CORPORATE ASSET MANAGEMENT PLAN

2011

[ Ralph Klein Park ]
Contents

Introduction .........................3
Background ..............................4
Asset overview and scope ............7
  Value of assets.......................7
  Condition of assets ..................8
  Performance of assets ...............11
A Serviceability Approach to Asset Management ..................14

Asset Management Action Plan: 2012–2020 .........................................................15
Action 1: Update the Corporate Asset Management Strategy & Policy .....................15
Action 2: Continually improve a management system for the practice of asset management ........................................16
Action 3: Enable an integrated approach to infrastructure decision-making ....................17
Action 4: Improve tracking of infrastructure investment ...........................................18
  Base Service ................................18
  Enhancement ................................18
Action 5: Continuous improvement of asset management practices ..........................20
  Update Asset Management Guidelines ............................................................20
  Levels of service and risk analysis .................................................................20
  Asset management innovation .................................................................22
Action 6: Develop our asset management enabling services (people, tools, data) .............23
  People ........................................23
  Tools and data ............................23
Action 7: Establish a funding strategy for infrastructure ...........................................25
  Infrastructure investment plans co-ordination ...............................................25
  Infrastructure funding strategy .................................................................25
Plan review and monitoring .................................................................................27

Appendix A:
Asset performance by business unit ..........28

Appendix B:
  Business unit overviews ..............46
  Corporate Properties & Buildings ....46
  Calgary Fire Department .............47
  Information Technology ...............48
  Parks .........................................48
  Recreation ...............................49
  Roads .......................................49
  Transit ......................................50
  Waste & Recycling Services .........50
  Water Resources and Water Services 51

Appendix C:
Priority areas for asset management improvement by business unit .................52

Appendix D:
Strategic risks ................................54

Appendix E:
Plan actions and timelines ................56
[Municipal Building Plaza]
Introduction

Three of The City of Calgary’s corporate asset management documents are the State of Asset Management Report (SOAM), the Infrastructure Status Report (ISR) and the Corporate Asset Management Plan (CAMP). This report serves as an action plan for improvement of The Corporation’s infrastructure management system (including practices, technology, business processes etc.) and governance model. It also addresses key findings and recommendations in the Infrastructure Status Report and the State of Asset Management Report.

The City of Calgary has adopted a process of continuous improvement based on the cycle of Plan, Do, Check, Act, and all three reports fit within this model illustrated below.

In the future, the Corporate Asset Management Plan will also provide direction regarding portfolio management and infrastructure investment across the asset systems or departments.

The City of Calgary also has a number of other documents that support the practice of asset management at both the corporate and business unit levels.
Background

Formed in August 2004, Corporate Asset Management (CAM) is a corporate function within The City of Calgary and spans all infrastructure asset managing business units. Corporate Asset Management works to establish and facilitate an asset management program including asset management planning, investment and budgeting, and performance measurement and advocacy.

City Council established strategic goal #6: **Safe, Reliable Infrastructure** for the 2009 – 2011 business cycle. In support of this strategic goal, Council Priorities 18 and 19 were also created:

18. **Create a plan to ensure safe, reliable public infrastructure, and mitigate the infrastructure gap.**
   - Maintain existing infrastructure while addressing the infrastructure deficit.
   - Improve stewardship of infrastructure, asset and geospatial information and asset management plans.
   - Implement infrastructure strategies to support a sustainable urban form.

19. **Improve the quality of The City’s asset information.**
   - Report on corporate assets and maintain reliable information in support of the Corporate Asset Management program.
   - Maintain asset performance measurement and management reporting.

In response to the above strategic directions, Corporate Asset Management and the Asset Management Network:

- Developed a Corporate Asset Management policy.
- Developed a Corporate Asset Management Plan supported by business unit asset management plans.
- Developed a Corporate Asset Registry.
- Implemented a life cycle analysis tool and capital planning software.

In support of Council’s strategic goal, Corporate Asset Management has been working with asset managing business units to develop customized, first-generation asset management plans. These plans will support development of a corporate-wide plan to deliver and ensure safe and reliable management of infrastructure and continuous improvement of the asset management program. All business units are at various points of maturity with their asset management programs. Business units are advancing their asset management programs in ways that are most appropriate to their particular lines of business. Although the journey to a mature asset management program may be different for each business unit, Corporate Asset Management is ensuring co-ordination and consistency.
It is clear that a number of business cycles are required to develop and implement a mature asset management program (Figure 2). In light of this, Corporate Asset Management expects that The Corporation requires three business cycles of ongoing improvement to implement appropriate best practices, processes and tools and to truly achieve the program’s desired objective of optimized infrastructure decision-making.

Due to a lack of available information, and evolving asset management planning, this plan does not make specific recommendations regarding infrastructure. Ongoing work and planning maturity will eventually allow this. However, this first Corporate Asset Management Plan will expand upon the findings of the Infrastructure Status Report and provide an action plan for continuous improvement of The City’s asset management program over the next business cycle.
Asset overview and scope

The scope of this document is limited to the following business units, each with a supporting business unit asset management plan:

- Corporate Properties & Buildings
- Fire
- Information Technology
- Parks
- Recreation
- Roads
- Transit
- Waste & Recycling Services
- Water Services/Water Resources

It is possible that additional business units and/or civic partners may be included in the scope of future publications of this document.

Value of assets

The following information has been extracted from the 2010 Infrastructure Status Report and shows the current replacement value of The City’s assets by business unit:

**FIGURE 3: CURRENT REPLACEMENT VALUE OF ASSETS BY BUSINESS UNIT *****

<table>
<thead>
<tr>
<th>Business Unit</th>
<th>Replacement value $ billions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate Properties &amp; Buildings</td>
<td>1.46</td>
</tr>
<tr>
<td>Fire</td>
<td>0.29</td>
</tr>
<tr>
<td>Information Technology</td>
<td>0.24</td>
</tr>
<tr>
<td>Parks</td>
<td>1.59</td>
</tr>
<tr>
<td>Recreation</td>
<td>0.81</td>
</tr>
<tr>
<td>Roads</td>
<td>12.89</td>
</tr>
<tr>
<td>Transit</td>
<td>2.42</td>
</tr>
<tr>
<td>Waste &amp; Recycling Services</td>
<td>0.09*</td>
</tr>
<tr>
<td>Water Services &amp; Water Resources</td>
<td>33.72</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>53.51</strong>**</td>
</tr>
</tbody>
</table>

* Does not include landfill cells.
** Does not include all business units that are covered in the Infrastructure Status Report.
*** Rounding errors may occur.
Condition of assets
Asset condition has been reported in terms of physical, functional and demand condition.

Physical condition is the physical state of the infrastructure that allows it to meet the intended service level based on its original function and demand criteria.

Functional condition is the state of the design of the physical infrastructure to meet the intended service level, as compared to current functional design criteria.

The demand condition of an existing asset is the ability for the capacity of the physical infrastructure to meet the service level required.

Physical, functional and demand condition grades must be viewed in conjunction with each other to provide a true picture of overall asset performance.

Assets have been classified into the condition rating categories of Very good/Good, Fair, and Poor/Critical. Ratings indicate the following:

- Very good/Good – only routine maintenance required.
- Fair – shows signs of wear and requires increasing amounts of maintenance.
- Poor/Critical – requires renewal or is unserviceable.

**FIGURE 4: CONDITION RATING OF ASSETS BY REPLACEMENT VALUE ($ BILLIONS)**

![Condition Rating Chart]

The information presented above is limited to the business units included within the scope of this document. For more detailed information regarding The City’s infrastructure, please refer to the 2010 Infrastructure Status Report.
At an aggregate level, the asset base is generally in good condition. However, average condition can be a misleading measure for a number of reasons:

- As new assets are put into service, the average condition of the asset portfolio may continue to improve even though Poor/Critical assets continue to deteriorate.
- Corporate average condition rating is not representative of individual business units and asset types.
- Condition rating does not consider the level of service that an asset is able to provide to customers.
- Condition rating does not consider risks associated with failure of an asset. Some of the assets reported in Poor/Critical condition may represent significant strategic risk to The Corporation. For example, Corporate Accommodations’ buildings portfolio is currently in Poor/Critical condition. Asset failures in this portfolio could impact multiple lines of business across The Corporation.

Although business units have been making significant improvements in their asset management practices, they continue to face a number of risks and challenges in maintaining current service levels. Some of the significant issues facing The Corporation are:

- Developing funding methodologies to support long-term sustainability of assets and current service levels.
- At a corporate level, physical condition is a greater risk to service delivery than functional or demand condition.
- Corporate Properties & Buildings is reporting the greatest percentage (93%) of their asset base to be in Fair to Poor/Critical physical condition. In terms of asset replacement value, Roads, Transit, and Water Services/Water Resources have the greatest value of assets in Fair to Poor/Critical condition ($9.2 billion).
- Corporate Properties & Buildings and Transit also report a majority of their assets to be in Fair or Poor/Critical functional and demand condition.
- Corporate Properties & Buildings reports operational spending per square foot to be 58 per cent of the industry standard.
• A significant portion of Calgary Fire Department facilities were built prior to 1970 and may require replacement in the 20-year time frame. Coupled with the demand for facilities to accommodate new growth, this could result in a significant number of new and old facilities that may need to be constructed concurrently. In addition, increased emphasis on re-development of existing areas in City plans may modify the service profile of present fire stations, requiring incremental additions or modifications to existing infrastructure.

