is vital in bringing about consistent asset management practices across all areas of The Corporation. This approach also ensures the use of assets is optimized. To continue to improve asset

management at The Corporation, formalization of asset management planning/plans is taking place. This includes the following activities:

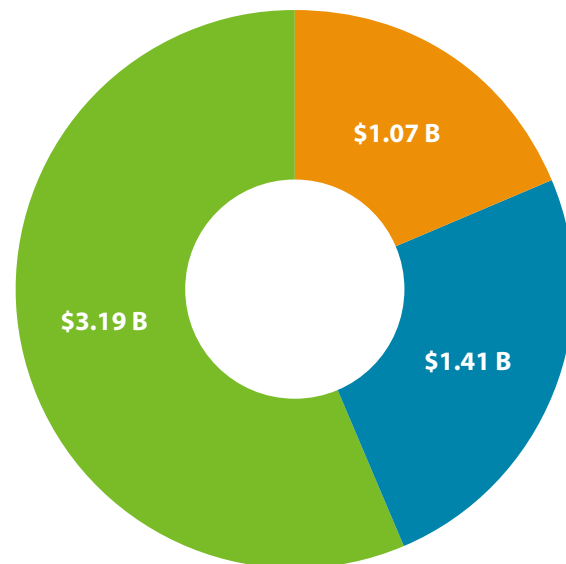
- Establishing standard performance monitoring mechanisms.
- Adopting risk management as a core business driver.
- Defining and aligning levels of service to asset performance.
- Developing comprehensive lifecycle management and financial plan.

**Infrastructure Gap \$5.67**  
(\$ Billions)

**\$1.07 B**  
Total Operating Gap

**\$1.41 B**  
Total Maintenance Gap

**\$3.19 B**  
Total Growth Gap



\* Does not include Transit projects from RouteAhead including Green Line, as well as projects beyond the 10-year horizon.

## 1.0 Introduction

### 1.1 History

The City of Calgary defines its assets as all physical infrastructure necessary to support social, economic and environmental services that it provides. In 2005, City Council approved an Asset Management Strategy and Corporate Asset Management Program to effectively and more efficiently use and maintain these assets. This set the stage for The City to develop an asset management system. This system is intended to monitor and maintain The City's assets. It is the foundation for infrastructure best practices that help The City provide effective municipal service while balancing smart growth and quality of life.

In general, the business units assess and maintain their assets and make recommendations for infrastructure growth. This work is completed with operational, strategic and governance support from the corporate asset management team and forms the basis of The City's asset management system. The asset management system is underscored by a process of continuous improvement based on the cycle of plan, do, check and act. The following three items are an important part of this cycle:

1. **Infrastructure Status Report (ISR)** – A corporate level document which includes business unit data. It reports on the overall state of City assets.
2. **Corporate Asset Management Plan (CAMP)** – A corporate plan which comprises individual business unit asset management plans and serves as an action plan for the improvement of The Corporation's Asset Management System (including practices, technology, people and business processes).
3. **Monitoring State of Asset Management or Asset Management Maturity** – This is measured within The City's Asset Management Plan.

### 1.2 Advancement of Asset Management System

Asset management provides a systematic, holistic, cost-effective and integrated approach to planning and management of assets. The purpose is to achieve agreed upon service levels with acceptable risk levels at the lowest lifecycle costs. Since the first-generation asset management strategy was developed in 2005, The City has evolved and improved its asset management capabilities. This has happened through the development of a more robust policy and updated strategy, the alignment of practices with international standards (ISO 50001), and the development of internal, made-in-Calgary-for-Calgary, corporate standards and frameworks.

Business units have developed investment forecasts that will begin to drive the development of business cases through the business planning period. In addition, there are clear actions for improvement identified by each of the business units. These actions include improving the understanding of performance and risk and using this information in decision-making, improving the quality of data and information, and integrating asset management into the core business planning processes.

Since 2008, The City has put a more concerted effort into developing asset management frameworks, plans, guidance and practice. This shows an improvement trend and to continue this trend, Corporate Asset Management and Infrastructure Calgary will need to collaborate further to ensure these initiatives are captured in business plans.

In 2016 and 2017, business units have identified more clearly the services they provide within their areas of responsibility. Most business units provide five or six clear service lines. Information provided by the business units with regards to infrastructure status or investment planning is not yet aligned with these service lines and a more aggregated view has been taken.



### 1.3 Role of Infrastructure Status Report

This report is a key component of The City of Calgary's asset management system, as noted earlier. The 2017 version of the ISR is the fifth iteration of the document. It continues to be an important document for helping to mitigate risk throughout The Corporation. It also serves as a guide for City Council to make informed infrastructure investment decisions.

This document helps The City understand the needs and performance of its infrastructure ahead of the development of 2019-2022 service plans and budget – "One Calgary."

We recognize the need to apply more robust decision-making processes that are founded on accurate data. This document seeks to build on these aspirations. It highlights the status of The City of Calgary's assets and provides an indication of its organizational capacity to deliver on strategic outcomes.

The infrastructure status is presented at an asset portfolio level, rolling up information and data from individual assets. This information provides an overall assessment of our assets and highlights how well these assets are achieving their strategic objectives. It consequently supports asset stewards to develop infrastructure investment priorities.

### 1.4 Purpose

Calgary's Asset Management Strategy identifies 11 essential elements for an effective asset management system. The four elements listed below guide the development of the ISR:

1. An accurate and consistent inventory for all municipal infrastructure.
2. Continual infrastructure status reporting to enable asset stewards to develop infrastructure investment priorities.
3. Alignment between service and infrastructure decisions.
4. Benchmarking to measure infrastructure performance.

As a result, the ISR provides answers to five key questions:

1. What do we own?
2. What is it worth?
3. What condition is it in?
4. What is its remaining service life?
5. What is the infrastructure funding gap?

The benefits of knowing the answer to these questions assist with the:

- Ability to plan for and manage the delivery of the required service level.
- Avoidance of premature asset failure.
- Risk management associated with asset failures, and mitigation of the consequences of failure.
- Accurate predication of future expenditure requirements through understanding remaining asset life and capital investment needs.

### 1.5 Report Overview

This report begins by answering the five key questions noted above. Answers to these five questions are first provided at a corporate level, followed by trend analysis based on the historical data. Answers to the questions are then provided at the asset portfolio level. The report ends with conclusions and next steps. More detailed information is available in the appendices. Information regarding service level and risk analysis can be found in the Corporate Asset Management Plan.

In June 2013, Southern Alberta and The City of Calgary experienced severe flooding because of a major rainstorm. The City of Calgary was faced with extensive damage to public infrastructure assets including bridges, roadways, public transit, a wastewater treatment facility, numerous City buildings, parks and pathways. Information technology and communications infrastructure was also impacted. The initial assessments quantified a total of 185 projects with an estimated cost of \$445 million to repair or rebuild.

As of July 2017, the program of work to repair and replace infrastructure damaged by the 2013 flood has evolved into a total of 220 projects of which 194 have been completed at a total estimated cost ranging from \$320 to \$340 million. It is expected that the full program of work will be completed by the summer of 2019 (due to anticipated delays in provincial government approvals).

The data for the 2017 Infrastructure Status Report is based on The City's portfolio of assets as of Jan. 1, 2017 and reflects post flood data.

### 1.6 Methodology

Although there are many commonalities across business units, in terms of how they manage their assets and record asset data and transactions, there are also many differences. To complete the ISR in a consistent manner, the following methodology was adopted:

- The largest business units (that comprise over 99 per cent of The City's asset value) were contacted to provide their asset data.
- Corporate Analytics and Innovation (CAI) acted in a supporting and co-ordinating role to collect asset data from the business units. This included:
  - Developing a template in the RIVA system to input the data. Business units were given the option to directly enter the required information into the RIVA system. They were also contacted on a regular basis to identify any concerns and answer questions.
  - CAI collected the responses, consolidated the data, conducted analyses, compiled the report and made recommendations for next steps.

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The ISR provides answers to five key questions:

1. What do we own?
  2. What is it worth?
  3. What condition is it in?
  4. What is its remaining service life?
  5. What is the infrastructure funding gap?
- 





## 2.0 Five Questions – Corporate Level Overview

### 2.1 What do we own?

In a broad sense, The City's asset base is comprised of five major asset portfolios:

- 1. Engineered structures** – A broad portfolio of assets including roads, bridges and associated assets, track and stations, water treatment and distribution, wastewater collection and treatment infrastructure, communications towers and cabling conduits, and landfill sites.
- 2. Buildings** – All buildings including the corporate accommodation portfolio (69 properties), fire halls, recreation centres, laboratories and affordable housing portfolio.
- 3. Land improvements** – Includes parks, playgrounds and sports pitches, as well as boulevards, carparks and other land improvements.
- 4. Vehicles** – Includes all bus and light rail vehicles as well as trucks and other vehicles to support all business unit operations.

- 5. Machinery and equipment** – Includes plant and equipment used in supporting fleet maintenance for transit and other vehicles to work landfill facilities, create asphalt for roads, fire fighting equipment as well as computer hardware/software.

Engineered structures (88.16 per cent) make up the majority of The City's asset base, followed by buildings (5.35 per cent), land improvements (3.39 per cent), vehicles (2.14 per cent), and machinery and equipment (0.95 per cent).

In addition to these major asset portfolios, The City also has land holdings. Land does not, however, depreciate like the other assets and does not require the same level of maintenance.

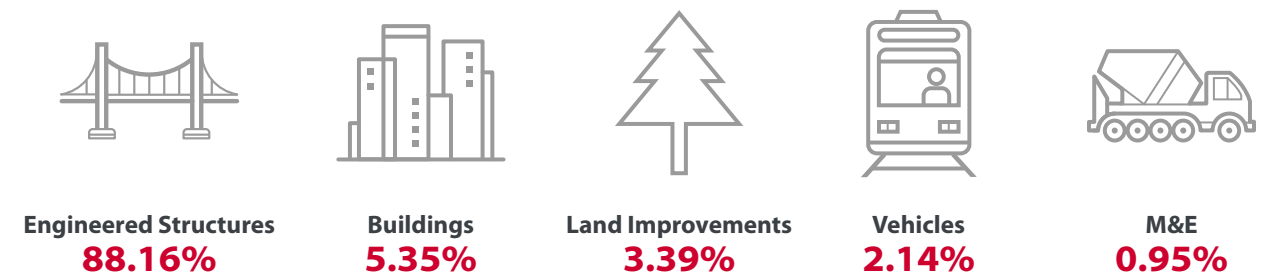


### 2.2 What is it worth?

As of Jan. 1, 2017, The City's total asset base has a replacement value of \$84.70 billion, up from \$60.48 billion in 2013.

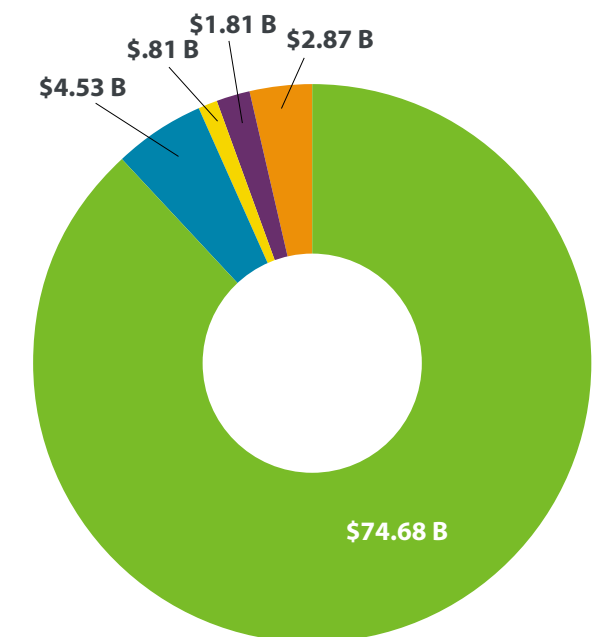
A breakdown by asset category is summarized in the chart. Engineered structures comprise approximately \$74.68 billion of the total, followed by buildings at \$4.53 billion, land improvements at \$2.87 billion, vehicles at \$1.81 billion, and machinery and equipment at \$0.81 billion.

#### Asset Value



Asset Value \$84.70 Billion\*

- \$74.68 B**  
Engineered Structures
- \$4.53 B**  
Buildings
- \$0.81 B**  
M&E
- \$1.81 B**  
Vehicles
- \$2.87 B**  
Land Improvements



\* Does not include \$4.22 billion land holdings owned by The City. Land does not depreciate like other assets and does not require the same level of maintenance.

### 2.3 What condition is it in?

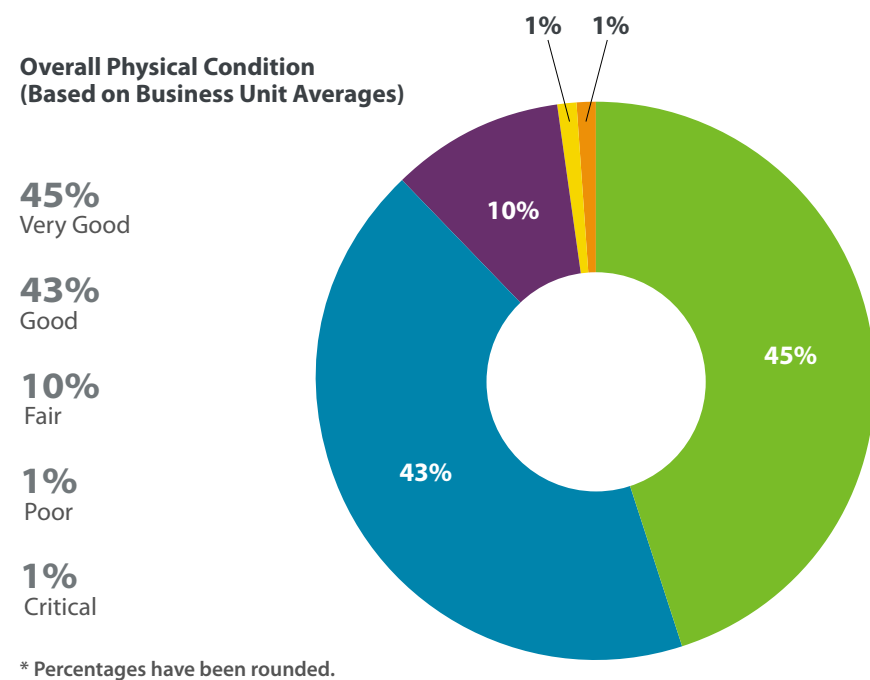
More than 88 per cent of The City’s infrastructure assets are in good or very good physical condition. Approximately 2.29 per cent of The City’s assets are in poor or critical physical condition.

In previous infrastructure status reports, the focus was on three types of condition assessments: physical, demand and functional. The current report only focuses on physical condition. Demand and functional conditions are addressed in the asset management plans.

Physical condition reflects the physical state of the asset, which may or may not affect its performance. The performance of the asset is the ability to provide the required level of service to customers in terms of reliability, availability, capacity, and meeting customer demands and needs. All of this is critical information for determining the remaining useful life of an asset. More importantly, it helps identify the timing for possible intervention steps to help bring levels of service to a desired standard.

#### Condition Assessment Rating Scale

Condition Category	Description	Rating Scale
Physical	Physical deterioration of the asset.	<b>Very good</b> – Sound or “as new” condition
		<b>Good</b> – Acceptable physical condition. Asset shows only minor deterioration.
		<b>Fair</b> – Tolerable physical condition. Moderate deterioration evident.
		<b>Poor</b> – Major deterioration evident.
		<b>Critical</b> – Asset deteriorated to such an extent that it is generally inoperable or unsafe.

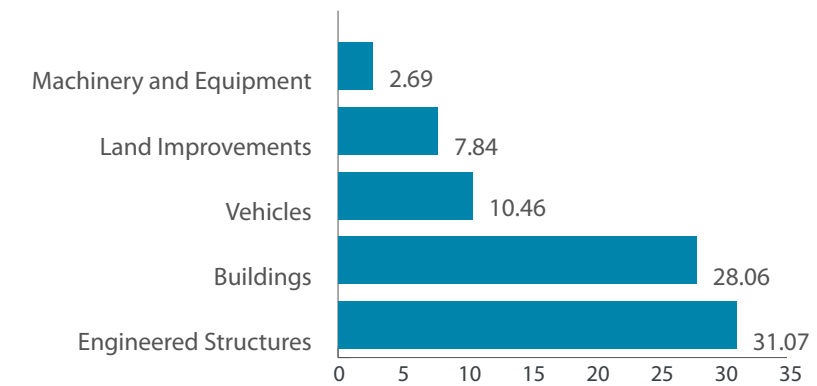


### 2.4 What is the remaining asset life?

Another important piece of information required, when making infrastructure investment decisions, is the remaining asset life within each major asset portfolio. This metric can help to illustrate where and when upgrades and replacements may be required.

The average remaining life varies by asset portfolio as shown in the chart below. It is important to understand that a long remaining useful life doesn’t necessarily mean that the asset is in good physical condition. On the other hand, a negative useful life doesn’t always mean the asset requires replacement. The asset still may be meeting its required level of service or can continue with maintenance.

Average Remaining Asset Life (Years)





## 2.5 What is the infrastructure gap?

The City of Calgary has identified that the current replacement value of its existing assets is approximately \$84.70 billion. With such an extensive asset base, it is important to understand the requirements for maintaining and upgrading these assets because as a municipality's overall capital stock grows, so do the funding requirements to help maintain, upgrade and repair these assets.

Capital investments are mostly long-term. Infrastructure spending, hence, relates not only to building long-term capital assets but also includes plans to repair and eventually replace these assets. Infrastructure gap, therefore, is an estimate of the total unfunded investments and is grouped into the following three categories:

**1. Capital growth gap:** Unfunded investments required to support the City's expansion. Primary drivers of growth-related expenditures are economic growth, population growth and demographic changes.

**2. Capital maintenance gap:** Unfunded investments required to maintain and upgrade existing infrastructure assets.

**3. Operating gap:** Funding shortfall required to bring existing assets to a minimum acceptable level for operation over their service life.

The City's 10-year projected infrastructure funding gap is \$5.67 billion. This has dropped from \$7.04 billion reported in 2013.

The table on the next page, outlines the estimates for operational, maintenance and growth funding requirements over the next 10 years.

Funded operating budget figures are based on approved 2016 operating budget extrapolated over the next 10 years. Funded and unfunded 10-year capital budget numbers are based on long-term data available in The City's capital budget system. These numbers have been calculated by individual business units and the data was rolled up to arrive at the total corporate gap.

