SCDOT

U.S. Department of Transportation
Federal Highway Administration

APPENDIX F

BRIDGE FORMS AND FLOODPLAIN CHECKLIST

FIX
INTERSTATE
26

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

COUNTY: Orangeburg DATE: 07/18/2025

ROAD #: S-65 STREAM CROSSING: Little Bull Creek

Purpose & Need for the Project:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a replacement of the existing structure under S-65 along Little Bull Creek.

I. FEMA Acknowledgement

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

Panel Number: 45075C0195C Effective Date: 01/16/2014 (See Attached)

II. FEMA Floodmap Investigation

FEMA Flood Profile Sheet Number N/A 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: Project Site is not located in a SFHA.

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

Justification: N/A

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

IV. Preliminary Bridge Assessment

A. Locate Existing Plans

a. Bridge Plans ☑ Yes ☐ No File No. 38.319 Sheet No. 39 (See Attached)

b. Road Plans ☑ Yes ☐ No File No. 38.319 Sheet No. 31 (See Attached)

B. Historical Highwater Data

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

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

c. Existing Plans ☐ Yes ☑ No See Above

V. Field Review

A. Existing Bridge

Length: 28 ft. Width: 25.5 ft. Max. span Length: 8 ft.

Alignment: ☑ Tangent ☐ Curved

Bridge Skewed: ☐ Yes ☑ No Angle: _____

End Abutment Type: _____

Riprap on End Fills: ☑ Yes ☐ No Condition: _____

Superstructure Type: Triple (s) 8 x 8 RCBC

Substructure Type: N/A

Utilities Present: ☐ Yes ☑ No

Describe:

Debris Accumulation on Bridge: Percent Blocked Horizontally: _____ %

Percent Blocked Vertically: _____ %

Hydraulic Problems: ☐ Yes ☑ No

Describe:

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: Bib sandy loam

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.

Backwater caused by the existing crossing doesn't appear to pose flooding risks to any structure/property in the adjacent floodplain.

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?

Proposed profile will improve the vertical curve

If "No", will the proposed bridge be:
☐ Staged Constructed
☐ Replaced on New Alignment

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

VI. Field Review (cont.)

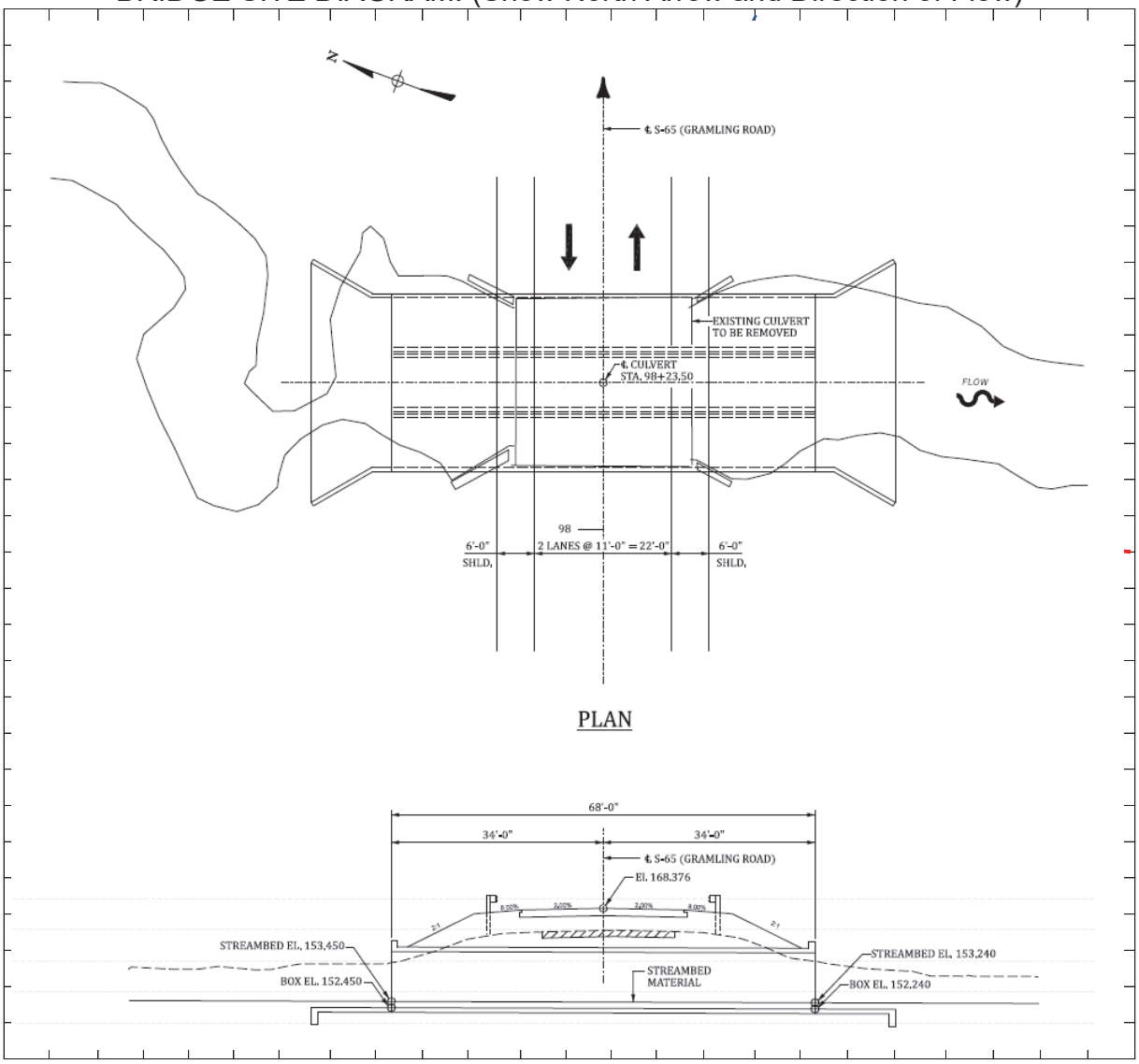
A. Proposed Bridge Recommendation:

Length: 68 ft. Width: 40 ft. Elevation: 168.37 ft.

Span Arangement: (3) 8'x8'

Notes: _____

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



Performed By: Clayon McCathern

Title: SC H&H Lead

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION FLOODPLAIN AND RISK ASSESSMENT

Regulation 23 CFR 650 shall apply to all encroachment and to all actions which affect base floodplains, except for repairs made with emergency funds. (See HEC-17) Note: These studies shall be summarized in the environmental review document prepared pursuant to 23 CFR 771.

Project Description:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a culvert replacement to the existing structure under S-65 along Little Bull Creek.

A. Narrative Describing Purpose and Need for Project:

a. Relevant Project History:

The purpose of the project is to widen I-26 from the eastern limits of the interchange with US 601 at Exit 145 through the interchange with US 301 at Exit 154.

b. Project Location (attach Location and Project Map):

See Appendix B

c. Major Issues and Concerns:

None

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

Yes ☐ **No** ☑

C. Will fill be placed within a 100-year floodplain?

Yes ☐ **No** ☑

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

Yes ☐ **No** ☑

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

N/A

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:

i. What are the flood-related risks associated with implementation of the action?

None

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

N/A

iii. Will the bridge entice people to build in floodplains?

N/A

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

Guardrail and 2:1 fill slopes are utilized at this location to minimize encroachments into the existing floodplain.

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

As per the hydraulic modedeling results, the proposed culvert extension would not cause any adverse hydraulic impacts. Therefore, no alternate measures are required.

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

N/A

H. List 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. Describe any information obtained on development and proposed actions in the affected area. Please include agency documentation.

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I. BACKWATER DAMAGE FORM

Major flood damage applies to shopping centers, hospitals, industrial facilities, residential areas, schools, farming operations, etc.

1. *Does the maximum flood cause major damage to upstream property?*

Yes - (Go to 2.) **No - (Go to 3.)**

2. *Would this damage occur if the road were not there?*

Yes - (Go to 3.)

No - (Perform a limited Least Total Expected Cost (LTEC) (HEC-17) analysis to see if the bridge opening should be increased and/or grades raised to minimize the damage potential. Go to II.)

3. *Was this a bridge replacement? If so, was the bridge opening increased enough to increase the discharge passed through the bridge?*

Yes - (Go to 4.) **No - (Go to II.)**

4. *Does the increased flow cause major damage downstream?*

Yes - (Perform a limited LTEC analysis to determine if the bridge opening should be reduced, the floodway redefined, and flood easements purchased upstream or if flood easements should be purchased downstream. Go to II.)

No - (Go to II)

II. TRAFFIC RELATED LOSSES

1. *Is the overtopping flood greater than the 100-year flood?*

Yes - (Go to III.) No - (Go to 2.)

2. *Does the ADT exceed 50 vehicles per day?*

Yes - (Go to 3.) No - (Go to III.)

3. *Does the duration of road closure in days, multiplied by the difference in length, in miles between the normal route and the detour, exceed 20?*

Yes - (Go to 4.) No - (Go to III.)