• Information Technology’s resources are strained under the current service delivery model. Growth of The Corporation will put additional pressures on Information Technology’s assets. These additional pressures, combined with aging infrastructure assets, increase the risk to service delivery and result in a projected decline in service levels, despite the recent increase in the overall condition of the asset base. Functional and demand condition are of greater significance than physical condition for Information Technology assets.

• Parks’ reports that high-risk assets have maintained satisfactory physical condition. However, low-risk assets have degraded over recent years. This has translated into a direct impact on customer levels of service. Without investment in assets, the condition of assets is projected to continue to degrade. It is expected this will continue to result in declining customer levels of service.

• Recreation has targeted upgrades at certain facilities which have resulted in a steady Fair condition of the asset base. Reactive operational interventions have provided temporary solutions to maintaining current service levels, however, there is an increasing risk of occurrences of failures to critical assets that cannot be addressed with operational measures alone. In addition, civic partner assets pose a risk to maintaining level of service, as the budget for emergency interventions required to address failure of these assets is typically funded from the Recreation budget.

• It is projected that Roads is significantly underfunded to meet the requirements for capital maintenance and growth.

Further commentary on the impact of asset condition on level of service has been included in Appendix A, a summary of which is given in the next section.

The valuation and condition information presented above is limited to business units within the scope of this document. More detailed information regarding The City’s infrastructure can be found in the 2010 Infrastructure Status Report and business unit asset management plans for each business unit featured in this document.
Performance of assets
Asset performance is reported in terms of the infrastructure’s ability to deliver the intended level of service. In Figure 5, trends are shown for the previous business cycle (2009 – 2011) by business unit, as well as the expected future service level trend.

**Figure 5: Asset Performance Summary by Business Unit**

<table>
<thead>
<tr>
<th>Business Unit</th>
<th>Condition</th>
<th>Service Levels</th>
<th>Risk to Service Delivery</th>
<th>Projected Service Levels</th>
<th>Data Confidence Reliability</th>
<th>Data Confidence Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate Properties &amp; Buildings</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Fire</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Information Technology</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Parks</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Recreation</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Roads</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Transit</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Waste &amp; Recycling Services</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Water Resources / Water Services</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

Detailed asset performance summaries for each business unit are provided in Appendix A. As well, overviews of each business unit’s asset management program are provided in Appendix B.

**Legend**
- Positive upward trend: An upward trend for categories, condition, service levels and projected service levels represents a positive outcome for The Corporation.
- Positive downward trend: A downward trend for category, risk to service delivery represents a positive outcome for The Corporation.
- Negative upward trend: An upward trend for category, risk to service delivery, represents a negative outcome for The Corporation.
- Negative downward trend: A downward trend for categories, condition, service levels and projected service levels represents a negative outcome for The Corporation.
- Consistent/even trend:
Serviceability approach to asset management

Traditionally an “asset stewardship” approach has been used to define the appropriate level of capital maintenance, and this is broadly the approach used in the Infrastructure Status Report. This approach uses condition, performance and age as three key parameters to identify the required level of capital maintenance. Although the asset stewardship approach provides a reasonably sound engineering assessment of the state of the asset base, the approach has a number of weaknesses. Most notably:

- The gradings assigned for condition and performance are subjective and the approach to grading may vary between departments and/or individuals.
- The information which underpins the gradings and the assessment of remaining life may be of varying age and quality.
- There is no assessment of the level of service that the asset provides to customers.
- There is no assessment of the risks associated with failure of the asset.

In addition, the approach tends to overestimate the requirement for capital maintenance. This is because it overlooks the asset operator’s capacity to:

- Rationalize the asset (by assessing whether or not it is still required).
- Adopt strategic solutions, by reorganizing the asset system in order to reduce or remove the asset.
- Use new technology.
- Implement cost-effective operational solutions to defer replacement.

For this reason, The City of Calgary is moving towards a serviceability approach. This involves agreeing on and then monitoring a set of defined asset and customer level of service measures. The serviceability approach involves identifying levels of service to customers and then costing how much is required to maintain this level of service. In addition, it provides a basis for assessing the benefits/costs associated with enhancing specific areas of service. This has proven to be a robust approach to the management of the asset base and enables both the justification and prioritization of capital expenditure.

“Serviceability” is therefore the capability of a system of assets to deliver a reference level of service to citizens and to the environment, now and into the future. Serviceability is deemed to be stable when the assessment of trends in a defined set of service and asset performance indicators demonstrates that service is in line with the reference level of service and, by inference, is likely to remain so into the future.
The reference level of service is determined from a specific subset of public health, environmental and customer service indicators. Service indicators reflect the degree of compliance with statutory regulations, regulatory and company standards, and customer preferences.

Asset performance indicators, measured at a system level, are drawn from a specific subset of measures that inform current and future levels of service. Stable serviceability normally requires that asset performance is in line with the reference level of asset performance.

The level of service measures or serviceability indicators can therefore be used to monitor the effectiveness of the asset management and maintenance regime from year to year, and to support the development of longer-term strategic plans for asset management.

In addition, a comprehensive suite of level of service measures can also be used, over a period of time, to give an indication of the overall performance of the organization, especially with regard to sustainability performance.

At a corporate level, this approach can be used in the future to establish the correct levels of capital maintenance for each of the business units. The approach would involve:

- Assessing the average annual capital maintenance expenditure for previous budget period(s).
- Adjusting for improvements or deterioration in levels of service.
- Adjusting for changes in asset inventory.
- Adjusting for implications of the legislated/growth programs.

The serviceability approach therefore establishes the level of capital maintenance investment from historic levels of investment, and the trends in the levels of service to customers. For this approach, it is therefore essential to maintain accurate records of the levels of capital maintenance expenditure across The City, and to have in place a comprehensive suite of level of service measures that are accurately reported on. These requirements are addressed in Actions #4 and #5 of the Action Plan that follows.
Asset Management Action Plan: 2012–2020

The 2010 Infrastructure Status Report makes three key recommendations to address The City’s infrastructure gap:

- Continuously improve the method of aligning service priorities with infrastructure investment decision-making.
- Continuously improve the facilitators (skilled people, process and data), monitoring methods and reporting tools that support the performance of infrastructure to deliver services.
- Implement a corporate funding strategy.

To expand upon the findings of the 2010 Infrastructure Status Report and provide an action plan for continuous improvement of The City’s asset management program over the next business cycle, seven actions are recommended. Refer to Appendix E for a list of all actions, three- and 10-year targets for action, and responsibilities.

**Action 1: Update the Corporate Asset Management Strategy & Policy**

Completed in 2005, the current asset management strategy document (Calgary’s Asset Management Strategy) acts as the asset management strategy for The Corporation, however, practice and performance expectations of The City’s asset management program have evolved, requiring updates to this document. The revised strategy will be based on the adopted Key Principles within the Asset Management Policy adopted by the Administrative Leadership Team July 26, 2010.

The content and direction of this document will be in accordance with the recommendations of the 2010 State of Asset Management Report (SOAM) and the 2010 Infrastructure Status Report (ISR) – scheduled for completion and sign-off by the end of 2011.

Items within The City’s asset management program to be addressed by the strategy include:

- inputs
- outputs
- governance
- business system
- people
- process
- data
- tools
- partners
Following is a diagram outlining an initial draft of the corporate asset management strategy:

**Figure 6: Outlines an Initial Draft of the Corporate Asset Management Strategy:**

**Action 2: Continually improve a management system for the practice of asset management**

The City of Calgary’s Asset Management Policy states that the British Standards Institute, Publically Available Specification 55 will become the basis for asset management practices and uses a Plan-Do-Check-Act cycle. An International Standards Organization (ISO) standard is currently being developed. The City’s policy may be revised in the future to align with ISO standard when it is complete. Included in the standard are areas not necessarily addressed in some business unit asset management plans. These include:

- Training and awareness programs for staff.
- Performance tracking and corrective action mechanisms or tools.
- Documentation and records for asset management.
- Asset management strategies.
- Asset management practice performance measurement, internal review and checking.
- Benchmarking infrastructure investment, service provision and risk management to other municipalities.

