

WOOD AND WATER, ENVIRONMENTAL
PERFORMANCE FOR A COMMUNITY POOL

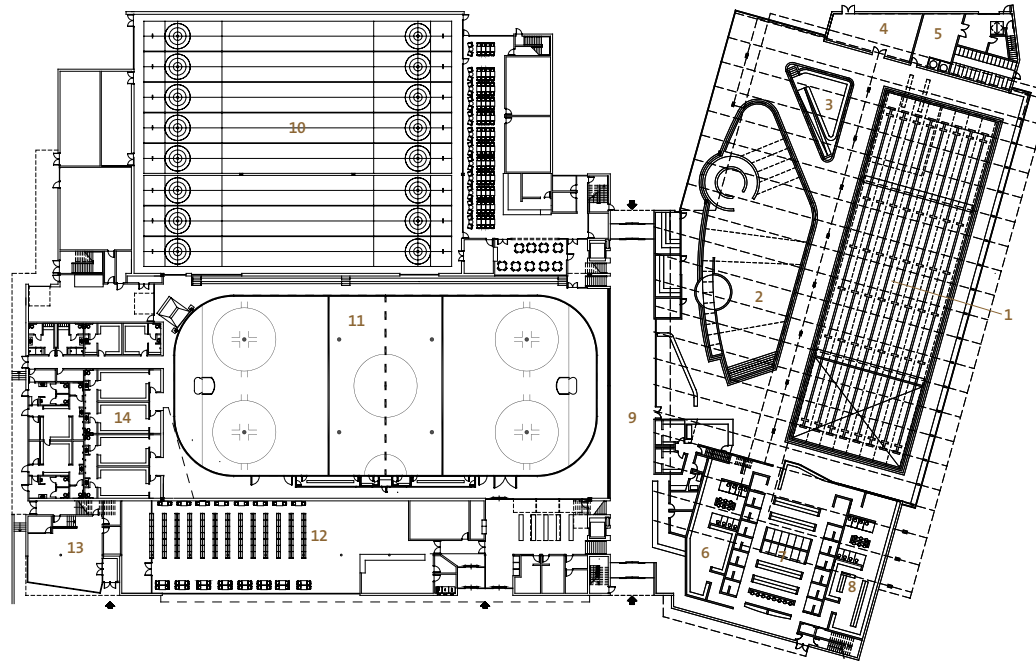
PERCY NORMAN

PERCY NORMAN AQUATIC CENTRE



Percy Norman Aquatic Centre





KEY

- 1 Lane Pool
- 2 Leisure Pool
- 3 Hot Pool
- 4 Steam Room
- 5 Sauna
- 6 Female Change Room
- 7 Universal Change Room
- 8 Male Change Room
- 9 Councourse
- 10 Curling Ice
- 11 Ice Arena
- 12 Library
- 13 Preschool
- 14 Ice Arena

ARCHITECTURE

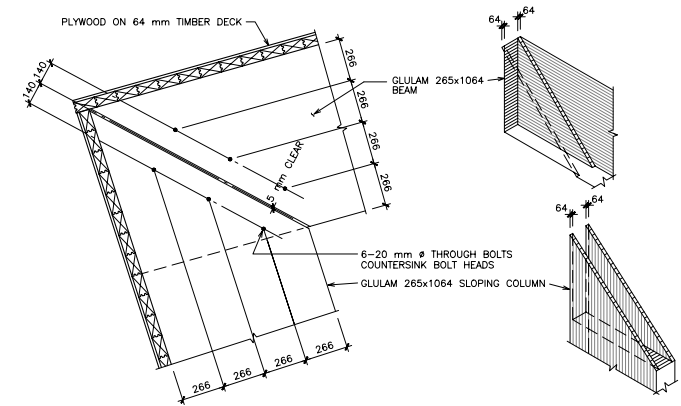
THE PERCY NORMAN AQUATIC CENTRE forms part of the new Riley Park Community Centre in Vancouver's Hillcrest Park. During the 2010 Olympic and Paralympic Winter Games, the Community Centre served as the venue for curling events, while the pool building was a marshalling area for athletes.

The Community Centre's predominantly steel structure is connected to the glulam and heavy-timber structure of the pool by a central vestibule that maintains an existing pedestrian axis across the park. The 66,500-ft² (6,200-m²) aquatic centre will include a leisure pool, 50-m lap pool, and an outdoor aquatic element.

The curved roof lines of the building help reduce its apparent scale, and large areas of glazing provide a visual connection to the surrounding park.

"The choice of wood for the Aquatic Centre was based on several criteria, including its superior structural performance in humid conditions, recognition of its role as a regional material, its acoustic and visual qualities, and its inherent sustainability."

