City of Edmonton- Select Facility Cost Analysis

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Colliers Project Leaders

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Executive Summary

Under the direction of the City of Edmonton (the City) Integrated Infrastructure Services (IIS) department, Colliers Project Leaders (Colliers) completed a cost analysis of cost drivers influencing comparative capital projects for fire stations and recreation centres within and outside the City. Through the comparison analyses, five major drivers have emerged:

Timing and Market Escalation

- Projects developed over the last five years have been exposed to challenges relating to the COVID-19 pandemic which interrupted supply chains, reduced construction output and in some cases, reduced available resources. Unprecedented escalation costs have increased project budgets during this time.

Sustainability and Climate Resilience Goals

- City Council declared a climate emergency August 27, 2019, signifying their deep commitment to being a leader in addressing sustainability and climate resiliency in Canada. While consultants and contractors were already required to address aggressive targets in the regulatory forum (through energy and building codes) the City has asked for their full commitment to reduce greenhouse gases, reduce energy costs, tighten-up building envelopes and incorporate renewable technologies into capital projects.

Program and Design Scope

- The functional space program and subsequent design determine the physical space required for specific activities, programs and services. The program is developed in the early stages of the project, with both City administration and business partner involvement and may include stakeholder engagement.

Complexity of Policies, Bylaws and Standards, and Regulatory Responses

- The City of Edmonton's policies, bylaws and standards support a population of over one million people. The documents guide the City Administration in conversations with both the public and the development industry. The City is challenged to balance straightforward direction with complex forward-looking measures that support a capital city in a northern climate and growing urban centre.
- City projects are required to meet building, fire and energy codes while also responding to the Zoning Bylaw 20001 at a minimum.

Business Partner Involvement

- The business partners involved a capital project are the operation teams who will run the facility and the maintenance teams who will repair the facility systems. The operations team is unique to the building type and the maintenance team often crossed building types with an interest in uniformity across the City where possible.

Recognizing that the Total Cost of Ownership of Capital Projects considers both capital and operating costs, this report addresses only capital costs. Within Capital Project Costs are both hard and soft costs. This report addresses only hard costs. While all capital project budgets contain both “soft” and “hard” costs within them, soft costs have proven to be difficult to obtain from other municipalities. When calculating the cost-per-square-meter of the building for each project, the building construction costs were used instead of the total construction cost. Building construction costs include all hard cost categories except for site works.

Limitations

Data was difficult to retrieve in a standard format across projects. The projects selected vary in age, are located in differing jurisdictions and in some cases confidentiality concerns were present. Cost data was available from a wide range of sources including final cost reports, construction progress claims and cost estimates. Key cost numbers were confirmed with IIS prior to the completion of the report by Colliers. Projects that are not complete as of Fall 2024 used forecasted numbers that were assumed to be comparable given the estimates were provided by IIS.

Finally, Colliers is in not party to the operations of the City’s facilities and as such are considered an independent third party. Colliers are acting objectively in the formulation of this report. Opinions reflected in this report are not intended to be or interpreted as legal advice or opinion.

1.0 Introduction

1.1 Purpose

Edmonton City Council passed a motion on June 11th, 2024:

"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 Facility and Renewal projects; including a direct cost comparison of current fire halls and recreation centre projects completed in Edmonton and within regional municipalities."

Subsequently, Colliers has supported the analysis of cost drivers influencing comparative capital projects. The following report focusses on recreation centres and fire stations (libraries have been omitted from the scope with the City's approval). The information collected and provided in this report is anticipated to support a City Council report and discussion that is scheduled for November 2024.

1.2 Objectives and Scope

Ultimately, this report offers a normalized comparison of infrastructure projects' relative costs to highlight impacts of key cost drivers. The scope of work included several phases: data collection and analysis, cost driver identification and impact analysis, and cost breakdown comparison. Cost data was gathered for a variety of capital projects underway or recently completed in Edmonton and regional municipalities. Colliers has subsequently provided qualitative and quantitative analysis of the identified impacts within and outside municipal influence. Finally, a direct cost breakdown comparison was prepared for the project types. Key differences and similarities are highlighted with insights into the probable rationale behind the two projects being considered as comparators.

1.3 Selected Projects

A total of ten Fire Station and Recreation Centre projects were selected for comparison for this mandate. Meadows Recreation Center in Edmonton is an eleventh. It is a useful reference though it is an older project. Recreation centres have been categorized by whether they are community-level, district-level, or rehabilitation projects. The projects are a mix of facilities built in and outside of the City. Recreation Centres have also been categorized based on whether they are new builds or rehabilitation projects. For instructional purposes the data has been structured as a series of comparisons. The projects and comparisons are listed below:

- **Fire Stations:**
  - Fire Station Windermere No. 31, Edmonton *vs* Fire Station No. 9, Leduc
  - Fire Station Pilot Sound No. 30, Edmonton *vs* Fire Station No. 1, St. Albert
- **Recreation Centres**
  - Hemingway Pool Rehabilitation, Edmonton ("Hemingway") *vs* Fountain Park Pool Rehabilitation, St. Albert ("Fountain")
  - Rollie Miles Recreation Centre, Edmonton ("Rollie Miles") *vs* Ricochet Oil Corp. Aquatic Centre, Drayton Valley (referred to as "Ricochet" henceforth)

- Lewis Farms Facility and Park Project, Edmonton (“Lewis”) *vs* Calgary Recreation Centre #1 Recreation Facility, Calgary
- Meadows Recreation Centre, Edmonton ("Meadows”) as a reference facility

2.0 Background

Colliers worked with the City to locate cost driver data/documentation relevant to the selected projects. Colliers met with the appropriate consultants, contractors, City departments and facility operators to inform the analysis of the selected facilities.

2.1 Data Collection

2.1.1 Data Collection Objectives

The objective of the Data Collection phase was to highlight project details to uncover defining features, cost patterns, relationships and trends. Colliers achieved this by gathering and organizing data on fire stations and recreation centres in Edmonton and regional municipalities. Additional content was reviewed including policies, bylaws, standards, administrative directives and relevant codes.

2.1.2 Data Collected

Colliers collected data on each of the projects by enlisting the help of the City's Project Working Group. The intent was to gather quantitative and non-quantitative information including possible cost drivers that are both indirect costs and direct costs. Several documents were requested to enable analyses:

- Project Business Cases
- Functional Programs (where available)
- Design Drawings
- Contracts and Agreements
- Cost Estimation Reports
- Tender Documents
- Risk Assessment Reports
- Value Engineering Studies
- Construction Progress Claims
- Lessons Learned Reports (where available)

Colliers initially attempted to gather hard and soft construction costs for each project, however due to data availability and confidentiality constraints, hard costs were compared only. Section 4.0 provides a breakdown of how hard costs were categorized and compared. More information can be found in Appendix A1.1 and A1.2 regarding fire station and recreation technical documents provided by City staff and surrounding jurisdictions.

2.2 Projects Overview

General project information is summarized in the following subsections.

2.2.1 Fire Stations Data

Table 1 summarizes fire station project information relating to timelines and project sizes. Projects lasted between one and six years, with the acceptance/approval of each business case by City Council

signifying the start of the projects, and year of occupancy signifying the end. The largest fire station for comparison is St. Albert's No. 1 facility which is also the newest project. Further details are offered in Section 4.0.

Table 1. Data collected on fire hall projects*

Facility	Location	Start	End	Size (m^2)
Fire Station No. 31	City of Edmonton	2017	2023	1,580
Fire Station No. 9	Leduc County	2022	2023	1,527
Fire Station No. 30	City of Edmonton	2012	2017	1,226
Fire Station No. 1	St. Albert	2019	2024	2,482**

*Data on Edmonton facilities provided by the City

** This station includes an emergency operations centre on the second floor, which makes it a larger facility with a significant portion of it made up of less expensive office space

2.2.2 Recreation Centres Data

Table 2 summarizes recreation centre project information relating to timelines and project sizes. The recreation centres selected for analysis have all been developed and/or constructed within the last ten years, with the acceptance/approval of each business case by City Council signifying the start of the projects, and year of occupancy signifying the end. Some centres have forecasted occupancies. The largest recreation centre is Edmonton's Lewis Farms Recreation Centre which is still under development. Further details are offered in Section 4.0.

Table 2. Data collected on recreation centre projects*

Facility	Location	Start	End	Size (m^2)
Hemingway	Edmonton	2018	2025	3,775
Fountain Park	St. Albert	2022	2023	5,519
Rollie Miles	Edmonton	2018	TBD	7,982
Ricochet	Drayton Valley	2021	2023	2,701
Lewis Farms	Edmonton	2018	2028	31,455
Calgary Recreation Centre	Calgary	2014	2016	8,733
Meadows	Edmonton	2011	2013	23,335

*Data on Edmonton facilities provided by the City

2.3 Emerging Cost Drivers

Upon review of the City's policies, bylaws, standards, programs and other factors, Colliers proposed a list of cost drivers to discuss with the City. The review considered qualitative and quantitative drivers, as described below.

2.3.1 Timing and Escalation

Projects developed over the last five years have been exposed to challenges relating to the COVID-19 pandemic which interrupted supply chains, reduced construction output and in some cases, reduced available resources. One measure used to understand how construction costs have fluctuated, is the Building Construction Price Index (BCPI).

The BCPI is a measure of the change over time in prices that contractors charge to build commercial, institutional, industrial and residential buildings. The line graph shown in Figure 1 illustrates the fluctuations in the BCPI year-over-year, with its greatest changes during the years of the pandemic (shaded area). The year 2022 saw the greatest climb in construction costs with a 14.11 percent change[1]. Edmonton's Fire Station No. 31 was tendered in 2020 and did not reach completion until 2023. Figure 1 shows the Edmonton projects' tender periods overlaid on the Edmonton's recreation centres are still underway.

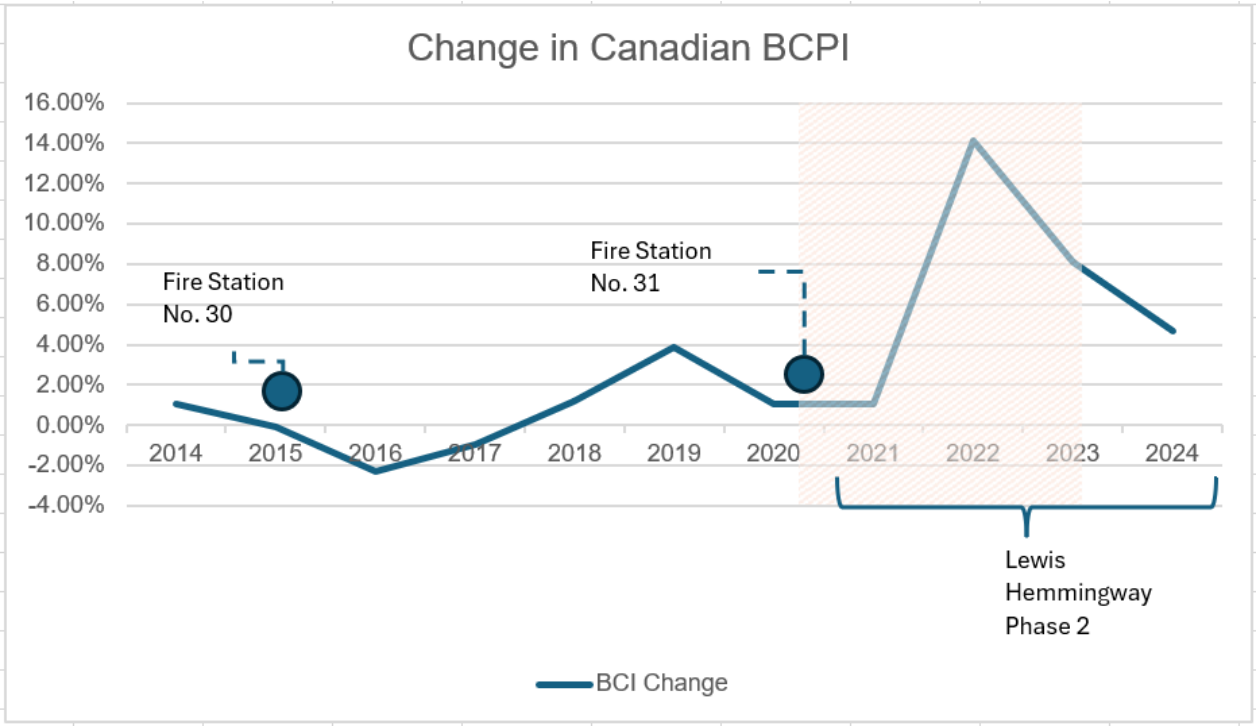

Figure 1. Change in Canadian Building Construction Price Index.

2.3.2 Sustainability and Climate Resiliency Goals

Edmonton's City Council declared a climate emergency August 27, 2019, signifying their deep commitment to being a leader in addressing sustainability and climate resiliency in Canada. While consultants and contractors were already required to address aggressive targets in the regulatory forum (through energy and building codes) the City asked for their full commitment to reduce greenhouse gases, reduce energy costs, tighten-up building envelopes and incorporate renewable technologies into capital projects. New policies were established and piloted.

Sustainability and climate resiliency goals do add capital costs to capital projects, but in doing so their objective is to reduce future operating costs. Given that operating costs are the largest expense in the total cost of ownership of City public buildings (some say 85 percent), projects typically undergo life cycle analysis early in their development to measure the return on investment in new technologies and

[1] Statistics Canada. (2024). *Table 18100276 Building construction price indexes, by type of building and division – Dataset.* https://open.canada.ca/data/dataset/4e857c0c-2309-438d-ad29-80b55d9c48f7

systems. The challenge with accurate forecast numbers for reporting is that these sustainability policies are recent or even pending, and construction projects take years.

Figure 2 illustrates the timeline of policies implementation/updates with Edmonton's project start dates indicated. The Fire Station No. 30 adhered to the Fire Rescue Service Delivery Policy C532 which was already implemented in 2012, in addition to the Sustainable Procurement C556 (not featured in the 10-year timeline). The other projects adhered to policies and bylaws as shown (further policies, bylaws, standards and regulatory response details are provided in Section 2.3.4). Note that Lewis here is shown with a start date in 2015 (before its business case which was the "start" date used in later chapters of this report). The City wanted to emphasize that the project began before the implementation of Policy C532 and the Project Development and Delivery Model (PDDM), however, both were later adopted during the project, after the schematic design was accepted.

