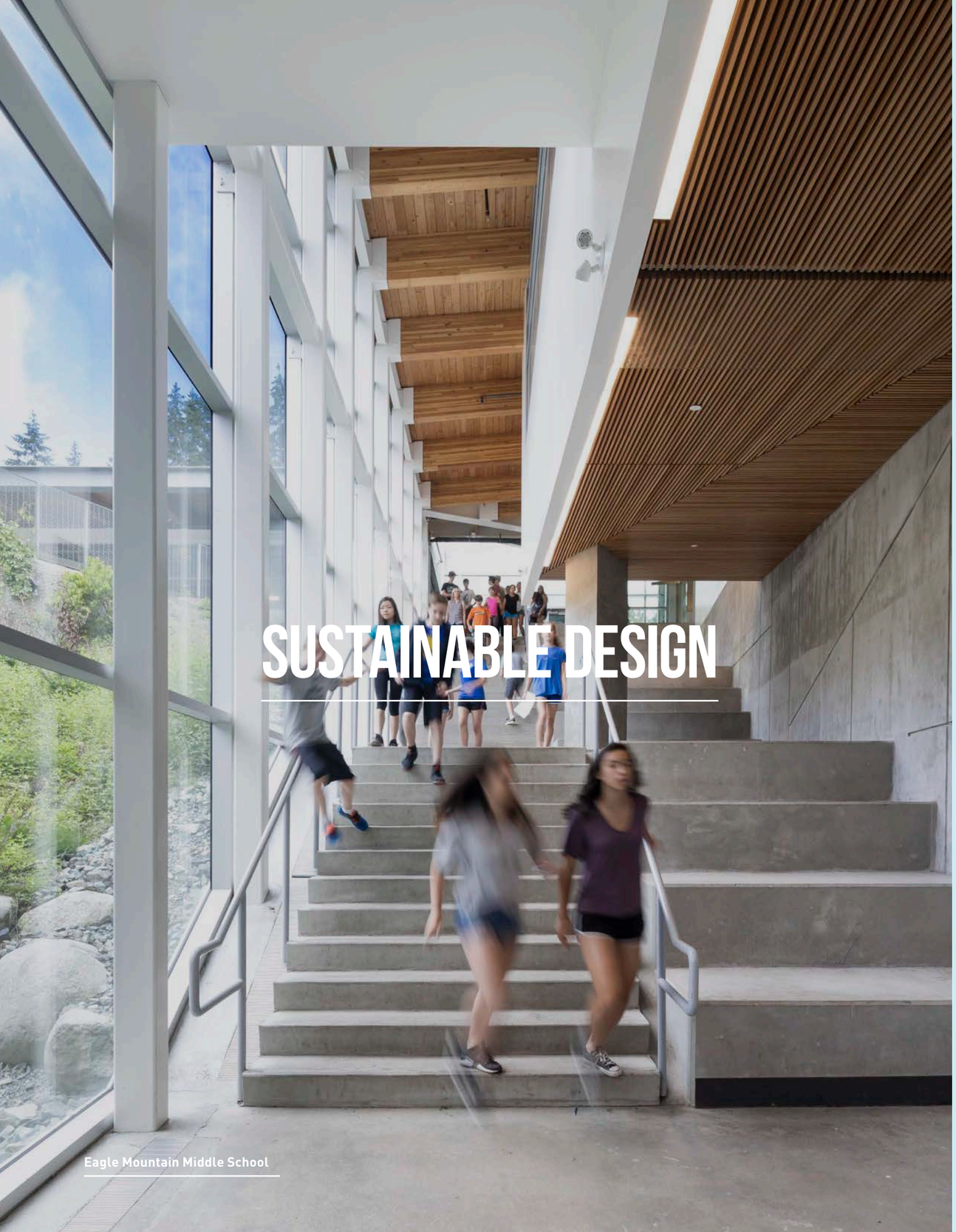
MASS TIMBER

B+H

2020

CONTENTS



SUSTAINABLE DESIGN

Eagle Mountain Middle School

Sustainabilty

Our design philosophy distinguishes between buildings that are merely built, and buildings that are livable, functional, resilient, and sustainable. To B+H, this distinction is critical: sustainable design is not an isolated element. Through evidence-based design, our experienced team of leaders in sustainability are actively engaged in the industry and are designers of, and advocates for, healthy communities. Our most recent involvement with the new Joyce Centre for Partnership & Innovation at Mohawk College in Hamilton, Ontario, marks our dedication to advancing sustainable design. One of sixteen building projects that are a part of the 2-year pilot program for the Zero Carbon Building Standard, this net zero facility takes a progressive approach to the typical design process, rooting design in the development of an energy budget. It is our commitment to create solutions that contribute to the wellbeing of people and the planet, while also meeting user and client needs through healthy environments and operational savings.

60+

projects certified or targeting LEED® Gold or Platinum

Our TD Centre project was the

first

existing building in North America to achieve WELL Building Standard Certification

70+

of our staff are LEED® AP. Many of them work with leading orgs like CaGBC and UNEP

We're the only architecture practice have won the BOMA Earth Award

four times

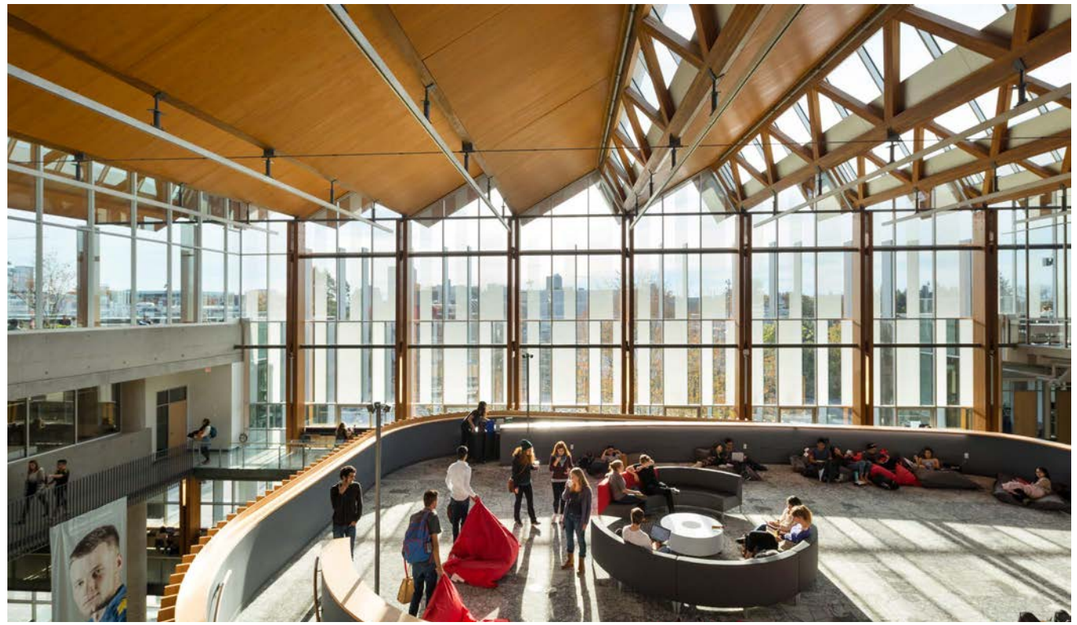
EXPERIENCE WITH MASS TIMBER

University of Windsor – Ed Lumley Centre for Engineering Innovation (B+H + Dialog in Association)

EXPERIENCE WITH MASS TIMBER

We adore wood in buildings. There is something very compelling, synchronistic and natural about the material. With respect to net-positive life cycle performance, wood is the immediate choice. As all materials have innate sensibility and techtonics, one must exert careful attention to the natural qualities of wood structures. Connections are of paramount importance. The distributed configuration of lateral bracing elements, to make manageable the loads for our connections, is critical. Wood lateral systems need to be considered uniquely – in distinction to steel or concrete systems. However, hybrid structures can allow for flexibility and expeditious approvals. We feel a unique strategy of perimeter shear panels in conjunction with more sizable interior lateral restraint mechanisms (e.g. CLT or concrete cores, like Brock Commons) can create a very flexible platform for deployment of the program.

We strive to include wood in as many of our projects as possible -- whenever the client has an appetite. We feel wood has many very tangible benefits to other building materials: its warmth and delight, its durability and fire safety performance, and its very low carbon footprint. Wood is the sustainable choice. We have excellent experience in the deployment of glue-laminated structures and CLT panels for many of the institutional projects in our portfolio.



