STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

November 20, 2018

U. S. Army Corps of Engineers
Raleigh Regulatory Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27587

ATTN: Mr. James Lastinger
NCDOT Division 9 Project Coordinator

SUBJECT: **Request for Modification of Section 404 Individual Permit and Section 401 Water Quality Certification** for the proposed Winston-Salem Northern Beltway Eastern Section from US 158 to I-40 Bus/US 421, Forsyth County, Division 9. WBS Element No. 34839.1.2, TIP Project No. U-2579B.

Reference: Section 404 Individual Permit – Action ID No. SAW-2008-03183, issued June 17, 2014 and modification issued July 2, 2014.
Section 401 Water Quality Certification – NCDWR Project No. 2014090 issued April 11, 2014 and modification issued July 28, 2104.

Dear Sir:

The North Carolina Department of Transportation (NCDOT) requests modification to the existing Individual permit and associated Water Quality Certification for the Winston Salem Northern Beltway Eastern Section from US 158 to I-40 Business/US 421 in Forsyth County. This project is currently under construction.

At sites 23 and 28, Smith Creek runs between existing westbound I-40 Business (US 421) and the adjacent ponds for the Windmill Fish Hatchery in a tightly restricted channel. We propose to extend the existing culvert at site 23 and place Smith Creek inside a 3 barrel box culvert at site 38. See Table 1 for previously permitted and revised impacts at permit sites 23 and 28.

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Table 1: Original and proposed impact summary for sites 23 and 28 on U-2579B.

Permit Site	Impact Type	Reason for Impact	January 2014 Permit Application	June 2014 Modification Application	Current Modification Application	Additional Mitigation Required+
23	Temporary	Dewatering for bank stabilization	21	89	121	0
23	Permanent	Bank Stabilization	54	54	36	0
23	Temporary	Dewatering for culvert extension	32	32	0	0
23	Permanent	Culvert Extension	100	100	151	51
28	Temporary	Dewatering for bank stabilization	0	188	0	0
28	Permanent	Bank Stabilization	25	365	194	0
28	Temporary	Dewatering for bank stabilization	0	188	0	0
28	Temporary	Dewatering for culvert	0	0	127	0
28	Permanent	Culvert	0	0	598	598
					Total new mitigation required	**649**

+Mitigation will at a 2:1 ratio will be provided by Division of Mitigation Services. See attached mitigation acceptance letter dated November 20, 2108.

Previous permitted impacts

At permit site 23 in the original permit application dated January 21, 2014 (issued June 17, 2014-USACE and April 11, 2014-DWR), a culvert extension was proposed to impact 100' of Smith Creek with an additional 32' of temporary impacts to dewater, and streambank stabilization was proposed to impact 54' of Smith Creek and an additional 89' of temporary impacts to dewater. Additionally, at site 28 in the permit modification request dated June 10, 2014 (issued July 2, 3014-USACE and June 17, 2014-DWR), the bank stabilization was revised from 25' to 365' of bank stabilization and an additional 188'of temporary impacts to dewater.

Proposed changes in impacts

Since Smith Creek was surveyed in 2008, the stream alignment has shifted closer to the road or the adjacent ponds in multiple location. In some areas adjacent to I-40 Business (US 421), Smith Creek has migrated to the toe of the existing fill for the roadway, and in other areas it has migrated into the toe of fill for the fish ponds. Due to the stream migration and instability, long term stability of the road fill and fish ponds are at risk. The permitted plans involved the construction of rock plating with retaining walls. However, when the fill slopes are extended for the guardrail installation and the onramp to the Winston Salem Beltway from I-40 Business/ US 421, the planned toe for the rock plating and walls are now in the active stream channel in some locations. If we installed the walls per plan, Smith Creek would be pushed in closer proximity to the ponds, and would threaten the stability of the ponds. Therefore, NCDOT plans to extend the existing triple barrel culvert under I-40 Business/ US 421 and install a triple barrel culvert in

Smith Creek between the road and the ponds. Additionally, the upstream end of the existing culvert will be lengthened by approximately 12' to accommodate traffic shifts during construction which will also result in a better alignment with the existing stream. These impacts were considered as part of the permanent impacts from the culvert extension in the original permit application, so the impact type won't change.

At permit site 28, the low flow barrel will not be buried 1' below the stream bed. The bed of Smith Creek has a predominately bedrock bottom making culver burial infeasible. There will be a spill over channel constructed on top of the exposed portion of the culvert, and it will be lined with Armorflex in the event of overtopping. The outlet of the low flow barrel will have a rip rap pad of Class II to prevent scour in the event of overflow. The 2 high flow barrels will have 1' concrete sills at the inlet and outlet. Floodplain benches will be constructed with Class II rip rap at the inlet and outlet. The high flow barrels will be backfilled with native material and/or Class I rip rap.

NEPA Documentation and History

A Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for U2579 (including sections B-F) and U2579A (including sections AA and AB) were completed in January 2007 and February 2008. A Right of Way Consultation for U2579B to update the FEIS was completed on May 17, 2012.

The FEIS and ROD assumed permanent impacts to Smith Creek in for the entire length paralleling Business 40/US 421 as a result of the interchange of the Northern Beltway at Business 40/US 421, so the proposed impacts so the original NEPA decision still applies. On July 13, 2005, which is prior to the NEPA decision document, NCDOT held a meeting with the agencies to discuss changes to the interchange that would result in impacting and relocating the above referenced section of Smith Creek. As a result of this plan, the adjacent ponds were to be drained and Smith Creek was to be relocated to the current location of the ponds. Meeting minutes are attached. The relocation of Smith Creek and the draining of the ponds were depicted on the Public Hearing Maps (https://www.ncdot.gov/projects/wsnb/Documents/eastern-section-5.pdf). During the 4B review held January 23, 2008, retaining walls were discussed along Smith Creek to avoid permanently filling Smith Creek and the ponds. At that time, the decision was made to move forward with the plan for the retaining walls. Meeting minutes are attached.

Coordination with future project U-5760

U-5760 (Big Mill Farm Interchange) is planned just east of the intersection of Business 40/US421. It is currently scheduled in the 2018-2027 STIP to let April 2022. The U-5760 project will require an acceleration lane on Business 40/ US 421 between the Big Mill Farm Interchange and the Winston Salem Northern Beltway. Through coordination between the two projects, NCDOT sees it pertinent to install the pavement and drainage system to accommodate the future acceleration lane between the two interchanges. In doing so now, it will reduce the cost of removing and reconstructing the drainage system planned for the U-2579B project. Additionally it will minimize the time of active construction in the highway between the two projects, thus minimizing safety concerns for the travelling public and construction staff. Since the culvert is needed for the onramp and guardrails and is fully within the fully within the footprint of the U-2579B project, NCDOT believes the impacts are justified under the Section 404 and 401 permit actions for that project.

Please see the enclosed revised permit drawings and Mitigation Acceptance Letter from the Division of Mitigation Services dated November 20, 2018.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact me at either aeuliss@ncdot.gov or (336) 747-7800.

