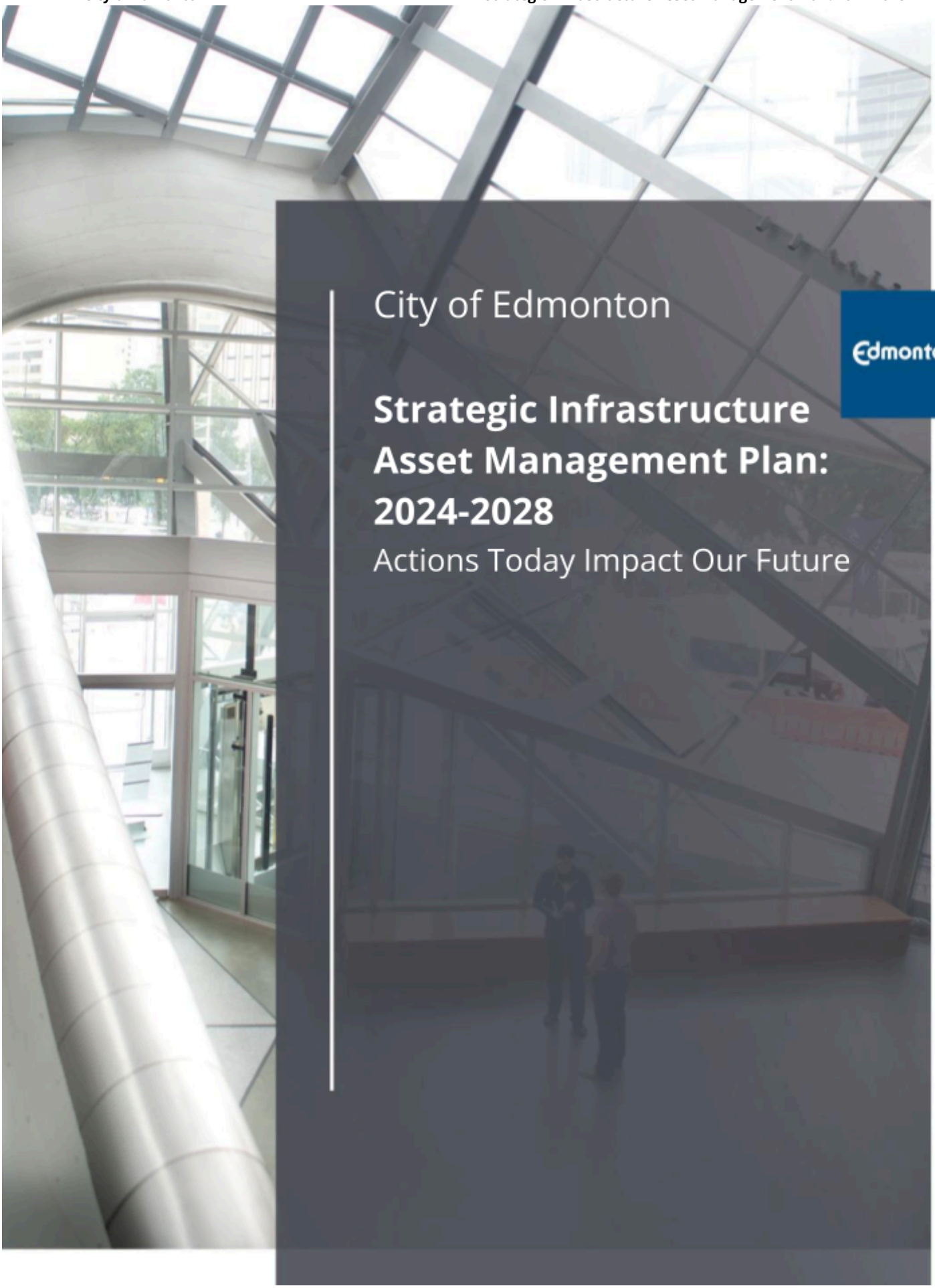

City of Edmonton

Strategic Infrastructure Asset Management Plan: 2024-2028

Actions Today Impact Our Future

Prepared for the City of Edmonton by:

Integrated Infrastructure Services / Asset Management Centre of Excellence

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1. EXECUTIVE SUMMARY

Edmonton's Strategic Infrastructure Asset Management Plan (SAMP) guides the corporation in applying the Asset Management Policy (C598) and best practices to manage infrastructure assets sustainably and to advance asset management maturity within the corporation. The Strategic Infrastructure Asset Management Plan is the framework for building an effective, transparent, data-driven infrastructure asset management system that connects asset investment to strategic goals and service-level outcomes.

The current *2018 to 2023 Infrastructure Strategy* is being updated and replaced with this Strategic Infrastructure Asset Management Plan. This update reflects changes in processes and procedures and the current organizational context.

Strategic Goals & Direction

Strategic direction for the SAMP is provided by ConnectEdmonton, Edmonton's Strategic Plan for 2019-2028 and The City Plan. ConnectEdmonton sets the direction for the City's future and outlines where we need to change today to realize our vision for Edmonton in 2050. The City Plan charts how Edmonton will become a healthy, urban, climate-resilient city supporting a prosperous region.

Asset Management Vision

The SAMP is one of the cornerstones to help the City strive towards its Asset Management vision:

> *The city's future is secured, strategic goals are achieved, and services are delivered through asset management.*
>
> *Everyone in the corporation understands the concepts of asset management and their role as part of the asset management system.*

Asset Management Policy & Objectives

The application of asset management is mandated through the C598 Asset Management Policy, which outlines principles that guide the management of infrastructure assets. The principles and associated objectives that guide the SAMP are service-focused, sustainably oriented, whole-lifecycle decision-making, and integrated.

Asset Management System

The City of Edmonton's asset management system is a set of integrated elements required to achieve the organization's asset management objectives. Five asset management enablers or pillars—Governance, Process, People, Data and Tools—are included. These enablers support effective decision-making and efficient actions throughout all asset lifecycle stages.

The City's strategic goals, strategic plan and Asset Management Policy are elements of this system, along with a key strategic component required for effective asset management across the corporation.

Levels of Service are key business drivers that establish expectations for how the City delivers its services. In the context of asset management, these drivers help inform how assets support the delivery of these services and how the assets must be managed to ensure services are delivered effectively and efficiently. Understanding, defining, documenting, communicating and measuring levels of service across the City's service lines will be a complex and resource-intensive undertaking. The City will develop a Level of Service Framework to support the organization and to provide consistency.

State and Condition of City Infrastructure

The 2023 Infrastructure State and Condition report summarizes the City's infrastructure assets, which have a replacement value of more than $34 billion. The inventory contains more than 600 different fixed and non-fixed asset types and is broken down into seven portfolios. This information provides a significant part of the context in which the asset management practices outlined in this SAMP are applied.

Figure 11 below illustrates the City of Edmonton's overall condition rating and breaks down the conditions per portfolio.

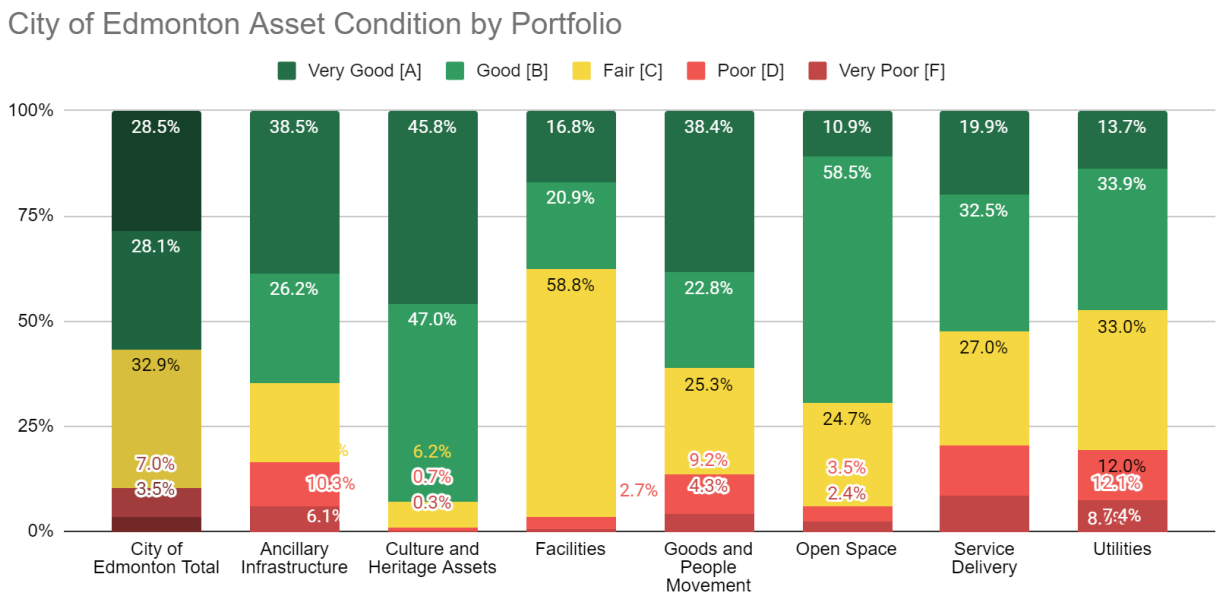

Figure 11: Overall Asset Condition By Portfolio - Source: 2023 Infrastructure State and Condition Report

The City's existing assets remain in good to very good condition in the vast majority of asset classes, with 56.6 per cent in good and very good condition, 32.9 per cent in fair condition, and 10.5 per cent in poor [D] or very poor [F] condition.

Future Trends & Impacts on Assets

Many factors can impact infrastructure assets directly or indirectly through changes to the demand for City of Edmonton services. Some key factors and trends and their potential impacts on infrastructure assets include population growth, inflation, new regulatory requirements, high costs of infrastructure, aging infrastructure and climate change.

Financial Summary

The City of Edmonton uses its capital and operating budgets to fund infrastructure investments and asset management activities through property tax, debt, user fees, grants from other orders of government, dividends, and utility fees.

The City of Edmonton uses capital funding for the renewal and growth of assets. Renewal investment needs are calculated using the Risk-Based Infrastructure Management System (RIMS) model to analyze and estimate the optimal long-term renewal funding requirements for the existing infrastructure portfolio at a network level.

The RIMS analysis supported the *Capital Investment Outlook: 2023-2032* presented to Council in June 2022. The RIMS analysis recommended a 10-year ideal renewal investment of $9.1 billion. When

including the estimated amount for complementary and opportunistic growth investments made on renewal projects, the total 10-year investment is $10.3 billion.

In the 2023-2026 Capital Budget, the City has a budget to fund approximately 54 per cent of the ideal renewal investment requirements. A significant portion of the available capital budget is constrained to specific asset groups, which receive their ideal renewal investment funding. The balance of assets will receive, an average, only 30 per cent of the ideal renewal investment funding.

Given the vast difference between ideal renewal investment levels and the current renewal funding levels, Administration will need to explore mechanisms to both limit the ideal renewal investment requirements (reduce the number of assets or the level of service provided by the assets) and increase and stabilize the funding available to renewal investment (dedicated renewal funding).

There are two ways that the City invests in capital growth: investments in growth components when renewing existing assets and investments in new assets. Growth components are added to renewal projects to improve the service and functionality of the asset and ensure that the City meets the criteria of new policies and public expectations that may have changed since the asset was originally built. Adding growth components during renewal work creates cost efficiencies compared to doing renewal and growth at separate times. Investments in new assets differ from growth components in renewal in that they are not tied to any renewal work undertaken. They result in a 100 per cent new asset to the City's overall inventory.

The City of Edmonton funds operating and maintenance activities through its operating budget. As the available funds are typically lower than the prescribed need, the City must prioritize the maintenance and operations activities to ensure the highest priority activities are undertaken. Priority of activities considers the importance of the service supported by the activities, the importance of the assets supported by the activities, any legislative requirements driving the activities, and potential cost savings or risk avoidance by conducting the activities.