University of British Columbia – AMS Nest, Vancouver

KWANTLEN POLYTECHNIC UNIVERSITY
TRADES & TECHNOLOGY CENTRE

CELEBRATING CRAFTSMANSHIP

This signature building creates a new gateway to Kwantlen Polytechnic University's high-tech facility for trades, technology and applied training programs. The facility provides direct connectivity and views to the outdoors, which is predominated by an indoor 'covered street' which provides visual and physical access to every floor and ensures optimum natural light and ventilation. The atrium features an expressive double height glu-laminated structure and a series of skylights which allow natural daylight to illuminate the space which is augmented with multi-coloured glazing. The celebration of craftsmanship is put on display throughout the facility to further enhance the learning experience for students. The centre's anticipated 30% (approximate) savings in energy usage is sufficient to power 19 typical Vancouver homes annually.

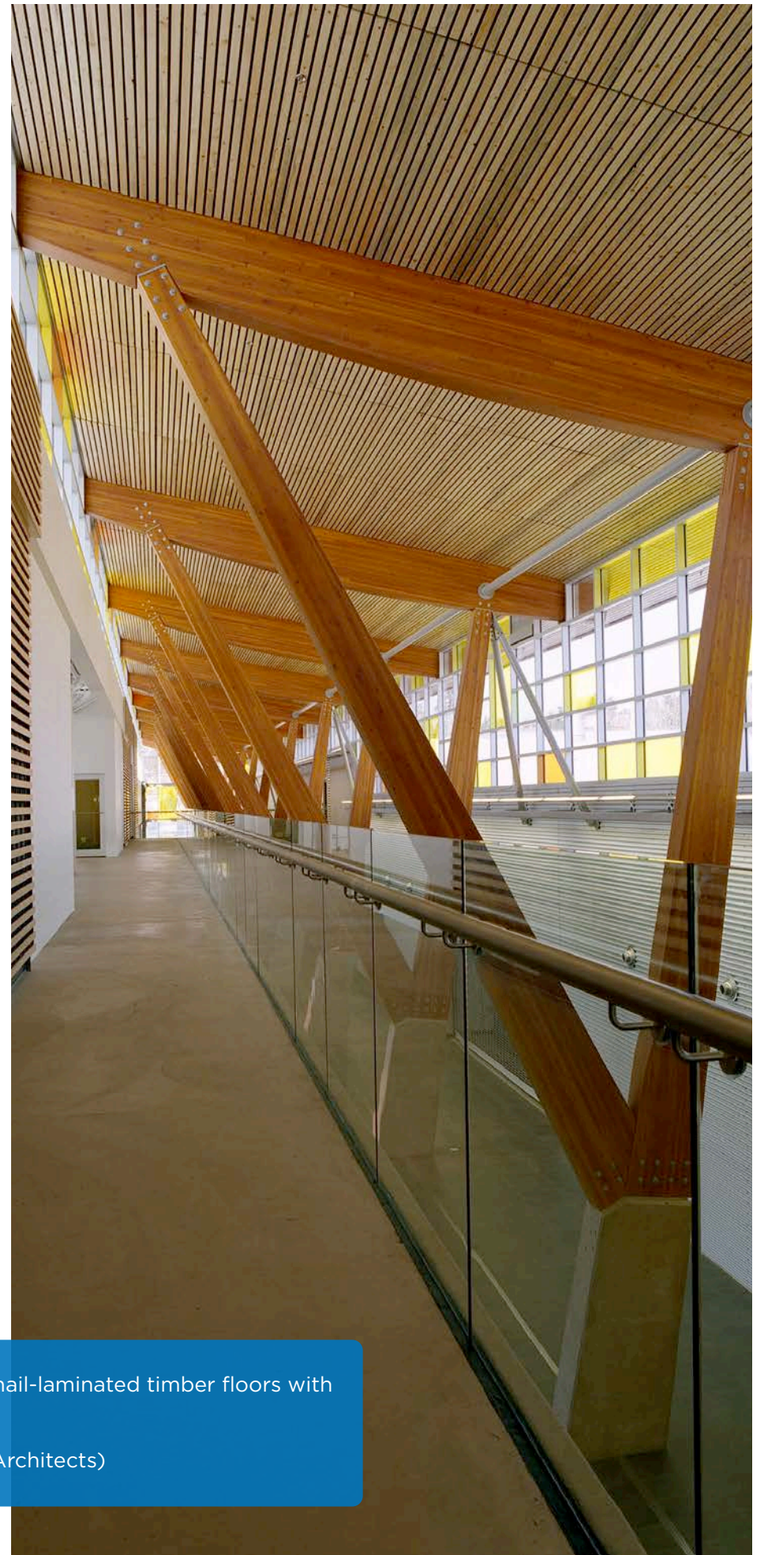
Awards

Consulting Engineers of British Columbia Engineering
Excellence Award of Merit (Awarded to Bunting Coady Architects who merged with B+H in December 2010)

Wood Design Award (Awarded to Bunting Coady Architects who merged with B+H in December 2010)

Location Surrey, Canada
Size 185,140 ft² | 17,200 m²
Status Completed 2007
Client Kwantlen Polytechnic University
Certification LEED® USGBC-NC Gold

Mass Timber Type: Nail-laminated timber, Glulam
Structural System: Hybrid timber / steel / concrete, nail-laminated timber floors with concrete topping
Manufacturer/Supplier: Structurlam
Architect: B+H Architects (formerly Bunting Coady Architects)
Structural Engineer: Bush Bohlman



AMS NEST UNIVERSITY OF BRITISH COLUMBIA

AN INSPIRING ‘HOME’ ON CAMPUS

PROJECT DESCRIPTION

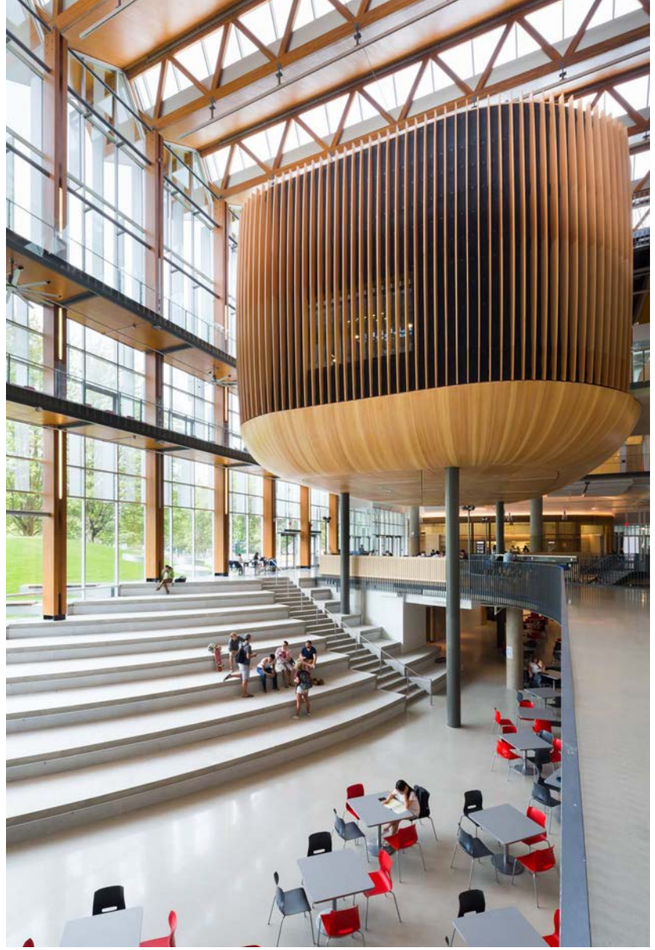
The B+H + DIALOG design for the AMS Nest at UBC strives to be a model community, sustainable and physically interconnected, ecologically, socially, financially sustainable, and characterized by inspirational architecture, dignified spaces and exciting landscapes that provide high-quality experiences for students. It assists in creating a campus that attracts the best students from all over the world. The Nest creates a global benchmark for social and ecological sustainable design excellence. It functions like an agora; a facility that provides an arena for the community to express its values. It is a space where the culture of the community flourishes. Local values can be engaged in light of global concerns – a local presence within a global network. This collaborative venture between B+H and DIALOG demonstrates our commitment to working together, and expresses the power of true teamwork to advance the goals and aspirations of the University through sound urban design, architecture and sustainability.

