

Infrastructure Strategy

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2 Acronyms, Abbreviations, and Symbols

AM	Asset Management
AMP	Asset Management Plan
CAO	Chief Administrative Officer
EAC	Equivalent Annualized Cost
IPWEA	Institute of Public Works Engineering Australia
LOS	Levels of Service
LRFP	Long Range Financial Plan
LRT	Light Rail Transit
NPC	Net Present Cost
O&M	Operations and Maintenance
RIMS	Risk-Based Infrastructure Management System
SAMP	Strategic Asset Management Plan
SLA	Service Level Agreement
SMART	Specific, Measurable, Achievable, Relevant, and Time-Bound
TBL	Triple Bottom Line
the City	City of Edmonton



The leaf symbol appears in the left margin beside sections that directly address sustainability.

3 Background

The City of Edmonton (the City) was one of the first Canadian cities to recognize the need for a strategic plan to manage infrastructure and has worked aggressively to overcome the infrastructure challenge. The City defines infrastructure as *“the physical assets developed and used by the City to support the community’s social and economic activities”*.

The City’s goal for Asset Management is to build an effective, transparent, data driven asset management system that connects asset investment with progress towards strategic goals and service level outcomes.

The City has developed performance indicators, and raised public awareness of its infrastructure challenges to help define needs. It has identified, developed, and adopted nationally recognized solutions such as evaluation tools, leading edge models to ascertain long-term infrastructure investment strategies (e.g., the City’s Risk-Based Infrastructure Management System [RIMS]), and a degree of integrated corporate asset management and capital budgeting not seen in other Canadian municipalities.

With these developments the City has garnered a reputation for being one of Canada’s most advanced and progressive jurisdictions in the implementation of leading infrastructure asset management techniques. To that end, the system developed for the prioritization of funding and projects for the 2015-2018 Capital Budget was selected as a Case Study for the 2015 International Infrastructure Management Manual, a widely recognized resource in public sector asset management.

The City’s 2006 Infrastructure Strategy was developed by the then Office of Infrastructure and Funding Strategy in conjunction with Council, senior managers, administrative staff, and external stakeholders. It addressed the pressing need to balance the renewal needs of existing infrastructure with the growth and expansion pressures faced by the City. The 2006 Infrastructure Strategy supported continuing development of effective infrastructure management tools, as well as collaboration between engineers, financial services, industry, citizens, other orders of government, and other stakeholders.

This document serves as an update to the City’s 2006 Infrastructure Strategy and is intended to cover the next 5 years (2018-2022). The purpose of this updated Infrastructure Strategy is to set out an agreed path forward for infrastructure asset management that is aligned with Council’s vision for the City and corporate strategic plans, and to set out the mandate for asset management processes in the City. The City has undergone dramatic change in its organisational approach to the Integrated delivery of infrastructure services. This includes a consolidation of almost all (with the exception of Fleet and Information Technology Assets) capital investment related asset management activities into one organisational unit (Lifecycle Management). The time is ideal to re-calibrate our approach and understanding of asset management, and of the benefits provided by an organized, deliberate, asset management system. Through this version of the Infrastructure Strategy, the City is moving forward in better integrating asset management and sustainability efforts, in order to improve the connection between investment decisions, level of service commitments to citizens, and sustainable outcomes for communities.

4 Business Context

How the City’s assets are managed and operated plays a key role in achieving the City’s strategic goals and objectives. Many of these goals and objectives are reliant on the long-term sustainability of the City’s infrastructure; therefore, one of the aims of this Infrastructure Strategy is to put in place a clear line of sight between those high-level objectives and the day-to-day activities carried out on the assets. Asset management objectives should be SMART (Specific, Measurable, Achievable, Relevant, and Time-Bound) and aligned to Council’s goals. Figure 3-1 shows the concept of line of sight between Council’s strategic plan and the asset management policy, strategy, and plans as a framework for asset management.

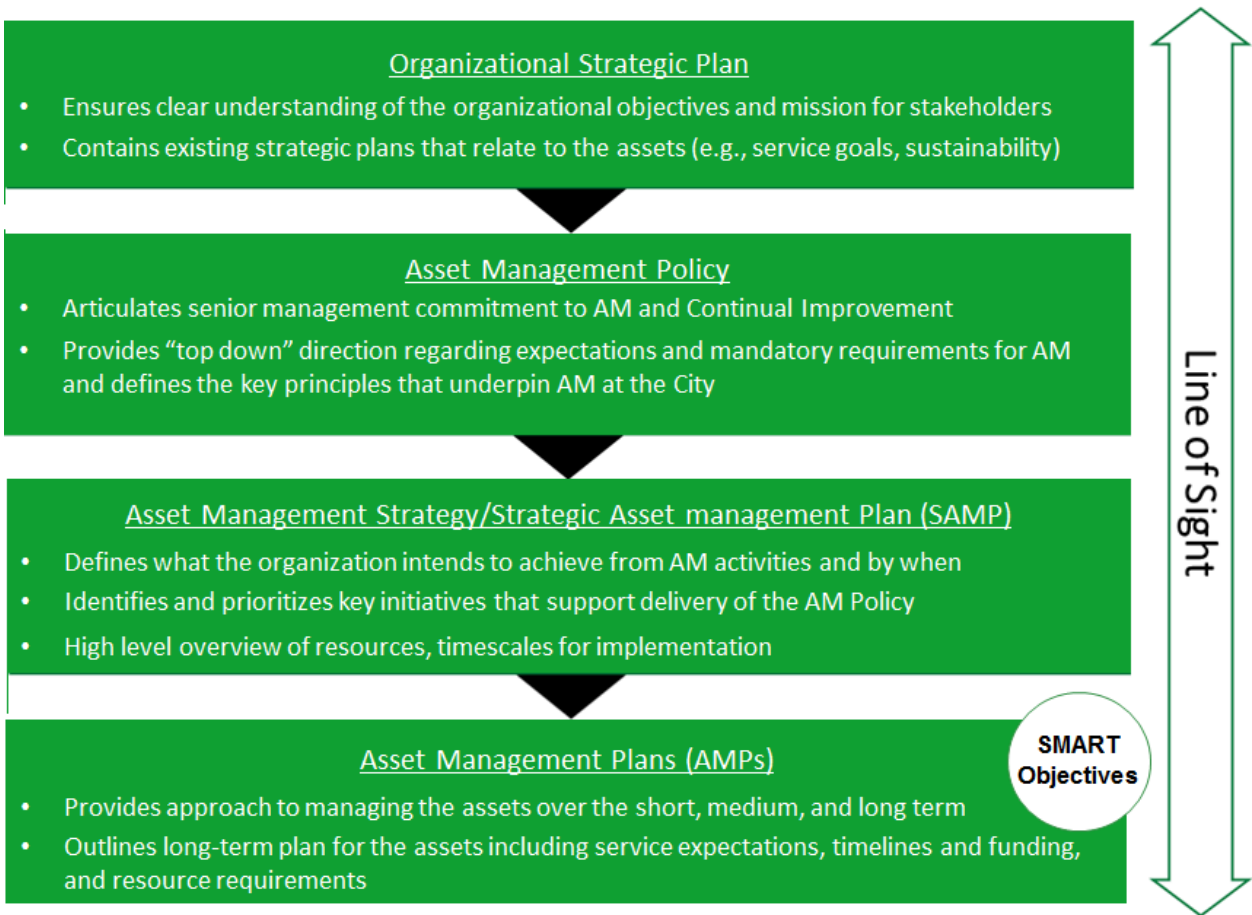


Figure 3-1. Framework for Asset Management

The City has a well-developed set of strategic planning documents. “The Way Ahead” is the City’s core organizational strategic plan for 2009-2018, which establishes six 10-year strategic goals to achieve the City’s vision and to direct long-term planning for the City. The Way Ahead outlines 12 corporate outcomes for the strategic goals and provides a set of indicators, measures, and targets for each outcome. To identify strategies to achieve the 10-year strategic goals, the City developed Directional Plans, also called “The Ways”. Collectively, The Way Ahead and The Ways form the City’s Strategic Plan (Figure 3-2).



Figure 3-2. City of Edmonton 2009-2018 Strategic Plans

It should be noted that the City is currently updating Council’s strategic plans, as “The Way Ahead” and “The Ways” are coming to the end of their planning horizon (2009-2018) . Instead of six "The Ways" documents, Council will have a single, integrated strategic plan with five goals. Figure 3-3 shows the preliminary, draft goals for Council’s strategic plan spanning 2019-2028.