	Operating	Capital Maintenance	Capital Growth	Total
<b>Required</b>	\$14.12 B	\$5.14 B	\$6.61 B	\$25.87 B
<b>Funded</b>	\$13.05 B	\$3.73 B	\$3.42 B	\$20.2 B
<b>Gap</b>	\$1.07 B	\$1.41 B	\$3.19 B	\$5.67 B

Based on the above data provided by the business units and civic partner outlining their infrastructure funding projections over the next 10 years, it is estimated that The City's total infrastructure needs, funded and unfunded, over the next 10 years is approximately \$25.87 billion. Business units/civic partner anticipate the ability to fund approximately \$20.2 billion during this time. The remaining \$5.67 billion is the 10-year infrastructure gap. Of this, \$1.07 billion is attributable to operating, \$1.41 billion to infrastructure maintenance and \$3.19 billion to capital growth. As the business planning and budgeting process spans four-year periods, the long-term portion of the funding gap has not been fully realized.

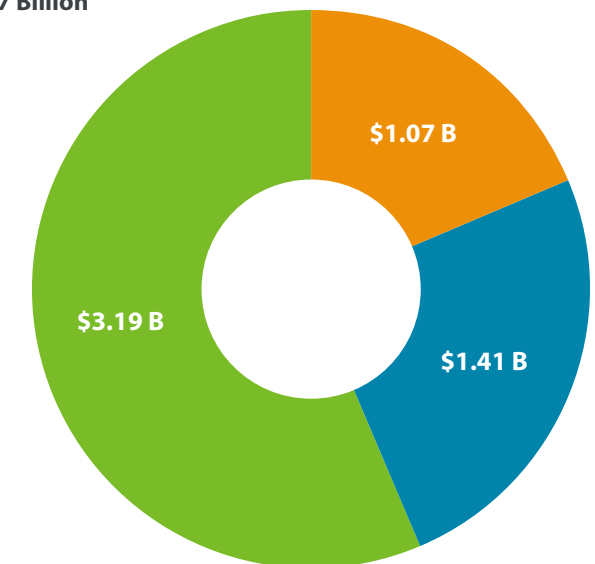


### Infrastructure Gap \$5.67 Billion

**\$1.07 B**  
Total Operating Gap

**\$1.41 B**  
Total Maintenance Gap

**\$3.19 B**  
Total Growth Gap



\* Does not include Transit projects from RouteAhead including Green Line as well as projects beyond the 10-year horizon.

### 3.0 Trends

The tables below show the value of The City of Calgary's infrastructure assets, remaining life, infrastructure gap (forecast) as well as assets' physical condition over the five business cycles.

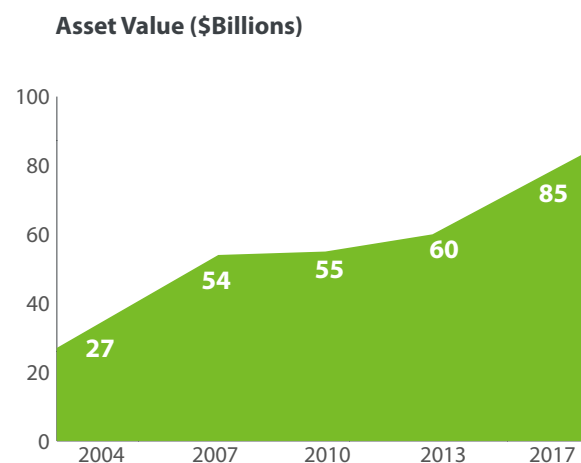
		2004	2007	2010	2013	2017
<b>Value (\$Billions)</b>		<b>27</b>	<b>54</b>	<b>55.14</b>	<b>60.48</b>	<b>84.70</b>
<b>Age (Years)</b>	<b>Expected</b>	<b>68</b>	<b>65</b>	<b>67</b>	<b>59</b>	<b>68</b>
	<b>Remaining</b>	<b>31</b>	<b>31</b>	<b>43</b>	<b>32</b>	<b>29</b>
<b>Gap (\$Billions)</b>	Operating	0.50	0.76	0.86	2.11	1.07
	Maintenance	2.30	2.67	3.23	1.70	1.41
	Growth	2.50	6.96	3.31	3.23	3.19
	<b>Total Gap</b>	<b>5.30</b>	<b>10.39</b>	<b>7.40</b>	<b>7.04</b>	<b>5.67</b>

	Physical Condition		
	<b>Good* (combined with V. Good)</b>	<b>Fair</b>	<b>Poor* (combined with Critical)</b>
<b>2004</b>	80%	14%	6%
<b>2007</b>	76%	17%	7%
<b>2010</b>	78%	16%	6%
<b>2013</b>	95%	3.50%	1.50%
<b>2017</b>	88%	9.70%	2.30%

#### 3.1 Asset value

There has been a continual upward trend in the value of our assets.

The most recent \$25 billion increase is largely because of newly built assets, new cost evaluation methods/rates and corporate-wide asset management maturity leading to a better understanding of asset inventory.





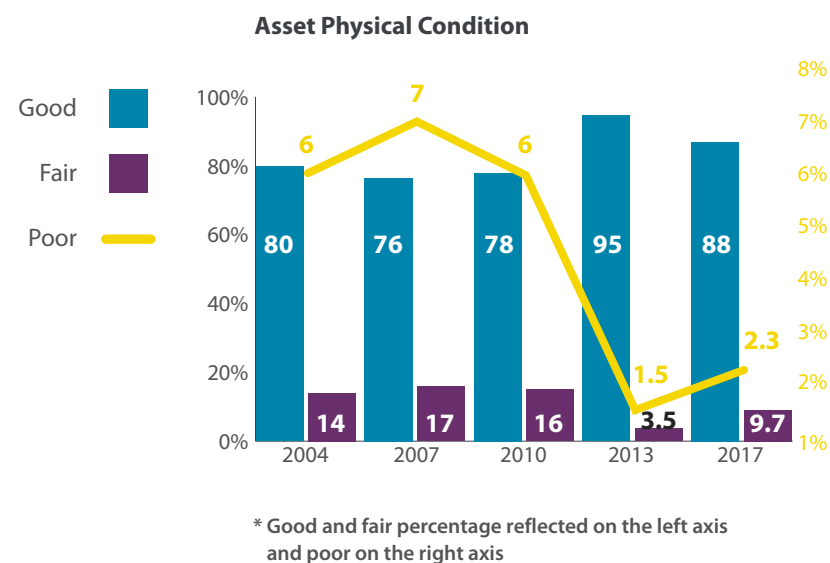
### 3.2 Physical condition

Physical condition reflects the physical state of the asset, which may or may not affect its performance. The performance of the asset is the ability to provide the required level of service to customers in terms of reliability, availability, capacity, and meeting customer demands and needs. Physical condition helps determine the remaining useful life of an asset and more importantly, the timing for possible intervention steps to help bring levels of service to a desired standard.

Efforts are consistently being made at The City to improve the state of its assets as evident from the graph, which shows an overall improvement over the past decade. However, from 2013 to 2017, there has been a decline in the condition. This indicates The City should consider additional expenditure on asset replacement, lifecycle maintenance and upgrades. As an example, it has been reported in the Roads Asset Management Plan that maintaining overall pavement conditions over the next 10 years requires an estimated budget of \$35 million each year. Pavement rehabilitation projects beyond the current year, however, are tentative and will be determined by funding availability, construction costs and strategic priorities.

In this context, it is important to understand that repeated maintenance spending shortfall over years can lead to a decline in asset condition, which can impact asset performance and ultimately service performance. This indicator, hence, should be actively managed so service targets can continue to be achieved.

Given the extent and confidence in the data, it is difficult to accurately determine whether The City's operational and technical performance is improving or declining. Customer satisfaction, however, can be impacted by declining condition which, if allowed to continue, may have to be propped up by extensive operational customer service and response efforts.



### 3.3 Age of assets

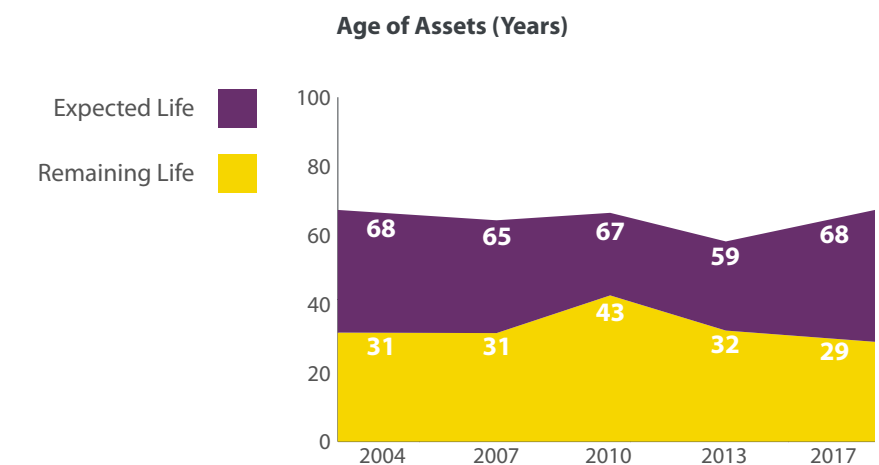
The life span of The City's diverse assets varies from a few years (e.g. information technology) to over 70 years (e.g. water network). On a weighted scale, average life expectancy of the infrastructure is currently about 68 years with the remaining life at 29 years.

At an aggregate level, expected life of assets has increased to 68 years. This increase can partially be attributed to the addition of new assets that have offset the deteriorating life expectancy recorded in 2013. Another reason may be related to improved asset inventory recording.

Remaining asset life values, in contrast, have slightly decreased. This indicates that some existing in-service infrastructure requires upgrades or replacement.

The life span of The City's diverse assets varies from a few years (e.g. information technology) to over 70 years (e.g. water network).

Age of assets shown below is derived from a weighted average scale.



### 3.4 Infrastructure gap

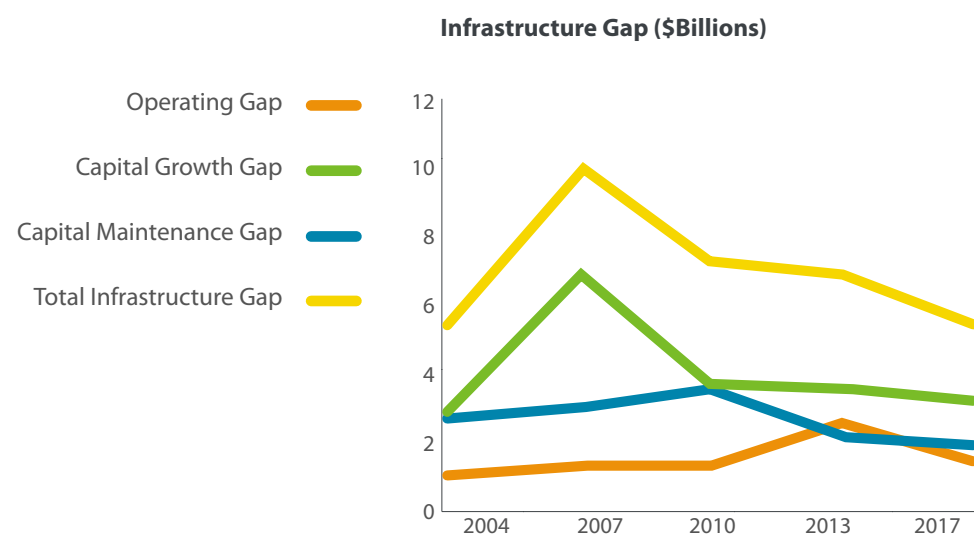
With such an extensive asset inventory, it is important to understand the requirements for maintaining and upgrading growing assets.

As the inventory expands to support growth, operating and maintenance costs associated with these new assets also go up. If there is not enough funding to repair, maintain and upgrade these assets, it creates a backlog of maintenance related projects. This affects The City's ability to deliver quality public service to its citizens and, in turn, has an impact on Calgarians' quality of life.

Since the last business cycle, total projected infrastructure gap has dropped by \$1.37 billion. However, any budget cuts in 2017-2018 can potentially impact capital maintenance and service levels which can affect this 10-year funding gap forecast and, hence, service delivery.

Declining operating gap over the last business cycle indicates that there is a growing awareness and an improved understanding of the operating impacts of capital across The Corporation. The capital maintenance gap has also dropped by almost \$0.29 billion since 2013. This indicates that additional commitments have been made to maintain The City's assets as business units gain a better understanding of how to manage levels of service and risk.

The capital growth gap has decreased as well by \$0.04 billion since 2013, but remains steady since 2010. This is because growth projections have not changed significantly so there is little change in funding projections.



## 4.0 Asset Portfolio Overview

### 4.1 Engineered structures

#### 4.1.1 What do we own?

Engineered structures are defined as permanent structural works such as roads, bridges and associated assets, track and stations, water treatment and distribution, wastewater collection and treatment infrastructure, communications towers and cabling conduits, and landfill sites.

Examining the engineered structures portfolio of assets reveals that majority of The City's engineered structures are located within Water followed by Roads.

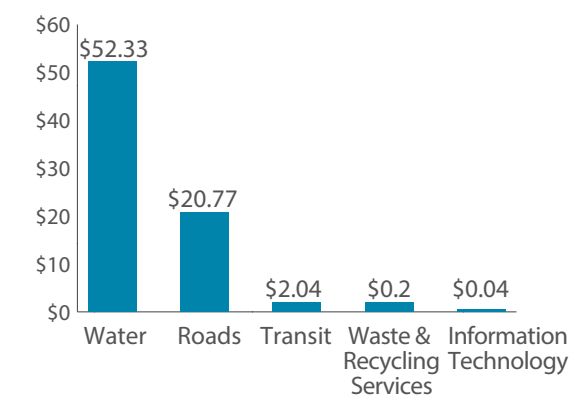
#### 4.1.2 What is it worth?

The total value of the engineered structures portfolio is approximately \$74.68 billion or 88.16 per cent of the total asset base.

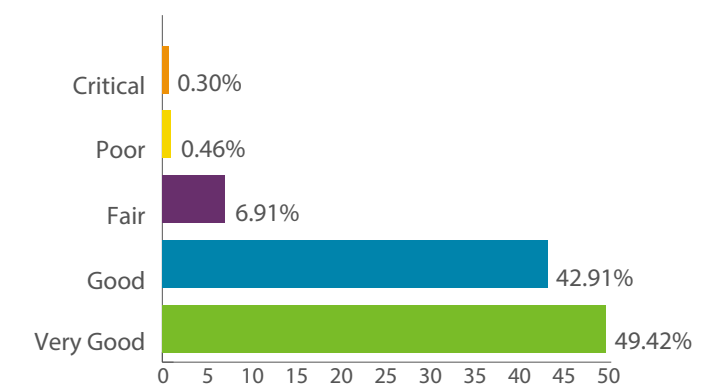
#### 4.1.3 What condition is it in?

A significant majority of The City's engineered structures are in very good/good physical condition.

Engineered Structures Value by Business Unit (\$Billions)



Engineered Structures Condition



\* Aggregate view of all corporate engineered structures.



#### 4.1.4 What is the remaining asset life?

The average remaining asset life for the engineered structures portfolio is approximately 31.07 years. Business unit specific average remaining life is reflected in the graph below.

#### 4.2 Buildings

##### 4.2.1 What do we own?

Buildings are defined as permanent, temporary or portable building structures intended for shelter and working space. Buildings include the corporate accommodation portfolio (69 properties), fire halls, recreation centres, laboratories and affordable housing portfolio.

Examining the buildings portfolio of assets reveals that most of The City's buildings are located within three business units: Facility Management, Recreation and Calgary Housing.

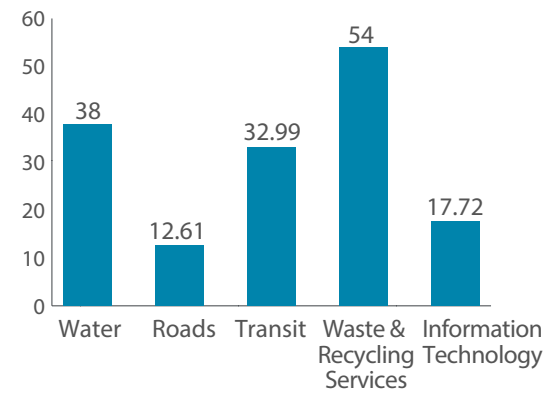
##### 4.2.3 What condition is it in?

Although the physical condition of buildings is overall good or fair, almost 20 per cent (at an aggregate level) are rated as poor or critical. There is a high risk of further deterioration of buildings which can severely impact the services provided by this asset class. Services that come under this category are recreation facilities, libraries, operational storage, safe and healthy workspace, public use space, laboratories, fire halls and affordable housing portfolio.

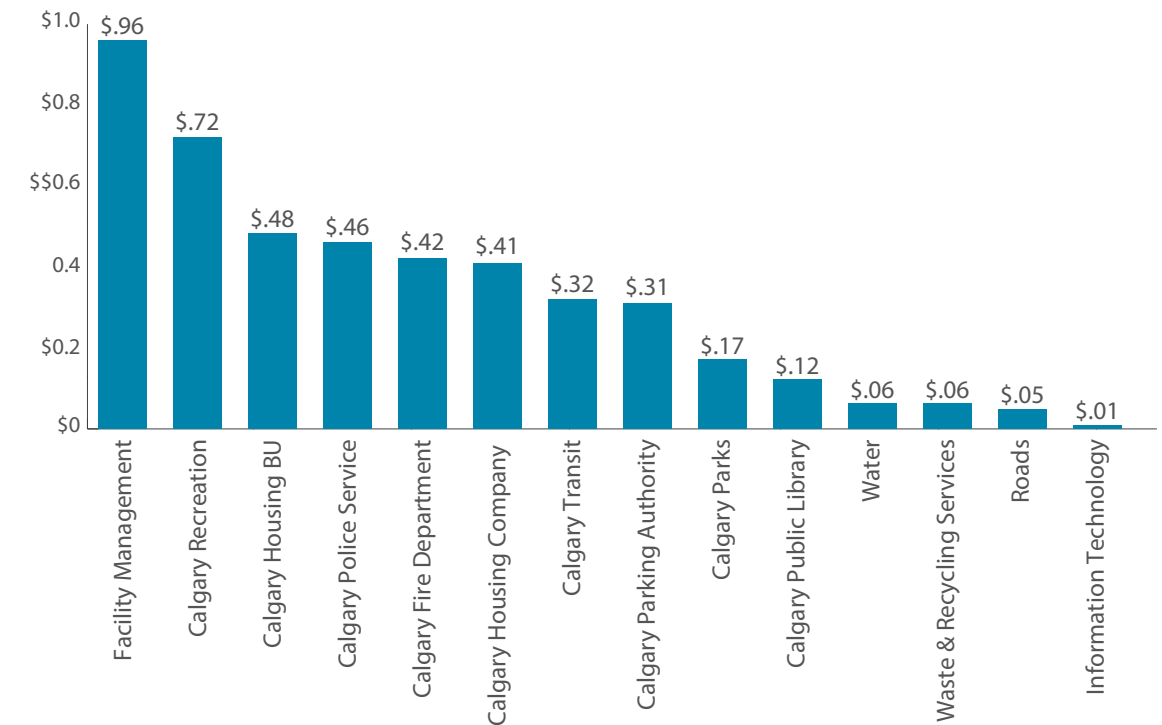
##### 4.2.2 What is it worth?