Sincerely,

Amy Euliss

Digitally signed by Amy Euliss
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Date: 2018.11.20 14:32:54 -05'00'

Amy Euliss
NCDOT Division 9 Environmental Officer

Attachments: Merger meeting minutes 7.13.05, January 23, 2018 4B meeting minutes, revised permit drawings sheets 25 and 26, revised impact summary sheets

cc:
Marcus Kiser, PE, Resident Engineer
Phil Suggs, Roadside Environmental
Beth Harmon, Division of Mitigation Services
Amy Chapman, NCDENR-DWR
Dave Wanucha, NCDENR-DWR
Carla Dagnino, NCDOT EAU

MEETING SUMMARY
MERGER TEAM MEETING – TIP Projects R-2247 and U-2579
July 13, 2005
1:00 PM – 3:00 PM

Attendees:

Name	Organization	Email
Jake Riggsbee	FHWA	Jake.Riggsbee@fhwa.dot.gov
Marella Buncick	USFWS	Marella_buncick@fws.gov
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Lauren Wolfe	PBS&J	lawolfe@pbsj.com
Eric Galamb	H.W. Lochner	egalamb@hwlochner.com

SUBJECT OF MEETING

Project R-2247 (Western Section of the Northern Beltway) – Continue discussion on Concurrence Points 2a/4a for the project, except for the EB portion. Project R-2247 EB (US 52 interchange) was not discussed because it is being redesigned to provide for I-74 as the through movement.

Project U-2579 (Eastern Section of the Northern Beltway) – Discuss a change in the US 421 interchange design that would require moving a stream that NCDOT previously committed to not impact.

ATTACHMENTS

- The following tables that were included in the June 9th Merger meeting packet have been updated based on discussions during the July 13th meeting:
  - Table 1: Hydraulic Table – Project R-2247 Preferred Alternative
  - Table 2: Streams Within the Project R-2247 Preferred Alternative Right of Way
  - Table 3: Wetland Impacts – Project R-2247 Preferred Alternative

**Please note that the impacts presented in Tables 1, 2, and 3 are based on NCDOT's impact calculations performed by Andrew Nottingham during his review of hydraulic structures for the projects. The NCDOT impact calculations are based upon stream information provided by the NCDOT Location and Survey Unit. Some of these impacts vary slightly from the impacts provided in the SFEIS/SDEIS. Impact calculations in the SFEIS/SDEIS are based upon a GIS stream layer provided by Forsyth County and supplemented by field reviews.*

PROJECT R-2247 – CONCURRENCE POINTS 2A/4A

The team continued the June 9th merger meeting discussion of stream crossings and drainage structures. The discussion was led by Mr. Nottingham and picked up where the June 9th discussion left off at Structure 10 in the area of Stream U/Wetland 12 and continued to the area west of the US 52 interchange (Project R-2247 EB). Project R-2247 EB was not discussed because this interchange currently is being redesigned. The merger team will meet again to discuss Project R-2247EB once the design concept is complete.

Structure #10 – Stream U - Unnamed tributary to Tomahawk Creek on north side of Robinhood Road interchange
NCDOT proposes two 6x7 box culverts at this location.

- **The team agreed to the culvert at Stream U**

Structure #11 – Stream U – Unnamed tributary to Tomahawk Creek north of Robinhood Road, and Wetlands 11 and 12.
Structure #11 is proposed to be two 6x5 box culverts at Stream U. Stream W is proposed as a minor piped crossing. At the June 9th meeting, the EPA asked if the Beltway alignment could be shifted east to avoid as much of Wetland 12 (medium quality wetland) as possible and to increase the distance from Stream V (Tomahawk Creek). NCDOT evaluated shifting the Beltway alignment to the east to avoid/minimize impacts to Wetland 12, and found that shifting the alignment would cause the Beltway to go outside of the corridor.

- **The team agreed to the culvert at Stream U. NCDOT committed to minimize impacts to Wetland 12 as much as possible using 2:1 slopes while staying within the corridor.**

Stream V and Stream X – Unnamed tributaries to Tomahawk Creek
A minor structure is proposed at Stream V and avoids parallel impacts. A minor structure is proposed on an access road crossed by Stream X.

- **Minor structures – no team decision required.**

Stream Y and Wetland 13 – Intermittent stream and medium quality wetland
A minor structure is proposed at Stream Y near Wetland 13.

- **Minor structure – no team decision required for Concurrence Point 2a. For Concurrence Point 4a, the team agreed to leave the alignment as shown in the vicinity of Stream Y and Wetland 13.**

Stream Z – Unnamed tributary to Bill Branch, Stream YY – Intermittent stream, Wetland 14 and Wetland 15
Minor structures are proposed at Stream Z and Stream YY. Wetland 14 is near Stream YY, but is outside the slope stakes. Wetland 15 would be completely taken by the Beltway (0.12 acres). The WRC asked if this wetland could be avoided because of its high quality rating. NCDOT stated that avoidance was not possible because of the location of Skylark Road and the access road that ties into it. The EPA asked what the slope of the construction limits were in the vicinity of Wetland 15. The NCDOT stated the slope was 2:1.

- **Minor structures – no team decision required.**

Stream AA – Unnamed tributary to Bashavia Creek, Wetland 16, Stream CC – Unnamed tributary to Bashavia Creek, and Stream DD – Unnamed tributary to Bashavia Creek
Minor structures are proposed at Stream AA, Stream CC, and Stream DD. The USFWS asked if impacts could be minimized to Stream AA because the crossing is near the confluence with Stream BB (Bashavia Creek) and Wetland 16 (a high quality wetland), and this stream would carry stormwater runoff from the Beltway. The EPA asked if a retaining wall could be used or slope stakes could be moved to avoid the 0.02 acre of impacts to Wetland 16. The WRC would like to see as much minimization as possible. Mr. Nottingham noted that the proposed structure at Stream AA is a pipe and the energy would be dissipated from it.

- **The NCDOT agreed to discuss minimization and stormwater treatment options at Concurrence Point 4B**

Stream EE – Unnamed tributary to Bashavia Creek and Stream FF – intermittent stream
Minor structures are proposed at Stream EE and Stream FF. The DWQ asked if Stream EE can be relocated.

- **The NCDOT agreed to daylight Stream EE as much as possible.**

Structure #12 – Stream HH – Mill Creek No. 3
NCDOT proposes a 3-barrel culvert at this location. The cost of the culvert is $1.5 million. A bridge at this location would cost $2.1 million and would be 350 feet in length. Table 1 (Hydraulic Table – Project R-2247 Preferred Alternative) listed a cost of $3 million for the bridge. Mr. Nottingham stated that this should be changed to $2.1 million. The EPA asked why a 350-foot long bridge would be required for a 5-foot wide stream. The NCDOT stated that the grade in the area and the fact that the stream is heavily entrenched and is in the 100-year floodplain contribute to the long length of the bridge. It was noted that structure costs do not include mitigation costs. Mitigation costs would be approximately $147,000 at this location (based on a price of $410/linear foot). The DWQ noted that the price difference between a culvert and a bridge at this location is relatively small compared to other locations along the project. The USFWS and DWQ would like to see a bridge at this location to keep the stream more stable.