Strategic Goal	Healthy City	Urban Shift	Regional Economic Resilience	Energy and Climate	Open and Effective Government
Strategic Goal Statement	Edmonton is a city that thrives, where every member of our community has equitable opportunity to be healthy and fulfilled	Edmonton is a city with infrastructure design, smart land use, transportation options and public spaces that enable the population to live safe and healthy lives	The Edmonton Metro Area has a robust, diversified economic system founded on ingenuity, regional collaboration and shared economic prosperity	Edmonton is a low-carbon city with smart energy options and innovative energy delivery systems. Our infrastructure is resilient to shocks and disturbances from climate change	The City of Edmonton government is open, transparent and accountable to Edmontonians

Figure 3-3. Draft Goals for New Strategic Plan

To deliver on Council’s strategic plan, Administration is developing a four-year Corporate Business Plan which outlines the key work and initiatives to be undertaken over the 2019-2022 period to help achieve Council’s goals. The Corporate Business Plan sets direction for Departments Business Plan priorities which are translated into tactical Branch Action Plans. Figure 3-4 shows an overview of the corporate planning framework with Council's vision, strategic plans, and operational asset management strategies, policies, and plans.

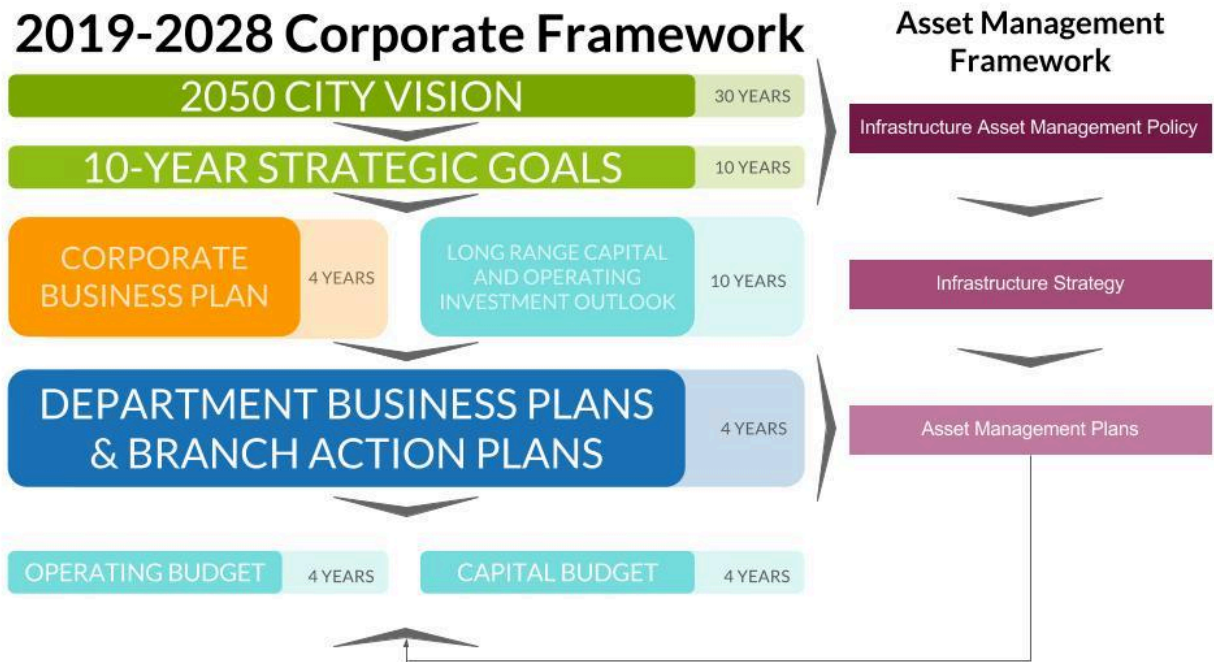


Figure 3-4. Overview of Corporate Planning Framework/Asset Management Framework Integration

Similar to The Way Ahead 2009-2018 and The Ways plans, Council’s renewed strategic goals recognize that infrastructure is critical to social, economic, financial and environmental sustainability and see infrastructure as one of the levers of change. For instance, The Way We Grow (Municipal Development Plan) cited infrastructure as a critical element in residential neighborhoods, parks, attractions and economic prosperity. The Way We Move acknowledged asset management as key to safe and effective public transportation. These concepts are echoed in Council’s 2019-2028 goal, Urban Shift. Infrastructure condition and funding strategies will have an effect on how fast Council’s updated goals will be achieved.

The City’s progress towards the 10-year strategic goals outlined in Council’s strategic plan is determined by the measures and targets in the Corporate Business Plan (currently under development) The overall strategy is to apply the concept of line of sight, as shown in Figure 3-1, in order to align the City’s asset/infrastructure management approach with Council’s goals.

4.1 Sustainability



Sustainability is the key theme underlying all of the City’s strategic goals and corporate outcomes. This includes ensuring that infrastructure assets should be socio-culturally, environmentally and economically sustainable into the long-term. The Way We Green, the City’s Environmental Strategic Plan, sets out the principles, goals, objectives and strategic actions and approaches for the City to achieve environmental sustainability and resilience. The City defines sustainability as *“our society’s ability to endure over a prolonged period as an integral part of Earth’s natural systems”* and the City defines resilience as *“the capacity of our city to withstand and bounce back intact from environmental disturbances”*. The City recognizes that the path to achieving sustainability and resilience depends on numerous factors including maintaining the natural assets used to deliver services, properly maintaining existing infrastructure, designing new infrastructure to be energy efficient, and building communities that value and practice sustainable living.

The City developed The Way We Green based on the view that the natural environment is the foundation of society and the economy, and that a strong and enduring society is possible only to the extent that its environmental foundation is also strong and enduring. Figure 3-5 illustrates the relationship between the environment, society, and the economy. The three concentric circles convey the idea that the economy exists within society and society exists within the natural environment, and, as such, both the economy and society are dependent on the environment.



Figure 3-5. Relationship of Economy, Society, and the Environment

The City has adopted 9 principles for pursuing sustainability and 18 principles for pursuing resilience in order to achieve the objectives of The Way We Green, as shown in Figure 3-6. These principles provide direction that influences the directions of other City strategic plans including The Way We Grow, The Way We Move, and The Way We Live.



Principles of Sustainability

Success-Level Principles

- Systematic Degradation of Nature
- Substances from the Earth's Crust
- Undermining the Capacity of People to Meet Their Needs
- Synthetic Substances Produced by Society

Strategy-Level Principles

- Biodiversity
- Model Cities on Ecosystems
- Use of Renewable Natural Resources
- Use of Non-Renewable Natural Resources
- Future Generations

Principles of Resilience

Success-Level Principles

- Carbon Neutrality
- Redundancy of Systems and Functions
- Systems Diversity
- Systems Durability
- Loop Tightness
- Local Self-Sufficiency
- Responsive to Natural Systems

Strategy-Level Principles

- Density, Diversity, and Mixed-Use
- Active Transportation
- Transit-Supportive Planning
- Place Making
- Complete Communities
- Integrated Natural System
- Integrated Technical and Industrial Systems
- Local Sources
- Engaged Communities
- Redundant and Durable Life Safety and Crucial Infrastructure Systems
- Resilient Operations

Figure 3-6. The Way We Green – Principles of Sustainability and Resilience

In addition to The Way We Green, the City has a number of policies that embed sustainability into other aspects of social and economic decision-making. Social challenges such as ageing populations (that require services with different mobility, recreational and care needs) as well as a public desire for more engagement in local government decisions requires new skills and resources. The Way We Live and The Way We Grow both address these and other social sustainability and resiliency issues. The Way We Prosper and The Way We Finance and the Way We Grow all strive to have a resilient, diversified economic environment that supports the City's goals for a vibrant livable city.

Other strategic instruments that embed sustainability and resiliency into decision-making include the *Sustainable Building Policy* and *Sustainable Purchasing Policy* that contributes to the City's strategic goals

of “Transforming Edmonton’s Urban Form”, “Preserving and Sustaining Edmonton’s Environment”, and “Diversifying and Strengthening Edmonton’s Economy”. The guiding principles of the City’s *Environmental Policy* align with the tenets of sustainability, in particular, the principle of “Intergenerational Equality”. In the *Natural Area Systems Policy*, the City recognizes the value of natural assets and their associated ecological services and long-term sustainability and adaptability is one of the principles of the City’s *Asset Management Policy* (see Section 3 of this Infrastructure Strategy).

Further developing and integrating asset management principles and processes into the City’s day-to-day operations will contribute to the achievement of the City’s environmental strategic goals for sustainability and resilience. These principles and associated concepts help the City’s decision-making at multiple levels, strategically, tactically, and operationally.

