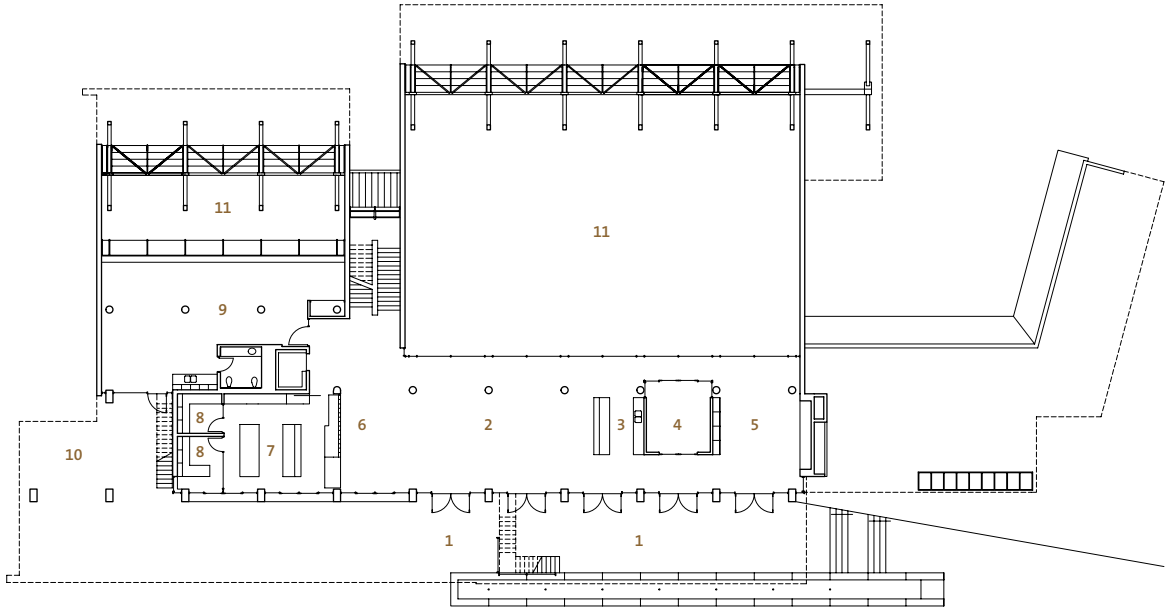
A COMMUNITY FACILITY INCORPORATES
STATE-OF-THE-ART SUSTAINABLE DESIGN

GLENEAGLES COMMUNITY CENTRE





Gleneagles Community Centre



KEY

1 Entry Porch
2 "Living Room"
3 Café
4 Meeting Room
5 Fire Place Lounge
6 Reception
7 Administration
8 Office
9 Childcare
10 Children's Playground
11 Open to Below

ARCHITECTURE

IN KEEPING WITH ITS OWN SUSTAINABLE development policies, the District of West Vancouver wanted this new community centre facility to embody leading-edge strategies for energy conservation and environmental stewardship. In response, the project team took a holistic approach, integrating structural, mechanical and electrical elements to create a facility that provides a healthy and comfortable environment for visitors and staff while minimizing impact on the environment.