- **The NCDOT agreed to place a bridge Stream HH instead of the proposed culvert.**

Structure #13 – Stream JJ (Unnamed tributary to Mill Creek No. 3), Stream KK (intermittent/perennial stream), Wetland 19 (low quality wetland), and Wetland 20 (high quality wetland)

NCDOT proposes a culvert at Stream JJ/Stream KK. Stream KK is perennial, with an intermittent section upstream of its confluence with Stream JJ. Stream JJ is perennial. The EPA and DWQ asked if the intermittent portion of Stream KK could be relocated.

- **The team agreed to the culvert as proposed at Stream JJ/Stream KK. The NCDOT agreed to consider relocating the intermittent portion of Stream KK and to evaluate minimization measures for Wetland 20 at Concurrence Point 4B.**

Stream LL – Unnamed tributary to Muddy Creek
NCDOT proposes a minor structure at Stream LL.

- **Minor structure – no team decision required.**

Structure #14 – Stream NN – Unnamed tributary to Muddy Creek
NCDOT proposes a single barrel culvert at Stream NN. The impacted length of the stream (541feet) seems large when compared to the culvert length (344 feet). The NCDOT will check these numbers.

- **The team agreed to the culvert as proposed.**

Structure #15 – Stream OO – Muddy Creek
NCDOT proposes a bridge at Stream OO.

- **The team agreed to the bridge as proposed.**

Stream PP – perennial stream
NCDOT proposes a minor structure at Stream PP

- **Minor structure – no team decision required.**

The discussion about Concurrence Point 2A/4A concluded. Mr. Houser presented a design issue regarding the US 421 interchange (Project U-2579) to the team.

PROJECT U-2579 ISSUE

The original design for the US 421 interchange included retaining walls to avoid several ponds and a stream near the interchange. In a previous merger team meeting, the NCDOT agreed to avoid these ponds and stream. However, the NCDOT is not satisfied with the current design of the interchange and needs to update the design. In order to update the design, the NCDOT would need to impact these water resources. Mr. Houser asked the team if the NCDOT could drain the ponds, move the stream, and treat the stormwater runoff from the Beltway before it flows into the relocated creek. The WRC asked if natural channel design would be used. Mr. Houser stated that it would. The WRC noted that moving the stream south of the interchange would not be possible due to topography in the area. The NCDWQ wanted to know if the new design would take all of the ponds. Mr. Houser said it probably would. The USFWS noted that if the interchange design does not work, it needs to be redesigned. The NCDWQ asked if 50-foot buffers and stormwater treatment would be included as part of the design. Mr. Houser said they would.

- **The team agreed to allow the NCDOT to relocate the stream.**

Table 1: Hydraulic Table – Project R-2247 Preferred Alternative

							Proposed Structure						Bridge, If Required		
New Structure Number	Old Structure Number (from Table 4-52 in DEIS)	Impacted Stream Number	Impacted Wetland Number	Segment	Figure Reference	Roadway	Type of Structure	Approximate Design Size	Approximate Stream Impact (ft)	Length of Relocated Stream (ft)	Wetland Impact (acres)	Approximate Cost of Structure ($)	Approximate Design Size (LxW, ft)	Square foot for a bridge	Cost of Structure ($)
1	1	E		C1*	2-12a	Northern Beltway	Bridge	2@ 140' x 38'	0	0	0	851,200	2 @ 140x38	10640	851,200
2	2	H		C1	2-12a	Northern Beltway – northbound	Bridge	1@ 1024' x 38'	0	0	0	3,112,960	1024x38	38,912	3,112,960
2	2	H		C1	2-12a	Northern Beltway – southbound	Bridge	1@ 1063' x 45'	0	0	0	3,826,800	1063x45	47835	3,826,800
2a	2a	H		C1	2-12a	McGregor Road	Bridge	1@ 69' x 30'	0	0	0	220,800	92x30	2760	220,800
3	N/A	H		C1	2-12b	I-40	Culvert	Extend 3@ 12' x 14', 36' upstream & 96' downstream	173	0	0	623,360	180x138, 180x92	41,400	3,312,000
4	3	J		B2	2-12b	Northern Beltway	Bridge	1@ 902' x 38' and 1@ 928' x 38'	0	0	0	5,563,200	902x38, 928x38	69,540	5,563,200
5	4	M		B2	2-12c	Northern Beltway	Culvert	1@ 8' x 8' x 242' long	257	0	0	174,750	2 @ 90x38	6840	547,200
6	5	J		C3	2-12c	US 421 – ramp AC	Bridge	1@ 692' x 34'	0	0	0	1,882,240	692x34	23,528	1,882,240
						US 421 – ramp C	Bridge	1@ 408' x 25'	0	0	0	816,000	408x25	10,200	816,000
						US 421 – northbound	Bridge	1@ 213' x 59'	0	0	0	1,005,360	213x59	12,567	1,005,360
						US 421 – southbound	Bridge	1@ 213' x 52'	0	0	0	886,080	213x52	11,076	886,080
7	N/A	H		C3	2-12c	Kester Mill Road	Culvert	3@ 9' x 10' x 43' long	73	0	0	110,510	70x27	1,890	151,200
8	6	P		A4	2-12d	Northern Beltway	Bridge	2@ 305' x 38'	0	0	0	1,854,400	2@ 305x38	23,180	1,854,400
9	7	R		A4	2-12e	Northern Beltway	Bridge	128	0	0	0	2,073,280	2@341x38	25,916	2,073,280
10	8	U		A4	2-12e	Robinhood Road	Culvert	2@ 6' x 7' x 214' long	246	0	0	261,990	190x65	12,350	988,000
11	9	U	11 & 12	A4	2-12e	Northern Beltway	Culvert	2@ 6' x 5' x 312' long	528	223	0.66	283,900	2@ 623x38	47,348	3,787,840
12	10	HH		C4*	2-12h	Northern Beltway	Culvert	3@ 12' x 10' x 302' long	319	0	0	1,541,710	2@ 350x38	38,608	2,128,000
13	N/A	JJ KK	19	C4*	2-12h	Northern Beltway	Culvert	1@ 8' x 8' x 394' long	147 (Intermittent) 292 (Perennial)	0	0.06	392,030	2@ 236x38	17,936	1,434,880
14	N/A	NN		B8*	2-12h	Northern Beltway	Culvert	1@ 9' x 9' x 344' long	391	0	0	392,535	2@ 236x38	17,936	1,434,880
15	11	OO		B8*	2-12i	Northern Beltway	Bridge	2@ 370' x 38'	0	0	0	2,249,600	2 @ 370x38	28,120	2,249,600
16	13,14,18	VV RR		B10**	2-12j	US 52 South – Ramp B to westbound Northern Beltway, Eastbound Northern Beltway, Westbound Northern Beltway	Culvert	1 @ 7' x 6' x 1460' long	1492 (VV) 164(RR)	230 (RR)	0	897,900	302x24, 287x38, 287x50	32,504	2,600,320
17	16,20	WW XX		B10**	2-12j	Ramp AD, Eastbound Northern Beltway Ramp A to US 52 North, Loop A to westbound Northern Beltway, Northern Beltway westbound, US 52 South -Ramp BD to eastbound Northern Beltway, Eastbound Northern Beltway, Loop D (Northern Beltway to US 52 North)	Culvert	1 @ 8' x 6' x 2417' long	2000 (WW) 689 (XX)	394 (XX)	0	1,708,800	505x24, 341x38, 164x24, 328x50, 328x50, 328x58, 492x24	86,086	6,886,880
18	15,24,26	XX		B10**	2-12j	Northern Beltway westbound, Eastbound Northern Beltway Ramp A to US 52 North, US 52 South -Ramp BD to eastbound Northern Beltway, US 52 North – Ramp D to eastbound Northern Beltway	Culvert	Extend Existing 2 @ 8' x 8', 52' upstream & 236' downstream	833	541	0	571,200	43x38, 230x38, 360x65, 1000x24	57,774	4,621,920
19	25	XX		B10**	2-12j	US 52 North Ramp D to eastbound Northern Beltway	Culvert	2 @ 10' x 9' x 274' long	377	0	0	804,190	500x24	12,000	960,000
20	21	XX		B10**	2-12j	US 52 Collector – south of Northern Beltway and US 52 northbound, US 52 Southbound	Culvert	Extend Existing 2 @ 9' x 9', 92' upstream & 30' downstream	269	0	0	356,850	203x103, 203x66	34,307	2,744,560
23	22	not labeled		B10**	2-12k	US 52 – north of the Northern Beltway	Culvert	Extend existing 2 @ 7' x 7', 30' upstream & 16' downstream	150	0	0	66,240	2 @ 128x50	12,800	1,024,000
22	23	UU		B10**	2-12k	US 52 – north of the Northern Beltway	Culvert	Extend existing 1 @ 8' x 7', 15' upstream & 15' downstream and supplement with 66" pipe 290' long	148	0	0	155,000	2 @ 157x50	15,700	1,256,000
21	N/A	TT		B10**	2-12k	US 52 – north of the Northern Beltway	Culvert	Extend 60" cmp 59' upstream & 79' downstream and supplement with 48" pipe 385' long	262	0	0	125,000	138x92, 138x112	28,152	2,252,160

