The District of Thunder Bay

Social Services Administration Board

Canadian Wood Council / Conseil canadien du bois

woodWORKS! Project of the Canadian Wood Council

Photo: Barry Wojciechowski Photography

Cover Photo: Jim Malo, FORM

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Introduction

The District of Thunder Bay Social Services Administration Board (the Board) delivers provincially mandated services to 13 communities in Northwestern Ontario. To help clients achieve self-sufficiency, the Board provides assistance to seniors, children, and people with addictions and administers social housing programs.

In March 2012, the Board's ability to help people was greatly enhanced by the opening of a new building in the Thunder Bay central business district. Before the new building came into service, services were delivered from three sub-standard locations, an arrangement that often required clients to travel from one location to another to get help.

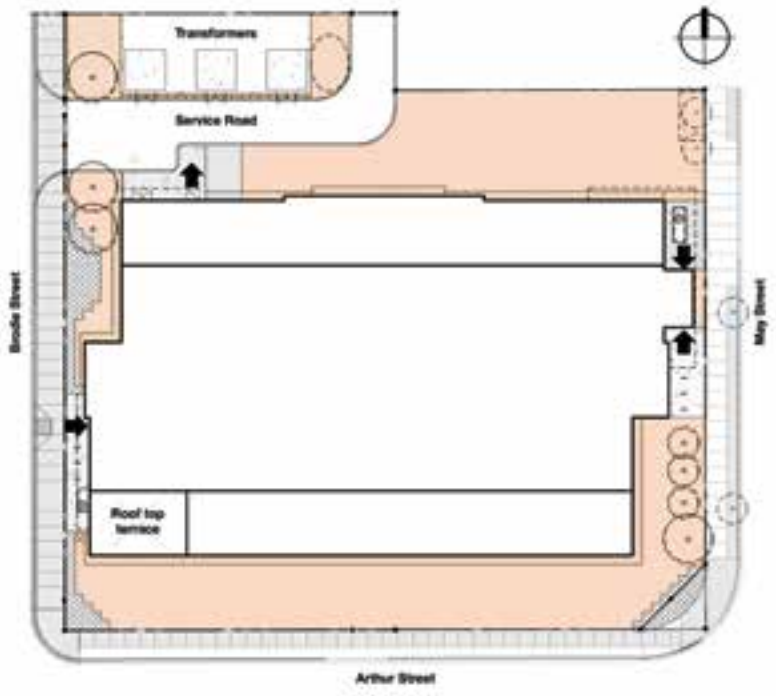

FIGURE 1 Site plan

A feasibility study that examined the possibility of amalgamating the three offices considered three different locations for the new building. The site selected is in the centre of Thunder Bay, adjacent to the city hall and library (**Figure 1**).

Initial resistance by the local community to bringing social services clients into the business district has been dispelled. Instead, it appears that the public and social services clients view a bright, progressive building as a positive influence. In addition, staff absenteeism has decreased.

The building is wood post and beam construction with wood-frame floors and infill walls. Glulam columns were left exposed. This aesthetically pleasing expression of the structure, combined with wood millwork and doors, provide a bright, positive atmosphere for staff and clients.

Building Description

The slab-on-grade foundation is supported by end-bearing piles. The relatively light weight of the wood superstructure reduced foundation costs compared to what would have been required for a concrete or steel superstructure. A high water table did not permit below grade parking on the site so parking is provided on an adjacent lot.

The main floor houses client reception, waiting, interview and meeting rooms as well as a kitchen and lunch room that is also used for vocational training. All client/staff interaction takes place on the main floor in a secure environment. **Figure 2** shows a cross-section through the building. There is a separate entrance for staff that provides access to the second and third floor administration areas and separate secure access to the interview rooms on the main floor.