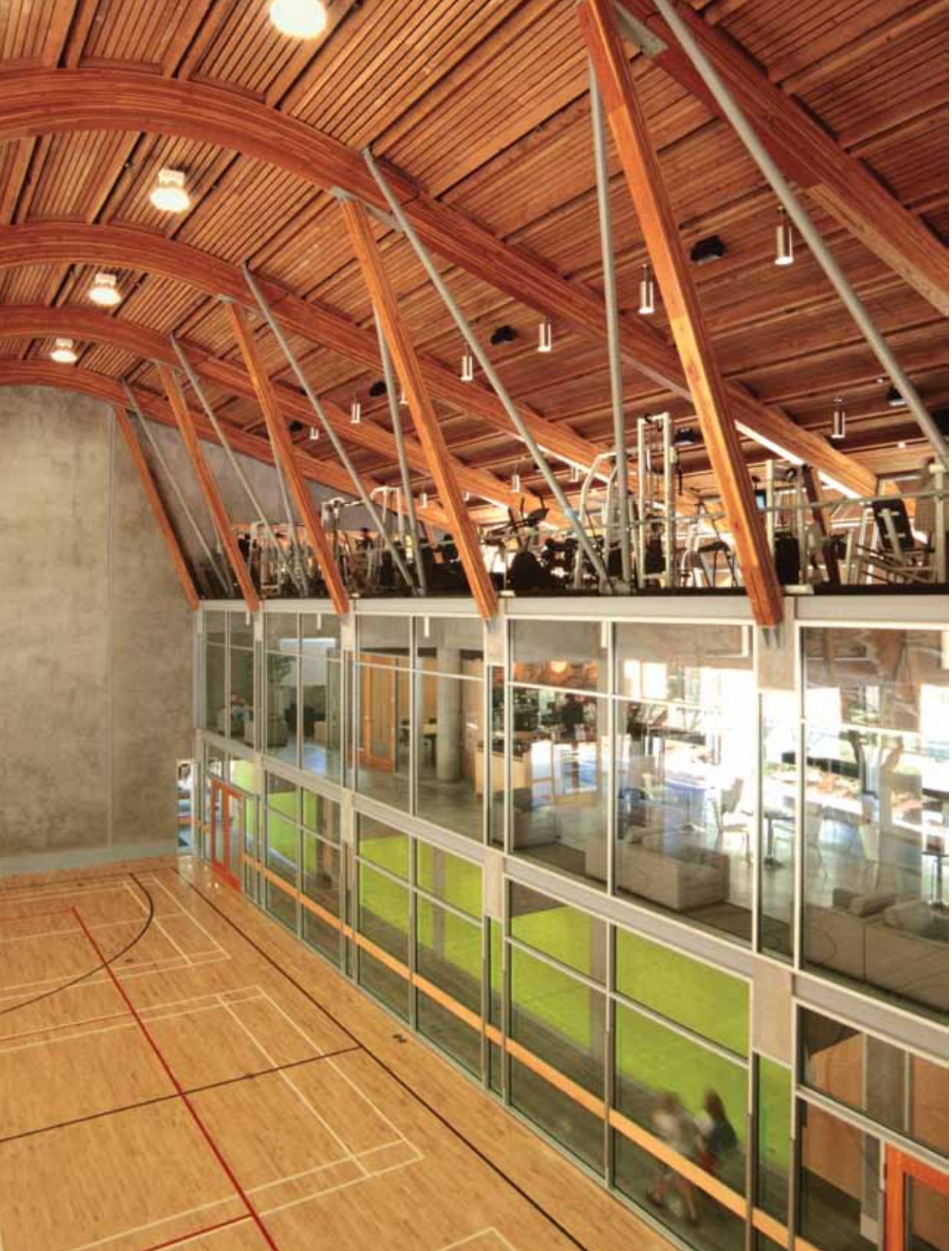
The Gleneagles Community Centre is located on a small, gently sloping site adjacent to a public golf course. The Centre is organized on three levels to minimize the building footprint. By subtly reshaping the cross-sectional topography of the site, the lower level and the intermediate level are both accessible from grade. The intermediate level is entered from a generous porch along the street and contains a community living room, café, meeting room, administration and child care facilities. The lower level opens on the opposite side of the building to the covered terraces and courtyard spaces adjacent to the golf course and includes a gymnasium, multipurpose room, arts room, youth room and outdoor specialty area. The upper level accommodates fitness facilities.

"Sheltered under the encompassing gesture of a large overhanging roof, the building deftly negotiates a subtle level change between a busy suburban street to the east and a protected lower court to the west.

This sectional shift is further accentuated with a spatial juxtaposition of scale, with the large volume of the gymnasium contrasting the more intimate, stacked program spaces of the lobby, public areas and exercise rooms, and providing strong visible connections between all parts of the building."