MICHAEL HENDERSON — HUGHES CONDON MARLER: ARCHITECTS



FACTS

- The 66,500-ft² (6,200-m²) Percy Norman Aquatic Centre forms part of the new Riley Park Community Centre in Vancouver's Hillcrest Park
- The building served as an athletes' marshall area during the 2010 Olympic and Paralympic Winter Games, after which it opened to the public
- The Aquatic Centre features a solid wood roof supported on Douglas-fir glulam beams that span up to 130 ft (43 m) across the main pool area



STRUCTURE

THE ROOF STRUCTURE OF THE POOL consists of $10\frac{1}{2} \times 41\frac{1}{2}$ -in (265×1060 -mm) Douglas-fir glulam beams at 12 ft (3.6 m) centres. Supporting $2\frac{1}{2}$ -in (63-mm) thick tongue and groove decking and $\frac{5}{8}$ -in (15.5-mm) plywood sheathing which acts as a diaphragm for shear resistance. The overall width of the building is 130 ft (43 m) and due to the limitations of truck transportation, each beam has been site fabricated from two pieces.

At the east end of the building, the beams are supported on outwardly inclined Douglas-fir glulam columns of similar cross-section, with steel

V supports picking up the other end of the beams at approximately the 123 ft (37 m) point, leaving a cantilever of a further 20 ft (6 m) to the glazed west wall. The column to beam connection has the outward appearance of a mitre joint, but internally is configured as a conventional bearing connection. The connection between the beam sections uses a combination bearing and knife plate.





WOOD AND SUSTAINABILITY

IN KEEPING WITH THE VANCOUVER BOARD OF PARKS' ongoing commitment to sustainability, this facility was built to high environmental standards, targeting Leadership in Energy and Environmental Design (LEED®) Gold standard.

- Regional materials (including the wood components) for construction;
- A 30% reduction in water use due to harvesting rainwater for use in dual-flush, water-efficient toilets;
- The transfer of excess heat from ice slab cooling to heat the building;
- The use of certified and sustainable wood in glulam beams; and
- The use of indoor materials (including wood products) that are low in volatile organic compounds and fumes and contain no urea formaldehyde.

All help to save and re-use energy and reduce water use and waste.

Wood's natural properties allow it to absorb and release moisture in order to maintain equilibrium with the adjacent air. This has the effect of raising humidity when the air is dry, and lowering it when the air is moist.

In addition, wood products store carbon that would otherwise—through natural forest decay or forest fires—be released to the atmosphere as greenhouse gases. In this way, building with wood contributes positively to an overall reduction in greenhouse gas emissions and the mitigation of climate change.

PROJECT CREDITS

CLIENTS

Vancouver Olympic Organizing
Committee for the 2010 Olympic
and Paralympic Winter Games
Vancouver Board of Parks and Recreation

ARCHITECT

Hughes Condon Marler: Architects

STRUCTURAL ENGINEER

Read Jones Christoffersen Ltd.

MECHANICAL ENGINEER

Stantec Consulting

ELECTRICAL ENGINEER

Stantec Consulting

LANDSCAPE ARCHITECT

PWL Partnership Landscape Architects
Inc.

CONSTRUCTION MANAGER

Stuart Olson Constructors Inc.

GLULAM FABRICATOR

Western Archrib

DECKING SUPPLIER

Curtis Lumber Co. Inc.

