

NEPA/404 Merger Team Meeting Agreement

Concurrence Point Number 2A: Bridging Decisions and Alignment Review

Project Description: N.C. 49 from John Kirk Drive to I-485 (widen existing roadway); realign Back Creek Church Road (S.R. 2827) on new location to the N.C. 49 and Mallard Creek Church Road (S.R. 2833) intersection; close existing at grade rail crossing at N.C. 49 and Back Creek Church Road, Charlotte, Mecklenburg County. **STIP Project: No. U-5768.**

- For Site 1 (Alternative 1), construct a three-span bridge approximately 220 feet long.
- For Site 2 (Alternative 1), construct a new Reinforced Concrete Box Culvert extending approximately 150 feet.
- For Site 3 (Alternative 2), replace the existing bridge with a single-span bridge approximately 70 feet long (based on hydraulics report). NCDOT will coordinate with Mecklenburg County and CDOT and will revise the length to 90 feet to accommodate the proposed Back Creek Greenway, contingent on a municipal agreement.
- If the project requires extension or replacement of the culvert at Site 4 (Alternatives 1 and 2), the Merger Team will be informed and will have an opportunity to agree upon the appropriate structure.

The additional information provided on June 20, 2019 (appended to this form) and discussed via conference call on June 24, 2019 included questions about the need for 10-foot setbacks for the bridge, how cut and fill were balanced for Site 2, and that NCDOT would continue to explore avoidance and minimization measures. If NCDOT is able to move the proposed Site 2 crossing, it would not substantially change the length of the culvert but would reduce impacts to a stream with current parallel impacts. This same information was provided to DWR via email on June 25, 2019, who provided concurrence on June 27, 2019.

The Project Team has concurred on this date of June 27, 2019, on the above Bridging Decisions and Alignment Review for STIP Project U-5768.

U.S. Army Corps of Engineers

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

North Carolina Wildlife Resources Commission

North Carolina Division of Water Resources

Charlotte Regional TPO

North Carolina Department of Transportation

DocuSigned by:
Eric Alsmeyer

DocuSigned by:
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Amanetta Somerville

DocuSigned by:
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Claire Ellwanger

DocuSigned by:
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Marla Chambers

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Donna Hoos

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Robert Cook

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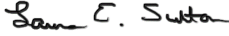
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June 20, 2019

MEMO TO: Merger Team

FROM: Laura E. Sutton, PE
 Team Lead – Divisions 7, 9 & 10
 Project Management Unit

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SUBJECT: STIP Project U-5768 - Supplemental Information for CP2A for Merger Team Consideration (proposed NC 49 and Back Creek Church Road improvements in Charlotte, Mecklenburg County)

During the June 13, 2019 Section 404/NEPA Merger Team CP2A meeting for STIP Project U-5768, questions were raised about assumptions made in the meeting packet and presentation with regards to the bridge length, unit costs, and mitigation costs for one of the proposed stream crossing options for major structures. Figures from the CP2A Meeting Packet showing the project location and the two proposed options for Back Creek Church Road (BCCR) are enclosed for reference.

Of the major structures evaluated, there were questions about the crossing associated with Site 2. Site 2 marks the crossing of an unnamed tributary (UT) to Back Creek. The information provided during the meeting is summarized in Table 1.

Table 1 - Site 2 Background Information from CP2A Meeting

Stream Name/ID	UT to Back Creek (SL)	
Intermittent/Perennial Status	Perennial	
Channel Dimensions	8.5' wide by 2' deep	
Stream Class	C	
Drainage Area	175 acres	
Existing Structure	None	
	<i>Culvert Option</i>	<i>Bridge Option</i>
Recommended Structure	1 @ 7'x6'x150'	125' long by 92' wide (3 spans @ 35', 50', 40')
Structure Cost ¹	\$232,000	\$3,439,000
Potential Stream Impacts ²	150'	none
Notes:		
1. Stream impacts are calculated based on slope stakes plus 40 feet. Stream impacts at proposed new crossing are measure the full length between slope stakes plus 40 feet. The reported stream impacts are approximate, based on preliminary designs.		
2. Structure costs only. Cost estimates are based on bid averages provided by NCDOT.		

During the meeting, agency representatives also questioned why the bridge length was so much longer than the proposed culvert width; questioned the cost of the bridge and culvert options; requested mitigation costs; and, asked about the potential to shift the alignment to minimize impacts to the stream and an associated UT along Alternative 1 (Yellow) -Y1- alignment.

Issue 1 – Length of Bridge vs. Culvert for Site 2

Proposed plan and profiles for both bridge and culvert options at Site 2 are shown in Figures 1 and 2, respectively. As the figures show, Site 2 is located in a relatively hilly area. The stream itself is in a valley with a large hill to the west. To construct the roadway with an adequate grade to meet current design standards and to balance earthwork quantities, excavation of the hill is required. The suitable material from the excavation can be placed as fill on top of the culvert or used to construct the bridge fill slopes.

As Figure 1 depicts, the preliminary minimum bridge length was determined by assuming a 10-foot minimum setback from the top of bank on each side of a stream to an interior pier. Then an assumed 1.5:1 fill slope was projected up to the proposed grade line and adjusted for the bridge superstructure depth based on the span lengths. As mentioned in the CP2A meeting, the geography and vertical profile (approximately 20' fill height) contributes significantly to the bridge length.

