

Mass Timber Demonstration Project

St. Johnsbury, Vermont



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Founded in 1889

Mission:

to inspire wonder, curiosity, and responsibility for the natural world.

- 1889 Original construction and 1895 addition
- heavy timber and masonry construction
- National Historic Register
- Community and State "gem"



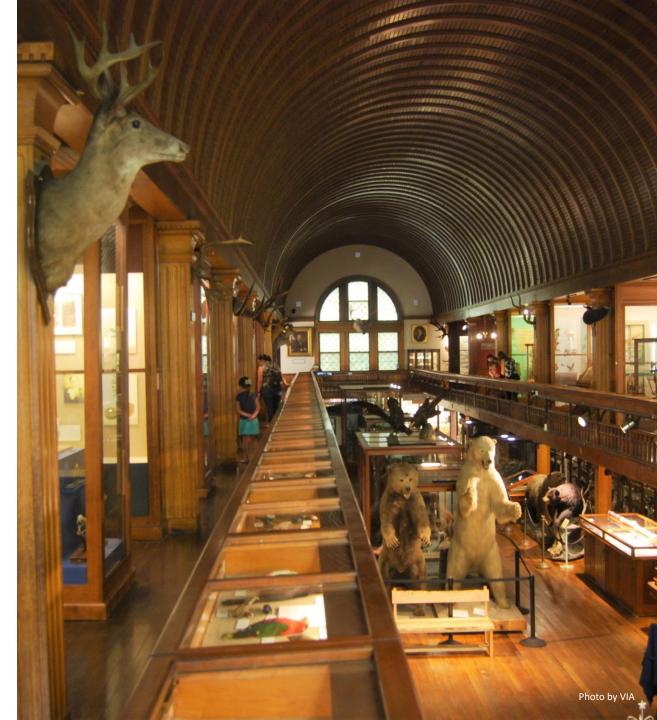


Project Goals/Objectives

- Create hands-on exhibit space for children
- Increase Accessibility
- Avoid interference with weather station
 - 2nd oldest in the US







Why Mass Timber?

- History and Community
 - Natural Science and History Museum
 - Education and Leadership
 - Regional Workforce Development
- Environmental Leadership
 - Energy Efficiency and Fossil Fuel Free
 - Embodied carbon
 - Regional wood
 - Forest stewardship







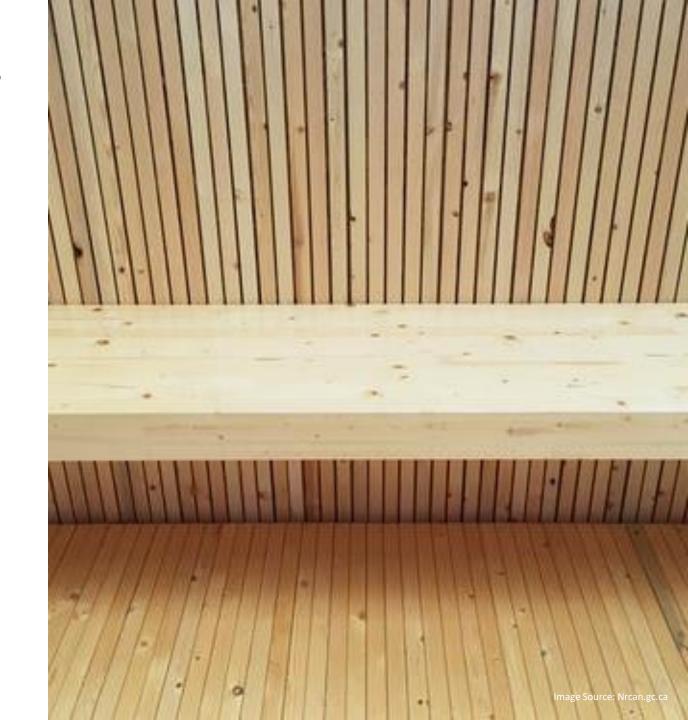
Why Nail Laminated Timber (NLT)?

Workforce Development & Regional Impact

- Regional wood,
- Keep dollars local,
- Forest stewardship,
- Industry/workforce catalyst
 - Translatable skills
 - Timber Framing tradition
 - Nailing patterns