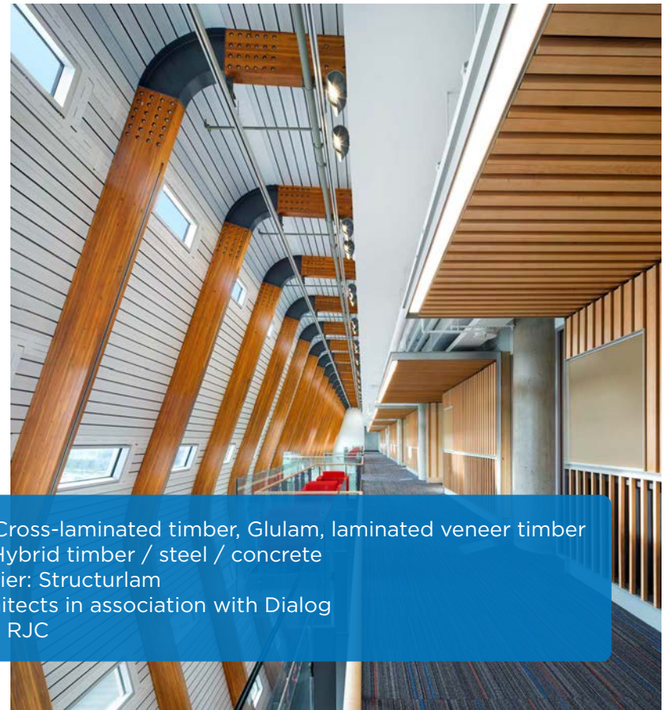
The range of services that the Nest offers to the University students includes counseling, bike rentals, food, classrooms, and meeting rooms in a variety of sizes, club offices, martial arts studio and retail. The project was designed to support the student’s desire for transparency. The AMS Nest was built in one of the most dense, centrally located campus areas, resulting in a five story structure that achieved a remarkable level of openness and visibility.

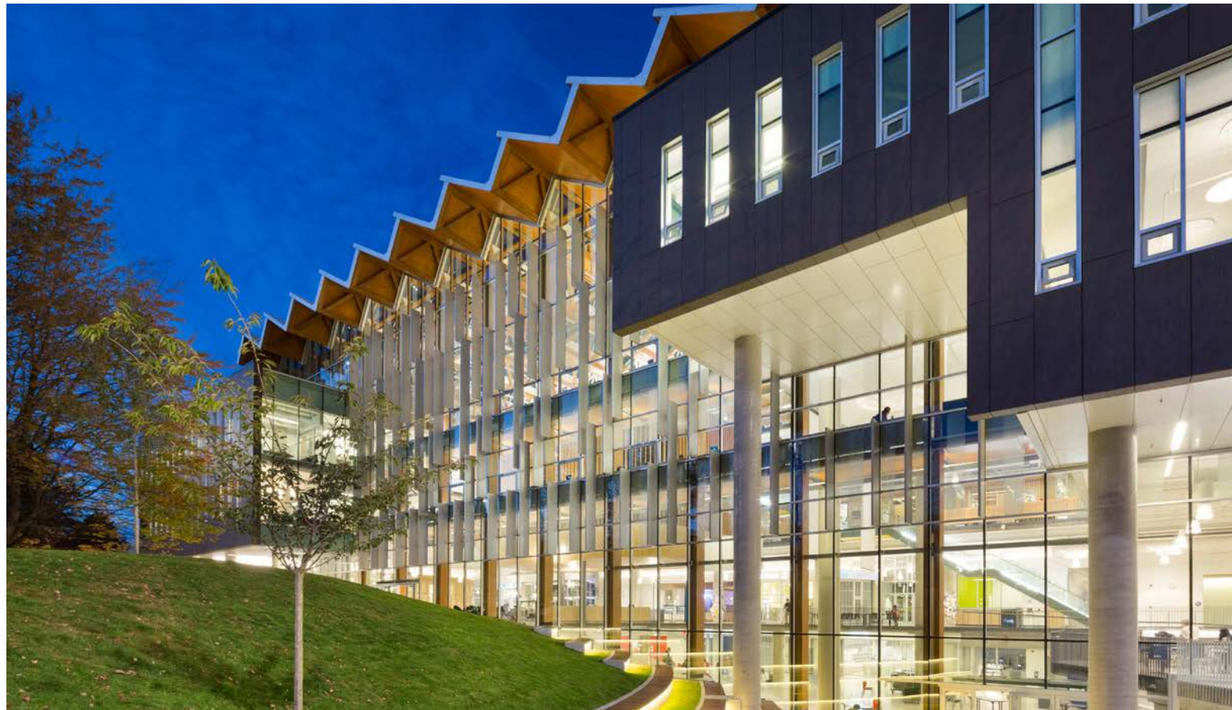
Location Vancouver, Canada
Size 251,050 ft² | 23,320 m²
Status Completed 2015
Client UBC Alma Mater Society
Certification LEED® Canada-NC Platinum
Photography Ema Peter

SUSTAINABLE DESIGN

Our AMS Nest used innovative glulam trusses and CLT roof panels to span voluminous central public spaces. We convinced the authorities that this system was fire-safe and thereby afforded the wonderful warm expression and low carbon footprint wood provides. Careful design and detailing were required to keep connections elegant and members light and slim. Paired triple height glulam columns act to support both the atrium roof trusses and the glazed façade. The roof trusses are also glulam, which allow light to fill the public spaces. CLT panels work structurally to span the roof portions but also to stiffen the trusses – their combined action optimizing the performance, lessening the depth and member sizing. The building code classification was non-combustible, but detailed and collaborative work with the AHJ, fire safety engineers and structural engineers garnered consensus and speedy approvals.







Mass Timber Type: Cross-laminated timber, Glulam, laminated veneer timber
Structural System: Hybrid timber / steel / concrete
Manufacturer/Supplier: Structurlam
Architect: B+H Architects in association with Dialog
Structural Engineer: RJC

ED LUMLEY CENTRE FOR ENGINEERING INNOVATION
UNIVERSITY OF WINDSOR

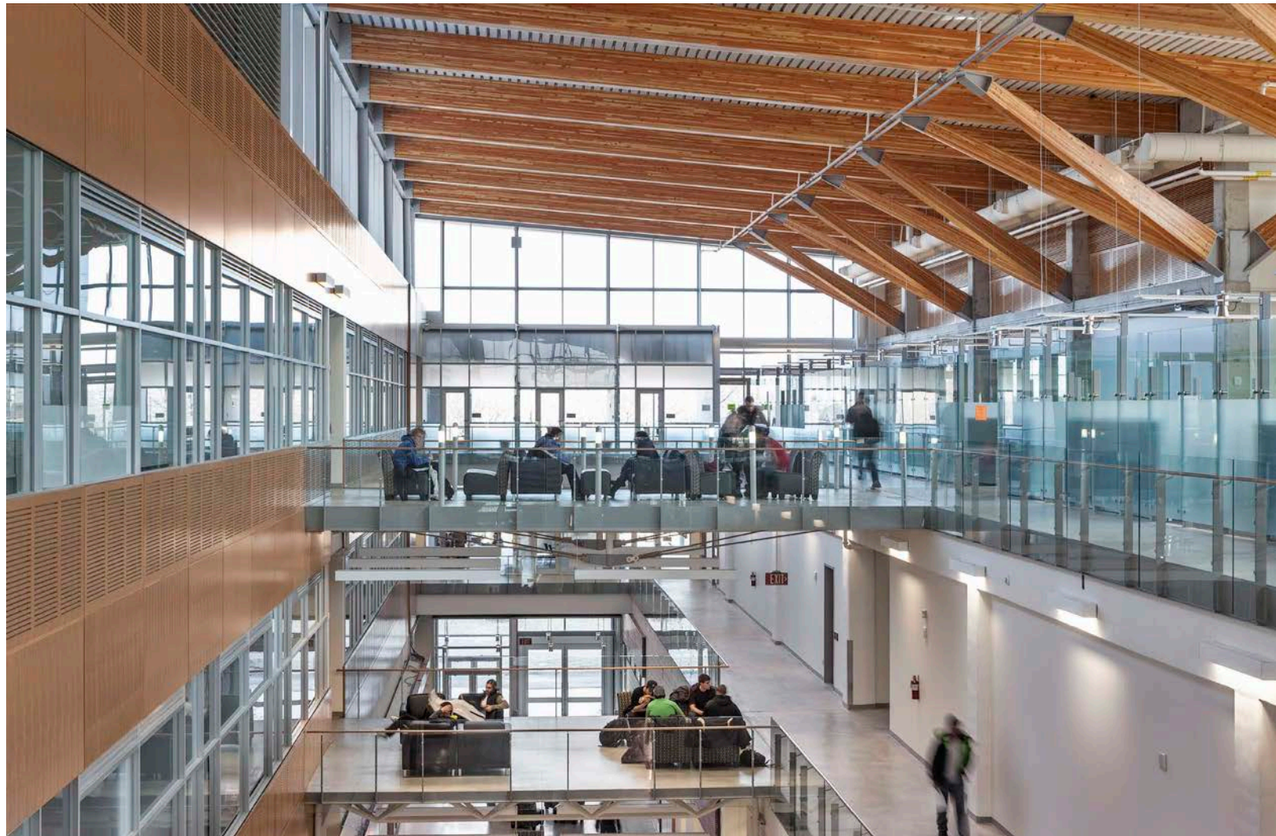
BUILDING A LEGACY

PROJECT DESCRIPTION

B+H was awarded the opportunity as lead architect to deliver an innovative multi-storey 310,000 ft2 educational facility. The building includes faculty offices, flexible high-tech classrooms, specialized research labs, student study, and activity spaces. Registered and targeting LEED Gold certification, it includes leading-edge sustainable technologies and live building monitoring systems to energize student learning while reducing energy consumption. The project was designed in conjunction with University focus groups to develop and design the LIVE building design mandate. This mandate develops the building as a learning tool, onto itself – hence the name LIVE – seeing the building perform, as if figuratively alive. Students can observe the building and see systems and design strategies in place and operation. Because of the challenging scale and scope of the project, B+H was able to use our technical resources which resulted in a complex, technically sophisticated research space and an innovative technology incubator. The project provides leading edge sustainable design; through an extensive user and stakeholder engagement process with highly successful collaboration in developing a multi-user plans with highly customized teaching spaces. The University of Windsor requested a diverse employment of structural materials; and with enthusiasm they supported our design utilizing structural glue-laminated timber. The public spaces and atria of the laboratory and teaching facility are adorned with the expressiveness and warmth of glulam columns and rafters. As well, our solar shading strategy relies on exterior glue-laminated timber fins to block the solar radiation and give the exterior a rich texture and elegant aspect.