Business cases and other decision-making tools used at each level of service delivery can be refined to explicitly identify benefits that are aligned to these principles. Strategic level decisions that are more aligned to policy principles improve efficacy, and benefit the city through better alignment of resource allocation to achieve City goals. Aligned tactical decisions bring effectiveness benefits that ensure investments are allocated to the right assets, at the right time, to minimize portfolio lifecycle costs from the triple bottom line perspective. Operational decisions that consider these principles encourage efficiency and improve service delivery by minimizing inputs (economic, social and environmental costs) to deliver a service. Decisions align with City’s goals, encourage consistency in City infrastructure decisions over time and less time is wasted on planning that doesn’t align with City goals.

Quantifying asset management benefits can be drawn from these three areas (efficacy, effectiveness and efficiency) and taken collectively consistently represents a large return on investment. It is a way of aligning a business (public agency or private company) to achieving its goals to the benefit of its owners (the taxpayer public or company shareholders).

4.2 Stakeholder Engagement

The City recognizes that community support is crucial to the success of this Infrastructure Strategy. A number of stakeholders, both internal and external, will be affected by, and have an interest in, the operational and service changes that can occur from implementation of this Infrastructure Strategy. Their needs (and the risks that will arise, if their needs are not met) must be understood and addressed in order for this Infrastructure Strategy to be successfully implemented.

The City’s *Public Engagement Policy* outlines the City’s commitment to citizen involvement and engagement. Engaging with the public is a priority for the City – City Council and City Administration believe that active, engaged citizens make for a more vibrant, positive and welcoming City, while also leading to better decisions. Therefore, for all identified internal and external stakeholders, the City is committed to clear, consistent, and timely communications, and to incorporating their priorities in implementation of this Infrastructure Strategy and related plans.

The City intends to establish more formalized engagement processes specific to infrastructure management, funding, service levels and decision-making. Currently, service delivery has been communicated through several channels to help maintain a connection to the public and other stakeholders. For example:

- The Citizen Dashboard - showcases performance data for select services the City of Edmonton provides. The City is committed to improving the way it informs citizens about the performance of municipal services, and has established targets for many of its services supported by infrastructure.
- Customer satisfaction surveys -The City has also conducted many surveys to obtain feedback from the public about municipal services and other aspects of community priorities. For example, the Measuring Progress Survey completed recently assessed the public’s perception of service delivery.

Several indicators directly relate to infrastructure including “Well-Designed Attractive City”, “Access to Infrastructure Services and Amenities”, and others indirectly such as “Quality of Life”, Safety, and “Connectedness” among others.

- An Engagement Calendar provides a centralized summary for citizens to access opportunities to participate in City consultation events and activities.
- The Edmonton Insight Community is an inclusive and accessible online citizen panel made up of diverse Edmontonians who provide feedback on City policies, initiatives and issues.

These engagement tools and mechanisms are a strong foundation that can be used to enhance stakeholder engagement in future infrastructure decision-making. There is a well-established culture of engagement internally and externally that can help define and refine infrastructure decision-making, service level definition and long-term planning. The City will identify key stakeholders in its service areas that are supported by infrastructure to help define service requirements, document how best to deliver services, and how to measure the achievement of service levels that the community requires. Within the asset management system, the needs and expectations of stakeholders will be better understood to ensure asset management objectives align to City objectives. Stakeholders are likely to include:

- Service Recipients – Stakeholders that use the municipal service support by infrastructure (e.g. the travelling public)
- Other Service Providers – Stakeholders that require the municipal service/infrastructure to provide their own services (e.g. couriers and taxi services using the road network)
- Regulatory Agencies – Stakeholders that set standards, compliance regulations or other legislation that govern service delivery (e.g. Ministry of Environment and Parks)
- The Wider Community – Stakeholders that wish to influence decision-making but may or may not be users of the service (e.g. taxpayers funding services they may not use, City staff)
- Neighboring Municipalities – Other communities that are adjacent to Edmonton and are affected by or have an interest in City services (e.g. Leduc County)

Service levels and corresponding performance targets that are established and monitored over time should reflect these stakeholders’ primary requirements, which may be diverse. Engagement helps the City understand how to best establish service levels and how to best measure and track service delivery.

The City’s Public Engagement Spectrum explains four possible roles the public can play in infrastructure decision-making through engagement:

- Advise - The public shares feedback and perspectives on infrastructure projects, or services.
- Refine - The public helps the City adapt and adjust approaches to infrastructure programs, projects, or services.
- Create - The public collaborates to develop and build solutions regarding infrastructure programs, projects, or services.
- Decide - The public is empowered to make decisions directly or on behalf of the City about policies, programs, projects, or services.

As the City implements its infrastructure strategy roadmap, future engagement activities will follow their Guiding Principles for Public Engagement, as defined by their Public Engagement Policy:

- A shared responsibility
- Relationship-building and perspective seeking

- Proactive, timely, and transparent
- Inclusive and accessible
- Innovative and continuously improving

5 Infrastructure Asset Management Policy

5.1 Purpose

The City of Edmonton (the City) provides a wide range of services to the community that require the ownership and responsible operations, maintenance, rehabilitation and removal of infrastructure assets including, but not limited to, land, buildings, fleet, IT, equipment, transportation, drainage, sewer and water infrastructure.

Asset Management (AM) is an integrated approach, involving all City branches/sections (business units), to effectively manage existing and new assets. The intent is to maximize benefits, reduce risks, and provide satisfactory levels of service to the community in a sustainable manner. Good asset management practices are fundamental to achieving sustainable communities.

This Policy outlines the fundamental asset management principles that will be developed and implemented across the City.

The asset management policy should articulate Senior Management and Council's commitment and intention with regards to Asset Management. It focuses the organization on its long-term commitment, and should be developed as a document with a life that extends beyond several Council terms. An AM policy should be considered as a policy of principles that are focused on service delivery and the infrastructure that supports it, and aligns with corporate values. Overall, the intent of an Asset Management Policy should be to provide:

1. Guidance to staff in carrying out the organization's long-term business strategies, mid-term asset management plans, and current asset management activities;
2. Clear direction for Asset Management through defining key principles that underpin Asset Management and assist with developing the organization's Asset Management objectives;
3. Alignment upwards with the organization's vision, goals and objectives, and alignment downwards to current and future procedures for asset management activities, and;
4. Clarity to what outcomes are required when implementing the AM policy.

There are multiple benefits to having an Asset Management policy.

Efficacy Benefits

- When policy principles align with the City's goals, this enables decision-making and investments that help the City to reach its goals.
- The Policy helps inform the public about how Council makes decisions, and gives Councillors reinforcing information that can be used when they must justify decisions to their constituents.

Effective Benefits

- It assists decision-makers by providing a framework of principles which they can use as a lens on choices they are asked to make. It supports Council in their ability to make responsible and prudent investment decisions at the right time.
- It helps reduce political bias, and align Council to a long-term consistency in infrastructure decision-making. It encourages consistency in City infrastructure decisions over time.

Efficiency

It makes planning more efficient. It articulates the principles that guide decision-making in the City. This encourages staff to develop investment options and supporting information that align with a unified set of principles. Staff have greater clarity on what are the priorities for investment decision-making, and can more readily prepare information and supporting data to provide to Council for them to make decisions within a well understood policy framework. Less time is wasted on planning that doesn't align with City goals.

5.2 Scope

The City owns a wide range of assets that are directly used to deliver services or are under contractual arrangements with external users to deliver services. Each year, the City may receive or construct new assets. In addition, the City may rely on natural assets that it does not own in delivering services. This Policy applies to infrastructure assets currently supporting provision of City services.

The City recognizes the importance of natural assets and will include these in its inventories and asset management practices. Examples include water bodies, forests, wetlands, and wildlife corridors.

5.3 Policy Statements

The City of Edmonton owns a variety of infrastructure assets which support the delivery of services. They require responsible acquisition, operation, maintenance, rehabilitation, and eventual replacement and/or disposal.

Asset Management is the coordinated activities of an organisation to realise value from assets. It involves City departments, stakeholders, citizens, and Council. The intent of asset management is to maximize benefits, manage risk and provide satisfactory levels of service to the community in a sustainable manner.

The City's Infrastructure Asset Management Policy is a critical element of the City's overall framework for asset management, which also includes the City's Infrastructure Strategy and the development of asset management plans.

The purpose of this policy is to:

1. Provide guidance to staff in carrying out the organization's long-term business strategies, mid-term asset management plans, and current asset management activities;
2. Provide clear direction for Asset Management through defining key principles that underpin Asset Management and assist with developing the organization's Asset Management objectives;
3. Align upwards with the organization's vision, goals and objectives, and alignment downwards to current and future procedures for asset management activities, and;
4. Provide clarity to what outcomes are required when implementing the AM policy

Asset Management Key Principles:

The following outlines fundamental asset management principles that will be developed over time and implemented across both the organization and third party organisations responsible for City Assets for

application when making decisions pertaining to the Infrastructure Assets the City owns.

