



VALUE ENGINEERING STUDY

**CSHPP-0007-00(550) Dougherty
PI No.: 0007550**

**CSSTP-M002-00(960) Dougherty
PI No. M002960**

Broad Avenue Bridge @ Flint River

Conducted on August 3, 2010

By

**Lisa L. Myers, AVS
Value Engineering Coordinator
Office of Engineering Services**

I. INTRODUCTION

GENERAL

This Value Engineering report summarizes the results of the Value Engineering study performed on August 3, 2010.

The scope of the Value Engineering study was limited to a review of common recommendations from similar types of projects.

VALUE ENGINEERING METHODOLOGY

The Value Engineering Study followed the basic Value Engineering procedure for conducting this type of analysis.

This process included the following phases:

1. Investigation
2. Speculation
3. Evaluation
4. Development
5. Presentation (Report Preparation)

Evaluation criteria identified as a basis for the review of recommendations included the following:

- ❖ Constructability
- ❖ Environmental Impacts
- ❖ Delay of project
- ❖ Cost of Redesign
- ❖ Relevancy to need and purpose of project
- ❖ Adherence to constraints and commitments

II. INVESTIGATION PHASE

PROJECT INFORMATION

Project Number: CSHPP-0007-00(550)
County: Dougherty
PI No.: 0007550

Proposed Letting: May 2011
Additional Right of Way or easements are not required.

PE Cost:	\$ 462,437
ROW Cost:	200,000
Construction Cost:	<u>9,783,028</u>
TOTAL	\$10,445,465

Additional Funding:
CSHPP-0008-00(823) Dougherty PI No. 0008823 PE: \$499,950
CSSTP-M002-00(960) Dougherty PI No. M002960 PE: \$243,771 CST: \$2,673,974

Project Length: 0.25 miles
Functional Classification: Urban Principal Arterial

Traffic ADT: 11,970 (2013)
15,610 (2033)
% Trucks: 5
Speed Design: 35 MPH

Bridge Work Required: Yes

Project Description: The project consists of the demolition and construction of Broad Avenue over the Flint River in Albany, Georgia. The project is a bridge replacement project with short roadway tie-ins at each end. The existing bridge is a three span open spandrel arch bridge with multiple closed spandrel arch spans in the approaches. The bridge is currently closed to all traffic due to foundation deterioration and undermining. Rehabilitation of the existing structure has been studied but was found to be not feasible due to the high rehabilitation costs, high ongoing maintenance costs and the short life expectancy of the rehabilitated structure.

Need and Purpose: The proposed project is needed to replace the permanently closed 2-lane bridge. The bridge replacement will also be 2-lanes. Presently, traffic is rerouted. Broad Avenue is a main connection into downtown Albany across the Flint River from East Albany. Replacing the bridge would bring it up to current design and Department standards and complete the severed link of the City Street Grid System.

Project Constraints: The following project constraints have been identified:

- There is a political push to open the proposed bridge to the public as soon as possible.
- The protected Purple Bankclimber Mussel has habitat in the vicinity of the existing bridge.
- The west end of the project is located in River Front Park.
- The existing bridge is an eligible historic resource.
- The existing and proposed bridges are in the view shed of the NRHP Listed Bridge House resource and the eligible Albany Downtown Historic District.
- There is the potential for archaeology resources at both banks.
- There are many utilities located on and adjacent to the existing bridge.
- The area is known for severe flooding. Water levels can fluctuate several feet on any given day. Water velocities can be very high.
- The river bed at the existing bridge consists of an exposed erodible and weak lime rock.
- River access is difficult.
- Broad Avenue intersection with Front Street is close to the west abutment.
- GDOT currently has \$7 million allotted for the project.

GDOT Commitments: GDOT has committed to the following in the Project Framework Agreement (PFA) executed by GDOT and the City of Albany on May 27, 2010.

- GDOT will contribute to the project funding in accordance with Attachment "A" of the PFA.
- GDOT will adhere to the project schedule established in the approved TIP/STIP. The project is currently programmed for the May 2011 Letting.
- GDOT will accomplish all PE activities for the project.
- GDOT will be responsible for letting the project.

Through public involvement, including three stakeholder meetings and a PIOH, the following commitments were made:

- A bridge typical section that provides for two travel lanes, two bicycle lanes and two wide sidewalks.
- An aesthetically attractive barrier such as Texas Rail.
- Pedestrian lighting on the bridge.
- An aesthetically attractive superstructure and substructure.
- A bridge with minimal maintenance costs.
- A bridge that minimizes the potential for future foundation scour.

