CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF OCTOBER 8, 2013

Item 1, Report No. 5, of the Priorities and Key Initiatives Committee, which was adopted without amendment by the Council of the City of Vaughan on October 8, 2013.

1 CORPORATE ASSET MANAGEMENT STRATEGY

The Priorities and Key Initiatives Committee recommends:

1) That recommendation 1 of the following report of the Interim City Manager, Commissioner of Engineering and Public Works and the Director of Engineering Services, dated September 16, 2013, be approved;

2) That staff report back as soon as possible to a Committee of the Whole (Working Session) illustrating the framework of costs and funding to show the full tax impact;

3) That staff review the implementation schedule so that funds being requested in 2014 can be phased in over 2014, 2015 and 2016;

4) That the benefits and cost savings be shown in the financial impact to illustrate the payback period; and

5) That the presentation by the Commissioner of Engineering and Public Works, the Director of Engineering Services, and Mr. Roop Lutchman, GHD, and Communication C1, presentation material, be received.

Recommendation

The Interim City Manager, Commissioner of Engineering and Public Works and the Director of Engineering Services in consultation with the Senior Management Team recommend:

1. That the framework contained within the Corporate Asset Management Strategy Report document be approved;

2. That the economic implications outlined in the report be included for consideration in the 2014 Budget Deliberations.

Contribution to Sustainability

An integral part of a sustainable city is effective asset management, assuring the management of the City's assets maximize the return on the capital and operating investments, and continue to provide optimal service to its residents. Phase 1 of the City's corporate asset management initiative is to develop a strategy to build the processes, tools and resources for the long-term.

Economic Impact

Capital Budget
During the 2013 Budget Deliberations, Capital Project EN-1958-13 Corporate Asset Management was presented whereby:

- $500k was approved in 2013 for the development of the Asset Management Framework
- $780k was recognized in 2014 for the initial implementation of the corporate asset management system, and
- $750k was recognized in 2015 for the continued implementation of the system

…/2

In order to move forward with the next stage of the Corporate Asset initiative, the revised estimate for implementing the newly defined elements is a total of $2.5M. This represents a $970k increase to the original estimated budget requirements, but reflects an efficient implementation process. The following Table summarizes these changes:

	2013 (Approved)	2014 (Forecast)	2015 (Forecast)	TOTAL
Preliminary Submission	$500,000	$780,000	$750,000	$2,030,000
Revised Submission	$500,000	$2,500,000		$3,000,000

Difference $970,000

The $2.5M funding for the project would be allocated for a computerized work management system (est. $1.65M), an enterprise asset management system (est. $350K) and data collection for various asset classes (est. $500K).

Operating Budget

To support a successful implementation of the Corporate Asset Management Framework and Strategy and ensure ongoing effectiveness, 5 FTE's will be required. The 5 FTE's represent a Manager to lead a newly created Asset Management Office, as well as 4 Asset Management Co-ordinator's within the Community Services and Engineering & Public Works Commissions. The total estimated cost associated with these 5 additional resources is approximately $600k. Staff will explore opportunities to partially offset the costs associated with the 4 of the FTE's. Staff will also explore funding the remaining FTE through the Water/Wastewater rates.

All of the identified Additional Resource Requests and Capital Budget requirements, for all the defined elements of the Asset Management implementation, will be considered as part of the 2014 Budget Deliberations.

Communications Plan

Not applicable at this time.

Purpose

To present the corporate asset management strategy and recommended implementation framework as identified in the Corporate Asset Management Strategy Report document (see Attachment No 1), and to advise Council of the financial implications associated with the framework.

Background - Analysis and Options

The development of a Corporate Asset Management System is a strategic initiative identified within Vaughan Vision 2020

One of the strategic initiatives identified by Council, within the Vaughan Vision 2020, is the implementation of a corporate asset management system. A corporate asset management system will create a consistent and standardized approach throughout the organization for the management of infrastructure and equipment, while allowing the flexibility to interpret and apply different practices for the various infrastructure classes.

Asset management can be defined as an integrated, lifecycle approach to effective stewardship of infrastructure assets that will maximize benefits, manage risk and provide appropriate levels of service to the public, in a sustainable and environmentally responsible manner.

The City owns a variety of assets which require ongoing management to ensure optimal investment and sustainability strategies, have been included in this initiative

The City owns a significant portion of public infrastructure that encompasses many different asset classes. As identified through the reporting requirements of PSAB 3150, a variety of assets, varying in both age and value, have been included in this initiative, including:

- Municipal Buildings – Community Centres, Libraries and Fire Halls
- Parks – Trees, Playground Equipment and Entrance Features
- Fleet – Vehicles and Equipment
- Road Network – Bridges, Sidewalks and Streetlights
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- Information Technology – Computers, Servers, Telephones and Equipment

Staff throughout the organization manage all of the City's assets

Municipalities are the stewards of the infrastructure they own. The historical value of the assets owned by the City exceeds $2.89B. These assets are actively managed by a variety of departments within the organization. In the absence of a corporate asset management strategy, each department may manage assets differently applying varying levels of asset management principals.

Future capital funding opportunities are likely to be contingent on municipalities having a detailed asset management plan

The Government of Ontario – Ministry of Infrastructure recently released "Building Together, Guide to Municipal Asset Management Plans". This plan sets out a strategic framework that will guide future investments in ways that support economic growth, are fiscally responsible and respond to changing needs. In addition, the document states "*We are moving toward standardization and consistency in municipal asset management. The first step is requiring any municipality seeking provincial capital funding to prepare a detailed asset management plan and show how its proposed project fits within it."* As a result, the corporate asset management strategy will align with this provincial document to ensure that the City can capitalize on any potential future funding opportunities.

GHD Inc. was retained to assist in developing a comprehensive Corporate Asset Management Strategy and an implementation framework for the City.

The Asset Management Strategy outlines a structured set of actions to be undertaken by the City to modify and improve its asset management capabilities and implement the most appropriate asset management system. The Corporate Asset Management Report, includes the following:

- Developing common goals and objectives
- Define the City's future vision of asset management
- Document and assess current status of City's asset management practices
- Refine the data requirements and level of service for all City assets

- Analyze the gap between the required level and current status of the City's asset inventory to achieve the future vision
- Identify and evaluate strategies and actions required to close the gaps, including resource requirements and timeframes, and
- Recommend the most appropriate asset management governance model for the City and strategies to implement the preferred model

A roadmap to implement Corporate Asset Management practices has been developed and can be fully achieved by 2016 (with the appropriate allocation of resources)

The Corporate Asset Management system includes a comprehensive development and implementation of key concepts, practices and technology solutions. Based on the timelines identified within Section 5 of the Corporate Asset Management Strategy Report, the City can reach a level of "Competent" on the PAS55 scale, by the end of 2016. All elements of the AM Framework would be fully implemented, the appropriate AM Governance model would be in place and leading AM practices would be integrated into many of the day-to-day activities throughout the Corporation.

The benefits of leading asset management practices will only be realized through the implementation of the Corporate Asset Management roadmap.

Asset management considers three key variables, namely level of service, cost of service, and risk. The interaction of these variables define the business case for a Corporate Asset Management strategy at the City.

The following benefits can be realized through the implementation of asset management at a corporate level:

1. City residents can expect reliable delivery of a defined level of service as the City improves its response to their needs.
2. The cost of service will continue to be lowered to the point where there is confidence that the City is operating efficiently with the resources provided.
3. Effective risk management where staff understands the likelihood of assets failing and the consequence and/or impact on levels of service.

A number of initiatives have been identified and developed as part of the Corporate Asset Management strategy and roadmap to help the City take advantage of the existing opportunity gaps identified. The improvement initiative recommendations are consistent with the four major elements of the AM Framework (Planning, Core Service Delivery, Performance Management and Support Services). The strategy and framework for Corporate Asset Management has been developed, and staff recommend proceeding with the implementation of the AM Roadmap.

A corporate investment of $3.1M is required to ensure the successful implementation of the Corporate Asset Management initiative

Data and information technology are essential components of a sound AM program. In the recommended framework, information technology systems and data management are key activities that will enable other elements of the AM Framework, namely planning, service delivery, and performance management.

To successfully implement Corporate Asset Management, the City needs to make the following four strategic investments in the short term:

1. Computerized Work Management System (CWMS) – Optimal allocation of operating budgets ($1.65M)
2. Asset Management System (AMS) – Optimal long term capital and financial decision making ($0.35M)
3. Data Collection Gaps – People and tools ($0.50M)
4. AM Governance – People – 5 FTE's ($0.60M)

The implementation of a Computerized Work Management System will ensure optimal allocation of operating budgets

The implementation of a Computerized Work Management System (CWMS) will provide the City with the technological tools and processes needed to optimize the operations and maintenance activities of its infrastructure. Undertaking maintenance activities at the most appropriate time will not only prolong the need for more expensive infrastructure rehabilitation/replacement, but will also ensure that infrastructure is meeting the required levels of service established by Council. In addition, the CWMS will ensure more efficient and consistent PSAB 3150 reporting.

The implementation of an Asset Management System will ensure optimal long term and financial decision making

An Asset Management System (AMS) will provide the tools needed to make informed decision making. The system will ensure consistent data collection while creating an integrated corporate asset inventory, where all asset information can be readily accessed. An AMS will help the City establish best practices and optimize organization processes. As a result, the following has been identified as benefits of a corporate asset management system:

- Integrate information across departments and commissions
- Optimize decision making
- Enrich long-term asset management planning
- Consistent and uniform financial reporting
- Present comparable information between competing projects

These actions will provide decision makers with added foresight and the ability to proactively grasp future opportunities, address future challenges, and reduce blind spots by understanding the longer-term financial implications of present and past decisions. This is a very strategic approach intended to generate discussion on where the City's future resources should be focused to best support the City's vision, operationalize strategies, generate public value and address pertinent challenges

Adjustments to the recognized 2014 and 2015 capital budgets are required to fund the strategic investments needed to continue implementation of the Corporate Asset Management framework

As part of the 2013 Budget Deliberations, Capital Project EN-1958-13 was submitted and $500,000 was approved for the development of the Corporate Asset Management Strategy and Framework. Estimated funding requirements in the amount of $780,000 and $750,000 were recognized for the 2014 and 2015 capital budgets, respectively, for the implementation of the Corporate Asset Management System.

Through the development of the Asset Management Strategy, it has been identified that a total investment of $2.5M will be required to procure the technology tools needed to successfully implement the Corporate Asset Management initiative, and is calculated as follows:

Requirements	Anticipated Cost
1. Computerized Work Management System (CWMS)	$1.65M
2. Asset Management System (AMS)	$0.35M
3. Data Collection Gaps	$0.5M
Total	**$2.5M**

In order to move forward with the next stage of the Corporate Asset initiative, the 2015 recognized budget ($750,000) would be advanced to 2014 and an increase to the capital budget of $970,000 would be required. This would result in a 2014 capital request of $2.5M, funded from Capital from Taxation, to be submitted for consideration during the 2014 Budget Deliberations.

A Manager of Corporate Asset Management will be needed to lead the implementation and ensure the success of this strategic initiative

To support a successful implementation of the Corporate Asset Management Framework and Strategy and ensure ongoing effectiveness, 5 FTE's will be required. The 5 FTE's represent a Manager to lead a newly created Asset Management Office, as well as 4 Asset Management Co-ordinator's within the Community Services and Engineering & Public Works Commissions. The total cost associated with these FTE's is approximately $600,000.

In order to continue the implementation of the Asset Management framework, the procurement of a consultant assignment may be considered once the 2014 Budget Deliberations have been completed. This consultant would assist the Asset Management steering committee to begin the procurement process of the CWMS, AMS and review of the identified data collection gaps. This assignment would be considered until the recruitment of a Manager of Corporate Asset Management has been completed.

Relationship to Vaughan Vision 2020/Strategic Plan

In consideration of the strategic priorities related to Vaughan Vision 2020, the recommendations of this report will assist in maintaining assets and infrastructure; priorities previously set by Council. The overall asset management process will take into account the City's objectives and strategic initiatives, such as Vaughan Vision 2020, Green Directions Vaughan and Vaughan's Financial Master Plan, and determines how these rely on infrastructure, and then develop a plan to provide the supporting infrastructure services at the lowest lifecycle cost.

Regional Implications

Not Applicable.

Conclusion

That Council approve the framework contained within the Corporate Asset Management Strategy Report document.

Attachments

Attachment No. 1 – Corporate Asset Management Strategy Report – City of Vaughan.

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF OCTOBER 8, 2013

Item 1, Priorities Report No. 5 – Page 7

Report prepared by:

Jack Graziosi, Director of Engineering Services, ext. 8201
Vince Musacchio, Manager of Capital Planning and Infrastructure, ext. 8311

(A copy of the attachments referred to in the foregoing have been forwarded to each Member of Council and a copy thereof is also on file in the office of the City Clerk.)

CLIENTS | PEOPLE | PERFORMANCE

City of Vaughan

Corporate Asset Management Strategy

Presentation to Priorities and Key Initiatives Committee

September 16th, 2013

Presented by:

Paul Jankowski | City of Vaughan – Project Sponsor |

Jack Graziosi | City of Vaughan – Project Manager |

Roop Lutchman | GHD – Project Director |




Summary of Key Findings

To continue the evolution of Asset Management, the City of Vaughan needs to make the following four strategic investments:

1. Computerized Work Management System (CWMS) – Optimal allocation of operating budgets
2. Asset Management System (AMS) – Optimal long term capital and financial decision making
3. Data Collection Gaps – People and tools
4. AM Governance – People

We Have A Common Vision for CAMS

Lack of Alignment

To a Common Vision For CAMS

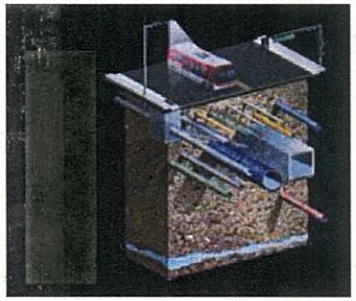
City Owned Assets

Community Services

- Municipal Buildings
  - Community Centres
  - Libraries
  - Fire Halls
- Parks
  - Trees
  - Playground Equipment
  - Benches
- Fleet
  - Vehicles
  - Equipment

Engineering and Public Works

- Roads & Sidewalks
- Watermains
- Sewers
- Bridges
- Streetlights
- Storm Water Management Ponds



Strategic and Corporate Services

- Information Technology
  - Computers
  - Servers

Staff are Engaged and Motivated to Implement CAMS

- Staff have embraced the overall Asset Management concept
- They believe that they are a lean organization and need help to deal with the challenges in the short, medium and long term
- Staff agree with the opportunity gaps and are eager to proceed with AM Development as per the Roadmap
- Technology has been identified as a key enabler and requirement to continue implementing AM at the City

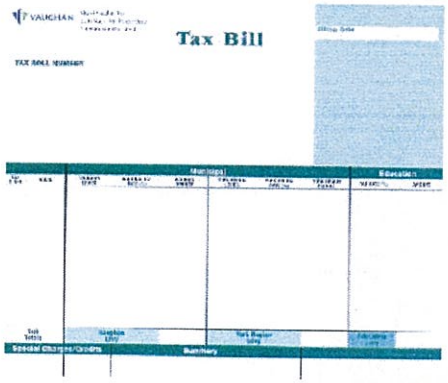
Corporate Asset Management Strategy (CAMS) = Improved Customer Focus & Effective Service Delivery

We need the following to implement CAMS:

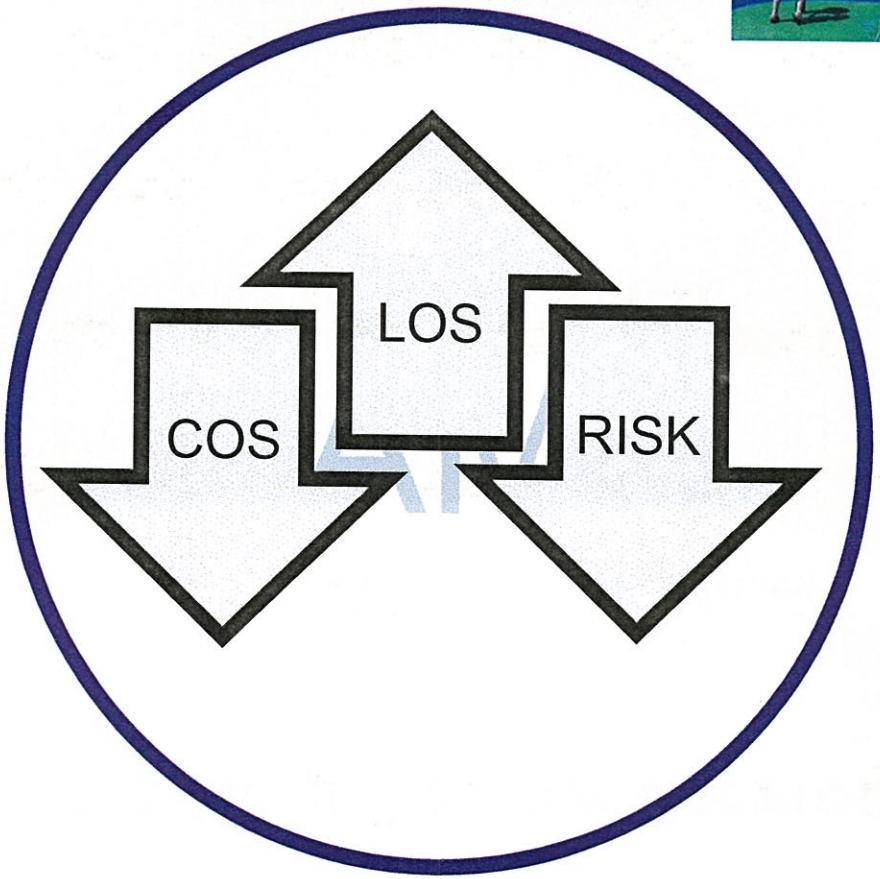
1. Approval of the Asset Management Framework
2. Establish the Asset Management Office (AMO)
3. Secure a Lead for the AMO to further guide the implementation of the strategy
4. Proceed with the technology tools needed
   a. Selection of an enterprise wide Computerized Work Management System (CWMS)
   b. Asset Management System (AMS)
5. Resourcing to close data gaps

Benefits

Improved Response to Needs of Customers



Keep Taxes and Rates Low



Continue to Deliver Service to Residents (Reduce Failures/Delays)