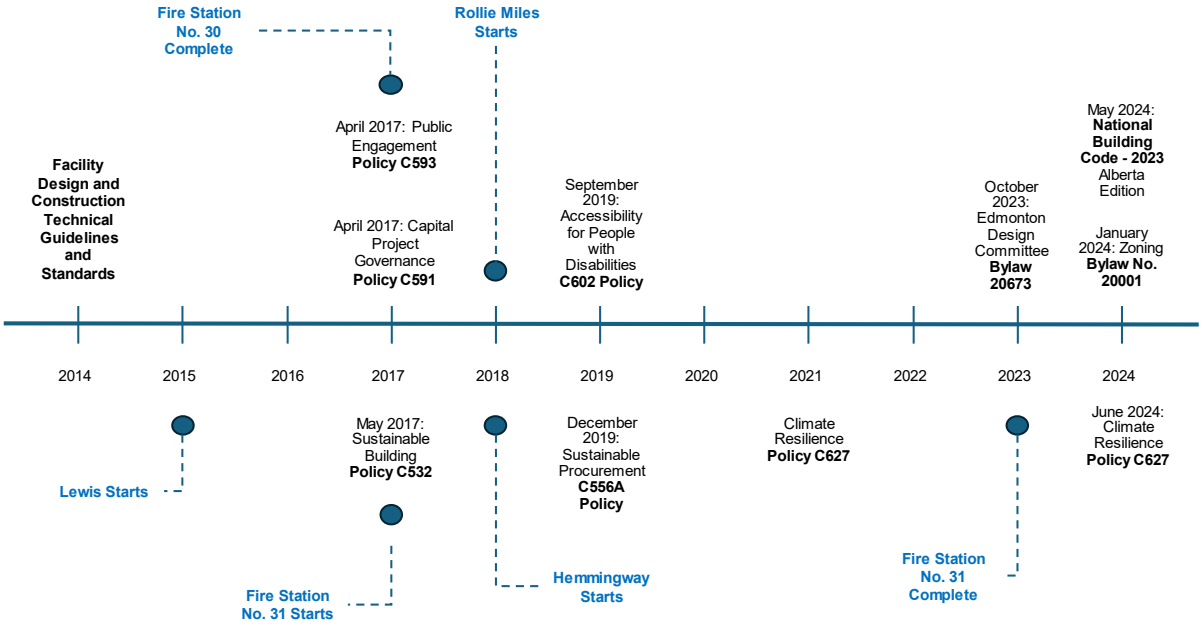

Figure 2. Policy and projects timeline.

2.3.3 Space Programs and Design

Functional programming was an important cost driver considered, as it reflects the physical space required for specific activities, programs and services. The program is developed in the early stages of the project, with both City administration and business partner involvement, including subject matter experts (SMEs) where appropriate.

The space program development and its execution in design is guided by the aspirations of the project team led by the Integrated Infrastructure Services (IIS) project manager who considers input from the project's business partners. Space program cost drivers include the size, orientation and number of spaces within the project (to accommodate staffing), and special technical requirements of each space (systems and equipment).The Facility Design and Construction Technical Guidelines and Standards supplement the functional space program development in support of consistency across City of Edmonton building operations.

Public and City Council engagement usually occurs as the building's design is developed using the approved functional space program. While cost savings can be achieved with larger builds, there are important considerations that can impact a general inverse relationship between size and cost per square meter. In review of the functional programs, it is evident that size, design and complexity of facilities are important cost drivers that can create additional costs independent of building size. When looking at relevant policies, bylaws and the regulatory environment across jurisdictions, there are differences in facility design requirements (sustainability, zoning, etc.) that contribute to building construction cost differences.

2.3.4 Policies, Bylaws, Standards and Regulatory Responses

The City of Edmonton's policies, bylaws and standards support a population of over one million people. The documents guide the City Administration in conversations with both the public and the development industry. The City is challenged to balance between straightforward directions and complex forward-looking measures that support a capital city in a northern climate and growing urban centre.

Publicly funded capital projects are required to meet building, fire and energy codes while also responding to Zoning Bylaw 12800 that ensures the city is humane and fair in its development of public places. Most influential as cost drivers to the Edmonton fire stations and recreation centres highlighted in this report are:

- City of Edmonton Zoning Bylaw No. 20001
- Edmonton Design Committee Bylaw 20673
- Sustainable Building Policy C532
- Climate Resiliency C627 (where applicable)
- Infrastructure Asset Management Policy C598
- Facility Design and Construction Consultant Manual – Vol. 1 and 2

While other policies, bylaws and standards were reviewed by Colliers, they were not found to significantly influence the cost of capital projects at the City of Edmonton. Other documents reviewed are noted in Appendix 1.

2.3.5 Business Partner Involvement

The business partners involved a capital project are the operation teams who will run the facility and the maintenance teams who will repair the facility systems.

2.3.6 Additional Considerations

Additional considerations are the City's total cost of ownership over the lifetime of the project and each capital project's total project costs – understood to consist of both hard and soft costs.

3.0 Impact Assessment

The cost drivers introduced in Chapter 2 were evaluated based on their monetary and non-monetary impacts on building construction costs.

3.1 Timing and Escalation

The impacts of timing and escalation as cost drivers are discussed in the context of the project comparisons in Chapter 4. As discussed previously, the BCPI was greatly impacted by the pandemic, with the year 2022 having the greatest climb in construction costs. Many projects underway during that period experienced negative budget and schedule impacts.

3.2 Sustainability and Climate Resiliency Goals

Details relating to the impacts of the City's sustainability and climate resiliency goals on capital projects are discussed according to specific policies below. While there is a separate section for bylaws, standards and regulatory responses, the following two policies are introduced here for discussion.

SUSTAINABLE BUILDING POLICY C532

The Sustainable Building Policy C532 was adopted May 9, 2017. C532 was intended to lead-by-example in establishing, implementing and maintaining sustainable building practices for the buildings it owns, leases and funds, over the course of their entire lifecycle. With support from other relevant City Policies, the City would strive to mitigate the effects of climate change by reducing the carbon emissions of its buildings with the goal to support The Way We Green goal of a carbon-free Edmonton. The sustainable building practices identified in this policy were to be integrated into City operating procedures. They included the following:

- LEED Silver certification
- Achieve 40 per cent or greater energy efficiency than the NECB 2011.
- Achieve 40 per cent or greater greenhouse gas reduction than the NECB 2011 reference building.
- Shall not exceed 80 kWh/sqm. for annual heading demand.
- Provide 1 per cent of capital cost towards on-site renewable for alternative energy generation.

In 2021 City of Edmonton administration did an analysis of C532 and recommended Council rescind C532 and C585 and adopt a new Climate Resilience Policy C672 (details are provided below).

CLIMATE RESILIENCY C627A

C627A was approved in June 2024, to provide clear and consistent governance and accountability for achieving a climate resilient community. The main goal of the policy is to reduce emissions by 35 percent by 2025, 50 percent by 2030, and be carbon neutral by 2050. Specifically, requirements include:

- Recognition of resources, greenhouse gas impacts and embodied carbon impacts in existing and new construction.
- Consideration for integration into district energy system.
- Emissions Neutral design the goal.

- Consumption targets raised to include 20% less energy compared to NECB 2017, TEDI target less than 80 kilowatt hours per sq. m. (as these are not office buildings)
    - Minimum of 1% of total capital budget dedicated to on-site renewable energy or alternative energy generation systems.
- Embodied carbon assessments required.
- Buildings designed to anticipate emerging technologies.
- Inclusion of performance management systems into the future.
- LEED Silver or better is the minimum.
- Resilient Design credits in LEED program pursued.
- Support of BOMA Best certification at occupancy.

Due to the recent approval of Policy C627, of the projects studied in this report, only Rollie Miles Recreation Centre is obliged to follow the requirements listed above. Rollie Miles is paused at Checkpoint 3 (design development) as of 2023. The design team of Rollie Miles was instructed to adhere to C627 where possible and so the Design Development Report has addressed Policy C627 and its projected impacts on the project. These will be tested as the design is completed, tendered and construction gets underway for Rollie Miles recreation facility. At this point in time the Rollie Miles natatorium will be an exception to the aggressive TEDI target of C627. Several procedures were added to activate C627, however two procedures in particular were reviewed as they relate directly to the design and construction of new buildings, or the rehabilitation of old buildings:

Climate Resilient Design and Construction of City Buildings Procedure

Initiated in 2021 and most recently approved September 2, 2024, this procedure is mandatory for any new builds greater than 600 square meters and requires that all new City Owned, Occupied Buildings shall be designed **Emissions Neutral** and shall attain at least *LEED Silver*, higher level LEED Certification or pre-approved Alternative Certification. Generally, the incremental costs for a LEED Certified or Silver rating is **2-4 percent of the capital cost**[2]. In addition, a **minimum of one percent of the total capital project budget** is expected to be dedicated to the incorporation of on-site *Renewable Energy or Alternative Energy generation systems*. All new construction must support *BOMA BEST certification* upon occupancy, and all new construction requires *Embodied Carbon assessments* as outlined in the City's Facility Design and Construction Consultant Manual(s).

Climate Resilient Existing City Buildings Procedure

Initiated in 2021 and most recently approved September 2, 2024, this procedure applies to both existing buildings, and energy retrofit and building renewals projects. For Energy Retrofit and Facility Renewals, an *Emissions Neutral portfolio plan* and decision-making framework is required to identify the type and depth of Climate Resilience upgrades required for a specific building. The framework outlines the process for classification of each asset, timelines for implementing the work and provides understanding of the cost and carbon implications for the work.

[2] City of Saskatoon. (2017). Utilities and Environment, Sustainability. https://pub-saskatoon.escribemeetings.com/filestream.ashx?DocumentId=137591

3.3 Space Programs and Design

Further details relating to the cost impacts of the space programs and design for each of the projects are discussed in Chapter 4. There is not a consistent inverse relationship between the size and cost per square meter for every facility, however program design complexity plays an important role in several hard cost categories.

3.4 Policies, Bylaws, Standards and Regulatory Responses

The City's Policy and Regulatory environment was reviewed to understand potential cost impacts on capital projects.

CITY OF EDMONTON ZONING BYLAW NO. 20001

The City's Zoning Bylaw No. 20001 was consolidated and approved in early 2024, with over 1400 pages, replacing Bylaws 12807 (2001), 12809 (2001), 17831 (2016) and 12800 in 2017. The document is comparable to many municipalities of a similar size, while smaller municipalities typically have briefer zoning documents, that are less prescriptive and have fewer staff reviewing on the town/city's behalf as the authority having jurisdiction. By having fewer compliance requirements, permitting processes can be streamlined, reducing administrative and legal costs associated with construction projects. However, thorough zoning laws are important to land use planning, environmental protection, community health, safety and more.

EDMONTON DESIGN COMMITTEE BYLAW 20673

The Edmonton Design Committee (EDC) was established by City Council in 2005 with the mandate to "improve the quality of urban design in the city of Edmonton." EDC meets this mandate primarily through the review of private development applications and key City of Edmonton projects.

The Edmonton Design Committee (EDC) bylaw supports the requirement that the EDC reviews and provides recommendations on development applications. This bylaw may have cost implications, as nearby communities of Spruce Grove, Drayton Valley, St. Albert and Leduc do not have a Design Committee to review applications against urban design principles. Having an entity such as the EDC can have several benefits such as enhanced quality of developments, design risk mitigation and assurance of regulatory compliance. With the outlined benefits, additional costs may also arise including increased administrative costs (application fees, additional documentation), delays in project timelines due to reviews and revisions, and finally, additional consultation and professional fees.

INFRASTRUCTURE ASSET MANAGEMENT POLICY C598

Approved March 20, 2018, this policy addresses the responsible acquisition, operation, maintenance, rehabilitation, and eventual replacement and/or disposal of City infrastructure assets. Asset Management requires coordinated activities to realize value from assets. It involves City departments, stakeholders, citizens, and Council. Policy C598 has fundamental asset management principles include:

- Service Delivery to Stakeholders.
- Long-Term Sustainability and Resiliency.
- An Integrate, Holistic Approach.
- Investment Decision-Making.

- Innovation and Continuous Improvement.

Amongst the policy's key definitions are the definition for Renewal, Rehabilitation and Replacement, which apply to the Hemingway Pool project:

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

> *Rehabilitation: The action of restoring or replacing parts or components of an infrastructure asset to a former condition or status. Generally involves repairing the asset to deliver its original level of service without resorting to significant upgrading or renewal, using available techniques and standards.*
>
> *Replacement – the action of replacing an infrastructure asset so as to provide similar, or an agreed alternative level of service."*

CAPITAL PROJECT GOVERNANCE POLICY C591

The Capital Project Governance Policy C591 was adopted in April 2017, requiring administration to ensure that sufficient information was prepared before capital budget processes commenced to support investment decisions. Specifically, the Project delivery approach is expected to ensure a consistent and phased approach for all capital projects, involving formal reviews with Council of each project, as it progresses. Any exceptions are evaluated on a case-by-case basis, returning to Council for approval when impacts to budget, timeline or scope are anticipated. Ultimately, the governance policy is in place to ensure consistency across projects in the delivery and budgeting of capital projects.

ACCESSIBILITY FOR PEOPLE WITH DISABILITIES C602

C602 was approved in 2019 and is up for review in 2024. The policy commits to accessibility and continuous improvement across all City services and programs, and applies an accessibility lens to infrastructure (facilities, open spaces, and transportation). In alignment with the C602, the Access Design Guide (2021) aims to promote accessibility in open spaces and facilities owned, operated, or leased by the City, by outlining measures that exceed the requirements of the 2019 National Building Code (NBC) – Alberta version.

City of Edmonton Access Design Guide

The Guide acts as a supporting document for projects for a certain type of infrastructure. Recreation facilities have accessibility guidelines for exercise areas, aquatic pools, ice rinks, golf courses and athletic parks. Many of the designs require barrier-free access, inclusive fitness equipment, floor finishes, color contrasting finishes, etc.

Administrative Procedure A1472

The Accessibility for People with Disabilities Administrative Procedure outlines how to apply accessibility and university design guidelines to ensure a consistent approach in the development, implementation and evaluation of City policies, civic engagement, infrastructure, etc. The Procedure requires that the Access Design Guide is applied in conjunction with the Barrier Free Design Guide to the City's planning, designing and maintaining of infrastructure either owner or occupied by the City.

The 2023 NBC(AE) will address most of the items the City covered in their forwarding-looking Policy C602, Access Design Guide and Administrative Procedure A1472. The City has consistently demonstrated leadership in the implementation of regulatory codes to ensure accessibility is addressed in its capital projects through the above

The policy has resulted in additional costs, though they will be nominal relative to other drivers. The cost of larger spaces for turning wheelchairs, wider corridors and additional guards are amongst the items that Edmonton's capital projects have included in capital projects voluntarily and will now be required to include through the current 2023 NBC(AE).