SUSTAINABLE DESIGN

Our University of Windsor Centre for Engineering Innovation design uses glue-laminated roof structure to enhance the central public atrium that links the entire facility. Tree-type columns bind to long-span glulam beams. The laminated Douglas fir wood is warm and textural. This robust building is softened; and welcomes the students and researchers into soaring interior spaces, peppered with informal study and lounge spaces. Acoustic lined Douglas fir plywood panels work in concert to attenuate sound and synchronize with the exposed structure. This wood motif is loved by the occupants.



Location Windsor, Canada
Size 310,000 ft² | 28,800 m²
Status Completed 2013
Client University of Windsor
Certification Registered & targeting LEED® NC Gold
Photography Toni Hafkenschield

Mass Timber Type: Glulam
Structural System: Hybrid timber / steel / concrete
Manufacturer/Supplier: Timber Systems Ltd.
Architect: B+H Architects
Structural Engineer: Halsall Associates

MARINE DRIVE RESIDENCE
UNIVERSITY OF BRITISH COLUMBIA

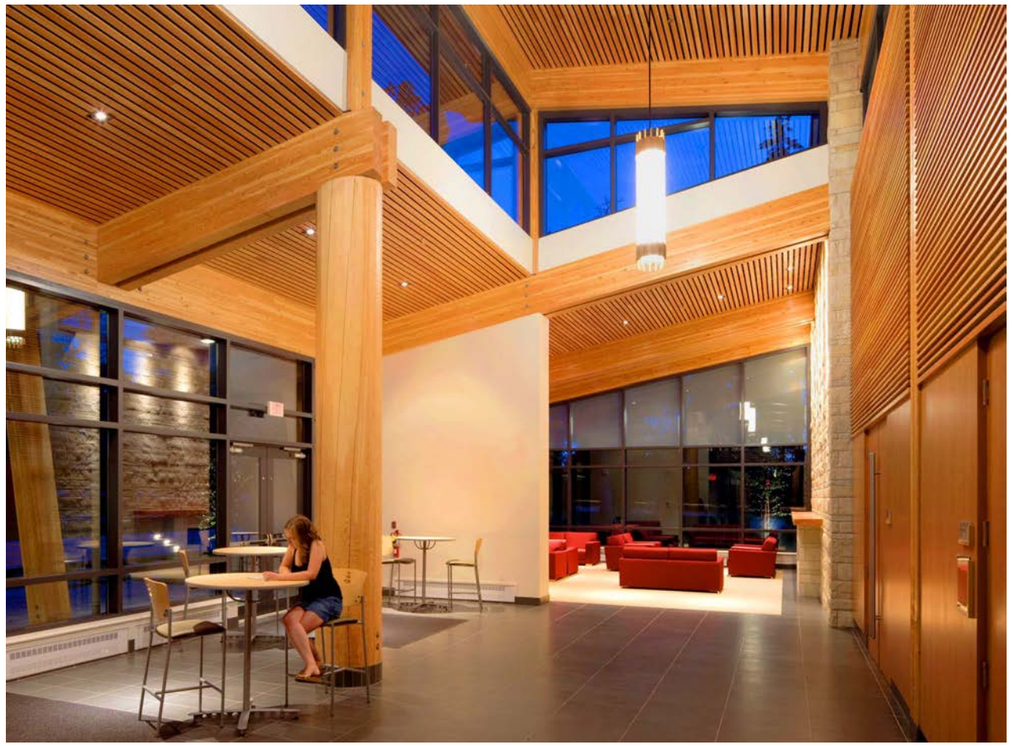
CAMPUS AS COMMUNITY

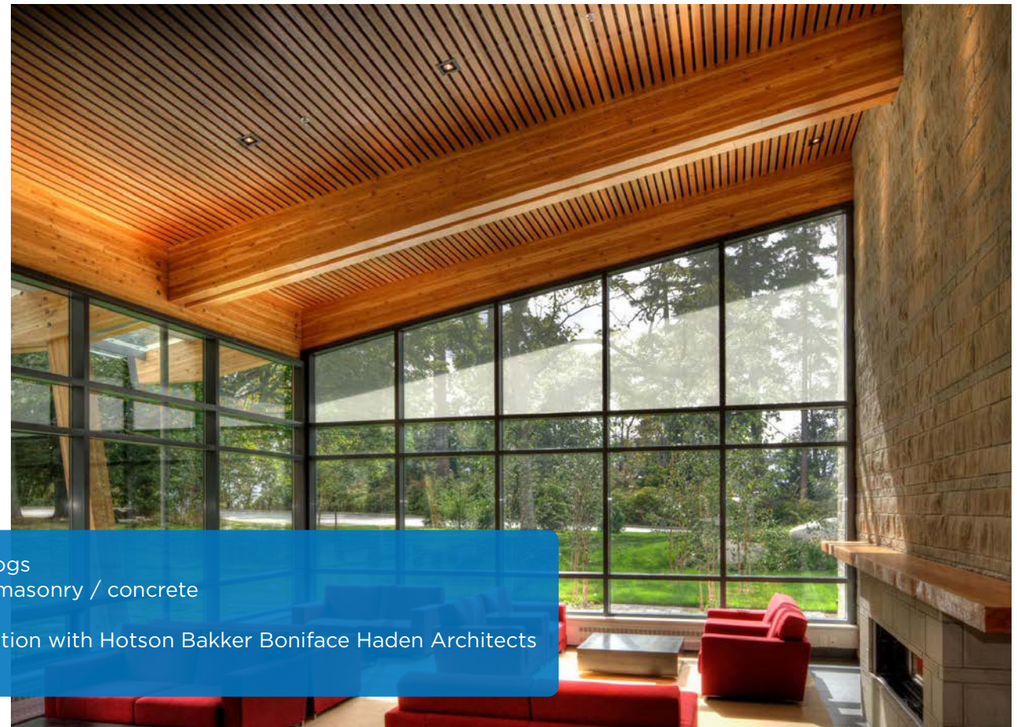
PROJECT DESCRIPTION

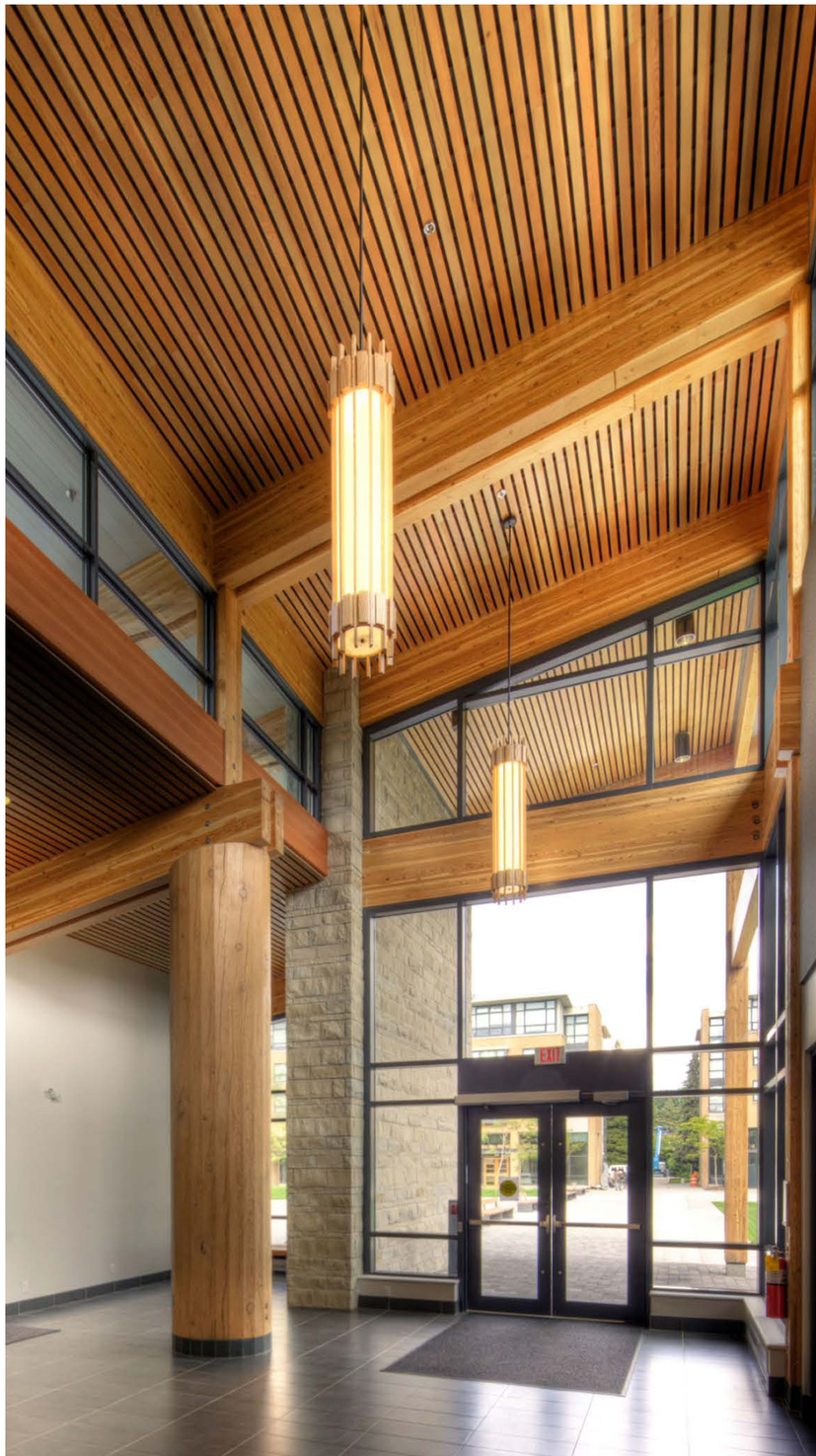
B+H was commissioned with Hotson Bakker Boniface Haden Architects to design this $100 million, three-phase student residence development. With a total of 1,600 beds, the development features a five-storey podium with five 18-storey towers incorporating fourbedroom, two-bedroom and single suites. It also includes the Commonsblock which features a variety of amenities such as cafeterias, retail and associated common spaces. The project encloses a richly landscaped quadrant which connects it to the Pacific Spirit Regional Park. Phase 1 and 2 involved the residences while Phase 3 involved the Commonsblock.

SUSTAINABLE DESIGN

Our Marine Drive Residence Amenity Building is a lovely example of how wood is a central element of the design. We used CLT roof panels and Glulam framing as well as rough-hewn wood columns recovered from the local beach. The result is a beloved small facility; a gem amongst the larger array of surrounding residence towers. The integration and siting of the facility was driven by a larger landscape strategy. The inclusion of found wood columns was a satisfying challenge – testing and inspection was critical -- but the result makes for a singular and unique attribute. The facility is driven by ground-source heat pumps, and so is a very efficient facility from an energy perspective.







