Northland Newton
Embodied Carbon Case Study

Overview

Material ingredients: Using the data included in the Carbon Leadership Forum 2021 Materials Baselines Report, specifications were written that identified lower embodied carbon targets than the average for structural and enclosure material components.

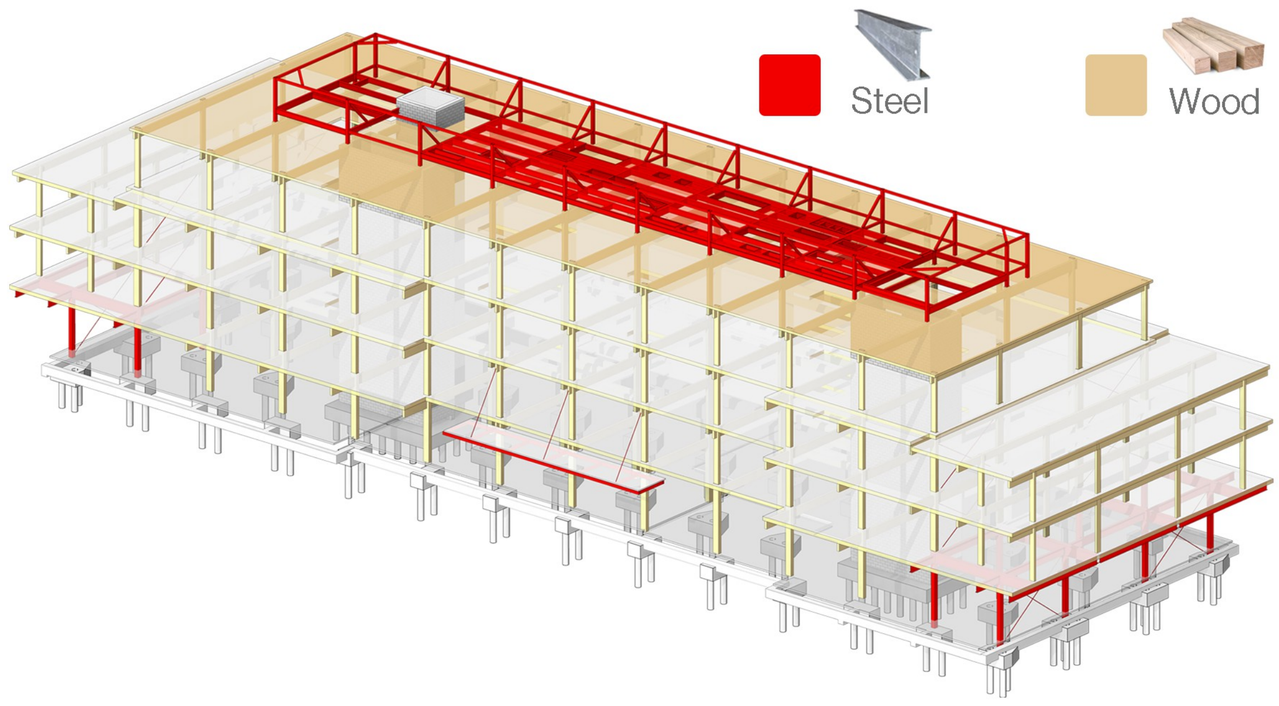
Component	Steel Baseline	CLT Baseline	CLT Design
CLT Floor Plates and Glulam Structure	No	Yes	Yes
Roof -Level Concrete Topping	Yes	No	No
Structural Slab Reduced from 12" to 4"	No	Yes	Yes
Low-EC Concrete	No	No	Yes
Low-EC Mineral Wool Insulation	No	No	Yes
GWP % Reduction From Steel Baseline	0%	44%	50%

Reduction of high embodied carbon materials:

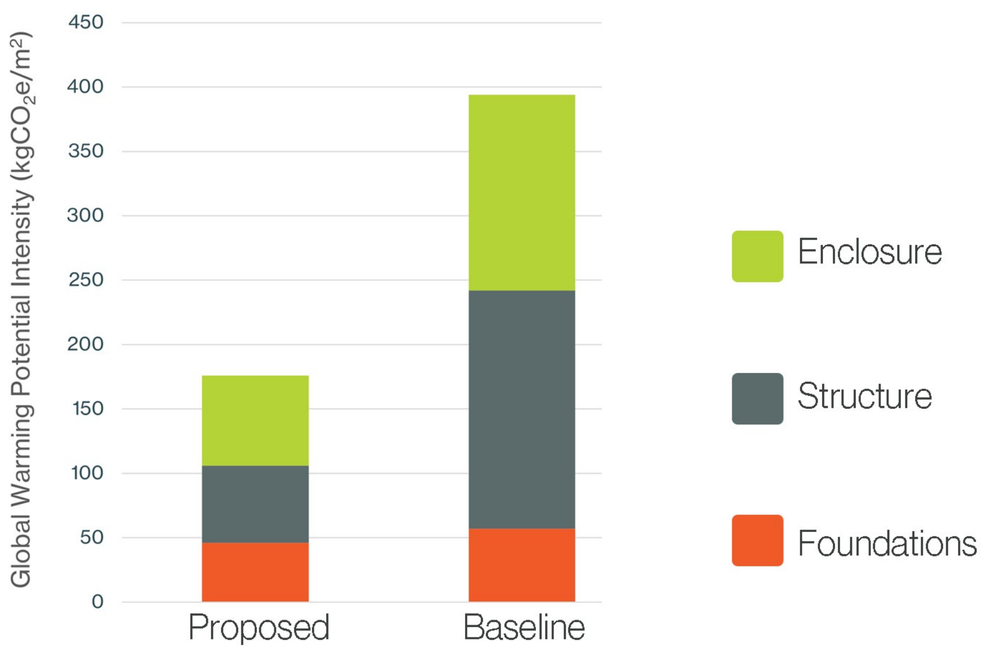
- Mass timber (cross laminated timber floor plates and glulam posts and beams) were used as the main structural components, reducing reliance on concrete and steel.
- CLT was used as the structural diaphragm at the roof level, eliminating concrete entirely.
- 12" reinforced concrete structural slab on grade was reduced to a 4" soil supported slab on grade.

Primary Contributing GWP Materials

28.3% Ready-Mix Concrete, 4000 PSI
20.1% Cross-Laminated Timber (CLT) and Glue-Laminated Timber (glulam)
9.7% XPS Insulation Boards
7.4% Flat Glass
5.4% Concrete Masonry
1,210,058 kgCO2 GWP of design without Biogenic
(190,910.82 kgCO2) GWP of Design Including Biogenic Contribution



Embodied Carbon Comparison



Lessons Learned

Start early with a preliminary analysis and set targets for structural material GWP.

Engage the construction and design team to reduce the amount of structural materials necessary.

Work with vendors and manufacturers to ensure cost and availability and request EPDs in specifications.

Investigate structural design to reduce the amount of material needed.

// Project Team

Client
Northland Investment Corp.

Construction Manager
Cranshaw Construction

Architect
Stantec Architecture

Structural
Odeh Engineers

Sustainability Consultant
Steven Winter Associates

Mass Timber Design Assist
TimberLab

Sustainability Assist
Lambert Sustainability