SUSTAINABLE PROCUREMENT C556B

The purpose of C556B (approved in 2022 and again in 2024) is to ensure procurement practices are open, fair, and transparent, and contribute to building and maintaining a healthy, climate-resilient community. C556B requires that all suppliers must agree to the terms of the City's Supplier Code of Conduct. In addition, suppliers and subcontractors are required to adhere to minimum ethical standards related to labour standards, employee treatment, wages, and benefits, working conditions and ethics standards. Environmental sustainability is integrated into C556B, as purchasing procedures and supply chain management processes are expected to advance the City's progress in maintaining climate resilience. The policy also includes objectives to remove barriers within Indigenous businesses to participate more in City procurement processes. Lastly, the Social Procurement Framework within the policy focuses on purchase outcomes related to employment, skills and training, social value supply chain and community development.

Some social value considerations relevant to C556B may affect costs of construction projects. Particularly, those relating to the social value supply chain. Social value supply chain criteria encourage more procurement from social enterprises and local subject matter experts. One of the possible (but as yet untested) impacts of this policy is that local markets may have fewer suppliers, reducing competition and potentially resulting in higher prices. Further, local supplies may have higher costs due to less developed supply chain infrastructure (limited access to bulk purchasing, lower inventory turnover, etc.).

FIRE RESCUE SERVICE DELIVERY POLICY C523A

The Fire Rescue Service Delivery Policy was adopted in 2012 and pertains only to Edmonton fire station projects. The Policy ensures alignment with the direction set by City Council in *The Way Ahead* (2009-2018) and expects that legislative requirements are met. In addition, the Policy ensures that industry standards and benchmarks are met, which include the National Fire Protection Association, and the Commission on Fire Accreditation International.

Similarly, the Fire Rescue Master Plan adopted in 2012 aligns with the direction set by Council in *The Way Ahead (2009-2018)* and its accompanying six 10-year strategic goals that guide the work of all City departments and branches. With respect to fire station design, the - City of Edmonton Fire Station Functional Program is based on the "chain of survival" as identified in the "Context" section from the Fire Rescue Master Plan. The City developed a functional program for Edmonton Fire Rescue Services Fire Stations, including a base program for all new Fire Stations and a series of potential add-on components to be added to a base station depending on factors including location and service needs, as determined by Edmonton Fire Rescue Services. Several of the comparator projects and associated municipalities do not have similar documented base scopes and prescribed functional programs for fire stations.

REGULATORY - CANADIAN NATIONAL BUILDING CODE AND ALBERTA EDITION OF NBC (AE)

From 1960 to 1995 the NBC was revised every five years. Working with the National Research Council of Canada, Alberta first adopted the National Building Code of Canada in 2007 as its base document with changes and modifications to suit Alberta requirements in regulating the design, construction, alteration, change of use and demolition of buildings.

The National Building Code – 2019 Alberta Edition (NBC (AE)) came into force on December 1, 2019. This code is based on the National Building Code of Canada 2015. It establishes design and construction standards, including barrier-free access in new buildings and energy efficiency for housing and small buildings. It also applies to the alteration, change of use and demolition of existing buildings.

Since the 2010 editions of the NBC, National Fire Code of Canada (NFC) and National Plumbing Code of Canada (NPC), nearly 600 technical changes have been incorporated in the 2015 editions to address technological advances, social policy and health and safety concerns. Examples of new areas can be found in the introduction of water use efficiency in the NPC and the expansion to six-story combustible construction in the NBC and NFC. A summary of the significant changes to these Codes is available on the Codes Canada website.

A project's start date determines the relevant building code it must follow. Generally, the NBC versions become more stringent as they are updated to include requirements for sustainability and accessibility in particular.

REGULATORY - NATIONAL ENERGY CODE FOR BUILDINGS (NECB)

The NECB 2020 sets out technical requirements for the energy-efficient design and construction of new buildings and additions. Several technical changes have been incorporated in this new edition, improving the level of energy efficiency provided by the Code and expanding compliance options. Significant changes in the NECB 2020 include:

- Extended to cover alterations, such as tenant improvements, to buildings originally constructed in accordance with the NECB.
- Thermal transmittance values reduced to improve the thermal performance of the building envelope.
- Whole-building airtightness testing is introduced as an option for complying with air leakage requirements.
- Lighting power densities are updated to reflect improvements in the efficacy of lighting products.
- Performance requirements for heating, ventilating and air-conditioning (HVAC) and service water heating equipment are updated to align them with relevant standards and regulations.
- Trade-off compliance paths for HVAC and service water systems, which were complex and not widely used, are removed.
- A new compliance path with 4 energy performance tiers is introduced to provide a framework for achieving higher levels of energy efficiency in buildings.

NECB 2020 is an improvement to NECB 2017 which replaced NECB 2011 and has increased sustainability goals.

ADDITIONAL DOCUMENTS

Several documents were reviewed that have little to no direct impact on project construction costs. The documents reviewed were provided in the City's Statement of Work, including:

- Diversity and Inclusion C538
- Public Engagement Policy C593
- Public Art to Enhance Edmonton's Public Realm Policy C458D
- Environmental Policy C512 (ENVISIO)
- Winter Design Policy C588
- Corporate Tree Management Policy C456B
- Facility Design and Construction Consultant Manual: Volume 1 – Design Process + Guidelines V.8, and Volume 2 – Technical Guidelines V.5

Some of these documents are recent and have no impact on the Edmonton projects that began in 2017 to 2018. Colliers has elaborated on the more impactful documents in the sections above and through the facility comparisons in the following pages.

3.5 Business Partner Involvement

As capital projects are planned, developed and built, the City emphasizes the importance of business partner involvement. The two key business partner groups for the building types addressed in this report are:

- The facility users who inhabit and operate the project. In the case of the fire stations this is the EFRS team while for the recreation centres it is their operating team.
- The City of Edmonton maintenance team who will service systems, maintain, replace and clean the facility. Since the maintenance team works across building types throughout the city, standardization of systems, finishes and protocols is desired. Requirements are reflected in the Facility Design and Construction Technical Guidelines and Standards.

These business partner teams are involved in the development of the City's capital project, from space program initiation to occupancy, through all design and construction meetings. A notable difference between fire stations and recreation centres is that firefighters can become the perceived "client" during the design and development process due to their living space needs and their expertise in FF&E requirements. The recreation centres have operational staff to influence the design and development process but are required to do considerably more public engagement for their facility. While early engagement in design mitigates many risks, there is opportunity for scope creep which becomes costlier as the project progresses.

3.6 The Total Cost of Ownership

Because a number of the Edmonton facilities identified for this report are still in development, the report's analysis looks at primarily the capital costs of fire stations and recreation centres. As of the autumn of 2024, most of these facilities have insufficient operating data. Still, a lot can be learned from the scope, schedule and budget of these projects when examined together.

As the image below illustrates, the total cost of ownership of city-owned assets includes not only initial project capital costs (roughly 15% of the project's lifetime costs), but also considers operating costs over time (roughly 85% including rehabilitation costs as the asset nears the end of its useful life).

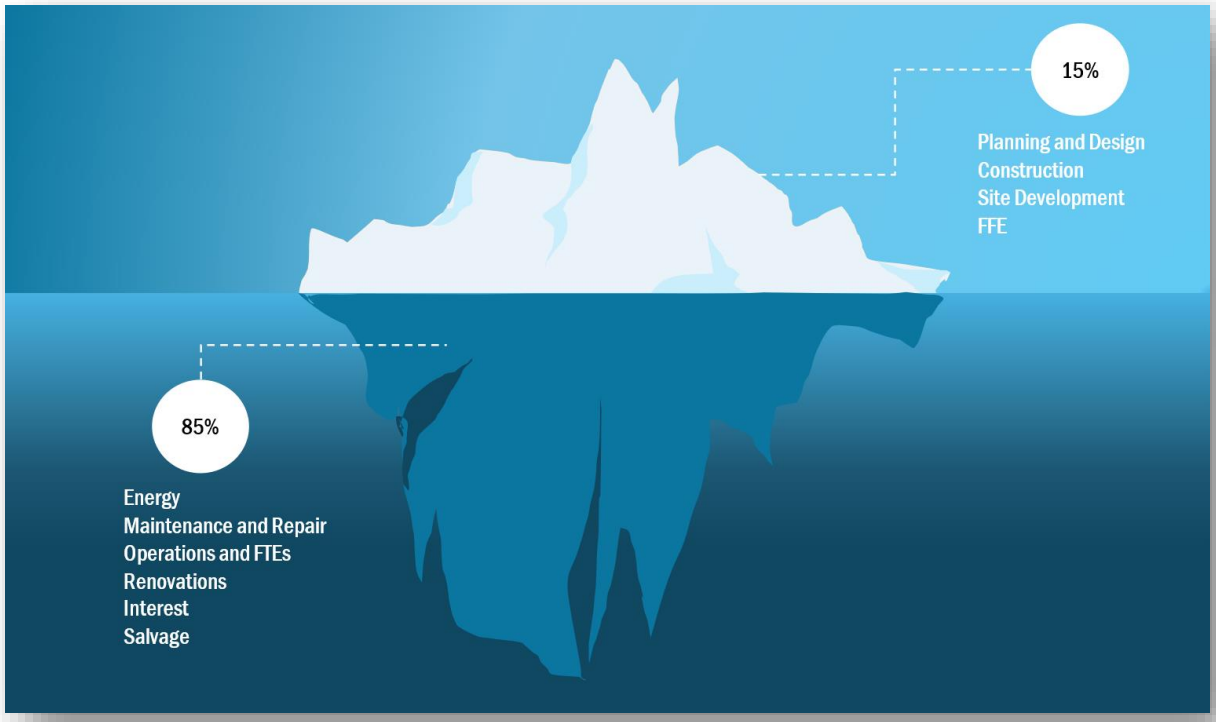

Figure 3. Iceberg depiction of project capital and lifetime costs.

The definition of Life Cycle Cost taken from the City of Edmonton's Infrastructure Asset Management Policy C598 describes it is the "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 disposal costs."

While capital costs are what remain in peoples' minds, the City of Edmonton wisely also addresses operational costs within the scope of capital project development through the above noted Policy C598. The mindset that considers items including high performance building systems, efficient envelopes and the use of renewable energy sources in the design/development phase of a project will reap greater return on its investment over time than the project that does not look into the future. With 85% of a project's costs showing up in the future over many decades, capital projects must be looked at as a whole and future-proofed through the use of sustainability programs and carefully considered programming followed by durable design.

3.7 Capital Project Hard and Soft Costs

Hard costs refer to the costs directly associated with the construction of a building or structure, such as material, labour and equipment. These costs make up typically around 70% of the project costs and are calculated at the beginning of the construction phase until construction is completed. They are typically fixed and only change significantly if the scope of the project changes.

Construction labour and material costs are broken into the following categories by the City when describing the distribution of hard costs in a project. Some examples of building hard costs broken-out proportionately will be referenced in later report sections. Hard cost categories include:

- General Requirements
- Major Building Structure
- Major Building Shell
- Major Building Interior
- Major Building Services
- Building Equipment

Soft costs are intangible costs not directly tied to the physical construction of a project, such as planning permits and consultant professional fees. The project scope, local regulations and loan interest rates can influence project soft costs. Usually managed separately by the owner, these can be incurred before, during and after the construction phase – making them more difficult to predict and estimate. They usually represent 18% - 30% of the overall project budget, depending on the complexity of the scope of work. Examples of soft costs include:

- Design Fees.
- Legal and Accounting Fees.
- Land Costs and/or Surveying.
- Marketing Expenses.
- Financing and Interest Payments.
- Security System Contract Fees.
- Environmental and Sustainability Assessments.
- Other Specialty Consultants.
- Taxes and Other Government Charges.
- Movable Furniture, Fittings and Equipment (FF and E)

For the purposes of this report, we compare building construction hard costs across fire stations and across recreation centres.

3.8 Cost Driver Summary

The chart below is intended as a simple summary of the drivers in relation to each other based on the report analysis. Large, deep colored arrows signify the greatest impact, whether in a positive (upward arrow) direction, or in a negative (downward arrow) direction. Decreasing size and lighter shading indicates decreasing level of impact. The upward arrows in the "Non-Monetary (Reputational)" column indicate that the associated cost drivers have a positive impact on the City's reputation. For instance, investing in sustainability and adhering to high standards for design and construction enhance the City's image as a responsible and forward-thinking municipality.

Table 3. Cost drivers and their impacts.

Cost Impact Drivers	Capital Impact	Operating Impact	Non-Monetary (Reputational) Impact
Timing and Escalation			
Sustainability and Climate Resilience			
Program and Design			
Policies, Bylaws, Standards and Codes			
Business Partner Involvement			

4.0 Cost Breakdown Comparison

Project costs are compared for each of the project types using an Edmonton and an outside Edmonton facility to contrast and compare. Key differences are highlighted, investigated and discussed in this section of the report.

4.1 Scope

Cost breakdown comparisons were completed for both fire stations and recreation centres. Two sets of fire stations were compared:

- Edmonton Windermere Fire Station No. 31 *vs* Leduc Fire Station No. 9
- Edmonton Pilot Sound Fire Station No. 30 *vs* St. Albert Fire Station No. 1

Three sets of recreation centres were compared:

- Edmonton Hemingway Pool *vs* St. Albert Fountain Park Pool (both rehabilitations)
- Edmonton Rollie Miles *vs* St. Albert Fountain Park Pool
- Edmonton Lewis Farms *vs* Calgary Recreation Centre No. 1

Meadows Recreation Centre is not a comparator project but was included in some sections of the report for supplementary information.

It is important to note that while all Edmonton fire stations are now occupied, the Edmonton recreation centres are all still under development. Edmonton's Hemingway Pool is in the final phases of construction, Edmonton's Rollie Miles has completed Design Development (City's checkpoint #3) and awaits approval to continue, and Edmonton's Lewis Farms is under construction as of Fall 2023.

4.2 Method

Cost breakdown benchmarking requires project cost normalization to enable reliable comparisons. Once costs were normalized, comparator projects were assessed.

Fire stations compared construction budgets and in some cases their construction ("hard cost") breakdowns – normalizing the construction cost numbers to 2024. Recreation centres compared total project budgets (because they were consistently publicly available) – normalizing the total project cost numbers to 2028. Normalizing recreation centres to 2028 is in response to 2028 being a year closer to the forecasted occupancy dates of the Edmonton recreation centres that are still in development.

4.2.1 Location and Time Indices

While it was initially planned to normalize project costs according to project locations, limited information is available for Building Construction Price Indices in smaller centres outside Edmonton and Calgary. However, a cost element has a time value, therefore indices were chosen to suit the time adjustments required, as comparator projects have different completion dates and/or different cost information publishing dates.