PHOTOGRAPHERS

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AQUATIC CENTRE

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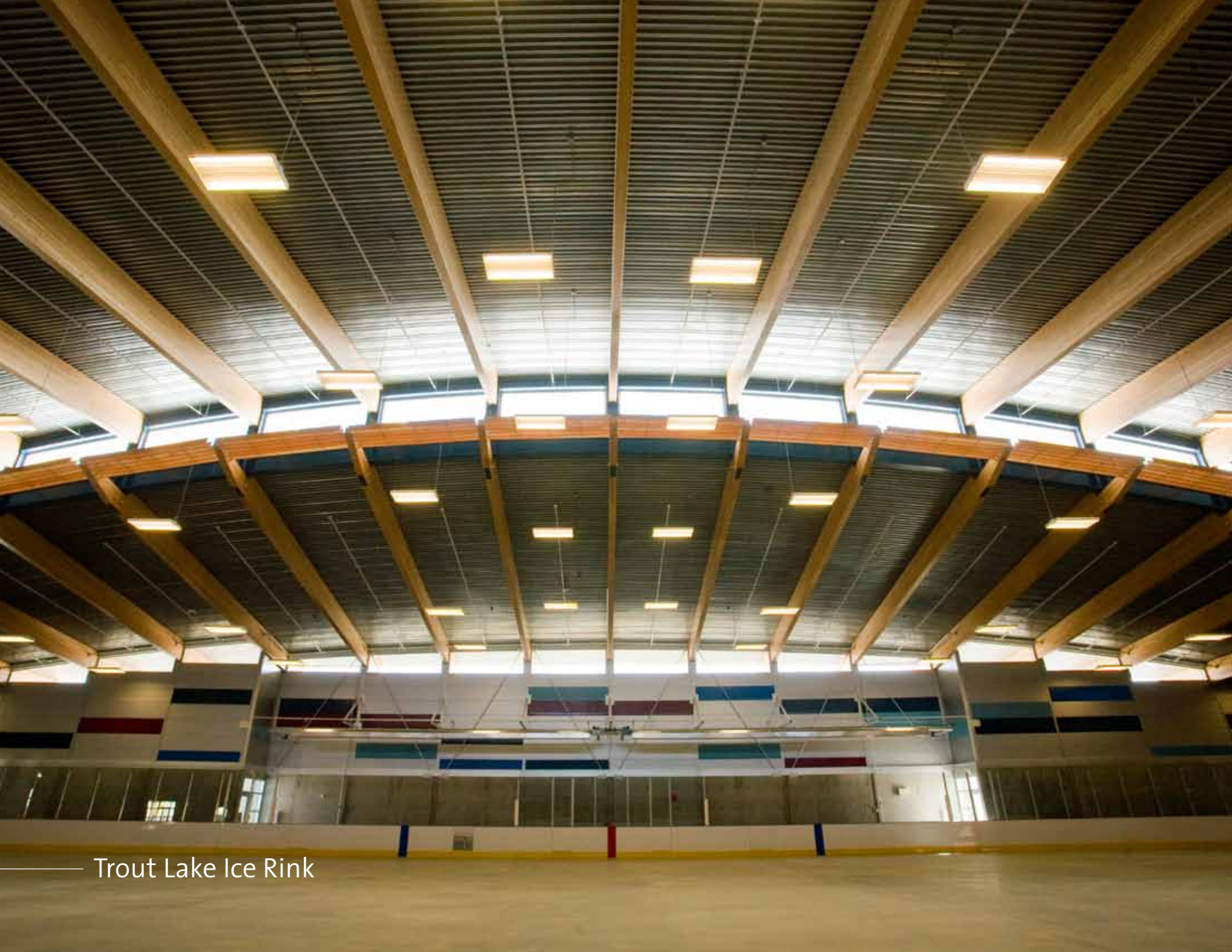
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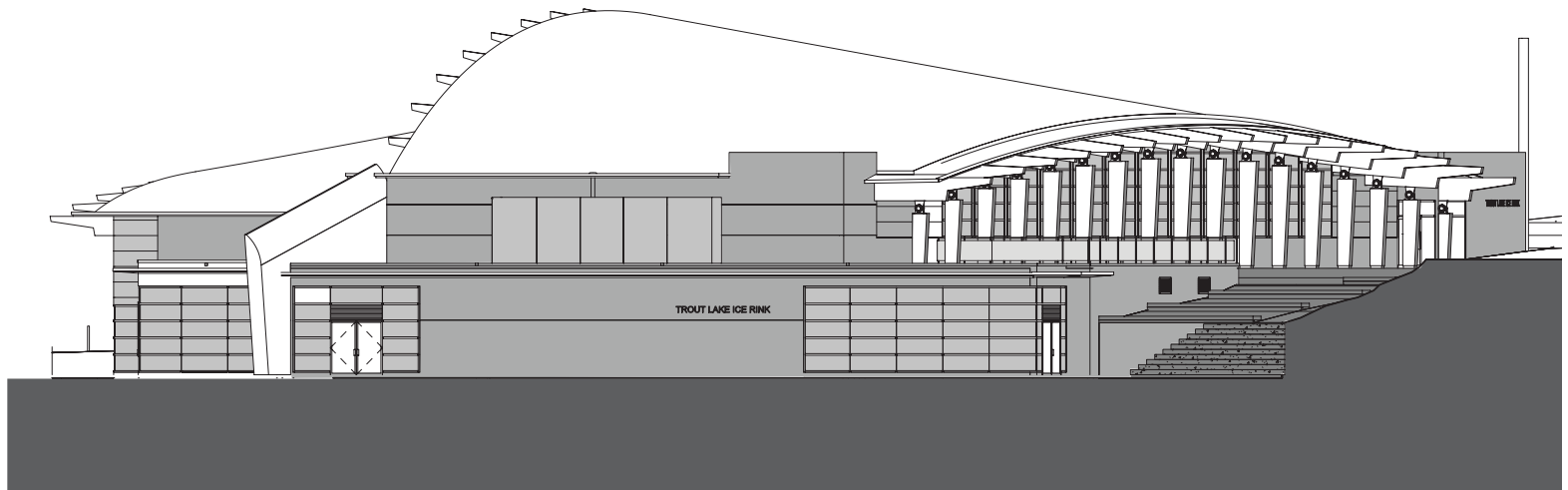
WOOD AND ICE, ENERGY EFFICIENCY
FOR A DYNAMIC COMMUNITY CENTRE