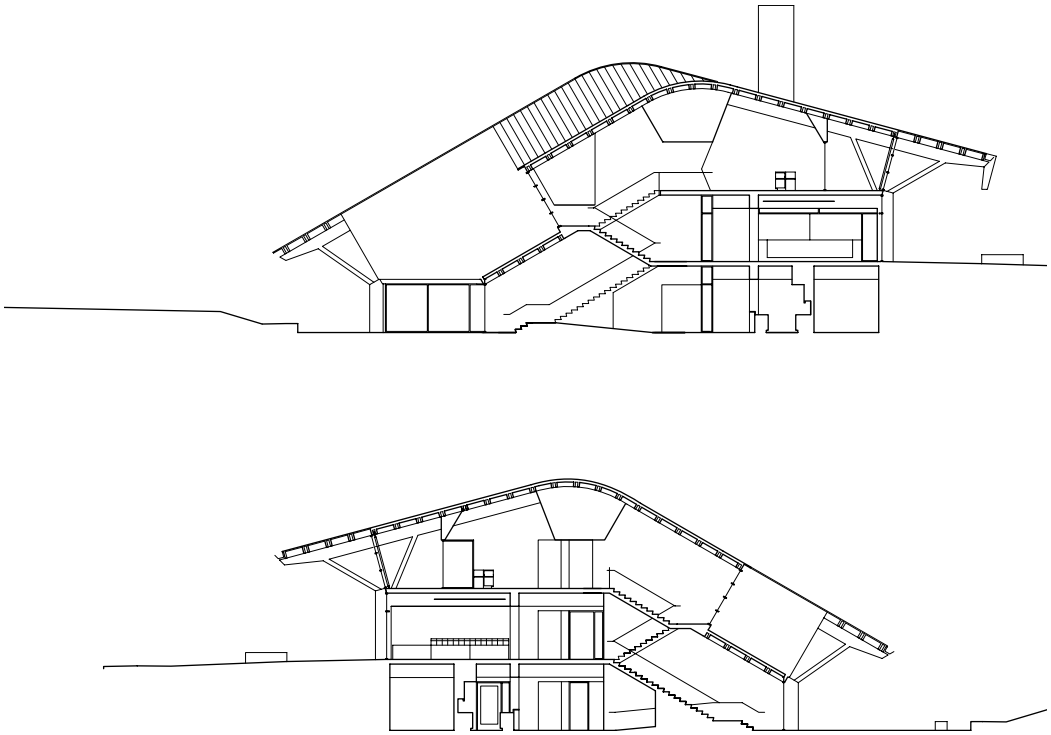
JOHN MCMINN – CITATION FROM GOVERNOR GENERAL'S MEDALS IN ARCHITECTURE

The sectional arrangement of interior spaces activates and energizes the building. The volume of the gymnasium rises through the three levels; walls that separate this volume from adjacent spaces are glazed or left open to facilitate visual connection between the various programs within the building. These simultaneous views of multiple activities animate the interior; the life of the building and the energy of the place are palpable to the community within and without.



FACTS

- This 24,070-ft² (2,236-m²) facility is the first in North America to be designed using the Swiss “BATISO” (Bâtiment isotherme) constant temperature building concept
- The Batiso concept combines a high-performance building envelope with radiant concrete slab cooling and heating, and 100% fresh air displacement ventilation



STRUCTURE

THIS IS A UNIQUE, SUSTAINABLY DESIGNED, exposed concrete and timber facility that utilizes the concrete surfaces of slabs and walls as passive radiators (no air conditioning). The very tall tilt-up concrete walls are exposed at both exterior and interior faces through use of a structurally composite insulated sandwich panel that uses rebar trusses to connect the inner and outer widths of concrete. Piping for radiant heating and cooling was cast into the thicker inner width of concrete.

The building comprises two rectangular volumes offset in plan. The cross-sectional arrangement is such that the pitched roofs covering these volumes have unequal slopes—shorter on the east side and longer on the west. Each roof is supported on segmented Douglas-fir glulam beams set at a 15 ft 9 in (4,800 mm) spacing.

The glulam beams are in turn supported on inclined glulam struts that spring from concrete columns that sit within the zone of the exterior wall. One set of struts supports the exterior roof overhangs; the other serves to reduce the internal spans over the gymnasium and other areas. Light steel cross bracing stiffens the structure longitudinally.

The spaces between the glulam roof beams are bridged by prefabricated roof panels that are comprised of solid Douglas-fir purlins and plywood sheathing. The panels are a standard 15 ft 8 in (4,770 mm) long and 3 ft 6 in (1,070 mm) wide, but of two different depths.