4. *Does the annual risk cost for traffic related costs exceed 10% of the estimated annual capital costs?*

Yes - (Perform a limited LTEC analysis to compare the cost to raise the grades and if necessary increase the bridge length with the traffic related costs. Go to III.)

No - (Go to III.)

III. ROADWAY AND/OR STRUCTURE REPAIR COST

1. *Is the overtopping flood less than the 100-year flood?*

Yes - (Go to 2) **No - (Go to 3)**

2. *Is the overtopping flood less than 0.5 foot over the low point on the roadway and duration no more than 1.0 hour?*

Yes - (Go to 3)

No - (perform a limited LTEC analysis to determine if the grades should be raised and/or the bridge opening increased or that the repair cost for embankment erosion are less significant. Traffic cost should be included in this evaluation.)

3. *Is the proposed bridge or culvert structure subject to potential damage due to debris?*

Yes - (Go to 4) **No - (Go to 5)**

4. *Perform a limited LTEC analysis to determine if the structure should be modified. (Go to 5.)*

5. *The risk assessment has determined the most economical design for the crossing within the design constraint* s.

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

COUNTY: Orangeburg DATE: 06/20/2025

ROAD #: I-26 STREAM CROSSING: Little Bull Creek

Purpose & Need for the Project:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a culvert extension to the existing structure under I-26 along Little Bull Creek.

I. FEMA Acknowledgement

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

Panel Number: 0193C Effective Date: 01/16/2014 (See Attached)

II. FEMA Floodmap Investigation

FEMA Flood Profile Sheet Number N/A 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: Project site is not located in a SFHA.

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

Justification:

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

IV. Preliminary Bridge Assessment

A. Locate Existing Plans

a. Bridge Plans ☑ Yes ☐ No File No. 38.488 Sheet No. 95 (See Attached)

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

B. Historical Highwater Data

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

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

c. Existing Plans ☐ Yes ☑ No See Above

V. Field Review

A. Existing Bridge

Length: 134.83 ft. Width: 26.67 ft. Max. span Length: 8 ft.

Alignment: ☑ Tangent ☐ Curved

Bridge Skewed: ☐ Yes ☑ No Angle: _____

End Abutment Type: N/A (Culvert Crossing)

Riprap on End Fills: ☐ Yes ☑ No Condition: Stable

Superstructure Type: Triple (3) - 8 x 6 RCBC

Substructure Type: N/A

Utilities Present: ☑ Yes ☐ No

Describe: Fiber optic marker post was observed in downstream floodplain.

Debris Accumulation on Bridge: Percent Blocked Horizontally: 10 %

Percent Blocked Vertically: 5 %

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: Culvert Outlet

b. Distance from F.G. to Normal Water Elevation: 10.43 ft.
c. Distance from Low Steel to Normal Water Elev.: 4.60 ft.
d. Distance from F.G. to High Water Elevation: 6.32 ft.
e. Distance from Low Steel to High Water Elev.: 0.49 ft.

f. Channel Banks Stable: ☑ Yes ☐ No
Describe:

g. Soil Type: Johnston sandy loam

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.

Backwater caused by the existing crossing doesn't appear to pose flooding risks for any structure/property in the adjacent floodplains.

C. Existing Roadway Geometry

a. Can the existing roadway be closed for an On-Alignment Bridge Replacement
☐ Yes ☑ No
Describe:

Culvert barrels will be extended through staged construction. Therefore, the roadway doesn't need to be closed.

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.)

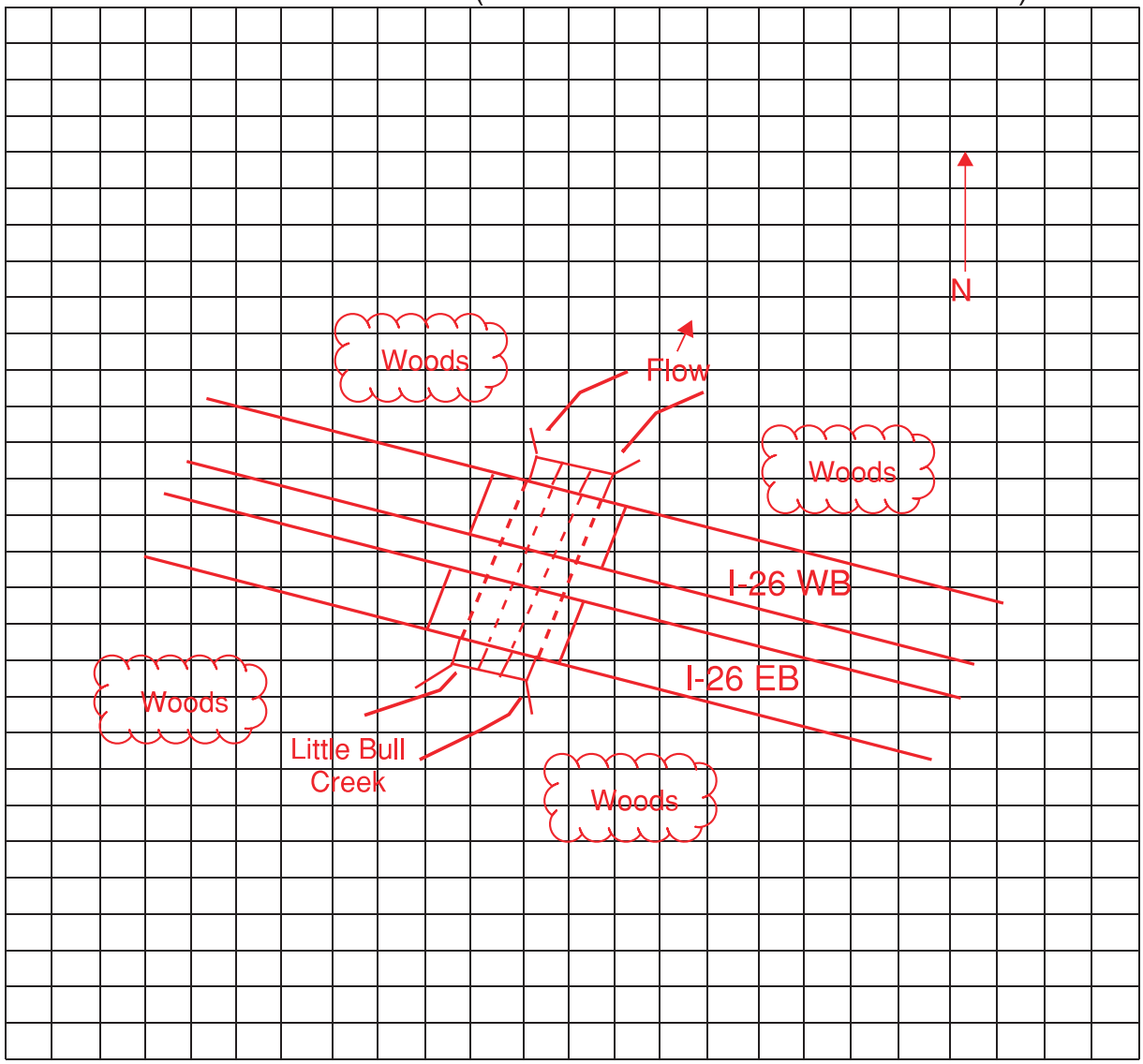
A. Proposed Bridge Recommendation:

Length: 154.33 ft. Width: 26.67 ft. Elevation: 197.90 ft. (Upstream Soffit Elevation)

Span Arangement: (3) 8'(W) x 6'(H)

Notes: _____

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



Performed By: Erfanul Huq

Title: Engineer

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION FLOODPLAIN AND RISK ASSESSMENT

Regulation 23 CFR 650 shall apply to all encroachment and to all actions which affect base floodplains, except for repairs made with emergency funds. (See HEC-17) Note: These studies shall be summarized in the environmental review document prepared pursuant to 23 CFR 771.

Project Description:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a culvert extension to the existing structure under I-26 along Little Bull Creek.

A. Narrative Describing Purpose and Need for Project:

a. Relevant Project History:

The purpose of the project is to widen I-26 from the eastern limits of the interchange with US 601 at Exit 145 through the interchange with US 301 at Exit 154.

b. Project Location (attach Location and Project Map):

See Appendix B

c. Major Issues and Concerns:

None

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

Yes ☐ **No** ☑

C. Will fill be placed within a 100-year floodplain?

Yes ☐ **No** ☑

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

Yes ☑ **No** ☐

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

N/A

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:

i. What are the flood-related risks associated with implementation of the action?

None

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

None

iii. Will the bridge entice people to build in floodplains?

No

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

Guardrail and 2:1 fill slopes are utilized at this location to minimize encroachments into the existing floodplain.

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

As per the hydraulic modeling results, the proposed culvert extension would not cause any adverse hydraulic impacts. Therefore, no alternate measures are required.

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

N/A

H. List 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. Describe any information obtained on development and proposed actions in the affected area. Please include agency documentation.

