



2010 ?? Biltmore Avenue Bridge

Description

Meta Fields

Project Summary : The superstructure consisted of a single-span modular decked steel beam bridge.

Project Location : On Biltmore Avenue (NC 81, an urban minor arterial) over the Swannanoa River in Biltmore Village

Mobility Impact Time :

- ABC: 4-month road closure with an off-site detour
- Conventional: 24 months with adjacent temporary detour bridge

Impact Category : Tier 6 (longer but reduced by months/years)

Dimensions : 135-ft-long and 72.5-ft wide single-span modular decked steel beam bridge

Average Daily Traffic At Time Of Construction : 34890

Traffic Management : required construction of temporary detour bridge if constructed conventionally

Existing Bridge Description : The existing four-lane reinforced concrete girder bridge with cast-in-place concrete deck consisted of three 41-ft spans. It was 123-ft long with a clear roadway width of 40 ft. Built in 1935, it was structurally deficient, functionally obsolete, and required replacement.

Replacement Or New Bridge : The longer and wider four-lane replacement bridge has two traffic lanes in each direction and two 7-ft-wide sidewalks. The superstructure consists of six modular units. Each 11.25-ft-wide unit has two 4-ft-deep Grade 50W plate girders spaced at 6.13 ft, and a composite concrete deck that is 10.5 inches thick over the girders and 8.0 inches thick between girders. The units are connected with 12-inch-wide longitudinal cast-in-place concrete closure joints.

Construction Method : The contractor constructed the superstructure units at an adjacent staging area. The girders were supported at bearing locations with required superelevation, and allowed to deflect under self-weight prior to installing the intermediate diaphragms to ensure fit. The girders were then shored to prevent deflection during deck casting. Each deck unit was cast with blockouts in the corners to facilitate placement of the end diaphragms between units. Shoring was removed after the deck concrete attained compressive strength. Foundations were constructed of micropiles, with demonstration micropiles required prior to construction to ensure capacity would be achieved. The abutments were constructed using cast-in-place concrete and the bridge seat elevations verified before placement of the bearing assemblies. The superstructure units were erected, and the intermediate diaphragms were tightened. The classic concrete bridge railing and sidewalks were constructed. The closure joints were then cast, followed by grinding of the deck and approach slab for rideability. Attendance at a pre-bid conference was mandatory to bid on the project. The contractor was required to construct, maintain, and afterwards remove a temporary pedestrian bridge for use during construction. From January 2 until April 30, the road was closed for construction. Traffic was maintained with an off-site detour approximately one mile in length through city streets. Prior to January 2, nightly road closures were allowed if needed. Liquidated damages were \$2000 per calendar day for interim and final completion. If all traffic lanes were not open Monday through Sunday from 6 am to 9 pm during the first construction phase, liquidated damages ranged from \$1000 per hour to \$500 per 15 minutes. All work was completed on schedule and no liquidated damages were incurred by the contractor. No incentives were offered for early completion.

High Performance Material : Partial replacement of cement with fly ash or ground granulated blast furnace slag in deck concrete

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Costs : The engineer's estimate for the project was \$3.03 million. The low bid was \$2.10 million (\$931,000 = 31% lower than engineer's estimate). There were four bidders. The cost per square foot of bridge was \$136 compared to \$135 for conventional construction in this region in 2010.

Funding Source : Federal and State

Incentive Program : IBRD (Innovative Bridge Research and Deployment Program): \$110,000

Contract Plans : 1

Other Related Url : 1

Foundations & Walls : micropile

Year Abc Built : 2010