The different purlin depths were used to reconcile the depth of the insulated interior roof with the uninsulated exterior overhangs so that the exterior metal roofing was maintained as a flush surface. The deeper (13 in or 331 mm) panels also include exposed 2 in (38 mm) thick decking below the plywood. An additional layer of plywood, installed after the panels were placed creates the necessary diaphragm action in the roof plane.

FACTS

- The wood roof, with spans up to 65 ft (20 m) , combines glulam rafters, heavy timber purlins and prefabricated wood and plywood panels in a structure that is elegant, economical and aesthetically pleasing
- The prefabricated roof panel system is integrated with the building's ventilation system and incorporates exposed acoustic panels also made of wood

WOOD AND SUSTAINABILITY

THE PRIMARY BUILDING STRUCTURE is an important component of the interior climate-control system. The structure acts as a huge thermal-storage mass—a giant static heat pump that absorbs, stores and releases energy to create an extremely stable indoor climate, with constant temperatures inside occupied spaces, regardless of the exterior climate. Radiant heating and cooling in both floors and walls maintains a set temperature; the concrete surfaces act alternately as emitters or absorbers. The thermal energy for this system is provided by water-to-water heat pumps via a ground-source heat exchanger under the adjacent permeable parking area.

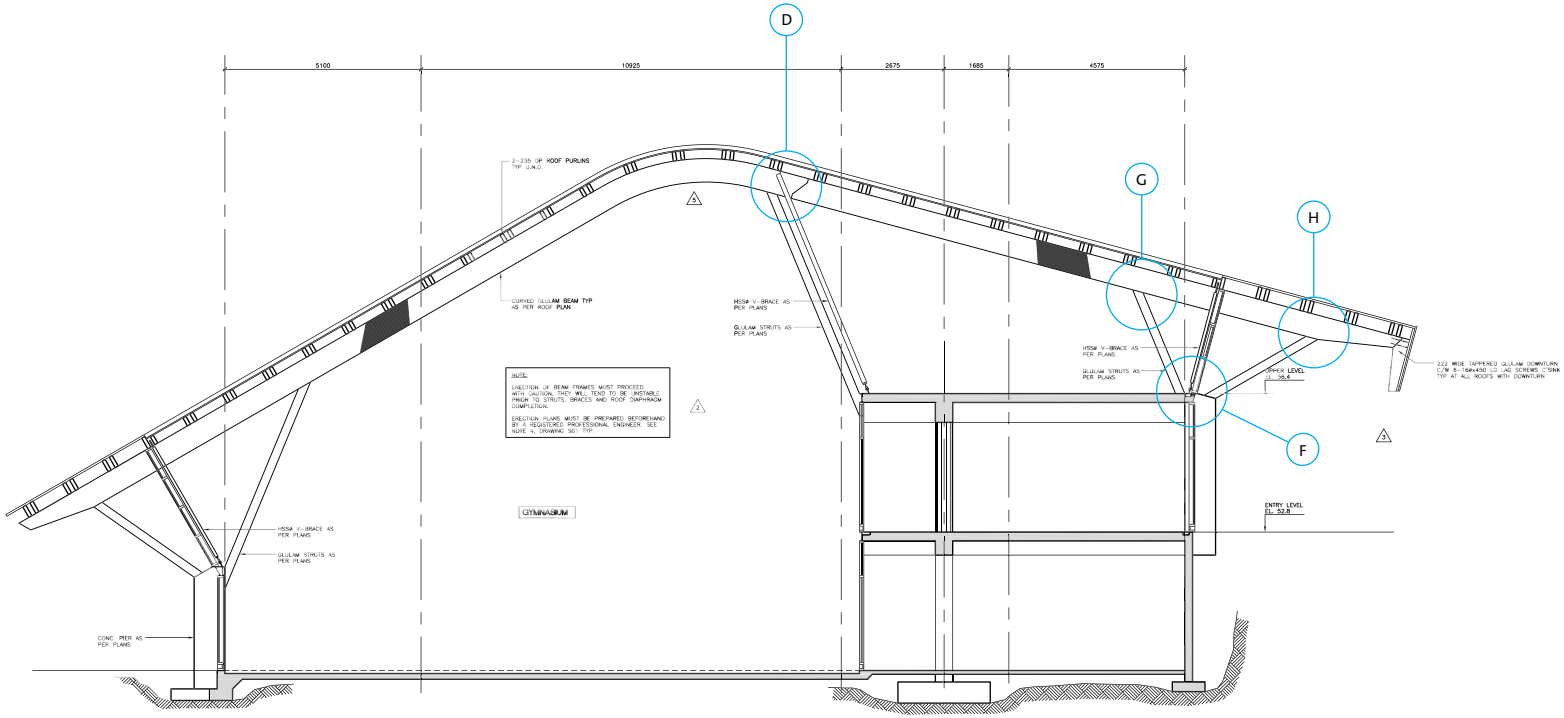
The mechanical system required to accomplish this has 40% of the capacity of a conventionally sized HVAC plant, resulting in both smaller mechanical equipment and space requirements. In-service measurement has confirmed that the building's energy consumption is less than 40% of that of an equivalent building designed with a conventional mechanical system.

