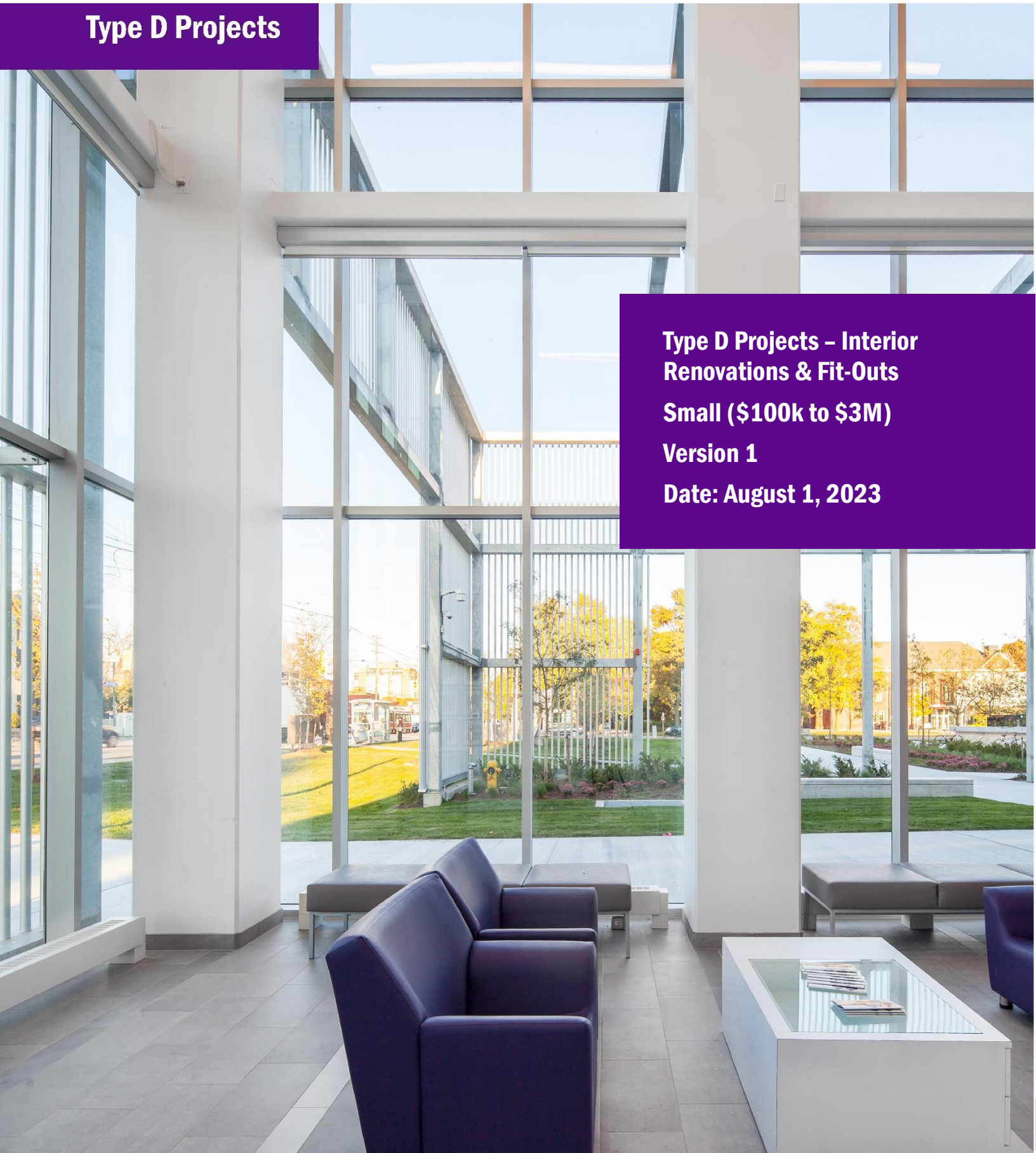
HUMBER ENERGY MASTERPLAN

# Green Building Standards

## Type D Projects



**Type D Projects – Interior Renovations & Fit-Outs**

**Small ($100k to $3M)**

**Version 1**

**Date: August 1, 2023**

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# INTRODUCTION

## 1.0 Purpose

Sustainability is one of Humber College's core values and we strive to be national leaders in sustainable development and campus operations. Humber continues to push the boundaries of low and zero-carbon, sustainable, healthy and resilient infrastructure across our campuses through our various strategic plans and initiatives: Sustainability Plan 2019-2024, Integrated Energy Master Plan and Climate Action Plan.