Service Delivery to Stakeholders

It is important for the City to adhere to defined levels of service (LOS), and in doing so balance stakeholder expectations, risk, affordability, time constraints, supporting Council priorities, and exploring technological advances and evolving markets.

The City shall:

- Have clearly defined LOS, and will target investments to:
 - maintain and manage assets at the defined LOS; and
 - recognize that LOS can change over time, and therefore monitor standards and service levels to ensure they continue to support community and Council expectations and objectives, and legislative/regulatory compliance.
- Create a common framework for establishing LOS. The framework should compliment and adhere to other City Policy, including the public engagement policy.
- Establish LOS that will be supported by:
 - Adherence to all relevant legislative, regulatory, and statutory requirements, where applicable
 - A risk-based decision making framework that considers impact to stakeholders when evaluating decisions on maintaining and enhancing, or reducing the LOS performance.
 - Determining the adequate balance between the value of stakeholder service and the cost.
 - Regular communications to Council and citizens on service performance and/or asset condition.
 - A clear understanding and evaluation of all options available to provide the service (or its elimination), recognizing advances in technology, market place, and changing business models.
 - Adherence to industry best practice(s), where applicable.

Long-Term Sustainability and Resiliency

Infrastructure assets should be socio-culturally, environmentally, and economically sustainable and resilient into the long-term. This involves triple bottom line consideration, long-term planning, and implementing resiliency actions.

The City shall:

- Make appropriate long-term decisions to better enable assets to meet the challenges of changing:
 - stakeholder expectations,
 - legislative requirements,
 - environmental impacts,
 - technological advancements.
- Consider socio-cultural, environmental, and economic factors and implications during asset management and investment planning processes.
- Consider proactive resilience when making infrastructure asset investment decisions, including but not limited to capital renewal and operational maintenance.

An Integrated, Holistic Approach

The concept of thinking holistically across departments and disciplines when managing services, capital assets, stakeholder experience, and other resources while efficiently delivering quality, and asset value by managing risk and maximizing value. (

The City shall:

- Implement a holistic approach to asset management that considers the impacts of decisions on stakeholders, and will make informed, evidence-based decisions using formal and consistent methods.
- Consider the assets in their system context, and their interrelationships, as opposed to optimizing individual assets in isolation. This includes systematically building resilience characteristics into infrastructure systems.
- Take a comprehensive approach to asset management that looks at the complete lifecycle of the asset, including planning, design, construction/development, operation, maintenance, rehabilitation, replacement, and disposal.
- Take steps to encourage collaboration, synergy, and cooperation across all business units as appropriate in order to build effective working relationships and sharing of information. The City should also extend this approach to regional, provincial, and national entities.

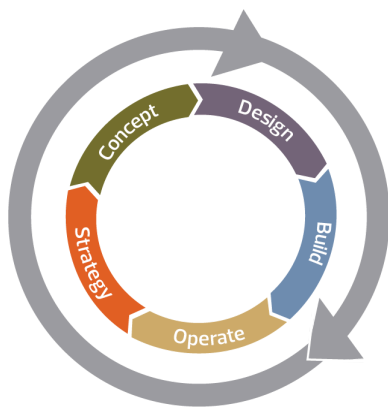


Figure 5-1. Edmonton's Sustainability Lens

Investment Decision-Making

Demonstrate fiscal responsibility and transparency in decisions related to the management of all City assets.

The City shall develop and maintain appropriate long-term plans for infrastructure investment, which include:

- Implementing and maintaining appropriate planning and assessment resources;
- Evaluating asset investment decisions based on life cycle cost to assess the full financial impact through acquisition, operation, maintenance, renewal and disposal.
- Embracing opportunities and challenges that arise from innovation and new technologies (including disruptive technologies);
- Developing prioritized and optimized capital investment plans that will enable rational transparent investment decisions to be made on an asset base.
- Clear line of sight to the service benefiting from the investment, and appropriate measures, outcomes, and targets to evaluate the effectiveness of the investment.

Innovation and Continuous Improvement

Create a culture that values innovation and continuous improvement in asset management practices to

fully realize asset value and achieve sustainable communities.

The City shall:

- Focus on driving innovation in the development of processes, tools, techniques, and solutions as required.
- Continually measure the effectiveness of its asset management programs and adjust, as applicable.
- Provide the necessary education and training in asset management to internal and external stakeholders.

6 Asset Management Decision-Making

Every municipality has their own way of making investment decisions. Documenting how these decisions are carried out is important for transparency and consistency across the City, and over time. People, not process, make decisions. A decision-making approach, however, can help frame decisions in ways that perhaps make them better decisions, and certainly a more informed decision. The AM Strategy is the reference that documents the high level decision-making approach and helps bring organizational resiliency, as the approach can be understood and followed by all those involved with infrastructure planning and delivery.

The City has always strived to achieve a balanced investment program that progresses towards their AM objectives. Within existing tools used to inform investment decisions, investment prioritization criteria capture the City's current preferences and priorities. This section is focused on explaining both how decisions are currently undertaken with regards to service impacting investments, and where the City seeks to advance in their asset management decision-making.

6.1 Existing Practice

The City assigns responsibility for asset management at two levels: the corporate level and the business unit level. The newly formed Lifecycle Management office is responsible for an integrated approach combining corporate asset management (utilizing various management tools to help Council optimize investment in infrastructure and aiding Council in capital planning to develop a long-term view of the City's infrastructure needs) with tactical decision making about infrastructure investment on assets within their purview (at the time of the preparation of this document, all non-fleet assets excluding specialized equipment). The Lifecycle Management section looks at asset data, analysis, and guidance on overall budgeting, while also developing decision-making tools and processes (prioritization techniques, risk analysis), corporate infrastructure policy, and reports on the state and condition of infrastructure.

As explained in the City's 2015-2018 Capital Budget, there needs to be a balance between efforts to maintain existing infrastructure (renewal) and efforts to expand the City's asset base to accommodate growth.

Renewal vs. Growth

Renewal is investment in existing infrastructure to restore to its former condition and may extend its service life. Capital investment in renewal extends the period of service potential but does not change the replacement value, and so does not increase the size of the infrastructure asset portfolio. Renewal includes rehabilitation and replacement.



Growth includes investment in new assets as well as investment in projects that add to or enhance components of existing infrastructure assets to improve the type of service provided and/or to improve functionality and /or capacity.

A combination of management tools are utilized in order for the City to position itself to make informed investment choices and adequately meet the required infrastructure investment needs.

The City's renewal needs are determined using a custom-made decision-making tool called the Risk-Based Infrastructure Management System (RIMS). RIMS includes methods for simulating asset deterioration over time by incorporating various rehabilitation and renewal scenarios. It also enables the testing of various funding strategies so that City Administration can see how certain funding levels impact infrastructure and can assess the status of infrastructure over a given time. RIMS was used to predict the investment required in infrastructure renewal for the 10-year 2015-2024 Capital Investment Agenda, which in turn was used to develop the 2015-2018 Capital Budget. The City is looking at further improving the way it allocates renewals funding by creating Asset Management Plans for all the City's assets during the next (2019-2022) budget cycle.

Growth needs and priorities are initially identified at the business unit level, with recommendations put forward based on alignment to the City's strategic plans, pre-existing Council commitments, and an initial presumption of unconstrained funding. The City will rank potential growth projects using the following updated prioritization criteria for the 2019-2022 Capital Budget cycle:

Strategic Criteria

1. Healthy City
2. Urban Shift
3. Regional Economic Resilience
4. Energy and Climate

Operational Criteria

5. Mandate
6. Impact - Geographic (External) or Organizational Impact (Internal)
7. Demand & Service Levels
 - 7.1. Change in Demand for the Project
 - 7.2. Level of Service
8. Capital or Operational Savings
9. Corporate Operational Risk

Weighting criteria are also applied to reflect the changing needs of the community and project ranking is further scrutinized on the basis of timing and synergies with other projects, relevance to current issues, available funding, and external factors. All growth projects are supported by a formal business case and the City intends to extend this practice to other types of projects.

6.2 Key Areas for Decision-Making Enhancement

When enhancing the City's infrastructure decision-making approach, it is important to establish a linkage to how the AM objectives, i.e. service levels, were determined. Currently, the City's funding for the service areas is influenced by the existing infrastructure portfolio, as well as needs established by business units to align with updated functionality or programming needs. There are several areas of improvement that have been identified. These are summarized within this section.