Location Vancouver, Canada
Size 726,730 ft² | 67,540 m²
Status Completed: Phase 1 - 2005 / Phase 2 - 2008 / Phase 3 - 2009
Client University of British Columbia
Collaboration Hotson Bakker Boniface Haden Architects
Photography TBD

Mass Timber Type: Glulam, timber logs
Structural System: Hybrid timber / masonry / concrete
Manufacturer/Supplier:
Architect: B+H Architects in association with Hotson Bakker Boniface Haden Architects
Structural Engineer: RJC

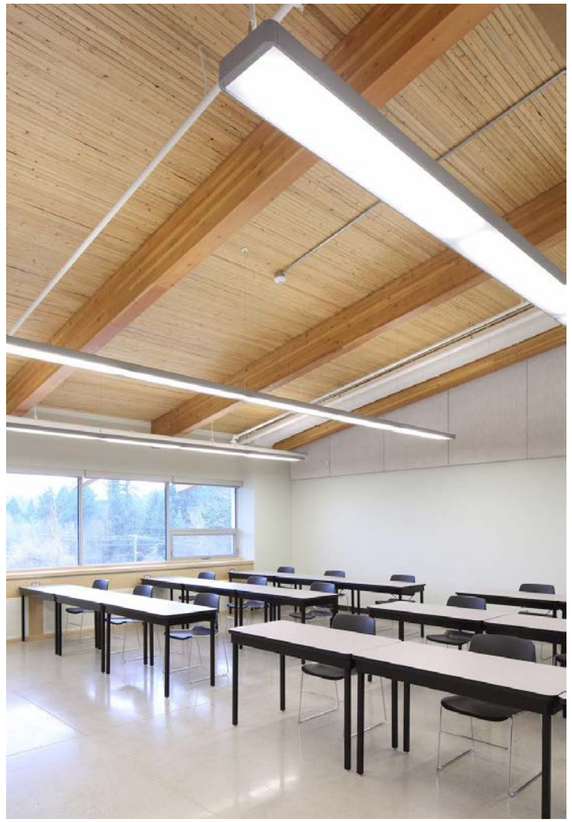
CAMOSUN COLLEGE CENTRE FOR TRADES EDUCATION AND INNOVATION

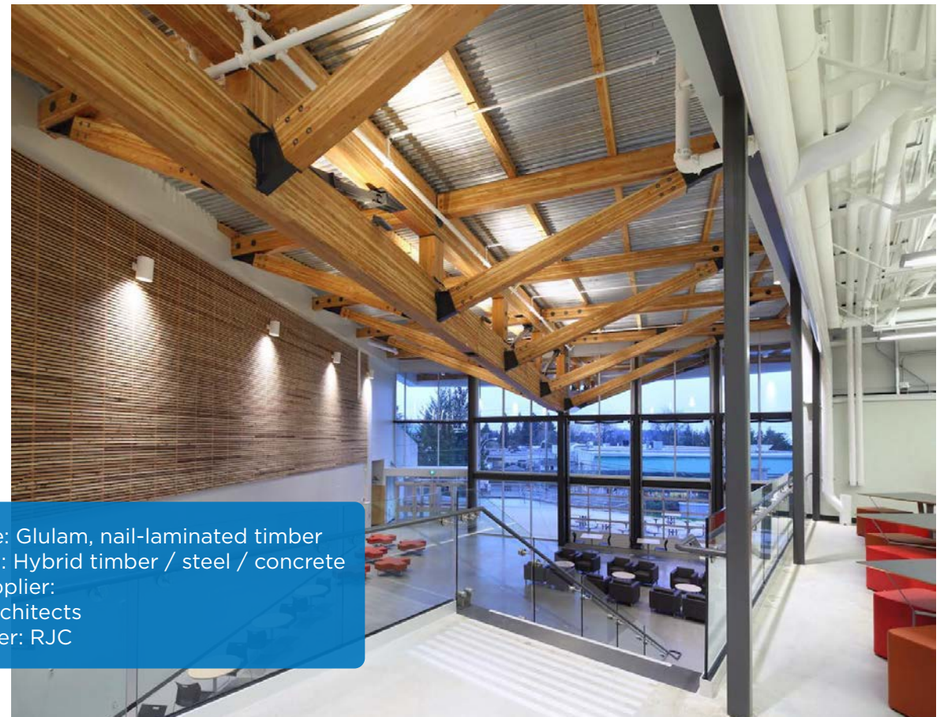
INTERACTION, INNOVATION AND IDEAS

This exciting project redefines Camosun College's Interurban Campus, increases the visibility and profile of trades education and innovation, and is now a centre for campus activities and events. The Centre for Trades Education and Innovation (CTEI) is a 21st century learning environment that facilitates the interaction and "cross pollination" of trades skills and ideas, while maintaining and improving opportunities for participation by people underrepresented in the trades.

CTEI consists of a new 45,000 ft² Marine Trades Centre facility and a new 35,000 ft² Mechanical Trades Centre Facility in addition to a new central student commons.

Location Victoria, Canada
Size 80,000 ft² | 7,432 m²
Status Completed 2015
Client Camosun College
Certification Registered and Targeting LEED® Canada NC Gold
Photography Ema Peter





Mass Timber Type: Glulam, nail-laminated timber
Structural System: Hybrid timber / steel / concrete
Manufacturer/Supplier:
Architect: B+H Architects
Structural Engineer: RJC

EAGLE MOUNTAIN MIDDLE SCHOOL

EDUCATION, ENVIRONMENTS & EXPERIENCES

Located in the Village of Anmore, the Eagle Mountain Middle School is nestled in the base of the mountains within an idyllic community, which has managed to maintain its semi-rural, natural environment. Bordered by parkland, old growth forests, and lakes, the placement of the building on a former landfill site takes full advantage of its natural surroundings. These links with nature also play a critical role in the education of its students through carefully considered light-filled spaces, which seamlessly integrate into the neighbouring landscape.