The total value of the buildings portfolio is approximately \$4.53 billion or 5.35 per cent of the total asset base.

Engineered Structures Average Remaining Asset Life (Years)



Buildings Value by Business Unit (\$Billions)

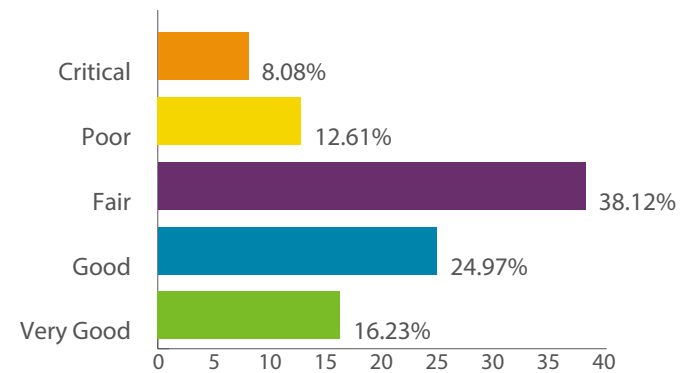


Recreation has reported almost 44 per cent of its buildings in poor or critical condition followed by Library at 37 per cent, Roads, Facility Management and Transit at 32 per cent, 30 per cent and 27 per cent respectively. Waste & Recycling Services, Calgary Police Services, Parks, Calgary Fire Department and Calgary Housing have also categorized a portion of this asset class under poor or critical condition.

#### 4.2.4 What is the remaining asset life?

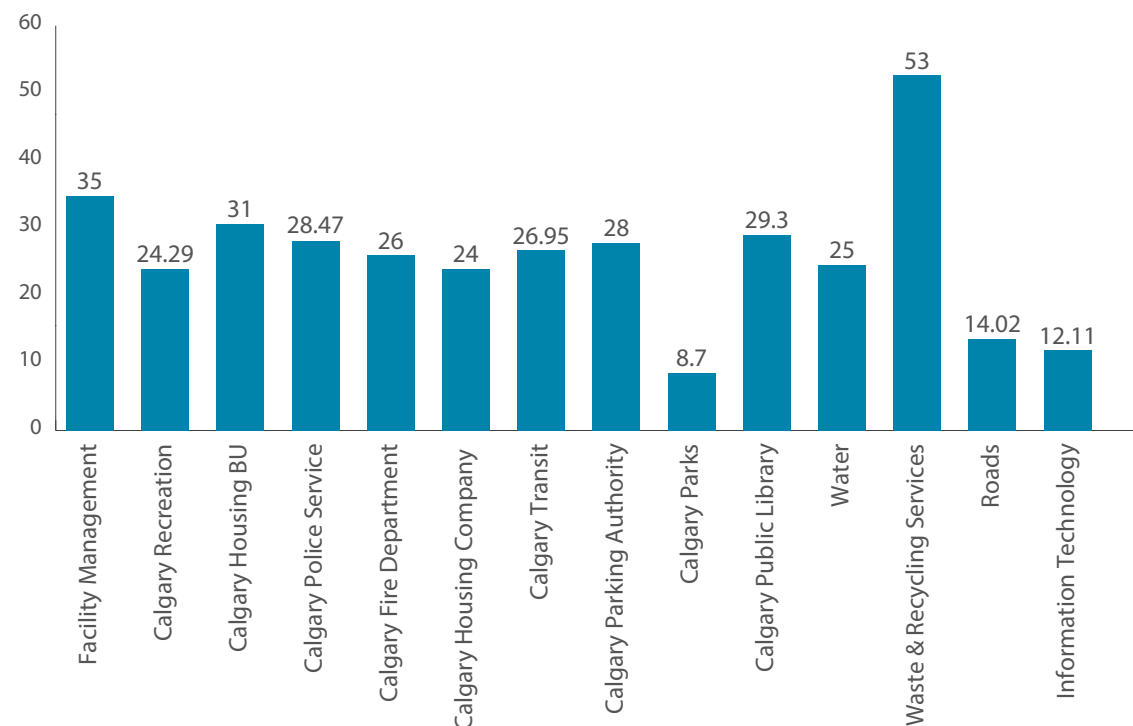
The weighted average remaining asset life for the buildings portfolio is approximately 28.06 years. Business unit specific average remaining life is reflected in the graph below.

#### Buildings Condition



\* Aggregate view of all corporate buildings.

#### Buildings Average Remaining Asset Life (Years)



#### 4.3 Land improvements

##### 4.3.1 What do we own?

Land improvements are defined as all improvements of a permanent nature to land such as parks, boulevards, parking lots, landscaping, lighting, pathways and fences.

Examining the land improvements portfolio of assets reveals that the majority of The City's land improvements are located within Parks.

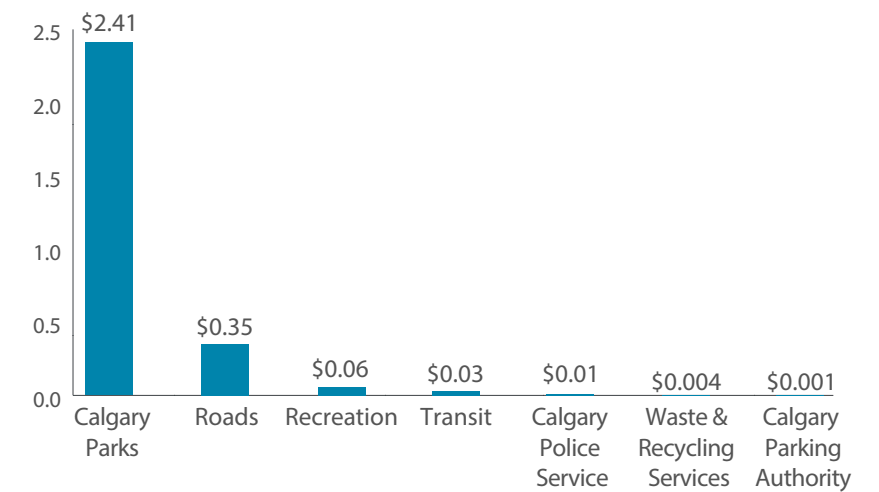
##### 4.3.2 What is it worth?

The total value of the land improvements portfolio is approximately \$2.87 billion or 3.39 per cent of the total asset base.

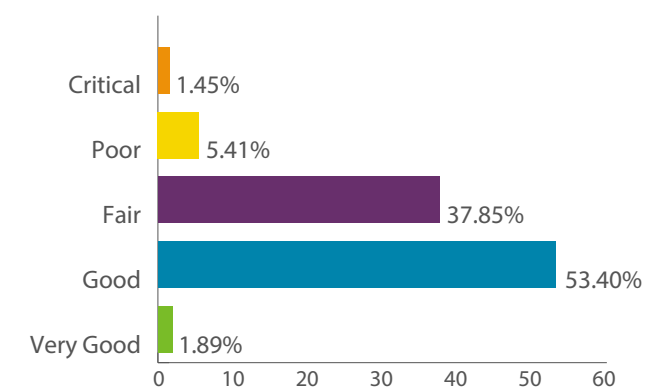
##### 4.3.3 What condition is it in?

The physical condition of The City's land improvement is generally good or fair. They should be monitored to ensure these assets do not fall into the poor or critical categories. Land improvements that fall into poor or critical condition mostly belong to Transit with a small percentage belonging to Parks. At an aggregate level, 6.86 per cent are currently in poor or critical condition and require maintenance or upgrades.

#### Land Improvements Value by Business Unit (\$Billions)



#### Land Improvements Condition



\* Aggregate view of all corporate land improvements.



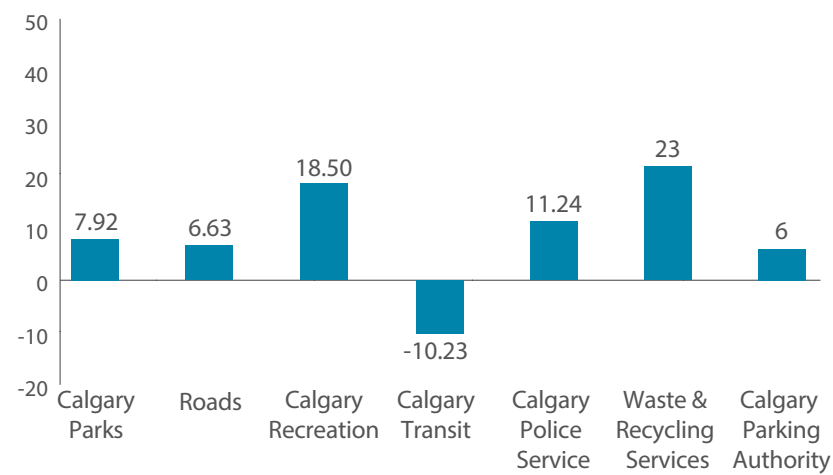
#### 4.3.4 What is the remaining asset life?

The weighted remaining asset life for the land improvement portfolio is approximately 7.84 years, however, there are some areas where assets appear to have exceeded their useful life and should be further examined. It is also important to understand that a long remaining useful life doesn't necessarily mean

that the asset is in good physical condition. On the other hand, a negative useful life doesn't always mean the asset requires replacement. The asset still may be meeting its required level of service or can continue with maintenance.

Business unit specific average remaining life is reflected in the graph below.

Land Improvements Average Remaining Asset Life (Years)



\* Asset lifecycle review is underway in Transit.



#### 4.4 Vehicles

##### 4.4.1 What do we own?

Vehicles are rolling stock primarily used for transportation purposes and include all bus and light rail vehicles as well as trucks and other vehicles to support all business unit operation.

Examining the vehicles portfolio of assets reveals that Transit holds the majority of vehicles (by value) followed by Fleet.

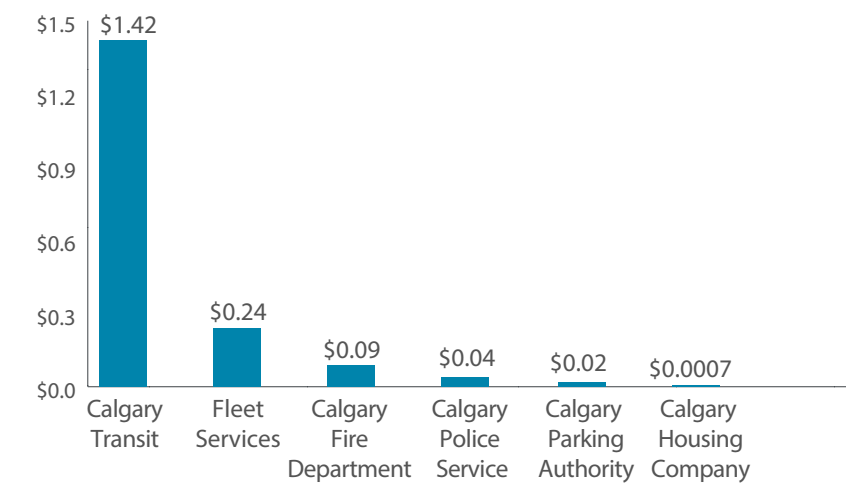
##### 4.4.2 What is it worth?

The total value of the vehicles portfolio is approximately \$1.81 billion or 2.14 per cent of the total asset base.

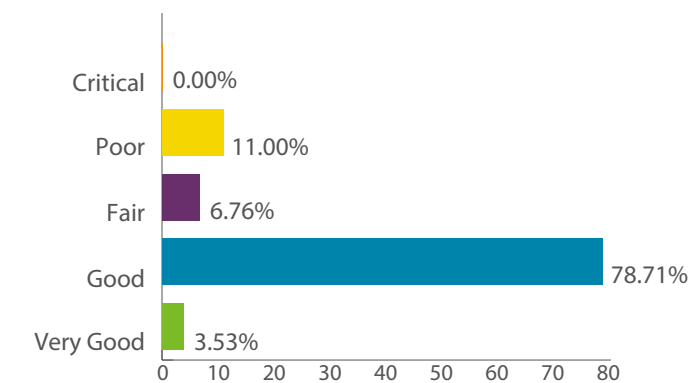
##### 4.4.3 What condition is it in?

The physical condition of The City's vehicles is, on average, good. Some business units and partners, however, have reported poor condition for part of their fleet (Calgary Housing Company: 12 per cent, Fire: 16 per cent, and Transit: 13 per cent).

Vehicles Value by Business Unit (\$Billions)



##### Vehicles Condition



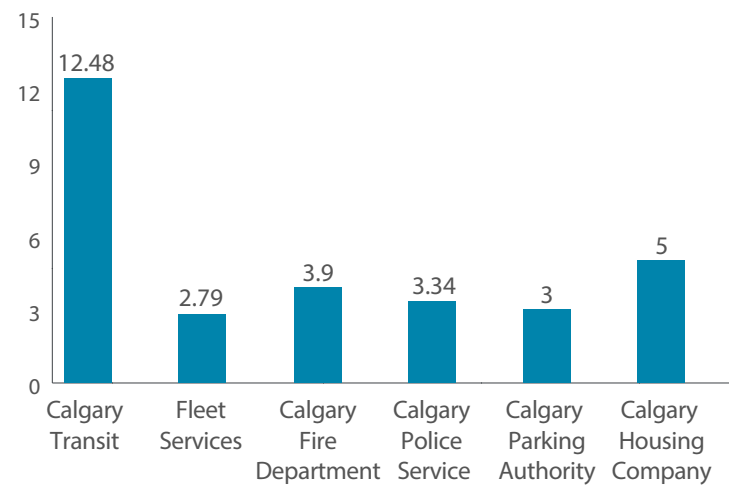
\* Aggregate view of all corporate vehicles.

Poor condition is typically a result of gap in maintenance spending and is a lead indicator for asset performance and ultimately service performance. Declining condition, if allowed to continue, is associated with the risk of declining service delivery for these areas of service.

**4.4.4 What is the remaining asset life?**

The weighted remaining asset life for the vehicles portfolio is approximately 10.46 years. Business unit specific average remaining life is reflected in the graph below.

**Vehicles Average Remaining Asset Life (Years)**



**4.5 Machinery and equipment**

**4.5.1 What do we own?**

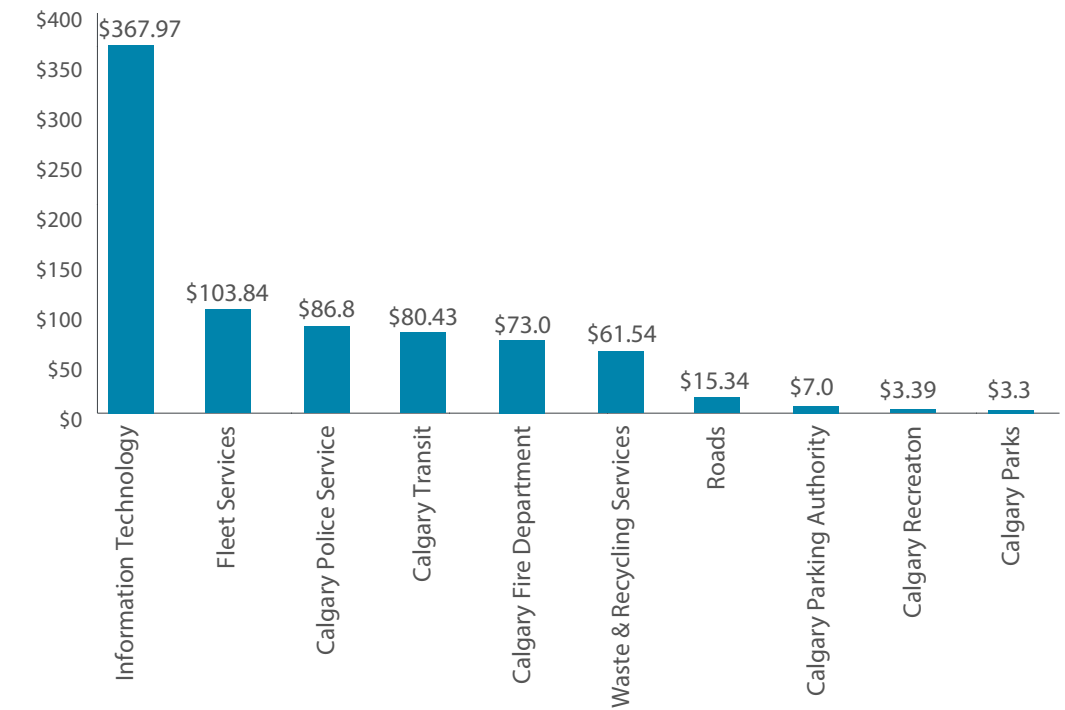
Machinery and equipment include plant and equipment used in supporting fleet maintenance for transit and other vehicles to work landfill facilities, equipment to create asphalt for roads, firefighting equipment and computer hardware and software.

Examining the machinery and equipment portfolio of assets reveals that most of The City's machinery and equipment assets are located within Information Technology followed by Fleet.

**4.5.2 What is it worth?**

The total value of the machinery and equipment portfolio is approximately \$806.81 million or 0.95 per cent of the total asset base.

**Machinery and Equipment Value by Business Unit (\$Millions)**





## 5.0 Conclusions

This report provides a snapshot of our current infrastructure inventory and informs and guides the decision makers as they plan for the next four years' business cycle. Information used in this report is based on the best available data, as of Jan. 1, 2017, supplied by various business units/service areas.

An analysis of corporate asset data reveals that, over the past four years, The City's infrastructure assets have grown in value from \$60.48 billion to \$84.70 billion. This increase has been a result of the following factors:

- Addition of new assets
- Asset management maturity
- Cost escalation factor
- New cost evaluation methods

Asset condition is a useful indicator of the extent of asset deterioration and remaining life of the asset. Assets in poor condition are more likely to be unreliable, leading to asset failures and potentially service failures. Asset condition is, therefore, critical information for The City to understand to support the timing of possible interventions to improve or maintain the levels of service at a desired standard. While overall asset health is still good, with a general upward trend over the last decade, it is seen that the condition profile has deteriorated since 2013.

