



APPENDIX N. FLOODPLAINS CHECKLIST AND BRIDGE RISK ASSESSMENT FORMS

**South Carolina Department of Transportation
Location and Hydraulic Design of Encroachments on Floodplains Checklist**

23 CFR 650, this regulation shall apply to all encroachments and to all actions which affect base floodplains, except for repairs made with emergency funds. Note: These studies shall be summarized in the environmental review documents prepared pursuant to 23 CFR 771.

I. PROJECT DESCRIPTION

The South Carolina Department of Transportation (SCDOT), in cooperation with the Federal Highway Administration (FHWA), is undertaking project-development and preliminary engineering services for the Bishopville Truck Route Project. The proposed project is located in the City of Bishopville in Lee County, South Carolina. On average, over 1,900 large commercial trucks travel N. Main Street (US 15) through downtown Bishopville daily. The project would provide an alternative route for trucks and is considered necessary to reduce existing and future truck congestion downtown. The primary purpose of the Bishopville Truck Route Project is to address truck traffic traveling through downtown Bishopville. The secondary purpose is to enhance the economic development of the area.

A. Narrative Describing Purpose and Need for Project

- a. Relevant Project History:
- b. General Project Description and Nature of Work (attach Location and Project Map):
- c. Major Issues and Concerns:

The primary purpose of the project is to address the volume of truck traffic movement through downtown Bishopville to improve mobility for vehicle and truck traffic in the area. The secondary purposes are to enhance economic development and overall travel safety in the project study area

Based on a study of the Flood Insurance Rate Maps (FIRMs), published by the Federal Emergency Management Agency (FEMA), the proposed project alternatives would involve construction within the existing 100-year floodplains of intersected and encroached waterways. These waters include Laws Branch, Black River, Robert E. Lee Branch, and Airport Run. The FIRM panels that contain the project crossings are 45061C0135C, 45061C0151C, and 45061C0153C all with an effective date of 11/19/2008. The panels document special flood hazard areas associated with these flooding sources. There is a Letter of Map Revision (LOMR) associated with panel 45061C0153C with an effective date of 1/23/2014 and case number of 13-04-1422P.

B. Are there any floodplain(s) regulated by FEMA located in the project area?

Yes

No

C. Will the placing of fill occur within a 100-year floodplain?

Yes

No

D. Will the existing profile grade be raised within the floodplain?

Yes, apart from one existing bridge crossing along McGuirt Road, all crossing locations amongst the alternatives would be new location bridges or culverts requiring localized fill within the 100-year floodplains of intersected and encroached waterways for roadway embankments and structures. Fill impacts would be limited to the edges of the floodplain outside of the river cross-section. It is anticipated that the fill would only have minor water surface elevation impacts.

E. If applicable, please discuss the practicability of alternatives to any longitudinal encroachments.

All crossings are perpendicular and would be unavoidable based on the surrounding topography of the alternatives.

F. Please include a discussion of the following: commensurate with the significance of the risk or environmental impact for all alternatives containing encroachments and those actions which would support base floodplain development:

a. What are the risks associated with implementation of the action?

Any bridge crossings will be designed with the minimum number of spans and follow setback requirements from channel banks to reduce floodplain elevation changes. The impacted areas are generally located in undeveloped zones. A No-Rise certification will be achieved in areas where there are identified structures located within the existing floodway.

Any culverted crossings will be designed with enough capacity to have minimal impact on water surface elevations.

Final impacts to the regulated floodplain are dependent on the final design and required hydraulic analysis.

a. What are the impacts on the natural and beneficial floodplain values?