Assets Help Deliver Services

Lighting

Trees

Equipment

Sidewalks

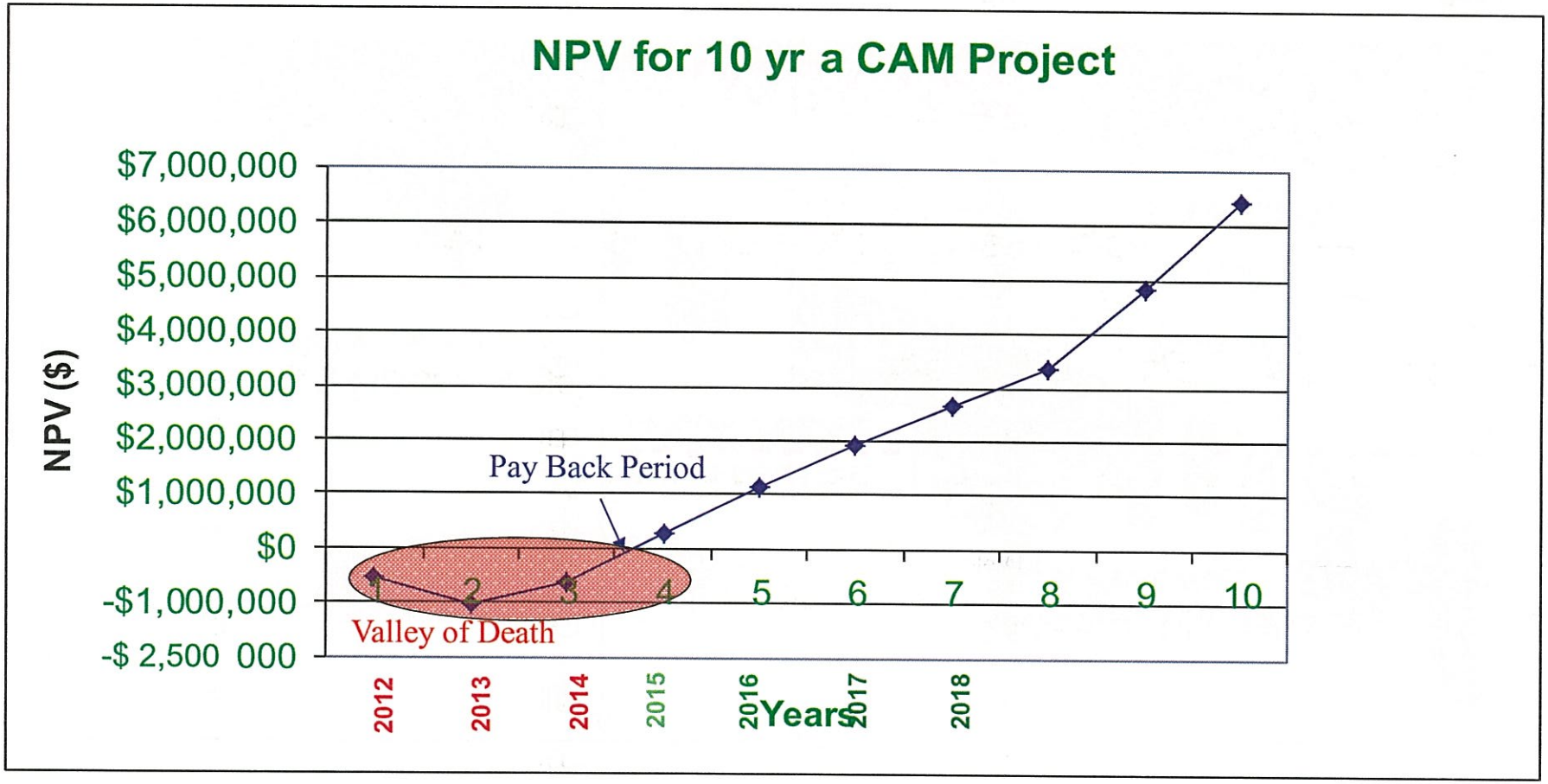
Roads

Water Mains

Technology

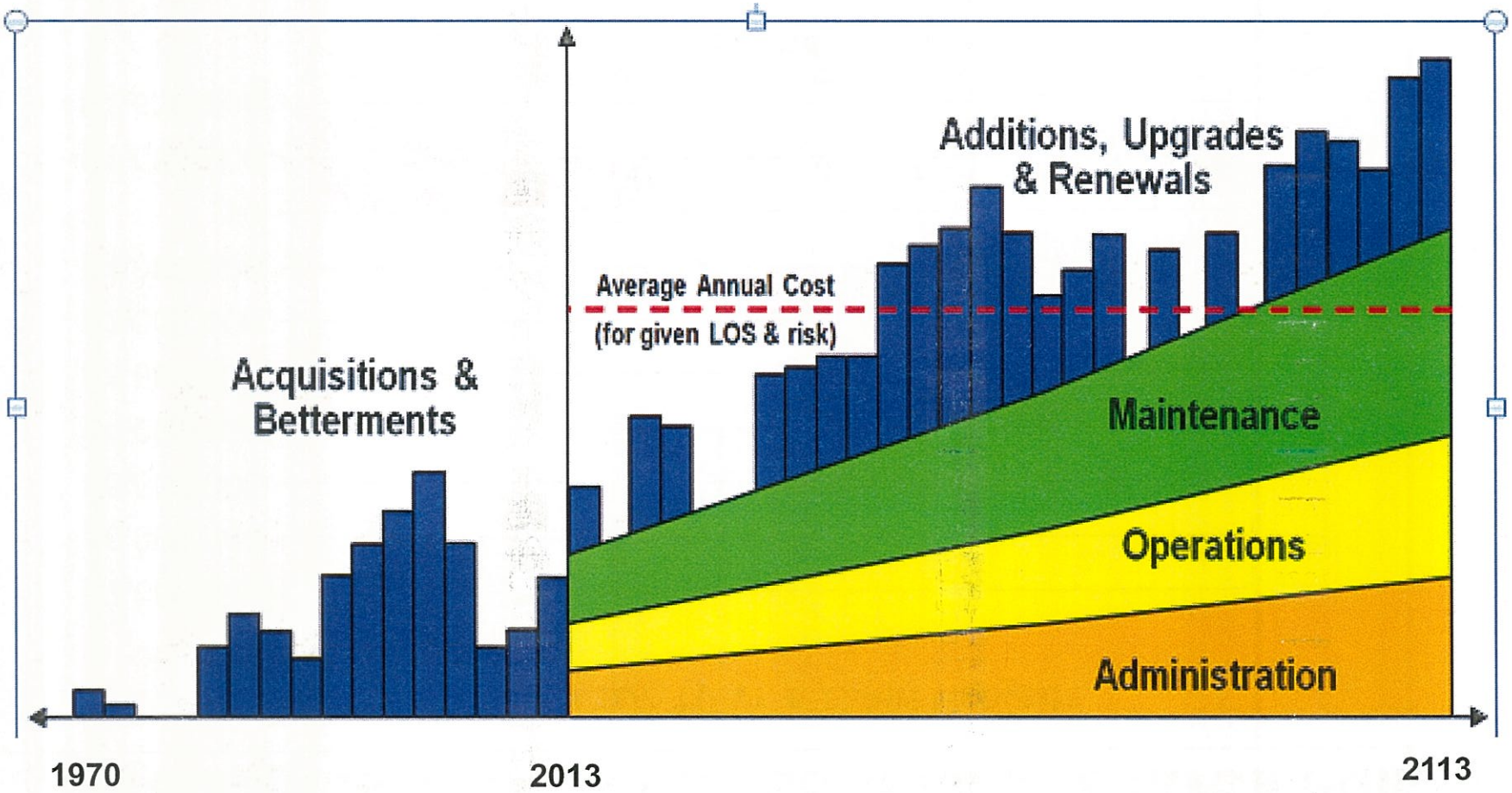
1. Maintain - Reliability
2. Renewals – Squeeze the assets (extend effective lives)
3. Replacements – Maximized the investment in the asset
4. Upgrades/Additions – at the right time to meet increased LOS demands

Implementing the Corporate Asset Management Strategy is a Good Investment of Scarce Funds

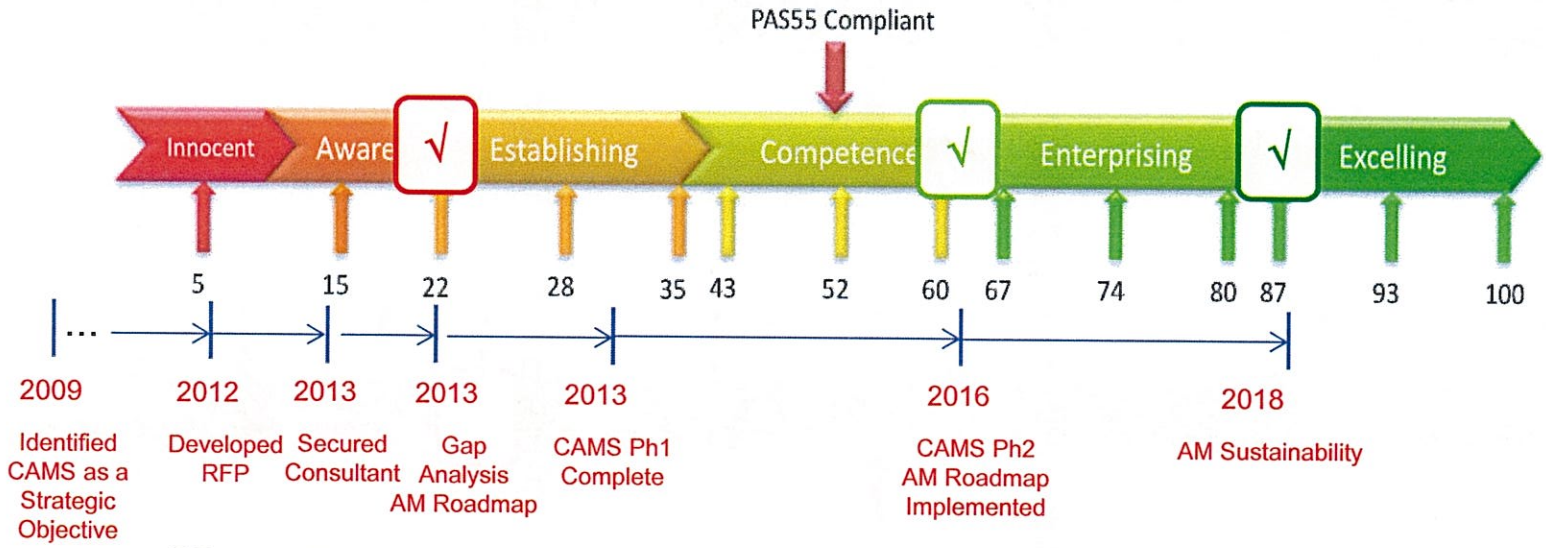


Staff Engaged and Doing the Right Work at the Right Time, for the Right Price and for the Right Reasons

Long Term Financial Planning



A significant opportunity gap has been identified



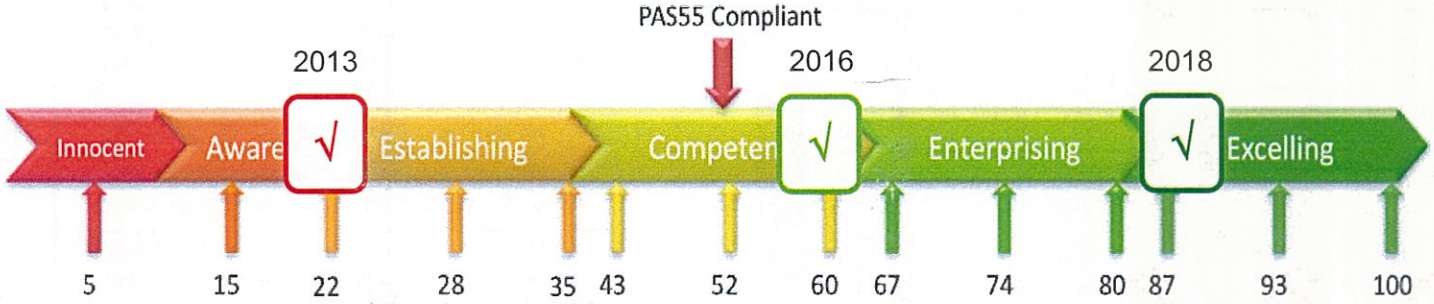
Maturity Score (International Standard- PAS55/ISO 55000)

0	Innocent	The organization is starting to learn about the importance of Asset Management
1	Aware	The organization is aware of the importance of Asset Management and is starting to apply this knowledge
2	Establishing	The organization is developing its Asset Management activities and establishing them as Business As Usual
3	Competence	The organizations Asset Management activities are developed, embedded and are becoming effective
4	Enterprising	The organization's Asset Management activities are fully effective and are being integrated throughout the business
5	Excelling	The organizations Asset Management activities are fully integrated and are being continuously improved to deliver optimal whole life value

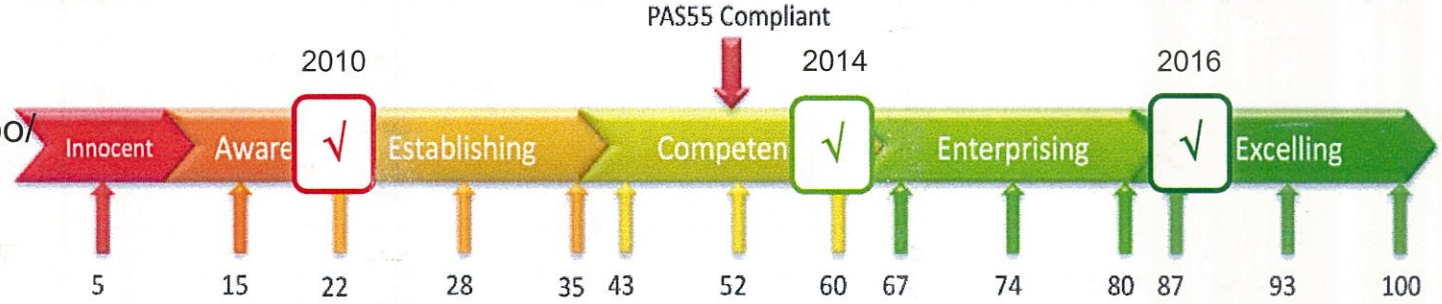
1. Just below average compared to other equivalent municipalities
2. These municipalities have acted on their opportunity gap
3. These municipalities are just completing Phase 1 or into Phase 2