"The team looked at a variety of materials for the roof. Wood was the overwhelming choice among the consultants, the client and the public. Wood was selected for its cost effectiveness, contribution to the project's sustainability objectives and warm material character."

DAVID SHONE, ASSOCIATE – PATKAU ARCHITECTS

The heavy timber roof structure incorporates substantial overhangs that provide protection from winter rains, shield interiors from excessive local solar loads in summer, and discharge rain water into adjacent landscape swales to permeate back into the natural landscape.

Wood was chosen for its appearance, cost effectiveness and its contribution to the overall sustainability goals of the project. A locally sourced and fabricated material, it has low embodied energy and is non-toxic and self-finished.



AN ELEGANT AND MULTIFUNCTIONAL WOOD ROOF

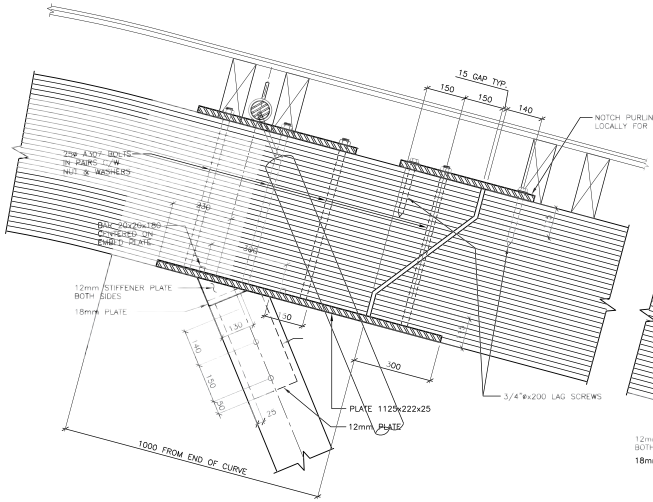
In addition to enclosing space and shedding water, the shed-like roof of the Gleneagles Community Centre serves multiple other functions. Internally, the expansive sloping planes of exposed wood unify and bring warmth to the main public spaces while promoting air flow for the displacement ventilation system. Externally, the roof collects and directs storm water back through a water feature to the site, while the large overhangs provide rain protection, reduce glare in the interior spaces and eliminate solar heat gain in summer.

The importance of the wood roof in defining the interior character of the building brought with it the desire to detail the structure with elegance and refinement. Accordingly, the structural engineers devised a series of bearing connections between the glulam struts and beams that minimized the need for exposed steel plates.

The connection between the concrete columns and the glulam struts is an angled knife plate and end bearing plate. The bearing plate takes the typical compression loading (roof weight and snow loads) and the knife plates are used to resist any tension loading from wind and seismic loads. The connections were designed to be simple and discreet to compliment rather than distract from the building form.

A similar detail is used where the strut joins the glulam beam, with only a small steel bearing plate—let into the underside—visible from below. On top of the beam, another recessed steel plate provides an anchor point for the steel cross bracing. All bolt heads are recessed, which allows the lines of the structural members to be read continuously—emphasizing the elegance of form and the visual qualities of the wood.

The suspended interior ceilings and the interior surface of the roof between the purlins are infilled with custom, prefabricated, acoustic ceiling panels comprised of Douglas-fir wood slats that are spaced with acoustic insulation in behind. This was done to provide acoustic treatment while maintaining continuity of the wood character.