SCDOT

I. BACKWATER DAMAGE FORM

Major flood damage applies to shopping centers, hospitals, industrial facilities, residential areas, schools, farming operations, etc.

1. *Does the maximum flood cause major damage to upstream property?*

Yes - (Go to 2.) **No - (Go to 3.)**

2. *Would this damage occur if the road were not there?*

Yes - (Go to 3.)

No - (Perform a limited Least Total Expected Cost (LTEC) (HEC-17) analysis to see if the bridge opening should be increased and/or grades raised to minimize the damage potential. Go to II.)

3. *Was this a bridge replacement? If so, was the bridge opening increased enough to increase the discharge passed through the bridge?*

Yes - (Go to 4.) **No - (Go to II.)**

4. *Does the increased flow cause major damage downstream?*

Yes - (Perform a limited LTEC analysis to determine if the bridge opening should be reduced, the floodway redefined, and flood easements purchased upstream or if flood easements should be purchased downstream. Go to II.)

No - (Go to II)

II. TRAFFIC RELATED LOSSES

1. *Is the overtopping flood greater than the 100-year flood?*

Yes - (Go to III.) No - (Go to 2.)

2. *Does the ADT exceed 50 vehicles per day?*

Yes - (Go to 3.) No - (Go to III.)

3. *Does the duration of road closure in days, multiplied by the difference in length, in miles between the normal route and the detour, exceed 20?*

Yes - (Go to 4.) No - (Go to III.)

4. *Does the annual risk cost for traffic related costs exceed 10% of the estimated annual capital costs?*

Yes - (Perform a limited LTEC analysis to compare the cost to raise the grades and if necessary increase the bridge length with the traffic related costs. Go to III.)

No - (Go to III.)

III. ROADWAY AND/OR STRUCTURE REPAIR COST

1. *Is the overtopping flood less than the 100-year flood?*

Yes - (Go to 2) **No - (Go to 3)**

2. *Is the overtopping flood less than 0.5 foot over the low point on the roadway and duration no more than 1.0 hour?*

Yes - (Go to 3)

No - (perform a limited LTEC analysis to determine if the grades should be raised and/or the bridge opening increased or that the repair cost for embankment erosion are less significant. Traffic cost should be included in this evaluation.)

3. *Is the proposed bridge or culvert structure subject to potential damage due to debris?*

Yes - (Go to 4) **No - (Go to 5)**

4. *Perform a limited LTEC analysis to determine if the structure should be modified. (Go to 5.)*

***5. The risk assessment has determined the most economical design for the crossing within the design constraint*s.**

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

COUNTY: Orangeburg DATE: 06/18/2025

ROAD #: I-26 STREAM CROSSING: Gramling Creek Swamp

Purpose & Need for the Project:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a culvert extension to the existing structure under I-26 along Gramling Creek Swamp.

I. FEMA Acknowledgement

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

Panel Number: 0382C Effective Date: 01/16/2014 (See Attached)

II. FEMA Floodmap Investigation

FEMA Flood Profile Sheet Number N/A 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: The hydraulic modeling results indicate there are no increases in baseflood elevations at published or un-published cross-sections as a result of this project.

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

Justification:

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

IV. Preliminary Bridge Assessment

A. Locate Existing Plans

a. Bridge Plans ☑ Yes ☐ No File No. 38.489 Sheet No. 280 (See Attached)

b. Road Plans ☑ Yes ☐ No File No. 38.489 Sheet No. 457 (See Attached)

B. Historical Highwater Data

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

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

c. Existing Plans ☐ Yes ☑ No See Above

V. Field Review

A. Existing Bridge

Length: 121.83 ft. Width: 33.33 ft. Max. span Length: 10 ft.

Alignment: ☑ Tangent ☐ Curved

Bridge Skewed: ☐ Yes ☑ No Angle: _____

End Abutment Type: N/A (Culvert Crossing)

Riprap on End Fills: ☐ Yes ☑ No Condition: Stable

Superstructure Type: Triple (3) - 10 x 10 RCBC

Substructure Type: N/A

Utilities Present: ☑ Yes ☐ No

Describe: Fiber optic marker post was observed in downstream floodplain.

Debris Accumulation on Bridge: Percent Blocked Horizontally: 10 %

Percent Blocked Vertically: 10 %

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: Culvert Outlet

b. Distance from F.G. to Normal Water Elevation: 10.1 ft.
c. Distance from Low Steel to Normal Water Elev.: 6.06 ft.
d. Distance from F.G. to High Water Elevation: 4.63 ft.
e. Distance from Low Steel to High Water Elev.: 0.59 ft.

f. Channel Banks Stable: ☑ Yes ☐ No
Describe:

g. Soil Type: Bibb sandy loam

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.

Backwater caused by the existing crossing doesn't appear to pose flooding risks for any structure/property in the adjacent floodplains.

C. Existing Roadway Geometry

a. Can the existing roadway be closed for an On-Alignment Bridge Replacement
☐ Yes ☑ No
Describe:

Culvert barrels will be extended through staged construction. Therefore, the roadway doesn't need to be closed.

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.)

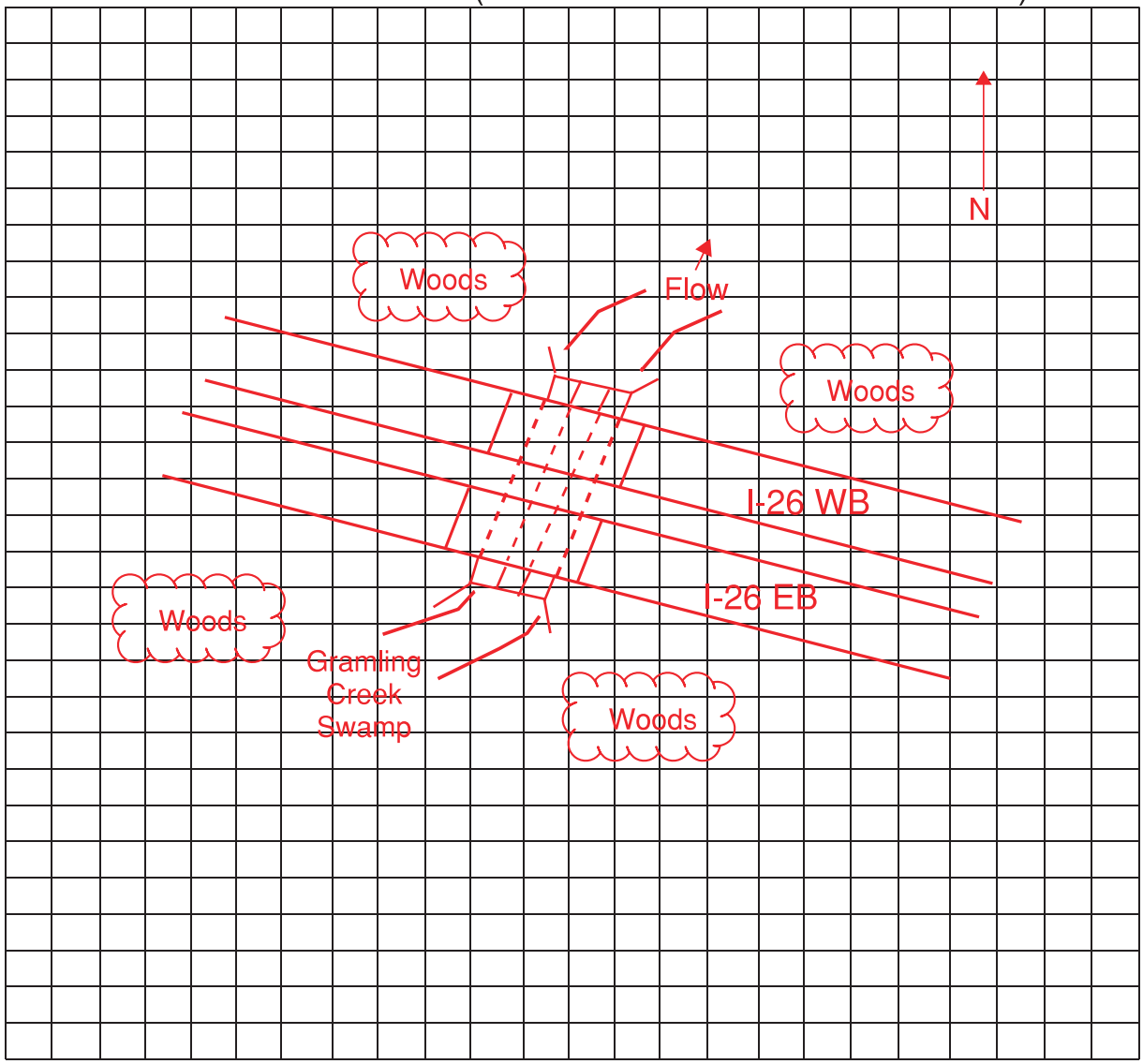
A. Proposed Bridge Recommendation:

Length: 153.33 ft. Width: 33.33 ft. Elevation: 158.16 ft. (Upstream Soffit Elevation)

Span Arangement: (3) 10'(W) x 10'(H)

Notes: _____

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



Performed By: Erfanul Huq

Title: Engineer

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION FLOODPLAIN AND RISK ASSESSMENT

Regulation 23 CFR 650 shall apply to all encroachment and to all actions which affect base floodplains, except for repairs made with emergency funds. (See HEC-17) Note: These studies shall be summarized in the environmental review document prepared pursuant to 23 CFR 771.