The Journey to Excellence in Asset Management

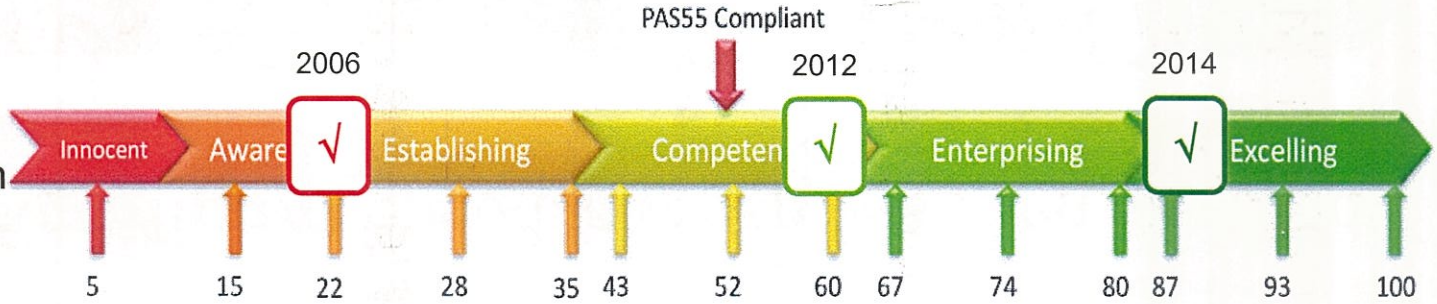
Vaughan



Region of Waterloo/
City of Barrie



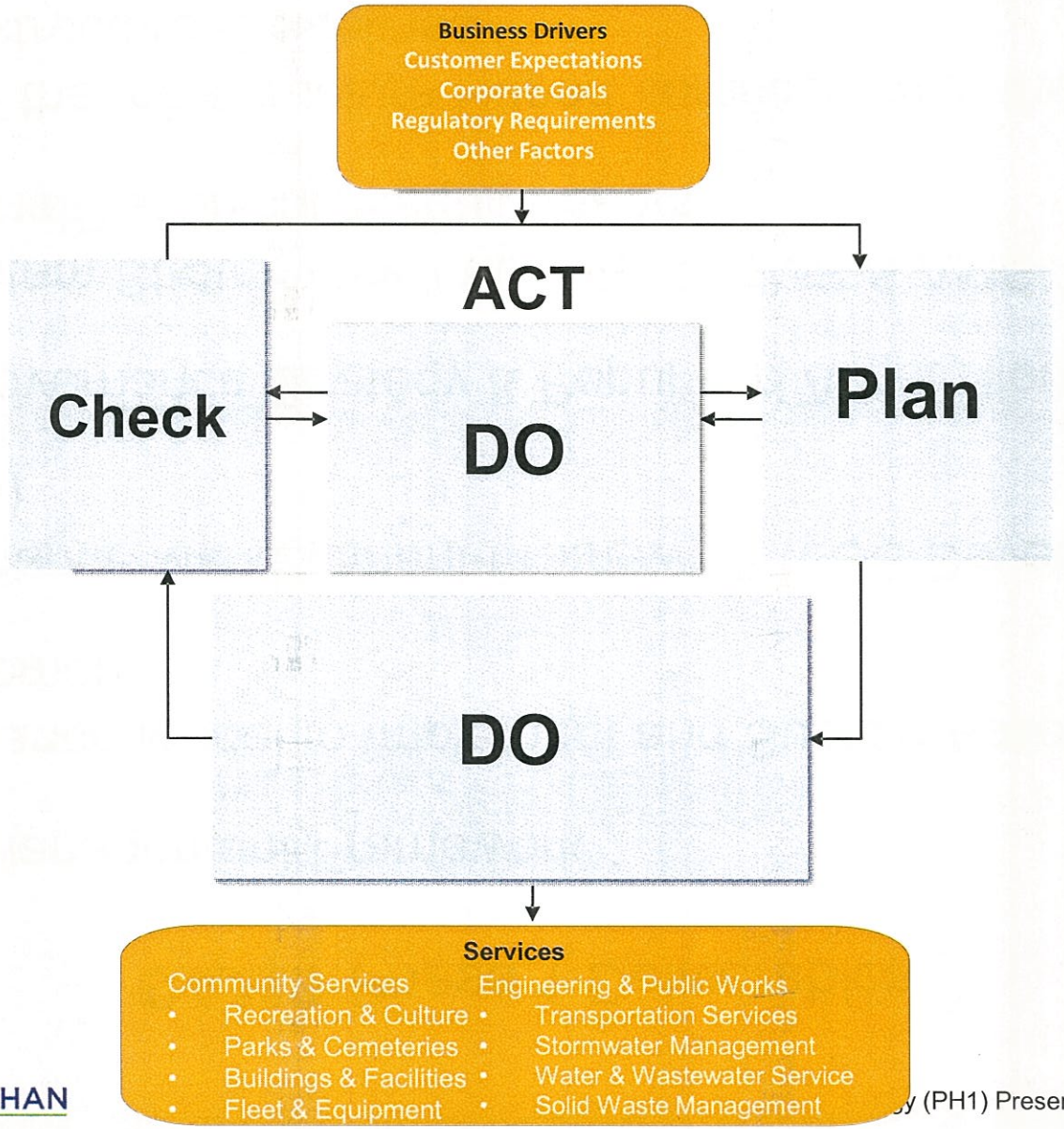
City of Calgary/
City of Hamilton



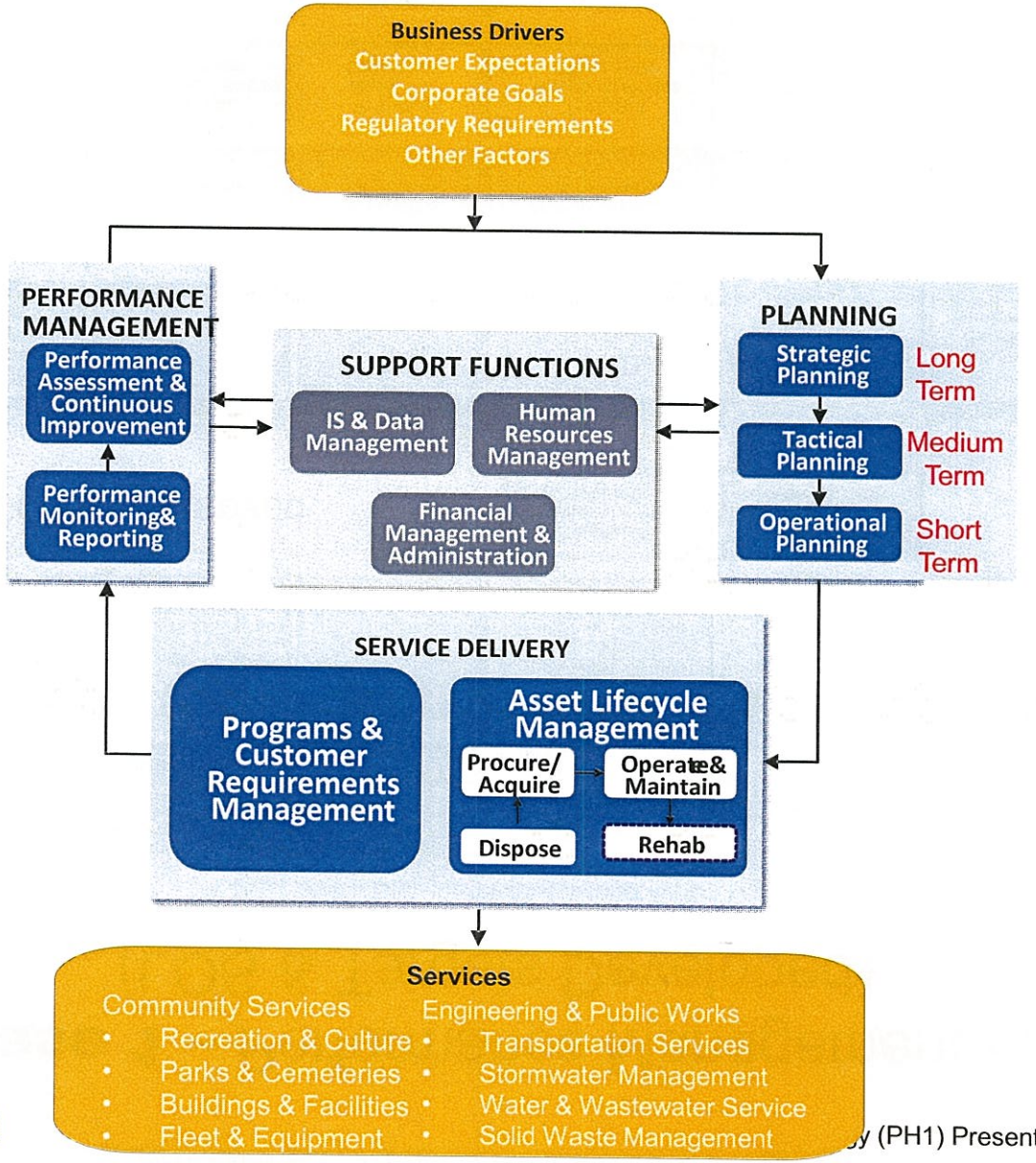
CAMS Phase 1 Deliverables

1. Asset Management Framework
2. Governance Model to Implement and Sustain Asset Management
3. Performance Management Framework (LOS Developed with Targets)
4. Data Governance Strategy & Populated Asset Hierarchy
5. AM System Strategy, including the CWMS & AMS Functional/Technical Requirements
6. State of the Infrastructure Report compliant with the Ministry of Infrastructure Guidelines

Asset Management Framework

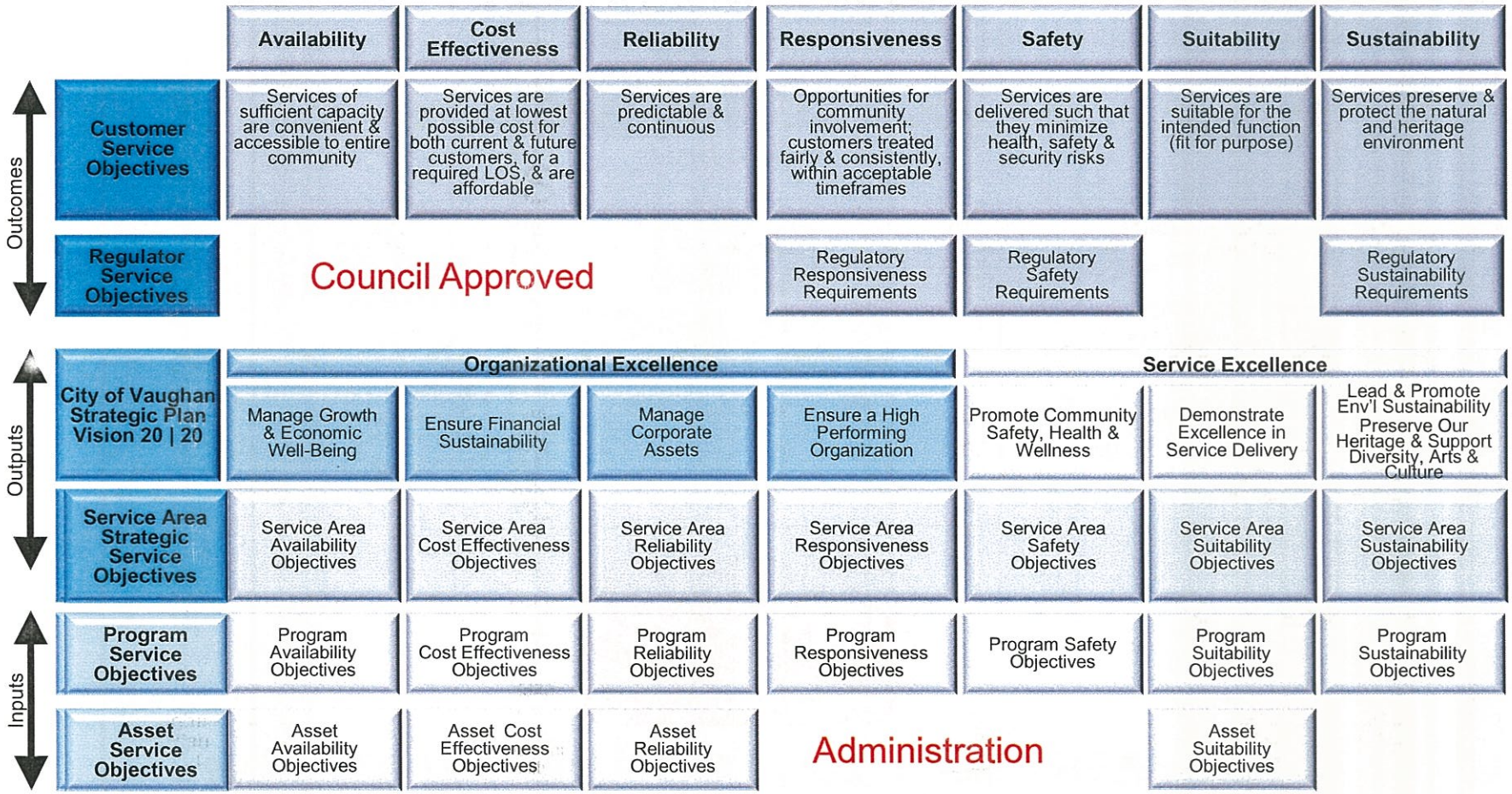


Asset Management Framework



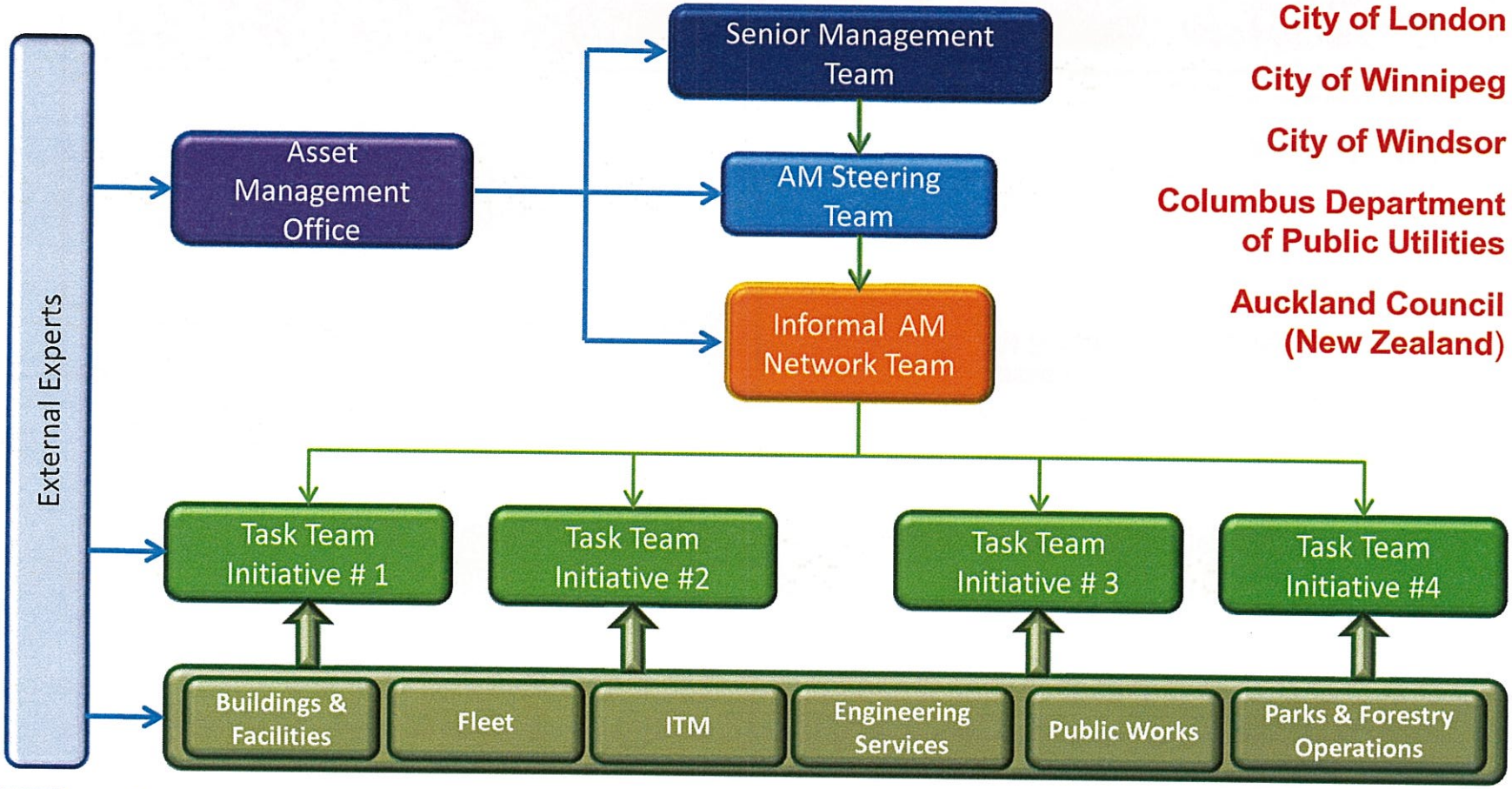
CAMS Phase 1 – Performance Management Framework (LOS & Targets Developed)

Logic Model



CAMS Phase 1 - Governance Model (Implementation)

1. Establish AMO
2. Fill the AMO Lead
3. Keep AM Steering Committee in place to support AMO Lead



City of Calgary

City of London

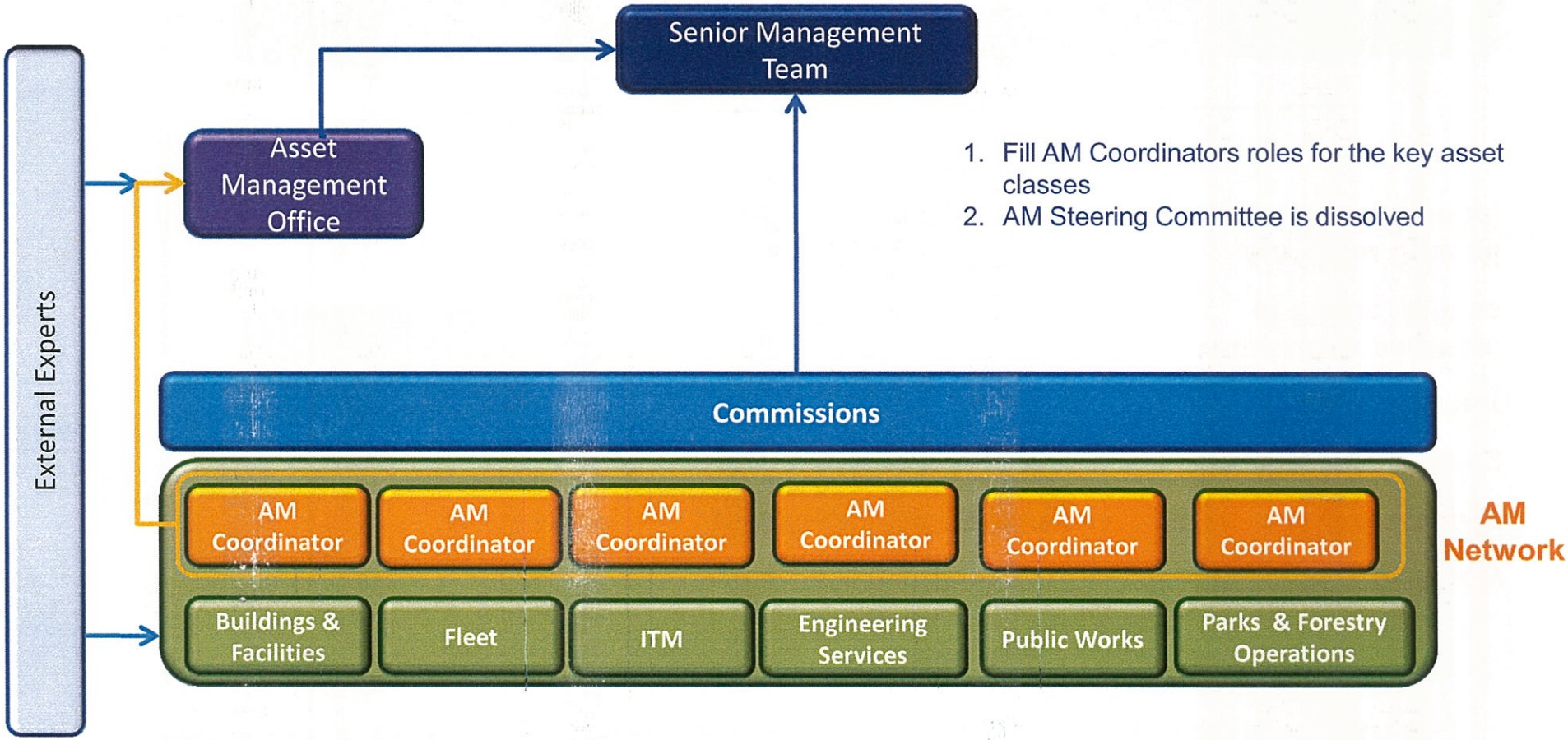
City of Winnipeg

City of Windsor

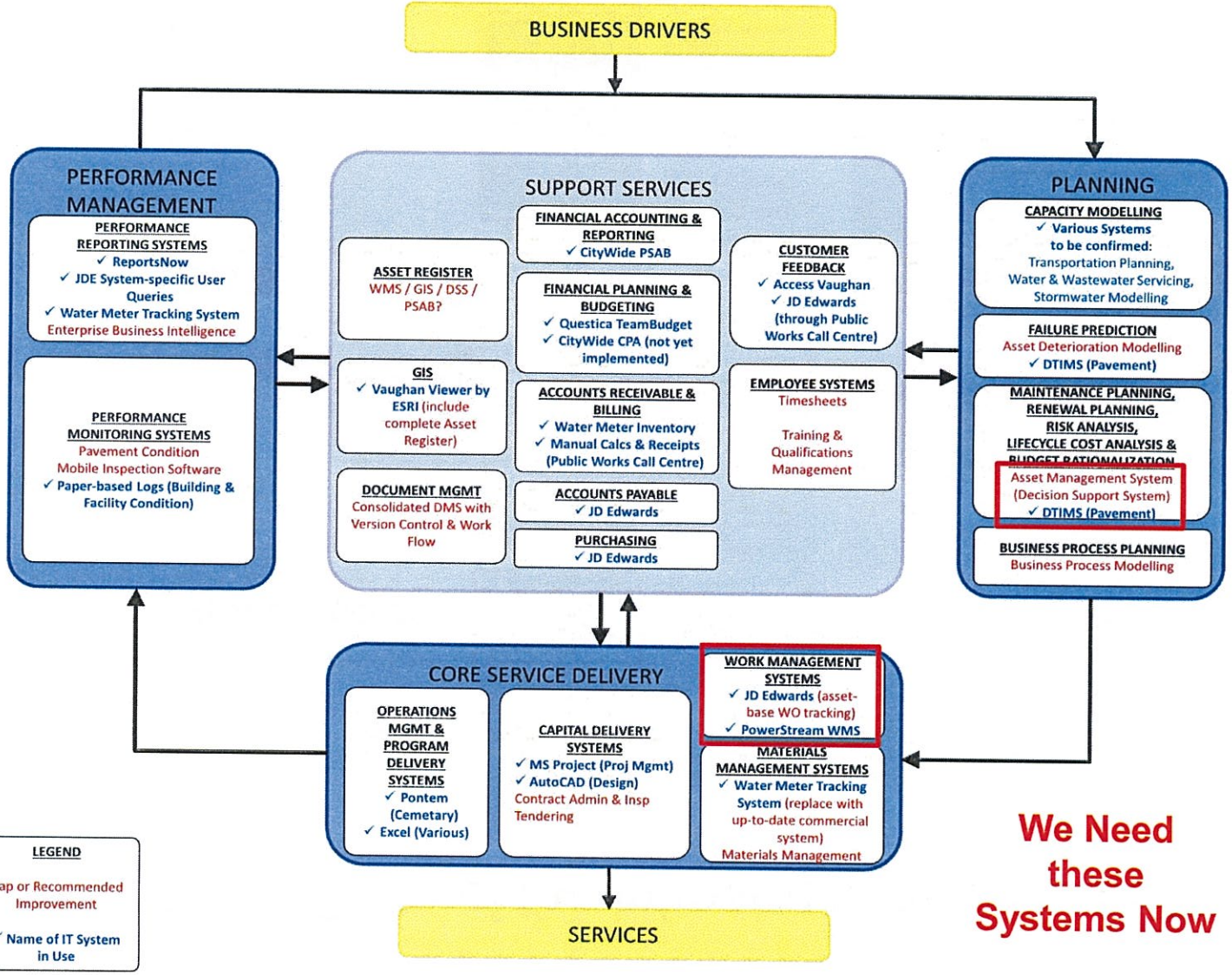
Columbus Department of Public Utilities

Auckland Council (New Zealand)