Alternative 1 would cross or encroach approximately 1.8 acres of floodplains associated with Laws Branch, Black River, Robert E. Lee Branch, and Airport Run. Approximately 1.6 acres of potential floodplain impacts are classified as Zone A, 0.1 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Alternative 2 would cross or encroach approximately 1.6 acres of floodplains associated with Laws Branch, Black River, and Robert E. Lee Branch. Roughly 1.2 acres of potential floodplain impacts are classified as Zone A, 0.3 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Alternative 3 would cross or encroach approximately 0.8 acres of floodplains associated with Laws Branch, Black River, Robert E. Lee Branch, and Airport Run. Roughly 0.4 acres of potential floodplain impacts are classified as Zone A, 0.3 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Alternative 4 would cross or encroach approximately 0.7 acres of floodplains associated with Laws Branch, Black River, Robert E. Lee Branch, and Airport Run. Roughly 0.3 acres of potential floodplain impacts are classified as Zone A, 0.3 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Alternative 5 would cross or encroach approximately 2.0 acres of floodplains associated with Laws Branch, Black River, and Robert E. Lee Branch. Roughly 1.6 acres of potential floodplain impacts are classified as Zone A, 0.3 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Alternative 6 would cross or encroach approximately 2.0 acres of floodplains associated with Laws Branch, Black River, Robert E. Lee Branch, and Airport Run. Roughly 1.6 acres of potential floodplain impacts are classified as Zone A, 0.3 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Alternative 7 would cross or encroach approximately 1.4 acres of floodplains associated with Laws Branch, Black River, Robert E. Lee Branch, and Airport Run. Roughly 1.2 acres of potential floodplain impacts are classified as Zone A, 0.1 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Alternative 8 would cross or encroach approximately 1.6 acres of floodplains associated with Laws Branch, Black River, Robert E. Lee Branch, and Airport Run. Roughly 1.2 acres of potential floodplain impacts are classified as Zone A, 0.3 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Alternative 9 would cross or encroach approximately 0.6 acres of floodplains associated with Laws Branch, Black River, Robert E. Lee Branch, and Airport Run. Roughly 0.4 acres of potential floodplain impacts are classified as Zone A, 0.1 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Alternative 10 would cross or encroach approximately 0.7 acres of floodplains associated with Laws Branch, Black River, and Robert E. Lee Branch. Roughly 0.3 acres of potential floodplain impacts are classified as Zone A, 0.3 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Alternative 11 would cross or encroach approximately 0.5 acres of floodplains associated with Laws Branch, Black River, Robert E. Lee Branch, and Airport Run. Roughly 0.3 acres of potential floodplain impacts are classified as Zone A, 0.1 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Alternative 12 would cross or encroach approximately 0.7 acres of floodplains associated with Laws Branch, Black River, and Robert E. Lee Branch. Roughly 0.3 acres of potential floodplain impacts are classified as Zone A, 0.3 acres are classified as a Zone AE, while the remaining 0.1 acres are classified as Zone AE regulated floodway.

Detailed flood studies of stream and river crossings would be required as part of the final roadway design. The bridges and culverts would be designed to FEMA standards and would provide clearances above the flood elevation, and therefore, an increase in flooding is not anticipated.

- b. What measures were used to minimize floodplain impacts associated with the action?

Various alternatives were analyzed from an engineering, environmental, and public perspective for this project. The alternative alignments were designed in an attempt to keep floodplain crossings perpendicular and span the smallest area wherever possible.

- c. Were any measures used to restore and preserve the natural and beneficial floodplain values impacted by the action?

No, the project is expected to have minimal effects on floodplain functionality, flood storage, or wildlife and fishery habitats. If conditions change based on final design and analysis, then additional measures would be evaluated to preserve and/or restore floodplain values.

- G. Please discuss the practicability of alternatives to any significant encroachments or any support of incompatible floodplain development.

Numerous alternatives were developed and evaluated using specific criteria established through public involvement activities and engineering design. The design would include minor impacts to the Laws Branch, Black River, Robert E. Lee Branch, and Airport Run floodplains from the placement of fill for the roadway embankment, bridge approaches, and/or culverts. All structures would be designed according to FEMA standards and would provide clearances above the flood elevation.

Generally, most flow conveyance along natural streams occurs within the channel area. Overbank areas along streams provide additional flow capacity and flooding relief during large storm events. The flow velocity in overbank areas is typically reduced, compared to channel flow, due to the rough topography. As a result, floodplain areas outside of the main channel can be impacted without significant increases in water surface elevations and floodplain limits. FEMA refers to these areas as the floodway and floodway fringe and regulated impacts are allowed within the floodway fringe.