Funding Strategies

One of the strategies employed to address future growth needs is to apply off-site levy requirements to new neighbourhood developments, which cover the cost of future capital requirements due to the development such as fire stations.

For renewal investments, the City utilizes grants from other orders of government to help fund its renewal investment activities. The City also utilizes dedicated renewal reserves, such as the Neighbourhood Renewal Reserve, which has helped significantly improve the overall condition of neighbourhood assets. The City is exploring a similar reserve fund to support other asset types, such as facilities, bridges or transit assets.

Performance Measures & Continuous Improvement

The current enterprise performance measure used to reflect the City's commitment to asset management is infrastructure physical condition. This measure indicates the overall condition of the portfolio of reported capital assets, measured as a percentage of assets in poor [D] or very poor [F] condition. This measure is communicated to Council biannually through the Infrastructure State and Condition report. The asset management plans or business plans for the functional areas that perform lifecycle management activities also contain specific asset measures and lifecycle activity measures (e.g., operation, maintenance, renewal, etc.).

Based on a 2019 corporate review of asset management practices, employee interview feedback and recommendations from the 2023 Capital Asset Management Audit, the corporation has developed a four-year plan to improve corporate asset management as part of the Strategic Asset Management Plan. Progress on the plan will be monitored and reported to the Corporate Asset Management Steering Committee and other leadership teams as required. Progress on the 2023 Capital Asset Management Audit recommendations will be reported to the Office of the City Auditor and, ultimately, the Audit Committee.

2. INTRODUCTION & CONTEXT

Edmonton's Strategic Infrastructure Asset Management Plan (SAMP) articulates a commitment to developing and maintaining the City's municipal assets, which support the delivery of programs and services to Edmontonians. More effective infrastructure asset management will help Edmonton provide cost-effective municipal services, promote economic development, ensure citizen health and safety, protect the environment including adapting to a changing climate, and support a high quality of life for all Edmontonians.

All actions taken in support of maintaining municipal infrastructure impact a decision that will need to be made in the future. Supporting municipal assets is not a one-and-done exercise, nor is it done in isolation from other activities across the City. The Strategic Infrastructure Asset Management Plan and the Infrastructure Asset Management Policy guide how the City of Edmonton collaboratively operates, maintains, renews, acquires, and eventually divests municipal assets in a manner that best supports the goals and direction of the City.

Purpose of This Plan

Edmonton's Infrastructure Strategic Infrastructure Asset Management Plan (SAMP) guides the corporation in applying the Asset Management Policy (C598) and asset management best practices to infrastructure assets and advancing asset management within the corporation. The Strategic Infrastructure Asset Management Plan applies to all infrastructure assets defined in the Asset Management Policy. Generally speaking, all assets should be managed with the full lifecycle in mind. However, there are assets that do not depreciate or cannot be capitalized, such as data and intangible assets (e.g. intellectual property); these assets are reflected in the policy as required to be managed similarly but do not fall under the Strategic Infrastructure Asset Management Plan.

This SAMP helps advance asset management at the City of Edmonton by articulating its objectives and guiding how the objectives will be achieved. By advancing these objectives, asset management maturity will increase throughout the organization.

Specific Asset Management Plans have been developed to ensure that the management of these assets is optimized throughout their lifecycles so that they can continue to support the provision of services to Edmontonians. These plans are intended to be updated routinely and aligned with the Asset Management Policy and guided by the SAMP and provide more specific direction for managing those assets. The following detailed Asset Management Plans have been developed for these asset groups:

- Buildings
- Paved Roads
- Sidewalks, Pathways, Trails, and Stairs
- Open Spaces
- Unpaved Roads
- Urban Forest

This document's principles and strategies should guide assets without specified asset management plans.

Strategic Goals & Direction

ConnectEdmonton

ConnectEdmonton is Edmonton's Strategic Plan for 2019 - 2028. It sets the direction for our future and outlines where we need to change today to realize our vision for Edmonton in 2050. The guiding principles of ConnectEdmonton unify the City's work and ensure that the City makes strategically consistent choices as we work to achieve our goals.

ConnectEdmonton identifies four focus areas that require transformational change in the next ten years to achieve our vision. The four goals, Healthy City, Urban Places, Regional Prosperity, and Climate Resilience, are the cornerstones of the City Plan.

We create a community to connect people to what matters to them. We care about the impact of our actions on our social, economic, cultural, spiritual and environmental systems. We serve those here today and those who come after us.

The City Plan

The City Plan charts how Edmonton will become a healthy, urban, climate-resilient city supporting a prosperous region. The Plan sets the stage for maintaining the essential services in our city. It helps the organization make incremental, transformational changes to build our future city with Edmontonians. The plan includes setting strategic direction for how Edmonton grows, including its mobility system, open spaces, employment, and social networks, generally touching on most aspects of life in Edmonton.

The City Plan:

- Provides direction for plans, guidelines, and other policy decisions
- Informs changes to City regulations
- Informs prioritization of infrastructure and budget
- Measures progress toward targets

The City Plan is implemented by integrating operational plans, programs, projects, and strategic decision-making. Implementing The City Plan will take time and require coordination across all departments.

Cities are complex and work best when interdependent systems such as land use, transportation, environmental, economic, and social factors are considered and integrated. The City Plan describes

these physical networks through a systems approach, taking the policies and concepts from the Plan and aligning corporate business planning and budget processes to ensure the city is preserved and enhanced as growth occurs.

A Relationship-Based City focuses on excellence in collaborative city-building by moving forward with people, partnerships, and relationships at our side. However, not everything in The City Plan is about making something new. Much of the work is about keeping things the same and providing existing services valued by Edmontonians.

The City Plan is the overarching strategy that guides decision-making and direction in how Edmonton is built and renewed. The outcomes provided in the City Plan describe where Edmonton wants to be as a city of two million people, and the decisions made today regarding infrastructure help to achieve that goal.

Asset Management Vision

The city's future is secured, strategic goals are achieved, and services are delivered through asset management.

Everyone in the corporation understands the concepts of asset management and their role as part of the asset management system.

Asset Management Policy & Objectives

Management of infrastructure assets within the City of Edmonton is mandated through the C598 -Asset Management Policy (Asset Management Policy). The Asset Management Policy outlines four principles that guide the application of asset management for infrastructure assets:

1. Service Focused
2. Sustainability Oriented
3. Whole Lifecycle Decision Making
4. Integrated

Due to their importance and the need to apply them to all of our asset management practices, the details of each principle and asset management objective are provided below for reference.

Principle #1: Service Focused

Assets must be managed to meet service needs, which must be clearly defined.

Objectives

The City will:

a. Ensure that asset Customer Levels of Service are clearly defined.

b. Ensure that asset Technical Levels of Service are clearly defined and aligned with Customer Levels of Service to enable effective decision-making.

Principle #2: Sustainably Oriented

Assets are to be managed in a financially, environmentally and socially responsible manner.

Objectives

a. The City will make asset decisions that consider affordability, environmental protection and climate resilience, accessibility to services, culture, and socio-economic equity for today and the future.

Principle #3: Whole Lifecycle Decision Making

Assets must be managed using a holistic approach across their entire lifecycle (acquisition, operation, maintenance, renewal, replacement, and divestment).

Objectives

The City will ensure that:

a. Impacts on assets from service provision decisions are considered.
b. Impacts on service provision from asset decisions are considered.
c. Risks (service, financial, environmental, climate , social) are managed across the asset lifecycle.

Principle #4: Integrated

Service and asset decisions are to be made in an integrated manner.

Objectives

The City will make asset management decisions that take into account:

a. Interconnections between services
b. Interdependencies of asset networks
c. Land use planning and economic development
d. Organizational, regional and intergovernmental relationships

Organizational Context

Organizational Structure, Roles, and Responsibilities

Various business areas and some city agencies are accountable for and responsible for the city's asset management activities. All of these parties must work in an integrated manner, as asset management activities cannot be completed in isolation.

The City of Edmonton's organization, excluding agencies, boards, and commissions, is primarily grouped by function. Table 1 below outlines some of the corporation's key asset management functions, structured around Imagine, Build, Maintain, Animate, and Enable functions. Specific people

or business areas are not identified in this table; however, each City's business area can be aligned with one or more functions. The current City departments include the Office of the City Manager, Community Services, City Operations, Employee & Legal Services, Financial & Corporate Services, Integrated Infrastructure Services, and Urban Planning & Economy.

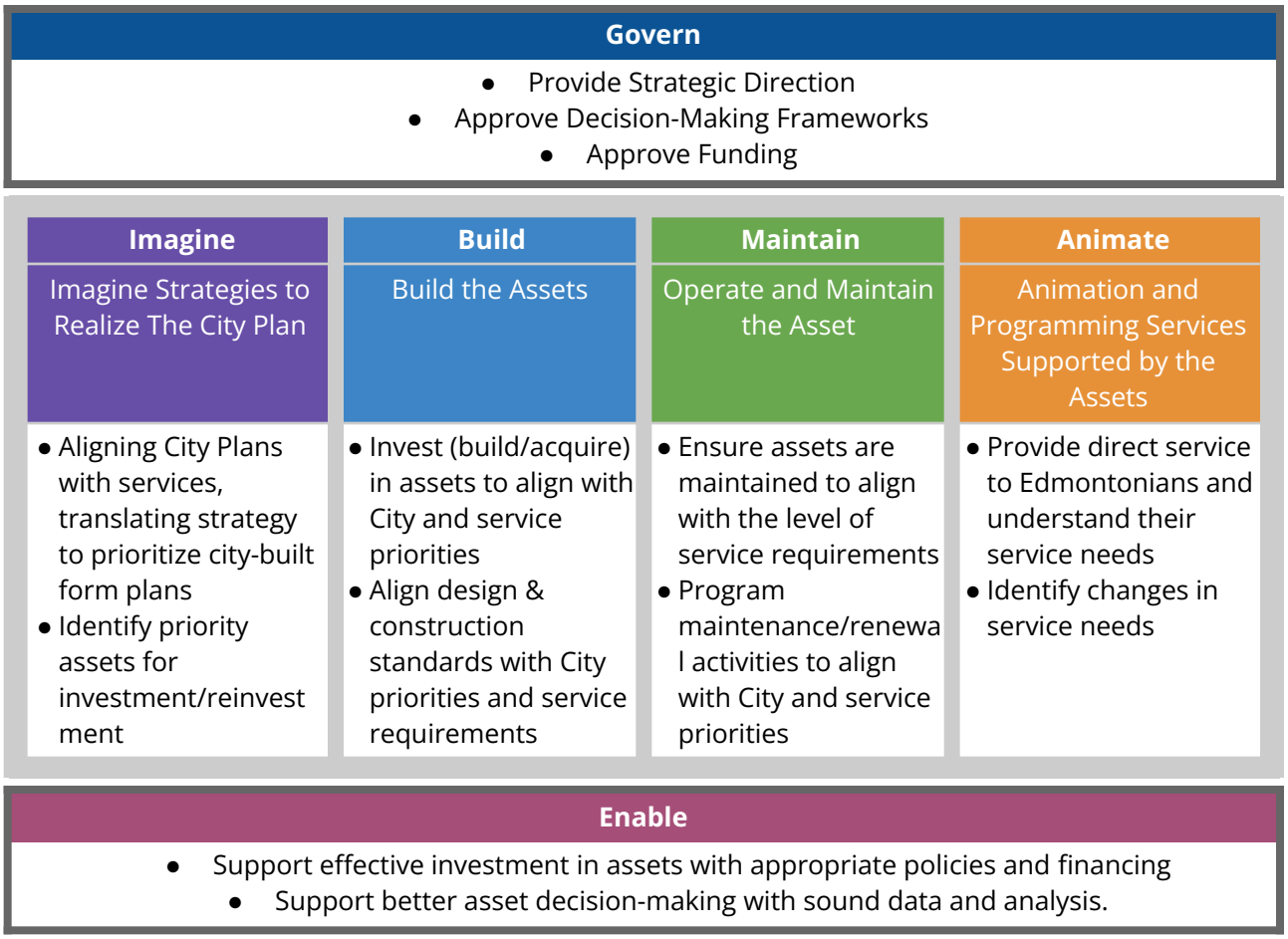

Figure 1: City of Edmonton Asset Management Organizational Context

Although it is not practical to identify the asset management roles and responsibilities of all of the business areas within the City, the following provides examples of responsibilities within the organization:

<u>Imagine</u>

The Urban Planning & Economy department is responsible for:

- Facilitating the development of Council's Strategic Goals (e.g. ConnectEdmonton)
- Developing the City's strategic plans (The City Plan, district-level planning, Community Energy Transition Strategy, and Climate Adaptation Strategy)
- Managing the City's land planning
- Identify and prioritize where and when new assets are required

Maintain

The City Operations Department is responsible for maintaining the City's infrastructure assets. It enables service delivery areas to continue providing services and prevents assets from aging prematurely. Operations work needs to be closely coordinated with the renewal activities performed by the Integrated Infrastructure Services Department (IIS).

