

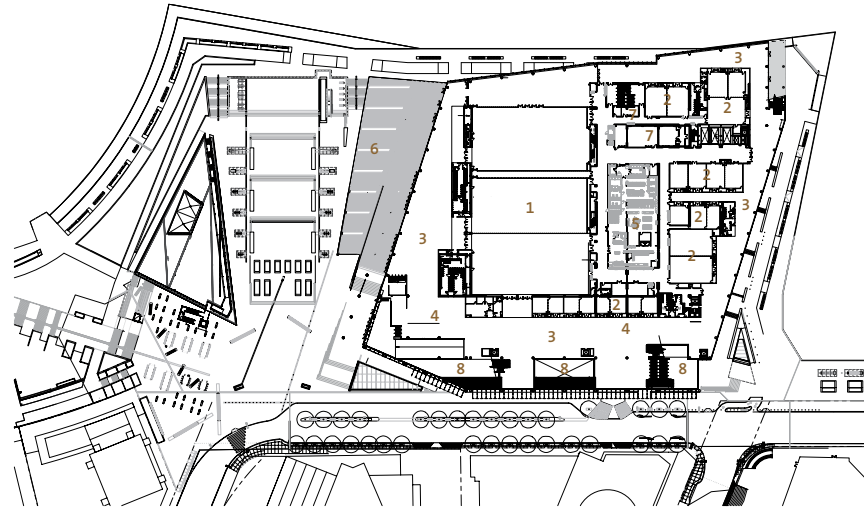
COMMERCE, PUBLIC SPACE AND THE ENVIRONMENT

VANCOUVER CONVENTION CENTRE





Vancouver Convention Centre



KEY

- 1 Ballrooms
- 2 Meeting Rooms
- 3 Pre-function Areas
- 4 Registration Areas
- 5 Kitchen
- 6 Terrace
- 7 Storage
- 8 Open to Below

ARCHITECTURE

THE VANCOUVER CONVENTION CENTRE expansion is a 1.1 million-ft² (100,000-m²) project that achieved Leadership in Energy and Environmental Design (LEED®) Platinum certification. As the broadcast centre for the 2010 Olympic and Paralympic Winter Games, it was a showcase for the products and manufacturing capabilities of the British Columbia forest sector.

The architectural concept creates a fully linked expansion immediately to the west of the original convention centre at Canada Place, and takes maximum advantage of its proximity to the central business and hotel district and of the site's topographic slope. The new facility has a direct connection to Harbour Green Park, and it has a visual connection—with full-height glazed walls on three sides—to the sweeping water and mountain views that extend from Stanley Park in the west to Canada Place in the east.

The design of the expansion was sensitively developed as a compliment to the internationally recognized image of Canada Place with its sail-like fabric roofs. The desire to maintain view corridors from the downtown core limited the overall building height, and has given the project a horizontal emphasis. Shallow, sloping roof planes supporting an extensive green roof create an architectural landform that is both an appropriate visual connection between the city and its natural context, and a reflection of local ecology and cultural values.

“One of the major ambitions of the project was to create a showcase for the community, its people, products and environment that reflect the unique character of Vancouver and British Columbia (including utilizing B.C. woods as a showcase product for the Province).”

JACQUES BEAUDREULT, PARTNER – MUSSON CATTELL MACKEY PARTNERSHIP
ARCHITECTS DESIGNERS PLANNERS

This connection to ‘place’ sets the project apart from most contemporary convention centres—a distinction that is reinforced by the extensive use of wood on the interior. The wood-panelled walls that flank the pre-function areas, banquet, and meeting rooms are visible from the exterior and at night add warmth to the lantern-like glow of the building as it hovers above the water.

The project siting and program requirements imposed physical constraints that necessitated an innovative response from the structural engineers. The building is supported on more than 1,000 piles and a concrete deck that together allow the steel structure to bridge roads and railroad tracks.

The Convention Centre's exhibition space is 300×735 ft (90×225 m) with a 90×120-ft (27×36-m) structural grid, and the building has a maximum clear roof span of 180 ft (55 m).