CAMS Phase 1 - Governance Model (at Maturity)



IT Systems for AM – Gap



We Need these Systems Now

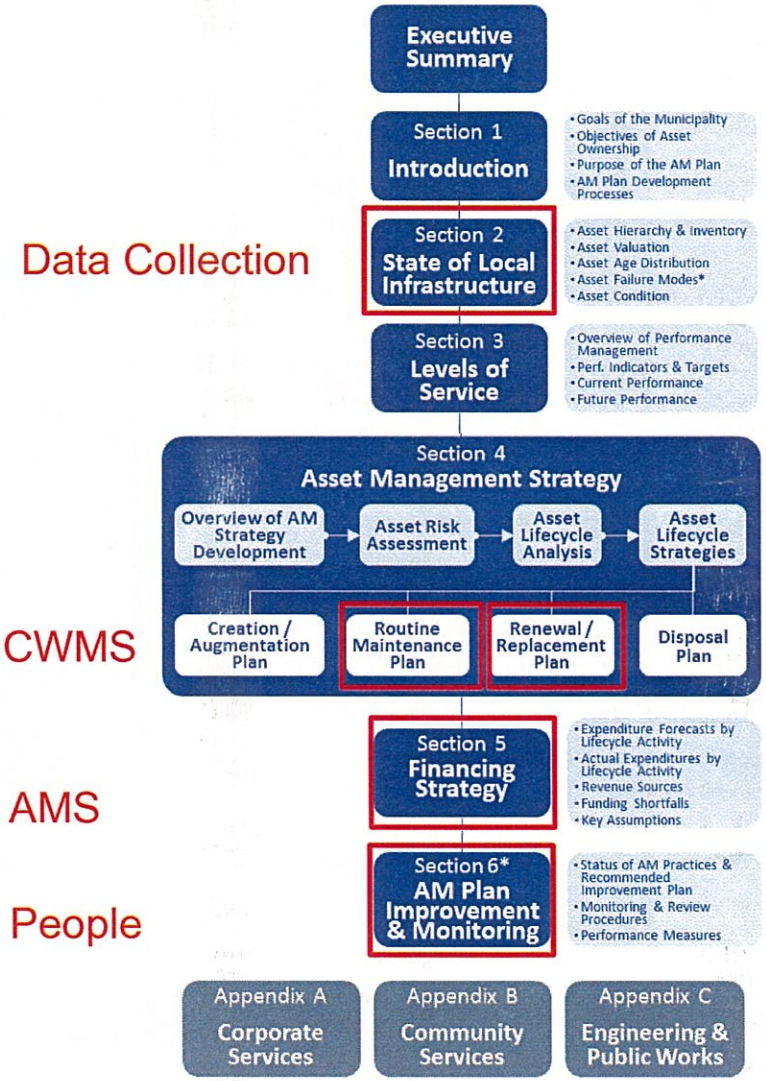
CAMS Ph1 - State of the Infrastructure Version 1

Data Collection

CWMS

AMS

People



This aligns with the Ministry of the Infrastructure's guidelines

Summary of Key Findings and Cost

Requirements	Anticipated Cost	Recognized Budget
1. CWMS	$1.65M	$780K – 2014 $750 – 2015
2. AMS	$0.35M	
3. Data Collection	$0.5M	
4. AM Governance	$ 0.6M (5 FTEs)	
Total	$3.1M	$1.53M

VAUGHAN

GHD

PRIORITIES AND KEY INITIATIVES - SEPTEMBER 16, 2013

CORPORATE ASSET MANAGEMENT STRATEGY

Recommendation

The Interim City Manager, Commissioner of Engineering and Public Works and the Director of Engineering Services in consultation with the Senior Management Team recommend:

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The Government of Ontario – Ministry of Infrastructure recently released "Building Together, Guide to Municipal Asset Management Plans". This plan sets out a strategic framework that will guide future investments in ways that support economic growth, are fiscally responsible and respond to changing needs. In addition, the document states "*We are moving toward standardization and consistency in municipal asset management. The first step is requiring any municipality seeking provincial capital funding to prepare a detailed asset management plan and show how its proposed project fits within it."* As a result, the corporate asset management strategy will align with this provincial document to ensure that the City can capitalize on any potential future funding opportunities.

GHD Inc. was retained to assist in developing a comprehensive Corporate Asset Management Strategy and an implementation framework for the City.

The Asset Management Strategy outlines a structured set of actions to be undertaken by the City to modify and improve its asset management capabilities and implement the most appropriate asset management system. The Corporate Asset Management Report, includes the following:

- Developing common goals and objectives
- Define the City's future vision of asset management
- Document and assess current status of City's asset management practices
- Refine the data requirements and level of service for all City assets
- Analyze the gap between the required level and current status of the City's asset inventory to achieve the future vision
- Identify and evaluate strategies and actions required to close the gaps, including resource requirements and timeframes, and
- Recommend the most appropriate asset management governance model for the City and strategies to implement the preferred model

A roadmap to implement Corporate Asset Management practices has been developed and can be fully achieved by 2016 (with the appropriate allocation of resources)

The Corporate Asset Management system includes a comprehensive development and implementation of key concepts, practices and technology solutions. Based on the timelines identified within Section 5 of the Corporate Asset Management Strategy Report, the City can reach a level of "Competent" on the PAS55 scale, by the end of 2016. All elements of the AM Framework would be fully implemented, the appropriate AM Governance model would be in place and leading AM practices would be integrated into many of the day-to-day activities throughout the Corporation.

The benefits of leading asset management practices will only be realized through the implementation of the Corporate Asset Management roadmap.

Asset management considers three key variables, namely level of service, cost of service, and risk. The interaction of these variables define the business case for a Corporate Asset Management strategy at the City.

The following benefits can be realized through the implementation of asset management at a corporate level:

1. City residents can expect reliable delivery of a defined level of service as the City improves its response to their needs.
2. The cost of service will continue to be lowered to the point where there is confidence that the City is operating efficiently with the resources provided.
3. Effective risk management where staff understands the likelihood of assets failing and the consequence and/or impact on levels of service.

A number of initiatives have been identified and developed as part of the Corporate Asset Management strategy and roadmap to help the City take advantage of the existing opportunity gaps identified. The improvement initiative recommendations are consistent with the four major elements of the AM Framework (Planning, Core Service Delivery, Performance Management and Support Services). The strategy and framework for Corporate Asset Management has been developed, and staff recommend proceeding with the implementation of the AM Roadmap.

A corporate investment of $3.1M is required to ensure the successful implementation of the Corporate Asset Management initiative

Data and information technology are essential components of a sound AM program. In the recommended framework, information technology systems and data management are key activities that will enable other elements of the AM Framework, namely planning, service delivery, and performance management.

To successfully implement Corporate Asset Management, the City needs to make the following four strategic investments in the short term:

1. Computerized Work Management System (CWMS) – Optimal allocation of operating budgets ($1.65M)
2. Asset Management System (AMS) – Optimal long term capital and financial decision making ($0.35M)
3. Data Collection Gaps – People and tools ($0.50M)
4. AM Governance – People – 5 FTE’s ($0.60M)

The implementation of a Computerized Work Management System will ensure optimal allocation of operating budgets

The implementation of a Computerized Work Management System (CWMS) will provide the City with the technological tools and processes needed to optimize the operations and maintenance activities of its infrastructure. Undertaking maintenance activities at the most appropriate time will not only prolong the need for more expensive infrastructure rehabilitation/replacement, but will also ensure that infrastructure is meeting the required levels of service established by Council. In addition, the CWMS will ensure more efficient and consistent PSAB 3150 reporting.

The implementation of an Asset Management System will ensure optimal long term and financial decision making

An Asset Management System (AMS) will provide the tools needed to make informed decision making. The system will ensure consistent data collection while creating an integrated corporate asset inventory, where all asset information can be readily accessed. An AMS will help the City establish best practices and optimize organization processes. As a result, the following has been identified as benefits of a corporate asset management system:

- Integrate information across departments and commissions
- Optimize decision making
- Enrich long-term asset management planning
- Consistent and uniform financial reporting
- Present comparable information between competing projects

These actions will provide decision makers with added foresight and the ability to proactively grasp future opportunities, address future challenges, and reduce blind spots by understanding the longer-term financial implications of present and past decisions. This is a very strategic approach intended to generate discussion on where the City's future resources should be focused to best support the City's vision, operationalize strategies, generate public value and address pertinent challenges

Adjustments to the recognized 2014 and 2015 capital budgets are required to fund the strategic investments needed to continue implementation of the Corporate Asset Management framework

As part of the 2013 Budget Deliberations, Capital Project EN-1958-13 was submitted and $500,000 was approved for the development of the Corporate Asset Management Strategy and Framework. Estimated funding requirements in the amount of $780,000 and $750,000 were recognized for the 2014 and 2015 capital budgets, respectively, for the implementation of the Corporate Asset Management System.

Through the development of the Asset Management Strategy, it has been identified that a total investment of $2.5M will be required to procure the technology tools needed to successfully implement the Corporate Asset Management initiative, and is calculated as follows:

Requirements	Anticipated Cost
1. Computerized Work Management System (CWMS)	$1.65M
2. Asset Management System (AMS)	$0.35M
3. Data Collection Gaps	$0.5M
Total	**$2.5M**

In order to move forward with the next stage of the Corporate Asset initiative, the 2015 recognized budget ($750,000) would be advanced to 2014 and an increase to the capital budget of $970,000 would be required. This would result in a 2014 capital request of $2.5M, funded from Capital from Taxation, to be submitted for consideration during the 2014 Budget Deliberations.

A Manager of Corporate Asset Management will be needed to lead the implementation and ensure the success of this strategic initiative

To support a successful implementation of the Corporate Asset Management Framework and Strategy and ensure ongoing effectiveness, 5 FTE's will be required. The 5 FTE's represent a

Manager to lead a newly created Asset Management Office, as well as 4 Asset Management Co-ordinator's within the Community Services and Engineering & Public Works Commissions. The total cost associated with these FTE's is approximately $600,000.

In order to continue the implementation of the Asset Management framework, the procurement of a consultant assignment may be considered once the 2014 Budget Deliberations have been completed. This consultant would assist the Asset Management steering committee to begin the procurement process of the CWMS, AMS and review of the identified data collection gaps. This assignment would be considered until the recruitment of a Manager of Corporate Asset Management has been completed.

Relationship to Vaughan Vision 2020/Strategic Plan

In consideration of the strategic priorities related to Vaughan Vision 2020, the recommendations of this report will assist in maintaining assets and infrastructure; priorities previously set by Council. The overall asset management process will take into account the City's objectives and strategic initiatives, such as Vaughan Vision 2020, Green Directions Vaughan and Vaughan's Financial Master Plan, and determines how these rely on infrastructure, and then develop a plan to provide the supporting infrastructure services at the lowest lifecycle cost.

Regional Implications

Not Applicable.

Conclusion

That Council approve the framework contained within the Corporate Asset Management Strategy Report document.

Attachments

Attachment No. 1 – Corporate Asset Management Strategy Report – City of Vaughan.

Report prepared by:

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Respectfully submitted,

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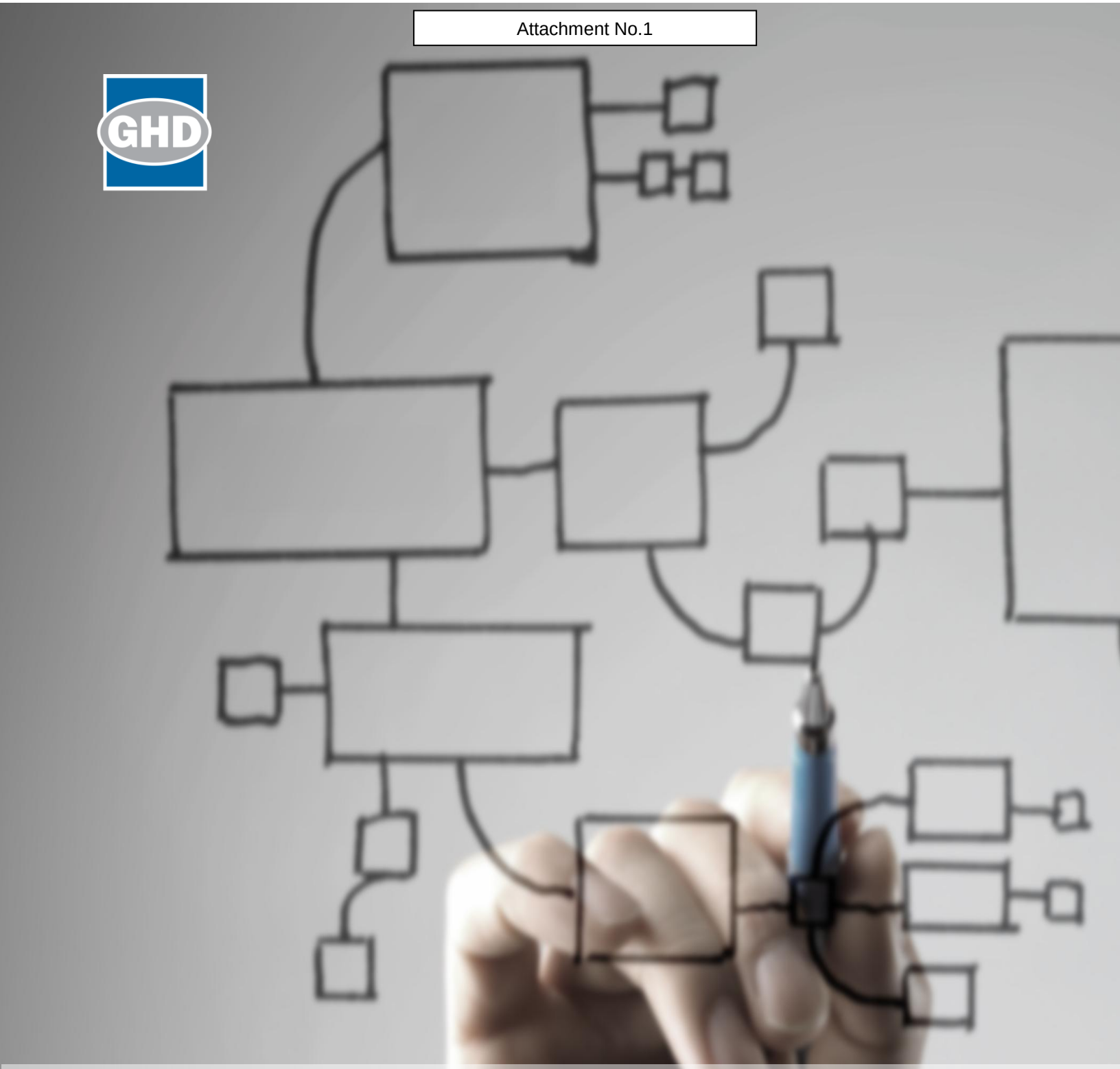
Interim City Manager

Paul Jankowski, P. Eng.
Commissioner of Engineering
and Public Works

Jack Graziosi, P. Eng.
Director of Engineering Services

JG:sm

Attachment No.1



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06 September 2013

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List of Abbreviations

Abbreviation	Definition
AM	Asset Management
AMO	Asset Management Office
AMS	Asset Management System
CAM	Corporate Asset Management
CAMS	Corporate Asset Management Strategy
CWMS	Computerized Work Management System
COS	Cost of Service
FTE	Full Time Equivalent
GIS	Geographic Information System
IS	Information Systems
ISO	International Organization for Standardization
IT	Information Technology
LOS	Level of Service
MOI	Ministry of Infrastructure
PAS 55	Publicly Available Specification for the Optimized Management of Physical Assets
RFP	Request for Proposal
SMT	Senior Management Team
WMS	Work Management System
WSAA	Water Services Association of Australia

1. Background

1.1 Objectives for Asset Management Practice Improvement

The City of Vaughan has been managing infrastructure to support service delivery since its establishment in 1850. However, while good practices are in place, a formalized method for managing infrastructure consistently across all commissions (e.g., Community Services, Engineering & Public Works, and Strategic & Corporate Services) is not in place. The Engineering & Public Works Commission has been tasked to develop an integrated City-wide approach to asset management, to be built upon existing practices. The City envisions a phased Corporate Asset Management (CAM) program that will ensure that leading practices in the areas of asset management processes, technologies and governance are implemented consistently across the various commissions in a stepped fashion that is sustainable over time. Specifically, key objectives for asset management practice improvement at the City have been identified as follows:

1. Integrate information across all commissions and departments
2. Optimize operational decision making
3. Enrich integrated long term asset planning
4. Report on assets in a consistent and uniform manner
5. Present comparable information between competing projects.