The Consumer Price Index (CPI) was used to achieve the escalation/time cost adjustments, as it represents changes in prices as experienced in *Canada*. Table 4 provides a summary of the CPIs for 2013 – 2025 and forecasted CPI for 2028.

Table 4. Consumer Price Indices (Statistics Canada).

Year	Consumer Price Index[3]
2013	123.0
2014	125.9
2015	127.2
2016	129.1
2017	130.4
2018	133.6
2019	136.6
2020	135.7
2021	141.4
2022	152.9
2023	157.2
2024	161.4
2025	166.2
2028	181

To complete project time adjustments, the following equation was used (Eq. 1):

$$\frac{Index\ for\ Year\ A}{Index\ for\ Year\ B} \times Cost\ in\ Year\ B = Cost\ in\ Year\ A \quad (1)$$

Typically, Year A was considered to be 2024 with an index of 161.4. Any deviations from this are noted in the comparisons. Costs (in Year B) were typically broken down according to the City's Asset Classification Breakdown, further discussed in Section 4.2.2.

4.2.2 Cost Breakdown Categorization

According to the City's Asset Classification Breakdown, there are several major hard cost categories: major building structure, major building shell, major building interior, major building services and site works. Equipment and land purchase costs were excluded from the hard cost breakdown as hard costs are by definition, costs related to the physical construction of a building, typically labour, materials and services. The breakdown is further defined:

- Major Building Structure: Concrete, Masonry, Structural Steel and Structural Wood Framing
    - Substructure
    - Superstructure
- Major Building Shell: Masonry Veneer, Thermal and Moisture Protection
    - Exterior Enclosures
    - Roofing
- Major Building Interior: Non-Loadbearing Block Walls, Decorative Metal, Finish Carpentry, Specialty Doors and Frames, Finishes, Specialties and Furnishings

[3] Bank of Canada. (2024). Consumer price index.

    - Partitions
    - Doors
    - Fittings
    - Stair Construction
    - Start Finishes
    - Wall Finishes
    - Floor Finishes
    - Ceiling Finishes
- Major Building Services: Conveying Equipment, Fire Suppression, Plumbing, HVAC, Integrated Automation, Electrical, Communications, and Electronic Safety and Security
    - Conveying Systems
    - Plumbing
    - HVAC
    - Refrigeration
    - Fire Protection
    - Electrical
    - Arenas / Rink Slab
    - Pool System
- Site Works: Earthworks, Exterior Improvements, Utilities
    - Site Preparation
    - Site Improvement
    - Site Civil/Mechanical/Electrical Utilities
    - Roads, Parking Lots, Ice Maintenance, Fencing, etc.

While all capital project budgets contain both “soft” and “hard” costs within them, soft costs have proven to be difficult to obtain from other municipalities. When calculating the cost-per-square-meter of the building for each project, the building construction costs were used instead of the total construction cost. Building construction costs include all hard cost categories except for site works.

4.3 Cost Breakdown Comparisons

The following section provides an overview of the monetary and non-monetary factors contributing to the costs of fire stations and recreation centres within and outside of the City of Edmonton. Comparison sets have been chosen to showcase the differences in timing, sustainability goals, space programs, the policy environment and partner involvement.

4.3.1 Fire Station Comparisons

Comparison Set #1 includes Edmonton's Windermere Fire Station No. 31 and Leduc's Fire Station No. 9. Comparison Set #2 includes Edmonton's Pilot Sound Fire Station No. 30 and St. Albert's Fire Station No. 1. The results of the comparisons are summarized in the following pages.

FIRE STATION COMPARISON #1

Edmonton's Windermere Fire Station No.31 and Leduc's Fire Station No. 9 are roughly the same built area but had very different timelines and used differing project delivery types. Further differences are discussed below.

Table 5. Fire Station Comparison #1

Component	Fire Station No. 31 Windermere Edmonton (2023 dollars)	Fire Station No. 9 Leduc (2023 dollars)
Project Details		
Area	1,580 SM	1,527 SM
Building Construction Cost	$12.50M (2023)	--
Site Construction Cost	$3.08M (2023)	--
Construction Cost Total	$15.582M (2023)	$5.685M
Building Construction Cost/SM	$7,913/SM (2023)	$2,610/SM (2023)
Location Type	Suburban Edmonton	Industrial Edmonton Airport Lands
Project Start Date	2017	2022
Project Completion Date	2023	2023
Project Length Of Time	6 years, through COVID-19	1-year, post-COVID-19

*Data on Edmonton facilities provided by the City

Comparing Hard Cost Breakdowns

Both fire stations are approximately 1,500 SM, however after normalizing construction costs (to 2024), the building construction costs per square meter were determined to be $8,123/SM for Edmonton's Windermere Station and $2,773/SM for Leduc's Station No. 9. The stacked bar graph in Figure 4. showcases the hard costs as percentages of the total construction costs for each fire station.

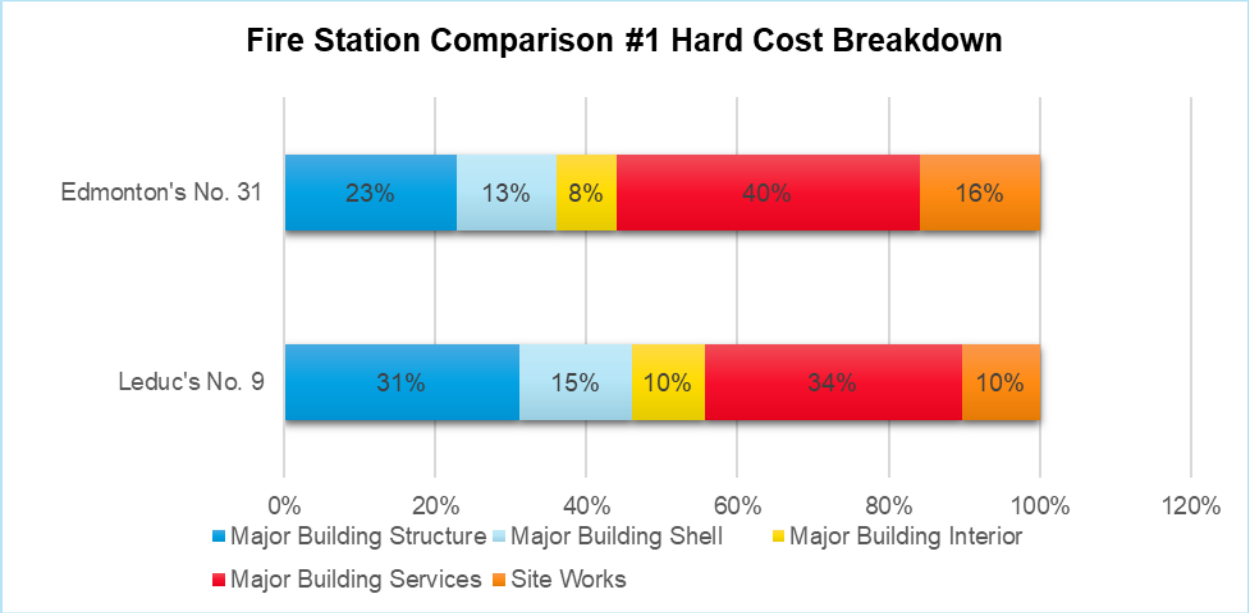

Figure 4. Fire Station Comparison #1 hard cost breakdowns.

Timing and Escalation

The pandemic impacted the Edmonton's Fire Station No. 31 construction costs most notably because the project was exposed to more years of escalation during the peak years of 2021 to 2023. By contrast, the Leduc Fire Station's was constructed faster and had less exposure to the impact of the pandemic, which is further described below.

The Leduc Station used Design-Build as their project delivery method – a procurement process solely focused on cost with little or no detailed information given. The Design Build RFP did not include sustainability goals, space program information, municipal policies, bylaws, design and construction technical guidelines and business partner involvement. The bids for the Leduc Station project varied from $2.5M to $30M reflecting the lack of inclusion of the items noted. The owner team selected a Design Build team with both a good price and experience of Leduc fire stations. The completion date for the Leduc project was tight and also nonnegotiable.

Sustainability and Climate Resilience

With respect to sustainability, it was noted that the City of Edmonton's Windermere Station was not only pursuing Sustainable Building Policy C532 as originally targeted but in 2021 the project team was asked to pursue Net Zero. The study done by the consultant team forecasted the overlay of Net Zero on C532 to add an additional cost of approximately $3M at a minimum. This ambitious sustainability revised target, that changed well into the design of the Windermere project, was a marked contrast to Fire Station No. 9 in Leduc's sustainability approach which was clearly to not pursue any third-party program or set any sustainability goals.

The hard cost percentages comparison between Edmonton's Windermere Station no. 31 and Leduc's Station no. 9 shows a higher Major Building Services percentage and a higher Site Works percentage for the Edmonton building.

Higher Major Building Services reflects the more complex mechanical and electrical services incorporated in response to Net Zero and C532. While these will impact the capital cost of this Edmonton project they

will also result in considerable savings in the stations operating costs and operating costs make up the larger portion of a building's total cost of ownership.

The LEED Silver certification for Windermere Station adds capital costs relative to the Leduc example because the LEED program requires projects to pursue some soft landscaping to:

- Protect or Restore Habitat
- Open Space
- Rainwater Management
- Heat Island Reduction
- Reduced Parking Footprint

The Leduc Station has almost no soft landscaping, had to address rainwater management through a change order during construction and does little to address open space, plant trees for helping to mitigate heat or address large areas for parking.

Space Program and Design

Edmonton's Windermere Fire Station No. 31 had an involved Edmonton Fire Department chief as the Operations Business Partner. The Fire Department team has, since the publication of its 2018 Fire Station Functional Program document (277 pages), developed a 2022 Guideline Change Log with more than 32 issue areas. Upgrades were in response to preferences of the users, design decisions and some were in response to sustainable goals. An example of a Windermere expense not seen in Leduc was the thicker, thermally broken slab under the bays – required by the Net Zero program to address better thermal performance.

Leduc Fire Station No.9 did not have a functional space program. Instead, direction to Design Build bidders was captured in a floor plan done by the owner's procurement consultant. The Leduc station was the third in a series of similar designs, all constructed by the same contractor. Table 6 provides key components of Leduc's Fire Station functional programming taken from their RFP preliminary drawings that relied heavily on past Leduc station layouts.

Table 6. Fire Station Comparison #1 functional programs.

Program	Edmonton's Windermere No. 31 (1,580 SM)		Leduc's No. 9 (1,527 SM)	
Component	Size (SM)	Units	Size (SM)	Units
Staff Living Quarters (Rooms)	7	8	13.5	7
Captain's Living Quarters (Rooms)	34	2	--	0
Bays	121.6 – 152.1	3	153.8 -196.5	4
Fitness Room	67	1	24	1
Mech./Elect. Areas	179 (mezzanine)	1	20	1
Offices	11 - 30	3	9.8 - 15.0	2
Lounge/Training	49	1	47.57	1

Program	Edmonton's Windermere No. 31 (1,580 SM)		Leduc's No. 9 (1,527 SM)	
Kitchen	65	1	30.65	1
Gear Storage	72	1	48.30	1

*Data on Edmonton facilities provided by the City

** The Owner Requirements for Leduc's First Nation No. 9 include a mezzanine space; however, dimensions were not available.

Policies, Bylaws and Standards & Regulatory Responses

The Edmonton Zoning Bylaw 12800 is detailed in its description of zones and requirements, special area zones, general development regulations, specific development regulations and its administrative and interpretive regulations. By contrast, the Fire Station in Leduc, sits on Edmonton International Airport (EIA) lands leased to operators, including the Leduc Fire department. Those developing on its lands are required to follow only the Landscape Design Guidelines (2010). The Leduc Station appears to have been spared the requirements of a zoning bylaw when designing for and making an application for their development permit.

Further, the Design Review process in Edmonton (Bylaw 20673) is well understood to support Principles of Urban Design, while referencing Edmonton Design Committee Standards and Procedures. By contrast, the Design Review on EIA lands are done by staff of the EIA referencing fewer documents and acknowledging the industrial character of the airport lands. As an example, rooftop units do not require screening on EIA lands and soft landscaping is discouraged. The standards between the Edmonton Windermere Station and the Leduc Station No. 9 vary tremendously.

Business Partner Involvement

The Edmonton Fire Rescue Services (EFRS) are one of only four municipalities in Canada to receive international accredited agency status with the Commission on Fire Accreditation International (CFAI) in 2010. This is thanks to the EFRS Standards and their 2014 Functional Program, outlining operating requirements for the new build of fire stations in Edmonton. The prime consultant team worked with the EFRS chief responsible and his team to maintain their accreditation through responsive design. By comparison, the Leduc fire station placed a previously tested station design in the Leduc Fire Station Design Build RFP and asked Design Build teams to bid on a small package of bidding documents. They did not require a design review process and had no known standards or guidelines. Reportedly the bids for the Leduc Station in response to the RFP were hugely varied – indicating it was not a shared understanding of the scope of work.

Leduc's Fire Station No. 9 project has admitted that they did not have operating or maintenance personnel involved in the review of their project early in its development. Without such partners at the table to support early decisions, future operating and maintenance costs were less likely to have been considered. By contrast, the City of Edmonton design development process involved operating and maintenance business partners to influence the operating and maintenance of their future facility. Examples of items Edmonton required but Leduc did not were gas detection performance, the use of copper wiring and a power distribution system that is suited to a commercial building and the Manual is specific about the minimum size of utility rooms.

Fire Station Comparison #1 Summary

The Leduc Fire Station was the third in a repeat series of stations so it could be built faster, had no sustainability targets, had minimal regulatory agencies to report to, had no business partners, and the project delivery method (Design Build) used did not allow for stakeholders involvement.

FIRE STATION COMPARISON #2

Edmonton's Pilot Sound Fire Station No. 30 and St. Albert's Station No. 1 both took approximately 5 years to complete though the Edmonton project was approximately half the size of the St. Albert station. The St. Albert station includes many unique functional programming spaces that are discussed in the paragraphs below. Table 7 summarizes the details collected to support the cost breakdown comparison.