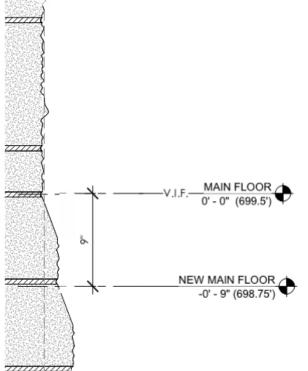
Image Source: Carolina Timberworks



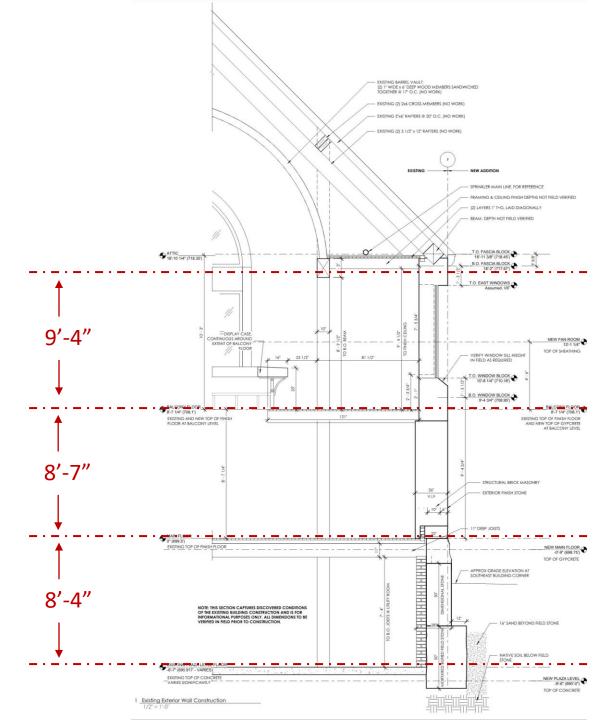
Why Nail Laminated Timber (NLT)?

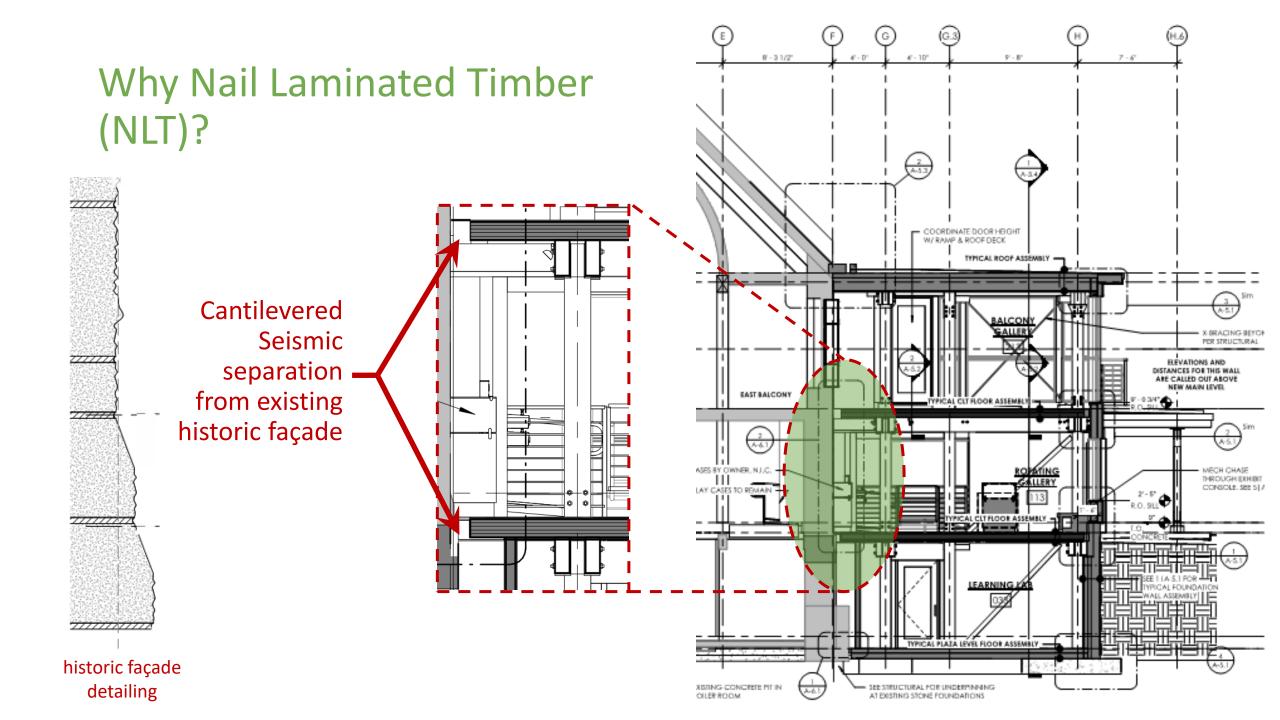
Project Challenges and Opportunities

Height limitations to meet existing floor levels









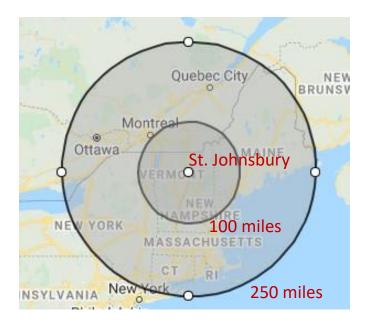
Sustainable Wood – working to keep it local

Modified spec language

- All softwood and solid sawn hardwood included in the project shall meet one or both of the below criteria:
 - Be sourced and certified by Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), and/or American Tree Farm System (ATFS),
 - ii. Be sourced and produced regionally (i.e. Wood harvested within 250 miles of St. Johnsbury and not travelling further than 250 miles of St. Johnsbury for processing) with documentation provided confirming a Forestry Management Plan is in place for harvest land representing at least 80% of the gross board feet wood produced from that facility.





