

ABC Innovative Projects

Montour Run Bridge No. 6					
Location	Scott Road over Montour Run in the northwestern metropolitan area of Pittsburgh in Allegheny County				
State	Pennsylvania				
Owner	Allegheny County				
Year ABC Built	2012				
State ID #	ECMS No. 79896				
NBI #	02-7213-0000-2466				
Coordinates	Latitude:	40.45648	Longitude:	-80.17584	
Contact Person	Mike Dillon Bridge Engineering Assistant Manager Department of Public Works Allegheny County, PA Phone: 412-350-5469 Email: Michael.Dillon@AlleghenyCounty.US				
Mobility Impact Time	ABC:	3-day closure		Conventional:	3.5-month closure
Impact Category	<i>Tier 1</i>	<i>Tier 2</i>	<i>Tier 3</i>	<i>Tier 4</i>	<i>Tier 5</i>
		X			
Primary Driver(s)	<ul style="list-style-type: none"> • reduced traffic impacts • reduced onsite construction time – minimized closure time • improved work-zone safety • improved site constructability • improved material quality and product durability • minimized environmental impacts • reduced life-cycle cost 				
Description	<ul style="list-style-type: none"> • 47.8-ft-long and 22.5-ft-wide single-span full-width decked steel beam bridge; 11° skew; 82-ton superstructure self-weight including steel grid deck (filled with lightweight concrete) and normal-weight concrete curbs • Urban location • Average Daily Traffic count: 650 (2012) • Traffic management alternative, if constructed conventionally: a detour was not feasible; the bridge was replaced over a holiday weekend to eliminate business disruptions <p>Existing Bridge: The existing single-span prestressed concrete adjacent box beam bridge was 48.0 ft long and 21.3 ft wide with masonry abutments. It had a 19.7 ft roadway. Built in 1889 and reconstructed in 1959, the bridge was deteriorated and required replacement.</p> <p>Replacement Bridge: The replacement bridge has one 11.5-ft-wide traffic lane, a 6-ft-wide shoulder, and a 2-ft-wide shoulder. The full-width decked beam cross-section consists of five 18-inch-deep steel I-beams spaced at 5 ft with a 7.2-inch-thick lightweight-concrete-filled steel-grid deck and precast curbs. The precast abutment caps are supported on the modified existing abutments. Other prefabricated elements included precast moment slabs at the</p>				

bridge approaches.

Construction Methods:

The precast abutment caps with backwalls and the precast moment slabs were fabricated at a precast plant and trucked to the bridge site. The superstructure was assembled at a staging area adjacent to the bridge site. The steel I-beams were framed, and the steel grid deck was attached and concrete filled. The curbs were cast and the metal rail posts were attached prior to erection.

The bridge was closed and the existing superstructure was removed. Minor modifications were made to the existing masonry abutments. The precast abutment caps with backwalls were erected. The superstructure span was lifted and set in place on elastomeric bearing pads on the abutment caps. The metal traffic rails were attached. The precast moment slabs and guardrail were installed. Gravel was temporarily placed on the approaches until paving is done in spring 2013. The bridge was opened to traffic. No overlay will be applied to the bridge deck.

The contract specified a 4.5-day closure. The bridge was completed in 3 days, 1.5 days ahead of schedule. Accelerated bridge construction was required since the bridge was the only access to five businesses; two of those businesses use wide permit vehicles to transport equipment. A detour was not feasible. The bridge was replaced over the 2012 Thanksgiving weekend to eliminate business disruptions. Liquidated damages of \$10,000 per hour would have been imposed on the contractor if the bridge was not open by 6:00 am the following Monday morning.

With conventional construction methods, it is estimated the bridge would take 3.5 months to construct.

Stakeholder Feedback:

This bridge was originally detailed with a longitudinal joint for placement purposes. The contractor requested to switch out the normal-weight concrete to lightweight concrete to eliminate the joint and to lift the entire span in one piece. Allegheny County approved the request. As a result, the owner does not have joint durability concerns, the contractor made better use of onsite labor and equipment, and the bridge was opened to the public sooner than would have been the case with conventional construction.

A strong commitment to the project is required by all stakeholders in the project. Shop drawing reviews and material procurement must be expedited. Business stakeholders must be on-board with the project. The contractor must be proactive with the project planning and have the necessary equipment and additional materials on site if the need arises.

High Performance Materials

- Lightweight-concrete-filled steel-grid deck

Photos

[Additional photos](#)



Project

Decision-Making Tools

Site Procurement

Project Delivery

Contracting

Planning	•	•	• Design-bid-build	• Full lane closure • Incentive / disincentive clauses
Geotechnical Solutions	<i>Foundations & Walls</i>		<i>Rapid Embankment</i>	
	•	•		
Structural Solutions	Prefabricated Bridge Elements & Systems			Construction
	Elements	Systems	Miscellaneous	• High-capacity crane
	• Steel grid (concrete filled) deck • Precast abutment caps w/backwalls	• Full-width decked beam unit (FDc ^L Bs)	• Precast curbs • LWC deck • Other – precast moment slabs	
Costs	<p>The engineer's estimate for the project was \$ 749,000. The low bid was \$805,000. There were five bidders. The conventional construction cost for all phases of work in this region (engineering and construction) in 2012 was \$1,000 per sq ft and for just a superstructure replacement in construction was \$600/sf. For this project the cost for all phases was \$1,200 per sq ft and just for superstructure replacement in construction was \$700 per sq ft.</p> <p>The overall project cost may in fact have been less with ABC when dealing with the need to keep some type of access to businesses during construction. A temporary bridge plus the costs to acquire right-of-way could have made the conventional construction cost for this project higher than ABC.</p>			
Funding	<i>Federal only</i>	<i>State only</i>	<i>Federal and State</i>	Other
				(80% State/20% County) PA State Bridge Bill
Incentive Program (\$)	<i>Highways for LIFE</i>	<i>IBRD</i>	<i>SHRP2</i>	<i>Other</i>
Contract Plans	Complete Set:	Structure Plans (link to pdf) Traffic Control Plans (link to pdf)	ABC *:	
Specifications	Complete Set:	Special Provisions (link to pdf)	ABC *:	
Bid Tabs	Bid Tabulation (link to xls)			
Schedule	Engineer's:	Engineer's Schedule (link to pdf)	Actual:	Contractor's Schedule (link to pdf)
Other Related Information	Construction Video [http://youtu.be/DnTOOvFG5dE]			
Photo Credits	Allegheny County; HDR			

* Specific to the ABC used in the project.