A Decarbonist's Approach: Rethinking of Schools as Community-Oriented Living and Learning Hubs in Mid-Sized Northern Cities

Landen James

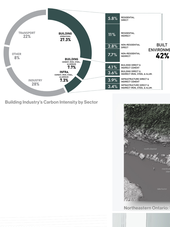
Thesis Advisor: Jean-Philippe Saucier
Second Reader: Peter Beckett

In the face of escalating climate urgency, the future of sustainable development necessitates pivotal shifts toward decarbonization, adaptability, and long-term resilience. This thesis proposes a holistic path for decarbonized institutional development in mid-sized northern Ontario cities by synthesizing low upfront embodied carbon strategies with design for disassembly, adaptability, and material sufficiency. By analyzing established district school board models for educational facility consolidation, it considers how the co-location and sharing of educational and community-oriented recreational amenities can generate a new architectural typology aligned with the 'schools as community hub' initiative.

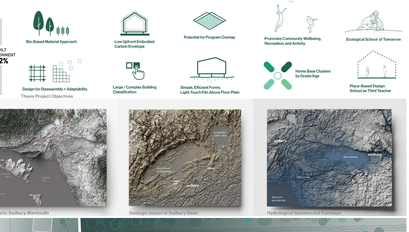
This thesis reimagines schools as Living and Learning Hubs, where circular construction practices, ecological education, and place-based design foster impactful, intergenerational learning outcomes. Simultaneously, it explores how municipal and educational institutions might better co-exist, asking how siting within sprawling, decentralized northern communities can forge meaningful connections between schools, neighbourhoods, leisure activities, and surrounding ecosystems.

Living + Learning Hub Network

Whole Life Carbon Lifecycle



Building Industry's Carbon Intensity by Sector

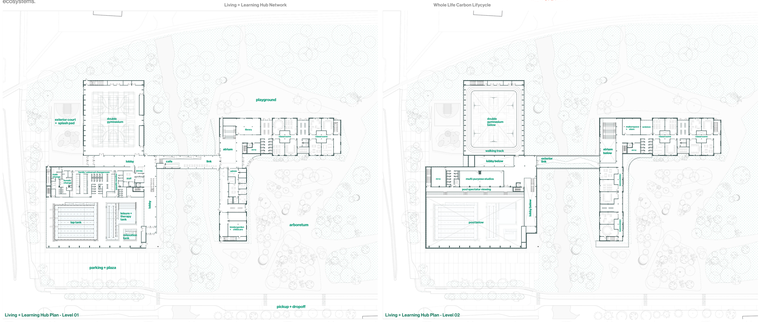


Thesis Project Objectives

Northeastern Ontario Sudbury-Manitoulin

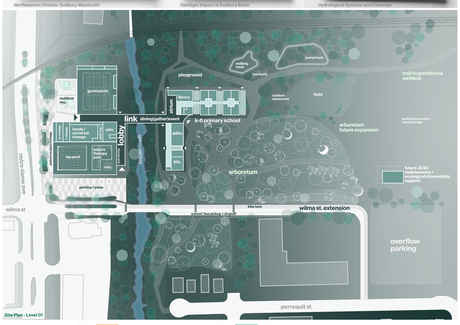
Geologic Hazards at Sudbury Basin

Hydrological Systems and Ponderosa Wetland



Living + Learning Hub Plan - Level 01

Living + Learning Hub Plan - Level 02



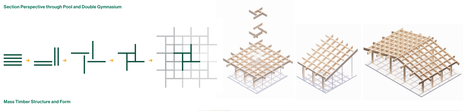
Site Plan - Level 01

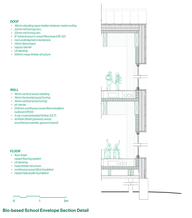
1. School Operational Extents - Noon
2. Rec. Centre Operational Extents - Noon
3. Rec. Centre Operational Extents - Noon
4. Rec. Centre Operational Extents - Daytime
5. After School Childcare Suite
6. Building Operational Extents - Evenings and Weekends
7. Building Operational Extents - Evenings and Weekends pt. 2
8. Summers - Full Service Day Camps