Featuring a steeply sloped three-level tiered design, the main classrooms, and media centre are arranged around an elevated central courtyard, which has been set one storey above the gymnasium and exploration level. The common courtyard is a space for exploration where students discover and interpret lessons learned from the classroom through direct and hands-on application.

The lower level support spaces and gymnasium, the intermediate level healthy living area and shops, and the upper level classrooms and courtyard, are all connected by a stepped central hall that acts as a primary gathering space, forming the heart of the school.

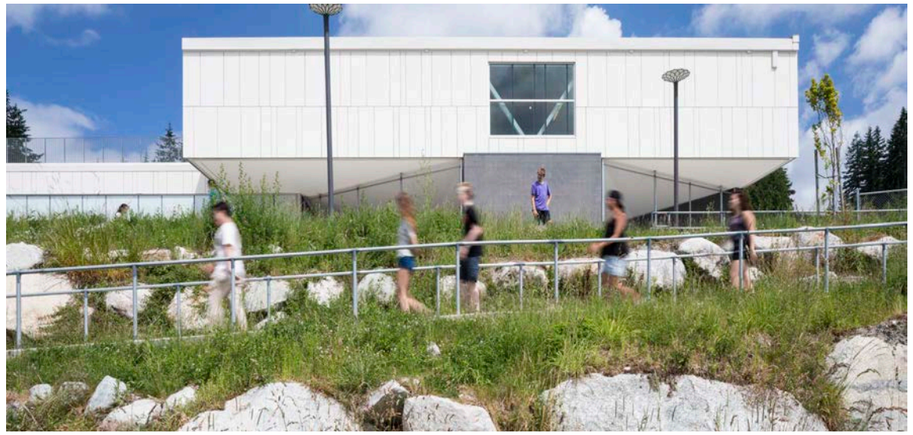
Through thoughtful experiences within its spaces, the school inspires teachers, staff, and visitors alike. Special design emphasis was put on evolving the classroom pods, the informal breakout spaces in the corridors, and the healthy living (art/foods/textiles) space. The building also includes an infant/child care centre, and a flexible gymnasium and multi-purpose hall, which are shared between the school and the community.

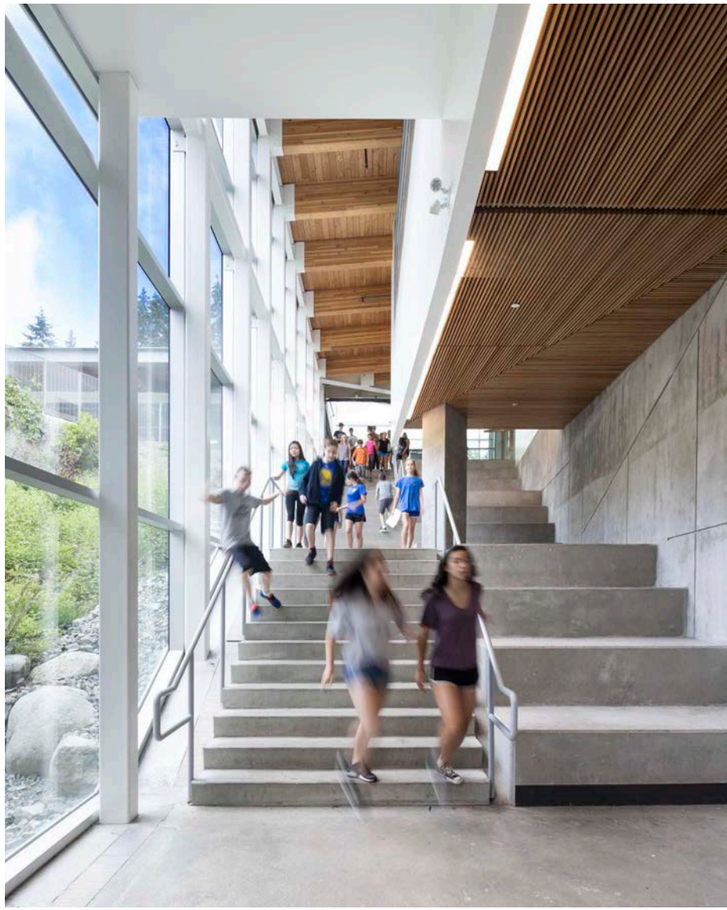
Awards

2011 Canadian Architect Award of Excellence

Location Anmore, Canada
Size 58,437 ft² | 5,429 m²
Status Completed 2015
Client Coquitlam School District (No. 43)
Certification Registered and targeting LEED® Gold
Photography Ema Peter

Mass Timber Type: Nail-laminated timber, Glulam
Structural System: Hybrid timber / steel / concrete, nail-laminated timber roof deck
Manufacturer/Supplier: Western Archrib
Architect: B+H Architects (Dylan Durst, Design Team)
Structural Engineer: CWMM





SURREY DISTRICT EDUCATION CENTRE

UNIFYING A WORKPLACE

This project consolidates the client's program to provide an integrated facility which unifies the School District's administrative offices under one roof.

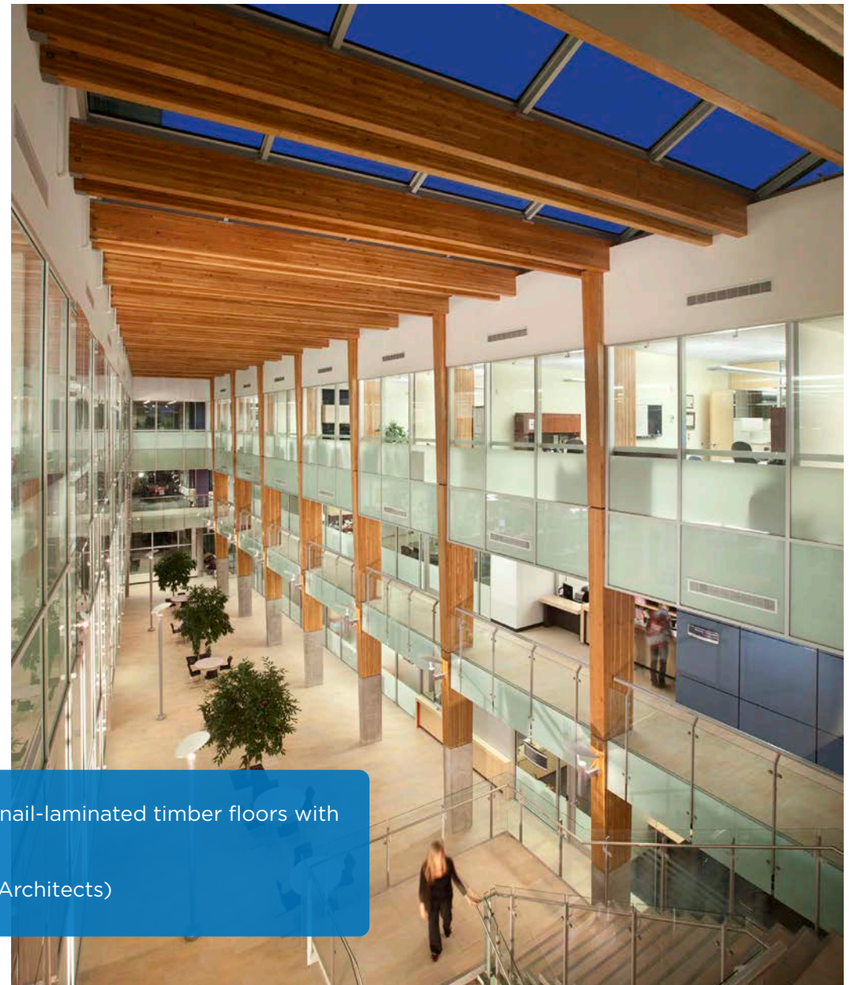
The evolution of the overall building concept, massing and configuration was conceived through a considered balance between program and the environment. Bisecting the overall building program to achieve shallow floor plates allows for maximum daylight harvesting and passive ventilation. The two primary program blocks were then skewed and rotated creating a central daylight atrium which serves as the primary gathering space. The highly expressive and gestural building form reinforces the client's desire for a highly visible project with a clearly identifiable physical presence in the heart of Surrey, BC.