Hydraulic evaluations will be performed as part of the final design for this project. The design will be completed following SCDOT and FEMA regulations. If after the completion of the studies it is determined that a Conditional Letter of Map Revision (CLOMR) is needed, continued coordination with FEMA would take place.

- H. Were local, state, and federal water resources and floodplain management agencies consulted to determine if the proposed highway action is consistent with existing watershed and floodplain management programs and to obtain current information on development and proposed actions in the affected? Please include agency documentation.

To date, there has been no coordination with local, state, or federal agencies regarding the proposed project and its impacts on the watershed and floodplain. At the appropriate stage of project development (i.e. final design), a complete hydraulic study performed to SCDOT guidelines for Hydraulic Design Studies would be conducted to more precisely determine the effects of the project on the base floodplains. If after the completion of the studies it is determined that a CLOMR needed, continued coordination with FEMA would take place.

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

COUNTY: _____

DATE: _____

ROAD #: _____

STREAM CROSSING: _____

Purpose & Need for the Project:

I. FEMA Acknowledgement

Is this project located in a regulated FEMA Floodway? Yes No

Panel Number: _____ Effective Date: _____ (See Attached)

II. FEMA Floodmap Investigation

FEMA Flood Profile Sheet Number _____ illustrates the existing 100 year flood:

- Passes under the existing low chord elevation.
- Is in contact with the existing low chord elevation.
- Overtops the existing bridge finished grade elevation.

III. No Rise/CLOMR Preliminary Determination

Preliminary assessment indicates this project may be constructed to meet the "No-Rise" requirements. A detailed hydraulic analysis will be performed to verify this assessment.

Justification:

Preliminary assessment indicates this project may require a CLOMR/LOMR. Impacts will be determined by a detailed hydraulic analysis.

Justification:

BRIDGE SCOPE AND RISK ASSESSMENT FORM

IV. Preliminary Bridge Assessment

A. Locate Existing Plans

a. Bridge Plans Yes File No. _____ Sheet No. _____ (See Attached)
 No

b. Road Plans Yes File No. _____ Sheet No. _____ (See Attached)
 No

B. Historical Highwater Data

a. USGS Gage Yes Gage No. _____ Results: _____
 No

b. SCDOT/USGS Documented Highwater Elevations
 Yes Results: _____
 No

c. Existing Plans Yes See Above
 No

V. Field Review

A. Existing Bridge

Length: _____ ft. Width: _____ ft. Max. span Length: _____ ft.

Alignment: Tangent Curved

Bridge Skewed: Yes No Angle: _____

End Abutment Type: _____

Riprap on End Fills: Yes No Condition: _____

Superstructure Type: _____

Substructure Type: _____

Utilities Present: Yes No
Describe:

Debris Accumulation on Bridge: Percent Blocked Horizontally: _____ %
Percent Blocked Vertically: _____ %

Hydraulic Problems: Yes No
Describe:

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

V. Field Review (cont.)

B. Hydraulic Features

a. Scour Present: Yes No Location: _____

b. Distance from F.G. to Normal Water Elevation: _____ ft.

c. Distance from Low Steel to Normal Water Elev.: _____ ft.

d. Distance from F.G. to High Water Elevation: _____ ft.

e. Distance from Low Steel to High Water Elev.: _____ ft.

f. Channel Banks Stable: Yes No

Describe:

g. Soil Type: _____

h. Exposed Rock: Yes No Location: _____

i. Give Description and Location of any structures or other property that could be damaged due to additional backwater.

C. Existing Roadway Geometry

a. Can the existing roadway be closed for an On-Alignment Bridge Replacement

Yes No

Describe:

If "yes", does the existing vertical and horizontal curves meet the proposed design speed criteria?