6.2.1 Revitalized Renewal

Renewal investment has been recognized as important to support the City's core service delivery. Indeed, the City's infrastructure renewal funding levels are typically higher than investment in projects that support growth. At present, renewal investment planning is limited to models that focus on "like for like" replacement, and lack a formalized mechanism to incorporate potential revitalization options that might also support growth. Future enhancement in this area will be focused to integrate and optimize growth and renewal investment opportunities.

The City will establish a formalized mechanism to consider revitalization in renewal projects while still operating within financial constraints. The current separation of renewal and growth investment decision-making is important to establish the adequacy and sustainability of investment. However, seeking and leveraging opportunities to enhance and revitalize an area of a community that enhances service levels, while renewal existing infrastructure, better integrates decisions and improves the service outcomes for citizens.

Finally, decision-making associated with renewal will also formally incorporate consideration of removal, disposal, divestiture or service elimination options as appropriate, to ensure the best service outcome given available resources.

6.2.2 Holistic Thinking Across the City

The City has a desire to embed more holistic thinking in decision-making within business unit service delivery. Existing management tools including the Risk Based Infrastructure Management System (RIMS) have holistic principles included within its methodology, however it is applied city-wide and currently cannot model changing functional or capacitive requirements over time. At a business unit level, some major strategic projects may already employ asset management principles and tools such as whole of life costing including consideration of divestiture, risk assessment, and triple bottom line assessment techniques, however this is not consistent nor universal. Planned enhancements to decision-making processes will integrate these concepts within business unit decisions at a tactical and operational level. This will be implemented to bring a consistent approach across a wider range of investment decisions being made across the City's business units for infrastructure.

6.2.3 Establishing and Tracking Service Levels Beyond Condition

Currently the City measures and reports service performance through customer focused metrics such as those reported on the Citizen Dashboard, through some Key Performance indicators, or through some condition based technical measures that are part of the RIMS methodology. There is an intention to have a more direct linkage between service level performance by business units and investment decision-making. Excepting infrastructure condition, there are currently few examples within City business units where service performance, relative to a defined service level, is an explicit input into investment decisions.

As part of this strategy, a more systematic, and consistent approach will be established that will also improve the City's ability to perform alternative investment comparisons between business units. This

will be accomplished through improved level of service definition with business units, a more consistent risk assessment methodology applied across all City business units, and an infrastructure performance framework that is consistently applied. This framework will endeavor to establish a strong linkage to municipal strategic goals and may employ multiple financial and assessment methods such as net present value, benefit cost analysis, risk-based assessments , multi-criteria analysis, or other balanced methods that incorporate social, environmental and economic considerations.

6.3 Embedding Sustainability into Infrastructure Decisions

Sustainability concepts and principles are best embedded directly into the decision-making approach to encourage its adoption across the municipality. All City decisions are also considered from a sustainability perspective. Figure 6-1 shows how the principles for sustainability and resilience outlined in The Way We Green are intended to serve as the City’s “sustainability/resiliency lens”, aiding decision-makers in understanding how their choices contribute to (or diminish) the City’s overall sustainability.



Figure 6-1. Edmonton’s Sustainability Lens

The City recognizes that “green” initiatives generally require higher initial capital investment, but, when examined more fully over their life cycle, these initial costs are offset (in whole or in part) by a variety of benefits, including:

- **operational benefits** (e.g., lower utility and maintenance expenses, longer useful life, and/or increased worker productivity);
- **social benefits** (e.g., benefits to human health); and
- **environmental benefits** (e.g., reduced greenhouse gas emissions).

As noted in The Way We Green, factoring these benefits into investment decisions, along with the initial capital outlay, changes the decision maker’s focus from “What is the lowest initial capital outlay?” to “What are the costs and benefits of the competing investment options and which option delivers the greatest net benefit to the community?”.

7 Asset Management Objectives

Asset management objectives and performance targets are commonly also termed Levels of Service and Performance Measures in a municipal context. AM Objectives guide decision-making in each service area. To make decisions, business units must know what they are trying to achieve. By setting these objectives, it guides all tactical and operational activities to helping deliver on higher level organizational objectives. This infrastructure strategy seeks to align all its future objectives to the City’s core values. This will encourage service level statements to have consistency across business units. By being developed within a universal framework, service statements / AM objectives provide the linkage between the organizational objectives and the AM plans that are to be developed by each business unit going forward. AM System objectives (aspirations of the manner in which we conduct our infrastructure decision-making and practices) can also can be about the service itself, and their supporting assets (how well we are delivering our services).

This section seeks to show how the City intends to translate City goals into specific AM objectives that can be readily used in AM planning processes. The ultimate aim of the City is to provide specified services to its customers, and it does this through its asset base. It is therefore vital to have a clear and consistent understanding of what services the City provides to its customers and how the City is performing in delivering these services. This can be articulated through asset management objectives and a Levels of Service (LOS) Framework.

AM Objectives for the organization are integral to the AM System and to activities and practices that will be deployed across the organization. It is very important to create a clear connection between the organization strategic objectives and the AM objectives. This is integral to developing effective ‘line of sight’ from the top down. As noted in Section 2 (Business Context), one of the aims of this Infrastructure Strategy is to put in place a clear line of sight between the City’s corporate objectives and the day-to-day activities carried out on the assets. This means clearly aligning LOS in each business unit with the City’s corporate outcomes, as will be described in the City’s integrated strategic plan. Figure 7-1 shows the concept of line of sight in LOS.

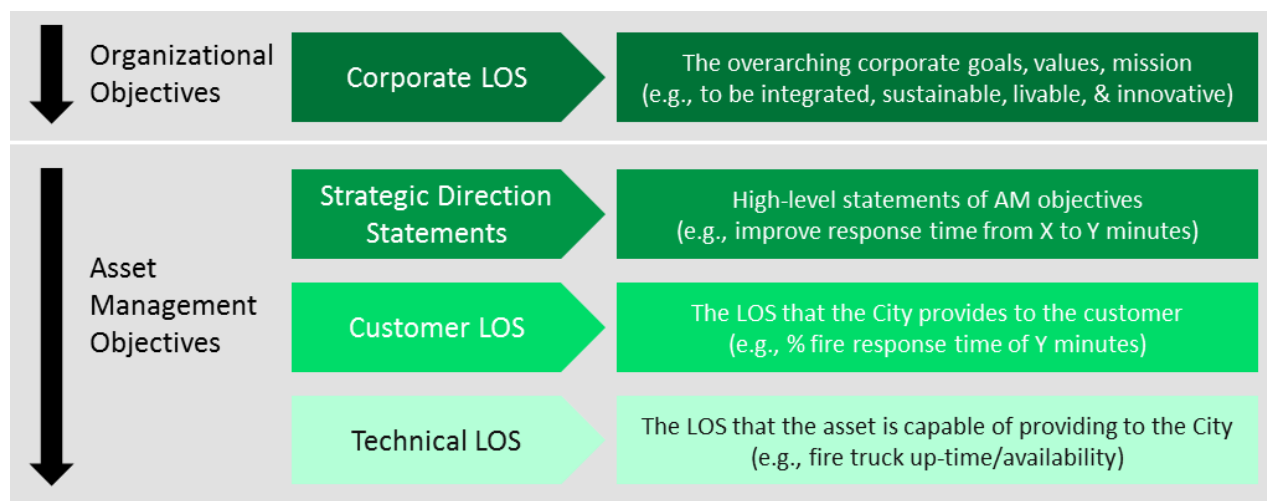


Figure 7-1. Line of Sight in Levels of Service

Council's corporate outcomes essentially form the City's Corporate LOS. The City, for the most part, has not yet defined Customer and Technical LOS, however, there is an understanding that the development of asset management plans and LOS for the business units is fundamental in progressing the City's asset management objectives and overall strategic goals.

There is knowledge within the City that exists to support the development of asset management objectives in the form of LOS. The City understands the physical service standards for each asset, which is already incorporated into long-term modelling. In addition, the City is generally aware of the LOS it maintains, even though it has not yet articulated what the LOS are, as each business unit will need to consult with internal and external stakeholders before formally establishing LOS and communicating them to the public and Council. The City recognizes that establishing a comprehensive LOS Framework is a priority and there is commitment from City leadership to do this.

