



Red Deer College Student Residence

RED DEER, AB

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All photos by Cooper & O'Hara





Introduction

Red Deer College (RDC) Student Residence is a 5,800-sq.m. (60,000-sq.ft.), five-storey wooden structure with 145 units, designed and completed to meet the 300-bed demand for the Canada Winter Games in early 2019. RDC envisioned a building that would be a welcoming, fun home base for students; the college was well aware that isolation and lack of community support for students have a negative influence on their ability to perform in the classroom and can negatively impact their mental health and well-being. The goal was to create a “residence” that felt more like a home.

Manasc Isaac Architects, led by Vedran Škopac, proposed a hybrid between a student residence and a set of seven distinct “public gathering spaces,” scattered around the perimeter of all five storeys of the building. As part of the plan, Škopac’s team increased the conventional amount of social space by a factor of 10. The residence also functions as a hotel, providing accommodation for short- and long-term visits.

Another design mandate was to incorporate sustainable features, which influenced the decision to utilize a wood structure with a high-performance building envelope that maximizes thermal performance and comfort. With a construction budget of \$18.5 million, funding allowed for photovoltaic panels cladding the east, south and west faces, which provides approximately 45 percent of all energy the student residence requires. Although the building was not aiming for certification, it was designed to a LEED Gold standard.

As an example of an innovative approach to dormitory housing, Red Deer College Student Residence prioritizes quality of life and sustainability, while using mass timber construction to achieve both goals. These are some of the reasons it won a 2019 *Wood Design & Building Canadian Wood Council Award*.



Project Description

Prior to starting the design, Manasc Isaac had completed a master plan for the portion of the Red Deer College campus where future student residences were to be built. The location was carefully chosen to minimize the walking distance to neighbouring student amenities on campus, including a bus stop that is only 35 metres (115 ft.) away from the building's main entry. The surrounding site is a mixture of wetlands, walking trails and remnants of a past farmer's field, with a variety of older and newly planted trees. The architect retained the existing berms and foliage surrounding the structure to maintain a relationship with the native terrain, while using excavated soil to create additional berms that mimic the rolling hills of the Albertan prairies.

Early in the design process, to create the opportunity for more natural light, air volume, views and interaction between students, the design team eliminated double-loaded corridors and increased the allowance for common space. This new design thinking dramatically increased the quality of the building's inner life, while creating a meaningful relationship between the structure and the surrounding landscape. The seven gathering spaces are simply "pauses" in the system of student units;

however, they are the most vibrant areas of the building, with expansive views and ample daylight.

One of the primary design goals was to create livable yet compact residential units that could accommodate a variety of inhabitants, including persons with disabilities; each floor includes at least three barrier-free units. A total of 145 residential units are spread across five floors, with 15 residences (11 barrier-free) on the first floor, and either 32 or 34 units on the upper floors.

Each floor includes accommodations for short- and long-term occupants, with three floors dedicated exclusively to students, visiting speakers and other RDC guests; the top and bottom floors accommodate short-term visitors.

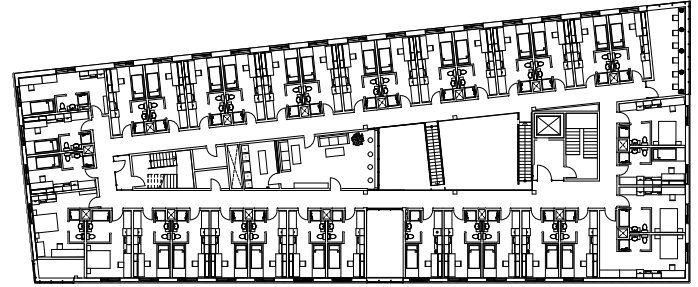
A variety of eight unit floor plans falls into three categories: standard (110 units, 16 sq.m.), standard with queen (11 units, 22 sq.m.) and barrier-free large with queen (24 units, 36 sq.m.). Within each unit, custom-built millwork was designed for the bathroom vanity, kitchen cabinetry, wardrobe, a murphy bed/desk/bookshelf combination and built-in bed frame with storage. Customized furnishings allowed the design team to maximize the efficiency of each floor plan.