Stream crossings not listed were crossed by pipes less than 72 inches

UT = Unnamed Tributary

*Information gathered from Public Hearing Map only. 2002 preliminary engineering design not completed for this segment.

**The drainage portion of the preliminary engineering design, which gives specific information about drainage structures, was not available. The structures listed are preliminary estimates of potential major drainage structures provided by the NCDOT.

*** Perennial stream that is not present on USGS quadrangle. These streams could be intermittent on the USGS maps.

Table 1: H Table 1: Hydraulic Table – Project R-2247 Preferred Alternative

New Structure Number	Impacted Stream Number	Stream Name	Stream Type	USACE Mitigable	Stream Class.	Channel Dimensions (ft), width x depth	NC DWQ Index #	Impacted Wetland Number	NCDWQ Rating	Wetland Quality
1	E	Little Creek	Perennial	Yes	C	15 x 1.5	12-94-11			
2	H	Silas Creek	Perennial	Yes	C	20 x 2	12-94-10			
2	H	Silas Creek	Perennial	Yes	C	20 x 2	12-94-10			
2a	H	Silas Creek	Perennial	Yes	C	20 x 2	12-94-10			
3	H	Silas Creek	Perennial	Yes	C	20 x 2	12-94-10			
4	J	Muddy Creek	Perennial	Yes	C	38 x 2.5	12-94-(0.5)			
5	M	UT to Muddy Creek	Perennial	Yes	C	4 x 0.5	12-94-(0.5)			
6	J	Muddy Creek	Perennial	Yes	C	38 x 2.5	12-94-(0.5)			
	J	Muddy Creek	Perennial	Yes	C	38 x 2.5	12-94-(0.5)			
	J	Muddy Creek	Perennial	Yes	C	38 x 2.5	12-94-(0.5)			
	J	Muddy Creek	Perennial	Yes	C	38 x 2.5	12-94-(0.5)			
7	H	Silas Creek	Perennial	Yes	C	20 x 2	12-94-10			
8	P	Reynolds Creek	Perennial	Yes	C	6 x 0.3	12-94-9			
9	R	UT to Tomahawk Creek	Perennial	Yes	C	11 x 0.9	12-94-9-1			
10	U	UT to Tomahawk Creek	Perennial	Yes	C	5 x 0.3	12-94-9-1			
11	U	UT to Tomahawk Creek	Perennial	Yes	C	5 x 0.3	12-94-9-1	11 & 12	34 & 49	Low & Med.
12	HH	Mill Creek Number 3	Perennial	Yes	C	5 x 0.8	12-94-4			
13	JJ	UT to Mill Creek Number 3	Intermittent	No	C	1.5 x 0.2	12-94-4	19	21	Low
	KK	***	Perennial	Yes	C	6.0 x 0.3	12-94-4			
14	NN	UT to Muddy Creek	Perennial	Yes	C	7 x 2	12-94-(0.5)			
15	OO	Muddy Creek	Perennial	Yes	C	3.5 x 0.3	12-95-(0.5)			
16	VV	***	Perennial	No	C	4 x 0.2	12-94-9-1			
	RR	UT to Grassy Creek	Perennial	Yes	C	2 x 0.1	12-94-7-3			
17	WW	UT to Grassy Creek	Perennial	Yes	C	8 x 0.3	12-94-7-4			
	XX	Grassy Creek	Perennial	Yes	C	9 x 0.5	12-94-7-3			
18	XX	Grassy Creek	Perennial	Yes	C	9 x 0.5	12-94-7-3			
19	XX	Grassy Creek	Perennial	Yes	C	9 x 0.5	12-94-7-3			
20	XX	Grassy Creek	Perennial	Yes	C	9 x 0.5	12-94-7-3			
23	not labeled	Beaver Dam Creek	-	-	-	-	-			
22	UU	UT to Beaver Dam Creek	Perennial	Yes	C	6 x 0.2	12-94-2			
21	TT	***	Perennial	Yes	C	3 x 0.1	12-94-2			

Stream crossirStream crossings not listed were crossed by pipes less than 72 inches

UT = UnnameUT = Unnamed Tributary

*Information g*Information gathered from Public Hearing Map only. 2002 preliminary engineering design not completed for this segment.

The drainag The drainage portion of the preliminary engineering design, which gives specific information about drainage structures, was not available. The structures listed are preliminary estimates of potential major drainage structures provided by the NCDOT.

*** Perennial s*** Perennial stream that is not present on USGS quadrangle. These streams could be intermittent on the USGS maps.