Corporate Asset Management has been involved in the development of a new International Standards Organization infrastructure management system. Once it is available, the system will identify and adopt applicable elements and practices of the standard.
Action 3: Enable an integrated approach to infrastructure decision-making

There are significant interdependencies between planning for and managing infrastructure assets with land use planning, geodemographic forecasting, social planning and finance and supply. Throughout the next business cycle, opportunities for collaboration and integration will be explored. For example:

- Undertake infrastructure life cycle valuations and quantitative sustainability assessments associated with statutory land use plans.
- Ensure any private sector actions affecting City service delivery checks costs and provides assistance to manage operational costs when approving development and subdivision applications.
- Establish a joint working group between Corporate Project & Asset Management, Asset Management Network, Land Use Planning & Policy and Transportation Planning to ensure a co-ordinated approach to sustainable urban development, including asset management planning. Other corporate groups should be incorporated as appropriate.
- Ensure, with the collaboration of Finance, that planning and infrastructure plans provide for guaranteed provision of operational costs and life cycle renewal costs.
- Require and provide sufficient resources to ensure that life cycle costing of land use plans is achieved through the City’s RIVA (Real-Time Infrastructure Valuation Analysis) modelling tool.
Action 4: Improve tracking of infrastructure investment

It is good business practice to have a clear understanding of the drivers of capital expenditure in order to develop efficient and effective asset management practices. The current Maintenance, Upgrade, Growth and Service classification system in use at The City does not fully capture the drivers behind investment from an asset management perspective.

Typically the total capital cost of infrastructure is split over two main categories: Base Service and Enhancement.

**Base Service**
Base Service is the capital expenditure required to maintain the current level of service to the community and/or other stakeholders (i.e. capital maintenance).

Also included under base service provision is the cost-effectiveness or economic efficiency category and relates to a capital expenditure required to facilitate certain savings in operating expenses arising from the project (i.e. automation or replacement of an asset with a modern/more efficient equivalent). In this case, the existing asset may still be in good condition and/or performing satisfactorily, however, investing capital into a more efficient replacement results in ongoing cost savings.

**Enhancement**
This relates to a capital expenditure that causes a permanent increase in the current level of service and establishes a new base level. Enhancement can be further separated into the following categories:

**Legislative**
There are required expenditures for compliance with new legally enforceable obligations.

**Enhanced levels of service**
Required expenditure to provide an identifiable, measurable and permanent change in the overall level of service to existing customers above the standard previously provided.

**Incremental growth**
Required expenditure providing services for new customers with no net deterioration from the current level of service provided to existing customers. Also, the expenditure that accommodates increased use of services by existing customers at the current level of service (i.e. a rise in fuel prices is likely to encourage more people to use the public transit system).
For any given project, the total estimated expenditure should be allocated to the correct category to accurately reflect actual drivers behind infrastructure investments. For example, this may require proportional allocation when a project addresses both base maintenance and growth drivers.

In the past, growth has been a significant driver of infrastructure investment and a large number of projects have progressed due to growth but have actually included a large element of base maintenance in the cost. By building up a more accurate and consistent record of the drivers behind infrastructure investment, The City will have a better understanding of its long-term requirements for capital maintenance expenditure, forming the basis of future infrastructure investment decisions.

A review and possible revision to the Maintenance, Upgrade, Growth and Service categories is needed to better support asset management practices and longer-term trending and analysis of capital funding needs. Corporate Asset Management recommends undertaking a review and revision to the Maintenance, Upgrade, Growth and Service categories, with any amendments put in place in 2014 in time for the 2015–2018 budget process.
Action 5: Continuous improvement of asset management practices

Update Asset Management Guidelines
Version 1 of the Asset Management Guidelines was created in 2008. The guidelines provide information on the techniques and practices of asset management within The City of Calgary. Much progress has been made in developing and refining asset management practices since 2008 and the guidelines need to be updated to reflect this work.

Levels of service and risk analysis
This is a significant area to focus on because it is the basis of asset management planning. Clear articulation of current and target level of service is a critical foundation for asset management planning and financial planning of infrastructure. A clear link must be established between customer values, customer outcomes and infrastructure investment using a risk-based approach.

Corporate level
To date, Corporate Asset Management has focused on assisting business units in advancing their asset management practices, primarily in the areas of levels of service analysis, risk analysis and business case development. This work has viewed assets either individually or in groups of similar assets. To complement this, corporate level of service and risk frameworks and governance need to be developed that will help the organization manage asset portfolios and systems.

As a whole, the organization must develop a better understanding of the interdependencies of the various assets and asset classes. This is necessary to better understand what investments are required to ensure the sustainability of assets, link investment to long-term strategic direction (i.e. Sustainability Direction) and integrate and optimize asset systems at a portfolio level.

This will be possible once business unit level of service and risk work is at a more advanced level. Business unit level of service and risk information is the feedstock for the corporate level of service and risk analysis. In future generations of the Corporate Asset Management Plan, the focus will increase on level of service and risk.
Business unit level

1. Establish level of service baselines: Continuing work on establishing baseline level of service information, performance measures and data collection. For business units adopting quality rating approach measures, there are additional level of service measures related to safety, legislation, availability, accessibility and sustainability that must be measured and documented. Once the level of service measures have been identified, a baseline will be established to quantify current performance against the measures.

2. Establish level of service targets: The next phase of level of service development is to identify what the target level of service should be, based on established funding patterns and delivery methods, as well as exploring innovative approaches to service delivery.

3. Determine costs to deliver services: It is important that the costs of service provision are identifiable. Business units are at differing levels of maturity in their capacity to identify the costs of providing differing levels of service. Corporate Asset Management estimates that it will require several business planning cycles for business units to reach a mature level in this area.

4. Engagement: Once cost of level of service is more accurately documented, it will be possible for business units to hold discussions with their key stakeholders and determine the level of service that stakeholders are willing to fund.

5. Asset level of service: This is the level of service the asset can provide to the asset manager (i.e. a water treatment peak capacity in support of a customer level of service). Business units are at different levels of maturity in documenting the asset level of service and correlating these to a target level of service.

6. Operational performance indicators: Business units need to document their operational strategies, practices and measures that support the assets. This will help with understanding how to optimally deliver a target customer level of service.

7. Risk assessments: Complete a level two asset risk assessment (defined in the Asset Management Guidelines) for all assets classes. The results of this assessment will be used to determine risk management strategies. A level three risk assessment (defined in the Asset Management Guidelines) should be completed as required for assets determined high risk.
Asset management innovation

Research and development of asset management leading practices and enabling services is necessary to ensure continued improvement in asset management across the organization. Corporate Asset Management has already linked with leading asset management organizations and practitioners. This helps ensure new ideas, practices and technologies in asset management are identified, and where applicable, incorporated into The City’s asset management program.

Within the organization, there are opportunities for collaboration and innovation, benefiting not only infrastructure asset management but other areas of practice as well. Work is currently under way to:

- Create a methodology to assess triple bottom line costs and benefits of infrastructure decisions.
- Research the effects of climate and weather on Calgary’s infrastructure assets

Corporate Asset Management will identify needs and develop support processes and tools to assist with continual improvement.
Action 6: Develop our asset management enabling services (people, tools, data)

People
As reported in the 2010 State of Asset Management Report, progress has been made across The Corporation in developing asset management skills and capacity. Nonetheless, “asset management skill development material is being developed independently within some areas of business units” (2010 Infrastructure Status Report, page 47). This is understandable in as much as The Corporation has a diversity of assets. Secondly, asset managers across The Corporation come from many professions including planners, engineers, scientists, accountants and business planners. For these reasons, there remains an opportunity to develop a generalized standard of practice and competencies for asset management practitioners. Corporate Asset Management has initiated work on developing a competency framework. Asset management practitioners will be engaged in creating the framework.

As part of continuing to enable the practice of asset management, Corporate Asset Management will continue to monitor needs, provide tools, and provide support in the areas of succession management, knowledge management and skills development, change management and communication.

Tools and data
An important area for ongoing development is implementation of standardized tools supporting asset management processes. By integrating the various systems together we will be able to make more informed infrastructure decisions on behalf of The City. To facilitate this, the following tools are being developed and/or implemented:

Corporate Asset Registry
A common asset registry for all corporate assets will be used to pool all required information at a corporate level. The tool selected to implement this is RIVA EI (Real-time Infrastructure Valuation Analysis Enterprise Inventory).
Life cycle cost analysis and capital planning
The Administrative Leadership Team has approved the use of a standardized tool for calculating the total life (beginning to end) costs of assets. The tool selected is RIVA DS (Real-time Infrastructure Valuation Analysis Decision Support). This will allow business units to predict future costs associated with managing their assets. The data for this will come from both the Corporate Asset Registry and the RIVA DS strategies.

Report automation
Work is under way to automate the preparation of Tangible Capital Assets and Infrastructure Status Reports.

RIVA AR (Real-time Infrastructure Valuation Analysis Asset Registry)
RIVA AR has been selected as the standard tool for business units that do not have an asset registry. Business units may also choose to implement tools that are already in use at The City.

Data standardization
It is important that corporate data standards are established. These standardized values are required for corporate reporting or corporate prioritization.

Standardizing the Computerized Maintenance Management Systems (CMMS)
The Administrative Leadership Team has made a decision not to acquire any additional Computerized Maintenance Management Systems. It is necessary to optimize the number of different systems that The City has and maintains.

Standardizing the project prioritization tools
The standard tool for project prioritization is Expert Choice.
**Action 7: Establish a funding strategy for infrastructure**

**Infrastructure investment plans co-ordination**

In 2010, Corporate Asset Management conducted an in-depth analysis of the processes used in creating the Corporate Level Infrastructure Investment Plan (CLIIIP), Emergency Response Infrastructure Investment Plan (ERIIP), Transportation Infrastructure Investment Plan (TIPP), and Community, Parks and Recreation Infrastructure Investment Plan (CPRIIIP).