Exposed structural wood is featured throughout the building interiors, with white walls accented by vibrant floor and furnishing colours selected to correspond with sun orientation; "hot" colours (orange, yellow) are placed on the "cool" sides of the building, while green and aqua are used in the "hot" zones.

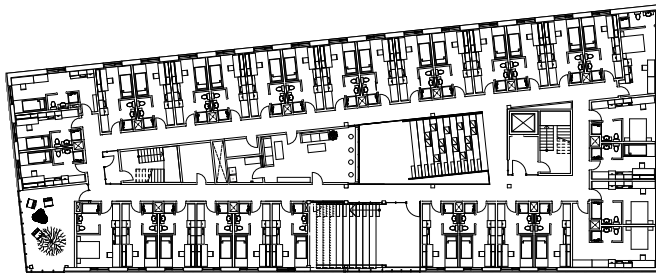
A central five-storey atrium connects the floors visually, with diffused natural light entering from the clerestories. Open railing along the hallways and interior glazing between common areas encourage interaction among different spaces, while the predominance of light wood enhances natural warmth; all ceilings are exposed spruce pine glulam panels, while glulam posts and lintels are also visible throughout the building.



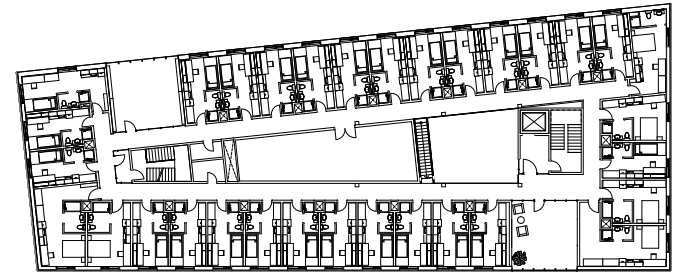
Main Floor



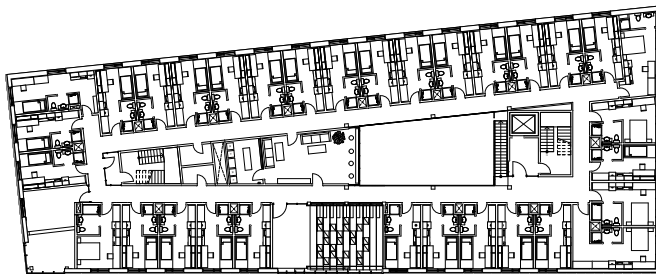
4th Floor



2nd Floor

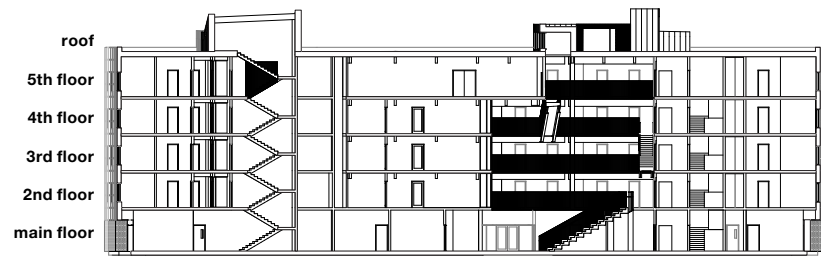


5th Floor

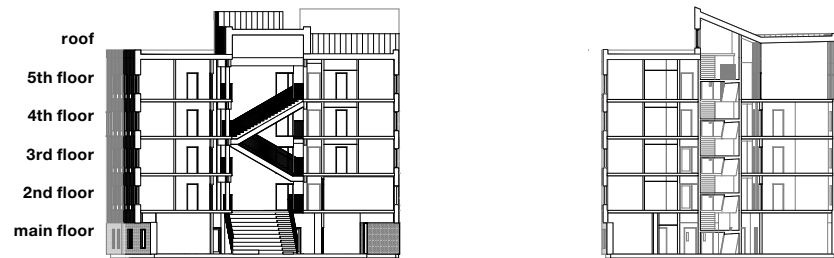


3rd Floor





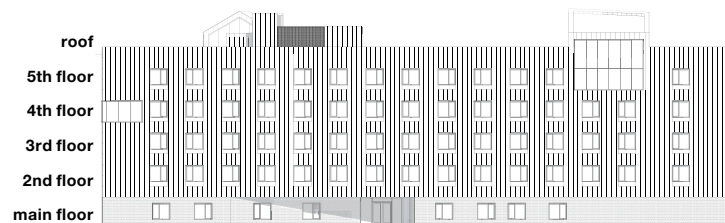
Longitudinal Section



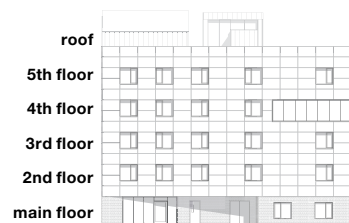
Cross Sections

Structure

The Red Deer College Student Residence superstructure was decided through a Choosing by Advantages (CBA) collaborative team exercise where concrete, steel, wood and com-slab were compared “apples to apples.” The Integrated Project Delivery (IPD) team decided to take advantage of the newly adopted ABC-2014 code article 3.2.2.50, to build a five-storey hybrid structure composed of glulam posts and lintels, glulam floor panels, dimensional lumber and a steel skeleton (the first storey) to support the glulam transfer slab.



North Elevation



East Elevation



West Elevation



South Elevation





Using LEED Gold standards as a guideline, the building was designed with all LED lighting, a locally controlled 90-percent-efficient HVAC system, R35 walls, R45 roof, R7 windows and Passive House Certified fibreglass curtain wall that exceed the prescriptive requirements of the National Energy Code for Buildings. To improve the health and wellness of occupants, special attention was given to maximizing interior walkability and minimizing the use of the elevator, while a generous bike room is provided right beside the main entry. Low-VOC materials and a no-PVC policy, waste management control, indoor

plants and operable windows for natural ventilation all contribute further to the healthy atmosphere. Additional sustainable features include low-flow plumbing fixtures, a reduced parking stall count and a design that maximizes solar heat gain in winter. Most significantly, a 153-kW photovoltaic array is integrated into the exterior facade to offset energy demand; before funding for the solar panels was confirmed, the designers had envisioned building the podium in black brick, to pay homage to the nearby Arthur Erickson-designed Arts Centre.