1.2 CAMS Phase 1 Scope

Phase 1 of this Corporate Asset Management (AM) Strategy program has focused on the following tasks:

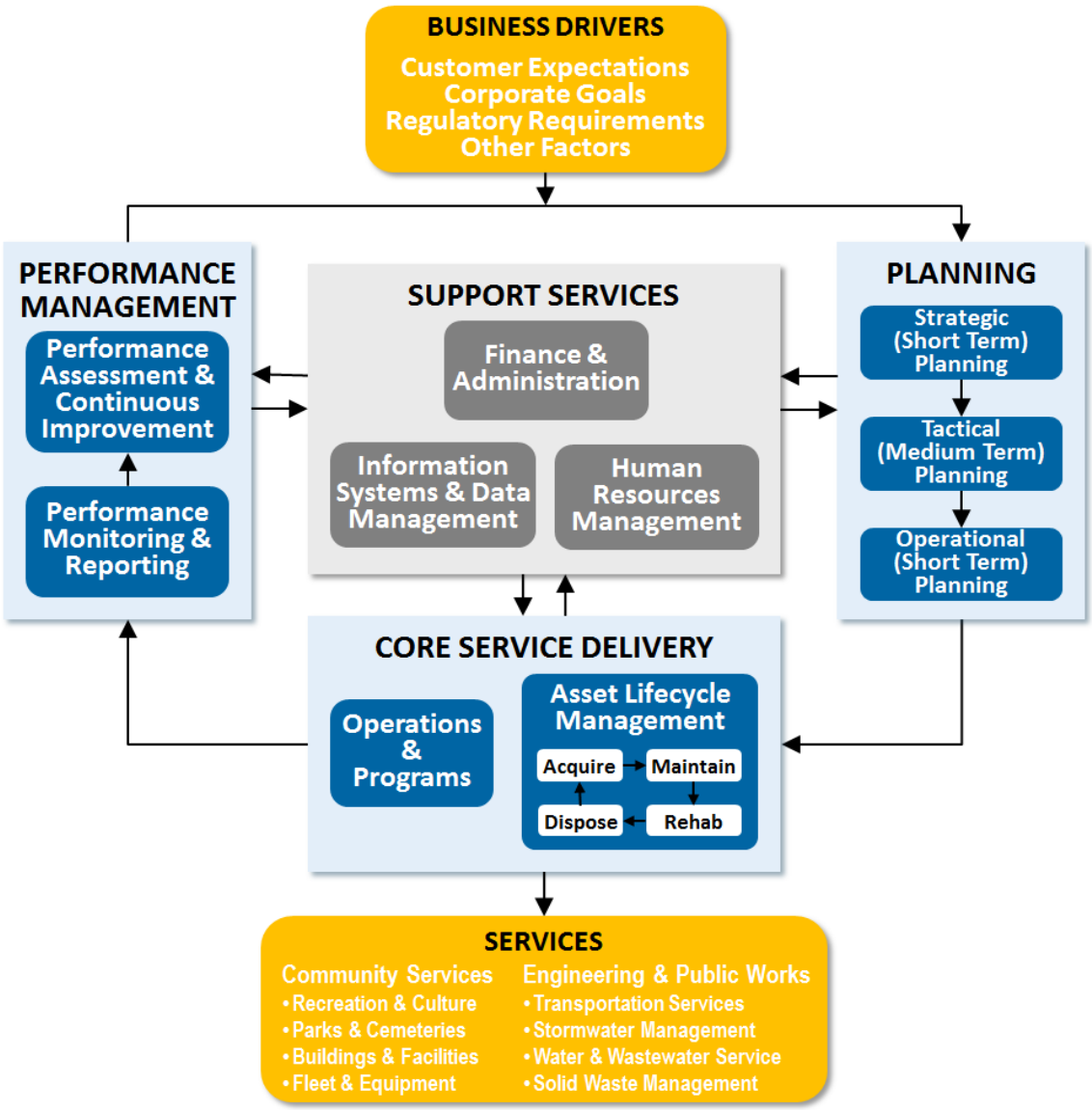
- **AM Strategy & Roadmap:** Conduct an AM GAP Assessment to establish the City's PAS 55 AM maturity scale rating and develop an AM roadmap to address any gaps in line with leading practices
- **AM Governance Model:** Recommend an AM Governance Model to support implementation of the City's corporate AM Strategy and vision
- **AM Data & Technology Tools:** Develop an Information Technology (IT) Systems Strategy to support implementation of the City's corporate AM strategy and initiatives
- **Performance Management & LOS:** Continuing to meet the existing council approved levels of service (LOS)
- **AM Plan:** Develop AM Plans in accordance with the Ministry of Infrastructure: Building Together, Guide for Municipal Asset Management Plans.

This report is provides a summary of the key deliverables for each of the above tasks and provides the rationale for Senior Management Team (SMT) and Council approval to proceed with the next phases of asset management development at the City.

1.3 Asset Management Framework

The following AM Framework has been recommended for approval by the City for implementing and sustaining asset management concepts and practices. It consists of several major elements, as outlined below the diagram.

Figure 1-1 City of Vaughan AM Framework



Business Drivers and Services

These are shown in yellow above and provide the boundaries or “book ends” to the framework.

- Business drivers are the external influences to the City’s business and include service requirements such as customer expectations, corporate goals, regulatory requirements, and environmental factors such as the general economy, and political and social priorities. Business drivers are used in the model to prioritize inputs of resources and establish focus on organizational activities that address the business drivers.
- The primary output of the City’s business is the delivery of a variety of community services and programs that will satisfy stakeholder’s needs – the ultimate outcome.

Processes

Core processes (shown in blue) contribute directly to the delivery of community services and cover the entire lifecycle of the asset, with individual practices required for different asset types, and include planning, service delivery, and performance management. Each of these processes is described below:

- **Planning:** Converts the business drivers into a set of operational plans that describe how the municipality will deliver services: the scope and quality of services, the programs (or processes) that will be used to deliver the defined services and the inputs required, including financial resources, human resources, and technology resources. The levels of planning include:
  - ***Long Term Planning*** which converts legal and stakeholder requirements and expectations into service outcomes and overall long-term strategies (e.g., Corporate/Commission/Division Strategic Plans, Policies)
  - ***Medium Term Planning*** which develops sub-plans to allocate resources (natural, physical, financial, human, etc.) to achieve the strategic goals, while meeting defined levels of service (e.g., Airport/Water/Transportation Master Plans, Performance Management Plan, Asset Management Plan, Human Resources Plan, Business Continuity Plans, Airport Business and Marketing Plan, Long Term Funding Strategy)
  - ***Short Term Planning*** which converts tactical, medium term plans into short term executable plans and budgets (e.g., 10-Year Capital Programs, Annual Operating Budgets, Emergency Preparedness & Response Plans, Operational Standards & Specifications).
- **Core Service Delivery:** Implements the Short Term executable plans including the following:
  - Lifecycle asset management including:
    - Asset creation or acquisition
    - Asset maintenance
    - Asset renewal (rehabilitation and disposal)
  - Operations and programming
  - Work and resource management

- **Performance Management:** Checks that the municipality is doing what it intended to do – at multiple levels: meeting stakeholders needs (the ultimate outcome), delivering the defined scope and quality of services (the key output), delivering the defined programs through the efficient and effective use of infrastructure, financial, human and technology resources (interim outputs). Activities (all of which will take place at multiple levels (outcomes, outputs, programs, and inputs)) include:
  - Monitoring actual results and reporting actual against targets over time, including benchmarking
  - Assessing gaps, and continuous improvement.

Support Services (shown in grey) enable core service delivery, and include the following:

- Financial management and administration
- Human resources management
- Information systems and data management.

1.4 Benefits of Asset Management

The definition of asset management considers three key concepts: Level of Service (LOS), Cost of Service (COS), and Risk. The interaction of these concepts is shown in the graphic below, alongside the definition of asset management.

Figure 1-2 The LOS, COS and Risk Interaction

Definition of Asset Management

Asset Management is an integrated set of processes that minimize the lifecycle costs of owning, operating, and maintaining assets, at an acceptable level of risk, while continuously delivering established levels of service.

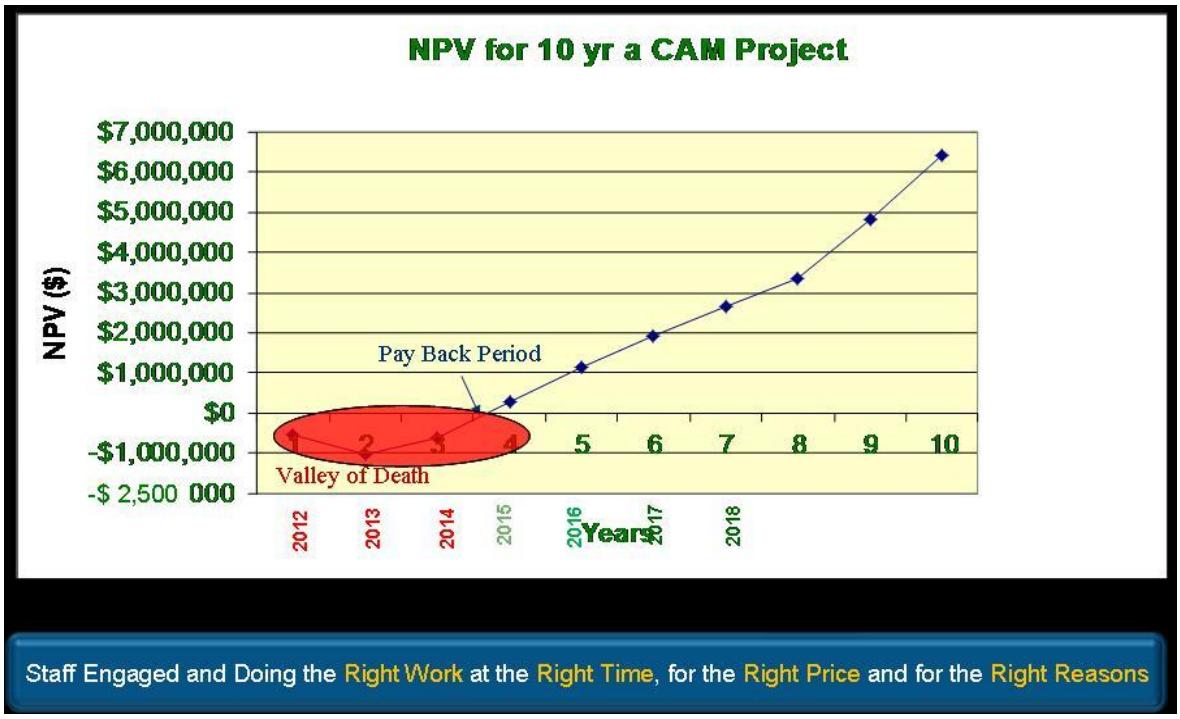
Implementing asset management at the City of Vaughan should bring the following real benefits:

- City residents can expect reliable delivery of council approved level of service (LOS) as the City improves its response to their needs.
- The Cost of Service (COS) will continue to be lowered to the point where there is confidence (backed up with good data) that the City is operating as lean as possible.
- In addition, there will be effective risk management where staff understands the likelihood of assets failing and the consequence or impact on levels of service. RISK is the product of these two elements. Effective risk management makes it clear, what assets should be funded for risk mitigation and quantifies the risk that the City is taking on.

Simply put, success at asset management means that City staff will always be engaged doing the right tasks, at the right time, for the right reasons and the right cost.

The City of Vaughan has begun its asset management journey, investing in its staff's time and the CAMS Phase 1 project. The City needs to continue with the AM development as per the AM Roadmap to realize the benefits discussed above. The figure below shows the return on investment curve for a similar asset management development project.

Figure 1-3 Return on Investment from a CAMS Program



2. Need for a City of Vaughan Asset Management Strategy (Vision)

Asset management is often defined as a framework – a "way of thinking" that is built around a "body of best practices". This way of thinking and the body of best practices focus on seeking the lowest total lifecycle cost of ownership for infrastructure assets while continuously delivering services at a level customers and stakeholders require and are willing to pay for, and at an acceptable level of risk to the community. While asset management is a strategic-level framework that embraces the entire business, it is only truly effective when practiced down at the "asset level" – that is, when capital investment to support growth, augmentation or renewal is truly the right solution, for the right reason, at the right time, and when maintenance investment is truly cost-effective in extending asset life, sustaining performance, and enhancing reliability.

The City of Vaughan need an asset management strategy to ensure:

1. Compliance with the Ministry of the Infrastructure's Asset Management Plan guidelines (meet provincial funding requirements)
2. A vision and strategic goals for asset management in accordance with Vaughan Vision 2020
3. The long term cost and required asset planning to sustain the assets owned by the City, to deliver the current and forecast future requirements to replace and maintain these assets
4. A framework for implementation of asset management across all departments for coordination at a corporate level
5. Accessible and reliable corporate data and reporting (e.g. TCA/PSAB 3150)
6. Technology required to support operational, maintenance, and capital decision making

The City's Corporate Asset Management Strategy (CAMS) provides a common definition of asset management, and captures the overall vision, mission and framework for implementing and sustaining leading asset management concepts and practices across all commissions.

Asset Management Definition

Asset Management is an integrated set of processes that minimize the lifecycle costs of owning, operating, and maintaining assets, at an acceptable level of risk, while continuously delivering established levels of service*.*

Vision

Consistently provide service excellence at sustainable and responsible asset lifecycle costs and acceptable levels of risk.

Mission

This corporate asset management initiative will be implemented in a five year period and will be sustained into the future to provide levels of service (LOS) that the community and stakeholders want and are willing to pay for through:

- Preservation of assets
- Protection of the environment
- Financial sustainability (including developing a strategy for addressing the infrastructure funding gap)
- Promotion of health and safety.

3. Asset Management Strategy

3.1 Current Situation Analysis

The AM strategy and supporting roadmap will define the various initiatives necessary to continue AM development within the City over the short, medium and long term.

The vision of leading asset management concepts and practices described in the preceding section can be considered as ultimate goals for AM at the City. To develop a clear AM Roadmap, it is essential that there is a full understanding of the current situation with respect to asset management concepts and practices at the City. This will then set the stage for identifying opportunity gaps and the development of the AM Roadmap to move the City to its vision of leading asset management practices.

3.2 Gap Analysis Methodology

The AM Framework elements described in the previous section form the structure for the gap analysis that is used to measure where the City is in its asset management practices relative to where it wants to be within a specified period of time. The gap is the distance between the "as is" of the current environment and the "to be" of the desired future state of the organization. In 2013, through

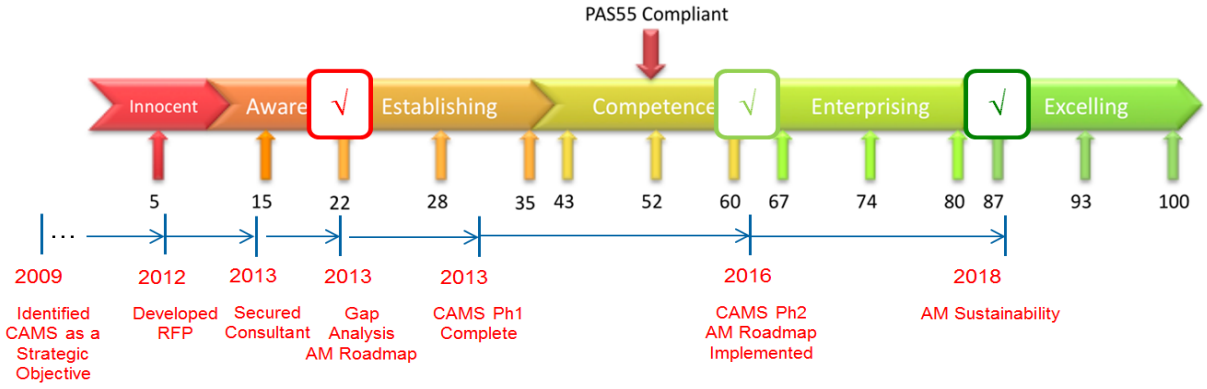
workshops with relevant city staff, GHD developed an understanding of the City's current decision-making processes and supporting data, systems and organization, and conducted a gap analysis using its TEAMQF gap analysis tool. When compared to leading practices, opportunity gaps were identified that served as the basis for development of improvement initiatives. In addition, GHD has projected scores for 2017 that indicate the level of AM maturity if the AM Roadmap is implemented.

3.3 Gap Analysis Results

The figure below shows that the City at a maturity level of "Establishing" its asset management practices. Council's initial support and identification of CAMS as a strategic objective for the City in 2009 has been the impetus for the CAMS Phase 1 project. The research into AM leading practices, programs being undertaken by similar municipalities, and the RFP development had the immediate effect of moving the City from "Awareness" to a maturity level of "Establishing" in 2013. The City is currently just below average compared to the maturity levels of other equivalent municipalities when they initiated their gap analyses. Many of these municipalities have acted on their opportunity gaps and are just completing Phase 1 or have started Phase 2 of their AM Roadmaps.

This CAMS Phase 1 project has established the necessary foundation for developing and sustaining leading practices at the City. With the AM Roadmap implemented over the next 5 years, the City can expect to start displaying a maturity level "Enterprising".

Figure 3-1 Gap Analysis Results



Maturity Score
(International Standard: PAS55/ISO 55000)

0	Innocent	The organization is starting to learn about the importance of Asset Management
1	Aware	The organization is aware of the importance of Asset Management and is starting to apply this knowledge
2	Establishing	The organization is developing its Asset Management activities and establishing them as Business As Usual
3	Competence	The organizations Asset Management activities are developed, embedded and are becoming effective
4	Enterprising	The organization's Asset Management activities are fully effective and are being integrated throughout the business
5	Excelling	The organizations Asset Management activities are fully integrated and are being continuously improved to deliver optimal whole life value

3.4 Business Drivers for Asset Management

This section of the report describes the key business drivers for the City, as identified from discussion with key staff, the Steering Team, and the Project Team. Business drivers describe the impetus for the business and supporting assets – the unique set of customer expectations, corporate goals and legislative requirements for the City that are used to set priorities for "balancing" the asset management program elements and determining an appropriate improvement program for the City. The following business drivers form the basis for future AM development at The City of Vaughan:

1. Capital Expenditure reduction/reduce debt
2. Regulatory compliance
3. Information system deficiencies
4. Value for money
5. Business performance improvement requirements
6. Mandated long term asset planning
7. Customer driven service level improvement
8. Continuous improvement – internally driven
9. Increasing asset acquisition and capital delivery costs
10. Significantly aging infrastructure.

4. Asset Management Roadmap

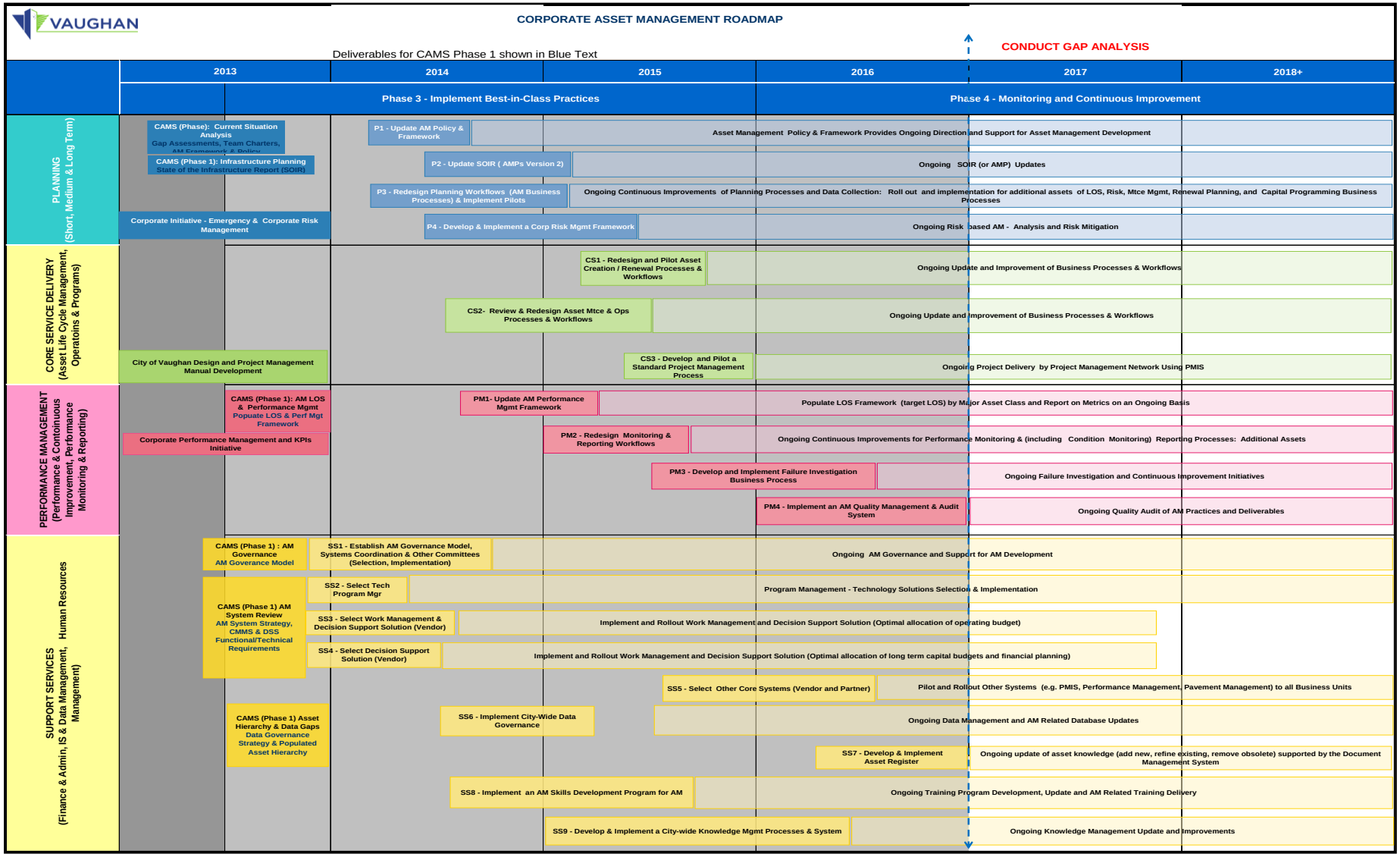
A high level schedule or AM Roadmap for improvement of City of Vaughan AM practices is shown in the following figure. It is anticipated that overall AM development of key concepts, practices, technology solutions can be in pace and rolled out to all City divisions by end of 2016. At that point in time all elements of the AM Framework would be fully implemented with the appropriate AM Governance model in place. This means that leading AM practices would be "business as usual" at the City. At that time, it is recommended that the City participate in AM external benchmarking activities (e.g. the WSAA 2016 AM International Benchmarking Initiative). The City will be well positioned to demonstrate AM practices consistent with "Enterprising" moving to "Excelling" on the AM maturity scale.