Build

The Integrated Infrastructure Services Department (IIS) is responsible for planning, designing, and delivering capital infrastructure, including renewing existing infrastructure. IIS works closely with all of the other areas mentioned previously to:

- Meet Edmontonians' service delivery needs in alignment with City policies.
- Design and build new assets to meet the defined Level of Service requirements for services
- Renew assets at the right time and in the right manner to maximize their useful lives

Animate

Animate areas include business areas such as Community Recreation and Culture, Waste Services, and Fire Rescue Services branches. The role of the animate or service delivery areas:

- Identify the Level of Service requirements for the service
- Determine the capacity and functional requirements of assets to support the delivery of their services (service levels)
- Use the assets appropriately and as intended
- Provide input into asset renewal

3. Asset Management System

The City of Edmonton's asset management system is a set of integrated elements required to achieve the organization's asset management objectives. Some of the system's elements include policies, plans, business processes, and information systems.

The following graphic depicts the City of Edmonton Asset Management System:

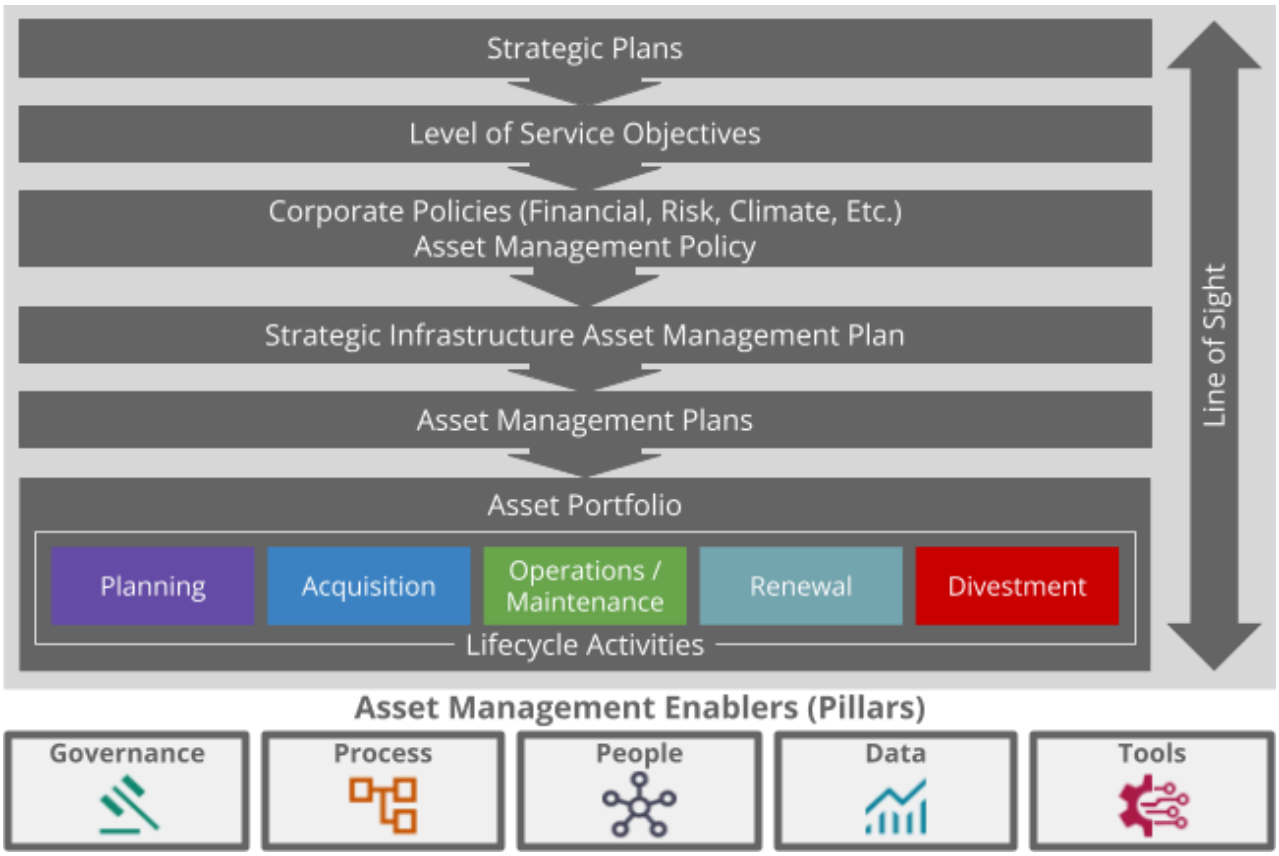

Figure 2: City of Edmonton Asset Management System

ConnectEdmonton and The City Plan guide the entire system. ConnectEdmonton is the City's strategic plan for 2019-2028 and The City Plan (Edmonton's combined Municipal Development Plan and Transportation Master Plan) Edmonton's vision for the future. These two documents provide a clear understanding of the organization's long-range goals and a framework for how services are being delivered and how they need to adapt as the City continues to grow.

The following key components of the system are the services the City provides to achieve the strategic goals and plans. This requires a clear definition of the service and associated levels of service. Additional information is provided in the Levels of Service section below.

The City's policies, including the Infrastructure Asset Management policy, set out the direction and intention of the Council for Administration in a manner that impacts how the City operates. The Asset Management Policy articulates Council's commitment to asset management and outlines the guiding principles of asset management at the City.

The Strategic Infrastructure Asset Management Plan (SAMP) activates the Asset Management Policy by articulating the City's asset management objectives and how these objectives will be achieved. While being a strategic document, the SAMP should also be used as an asset management plan for assets without a dedicated plan.

Specific Asset Management Plans (AMPs) provide a tactical approach to managing the various portfolios of assets throughout their lifecycles. The City currently has developed the following AMPs that cover most of its significant assets:

- Bridges
- Buildings
- Open Spaces
- Paved Roads
- Sidewalks, Pathways, Trails, and Stairs
- Unpaved Roads

These AMPs include key considerations, such as, levels of service, asset management strategies, climate risk assessments and improvement plans.

Managing the lifecycle activities of planning, acquisition, operations/maintenance, renewal, and divestment for municipal infrastructure is very resource-intensive. These actions are required to bring assets into the City's inventory, ensure the life of the assets is optimized through maintenance and renewal, and ultimately dispose of the asset once it no longer meets the needs of the service it supports.

Even though the graphic shows the asset management system cascading down from Strategic Plans, a line of sight needs to go upwards and downwards through the system when making asset decisions. For instance, changing an asset's maintenance schedule may impact a service provider's ability to meet its service delivery targets. Setting a standard to increase plantings along streetscapes might require a different maintenance method, requiring new skill sets or tools to deliver work.

Asset management plans outline long-term plans, timelines, and funding expectations. They are used in conjunction with asset maintenance plans and standard operating procedures.

Asset management enablers support the City's asset management system. These enablers support effective decision-making and efficient actions throughout all asset lifecycle stages. The following provides a brief description of what each enabler is intended to accomplish:

Governance Establishing structures and accountabilities for the assets and associated asset data to enable asset decision-making.

Process Establishing and documenting harmonized processes between asset types and functional groups, streamlining processes where practical.

People Establish formal and informal communications to coordinate activities, share information and ensure City staff have a technical understanding of asset

	management practices to support better decision-making throughout the lifecycle of assets.
Data & Analytics	Establishing asset data management strategies, consolidating and cleaning data sources, linking data between sources and ensuring all assets are identified and documented
Tools	Integrating and optimizing systems & tools to maximize the availability of data and streamline reporting and asset decision-making.

The following two sections will elaborate more on the Levels of Service and Lifecycle Activities.

Levels of Service

Overview of Levels of Service

Levels of Service (LOS) are key business drivers that establish expectations for how the City delivers its services. In the context of asset management, these drivers help inform how assets support the delivery of these services and how the assets must be managed to ensure services are delivered effectively and efficiently.

The City of Edmonton intends to benefit the most significant number of users while meeting the assets' legislated, technical and safety standards. Service levels are set within the bounds of available funding and resources. As expectations of service levels vary between different users, it's important for the City to set and communicate service level targets so everyone understands what is expected from the delivery of services and the related assets.

Level of Service Framework

With the increased prominence of asset management practices in North America and the associated development of International Standards (ISO 55000 Asset Management, Principles, and Terminology and ISO 55001 Asset Management Systems), it was identified that there is a need to formalize the understanding of stakeholder expectations. As asset management practices matured, the concept of level of service was introduced to capture stakeholder expectations. This was further refined into the Customer Levels of Service and Technical Levels of Service described below.

The current levels of service within the City were developed with the creation and evolution of the various services the City provides. The City currently has approximately 70 lines of services, and information related to levels of service is contained within the functional business areas that provide these services. The current levels of service are primarily technical. Additional work is required to develop Customer Levels of Service within the organization.

Understanding, defining, documenting, communicating and measuring levels of service across the City's service lines will be a complex and resource-intensive undertaking. The City will develop a Level of Service Framework to support the organization and to provide consistency The framework's components will consider governance, processes, data, staff knowledge and tools.

Figure 4 below shows the interrelationships between the City's strategic goals, asset management objectives, Customer Levels of Service and Technical Levels of Service. Each level of the figure informs the next level below it. Customer Levels of Service are required to inform asset decisions and influence Technical Levels of Service.

Organizational Objectives	CONNECTEDMONTON The City Plan	The overarching corporate goals, values and mission statements (e.g., the City Plan goal—Encourage healthy and active living by supporting community-focused recreational, leisure, social and cultural programs).
Asset Management Objectives	Strategic Direction Statements	High-level statements of service delivery objectives (e.g. Approach to Community Recreation - Every resident will have a place to connect, be active and participate in indoor recreation within five kilometres of their residence).
	Customer Levels of Service (CLOS)	The Level of Service that is experienced by customers/users.
	Technical Levels of Service (TLOS)	The Level of Service that is provided to deliver the service.

Figure 3: Levels of Service Context

Customer Levels of Service

Customer Levels of Service (CLOS) reflect what the user can expect when using or partaking in the service.

The City considers seven customer values when developing Customer Levels of Service expectations:

1. **Legislative**: The City's services meet standards set by legislative assemblies, such as Provincial or Federal standards.
2. **Safety**: The City's services do not harm the customer, bystanders, wildlife/pets or the environment.
3. **Accessibility:** Services and information are accessible to customers of all abilities.
4. **Sustainability**: Services are provided in a financially and environmentally sustainable manner.
5. **Reliability**: Services provided by the City are available and delivered on schedule as expected.