Over the next 10 years, it is estimated The City's total infrastructure need, funded and unfunded, is approximately \$25.87 billion. As The City anticipates the ability to fund approximately \$20.20 billion during this time, it has been identified that the total 10-year infrastructure gap is approximately \$5.67 billion. Of that, approximately \$ 1.07 billion is attributable to operating, \$1.41 billion is unfunded infrastructure maintenance and \$3.19 billion is for new construction due to growth. As the business planning and budgeting process spans four-year periods, the long-term portion of the funding gap has not been fully realized.

As The City of Calgary prepares for the next four-year business planning cycle, it is important The City looks to close the infrastructure funding gap through comprehensive asset management. The current economic environment has created additional funding constraints which means the allocation of scarce resources must be prioritized efficiently and effectively. The corporate asset management plan draws on the business unit asset management plans to highlight the investment needs through the next business plan period from 2019 to 2022, for infrastructure based on service performance objectives, asset performance trends, asset condition and risks. This work is critical to ensure citizens are provided the services they expect.

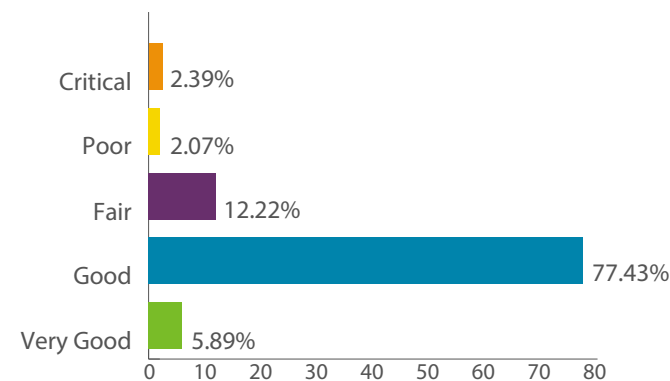
### 4.5.3 What condition is it in?

The physical condition of The City's machinery and equipment is generally good. At an aggregate level, however, 4.46 per cent of The City's machinery and equipment is in poor or critical condition that requires attention to maintain the service levels.

### 4.5.4 What is the remaining asset life?

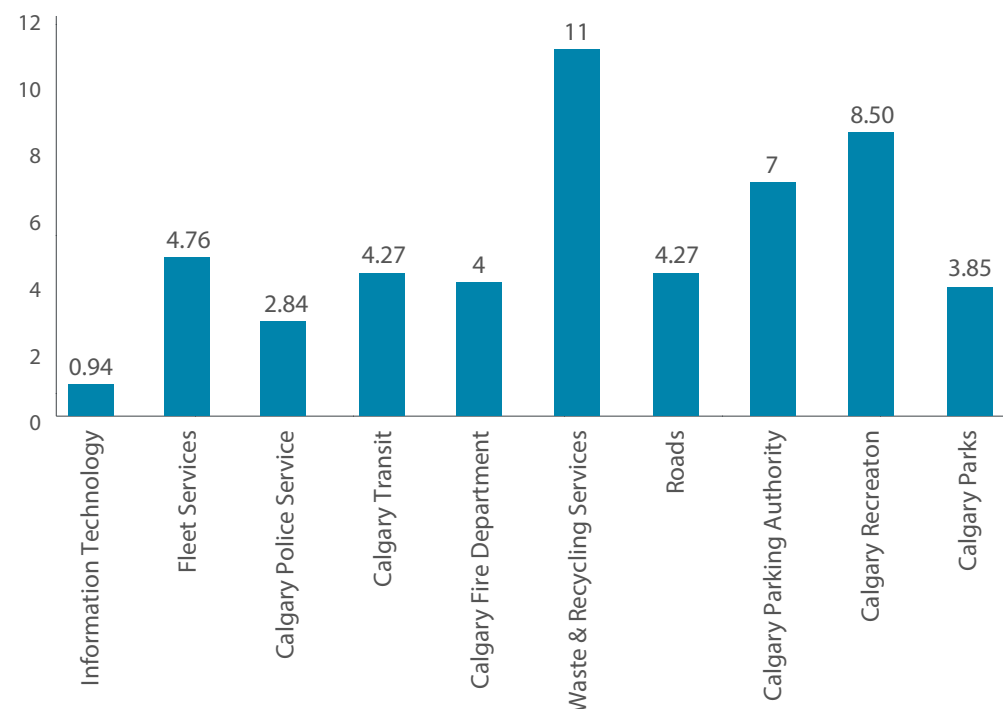
The weighted average remaining asset life for the machinery and equipment portfolio is approximately 2.69 years. Business unit specific average remaining life is reflected in the graph below.

#### Machinery and Equipment Condition



\* Aggregate view of all machinery and equipment.

#### Machinery and Equipment Average Remaining Asset Life (Years)



## Appendix 1

### Total asset replacement value by business unit/civic partner/related authority

(Does not include land)

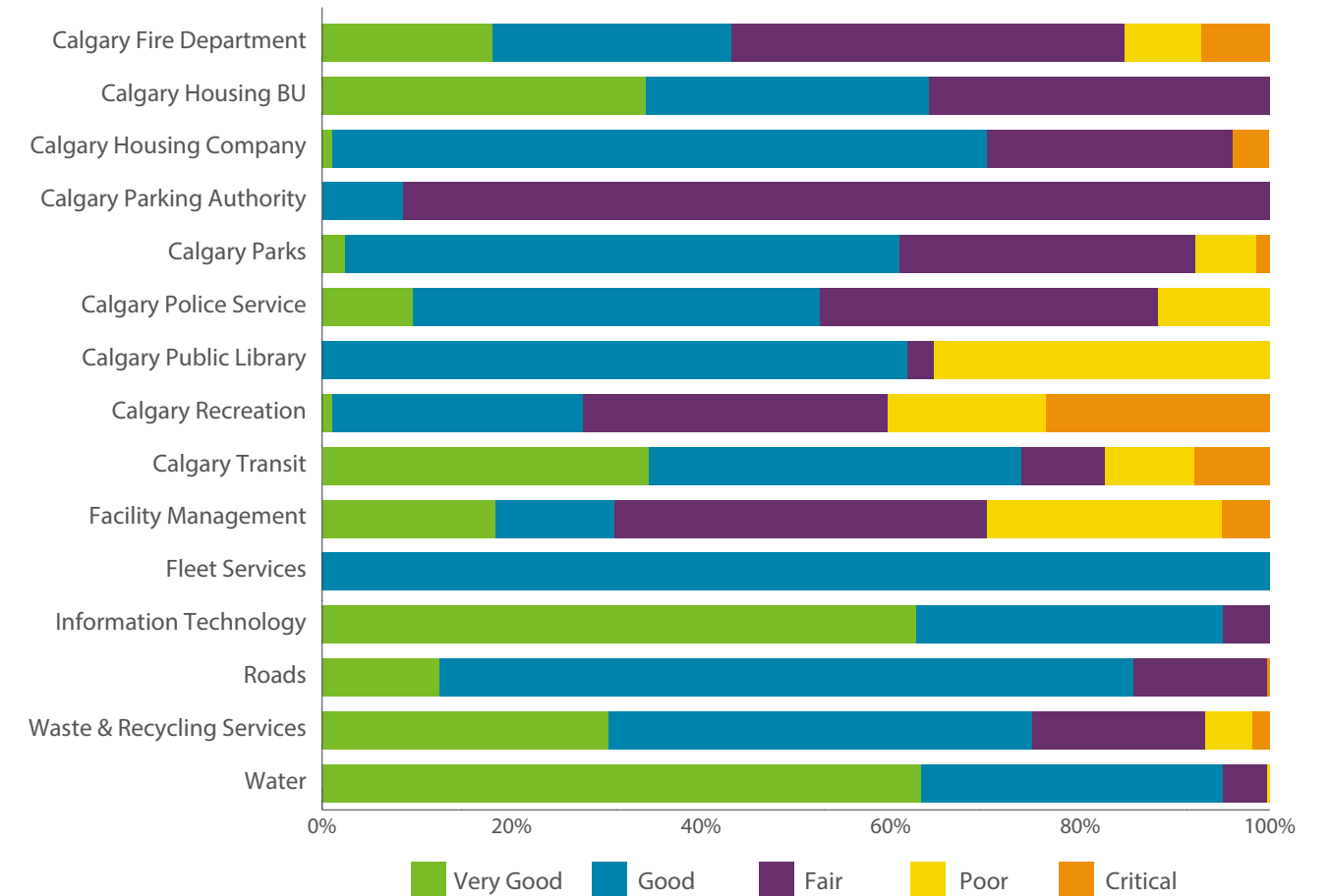
Business Unit/Civic Partner/Related Authority	Replacement Value (\$Billion)	Percentage
Calgary Fire Department	\$0.58	0.69%
Calgary Housing BU	\$0.48	0.57%
Calgary Housing Company	\$0.41	0.48%
Calgary Parking Authority	\$0.34	0.40%
Calgary Parks	\$2.58	3.07%
Calgary Police Service	\$0.60	0.70%
Calgary Public Library	\$0.12	0.15%
Calgary Recreation	\$0.78	0.92%
Calgary Transit	\$3.89	4.59%
Facility Management	\$0.96	1.13%
Fleet Services	\$0.34	0.41%
Information Technology	\$0.42	0.49%
Roads	\$20.48	24.19%
Waste & Recycling Services	\$0.32	0.38%
Water	\$52.39	61.85%
Total		100.02%*

\* Adds to more than 100 per cent due to rounding.

## Appendix 2

### Physical condition by business unit/civic partner/related authority (percentage)

#### Physical Condition by Business Unit



\* Based on the aggregate of a business unit/civic partner/related authority's asset portfolio.

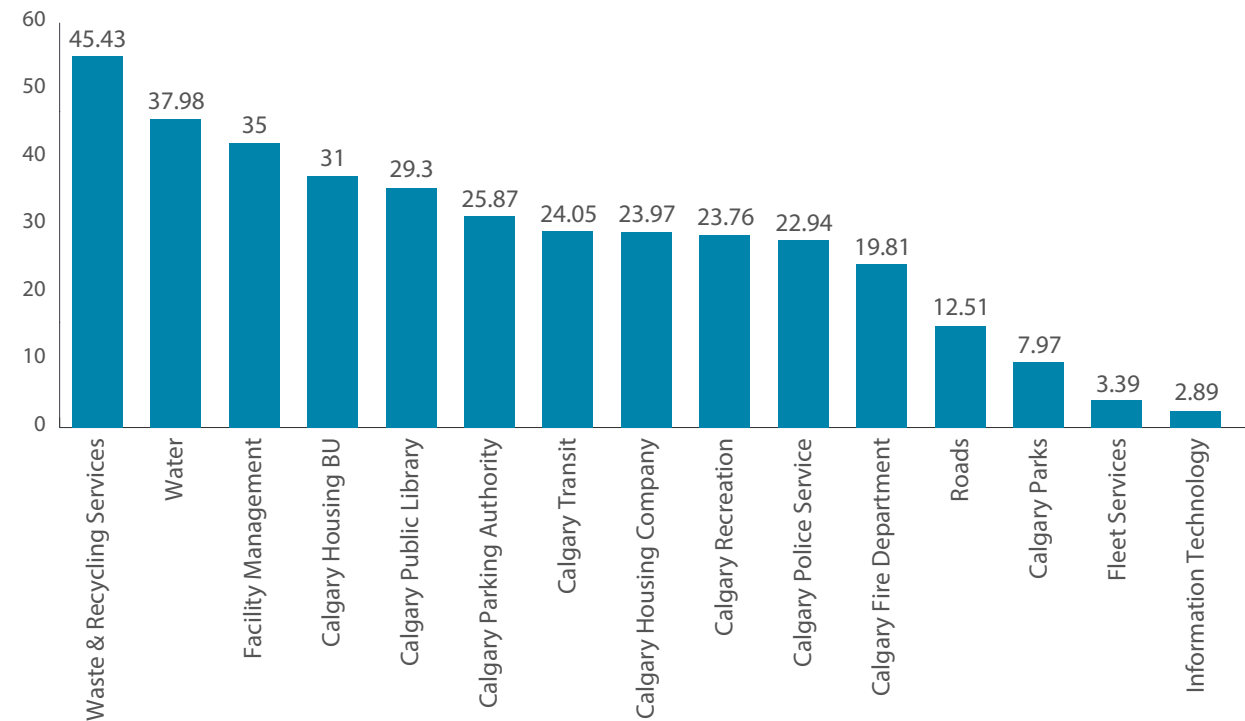




## Appendix 3

### Remaining average asset life by business unit/civic partner/related authority (years)

Remaining Average Asset Life by Business Unit (Years)



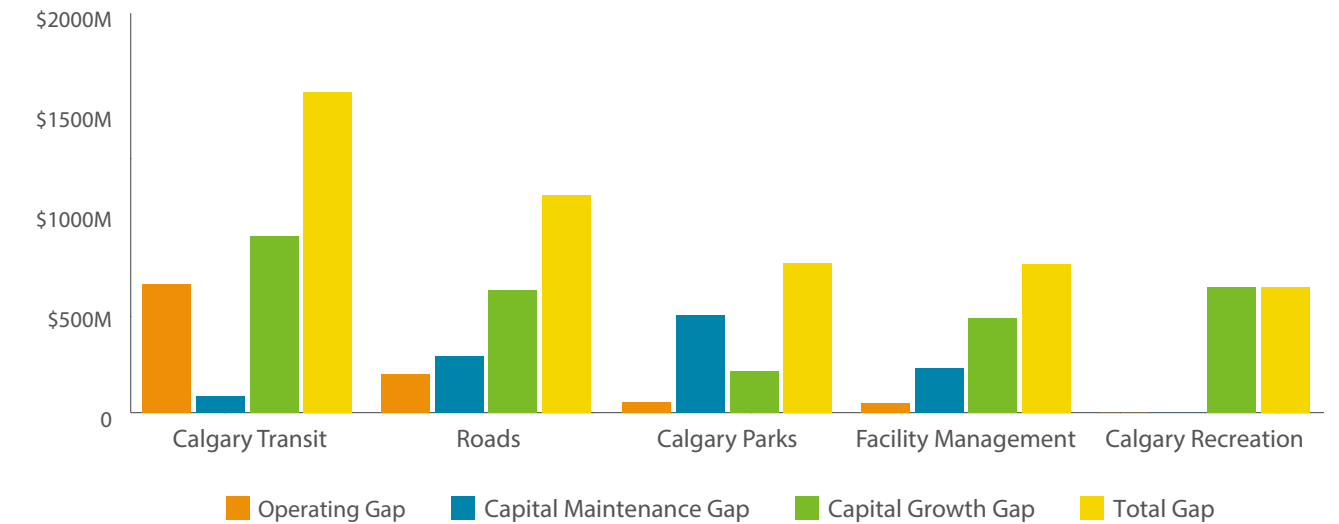
\*Represents weighted average remaining life of the entire asset portfolio owned by the business units/civic partner/related authority.

## Appendix 4

### 10-year infrastructure funding gap by business unit/civic partner/related authority

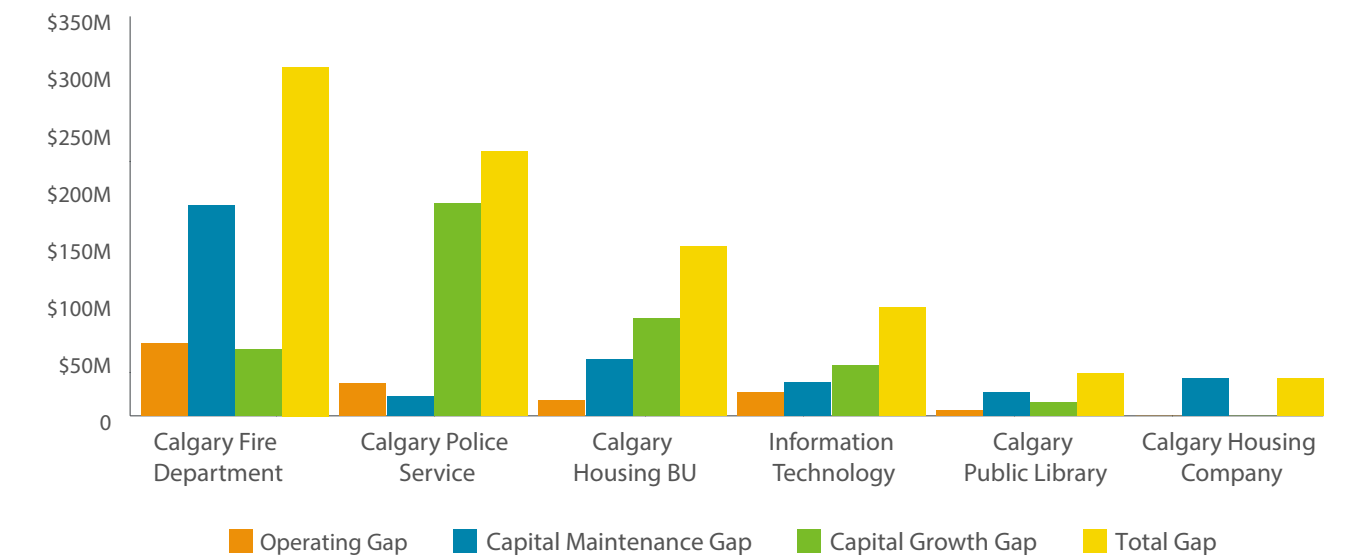
Total Corporate Gap = \$5.67 billion (\$5670 Million)

Business units with a 10-year infrastructure funding gap of \$600 million or more



\*Recreation's capital maintenance requirements for assets that would be replaced as part of capital growth have been deducted from the overall maintenance requirement value resulting in capital maintenance cost savings of approximately \$101 million over 10 years, and hence, closing the capital maintenance gap.

Business units with a 10-year infrastructure funding gap of less than \$350 million



## Appendix 5

### Business unit (BU), civic partner and related authority narratives

The following provides an overview of the services, standards, infrastructure and management strategies for the individual participating business units, civic partner and related authority.



## Chief Financial Officer

### Information Technology (IT)

The main purpose of IT is to provide a large and diverse asset portfolio to support the delivery of core and essential services to the citizens of Calgary.

Information Technology services include:

- Technology architecture, infrastructure governance and security to ensure the privacy and confidentiality of customer and corporate information.
- Partnership and collaboration with business units to provide effective systems solutions and hosting services.
- Information management to ensure the integrity of access, use and storage of customer and corporate data.
- Management of corporate technology lifecycle planning and portfolio management.
- Guidance to business units on change management and business process management.
- Leadership on web innovation and emerging technologies to address growing demands within a changing environment.