As Figure 2 from the Hydraulic Planning Report shows, the culvert is buried approximately 20' and the preliminary culvert size is based on the drainage area and topography. A single barrel box culvert was determined to provide the required hydraulic conveyance at this crossing. The width of the culvert is estimated to be approximately 7 feet to match the downstream channel width and the preliminary analysis indicates that a 7-foot x 5-foot RCBC is adequate for conveyance. To minimize environmental impacts and aid in animal passage, a 7-foot x 6-foot RCBC buried 1 foot is the preliminary culvert size included in the estimate. Please note that as the project design progresses there may be opportunity to further adjust the alignment and grade to minimize the required culvert length. It is also noted that the upstream structure is a 42-inch circular pipe at Wyndham Point Drive and approximately 1,300 ft downstream is the confluence with Back Creek. The normal flow depth in the stream is approximately 0.5'.

As shown in Figure 3, the bridge length at Site 3 is also based on the 10-foot minimum setback to the slope protection (since interior pier is not required) and then an assumed 1.5:1 fill slope was projected up to the proposed grade line and adjusted for the bridge superstructure depth. The differences in bridge lengths between Site 2 and Site 3 are primarily due to the difference in fill heights since the vertical profile at Site 3 ties in very close to the existing grade and minimal fill is required.

Issue 2. Unit Costs and Quantities

As discussed in the CP2A meeting, the initial bridge and culvert estimates included structure costs only. At the request of the merger team, the detailed estimate for the culvert has been updated to include anticipated earthwork, pavement, curb and gutter, and multi-use path items. Multi-use path items are typically incidental to the square-foot bridge cost, but the bridge estimate has been revised to include earthwork and reinforced bridge approach fills. As mentioned in last week's meeting, the bridge width significantly contributes to the bridge cost.

Table 2 - Site 2 Detailed Cost Estimate

Description	Quantity	Unit	Price	Amount Culvert Option	Amount Bridge Option
<i>Structure Items</i>					
RCBC 7' x 6'	150*	LF	\$ 1,300.00	\$ 195,000*	-
Bridge over Trib. to Back Creek 92' W x 125' L	11,500	SF	\$ 250.00	-	\$ 2,875,000
Bridge Approach Slabs 2 @ 92' W x 25' L	4,600	SF	\$ 25.00	-	\$ 115,000
15% Misc. & Mob				\$ 30,000*	\$ 449,000
Structure Items Total				\$ 225,000*	\$ 3,439,000
* Please note that the original estimate used a culvert length of 155'.					
<i>Roadway Items</i>					
Earthwork (borrow)	19,100	CY	\$ 8.00	\$ 152,800	-
	6,000	CY	\$ 8.00	-	\$ 48,000
Reinforced Bridge Approach Fills	1	LS	\$ 45,000.00	-	\$ 45,000
Fine Grading	2,038	SY	\$ 3.00	\$ 6,114	-
	589	SY	\$ 3.00	-	\$ 1,767
Full Depth Pavement	1,119	SY	\$ 60.00	\$ 67,140	-
	49	SY	\$ 60.00	-	\$ 2,940
Subgrade Stabilization	1,119	SY	\$ 10.00	\$ 11,190	-
	49	SY	\$ 10.00	-	\$ 490
2'-6" Concrete Curb and Gutter	346	LF	\$ 25.00	\$ 8,650	-
4" Concrete Sidewalk	462	SY	\$ 57.00	\$ 26,334	-
5" Monolithic Islands	116	SY	\$ 91.00	\$ 10,556	-
35% Misc. & Mob				\$ 99,000	\$ 34,400
Roadway Items Total				\$ 381,800	\$ 132,600
Total				\$ 606,800	\$ 3,571,600
<i>Mitigation</i>					
Stream (2:1 ratio)	300	LF	\$ 507.32	\$ 152,200	-
Wetland (premium rate)	0.01	AC	\$ 91,984.41	\$ 920	-
Mitigation Total				\$ 153,200	-

Issue 3. Mitigation Costs

During the Merger Meeting, it was agreed that it was appropriate to assume a 2:1 mitigation ratio for stream impacts. Using the current impacts (slope stake limits buffered by 40 feet) and assuming \$507.32 per linear foot for stream mitigation and \$91,984.41 (as a premium rate area) per acre for wetland mitigation, mitigation values were calculated for the proposed Site 2 crossing. Using a bridge rather than a culvert would reduce mitigation costs for Alternative 1 by approximately \$153,200.

Issue 4. Alignment Adjustments for Site 2

During the discussion of Site 2, it was noted that NCDOT would attempt to adjust the alignment of Alternative 1 in this area to minimize impacts to a UT that currently has a parallel impact. The constraints in this area include providing access to the housing development north of Site 2 while maintaining a perpendicular intersection with existing

Back Creek Church Road. The avoidance and minimization efforts are on-going and will be presented to the Merger Team at the CP4A meeting. Please note that the impacts associated with the culvert at Site 2 for stream SL are not anticipated to change significantly if the -Y1- and / or -Y3- alignments are moved based on the estimated slope stake plus 40 feet limits.