COUNCIL REPORT

COST BENEFIT ANALYSIS AND COST DRIVERS ON COMPARATIVE CAPITAL PROJECTS

Recommendation

That the November 27, 2024, Integrated Infrastructure Services report IIS02537, be received for information.

Requested Action		Information only	
ConnectEdmonton's Guiding Principle		**ConnectEdmonton Strategic Goals**	
CONNECTED This unifies our work to achieve our strategic goals.		Urban Places	
City Plan Values	LIVE, ACCESS		
City Plan Big City Move(s)	A rebuildable city	**Relationship to Council's Strategic Priorities**	Conditions for service success
Corporate Business Plan	Managing the corporation		
Council Policy, Program or Project Relationships	• C591 - Capital Project Governance Policy • C598 - Infrastructure Asset Management Policy • C627 - Climate Resilience Policy • C602 - Accessibility for People with Disabilities Policy • C573A - Complete Streets Policy • C555 - Private Public Partnership (P3) Policy • C593A - Public Engagement Policy • C587A - Enterprise Risk Management Policy • C556C - Sustainable Procurement Policy • C458D - Public Art to Enhance Edmonton's Public Realm • C512 - Environmental Policy		
Related Council Discussions	• June 11/12, 2024, FCS02362 Spring 2024 Supplemental Capital Budget Adjustment - 2023-2026 Capital Budget • January 30, 2024, IIS02122 Major Capital Project Update		

Previous Council/Committee Action

At the June 11/12 City Council meeting, the following motion was passed:

That Administration provide a report with a cost benefit analysis and cost drivers that influence comparative capital projects including Codes, Policies, Bylaws, Program or other factors, with a focus on Facilities and Renewal Projects; including a direct cost breakdown comparison of current fire hall and recreation centre projects completed in Edmonton and within regional municipalities.

Executive Summary

- A comparative third-party cost analysis was conducted on selected facility projects, including new construction and renewal of fire stations and recreation centres.
- There were limitations in available data from other municipalities including cost drivers, both internal and external, that influence project costs and when available should also be considered in comparative analyses. The reviews are therefore based on comparing available data between projects, however are not comprehensive due to the limitations noted.
- Key findings from the analysis include:
    - the City of Edmonton is a leader in climate-resilient infrastructure, integrating sustainability and climate resilience into its projects that meet project based climate goals and will reduce operating and maintenance costs over the life of facilities compared with other municipalities,
    - complexity of scope in these facility projects to incorporate City policies does increase costs and timelines for Edmonton projects compared to the majority of the smaller municipalities with less of these (exception was similar comparison with Calgary),
    - the level of Business Partner engagement and accommodation is another contributing factor to increases in time, cost and scope comparing with the other municipalities, and
    - given the inflationary period of the projects reviewed through this analysis, it further highlighted the higher relative costs due to longer times for Edmonton projects to be completed compared to the other municipalities.

REPORT

Typical Project Overview

The City of Edmonton has a defined project development and delivery model (PDDM) that is followed for all capital projects. Once initiated, each facility infrastructure project generally progresses through similar stages of development from an initial needs assessment through service commencement (checkpoints one through five). Further details relating to these stages are outlined in Attachment 1.

In the past, capital budget requests for facility infrastructure projects were often submitted at early development stages, with low confidence thresholds relating to the scope, schedule and budget estimations. This approach frequently led to unanticipated adjustments to scope,

schedule and budget (underperformance), with outcomes falling short of anticipated expectations. During this period, projects commonly required subsequent additional funding requests, schedule adjustments and scope modifications, often resulting in extended service disruptions and low public confidence and transparency. To address these challenges, and as part of broader project management and governance enhancements, City Council approved Capital Governance Policy C591 in 2017, which established the administrative framework for the Project Development and Delivery Model (PDDM). The objective of PDDM is to formally integrate the City's project and financial processes under one common framework. This policy, along with the centralization of capital infrastructure resources into the Integrated Infrastructure Services Department, led to improved consistency and performance reporting, as well as the introduction of a standardized system of checkpoints for City Council oversight of infrastructure projects. Under the policy, Administration is required to report to City Council at specific intervals to request capital funding depending on the scale of project at both project initiation (checkpoint 1) and for approval of the full capital budget for the project (checkpoint 3). It is important to note that a project's overall capital budget encompasses all costs incurred from project initiation through commissioning and service commencement, extending beyond direct construction expenses.