Project Description:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a culvert extension to the existing structure under I-26 along Gramling Creek Swamp.

A. Narrative Describing Purpose and Need for Project:

a. Relevant Project History:

The purpose of the project is to widen I-26 from the eastern limits of the interchange with US 601 at Exit 145 through the interchange with US 301 at Exit 154.

b. Project Location (attach Location and Project Map):

See Appendix B

c. Major Issues and Concerns:

None

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

Yes ☑ **No** ☐

C. Will fill be placed within a 100-year floodplain?

Yes ☑ **No** ☐

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

Yes ☑ **No** ☐

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

N/A

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:

i. What are the flood-related risks associated with implementation of the action?

None

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

None

iii. Will the bridge entice people to build in floodplains?

No

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

Guardrail and 2:1 fill slopes are utilized at this location to minimize encroachments into the existing floodplain.

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

As per the hydraulic modedeling results, the proposed culvert extension would not cause any adverse hydraulic impacts. Therefore, no alternate measures are required.

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

N/A

H. List 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. Describe any information obtained on development and proposed actions in the affected area. Please include agency documentation.

SCDOT

I. BACKWATER DAMAGE FORM

Major flood damage applies to shopping centers, hospitals, industrial facilities, residential areas, schools, farming operations, etc.

1. *Does the maximum flood cause major damage to upstream property?*

Yes - (Go to 2.) **No - (Go to 3.)**

2. *Would this damage occur if the road were not there?*

Yes - (Go to 3.)

No - (Perform a limited Least Total Expected Cost (LTEC) (HEC-17) analysis to see if the bridge opening should be increased and/or grades raised to minimize the damage potential. Go to II.)

3. *Was this a bridge replacement? If so, was the bridge opening increased enough to increase the discharge passed through the bridge?*

Yes - (Go to 4.) **No - (Go to II.)**

4. *Does the increased flow cause major damage downstream?*

Yes - (Perform a limited LTEC analysis to determine if the bridge opening should be reduced, the floodway redefined, and flood easements purchased upstream or if flood easements should be purchased downstream. Go to II.)

No - (Go to II)

II. TRAFFIC RELATED LOSSES

1. *Is the overtopping flood greater than the 100-year flood?*

Yes - (Go to III.) No - (Go to 2.)

2. *Does the ADT exceed 50 vehicles per day?*

Yes - (Go to 3.) No - (Go to III.)

3. *Does the duration of road closure in days, multiplied by the difference in length, in miles between the normal route and the detour, exceed 20?*

Yes - (Go to 4.) No - (Go to III.)

4. *Does the annual risk cost for traffic related costs exceed 10% of the estimated annual capital costs?*

Yes - (Perform a limited LTEC analysis to compare the cost to raise the grades and if necessary increase the bridge length with the traffic related costs. Go to III.)

No - (Go to III.)

III. ROADWAY AND/OR STRUCTURE REPAIR COST

1. *Is the overtopping flood less than the 100-year flood?*

Yes - (Go to 2) **No - (Go to 3)**

2. *Is the overtopping flood less than 0.5 foot over the low point on the roadway and duration no more than 1.0 hour?*

Yes - (Go to 3)

No - (perform a limited LTEC analysis to determine if the grades should be raised and/or the bridge opening increased or that the repair cost for embankment erosion are less significant. Traffic cost should be included in this evaluation.)

3. *Is the proposed bridge or culvert structure subject to potential damage due to debris?*

Yes - (Go to 4) **No - (Go to 5)**

4. *Perform a limited LTEC analysis to determine if the structure should be modified. (Go to 5.)*

***5. The risk assessment has determined the most economical design for the crossing within the design constraint*s.**

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

COUNTY: Orangeburg DATE: 08/08/2025

ROAD #: I-26 STREAM CROSSING: Middle Pen Swamp

Purpose & Need for the Project:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a culvert extension of the existing culvert structure under I-26 along Middle Pen Swamp

I. FEMA Acknowledgement

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

Panel Number: 45075C0405C Effective Date: 01/16/2014 (See Attached)

II. FEMA Floodmap Investigation

FEMA Flood Profile Sheet Number N/A 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: The proposed culvert extension is designed at Middle Pen Swamp to meet the requirements for a "No - Rise."

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

Justification:

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

IV. Preliminary Bridge Assessment

A. Locate Existing Plans

a. Bridge Plans ☑ Yes ☐ No File No. 38.489 Sheet No. 281 (See Attached)

b. Road Plans ☑ Yes ☐ No File No. 38.489 Sheet No. 25 (See Attached)

B. Historical Highwater Data

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

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

c. Existing Plans ☐ Yes ☑ No See Above

V. Field Review

A. Existing Bridge

Length: 118 ft. Width: 38 ft. Max. span Length: 12 ft.

Alignment: ☑ Tangent ☐ Curved

Bridge Skewed: ☐ Yes ☑ No Angle: _____

End Abutment Type: Culvert Wingwalls

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:

V. Field Review (cont.)

B. Hydraulic Features

a. Scour Present: ☐ Yes ☑ No Location: _____

b. Distance from F.G. to Normal Water Elevation: 6.84 ft.
c. Distance from Low Steel to Normal Water Elev.: 4.08 ft.
d. Distance from F.G. to High Water Elevation: 6.32 ft.
e. Distance from Low Steel to High Water Elev.: 4.08 ft.

f. Channel Banks Stable: ☑ Yes ☐ No
Describe:

g. Soil Type: Naboco loamy sand

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.

Farm located immediately upstream of the culvert crossing.

C. Existing Roadway Geometry

a. Can the existing roadway be closed for an On-Alignment Bridge Replacement
☐ Yes ☑ No
Describe:

Culvert barrels will be extended through staged construction. Therefore, the roadway doesn't need to be closed

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

N/A.

If "No", will the proposed bridge be:
☑ Staged Constructed
☐ Replaced on New Alignment

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

VI. Field Review (cont.)

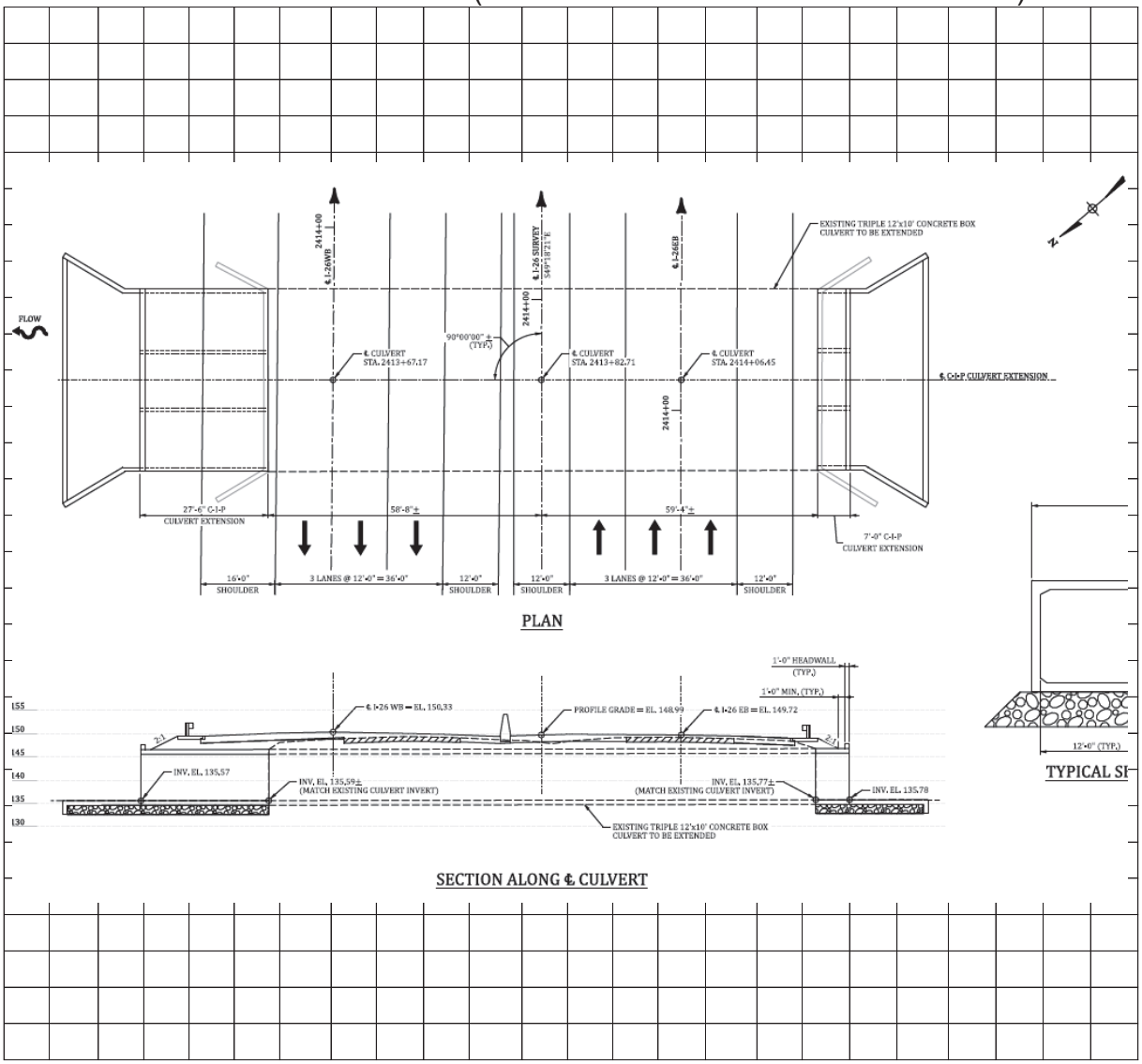
A. Proposed Bridge Recommendation:

Length: 152.5 ft. Width: 38 ft. Elevation: 149.72 ft.

