

Case Study

Yellowhead County's Administration Building
Edson, Alberta

October 30, 2024

Background

Almost 20 years ago in 2005, the Yellowhead County Administration Building in Edson, Alberta, became a leading example of sustainable design in municipal buildings in the region. Designed by Manasc Isaac Architects (now [Reimagine Architects](#)), this [LEED®](#) Silver certified building was ahead of its time, setting a high standard for environmental responsibility by not using fossil fuels for heating and instead incorporating geothermal technology for space heating and solar technology for heating hot water.

Costs for construction were not included due to the significant change in pricing over the past two decades, but the building's design principles remain admirable. The facility not only meets Yellowhead County's functional needs as an administrative hub for the county, but also continues to achieve its environmental goals - reducing the building's environmental impact, lowering energy costs, and serving as a model of environmental stewardship.

The landscaping is low-maintenance, using local plant species and a rainwater collection system for watering the plants and grass. Nearly twenty years later, the building is still a great example of how thoughtful design can meet both functional needs and environmental goals. This approach has enabled the building to exceed emissions standards while ensuring a comfortable environment for its occupants.

Shafraaz Kaba - the project manager, designed the building with a vision of long-term sustainability. We asked Shafraaz to share some thoughts on the building's design journey and impact, here is what he said below;



About the Project

Author/Contributor: ENBIX - Alberta Ecotrust, Shafraaz Kaba

Location: Edson, Alberta

Year completed: 2005

Size: 1831 m²

Architect: Manasc Isaac Architects (now [Reimagine Architects](#))

Project Manager: [Shafraaz Kaba](#)

Energy Advisor: Partly by the mechanical engineering team at [KEEN Engineering](#)

Designer: [Shafraaz Kaba](#), Manasc Isaac Architects (now [Reimagine Architects](#))

Structural Engineer: [RJC](#)

Mechanical Engineer: [KEEN Engineering](#) (now **Stantec**)

Electrical Engineer: Reid Crowther

General Contractor: [Graham](#) Construction

Interview with Shafraaz Kaba

Q: Were there any funding programs used? Were you trying to achieve net zero energy?

Shafraaz: "No, achieving net zero was actually an accident. We wanted to achieve LEED® silver and to design the most efficient building possible. We applied for the Commercial Building Incentive Program (CBIP)- which helped offset some of the costs for energy modelling and design."

Q: What were the key learnings from this project?

Shafraaz: "There were significant commissioning challenges as 20 years ago, geo-exchange wasn't really a big thing. There weren't many companies at the time that knew how to install ground loops and it was challenging to get them to work with heat pumps. One of the pumps was even installed backward, which took longer than it should have to troubleshoot. There are ways to mitigate that, by checking to see if everything was installed correctly, and when a commissioning team ensures the systems are meeting parameters before handing over the facility to the client.

Another challenge was with some of the exterior building materials - using wood or applying paint on the exterior of a building is always challenging because UV rays and other elements will eventually cause deterioration. Finding the right sealant for exterior exposed mass timber was difficult, and maintaining materials like glulam adds to the upkeep, as natural materials will always require ongoing care and maintenance."

Q: What were the key advancements or changes in building materials and energy systems?

Shafraaz: “The clients are still happy with the building and it continues to function well. People still respond positively to it. Today’s heat pump technology has become more efficient, and heat pumps are far more reliable now. A lesson from this project was the importance of properly commissioning the pumps and ensuring building operators are trained to understand the maintenance and troubleshooting of them.”

“Today, we train building operators to a level of understanding and explicit knowledge that this is a high-performance building that requires knowledge of building management systems (BMS) and to look for anything that deviates from initial operating parameters.”



Technical:

Wall design: R-16 effective. 4” rigid insulation on the exterior of the building envelope, 16mm plywood sheathing, on 2x6 wood stud walls. Glue-laminated columns and beams.

Ceiling insulation: R-35 effective. 8” rigid insulation on sheathing board, topped with a 2-ply modified bituminous membrane roofing system.

Windows/doors: The high clerestory windows facing South have ledges (light shelves) with mirrored tops that allow more light in and to bounce the light deeper into the room.

Mechanical & Electrical Systems:

HVAC: 13 heat pumps in the building, 2 air exchangers, and 3 fans. There is no gas line to the building and they use no fossil fuels to heat the facility

Hot Water: Solar PV is used to heat the water.

Electrical Service: The Administration Building is powered by electricity that is 100% from the green grid or offsets, as Yellowhead County committed to purchasing green power from the grid. Yellowhead County participates in the AMSC Energy program and has purchased Green Power as an optional product offered in the Energy Aggregation Program.



South exterior view of the Yellowhead County Administration Building, showcasing its mass timber design elements and architecture.

Renewables: The geexchange system consists of 13 heat pumps all operating within a closed-loop configuration. The installation required drilling 48 boreholes, each reaching depths of up to 100 meters (~350 feet). The ground temperature remains stable year-round, with a minimum baseline of around 8°C, ensuring efficient thermal exchange throughout the seasons.

A solar system is used for heating the hot water for the building.



Solar thermal hot water heating system installed on a shingled roof, harnessing solar to provide efficient hot water heating year-round.

Stormwater management: All plants require minimal maintenance or are indigenous to the area. Rainwater is collected and stored in cisterns for watering plants and grass.

Other: Lighting - High-output T5 fluorescent fixtures were originally installed for both direct and indirect office lighting, while clerestory windows provide natural light in the office area.

Energy Performance:

Annual Natural Gas Consumption: none

Energy Use Intensity: 122 kWh/m²

Carbon Emissions:

Annual Operational Carbon Emissions from Electricity Consumption: Net zero energy as it's pulling from the green grid. "The Administration Building is powered by electricity that is 100% from the green grid or offsets, as Yellowhead County committed to purchasing green power from the grid." [Yellowheadlines, Summer 2016, 5](#). Yellowhead County participates in the AMSC Energy program and has purchased Green Power as an optional product offered in the Energy Aggregation Program.

Annual Operational Carbon Emissions from Natural Gas Consumption: 0. No natural gas line to the facility.

As we aim for an emissions-neutral future, this building is a great example of how successful projects from twenty years ago in rural areas can inform and inspire future projects. Alberta Ecotrust and ENBIX would like to thank Shafraaz Kaba for his contribution to a past presentation of this case study at BUILDEX-Alberta 2023, and his participation in this case study.



Weathered wood and oxidizing steel on the facility's exterior railings display the textures developed over years of exposure to the elements.

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