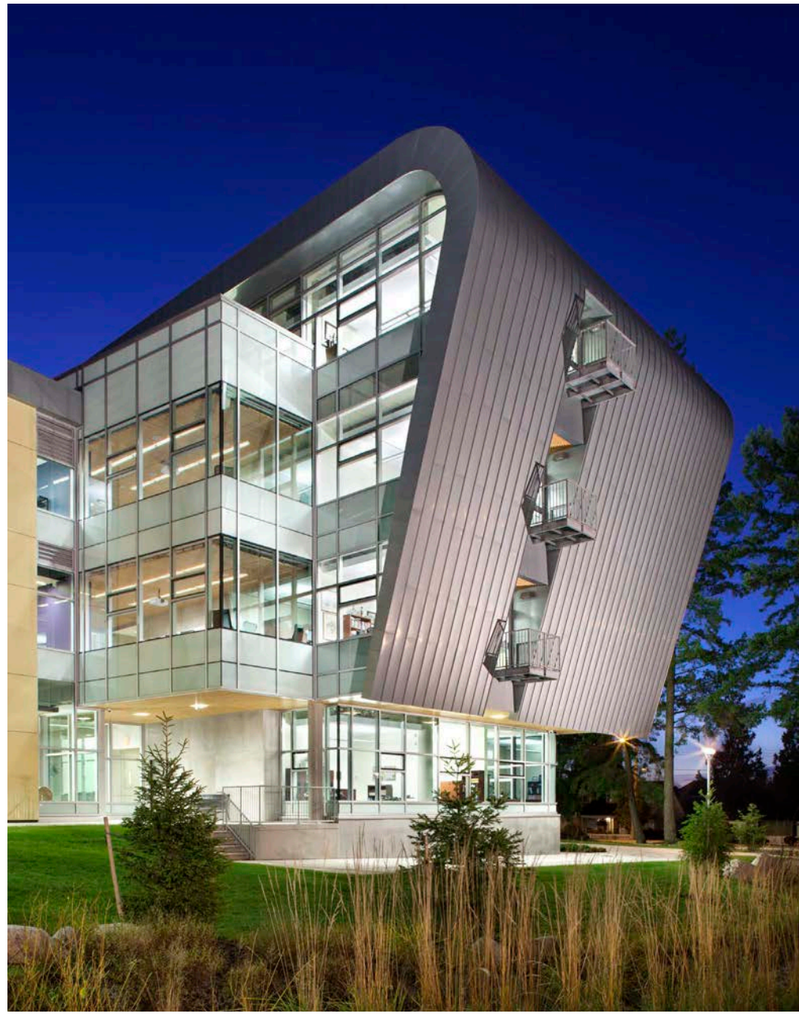
Awards

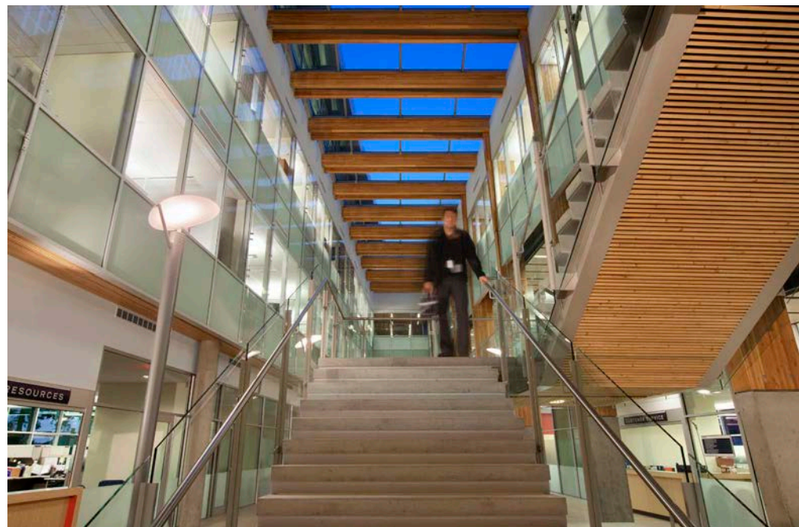
New City Design Awards Award of Merit

Location Surrey, Canada
Size 125,000 ft² | 11,611 m²
Status Completed 2011
Client School District No. 36 (Surrey)
Certification LEED® Canada-NC Gold
Photography Ema Peter

Mass Timber Type: Nail-laminated timber, Glulam
Structural System: Hybrid timber / steel / concrete, nail-laminated timber floors with concrete topping
Manufacturer/Supplier: Structurlam
Architect: B+H Architects (formerly Bunting Coady Architects)
Structural Engineer: Fast+Epp







THE JOYCE CENTRE FOR PARTNERSHIP & INNOVATION
MOHAWK COLLEGE

BUILDING A NET-ZERO FUTURE

PROJECT DESCRIPTION

B+H working in collaboration with McCallum Sather Architects have been commissioned to design a benchmark facility for engineering learning and sustainable performance. This new engineering lab includes innovative teaching and learning spaces as well as performing to a net-zero energy certification – generating all energy consumption via on-site renewables. The proposal includes a 500 kW Photovoltaic array to drive this all electric building. The systems include VRF heat pumps connected to a geothermal loop, with ultra-low energy DOAS demand operated ventilation system.

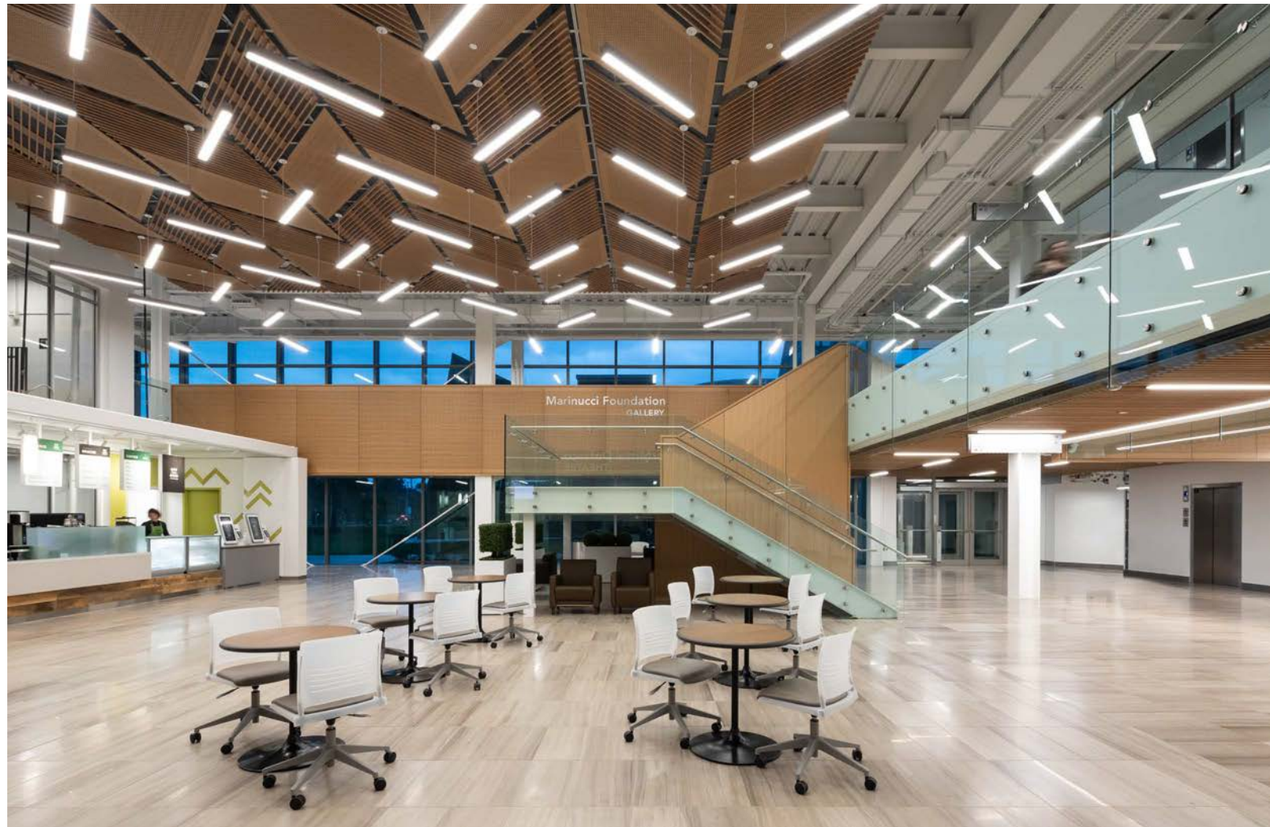
The building skin is a very high performance assembly for best thermal control, air control and daylighting control. The facility will stand as an exemplar to students and visitors, proving Mohawk's commitment to environmental and educational excellence.

In order to achieve this energy performance, the design team assembled together from the earliest RFP release. The integration of the design disciplines was intense. Our architectural agenda was aligned with all the other disciplines –most notably with our energy design engineer. The design team fashioned a design energy budget. We committed to meet various performance targets in order to achieve this budget. Target insulation values, combined with target window-to-wall ratios, glass performance, lighting density targets, HVAC power densities, static pressure fan performance targets, etc. all rolled-up to establish an end-use breakdown that drove the design form the outset.