Span Arangement: 3 - 12' X 10' Box Culverts

Notes: The proposed box culvert was extended 34.5'.

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



Performed By: Clayon McCathern

Title: SC H&H Lead

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION FLOODPLAIN AND RISK ASSESSMENT

Regulation 23 CFR 650 shall apply to all encroachment and to all actions which affect base floodplains, except for repairs made with emergency funds. (See HEC-17) Note: These studies shall be summarized in the environmental review document prepared pursuant to 23 CFR 771.

Project Description:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a culvert extension to the existing structure under I-26 along Middle Pen Swamp.

A. Narrative Describing Purpose and Need for Project:

a. Relevant Project History:

The purpose of the project is to widen I-26 from the eastern limits of the interchange with US 601 at Exit 145 through the interchange with US 301 at Exit 154.

b. Project Location (attach Location and Project Map):

See Appendix B

c. Major Issues and Concerns:

None

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

Yes ☑ **No** ☐

C. Will fill be placed within a 100-year floodplain?

Yes ☑ **No** ☐

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

Yes ☑ **No** ☐

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

N/A

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:

i. What are the flood-related risks associated with implementation of the action?

None

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

None

iii. Will the bridge entice people to build in floodplains?

No

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

Guardrail and 2:1 fill slopes are utilized at this location to minimize encroachments into the existing floodplain.

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

As per the hydraulic modedeling results, the proposed culvert extension would not cause any adverse hydraulic impacts. Therefore, no alternate measures are required.

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

N/A

H. List 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. Describe any information obtained on development and proposed actions in the affected area. Please include agency documentation.

SCDOT

I. BACKWATER DAMAGE FORM

Major flood damage applies to shopping centers, hospitals, industrial facilities, residential areas, schools, farming operations, etc.

1. *Does the maximum flood cause major damage to upstream property?*

Yes - (Go to 2.) **No - (Go to 3.)**

2. *Would this damage occur if the road were not there?*

Yes - (Go to 3.)

No - (Perform a limited Least Total Expected Cost (LTEC) (HEC-17) analysis to see if the bridge opening should be increased and/or grades raised to minimize the damage potential. Go to II.)

3. *Was this a bridge replacement? If so, was the bridge opening increased enough to increase the discharge passed through the bridge?*

Yes - (Go to 4.) **No - (Go to II.)**

4. *Does the increased flow cause major damage downstream?*

Yes - (Perform a limited LTEC analysis to determine if the bridge opening should be reduced, the floodway redefined, and flood easements purchased upstream or if flood easements should be purchased downstream. Go to II.)

No - (Go to II)

II. TRAFFIC RELATED LOSSES

1. *Is the overtopping flood greater than the 100-year flood?*

Yes - (Go to III.) No - (Go to 2.)

2. *Does the ADT exceed 50 vehicles per day?*

Yes - (Go to 3.) No - (Go to III.)

3. *Does the duration of road closure in days, multiplied by the difference in length, in miles between the normal route and the detour, exceed 20?*

Yes - (Go to 4.) No - (Go to III.)

4. *Does the annual risk cost for traffic related costs exceed 10% of the estimated annual capital costs?*

Yes - (Perform a limited LTEC analysis to compare the cost to raise the grades and if necessary increase the bridge length with the traffic related costs. Go to III.)

No - (Go to III.)

III. ROADWAY AND/OR STRUCTURE REPAIR COST

1. *Is the overtopping flood less than the 100-year flood?*

Yes - (Go to 2) **No - (Go to 3)**

2. *Is the overtopping flood less than 0.5 foot over the low point on the roadway and duration no more than 1.0 hour?*

Yes - (Go to 3)

No - (perform a limited LTEC analysis to determine if the grades should be raised and/or the bridge opening increased or that the repair cost for embankment erosion are less significant. Traffic cost should be included in this evaluation.)

3. *Is the proposed bridge or culvert structure subject to potential damage due to debris?*

Yes - (Go to 4) **No - (Go to 5)**

4. *Perform a limited LTEC analysis to determine if the structure should be modified. (Go to 5.)*

5. *The risk assessment has determined the most economical design for the crossing within the design constraint* s.

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

COUNTY: Orangeburg DATE: 09/19/2025

ROAD #: I-26 STREAM CROSSING: UTrib 1 to Mid Pen Swamp

Purpose & Need for the Project:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a culvert extension of the existing culvert structure under I-26 along Unnamed Tributary 1 to Middle Pen Swamp.

I. FEMA Acknowledgement

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

Panel Number: 45075C0405C Effective Date: 01/16/2014 (See Attached)

II. FEMA Floodmap Investigation

FEMA Flood Profile Sheet Number N/A 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: The proposed culvert extension is designed at Unnamed Tributary 1 to Middle Pen Swamp to meet the requirements for a "No - Rise.

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

Justification:

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

IV. Preliminary Bridge Assessment

A. Locate Existing Plans

a. Bridge Plans ☑ Yes ☐ No File No. 38.489 Sheet No. 283/28 (See Attached)

b. Road Plans ☐ Yes ☑ No File No. 38.489 Sheet No. 32 (See Attached)

B. Historical Highwater Data

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

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

c. Existing Plans ☐ Yes ☑ No See Above

V. Field Review

A. Existing Bridge

Length: 225 ft. Width: 17 ft. Max. span Length: 8 ft.

Alignment: ☑ Tangent ☐ Curved

Bridge Skewed: ☐ Yes ☑ No Angle: _____

End Abutment Type: Culvert Wingwalls

Riprap on End Fills: ☐ Yes ☑ No Condition: _____

Superstructure Type: _____

Substructure Type: _____

Utilities Present: ☐ Yes ☑ No

Describe:

Debris Accumulation on Bridge: Percent Blocked Horizontally: 5 %

Percent Blocked Vertically: 5 %

Hydraulic Problems: ☐ Yes ☑ No

Describe:

V. Field Review (cont.)

B. Hydraulic Features

a. Scour Present: ☐ Yes ☑ No Location: _____

b. Distance from F.G. to Normal Water Elevation: 9.45 ft.
c. Distance from Low Steel to Normal Water Elev.: 4.61 ft.
d. Distance from F.G. to High Water Elevation: 8.27 ft.
e. Distance from Low Steel to High Water Elev.: 3.43 ft.

f. Channel Banks Stable: ☑ Yes ☐ No
Describe:

g. Soil Type: Elloree loamy sand

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.

Farm located immediately upstream of the culvert crossing.

C. Existing Roadway Geometry

a. Can the existing roadway be closed for an On-Alignment Bridge Replacement
☐ Yes ☑ No
Describe:

Culvert barrels will be extended through staged construction. Therefore, the roadway doesn't need to be closed

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

N/A

If "No", will the proposed bridge be:
☑ Staged Constructed
☐ Replaced on New Alignment