6. **Quality Standard**: Services provided by the City meet their intended quality standards. An example of different quality standards includes a recreation service that supports high-performance athletes compared to a service geared towards leisure recreation.
7. **Customer Experience**: Services provide a positive customer experience. Examples of customer experience include cleanliness, sensory, personal interactions, lighting, colours, etc.

These values guide the development of more detailed service provision levels and the Technical Levels of Service.

Technical Levels of Service

Technical Levels of Service (TLOS) define what the City does to deliver the service in alignment with the Customer Levels of Service. This includes any direct functions required to provide the service (e.g., programming and scheduling), the requirements of the asset (e.g., specifications) and the activities the City performs on those assets to support the related services.

The following describes the Technical Levels of Service in the context of the seven Customer Levels of Service values:

1. **Legislative**: The City manages the services and assets throughout their lifecycle to meet standards set by other orders of governments, such as Provincial or Federal standards. Examples include programming using facilities within occupancy standards and performing regulated maintenance on facility equipment.
2. **Safety**: The City manages the services and assets to avoid harming the customers, bystanders and wildlife/pets. Examples include managing customer behaviours to prevent injury to others or performing preventative maintenance to avoid unsafe asset failures.
3. **Accessibility:** The City manages services and assets to ensure that services and information are accessible to customers of all abilities. Examples include offering programs for all abilities, purchasing equipment that can be used by all abilities, or designing accessible infrastructure.
4. **Sustainability**: The City manages services and assets financially and environmentally sustainable. Examples include investing in Greenhouse Gas reduction or flood mitigation measures while renewing assets and consolidating services into fewer facilities and potentially closer to where they need to deliver the service to reduce operating costs.
5. **Reliability**: The City manages services and assets to ensure they are available and delivered on schedule as expected. Examples include performing preventative maintenance to avoid premature asset failures and programming and prioritizing renewal with service provision to limit disruptions to service delivery.
6. **Quality Standard**: The City manages services and assets so they meet their intended level of quality standards. Examples include setting and reviewing development and construction

standards to align with service delivery requirements and incorporating growth investment in renewal projects to ensure existing assets meet modern service delivery standards.

7. **Customer Experience**: The City manages services and assets to provide a positive customer experience. Examples include training staff to be knowledgeable in the service they provide, interacting with customers professionally, and ensuring that roadways have the appropriate ride quality.

Both the Customer and Technical Levels of Service guide the development of more detailed service provision levels. The following table provides examples of detailed Customer and Technical Levels of Service measures.

City Plan Goal Encourage healthy and active living by supporting community-focused recreational, leisure, social and cultural programs.		
Approach to Community Recreation Every resident will have a place to connect, be active and participate in recreation indoors within five kilometres of their residence.		
	Customer Level of Service	**Technical Level of Service**
Legislative	• Services provided meet regulated standards	• Per cent of scheduled chemical tests which are within acceptable limits.
Safety	• Customers and staff are physically and emotionally safe when accessing Community Recreation Facilities.	• Number of safety incidents reported annually.
Accessibility	• Universal access is provided to all recreation facilities.	• Per cent of recreation facility that aligns with the City's Access Design Guide specifications.
Sustainability	• Facilities are resilient to impacts of climate change.	• Per cent of facilities that have been assessed and renovated to mitigate impacts from climate change.
Reliability	• Facility infrastructure is reliable and operates to its intended purpose.	• The per cent of the time, the asset is available due to proper maintenance.
Quality Standard	• Facilities provided have the amenities required to support the activities offered.	• Per cent of facilities that meet the specified design standards for the intended function of the facility.
Customer Experience	• Facilities are clean and well-maintained.	• The per cent of time cleaning schedules are adhered to.

Figure 4: Levels of Service - Community Recreation Example

Understanding service levels and the associated costs enables the City to adjust its resources to maximize benefits cost-effectively. As the City continues to increase its asset management maturity by developing and adopting a Level of Service Framework, additional Customer and Technical Levels of Service will be defined and measured.

Lifecycle Management

This section guides managing assets through the lifecycle phases of acquisition, operations and maintenance, renewal and replacement and divestment. Many of the City's significant assets (e.g., bridges, roads, buildings, and open spaces) have more detailed strategies identified through specific dedicated asset management plans. The following actions guide lifecycle management where specific guidance is not documented elsewhere.

Acquisition Planning

The acquisition of an asset is defined as:

- Adding a capital asset into the City's inventory through creating, purchasing, designing, constructing and accepting contributions or donations. Examples include purchasing equipment, designing and constructing a specialized asset, and accepting contributions from developers or art donations.
- Upgrading or expanding an existing capital asset already in the City's inventory. This activity intends to address a change in service need, either by improving the asset's ability to support the service or increasing its capacity. Examples include:
    - Adding turf fields to an indoor soccer facility to meet the demand for services.
    - Increase the width of an existing sidewalk to meet current policy requirements.
    - Installation of a new interactive exhibit to increase attendance at an attraction.

These activities increase the levels of service provided by the asset portfolio and are considered growth investments.

Acquisition Considerations

The following table provides items that should be considered when acquiring an asset. Due to the wide variety of asset types owned by the City, these items have been kept at a more general level and are intended to guide business areas in applying them to their specific context.

Category	Considerations
Service Focused	• Are the service levels clearly understood?

	● Have various options for achieving the required levels of service been assessed? ● Does the potential asset align with the required levels of service? ● Have the service delivery impacts of the acquisition been assessed?
Sustainability Oriented	<u>Financial</u> ● Will this acquisition provide value for money? ● Has the opportunity cost of the acquisition been considered? ● Will this acquisition result in the addition or reduction of other costs? ● How does acquisition affect affordability, e.g., impact taxes or user fees? ● Is this investment the most cost-effective method for achieving project outcomes? (Can we co-locate? Lease versus Own? Public Private Partnership?) <u>Environmental</u> ● How does climate risk affect the asset being acquired? ● How does this acquisition affect climate resilience adaptation? ● How does this acquisition affect climate resilience mitigation? ● Will the acquisition or use of this asset create pollution or negatively impact air and water quality? <u>Social</u> ● How does this acquisition impact accessibility to the service? ● How does this acquisition affect cultural considerations? ● How does this acquisition affect socioeconomic equity?
Whole Lifecycle Decision Making	● Is the acquisition based on the lifecycle costs (acquire, operate, maintain, renewal, and divestment)? ● Has operating impacts of capital been considered? ● Has capital impacts of operating been considered? ● Have potential risks (climate, environmental, etc) throughout the asset lifecycle been considered?
Integrated	● How does the acquisition impact other services? ● How does the acquisition impact other projects? ● How does the acquisition impact other assets? ● How does the acquisition connect to land use planning? ● How does the acquisition impact organizational, rational and intergovernmental relationships?

Administrative	• All new investments are considered capital investments. • All new investments must be incorporated into relevant inventory databases, asset management plans and maintenance plans.

Figure 5: Acquisition Considerations

Operation and Maintenance Planning

Operations and maintenance involve performing activities to ensure that assets are accessible and operate effectively on a day-to-day basis to support service delivery. Operations and maintenance activities help to maintain and sometimes improve asset condition. These activities typically do not extend the asset's expected life. Instead, they enable the asset to achieve its expected life. Put another way, without adequate investment in operations and maintenance activities, assets will deteriorate faster and expire prematurely. The extent to which maintenance activities blend into renewal investment activities, noted in the next section, may vary depending on the complexity or nature of the asset. The scope of these activities should be documented within the appropriate maintenance plans.

The City performs the following operation and maintenance activities on its major infrastructure assets, and these activities can be used as a guide for other assets:

- Inspections: periodic inspections of assets to ensure they are operating as intended, measure performance, determine if repairs are required and meet legislative requirements.
- Operations are routine activities that support the asset's accessibility and functioning as intended. Examples include street sweeping, grass mowing, snow clearing, etc. Operations activities consume resources, including labour, energy and materials, but they do not extend the asset's overall life.
- Preventive Planned Maintenance: Regularly scheduled activities are completed to support assets in reaching their intended useful lives. Proper preventive maintenance will reduce the total lifecycle costs while maintaining customer service performance.
- Corrective Maintenance is physical repairs performed on assets to return them to their intended operating state. These repairs do not significantly extend the overall life of the asset (e.g., it is a repair, not a full replacement, upgrade or major rehabilitation).

Assets should have a plan for each of these activities where applicable, and prioritization criteria should be established where funding is limited to help prioritize operations and maintenance activities.

Considerations for Operation and Maintenance Planning

When planning for operations and maintenance activities, the City needs to consider the items identified in Figure 6 below:

Category	Considerations
Service Focused	● What is the level of service expected for this asset? ● Are we achieving the expected levels? ● Do these activities interfere with service delivery, and how can we minimize the impacts, e.g., by performing activities outside of regular service delivery hours? ● Do these activities require temporarily taking assets out of service?
Sustainability Oriented	Financial ● Are we using the most cost effective means of maintaining assets? Environmental ● Are we operating these assets to limit energy usage or Greenhouse Gas production? ● Are we maintaining these assets to limit environmental damage? ● Are we effectively and efficiently using resources such as water, fuel, and other materials to minimize waste and reduce our environmental impact? ● Does operation of the asset comply with all relevant environmental regulations and standards? Social ● Do maintenance priorities consider equity?
Whole Lifecycle Decision Making	● Are we considering the long term impacts of the maintenance strategies on other lifecycle activities? (Eg. Impact to future renewal investment) ● Are we maintaining assets to support effective service delivery? ● Do the monitoring programs consider the increasing risk of changing climate conditions?
Integrated	● Are maintenance activities aligned with the operations of the service provided by the asset? ● Are required shutdowns or maintenance cycles timed with slow periods for service delivery? ● Are maintenance decisions integrated with renewal investment decisions?
Administrative	● All operations and maintenance are considered operational expenses.

	• All assets have maintenance plans. • All maintenance activities are recorded in a relevant database. • Maintenance schedules are maintained and communicated with relevant teams. • All operational and maintenance costs by asset for established service levels can be estimated, and actual costs can be attainable.

Figure 6: Operation and Maintenance Planning Considerations

Renewal Planning

Renewal investment involves fully replacing an asset with a new modern equivalent asset or applying a rehabilitation treatment that reinstates the asset (or a component of the asset) to a better physical condition. The City funds renewal through its capital budget, managing renewal separately from maintenance activities for larger asset groups, such as facilities, goods movement and open spaces, due to the increased complexity of the renewal activities. Additionally, while maintenance is intended to help the asset achieve its planned life expectancy, renewal Investment extends an asset beyond its current projected lifecycle.

Depending on the type and complexity of the assets, renewal may need to be planned out years in advance to enable adjustments to service delivery expectations and accommodate the disruption caused by renewal. This planning typically coincides with preparing the City's four-year capital budget cycles. The disruption to services due to renewal work is also leveraged as an opportunity to perform upgrades or growth investments while the service is already out of commission.

Renewal investment options for the larger asset groups include:

- Early Life Rehabilitation: These are treatment options that may be considered when an asset is in the early stages of its remaining useful life (B-Good condition). Typically, they are rare for most asset types. Still, some assets do require reinvestment or replacement of component parts at frequent intervals throughout the overall lifespan of the asset (e.g., microsurface treatment on a newer road asset).
- Mid-Life Rehabilitation: These options may be considered when an asset is in the middle portion of its remaining useful life (B-good or C-fair condition). The most common forms of mid-life rehabilitation are replacing or refurbishing component parts that have a shorter lifespan than the overall asset (e.g., repaving the surface of a road asset).
- Later-Life Rehabilitation: these are treatment options considered viable even when an asset is approaching the end of its remaining useful life (D-poor condition). They can include replacement or refurbishment of component parts the same as might be considered for mid-life rehabilitation, except that for later-life rehabilitation, there is a condition that the treatment option should only

be undertaken if it is cost-effective given the potentially short remaining useful life of the overall asset (e.g. another repaving of the surface of a road asset if the road structure is expected to outlast the new repavement). Depending on the extent of the rehabilitation, renewal may include growth considerations to address standard changes and functionality improvements where practicable.