SUSTAINABLE DESIGN

This project is a fully net-zero energy design; generating all its required operating energy on site, on an annualized basis. The design is all-electric. It uses ultra-efficient VRF heat pumps, coupled to a ground-source heat loop. It is powered by a 545 kW photovoltaic array, generating 600,000 kWh per year. The facility is scheduled to use a very-low 70.5 kWh/m² EUI. In recognition of its superior performance, the Joyce Centre was a Canadian pilot project for two ground-breaking sustainable design programs: the Canada Green Building Council's Zero Carbon Buildings Initiative and the World Green Building Council's Advancing Net Zero Initiative. The final design prioritizes the end-users, Mohawk's students and staff, creating a social learning environment that will become a driver of innovation. The project completed in April 2018.

Location Hamilton, Canada
Size 96,000 ft² | 8,919 m²
Status Completion 2018
Client Mohawk College



WEST SEATTLE BRIDGE CONCEPT

BRIDGING SEATTLE WITH MASS TIMBER

When we heard the West Seattle Bridge was failing, we set out to design a replacement that would serve the city both practically and culturally- with mass timber.

Designing and constructing a viaduct, particularly a highly traveled, visible crossing such as the West Seattle Bridge, is ideally a once-in-a-century effort. We proposed the use of mass timber in our bridge design, a material already used for vehicular bridges in Canada and Norway, that has a design-life of 75-100 years- much longer than the expected life of the existing concrete bridge. The use of trees for bridge building, combined with modern technology, will strengthen Seattle's identity as an environmentally conscientious, grounded, and future-forward city. It is also an opportunity and invitation to reinforce cultural and geographic authenticity, both in form and material.

A continuous, sinuous form of arches above and below the drive deck connect at the piers and enable the 590ft (180m) and 375ft (115m) spans of the structure. The resulting form is a visual continuum, echoing the spirit of Seattle, our place between the mountains and the sea. The waveform is highly visible and experienced from long vistas, including Puget Sound ferries and close-up "by riding the wave" across the viaduct. The bridge is designed for multi-modal uses but also boasts expansive city, harbor and mountain views for car and light-rail passengers, bicyclists, runners, and pedestrians alike. Maybe, in the not so distant future, we will reduce the number of lanes for private occupancy vehicles on the bridge and turn some of the roadway into a high-rise bridge park that overlooks Seattle and Puget Sound.

Location Seattle, WA

Status: Concept Submitted

OPPORTUNITIES FOR MASS TIMBER PROJECTS

University of British Columbia – AMS Student Nest (B+H & Dialog in Association)
The Knoll and West Atrium Glazing

TALL WOOD & MASS TIMBER DESIGN

In Canadian cities such as Vancouver, the pressure of urban density is being met by the accelerated construction of concrete and steel buildings. As a response to this homogenous and ubiquitous condition as well as the need to accommodate an increasing urban population comes the rising popularity and encouragement for wood architecture in the densification of our cities. The integration of wood architecture into an urban setting offers the opportunity to harmoniously balance our natural resources by allowing wood construction to co-exist alongside concrete and steel to densify Vancouver and add diversity to the city's overall material pallet.

The proposed mixed-use, retail and residential developments centrally located offers the opportunity to introduce wood construction into a dense urban environment that is primarily steel and concrete.

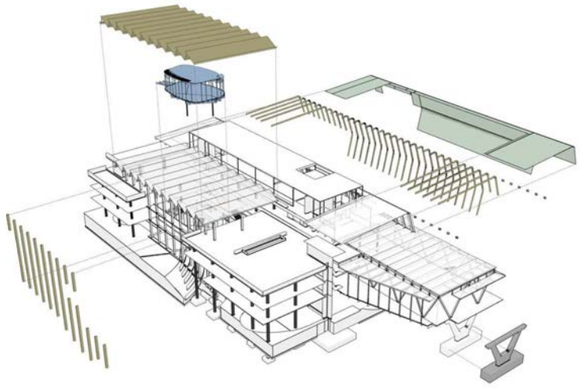
The use of wood as a primary building material has significant environmental benefits when compared to other construction materials. With sustainable forestry management practices, wood is a highly renewable building resource that through its life cycle, contributes to the storing of carbon emissions and reduces greenhouse gases. In the material's primitive state, trees help to reduce greenhouse gas emissions by absorbing carbon from the atmosphere (carbon that is not re-released when the trees are harvested for building materials). Furthermore, structural wood systems have the potential to be prefabricated offsite, thus reducing the overall construction time and the need for energy intensive site processes.

In addition to environmental benefits, the use of wood is highly desirable from a user's perspective. Wood as a natural material reminds us of nature and provides feelings of warmth, calmness, and tranquility. Especially in urban settings, the connection to nature and use of wood in buildings is a highly desirable and marketable trend in the movement towards healthy interior environments and high-quality working spaces.

Furthermore, as part of British Columbia's Clean BC, a twelve-year plan that aims to ramp up funding for renovations and energy retrofits, reduce greenhouse gas emissions and transition to a low-carbon economy, new programs such as the Wood First Initiative are being implemented that encourage and support the use of wood as a primary building material. Together with new codes that increase the maximum height for wood-framed residences, Wood First is increasing climate-friendly construction while growing markets for B.C. value-added forest products and innovative wood construction technologies. Forest carbon offset projects generate carbon offsets by improving the quality of our forests and protecting areas that were otherwise designated for harvesting or other land use activities.

In conclusion, structural innovations and new allowances for tall wood buildings are propelling wood to the forefront of materials solutions that accommodates urban density, addresses environmental issues, and improves the quality of our built context as it relates to humans and nature.

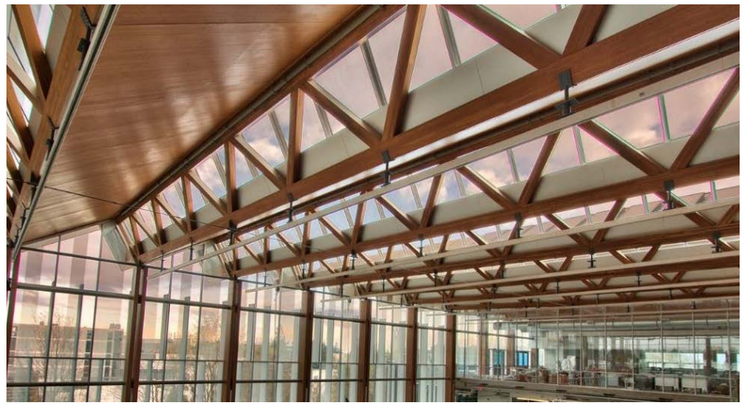
PROJECT FEATURES

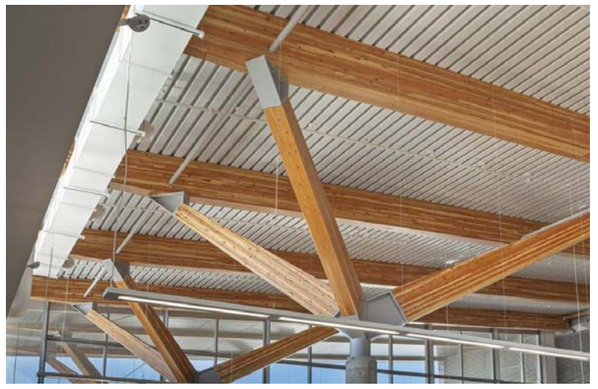


Caption: UBC AMS Nest. Extensive structural wood: CLT roof panels and glulam columns and innovative trusses frame the large public spaces of the building. Detailed computer simulations were performed to prove out the robust fire safety strategy of this structural system. The resultant quality of space is warm and inviting.

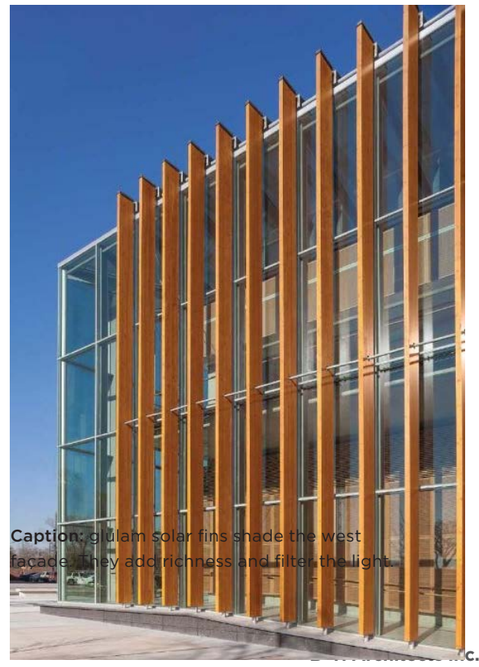
Caption: UBC Marine Drive Amenity Building: Glulam columns and beams support CLT roof panels.

Caption: UBC AMS Nest. Innovative Glulam trusses allow for natural light to suffuse the atrium space.





Caption: University of Windsor Centre for Engineering Innovation: the upper galleria of the central atrium is spanned by glulam roof structure supported by expressive glulam column trees. Wood became a very important way to enliven the public spaces.



Caption: glulam solar fins shade the west facade, they add richness and filter the light.

B+H | BOLD + human

B+H

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