There are seven universal customer/stakeholder/citizen values to consider when developing Customer LOS measures:

1. **Accessibility:** The ability for all possible customers of different abilities to access and use a service provided by the City, and in addition, to be able to access information about the service, and the assets that exist to provide that service.
2. **Reliability/Availability:** The frequency the service is available for use by the customer. This is closely related to how reliable the service is. If a customer has access to a service between certain hours on a daily basis, this is the availability, if the service is often overrun or late/early, this would be the reliability.
3. **Quality:** The level of excellence in service delivery provided by the City.
4. **Customer Service:** The service provided for interacting with the customer regarding the services provided. This service allows customers to provide feedback on the services.
5. **Safety:** A measure of service that takes into account the amount of harm that could be incurred to the customer, bystanders, wildlife/pets, and the environment.
6. **Sustainability:** This translates into striving for community well-being, a sustainable environment, a prosperous economy, and smart growth and mobility choices. It is achieved by having a balanced financial capacity and creating a sustainable corporation that will drive toward this vision and provide the services citizens need today and in the future.
7. **Legislative:** Service provided by the City that has to meet standards set by legislative assemblies such as Provincial or Federal standards.

Additional customer values may be identified for different business units depending on the type of service provided and how the key customer groups relate to the services provided. For example, other customer values may include Responsiveness, Convenience, etc. Customer service level statements crafted in the context of these values can increase the connection of investment decisions to the aspects of service that are important to all stakeholders. By applying the strategic intent expressed in these service level statements to our asset base within the City's affordability/financial constraints, it can define and prioritize investment and programs of work. This alignment to customer expectations, and service levels ensure our AM objectives are aligned with and help achieve corporate goals.

For some business units, "customers" might be internal stakeholders or other external organizations. For example, the IT Department exists to provide services to other business units, so their customers are internal to the organization. Tax payers are an obvious external stakeholder but they aren't the only ones, for example, the environment is generally considered a customer/stakeholder as well, and is typically represented by the regulating bodies in the Province.

Typically, cities and municipalities collect large amounts of Technical LOS measures, however, they do not articulate exactly what they are doing for their customers, and the Customer LOS measures should reflect what service the customers directly receive. Customer LOS should align with the expectations of the customer but also be realistic and practical within the budgetary, timing, and external constraints within which the City operates. The City's Citizen Dashboard could be one possible location for Customer LOS measures to be reported and monitored.

It is important for the LOS Framework to reflect both "leading" and "lagging" performance indicators. Normally, Technical LOS measures are the leading indicators that will, in time, affect the lagging Customer LOS measures. For example, in Figure 7-1, if fire truck up-time/availability is low, then over time this will affect the Fire Department's response time to customers as fire trucks are unable to respond to calls.

Some KPIs exist to guide asset planning in some City business units, however there are many business units that do not have any. There is a proposed key improvement initiative that will focus on LOS, augment existing KPIs and develop service level statements to govern management of infrastructure. One example of a recent program with clearly defined LOS is the alley renewal program. Development of this program included public consultation and the program's LOS measures were approved by council. The service levels use condition as a proxy for service quality. While condition may not fully reflect the customer experience when using the asset, the process reflects a step forward in defining service levels for this aspect of the network.

Developing a formalized LOS Framework will help the City articulate asset management objectives and will support the City's goals for sustainability and resilience. As one of the universal customer values, sustainability will be a key component of the City's LOS Framework and each business unit will need to identify Technical and Customer LOS in order to measure the progress towards the desired sustainability outcomes. Going through the exercise of measuring and monitoring Technical and Customer LOS for sustainability will help the City in its pursuit of its strategic goals.



8 Asset Management Activities

The City has identified 10 asset management system improvement activities, for which they would like to evolve and develop a common approach across all of the City's business units. These activities include:

1. Asset Management Plans
2. Levels of Service
3. Investment Planning
4. Triple Bottom Line
5. Operational Maintenance Strategy
6. Asset Accountability
7. Asset Management Training
8. Risk Management
9. Asset Health Monitoring
10. Life Cycle Planning and Optimization

The following subsections provide a brief overview of the 10 asset management activities, above.

8.1 Asset Management Plans

ISO 55000 defines an Asset Management Plan (AMP) as *“documented information that specifies the activities, resources and timescales required for an individual asset, or a grouping of assets, to achieve the organization's asset management objectives”*. AMPs are a fundamental part of ISO 55001, which sets out the requirements for an asset management system.

AMPs should be derived directly from the City's asset management strategy and can be written and applied at different levels. Having an AMP in place can improve access to infrastructure funding from other levels of government and provides transparency in asset management decision-making.

Establishing asset management plans will help fulfil the asset management policy by aligning asset investment decisions and activities consistently with the processes identified in this strategy. The following commitments and principles in the policy also make reference to the plans themselves:

The City shall develop and maintain appropriate long-term plans for infrastructure renewal, for the purchase/construction of new infrastructure and for the decommissioning of redundant infrastructure that includes:

- implementing and maintaining appropriate planning resources;
- adapting and becoming more resilient to changing risk;
- understanding annual operational and investment needs;
- considering lifecycle costs and new technologies; and
- providing stable long-term funding.
- Evaluate the economic cost and charge fairly for services into the long-term to ensure financial sustainability.
- Evaluate asset investment decisions based on whole life cost of assets to assess the full impact of managing assets through their life cycle from acquisition to renewal or disposal.
- Evaluate asset investment decisions considering affordability, willingness to pay, and intergenerational equity.

- Develop prioritized capital investment plans that will enable rational transparent decisions to be made on the asset base as it relates to LOS.

The plans are the tiered reflection of this strategy being implemented within an asset class. The following outline highlights the key components of initial asset management plans to be developed within the City’s service areas. Individual service plans may have additional components that are unique to their needs, however, all plans should have the following content as a minimum for consistency across the City:

- Context: Overview of the services being supported by the infrastructure, how they fit with the City’s obligations, goals and objectives. It also defines the scope of the infrastructure portfolio.
- Current State of the Infrastructure: A summary of the current status of the infrastructure in terms of portfolio size, age, value, condition and other metrics.
- Level of Service and performance tracking - that documents service levels currently being delivered, how performance is being tracked and measured, and the process for how cost of service, service delivery and risk have been established for existing services and associated portfolio.
- Growth, Future Demand: Documents where service enhancements may be required to accommodate future capacity needs, changing factors (e.g. greying community, climate change, technological changes) or other influences that are anticipated over the planning horizon.
- Asset Management Strategies - Documents the operational, maintenance, and renewal interventions that are employed on the infrastructure to maintain service levels (e.g. crack sealing, patching, mill and fill, overlay, full-depth reconstruction), as well as their cost and effect on service/performance. This assists in the life-cycle analysis / modelling process that may be done to assist decision-making and financial planning.
- Decision-making processes and risk - Documents how decisions are made associated with investment planning, and what information, analysis, and reporting is done to support decisions. Risk is embedded within these processes and is integrated in a systematic way to directly contribute to decision-making.
- Financial Plan - The financial forecast over a long term (sufficiently long to include at least one lifecycle of all assets in the portfolio) planning horizon that quantified the investment required to deliver service levels. It includes near term capital budgeting that aligns with long term investment needs. Investment requirements as well as revenue strategies to fund required investment are included in this section.
- Improvement Plan: Highlights where asset management practices are to be improved upon, and a schedule for when these improvements will be implemented in this service area.

8.2 Levels of Service

A documented suite of LOS measures enable a common understanding of what service levels customers currently receive, and the associated cost of maintaining infrastructure and assets to provide continuity of this baseline service. Having these measures set at the appropriate levels within the organization can ensure alignment from the corporate performance vision, to asset investment decisions, and day-to-day operational activities.

The monitoring of service performance enables the City to demonstrate transparency, equity and accountability in relation to service provision. With a common understanding of current LOS and associated costs, the City will be better prepared to negotiate, defend and provide services to customers. The City will have better information to articulate the financial impacts of improving or reducing services, and to engage in “willingness to pay” discussions with customers. This will enable the City to

move towards budgets based on achieving a set LOS and/or being able to communicate a reduction or improvement in LOS associated with a reduction or increase in available budgets.

Implementing level of service measures and key performance indicators aligns with the City's asset management policy commitments. The concept of having defined levels of service (LOS) that balance customer expectations with risk, affordability, and time constraints, while supporting Council and community priorities is a core principle within the policy. It requires the City to have a clearly defined LOS that balances customer expectations and regulatory requirements with risk, affordability, and available resources, and maintain and manage assets at the defined LOS.

8.3 Investment Planning

The City has well established investment planning processes at the Corporate level through approaches such as RIMS and the growth prioritization criteria. The individual Departments/Service Areas have established processes but there are variations in practices across service areas and it is not clear how well aligned each is to the corporate process. It is the intent of the City to improve alignment between corporate and service area investment planning processes.