Streams Within the Project R-2247 Preferred Alternative Right of Way

Stream Label[1]	Crossed by a Major Drainage Structure	Stream Name	Stream Type	Impacted Length (ft)	Length of Relocated Stream (ft)	USACE Mitigable[2]	Stream Class.	Width (ft)	Depth (ft)	NC DWQ Index #	Primary Substrate	Aquatic Organisms Observed
A		*	Ephemeral	261	0	No	C	3.5	0	12-94-11	Sand	None
Ba		UT to Little Creek	Intermittent	1,055	0	No	C	5	2.5	12-94-11	Gravel	None
Bb		UT to Little Creek	Perennial	261	0	Yes	C	5	2.5	12-94-11	Gravel	None
C		**	Intermittent	214	0	No	C	1.5	0.4	12-94-11	Gravel	None
D		**	Intermittent	129	0	No	C	1	0.3	12-94-11	Sand	None
E	Yes (WS 1)	Little Creek	Perennial	0	0	Yes	C	15	1.5	12-94-11	Sand	None
F		*	Ephemeral	313	0	No	C	1.5	0	12-94-10	Clay	None
G		*	Ephemeral	210	0	No	C	1	0	12-94-10	Clay	None
H	Yes (WS 2, 2a, 7)	Silas Creek	Perennial	173	0	Yes	C	20	2	12-94-10	Sand	None
I		***	Perennial	69	0	Yes	C	3	0.3	12-94-10	Sand	None
J	Yes (WS 4, 6)	Muddy Creek	Perennial	0	0	Yes	C	38	2.5	12-94-(0.5)	Gravel	Snails
K		UT to Muddy Creek	Perennial	OUTSIDE ROW	0	Yes	C	6	0.5	12-94-(0.5)	Gravel	Snails
L		UT to Muddy Creek	Perennial	84	0	Yes	C	2.5	0.3	12-94-(0.5)	Sand	None
M	Yes (WS 5)	UT to Muddy Creek	Perennial	257	0	Yes	C	4	0.5	12-94-(0.5)	Gravel	Snails
N		**	Intermittent	1,188	330	No	C	3	0.4	12-94-(0.5)	Silt	None
O		**	Intermittent	311	0	No	C	2	0.3	12-94-(0.5)	Sand	None
P	Yes (WS 8)	Reynolds Creek	Perennial	0	0	Yes	C	6	0.3	12-94-9	Gravel	Snails
Q		UT to Tomahawk Creek	Perennial	830	0	Yes	C	5	0.3	12-94-9-1	Gravel	Snails
R	Yes (WS 9)	UT to Tomahawk Creek	Perennial	0	0	Yes	C	11	0.9	12-94-9-1	Sand	None
S		UT to Tomahawk Creek	Perennial	310	547	Yes	C	4	0.2	12-94-9-1	Gravel	Snails
T		**	Intermittent	464	0	No	C	2	0.1	12-94-9-1	Silt	None
U	Yes (WS 10, 11)	UT to Tomahawk Creek	Perennial	1,224	1,528	Yes	C	5	0.3	12-94-9-1	Sand	None

Streams Within the Project R-2247 Preferred Alternative Right of Way

Stream Label[1]	Crossed by a Major Drainage Structure	Stream Name	Stream Type	Impacted Length (ft)	Length of Relocated Stream (ft)	USACE Mitigable[2]	Stream Class.	Width (ft)	Depth (ft)	NC DWQ Index #	Primary Substrate	Aquatic Organisms Observed
V		UT to Tomahawk Creek	Perennial	522	0	Yes	C	6	0.3	12-94-9-1	Gravel	None
W		***	Perennial	224	0	No	C	4	0.2	12-94-9-1	Sand	None
X		UT to Tomahawk Creek	Perennial	92	0	Yes	C	3	0.4	12-94-9-3	Gravel	Snails
Y		**	Intermittent	849	0	No	C	2	0.1	12-81-(0.5)	Clay	None
Z North		UT to Bill Branch	Intermittent	305	0	No	C	1.5	0.3	12-94-5	Clay	None
Z South		UT to Bill Branch	Intermittent	293	0	No	C	1.5	0.3	12-94-5	Clay	None
AA		UT to Bashavia Creek	Intermittent	335	0	No	C	2	0.2	12-81-(0.5)	Sand	None
BB		Bashavia Creek	Perennial	0	0	Yes	C	4	0.9	12-81-(0.5)	Sand	None
CC		UT to Bashavia Creek	Perennial	374	0	Yes	C	2	0.2	12-81-(0.5)	Sand	Snails
DD		UT to Bashavia Creek	Perennial	393	0	Yes	C	2	0.2	12-81-(0.5)	Gravel	None
EE		UT to Bashavia Creek	Intermittent	548	0	No	C	1	0.1	12-81-(0.5)	Sand	None
FF		**	Intermittent	714	0	No	C	1	0.1	12-81-(0.5)	Sand	None
GG		**	Intermittent	776	0	No	C	0.5	0.1	12-94-4	Clay	None
HH	Yes (WS 12)	Mill Creek No. 3	Perennial	319	0	Yes	C	5	0.8	12-94-4	Sand	None
II		**	Intermittent	357	0	No	C	1.5	0.2	12-94-4	Sand	None
JJ	Yes (WS 13)	UT to Mill Creek No. 3	Intermittent	147	0	No	C	1.5	0.2	12-94-4	Silt	None
KK	Yes (WS 13)	***	Intermittent Perennial	813 292	0	No Yes	C	6	0.3	12-94-4	Gravel	Snails
LL		UT to Muddy Creek	Intermittent Perennial	620 647	0	No	C	2.5	0	12-94-(0.5)	Sand/silt	None
MM		*	Ephemeral	102	0	No	C	1	0	12-94-(0.5)	Vegetation/ Silt	None
NN	Yes (WS 14)	UT to Muddy Creek	Perennial	391	0	Yes	C	7	2	12-94-(0.5)	Silt	Fish, Frogs, Water Striders
OO	Yes (WS 15)	Muddy Creek	Perennial	0	0	Yes	C	3.5	0.3	12-95-(0.5)	Sand	None
PP		***	Perennial	361	0	Yes	C	1.5	0.1	12-95-(0.5)	Sand	None
QQ		UT to Muddy Creek	Perennial	635	0	Yes	C	2	0.2	12-94-(0.5)	Gravel	None

Streams Within the Project R-2247 Preferred Alternative Right of Way

Stream Label[1]	Crossed by a Major Drainage Structure	Stream Name	Stream Type	Impacted Length (ft)	Length of Relocated Stream (ft)	USACE Mitigable[2]	Stream Class.	Width (ft)	Depth (ft)	NC DWQ Index #	Primary Substrate	Aquatic Organisms Observed
RR	Yes (WS 16)	UT to Grassy Creek	Perennial	OUTSIDE ROW	0	Yes	C	2	0.1	12-94-7-3	Gravel	Snails
SS		**	Intermittent	444	0	No	C	3	0.1	12-94-2	Gravel	None
TT	Yes (WS 23)	***	Perennial	294	0	Yes	C	3	0.1	12-94-2	Cobble	None
UU	Yes (WS 22)	UT to Beaver Dam Creek	Perennial	225	0	Yes	C	6	0.2	12-94-2	Gravel	None
VV	Yes (WS 16)	UT to Grassy Creek	Perennial	2,326	0	No[3]	C	Braided	0.3	12-94-7-3	Sand	None- impacted by fungus from chip pile runoff
WW	Yes (WS 17)	UT to Grassy Creek	Perennial	2,255	0	Yes	C	8	0.3	12-94-7-4	Sand	None
XX	Yes (WS 17, 18, 19, 20)	Grassy Creek	Perennial	1,545	0	Yes	C	9	0.5	12-94-7-3	Sand	None
YY		**	Intermittent	232	0	No	C	2.5	0.1	12-94-5	Sand	None
ZZ		**	Intermittent	225	0	No	C	1.5	0.1	12-94-7-3	Sand	None

USACE Mitigable (linear feet)	**11,427**	**2,075**
Not Mitigable (linear feet)	**13,581**	**330**
Total Linear Feet of Stream Channel	**25,008**	**2,405**

UT = Unnamed Tributary

Impacts are based upon construction limits for the 2002 preliminary engineering designs except where crossed by a major drainage structure, where impacts are based upon measured impacts of that structure.