Table 7. Fire Station Comparison #2

Component	Fire Station No. 30 Pilot Sound Edmonton (2017 dollars)	Fire Station No. 1 St. Albert (2024 dollars)
Area	1,226 SM	2,482 SM
Building Construction Cost	$6.65M (2017)	--
Site Construction Cost	$1.99M (2017)	--
Construction Cost Total	$8.632M (2017)	$14.11M (2024)
Building Construction Cost/SM	$5,420/SM (2017)	$5,082/SM (2024)
Location Type	Suburban Edmonton	Suburban St. Albert
Project Start Date	2012	2019
Project Completion Date	2017	2024
Project Length of Time	5 years	5 years

*Data on Edmonton facilities provided by the City

Comparing Hard Cost Breakdowns

After *normalizing* building construction costs (to 2024), the building construction cost per square meter was determined to be $6,711/SM and $5,082/SM for Edmonton's Pilot Sound Fire Station No. 30 and St. Albert's Fire Station No. 1, respectively.

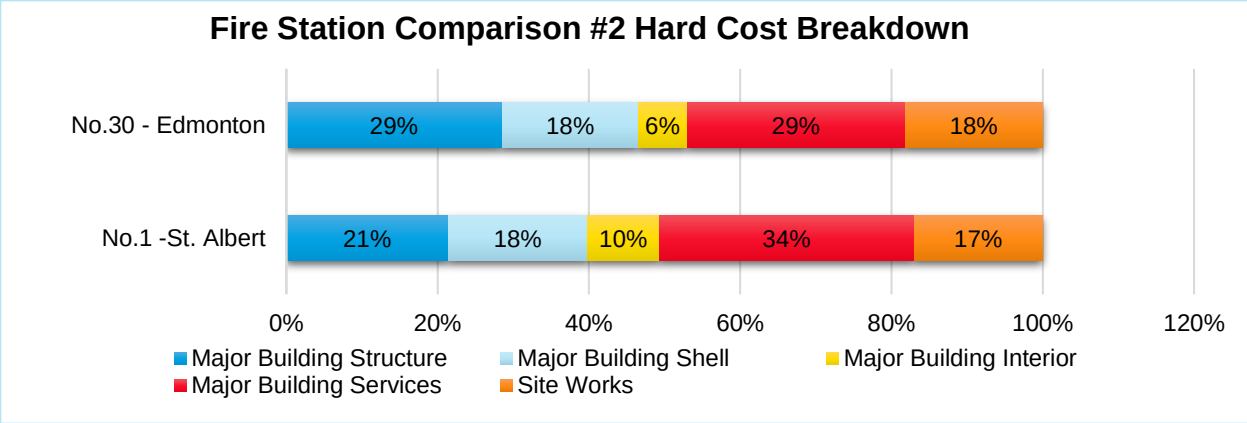

Figure 5. Fire Stations No. 1 and No. 30 cost breakdown comparison.

Timing and Escalation

The two stations were built 7 years apart with the Edmonton's Fire Station No. 30 beginning in 2012, followed by the St. Alberta Station in 2019. The later St. Albert Station is double the size of Edmonton's Pilot Sound Fire Station and probably drew lessons from the Edmonton Station No. 30 as the same prime consultant team was used. The St. Albert Fire Station did not let the period of escalation that it was built through influence its final cost per square metre to the same extent that other projects did, presumably due to the experience of its team and timing of the actual bidding.

Sustainability and Climate Resilience

Edmonton's Fire Station No. 30 was guided by sustainability policies that predated the 2017 Sustainable Building Policy C532. Taking an equally modest approach, St. Albert's Fire Station No. 1, 7 years later, pursued LEED Certification – a lighter set of LEED requirements than was required in Edmonton. It did not pursue Net Zero or anything like Edmonton's C532 that was in play at the time. The fact that it pursued LEED Certification ensured that it's Major Building Services were robust – demonstrated by the larger percentage shown for this in the cost breakdown above. Edmonton, however, spent more on its Building Structure and less on its Building Interior elements.

To compare the probable operating cost impacts from sustainability goals at the time of each of these two projects is to examine the difference between the LEED V.3 Silver score card used on Edmonton's Fire Station No. 30 and the LEED V.4 Certified score card on St. Albert's No. 1 Station. They would have been roughly equivalent.

Space Program and Design

St. Albert's Fire Station No. 1 is larger than Edmonton's Fire Station No. 30 because it includes a second floor emergency operations centre mostly consisting of office space. As presented in Table 8, St. Albert's fire station encompasses 14 staff living quarters rooms, four bays and four offices. It also contains additional programming that is absent in Edmonton's fire station. These include separate lockers from washrooms, a Fire Prevention Office and Ambulance Staff Area (over 200 SM of space).

Table 8. First Station Comparison #2 functional programs.

Program	Edmonton's Pilot Sound No. 30 (1,226 SM)		St. Albert's No. 1 (2,482 SM)	
Component	Size (SM)	Units	Size (SM)	Units

Program	Edmonton's Pilot Sound No. 30 (1,226 SM)		St. Albert's No. 1 (2,482 SM)	
Staff Living Rooms	6.7	8	8	14
Captain's Living Rooms	13	2	8	1
Bays	122 - 304	3	829.29*	4
Fitness Room	50.05	1	65	1
Mezzanine Area	82.5	1	47.2	1
Offices	30.6	1	10 - 30	5
Training Room	--	0	15	1
Dayroom/Lounge	40.37	1	68	1
Kitchen	72.38	1	97	1
File Storage Room	--	--	17.5	1
Men's Locker with Washroom	--	--	90	1
Gear Storage	72.6	1	90	1

*Bay area is for total program.

Complexity of Policies, Bylaws and Standards & Regulatory Responses

The City of Edmonton's Pilot Sound Fire Station No. 30 adhered to the now updated Edmonton Zoning Bylaw 12807 and 12809. By contrast, St. Albert did not have as detailed a zoning bylaw to guide it. Through discussions, Colliers found that development permits and building permits take just two weeks and are reviewed by a small group of city planners in St. Albert, making the review process faster – and probably less thorough. St. Albert capital projects are only asked to reference the City's online 'Planning Primer' to anticipate their development permit and building permit application needs. There is not a known design review process and the professionals on staff in St. Albert are a small team.

Business Partner Involvement

The St. Albert Fire Station benefitted from the learnings of Edmonton's Pilot Sound Fire Station No. 30 because it followed the Edmonton project and made use of the same prime consultant team. The designs have similarities. Edmonton's Pilot Sound Fire Station No. 30 would have been guided by EFRS standards that support Edmonton's accreditation with the CFAI while St. Albert Stations would not. The Edmonton station would have benefitted from the EFRS staff involvement as business partners and City of Edmonton operating staff as well. In a round-about way St. Albert would have learned from the Edmonton project through the business partner involvement with the larger city.

Fire Station Comparison #2 Summary

The St. Albert Fire Station was developed not long after Edmonton's Pilot Sound Fire Station and learned from the Edmonton station. St. Albert had a lighter set of sustainability targets, fewer regulatory agencies to report to, had fewer business partners, and the project delivery method was similar to the Edmonton project.

4.3.2 Recreation Centres Comparisons

Comparison Set #1 includes Edmonton's Hemingway and St. Albert's Fountain Park, Comparison Set #2 includes Edmonton's Rollie Miles and Drayton Valley's Ricochet, and Comparison Set #3 includes Edmonton's Lewis Farms and Calgary's Recreation Centre No. 1. The results of the comparisons are summarized in the following pages. It is important to note that the Edmonton recreation centre projects are not yet complete. Colliers used projected completion dates and current construction costs provided by the City's IIS team to estimate cost-per-square-meter metrics.

RECREATION CENTRE COMPARISON #1

The first comparison is between two recreation centres that underwent rehabilitation efforts. Edmonton Hemingway Pool and St. Albert Fountain Park Pool are both older buildings, originally constructed in the 1970s. Edmonton's Hemingway project is still underway, so costs presented below reflect a mix of known and forecasted construction costs (see Table 9).

Table 9. Recreation Centre Comparison #1.

Component	Hemingway, Edmonton (2026 dollars)	Fountain Park, St. Albert (2023 dollars)
Area	3,775 SM	5,519 SM
Building Construction Total	$38.03M (esc. 2026)	--
Site Construction Cost	$0.57M (esc. 2026)	--
Construction Cost Total	$38.6M (esc. 2026)	--
Building Construction Cost/SM	$10,074/SM (esc. 2026)	$1,795/SM (2023)
Location Type	Edmonton	St. Albert
Project Start Date	2018	2019
Project Completion Date	2026	2024
Project Length Of Time	8 years	5 years

*Data on Edmonton facilities provided by the City

COMPARING HARD COST BREAKDOWNS

After *normalizing* construction costs (to 2024), the building construction cost per square meter was determined to be $9,509/SM and $2,050/SM for Edmonton's Hemingway and St. Albert's Fountain Park, respectively.

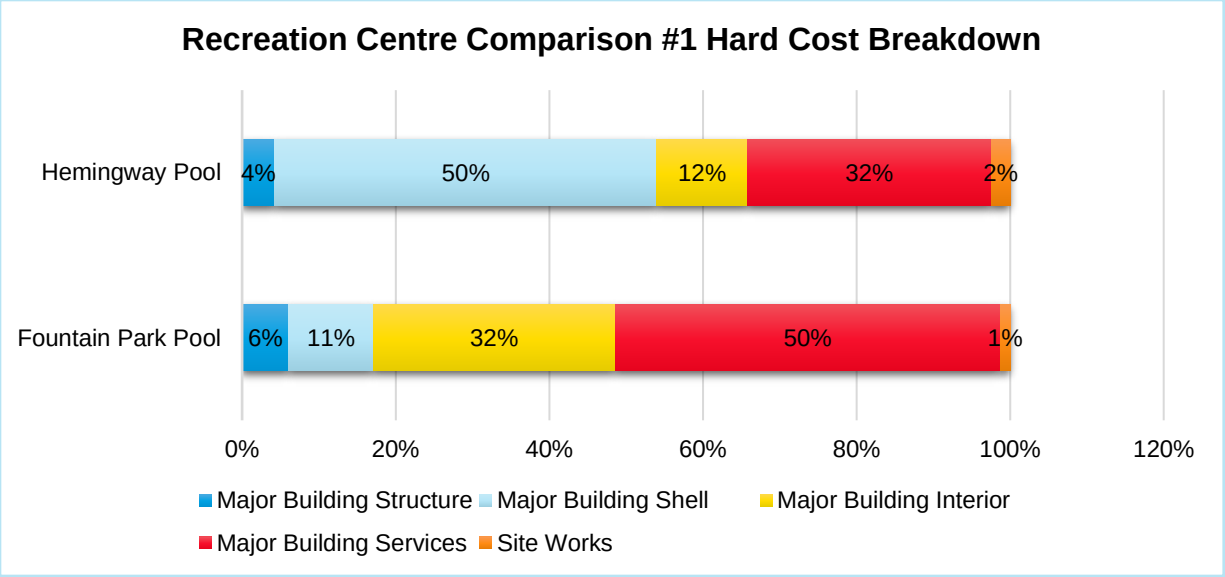

Figure 6. Edmonton's Hemingway and St. Albert's Fountain Park hard cost breakdown comparison.

Fountain Park Pool was a project that included significant mechanical and electrical system renovation/replacement, entirely new finishes, interior renovations to acknowledge accessibility requirements and a small amount of envelope remediation. Its drawings were detailed in descriptions of tile finishes, new ramps and guards and change room reconfigurations to accommodate accessible space needs. It makes sense that the larger portion of the construction hard costs are attributed to Major Building Services and Major Building Interior (finishes). Its site was untouched, and the Major Building Shell was only patched.

Hemingway Pool was a project focused on preserving and yet making more efficient its Building Services and Building Envelope. Both came at a proportionately greater cost due to the building's need to respect the original architectural form. The Major Building Interior scope of work was small, as were modifications to the historic structure.

Timing and Escalation

Both projects followed the Construction Management project delivery method. Edmonton's Hemingway project made use of this flexible project delivery method to allow for sequential tendering over a longer period of time. Specifically, the bidding packages had to be redistributed to match funding as it became available over time:

- Phase 1 - Tender Package 1: Investigation/demolition and abatement
- Phase 1 - Tender Package 2: Mechanical
- Phase 1 - Tender Package 3: Pool basin
- Phase 1 - Tender Package 4: Pool mechanical
- Phase 2: Building envelope, curtain wall glazing and roof

By contrast, St. Albert's Fountain Park project was developed and delivered from May 2022 to September 2024 - a shorter period of time. Construction Management applied to the Fountain Park project allowed a revised schedule that reduced two phases to one phase following an unexpected discovery, saving the project nine weeks and approximately $500,000.

Both rehabilitation projects travelled through the period of significant escalation but because the Hemingway project has a longer project schedule, it took on greater costs.

Sustainability and Climate Resilience

LEED Silver is currently being pursued by Hemingway but not Fountain Park. Hemingway is projected to benefit from an annual energy consumption of 24.7 percent less than the LEED reference building – LEED Prerequisite Eap2.

Space Program and Design

Table 10 summarizes the chosen functional programming components for the Recreation Centre Comparison Set #1. St. Albert's recreation centre is much larger than Edmonton's Hemingway facility, however the project focussed on aesthetic improvements aside from lifecycle work and a concrete slab replacement task to address safety concerns. Conversely, the Hemingway project aimed at achieving energy efficiency, achieving sustainability standards and improving indoor air quality, in addition to replacement of the major HVAC and electrical systems, installation of new finishes and upgrades to the building exterior.

An important aspect of the design of the Hemingway pool, was the building envelope. The structure's unique exterior design reflects the crest of a wave, with the use of piers and cables. Much of the rehabilitation efforts focussed on the replacement of the building's exterior, the roofing assembly, the glass curtain wall panels, lighting and perimeter drainage.

The Hemingway project was broken into two phases: the first phase required replacement work of building systems and rehabilitation work on the pool basin. The pool was closed during the pandemic which allowed for a more thorough testing of the facility. This led to the discovery of cracks in the pool basin. The repairs were added to project's second phase which is ongoing. Several additional issues were discovered relating to the building envelope, mechanical systems and electrical systems.

In the second phase of the project, the City addressed further lifecycle requirements, accessibility policies and sustainability policies. While accessibility considerations in the Hemingway renewal project originally required a "like for like" approach as befit the "renewal" approach described in the C598 Asset Management Policy, accessibility improvements became necessary and some were added to the scope as they were determined to be critical. Others were omitted if they could not be justified under an increasing budget. This project and the elements of the space program within scope continually shifted in response to available funding.

Hemingway's initial planning had predicted very little of this increased scope as it was to be a straightforward rehabilitation. As its significance was recognized, its unique funding model acknowledged and its need to address both a newly constructed neighbour and more accessibility requirements came into focus, the City of Edmonton team has had to respond with agility to increased demands. These naturally represent increased costs.

Table 10. Recreation Centre Comparison #1 functional programs.