- End-of-life renewal is a treatment option considered when an asset is approaching or at the end of its remaining useful life (D or F condition). Typical options include replacing the asset with a new, modern equivalent asset or major rehabilitation that returns the asset to new or near-new condition (e.g., full reconstruction of the road asset). At this stage of life, rehabilitation or replacement will likely include growth considerations to address changes to standards and functionality improvements.

Using road assets as an example:

Once a road is built early in its useful life, a micro-surfacing treatment is applied to the roadway, which helps to extend the life of the roadway. In the middle of the road's life, the road surface will have deteriorated faster than the road structure, so the road surface will be repaved, leaving the structure as is. When applied at the optimal time in the asset's life, this repaving will help protect and retain the road structure.

The renewed road surface will have deteriorated again in the later stage of the road's life. An assessment of the overall road structure and how long it will take to deteriorate will determine whether another replacement will be a practical investment. If the structure is expected to remain intact as long as the new pavement is in use, a replacement can be completed. If the structure does not remain intact, the road will continue to deteriorate until the appropriate end-of-life renewal investment is implemented.

When made at the appropriate time, these strategic investments help the assets achieve much longer lifespans and reduce the overall investment requirements in our assets. Figure 7 below illustrates this concept.

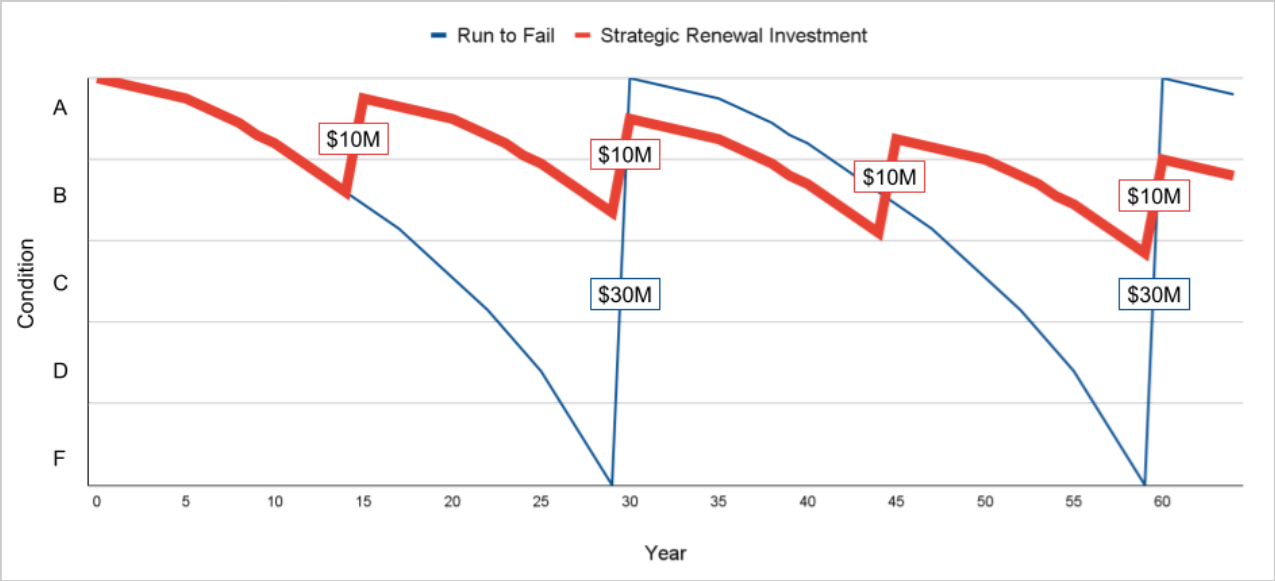

Figure 7: Comparison of Run-to-Fail vs Strategic Renewal Investment Strategies

Smaller and simpler assets (e.g., equipment) may need viable, cost-effective mid-life renewal options. The plan for these assets is to use them for as long as possible by performing proper maintenance and simply replacing them at the end of their useful lives. This method is called run-to-fail, where the asset is used without renewal investments until it can no longer support the service.

Considerations for Renewal Investment Planning

When planning for renewal investment, the City needs to consider the following items identified in Figure 8 below:

Category	Questions
Service Focused	• What is the level of service expected for this asset? • Is the asset achieving the service levels? • Is an upgrade required? • How are services being adjusted to accommodate the planned renewal?
Sustainability Oriented	Financial • Are we investing in the highest-priority assets? • Are we investing at the right point in an asset's life? Environmental • How can the renewal investment help achieve the corporate climate resilience goals (e.g., reducing energy usage and Greenhouse Gas production)? • Do we consider climate impacts proactively to reduce cost of retrofit or

	damages later? <u>Social</u> ● How does investment in this asset affect affordability, e.g., impact taxes or user fees? ● How will this investment impact accessibility to services?
Whole Lifecycle Decision Making	● Have various options, including lifecycle cost analysis, been considered? ○ What are the long-term costs associated with this investment? ○ What are the operating impacts, including future maintenance? ○ What are the potential Impacts on partnership agreements? ○ Is this investment the most cost-effective method for achieving renewal outcomes? ○ Is the balance of growth (e.g. upgrading the asset to support service delivery) and renewal considered? ○ Are there opportunities to invest in climate resilience during renewal of assets to reduce future costs?
Integrated	● Are renewal investment plans aligned with strategic plans? ● Are renewal investment plans aligned with maintenance activity schedules? ● Are renewal projects and investment plans aligned with service delivery strategies? ● Are renewal projects aligned or interconnected with upgrade/expansion projects or other projects?
Administrative	● All renewal investment is considered a capital investment. ● All renewal investment activities are prioritized considering asset condition and impacts on service delivery. ● All renewal investment activities are recorded in a relevant database. ● Renewal investment programs are maintained and communicated with relevant teams.

Figure 8: Renewal Investment Planning Considerations

Divestment Planning

The requirement to divest assets may result from them approaching the end of their useful life, a change in the service requirements, or some other factor causing them to be no longer needed. Divestment of an asset can include replacing, repurposing, demolishing/discarding, selling, or transferring the asset. To support asset decisions at various milestones, including divestment

planning, the City has developed an Asset Rationalization Framework (Appendix B) approved by Council in 2023.

Asset Rationalization

Administration began developing an Asset Rationalization Framework in 2022 to create a consistent asset management process to guide end-of-life decision-making for infrastructure assets. In addition to the other asset management activities of acquiring, operating, maintaining, and renewing, divestment is a key activity to ensure the City maximizes value from its $34 billion asset base and optimizes the allocation of limited available funding so it is not spent on assets that no longer meet current service requirements.

The framework is intended to be consistent yet adaptable due to the wide variety of services the City provides and the associated assets. The framework was developed using the facilities asset type with the intent to adapt and scale it to meet the needs of other asset types. The framework is broken down into three phases: Planning, Asset Assessment, and Options Analysis.

During the planning phase, assets or asset groups are selected for evaluation, and a cross-corporate review team is chosen to evaluate large and complex assets using the framework. The review team identifies the targets against which to evaluate the assets and the data sources used to support the measurement.

The Asset Assessment phase involves collecting and analyzing the data from the data sources identified in the planning phase and conducting an evaluation of the asset. The evaluation criteria are grouped into the following categories: asset condition, safety, financial, service delivery/utilization, environmental and climate risk and social. This phase's outcome determines whether an asset should move to the Options Analysis phase. Assets that do not move into the Options Analysis phase continue to be managed and maintained within the City’s inventory through appropriate capital investments and operating plans.

In the Options Analysis phase, various divestment options are developed, which may include replacing, repurposing, demolishing/discarding, selling, or transferring the asset. For the more significant asset groups (e.g. facilities, roads, transportation), once the options have been developed, they are evaluated using a combination of the net present value of the cost of each option and a qualitative score that includes quality, sustainability, GBA+, efficiency, functionality and capacity.

Once the Options Analysis has been completed, the recommended option(s) for the significant assets are presented to the Corporate Asset Management Steering Committee for review and approval of the recommendations, which completes the activities under the Asset Rationalization Framework.

The specific implementation activities of the approved options will vary depending on various factors, including the service provided by the assets, risks and required approval authorities. The appropriate department is responsible for leading the implementation and coordinating the activities needed.

Assets should be proactively reviewed on a periodic basis using the Asset Rationalization Framework. Given the wide range of assets within the City of Edmonton's infrastructure asset inventory, the frequency of the reviews will be dependent upon factors such as the importance of the service the asset serves, the asset's useful life, the quantity of a particular asset or asset group, frequency of asset renewal, available staff resources and costs to perform the reviews. For example, assets with a short useful life and no renewal options (e.g. some equipment) may only need maintenance inspections and not require a full asset rationalization review during the asset's lifetime. The facilities portfolio, on the other hand, contains over 980 assets of various sizes and complexities, and the useful life of the assets can be extended through renewal. In this case, proactive reviews will require extensive resources and will require many years to complete one cycle of review.

In addition to the proactive reviews, the Asset Rationalization Framework will be applied to road, bridge, facilities and open spaces infrastructure assets as part of capital renewal projects, when there is an asset failure, when there is a change in service or when other situations arise resulting in a need to review assets.

When applying the Asset Rationalization Framework, it is important to recognize the impact a change in the asset has on the service it supports. While an action to divest an asset may make financial sense, it may negatively impact the service being delivered, so any option reviewed must consider how the service will accommodate the change to the asset.

Considerations for Divestment Planning

When planning for asset divestment, the City needs to consider the following items identified in Figure 9 below:

Category	Questions
Service Focused	● What is the impact on the service that was supported by the asset to be disposed of? ● Will the divestment require a replacement to continue delivery of a service, and has this been planned and approved?
Sustainability Oriented	Financial ● Is there an asset retirement obligation identified for this asset? Environmental ● Will this divestment have impacts on the local environment?

	● How can the reuse or recovery of the asset or asset materials be maximized? <u>Social</u> ● Will this divestment adversely impact a portion of the City's population?
Whole Lifecycle Decision Making	● What is the full cost to dispose of this asset? ● What are the potential costs for retaining this asset? ● Will this divestment result in a change to annual operating expenses?
Integrated	● Is this divestment aligned with broader city development goals? ● Are the renewal and maintenance strategies aligned with the divestment of this asset?
Administrative	● All divestment activities are considered operational expenses unless completed as part of a capital investment to replace the disposed asset. ● All assets that have been disposed of should be removed from asset management and maintenance plans. ● All assets having been disposed of should be removed from relevant inventory databases. ● Assets to be disposed of are to be planned with all relevant teams.

Figure 9: Divestment Planning Considerations

4. CURRENT STATE

State and Condition of the City's Assets

As reported in the 2023 Infrastructure State and Condition report, the City owns an inventory of assets with a replacement value of more than $34 billion. The inventory contains more than 600 different fixed and non-fixed asset types and is broken down into the seven portfolios identified in Figure 10:

Portfolio	Description	Replacement Value (As of Dec 31, 2022)
Ancillary Infrastructure	Assets which are part of an overall system and support the delivery of service for which other asset types rely.	$3.3 Billion (9.6%)
Culture and Heritage Assets	Assets intended to preserve the city's heritage.	$0.1 Billion (0.2%)
Facilities	Vertical structures comprise several systems and house programs delivered by the City.	$8.4 Billion (24.2%)
Goods and People Movement	Supports the movement of vehicle, pedestrian and intermodal travel options.	$16.8 Billion (48.3%)
Open Space	Open-air assets with a predominance of green space and minimal hard surface support a sustainable natural environment. May be built or natural assets.	$4.8 Billion (13.9%)
Service Delivery	Assets which provide direct service to Edmontonians in support of quality of life.	$0.9 Billion (2.6%)
Utilities	Assets that provide service to Edmontonians and are managed separately from other COE assets as utility provision assets.	$0.4 Billion (1.2%)
Total Inventory		**$34.7 Billion**

Figure 10: Inventory Portfolio Descriptions - As of December 31, 2022

The City's existing assets remain in good to very good condition in the vast majority of asset classes, with 56.6 per cent in good and very good condition, 32.9 per cent in fair condition, and 10.5 per cent in poor [D] or very poor [F] condition. The City of Edmonton uses the percentage of assets in poor [D] and very poor [F] condition as its measure of performance for asset condition, as assets in poor [D] condition are at a higher risk of failure, which in turn, negatively impacts the service that can be provided to Edmontonians by those assets.