These Green Building Standards mandate sustainability requirements for the various types of construction projects at the College. There is a particular emphasis on the design and construction teams to demonstrate compliance with the requirements through very clear deliverables. It is the responsibility of design and construction teams to ensure these requirements are captured in design documents and implemented during construction.

The goals are simple; clearly communicate our sustainability objectives, demonstrating leadership and accelerating market transformation.

## 2.0 Project Types

### 2.1 General

There are various types of construction projects implemented at the College and the sustainability requirements will vary based on the size and complexity of the project. In order to standardize the requirements, projects are divided into the four main project types described in Sections 2.1.1 to 2.1.4 below. This document specifically focuses on the requirements for **Type D projects**.

#### 2.1.1 Type A – New Buildings, Additions & Major Renovations - Large (>2500m², >$15M)

- This project type applies to larger new buildings or major building renovations. Typically, these projects would impact over 2,500m² of floor area or have a capital budget exceeding $15M.

For a renovation to be considered major, the entire building would typically need to be unoccupied during construction and include extensive alteration work in addition to work on the exterior shell of the building and/or primary structural components and/or the core and peripheral MEP (mechanical-electrical-plumbing).

### 2.1.2 Type B – New Buildings, Additions & Major Renovations - Small (<2500m², <$15M)

- This project type applies to smaller new buildings, additions or major building renovations. Typically, these projects would impact less than 2,500m² of floor area or have a capital budget below $15M. For a renovation to be considered major, the entire building would typically need to be unoccupied during construction and include extensive alteration work in addition to work on the exterior shell of the building and/or primary structural components and/or the core and peripheral MEP (mechanical-electrical-plumbing).

### 2.1.3 Type C – Interior Renovations & Fit-Outs - Large (>$3M)

- This project type applies to larger interior renovations & fit-outs that have a capital budget exceeding $3M.

### 2.1.4 Type D – Interior Renovations & Fit-Outs – Small ($100k to $3M)

- This project type applies to smaller interior renovations & fit-outs that have a capital budget below $3M.

## TYPE D PROJECTS – INTERIOR RENOVATIONS & FIT-OUTS – SMALL ($100k to $3M)

# 3.0 Environmental Protection and Sustainability

## 3.1 General

- Humber has developed environmental guidelines for Contractors in its Contractor Handbook. The Contractor Handbook outlines specific requirements and responsibilities of the contractor related to waste management, hazardous materials, energy & water conservation and site clearing. Please refer to the Contractor Handbook for further details and deliverables.

# 4.0 Greenhouse Gas Emissions & Energy Efficiency

## 4.1 Mechanical & Electrical Design

- Humber has robust standards, specifications and design guidelines which were designed with energy efficiency and sustainability in mind.

- Deliverables
    - Provide to 75% Construction Documents, provide a completed M&E Design Checklist.

## 4.2 Building Envelope Requirements

- For projects with a building envelope component, the following requirements must be met:

    - Thermal Transmittance of Windows and other glazing systems (Entire Assembly: IGU + Frames):

        - Punched Windows & Curtain Wall: Triple Pane, U<1.0 W/m2K
        - Operable Windows: Triple Pane, U<U=1.2 W/m2K

- Walls, Above Grade (Entire Assembly):
    - The conditions will vary significantly for each project. Instead of providing a prescriptive requirement, the intent is to maximize the thermal performance of the effected wall (i.e. increase insulation beyond building code and reduce thermal bridging)

# 5.0 Health & Wellness

## 5.1 Encourage Physical Activity

- Where a staircase is included in the space it shall be updated to consider the aesthetic design. The aesthetic design shall include two of the following:
    - Music;
    - Artwork;
    - 20 fc light level;
    - Natural design elements (e.g. plants, water features, images of nature); and/or
    - Gamification.

## 5.2 Mental Wellbeing

- In order to meet the requirements for enhancing the mental well-being of building occupants the following is required:
    - A combination of plants (e.g., potted plants, plant walls), nature views, and natural materials, patterns, shapes, colors, and/or images within the common spaces.
    - Design elements intended for human delight that celebrate culture (e.g., culture of occupants, workplace, surrounding community), celebrate place (e.g., local architecture, materials, flora, artists), and integrate art.

