

TIMBER-STRONG DESIGN BUILD

Rivka De Conto, Sydney Gibson, Heavenlee Seria & Zac Timmons
Department of Civil Engineering, Construction Management and Environmental Engineering

PROJECT DESCRIPTION

- 2026 Intermountain Southwest Symposium
- Build & Design Project
- Two-Story light framed wooden structure
- Time, Sustainability, Aesthetic, Material, & Structural Constraints

ENGINEERING ANALYSIS

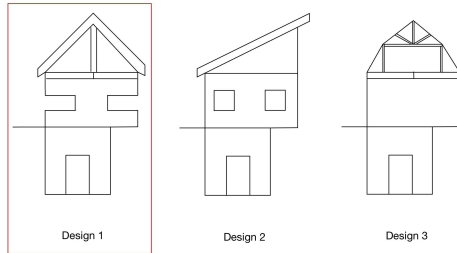


Figure 1: Design Sketches

Decision Matrix: Roof Design				
		Design 1	Design 2	Design 3
Criteria	Weight (%)	Weighted Score	Weighted Score	Weighted Score
Cost	15%	0.375	0.45	0.15
Assembly Speed	20%	0.5	0.6	0.4
Creativity/Aesthetic	15%	0.45	0.15	0.375
Sustainability	15%	0.375	0.3	0.15
Durability	35%	1.05	1.05	1.05
Total	100%	2.75	2.55	2.125

Table 1: Design Decision Matrix

TRIPLE BOTTOM LINE: IMPACTS

Environmental:

Carbon stored in the wood is 191 metric tons of CO₂ with avoided greenhouse gas emission of 407 metric tons of CO₂. Embodied carbon total is calculated at 191 metric tons of CO₂, supporting the movement for sustainable design.

Social:

Encourages others to move towards wood construction as the project simultaneously promotes durability and sustainability.

Economic:

Wood is generally cheaper to source as it is widely available which will greatly reduce total project costs. Being a great cost-effective material for construction.

DESIGN

- Building Information Model (BIM) in REVIT with Architectural & Structural Views
- Structural Plan Set of entire structure with supporting hand calculations



Figure 2: Structural View



Figure 3: Architectural View

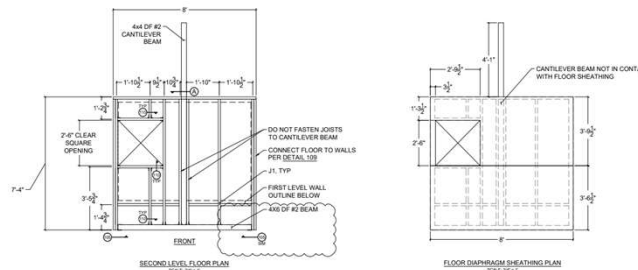


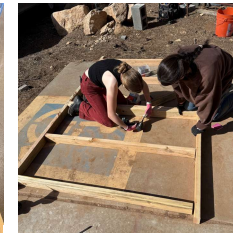
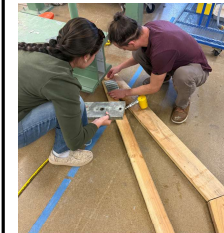
Figure 4: 2nd Level Floor & Sheathing Plan

Diaphragm Factor of Safety	
Roof	3.45
Floor	1.37
Average	2.41

Shear Wall Factor of Safety	
1 st Story	1.60
2 nd Story	1.55
Average	1.58

Table 2: Design Factor of Safety

CONSTRUCTION



COST TO IMPLEMENT

Description	Purchased	Donated	Total
Wall Framing: 1 st Floor	\$382.43	-	\$382.43
Floor System	\$159.12	-	\$159.12
Wall Framing: 2 nd Floor	\$385.6	-	\$385.6
Roof Framing	\$170.71	-	\$170.71
Connectors & Fasteners	-	\$868.72	\$868.72
Total Cost	-	-	\$1,377.30

Table 3: Design Budget Cost

ACKNOWLEDGEMENTS

We would like to thank our mentees Thomas Strange and Landen Bell for their assistance and support for this competition. As well as Dr. Robin Tuscherer, Sabrina Gibson, Adam Bringhurst and Mark Lamer for their knowledge and insight towards the success of this project.

SPONSORS



Slide 1

- 1 add pre comp construction pics
Heavenlee Leilehua Seria,
2026-03-31T23:21:10.159
- 2 34 inches x 44 inches or 36" x 48"
Heavenlee Leilehua Seria,
2026-03-31T23:21:29.275