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

VI. Field Review (cont.)

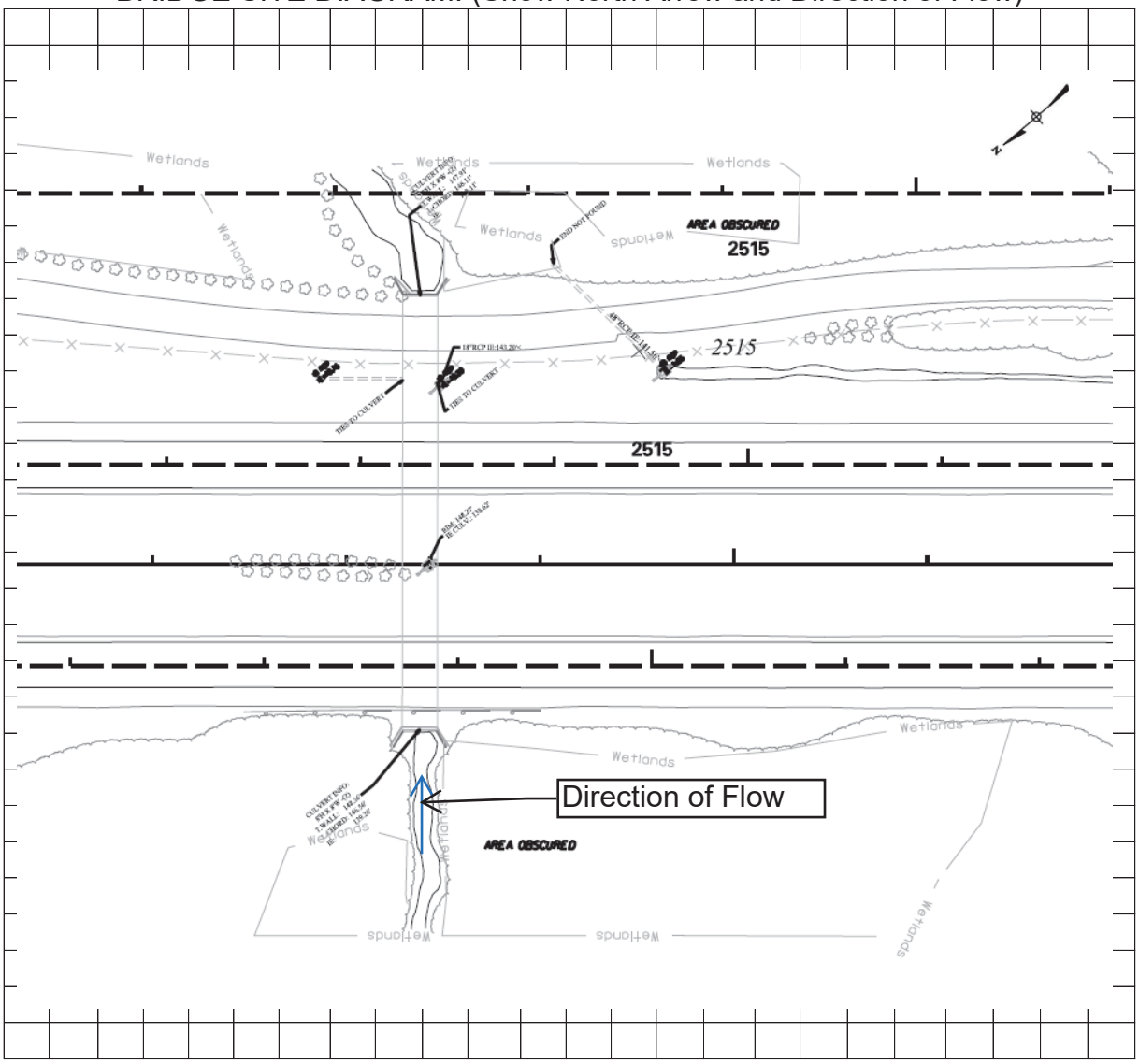
A. Proposed Bridge Recommendation:

Length: 252.5 ft. Width: 17 ft. Elevation: 152.10 ft.

Span Arangement: 2 - 8'x8' Box Culverts

Notes: The box culvert was extended 27.5 ft.

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



Performed By: Clayon McCathern

Title: SC H&H Lead

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION FLOODPLAIN AND RISK ASSESSMENT

Regulation 23 CFR 650 shall apply to all encroachment and to all actions which affect base floodplains, except for repairs made with emergency funds. (See HEC-17) Note: These studies shall be summarized in the environmental review document prepared pursuant to 23 CFR 771.

Project Description:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a culvert extension to the existing structure under I-26 along Unammed Tributary 1 to Middle Pen Swamp.

A. Narrative Describing Purpose and Need for Project:

a. Relevant Project History:

The purpose of the project is to widen I-26 from the eastern limits of the interchange with US 601 at Exit 145 through the interchange with US 301 at Exit 154.

b. Project Location (attach Location and Project Map):

See Appendix B

c. Major Issues and Concerns:

None

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

Yes ☑ **No** ☐

C. Will fill be placed within a 100-year floodplain?

Yes ☑ **No** ☐

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

Yes ☑ **No** ☐

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

N/A

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:

i. What are the flood-related risks associated with implementation of the action?

None

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

None

iii. Will the bridge entice people to build in floodplains?

No

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

Guardrail and 2:1 fill slopes are utilized at this location to minimize encroachments into the existing floodplain.

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

As per the hydraulic modedeling results, the proposed culvert extension would not cause any adverse hydraulic impacts. Therefore, no alternate measures are required.

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

N/A

H. List 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. Describe any information obtained on development and proposed actions in the affected area. Please include agency documentation.

SCDOT

I. BACKWATER DAMAGE FORM

Major flood damage applies to shopping centers, hospitals, industrial facilities, residential areas, schools, farming operations, etc.

1. *Does the maximum flood cause major damage to upstream property?*

Yes - (Go to 2.) **No - (Go to 3.)**

2. *Would this damage occur if the road were not there?*

Yes - (Go to 3.)

No - (Perform a limited Least Total Expected Cost (LTEC) (HEC-17) analysis to see if the bridge opening should be increased and/or grades raised to minimize the damage potential. Go to II.)

3. *Was this a bridge replacement? If so, was the bridge opening increased enough to increase the discharge passed through the bridge?*

Yes - (Go to 4.) **No - (Go to II.)**

4. *Does the increased flow cause major damage downstream?*

Yes - (Perform a limited LTEC analysis to determine if the bridge opening should be reduced, the floodway redefined, and flood easements purchased upstream or if flood easements should be purchased downstream. Go to II.)

No - (Go to II)

II. TRAFFIC RELATED LOSSES

1. *Is the overtopping flood greater than the 100-year flood?*

Yes - (Go to III.) No - (Go to 2.)

2. *Does the ADT exceed 50 vehicles per day?*

Yes - (Go to 3.) No - (Go to III.)

3. *Does the duration of road closure in days, multiplied by the difference in length, in miles between the normal route and the detour, exceed 20?*

Yes - (Go to 4.) No - (Go to III.)

4. *Does the annual risk cost for traffic related costs exceed 10% of the estimated annual capital costs?*

Yes - (Perform a limited LTEC analysis to compare the cost to raise the grades and if necessary increase the bridge length with the traffic related costs. Go to III.)

No - (Go to III.)

III. ROADWAY AND/OR STRUCTURE REPAIR COST

1. *Is the overtopping flood less than the 100-year flood?*

Yes - (Go to 2) **No - (Go to 3)**

2. *Is the overtopping flood less than 0.5 foot over the low point on the roadway and duration no more than 1.0 hour?*

Yes - (Go to 3)

No - (perform a limited LTEC analysis to determine if the grades should be raised and/or the bridge opening increased or that the repair cost for embankment erosion are less significant. Traffic cost should be included in this evaluation.)

3. *Is the proposed bridge or culvert structure subject to potential damage due to debris?*

Yes - (Go to 4) **No - (Go to 5)**

4. *Perform a limited LTEC analysis to determine if the structure should be modified. (Go to 5.)*

5. *The risk assessment has determined the most economical design for the crossing within the design constraint* s.

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

COUNTY: Orangeburg DATE: 08/08/2025

ROAD #: I-26 STREAM CROSSING: Mill Branch

Purpose & Need for the Project:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a culvert extension of the existing culvert structure under I-26 along Mill Branch.

I. FEMA Acknowledgement

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

Panel Number: 45075C0420C Effective Date: 01/16/2014 (See Attached)

II. FEMA Floodmap Investigation

FEMA Flood Profile Sheet Number N/A 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: The proposed culvert extension is designed at Mill Branch to meet the requirements for a "No - Rise."

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

Justification:

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

IV. Preliminary Bridge Assessment

A. Locate Existing Plans

a. Bridge Plans ☑ Yes ☐ No File No. 38.493 Sheet No. 175/17((See Attached)

b. Road Plans ☐ Yes ☑ No File No. 38.493 Sheet No. 12 (See Attached)

B. Historical Highwater Data

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

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

c. Existing Plans ☐ Yes ☑ No See Above

V. Field Review

A. Existing Bridge

Length: 190 ft. Width: 33 ft. Max. span Length: 10 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:

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: Johnston Sandy Loam

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.

Farm located immediately upstream of the culvert crossing.