4.1 Summary of Requirements

To continue the evolution of Asset Management, the City of Vaughan needs to make the following four strategic investments in the short term:

1. Computerized Work Management System (CWMS) – Optimal allocation of operating budgets
2. Asset Management System (AMS) – Optimal long term capital and financial decision making
3. Data Collection Gaps – People and tools
4. AM Governance – People

5. Implementation Schedule (Timing)



6. Asset Management Governance Model (People Requirements)

6.1 Overview

The structural configuration of an organizational design is the way work is divided and how it achieves coordination among its various work activities around the assets lifecycles. An organizational design structure resolves the two basic tasks of getting work done by:

1. Dividing up the work in the organization into logical units
2. Providing the coordination and control of work.

Understanding the assets and the work needed around the lifecycle (plan, design, create, operate, maintain rehabilitate/replace and dispose) of these assets to create a service is fundamental to the organizational design process. Organization design is the series of management decisions needed to achieve the Region's vision and mission that gets translated into the strategies and tactics in the strategic plan. Four major organizational arrangements can be interpreted for the City's unique business environment:

- Division of labour
- Allocation of authority
- Departmentalization
- Span of control.

6.2 Recommended Governance Model

6.2.1 Governance Model for AM Implementation

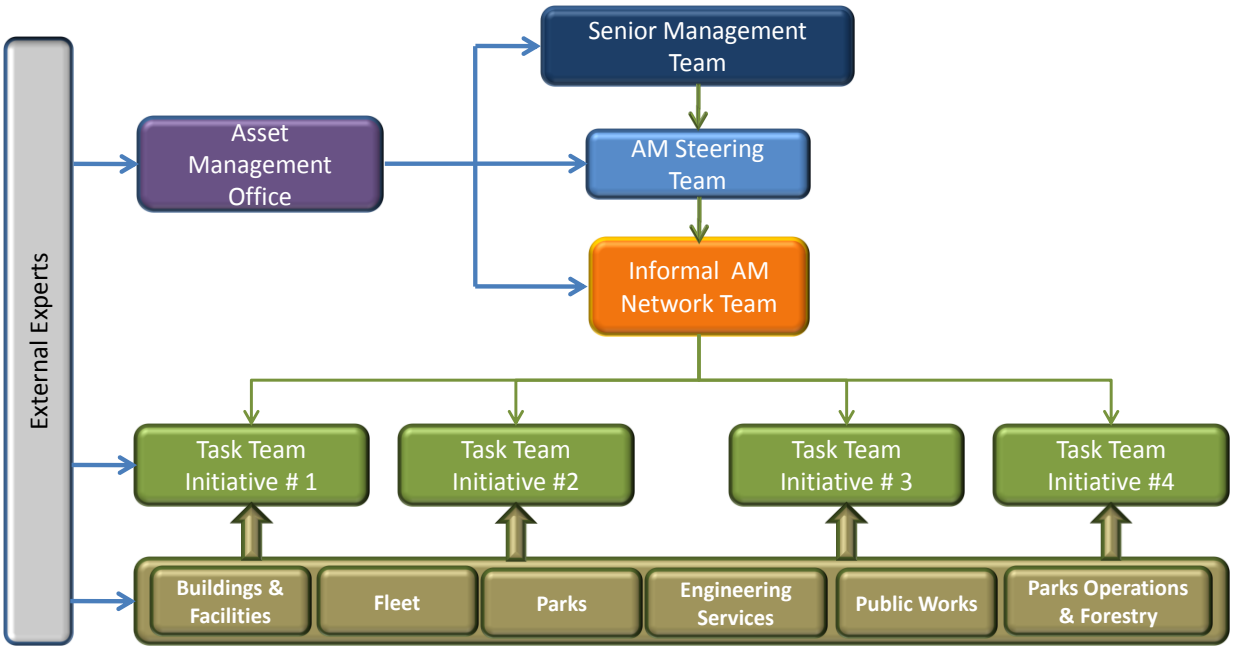
The recommended organization design includes the establishment of a new Asset Management Office to enable the ongoing development of AM and the embedding of AM practice.

The key features are:

- The AM Steering Team continuing its role to provide overall guidance and direction for AM development across the City
- The establishment of an Asset Management Office (AMO)
- The formalizing of the Asset Management Network Team of AM "power users" comprising asset management leads from each of the City Departments. This team will be led by the AMO.

- The capacity to set up temporary Task Teams to undertake AM improvement projects. The AM Leads from each Department will determine whether they will nominate member(s) from their Department to participate in the task team and identify these staff. The AM Network Team, with support from the AMO, will monitor the progress of each project. At the completion of the project, the Task Teams will disband.

Figure 6-1 Governance Model for AM Implementation



Additional notes:

- FTE neutral
- Fill the AMO Lead internally (by the end of 2013)
- Identify Asset Manager roles for the key asset classes (end of 2013)
- Keep AM Steering Team in place to support AMO Lead.

6.2.2 Governance Model for AM Maturity

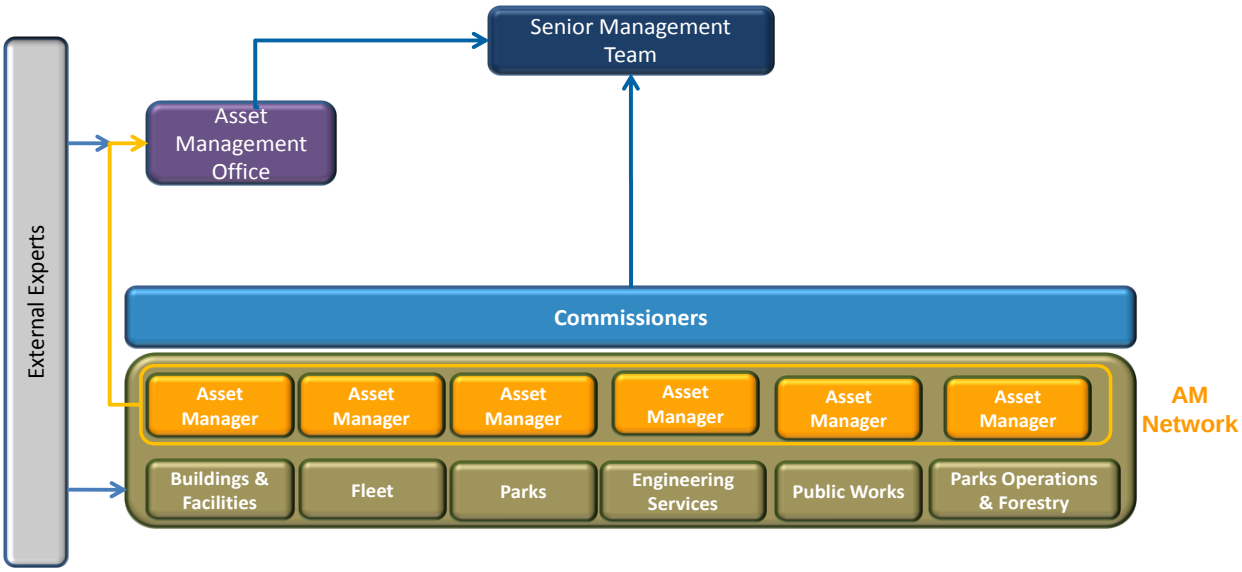
At maturity, the above recommended organization design transitions to “business as usual” with the elimination of the AM Steering Team and Task Teams

The key features are:

- The AM Steering Team is eliminated as the role to provide overall guidance and direction for AM development across the City is reduced and taken on by the Senior Management Team

- The continued role of the Asset Management Office (AMO)
- The transition of the AM Network Team to be led by their respective Commissioners.
- The elimination of Task Teams as AM improvement projects are less frequent.

Figure 6-2 Governance Model for AM Maturity



Additional notes:

- Fill additional AMO roles
- Formalize the Asset Manager role and the AM Network
- Could still be FTE neutral if effectiveness gains are realized.

7. LOS / Performance Management Framework (Process)

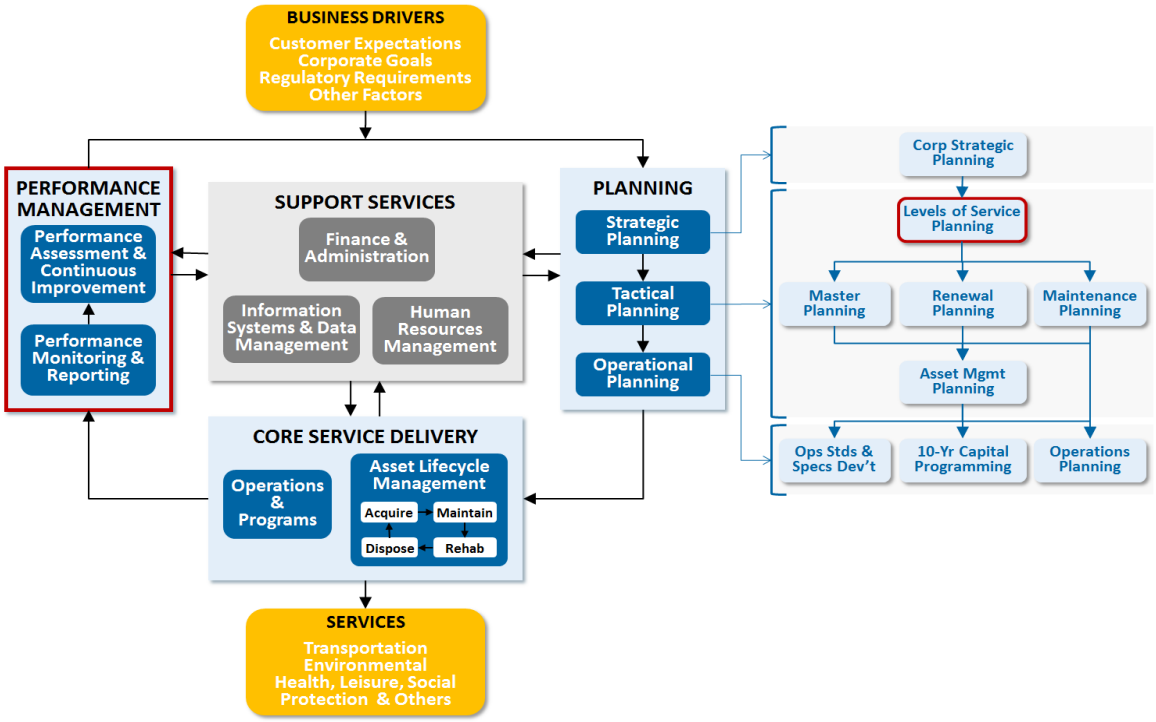
7.1 Overview

Performance management is the systematic and cyclical process of identifying objectives, collating information regarding the achievement of those objectives, reporting the information in a meaningful way, and using the information to

improve the achievement of objectives. Good performance management can help a municipality to improve service delivery and demonstrate accountability to its customers and community, including provision of value for money.

Performance Management is an important component of the Asset Management (AM) Framework as it evaluates the effectiveness and efficiency of the Planning, Service Delivery and Support Services components of the AM Framework and guides continuous improvement. Performance management includes Levels of Service Planning and Performance Management including Monitoring & Reporting and Performance Assessment & Continuous Improvement, as shown in the following figure.

Figure 7-1 Performance Management & the AM Framework



One of the key objectives of asset management is to manage the relationship between level of service, cost of service, and risk exposure over time. Understanding this relationship enables informed analysis and decision-making. It also supports the discussion / negotiation with customers and other stakeholders as it reduces the “dissonance” created when cost and risk are not part of the discussion.

An assessment of asset risks and cost of services are provided in the AM Plan (Section 4, Asset Management Strategy, and Section 5, Financing Strategy). An assessment of the full cost of service and risk exposure associated with the existing or any targeted level of service is only possible once the necessary asset management processes, information, and decision support systems are in place.

7.2 Levels of Service (LOS) Planning

Levels of Service (LOS) Planning is a subset of Tactical Planning (as shown in the figure above), with the objective to clearly define community objectives, expected LOS, and performance indicators and targets that will enable the identification of performance “gaps” to guide continuous improvement, including asset decision-making and investment.

The most fundamental principle of LOS Planning is the need for agreement on high-level objectives or outcomes because they should drive the design of the performance management framework, including the selection of key performance indicators. The performance management framework that links performance indicators to service levels to ultimate objectives must be built from the “top down.”

A levels of service framework is used to integrate inputs, programs, outputs and outcomes into a meaningful and compelling “story” about public sector performance, founded on a clear understanding of the ultimate outcomes to which programs and assets contribute. The framework ties together, in a logical chain or hierarchy, the inputs (including assets and programs), outputs and outcomes.

The following LOS Planning steps are used to develop the performance management framework:

- **LOS Planning – Step 1: Define Community Objectives and LOS Standards** that the municipality strives to achieve through its programs and supporting assets. The nature of many public programs is the simultaneous pursuit of two or more high-level objectives that “make a difference” to the community. These objectives sometimes conflict with each other (e.g., economic, environmental and social responsibilities, typically known as “the triple bottom line”, are potentially conflicting objectives). LOS statements commonly relate to service “attributes” such as cost effectiveness, availability, reliability, responsiveness, suitability or fitness-for-purpose, safety, and sustainability.

  - ***External Outcomes*** are the expected LOS imposed on the organization by outside entities such as customers and other stakeholders (e.g., regulatory agencies). Legislative requirements are often related to safety and environmental sustainability.
  - ***Internal Outputs*** are the LOS objectives defined internally by the organization, such as strategic or master plans, often created in consultation with the community.
  - ***Internal Inputs*** are the LOS objectives defined for programs and assets.
- **LOS Planning – Step 2: Establish Asset Performance Indicators and Targets**, which will show whether or not the organization is making progress toward achieving targeted results. Each service level is typically supported by one or more performance indicators or measures that provide quantitative attributes of the services to be delivered such as how much, how frequently, and of what nature.

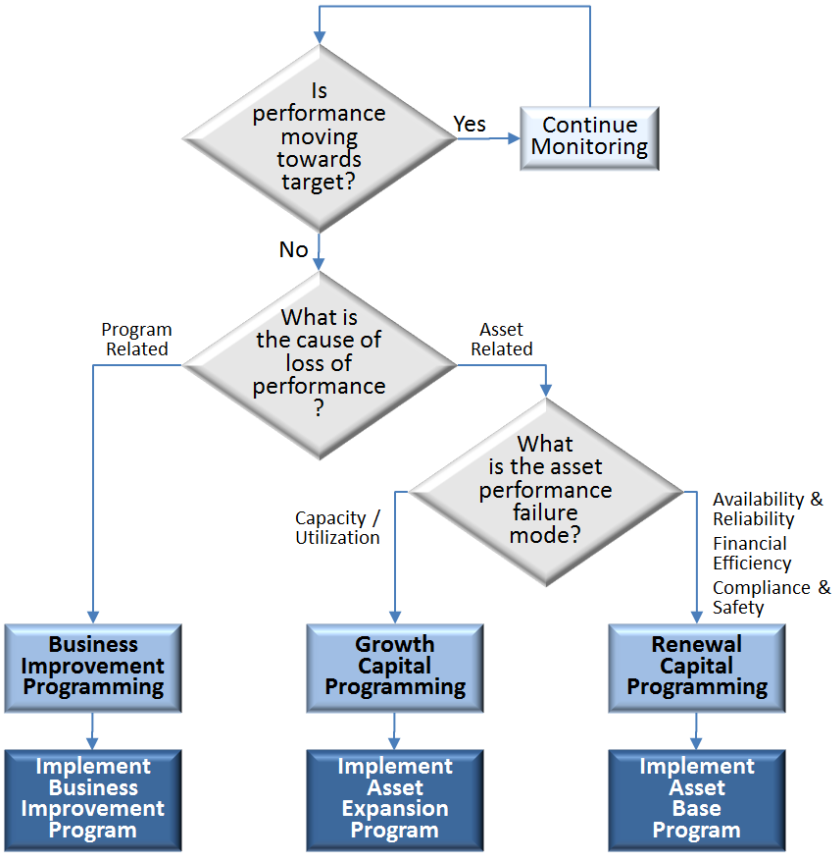
7.3 Performance Management

Once the performance management framework is developed, performance is monitored, reported and evaluated, followed by development and implementation of an improvement plan:

- **Performance Management – Step 1: Monitor and Report Performance** based on the Performance Management Framework, including gathering, managing and reporting performance data at the required intervals.
- **Performance Management – Step 2: Evaluate Performance and Plan Improvements**, including assessing the reasons for non-performance, developing the most appropriate remedy, and planning and implementing the solution.

The approach to improving performance could involve a combination of: new policies, changes to business processes, new or upgraded assets or facilities, enhancement to systems and/or data, organizational changes, and staff development.