Stream relocations are considered mitigated impacts.

[1] Stream labels refer to **Figures 3-11(a-ee)**.

[2] USACE mitigable streams are considered as such based on guidance from the USACE.

[3] The perennial stream has been significantly impacted by runoff from a chip/mulch pile. The stream has a white fungal growth preventing a "USACE Mitigable" classification. The USACE concurs with this determination

* Ephemeral stream not present on USGS quadrangle. No stream name. The stream classification and index number relate to closest tributary stream.

** Intermittent stream not present on USGS quadrangle. No stream name. The stream classification and index number relate to closest tributary stream.

*** Perennial stream that is not present on USGS quadrangle. These streams could be intermittent on the USGS maps.

Wetland Impacts – Project R-2247 Preferred Alternative

Wetland[1]	Wetland Impacts (acres)	NCDWQ Rating	Wetland Quality	Associated Stream Name
1	0.02	62	High	UT to Little Creek
2	0.70	77	High	Silas Creek
3	0.13	68	High	Silas Creek
4	0.32	25	Low	Muddy Creek
5	0.04	52	Medium	Intermittent Stream not present on USGS quad map. No stream name
6	0.52	80	High	Tomahawk Creek
7	0.05	70	High	Intermittent Stream not present on USGS quad map. No stream name
8	Outside Slope Stake and ROW	89	High	Tomahawk Creek
9	0.27	25	Low	UT to Tomahawk Creek
10	Outside Slope Stake and ROW	60	High	UT to Tomahawk Creek
11	0.12	34	Low	Perennial stream not present on USGS quad map. No stream name
12	0.74	49	Medium	UT to Tomahawk Creek
13	0.08	44	Medium	Intermittent Stream not present on USGS quad map. No stream name
14	Outside Slope Stake	56	High	Intermittent Stream not present on USGS quad map. No stream name
15	0.12	63	High	Bashavia Creek
16	0.02	84	High	Bashavia Creek
17	0.03	41	Medium	Intermittent Stream not present on USGS quad map. No stream name
18	0.02	41	Medium	Intermittent Stream not present on USGS quad map. No stream name
19	0.06	21	Low	UT to Mill Creek No. 3
20	0.04	63	High	Perennial stream not present on USGS quad map. No stream name
21	0.10	31	Low	UT to Muddy Creek
22	Outside Slope Stake and ROW	39	Medium	Ephemeral stream not present on USGS quad map. No stream name
23	0.01	43	Medium	UT to Muddy Creek
24	Outside Slope Stake and Row	64	High	UT to Grassy Creek
26	0.01	42	Medium	Intermittent Stream not present on USGS quad map. No stream name
27	0.20	68	High	UT to Grassy Creek
	0.87	**Total Acreage – Low Quality Wetland**		
	0.93	**Total Acreage – Medium Quality Wetland**		
	1.80	**Total Acreage – High Quality Wetland**		
TOTAL	**3.60**			

UT = Unnamed Tributary

Impacts are based upon construction limits for the 2002 preliminary engineering designs.

Some wetlands were so small that they do not show up on the mapping or are immediately adjacent to the corridor and were included in case the corridor shifted slightly.

[1] Wetland numbers refer to **Figure 3-11(a–ee)**.

Draft Minutes from the Interagency 4B Hydraulic Design Review Meeting U-2579B Winston-Salem Northern Beltway (Eastern Section) from I-40 Bus/US 421 to US 158 in Forsyth County

A Hydraulic Design Review Meeting was held on Wednesday January 23, 2008 in the Hydraulics Design Conference Room at the NCDOT Century Center Complex from 9:00 am – 11:00 am

Team Members:

John Thomas: USACE	(present)
Marella Buncick: USFWS	(present)
Marla Chambers: NCWRC	(present)
Amy Euliss: NCDWQ	(not-present)
Brian Wrenn: NCDWQ	(not-present)
Chris Militscher: EPA	(not-present)
Kathy Matthews: EPA	(present)
Donnie Brew: FHWA	(present)
David Harris: NCDOT, REU	(not-present)
Tony Houser: NCDOT, Roadway	(present)
Lonnie Brooks: NCDOT, Structures	(present)
Derrick Weaver: NCDOT, PDEA	(not-present)
Rachelle Beauregard: NCDOT, NEU	(not-present)
Keith Raulston: NCDOT, Division 9	(present)

Participants:
Andrew Nottingham, NCDOT Hydraulics
Will Hines, Sungate Design Group
David Wainwright: NCDWQ
Troy Wilson, USFWS
Kent Boyer, NCDOT Division 9
Gene Noderino, NCDOT NEU
Missy Dickens, NCDOT PDEA
Vasim Barodawala, NCDOT Roadway
John Braxton, NCDOT Roadway
Lee Moore, NCDOT Roadway
Roy Girolami, NCDOT Structures
John Arms, NCDOT Hydraulics
Greg Price, NCDOT NEU

Minutes:

General Introduction was initiated by Andrew Nottingham. Introductions were made by all in attendance.

General Comments:

The Hydraulics Engineer stated that where it was practicable, guardrail and shoulder berm gutter were eliminated and 4:1 fill slopes were used.

The Hydraulics Engineer stated that proposed cross-pipes located on Jurisdictional Streams (JS) would be increased by one pipe size and buried 20% (except in locations where Agencies requested that a Drop Box be used).

The Hydraulics Engineer stated that in locations where the storm drainage outlet pipe was a 15 or 18 inch pipe, a Preformed Scour Hole would be used where practicable.

Sheet 4:

No Impact from U-2579B. Begin Construction starts on Sheet 5.

Sheet 5:

JS (unnamed tributary to Lowery Mill Creek) located on Sheet 5 and 20: The Hydraulics Engineer stated that the proposed double barrel box culvert will have a sill in one barrel. The Agencies requested that baffles also be placed in the box culvert.

Wetland located near Begin Construction: The Hydraulics Engineer stated that an Energy Dissipater would be used at this location.

JS located near Station 495+00: The Hydraulics Engineer stated that the three storm drainage systems taken to this outlet would connect to each other using a Junction Box and that there would only be one outlet pipe.