- Strive to achieve the following:

    - 70% of all workstations are within 7.5 m of transparent envelope glazing

## 5.3 Ergonomics

- Workstation seating must allow for height, depth, backrest, and armrest adjustment.

## 5.4 Occupant Comfort

- All vertical transparent envelope glazing must include manual shading that is controllable by building occupants at all times.
- Retain a specialty acoustics consultant with extensive experience addressing acoustic concerns in post-secondary institutions. The consultant will be responsible for providing a detailed report that describes the existing conditions, recommended solutions, and measurement results. The report shall outline acoustical solutions with a focus on managing background noise, speech privacy, reverberation time, and/or impact noise.

## 5.5 Occupant Safety

- In order to meet the requirements for safe stair access a minimum of two of the following is required for all stairs:
    - handrails located on two sides;
    - high-contrast tread edges with matte finishes to avoid glare;

    - lighting to illuminate dark corners and/or entrances and exits; and/or
    - visual cues (with paint, lighting, tape) to highlight edges, entrances, exits, or obstacles.
- All bathrooms shall meet the following requirements:
    - Trash receptacles are provided in stalls (in women's and single-user bathrooms);
    - A hook, shelf, or equivalent storage support is provided in each toilet stall;
    - Floor drains are equipped with a self-primed liquid-seal trap.

### 5.6 Deliverables

- As part of the 75% Construction Documents submission, provide a memo report describing how the health and wellness requirements are implemented and the rationale for any items that were not included in the design.

## 6.0 Resiliency & Climate Readiness

### 6.1 General

- Our infrastructure needs to be ready to withstand the impacts of climate change and extreme weather expected in the future. The overall impact of changes in Toronto's climate on infrastructure includes: higher risk of flooding events, extreme heat and cold events and power outages. To reduce the impact of these expected changes, new development must be constructed in such a way to mitigate floods, improve thermal resilience and ensure critical needs are on back-up power generation.

- The intent of this section is to outline the key design strategies that will reduce risk and life cycle costs of the Humber's infrastructure due to predicted climate change in the Toronto area.

### 6.2 Flooding

- Risks due to increased precipitation and flooding are mitigated through the following:

    - Locate ground floor electrical circuits in the ceiling

    - Specify watertight utility conduits

### 6.3 Extreme Heat & Cold

- Risks due to extreme heat & cold are mitigated through requirements for a high-performance building envelope and operable windows – all referenced in other parts of this standard.

### 6.4 Power Outages

- Risks due to power outages will be mitigated through robust back-up power generation infrastructure and ensuring that critical functions are on emergency power. There is also a focus on centralizing Heating and Cooling infrastructure through connection to District Energy/Central Plant systems at our main campuses. Project must meet the following requirements:

    - To prevent freezing risk, pipes must be run through interior walls

    - Ensure the following services are on emergency power:

        - Emergency lighting

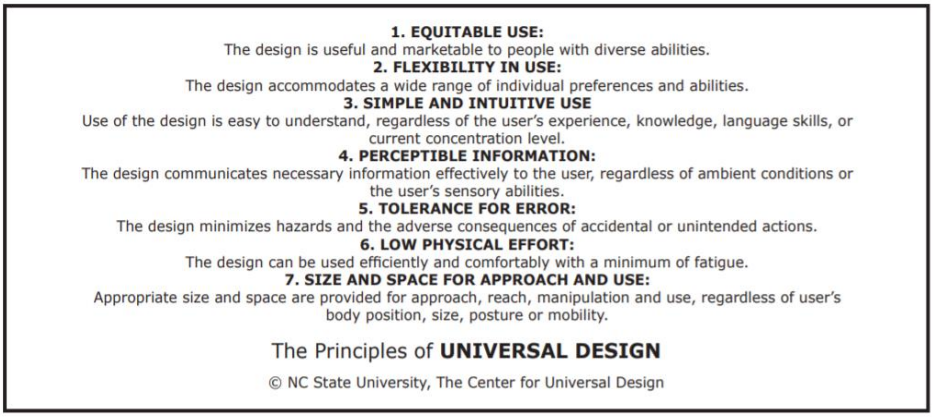
- Fire Protection Equipment
- Passenger elevators (minimum one per bank)
- Space heating - This includes all central equipment (e.g. boilers, distribution/circulation pumps) and local devices required to prevent freezing, as well as their associated building automation system controls.
- Sump Pumps
- Security Cameras
- Flush Valves & Faucets
- Commercial fridges and freezers

### 6.5 Deliverables

- As part of the 75% Construction Documents submission, provide a memo report describing how the resiliency requirements are implemented and the rationale for any items that were not included in the design.