Varied floor plans with a well-mapped pedestrian path accommodate the integration of seven connected common spaces, each of which is unique in form and program. The spaces link together starting with the entrance, reception and feature stair, which connect to the main floor lounge and communal kitchen; on the second floor, a tree room/relaxation space and multipurpose stair/stage/movie area provide two distinct areas for socialization, while a study space and reading/meeting room on the

fourth and fifth floors allow for academic activities. On the top floor, the common area is a multipurpose space designed for socialization. On each floor, laundry rooms include seating and work areas, while several lounge rooms are strategically placed throughout the building to supplement the larger common spaces, with views into the atrium through expansive, full-height glazed walls. These design details contribute to an open, communal atmosphere that is filled with ambient light and lively activity.



During design development of floor layouts and further detailing of student units, a full-scale mockup of a typical student unit was built and placed on the RDC Campus, for student and faculty to visit and critique. An expandable midline allowed for a variable width, which contributed

to the decision of adding four inches to the original plan to expand the bathroom width and space between the bed and desk. This adjustment resulted in a drop from 150 units overall to 145, with an improved ergonomic design for each unit.

Materials

STRUCTURAL

Frame:

Glulam posts and lintels on floors two through five, steel skeleton on main floor.

Floor and roof systems:

800-mm-wide and 130-mm-thick spruce pine glulam panels, Westdek by Western Archrib.

Load-bearing walls and interior partitioning:

38 x 140 mm dimensional lumber.

EXTERIOR

Siding:

Black PV modules on east, south and west facades, with galvanized corrugated metal sheeting on the north facade; black brick on main floor.

Roofing:

SBS two-ply roofing system and black standing seam metal roofing.

Windows/doors:

Fibreglass punched windows, Glass Curtain Passive House Certified fibreglass curtainwall, all triple-glazed with two low-E coatings; aluminum doors.

Landscape:

Excavated soil was kept on site to form landscaped berms that mimic the rolling hills of the Albertan prairies.