TROUT LAKE ICE RINK





Trout Lake Ice Rink



ARCHITECTURE

LOCATED IN JOHN HENDRY PARK in east Vancouver, this new ice rink is the first phase in the replacement of an aging community centre facility. The rink served as a practice facility for competitors who participated in the 2010 Olympic and Paralympic Winter Games, and opened for public use after the Games.

The building is sited at the foot of an east-facing slope, between the park edge and Trout Lake. This siting together with the roof profile—a shallow vault springing from low perimeter walls—minimizes the impact of the ice rink's large volume and establishes a scale in keeping with the surrounding single-family neighbourhood. The west elevation is articulated by a colonnaded exterior gallery that provides views down to the ice surface.

"We chose the glulam beams to provide a contemporary west coast look and reflect current local construction practices."

WALTER FRANCL, PRINCIPAL — WALTER FRANCL ARCHITECTURE INC.

The roof structure consists of an arched steel truss spanning the length of the rink, north to south. This primary arch reduces the east-west span which in turn allows the secondary structure of curved glulam ribs to be reduced, resulting in a simple, appealing, and efficient structure. The public space (skaters' lounge), located at the north end of the building, has good visual and physical connection to the future community centre and entrance plaza.



FACTS

- Trout Lake Ice Rink is the first phase in the replacement of an aging community centre facility in Vancouver's John Hendry Park
 - After serving as a practice rink for competitors who participated in the 2010 Olympic and Paralympic Winter Games the facility opened for public use
 - British Columbia Douglas-fir glulam beams span laterally from the side walls of the main rink space to bear on a central steel truss that creates a clerestory running the length of the building
 - The skaters' lounge and lobby area feature wood panelling made from trees blown down in Vancouver's Stanley Park during a severe winter storm
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STRUCTURE

THE ROOF STRUCTURE CONSISTS of a single central longitudinal steel arch 210 ft (64 m) in length that is connected by pin joints to buttress walls at the north and south ends of the ice rink. The arch is constructed as a curved, wedge-shaped, Vierendeel-type truss using wide-flange steel members with welded joints. The truss divides the roof longitudinally with one half of the roof structure bearing on the lower chord, and the other half on the upper chord, creating a clerestory that allows natural light to penetrate into the space.

The arch supports British Columbia Douglas-fir glulam beams that span across the arena from concrete columns at the exterior wall locations. The beams are spaced at 12 ft (3.6m) centres and are all 7 3/4-in (196-mm) wide, but depending on load and span are either 30-in or 36-in (750-mm or 914-mm) deep. The glulam beams support structural steel decking. All other structural elements—including the north-, south-, and west-side low roofs, gable end walls, retaining walls, and interior partitions—are constructed of exposed, cast-in-place, reinforced concrete.





WOOD AND SUSTAINABILITY

THE ENTIRE RINK IS PROVIDED with ample daylight and natural ventilation through clerestory windows along the arched truss and the top of the east wall, as well as through glazing along the viewing gallery on the west façade.

Energy consumption is reduced by the resulting lower demand for mechanical ventilation. Roof overhangs prevent heat buildup inside the rink, and the underground ancillary spaces covered by landscaping minimize heat loss. Wood is part of a palette of durable materials that includes architectural concrete, insulated metal panels, and aluminum glazing systems. The building is targeted to achieve a Leadership in Energy and Environmental Design (LEED®) Silver rating.

As the design of the ice rink was in progress at the time of a severe winter storm which blew down a significant number of trees in Stanley Park, the owner and design team made all efforts to use the wood

from the fallen trees in the construction of this community building. Suspended wood ceilings made entirely from storm felled Stanley Park Douglas-fir are a prominent feature in the skaters' lounge and hallway.

Wood has low thermal conductivity and good insulating properties, and light wood-frame technology lends itself readily to the construction of buildings with low operating energy.

As a renewable material with low toxicity and low embodied energy, wood contributes to improved indoor environmental quality and lower life cycle energy costs. The wood members also contribute to a reduction in global warming by retaining the carbon that, through forest fires or natural forest decay, would otherwise be released into the atmosphere as greenhouse gases.

V N V W

T LAKE



PROJECT CREDITS

CLIENT
Vancouver Board of Parks and Recreation

ARCHITECT
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STRUCTURAL ENGINEER
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ELECTRICAL ENGINEER
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