North Sharon Road Bridge

Structure/Design Type: Vehicular bridge/
Stress-laminated, glued-laminated
Location: Kalkaska County, Michigan
Owner: Kalkaska County Road Commission
Engineer: Howard Haselschwardt
Spans over: North Branch of Manistee River
Length (out-to-out): 35’
Width (out-to-out): 32’
Number of Spans/Skew: 1 / 0.0
Design Live Load: HS-25
Primary Wood Species: Red pine/southern pine
Superstructure Preservative: CCA

Preliminary costs $30,690
Substructure cost $64,315
Superstructure cost $97,734
Other costs $80,664
Surfacing
Total cost $273,403

*Surfacing was not included in original bridge design

Camp Petosega Bridge

Structure/Design Type: Vehicular bridge/
Stress-laminated sawn lumber
Location: Emmet County, Michigan
Owner: Emmet County
Engineer: Howard Haselschwardt
Spans over: Cedar Creek
Length (out-to-out): 24’
Width (out-to-out): 14’
Number of Spans/Skew: 1 / 0.0
Design Live Load: HS-15
Primary Wood Species: Red pine
Superstructure Preservative: CCA

Preliminary costs $12,000
Substructure cost $3,002
Superstructure cost $24,354
Other costs $7,300
Surfacing
Total cost $46,656

*Bridge was not surfaced

Lewiston Grade Road Bridge

Structure/Design Type: Vehicular bridge/
Stress-laminated sawn lumber
Location: Crawford County, Michigan
Owner: Crawford County Road Commission
Engineer: Howard Haselschwardt
Spans over: East Branch of Au Sable River
Length (out-to-out): 22’
Width (out-to-out): 16’
Number of Spans/Skew: 1 / 0.0
Design Live Load: HS-20
Primary Wood Species: Red pine
Superstructure Preservative: CCA

Preliminary costs $14,300
Substructure cost $47,400
Superstructure cost $24,000
Other costs $34,400
Surfacing $2,200
Total cost $122,300
Wilcox Bridge

Structure/Design Type: Vehicular bridge/ Stress-laminated, glued-laminated
Location: Crawford County, Michigan
Owner: Crawford County Road Commission
Engineer: Paul Repasky
Spans over: East Branch of Au Sable River
Length (out-to-out): 29’
Width (out-to-out): 32’
Number of Spans/Skew: 1 / 0.0
Design Live Load: HS-20
Primary Wood Species: Red pine/ southern pine
Superstructure Preservative: CCA

Cost Definitions:

Preliminary Costs include costs associated with surveys, soils investigations, design, staking, and other costs that precede construction work.
Substructure Costs include costs associated with excavation, abutments, bents/piers and on-site work associated with the placement and assembly of the bridge substructure.
Superstructure Costs include costs associated with materials, labor, and preservative treatment of decks, beams/stringers, and railings and on-site work associated with the placement and assembly of the bridge superstructure.
Other Costs include costs associated with detours, mobilization, demolition, site work/approaches, monitoring costs.
Surfacing Costs include costs of materials for superstructure only, and costs associated with the installation of surfacing materials.

Local Impact:
1. All bridges were designed and installed using in-state firms.
2. Most fabrication and some preservative treatment were done in Michigan.
3. Native red pine was used in the construction of all four bridges.
4. Long-term business relationships were formed between the public and private participants.

Funding Sources:
USDA Forest Service: $121,000; Balance of funding from other partners including the Grayling Regional Chamber of Commerce, Michigan Department of Natural Resources, Road Commission for Crawford County, Emmet County, Kalkaska County Road Commission.

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The publication *Best Management Practices for the Use of Preservative-Treated Wood in Aquatic Environments in Michigan* was developed over the course of this project. This publication can be viewed by visiting: [http://www.fs.fed.us/na/wit/WITPages/michbmp.htm](http://www.fs.fed.us/na/wit/WITPages/michbmp.htm).