Program	Hemingway, Edmonton (3,775 SM)		Fountain Park, St. Albert (5,519 SM)	
Component	Size (SM)	Notes	Size (SM)	Notes
Multi-lane Pool	933	8-lanes 50 M	Included	8-lanes 25 M
Small Pool	--	--	Included	--

Program	Hemingway, Edmonton (3,775 SM)		Fountain Park, St. Albert (5,519 SM)	
Leisure Pool	--	--	Included	--
Whirlpool	80	--	Included	--
Fitness Area	411	--	Included	--
Community Lounge	--	Cafeteria	Included	--
Sauna and Steam Room	12	--	Included	--
Pre-School Playground	--	--	Included	--
Multi-purpose Rooms	--	--	Included	2 rooms
Indoor Multi-Purpose Court	--	--	Included	1 court

Policies, Bylaws and Standards & Regulatory Responses

Fountain Park was described as a “refurbishment for 20 years” while Edmonton’s Hemingway is on the Inventory of Historic Resources which is a list of heritage resources that merit conservation but are not legally protected. The Hemingway project obtained City Council’s approval to pursue designation as a Municipal Historic Resource, early in its development. Once designated as a Municipal Historic Resource in the future it will be put on the Register and protected by Policy C450B. With a historic resource planner involved throughout the project, all rehabilitation measures have considered the historic integrity of the structure as well as the significance of the unique building envelope and form. The Hemingway project represents a long-term commitment to the City of Edmonton’s cultural heritage.

The scope of work for the Hemingway Pool project began with a renewal assessment to consider restoring it to its former condition. It was to be rehabilitation work as described in C598.

Business Partner Involvement

The heritage character of the Hemingway project brought about the involvement of the City’s heritage planner who helped the team anticipate decisions that might impact its successful application for designation as a Historic Resource.

The lengthy wait for funding on the Hemingway project allowed the City to conduct stakeholder engagement resulting in additional program elements. Additional scope items included hot tub alteration, rake seating adjustment to make the mezzanine accessible, elevator addition, and numerous electrical additional components. Business partner involvement in the Hemingway’s project early phases was critical to planning for its future operational and maintenance needs. One assumes the Fountain Park Pool received similar input from their O+M business partners as the drawings were very detailed and often addressed items improved access and/or deterioration of some built elements.

Recreation Centre Comparison #1 Summary

The St. Albert Fountain Park Pool was built faster, had no sustainability targets, had minimal regulatory agencies to report to, had some early business partner involvement, and the Construction Management project delivery method allowed for a shortened project schedule with little or no stakeholder involvement. The Fountain Park Pool was not a historically significant project that comes with more complex regulatory

and funding requirements. By comparison, Hemingway Pool had to await funding that came over several years, making the project longer. While this assessment provides insights for this one case, deeper analysis is recommended for confirmation of the City's cost drivers in rehabilitation work.

RECREATION CENTRE COMPARISON #2

The second comparison is between two new-build recreation centre projects. Edmonton Rollie Miles completed Design Development (checkpoint #3) and has firm costing. It awaits approval to proceed with a target start year of 2028. Drayton Valley's Ricochet Aquatic Centre is recently complete and smaller in scale but shares program elements with Rollie Miles. Table 11 includes only some information from the Ricochet Aquatic Centre project. Proportional breakdown of the Ricochet Aquatic Centre construction costs were not available.

Table 11. Recreation Centre Comparison #2

Component	Rollie Miles, Edmonton (2028 dollars)	Ricochet, Drayton Valley (2022 dollars)
Area	7,982 SM	2,701 SM
Building Construction Cost	$94.3M (2028)	--
Site Construction Cost	$9.20M (2028)	--
Construction Cost Total	$103.5M (2028)	$22.34M (2022)
Building Construction Cost/SM	$11,814/SM (2028)	$8,271/SM
Location Type	Former Scona Pool site	Residential subdivision
Project Start Date	2018	2021
Project Completion Date	Pause at DD	2024
Project Length of Time	5 years to DD Possible additional 3-4 years to complete	4 years

*Data on Edmonton facilities provided by the City

Comparing Hard Cost Breakdowns

After *normalizing* construction costs (to 2024), the building construction cost per square meter was determined to be $10,535/SM and $8,597/SM for Edmonton's Rollie Miles and Drayton Valley's Ricochet, respectively. Project costs were found publicly on the Alberta Major Projects site. Due to data availability limitations, a hard cost breakdown was only possible for the Rollie Miles Project (Figure 7).

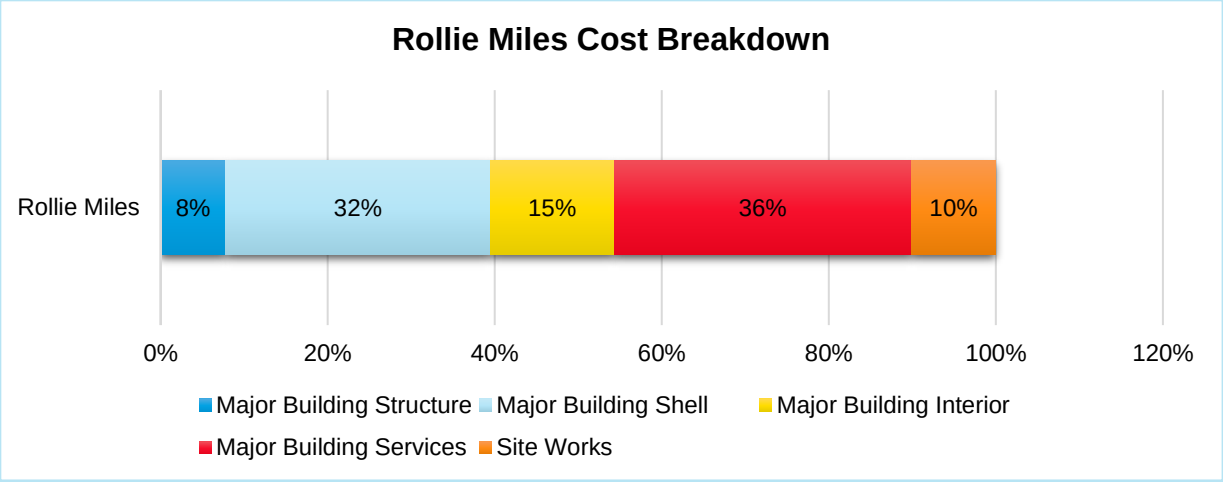

Figure 7. Rollie Miles hard costs breakdown.

Timing and Escalation

Both of these projects have progressed through the volatile escalation period of 2020 to 2023. As the economy and inflation settle it is hoped that the Rollie Miles construction cost forecasts and the forecasted completion schedule will hold to the forecasts.

Major Building Shell and Major Building Services will be proportionately higher for rec centre projects due to the heights and clear spans needed to support the facility uses. Services need to move humidity and temperatures around so they do not leak into unwelcome spaces. With Rollie Miles reaching into the future and committing to Climate Resiliency Policy C627 the Services will be considerable in the capital cost picture.

Sustainability and Climate Resilience

The Climate Resiliency Policy C627 will be addressed in Rollie Miles Recreation Centre in the following ways:

- The Green Electricity Purchase program, using renewable energy, will go a long way to help meet the requirements. The only exception will be the use of gas boilers for make-up heat for extreme cold conditions. Emissions generated by the use of the boilers are intended to be offset with on-site PV use.
- LEED Silver is possible and 20 percent less energy use is also felt to be achievable.
- The Thermal Energy Demand Intensity (TEDI) target of maximum 80Wh/m2 cannot be met. It is exceeded with the likely TEDI value of 117 kWh/m2 that was found to be acceptable to the City's Climate Resilient Building Team, given the higher-than-normal energy demands of a typically hot and humid natatorium.
- On-site PV will meet the 1 percent on-site renewable /alternative energy requirement.

By contrast, Drayton Valley's Ricochet Centre did not pursue any sustainability goals.

Space Program and Design

Table 12 summarizes the key functional programming elements for each of the recreation centres in Comparison Set #2. Functional Programming documentation for Drayton Valley's Ricochet was

unavailable, however amenities were identified from publicly available documents. Edmonton's recreation centre is almost three times the size of Drayton Valley's with the inclusion of a gymnasium size adhering to the International Basketball Federation's rules, as well as large fitness area. While Ricochet has a multipurpose room and support spaces, the facility is predominately an aquatics centre.

Table 12. Recreation Centre Comparison #2 functional programs.

Program	Rollie Miles, Edmonton (7,982 SM)		Ricochet, Drayton Valley (2,701 SM)	
Component	Size (SM)	Notes	Size (SM)	Notes
Multi-lane Pool	510	8 lanes 25 meters	Included	6 lanes 25 meters
Small Pool	--	--	--	--
Leisure Pool	220	--	Included	--
Whirlpool	--	--	Included	--
Fitness Area	464.5	--	--	--
Sauna	16.7	10-12 people	--	--
Lazy River	--	--	Included	--
Steam Room	16.7	10-12 people	Included	--
Multi-Purpose Room	148.6	60 people	Included	Community Room
Gymnasium	608	FIBA Size	--	--

Policies, Bylaws and Standards & Regulatory Responses

The Edmonton Zoning Bylaw is detailed in its requirements for the development permit process. Drayton Valley has a zoning bylaw, but it is not apparent that they have a design review process and details regarding the development/building permit submissions are limited.

The PDDM process adopted by the City of Edmonton has served the Rollie Miles project well to date as the Design Development Report and associated documents complete at Checkpoint 3 are thorough. The project team anticipates a project cost (tested by both the contractor and a cost consultant) that catches the latest in Sustainability and Climate Resilience aspirations, the latest in building code, fire code and energy code requirements, and other forward-looking City policies, bylaws and standards.

Business Partner Involvement

The Drayton Valley Ricochet project utilized a project delivery method with minimal drawings created by professionals. The total drawing package included only 4 architectural sheets, 11 structural sheets and 1 mechanical sheet, with specifications listed on the drawings. Integrated Project Delivery (IPD) is an increasingly popular manner of delivering projects as it involves the trades in the development of the project in early stages. The IPD method relies on the general contractor with experience in the delivery method, unique contracts and stakeholders prepared to participate. While the method is still considered risky to some in the industry (as the target project cost relies on a large group of people to work well together and the design continually changes through the process) it does bring the operators and maintenance staff (the business partners) into the conversation early in the project development process.

By contrast, Edmonton's Rollie Miles project is forecasted to deploy a stipulated sum procurement method where the prime design team completes the tender package entirely before the project is bid. With Edmonton's Rollie Miles project, both the general contractor and a cost consultant provide budget costing that is then compared, discussed and informs the costing, scheduling and scope of the project as it is paused to await final funding.

Recreation Centre Comparison #2 Summary

Drayton Valley's Ricochet Aquatic Centre was smaller, built faster, had no sustainability targets, had minimal regulatory agencies to report to, had no business partners, and the project delivery method brought local trades together with the project team to address constructability as the principal focus of the project.

RECREATION CENTRE COMPARISON #3

The last comparison is between two new-build recreation centre projects. Edmonton Lewis Farms is expected to be complete in 2028 though Calgary's Recreation Centre No. 1 was completed some years ago. Since cost estimates collected on the Edmonton project were already escalated to 2028, Calgary Recreation Centre costs were normalized accordingly.

Table 13. Recreation Centre Comparison #3

Component	**Lewis Farms, Edmonton (2028 dollars)**	**Calgary Centre No. 1 (2016 dollars)**
Area	34,824 SM	8,643 SM
Building Construction Cost	$211.40M (esc. 2028)	--
Site Construction Cost	$22.10M (esc. 2028)	--
Construction Cost Total	$233.5M (esc. 2028)	$54M (2016)
Building Construction Cost/SM	$6,070/SM (esc 2028)	$4,859/SM (2016)
Location Type	Suburban Edmonton	Suburban Calgary
Project Start Date	2018 (Business Case)	2008 (Business Case)
Project Completion Date	Forecasted 2028	2016
Project Length Of Time	10 years	8 years

*Data on Edmonton facilities provided by the City

Comparing Hard Cost Breakdowns

After *normalizing* construction costs (to 2028), the building construction cost per square meter was determined to be $6,721/SM and $6,815/SM for Lewis and Calgary Recreation Centre, respectively. Project costs were found publicly on the Alberta Major Projects site. Due to data availability limitations, a hard cost breakdown was only possible for the Lewis Project (Figure 8).

Interestingly, in discussions with the prime consultant team who did Calgary Rec Centre No. 1 and subsequently has done several other recreation facilities in Calgary, it was noted that in 2024 they are estimating approximately $7,000/SM for new recreation centres.

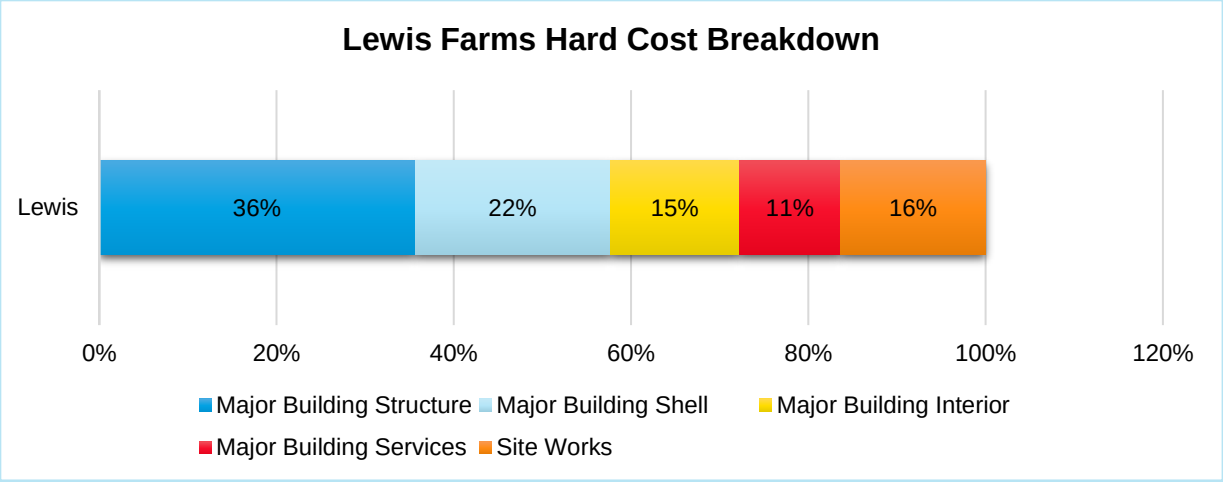

Figure 8. Lewis hard cost breakdown.

