DALHOUSIE UNIVERSITY
FACULTY OF ENGINEERING
Department of Civil Engineering

6 Storey Wood Building

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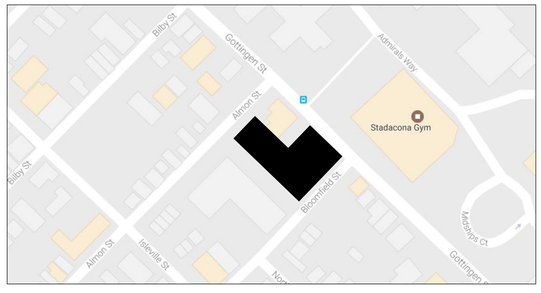
Scope of Work

Atlantic Wood Consultants were tasked with the structural design for a six storey, mixed-use building. Wood was specified as the primary structural material and will be supported on concrete foundations bearing on fractured slate bedrock at 2m depth.

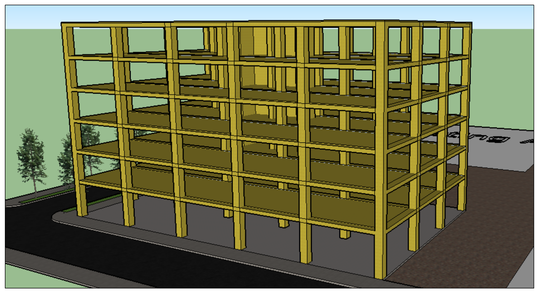
Initial Conditions

Project Location

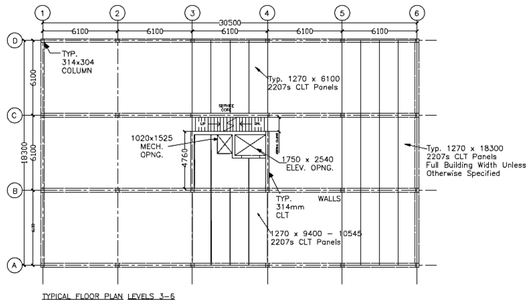


The site is located on Gottingen St. between Almon St. and Bloomfield St. in the north end of Halifax, NS.

Member Design



Two engineered wood products, Cross Laminated Timber [CLT] and Glue Laminated Timber [Glulam] were chosen for the structural members because of their predictability and strength. Exterior walls were constructed using standard light-wood framing.



Cross Laminated Timber Panels were used for:
Floor & Roof – Nordic 5ft x 60ft 220-7s panels
Shear Wall – Nordic 314-9L panels

Glue Laminated Timber was used for:
Beams – 315 x 532mm in all locations
Columns – 314 x 304mm in all locations
except interior columns of levels 1 & 2 which use 365 x 380mm and 314 x 342mm respectively.

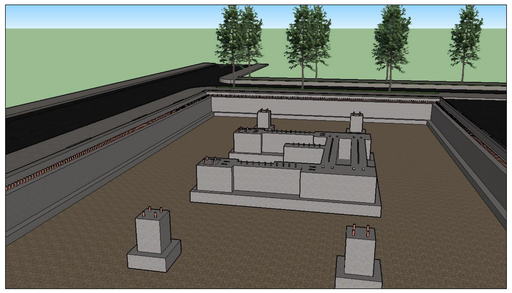
Shear Wall Connection Design

High capacity hold-downs are placed at each end to resist overturning forces. Each hold-down uses 60, 220mm long, screws to provide ample resistance to wind and seismic forces.

Sliding forces are resisted along the bottom of the panel with 100*mm* screws.

Shear is transferred between adjacent panels with an innovative double angle screw configuration: 580*mm* screws interweave across the butt joint at a compound angle of 53° from the surface plane.

Foundation Design



The building foundation is comprised of six rectangular footings and one long strip footing that runs along the perimeter of the building envelope. The building's concrete footings are designed to take the gravity loads from the columns and transmit them into the bedrock, located two meters beneath the ground surface.

Final Design

The building, located at 2778 Gottingen St. was designed to blend in with surrounding infrastructure while providing a modern appearance. The 60' x 100' building will feature a rear parking lot with entrances onto Bloomfield St. and Almon St. and commercial frontage along Gottingen with large windows.

Storey to storey height for floors 2-6 of the building is 10' with 8' of clear space; the commercial level will feature an additional 2' of clear height.

Post and beam construction provides an open layout which allows the building to be repurposed over time.

Carbon Footprint

Carbon stored in the wood:
813 metric tons of carbon dioxide

Avoided greenhouse gas emissions:
350 metric tons of carbon dioxide

Total potential carbon benefit:
1163 metric tons of carbon dioxide

Equivalent to:

246 cars off the road for a year

Energy to operate 123 homes for a year

Carbon footprint quantities are estimated by using the Carbon Calculator tool provided by the Canadian Wood Council at cwc.ca.

Conclusion and Recommendations

Well built wood buildings can last for generations – Morse's Tea building in downtown Halifax was built in 1841– and are capable of great heights – the Brock Residence, completed this year at the University of British Columbia stands at 19 storeys.

Atlantic Wood Consultants performed the design of this building with the intention of creating a structure that can withstand the harsh Canadian winters – able to withstand the heavy snow and strong winds that it will be subjected to – without issues to its serviceability or integrity. The robust structural design and open layout will allow the structure to adapt to any use.

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Special Thanks to:
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MLB