## 7.0 Accessibility

- Humber is committed to creating barrier free campuses in compliance with the Accessibility for Ontarians with Disabilities Act (AODA). We strive to meet or exceed best practice.
- Our standard is aligned with the concept of universal design, "The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."




- Humber has adopted Brock Universities Facility Accessibility Standard for all new construction and renovations and projects must comply with its requirements: https://brocku.ca/human-rights/wp-content/uploads/sites/208/2014-Facility-Accessibility-Design-Standards.pdf. This standard was developed based on the City of London FADS 2006 standard, customized for a post-secondary environment. This standard goes beyond the Building Code requirements.

# 8.0 Other

## 8.1 Waste and Recycling Infrastructure

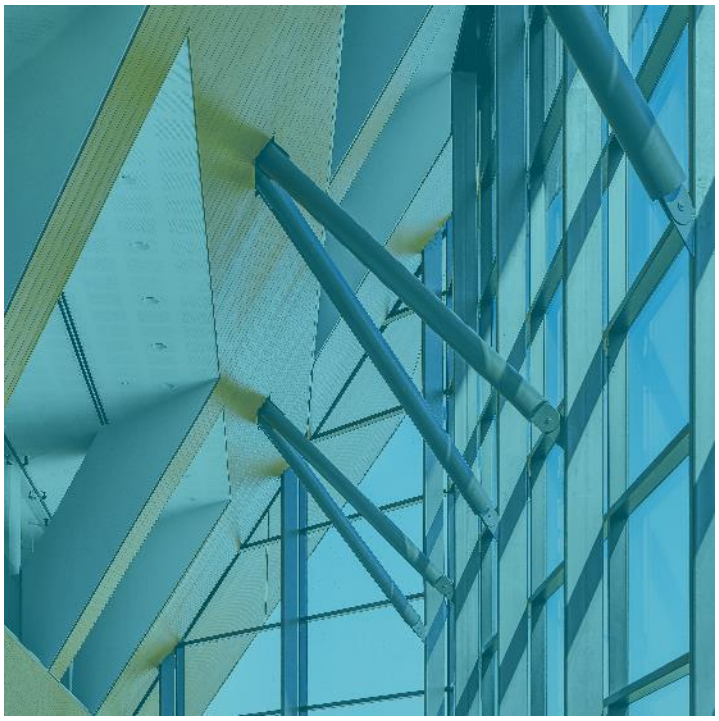
- Include sufficient centralized waste sorter bins – front loading colour-coded bins with different openings for each stream and include backboards for signage. Depending on the location, 3 or 4 sections will be required in the sorter bin. The specification is available here: Clean River
- Building designs must consider the reduction and flow of ongoing waste generated within the buildings once in use.
- Consider layout of waste storage room/space, accessibility for staff as well as trucks that are removing the waste, noise, time of day, etc.
- For all projects, representatives from the Office of Sustainability must be invited to a meeting to review requirements for dishwashing (where applicable) and waste management.

- Deliverables:
    - With the Issued for 75% Construction Documents, submit bin types and placement within project to Sustainability Office (sustainability@humber.ca) for review and confirmation prior to order.

## 8.2 Electric Vehicle (EV) Chargers

- If EV chargers are deemed necessary for the project, EV parking must be Level 2 Chargepoint stations.