FACTS

- The original Vancouver Convention and Exhibition Centre at Canada Place opened in July 1987 subsequent to the building serving as the Canada Pavilion during Vancouver's Expo '86 World's Fair
 - Within 10 years the facility was operating at capacity, and up to CAD \$100 million annually in delegate spending was going elsewhere because the facility could not meet the demand
 - The 1.1 million ft² (100,000 m²) project triples the Convention Centre's original capacity and will help generate an additional CAD \$107 million annually in delegate spending
 - The expansion will increase the number of annual delegate days from 150,000 to nearly 370,000 within the first 5 years of operation
 - Built over land and water on some 1,000 piles, the expansion was completed in Spring 2009. The Vancouver Convention and Exhibition Centre was the home of the 2010 Olympic and Paralympic Winter Games' media and broadcast centres
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WOOD AND SUSTAINABILITY

THE VANCOUVER CONVENTION CENTRE EXPANSION PROJECT achieved LEED® Platinum certification. As a landmark facility in one of the most spectacular waterfront settings in the world, the building was the focus of much professional and public scrutiny in regard to the success of its sustainable design strategies.

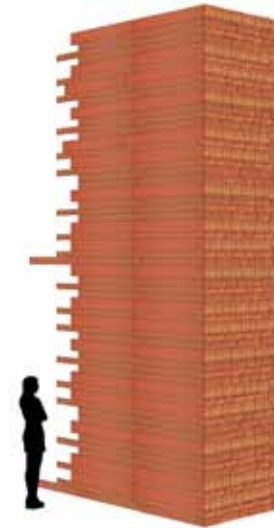
Prominent among these is the creation of a marine habitat skirt, a bio-engineered structure that is attached to the perimeter frame of the concrete deck. The habitat frame consists of a series of permanent, stepped, pre-cast concrete benches with exposed aggregate surfaces and artificial tide pools that are designed to facilitate rapid colonization by a wide variety of marine life.

The project's extensive green roof is considered to be one of the most ecologically sophisticated in North America and is a defining feature of the project's architecture. The roof is planted with nearly 400,000 bulbs and grasses—mostly wild grasses and grass-like vegetation native to the Pacific Northwest. Plants were collected 3 years before construction began and planted in test plots close to the site to gauge the response of the various species to the extremes of an exposed roof environment and to allow time for the best adapted to be propagated.

Plants were chosen for their ability to flower at different times, produce different types of seed, and attract different insects and birds. Four beehives were installed and are maintained by a beekeeper. Bees pollinate the flowering grasses and produce honey for use by the Convention Centre.

Durability of materials, including the wood assemblies, is a critical component of sustainability and contributes to a LEED® credit under the Materials and Resources section. The durable, low-maintenance finishes provided by the wood panelling system and the slatted glulam ceilings meet the standards referenced by LEED®. The wood also comes from third-party certified forests which means that the products meet some of the highest global criteria for sustainably managed forests.

Because of its low embodied energy, low toxicity and the carbon sequestered within it, wood makes a significant contribution to the overall environmental performance of the building. For example, the amount of carbon sequestered and stored in the wood used in the building amounts to about 520 metric tonnes of CO₂. Add to this an estimated 1,080 metric tonnes of CO₂ accounting for the amount of avoided emissions resulting from the use of wood instead of more greenhouse gas intensive materials, and the total potential carbon benefit is 1,600 metric tonnes of CO₂. This amounts to removing over 290 cars from the road annually or to the energy used to power 145 homes in a year.



FACTS

- The CAD \$883 million project was jointly funded by the federal and provincial governments and Tourism Vancouver, and through revenues generated by the Vancouver Convention Centre Expansion Project —the provincial Crown Corporation that implemented the project
 - There are over 2 ac (almost 1 ha) of wood feature walls clad in British Columbia wood, as well as roughly 32 linear mi (52 km) of decorative glulam beams covering the ceilings. The panels comprise about 150,000 bd ft (120 m³) of hemlock from the southern coast of British Columbia
 - Featuring floor-to-ceiling glass throughout, the project also includes a 6-ac (2.5-ha) living roof, one of the largest in the world
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INTERIOR DESIGN

FROM AN INTERIOR DESIGN PERSPECTIVE, the primary concern was to ensure that the building responded to its site and context. The upper convention floors are organized with a central core of flexible meeting and function rooms supported by service spaces. The upper floors are encircled by fully glazed perimeter walls that take full advantage of the spectacular views.

In a province where the forest industry is integral to the economy, it was important for the design team to reflect and reinforce this connection through the extensive use of wood. The team sought to develop the design around some iconic image that would capture the nature of British Columbia's historic relationship with the material, but in a contemporary way.