Special technical considerations: The architects utilized the CSA-O86 Annex B Method, also known as the “char-rate method” to satisfy the intent of the code. The 130-mm-thick GLT panels covered with a solid 19-mm plywood diaphragm would meet and/or exceed the Code requirement of 1 h Fire Resistance Rating [FRR]. ABC-2014 Article 3.2.2.50, which permits up to six-storey tall wooden structures.



INTERIOR

Ceilings:

All ceilings in exposed spruce pine wood from superstructure.

Millwork:

Reception desk and student cantina tables created from GLT floor panel offcuts.



Site Location On Red Deer College Map



Southwest View

a detailed design mandate and a baseline, market-based budget that are evaluated by all participating parties to determine opportunities for improvement and savings. The advantage and incentive for all teams – in this case, 12 partners including the client, the architects, engineers, contractors, framers, steel suppliers and others – is a collaborative process and a share of both risks and profits that are the result of savings in relation to the baseline budget. This ensures efficiency in materials and labour; when one department saves money, all parties benefit. As Škopac notes, this process also provides transparency to the client, so there are no hidden costs. At every stage, the partners validate the design details and then seek further efficiencies.

The building went through the typical design steps, from hand sketches and conceptual modelling in Rhino to a more complicated BIM software platform; at that stage, the designers realized that adding the interior details was going to require more time and resources than necessary. Rather than use computer-aided design, a simpler solution was considered and implemented: by hand-drawing all the building details, the team managed to “LEAN-up” their design process. “It was a huge time saver,” admits Škopac. “We were so pleased with it, we considered doing it with every project.”

Because Manasc Isaac also developed the master plan for the site, which will include two or three additional buildings, the firm envisioned how the RDC Student Residence would integrate into the overall setting, both in relation to the campus and the nearby wetlands, which are protected both provincially and federally. “All parties agreed that nature should be preserved, so we built around it,” Škopac explains. “We ended up with this elongated rectangle and we decided to rotate it towards the wetland, so essentially one corner is in dialogue with the campus, while one corner is in dialogue with nature. That gave us the opportunity to eliminate corridors in the building; therefore, having the building narrow on one end helped us decrease the spacing between the north and south sides.”

Technology & Design

The highly collaborative team used an Integrated Project Delivery (IPD) poly-party contract to guide the project’s development. The building design was developed through a series of integrative workshops, presentations, community engagement and a collaborative iterative process which was based on considering the project’s values and programmatic necessities established at the beginning of the project.

Several years ago, Manasc Isaac was among the first architecture firms in Canada to use the IPD process, which starts by establishing



Red Deer College Residence Masterplan



Conclusion

Red Deer College Student Residence is a case study of a design driven by the needs of its diverse and distinct inhabitants, considering not only the health and well-being of students but also the structure's environmental impact, both on the site and overall. It is a beacon project that generated remarkable socio-economic benefits by supporting local trades and providing a new link between the wetlands and campus life. Within the building, a focus on cohesiveness unites public and private spaces to encourage interaction, with inviting common areas to accommodate a variety of activities. From start to finish, this project is an example of highly successful collaborative design.





Project Team

Owner

Red Deer College
100 College Ave.
Red Deer, AB T4N 5H5

Architect

Manasc Isaac Architects
10225 100 Ave. NW
Edmonton, AB T5J 0A1
Tel: 780.429.3977
manascisaac.com

Structural Engineer

RJC
17415 102 Ave. NW #100
Edmonton, AB T5S 1J8
Tel: 780.452.2325
rjc.ca

General Contractor

Clark Builders
5555 Calgary Trail NW #800
Edmonton, AB T6H 5P9
Tel: 780.395.3300
clarkbuilders.com

Wood Supplier

Western Archrib
4315 92 Ave NW
Edmonton, AB T6B 3M7
Tel: 780.465.9771
westernarchrib.com



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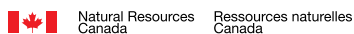
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 Alberta Wood WORKS!: 780.392.1952
 BC Wood WORKS!: 877.929.WOOD (9663)
 Quebec — Cecobois: 418.650.7193
 Atlantic Wood WORKS!: 902.667.3889
 Wood WORKS! National Office: 800.463.5091
 US Program: help@woodworks.org

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