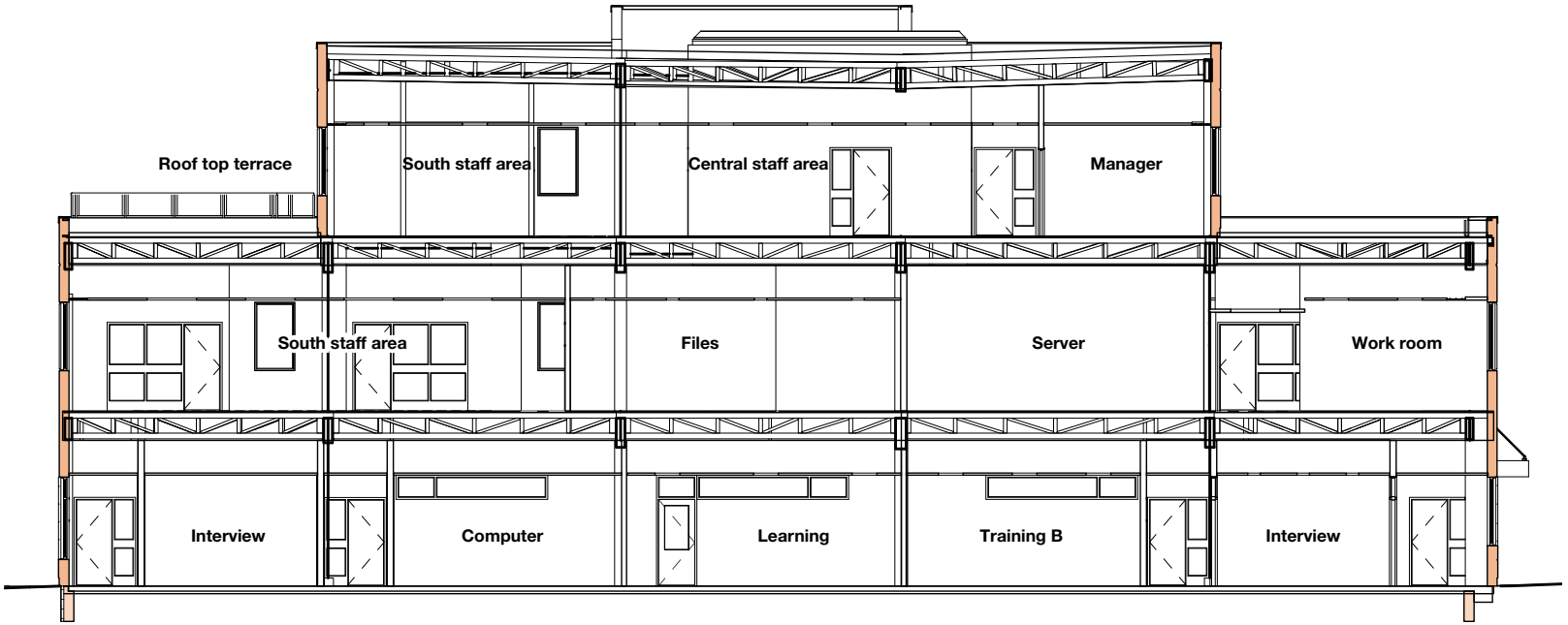

FIGURE 2 Cross section (north/south direction)

Beyond the architectural and structural design considerations unique to the site and the structure, the project also required careful planning to overcome staff resistance to the amalgamation of services into one building and the consolidation of duplicated services including reception and accounting (**Figure 3**).

Interaction with the staff during the design process was essential for achieving acceptance of the merger. In addition, the scope of the social services provided by the Board was expanding. The building layout has been carefully planned to offer privacy and dignity to clients while providing safety and security for staff during client interactions.

Lighting is an important aspect of a productive work environment. To create an inviting and relaxed atmosphere for clients and staff, the building makes optimum use of natural light with large windows and a skylight shaft that admits light to the mid-floor areas of the second floor. 9-foot ceilings add a feeling of spaciousness. Photovoltaic solar panels generate on-site power under the FIT (Ontario Hydro Authority Feed-In Tariff) program and also provide shading to the ground-floor, south-facing windows.

The layout of the second and third floor office areas equalizes the quality of the open-plan workstations. The workstations are located around the perimeter so that all staff have access to natural light and outdoor views.

FIGURE 3 Main floor plan

Carpet and workstation fabric help mitigate sound transmission through the space. The carpet is located over a layer of acoustical control board that further reduces the transmission of airborne and impact sound.

In-ground hydronic heating is used to condition the ground floor. Radiant heaters located in the ceiling around the perimeter of the ceiling are used to condition the second and third floors.

The building envelope has higher insulation value than the National Energy Code for Buildings (NECB) requires. This superior thermal performance was attained using a combination of batt and rigid insulation.

Three types of exterior cladding were used over the drainage cavity (rain screen). The grey colour (see front cover) at the base of the building is fibre-cement cladding, the wood-coloured cladding is a wood-faced phenolic composite product, and all other areas are stucco.

The Design Process

FORM Architecture Engineering was an early adopter of building information modelling (BIM) and continues to be actively involved in advancing project design, construction and operations and maintenance. Indeed, the architects consider that walk-through demonstrations enabled by BIM were key to the selection of their design proposal. Building information modeling provided visual feedback throughout the design process. **Figure 4** shows one view of the BIM model developed at the conceptual stage.