As stated in the Asset Management Policy (see Section 5.4), the City shall evaluate asset investment decisions based on life cycle cost to assess the full financial impact through acquisition, operation, maintenance, renewal and disposal. This comes into effect during the options evaluation stage of a project – with the problem understood, a selection of solution options are evaluated. Life Cycle Cost Analysis is a method used to compare these options against each other on a financial basis. Currently there is significant variation in its application across projects. It is the intent of the City to develop a standard Life Cycle Cost Analysis framework and achieve consistent application of the framework.

8.4 Triple Bottom Line

The overall program will have a broad scope that goes beyond City infrastructure and will look at approaches/tools that can be applied to all significant decisions made by City managers and elected officials (and probably others) that have social/economic/environmental trade-offs and consequences. This would likely include urban design decisions that precede and influence infrastructure, as well as significant operating decisions that involve no capital/infrastructure. In addition, the program will examine ways of building capacity (awareness and learning) on this topic across the entire City workforce. This program also aligns with the asset management policy which references that services and infrastructure assets should be socio-culturally, environmentally, and economically sustainable into the long-term. This involves triple bottom line consideration, long-term planning, environmental awareness, and implementing resiliency actions. The policy requires long-term decisions and provisions meet the challenges of customer expectations, legislative requirements, environmental impacts, and technological innovation, be proactive and consider socio-cultural, environmental, and economic factors and implications during asset management planning and investment processes.



8.5 Operations and Maintenance Strategy

Managing the life cycle of infrastructure assets is an important part of asset management. Life cycle management can be split into four key components – Acquire, Operate, Maintain and Dispose.

In the municipal environment, the Operate and Maintain components – also referred to as Operations and Maintenance (O&M) – are typically the longest periods of time in the life cycle of an asset, and they are about ensuring that assets run effectively on a day-to-day basis to deliver value to customers.

Maintenance is a critical part of an infrastructure organization. There are two fundamental types of maintenance: planned maintenance and reactive maintenance. An infrastructure-based organization

needs to define a maintenance strategy and decide how they want to manage maintenance within the organization. Reactive maintenance can be considerably more expensive than planned maintenance and often this will have a direct impact on service to customers. Getting planned maintenance right will both reduce total overall cost and improve service performance to customers. What planned maintenance entails is asset dependant, and can include “run to failure” under certain cost/value scenarios.

In order to become more effective as an infrastructure-based organization, the City is striving to improve its ratio of planned to reactive maintenance. This will help the City to better maintain their existing asset base, as well as reduce reactive maintenance costs and impacts to customer service.

Having a maintenance strategy aligns with the City’s asset management policy which fosters a concept of thinking holistically across departments and disciplines when managing services, capital assets, and other resources. The policy requires the City business units to build effective working relationships and the sharing of information. This includes, but is not limited to, Engineering, Operations, Maintenance, Finance, and Planning, as well as cross-service functions. Additionally, the policy requires the evaluation of asset investment decisions based on whole life cost of assets to assess the full impact of managing assets through their life cycle from acquisition to renewal or disposal.

Renewal plans shall consider and be coordinated with maintenance strategies that allow for the balancing of preventative and reactive maintenance, renewal, replacement and removal that minimizes life cycle cost and maintains or improves the overall service delivery that is supported by the infrastructure portfolio. Accordingly, maintenance plans for assets will be integrated with long term planning to optimize portfolio investment.

8.6 Asset Accountability

The City needs to take an active and responsible role in ensuring the appropriate authority or individual is accountable for infrastructure and community assets.

The City will establish an appropriate set of responsibility principles and a governance process to eliminate ‘grey’ assets that currently do not have a formally assigned owner within the City or any newly acquired assets where there is uncertainty about accountability. Clearly defined asset accountability and associated roles and responsibilities will ensure that assets are managed appropriately and safely, regardless where stewardship accountability resides.

In some cases, third party stakeholders are stewards for infrastructure that the City has partial or full responsibility for. For example, facilities may be operated and maintained by non-profit agencies , including infrastructure renewal responsibilities. In some cases, formal contractual relationships exist, while in others, there are less formal agreements in place. The asset management policy speaks to the need to establish appropriate mechanisms to ensure City principles transfer and are adopted to all infrastructure decisions, regardless of the allocation of responsibilities with third party stakeholders. Where shareholders have limited resources and capabilities, the City will seek to find a mechanism to enable asset accountability to be allocated appropriately to those with the skills required to fulfill this policy.

Recent organizational changes within the City has also identified the need to assess the responsibility structure and roles for activities that affect infrastructure management and planning. Operations, maintenance and renewal planning and implementation require a responsibility and accountability matrix that reflects the new City organizational structure. For example, while data governance may be a shared responsibility, different individuals may have accountability for renewal planning, capital project management, infrastructure maintenance and operations associated with service delivery. This process will clarify responsibility and accountabilities that align with the new structure and ensure a consistent management structure is in place across the City for its infrastructure. This aligns and helps fulfil the

asset management policy which requires business units to build effective working relationships and the effective sharing of information.

8.7 Asset Management Training

The 2016 Canadian Infrastructure Report Card states that “*all communities would benefit from increased asset management capacity.*” And that capacity comes in the form of skilled asset management staff in the organization – capable of guiding the City and individual business units in understanding the asset management challenge, and how to go about moving forward as an organization while balancing customer demands with infrastructure needs.

At the City of Edmonton, the asset management policy requires the City to provide the necessary education and training in asset management to deliver on the City’s goals and objectives. A commitment has been made to Council to move forward with implementing asset management across the organization. To do this, the asset management capacity and competency of staff needs to be improved, which is best done through asset management training.

8.8 Risk Management

Inherent with delivering a wide range of services to the community, organizations are exposed to a variety of internal and external factors that add uncertainty to the successful delivery of service. These uncertainties are termed “risks” and, unchecked, have potential to adversely affect an organization’s ability to deliver services in an effective and efficient manner.

Risk is often defined by the following basic equation:

$$\text{Risk} = \text{Likelihood} \times \text{Consequence}$$

ISO 31000 defines risk management as “*coordinated activities to direct and control an organization with regard to risk*”. As such, the objective of risk management is to assess which risks pose unacceptable conditions to the organization and advance plans to address them. This is best accomplished through structured processes that identify, analyze, and evaluate risks with due regard given the objectives of the organization. A risk-based approach to assessment and mitigation enables the organization to make more informed, defensible decisions regarding the allocation of resources with respect to managing their assets, thereby enhancing the ability to deliver efficient and effective service.

Risk management can help the City improve performance in a number of ways by focusing attention and resources on the issues that pose the biggest threat to service delivery performance to customers and other stakeholders. The asset management policy conveys an intention to use a risk-based decision-making framework that considers impact to customers when evaluating decisions on maintaining the existing asset base. It commits the City to establish defined levels of service that balance customer expectations with risk, affordability, and time constraints, while supporting Council and community priorities. This process will allow the City to direct resources, expenditures, and priorities in a way that achieves the established LOS and benefits at an acceptable level of risk. Service levels create a focus for discussion about service delivery and the public’s expectations. While there is a risk of a divergence between service expectations and affordability, service levels can be reviewed with stakeholders to identify where there is support to increase funding for enhanced service delivery, or an opportunity for innovation to close service gaps within the affordability envelope.

Finally, it should be noted that service delivery that incorporates risk management should equally consider the positive and negative aspects of risk. Innovation and opportunities to change service in new ways may improve service quality, save money, or create value in other ways. Risk will be integrated

into decision-making to not only help avoid negative consequences, but also take appropriate risks where opportunities arise that advance the City's ability to deliver services and achieve City goals.

8.9 Asset Assessments

Routine monitoring of the condition and performance of the asset base is essential to identify defects, deficiencies, and concerns, and initiate proactive action to treat the risk before it impacts on customers and other stakeholders. In simple terms, these assessments can be classed into two main categories – low cost visual inspections and more specialized inspections.

In addition, a comprehensive asset inventory (asset register) serves as the foundation for the City's asset management activities and asset planning and decision making. The asset inventory helps in making informed, strategic decisions about the City's infrastructure. By gathering and maintaining this information, the City can position itself to more readily take action on any risks or costs associated with the renewal and replacement of infrastructure.

A cost-effective regime of asset assessments allows the City of Edmonton to act on emerging asset risk before it impacts on the customer and it can provide a more reliable dataset for statistical modelling of the life cycle behavior and deterioration of the assets that is the basis for renewals planning. The asset management policy specifically mentions the requirement to monitor standards and service levels to ensure that they meet/support community and Council expectations and objectives and that they are compliant with regulatory requirements. Condition, and other performance indicators also allow the City to perform analysis that can better inform decision-making that is consistent with other policy principles.