In two reports to the Administrative Leadership Team, Corporate Asset Management reported that there is limited commonality in the methods used to prepare the infrastructure investment plans and therefore it is difficult to compare and align investment needs. Corporate Asset Management recommended that a common financial module be adopted, and in July 2011, the Corporate Level Infrastructure Investment Plan was prepared using a financial module which is compatible with the Transportation Infrastructure Investment Plan.

Looking ahead, Corporate Asset Management will be working to further support standardization of the way infrastructure investment plans are collected and processed. This will be necessary to implement an infrastructure funding strategy.

**Infrastructure funding strategy**

As recommended in the 2010 Infrastructure Status Report, a strategy to mitigate the infrastructure gap is to implement a corporate funding strategy to co-ordinate ongoing financial requirements and to explore and introduce qualified alternative funding opportunities.

Corporate Asset Management will partner with Finance to develop a scope of work for the infrastructure funding strategy.
Plan review and monitoring

The updated State of Asset Management Report and Infrastructure Status Report are anticipated to be the primary outputs of the “Check” segment of the business system. Based on identified criteria in the asset management strategy and associated objectives, the Corporate Asset Management Plan will provide the scope, schedule and resources for the delivery of these objectives, and both documents will report on the progress of the plan.

The State of Asset Management Report will monitor and report on the current and anticipated level of development of the practice of asset management both at a business unit and a corporate level. The Infrastructure Status Report will report on the current and anticipated status of the City’s infrastructure.

The State of Asset Management Report and the Infrastructure Status Report will provide recommendations based on the performance status, and plan progress with the intent of providing guidance to stakeholders identified in the governance model for their consideration and action.
Levels of service

Corporate Properties & Buildings’ managed square footage has increased by approximately 28 per cent between 2007 and 2010. However, operations and maintenance budgets have not increased proportionally and, operational spending is at 58 per cent or $6.95 per square foot when compared to the industry standard $12.00 per square foot.

The funding gap is the result of The City matching its budget increases with the Consumer Price Index. When industry recently experienced significant escalation of building maintenance and operating costs that were well above this core rate of inflation, The City’s funding did not keep pace. Accordingly, Facility Maintenance resources are being prioritized to focus on reactive maintenance activities, resulting in a backlog in preventative maintenance tasks and open work orders.

Level of service is impacted on a number of levels. Corporate tenants perceive workspace conditions to be declining directly impacting the ability of The Corporation to attract and retain employees. Further impacts to level of service include a lack of space for increased staffing rates and less reliable buildings.

Maintaining level of service

An immediate investment in Corporate Properties & Buildings’ asset portfolio is required to maintain current levels of service to the customer base. This investment will support a shift to an increased focus on preventative maintenance, increase asset reliability, and reduce operating and maintenance costs for The City over the long term.

Reactive operational interventions currently used to maintain level of service are only a temporary solution. Future growth of The City will put additional pressure on Corporate Properties & Buildings’ assets and resources. These extra demands will increase the risk of critical asset failures and a subsequent decline in delivery of customer level of service.

Accordingly, Corporate Properties & Buildings is developing a risk-based asset management model. The model will detail changes in the asset risk profile and the level of risk related to service delivery disruption to the customer base as a result of insufficient long-term dedicated funding. Moving forward, the aim is to explicitly link levels of risk with the level of available funding, and identify the best intervention options available.
The current condition of Corporate Properties & Buildings’ asset base poses a risk to future service delivery. Lack of a dedicated funding source to maintain the building portfolio will eventually impair Corporate Properties & Buildings’ ability to deliver a sustainable level of service to its customers.

**Enhancing level of service**

Enhancing levels of service in the area of operations and maintenance is unlikely until long-term dedicated funding can be identified to support the required investment in capital maintenance activities necessary to manage the current backlog of maintenance work orders. Corporate Properties & Buildings’ most significant challenge is that building operations is currently experiencing both an increase in operating expenses related to a lack of life cycle maintenance, and a decreased expected lifespan of facilities related to restricted operating and maintenance funding.

However, an enhanced level of service is indicated as necessary, especially as it relates to space. Challenges include restricted space for corporate tenants who are planning for growth in their workforce. A second space-related challenge is the lack of temporary or “swing” space for corporate tenants while facility upgrades are performed. This challenge will be remedied if Corporate Properties & Buildings’ highest priority budget requests are approved during the 2012–2014 budget deliberations.

**Data Confidence**

Corporate Properties & Buildings is in the process of defining comprehensive level of service performance metrics, including quantifying the costs of level of service delivery and the risks to level of service associated with inadequate funding.

Corporate Properties & Buildings is implementing a Customer Service Framework and has assessed its core lines of service with the objective of developing a comprehensive set of customer level of service performance metrics. In the future, Corporate Properties & Buildings will focus on linking client business unit service level requirements to asset life cycle, capital investments and operational expenditures.

The majority of Corporate Properties & Buildings’ building assets are captured in an asset registry and Corporate Properties & Buildings is in the process of conducting a review of the data to support asset management planning.

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Levels of service

The Calgary Fire Department’s current response time and asset life cycle benchmarks were approved by Council in 2010. These benchmarks define a standard of response coverage, distribution of resources, as well as level of emergency response, and provide a strong basis for fleet and facility asset levels of service.

Fire uses a variety of specialized assets to meet its operational service levels for emergency services. To provide an effective fire service, asset procurement and maintenance must find an effective balance between service delivery, sustainability and cost effectiveness.

Maintaining level of service

Fire derives an important measure of its levels of service from Citizen Satisfaction surveys. Fire continues to maintain a very high citizen satisfaction score, which also signifies a high level of expectation from Calgarians to maintain this level.

As would be expected of an emergency service, Fire’s existing assets support necessary front line support, although some asset classes, most notably its response fleet, are struggling to do so. Infrastructure is functional, although not necessarily optimal.

Growth is placing considerable strain on the assets’ ability to maintain levels of service. Growth is occurring in most quadrants of the city, which can result in short-term critical service gaps. Despite significant effort by Fire to address these gaps, the Fire Department will be challenged to maintain its level of service in the coming five to 10 years.

Due to an influx of Provincial funding, significant investment has recently been committed to Calgary Fire Department infrastructure. Grant based funding streams are subject to volatility. Delays in receiving essential capital funding to provide core services could result in compromised performance benchmarks and provision of services.

Key infrastructure challenges for the Calgary Fire Department include:

- Sustaining quality fire services by maintaining the safety and functionality of stations, apparatus and equipment used to serve established communities.
- Improving service delivery in new communities.
- Developing funding methodologies to support long-term sustainability of assets and maintain existing levels of service.
• Maintaining current capital budget allocations and integrating operating impacts of capital and growth into current and future Council-approved operating budget allocations.

Future risks to Calgary Fire Department infrastructure include:
• A significant portion of the Fire Department’s facilities were built prior to 1970 and may require replacement in the 20-year window. Depending on how quickly growth facilities can be addressed, a significant number of old and new facilities may need to be constructed concurrently.
• Fleet and fire equipment inventory vintages reflect peaks and valleys that may create compound funding and replacement issues.
• Increased emphasis on re-development of existing areas in City plans may modify the service profile of present stations requiring incremental additions or modifications to existing infrastructure.
• Evolution of overall municipal and provincial emergency services may impact future infrastructure requirements (e.g. location and provision of ambulatory or disaster services).

Enhancing level of service
Fire is examining new deployment and funding models to address maintenance and improvement of fire response times. Fire is also leveraging GIS mapping, and working with community planning to ensure future and replacement fire stations are appropriately located.

Building on progress achieved through improved business and operational planning, tangible capital asset reporting, and asset management planning, the department continues to maximize its resources, operations, and processes to ensure that it can achieve its vision of being an international fire service leader.

Data Confidence
Inventory data is considered to be reliable and accurate. Condition, function and demand data are assessed at high level only. Collection of additional information and improvements to data processes are under way.

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Levels of service
Replacement of aging assets with newer assets has resulted in overall better condition of the asset class. Information Technology’s assets are short-life assets and typically replaced based on age rather than condition. Overall, it is thought that the levels of service provided over the recent period have remained steady.

Maintaining level of service
Information Technology’s resources, especially human resources, are strained under the current service delivery model. Growth of The Corporation will put additional pressures on Information Technology’s assets and resources. These additional pressures, combined with aging infrastructure assets, increase the risk to service delivery, and result in a projected decline in service levels, despite the recent increase in the overall condition of the asset base. Information Technology is planning to implement a revised recoveries model to provide additional service options to customers and secure financial resources to maintain levels of service.