A common thread that runs through all City services, Information Technology owns and operates a pool of assets with a replacement value of \$414 million (reported end of year 2016, cost based BI report). These assets have been divided into four groups:

#### Hardware

IT hardware assets are comprised of the physical components such as computers, servers, peripherals, storage and computer networks.

#### Software

IT software assets include corporate enterprise systems, databases, desktop software, cloud applications and software tools.

#### Data Centre

IT Data Centre group is focused on assets specific to the enablement of the data centre function (i.e. raised floor, UPS, fibre interconnects, environmental) and not general building assets. IT does not report or manage actual buildings.

#### Fibre plant - towers

Two main categories of engineered structures are The City's fibre optics network (over 400 kilometres) and wireless network towers.

#### Condition

Asset condition ratings are based on straight-line deterioration. Most technology asset types do not display visible physical deterioration, but the physical, demand or functional condition decrease over time. At an aggregate level, the IT asset base is in good/very good condition.



## Community Services

### Calgary Fire Department

Calgary Fire Department's (CFD) vision is, "To be the international fire service leader" and its mission is, "To serve the community through excellence in fire prevention, education, protection and safety." Safe, reliable and well-maintained infrastructure is essential for the delivery of CFD's emergency and non-emergency services to the citizens of Calgary. The performance and reliability of CFD's infrastructure provides a critical foundation for Calgary's economic development, competitiveness, prosperity, reputation and overall quality of life of its citizens.

CFD has three service portfolios:

#### Fire and emergency response

This service provides emergency response services, including responses to fire, fire-related and medical incidents, as well as motor vehicle accidents, hazardous material releases, other specialized rescue services needed to save lives, protect property and the environment for residents, businesses and visitors of Calgary.

#### Fire inspections and enforcement

This service provides fire inspections and enforcement, saves lives, protects property and the environment by providing services to business and property owners to ensure compliance with Safety Codes Act regulations to minimize fire-related risks to Calgarians.

#### Fire safety education

This service provides home safety and injury prevention education and initiatives to citizens in order to increase knowledge and awareness of safety, and promote behaviours that contribute to safe living in our communities.

In 2016, close to 1,500 women and men, both uniformed and civilian, responded to over 57,000 incidents, made over 17,000 non-emergency public contacts with safety and prevention messages, and provided essential training and support to front-line emergency personnel.

CFD uses a variety of specialized assets to meet its operational demands for emergency services.

Assets include:

#### Buildings and land

- 40 active emergency response stations (including multi-service and leased facilities).
- Emergency Operations Centre.
- Fire Headquarters.
- Apparatus & Equipment Maintenance Facility.
- Wellness Centre.
- Fire Training Academy.
- Former Station #10.
- 46 Buildings and land improvement.

#### Lifecycle Management

IT owns and manages a variety of asset types, which in turn require a range of lifecycle management approaches. Information held on all the assets is updated on an ongoing basis as assets are continually replaced, upgraded and retired. The lifecycle of IT assets is typically shorter than other City-owned infrastructure assets and replacement is often based on age rather than on condition due to high consequences of assets failing and the lack of a visible deterioration profile. The need to keep existing information technology infrastructure current and compatible with industry and product lifecycles is also a key driver of asset replacement on relatively short lifespans.

#### IT-AM Practice

The IT asset management strategy and action plan is founded upon continuous improvement across the three IT-AM pillars of:

- Managing "the Assets."
- Maturing "the Practice."
- Managing "the Information."

IT supports a significant percentage of non-IT, business unit reported technology assets with significant interdependencies between planning for and managing these assets. To address the gap, IT is moving to horizontally integrate the IT BU asset management plans with other BUs.

IT leverages ITIL v3.0 Service Management frameworks, International Association of Information Technology Asset Managers (IAITAM) best practices and the development of a formal ITAM practice, and continues to define Levels of Service (LOS) across distinct three layers (Backbone/Systems, IT Services and Outward Facing Services).





### Fleet, machinery and equipment

- 112 heavy apparatus (pumpers, tankers/ladders and emergency response units).
- 156 light duty vehicles (including trucks, boats and trailers).
- 35,148 pieces of fire equipment (including life safety, hazardous, communications and personal protective equipment).

### Key challenges and solutions

- Changing demographics (e.g. aging population) and intensification due to redevelopment could significantly change the volume and nature of emergency calls.
- Economic cycles could affect level and sourcing of funding.
- Changes in provincial and federal regulations (e.g. climate change programs) could impact cost to build and operate assets.
- Increased severity and frequency of weather events and disasters could put a strain on resource capacity.
- Changes in workforce and culture (i.e. due to retirement and generational difference) could impact level of service and implementation of identified initiatives.

### Funded and unfunded capital priorities (2017-2026)

To address aging infrastructure and respond to growth, the key funded capital projects for CFD include:

- NE Industrial Emergency Response Station
- East MacLeod Emergency Response Station (Temporary)
- West MacLeod Emergency Response Station (Temporary)
- South MacLeod Emergency Response Station
- Cornerstone Emergency Response Station
- Tuscany Emergency Response Station
- Station 17 Emergency Response Station (Replacement)
- Station 7 Emergency Response Station (Replacement)
- General lifecycle of facilities, apparatus and equipment

Identified but unfunded key capital projects are:

- Station 1 Emergency Response Station (Replacement)
- Station 2 Emergency Response Station (Replacement)
- Station 12 Emergency Response Station (Replacement)
- Station 36 Emergency Response Station (Replacement)
- Keystone Hills Temporary Emergency Response Station
- Belvedere Emergency Response Station





## Calgary Parks

The mission of Calgary Parks is to “enable, contribute and sustain dynamic communities through great parks and open spaces.” As the steward of open space in Calgary, we provide a diverse range of services to Calgarians and visitors. This broad spectrum of services includes planning and development, education and front-line management of all assets that contribute to the enhancement of those spaces.

There are a variety of parks in Calgary including regional and local community parks, cultural landscapes, sport sites, environmentally sensitive areas and urban plazas. Calgary Parks manages both living and non-living assets for the long-term sustainability and enjoyment of the public.

The following is an overview of the 2016 assets Calgary Parks stewards:

- 2,600 local community parks
- 39 regional park sites
- over 8,300 hectares of parkland
- 131 joint use sites (shared with school boards)
- 10 spray parks/wading pools
- over 475 soccer fields
- over 430 ball diamonds
- over 60 tennis/pickleball courts
- 1,100 playgrounds
- four Parks public buildings
- four restaurants in parks
- 150 off-leash areas in parks
- over 465,000 public trees
- 800 kilometres of pathways/100 kilometres of unpaved trails
- five cemeteries and an indoor mausoleum

Calgary Parks maintains physical conditions on all assets as well as Citizen Level of Services (CLOS) on a regular basis. The data collection process and the analysis of data from the Parks Asset Reporting & Information System (PARIS) allow for improved lifecycle funding projections and project planning.

### Land and land improvement

Calgary Parks oversees assets within geographic areas of parks and open spaces that is approximately 12 per cent of the city’s footprint. This extraordinary land base is approximately 10,800 hectares and includes river valleys, ravine systems, areas of environmental reserve as well as community and regional parks. 8,300 hectares of the 10,800 is captured as official park system. Approximately 3,900 hectares (45 per cent) is managed as ornamental parks space (i.e. mowed grass, planted vegetation, recreation areas such as sport fields). The balance, 4,400 hectares is comprised of primarily natural vegetation with infrastructure such as pathway/trail system, seating and parking areas. Outside of the official parkland, Calgary Parks still manages the natural environment for public use and safety, hazardous conditions, and invasive weeds.

### Buildings

Calgary Parks public buildings include facilities at Ralph Klein Park, Inglewood Bird Sanctuary, Reader Rock Garden and Devonian Gardens. Parks public buildings are utilized for programs and booked for special events, weddings, etc. Parks is landlord to four restaurants at parks sites: River Café at Prince’s Island Park, Reader Café at Reader Rock Garden, Provisions at Central Memorial Park and Seasons at Bowness Park. City buildings for staff and equipment include both permanent, portable trailers, depots, garages and c-cans. There are also year-round and seasonal washroom facilities throughout various parks across the city.

The data collection process through tools like RIVA DS and RIVA CP allow for improved capital and operational lifecycle funding projections and project planning. The EAM system is utilized for daily work orders and preventative maintenance scheduling.

### Machinery and equipment

Calgary Parks utilizes technology such as hand-held GPS units and smaller equipment such as tablets for use in offices and the field. Calgary Parks acquired four small aerial trucks after Snowtember to improve response and resiliency to extreme weather events and proactively prune trees to mitigate future damage from extreme events.

### Culture, Parks and Recreation Infrastructure Investment Plan (CPRIP)

Calgary Parks uses a systematic approach to identify priority projects for capital funding. The investment plan uses research and current conditions to prioritize renovations and park redevelopment. CPRIP also outlines funding requirements to support this work.



## Calgary Recreation

Calgary Recreation provides more than registered programs. It also oversees the development, maintenance and enhancement of recreation infrastructure. Capital Development is a division within Calgary Recreation responsible for the planning, development and maintenance of public recreation infrastructure.

Our current inventory of City-owned and operated recreation facilities includes:

- 15 ice arenas
- two multi-use leisure centres
- 12 indoor pools
- two arts centres
- Glenmore reservoir facility, including a sailing school and boat patrol site
- nine outdoor pools (in collaboration with community partners)
- 12 athletic parks and associated buildings
- Calgary Soccer Centre
- Centennial Planetarium
- eight golf courses (at six locations) and associated buildings

### Culture, Parks and Recreation Infrastructure Investment Plan (CPRIIIP)

Calgary Recreation uses a systematic approach to identify priority projects. The Culture, Parks and Recreation Infrastructure Investment Plan (CPRIIIP) uses research, current Building Condition Assessments (BCAs), and growth and maintenance requirements to prioritize needed renovations, upgrades and new developments. CPRIIIP also outlines funding requirements to support this work.

### Facility Development & Enhancement Study (2016)

In 2014, Calgary Recreation initiated the Facility Development & Enhancement Study (2016) to review current service levels at City-owned and operated recreation facilities. The study measures existing levels of service against current and future demand to identify any gaps or opportunities for improvement. Results reveal an urgent need to replace inadequate, deteriorating or operationally costly facilities, and address underserved areas of Calgary. Results also show that existing facilities are deficient in terms of space and amenities based on model amenity plans for optimized service delivery. This information was used to develop a 10-year capital growth requirement (see Capital Growth below).

### Buildings

Building values are based on the Recreation Capital Planning Tool (ReCaPT). Note: We are currently in the process of transitioning to new capital planning software (centerRivaDS). ReCaPT Current Replacement Values (CRV) have been inflated from 2013 to 2016 values. Values for deferred maintenance are also reported. These values are derived by subtracting the capital investment requirement from maintenance requirement values for each facility between 2013 and 2016. This calculation yields the Facility Condition Index (FCI) per cent, allowing us to assess the current and future maintenance needs of our assets.

Since 2013, Calgary Recreation has added several new assets to our inventory, including New Brighton Athletic Park, the Centennial Planetarium and the Calgary Soccer Centre (formerly Subway Soccer Centre). The CRVs for the Planetarium (\$42.1 million) and Calgary Soccer Centre (\$15.9 million) were generated using PeopleSoft Asset Management (PSAM) values. These values were then appreciated and inflated at three per cent per year.

### Capital maintenance

ReCaPT also allows us to project capital maintenance requirements for each facility over the next 10 years (\$351.4 million). This number does not include the approximate \$101 million savings on capital maintenance requirements due to future implementation of capital growth projects. Funding for capital maintenance is estimated by increasing annual budget allotments for the current budget cycle by three per cent annually. For facilities where a current BCA already exists, the FCI rating was taken directly from the BCA instead of being calculated.

### Capital growth

Results of Calgary Recreation's Facility Development and Enhancement Study (FDES) were used to develop the 10-year capital growth requirement (\$661.7 million). Maintenance requirements for assets that would be replaced as part of capital growth have been deducted from the ReCaPT maintenance requirement value (resulting in potential capital maintenance cost savings of approximately \$101 million over 10 years).

### Land improvement, machinery and equipment

Values for land improvements, machinery and equipment use PSAM values. These values are lower than in previous years due to changes in TCA reporting requirements. While the quantity of equipment owned and managed by Calgary Recreation has not decreased, the definition of what constitutes a TCA has changed.

### Operation funding

Operation funding requirements (\$361.4 million) are based on averaging annual funding and inflating this by three per cent annually from 2015-2018. Based on this escalation, we assume there will be no gap in funding. We are currently undertaking a Zero-Based Review (ZBR) of our operations to identify gaps and redundancies to help improve efficiency.

### Key challenges and opportunities

Calgary Recreation faces several challenges that could impact our ability to maintain current service levels:

- Aging infrastructure requires more resources to maintain.
- Aging mechanical systems are inefficient and operationally costly. They may also not be environmentally sustainable.
- Several facilities are past their useful life and require redevelopment or complete replacement. Other facilities are deficient in terms of space and amenities.
- There is a service gap in growth areas of The City.
- Rapid population growth has resulted in increased demand. Citizen dynamics, expectations and preferences are also changing.
- Changes in legislation and best practices are outpacing upgrades and investment.
- Service maintenance contract fees are escalating beyond inflation rates.
- There is a shortage of available land for expanded/new developments to meet service requirements in some of the existing community catmint areas



The Affordable Housing service line is supported through Calgary Housing (CH – Calgary Housing Business Unit) that includes services provided by the Calgary Housing Company (CHC - wholly Owned Subsidiary).

CH provides safe and affordable housing solutions to citizens of Calgary through property management of:

- 2,723 units owned by the Province of Alberta
- 2,173 units owned by The City
- 1,930 CHC-owned units

CHC also administers approximately 1,500 private landlord rent supplements.

Calgary Housing is a business unit within the Community Services Department of The City of Calgary and owns 2,146 units managed by CHC. These units reside in The City Partnership (affordable) and City-owned community housing (Social Housing) portfolios.

Calgary's City-owned Community housing portfolio (CHP) represents 1,048 affordable housing units constructed between 1969 and 1973, the majority of which are in a fair condition. Properties are on average more than 44 years old and are showing deterioration due to deferred maintenance as a result of insufficient funding for operating subsidies and underfunded capital investment. This portfolio is 100 per cent deep subsidy social housing units, therefore, Calgary Housing Company is limited in generating rent revenue because eligibility and rent calculation for the units is provincially legislated in the Social Housing Accommodation Regulation (SHAR). Operating agreement funding for maintenance of building structures and systems (90 per cent Province of Alberta, 10 per cent City) in their present form are set to expire between 2021 and 2024. These expiring operating agreements represent a risk to The City of Calgary who will then become responsible for the operations and maintenance deficit for these assets estimated to be \$3 million annually (not including required capital investments).

Calgary Housing Company and the Affordable Housing Division within the Calgary Housing Business Unit are currently in discussions regarding establishing an asset management program for City-owned properties. CHC's newly developed asset management program is being considered for City-owned units which will support City of Calgary corporate asset management compliance.

\$2.5 million of grant funding for 2017 has been received from the province to address outstanding lifecycle requirements in the CHP portfolio. CHC has identified additional capital requirements of \$27 million over the next 10 years. There is currently no lifecycle maintenance capital reserve in place for this portfolio. The City of Calgary's Partnership Portfolio represents 1,122 affordable housing units that range in age from 49 years to newly developed. The City is responsible for the maintenance costs for this portfolio which is managed through a self-funded operating model based on mixed tenant rental income. There are no operating subsidies received from other levels of government for this portfolio. Most of the units in this portfolio are either new construction or have had extensive renovations and are considered to be in good to excellent condition. Three new projects, were completed in 2017:

- Kingsland – 32 units
- Crescent Heights – 16 Units
- Bridgeland – 24 units

As Calgary continues to grow and change, so do the needs of Calgarians. Using CPRIP, ReCaPT and FDES data, Calgary Recreation has identified several opportunities to address challenges in a strategic way. The following approaches will help maintain and improve service levels while ensuring investments are based on sound evidence of where investment will have the greatest value for citizens:

- Prioritized funding requirements submitted through the CPRIP.
- The Facility Management Framework Project.
- Increased funding from Council for recreation lifecycle.
- The possible conversion of facilities for alternative uses.
- A comprehensive annual lifecycle plan for Calgary Recreation.
- Modernization of facilities and new asset management software to allow for better monitoring and forecasting of high priority projects.
- Possible closure or repurposing of some facilities.

#### Community Associations (CA) and Social Recreation Groups (SRGs)

Community Associations (CA) and Social Recreation Groups (SRGs) assets have not been reported in this report.

Partner infrastructure is being reported through "Status of Community Associations and Social Recreation Organizations on City-owned Land." They are not included in the ISR because it is only the land that is owned by The City of Calgary. These facilities are operated and maintained by the organization or lease holder, and are governed by the lease or License of Occupation (LOC) that is in place with The City. With this unique legal agreement, all regular maintenance and lifecycle work is the responsibility of the organizations, and not The City of Calgary. While the assets are not directly owned by The City, they do represent replacement cost liabilities in the range of \$950 million. If a group does not have adequate funding for the maintenance of the building, or decides not to renew the LOC, the infrastructure would become The City's responsibility and/or assets. The City does provide support to groups through the Capital Conservation Grant (Council Policy CPCS006), which was created to recognize the increasing challenges faced by community associations in operating and maintaining facilities.







For the 2015 – 2018 budget cycle, Council directed the Office of Land Servicing & Housing (OLSH) to build 88 affordable housing units per year. This responsibility was later transferred to the Calgary Housing business unit. The following properties are expected to open:

- Wildwood – 48 units (2018)
- Rosedale – 16 units (2019)

The capital grant agreement that supports the construction funding to build these units contains a maximum rent restriction under a 20-year long-term agreement. This agreement limits revenue opportunities for these projects. A reserve has been established for this portfolio which is limited in compliance to CMHC guidelines. The annual maximum contribution is \$500 per unit. As of 2016, this reserve has reached the maximum of \$5.4 million as per operating agreement, and will continue to grow together with the increased number of units.

The Corporate Affordable Housing Strategy and Implementation Plan were approved by Council in July 2016. This plan identified six priority areas to grow affordable housing including the need to both develop new affordable housing units and create a long-term pipeline of prioritized projects. This 10-year plan would then be incorporated into the capital budget plan cycles for 2019-2022 and 2023-2026. A stable source of funding is required to commit to those development projects.

The six strategic areas are:

1. **Get the Calgary community building** – Support housing developers to get new homes into the ground for people in need.
2. **Leverage City land** – Provide City land to contribute to affordable housing development.
3. **Design and build new City units** – Model tenant-centered design and place making for inclusive communities.
4. **Regenerate City-owned properties** – Lead strategic reinvestment to preserve homes for the highest-need residents.