Figure 11 below illustrates the City of Edmonton's overall condition rating and breaks down the conditions per portfolio.

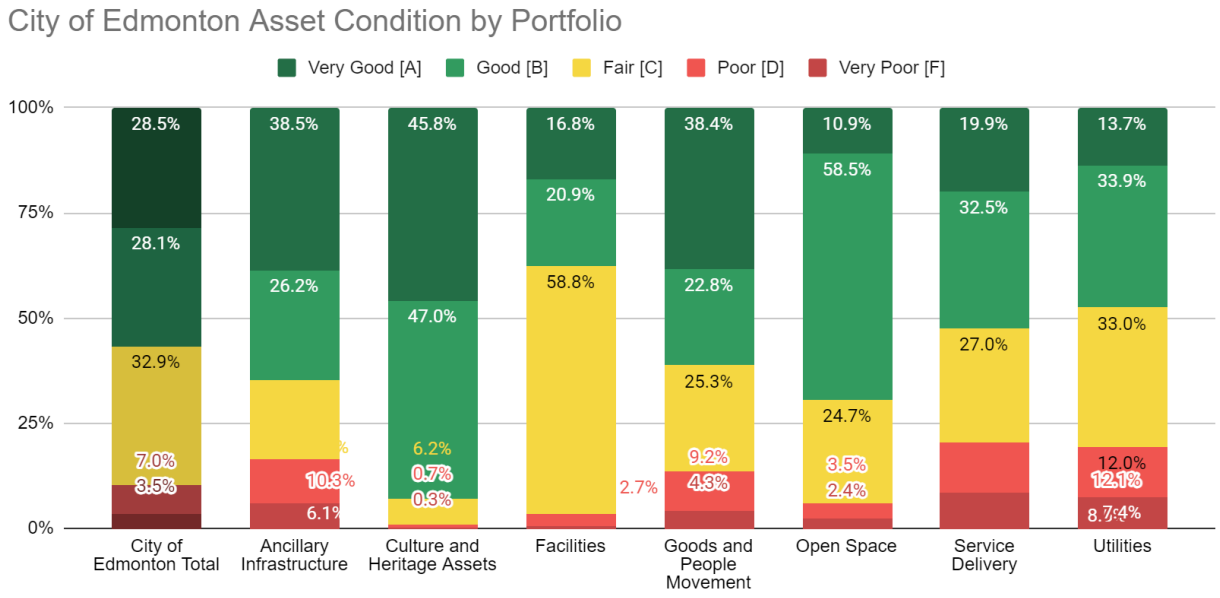

Figure 11: Overall Asset Condition By Portfolio - Source: 2023 Infrastructure State and Condition Report

As shown in Figure 12 below, we see the progression of asset condition ratings over 20 years. By 2011, there was a swell of assets in good and very good condition, directly correlating to a swell in assets in poor [D] and very poor [F] condition in later years. In the years before this, during the province's last big financial boom, more focus was directed toward growth projects than renewal investment projects. As a result, the City had many new assets, but its existing assets did not get the required attention and fell into disrepair. Since then, the City has strategically moved from rapid growth and upgraded to a more balanced approach, with measured growth and focused renewal investment. This approach has resulted in a significant reduction of assets in poor [D] and very poor [F] condition.

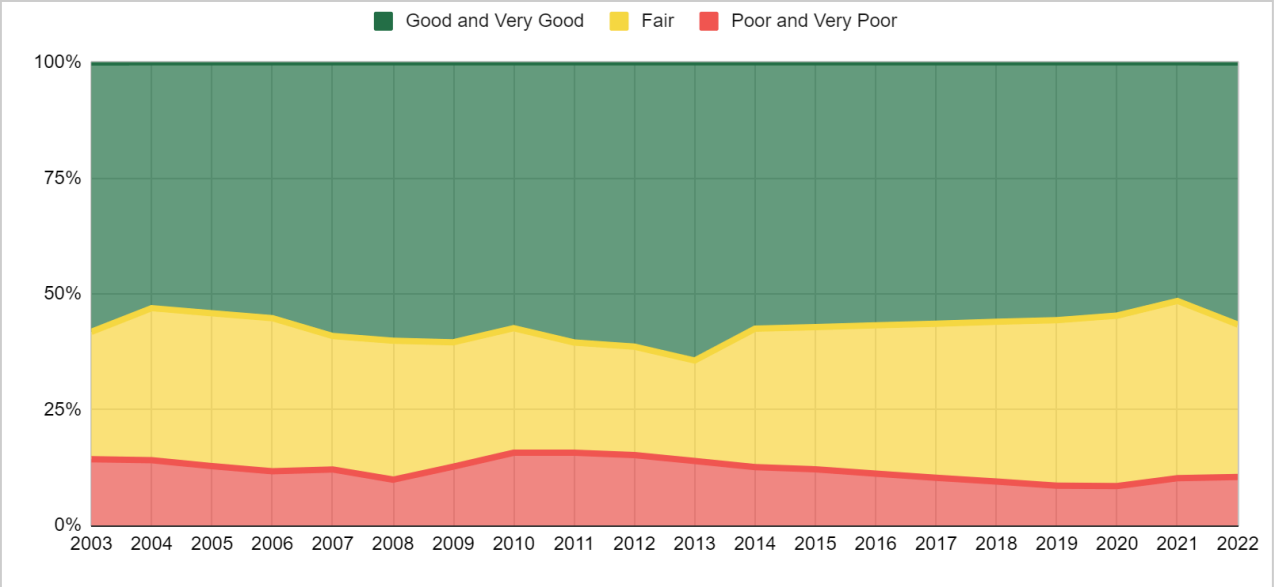

Figure 12: Historical Asset Condition Distribution - Source: 2023 Infrastructure State and Condition Report

The City's approach to managing its asset inventory is to build an effective, transparent, data-driven system that connects asset investment to strategic goals and service-level outcomes. The City has developed performance indicators and raised public awareness of its infrastructure challenges. This work has led to identifying, developing and adopting nationally recognized solutions such as evaluation tools and leading-edge models to ascertain long-term infrastructure investment strategies (e.g., the City's Risk-based Infrastructure Management System [RIMS]), integrated corporate asset management and capital budgeting.

5. FUTURE TRENDS & IMPACTS ON ASSETS

A multitude of factors can impact infrastructure assets directly or indirectly through changes to the demand for City of Edmonton services. This section highlights some key factors and trends and the potential impacts on infrastructure assets.

Population Growth

The City Plan envisions the city with a population of two million residents. While a timeline is not prescribed within The City Plan, this target could be achieved within a few decades. Each year, the population changes from births, deaths and migration, impacting infrastructure requirements. Infrastructure planning for a growing population can be more predictable during periods of relatively stable growth. However, rapid population growth, which has been Edmonton's experience in recent years, puts significant pressure on infrastructure requirements, which could have implications on infrastructure planning even after the rapid growth period has ended. Another consideration for infrastructure planning as Edmonton's population reaches its two million target is that the age demographics of Edmonton's population could change, which could mean shifts in infrastructure requirements that would need to be considered.

Edmonton not only continues to grow into developing areas but also through infill in redeveloping neighbourhoods. Both types of growth impact the demand for infrastructure of various kinds. For example, more and different recreation opportunities will need to be developed in new neighbourhoods, and mature neighbourhoods may see changing recreation opportunities align more closely with changing demographics. An increase in new neighbourhoods and infill creates a need for new assets, as well as expansion and upgrade of existing assets to keep up with the demand. This will require an associated increase in resources to operate, maintain and renew these assets.

The transportation network is expected to see changes in how it is developed, with an increased focus on active modes of transportation over vehicular travel. The increased population will add pressure to expand the transit network with LRT line extensions, the introduction of bus rapid transit, and increased bus networks.

Services such as Police and Fire Rescue typically grow proportional to the city's population; however, this could be impacted by other factors, such as focused crime prevention initiatives or increased demand for fire protection due to changing climate conditions.

Fleet and Equipment typically grow as the services they support grow. Much of these assets are driven by staff delivery requirements and changes in technology.

Other Strategic Trends

The City's 2025 Corporate Strategic Risks Report, FCS02497, September 4, 2024, Audit Committee, identified other trends and potential impacts to infrastructure assets, based on input from Administration leadership and subject matter experts, focusing on trends from global studies. The relevant information is summarized below using the themes outlined in the report.

Economic Prosperity and Financial Constraints

The City of Edmonton faces fiscal challenges stemming from a limited revenue base, reliance on property taxes, and insufficient non-tax revenue growth. Rapid population growth, growing resident expectations and ambitious strategic goals are placing expenditure pressures on the city's budget. Moreover, Edmonton's role as a regional service hub and gateway to the north presents unique social and public health challenges.

The high costs of goods, services and infrastructure purchased by the City strain the operating and capital budgets, restricting the City's ability to meet public service expectations. At the same time, a decrease in capital funding available for infrastructure projects contributes to declining asset conditions and higher maintenance costs for the City's physical assets. Aging infrastructure and fleet add to operating costs, which impacts service levels as more funding is required for maintenance.

Environment and Climate Change

The effects of climate change may emerge more slowly than other short-term risks, but their consequences intensify over time and ripple across multiple systems, including the economy, health, governance, security, energy, and transportation. The 2024 World Economic Forum on Global Risks predicts that extreme weather events, critical changes to Earth systems, biodiversity loss, and natural resource shortages will be the top four global risks over the next decade. These risks present significant challenges to Edmonton's infrastructure, economy, and overall well-being.

An Edmonton-specific study finds that climate change could cause direct annual costs to the City of approximately $1 billion by the 2050s and up to $4 billion by the 2080s. This economic analysis illustrates that climate change will have real economic consequences for Edmonton, imposing a significant cost on future Edmontonians if action is not taken.

Without proactive measures to both reduce greenhouse gas emissions and adapt to changing climate conditions, the scale of these impacts and the necessary investments to address them could strain Edmonton's capacity to adapt, leading to even greater economic and social costs in the long run.

Infrastructure and Technology

Current capital funding levels are insufficient to meet renewal requirements, resulting in deteriorating asset conditions, higher maintenance costs, potentially higher future capital costs and challenges in meeting current service levels. The challenges extend to the City’s technology assets, impacting the ability to replace, upgrade, and maintain aging digital infrastructure assets. This can lead to cybersecurity vulnerabilities, increased operational costs and declining public service quality.

Public Sphere

Increased and changing demands for social support and public safety services affect the City’s growth, liveability and vibrancy. Diverging public opinion and perceptions make it difficult to meet the expectations of all Edmontonians because, although each City service has residents who value it, there is no consensus on a list of services the City should prioritize.

The combination of limited funding, changing public needs, and a need for more consensus on service prioritization will continue challenging the City of Edmonton as the Administration attempts to balance competing priorities with limited resources.

Some of these trends translate directly into asset risks, and the risk management section of this document details those risks and mitigating actions.

