Breaking from Traditional Widening with a Signature Single Span Arch Bridge on I-20/59

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2018 ALDOT Pre-Construction Conference

Tuscaloosa, AL

- all

Miss

2 overpasses (McFarland & Skyland)

Montgomery

Project Location



Cottono

Pro

ama



The "Traditional" bridge plan:

- Constructed in the late '60s.
- Haunch girders
- Non-standard bridge rail





- Dual bridges
- 4 span
- Length = 265'



The "Traditional Widening":







Breaking from "Traditional" with a SPUI Layout



Breaking from "Traditional" with a SPUI Layout



Breaking from "Traditional" with a SPUI Layout



Action items:

- Study other roadway alternatives through the IMS process
- Look for other bridge alternatives



The IMS Study

3 alternatives studied:

- Alternative A SPUI V
- Alternative B Displaced SPUL
- Alternative C Diverging Diamond Interchange (DDI)



Columbus Gateway









Damen Avenue Arch Bridge Chicago, Illinois





Arapaho Road Bridge

Addison, Texas



George Washington Carver Bridge Des Moines, Iowa





Selected Bridge Alternative



Existing Bridge

Proposed New Bridge





Bridge Layout



ΑΞϹΟΜ

Bridge Layout





Superstructure



Superstructure





- 4-foot deep steel plate I-girder floorbeams spaced at 17'-9" centers.
- Transverse floorbeams supported from arch ribs by hanger cables.



Arch Rib

w.P.

1'-1/2" 1'-1/2" 2'-3''

TYPICAL SECTION ARCH RIB

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— € ARCH RIB

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WEB P (TYP.)



- bracing and are offset in plan to accommodate skew.
- Ribs fabricated from steel plates in a varying trapezoidal shape.



Hanger Cables

- Hanger cables are all 2-5/8" dia. ASTM A586 structural strand.
- Galvanized Class A inner wires and Class C outer wires.
- Anchored at outside edge of floorbeam and attached to arch ribs with gusset plates and open strand socket.



AECOM

Construction Sequence



Construction Sequence



STAGE II CONSTRUCTION

• Stage III



STAGE III CONSTRUCTION

Construction Sequence

• Stage II (Stage III similar)



Completed Bridge



Completed Bridge





Completed Bridge - Lighting



ABUTMENT WALL WASHES

Completed Bridge - Lighting



View along I-20/59

View along McFarland Blvd.





Current Status

- I-20/59 Arch Bridge project combined with larger \$83 million bid package for other I-20/59 corridor improvements.
- Let for bidding by ALDOT in September 2017.
- Project awarded to Brasfield & Gorrie, LLC.
- Cost of arch bridge (structural work only) approximately \$13.2 million or about \$400/ft².
- Construction of bridge anticipated to start spring this year.



Interstate 59/20 Reconstruction Tuscaloosa, Alabama

over McFarland Blvd was chosen as the preferred concept. The aesthetic lighting was designed to allow the owner/local community to adjust the white LED lighting, revealing the

- · Design of the aesthetic lighting of the structure

Alabama Department of Transportation 1409 Coliseum Boulevard

Montgomery, AL 36110

- · Innovative erosion and storm water control design on the corridor due to the proximity of
- Integrated every aesthetic and constructability project goal under severe geometric constraints
- Arch biddge design spanned across McFarland Blvd without any intermediate support and within the footprint or the existing 1-20/59 bidges
 Maintenance of two lanes of traffic in each direction on 1-20/59 throughout construction
 Post construction storm water management design







2018 Merit Award Winner

- SPUI design
- Arch Bridge design
- **Aesthetic lighting**
- Sequence of construction





Post construction stormwater

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Erosion and sediment control





Acknowledgments

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