5. **Strengthen intergovernmental partnerships**
  - Recommend solutions to the federal and provincial governments.

6. **Improve the housing system** – Leverage research, programs and partnerships to transform outcomes for people.

#### **Key challenges and solutions**

The single most pressing challenge facing Calgary's affordable housing sector is inadequate housing supply. Only three per cent of households in Calgary are supported by non-market housing, as compared to six per cent of households nationwide. As population growth is far outpacing the creation of affordable housing units in Calgary, population forecasts suggest over 22,000 new non-market units could be required to house six per cent of all Calgary households in 2025.

The purpose of The City's development program is to contribute to creating non-market units towards that deficit as identified through Targets 1-3 in the Corporate Affordable Housing Strategy. It is also intended to illustrate the value and importance of providing safe and adequate affordable housing developments through community engagement, creative architecture and innovative operating models. A large focus of the program is to use municipal tools to enable the non-profit sector to increase affordable housing inventory. The development program leverages municipal, provincial and federal funding to create units in all Calgary communities. A variety of built forms are utilized. The City has made an effort to leverage other City funds (i.e. Parks, Centre City, Heritage, Integrated Civic Facilities and Transit Oriented Development) wherever feasible.



## Calgary Housing Company (CHC)

CHC is a wholly-owned subsidiary of The City of Calgary. CHC owns and manages 1,930 affordable housing units the majority of which are in good condition. Capital and operating expenses for the majority of units are self-funded.

The portfolio is comprised of properties constructed between 1960 and 1994, and includes the recent acquisition of a 163-unit high-rise complex in East Village. In addition, CHC received \$3.48 million capital project grant funding in 2017 from the province to help CHC improve the condition of its properties.

A portion of the CHC properties are managed under the terms of operating agreements. One such funding agreement related to 207 CHC-owned units will expire between 2027 and 2031.

In 2016, CHC's board of directors approved the CHC Asset Management Policy. This policy establishes the foundation and direction for CHC's asset management program and sets out the guidelines for required maintenance investment identification, prioritization and planning. It is intended that the policy will guide CHC through all stages of the asset lifecycle management and support the delivery

of sustainable services, as well as consider divestiture or redevelopment once a property no longer meets sustainability criteria. In addition, CHC has completed a Strategic Asset Management Program (SAMP) and Asset Management Plan (AMP) documents which define key deliverables of the asset management program.

CHC is now focused on the building capacity asset management area. One of the critical elements is conducting building condition assessments on its properties which builds CHC's prioritized 10-year capital plan. Prioritization is based on risk and level of service criteria.

To improve CHC asset management decision support, CHC is migrating to a new integrated Enterprise Software platform which is standard within The City of Calgary by the end of 2018.



## Deputy City Manager's Office

### Facility Management

Facility Management (FM) strategically plans, builds and operates a portion of The City's portfolio of municipal workplaces and public spaces which includes administrative buildings, operations workplace centres, multi-service facilities and emergency response stations. As the corporate accommodation planner and property manager, FM provides comprehensive services for each phase of facility development to help deliver quality frontline services to citizens of Calgary.

The business unit totals approximately 180 employees and delivers four lines of service:

- Facility Planning
- Facility Infrastructure
- Facility Operations
- Operational Co-ordination

Facility Management applies sustainability principles to inform decision-making, design, procurement and asset management. FM co-ordinates City service needs to achieve the best possible outcome when planning, providing and maintaining buildings, offices and work depots for The Corporation. FM's objective is to support other business units' service delivery and lower future operating costs, and minimize The City's impact on the environment. The FM asset portfolio is comprised of (approximately):

- Three million square feet of building space with an estimated current replacement value of \$1 billion\*. The portfolio excludes recreation centres, fire, police and Calgary Transit buildings. (\*Current replacement value is the cost to replace all components of an existing building; the current replacement value is not generally equal to market replacement value.)
- 69 buildings which are erected on 368 acres of land (stand alone and OWC sites) valued at approximately \$93 million, according to Tangible Capital Assets reporting.

Within the Facility Management's portfolio, the primary focus from a lifecycle maintenance perspective is on buildings. The weighted expected life for buildings in the portfolio is 75 years with an estimated 36 years remaining based on the weighted average (multiplying the buildings remaining life by the buildings replacement value divided by the total replacement value of the portfolio. Weighted years remaining for each building summed to determine the average years remaining for the whole portfolio.)

FM's asset base continues to age, and without sufficient capital lifecycle maintenance investment, there will be a serious risk to sustainable levels of service delivery to customers and ultimately service delivery interruptions to citizens. Data from condition analysis indicates that if we do not invest in the building portfolio, by 2026 the rehabilitation of 15 buildings (22 per cent of the portfolio) will be equal to the cost to replace them.

With limited and partial funding, FM has put in place a systematic approach to identifying, evaluating and mitigating lifecycle risk at a building asset level for the portfolio in order to make stronger risk-based decisions and to prioritize capital projects. Also, FM will be implementing Stage Gating and other business improvement initiatives like myFM, Corporate Co-ordinated Operations & Maintenance, and Integrated Civic Facility Planning to reduce the demand for funding.

Fleet Services supplies vehicles and equipment on a lease basis to various City business units for their needs to provide services to the constituents of The City of Calgary.

Fleet provides full lifecycle management for approximately 3,000 Fleet-owned units. Services include budgeting of replacement and growth units, and purchase and commissioning into service. These activities are funded from self-supported debt.

All of Fleet's current assets are in good condition.

Fleet also provides preventative maintenance, repairs, fabrication, welding and body shop services for all Fleet-owned and non-owned units, as well as operator training.

Fleet maintains its assets in accordance with the following regulatory requirements:

- Traffic Safety Act (Provincial)
- Occupational Health and Safety Act (Provincial)
- National Safety Code (Federal)
- Canadian Motor Vehicle Safety Standards (Transport Canada)

Asset management strategy for replacement and growth requirements over the next 10 years includes:

- Maintenance: to maximize the use of the asset during its economic lifecycle Fleet will provide optimum preventative maintenance in compliance with manufacturer recommendations. Intervals of preventative maintenance and repair activities are optimized to provide maximum up-time for client operations.
- Growth is planned based on client needs and their operational budgetary constraints.
- Fleet is investing in upgrades and new system developments to support its asset management practices and decision support.

### Facility condition assessments

Industry standard facility condition assessments were completed on the majority of FM's building portfolio in 2015 and are monitored and updated regularly. As of the end of 2016, data indicates 22 buildings in the portfolio (31 per cent of portfolio CRV) are considered to be in good to excellent condition; 29 buildings (39 per cent of portfolio CRV) are considered to be in fair condition, and 18 buildings (30 per cent of portfolio CRV) are considered to be in poor to critical condition. Based on the analysis completed for capital maintenance requirements and an assumption that the current level of funding will continue (with an inflated rate of three per cent per year), additional funding of \$224 million is required over the course of the next 10 years to bring the current condition of the portfolio to the target condition.

### Project prioritization

FM continues to review buildings in the Corporate Accommodation Portfolio on an individual basis as well as portfolio level. Due to refined analysis, revisiting target conditions and the development of individual building lifecycle plans, the estimated cost from 2017-2026 to bring building conditions up to target conditions has been reduced from \$50.6 million per year to \$48.7 million per year. Using a risk-based approach in conjunction with the input from internal facility operators, asset planners and accommodation planners, FM has been able to perform a risk-based project prioritization in order to determine which facilities are required to be kept and maintained in operating condition and which can be allowed to deteriorate towards demolition. This prioritization incorporates numerous variables such as physical condition, facility use, service delivery, demand and asset substitutability. The risk-based model contains details of the changes in both the asset risk profile and the level of risk the customer will be exposed to as a result of the level of funding obtained. This analysis has resulted in a more accurate picture of capital lifecycle maintenance funding requirements and has positioned FM as an industry leader in asset management of public property.





# Transportation

## Roads

Roads is one of four business units in the Transportation department, the others being Transit, Transportation Planning, and Transportation Infrastructure. Roads is responsible for operating, maintaining and renewing The City of Calgary’s roadway infrastructure in a safe and sustainable manner in order to enable the movement of people and goods.

Roads is also impacted by the construction work done by other parties. The Transportation Infrastructure (TI) business unit delivers major projects like the addition of new interchanges and major roadway upgrades, while private developers build roadway infrastructure in new subdivisions. Roads inherits the ongoing operation, maintenance and renewal of this infrastructure.

Operational activities include snow and ice control (SNIC) and spring clean-up (SCU); street use and permitting; design and operation of electronic traffic control devices; traffic monitoring and control, including detours for roadway construction and special events; the production and sale of signs and construction materials; and pavement marking.

Maintenance and renewal activities include condition inspection, repair, replacement or rehabilitation, and minor upgrades in order to preserve and improve the safety and reliability of the roadway infrastructure. Roads also provides review, inspection and acceptance services for infrastructure constructed by developers and third-party contractors.

As of the end of 2016, the total replacement cost of all roadway assets under Roads stewardship was estimated to be \$20.48 billion (excluding land). There has been an increase of \$7.96 billion since the last report (2013 ISR). This increase in value is largely associated with the airport tunnel, Plus15 overpasses and new unit rates for pavement and concrete.



The Roads asset portfolio is described in the table below.

Asset Type	Quantity	Unit of Measure	Current Replacement Cost (\$Millions)	Average Physical Condition
Boulevards	1,012.0	Hectares	\$51.0	Fair
Bridges and Tunnels	363	Count	\$1,514.4	Good
Curbs & Gutters	6,600.0	Linear kilometres	\$2,514.1	Very Good
Facilities and Storage	n/a	Various	\$46.6	Fair
Fences / Guardrails	317.6	Linear kilometres	\$282.0	Fair
Guide Signs	276	Count	\$34.5	Good
Lanes	3,067.1	Lane kilometres	\$897.0	Fair
Machinery & Equipment	423.0	Count	\$15.3	Fair
Engineered Walkways	96.4	Linear kilometres	\$17.6	Fair
Pavement	16,254.6	Lane kilometres	\$9,935.3	Good
Plants	2	Count	\$22.3	Poor
Retaining Structures > 1 metre	35.8	Linear kilometres	\$132.3	Good
Retaining Walls < = 1 metre	16.8	Linear kilometres	\$16.5	Fair
Sidewalks	5,680.6	Linear kilometres	\$2,627.7	Good
Signs	98,994	Sign posts	\$48.0	Good
Street Furniture	1,799	Count	\$3.2	Fair
Street Lights	83,792	Streetlight stands	\$1,532.1	Fair
Timber Stairways	68	Count	\$3.0	Fair
TMC	1	Count	\$8.1	Fair
Traffic Barriers	112.1	Linear kilometres	\$60.3	Fair
Traffic Signals	1,029	Signalized intersections	\$208.3	Good
Pedestrian Passes (over 15)	90	Count	\$515.0	Good
<b>Total:</b>			<b>\$20,484.6</b>	

The management of roadways is governed by the following legislation:

**Municipal Government Act (2017)**

**City Transportation Act (2014)**

**Traffic Safety Act (2017)**

**Public Highways Development Act (2010)**

**Highways Development and Protection Act (2013)**

**Dangerous Goods Transportation and Handling Act (2010)**

These do not articulate the standards for roadway construction, operation and maintenance, but do set out the guidelines by which transportation authorities must operate. Roads has developed internal design and construction standards, and maintenance and operation procedures based, where appropriate, on industry best practice guides.

City of Calgary policies that impact the provision of roadway services include:

- TP001 Dangerous Goods Route Network Development Policy
- TP002 Traffic Calming Policy
- TP003 Surface Transportation Noise Policy
- TP004 Snow and Ice Control Policy
- TP005 Truck Route Network Development Policy
- TP006 High Load Truck Route Network Development Policy
- TP007 Installation of 'Out of Sequence' Traffic Signals Policy
- TP008 Streetlight Standards and Sign Poles – Colour of Paint Policy
- TP009 Environmental Capacity Guidelines for Roadways Policy
- TP010 Pedestrian Policy

- TP011 Bicycle Policy
- TP012 Calgary Transportation Plan
- TP013 Roadside Memorials Policy
- TP014 Parking Governance Roles and Responsibilities
- TP015 Calgary Parking Authority Financial Returns to The City
- TP016 Roundabout Policy
- TP017 Parking Policy Framework for Calgary
- TP018 Residential Street Design Policy
- TP019 Slope Stability Management Policy
- TP020 Transportation Corridor Study Policy
- TP021 Complete Streets Policy
- LUP005 Visitor Parking Permit Policy

Roads performs regular and formal condition surveys for approximately 85 per cent of its asset base. The assets that are not formally assessed are primarily either supporting operational activities or replaced as failure occurs. Service levels are determined largely based on roadway classification, with high volume roads receiving increased inspection and maintenance, and being constructed to more robust specifications.

Roads services are primarily funded as follows (in 2017):

- 72% Tax Support
- 16% Internal Recoveries
- 10% User Fees/Other Sales
- 2% Grants and Invest Inc

### Funding impact

Roads services are also impacted by the funding available for major capital projects delivered by Transportation Infrastructure. The Calgary Transportation projects that have been deferred as a result of this funding reduction are focused primarily on improving goods movement and accommodating traffic growth.

The deferral of these projects, along with Calgary's continued and rapid growth, is expected to generate additional traffic that will increase both congestion for roadway users and also the deterioration rate of existing roadway assets. As with many of Calgary's business units, Roads faces the challenge of maintaining current service levels while usage increases and capital funding decreases.

Roads is committed to facing this challenge in a number of ways. Two examples include the implementation of solutions to improve peak traffic flows, such as the lane reversal systems on Centre Street, Memorial Drive and Fifth Avenue S.W.; and the use of new technologies and tools that can increase staff efficiencies and reduce asset lifecycle costs.





## Calgary Transit

Calgary Transit connects people and places by providing mobility (the ability to move from place to place) and accessibility (the ability to reach a destination). Calgary Transit’s mission is, “Connecting you with people and places you care about by providing safe, accessible, reliable and courteous public transportation services.”

To realize this mission, Calgary Transit:

- Delivers safe, clean, reliable and well-maintained public transit.
- Provides service through community shuttle, bus, bus rapid transit (BRT) and light rail transit (LRT).
- Provides specialized transportation services for disabled or limited mobility persons (Calgary Transit Access).
- Plans future transit service and supports transit-oriented development.

The following regulatory standards have the largest impact on the management of Calgary Transit assets:

- Air quality regulations set out by the Alberta government.
- Vehicle weight restrictions as mandated by Alberta Transportation.
- Fuel storage regulations as outlined by the Petroleum Tank Management Association of Alberta.
- Alberta Building Code (Alberta Government).
- Alberta Fire Code.
- Access Design Standard 2016 – City of Calgary.

Other groups or policies that have an impact on the management of Calgary Transit assets include:

- American Public Transportation Association (APTA).
- Alberta Transportation.
- Canadian Urban Transit Association (CUTA).
- National Fire Protection Association 130.
- City of Calgary Advisory Committee on Accessibility.
- City of Calgary – Environmental Policy.

Currently, Calgary Transit assets include:

### Buildings

- Anderson garage and maintenance facility for buses and LRVs.
- Spring Gardens administration building and maintenance and storage facility for buses.
- Victoria Park administration building and maintenance and storage facility for buses.
- Oliver Bowen maintenance and storage facility for LRVs.
- Haysboro garage storage facility for LRVs.
- Westbrook administration building.
- Calgary Transit Access garage.
- Canyon Meadows and 69th Street parkades.
- 45 LRT stations.

### Engineered structures

- 57 major structures, bridges and tunnels.
- 44 parking lots comprised of 16,978 parking stalls.
- 45 LRT platforms.
- 48 LRT traction power substations.
- LRT signal systems including wayside ABS, crossing systems, interlocking systems and signal rooms.
- 119 kilometres of single track.
- Communications infrastructure including closed circuit television cameras, communications rooms, help phones, public announcement systems, passenger information systems, radio systems, SCADA (supervisory control and data acquisition) systems, train tracking systems and underground infrastructure.

### Vehicles

- 733 40-foot standard buses.
- 93 60-foot articulated buses.
- 159 community shuttle buses.
- 200 LRVs.
- 109 light and heavy duty support vehicles.

### Machinery and equipment

- 244 ticket vending machines.
- 1,036 fare boxes and other cash processing equipment.
- Other equipment including containers, radios, software, fuelling infrastructure and alerting systems.

### Land and land improvements

- 144 land parcel areas.
- 80 land improvement items such as fencing, outdoor lighting, signs, bike racks and pathways.

### Asset condition

Calgary Transit initiatives align with long-term Council priorities, including assessing the condition of assets. These assets have various condition ratings ranging from very good to critical. While a significant number of Calgary Transit assets are in very good or good condition, there are also assets that are in fair, poor or critical condition. As assets age and with an increased demand on the transit system, impacts on the assets are encountered in areas that include asset availability, condition and lifespan.

Various divisions in Calgary Transit ensure that transit assets remain in a state of good repair, and work in a reliable and safe manner. This is achieved through tracking asset conditions relative to life expectancy, years in service and other applicable factors. Calgary Transit also tracks the replacement costs associated with asset conditions.

### Key issues and challenges

Transportation is a priority issue for Calgarians. In addition, transit has been identified as one of the Calgary Transportation Plan (CTP) policy areas that contribute most to achieving the Key Directions for Land Use and Mobility. Infrastructure-related key issues for Calgary Transit include:

- **Service provision:** The provision of sustainable transit service in a safe, efficient and cost-effective manner.
- **Asset management:** Enhanced asset management of all infrastructure and asset categories to meet defined levels of service in the most cost-effective manner for present and future transit consumers.
- **Financial requirements:** The acquisition of funding related to operating and capital budgets, including areas of growth, while also assessing the impacts of future demands on the transit system.
- **Climate change:** There is a commitment towards environmental awareness and considerations. This includes designs for new buildings that are based on meeting LEED standards, recycling, energy efficiency and the elimination of timber creosote-treated ties from the Light Rail Transit system.

The plan for the implementation of asset management practices in Calgary Transit include the following high-priority areas:

- Develop and implement processes for collecting, assessing and maintaining asset condition information for each asset category.
- Develop measures and processes for tracking asset performance for each asset category.
- Develop a 10-year capital plan and an accompanying long-term operational expenditure plan.
- Review established preventative maintenance schedules and other types of maintenance occurrences for opportunities to optimize asset reliability.
- Identify required asset management competencies and address opportunities for development.

## Utilities & Environmental Protection

### Waste & Recycling Services

- Develop a resource plan for capital project implementation and long-term asset stewardship.