C. Existing Roadway Geometry

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

☐ Yes ☑ No

Describe:

Culvert barrels will be extended through staged construction. Therefore, the roadway doesn't need to be closed

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

N/A

If "No", will the proposed bridge be:

☑ Staged Constructed

☐ Replaced on New Alignment

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

VI. Field Review (cont.)

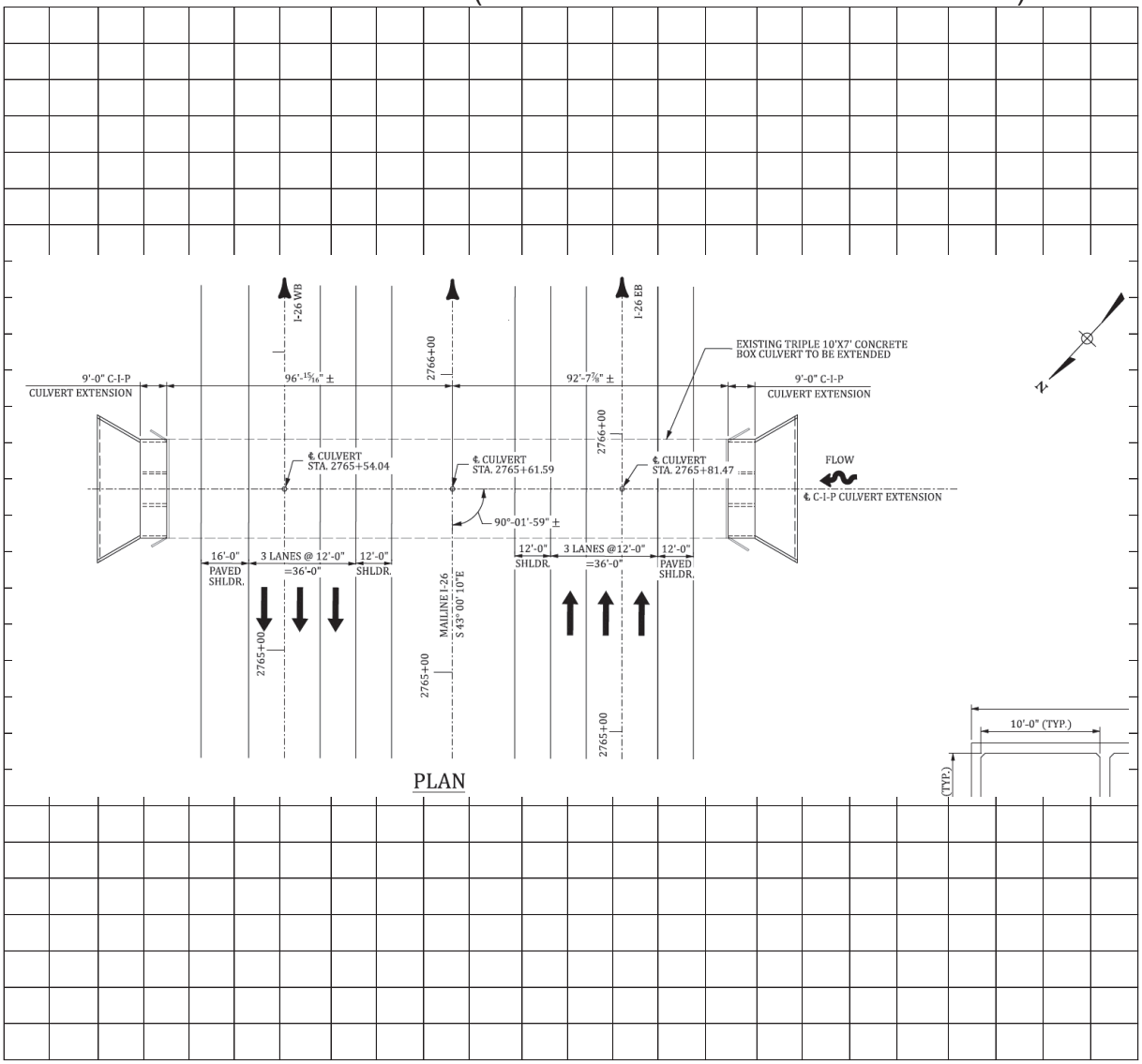
A. Proposed Bridge Recommendation:

Length: 208 ft. Width: 32 ft. Elevation: 134.13 ft.

Span Arangement: 3 - 10' X 7' Box Culverts

Notes: The proposed box culvert was extended 9' upstream and downstream.

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



Performed By: Clayon McCathern

Title: SC H&H Lead

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION FLOODPLAIN AND RISK ASSESSMENT

Regulation 23 CFR 650 shall apply to all encroachment and to all actions which affect base floodplains, except for repairs made with emergency funds. (See HEC-17) Note: These studies shall be summarized in the environmental review document prepared pursuant to 23 CFR 771.

Project Description:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in a culvert extension to the existing structure under I-26 along Mill Branch.

A. Narrative Describing Purpose and Need for Project:

a. Relevant Project History:

The purpose of the project is to widen I-26 from the eastern limits of the interchange with US 601 at Exit 145 through the interchange with US 301 at Exit 154.

b. Project Location (attach Location and Project Map):

See Appendix B

c. Major Issues and Concerns:

None

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

Yes ☑ **No** ☐

C. Will fill be placed within a 100-year floodplain?

Yes ☑ **No** ☐

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

Yes ☑ **No** ☐

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

N/A

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:

i. What are the flood-related risks associated with implementation of the action?

None

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

None

iii. Will the bridge entice people to build in floodplains?

No

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

Guardrail and 2:1 fill slopes are utilized at this location to minimize encroachments into the existing floodplain.

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

As per the hydraulic modedeling results, the proposed culvert extension would not cause any adverse hydraulic impacts. Therefore, no alternate measures are required.

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

N/A

H. List 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. Describe any information obtained on development and proposed actions in the affected area. Please include agency documentation.

SCDOT

I. BACKWATER DAMAGE FORM

Major flood damage applies to shopping centers, hospitals, industrial facilities, residential areas, schools, farming operations, etc.

1. *Does the maximum flood cause major damage to upstream property?*

Yes - (Go to 2.) **No - (Go to 3.)**

2. *Would this damage occur if the road were not there?*

Yes - (Go to 3.)

No - (Perform a limited Least Total Expected Cost (LTEC) (HEC-17) analysis to see if the bridge opening should be increased and/or grades raised to minimize the damage potential. Go to II.)

3. *Was this a bridge replacement? If so, was the bridge opening increased enough to increase the discharge passed through the bridge?*

Yes - (Go to 4.) **No - (Go to II.)**

4. *Does the increased flow cause major damage downstream?*

Yes - (Perform a limited LTEC analysis to determine if the bridge opening should be reduced, the floodway redefined, and flood easements purchased upstream or if flood easements should be purchased downstream. Go to II.)

No - (Go to II)

II. TRAFFIC RELATED LOSSES

1. *Is the overtopping flood greater than the 100-year flood?*

Yes - (Go to III.) No - (Go to 2.)

2. *Does the ADT exceed 50 vehicles per day?*

Yes - (Go to 3.) No - (Go to III.)

3. *Does the duration of road closure in days, multiplied by the difference in length, in miles between the normal route and the detour, exceed 20?*

Yes - (Go to 4.) No - (Go to III.)

4. *Does the annual risk cost for traffic related costs exceed 10% of the estimated annual capital costs?*

Yes - (Perform a limited LTEC analysis to compare the cost to raise the grades and if necessary increase the bridge length with the traffic related costs. Go to III.)

No - (Go to III.)

III. ROADWAY AND/OR STRUCTURE REPAIR COST

1. *Is the overtopping flood less than the 100-year flood?*

Yes - (Go to 2) **No - (Go to 3)**

2. *Is the overtopping flood less than 0.5 foot over the low point on the roadway and duration no more than 1.0 hour?*

Yes - (Go to 3)

No - (perform a limited LTEC analysis to determine if the grades should be raised and/or the bridge opening increased or that the repair cost for embankment erosion are less significant. Traffic cost should be included in this evaluation.)

3. *Is the proposed bridge or culvert structure subject to potential damage due to debris?*

Yes - (Go to 4) **No - (Go to 5)**

4. *Perform a limited LTEC analysis to determine if the structure should be modified. (Go to 5.)*

5. *The risk assessment has determined the most economical design for the crossing within the design constraint* s.

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

COUNTY: Orangeburg DATE: 09/18/2025

ROAD #: I-26 STREAM CROSSING: Cow Castle Creek

Purpose & Need for the Project:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in widening of the existing bridge deck at Cow Castle Creek.

I. FEMA Acknowledgement

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

Panel Number: 45075C0630C Effective Date: 01/16/2014 (See Attached)

II. FEMA Floodmap Investigation

FEMA Flood Profile Sheet Number N/A 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: Base flood elevation at the proposed bridge crossing would be less than that at the existing bridge crossing.

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

Justification:

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

IV. Preliminary Bridge Assessment

A. Locate Existing Plans

a. Bridge Plans ☑ Yes ☐ No File No. 38.789 Sheet No. 4 (See Attached)

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

B. Historical Highwater Data

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

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

c. Existing Plans ☐ Yes ☑ No See Above

V. Field Review

Separate bridges on EB and WB side.

A. Existing Bridge

Length: 210 ft. Width: 43 ft. Max. span Length: 30 ft.

Alignment: ☑ Tangent ☐ Curved

Bridge Skewed: ☐ Yes ☑ No Angle: _____

End Abutment Type: RC Abutment

Riprap on End Fills: ☑ Yes ☐ No Condition: Stable

Superstructure Type: RC bridge deck with seven (7) 30 ft spans

Substructure Type: RC abutments and intermediate bents

Utilities Present: ☑ Yes ☐ No

Describe: Utility marker post for buried electric line was observed in downstream floodplain.