6. FINANCIAL SUMMARY

As with other municipalities across Canada, the City of Edmonton has limited tools and legislated authority to raise revenue to fund services and infrastructure. Available tools include property tax, debt, user fees, grants from other orders of government, dividends, utility fees and other minor sources. The City of Edmonton uses a combination of these fiscal tools for infrastructure investments and asset management activities through its capital and operating budgets.

Capital Funding

From an infrastructure and asset management perspective, capital funding is used for the renewal and growth of assets.

Renewal Investment Needs and Funding Levels

Renewal funding restores an asset to an efficient operating condition and extends its service life. Renewal might include replacing individual components as they age or become obsolete or extensive redevelopment of the asset. Capital investment in renewal extends the period of service potential but does not change the replacement value, which means it does not increase the size of the infrastructure asset portfolio.

As part of its renewal planning, the City of Edmonton uses the Risk-Based Infrastructure Management System (RIMS) model to analyze and estimate the optimal long-term renewal funding requirements for the existing infrastructure portfolio at a network level. For example, when analyzing arterial roads, RIMS performs the analysis using the entire arterial network as a whole and does not break down the data into smaller segments within the network.

The model uses the current physical conditions of asset networks, target physical conditions, renewal investment options/costs, and expected lifecycle deterioration curves to determine the optimal investment amount and timing based on these inputs. RIMS also estimates the impact of different investment options on the asset portfolio.

The target physical conditions contain four variables, each with their own targets:

- Average Condition Index: A value from one to five represents the average condition of a category of assets. Ranges from one being very poor [F] to five being very good [A].
- Severity: A computed risk factor representing the risk of asset failure of an asset category. The calculation is the product of the probability of failure of an asset by its impact of failure.
- Percentage of Assets in D and F Condition: The per cent of assets within a category that is assessed at either a poor [D] or very poor [F] physical condition.
- Percentage of Assets in F Condition: The per cent of assets within a category that are assessed at very poor [F] physical condition.

RIMS uses an algorithm that optimizes funding and the target physical conditions. The result of the RIMS analysis for the City's portfolio of infrastructure assets is an ideal investment target. This information informs long-term budget requirement forecasts in the 10-Year Capital Investment Outlook. Using these forecasts and the available revenue identified within the 10-Year Capital Investment Outlook, Administration prioritizes and allocates the available funding to ensure the highest-risk assets are funded while at the same time ensuring all assets receive a fair portion of the available funding. These allocations are then input into the four year Capital Budget.

As ideal investment levels are higher than what is typically available to invest in renewal, program managers need to prioritize within what is available to them to maximize the impact the limited investment has on the assets. This might mean only renewing the most critical components of an asset, delaying renewal to a future budget cycle, or reducing the level of service provided by the asset.

The RIMS analysis supported the Capital Investment Outlook 2023-2032. The RIMS analysis recommended a 10-year renewal investment of $9.1 billion. When including the estimated amount for complementary and opportunistic growth investments made on renewal projects, the total 10-year investment is $10.3 billion.

By contrast, the funding available to support renewal investment is significantly lower than the ideal renewal investment requirements. In the 2023-2026 Capital Budget, the City has a budget to fund approximately 54 per cent of the ideal renewal investment requirements. A significant portion of the available capital budget is constrained to specific asset groups, which receive their ideal renewal investment funding, leaving the balance of assets to receive, on average, only 30% of the ideal renewal investment funding.

Given the vast difference between ideal renewal investment levels and the current renewal investment funding levels, Administration will need to explore mechanisms to both limit the ideal renewal investment requirements (reduce the number of assets or the level of service provided by the assets) and increase and stabilize the funding available to renewal investment (dedicated renewal funding).

Growth Investment Needs and Funding Levels

The city goes through an ongoing calculation to deal with changing economic circumstances and a shifting population. The City must be poised to facilitate growth, but it must safeguard the integrity of existing services and structures. Being unprepared for growth will lead to poorly planned and expensive development. It might compromise the condition, life and value provided to residents. There needs to be an ongoing balance between renewal and growth.

There are two main ways that the City invests in capital growth: investments in growth components when renewing existing assets and investments in new assets. Growth components are added to renewal projects to improve the type of service and functionality of the asset and ensure that the City

meets the criteria of new policies and public expectations since the original asset was first built. Adding growth components during renewal work creates cost efficiencies compared to doing renewal and growth at separate times. Investments in new assets differ from growth components in renewal in that they are not tied to any renewal work undertaken. They result in a 100 per cent new asset to the City's overall inventory.

For the 2023-2026 fiscal cycle, Council approved approximately 130 growth projects and composites for design or development, totalling more than $4.9 billion. Significant projects include expanding the LRT network along the Valley Line and Capital Line, accelerating the Active Transportation Network, and developing the Lewis Farms Recreation Centre. It is essential to invest in developing new assets to support a growing and changing population, providing alternative modes of transportation and improving livability in the City. However, as new assets are created, it is equally important that they are planned for, maintained, and invested in throughout their lifecycles, which will cost significantly more than the initial investment cost. Investment in growth is a commitment lasting decades, so growth must be judiciously invested to maximize the value of the City's investments.

Operating Funding

The City of Edmonton funds operating and maintenance activities through its operating budget. The vast majority of operating and maintenance activities are based on the availability of funds rather than the prescribed need for the activity. As the available funds are typically lower than the prescribed need, the City must prioritize the maintenance and operations activities to ensure the highest priority activities are undertaken. Priority of activities considers the importance of the service supported by the activities, the importance of the assets supported by the activities, any legislative requirements driving the activities, and potential cost savings or risk avoidance by conducting the activities. Because operating and maintenance activities are so closely integrated with service delivery activities, regular coordination with service delivery groups is imperative to ensuring the most effective use of limited resources.

Funding Strategies

Investment in the growth, maintenance, and renewal of the asset portfolio is imperative to ensure the services delivered by the City meet Edmontonians' needs. To fund Edmontonians' needs, priority, data-driven decision-making, and sometimes compromise are required. Regarding creativity, Edmonton uses tools and best practices within the asset management industry to assist.

Growth Investment

As anticipated by the City Plan, Edmonton will continue to grow with an increasingly diverse population that will need new and enhanced services. The City envisions this growth by redeveloping existing and new neighbourhoods.

Offsite levies

One of the strategies employed to address future growth needs is to apply off-site levy requirements to new neighbourhood developments, which cover the cost of future capital requirements due to the development. Currently, off-site levies apply only to new Edmonton fire halls and arterial roads. In the case of fire halls, it is anticipated that the City will be able to recover approximately 45 per cent of the cost of new fire halls from developers through off-site levies, with the remaining 55 per cent needing to be funded by the City. Recent changes to the off-site levy regulations by the provincial government require that before applying an off-site levy, there is a demonstrable benefit to those developments that pay the levy and that a developer not be required to make an overpayment.

Renewal Investment

The City prioritizes the renewal of its existing asset portfolio as its top capital investment priority, ensuring that a significant portion of the available capital funding in a given budget cycle is allocated to renewal investment. Even with this allocation, more funding than available to invest in renewal is required. The City utilizes grants from other orders of government to help fund its renewal investment activities. While these funds have proportionately decreased over the years, they still account for a significant portion of the renewal investment funding.

One of the methods the City uses to ensure appropriate funding for renewal investment is through a dedicated renewal reserve. The City currently has a reserve fund for Neighbourhood Renewal, which provides stable funding for the delivery of neighbourhood renewal projects and has helped significantly improve the overall condition of neighbourhood assets. The City is exploring a similar reserve fund to support other asset types, such as facilities, bridges or transit assets. With this reserve, the City's most at-risk assets would receive the required investment and reduce the risk of service disruptions.

7. RISK MANAGEMENT

Strategic Risks

The City of Edmonton assesses and communicates corporate strategic risks annually. The 2025 Corporate Strategic Risks Report[1] summarizes the key risks that impact the City of Edmonton's ability to reach its strategic goals, outcomes and service-level commitments.

The strategic risks are considered in relation to the City's goals outlined in ConnectEdmonton, The City Plan and the Corporate Business Plan. Enterprise Risk Management is a key element of the City's Strategic Planning Framework and supports the integrated business planning and budgeting approach.

[1] *2025 Corporate Strategic Risks Report, FCS02497, September 4, 2024, Audit Committee*

Figure 13 below summarizes the infrastructure asset-related risks and mitigating actions. The risk code aligns with Attachment 1 of the 2025 Corporate Strategic Risks Report FCS02497 for ease of reference.

Report FCS02497 Risk Code	Risk Rating	Risks	Mitigating Actions
F1	High	Increased strain on budgets impacts the ability to meet the public's service level expectations.	Identify financial pressures related to growth and set targets for renewal. Align service levels to available budgets.
IA2	Med	Increasing funding deficit on infrastructure growth and renewal projects causes infrastructure degradation that can lead to service disruptions, safety hazards, and increased maintenance costs, impacting the overall effectiveness of assets and the quality of life for residents.	Continue financial controls, monitoring, prioritization in capital projects and adherence to city debt management fiscal policy. Continue work ensuring that operating costs of capital are effectively determined throughout long-term integrated business planning, ensuring resources are allocated and prioritized to meet service level agreements. Present a prioritized approach to renewal investment and funding. Strengthen the connection between growth, renewal, operations and maintenance planning conversations. Explore options with Council to develop dedicated renewal funding allocations from property taxes to ensure consistent funding for capital renewal investment. Engage in comprehensive asset management, renewal programs, climate risk assessments and innovative financing. Use modern technology to enhance infrastructure longevity and integrate climate resilience.
IST1	Med	Replacement, upgrades or maintenance of aging digital infrastructure assets are insufficiently funded, resulting in cybersecurity vulnerability, increased operational costs, and declining public service quality.	Continue reprioritizing capital investments to focus on the most critical to replace/update. Leverage capital renewal requirements to incorporate application renewal. Active funding and improvements to cyber security measures to ensure upgrades meet the required security standards and best practices to protect the city's digital assets.

			Prepare contingency plans to ensure continued delivery of services in the case of a cyber-attack.
ENV1	Med	Changing climate conditions and more frequent severe weather events will strain City assets and services.	Continue leadership and funding to support the Climate Adaptation Strategy and Action Plan. Advanced research is needed to develop adaptation targets that enhance decision-making and advocate for securing funds for initiatives that help prepare the city for a changing climate. Advance work on a Climate Resilient Planning and Development Action Plan that supports a climate-prepared and adapted urban form.
IA1	Med	Mitigation, adaptation and resilience responses for climate change impact lifecycle management scope and costs for infrastructure, fleet, and equipment.	Use steering and working committees, including the Climate Task Force, to guide the implementation of The City Plan, Greenhouse Gas Management Plan, Climate Resilient Edmonton Adaptation Strategy and Community Energy Transition Strategy with policy tools. Prioritize investment in green equipment, technology and resources.

Figure 13: Summary of Strategic Risks

Renewal Investment Risk Management

As mentioned in the capital funding section, the City uses the Risk-Based Infrastructure Management System (RIMS) model to analyze and estimate the optimal long-term renewal funding requirements for the existing infrastructure portfolio at a network level. One of the key components of RIMS is risk-related inputs.

The risk input starts with assessing assets based on their Level of Importance to the service they support and their impact of failure. This assessment is performed across the following risk categories:

- Health and Safety of Asset Users (City Employees and or Residents)
- Environment
- Financial (including operations and maintenance and one-time capital impact across the portfolio)
- Economic Impact and
- Service Quality / Reputation

The Level of Importance assessment results in assets classified as High, Medium or Low importance. The combined results from these five categories also form an asset's severity score, ranging from as low as five to as high as 1000. Severity scores are calculated based on the consequence of the failure of a single asset within a class of assets. Most failure impacts are mitigated through redundancies, thus keeping results near 200.

The physical condition of assets is one of the primary indicators of potential failure, as an asset with a lower condition rating will have a higher likelihood of failure. RIMS considers this by setting asset condition targets for each asset group based on their Level of Importance. These targets include an average condition index, per cent of assets in D&F condition and per cent of assets in F condition.