Enhancing level of service
Service level demands for Information Technology services continue to grow with advances in technology and increasing expectations for use of technology by internal and external customers. Enhancing levels of service will likely require modification of the current service delivery model and development and implementation of a resourcing plan. Information Technology has recognized the need to shift its service delivery model to a strategic level customer-centric model that identifies and leverages opportunities for efficiencies. Alternate service delivery will be evaluated on an ongoing basis as technologies and customer demands continue to evolve. Demand characterization will assist with better understanding and meeting customer demands.
Data Confidence
Levels of service have not been comprehensively defined or tracked and the reported level of service performance is based on anecdotal evidence. The majority of the assets are captured in asset registries, although valuation information could be improved.

Data Reliability
Low High

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Levels of service

Through physical inspections and capital investment planning, high-risk assets such as playgrounds and pathways have maintained satisfactory physical condition. Low-risk assets such as garbage cans and benches have degraded over recent years; this has translated to a direct impact on customer levels of service.

Maintaining level of service

Without investment in assets, the condition of assets is projected to continue to degrade. It is expected that this will continue to result in declining customer levels of service.

Enhancing level of service

Upon completion of the Quality Rating System, Parks will verify the results to ensure the rating accurately captures the customer experience. Parks will subsequently use these consultation data to set a target Quality Rating to adjust and improve levels of service in locations that are of significant importance to customers. Level of service enhancement are unlikely to be achieved without significant investment in assets and a commitment of long-term resources for life cycle maintenance.
Data Confidence

Parks has begun to implement a Quality Rating System that reflects a customer level of service. Initial baseline data will be compared with future evaluations. The majority of the assets are captured in asset registries.

The majority of Corporate Properties & Buildings’ building assets are captured in an asset registry and Corporate Properties & Buildings is in the process of conducting a review of the data to support asset management planning.

Data Reliability

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## Appendix A:

### RECREATION

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<th>Asset condition by replacement value</th>
<th>Trending in 2009–2011 business cycle</th>
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#### Levels of service

Targeted upgrades at certain facilities have resulted in a steady average condition of the asset base over the recent period. However, the condition of many of the assets has degraded over recent years. Recreation has responded with operational interventions at degrading facilities in an attempt to maintain a steady level of service. Over a third of the assets owned by Recreation are reported to have a Fair or Poor/Critical functional and demand condition, impacting the business unit’s ability to provide the level of service desired.

#### Maintaining level of service

Growth of the city, both through densification of developed areas and through greenfield development, will put additional pressures on Recreation’s assets and resources. Reactive operational interventions currently used to maintain level of service are only a temporary solution. There is an increasing risk of:

- Failures to critical assets that cannot be addressed with only operational measures.
- A growing backlog of maintenance work orders.

Both of these scenarios will likely lead to a decline in delivery of customer level of service. In addition, civic partner assets pose a risk to maintaining level of service, as the budget for emergency interventions required to address failure of these assets is typically funded from the Recreation budget.
**Enhancing level of service**

Recreation has defined a preliminary target customer Quality Rating for its facilities. Meeting this quality rating would require enhancing levels of service at certain facilities. It is projected that changing demographics of Calgary may change the type of service demands. Achieving level of service enhancements requires significant investment in assets, and commitment of long-term resources for life cycle maintenance – for assets owned by both Recreation and civic partners.

**Data Confidence**

Recreation has begun defining aspects of customer service level through a Quality Rating System and will be tracking against this baseline in the future. The majority of the assets are captured in asset registries and valuation and condition information is updated on an ongoing basis.

**Data Reliability**

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**Data Accuracy**

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Levels of service
The annual Citizen Satisfaction Survey over the past five years showed that citizens’ satisfaction with Roads’ level of service peaked in 2005–2006 and declined in 2007–2010. This decline may be attributable to increasing customer demand in the face of budget challenges.

Maintaining level of service
Investment in Roads assets is dictated by budget allocation, which invariably impacts the level of service. With the dynamic nature of revenue sources, level of service will fluctuate in reaction to available finances. Growth of the city, both through densification of developed areas and through greenfield development, will put additional pressures on Roads assets and resources. It is projected that Roads is significantly underfunded to meet the requirements for capital maintenance and growth.

Enhancing level of service
The expectation of Roads is on maintaining current levels of service in the face of the continued growth of the city. Enhancing the current level of service may pose a challenge given the shrinking budget expectation. While services like snow and ice removal may attract attention, and hence increased funding, leading to an enhanced level of service in those areas, other areas funded through capital budget may not be commensurately funded thereby leading to declining level of service. Roads’ challenge is to balance public expectation against the budget realities.
Data Confidence
While some service levels have been defined, a comprehensive set of service levels does not exist. Reported level of service performance is based on anecdotal evidence. Asset inventories are maintained and updated on an ongoing basis.

Data Reliability

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Levels of service
The condition of the overall asset base has declined over the recent period as investments have been focused on servicing growth rather than maintaining the existing asset base. Transit has responded with operational interventions to maintain levels of service throughout this period. Although there has been a focus on growing the service, the demand condition of the assets is rated at approximately 50 per cent Fair and 50 per cent Poor/Critical. This rating indicates that Transit assets are not adequately meeting the demands for services in all areas.

Maintaining level of service
Growth of the city will continue putting additional pressures on Transit assets and resources. Reactive operational interventions currently used to maintain service levels are only a temporary solution, and many of the facilities and service fleet assets are reaching Critical condition where failure is becoming more probable, and the impacts to service levels could be significant. Projections of steady levels of service are based on continuation of current investment patterns and are due to attempts at enhancing levels of service by expanding service coverage and frequency, being offset by decreased reliability of current assets. A localized failure of LRT track and way assets could have a significant and widespread impact on service due to the linear nature of the asset.
Enhancing level of service
Realization of corporate direction outlined by the Municipal Development Plan and the Calgary Transportation Plan requires enhancement in Transit levels of service. Achieving enhancements to service levels will require investment in both extending service coverage and service hours, as well as significant investment in renewing and extending the current asset base.

Data Confidence
While some service levels have been defined, a comprehensive set of service levels does not exist. Reported level of service performance is based on anecdotal evidence. Confidence in asset inventories and valuation varies for each Transit asset type.

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**WASTE & RECYCLING SERVICES**

### Levels of service

Waste & Recycling Services provides collection services for residential garbage, some commercial garbage, residential blue cart recycling and community recycling depots. The business unit operates and manages The City’s active and former landfill sites to ensure compliance with regulatory requirements and approvals to operate.

The reported asset condition increased through the last period, which is likely due to acquisition of new assets and renewal of some existing assets. This increase in condition, combined with the addition of services like residential recycling collection, has resulted in an increase of levels of service.

### Maintaining level of service

Waste & Recycling Services continues to receive very high customer satisfaction rates related to customer level of service. The resources required to maintain current service levels are in place. Waste & Recycling Services has adequate funding for and is actively replacing aging support infrastructure like scale houses and truck shelters to ensure current levels of service are maintained or improved.

Waste & Recycling Services has made significant advancements in managing assets. It includes the development of a 10-year investment plan with a funding strategy and a building maintenance program to maintain and extend the lifecycle of new and existing support infrastructure.
Enhancing level of service

The waste diversion goal of diverting 80 per cent of waste from landfills by the year 2020 will require enhancement in levels of service. Achieving this goal will not be possible without either significant capital investment in waste processing facilities, or through securing contracts with third party service providers. Capital investments in infrastructure should be combined with a strategy for resourcing the required life cycle maintenance required to maintain the enhanced levels of service.

Data Confidence

Levels of service have been defined. Measurement and reporting continues to be improved. The majority of the assets are captured in asset registries, although there are some challenges with asset valuation (especially landfills).

Data Reliability

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Levels of service

Water Resources and Water Services delivers safe drinking water and protects the environment by providing water treatment, water distribution, wastewater collection, wastewater treatment and stormwater management services to Calgarians 24 hours a day, seven days a week. Through its ISO 14001 compliance, business units manage all federal and provincial regulatory requirements and develops bylaws to meet its business objectives.

Maintaining level of service

Water Resources and Water Services is managing its asset base. Staff continue to look for ways to improve the efficiency and effectiveness of the infrastructure. Identification of critical assets is under way. This will reduce the risk of impacting service levels and allow for Water Resources and Water Services to continue investing strategically in assets. Customer levels of service are being investigated in order to better understand customer expectations and align investments accordingly. Current investment levels will maintain asset condition. Examples of current metrics include:

- Water and wastewater availability.
- Response time to emergencies.
- Per cent of time meeting regulatory requirements.
- Plant capacity available.
**Enhancing level of service**

Water Resources and Water Services is implementing demand management tactics and expanded services for regional customers. Plans are also under way to create networks for reclaimed water re-use. All enhancements will be expected to adhere to regulatory requirements and the demand for service 24 hours a day, seven days a week.

**Data Confidence**

Water provides uninterrupted services to its customers. The system has been engineered to ensure reliability and safety thus reducing risks to that service level. The distribution and collection networks, the treatment plants, and customer relationship management systems all work towards providing uninterrupted water service.