Work on this initiative includes establishing baseline expectations, including role clarity, for what is assessed, the frequency of assessment and the level to which the asset is assessed (visual inspection, vs instrumentation etc), and includes an assessment of the current resources devoted to assessment activities, and the adequacy of the various asset inventories used to house asset information.

8.10 Life Cycle Planning and Optimization

Life cycle planning is about understanding the life cycle behavior of the various types of assets and using this understanding to develop robust forecasts of the investment funding required for renewal of the existing asset base. The City has made considerable progress in this area through the corporate RIMS model and various renewals planning methods across the Department/Service Areas. It is the intent of the City to have robust renewal planning models across all of the significant asset classes.

Life cycle optimization is about improving the overall life cycle performance, both cost and service delivery performance, of each of the asset classes. Once the existing life cycle behavior is understood then it may be possible to develop alternative life cycle strategies to improve overall life cycle performance. An example of this might be the addition of crack sealing to the road pavement strategy in order to delay re-surfacing and reconstruction interventions.

Implementing lifecycle planning and optimization aligns with the City's infrastructure asset management policy. It requires consideration of the interrelationships between services and assets by dynamically adjusting life cycle work across the asset base. It commits the City to take a comprehensive approach that looks at the "big picture" and considers the combined impact of managing all aspects of the asset life cycle, including disposal and removal. Ultimately this process will enable the City to evaluate asset investment decisions based on whole life cost of assets to assess the full impact of managing assets through their life cycle from acquisition to renewal or disposal.

8.11 Activity Action Plan

The City has identified ten key initiatives to advance asset management practice and improve how the City manages its infrastructure supporting service delivery. The relative importance of each of these options were ranked by internal stakeholders to determine the relative importance of improvement initiatives. Participants included representatives from the following stakeholder groups:

- Open Spaces
- Right of Way
- Edmonton Transit
- Waste Services
- Citizen Services
- Fleet
- EPCOR Drainage
- Facilities
- Corporate Asset Management
- EPCOR Water
- EPCOR Power

The initiatives have been allocated into a preliminary implementation schedule. Some initiatives, such as risk management, Triple Bottom Line and Levels of Service will be implemented as a corporate initiative, while many of the others will be implemented through collaboration between business units and Lifecycle Management.

Table 8.1 Key Improvement Initiative Implementation Schedule

Initiatives	Rank	2018	2019	2020	2021	2022
Asset Management Plans	3					
Levels of Service	2					
Investment Planning and Whole Life Costs	9					
Triple Bottom Line	10					
Operations and Maintenance Strategy	7					
Asset Responsibility	5					
Asset Management Training	6					
Risk Management	4					
Asset Assessments	1					
Lifecycle Planning and Optimization	8					

Asset management is an evolving practice and matures through continuous improvement processes. Improvement initiatives, for this reason should be viewed not as a project, but as a process of improvement. Projects come to completion. Processes improve over time, but never conclude. The proposed improvement initiatives should be considered in this context. Improvement will advance practice, but further potential improvements will be possible beyond the current schedule.

Secondly, many of the above initiatives will have a transformational change effects within the City. Their successful implementation will change how the City does business. As such, all ten initiatives will be challenging to accomplish within the next five years. Change takes time and steady reinforcement is required for it to have a lasting effect. Despite this challenge, all ten initiatives have been scheduled within the next five years. Some will reach a steady state before the end of the scheduling period, others

will only begin at the end of the five-year period. Having all activities planned to start will allow for integrated initiatives to process in concert.

Finally, this roadmap contains both fundamental building blocks such as the asset responsibility task as well as initiatives that maintain the City in an AM leadership position such as TBL and risk management. It has been tailored to the City's unique current status, and builds on the many strong advances made in asset management practice up to this point. This schedule and implementation plan should be revisited annually and adjusted based on progress and new requirements that may arise as the strategy is implemented.

9 Asset Management Roles and Responsibilities

9.1 Current Status

In any organisation, role clarity is important for an individual, and an organisation to function effectively. Roles and responsibilities of personnel who are tasked with implementing the asset management system are important to clarify. When well-structured, they can bring transparency of an individual's relationship to others in the organisation, their contribution to the AM system, and accountability can be appropriately allocated.

The current working practice for governance of corporate Asset Management can be described as follows:

- The Director of Lifecycle Management is responsible for planning and initiating City-wide improvements to asset management practices such as this strategy and the roadmap of improvements
- The Director of Lifecycle Management assembles a Committee of Directors on an as-needed basis for consultation, review and refinement of improvement proposals
- The Director of Lifecycle Management reports to a collection of Branch Managers for approval and authorization to proceed with improvement proposals (such as this strategy)

While these informal relationships have been effective in developing asset management improvements within the City to date, recent reorganizational changes have provided an opportunity to progress the maturity of the City of Edmonton's practice of asset management even further. The service focused reorganisation of City Departments, including the Integrated Infrastructure Services Department and its focus on integration, project management, and continuous improvement, will create an efficient and effective platform for the implementation of this strategy.

9.2 Defining Future Roles and Responsibilities

Well defined roles and responsibilities also help in progressing cultural change and education as people across the organization become engaged in advocating and undertaking new tasks and interfacing with others beyond their immediate group. A draft set of responsibilities for a selection of roles (from Mayor and Council to all City employees,) has been developed to support future refinements in the asset management system governance structure. These are summarized in Table 9.1.

Table 9.1 - Roles and Responsibilities

Individual Role	Responsibilities
Mayor and Council	<ul style="list-style-type: none"> ● Approve and direct the development of the Mission and Vision for the City as a whole. ● Provide financial oversight and approval ● Direct the development and approve of high level policy and planning frameworks and instruments. ● Empower management with the power to execute and guide through policy and planning instruments. ● Champion the asset management system in communications with the public
City Manager	<ul style="list-style-type: none"> ● Provide adequate resources to support the asset management system at the corporate level. ● Communicate with Council with respect to asset management policy. ● Champion asset management within and outside the organization. ● Take ownership of the Mission and Vision for the City
Deputy City Managers	<ul style="list-style-type: none"> ● Provide business unit sponsorship for asset management practices and concepts. ● Ensure adequate resources are available for AM improvement initiative implementation and overall AM development. ● Provide leadership and support to business unit asset management representatives. ● Ensure that planning instruments are followed and adhere to higher level plans and strategic targets.
Business Unit Asset Management Representatives	<ul style="list-style-type: none"> ● Participate in implementation teams for the asset management improvement process. ● Participate in asset management and capital planning related committees. ● Provide asset management knowledge to business unit operations. ● Champion asset management culture within business unit and operations staff. ● Provide departmental expertise to the asset management committees and working groups to ensure proper alignment and acceptance. ● Guide asset management activities assigned to business unit, such as inventory or condition assessment to aid in information management. ● Prepare asset management plans for assets assigned to the business unit. ● Track and report on asset management benefits at the business unit level.
Director, Lifecycle Management	<ul style="list-style-type: none"> ● Track, analyze and report on AM program benefits to the senior leadership team/stakeholders. ● Provide City-wide leadership in asset management practices and concepts, and strategy. ● Provide leadership to asset management roles in the corporate AM team. ● Facilitate skills development as it relates to asset management across the organization. ● Facilitate communication and change management as it relates to asset management. ● Champion asset management principles and best practices. ● Be accountable for all asset management improvement initiatives. ● Assign AM responsibilities to Business Unit AM representatives and work with Deputy City Managers and Directors to ensure Business Unit AM representatives are accountable for their tasks that support the overall AM program. ● Coordinate internal and external AM performance reporting. ● Lead the preparation asset management plans for assets assigned to Lifecycle Management
Lifecycle Management	<ul style="list-style-type: none"> ● Provide skills development to employees specific to asset management

	<ul style="list-style-type: none"> ● Participate in regular asset management network coordination and planning meetings with other representatives. ● Participate in implementation task teams as part of the asset management improvement process. ● Support the preparation of the asset management plan for major asset classes. ● Support through analysis the tracking/reporting on departmental asset management benefits. ● Play a leading role in making appropriate asset management information available for decision making ● Develop asset management plans. ● Prepare an infrastructure status report. ● Report on the condition of the City's assets. ● Develop a LOS framework that can be consistently applied City-wide. ● Coordinate LOS reporting and performance management. ● Forecast and analyze future user requirements and demands. ● Coordinate asset management network team assignments and progress
City Employees	<ul style="list-style-type: none"> ● Embrace the new business processes and technology tools necessary to be effective at asset management. ● Continue team based approach to service delivery and customer satisfaction. ● Capture quality data as part of the daily operations. ● Leverage data to track performance and drive decision making. ● Seek to be innovative with respect to service delivery and adopt a culture of continuous improvement. ● Participate in implementation task teams as part of the asset management development process.