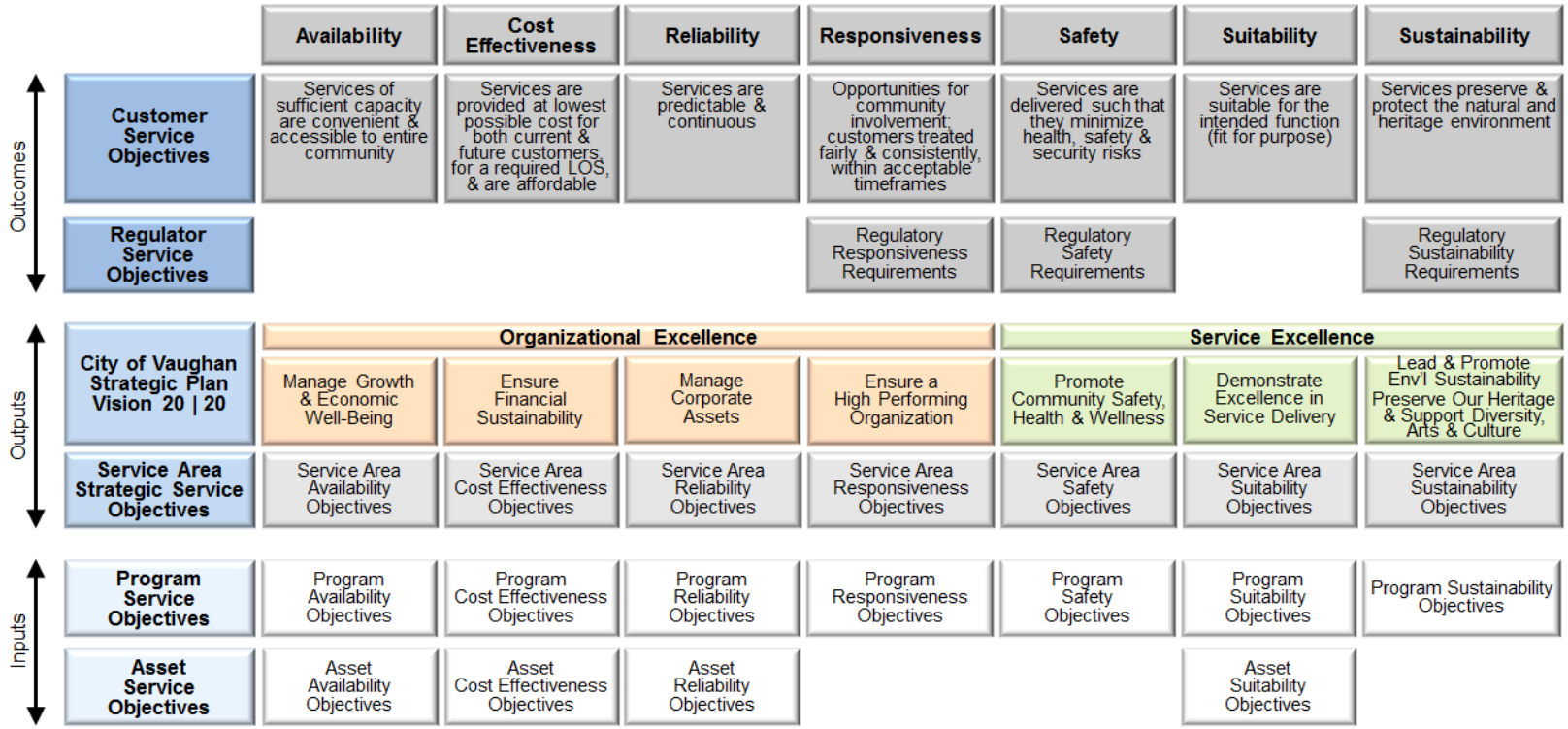
Figure 7-2 Continuous Improvement Decision Framework



7.4 Recommended LOS Framework

The Vaughan Vision 2020 Corporate Strategic Overview presents the long-term strategy for the growth of the City of Vaughan. The three major strategic goals are **Organizational Excellence**, **Service Excellence**, and **Staff Excellence**, each with their own specific themes designed to accomplish long-term success. The first two are shown as part of the recommended LOS Framework in figure 7.2 below. The LOS framework assists in operationalizing strategic objectives from the corporate business plan.

Figure 7-3 LOS Framework



8. Technology Tools (Data & Technology Tools)

8.1 Overview

Data and information technology (IT) are among the core elements of a sound AM program. In the AM Framework, Information Systems (IS) and data management are key activities of the Support Services that enable the other elements of the AM Framework, namely Planning, Service Delivery, and Performance Management.

Note: During the development of the CAMS, the consultant retained by the City of Vaughan to develop the corporate IT strategy engaged many senior staff to identify relevant IT needs and issues from a corporate perspective. Based on this feedback, the Corporate IT strategy includes linkages the CAMS.

8.2 Data & Knowledge

The asset data and information form the basis of every decision made by the City. The categories of data commonly used to support AM activities are:

- **Primary data** such as registry, location, valuation and physical attribute data
- **Secondary data** such as maintenance, condition, detailed attributes, basic performance, failure mode data
- **Tertiary data** such as advanced-analytics oriented data to support optimized decision-making.

Each piece of data must be collected, validated, updated, maintained and stored, and these activities are time-consuming and costly, so it is essential for the organization to define which attributes will be collected for which assets. The quality, accuracy and availability required for each data element should also be defined.

The investment in each piece of data collected should be balanced by the value or benefit obtained through the use of that data. For example, for major capital assets it is important to collect failure history and manufacturer information to support more informed procurement decisions in the future; however, failure and manufacturer details may not be necessary to track for less expensive assets. Similarly, data used in regulatory reporting is critical, and must be collected.

Data should be coordinated and managed across the City to ensure that all business activities are being supported by the required availability, accuracy and quality of data. Best practice data management also strives to ensure that data is only being collected once, and aims to minimize the amount of data duplication in the system.

8.3 Information Technology Systems

IT systems and tools for business processes provide the vehicle for the input, storage, organization, analysis, and retrieval of asset-related data. The efficiency of

an organization is highly dependent upon the functionality, level of integration, and software solutions used to support asset operations.

Information systems come in a variety of forms, including card/paper-based, computer spread sheets, stand-alone databases, or centrally administered electronic systems. Each type of system is associated with different levels of cost and complexity in terms of initial investment, staff training and maintenance, and offers a range of associated benefits including improved efficiency and sophistication of analysis. The categories of IT systems to support AM activities are:

- **Primary applications** (and databases) such as financial systems, customer and property records, complaint/customer management systems, asset registers, plans and drawing records, geographic information systems (GIS), maintenance management systems, and operations and maintenance manuals.
- **Secondary applications** such as knowledge management systems, inventory/resources/spares management and purchasing systems, predictive models (for primary failure modes), capacity/utilization models, condition assessment and record system, emergency response plans, and contract management / administration systems.
- **Tertiary (lifecycle) applications** such as risk assessment (e.g., consequence of failure), treatment (risk reduction) options, optimized renewal decision making, lifecycle cost system, mobile computing systems, project management applications, maintenance analysis software, performance monitoring applications, and stores/ spares optimization application.

IT systems should be coordinated and managed across the City to ensure that all business activities are being supported by the required functionality, and to improve integration of systems, so that data and information can be efficiently shared across departments.

As shown in the AM Roadmap, the selection and implementation of enterprise wide Computerized Work Management System (CWMS) and an Asset Management System (AMS) are critical path activities in AM development for the City.

9. Business Case (Benefits and Costs)

The definition of asset management considers three key concepts: Level of Service (LOS), Cost of Service (COS), and Risk. The interaction of these concepts is shown in the graphic below, alongside the definition of asset management. In simple terms, this represents the overall business case for Asset Management at the City of Vaughan.

Figure 9-1 The LOS, COS and Risk Interaction

Definition of Asset Management

Asset Management is an integrated set of processes that minimize the lifecycle costs of owning, operating, and maintaining assets, at an acceptable level of risk, while continuously delivering established levels of service.

Implementing asset management at the City of Vaughan should bring the following real benefits:

- City residents can expect reliable delivery of a defined level of service (LOS) as the City improves its response to their needs.
- The Cost of Service (COS) will continue to be lowered to the point where there is confidence (backed up with good data) that the City is operating as lean as possible.
- In addition, there will be effective risk management where staff understands the likelihood of assets failing and the consequence or impact on levels of service. RISK is the product of these two elements. Effective risk management makes it clear, what assets should be funded for risk mitigation and quantifies the risk that the City is taking on.

Simply put, success at asset management means that City staff will always be engaged doing the right tasks, at the right time, for the right reasons and the right cost.

The City of Vaughan has begun its asset management journey, investing in its staff's time and the CAMS Phase 1 project. The City needs to continue with the AM development as per the AM Roadmap to realize the benefits discussed above. The figure below (Fig 9-2) shows the typical return on investment curve for an asset management development project.

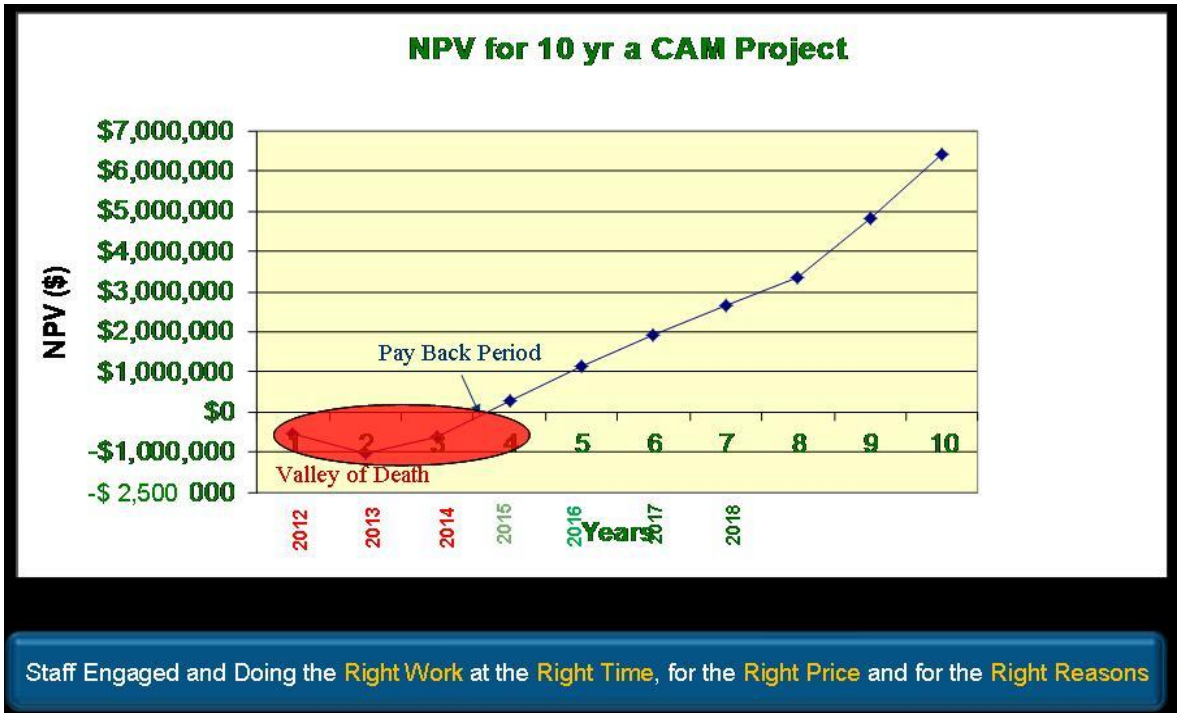


Fig 9-2 Return on Investment from an AM Program

CAMS Phase 1 will establish the strategy for AM at the City; however, it is important that the City implements the AM Roadmap to realize the benefits of leading asset management practices. A number of Improvement Initiatives have been developed to help the City take advantage of the opportunity gaps identified in the gap assessment. These Improvement Initiative recommendations are outlined in the table that follows, and have been developed consistent with the four major elements of the AM Framework (Planning, Core Service Delivery, Performance Management and Support Services).

For each initiative, the table recommends a time-frame for initiation, as follows:

- Short Term: 1 year
- Medium Term: 2-3 years
- Long Term: 4 or more years

In addition, resourcing lead and support roles have been recommended.

Focus Area	No.	Improvement Initiative	Key Tasks	Tangible Benefits	Phasing (Term)	Resources		Estimated Resource Costs							
								Phase 2 (2014 to 2016)				Phase 3 (2016 to 2018)			
						Lead	Support	Internal (FTEs)	External ($)	Software ($)	Hardware ($)	Internal (FTEs)	External ($)	Software ($)	Hardware ($)
Planning	P1	Update AM Policy & AM Framework	AM Framework building on the initial documents that were prepared as part of CAMS Phase1	A guide for ongoing development of consistent asset management practices for all asset classes	Short	AMO	Division Asset Managers	0.1	$20,000						
	P2	Update State of the Infrastructure report (AMPs) - Version 2	Update the SOIR/AMP Table of Contents & Guidelines Update the SOIR/MP Data Input Requirements Update Corporate SOIR/AMP Update the SOIR/AMPs by Major Asset Class	AMPs are an important AM deliverable that lay out the short, medium and long term asset management strategies and associated financial needs, smooth out the funding profile, and demonstrate sustainable asset and financial management	Medium	Asset Managers	AMO	2.2	$100,000						
	P3	Redesign Planning Workflows & Implement Pilots	Redesign and document all business processes related to Planning based on leading practices and building on the work done in the pilots – expand piloted processes to other assets or asset types, and further improving the Planning processes Identify desired roles/responsibilities, communication and training needs, and data and knowledge, technology and performance management requirements based on updated / redesigned business processes Implement updated / redesigned processes and associated practice elements: fill required roles, conduct communication and training, manage data and knowledge, configure technology, and manage performance		Short/ Medium	Asset Managers	AMO, Consulting	1	$500,000			0.5	$150,000		

Focus Area	No.	Improvement Initiative	Key Tasks	Tangible Benefits	Phasing (Term)	Resources		Estimated Resource Costs							
								Phase 2 (2014 to 2016)				Phase 3 (2016 to 2018)			
						Lead	Support	Internal (FTEs)	External ($)	Software ($)	Hardware ($)	Internal (FTEs)	External ($)	Software ($)	Hardware ($)
	P4	Develop & Implement a Corporate Risk Management Framework	Develop a Corporate Risk Management Framework - Update the Risk Management Framework to include business, project, safety, physical asset, and operational risks Identify desired roles/responsibilities, communication and training needs, and data and knowledge, technology and performance management requirements based on updated Risk Management Framework Implement updated / redesigned Risk Management Framework and associated practice elements: fill required roles, conduct communication and training, manage data and knowledge, configure technology (e.g., a simple Risk Management tool using MS Excel or MS Access), and manage performance in conjunction with Supporting Services Develop Risk profiles & mitigation strategies Implement risk mitigation strategies	Enable consistent and transparent prioritized and optimized decision-making across Commissions – ensures limited funds are allocated to high risk areas of the operations	Short	AMO	Corporate Risk Management Staff, Division Asset Managers, Consulting	1	$100,000			0.5	$100,000		
Core Service Delivery	CS 1	Review & Redesign Asset Creation/Renewal Processes & Workflows	Update / redesign and document business processes related to Asset Creation, Renewal & Disposal based on leading practices and building on the work done by the Commissions Identify desired roles/responsibilities, communication and training needs, and data and knowledge, technology and performance management requirements based on updated / redesigned business processes Implement updated / redesigned processes and associated practice elements: fill required roles, conduct communication and	Deliver projects of appropriate scope to meet service levels and minimize lifecycle costs, on time, on budget, and at minimal risk	Medium	Engineering	AMO, Division Asset Managers, Divisional CIP Staff	3	$100,000						

Focus Area	No.	Improvement Initiative	Key Tasks	Tangible Benefits	Phasing (Term)	Resources		Estimated Resource Costs							
								Phase 2 (2014 to 2016)				Phase 3 (2016 to 2018)			
						Lead	Support	Internal (FTEs)	External ($)	Software ($)	Hardware ($)	Internal (FTEs)	External ($)	Software ($)	Hardware ($)
			training, manage data and knowledge, configure technology, and manage performance in conjunction with Supporting Services Update frameworks, processes, standards & tools on an ongoing basis												
	CS 2	Review & Redesign Maintenance & Operations Processes & Workflows	Update / redesign and document business processes related to Maintenance, Operations and Work & Resource Management based on leading practices Identify desired roles/responsibilities, communication and training needs, and data and knowledge, technology and performance management requirements based on updated / redesigned business processes Implement updated / redesigned processes and associated practice elements: fill required roles, conduct communication and training, manage data and knowledge, configure technology (CWMS), and manage performance	Enable the planning, scheduling, resourcing, execution and completion of maintenance and operations to meet desired Levels of Service including reliability and safety, and to extend asset life and reduce lifecycle costs through the right mix of reactive and proactive work	Medium/ Long	O&M Managers	AMO, Division Asset Managers, Consulting	4.5	$110,000						
	CS 3	Develop & Implement a Standard Project Management Process	Review / update and document, in a Corporate PM Manual, a Corporate Project Management (PM) Process based on leading practice PM Body of Knowledge (PMBOK) project management processes developed by the Project Management Institute (PMI) – these processes will be used by all Commissions in any work activity that requires project management. Identify desired roles/responsibilities, communication and training needs, and data and knowledge, technology and performance management requirements based on the updated Corporate PM Processes	Bring a consistent leading practice approach to management of projects across the City, resulting in delivery of projects of appropriate scope to meet service levels and minimize lifecycle costs, on time, on budget, and at minimal risk	Medium	Engineering	AMO, Division Asset Managers, Divisional PMs	2.1	$100,000				$50,000		

Focus Area	No.	Improvement Initiative	Key Tasks	Tangible Benefits	Phasing (Term)	Resources		Estimated Resource Costs							
								Phase 2 (2014 to 2016)				Phase 3 (2016 to 2018)			
						Lead	Support	Internal (FTEs)	External ($)	Software ($)	Hardware ($)	Internal (FTEs)	External ($)	Software ($)	Hardware ($)
			Implement updated / redesigned Corporate PM Processes and associated practice elements: fill required roles, conduct communication and training (i.e., PMP certification), manage data and knowledge, configure technology, and manage performance in conjunction with Supporting Services Implement Reliability Centred Design												
Performance Management	PM 1	Update the AM Performance Management and LOS Framework	Update the tiered AM Performance Management Framework (Corporate, Customer, Asset/Technical and Operational LOS) 1) based on the initial framework prepared as part of CAMS Phase 1 2) including LOS and supporting metrics 3) including metrics identified from the Business Process re-design initiatives above Document and update processes & workflows and link to work processes and LOS Continued development of metrics/targets for Divisions , Sections and workgroups These standard processes will be used by all Commissions in further development of monitoring & reporting and performance assessment workflows	Framework and associated processes provide a consistent approach across Commissions to track what is important, identify improvement opportunities, and to make timely adjustments Provides a clear link between corporate, customer and technical levels of service, and enables AM activities to focus on what is important – from asset planning to service delivery, to performance management, and to support services	Short	Asset Managers	AMO, City Staff	1	$75,000						
	PM 2	Design and Implement a Failure Investigation Business Process	Develop/document a leading practices failure investigation approach (e.g. FMECA) Provide training to staff on failure investigation Incorporate investigation outcomes into the	Failures are fully investigated and learnings are incorporate into maintenance or design practices to improve asset reliability	Short/ Medium	Asset Managers	AMO, City Staff	2	$30,000						