**Data Reliability**

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- High

**Data Accuracy**

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The following sections highlight some of the key observations regarding each business unit’s asset management program:

Corporate Properties & Buildings

Corporate Properties & Buildings (CPB) is part of the Corporate Services department. As a core service facilitator in the delivery of front line services to Calgarians, Corporate Properties & Buildings works with the other City business units to meet their specific accommodation and service support needs by developing strategies for the best use of The City’s land and buildings. This support role is critical to enable the delivery of quality front line services that contribute to a safe, sustainable and vibrant community that can be enjoyed by all citizens. Services include:

- Managing The City’s real estate assets including land acquisition.
- Identifying office and work space requirements, and developing corporate-wide accommodation and land plans.
- Supporting development and/or re-development of Operational Workplace Centres for the delivery of services to citizens.
- Conducting facility condition analysis for building maintenance and life cycle requirements.
- Implementing preventative maintenance programs.
- Developing sites in accordance with sustainability principles.
- Managing the design and construction of buildings.
- Managing the provision of office space, furniture and move management services.
- Operating 189 buildings totalling 3.5 million square feet, as well as seven Operational Work Centers.

Corporate Properties & Buildings is the custodian of more than 8,000 parcels of land. The total reported value of the Corporate Properties & Buildings asset portfolio is $3.43 billion: $2.01 billion is land and $1.42 billion is buildings and land improvements. Asset information is stored in three main databases: VFA (facility condition and valuation), Infor Enterprise Asset Management (facility maintenance management), and Land Inventory Data Application (LiNDA).

The Corporate Accommodation portfolio represents a significant investment valued at approximately $1.4 billion for comparable facilities in today’s market. The portfolio is in an overall Fair to Poor physical condition with a Facility Condition Index of 0.34. The majority (85 per cent) of this is attributed to building systems and components that have served beyond their useful life cycles.

This Fair to Poor condition is causing an accelerating deterioration of The City’s assets and has the potential to compromise business continuity. As such, Administration has undertaken analysis of the present and future risk of the continued performance of these sites and buildings to provide adequate accommodation of staff and operations.
A key element in this analysis is the measurement of the condition of buildings through industry standard assessment and Facility Condition Index reporting. An industry standard rating for this index is:

- 0 – 0.05 = Excellent
- 0.05 – 0.1 = Good
- 0.1 – 0.5 = Fair to Poor
- > 0.5 = Critical

A second key element in this analysis is the measurement of workspace conditions within buildings. A pilot Workplace Condition Assessment which assigned a Workplace Condition Index to all reviewed spaces was performed in 2010/2011. Further Workplace Condition Index assessments are planned for 2011 and 2012.

The budget requests for the 2012–2014 business cycle focus on urgent and critical items as well as key sites where current conditions are poor, but need for service delivery and reliability are highest. Further requests support the corporate accommodation growth requirements for land and space. Prioritization of funding for current sites has been performed taking business unit needs, current conditions, criticality of service, location and workplace conditions into consideration.

The 2015–2017 budget cycle will entail requests to more quickly address the Facility Condition Index life cycle maintenance backlog, workplace conditions and service delivery of buildings. The delay will allow Corporate Properties & Buildings to improve its business model and ability to deliver projects.

**Calgary Fire Department**

Calgary Fire Department’s most critical assets – those that directly support front line service, including facilities (buildings), heavy fleet and front line fire equipment, are co-ordinated centrally by the Logistics & Infrastructure division. This division is the Department’s primary asset steward and is responsible for creating and implementing capital spending plans, as well as reporting and managing asset inventory data, for facilities, standard fire equipment and light and heavy fleet.

Other assets, such as communications equipment, furniture, fitness equipment, special team equipment (hazardous materials, dive, search and rescue, etc), training equipment and/or medical equipment, are managed by the areas that can most closely identify and manage these special needs. Each assigned division determines how best to look after their inventory of items.

Calgary Fire Department works with several asset management information management systems, including M5, Infor EAM (Enterprise Asset Management), PeopleSoft Asset Management, FoxPro and Excel tools. These tools perform inventory management, work management and life cycle costing analysis tasks. Integrated analysis between asset groups is a challenge, although improvements to current and future spending plans are ongoing. Integration of asset data into an integrated asset management or work management systems would be a long-term goal.

Asset Management practices are still in their infancy at Calgary Fire Department. There is an opportunity to reap significant benefits from developing and implementing a more comprehensive approach to asset management.
**Information Technology**

Information Technology owns a variety of asset types requiring a range of life cycle management approaches. Information held on all the assets is updated on an ongoing basis as assets are continually replaced, upgraded and retired. The life cycle of Information Technology assets is typically shorter than other City-owned infrastructure assets, and replacement is often based on age not condition. This is due to high consequences of assets failing and the lack of a visible deterioration profile.

Asset performance and demand condition are also common triggers for asset replacement or upgrade as technologies and demands of technologies change quickly. Information Technology uses the Sharepoint Temporary Asset Registry (STAR) as an asset register, and Remedy 7 as a work management system.

Information Technology has not defined service levels but they have adopted the Information Technology Infrastructure Library (ITIL) approach which contains a service catalogue component and will help inform levels of service. Strategic risks have been identified in the IT Strategy and Work Plan, along with a management strategy. An asset risk framework has not been developed. Instead, assets associated with critical services, such as central servers, are replaced proactively to mitigate risks.

**Parks**

To date, Parks has relied on the knowledge and expertise of supervisors for management of the assets. Parks is working to improve upon this approach as moderate turnover rates create challenges in knowledge and information management. In the future, asset information pertaining to the condition of the asset, date of installation, cost of installation and estimated functional life of the asset will be stored in the Parks Asset Reporting & Information System (PARIS), and used to facilitate a more proactive approach to management of assets.

Parks has recently implemented the use of a Quality Rating System that can be used to measure and communicate customer levels of service related to the overall quality of experience provided by the Parks assets. The Quality Rating System is a non-technical measure that uses a five-star rating system. Asset levels of service, technical measures used by the asset manager to manage the asset, are still to be defined. Business performance measures are in place. Parks has begun the development of a strategic risk management framework while asset risk frameworks have yet to be developed.
Recreation
Recreation facilities are managed at a component level. A preventative maintenance schedule is in place and primarily based on manufacturer recommendations. However, available resources restrict the amount of preventative maintenance performed resulting in a high proportion of reactive maintenance. Software tools used for asset management include Enterprise Asset Management (EAM) as a facility maintenance management system, and Excel-based life cycle reports for longer-term asset life cycle planning.

Recreation is dedicated to improving asset management practices in order to optimize the use of the limited funding pool available, and is working towards implementing a risk-based approach to prioritizing future capital maintenance activities.

Recreation has started defining a set of customer service levels and has scored all facilities using the Quality Rating System. Asset levels of service have not yet been defined and targets will be set for asset and customer level of service. Recreation has established a strategic risk management framework and is working to customize a tool for detailed asset risk assessment.

Roads
Roads asset management initiative started in 2005 with the inauguration of the Road Asset Management Program (RAMP). The program was aimed (among other things), at documenting, reporting, supporting and enhancing asset management practice in Roads. As one of the business units that make up the City’s Transportation department, Roads maintains all the City of Calgary’s transportation assets which include pavement, sidewalks, bridges, signals, streetlights and signs and pavement markings. With an asset base valued at about $12.8 billion in replacement cost in 2010, Roads is second to Water Services/Water Resources in infrastructure ownership and responsibility.

Roads asset management process has evolved from subjective and experience-based strategy to a robust data driven level of service and condition-based strategy. To accomplish this, Roads has employed a range of technologies and tools including GIS, Municipal Pavement Management Application (MPMA), Hansen, PeopleSoft, RIVA and Excel spreadsheet to effectively manage the assets. With the assistance of IT and Corporate Asset Management, Roads is working toward the automation of data load in order to reduce human intervention, reduce errors, enhance data integrity, and integrate with the financial system. The longer-term strategies to further enhance the process will include alignment with the business plan, driver for the budget, and integration with the financial and work management system. In addition, Roads has a dedicated unit within the Business and Technology division that is responsible for asset management. Roads is continually researching best practices, and collaborating with other City departments and outside organizations in order to advance our asset management maturity.
**Transit**
Preventative maintenance is conducted for fleet (buses and light rail vehicles) using a kilometre-based maintenance schedule per manufacturer recommendations. Condition assessments of Light Rail Vehicles are conducted annually by assessing individual components to determine an overall condition rating and prioritize upgrades and renewals to vehicles. Bus condition information is assessed on an ongoing basis as scheduled maintenance activities are conducted. Fleet performance information is tracked, such as the number of kilometres travelled between breakdowns.

Light Rail Transit track and way, communications and electrical infrastructure are maintained using a scheduled maintenance regime which is primarily condition based. Valuation and condition assessments of facilities (including LRT stations) were conducted in 2008, but are not updated on an ongoing basis. Mechanical and electrical systems in Transit facilities are inspected, and some maintenance is conducted on pre-defined maintenance schedules. Facility maintenance is conducted on an as-needed basis, and capital maintenance projects at one facility are grouped when possible to minimize service interruptions.