Lewis Farms is a large and complex project with many program pieces needing a variety of forms, envelope types, mechanical and electrical systems, resulting in a large building structure cost when set against the other facility types. Clear spans, larger building volumes inside and complex collisions of multiple building types impact the project cost and show up in a larger portion of the building hard costs being attributed to Major Building structure.

Timing and Escalation

The Calgary Recreation Centre was designed and bid in a more stable economic climate while Edmonton's Lewis Farms project has been developing through a volatile economic climate. In response to escalating costs Lewis has gone through numerous cycles of budget review and value engineering before being approved as part of the 2023-2026 Capital Budget. In the final efforts to get it back to an early budget of a different economic time the project team undertook an exercise to reduce the construction budget approximately $100 million (30%). The project was then re-designed to match the revised budget, removing space program elements as required and modifying the drawings to capture these changes. Lewis Farm's unfortunate timing resulted in the decision to change project delivery methods along the way. In the beginning, a Construction Management as Consultant Delivery Method (CCGC) was used, followed by an "Integrated Project Delivery style" phase with a Construction Manager, and finally, it moved to a Construction Manager at Risk method. Despite the change in approaches, formal checkpoint reviews were adopted to acknowledge the PDDM manner of managing projects.

Sustainability and Climate Resilience

LEED Silver V.3 was pursued by the Calgary Recreation Centre which was consistent with the times and the City of Calgary sustainability aspirations. Lewis Farms, however, is pursuing the City of Edmonton's Sustainable Building Policy C532 as well as LEED Silver. C532 requires the Lewis Farms project to dedicate one percent of its total capital budget to the incorporation of on-site renewable and/or alternative energy generation. It is working with a photovoltaic supplier to incorporate an array onto the building's roof, as Windermere Fire Station did. And as expected, the capital cost of the supply and installation of these elements adds cost to the project initially though it will absolutely save the project electrical operating costs into the future.

Space Program and Design

Table 14 summarizes selected functional programming elements for Edmonton's Lewis and Calgary recreation centre projects. The Lewis project is over four times the size of the Calgary comparison project and includes a site plan with baseball diamonds, tennis courts, pickleball courts and gathering areas in addition to the facility.

Table 14. Recreation Centre Comparison #4 functional programming.

Program	Lewis, Edmonton (34,824 SM)		Calgary Recreation Centre (8,643 SM)	
Component	Size (SM)	Notes	Size (SM)	Notes
Multilane Pool	1,353	9 lanes 50 meters	Included	--
Small Pool/Whirlpool	106	--	--	--
Leisure Pool	324	--	––	--
Water Slide		--	--	--
Waterslide	Included	62.2 M Ride 8.5 M Platform	--	--
Fitness Area	1,387	--	1,761	Inc. Studios, Track, Training Rooms, Offices
Sauna	--	--	Included	--
Steam Room	44	--	––	--
Hockey Rink	3,024	Twin Arena	--	--
Gymnasium	390	Single	671	1 Court
Double Gymnasium	1,761	--	--	--
Library	948.5	Inc. Educational Spaces	991	--
Retail Space	388	--	104	Food

Policies, Bylaws and Standards & Regulatory Responses

The Edmonton Zoning Bylaw and the Calgary Land Use Bylaw are similarly detailed in their requirements to support the development permit processes of each city. Both projects undergo design review by design committees appointed by their cities.

Business Partner Involvement

Edmonton involves operating and maintenance staff in stakeholder groups through their design phases, allowing operators to comment on design decision impacts to their centre's operating and maintenance in the future – including probable utility costs and personnel costs. A similar approach occurred at the Calgary recreation centres as the YMCA traditionally operates Calgary recreation centres. Consistent involvement early in the process is key to planning for and anticipation of operating costs across a number of facilities – using shared data.

Recreation Centre Comparison #3 Summary

The Calgary Recreation Centre No. 1 was smaller, built faster, had fewer sustainability targets, had similar regulatory agencies to report to, was part of a larger City-approved program, had business partners, and the project delivery method was straightforward with little risk in a stable economic environment.

4.3.3 Hard Cost Benchmarking

Using Yardsticks references, typical industry hard cost proportions by project type were compared with Edmonton's projects discussed throughout Section 4.3. Table 15 summarizes the fire station hard cost benchmarking. Note that General Requirements and Building Equipment categories were omitted for each of the Edmonton projects due to data availability, however they were included in the industry breakdown to provide an overarching perspective of the distribution of all category costs.

Fire Station No. 31 was similar to industry regarding the Major Building Structure hard costs, while it was almost 10 percent more than the expected costs relating to the Major Building Services. Conversely, the Major Building Services costs of Fire Station No. 30 were almost half of the industry benchmark. Both of Edmonton's fire stations had lower Major Building Interior costs.

Table 15. Fire station hard cost benchmarking.

Hard Cost Category	Industry	Edmonton's No. 31	Edmonton's No. 30
General Requirements	10%	--	--
Major Building Structure	20.40%	22.91%	28.52%
Major Building Shell	17.30%	13.17%	18.03%
Major Building Interior	15.40%	7.84%	6.42%
Major Building Services	30.40%	40.21%	28.82%
Building Equipment	6.50%	--	--
Complete Building	**100%**	**--**	**--**

Table 16 summarizes Edmonton's recreation centre hard cost comparisons and benchmarking. Note that the Hemingway project was a rehabilitation project and deviations from industry averages were expected. The Meadows project was included in the analysis and had three times the industry average hard costs relating to the Major Building Shell but had over six times less the costs associated the Major Building Structure. Rollie Miles also had proportionately larger Major Building Shell hard costs, and lower Major Building Structure costs. Major Building Interior cost proportions were similar across projects and close to what is typically expected for recreation centre builds.

Table 16. Recreation centre hard cost benchmarking.

Hard Cost Category	Industry	Hemingway Pool	Rollie Miles	Lewis	Meadows
General Requirements	10%	--	--	--	--
Major Building Structure	29.30%	4.27%	7.82%	35.64%	18.16%
Major Building Shell	16.60%	49.71%	31.68%	22.04%	31.63%
Major Building Interior	13.20%	11.84%	14.82%	14.53%	9.98%
Major Building Services	25.20%	31.71%	35.60%	11.44%	23.78%
Building Equipment	5.60%	--	--	--	--
COMPLETE BUILDING	**100%**	**--**	**--**	**--**	**--**

5.0 Discussion & Closing Remarks

This Cost Analysis Report shows that the City of Edmonton does have a cost factor associated with its new build and rehabilitation capital projects when compared to other facilities in neighbouring jurisdictions. The cost factors influencing the higher costs experienced in Edmonton across the noted projects in this report are described below.

Projects Still Underway

Of the five Edmonton facilities examined, four are not yet complete while one has been completed within the last year. This makes it difficult to obtain operational and maintenance information to confirm forecasted life cycle assessments. Instead, Colliers has acknowledged sustainability and climate resiliency goals within the context of each capital project and within the policy environment of the time.

This has resulted in the report heavily relying on capital cost comparisons, which are obviously only one part of the cost of ownership. It is worth noting that operating costs will be much improved with the sustainability and climate resilience goals so well imbedded into the projects at early phases. Recognizing that operating costs can represent closer to 85% of the cost of ownership of the City's assets, this is where the efforts should be focused – even if the numbers are not yet well understood.

Timing and Escalation

In the last ten years captured in this analysis, 5 of the years have experienced considerable volatility in the construction industry across the world. The COVID19 pandemic resulted in unprecedented escalation numbers. The forecasting, planning and management of complex public projects has been more difficult than ever before. Unpredictable supply chains and labour markets together with the necessary breaking apart of project teams to address health concerns has undeniably had an impact on project costs – showing up most notably in the form of escalation at its height from 2021 to 2023.

Sustainability and Climate Resilience

The COVID19 pandemic and an increasing number of extreme weather events has every municipality in Canada swiftly re-evaluating their sustainability and climate resiliency policies. Edmonton, is a winter city that relies on quality building envelopes and building systems to keep its energy costs down, its emissions low and its citizens comfortable. Edmonton continues to lead Canada in the development of more stringent goals to support sustainability in the design and construction of publicly funded capital projects.

Space Program and Design

The construction costs of a facility are dependent on the size and complexity of the design. IIS provides oversight of capital projects through the development of the space program, the design phases and construction while monitoring scope, schedule and budget.

The City developed a functional program for Edmonton Fire Rescue Services Fire Stations, including a base program for all new Fire Stations and a series of potential add-on components to be added to a base station depending on factors including location and service needs, as determined by Edmonton Fire Rescue Services. Several of the comparator projects and associated municipalities do not have similar documented base scopes and prescribed functional and programs for fire stations.

For new Edmonton Recreation Centres project the areas of the facilities are overall larger than the comparison projects referenced in this report. The Edmonton recreation projects reviewed often included additional and / or larger spaces to address Community demands (ex. multi-sheet arenas; double gymnasiums; libraries etc.).

To support smooth delivery of capital projects and manage cost variability, the business case and space program are fixed before the design phase progresses. The early engagement of business partners who operate and maintain the proposed projects support the scope development to ensure all design requirements are met. Sometimes this results in a more complex scope and design which increases the project's construction hard costs and expands the project's schedule. The cost drivers are in many ways all interdependent.

Policies, Bylaws and Standards and Regulatory Responses

Comparing Edmonton fire stations and recreation centres to smaller centres did uncover differences in municipal oversight. Smaller centers have less restrictive, or no policies, bylaws and standards, and they build fewer public facilities. When reviewing project reporting across jurisdictions, the City has increased reporting to maintain transparency.

All municipalities, regardless of their size and administrative support are required to respect building, fire and energy codes. But putting in place policies, bylaws and standards to protect their community's quality of life is simply slower to happen in the smaller centres like Leduc, St. Albert and Drayton Valley.

The Calgary Recreation Centre No. 1 was chosen as a comparator to the most recent and largest of Edmonton's recreation centres underway because it is in a comparable city with comparable policies, bylaws and standards. It's costs, despite its difference in size, was found to be remarkably close to that of Edmonton's Lewis Farms Recreation Centre.

Business Partner Involvement

Smaller municipalities tend to have less formal and less frequent engagement with their business partners on capital projects. Less funding means less expertise and pursuing sustainability programs like LEED Certification, Net Zero or Neutral Emissions Data all require those people within the municipality's team.

Appendix 1 TECHNICAL DOCUMENTS COLLECTED

A1.1. Fire Stations

Building Type	Building Location	Building Name	Technical Documents Collected
Fire Hall	City of Edmonton	Fire Station No. 31 Winder-mere	Commission Report, Energy Use Model, LEED Checklist, Design Development Report, Rooftop Solar Design, Technical Drawings (Architectural, Electrical, Geothermal, Civil, Landscape, Mechanical, Energy Use), NECB Compliance Report
Fire Hall	Leduc County	Fire Station No. 9	Price Proposal, Owner Requirements, Preliminary Drawings, Geotechnical Investigation, Parking, Landscape Guidelines, Highway Commercial Guidelines, Drawings, Construction Cost, Design Build RFP, Photos of the completed project
Fire Hall	City of Edmonton	Fire Station No. 30 Pilot Sound	Building Layout, Schematic Design Report, LEED Scorecard Tracker, Construction Contracts, Commission Report
Fire Hall	St. Albert	Fire Station No. 1	Schematic Design Report, Progress Claim, EOC Space Change Order, Drawings, Specifications

A1.2. Recreation Centres

Building Type	Building Location	Building Name	Technical Documents Provided
Rehabilitation	City of Edmonton	Hemingway Pool	Business Case, Construction Management Agreement, Total Project Cost Estimate – Phase 1, Total Project Cost Estimate – Phase 2, Design Development Cost Report, Design Development Cost Report (Consultant), Design Development Report, Energy Modeling Report, LEED Certified Scorecard, Drawings, Specifications, Tender Packages, Schematic Design Cost Report (CM), Schematic Design Cost Report (Consultant), Schematic Design Report
Rehabilitation	City of St. Albert	Fountain Park Pool	Architectural Drawings
Recreation Centre (Community Level)	City of Edmonton	Rollie Miles Recreation Centre	Technical designs (HVAC, architectural, structural, etc.), Schematic Design Report, Design Development Report
Community Level	Drayton Valley	Ricochet Aquatic Centre	Architectural Design Narrative, Redacted Cost Estimate, Architectural Plans
Recreation Centre (District Level)	City of Edmonton	Lewis Farms Facility and Park Project	Architectural design cost comparison, Design Development Report, Tender Drawings, Specifications, Stantec And PCL Agreements,

Building Type	Building Location	Building Name	Technical Documents Provided
			Project Charter, Business Case, Pre-Tender Estimate
Recreation Centre (District Level)	City of Calgary	Calgary Recreation Centre #1 Recreation Facility	Schematic Design Drawings, Project Cost and Construction Cost
Recreation Centre (District Level)	City of Edmonton	Meadows Recreation Centre	Drawings, Specifications, Business Case, Construction Contracts, Consultant Agreement, Design Development Cost Report, Final Total Project Costs, Functional Program, LEED Scorecard, Pre-Tender Cost Estimate, Project Charter, Project Closure Summary Report

Appendix 2 FIRE STATION CHARTS: WINDERMERE AND LEDUC

	WINDERMERE FIRE STATION NO. 31	LEDUC FIRE STATION NO. 9
KEY INFORMATION		
BUILDING PHOTO		
FUNCTIONAL PROGRAM		
Design	Local and specialty architects	Done by procurement consultant RPM based on former Leduc stations. Design completed by Contractor and architect. Small design professional involvement
Staff Living Quarters	8 Rooms	7 Rooms
Captain's Living Quarters	2 Rooms	NA
Captains Washroom & Shower	2	NA
Bike Storage Area	NA	NA
Universal Locker Area	1	1
Universal Shower Area	1	1
Deluge Shower	1	1
General Staff Washroom Area	2	2
Public Washrooms	1	1
Community Storage (Example uses; donations, mail, etc.)	1	1
Training Room	NA	1
Common Spaces: Kitchen	1	1

	WINDERMERE FIRE STATION NO. 31	LEDUC FIRE STATION NO. 9
Common Spaces: Day Lounge	1	1
Common Spaces: Study	1	1
Common Spaces: Fitness Space	1	1
Operations Area: Watch Box	1	NA
Operations Area: Apparatus Bay	3	4
Operations Area: Drying Room	1	1
Operations Area: Mezzanine Area	1	1
Operations Area: Hose Tower	NA	NA
Operations Area: Hose Rack Alcove	NA	1
Operations Area: Hazardous Materials Storage	1	NA
Operations Area: Fire Fighting Gear Room	1	1