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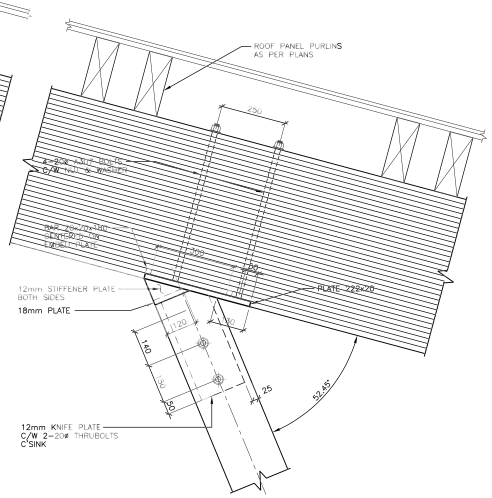

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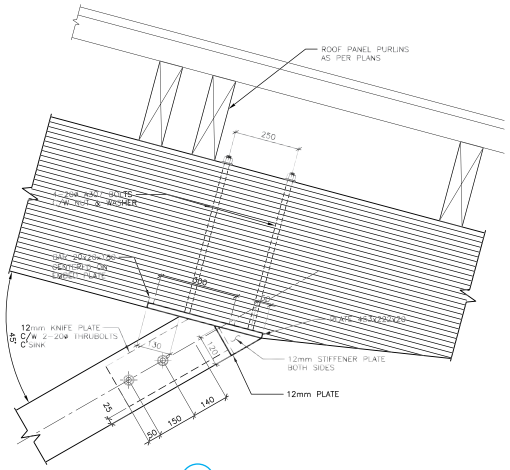

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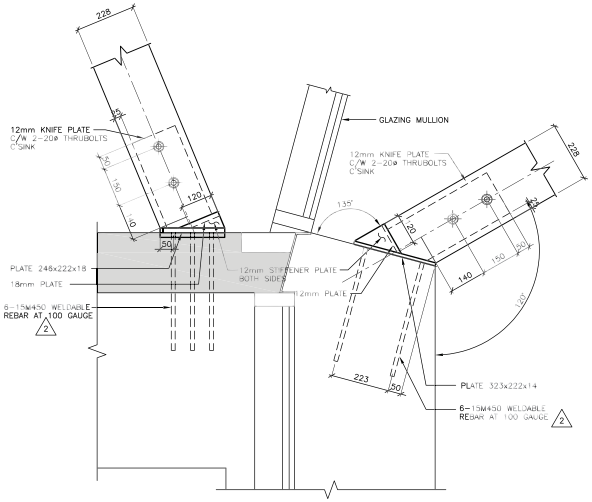

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NOTE:
1. ALL PLATES AND HARDWARE TO BE HOT DIPPED GALVANIZED.
2. ENDS OF STRUTS AND BEARING NOTCHES FOR BEARING BARS ARE DESIGNED FOR PRECISION FIT AND FULL BEARING IN FINAL ASSEMBLED CONDITION. ENSURE SUCH FULL BEARING IS MAINTAINED ON THESE SURFACES.

"The materials for the building were chosen to align with the architectural, structural and mechanical requirements. The exposed glulam beams are aesthetically pleasing while spanning significant distances. The prefabricated, architecturally expressed wood panels perform multiple functions, being integrated with the building ventilation system, while spanning between the glulam purlins and acting as part of the roof diaphragm."

STEPHAN PASCHE, STRUCTURAL ENGINEER, FAST + EPP

GLENEAGLES CO

PROJECT CREDITS

CLIENT
District of West Vancouver

ARCHITECT
Patkau Architects

STRUCTURAL ENGINEER
Fast + Epp Structural Engineers

MECHANICAL/ELECTRICAL ENGINEER
Earth Tech

CIVIL ENGINEER
Webster Engineering Ltd.

LANDSCAPE ARCHITECT
Vaughan Landscape Planning & Design

PROJECT MANAGER
Maurice J. Ouellette Consulting

GENERAL CONTRACTOR
Country West Construction Ltd.

GLULAM FABRICATOR
Western Archrib

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