Debris Accumulation on Bridge: Percent Blocked Horizontally: 0 %

Percent Blocked Vertically: 0 %

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: 14.75 ft.

c. Distance from Low Steel to Normal Water Elev.: 9.85 ft.

d. Distance from F.G. to High Water Elevation: 10.03 ft.

e. Distance from Low Steel to High Water Elev.: 5.13 ft.

f. Channel Banks Stable: ☑ Yes ☐ No

Describe:

g. Soil Type: Mouzon fine sandy loam

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.

Backwater caused by the bridge crossing doesn't appear to pose flooding risks for any structure/property in the adjacent floodplains.

C. Existing Roadway Geometry

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

☐ Yes ☑ No

Describe:

Staged construction will be performed. Therefore, the roadway doesn't need to be closed.

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.)

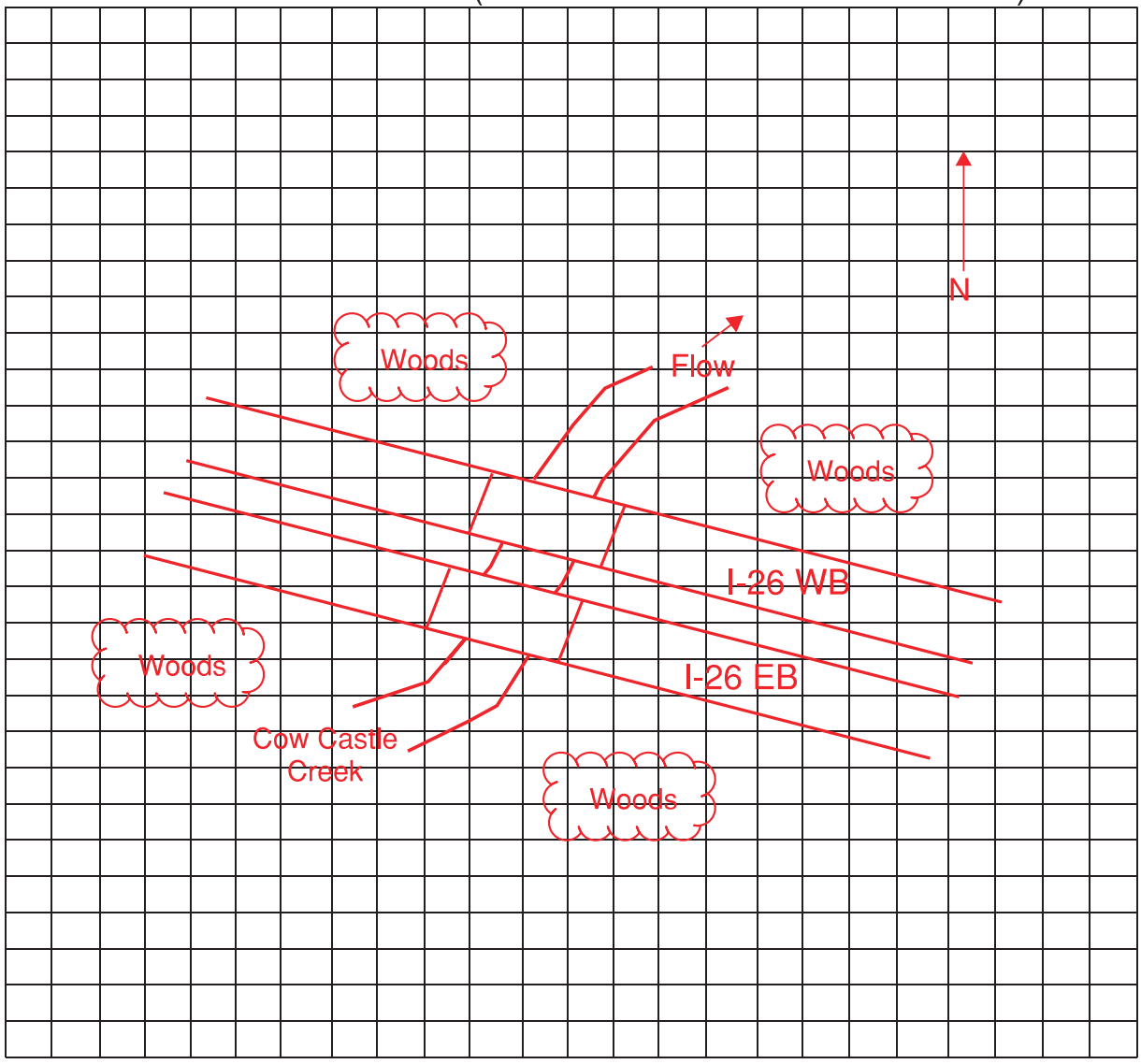
A. Proposed Bridge Recommendation:

Length: 228 ft. Width: 132.58 ft. Elevation: 99.95 ft. (Minimum Upstream Low Chord Elevation)

Span Arangement: Three (3) - 76' spans

Notes: _____

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



Performed By: Erfanul Huq

Title: Engineer

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION FLOODPLAIN AND RISK ASSESSMENT

Regulation 23 CFR 650 shall apply to all encroachment and to all actions which affect base floodplains, except for repairs made with emergency funds. (See HEC-17) Note: These studies shall be summarized in the environmental review document prepared pursuant to 23 CFR 771.

Project Description:

This project consists of widening I-26 from an existing 4-lane section to a 6-lane section which will result in widening of the existing bridge deck at Cow Castle Creek.

A. Narrative Describing Purpose and Need for Project:

a. Relevant Project History:

The purpose of the project is to widen I-26 from the eastern limits of the interchange with US 301 at Exit 154 through the interchange with US 15 at Exit 172.

b. Project Location (attach Location and Project Map):

See Appendix B

c. Major Issues and Concerns:

None

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

Yes ☑ **No** ☐

C. Will fill be placed within a 100-year floodplain?

Yes ☑ **No** ☐

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

Yes ☑ **No** ☐

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

N/A

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:

i. What are the flood-related risks associated with implementation of the action?

None

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

None

iii. Will the bridge entice people to build in floodplains?

No

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

Guardrail and 2:1 fill slopes are utilized at this location to minimize encroachments into the existing floodplain.

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

As per the hydraulic modeling results, the proposed project would not cause any adverse hydraulic impacts. Therefore, no alternate measures are required.

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

N/A

H. List 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. Describe any information obtained on development and proposed actions in the affected area. Please include agency documentation.

SCDOT

I. BACKWATER DAMAGE FORM

Major flood damage applies to shopping centers, hospitals, industrial facilities, residential areas, schools, farming operations, etc.

1. *Does the maximum flood cause major damage to upstream property?*

Yes - (Go to 2.) **No - (Go to 3.)**

2. *Would this damage occur if the road were not there?*

Yes - (Go to 3.)

No - (Perform a limited Least Total Expected Cost (LTEC) (HEC-17) analysis to see if the bridge opening should be increased and/or grades raised to minimize the damage potential. Go to II.)

3. *Was this a bridge replacement? If so, was the bridge opening increased enough to increase the discharge passed through the bridge?*

Yes - (Go to 4.) No - (Go to II.)

4. *Does the increased flow cause major damage downstream?*

Yes - (Perform a limited LTEC analysis to determine if the bridge opening should be reduced, the floodway redefined, and flood easements purchased upstream or if flood easements should be purchased downstream. Go to II.)

No - (Go to II)

II. TRAFFIC RELATED LOSSES

1. *Is the overtopping flood greater than the 100-year flood?*

Yes - (Go to III.) No - (Go to 2.)

2. *Does the ADT exceed 50 vehicles per day?*

Yes - (Go to 3.) No - (Go to III.)

3. *Does the duration of road closure in days, multiplied by the difference in length, in miles between the normal route and the detour, exceed 20?*

Yes - (Go to 4.) No - (Go to III.)

4. *Does the annual risk cost for traffic related costs exceed 10% of the estimated annual capital costs?*

Yes - (Perform a limited LTEC analysis to compare the cost to raise the grades and if necessary increase the bridge length with the traffic related costs. Go to III.)

No - (Go to III.)

III. ROADWAY AND/OR STRUCTURE REPAIR COST

1. *Is the overtopping flood less than the 100-year flood?*

Yes - (Go to 2) **No - (Go to 3)**

2. *Is the overtopping flood less than 0.5 foot over the low point on the roadway and duration no more than 1.0 hour?*

Yes - (Go to 3)

No - (perform a limited LTEC analysis to determine if the grades should be raised and/or the bridge opening increased or that the repair cost for embankment erosion are less significant. Traffic cost should be included in this evaluation.)

3. *Is the proposed bridge or culvert structure subject to potential damage due to debris?*

Yes - (Go to 4) **No - (Go to 5)**

4. *Perform a limited LTEC analysis to determine if the structure should be modified. (Go to 5.)*

***5. The risk assessment has determined the most economical design for the crossing within the design constraint*s.**