Typical Facility Capital Project Costs Summary

The general budget breakdown for a facility capital project can vary significantly from project to project but will generally include many similar and common cost categories. This can include, but is not limited to the following:

1. General Expenses (insurance, administrative fees, permits, etc.)
2. Professional Services (engineering, quality assurance, project management, etc.)
3. Site Servicing - Utilities (offsite)
4. Civil - Base Grading and Foundation (onsite and below ground)
5. Structural (footings, foundations, concrete/structural steel)
6. Exterior Finishings (cladding, masonry, facade and architectural finishes)
7. Mechanical (Rough / Final)
8. Electrical (Rough / Final)
9. Interior Finishings (wall systems, flooring, etc.)
10. Site Furnishing/Landscaping
11. Land
12. Furnishings / Fixtures / Equipment ("FFE")

Each cost category is influenced by a variety of internal and external cost drivers that affect its overall cost. Internal factors are those within the City of Edmonton's direct control, while external factors are outside the City's direct influence. When conducting a comparative analysis of facility

projects, it is important to consider the context in which projects are developed based on the following categories:

1. Functional Program
2. Market Factors
3. Risk Tolerance
4. Design Context

Further information on these cost driver categories and how they can influence facility project costs is provided in Attachment 2.

Facility Project Cost Benefit Analysis

To support the analysis requested by Council, Administration engaged a third-party consultant to conduct a comparative analysis of various facility projects. The selected projects were chosen based on recent discussions with Council during the motion's deliberation and approval, as well as the feasibility of obtaining detailed cost information from other municipalities within the report's timeframe.

Project	Municipality	Project Status
Fire Stations		
Nisku Fire Station No. 9	Leduc County	In Operation
Windermere Fire Station No. 31	Edmonton	In Operation
Pilot Sound Fire Station No. 30	Edmonton	In Operation
St. Albert Fire Station No. 1	St. Albert	In Operation
Recreation Centres		
Peter Hemingway Pool Rehabilitation	Edmonton	Construction
Fountain Park Pool Rehabilitation	St. Albert	In Operation
Rollie Miles Recreation Centre	Edmonton	Schematic Design
Ricochet Recreation Centre	Drayton Valley	In Operation
Quarry Park Recreation Centre	Calgary	In Operation
Lewis Farms Recreation Centre	Edmonton	Construction
The Meadows Recreation Centre	Edmonton	In Operation

The analysis performed was limited by availability of information and the time available to complete the analysis. Detailed cost information from other municipalities was often not readily available for reasons including privacy or confidentiality provisions relating to commercial terms or liability. In these instances the analysis had to rely on available public documents and records,

which are more general in nature. In recognizing this constraint the analysis utilized a qualitative assessment of project cost impacts, augmented by previously completed analyses used to inform previous policy amendments and recommendations.

The key findings from the third-party analysis are summarized in the following five prioritized categories.

1. **Timing and Market Escalation:**

   Construction projects, particularly those in a dynamic and growing city like Edmonton, are highly susceptible to economic fluctuations. Unexpected events, such as the COVID-19 pandemic, can trigger significant cost escalations due to supply chain disruptions, labor shortages and inflation. The Building Construction Price Index (BCPI) highlights the impact of such events, with a notable surge observed in 2021 and 2022. Projects with longer timelines are particularly vulnerable to these market volatilities.

   Further, it is important to consider the timing of projects when making cost comparisons between projects that span different time periods. Normalizing costs to a single consistent year, either to the present day or to a commonly defined time period in the future, ensures the analysis is more equitable and fair. For example, a project built after the COVID-19 pandemic may be up to 30 per cent more expensive than a comparable project built before the pandemic. The analysis completed showed that after normalizing costs to a consistent year, the cost per square meter for Lewis Farms was within 5 per cent of a recent recreation centre in Calgary (approximately $6,000 per square meter).

2. **Sustainability and Climate Resilience Goals:**

   The City of Edmonton has progressively ambitious goals for sustainability and climate resilience, which are reflected in its evolving policies and building standards. Meeting these requirements often necessitates the use of newer, more expensive technologies and building materials. For instance, the shift towards emissions neutral standards in 2021 significantly impacted the design and cost of projects like the Windermere Fire Station. While these upfront costs can be higher, they can lead to long-term savings through reduced energy consumption and lower operating costs, aligning with the City's commitment to sustainable practices.

   Capital Investments in sustainability and climate resilience do assume a payback in operations and maintenance over the total lifecycle of the asset. The analysis conducted when Policy C627A was being evaluated suggested this could be an incremental capital cost increase of up to 15 per cent. The payback period for this capital cost increase may vary depending on the type of building design and the public service being delivered. Public infrastructure generally has a significantly longer design and service life compared to other commercial infrastructure, as evidenced by the many legacy and historic buildings in the City’s asset portfolio. When taking into account the total cost of ownership, the payback period for investments like solar photovoltaic microgeneration, local ground source heat pumps, or enhanced building envelope upgrades can generally vary from 10 to 25+ years.

3. **Program and Design Scope:**

   The design scope of a facility, encompassing its size, complexity and specific features, directly influences construction costs. For example, the inclusion of specialized spaces, such as a fitness room or a mezzanine area, can significantly impact the overall cost. The functional program, which outlines the detailed spatial requirements, plays a crucial role in shaping the design scope and, consequently, the project budget.