Section Perspective through Pool and Double Gymnasium

Ponderosa Public School + Line at Junction Creek

Public School Atrium


Mass Timber Structure and Form

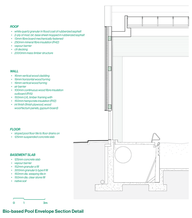


Bio-based School Envelope Section Detail

Public School Enlarged Elevation

Ponderosa Public School Entry + Courtyard

Double Gymnasium + Walking Track

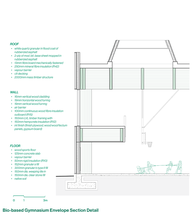


Bio-based Pool Envelope Section Detail

Pool Enlarged Elevation

Pool Entry + Parking Plaza

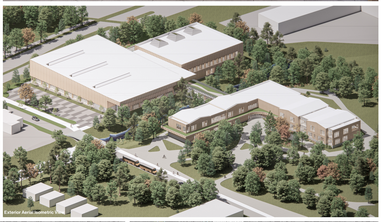
Link + Cafe

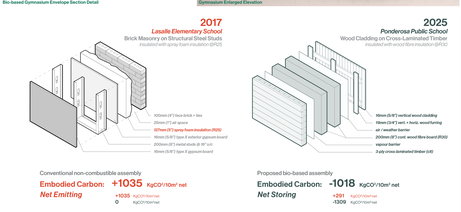


Bio-based Gymnasium Envelope Section Detail

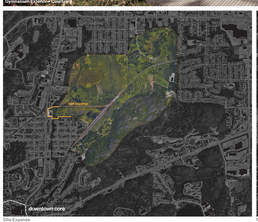
Gymnasium Enlarged Elevation

Gymnasium Exterior Courtyard

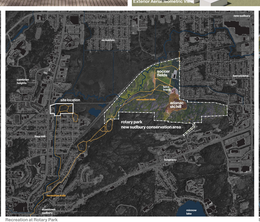

Exterior Aerial Perspective View



Embodied Carbon Analysis Comparing Convention School Wall Assembly vs. Proposed Bio-based Assembly

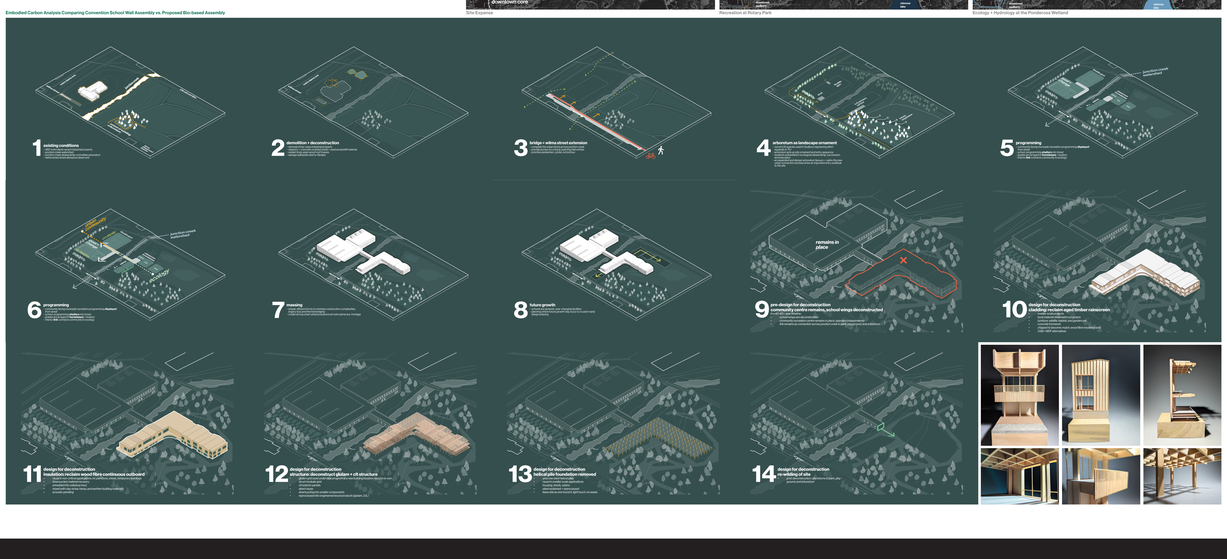


Site Expanse



Recreation at Rotary Park

Strategy + Hydrology at the Ponderosa Wetland



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