Some of the challenges Calgary Transit faces include:

- Aging infrastructure which impacts service availability and delivery.
- The acquisition of funding to address the infrastructure gap — due to uncertainty regarding guaranteed funding, estimated funding based on an inflationary index has been provided in this report for years beyond 2018.
- Increased customer demands in terms of levels of service.
- The need to keep up with transit growth in developing or existing communities.
- Varying currency exchange rates related to asset procurement or contractor services.

#### Infrastructure risk

Calgary Transit is committed to identifying risks and operational changes which relate to the continual improvement of transit service and its asset management framework. These include a plan to assess and monitor risks related to the achievement of required levels of transit service provision. The following are some key areas regarding Calgary Transit infrastructure risk:

- The age of the infrastructure and rate at which assets reach specified lifecycles.
- The availability of capital and operating funds to ensure sustainable service provision.
- Climate change concerns including the increase in the number of flash floods and lightning strikes was observed. Colder and wetter weather will have an impact on all transit assets.
- The ability of the transit system to accommodate an increase in ridership and adjust to decreases in ridership.
- Supply chain requirements and the inability to procure parts or assets for upgrades, replacements or repairs.
- The availability of the required human resources for sustained service provision.

In some cases, addressing a risk in one area can affect or generate risks in other areas. In 2016, four-car trains were implemented, including the new S200 model CTrains. While this is a service improvement to ensure that Calgary Transit can transport larger numbers of people, there is an associated drain on other infrastructure components such as traction power requirements. Changes in ridership also require opportunities for service flexibility and adjustments.

#### Investment planning and funding

The 2015-2024 Waste & Recycling Services Infrastructure Investment Plan (WRIIP) is a strategic capital plan that supports the delivery of critical waste and recycling services. The WRIIP is structured in terms of investment drivers and programs. The four drivers common across UEP are: (i) maintaining assets (ii) regulatory and environmental protection (iii) service and (iv) growth. The three programs specific to Waste & Recycling Services (WRS) are: (i) landfill (ii) diversion and (iii) facilities and equipment. Within a program, the projects are prioritized based on their customer service and environmental objectives, affordability, and available delivery resources. The current WRIIP presents capital investments of \$626 million through the 2015-2024 planning period. The development of the next iteration of WRIIP (2019-2028) is currently underway.

Action Plan is the Council approved budget for the active four-year business cycle. The capital component of WRS's action plan is a subset of WRIIP, and is approved initially for the entire four-year term with an opportunity to amend once every year through the cycle. The operational component of the action plan is approved by Council each year as part of the annual budget process. In November 2014, Council approved \$326.0 million in capital and \$671.6 million in operational expenditures under the WRS Action Plan for the 2015-2018 business cycle.

WRS capital expenditures are met entirely through Gas Tax Fund (GTF) grant, self-supported debt, and self-funded Sustainment (Capital) Reserve capitalized from user fees and revenues. WRS capital expenditures are not funded through general municipal revenues or property taxes. As such, with regards to the terminology used in this ISR report, WRS operates under a financial model which does not identify an "infrastructure funding gap."

#### Portfolio overview

WRS has a waste diversion goal of diverting 70 per cent of waste generated from all sectors from City landfills by the year 2025. The approach to managing day-to-day operations and service delivery is based on the following four pillars of Customer Focused Services:

- We Educate, Engage and Empower
- We Collect Waste
- We Divert Waste
- We Manage Garbage

Consistent with the corporate Asset Management Policy, assets are considered a means to provide service and value, and asset management as the practice of delivering service and value by utilizing the assets optimally. An overview of the infrastructure assets under WRS stewardship, in service as of Jan. 1, 2017, follows.

#### Collections infrastructure

- Blue (recycling) carts and black (garbage) carts serving over 320,000 single-family residential houses
- More than 5,900 collection bins serving businesses and organizations
- 40 community recycling depots
- Specialized and custom-developed software tools

#### Waste management facilities

- Three active waste management facilities (WMF) at (i) East Calgary, (ii) Spyhill and (iii) Shepard landfill sites
- Two biocells, one each at East Calgary and Shepard landfill sites
- One industrial waste facility at Shepard landfill site
- Five inactive landfill sites with closure dates between 1950 and 1994
- Significant land areas designated as future airspace at the active landfill sites





### Landfill management and operations support infrastructure

- Leachate extraction systems consisting of nearly 30 kilometres of pipe network and over 250 wells and sumps with an average daily yield of 81 cubic metres of leachate.
- One leachate treatment pilot plant at East Calgary WMF (decommissioned as of Jan. 1, 2017).
- Gas extraction systems consisting of nearly 14 kilometres of pipe network and over 40 wells and monitoring points with annual yields of 7.3 million cubic metres of landfill gas and nine million cubic metres of soil vapour.
- 30 kilometres of paved and gravel roads and pads, and 45 kilometres of light trails.
- Eight stormwater retention ponds, peripheral engineered wetlands, ditch drainages and culvert structures.
- Over 1,200 environmental monitoring wells.
- 60 kilometres of litter and security fences.
- Various specialized equipment and devices for waste management and environmental control operations.

### Diversion infrastructure

- At each of the three active WMF: one Throw N' Go pad (accepting general recyclables drop-off), one electronics recycling drop-off receptacle, one household hazardous waste (HHW) drop-off receptacle, one construction and demolition waste drop-off pad, and one compost pad.
- Six HHW receptacles at designated fire stations.

### Buildings

Buildings provide for offices, material storage, labs, vehicle parking, vehicle washing, maintenance shops, equipment storage, trailers, transfer station, scalehouses, landfill gas control rooms and environmental control facilities. The buildings under WRS stewardship are as follows:

- 18 buildings at Spyhill WMF.
- 23 buildings at East Calgary WMF.
- 12 buildings at Shepard WMF.
- Two fully-owned and one partially-owned buildings at Shepard operational workplace centre.
- Three buildings at Springbank landfill (inactive).
- Three buildings at Nose Creek landfill (inactive).
- Two buildings at Spring Gardens operations base.

### Infrastructure being acquired

The completion of the following capital projects, which are ongoing, will result in substantial additions to the WRS asset portfolio.

- **Green Carts:** to accept compostable organic waste, have been deployed to serve 320,000 single-family residential houses in 2017.
- **Composting facility:** being constructed at Shepard WMF with a capacity to process 100,000 tonnes of organics and 45,500 tonnes of biosolids annually. This is a covered (indoor processing) facility producing Category 'A' compost all year round.

### Valuation and condition

The inventory, valuation and condition information of the assets is derived from the datasets developed for implementation of the Waste & Recycling Services Asset Management System (WRAMS). In contrast to the information provided in previous editions of ISR which were based on the accounting-oriented TCA (Tangible Capital Assets) records and came with broad assumptions, the current information provides a more realistic representation of the actual asset portfolio.



The valuation and condition profiles, as of Jan. 1, 2017, are summarized in the table below. The notes that follow clarify the assumptions made in the group calculations of condition and remaining life.

Asset	Replacement Value (\$M)	Condition Profile (see Note 1)					Avg. Remain Life (Yrs.)
		Very Good	Good	Fair	Poor	Very Poor	
<b>Buildings</b>							
No. of buildings (Total 63)		29	8	14	11	1	
Buildings	\$56.1	47%	24%	10%	10%	9%	53
<b>Category Sub-total</b>	<b>\$56.1</b>	<b>47%</b>	<b>24%</b>	<b>10%</b>	<b>10%</b>	<b>9%</b>	<b>53</b>
<b>Engineered Structures</b>							
Liners	\$10.3	–	100%	–	–	–	120
Caps	\$68.4	31%	43%	26%	–	–	75
Leachate	\$41.9	21%	55%	23%	1%	–	49
Gas Collection	\$25.1	45%	35%	15%	5%	–	16
Drainage	\$21.6	10%	70%	15%	5%	–	56
Roadways	\$22.4	55%	17%	26%	2%	–	15
Diversion Infrastructure (see Note 2)	\$8.3	5%	60%	30%	5%	–	35
<b>Category Sub-total</b>	<b>\$198.0</b>	<b>28%</b>	<b>48%</b>	<b>22%</b>	<b>2%</b>	<b>0%</b>	<b>54</b>
<b>Machinery &amp; Equipment</b>							
Carts (Black and Blue only (see Note 3))	\$36.8	30%	50%	15%	5%	–	11
Bins	\$17.8	10%	50%	10%	25%	5%	13
Specialized Vehicles and Portable Equipment	\$1.3	10%	55%	25%	10%	–	10
Fences (Litter)	\$0.7	10%	90%	–	–	–	12
Specialized Software	\$5.0	–	100%	–	–	–	4
<b>Category Sub-total</b>	<b>\$61.5</b>	<b>21%</b>	<b>55%</b>	<b>12%</b>	<b>10%</b>	<b>1%</b>	<b>11</b>
<b>Vehicles (see Note 4)</b>							
	–	–	–	–	–	–	–
<b>Land Improvements</b>							
Fences (Security)	\$3.9	59%	10%	29%	2%	0%	23
<b>Category Sub-total</b>	<b>\$3.9</b>	<b>59%</b>	<b>10%</b>	<b>29%</b>	<b>2%</b>	<b>0%</b>	<b>23</b>
<b>Portfolio Grand Total (\$M)</b>	<b>\$319.5</b>	<b>31%</b>	<b>45%</b>	<b>18%</b>	<b>5%</b>	<b>2%</b>	<b>45</b>

- Notes:
- The class-level condition profile percentages and remaining life are calculated as weighted averages of replacement value.
  - "Diversion Infrastructure" excludes the Composting Facility which was not operational on Jan. 1, 2017.
  - "Carts" excludes the 240L green carts which were not operational on Jan. 1, 2017.
  - The standard vehicles used by WRS are leased from Fleet Services and reported under their portfolio. Specialized vehicles and portable equipment are reported under WRS Machinery & Equipment.

### Integrated Risk Management

By implementing the Integrated Risk Management (IRM) processes, WRS has been proactive in identifying and managing risks. In terms of the risks impacting infrastructure, the WRS business unit risk register features a dedicated risk category of "asset."

This category covers risks that are both strategic (e.g. planning and delivering assets to meet growth demands) as well as specific to an asset class (e.g. managing landfill leachate). Key infrastructure risk themes tracked on the WRS risk register are as follows:

- Evolving regulatory environment (e.g. more stringent requirements driven by greenhouse gas emissions and climate change considerations).
- Financial challenges (e.g. state of economy and competition from commercial enterprises).
- Customer expectations (e.g. level of service and effectiveness of waste diversion initiatives).
- Asset lifecycle maintenance and renewal (e.g. better asset information and decision processes).
- Extreme weather and natural disasters (e.g. severe floods and snow events).

### Integrated Infrastructure Risk Management Framework

The Integrated Infrastructure Risk Management Framework (IIRMF) is a standard for infrastructure-specific risk management.

It specifies minimum requirements and provides common definitions which enable structured evaluation and mitigation of risks at both the individual asset and infrastructure system levels.

WRS is currently undertaking a pilot exercise to implement IIRMF methods on leachate, liners and landfill gas asset systems. These groups of assets have the highest infrastructure risk for WRS. The pilot implementation basically involves applying risk-centric methodologies at various stages of infrastructure planning and management processes. The knowledge outcomes from this exercise

will inform: (i) the business unit and department level IRM analyses regarding infrastructure risks and (ii) the development and investment prioritization of the next Waste & Recycling Services Infrastructure Investment Plan (WRIIP).

### Strategies

Key ongoing asset management strategies are briefly described as follows:

- The implementation of WRAMS is in progress. When completed, this system will provide WRS with an asset registry along with the ability to capture, analyze and report information at the individual asset level. An automated work order system is planned for the next phase of this initiative.
- A consulting assignment is in progress to undertake condition inspections, quantitatively profile the condition of building assets and components, and develop the lifecycle management strategy and plans. Similarly, the condition inspections and lifecycle planning of landfill roads and pads is currently underway. In-house subject matter experts are conducting analyses to develop an inspections program and collect condition data in coordination with the WRAMS implementation initiative.
- Utilizing the insights learned from the pilot implementation of IIRMF, it is expected that the application of risk-based methods will be expanded to further asset groups.
- Development of the WRS Asset Management Plan is nearing completion. The emphasis of the current iteration has been to integrate asset management planning with the business and budgeting process, including the WRIIP process.
- Development of the WRS Strategic Framework as a 10-year planning document is in progress. When complete, the framework will provide better clarity and direction for prioritizing future infrastructure investments.



# Utilities & Environmental Protection

## Water Resources and Water Services

The Water Utility is a part of Utilities & Environmental Protection (UEP). UEP works with the community and The Corporation to protect land, air and water. The Water Utility business units (Water Resources and Water Services) contribute to this vision by helping to protect our watersheds, providing world class water and wastewater treatment, and conserving our water resources for future generations while supporting Calgary's growth.

### Asset portfolio

The Water Utility provides valued and essential water, wastewater and stormwater services through development, operation and maintenance of a significant infrastructure system.

The infrastructure includes two water treatment plants, and a distribution network of reservoirs, water pump stations, pipes and service connections to deliver safe drinking water to customers. The Water Utility also operates the Glenmore Dam, which stores raw water in the Glenmore Reservoir. The wastewater infrastructure includes three wastewater treatment plants, a network of lift stations, sanitary pipes and services to collect and treat wastewater. The stormwater system includes stormwater pipes, wet ponds, dry ponds, wetlands and lift stations.

### Asset condition

The majority of assets in the Water Utility range in physical condition from fair to excellent. A few exceptions exist for each category. These components have been identified for maintenance, upgrades or replacement in the future. The water, wastewater and stormwater infrastructure is able to meet the current demand requirements of The City; however, important infrastructure investments will be required to maintain our customer levels of service and continue to meet service demand into the future.

### Water infrastructure investment drivers

In order to achieve business objectives and ultimately continue to deliver a sustainable and reliable service to our customers, the Water Utility has identified four main investment drivers:

- Maintain assets.
- Regulatory and environmental protection.
- Service.
- Growth.

### Maintain assets

Effective asset management requires continued long-range infrastructure planning.

The Water Utility has ongoing condition assessment and maintenance programs, which have helped identify and eliminate potential service failures that could be costly to replace on a reactionary basis. For example, the yearly watermain break count has been steadily decreasing as a direct result of such strategies, thereby reducing service disruptions placing Calgary as one of the best performing municipalities in the country.

The condition assessment and maintenance programs are vital in order to ensure the reliability of our infrastructure. This infrastructure is critical to maintaining levels of service to all areas of The City. Asset Management strategies and maintenance investments ensure that the Water Utility continues to provide a high level of service to citizens.

In future years, The Water Utility will require reinvestments across all three lines of service (water, wastewater and stormwater) as assets approach the end of their useful life. Increased investments are required in maintenance and inspection programs to proactively replace assets coming to the end of their asset lifecycle and ensure reliable service and operational efficiency.

Areas of asset and investment management that are being reviewed and improved include:

- Maintenance plans to optimize asset lifecycle costs for all asset classes.
- Stage Gating was implemented for the Water Utility in June 2016. At that time, it was planned that a review of the process would be completed within six to eight months of implementation. That review process has taken place, incorporating feedback across various stakeholders groups, to get feedback to understand how well the process is working and identify areas for improvement.
- Condition and risk assessment programs for all asset classes to ensure investments are directed to higher risk assets.
- New and innovative technologies to improve the effectiveness of condition assessment, maintenance and rehabilitation programs.

### Regulatory and environmental protection

The City must comply with regulatory requirements in order to prevent risks to public health and the overall environment, and maintain its approval to operate. This requires investment in our existing infrastructure to maintain compliance and the provision of new infrastructure as more rigorous regulatory requirements are put in place.

The City is dedicated to protecting and managing our precious water resources. Through an integrated approach, the entire watershed must be considered including reducing upstream risks to our water source, reducing Calgary's impacts on the rivers (Stormwater Management Strategy) and conserving this limited resource through its responsible and efficient use (30-in-30 Water Efficiency Plan). Watershed planning initiatives are aligned to the provincial Water for Life strategy and regional watershed management plans to protect the watershed.

The City's water treatment plants produce safe and reliable drinking water that meets existing regulatory standards. Drinking Water Safety Plans (DWSP) have been prepared to meet the requirement for all Water Treatment Systems in Alberta. The Wastewater treatment plants continue to meet the approval to operate requirements.

Over the next 10-year period, The City will need to make investments to meet future regulatory requirements. Some of the anticipated future regulatory requirements include the tightening of effluent discharge limits from wastewater treatment plants.

### Service

Aging infrastructure and increasing demand are challenges that drive the need for continuous investment in order to maintain service levels to citizens. Work continues to identify opportunities to enhance resilience and protect The City's infrastructure and citizens' property. The City has made significant investments in past business cycles to ensure an appropriate level of resilience for key infrastructure. An example is the investment in upgrading pre-treatment facilities at two water treatment plants. The benefits of these upgrades were clear during the flood in June 2013, as The City was able to provide safe drinking water throughout the event.

The Water Infrastructure Investment Plan includes projects and programs such as Community Drainage Improvements (CDI), Watermain replacements and Local Water Quality Improvements to ensure the highest levels of service for The City, its citizens and its regional customers.

## Calgary Police Service (CPS)

The Calgary Police Service (CPS) works to maximize public safety in Calgary through a community policing strategy that focuses on education, prevention, early intervention, enforcement and investigations.

This commitment to public safety is directly supported by our organizational support bureau, which includes infrastructure. In addition, public trust and confidence is central to the CPS's work on public safety.

The CPS infrastructure division aligns directly with the Council priority of a well-run city and continues to find efficiencies through increased use of smart technology and more efficient infrastructure.

### Key issues and challenges

The key challenge for the CPS is to acquire, maintain and fully utilize infrastructure assets to deliver on its goals and commitments to the citizens of Calgary. That is accomplished by utilizing best practices in management of existing assets, as well as forecasting and identifying short, medium and long-term infrastructure priorities.

As part of the community policing approach, the CPS continues to increase its partnerships with other agencies to provide services focused on the needs of citizens. These partnerships have infrastructure implications with a number of community groups utilizing CPS facilities for meetings and events. As well, CPS staff and equipment are co-located with other service providers to form multi-agency collaborations, such as the Sheldon Kennedy Child Advocacy Centre (SKCAC) and the Safe Communities Opportunity and Resource Centre (SORCe).

Factors that may affect the management of infrastructure include:

- Community changes, such as population and demographic structure, socio-economic trends and traffic volume.
- Market changes, such as economic situation, industry standards and real estate volatility.
- Federal and provincial legislations.
- Operational changes, such as growth in staffing, volume and complexity of crime and social disorder, emergence of organized crime, and policy changes.