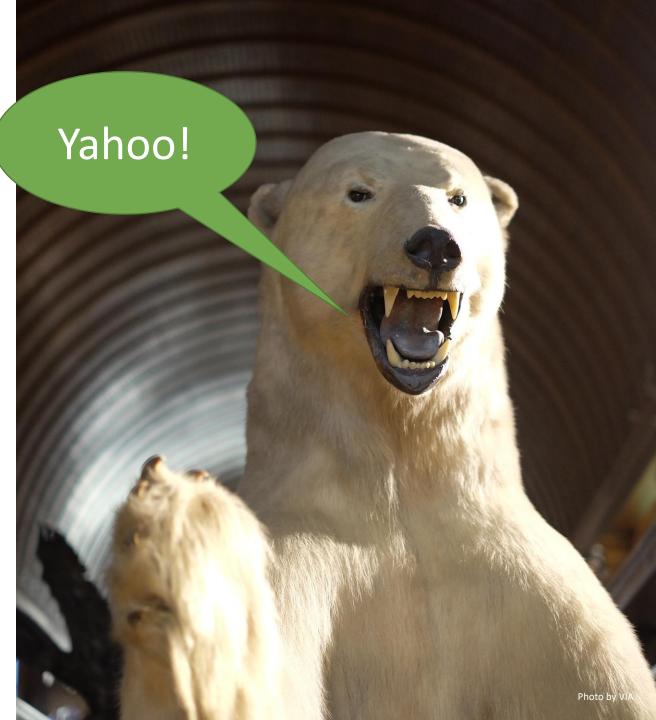




CLT Innovation Grant

Eastern Hemlock from Vermont/NH/NY
SmartLam processing/production - Alabama
Pilot Project with APA testing





NLT to CLT Design Modifications/Adaptations



CLT

bi-directional

easier to penetrate and create infrastructure passageways

higher shear capacity

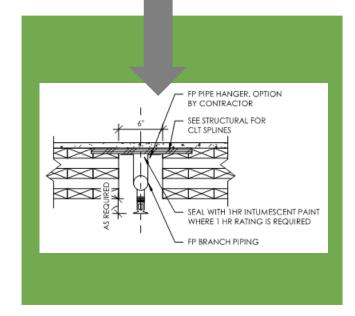
eliminate sheathing on top of NLT and instead include a "surface spline" shear connection between panels

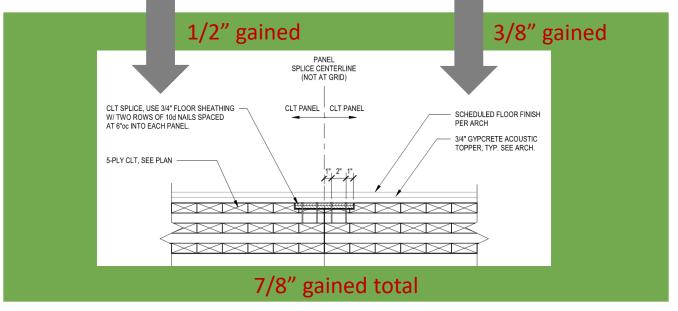
dimensions

5-ply CLT = 6-7/8"

VS.

8" NLT = 7-1/4"

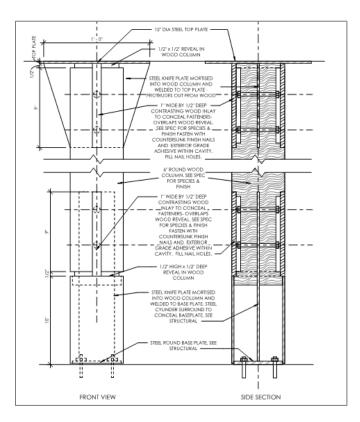






Historic Preservation Concerns:

- Refined detailing
 - Round entry columns and base and capitol detailing
- Sandblasted exposed concrete
- Local Vermont Slate with detail banding and coursing





Wood Species Highlights:

Hemlock

- CLT
- Round wood entry columns
- Spruce-Pine-Fir or Black
 Spruce

Spruce-Pine-Fir or Black Spruce

 Glue-laminated columns and beams

Douglas Fir

- Windows (interior) and Entry Doors
- Entry soffits
- Entry column accents/ inlays

Maple or Birch

- Interior wall panels,
- stair treads,
- Millwork, and
- Interior doors









THANK YOU!



Questions / Discussion?





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Ruggles Engineering Services, Inc.





