

# Edwin C. Moses Boulevard Bridge

## Design allows reuse of existing substructure with shallow precast concrete U-beams

by Seth R. Schickel, RW Armstrong

The first precast, prestressed concrete U-beam bridge in Ohio—Dayton’s Edwin C. Moses Boulevard Bridge—was dedicated in May 2010. The bridge crosses Wolf Creek at its confluence with the Great Miami River and replaces the Veterans Memorial Bridge, which was a two-span, earth-filled concrete arch. The bridge is located in the historic Wright-Dunbar District and features parks in three of its quadrants and a bicycle trail along the creek. These elements were the inspiration for the bridge’s innovative design and signature aesthetic statement.

RW Armstrong, the design consultant, used a weighted matrix analysis to compare several structure types and treatments. The designers analyzed a range of project factors—not just capital costs alone—such as aesthetics, constructability, durability, environmental effects, life-cycle cost, and maintainability. To maximize resources, the City of Dayton selected conventional structure types with unique aesthetic features for a detailed study. A2SO4 Architecture developed aesthetic concepts and renderings. After reviewing study results and community input, the city selected a streamlined and slender two-span concrete bridge with an aesthetic cable stay tower.

The bridge substructure design blends new and old in innovative ways. Portions of the existing foundation elements were incorporated into the new substructure units. The new bridge is 22 ft wider, so new steel pile footings were constructed on both sides of the existing footings. New pier and abutment walls were then constructed across the combined foundation.

The replacement bridge required a shallow superstructure depth to maintain the existing waterway opening and to keep the low chord above the adjacent levee elevation. Because of roadway constraints, the vertical profile could not be raised. To satisfy these requirements and provide the desired aesthetics, the designers selected a superstructure with a concrete bridge deck on 48-in.-deep precast, prestressed concrete U-beams. This first application of U-beams in Ohio allows wider beam spacing (12 ft 3 in. on center) and has an elegant edge profile—both of which are integral to the structure’s aesthetic concept.



*Dramatic LED lighting and accent colors selected by the community highlight the bridge’s signature elements. Photo: RW Armstrong.*



*Community input and a weighted analysis of options and priorities helped define the bridge’s structure type and features. Photo: RW Armstrong.*

The U-beams delivered benefits beyond pleasing aesthetics. They allowed fewer beam lines compared to bulb-tee beams, were inherently more stable during construction, and reduced the thickness of the bridge deck. The U-beams were designed to meet both Ohio Department of Transportation and AASHTO requirements.

The completed Edwin C. Moses Boulevard Bridge is a unique structure that combines form and function with innovative elements to solve a variety of technical and aesthetic challenges.

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*The Edwin C. Moses Boulevard Bridge features 48-in.-deep precast, prestressed concrete U-beams, the first U-beams to be used in Ohio. Photo: City of Dayton, Ohio.*