   One of the relatively simple metrics to evaluate when comparing facilities is the building footprint area. As outlined in the analysis, the size of fire station buildings is relatively similar for similar functional programs (within 5 per cent) however, there are differences that do exist within the functional program. For example, new Edmonton fire facilities include unique requirements such as drive through bays, as well as dedicated space for gear rooms. The analysis of recreation centers did demonstrate that the City does have larger recreation facilities which are attributed to a larger functional program. These integrated facilities incorporate other services for example such as libraries, additional community spaces and commercial retail areas into the building program which other recreation centres do not.

   Additionally, as it relates to comparing project budgets, different scope items may be included in the overall cost. The building itself may only represent 70-90 per cent of the total budget when other aspects of the program are considered. The budget may (or may not) include other tangible costs such as fleet, specialized equipment land, or other offsite servicing related expenses.

4. **Complexity of Policies, Bylaws, Standards and Regulatory Responses:**

   The City of Edmonton has a comprehensive and detailed set of policies, bylaws and standards that govern the design and construction of its facilities. These regulations ensure high-quality construction, public safety and compliance with various environmental and accessibility requirements. However, this complexity can also lead to higher administrative, legal and design costs compared to municipalities with less stringent regulations. For example, the design review process under Edmonton Design Committee Bylaw 20673 add layers of complexity and potential time and cost implications compared to processes in other municipalities.

   This should not suggest that these additional policies, bylaws and standards are not effective, necessary, or do not provide public value. For example, the urban context of a building situated within an urban community (Windermere No. 31 Fire Station vs. Leduc No. 9 Fire Station) can be substantially different and warrant a different design approach or set of assumptions to support community expectations. In many ways, these policies, bylaws and standards are the product of institutional experience and a byproduct of lessons learned from past projects and help to create alignment between Administration, Council and the public about their unique values, priorities and expectations for the project.

5. **Business Partner Involvement:** The City of Edmonton places a high emphasis on collaboration with business partners throughout the project development process. This ensures that all design requirements are met, future operating costs are considered and the facility meets the unique

needs of the community. For instance, the active involvement of the Edmonton Fire Rescue Services (EFRS) in the design of Fire Station No. 31 ensured alignment with their operational needs and accreditation standards. While this collaborative approach can lead to more complex and expensive designs upfront, it also enhances the long-term value and benefits of the facility by incorporating user feedback and expertise.

In many ways, this additional effort and resources provided by business partners is a product of the value placed on ensuring effective integration into the design. This risk mitigation, helps establish a higher degree of confidence in ensuring that the facility meets the long term operational needs of the service provider and avoids any costly rework over the lifecycle of the facility.

A copy of the complete analysis is provided in Attachment 3.

Summary

There are a significant number of cost drivers that uniquely impact the development and delivery of facility projects. When conducting a comparative analysis of facility projects each of these cost drivers need to be considered uniquely to provide a fair and equitable comparison. Without this context there is significant risk of the public forming unconfirmed, inaccurate or improper conclusions from misleading information. No two facilities analyzed have similar timeframes for delivery, functional programs, policy contexts, design environments or public expectations and, as such, their costs are variable.

The capital cost of a facility represents a single dimension of the overall lifecycle or total cost of ownership related to a facility. The City of Edmonton, through its policy environment, has many priorities that largely influence the design approach. It should also be noted that the City's facility infrastructure portfolio includes a significant number of aging buildings that continue to provide services well beyond a typical service lifetime (50+ years).

Community Insight

Administration continues to listen to and engage with the public and varied community stakeholders during the different phases of a capital project, including planning, design and construction. The feedback gathered through the engagement process helps Administration adjust designs and mitigate any potential impacts to reflect the needs of Edmontonians.

Feedback from Edmontonians has significantly influenced the City's policies and guidelines for infrastructure projects. The City Plan and other Council priorities provide key policy direction.

GBA+

Administration integrates GBA+ considerations into the planning and design phases of its infrastructure projects. City policies and Council priorities can also influence the functional program and design elements of projects, which can have a direct impact on end users, particularly those facing unique barriers and challenges. Public engagement plans are designed to be inclusive, ensuring diverse groups and those whose voices are heard less often are given an opportunity to contribute their perspectives.

Environment and Climate Review

Climate risks to infrastructure will impact the City's long-term livability. Investment, location, design and operational decisions all provide opportunities to consider climate resilience in infrastructure and assets development. The comparative analysis, which includes an assessment of Council's Climate Resilience C627 Policy, demonstrates that the City is a leader in climate resilient infrastructure and assets, which are being planned, designed, built and operated in ways that anticipates, prepares for, and adapts to changing climate realities. This policy supports the following areas that are reflected in The City Plan directives as the City progresses in the implementation of its Infrastructure Strategy:

- Energy Transition
- Climate Change Readiness
- Lifecycle Costs of Infrastructure
- Regional Innovation

Attachment 4 demonstrates these four areas in detail.

Attachments

1. Facility Project Process
2. Cost Drivers
3. Edmonton Cost Analysis Final Report (3.0)
4. Environment and Climate Review