It is primarily in the pre-function areas that British Columbia wood products are showcased. The central core of meeting rooms

is conceived as an enormous stack of lumber, the kind that could be seen at a smaller scale on building sites and in lumber yards around the province. The unique wall detail creates the head-on impression of stacked, odd-length 2×4 and 2×6 lumber, while the smooth surface of the perpendicular walls resemble the side view of the same stack.

The illusion is created by cladding the outward facing walls of the conference rooms with a panel system composed of a plywood backing textured with short, variable length off cuts of 2×4 and 2×6 quarter-sawn end-grain hemlock. Perpendicular walls use strips of edge-grain hemlock mounted in a similar way.

Above, 4×6-in (100×150-mm) Douglas-fir glulam beams suspended at 4 ft (1,200 mm) intervals create a slatted ceiling plane that conceals building services and adds visual warmth to the space.



THE WORLD'S BIGGEST WOOD PILE

ISLAND PRECISION MANUFACTURING LTD. (IPM) was awarded the contract to supply and install more than 100,000 ft² (9,300 m²) of wood panelling, and more than 9,000 glulam ceiling beams. IPM subcontracted Moorinwood Inc. to fabricate the wood panels and Structurlam Products Ltd. to manufacture the Douglas-fir glulam beams.

Hemlock was chosen for the wall panels as it is an abundant and readily accessible coastal British Columbia species. The wall panel detail is particularly interesting. Morinwood developed an innovative automated assembly process to manufacture the panels to the tight tolerances and in the huge quantities required. To meet the tight timeline, and maintain the required quality, Morinwood set up a dedicated 5,000 ft² (450 m²) manufacturing plant with an automated production line to assemble the more than 1 million individual pieces.

The process used a German-made KUKA robotic arm. It is more commonly used on automobile assembly lines, but the arm was adapted to collect, pre-glue, and attach the individual wood blocks to the backing panels. The robotic arm was able to produce more than 500 panels per week.

Installation involved screwing the individual panels to horizontal wood strapping. Wood blocks were omitted from each panel to facilitate

“(The wood paneling system) is an example of a British Columbia company working to show the (wood-manufacturing) strength of the province, which is now an intrinsic feature of all government funded projects.”

THE RIGHT HONOURABLE GORDON CAMPBELL, PREMIER OF BRITISH COLUMBIA

fixing of the panels to the wall, then loose blocks were glued in place to conceal the screws. The eight panel types were installed in a random pattern—the fasteners were covered with blocks of different lengths to eliminate any possibility of repetition, thus reinforcing the illusion that this is the world’s largest wood pile.

Under the British Columbia building code, the Convention Centre was required to be of non-combustible construction, but was permitted to have combustible wood finishes on the walls and ceilings not exceeding 1 in (25 mm) thick. Because neither the wood paneling nor the glulam ceiling members conformed to this requirement, equivalencies were needed to permit their use. This was achieved by upgrading the sprinkler systems in the areas of the building where the wood components are installed. The additional cost was partly offset by the elimination of passive fire protection to the steel structure on these floors.





“The convention centre is designed to showcase the region’s environment. We had concluded that an ordinary roof would not be aesthetically pleasing, and we had an opportunity with that large an area to turn the roof into an urban oasis.”

RUSS ANTHONY, PAST PROJECT DIRECTOR – VANCOUVER CONVENTION CENTRE EXPANSION PROJECT

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PROJECT CREDITS

CLIENT

VCCEP—a Division of the BC Pavilion Corporation (pavco)

ARCHITECTS

Musson Cattell Mackey Partnership Architects
Designers Planners
Downs/Archambault & Partners
LMN Architects

STRUCTURAL ENGINEER

Glotman Simpson Consulting Engineers

CIVIL ENGINEER

Sandwell Engineering Inc.

ELECTRICAL ENGINEER

Schenke/Bawol Engineering Ltd.

BUILDING CODE CONSULTANT

LMDG Building Code Consultants Ltd.

ENVIRONMENTAL CONSULTANT

EBA Engineering Consultants Ltd.

HORTICULTURAL & ECOLOGICAL CONSULTANT

Rana Creek Habitat Restoration

SUSTAINABLE LIVING ROOF SYSTEM

Flynn Canada Ltd.

GLULAM FABRICATOR

Structurlam Products Ltd.

INTERIOR WOOD FABRICATOR

Morinwood Inc.

GLULAM AND INTERIOR WOOD PANELLING INSTALLER

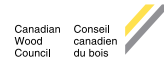
Island Precision Manufacturing

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