# APPENDICES



## APPENDIX A: Green Project Summary Example

# Barrett Centre for Technology Innovation

HUMBER
Office of Sustainability

Green Building Project Summaries
Barrett Centre for Technology Innovation
Opening Day: 4/1/2019

ENERGY MASTERPLAN

| | Project Team |
|---|---|
| Project Manager | Colliers Project Leaders |
| Architect | Perkins&Will |
| Contractor | BIRD Construction |
| LEED Consultant | Fluent Group Consulting Engineering Inc. |
| Structural Engineer | Thornton Tomasetti |
| Mechanical Engineer | MCW Consultants |
| Building Science Professional | RDH Building Science Inc. |
| Building Code Consultant | LRI |
| Acoustical Consultant | Aercoustics |
| Accessibility Consultant | DesignABLE Environments |

The Barrett Centre for Technology Innovation (Barrett CTI) pioneers a new educational model, focusing on sustainable building practices, automated manufacturing and human-centred solutions for the 21st century. Located at Humber's North Campus, the 93,000-square-foot facility is a living laboratory that omits traditional classrooms entirely. Interdisciplinary teams of students, faculty, industry partners and community members make use of interactive technology zones, digital media studios, cutting-edge prototyping and maker spaces, interactive demonstration areas and flexible open concept gathering spaces.

The central atrium, which is the grand entrance to the building and campus life, is a dynamic location to meet, work and socialize. The expansive space is utilized for idea-sharing, showcasing new products and exploring new technologies. Residential suites on the top floor allow industry advisors to live on-site while working on projects. Designed to inspire innovation, the Barrett CTI will enable students to immerse themselves in world-class technologies and mend the gap between education and real-world experiences.

The Barrett CTI is certified LEED-Platinum and the second-largest net-zero energy building in Canada at the time of construction, reflecting Humber's commitment to providing national leadership in sustainable campuses. The sustainability features also function as teaching tools and include:

- Passive heating and cooling systems;
- A high-performance roofing system and building envelope;
- Hydronic in-floor heating;
- An abundance of natural, low-energy materials with long lifespans;
- A green roof.

Several "truth windows" allow onlookers to view the buildings' inner workings, another vital tool for teaching and learning.

## Project Highlights

| | |
|---|---|
| 65% | Reduction in energy use compared to baseline building |
| 85% | Construction waste diverted from landfill |
| 34% | Of materials were locally sourced (within 800 km) |
| 40% | Reduction in water use compared to baseline building |
| 24% | Recycled content in building construction materials |

# Project Overview

## Part of the Community

The Barrett CTI reaches beyond student life; the buildings' future-focused design compliments the surrounding network of campus open spaces and inspires innovation. The gravity-defying infrastructure is accessible and interactive, inviting community members to explore the area. The strategically placed building creates a new community hub for the rapidly growing campus. Connecting to trails, bike parking, and existing and new transit structures, including development of a light-rail transit (LRT)—the Barrett CTI is a gateway to campus life and the vibrant local community.

## Energy, Water & GHG Efficiency

- **Energy Target:** The Barrett CTI aligns with Humber's long-term Integrated Energy Master Plan, which mandates that all new campus buildings achieve an energy use intensity (EUI) of 100kWh/m2/year. This aggressive EUI led to design interventions that used a conservation-first approach.
- **Passive Heating & Cooling Systems:** The base building design for the Barrett CTI prioritized passive strategies and extensive energy conservation measures, including a moderate glazing-to-wall ratio of 40% focuses on glazing on where daylight is needed most in occupied areas; Brise Soleil shading devices on the south façade minimize heat gain and glare; and a multi-storey thermal chimney which allows natural ventilation in mild weather and 100% natural daylighting.
- **High Efficiency HVAC:** The building is provided with 95% efficient condensing style boilers serving DHW and service heating loop; dedicated outdoor air system with energy recovery enthalpy wheels to temper outside air and reduce energy, and distributed fan coils until to cut transmission energy use with hydronic systems instead of central systems.
- **Net-Zero Energy:** The Barrett CTI is a net-zero energy building, the 700 KW-DC (580kW-AC) solar installation on the adjacent parking structure generates enough renewable energy to offset the buildings' annual energy use.
- **High-Performance Roofing System & Building Envelope:** Parametric design analysis, including solar and radiation, wind and day-lighting penetration, optimized both the massing and envelope resulting in a highly insulated façade and concrete floors acting as thermal mass in the lobby.
- **Green Roof:** The building maximizes green spaces and has a partly vegetated enclosed roof and garden to manage stormwater runoff and mitigate potential infrastructure failure and associated financial burdens. The green roof engages students in the concepts of wellness and environmental stewardship.