



# Construction Manager/ General Contractor

## PROJECT CASE STUDY

### Construction Manager/General Contractor Method Hastens Delivery of Critical Bridge for Fond du Lac Reservation

During June 2012, record amounts of rainfall in the Duluth area of northeastern Minnesota brought about a 500-year flood event that caused more than \$17.8 million in damage to public infrastructure across the state. Swollen rivers and flash floods washed away or damaged several bridges and rendered large sections of roadway impassable, including a primary road on the Fond du Lac Reservation that was essential for access to homes and emergency services.

With Fond du Lac Reservation residents needing this route restored as soon as possible, the Federal Highway Administration's Central Federal Lands Highway Division (CFLHD) developed an innovative project deployment solution using the Construction Manager/General Contractor (CM/GC) method, which saved time and money in repairing and building a new bridge on this vital road.

#### Bridging the Gap in Reservation Road

The 2012 storm event substantially damaged Carlton County Road 114, locally known as Reservation Road, at a 60-inch pipe culvert crossing carrying Fond du Lac Creek underneath. The event caused water to back up at the culvert and collect along the roadway embankment, resulting in failure of the slope, and ultimately the roadway. An approximately 110-foot stretch of the road was completely washed out, leaving it impassable and closed.



*Floodwaters damaged the culvert and washed out more than 100 feet of road at a creek crossing on the Fond du Lac Reservation in Minnesota during June 2012. (Photo courtesy: Central Federal Lands Highway Division)*



*The CM/GC process helped expedite delivery of a new bridge for the Reservation while saving approximately \$150,000 in engineering costs. (Photo courtesy: Central Federal Lands Highway Division)*

### BENEFITS OF CONSTRUCTION MANAGER/GENERAL CONTRACTOR

#### Risk Mitigation

- ▶ Contractors can identify potential risks, including financial, and suggest methods to mitigate these during design and construction.

#### Time Savings

- ▶ Contractor input on issues such as constructability, material availability, and local construction techniques helps maintain the construction schedule while providing a quality product.

#### Cost Savings

- ▶ A collaborative team approach with the contractor during design can result in a careful design that avoids the need for change orders.

FHWA's Eastern Federal Lands Highway Division requested delivery assistance from CFLHD in December 2012. CFLHD scoped the project that month, and committed to having the road reopened by the end of the 2013 construction season.

The repair site was approved for funding under the Emergency Relief for Federally Owned (ERFO) Roads Program. The ERFO program repairs are intended to be replace-in-kind to pre-disaster conditions; however, the existing culvert at this location was undersized and would likely fail again in the future from embankment piping, overtopping, or saturation any time a 10- to 20-year storm event occurs. The embankment had failed in the past at this same location, approximately 20 years ago. The existing culvert was also impairing fish passage in Fond du Lac Creek, a designated trout stream.

CFLHD performed a life cycle cost analysis to determine the most cost-effective engineering solution. Options considered in the analysis included box culverts, plate arches, a bridge, and replace in kind. Ultimately, the bridge was selected based on life cycle cost, minimization of environmental impacts, and agency input.

The ambitious project schedule involved repairing damage to the existing roadway and environment and constructing a new bridge before the onset of winter weather. There were also cultural and natural resource issues to consider, such as maintaining fish passage in the existing trout stream. With these considerations, CM/GC was chosen as the project delivery method to help mitigate schedule risks and improve constructability. The CM/GC process allowed valuable input from the contractor on availability of materials, especially considering the significant demand due to repairs underway following the floods, and on locally viable construction methods. It also allowed for early procurement of long lead-time items, which helped maintain the project schedule.

Development of the plan, specification and estimate (PS&E) package and construction occurred within a 10-month period. Construction began in July 2013, and final inspection was completed in October 2013. The washed out culvert was replaced with a single span, pre-stressed, reinforced concrete girder bridge, which satisfied hydrologic and hydraulic design standards while accommodating fish passage. The total construction cost was \$1.5 million.

Input from the contractor during design development allowed the project to be delivered within budget and minimized the number of construction modifications. The expedited schedule not only met the expectations of the client, the Fond du Lac Tribe, but also saved approximately \$150,000 in engineering costs.

## ADDITIONAL RESOURCES

- ▶ FHWA CM/GC Project Delivery Program Guide: <http://www.fhwa.dot.gov/construction/cqit/cm.cfm>
- ▶ FHWA Accelerating Innovation CM/GC Web page: <http://www.fhwa.dot.gov/everydaycounts/edctwo/2012/cmgc.cfm>

## Keys to Success

- ▶ Utilize contractor knowledge of cost, availability, capacity and quantities of materials, labor and equipment to maintain schedule.
- ▶ Identify potential risks, including financial, and construction methods to mitigate these risks during the design process.

For additional information about this EDC initiative, please contact:

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*Every Day Counts (EDC), a State-based initiative of FHWA's Center for Accelerating Innovation, works with State, local and private sector partners to encourage the adoption of proven technologies and innovations aimed at shortening and enhancing project delivery.*



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