Appendix 3 FIRE STATION CHARTS: PILOT SOUND AND ST. ALBERT

	PILOT SOUND FIRE STATION NO. 30	ST. ALBERT FIRE STATION NO. 1
KEY INFORMATION		
BUILDING PHOTO		
FUNCTIONAL PROGRAM		
Design	Local architects. Fourth station building in five years.	Same local architects team. Last fire station built preceding St. Albert's Fire Station No. 1 was completed in 2011.
Staff Living Quarters	8 Rooms	14 Rooms
Captain's Living Quarters	2 Rooms	1 Room
Captains Washroom & Shower	2	1
Bike Storage Area	NA	1
Men Staff Locker Area	1	1
Men's Shower Area	1	1
Men's Toilet Area	1	1
Women's Shower Area	1	2
Women's Toilet	1	1
Female Staff Locker Room	1	1
Deluge Shower	1	1
General Staff Washroom Area	1	2
Public Washrooms	1	1
Community Storage (Example uses; donations, mail, etc.)	1	1
Training Room	1	NA

	PILOT SOUND FIRE STATION NO. 30	ST. ALBERT FIRE STATION NO. 1
Common Spaces: Kitchen	1	1
Common Spaces: Day Lounge	1	1
Common Spaces: Study	1	1
Common Spaces: Fitness Space	1	1
Operations Area: Watch Box	1	NA
Operations Area: Apparatus Bay	3	4
Operations Area: Drying Room	1	1
Operations Area: Mezzanine Area	1	1
Operations Area: Hose Tower	NA	1
Operations Area: Hose Rack Alcove	NA	1
Ambulance: Staff washrooms and lockers	NA	1
Ambulance: Emergency Operations Centre and Dispatch Room	NA	1
Ambulance: Emergency Operations Office	NA	1
Ambulance: Break-out Rooms	NA	1
Ambulance: Media Briefing Room	NA	1
Operations Area: Hazardous Materials Storage	1	1
Operations Area: Fire Fighting Gear Room	1	1

Appendix 4 RECREATIONAL CENTRE CHART: HEMINGWAY AND FOUNTAIN PARK

	HEMINGWAY RECREATION CENTRE	FOUNTAIN PARK POOL
KEY INFORMATION		
BUILDING PHOTO		
		
FUNCTIONAL PROGRAM		
Design	Historically significant building aiming for historic designation Local architects	Titled “lifecycle repair” Local architects
Leisure Pool	1	1
Multi-Lane Pool	1 - 8-lane 50-meter pool	1 pool- 25 8-lane 25-meter pool
Whirlpool	1	1
Children’s Pool	NA	1, also has a Water Feature area
Sauna	1	1 but it’s combined with steam room
Steam Shower	1	1
Pool Deck	3	NA
Aquatic Centre Offices	5	1
Aquatic Centre Cash	1	NA
Gym	1	NA
Men’s Change Room	1	1
Women’s Change Room	1	1
Men’s Washroom/Shower	2	1
Women’s Washroom/Shower	2	1
Ungendered/Family Washroom/Shower	NA	1

	HEMINGWAY RECREATION CENTRE	FOUNTAIN PARK POOL
Barrier Free Change Room	2	NA
Barrier Free Washroom/Shower	1	NA

Appendix 5 RECREATIONAL CENTRE CHART: ROLLIE MILES AND RICOCHET

	ROLLIE MILES RECREATION CENTRE	DRAYTON VALLEY RICOCHET AQUATIC CENTRE
KEY INFORMATION		
BUILDING PHOTO		
FUNCTIONAL PROGRAM		
Design	Local and specialty architects	Different kind of professional involvement Rudimentary envelope, interior wall systems and finishes
Leisure Pool	1	1
Multi-Lane Pool	1	1
Whirlpool	NA	NA
Children's/Teaching Pool	1	NA
Hot Tub	1	1
Sauna	1	NA
Steam Room	1	1
Pool Deck	1	NA
Aquatic Centre Offices	3	2
Aquatic Centre Concessions	1	NA
Gym	1	NA
Fitness Area	1	NA
Fitness Admin Offices	NA	NA
Multi-Purpose Sports Hall	1	NA
Indoor Racing Track	NA	NA
Spinning Studio	NA	NA
Bouldering	NA	NA
Spectator Seating	NA	NA
Hockey Rink	1 Convertible Basketball Court-Ice Rink	NA
Arena Concessions	NA	NA
Arena Admin Offices	NA	NA

	ROLLIE MILES RECREATION CENTRE	DRAYTON VALLEY RICOCHET AQUATIC CENTRE
Men's Shower/Change Room	2	1
Women's Shower/Change Room	2	1
Universal Shower/Change Room	1 (Barrier Free)	1 (Barrier Free)
Public Washroom	2	1
Universal Public Washroom	2 (Barrier Free)	1 (Barrier Free)
Staff Lockers	1	1
Cafeteria	NA	NA
Daycare	NA	NA
Retail Space	NA	1
Library	NA	NA
Community Meeting Spaces	1	NA
Indoor Playground	NA	NA

Appendix 6 Recreational Centre Chart: Lewis Farms and Calgary

	LEWIS FARMS RECREATION CENTRE	CALGARY RECREATION CENTRE
KEY INFORMATION		
BUILDING PHOTO		
		--
FUNCTIONAL PROGRAM		
Design	Local + specialty architect	Local architects
Leisure Pool	1	1 but small
Multi-Lane Pool	1 – 10-lane 50 m pool	1 – 6-lane 25 m pool
Whirlpool	1	NA
Children's Pool	1	NA
Hot Tub	1	1
Sauna	NA	NA
Steam Shower	1	2
Pool Deck	NA	NA
Aquatic Centre Offices	2	1
Gym	1	1
Fitness Studio	1	2
Fitness Admin Offices	1	1
Multi-Purpose Sports Hall	NA	NA
Indoor Racing Track	1	1
Spinning Studio	1	NA
Bouldering	1	NA
Spectator Seating	NA	NA
Hockey Rink	2	NA
Arena Concessions	1	NA
Arena Admin Offices	1	NA
Men's Change Room	2	1
Women's Change Room	2	1
Ungendered/Family Change Rooms	2	1
Men's Washroom/Shower	2	1
Women's Washroom/Shower	2	1
Ungendered/Family Washroom/Shower	2	1
Barrier Free Change Room	2	1
Barrier Free Washroom/Shower	2	1

	LEWIS FARMS RECREATION CENTRE	CALGARY RECREATION CENTRE
Public Washroom	2	NA
Staff Lockers	1	NA
Cafeteria	1	2
Daycare	1	1
Retail Space	1	NA
Library	1	1
Community Meeting Spaces	1	2
Indoor Playground	1	NA

Appendix 7 POLICY COMPARISONS

A7.1. Fire Stations Comparison Set #1

	Edmonton Windermere Fire Station No. 31	Leduc Fire Station No. 3
POLICIES AND BYLAWS	Start May 2017	
Zoning/Bylaw	Zoning Bylaw 17831 2016	Edmonton International Airport Technical Guidelines
Design Review	CoE Design Committee Bylaw 20673 2005 Standards + Procedures 2022	EIA Landscape Design Guidelines 2010 are loose.
Sustainability – LEED Silver	Version 4.0	NA
NetZero	Approved as pilot project (Improving on C532)	NA
Capital Project Governance	Capital Project Governance Policy C591 PDDM process includes CoE professionals Approved 2017	No facilities staff. Lease the land.
Fire Rescue Service Delivery and Master Plan	Fire Rescue Service Delivery C523A With Fire Rescue Master Plan Adopted 2012	NA
Facility Design and Construction Technical Guidelines and Standards	Facility Design and Construction Consultant Manual Volume 1 and 2 (approx. 320 pages) Updated alternate years since 2014	NA

A7.2. Fire Stations Comparison Set #2

	Pilot Sound Fire Station No. 30	St. Albert Fire Station No. 1
POLICIES AND BYLAWS		
Zoning/Bylaw	Zoning Bylaw 12800 Updated 2023 1402 pages	St. Albert Land Use Bylaw only recently updated.
Design Review	CoE Design Comm. Bylaw 20673 Standards + Procedures Updated 2023	-
Sustainability – LEED	LEED Silver Version 4.1	LEED Certified

	Pilot Sound Fire Station No. 30	St. Albert Fire Station No. 1
Sustainable Building	Sustainability Building Policy C532 Adopted 2008	-
NetZero	Improving on C532 *Used only by Windermere Fire Station*	-
Climate Resiliency Including Emissions Neutral	Climate Resiliency Policy C627 June 2021 *Too late for this project*.	-
Capital Project Governance	Capital Project Governance Policy C591 PDDM process includes CoE professionals Approved 2017 *Too late for this project.*	-
Asset Management	Asset Management Policy C598 Renewal and Growth Definitions Updated 2018	-
Accessibility	Accessibility for People w Disabilities Policy C602 Adopted 2019 *Too late for this project.*	Chose to make portions accessible as permitted by NBC(AE) 2017 for non-public bldg.
Diversity and Inclusion	Diversity and Inclusion Policy C538 Adopted 2023 *Too late for this project.*	-
Public Engagement Policy	Public Engagement Policy C593B Updated 2024	-
Sustainable Procurement	Sustainable Procurement Policy C556B Approved 2022 *Too late for this project.*	-
Public Art	Public Art Policy C458D Approved 2021 Updated 2024 *Too late for this project.*	-
Environmental	Environmental Policy C512 (ENVISIO) Adopted 2006	-
Winter Design	Winter Design Policy C588 Adopted 2016 *Too late for this project.*	-
Corporate Tree Mg't	Corporate Tree Mg't Policy C456B Adopted 2020 *Too late for this project.*	-

	Pilot Sound Fire Station No. 30	St. Albert Fire Station No. 1
Fire Rescue Service Delivery and Master Plan	Fire Rescue Service Delivery C523A With Fire Rescue Master Plan Adopted 2012	-
Technical QMS	Professional Engineering and Geoscience + QMS Adopted 2022 *Too late for this project.*	-
Project Management for Capital Projects	Project Mg't for Capital Projects Standard Approved 2023 *Too late for this project.*	-
Facility Design and Construction Technical Guidelines and Standards	Facility Design and Construction Consultant Manual Volume 1 and 2 (approx. 320 pages) Updated alternate years since 2014 *Too late for this project.*	-
REGULATORY ENVIRONMENT		
Alberta Building Code (ABC) 2006 – in force Sept. 1, 2007	ABC 2006	
Alberta Building Code (ABC) 2014 - in force May 1, 2014		
National Building Code NBC(AE) 2019 – in force Dec. 1, 2019		NBC(AE) 2019
National Building Code NBC(AE) 2023 – in force May 1, 2024		

A7.3. Recreation Centres Comparison Set #1

	EDMONTON HEMINGWAY RECREATION CENTRE REHABILITATION	ST. ALBERT FOUNTAIN PARK POOL
POLICIES AND BYLAWS	Start 2018	
Zoning/Bylaw	Zoning Bylaw 17831 2016	
Design Review	CoE Design Committee Bylaw 20673 2005	St. Albert has small facilities department

	EDMONTON HEMINGWAY RECREATION CENTRE REHABILITATION	ST. ALBERT FOUNTAIN PARK POOL
		and is their own AHJ.
Sustainability – LEED	LEED Silver Version 4	-
Sustainable Building	Sustainability Building Policy C532 Approved 2017	-
Capital Project Governance	Capital Project Governance Policy C591 PDDM process includes CoE professionals Approved 2017	
Asset Management	Asset Management Policy C598 Updated 2018	-
Accessibility	Accessibility for People w Disabilities Policy C602 Adopted 2019	-
Winter Design	Winter Design Policy C588 Adopted 2016	-
Facility Design and Construction Technical Guidelines and Standards	Facility Design and Construction Consultant Manual Volume 1 and 2 (approx. 320 pages) Updated alternate years since 2014	-
Historic Resources Protection	Seeking registration under Policy C-450B which is a list of municipal historic resources that are legally protected from demolition or inappropriate alteration.	

A7.4. Recreation Centres Comparison Set #2

	EDMONTON ROLLIE MILES RECREATION CENTRE	DRAYTON VALLEY RICOCHET AQUATIC CENTRE
POLICIES AND BYLAWS	Start Sept 2018	
Zoning/Bylaw	Zoning Bylaw 17831 2016	Drayton Valley Land Use Bylaw 2020/12/D Adopted 2021 Updated May 2024 Unclear who AHJ is
Design Review	CoE Design Committee Bylaw 20673 2005 Standards + Procedures 2022	-
Sustainability – LEED Silver	Version 4.0	-
Sustainable Building	Sustainability Building Policy C532 Approved 2017	-
Climate Resiliency Including Emissions Neutral	Climate Resiliency Policy C627 Including Net-Zero Emissions	

	EDMONTON ROLLIE MILES RECREATION CENTRE	DRAYTON VALLEY RICOCHET AQUATIC CENTRE
	20% improvement over NECB 2017 and a TEDI less than 80kWh/m. sq.	
Capital Project Governance	Capital Project Governance Policy C591 PDDM process includes CoE professionals Approved 2017	-
Asset Management	Asset Management Policy C598 Updated 2018	-
Accessibility	Accessibility for People w Disabilities Policy C602 Adopted 2019	-
Public Engagement	Public Engagement Policy C593B Updated 2024	-
Environmental	Environmental Policy C512 (ENVISIO) Adopted 2006	-
Winter Design	Winter Design Policy C588 Adopted 2016	-
Facility Design and Construction Technical Guidelines and Standards	Facility Design and Construction Consultant Manual Volume 1 and 2 (approx. 320 pages) Updated alternate years since 2014	-

A7.5. Recreation Centres Comparison Set #3

	EDMONTON LEWIS FARMS RECREATION CENTRE	CALGARY REC CENTRE NO. 1
POLICIES AND BYLAWS	Start Aug. 2018	
Zoning/Bylaw	Zoning Bylaw 17831 2016	Zoning Bylaw of the time
Design Review	CoE Design Committee Bylaw 20673 2005 Standards + Procedures 2022	Calgary's CPC
Sustainability – LEED Silver	Version 4.0	Version 4.0
Sustainable Building	Sustainability Building Policy C532 Approved 2017	Calgary equivalent
Capital Project Governance	Capital Project Governance Policy C591	Calgary equivalent

	EDMONTON LEWIS FARMS RECREATION CENTRE	CALGARY REC CENTRE NO. 1
	PDDM process includes CoE professionals Approved 2017	
Asset Management	Asset Management Policy C598 Updated 2018	Calgary equivalent
Winter Design	Winter Design Policy C588 Adopted 2016	NA
Facility Design andFI Construction Technical Guidelines and Standards	Facility Design and Construction Consultant Manual Volume 1 and 2 (approx. 320 pages) Updated alternate years since 2014	Calgary equivalent