Figure 14 below summarizes these factors. RIMS uses the factors to set thresholds for optimizing renewal actions for each asset group. Assets with a higher Level of Importance to the service they support have a lower tolerance for assets in failing condition, reinforcing the importance of service when making asset decisions.

Importance Level	Target Average Condition Index	Target Severity	Target % of Assets in D&F	Target % of Assets in F	Examples
High	3.5	200	1%	0%	River Crossing Bridges, Self-Contained Breathing Apparatus
Medium-High	3	200	5%	2%	LRT Track Structure
Medium	2.75	200	10%	5%	Police Marked Vehicles
Medium-Low	2.5	200	20%	7%	Bus Shelters
Low	2.25	200	40%	10%	Signage, Furniture, and Audio-Visual Equipment

Figure 14: RIMS Portfolio Target States by Asset Importance Level

Asset Specific & Asset Management Practices

Asset management risks related to a specific asset type or asset management practice can be found in asset management plans or the business plans for the functional areas that perform asset management activities (e.g. animate, operating/maintain, etc.).

8. PERFORMANCE MEASURES & CONTINUOUS IMPROVEMENT

Performance Measures

Enterprise Measures

The current performance measure used to reflect the City's commitment to asset management is the measure of infrastructure condition. This measure indicates the overall condition of the portfolio of reported capital assets, measured as a percentage of assets in poor [D] or very poor [F] condition. While captured annually, the physical condition of infrastructure assets is communicated to Council biannually through the Infrastructure State and Condition reports. The latest report, 2023 Infrastructure State and Condition, was shared on November 17, 2023.

This measure is an important indicator that supports decision-making for programming operations and maintenance, renewal and growth investment and risks around service delivery. As part of the asset management improvement actions, additional measures will be developed to support enhanced decision-making and measure progress toward enhancing asset management practices. These measures will be completed in alignment with the Capital Asset Management Audit recommendations on September 22, 2023[2].

Specific Asset and Lifecycle Activity Measures

The asset management plans or business plans for the functional areas that perform lifecycle management activities contain specific asset measures and lifecycle activity measures (e.g., operation, maintenance, renewal, etc.).

Continuous Improvement

With $34.7 billion of infrastructure replacement value, incremental improvements in the City of Edmonton's asset management practices can significantly impact the corporation. The City of Edmonton identifies opportunities for improvement through reviews, employee feedback and audits.

The City of Edmonton reviewed its asset management practices in 2019 and interviewed employees from various levels across the corporation for their feedback and input on current asset management practices in 2023. The Office of the City Auditor also performed a Capital Asset Management Audit of the corporation in 2023. Based on these activities, the corporation has developed a four-year plan to improve corporate asset management continuously. Figure 16 summarizes the key asset management improvement actions. A full breakdown of the actions, activities and timelines can be found in Appendix A: Asset Management Improvement Activities.

[2] Capital Asset Management Audit recommendations, IIS02011, September 22, 2023, Audit Committee

Key Improvement Actions	Tactics and Activities
Asset Management Enablement	Provide mandatory introductory asset management training to all City employees.
	Develop and consolidate asset management tools and implement a corporate-wide asset data management approach
Tools, Processes & Data: Asset Management Decision Making	Develop a framework for determining a ranking of assets by criticality (e.g. risk, climate impacts, service impacts, social, etc.) for use in investment and program planning.
Tools, Processes & Data: Asset Performance Measures	Develop a framework for establishing measures of Demand/Capacity for assets and a process for assessing the Demand/Capacity of assets.
Tools, Processes & Data: Financial Management	Develop a lifecycle costing tool and incorporate its use into budget approvals for growth projects and renewal projects that include upgrades, expansion or transformation. This will integrate full lifecycle costing into capital investment processes.
2023 Capital Asset Management Audit	Guide the development, approval and regular updates of Asset Management Plans for significant asset categories.
	Develop and communicate guidance for asset managers on accurate and complete data requirements.
	Develop guidance on asset disposition, including regular asset portfolio reviews to use budgets better.
	Define clear strategic performance measures related to asset management practices.

Figure 16: Asset Management Activities Summary

Monitoring & Review

Progress on this plan will be monitored and reported to the Corporate Asset Management Steering Committee and other leadership teams as required. Progress on the 2023 Capital Asset Management Audit recommendations will be reported to the Office of the City Auditor and, ultimately, the Audit Committee.

9. DEFINITIONS

Term	Definition
Asset Management	Coordinated activity of an organization to realize value from its assets
Asset Management Maturity	The level of advancement of the City's governance, processes, training, data, and tools related to the management of the City's assets throughout their entire lifecycles. While referred to in a City context, maturity levels vary between departments of the City.
Asset Management Plan	A plan developed for the management of infrastructure assets that combines multidisciplinary management strategies (including technical and financial) over the lifecycle of the asset in the most cost-effective manner to deliver a specified level of service. It specifies the activities, resources and timescales required for individual assets (or asset groups) to achieve the organization's asset management objectives. A significant component of the plan is therefore a long-term program of works and cash flow projection for the activities. Each plan will vary in complexity depending on the asset group it pertains to.
Asset Management System	A set of integrated elements required to achieve the organization's asset management objectives. Some of the system's elements include policies, plans, business processes, and information systems.
Environment	Includes the earth's natural system and resources. Sustainability of the environment encompasses a range of interconnected issues including but not limited to: climate resilience (mitigating and adapting to climate change), biodiversity loss, waste management, pollution and natural resource shortages.
Growth Investment	Investment in upgrading existing infrastructure assets or developing new infrastructure assets (created or acquired) increases the value of the overall portfolio of assets. These actions increase or add to the intended Level of Service provided by the City's portfolio of infrastructure assets.
Holistic approach	Considers a complete system rather than isolated analysis of individual parts.

Term	Definition
Ideal Renewal Investment	An optimized renewal investment projection that considers the type and timing of rehabilitation actions throughout the lives of the various networks of assets to achieve or remain within the target condition of the assets without the constraint of budget. This does not mean all assets are in good or very good condition. Instead, there is a distributed mix of asset conditions throughout the portfolio, which, when optimally invested in, limits the number of condition-based risks to a prescribed limit.
Infrastructure Asset	An item, thing or entity that has potential or actual value to an organization. Examples include Goods and People Movement (roads, sidewalks, bridges, transit), Facilities (fire halls, offices, recreation centres), Open Space (trails, playgrounds, sports fields), Ancillary Infrastructure (fleet and equipment), Culture and Heritage (art and exhibits), Service Delivery (police, fire, and recreation equipment), Utilities (waste management and renewable energy assets).
Level of Service	The parameter or combination of parameters that reflect socio-cultural, financial/economic, and environmental outcomes that the organization delivers. They describe the outputs or objectives that the City intends to deliver, including measures at the organization's corporate, stakeholder, and asset operator levels. They are the composite indicators such as quality, quantity, reliability, responsiveness, safety and cost for a particular activity or service area against which service performance may be measured. ● Customer Levels of Service: define how a service is perceived by the user, using non-technical measures. ● Technical Level of Service: specific and quantifiable measures for service targets specific to the asset
Lifecycle Cost	Sum of all recurring and one-time (non-recurring) costs over the full life span or a specified period of an asset. It includes planning, design, construction, acquisition, operation, maintenance, rehabilitation and divestment costs.

Term	Definition
Maintenance	All actions necessary, excluding renewal actions, to address the deterioration of an asset, preserve its condition, and achieve its expected useful life are considered maintenance. Maintenance does not increase the Level of Service of the asset or increase its service life; rather, it slows down deterioration and delays when renewal actions are necessary. Maintenance actions are not capitalized within the City of Edmonton context and should be proactively built into operating budgets.
Modern Equivalent Asset	An asset that provides a similar function and equivalent level of service to the asset being renewed but is constructed or made using current materials and techniques. Modern equivalent assets are used when the type of asset to be renewed is no longer being manufactured or is cost-prohibitive to reproduce. A simple example is the renewal of flooring in a facility where the previous flooring material was made from vinyl asbestos tile. As this type of tile is no longer produced, vinyl composition tile, which provides a similar Level of Service, is used as its modern equivalent.
Natural Assets	The land, air, water, living organisms and other formations, such as aquifers, creeks and rivers that provide equivalent civil engineered municipal goods and services.
Net Present Value	The sum of the discounted cash flows, where future cash flows are discounted by the discount rate. At high discount rates and long periods into the future the Present Value of money is small.
Remaining Useful Life	An estimate of the number of remaining years an asset is expected to function to its intended performance specification before requiring replacement. This is typically calculated by subtracting its current age from the expected useful life of the asset and factoring in the asset's current condition rating. While remaining useful life can help to plan for future replacements, the asset’s condition determines when an asset needs replacing, regardless of age.

Term	Definition
Renewal Investment	Investment in existing infrastructure assets to restore the asset 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, therefore, does not increase the size of the infrastructure asset portfolio. Renewal includes rehabilitation and replacement: ● Rehabilitation involves restoring or replacing parts or components of an infrastructure asset to its former condition or status. Generally, it involves repairing the asset to deliver its original Level of Service without significantly upgrading or enhancing it, using available techniques and standards. ● Replacement: The action of replacing an infrastructure asset to provide a similar or an agreed-upon alternative Level of Service. For simple assets, where rehabilitation costs as much or more than the value of the asset, replacement is the typical investment option. For larger, complex assets, the following investment options utilize one or both of the above renewal actions: ● Early Life Rehabilitation: Proactive interventions to an asset usually in the early stage of its lifecycle to extend the asset's life. These actions are rare, but used where the activity is more cost effective than a larger rehabilitation later in the lifecycle. ● Mid-Life Rehabilitation: Proactive interventions to an asset once it reaches C-fair condition. This typically involves replacement of component parts or systems of a larger asset. ● Later Life Rehabilitation: Similar to Mid-Life Rehabilitation, however, investment in this asset is intended to keep the asset operational for a short period of time, typically to stretch out its lifecycle enough to accommodate the timing of its replacement. ● End-of-life Renewal: Investment in an asset that is approaching or at the end of its remaining useful life (D or F condition). Typical options include replacing the asset with a new, modern equivalent asset or major rehabilitation that returns the asset to new or near-new condition. At this stage of life, rehabilitation or replacement will likely include growth considerations to address changes to standards and functionality improvements.

Term	Definition
Replacement Value	The cost of total replacement of an existing asset in today's dollars, including assets that replicate what is in existence with the most cost-effective asset providing an equivalent Level of Service. Replacement value considers the cost of replacing an obsolete asset with its modern equivalent and the cost of meeting current legislative or regulatory requirements.
Resilience (Climate Resilience)	The concept of resilience is wider than natural disasters and covers the proactive capacity of public, private, and civic sectors to anticipate, reduce, accommodate or recover from a crisis or hazardous trend in a timely and efficient manner. Climate resilience includes both mitigation actions to address the cause of climate change and adaptation actions to address the effects of climate change.
Stakeholder	Includes, but is not limited to internal and external partners (such as operators, maintainers, utilities, citizens, visitors, and explorers.
Sustainability	Meeting the needs of today without compromising the needs of future generations. It is about improving the standard of living by protecting human health, protecting the environment, using resources efficiently and advancing long-term economic competitiveness. It requires the integration of environmental, economic and socio-cultural priorities into policies and programs and requires action at all levels--citizens, industry, and governments.

10. APPENDICES

Appendix A: Asset Management Improvement Activities

Appendix B: Asset Rationalization Framework Process Overview

11. REFERENCES

CONNECTEDMONTON: Edmonton's Strategic Plan 2019-2028

The City Plan

C598A Infrastructure Asset Management Policy

2023 Infrastructure State and Condition Report

Capital Investment Outlook: 2023-2032