Sheet 6:

JS located near Station 502+00: Use a Drop Box at the outlet of the cross-pipe in order to dissipate as much energy as possible prior to stormwater re-entering the natural stream channel. Due to the steepness of the proposed cross-pipe, this is preferable to using an in stream riprap dissipater. In cases where a Drop Box is used, no need to bury inlet of pipe.

JS located near Station 506+00: Use a Drop Box at the outlet of the cross-pipe.

JS located near Station 509+00: No comment.

Sheet 7:

JS located near Station 523+00: No comment.

Sheet 8:

Wetland located near Station 527+00: The Hydraulics Engineer stated that the inlet invert of the proposed cross-pipe would be placed at the same elevation as the water surface elevation in the wetland.

Pond: There was some discussion about whether or not the pond would be kept and if this area could be used for mitigation. At this time, NCDOT does not know because negotiations with the current property owners have not taken place.

Sheet 9:

No impact.

Sheet 10:

Martin Mill Creek and Tributary to Martin Mill Creek: After a lengthy discussion where the pros and cons for several alternatives were discussed, based on a general consensus, it was decided that a minimum length bridge (about 225 feet) will span Martin Mill Creek and that a box culvert would convey the Tributary to Martin Mill Creek. The Hydraulics Engineer stated that a sill would be placed in one of the barrels of the box culvert. The Agencies requested that baffles be placed in the box culvert.

Sheet 11

JS located parallel to the roadway (Sheet 10 and 11): The Hydraulics Engineer stated that the stream would be piped along the toe of fill due to the large amount of excavation that would be required for an open channel. It was also stated that there would be a short channel change at the inlet in order to protect the proposed roadway embankment. Use a Drop Box at the outlet of the proposed pipe.

JS located near Station 572+00 (Sheet 11 and 12): The JS is completely impacted by the proposed roadway. The Hydraulics Engineer stated that a lateral ditch would be used to take the stormwater along the toe of fill to a point where the length of the proposed cross-pipe can be significantly reduced. The Agencies suggested that the proposed cross-pipe tie directly into the proposed pipe that is carrying the JS located parallel to the roadway.

Sheet 12:

JS located near Station 575+00: No comment.

Sheet 13:

No impact.

Sheet 14:

No impact.

Sheet 15:

JS located near Station 616+00 (Kerners Mill Creek): The Hydraulics Engineer stated that a triple barrel box culvert is proposed at this crossing. The Agencies requested that baffles be placed in the box culvert and that a sill be placed in one of the barrels. There was some discussion about using a bottomless culvert or a wider box culvert that could match the width of the natural channel. NCDOT Hydraulics stated that in order to use a bottomless culvert, there would have to be bedrock located fairly close to the surface. Bedrock had been observed in the upper portion of the stream, but was not clearly evident in the lower portion. NCDOT will investigate if a bottomless culvert can be used. NCDOT Structures stated that using a wider box culvert would not be practicable due to the thickness of the top slap required.

The Hydraulics Engineer stated that a majority of the storm drainage from the roadway would be taken to an area located near Station 619+00 Left where the proposed cross-pipe would act as an outlet control device and provide as much detention as practicable.

JS located near Station 629+00 (Smith Creek): The Hydraulics Engineer stated that bridges would be used to span the stream.

Sheet 16:

JS and Pond located parallel to the roadway near Station 635+00: The JS and Pond are completely impacted by the proposed roadway. It was brought to our attention that there are wetlands associated with this JS that are not currently shown on the plans.

The Hydraulics Engineer stated that the areas inside of the Loops and between the Ramps would be designed and used as a Detention Basin as much as practicable.

At this point, the allotted time for the 4B Meeting ran out and it was stated that the 4B Meeting would have to be continued in 2 months.

Meeting adjourned.

Draft Minutes from the Interagency 4B Hydraulic Design Review Meeting U-2579B Winston-Salem Northern Beltway (Eastern Section) from I-40 Bus/US 421 to US 158 in Forsyth County

A Hydraulic Design Review Meeting was held on Wednesday, March 12, 2008, in the Hydraulics Design Conference Room at the NCDOT Century Center Complex from 9:30 am – 11:00 am. This meeting was a continuation of the meeting held on January 23, 2008.

Team Members:

John Thomas: USACE	(present)
Marella Buncick: USFWS	(present)
Marla Chambers: NCWRC	(not-present)
Amy Euliss: NCDWQ	(not-present)
David Wainwright: NCDWQ	(present)
Chris Militscher: EPA	(present)
Kathy Matthews: EPA	(present)
Donnie Brew: FHWA	(not-present)
David Harris: NCDOT, REU	(not-present)
Tony Houser: NCDOT, Roadway	(present)
Lonnie Brooks: NCDOT, Structures	(not present)
Derrick Weaver: NCDOT, PDEA	(not-present)
Rachelle Beauregard: NCDOT, NEU	(present)
Keith Raulston: NCDOT, Division 9	(present)

Participants:
Andrew Nottingham, NCDOT Hydraulics
Will Hines, Sungate Design Group
Greg Price: NEU
Felix Davila, FHWA
Kent Boyer, NCDOT Division 9
Gene Noderino, NCDOT NEU
Missy Dickens, NCDOT PDEA
Vasim Barodawala, NCDOT Roadway
John Braxton, NCDOT Roadway
Roy Girolami, NCDOT Structures
Paul Ervin, NCDOT Structures

Minutes:
Chris Militscher (EPA) noted that Marla Chambers (NCWRC) could not make the meeting but had provided comments to him to present at the meeting.

Sheet 16:

The Hydraulics Engineer stated that the areas inside of the Loops and between the Ramps would be designed and used as a Detention Basin as much as practicable and that the ultimate outlet will be taken directly to Smith Creek by way of a 4 foot base channel with riprap.

Sheet 17:

An additional wetland will be delineated near Station 662+50.

JS located at Station 667+00 (Fishers Branch): The Hydraulics Engineer stated that the box culvert would be a triple barrel due to FEMA requirements and that two of the barrels would have a sill.

Sheet 18:

JS located at Station 667+00 (Fishers Branch): The Hydraulics Engineer stated that the storm drainage system will be taken directly to Fishers Branch by way of a 4 foot base channel with riprap, with the exception of the stormwater from the shoulder berm gutter, which will be taken to a Preformed Scour Hole.

Sheet 19:

JS located at Station 688+50: The upstream pond will be completely drained and the downstream pond will be temporarily drained to an elevation below construction. The Agencies asked if there could be a Stream Restoration in the drained upstream pond. NCDOT will investigate.

Stormwater from the shoulder berm gutter will be taken to a Preformed Scour Hole.

Sheet 20:

JS (unnamed tributary to Lowery Mill Creek) located on Sheet 5 and 20: The Hydraulics Engineer stated that the proposed double barrel box culvert will have a sill in one barrel. The Agencies requested that baffles also be placed in the box culvert.

Sheet 21:

The Project ends before US 158 crosses Lowery Mill Creek. The Hydraulics Engineer described the proposed storm drainage systems and stated that existing drainage patterns and outfalls were basically being kept the same with the exception of the existing storm drainage outlet located immediately downstream of the US 158 crossing, which will be relocated immediately upstream of the US 158 crossing.