- Environmental standards, such as Leadership in Energy and Environmental Design (LEED) certification and The City's Triple Bottom Line commitments, modern waste management principles including composting, and right sizing of the fleet with energy efficient vehicles.

### Assets

The assets which the CPS manages include:

#### Buildings

- 29 buildings which are owned by The City or leased from third parties. These include but are not limited to the Westwinds Campus, eight district offices (multi-service and leased facilities), stable, canine training centre and indoor shooting range.

#### Vehicles, machinery and equipment

- Approximately 1,270 vehicles.
- Two helicopters.
- Approximately 3,540 personal computers, laptops and printers.
- 521 vehicle-mobile workstations.
- 2,603 mobile or portable radio and other telecommunication systems.
- Various traffic equipment, robots and breathalyzer equipment.
- Digital traffic cameras and related infrastructure.
- Automated Fingerprint Identification System (AFIS).

#### Funded capital priorities

- Arrest Processing facility.
- North Deerfoot Campus facility improvement.

#### Unfunded capital priorities for the next 10 years

- Replacement of two district offices due to aging (more than 35 years old).
- Renovation and improvement of two district offices.
- Westwinds Campus expansion to include special purpose facilities.

### Growth

The Water Infrastructure Investment Plan includes significant investments to upgrade the existing infrastructure and provide new infrastructure to accommodate growth in both developed and developing areas. Although lower than expected growth levels were experienced in Calgary in 2016, there continues to be a need to invest in infrastructure to address capacity constraints.

The high growth levels experienced in Calgary in the first half of the decade have had an impact on the capacity at wastewater and water treatment plants. The Bonnybrook Wastewater Treatment Plant (BBWWTP) is currently servicing a population that is nearing its installed capacity. A capacity upgrade of one of the water or wastewater treatment plants is required on average every 10 years based on the last 20 years of historical growth.

The Water Utility is focused on delivering the best value for money to meet the citizens' current and future water needs, and support stable and predictable rates and service levels. This is only possible through robust asset management plans and practices, and strategic investments.

The Water Utility will continue to provide high service levels and ensure appropriate investments are made to extend the life of its aging assets. The Water Utility will continue to ensure strategic infrastructure investments are made to support growth and comply with current and future regulatory requirements, while protecting and managing our valuable water resources.







## Related Authority and Civic Partners

### Calgary Parking Authority

#### Overview

The mandate of the Calgary Parking Authority (CPA) is set out in CPA Bylaw No. 28M2002. The Authority's operations are governed by this bylaw. We fulfil the mandate by planning, developing and operating public parking services, parking enforcement services and municipal impound lot, parking advisory services, residential parking permit services and management services for parking facilities.

**Public parking services:** Our public parking facilities help fulfil Council's vision for the overall land use direction of The City and its transportation system. The Downtown Parking Strategy was updated and the new Integrated Downtown-TOD Parking Strategy (TT2016-0204) was approved by City Council on June 20, 2016. Other applicable policies include the Calgary Parking Policies (TT2017-0512) and Commercial On-Street Parking Policy (TT2013-0795).

**Parking enforcement services and municipal impound lot:** Our parking enforcement services enhance public safety, improve traffic flow and mobility, and encourage compliance with municipal and provincial parking regulations.

**Parking advisory services:** We advise stakeholders and our peers in the municipal and provincial governments and in business and community organizations on parking issues, policy and regulations.

**Residential parking permit services:** The residential parking program is governed by Bylaw 25M2017. We verify qualifications of applicants, and issue residential and visitor permits in this program designed to protect zone residents from the impact of non-local parking.

**Management services for parking facilities:** Our parking management program and expertise make our services valuable to municipal and third-party clients who wish to have their parking managed by specialists.

#### CPA projects and initiatives

CPA's new impound facility was completed in July 2016. This new facility includes 14,000 square feet of floor space and is LEED (Leadership in Energy and Environmental Design) gold certified. This facility houses CPA's enforcement support and enforcement staff, and provides frontline service to customers who have had their vehicles impounded.

CPA's first third-party joint venture project was completed in October 2016. This project is located in Kensington at the former Lido Café site. The new development includes a 34-space parkade that is owned by The City and operated by the CPA. This project also includes a residential tower, a residential parkade and at-grade retail.

On May 9, 2017, City Council approved amendments to the Calgary Traffic Bylaw, allowing the Residential Parking Permit (RPP) program to start using online permits in place of passes and hang tags for resident and visitor parking. The benefits of the updated program include a quick online permit application/renewal process for residents and a two-year permit versus the previous one-year permit. Additionally, permits will now be linked to licence plates which will allow for more effective and efficient enforcement practices in residential parking zones. The system will transition all residential parking zones to the new system over the course of a year beginning on Aug. 1, 2017.

CPA and the Calgary Municipal Land Corporation (CMLC) are partnering to develop the Ninth Avenue Parkade (9AP). The new parkade will service the East Village and area developments. The parkade will be located at 363-407 Ninth Ave. S.E. (Lot 62) and include over 500 parking stalls. The expected completion date is 2020.

### Preventive maintenance program

The maintenance of our facilities is currently managed through an extensive database, which highlights all work required by our Facilities division. In addition to this, an in-house software program links our preventive maintenance program, parts inventory and work orders into one database.

### Facility management

On an annual basis, all facilities are monitored by a structural engineer, HVAC, mechanical and electrical consultants. In each facility, critical areas identified as unique are examined and logged. Regular monitoring allows for long-term expenditure forecasting for structure maintenance. Monitoring includes reviewing roof condition, mechanical system operations, membrane wear and slab structural integrity. In addition, we continue to monitor our facilities in real time, using our Building Management System. This system has over 21,000 points of monitoring. In 2009, CPA completed a facility-wide energy audit and implemented upgrades where applicable. As a management strategy CPA is trying to ensure mechanical and structural compliance through best practices thereby extending the current lifecycle of these assets.

### Funding plan

The CPA continues to monitor and fund initiatives for lifecycle review and asset management strategies. In the next four-year budget cycle (pending approval), the CPA will fund activities necessary for infrastructure lifecycle maintenance and energy and efficiency upgrades.

### Key issues and challenges

#### Surface membranes

All of CPA's indoor parking structures have a protective membrane installed which protects the concrete and rebar in the floor slabs from wear and corrosive materials. As our infrastructure ages, the membranes wear off, particularly in the drive lanes, entry lanes and corners. Our continuous maintenance of these membranes is vital in preserving the structural integrity of the facility. This process continues to be vital in our structural maintenance program. Our preventive maintenance system identifies the need for consistent re-coating of the wear areas to maintain the protection of the structural slabs. As these systems reach the end of their expected life, extensive re-coating will be required.

### Surface lots

Most surface lots require a regular repair and maintenance program. Several of our surface lots will require extensive surface and drainage upgrades. CPA aligns with The City's Triple Bottom Line policy, Crime Prevention Through Environmental Design (CPTED) and LEED. To support these programs, the CPA reviews surface lot lighting and evaluates the feasible use of permeable asphalt and recharge of the aquifer.

### Structural preventive maintenance

Four of our parking structures have significant structural risk that is mitigated by ongoing inspection and repair programs. The most significant are City Centre, McDougall, City Hall and James Short parkades.

### City Centre Parkade

This parkade is our oldest parking structure and the only open-air designed structure in our inventory. This structure requires major maintenance over the next few years. Exposure to the elements, specifically snow and road salt brought into the parkade by vehicles, has contributed to membrane failure and waterproofing issues. Built in the late 1970s, the major structural elements are the slabs, beams and columns. The underside of each slab is not protected with a membrane coating, therefore without consistent annual maintenance and a lifecycle program at five-year intervals, cracking and concrete delaminating will lead to corrosion and eventual failure. This facility has very aggressive turn patterns, specifically on the centre ramp, and an ongoing maintenance program is required to ensure that the membrane does not wear to the point that the structural slab integrity is compromised. This lifecycle program is currently scheduled at three-year intervals. Ongoing inspections and repair programs will mitigate concerns. Within the next five years a major rehabilitation of all structural elements will have to be undertaken on this facility.

### McDougall Parkade

This underground parking structure was built in the early 1980s. This unique parking structure, built beneath the McDougall School heritage site, was constructed using a structural element of unbonded post-tensioned cables. This structure is typically below the water table during spring run-off and as such the concrete walls leak extensively every spring. The combination of leaking walls and the unbonded post tension cables could be disastrous if extensive corrosion of the cables were to occur. To ensure the structural integrity of this facility, a program of ongoing inspection, delamination repair and wall-crack repair has been developed. It has been determined that this facility is experiencing a higher than normal trend of structural failures, due to the abovementioned conditions. A monitoring program has been developed in consultation with expert engineers to provide remedial advice on a rehabilitation and preventative repair plan.

### City Hall Parkade

This underground parking structure was built in the early 1980s. Due to the June 21, 2013 flood, the entire seven-floor parkade was submerged underwater for two weeks. The entire infrastructure (electrical, mechanical, venting, elevators, etc.) has been replaced and design measures have been put in place to mitigate the impact of potential future floods.

### James Short Parkade

This underground parking structure was built in the late 1980s. Similar to the McDougall Parkade, this below-grade structure is situated under a City park. This facility is regularly monitored for possible geo-technical rebound or other structural movement issues, and a structural program to repair failing expansion joints is scheduled for 2017.





### **Mechanical upgrades**

All mechanical upgrades have been completed with the exception of the James Short boiler replacement, which is anticipated to be complete by the end of Q4 2017. A heavy financial burden will arise when some of these facilities reach the replacement stage. CPA's three oldest parkades (City Centre Parkade built in 1978, McDougall Parkade built in 1983; and City Hall Parkade built in 1985) are nearing their 50-year lifecycle. The Parkade Structure Replacement Fund was established in 1999 for annual contributions of \$2 million plus interest, which would provide for partial capital replacement funding. At the end of 2016, this fund had \$88 million. Additionally, the land acquisition fund, which has a balance of \$40 million, can be used for the replacement of existing cash-in-lieu stalls which are located within the subject facilities.

### **Vehicles**

CPA's facilities department utilizes a fleet of vehicles and heavy-duty equipment to maintain parkades and surface lots. These vehicles experience increased maintenance due to operating primarily downtown. Furthermore, snow removal causes excess wear and tear. Facilities are aligned with The City of Calgary Fleet Asset Management Plan for vehicle replacement. Currently, half of the facilities vehicles are due for replacement, based on Fleet Management's lifecycle standards. A replacement strategy, averaging three vehicles per year over the next five years, will bring the vehicle inventory up to standard. Our fleet of vehicles for the enforcement and enforcement support officers sustains high mileage due to the area they cover. In order to minimize breakdowns associated with high mileage, the vehicles are turned over, on average, every three to four years.

### **Revenue control equipment**

The Calgary Parking Authority utilizes the ParkPlus System™ which allows the option of paying at the pay machines or through various web options. The purchase of additional pay machines will be required to extend the payment system to new development areas, as well as into new areas of The City as parking demand requires.

### **Information technologies**

Allowance must be made for funding the replacement of data storage, data network, server, desktop computer, uninterruptible power and other disaster recovery infrastructure systems to provide uninterrupted services for the various operations within the CPA. Costs associated with software development of both currently deployed and future software, that will provide enhancements and new services to make the business processes more efficient, must also be taken into consideration.

Systems such as the ParkPlus System™, payment of tickets online (PTO) and BITS are only a few of the current in-house software packages that require ongoing maintenance both on hardware and software levels. Security video, access and cellular wireless repeater control systems are integral parts in the support and maintenance of the corporate infrastructure. These systems are being supported by the IT department and are comprised of computer and data storage components which require regular upgrading and repairs.

All of the above information shows that both hardware and software funds are required to support these critical business systems on an ongoing basis.

### **What do we own/manage?**

#### **Parking spaces off-street**

- 10 parking structures (5,694 parking spaces).
- 33 surface lots (6,249 parking spaces).
- Impound lot land (1,040 spaces for impounded vehicles).

#### **Machinery and equipment**

- 559 on-street ParkPlus System™ pay machines controlling payment for 6,689 parking spaces.
- 60 off-street (surface lots) ParkPlus System™ pay machines controlling payment for 4,991 parking spaces.
- 48 ParkPlus System™ pay machines in parkades as controlling payment for 6,249 parking spaces.
- 71 vehicles (six enforcement support, 43 enforcement, four technical services, 18 facilities).
- One utility trailer.
- Eight heavy machinery items (tenant sweepers and skid steers).

#### **Buildings and land**

- CPA administration office located on street level of the Centennial Parkade.
- Impound Lot building located at 400 39th Ave. S.E.
- Building on 615 Third Ave. S.W. (Veritas Building).
- Land on 830 Ninth Ave. S.W. (Knoxville's).

### **Systems**

- ParkPlus System™.
- BITS (Bylaw Infraction Tracking System).
- Impound Lot Vehicle Tracking System.
- Computer Aided Dispatch (CAD) System.
- Pay Tickets Online (PTO) via web services linked to BITS.
- Mobile Citation Application.
- Access to the Internet through the CPA Corporate Connection complete with associated hardware and systems.
- Web services for external and internal users.
- Security video, access and cellular wireless repeater control systems for parkades and office areas.
- Corporate servers, data storage and data networking systems that support the collection and retrieval of information for The Corporation.
- Intranet.
- Smartphone ParkPlus System application.
- ParkOnline System (providing access for Calgary Zoo, Heritage Park, Telus SPARK and contract parking access).
- Residential Parking Permit System.



## Related Authority and Civic Partners

### Calgary Public Library

The Calgary Public Library's (CPL) asset portfolio consists of the following categories: materials, buildings, IT infrastructure and equipment, furniture and equipment, and vehicles. CPL does not own buildings or land, but is the steward of the buildings it occupies. Any land improvements are associated with a building and are included as a subset of those assets.

All asset conditions are good except for the following buildings:

Buildings	Asset Category	Condition
Central Library	Buildings	Poor
Memorial Park	Buildings	Fair
Village Square	Buildings	Fair

The Calgary Public Library Board currently conducts required lifecycle maintenance and replacement from the Library Lifecycle Grant that is provided annually by The City of Calgary. The asset management program is entirely dependent on this lifecycle grant as virtually CPL's entire operating grant is used to fund open hours at library locations, an extensive outreach effort to communities more distant from established locations, and to purchase items for borrowing purposes. The Library Lifecycle Grant is critical because without this support there would be no funds to repair or replace the assets on which this service delivery depends, and eventually the service delivery would be detrimentally affected.

Growth and major maintenance projects are dependent on funding from outside sources, which historically have been provided by The City of Calgary and the Province of Alberta.





## Related Authority and Civic Partners

### Other civic partners

Since 2015, The City has been working with seven civic partners (and Calgary Public Library) to support partner-specific asset studies and tools. The tools include building condition assessments, asset management plans, underground utility assessments, asset management software and additional studies as required, e.g. lighting audit, hazardous materials assessment, aquatics audits, dock assessment and/or flood resiliency study.

In keeping with The City of Calgary's Corporate Energy Plan, the studies also identify opportunities to improve the energy efficiency to help reduce energy consumption and environmental impacts and lower operating costs. The suite of tools help civic partners make consistent, effective and informed infrastructure decisions; create standardized approaches to asset management; demonstrate responsible stewardship of assets; and identify the funding required to optimize the maintenance and longevity of the assets.

The organizations that The City has been working with to date include: Arts Commons, Calgary TELUS Convention Centre, The Calgary Zoological Society, Fort Calgary Preservation Society, Heritage Park Society, Lindsay Park Sports Society, and Calgary Science Centre Society. Two of the other civic partners (Arts Commons and Fort Calgary Preservation Society) have completed asset management plans. Work for the other civic partners is underway and will be complete for inclusion in the next report.



## Appendix 6

### Acronyms and abbreviations

AMP	Asset Management Plan	CWMS	Computerized Work Management System
APTA	American Transportation Association	DCMO	Deputy City Manager's Office
BBWWTP	Bonnybrook Wastewater Treatment Plant	ERIIP	Emergency Response Infrastructure Investment Plan
BITS	Ticket Tracking System utilized by Calgary Parking Authority	ESRD	Environment & Sustainable Resource Development
BRT	Bus Rapid Transit	FCI	Facility Condition Index
BU	Business Unit	FDES	Facility Development & Enhancement Study
CAD	Computer Aided Dispatch	FM	Facility Management
CAMP	Corporate Asset Management Plan	GTF	Gas Tax Fund
CBS	Capital Budget System	HVAC	Heating, Ventilation and Air Conditioning
CDI	Community Drainage Improvements	IIP	Infrastructure Investment Plan
CCTV	Closed Circuit Television	IIRMF	Integrated Infrastructure Risk Management Framework
CFD	Calgary Fire Department	IRM	Integrated Risk Management
CFO	Chief Financial Officer	ISR	Infrastructure Status Report
CHC	Calgary Housing Company	IT	Information Technology
CHP	Community Housing Portfolio	LEED	Leadership in Energy and Environmental Design
CLOS	Customer/Citizen Level of Service	LOS	Levels of Service
CMHC	Canada Mortgage and Housing Corporation	LRT	Light Rail Transit
CMLC	Calgary Municipal Land Corporation	LRV	Light Rail Vehicle
CPA	Calgary Parking Authority	M&E	Machinery & Equipment
CPL	Calgary Public Library	NFPA	National Fire Protection Association
CPRIIP	Culture, Parks, Recreation Infrastructure Investment Plan	OLSH	Office of Land Servicing & Housing
CPS	Calgary Police Service	OWC	Operations Workplace Centre
CPTED	Crime Prevention Through Environmental Design	PARIS	Parks Asset Reporting and Information System
CRV	Current Replacement Value	PAYG	Pay-As-You-Go
CS	Community Services	PCI	Payment Card Industry
CTC	Corporate Technology Committee	PSAB 3150	Public Sector Accounting Board, Standard 3150
CUTA	Canadian Urban Transit Association		



PSAM	PeopleSoft Asset Management	WRAMS	Waste & Recycling Services Asset Management System
PTO	Payment of Tickets Online	WRS	Waste & Recycling Services
ReCaPT	Recreation Capital Planning Tool	WRIIP	Waste & Recycling Services Infrastructure Investment Plan
RPP	Residential Parking Permit	ZBR	Zero-Based Review
SAMP	Strategic Asset Management Program	9AP	Ninth Avenue Parkade
SCU	Spring Clean-up		
SGCI	Strategic Growth and Capital Investment		
SHAR	Social Housing Accommodation Regulation		
SNIC	Snow and Ice Control		
TBL	Triple Bottom Line		
TCA	Tangible Capital Assets		
TOD	Transit Oriented Development		
TI	Transportation Infrastructure		
TMC	Traffic Management Centre		
UEP	Utilities & Environmental Protection		
WMF	Waste Management Facility		