BIM was an integral part of the design solution, both architecturally and structurally. The building was conceived as a two storey structure, but the architect was advised that the building needed to be capable of having a third floor added if the client's user requirements changed. Indeed, when the design was 95% complete, the architect was instructed to add the third floor. FORM Architecture Engineering was the architect, structural engineer and interior designer for this project, a fact that allowed quick adjustment to design changes. BIM completed the redesign with only a one-month delay in the schedule.

When construction was 95% complete, changes to the layout on the second floor were requested. Architect Michelle Gibson stated, "It was a good thing we were using wood construction so that changes could be made relatively easily."

FIGURE 4 Perspective showing wood structure

Use of Wood

FORM Architecture Engineering's approach is to use wood wherever possible and the client, District of Thunder Bay Social Services Administration Board, recognized and appreciated the appearance and ambience benefits of exposed structural wood elements and finishes in the client and the office areas.

Structural wood components were used throughout the building. In addition to the exposed glulam columns that can be seen on all three floors, wood trusses and wood-framing were used for all exterior walls, interior partitions, floors and the roof (**Figures 5 and 6**). All wood products, including the glulam, were standard stock materials. In addition to the exposed columns, the building makes generous use of wood doors and millwork to provide the desired appearance and ambience.

The photograph of the reception area shows how structural and decorative wood products were used to create a pleasing atmosphere. The desk is constructed of a plastic laminate over particle board with solid wood bullnoses and horizontal trim. The large, custom designed "way-finding' signage throughout the building was made locally from medium density fibreboard (MDF) covered with a wood veneer. The linoleum floor has simulated wood accents to blend with the colour and tone of the room. The suspended feature ceiling at the desk is cherry. Horizontal maple trim has been applied to the walls throughout the building to achieve visual continuity. The doors are maple veneer with a clear finish that highlights the warmth and beauty of the wood grain.