- A bridge that minimizes impacts to River Front Park and the Flint River.
- A bridge that allows for future development of the properties at the east end of the bridge and of a future park on the east river bank.
- A bridge that minimizes the risk of design and schedule delay due to environmental permitting and mitigation.
- GDOT will attempt to get the proposed bridge open to the public as soon as possible.

Bridge Type Study: A Bridge Type Study was completed in June 2010.

There are several major constraints with regard to the development of the most appropriate bridge type for the replacement. These are:

- Cost
- Durability (future maintenance cost)
- Environmental Impacts
 - o Ecology (purple mussel)
 - o Impact on parkland
 - o Public opinion (a very visible site in the downtown Albany business and tourist district)
- Constructability
 - o Fast flowing, variable water surface elevation, rock bottomed river
 - o Demolition of old bridge creating environmental concerns and/or high cost

A public and stakeholder process screened the list of potential bridge alternates down to three viable solutions:

- Prestressed concrete girder bridge
- Cast-in-place post tensioned segmental concrete box girder bridge
- Continuous variable depth composite structural steel girder bridge

This bridge type study discussed the three bridge types with respect to all constraints. A comparison matrix was developed to summarize the discussion. The matrix demonstrated that the steel option was dismissed because the erection of the main river span creates constructability concerns for impact on the river that the long span option was developed to avoid, yet does not provide any balancing benefits over the other two options. The matrix also demonstrated that the prestressed girder bridge is least expensive but is also least acceptable with regard to all other constraints – and therefore offers a potential for delay if mitigation of impact on any constraint is necessary.

III. SPECULATION PHASE

Common recommendations that might apply to this project generated utilizing brainstorming method:

- A. 11 foot lanes
- B. Adjust vertical profile to minimize earthwork and/or utilize existing pavement
- C. Narrow or eliminate sidewalks
- D. Eliminate/minimize bicycle lanes
- E. Minimize road closure duration and use of detour route.
- F. Economical design of bridge

IV. EVALUATION PHASE

- A. 11 foot lanes
Plans already utilize 11 foot lanes.
- B. Adjust vertical profile to minimize earthwork and/or utilize existing pavement
Profile is set to match existing profile as much as possible and cannot be adjusted.
- C. Narrow or eliminate sidewalks
Project is located in an urbanized area. Sidewalks are an important part of this project. GDOT has committed to installing wide sidewalks.
- D. Eliminate/minimize bicycle lanes
Project is located in an urbanized area. Bicycle lanes are an important part of this project. GDOT has committed to installing 4 ft bicycle lanes.
- E. Minimize road closure duration and use of detour route.
The existing bridge has been closed to all traffic in February 2009. GDOT has committed to opening the proposed bridge as soon as possible. The design of the bridge was selected to minimize environmental, design and construction delays.
- F. Economical design of bridge
The proposed bridge design is the most economical choice to meet all structural and environmental requirements. The proposed design also satisfies all commitments. See comparison matrix on the following page from Heath and Lineback's Bridge Type Study.

Comparison Matrix of Options

Constraint	Prestressed Concrete Girders	Segmental Box Girder	Composite Steel Girders
Cost *	\$7.3 million	\$9.4 million	\$10.5 million
Maximize Durability	√	√	
Minimize Environmental Impacts			
Ecology		√	
Parkland		√	√
Public		√	
Maximize Constructability			
River Const.		√	
River Demo.		√	√

* Costs are bridge structure only for comparison purposes and do not represent total project cost

√ Respects the constraint

A comparison of these three options with regard to the project constraints is shown above. The Steel Haunched Composite Girder option is eliminated due to the fact that its primary advantage of clear spanning the river is offset by the ecology constraint (as construction is required in the river) and because it represents the high cost option. The Prestressed Concrete Girder option offers the least expensive solution, but with the most impacts to constraints. The Cast-in-Place Segmental Box Girder option offers a costlier solution, but minimizes the project impacts and the risk of project delay associated with mitigating impacts. The two options, Prestressed Concrete Girder and Segmental Box Girder, offer two solutions that are practical and convenient. The relative “value” of each was derived by considering the total cost of each and the benefits offered in terms of impacts on constraints and possible schedule delays.

V. DEVELOPMENT PHASE

No items were considered for development. Several of the suggestions were already incorporated into the plans and contract documents. The remaining items could not be considered due to the constraints and commitments.

VI. CONCLUSION

The plans do not propose any required right of way or easements. TPro indicates \$200,000 for ROW. After selection of the bridge type, it has been determined that no right of way or easements are needed; therefore, the proposed \$200,000 can be eliminated and will be considered VE Savings.

The plans have been designed in order to meet the constraints and commitments. Any changes to the project plans would delay the project and not add any additional value.