Tools used for Asset Management include M5, EAM, a VFA database and various Excel spreadsheets. Transit has begun the process of defining customer level of service and has scored LRT stations using the Quality Rating System. A strategic risk framework has been developed, but a comprehensive asset register has not yet been developed. Currently, asset risks are identified and addressed in an informal way.

**Waste & Recycling Services**
The majority of Waste & Recycling Services owned assets are operated and maintained by Waste & Recycling Services. Historically, the business unit has responded to customer demands by focusing on collections and disposal, and therefore, has managed assets directly associated with their services (e.g. landfill cells, trucks, bins, etc.) with a proactive approach.

Assets such as buildings and land improvements have been managed on an as-needed basis. Infrastructure planning has been focused on maintaining functionality or addressing immediate capacity issues. Waste & Recycling Services has developed a strategic risk management framework and is in the process of developing an asset risk management framework.

Waste & Recycling Services has also developed a building maintenance program to maintain and extend the life cycle of new and existing support infrastructure. This will ultimately inform Waste & Recycling Services’ 10-year infrastructure investment plan that is currently under development. Waste & Recycling Services uses a variety of tools for asset management, such as spreadsheets, Oracle applications, GIS software and software that has been specifically designed for use at landfill sites.

The size and value of the asset base owned by Waste & Recycling Services will substantially increase as capital infrastructure is built to support waste diversion initiatives. Waste & Recycling Services has identified the need for improved management of its assets and is focusing on developing and implementing asset management processes that will support efficient customer service delivery in the long term.

Customer and asset level of service have been defined, expansions in level of service will be quantified after current levels of service benchmarked and new levels set.
Water Resources and Water Services

Water is a part of Utilities & Environmental Protection (UEP). The department mission is to “…work with the community and Corporation to conserve, protect and enhance air, land and water for present and future generations.” Water contributes to this mission by helping to protect our watersheds, providing world class water and wastewater treatment, protecting property from flooding, and conserving our water resources for future generations.

Water will be focusing on nine major areas for improvement:

- Improved capital investment planning.
  - Prioritized infrastructure investment planning and project portfolio management to ensure investments are directed toward highest business value.
  - Co-ordination and evaluation of projects that support The City’s growth and development objectives to ensure that those investments are optimized.
- Refined and detailed customer service levels.
  - Better understanding customer willingness to pay for commensurate service levels.
- Asset life cycle cost forecasting (i.e. Maintenance plans to optimize asset life cycle costs for all asset classes).
- The development of a technological plan for asset information.
- Registration of asset risk (i.e. Condition and risk assessments for all asset classes to ensure reinvestments are directed to higher risk assets).
- Continual improvement of asset knowledge.
- Employee engagement and development in asset management practices.
- Establishment of asset management governance.
- Financial policy setting in support of asset management goals, including an improvement of asset financial information for tangible capital assets.

Once these areas are actualized, the outcome will be improved investment decisions based on an understanding of the asset risk, life cycle costs, and service level it plans to achieve within a sustainable funding model.
# Appendix C: Priority areas for asset management improvement by business unit

<table>
<thead>
<tr>
<th>Category</th>
<th>AREA FOR IMPROVEMENT</th>
<th>CPB</th>
<th>Fire</th>
<th>IT</th>
<th>Parks</th>
<th>Rec</th>
<th>Roads</th>
<th>Transit</th>
<th>WRS</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data</strong></td>
<td>Review and update existing asset information systems (i.e. asset registry and work management information) and asset data (condition assessment, FCI, asset valuation, etc.)</td>
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<td></td>
<td>Clarify issues of land ownership/stewardship between business units.</td>
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<td></td>
<td>Standardize condition grading definitions across asset groups and track physical, functional and demand condition of assets.</td>
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<td></td>
<td>Track operation and maintenance costs to specific assets, and use information to optimize maintenance strategy and inform investments in efficiency upgrades.</td>
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<td>Track operational and maintenance expenditure to quantify base operational expense, new operational expense and temporary operational expense (used in lieu of capital solutions), as well as proactive and reactive maintenance.</td>
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<td>Quantify the impacts on assets of complying with current and pending plans/policies/legislation.</td>
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<td></td>
<td>Quantify capital maintenance backlog.</td>
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<td></td>
<td>Quantify return on investment for environmental/sustainability related investments.</td>
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<td>Track changes to legislation and estimate impacts on assets.</td>
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<td></td>
<td>Conduct vulnerability assessment of existing infrastructure to climate change impacts.</td>
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<th>Transit</th>
<th>WRS</th>
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<tbody>
<tr>
<td><strong>People</strong></td>
<td>Dedicate personnel to identify and apply for grants.</td>
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<td></td>
<td>Develop resourcing plan for capital project implementation, long-term asset stewardship and asset maintenance.</td>
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<tr>
<td></td>
<td>Identify required asset management competencies and areas for development. Develop resourcing plan for capital project implementation and long-term asset stewardship.</td>
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<th>Category</th>
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<th>Roads</th>
<th>Transit</th>
<th>WRS</th>
<th>Water</th>
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</thead>
<tbody>
<tr>
<td><strong>Tools</strong></td>
<td>Develop Information Technology Master Plan, identifying opportunities to optimize and integrate use of asset management information technology tools and/or improve efficiencies in tracking and information updates.</td>
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<td>Populate and maintain asset and strategic risk management framework, implement mitigating actions, and record effectiveness in reducing risk over time.</td>
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<td></td>
<td>Continue testing alternative project and service delivery approaches, including partnerships with private industry to accommodate changing demands. Document results of investigations in future asset management plans.</td>
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<td></td>
<td>Develop and implement processes for maintaining asset condition (physical, functional and demand) information for each of the asset groups.</td>
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<td></td>
<td>Develop measures and processes for tracking asset performance for asset groups.</td>
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<tr>
<td></td>
<td>Review internal service agreements with Corporate Services business units (e.g. Corporate Properties &amp; Buildings, Information Technology and Fleet) to ensure clear delineation of responsibilities and optimal arrangement and allocation of resources.</td>
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<td></td>
<td>Map asset management processes and governance (including tangible capital asset sustainment) and communicate map with staff involved in Asset Management.</td>
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<td></td>
<td>Use risk-based approach to develop prioritized capital maintenance plans for the term of the Asset Management Plan.</td>
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<td></td>
<td>Identify operational impacts of planned capital projects to develop long-term operational expenditure plan.</td>
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<td></td>
<td>Use asset risk and condition information to develop improved asset deterioration models that can be used for life cycle planning.</td>
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<td></td>
<td>Identify spend-to-save projects in capital plan.</td>
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<td></td>
<td>Align funding model and resource plan with long-term capital plan.</td>
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<td></td>
<td>Identify operational challenges that can be addressed with capital investments, and conduct life cycle cost analysis on potential solutions.</td>
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<td></td>
<td>Implement the use of Business Case Evaluation template for capital projects.</td>
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<td></td>
<td>Financial policy setting to improve asset financial information.</td>
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<td></td>
<td>Develop and implement systems for asset renewal, replacement, acquisition or extension.</td>
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<td></td>
<td>Define current customer level of service and related asset level of service and operational performance indicators. Develop processes to track level of service regularly.</td>
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<td></td>
<td>Formalize process for service demand measurement and track against baseline.</td>
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<td>Determine target level of service (includes quality rating where appropriate) for each asset type, and develop corresponding plan to achieve target rating.</td>
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<td>Quantify the current costs of level of service delivery and estimate costs of target level of service; link changes in level of service to incremental changes in capital and operational expenditure requirements and to user fees or other funding sources.</td>
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<td></td>
<td>Assess the impact of growth and population movement on the asset base.</td>
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<td></td>
<td>Identify and implement demand management strategies and opportunities for asset optimization.</td>
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</tbody>
</table>
Appendix D: Strategic risks

The following table summarizes strategic risks that were common to most business units. These risks were identified in strategic risk workshops conducted with the business units.