If "No", will the proposed bridge be:

Staged Constructed

Replaced on New Alignment

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

VI. Field Review (cont.)

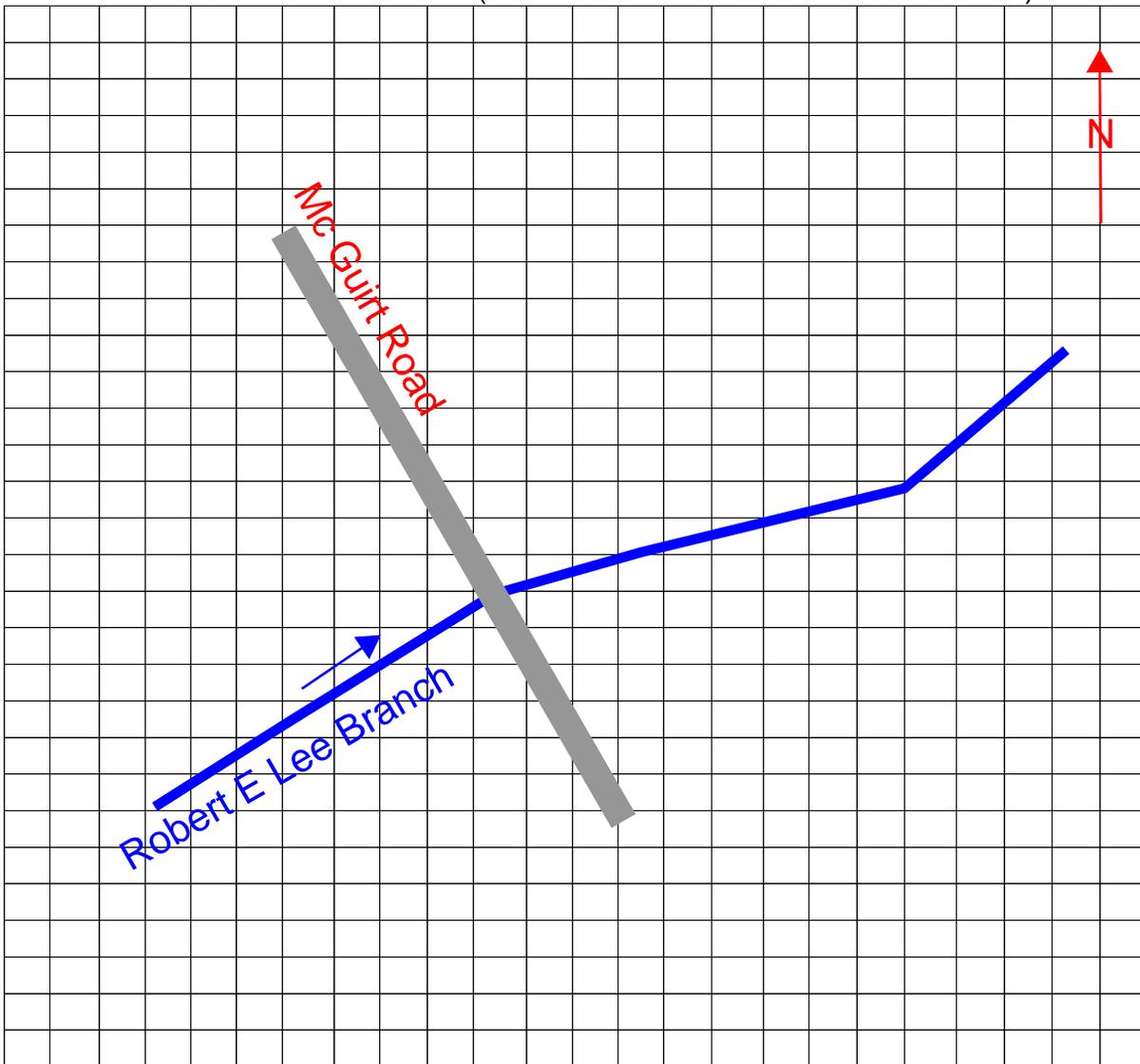
A. Proposed Bridge Recommendation:

Length: _____ ft. Width: ft. Elevation: _____ ft.

Span Arrangement: _____

Notes: _____

BRIDGE SITE DIAGRAM: (Show North Arrow and Direction of Flow)



Performed By: _____

Title: _____