Focus Area	No.	Improvement Initiative	Key Tasks	Tangible Benefits	Phasing (Term)	Resources		Estimated Resource Costs							
								Phase 2 (2014 to 2016)				Phase 3 (2016 to 2018)			
						Lead	Support	Internal (FTEs)	External ($)	Software ($)	Hardware ($)	Internal (FTEs)	External ($)	Software ($)	Hardware ($)
			various Preventive Maintenance programs												
	PM 3	Redesign Performance Assessment Workflows	Develop/document Performance Monitoring & Reporting workflows based on leading practice and building on existing processes Identify desired roles/responsibilities, communication and training needs, and data and knowledge, and technology based on the updated Performance Monitoring & Reporting processes Implement updated / redesigned Performance Monitoring & Reporting processes and associated practice elements: fill required roles, conduct communication and training, manage data and knowledge, configure technology, and manage performance in conjunction with Supporting Services Train Staff on CI processes and techniques Ongoing CI initiatives, monitoring & rewards recognition Review / update and document Performance o •Implement regular internal reviews and benchmark against other Commissions Conduct regular AM international Benchmarking (e.g. WSAA)	Provide valuable knowledge to decision-making and the ability to demonstrate confidence in the decision Enable continuous improvement that is focused on performance gaps that are most important to the City – moving from “data rich and knowledge poor” to “data rich and knowledge rich	Short/ Medium	Divisional Managers	AMO, Divisional Managers, City Staff	2	$30,000			0.5	$80,000		
	PM 4	Develop & Implement a Quality & Audit Process	Review / update and document Quality & Audit Process based on leading practice and building on existing processes Identify desired roles/responsibilities, communication and training needs, and data and knowledge, and technology based on the updated Quality & Audit Process Implement updated / redesigned Quality & Audit Process and associated practice elements for those AM processes and deliverables already in place: fill required	Ensures that all staff undertake AM practices as expected and reliably delivers high quality results – overall lower cost of asset ownership	Medium/ Long	AMO	Division AM Managers					2	$50,000		

Focus Area	No.	Improvement Initiative	Key Tasks	Tangible Benefits	Phasing (Term)	Resources		Estimated Resource Costs							
								Phase 2 (2014 to 2016)				Phase 3 (2016 to 2018)			
						Lead	Support	Internal (FTEs)	External ($)	Software ($)	Hardware ($)	Internal (FTEs)	External ($)	Software ($)	Hardware ($)
			roles, conduct communication and training, manage data and knowledge, configure technology, and manage performance in conjunction with Supporting Services												
Support Services	SS 1	Implement the AM Governance Model including the AM Systems Coordination and supporting Sub-Committees to support system selection and implementation	Establish the AM Governance Model Develop the AM Systems Coordination Committee Team Charter and conduct Team Chartering Create and charter sub-committees and extended teams to support selection and implementation tasks as necessary	Allows for successful selection and delivery of core technology solutions	Short	SMT	AMO, Division Managers, Corporate IT	2.5	$10,000			2			
	SS 2	Select Technology Program Manager	Develop scope of work consistent with CAMS Phase 2 IS Future State Deliverable Conduct Selection process	Allows for successful selection and delivery of core technology solutions	Short	AM Systems Committee	AMO, Division Managers, Division IT Reps	2.5	$250,000						
	SS 3	Select and implement a Work or Maintenance Management System (WMS/CWMS)	Define asset management activities and business processes to be supported by software. Define also interfaces to other IT systems at the City. Based on these definitions, document the functional requirements of the new software. Conduct software procurement process, including request for proposal, software demonstrations, selection & negotiation Conduct change management to prepare organization for change in software and processes. Develop detailed implementation plan with both vendors, implement WMS /CWMS	WMS/CWMS solution and vendor partnership that provides best value for Commissions	Short/ Medium	Technology Program Manager	AMO, Division Managers, Division IT Reps, AM Systems Committee	6	$240,000	$1,200,000	$50,000	1	$100,000		

Focus Area	No.	Improvement Initiative	Key Tasks	Tangible Benefits	Phasing (Term)	Resources		Estimated Resource Costs							
								Phase 2 (2014 to 2016)				Phase 3 (2016 to 2018)			
						Lead	Support	Internal (FTEs)	External ($)	Software ($)	Hardware ($)	Internal (FTEs)	External ($)	Software ($)	Hardware ($)
			(pilot and rollout to all areas) Monitor performance of new software and processes in supporting AM activities. Update and modify as required.												
	SS 4	Select and implement an Asset Management System (AMS)	Same as above but for a Asset Management System (AMS)	AMS solution and vendor partnership that provides best value for Commissions	Short/ Medium	Technology Program Manager	AM Systems Committee	1.5	$100,000	$250,000					
	SS 5	Select other core systems (e.g. PMIS, Performance Management, Condition Monitoring)	Define other asset management activities and business processes to be supported by software. Define also interfaces to other IT systems at the City. Based on these definitions, document the functional requirements of the new software. Conduct software procurement process, including request for proposal, software demonstrations, selection & negotiation Conduct change management to prepare organization for change in software and processes. Develop detailed implementation plan with vendors & implement other core systems e.g. Performance management, PMIS, Pavement Management, (pilot and rollout to all areas) Monitor performance of new software and processes in supporting AM activities. Update and modify as required.	Additional City core systems (e.g. PMIS, Performance Management, Condition Monitoring) solutions and vendor partnership that provides best value for Commissions	Medium/ Long	Technology Program Manager	AMO, AM Systems Committee, Division AM Managers, IT Reps					2	$250,000	$750,000	
	SS 6	Implement a City-wide data governance program.	Establish data governance sub-committee, including representatives from Divisions and work groups across Commissions. Update the Data Guidance document; define data governance vision, mission and policies for the City. Disseminate vision,	Consistency in data capture throughout the asset lifecycle as needed to support AM processes	Short	AM Systems Committee	AMO, AM Systems Committee, Division AM Managers, IT Reps	0.9	$75,000						

Focus Area	No.	Improvement Initiative	Key Tasks	Tangible Benefits	Phasing (Term)	Resources		Estimated Resource Costs							
								Phase 2 (2014 to 2016)				Phase 3 (2016 to 2018)			
						Lead	Support	Internal (FTEs)	External ($)	Software ($)	Hardware ($)	Internal (FTEs)	External ($)	Software ($)	Hardware ($)
			mission and policies to all staff. Establish Current State data register listing asset and asset attribute data that are collected and maintained in different departments. Define procedures, roles and responsibilities associated with collection and maintenance of current state data. Update data governance vision, mission, policies, standards, procedures, roles and responsibilities as needed.	Effective data quality based on high quality and readily available data											
	SS 7	Develop and Implement an Asset Register	Review asset databases and data attributes Define data requirements to support the City's future AM activities needs Define strategies for closing data gaps. Build the Asset Register Build the necessary interfaces to core systems	A common asset data register will define which asset attributes will be collected for which assets. The register should also indicate what level of data quality is required, who is responsible for the data.	Short	Technology Program Manager	AM Systems Committee, Division AM Managers, IT Reps, Technology Vendors					2.4	$200,000	$200,000	
	SS 8	Develop & implement an AM Skills Development Program	Identify potential retirees Develop an AM Training Plan Define the desired roles, responsibilities and competencies around the asset lifecycle for each major asset class Conduct Skill Gap Analysis Develop Training materials and Training Delivery Schedule	All staff has the desired skills and competencies necessary to support asset management needs.	Short/ Medium	AMO	AMO, Division AM Managers, Corporate HR	3.6	$15,000						

Focus Area	No.	Improvement Initiative	Key Tasks	Tangible Benefits	Phasing (Term)	Resources		Estimated Resource Costs							
								Phase 2 (2014 to 2016)				Phase 3 (2016 to 2018)			
						Lead	Support	Internal (FTEs)	External ($)	Software ($)	Hardware ($)	Internal (FTEs)	External ($)	Software ($)	Hardware ($)
			Deliver Training (Train the Trainer, Core Training, Refresher Training) Conduct review and update Training Plan accordingly Incorporate into overall corporate training process												
	SS 9	Develop & Implement a City Wide AM Knowledge Management Program	Develop an AM Knowledge Management Strategy Conduct an assessment of the key knowledge areas needed to sustain the City's AM practices Update existing business processes, SOPs, Standards etc. and add new as necessary Develop and maintain a master list of these key documents – establish update intervals. Capture documentation in the Electronic Document Management System (EDMS) or other Technology Solution (e.g. MS SharePoint	Supports easy access to the right and latest asset knowledge Reduces the risk of knowledge loss to the organisation	Medium/ Long	AMO	AMO, Division Managers, AM Managers, Corporate HR, City Staff					6	$250,000		
								35.9	**$1,755,000**	**$1,450,000**	**$50,000**	**16.9**	**$1,230,000**	**$950,000**	

10. State of the Infrastructure Report

10.1 Overview

As a condition of future provincial infrastructure funding, municipalities will be required to demonstrate that a full range of available financing and revenue generation tools has been explored. This requirement is in addition to demonstrating that municipalities are complying with all relevant legislative requirements.

According to the Ministry of Infrastructure (MOI) Guide for Municipal Asset Management (AM) Plans, 2012, an asset management plan is a strategic document that states how a group of assets is to be managed over a period of time. The AM Plan describes the characteristics and condition of infrastructure assets, the levels of service expected from them, planned actions to ensure the assets are providing the expected level of service, and financing strategies to implement the planned actions. A detailed AM Plan has the following sections:

- Executive Summary
- 1) Introduction
- 2) State of Local Infrastructure
- 3) Levels of Service
- 4) Asset Management Strategy
- 5) Financing Strategy.

Future provincial capital funding will be conditional on municipalities ensuring that their asset management plans include, at minimum, all of the content described in the MOI Guide for Municipal AM Plans, 2012. All data and analysis supporting the asset management plan must be documented and kept on file.

10.2 AM Plan Contents

The recommended contents of the AM Plan, which include the requirements described in the MOI Guide for Municipal AM Plans, are summarized in the figure below and provided in the sections that follow. The AM Plan will include a main body plus an appendix for each of A: Corporate Services (Information & Technology assets), B: Community Services (Recreation & Culture, Parks & Cemeteries, Buildings & Facilities, and Fleet & Equipment assets), and C: Engineering & Public Works Transportation, Stormwater Management, Water & Wastewater, and Waste Management assets).

Figure 10-1 AM Plan Table of Contents

* Note that neither the Asset Failure Modes, listed under Section 2 State of Local Infrastructure in the above figure, nor Section 6: AM Plan Improvement &

Monitoring are required by the Ministry of Infrastructure Guide for Municipal Asset Management Plans.

10.2.1 Executive Summary

Provides a succinct overview of the AM Plan:

- **Introduction:** Summary of goals of the municipality, objectives of asset ownership, purpose of AM Plan, and AM Plan development processes
- **State of Local Infrastructure:** Summary of the asset hierarchy, inventory, valuation, age distribution and condition, and how and when this asset information will be updated.
- **Levels of Service:** Summarizes levels of service through performance indicators with targets and current performance, and outlines external trends or issues that may affect expected levels of service.
- **Asset Management Strategy:** Summary of the near term set of planned actions, by asset type, that will enable the assets to provide the desired levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost.
- **Financing Strategy:** Summary of financial requirements associated with the AM Strategy, and associated recent and current budgets, revenue sources, and funding shortfalls

10.2.2 Section 1: Introduction

Explains how the goals of the municipality are dependent on infrastructure, and clarifies the relationship of the AM Plan to municipal planning and financial documents. States the purpose of the AM Plan, which assets are included in the Plan, how many years the Plan covers, and when it will be updated. Describes how the AM Plan was developed, how it will be evaluated and improved.

- **Goals of the Municipality:** Explains the goals of the municipality and how they are dependent on infrastructure.
- **Objectives of Asset Ownership:** States which infrastructure assets are required to support municipal goals and which are included in the AM Plan.
- **Purpose of the AM Plan:** Explains the purpose of the AM Plan. Clarifies the relationship of the AM Plan to municipal planning and financial documents.
- **AM Plan Development Processes:** Describes the contents of the AM Plan, how it was developed, how many years the Plan covers and when it will be updated, and how it will be evaluated and improved.

10.2.3 Section 2: State of Local Infrastructure

Summarizes the asset hierarchy, inventory, valuation, age distribution and condition. Also discusses how and when information regarding the characteristics, value, and condition of assets will be updated.

- **Asset Hierarchy & Inventory:** Asset types (e.g., urban arterial road, rural arterial road, watermains) and quantity/extent (e.g., length in kilometers for linear assets).
- **Asset Valuation:** Financial accounting valuation and replacement cost valuation. Financial valuation uses historical costs and depreciation assumptions. Replacement cost valuation is forward-looking and accounts for expected inflation, changes in technology and other factors.
- **Asset Age Distribution:** Asset age distribution and asset age as a proportion of expected useful life.
- **Asset Condition:** Asset condition (e.g. proportion of assets in "good," "fair" and "poor" condition). Asset condition must be assessed according to standard engineering practices. For bridge structures, condition is based on an analysis of bridge inspection reports.
- **Asset Information Assumptions & Update:** List of all assumptions and data verification policy and a condition assessment policy that sets out when and how asset information will be verified and when and how assets will be assessed to determine their condition. This policy must be consistent with provincial requirements (e.g., municipal bridges to be inspected every two years).

10.2.4 Section 3: Levels of Service

Defines levels of service through performance indicators and targets, and outlines current performance. Describes external trends or issues that may affect expected levels of service.

- **Overview of Performance Management:** Explains how the municipality manages asset performance to meet municipal goals, regulatory requirements, and customer/ community expectations, including provision of value for money.
- **Performance Indicators & Targets:** Defines levels of service through performance indicators and targets.
- **Current Performance:** Shows current performance relative to the targets set out, and timeframes to achieve the targets if they are not already being achieved.
- **Future Performance:** Discusses any external trends or issues that may affect expected levels of service or the municipality's ability to meet them.

10.2.5 Section 4: Asset Management Strategy

The asset management strategy is the set of planned actions that will enable the assets to provide the desired levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost.

- **Overview of AM Strategy Development:** Overview of available lifecycle activity options (e.g., maintenance, renewal, expansion and non-asset solutions), risk assessment methods, and options analysis methods used to

sustainably manage risk, at lowest lifecycle cost and overview of procurement methods.

- **Asset Risk Assessment:** Identification of risks that may affect the ongoing delivery of services from infrastructure, by asset type.
- **Asset Lifecycle Analysis:** Assessment of direct and indirect asset lifecycle benefits and costs, by asset type.
- **Asset Lifecycle Strategies:** Summary of the set of planned actions, including maintenance, renewal, expansion and non-asset solutions, by asset type

10.2.6 Section 5: Financing Strategy

This section integrates asset management planning with financial planning and budgeting.

- **Expenditure Forecasts by Lifecycle Activity:** Shows yearly expenditure forecasts broken down by available lifecycle activity options, both 10-year and over asset lifecycle (e.g., maintenance, renewal, expansion and non-asset solutions)
- **Actual Expenditures by Lifecycle Activity:** Provides actual expenditures for these categories from the previous two to three years for comparison purposes
- **Revenue Sources:** Gives a breakdown of yearly revenues by confirmed source
- **Key Assumptions:** Discusses key assumptions and alternative scenarios, where appropriate
- **Funding Shortfalls:** Identifies any funding shortfall relative to financial requirements that cannot be eliminated by revising service levels, asset management and/or financing strategies, and discuss the impact of the shortfall and how the impact will be managed.

10.2.1 Section 6: AM Plan Improvement & Monitoring

Provides a summary of the assessment of current and future AM practices and provides details on planning for monitoring the performance of the AM plan and any improvement to the systems that will improve the level of confidence in the AM plan.

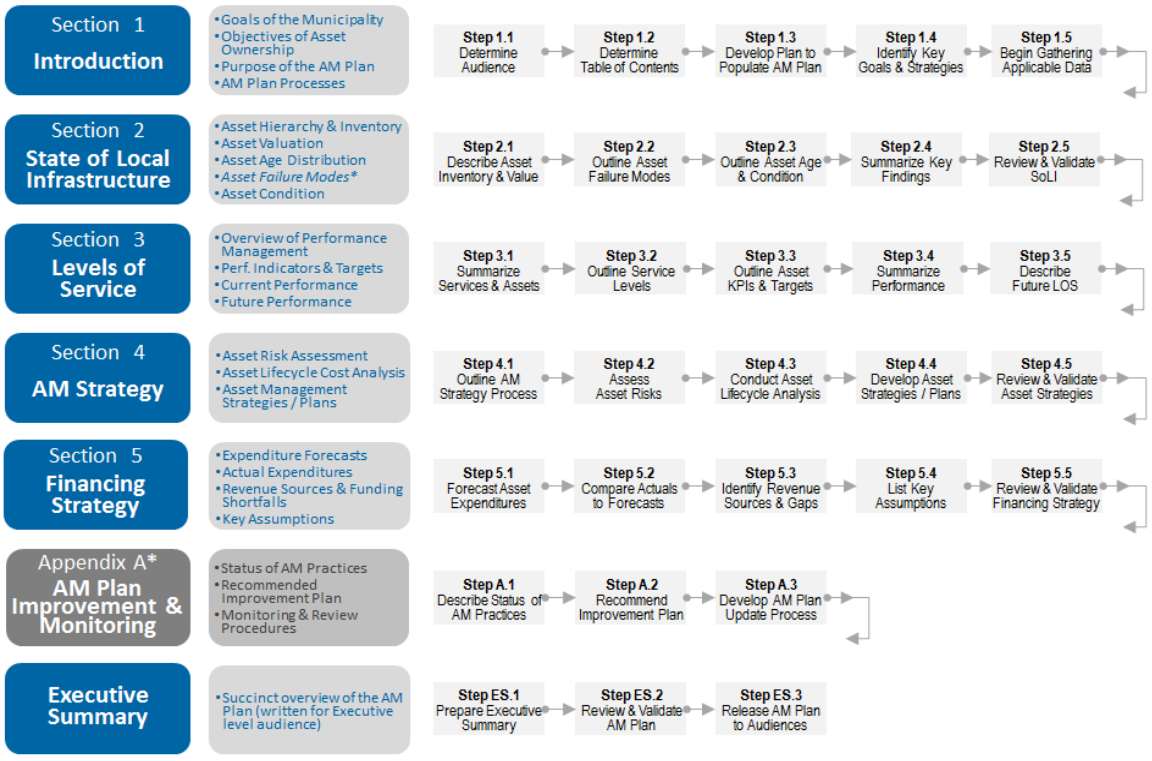
- **Status of AM Practices & Recommended Improvement Plan:** Current and desired state of AM processes, data and systems with details of actions proposed and timetables for improving accuracy and confidence in the AM plan, indicating responsibility for each actions and details of resources required to implement the improvement program
- **Monitoring & Review Procedures:** Procedures and timetable for performance reporting (3-year review of AM plan) and timetable for external audit and review (of process, data integrity, level of service)

- **Performance Measures:** Outlines performance measures for the AM Framework development and describes how the effectiveness of the AM Plan will be measured.

10.3 AM Plan Development Methodology

The figure below provides an overview of the steps undertaken to develop a detailed AM Plan. * indicates not required by MOI AM Plan Guide.

Figure 10-2 AM Plan Development Methodology



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