### Identified Strategic Risks

<table>
<thead>
<tr>
<th>Risk category</th>
<th>Description</th>
<th>Identified adverse events/missed opportunities</th>
<th>Potential mitigation actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery of service</td>
<td>Risks which affect The City’s ability to meet the demands for City service and products, internally and externally.</td>
<td>• Funding unavailable to implement strategic plans and prepare for future customer service demands.</td>
<td>• Implement consistent and robust risk-based approach to prioritizing capital maintenance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased rate of asset failure due to backlog of capital maintenance.</td>
<td>• Develop business unit asset management plans based on direction from Corporate Asset Management Plan that aligns with corporate long-term vision.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Failure to implement corporate policies or meet Council-approved goals.</td>
<td>• Use of RIVA for projection of long-term capital maintenance requirements.</td>
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<tr>
<td></td>
<td></td>
<td>• Political climate influencing business priorities and project prioritization process, reallocating resources from potentially high-need areas.</td>
<td>• Define and communicate a clear set of customer level of service.</td>
</tr>
<tr>
<td>Strengthening the workplace</td>
<td>Risks associated with human resource capacity for maintaining a sufficient and representative workforce with the appropriate skill mix, information and time to effectively carry out operations.</td>
<td>• Inability to hire, attract, retain and/or train staff to deliver appropriate levels of service.</td>
<td>• Develop staff resourcing plan for capital project implementation.</td>
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<td></td>
<td></td>
<td>• Workforce interruption due to labor action.</td>
<td>• Develop and implement staff retention strategy.</td>
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<td></td>
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<td>• Identify competencies required for various positions and develop training plan to address gaps.</td>
</tr>
<tr>
<td>Legal compliance</td>
<td>Risks associated with compliance to legislation, policies, procedures, standards, bylaws and/or exposure to liability.</td>
<td>• Changes in City policy or in legislation not matched with required budget increase.</td>
<td>• Strengthen relationships with regulatory authorities with the aim of identifying upcoming regulation changes.</td>
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<td></td>
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<td>• Conduct high level asset impact studies to inform development of City policy.</td>
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<td></td>
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<td></td>
<td>• Develop policy compliance plans at a business unit level which are linked to infrastructure investment plans.</td>
</tr>
<tr>
<td>Reputation/trust</td>
<td>Risks associated with public perception and confidence in The City.</td>
<td>• Inability to implement projects or strategies required to meet publicly approved Council goals or plans.</td>
<td>• Develop and communicate a clear set of customer level of service</td>
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<tr>
<td></td>
<td></td>
<td>• Inability to meet public service expectations.</td>
<td>• Track performance of Customer level of service</td>
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<tr>
<td></td>
<td></td>
<td>• Inconsistent service delivery.</td>
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</tr>
<tr>
<td>Risk category</td>
<td>Description</td>
<td>Identified adverse events/missed opportunities</td>
<td>Potential mitigation actions</td>
</tr>
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<td>---------------</td>
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</tbody>
</table>
| **Financial** | Risks associated with operating and capital funds. | • Inability to plan long-term capital funding due to reliance on unsustainable funding sources (i.e. short-term government grants, etc.).  
• Significant additional and unbudgeted capital expenditure requirements (e.g. facilities returning to City inventory, emergency capital maintenance requirements, immediate legislation change).  
• Increased cost of using corporate services or implementing corporate policies (Human Resources, Information Technology, Corporate Properties & Buildings, Public Art, etc.) not accompanied by budget increases; reduces available operations and capital budgets.  
• Increased cost of fleet agreements not accompanied by operations budget increases.  
• Increased operational costs related to degrading assets and backlog of capital maintenance.  
• Increase in size of asset base not accompanied by appropriate increases in operational budgets.  
• Non-optimal use of capital and operational budgets due to predominantly reactive capital maintenance approach. | • Identify alternate sources of long-term funding where available.  
• Develop secure reserves for long-term capital maintenance.  
• Conduct business unit impact studies prior to making changes to Corporate Services cost structures.  
• Implement risk-based approach to prioritizing capital maintenance. |
| **Health and safety** | Risks associated with The City’s ability to meet health and safety legislation, standards and regulations. | • Increasing rate of safety incidents or occurrence of significant injury/death incident related to condition of assets. | • Implement risk-based approach to prioritizing capital maintenance. |
| **Triple bottom line** | Risks associated with the ability to meet environmental targets and International Standards Organization (ISO) objectives and targets, to contribute to sustainable resource use, community well-being and/or to remain an attractive city for economic investment. | • Inconsistent implementation of Triple Bottom Line Policy.  
• Insufficient budget resources to meet Triple Bottom Line targets and policies. | • Develop tools for consistent implementation of the Triple Bottom Line Policy. |
## Appendix E: Plan actions and timelines

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Action 1: Update Asset Management Strategy and Policy.</td>
<td>•</td>
<td></td>
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<td>CAM</td>
<td>1, 17</td>
<td>Periodic updates thereafter as needed.</td>
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<tr>
<td>Action 2: Training and awareness programs.</td>
<td>•</td>
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<td>CAM</td>
<td>3, 19, 22</td>
<td>Periodic updates and continual improvement thereafter.</td>
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<tr>
<td>Action 2: Training and awareness programs.</td>
<td>• •</td>
<td></td>
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<td>BU</td>
<td>3, 19, 22</td>
<td></td>
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<tr>
<td>Action 2: Performance tracking and corrective action tools.</td>
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<tr>
<td>Action 2: Documentation and records for asset management.</td>
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<td>CAM/BU</td>
<td>5, 8, 9, 12, 25, 26, 29</td>
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<tr>
<td>Action 2: Asset management strategies.</td>
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<td>CAM/BU</td>
<td>1, 8</td>
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<tr>
<td>Action 2: Benchmarking to other appropriate organizations.</td>
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<td></td>
<td></td>
<td>CAM/BU</td>
<td>2, 7, 8, 11, 19, 20, 29</td>
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<tr>
<td>Action 3: Undertake life cycle valuations and quantitative sustainability assessments associated with statutory land plans.</td>
<td>• •</td>
<td></td>
<td></td>
<td>CAM/LUPP/DBA</td>
<td>6, 7, 21, 23, 27</td>
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<tr>
<td>Action 3: Private sector actions affecting City service delivery; check costs and provide assistance with managing operational costs when approving development and subdivision applications.</td>
<td>• •</td>
<td></td>
<td></td>
<td>BU/LUPP</td>
<td>6, 7, 27</td>
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<tr>
<td>Action 3: Establish joint working committee.</td>
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<td>CAM/LUPP</td>
<td>6, 18, 21, 27</td>
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<tr>
<td>Action 3: Ensure, with the collaboration of Finance, that planning and infrastructure plans provide for guaranteed provision of operational costs and life cycle renewal costs.</td>
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<td>CAM/FINANCE</td>
<td>6, 7, 27</td>
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<tr>
<td>Action 3: Provide sufficient resources to ensure that life cycle costing of land use plans is achieved through The City’s RIVA modelling tool.</td>
<td>• •</td>
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<tr>
<td>Action 5: Update Asset Management Guidelines.</td>
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<td>CAM</td>
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<tr>
<td>Action 5: Levels of service and risk analysis (corporate level).</td>
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<td></td>
<td></td>
<td>CAM</td>
<td>1, 7, 16</td>
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<td>Action 5: Levels of service and risk analysis (business unit level) – establish level of service baselines.</td>
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<td>Action 5: Levels of service and risk analysis (business unit level) – engagement.</td>
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<td>Action 5: Levels of service and risk analysis (business unit level) – asset level of service.</td>
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CAM = Corporate Asset Management
BU = Asset-owning Business Unit
LUPP = Land Use Planning and Parks
DBA = Development and Building Administration
RIVA = Resource Impact Visualisation and Analysis

*See legend below.
<table>
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<td>Action 5: Levels of service and risk analysis (business unit level) – operation performance indicators.</td>
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<td>Action 5: Asset management innovation – create methodology to assess triple bottom line costs and benefits of infrastructure decisions.</td>
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<td>Action 5: Asset management innovation – research the effects of climate and weather on Calgary’s infrastructure assets.</td>
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<td>8, 11, 23</td>
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<td>Action 6: Asset management enablers: Corporate Asset Registry.</td>
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<td>Action 6: Asset management enablers: life cycle costs analysis and capital planning</td>
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<td>Action 6: Asset management enablers: report automation.</td>
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<td>Action 6: Asset management enablers: Riva AR.</td>
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<td>Action 6: Asset management enablers: data standardization.</td>
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<td>Action 6: Asset management enablers: standardizing the computerized maintenance management systems.</td>
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<td>Action 7: Establish a funding strategy for infrastructure: infrastructure investment plans co-ordination.</td>
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<td>Development 2012–14, implementation 2015–17 and continual improvement thereafter.</td>
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<td>Action 7: Infrastructure funding strategy.</td>
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**STATE OF ASSET MANAGEMENT REPORT ASSESSMENT AREA**

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<tr>
<th>Assessment Area</th>
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<tr>
<td>1</td>
<td>Overall strategic planning</td>
</tr>
<tr>
<td>2</td>
<td>Business unit targets and key performance indicators</td>
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<tr>
<td>3</td>
<td>People skills and competencies master planning</td>
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<td>4</td>
<td>Technology assets planning</td>
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<td>5</td>
<td>Business process mapping</td>
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<td>6</td>
<td>Future trends (impact of growth)</td>
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<td>Level of service</td>
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<td>Asset management plan and master plans</td>
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<td>Legal, regulatory and statutory requirements</td>
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<td>Asset registry</td>
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<td>Asset knowledge</td>
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<td>Data maintenance</td>
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<td>Business applications</td>
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<td>Technology systems integration</td>
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<td>15</td>
<td>Infrastructure investment plan development and implementation</td>
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<td>16</td>
<td>Risk framework – business unit level and asset level</td>
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<td>17</td>
<td>Asset management leadership and governance</td>
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<td>18</td>
<td>Culture change – (role and responsibility clarity, empowerment and training)</td>
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<td>Communication and information sharing</td>
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<td>Continuous improvement culture (sustainability)</td>
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<td>Knowledge retention and succession planning</td>
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<td>Capital projects – planning, design and construction</td>
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<td>28</td>
<td>Asset management</td>
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<td>29</td>
<td>Audit and review</td>
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