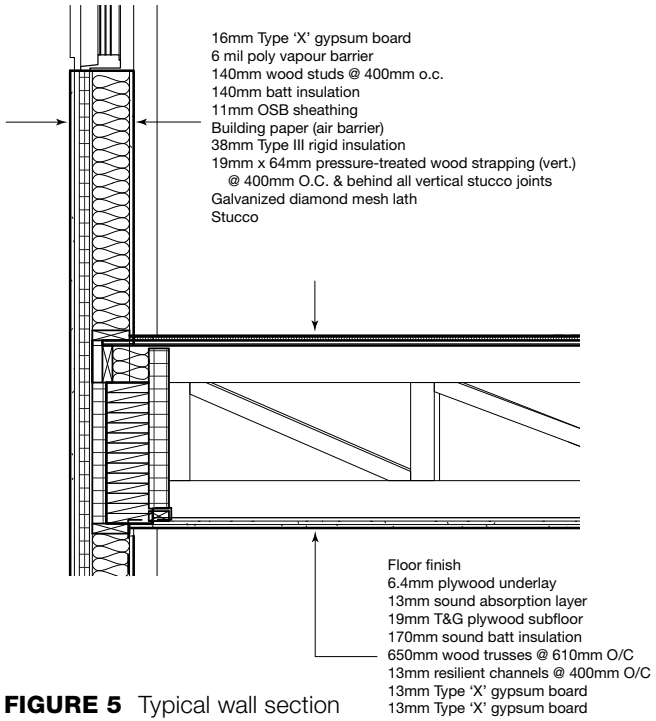

FIGURE 5 Typical wall section

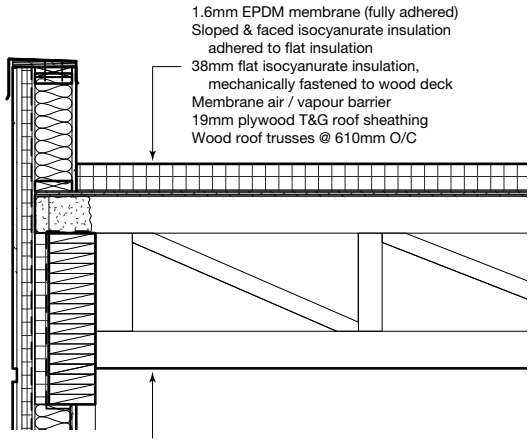

FIGURE 6 Typical roof section

Photo: Barry Wojciechowski Photography

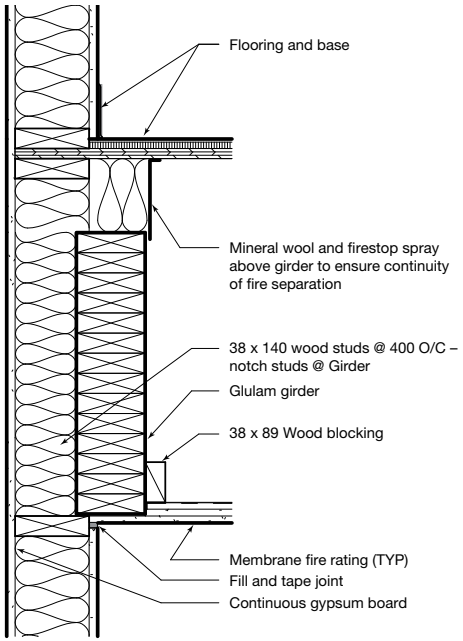

FIGURE 7 Section through the wood-framed elevator shaft

The elevator shaft wall is designated ULC W301 and has a fire resistance rating of one hour. It is comprised of 38 x 140 mm (2x6) studs with Type X gypsum board on both sides and batt insulation in the cavity in order to achieve the required fire and sound ratings (**Figure 7**). The use of wood for the elevator shafts minimized the potential for differential movement between the shafts and the rest of the structure.

Meeting Building Code Requirements

The District of Thunder Bay Social Services Administration Board building is classified as Group D, Office and Personal Services (Office). It is three stories, accessible from three streets, has a gross area of 5,092 m^2 (54,780 $ft.^2$), and is sprinklered throughout. The roof of the second floor was designed to have ¾-hour fire resistance rating to accommodate the potential addition of a third floor, an adjustment that was indeed realized during the design stage.

Photo: John Burrows

Wood and Climate Change

Using sustainably harvested wood products that store carbon, instead of non-renewable, energy-intensive building materials that require large amounts of fossil fuels to manufacture, can help slow climate change. Trees provide the only major building material grown by energy from the sun. Though processing the wood into building products does require energy, albeit less than competing materials, the needs of the mills are often supplied by using the biomass waste generated by the manufacturing process. At the end of their service life, forest products can be easily reclaimed for reuse, recycling or use as a carbon-neutral source of energy.

The wood volumes used in the Thunder Bay building are:

Glulam columns	40 m^3
Glulam beams	109 m^3
Plywood floor sheathing	70 m^3
Trusses/engineered joists	139 m^3
Shear wall wood framing	24 m^3
Exterior wall wood framing	59 m^3
Total	**441m^3**

The on-line Carbon Calculator tool (http://www.cwc.ca/index.php/en/resources/electronic-tools) can be used to calculate the amount of carbon that is not released to the environment when wood construction is used. The carbon calculation for the Thunder Bay building is shown at upper right. It indicates a carbon benefit of the wood structure is equivalent to taking 205 cars off the road for one year or, expressed differently, the energy to operate a home for 91 years.

For more information about the benefits of using Canadian forest products visit: www.feel-good.ca

Carbon Summary

Results

Volume of wood products used:
441 cubic meters (15574 cubic ft) of lumber and sheathing

U.S. and Canadian forests grow this much wood in:
1 minutes

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

Avoided greenhouse gas emissions:
730 metric tons of carbon dioxide

Total potential carbon benefit:
1073 metric tons of carbon dioxide

Project Name: Thunder Bay Social Services Building
Date: February 27, 2013

Results from this tool are estimates of average wood volumes only. Detailed life cycle assessments (LCA) are required to accurately determine a building's carbon footprint. Please refer to the References and Notes' for assumptions and other information related to the calculations.

Equivalent to:

205 cars off the road for a year

Energy to operate a home for 91 years

Photo: DSSAB Construction

Photo: Barry Wojciechowski Photography

Conclusion

The new building commissioned by the District of Thunder Bay Social Services Administration Board office is an important step for amalgamating and enhancing the delivery of social services in the region. The building's extensive use of exposed structural elements and wood finishes provides a welcoming, upbeat atmosphere for clients and service providers.

This successful project has already been recognized with two awards: the Institutional- Commercial Wood Design Award from Wood WORKS! (for large projects with a value over $10 million), and the Clean, Green, and Beautiful Award from the City of Thunder Bay. In addition, FORM Architecture Engineering won a Northern Ontario Business Award for *Company of the Year (15-50 employees)*, in large part due to this project.

Photo: Barry Wojciechowski Photography

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Photo: Barry Wojciechowski Photography

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