LOWSPAN
BARAGA COUNTY

PROJECT PROFILE




PROJECT DESCRIPTION

2013's rapid spring snowmelt caused havoc to several Upper Peninsula County Road Commissions. Not the least was Baraga County, where numerous already marginal culverts and bridges failed or were further compromised. The complete failure and resulting road closure of a large corroded metal culvert at Beaufort Lake Road over the Spurr River proved especially troublesome. The available detour route was inconvenient for residents and time consuming for emergency vehicles but, the low ADT count limited available funding as those funding agencies considered the cost-benefit analysis of a bridge. A permit necessitated a much larger structure hydraulically than the existing undersized culvert while mandating a much higher low bridge elevation than the current culvert. Existing road elevations required a maximum top of structure elevation or incur a significantly costly lift of the entire roadway and approach. Compounding these challenges was a loading design that met the new MDOT HL 93 MOD criteria (see scope) due to heavy logging in the vicinity.

All these geometric and hydraulic factors eliminated the consideration of a conventional arch or three-sided box culvert. Installation and maintenance costs of a conventional bridge beam structure was also considered prohibitive. LowSpan was selected as the most suitable structure for the location.

LOWSPAN PROVIDED

- The minimum low chord and end area required by the waterway permitting agency.
- The high degree of structure available with a prestressed top slab allowed for a thin yet sufficient structure to meet the desired maximum bridge high chord.
- The structure to have a buried non-wearing surface. An economical installed cost and the speed of installation typical of a clear span arch/3 sided box crossing provided additional benefits.

*LowSpan **prestressed** culvert provided an unparalleled structure with job specific geometries within the estimated budget in a fraction of the time when compared to a conventional bridge or cast-in-place structure.*

LOWSPAN PROVIDED

- The stream was diverted through a temporary culvert.
- The failed culvert was removed and added channel width was excavated.
- A conventional spread/slab foundation was utilized. Sheeting provided added scour protection.
- The entire structure, less the foundation, was precast (i.e. prestressed precast 3-sided spans, precast wing walls, and precast headwalls)
- After precast installation, transverse post tensioning and grouting to the foundation(s) was performed. This provided a completed precast structure in 3 days!
- Backfilling, grading, and base course paving followed

LOCATION

Location: Baraga County Michigan, Beaufort Lake Rd. over the Spurr River (24' span x 4.5' rise x 33' length)
Date: Fall/early Winter of 2015
Owner/Engineer: Baraga County Road Commission (additional funding provided by the U.S. Department of Interior Bureau of Indian Affairs)
Precast Producer: Upper Peninsula Concrete Pipe Co., Inc. (UPCPC)
Contractor: MJO Contracting, Inc.

SCOPE

- Replacement of a severely corroded and failed metal culvert with a new and correctly sized stream crossing structure.
- Limited funding available for a low ADT county road
- Defined and restrictive low and high chord elevations
- High design load criteria (MDOT HL 93 MOD, 60 kip/axle + 20% f.o.s.)