Sheet 22:

No impact.

Sheet 23:

No impact.

Sheet 24:

No impact.

Sheet 25:

No impact.

Sheet 26:

Smith Creek: The Hydraulics Engineer stated that a combination of retaining walls and 1.5:1 fill slopes with riprap were being proposed in order to avoid permanent impact and relocation of Smith Creek that would also impact the adjacent ponds. The Agencies expressed some concern that the water quality of Smith Creek would be temporarily impacted during construction of the retaining walls. NCDOT stated that the retaining walls, type unknown at this time, would have less of an impact, both during construction and permanently, than the alternative of using 1.5:1 slopes along the entire length.

The Agencies expressed some concern that the existing box culvert under Business I-40 is undersized due to evidence of a large scour hole located at the outlet. NCDOT stated that based on the hydraulic calculations, the box culvert was not undersized.

Sheet 27:

Smith Creek: The Hydraulics Engineer stated that 1.5:1 fill slopes with riprap were being proposed in order to avoid permanent impact and relocation of Smith Creek that would also impact the adjacent ponds.

An additional Jurisdictional Stream will be delineated upstream of Station 65+00 -Y4-.

Sheet 28:

JS located at Station 107+50 -Y4- (downstream): The Hydraulics Engineer stated that three cross-pipes (two under Business I-40 and one under Ramp B) will be connected using a Junction Box just downstream of Ramp B and that there would be only one outlet pipe. The Junction Box will serve as a Drop Box.

An additional Jurisdictional Stream will be delineated upstream of Station 104+50 -Y4- (outlet of pond).

An additional Jurisdictional Stream will be delineated downstream of the existing 18" cross-pipe located at Station 109+50 -Y4-.

Sheet 29:

No impact.

Sheet 30:

It was stated that the stream located south of Business I-40 and running parallel to the roadway embankment was Jurisdictional. The Hydraulics Engineer stated that the fill slope in this area has been steepened to 1.5:1 with riprap in order to avoid any impact.

The Hydraulics Engineer stated that existing drainage patterns are being maintained.

The Project ends before Business I-40 crosses Salem Creek.

Sheet 31:

The Hydraulics Engineer stated that an Energy Dissipater will be used at the end of the proposed storm drainage system, which is located about 200 feet from Salem Creek.

The Project ends before SR 2667 crosses Salem Creek.

Meeting adjourned.

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
TIM BAUMGARTNER
Director

NORTH CAROLINA
Environmental Quality

November 20, 2018

Ms. Amy Euliss
Division 9 Environmental Officer
North Carolina Department of Transportation
375 Silas Creek Parkway
Winston-Salem, North Carolina 27127-7167

Dear Ms. Euliss:

Subject: DMS Mitigation Acceptance Letter:

U-2579B, Winston-Salem Northern Beltway (Eastern Section) from US 311 to east of US 52, Forsyth County

References: USACE 404 Individual Permit issued June 17, 2014 (USACE Action ID 2008-03183)

NCDWR 401 Water Quality Certification issued July 28, 2014 (NCDWR ID 2014-0090)

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the additional compensatory stream mitigation for the subject project. Based on the information supplied by you on November 19 and 20, 2018, the impacts are located in CU 03040101 of the Yadkin River basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Table 1 – Additional Impacts (feet / acres)

Yadkin 03040101 CP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	0	649.0	0	0	0	0	0

*NOTE: Some of the stream impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

This additional impact and associated mitigation needs were not projected by the NCDOT in the 2018 impact data. DMS is currently providing stream and riparian wetland mitigation for the impacts associated with this project located in cataloging unit 03040101 of the Yadkin River basin as required by the 404 and 401 permits issued in June and July 2014, as shown in the below table (in mitigation credits)

Table 2 – Current Permitted Impacts and Associated Mitigation Requirements provided by DMS (based on 2014 issued permits) and Revised Anticipated Impacts (based on mitigation request)

Impact Type	Total Permitted Impacts (feet / acre / sq ft)	Mitigation Provided by DMS per Issued Permits (Credits)	Additional Impact (for approval)	Revised Total Impacts*
Stream (warm)	9,044.0	16,863.0	649.0	9,693.0
Riparian Wetland	1.96	3.92	0	1.96

*Some of the additional stream impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details. DMS will provide the amount of mitigation as determined by the regulatory agencies.

This mitigation acceptance letter replaces the mitigation acceptance letter issued on January 17, 2014. DMS commits to implementing additional sufficient compensatory stream mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies using the delivery timeline listed in Section F.3.c.iii of the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from DMS.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-707-8420.

Sincerely,

Beth Harmon

for James B. Stanfill
DMS Asset Management Supervisor

cc: Mr. James Lastinger, USACE – Raleigh Regulatory Field Office
Mr. Dave Wanucha, Division of Water Resources, Wetlands/401 Unit
File: U-2579B Additional

PROJECT REFERENCE NO.	SHEET NO.
U-2579B	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

8/17/99

CONSTRUCTION REVISION - 11/6/18 - REVISED ROADWAY AND HYDRAULIC DESIGN TO ACCOUNT FOR FUTURE U-5760 PROJECT, BEGINNING AT -Y4- STA. 35+50.00 - RSH

DENOTES FILL IN WETLAND

BEGIN U-2579B MODIFICATIONS
-Y4- POT Sta. 35+50.00

FUTURE U-5760 IMPROVEMENTS (BY OTHERS)

119 ARNOLD G. KING, HELEN H. PRINCE, DB 2250 PG 829

120 HAROLD DAVID HOPKINS, DB 3113 PG 1518

215 TOWN OF KERNERSVILLE, DB 2065 PG 1771

SITE 22

300' TAPER | 1300' FULL LANE | 300' SHOULDER TAPER

TAIL DITCH SEE DETAIL#9 EST. DDE 17CY
CLASS 'I' RIP RAP EST 20 TONS EST 39 SY GEO

24" RCP-III | JB w/MH | 15° | COLLAR | REMOVE FES | 24"

RETAIN AND EXTEND | TRENCHLESS INSTALLATION 36" WELDED STEEL | CONVERT OTCB TO 2GI | RETAIN

-Y4EB- N 85° 33' 45.8" W | -Y4- | -Y4WB- | US 421/I-40 BUS/NC 150

DITCH BLOCK MIN. HEIGHT-1'0"

15" CSP W/2 ELBOWS | CLASS 'B' RIP RAP EST 2 TONS EST 5 SY GEO

BEGIN SBG -Y4EB- STA 40+50 LT | 18" CSP W/2 ELBOWS | PSH SEE DETAIL SHEET 2D-1

20" WELDED STEEL TRENCHLESS INSTALLATION | GREU MED TL-3 | REMOVE | FILL W/FLOWABLE MATERIAL

15" RCP-IV | COLLAR 60° CHL

BEGIN SBG -Y4WB- STA 39+50 RT

CLASS 'B' RIP RAP EST 2 TONS EST 7 SY GEO

TOE PROTECTION W/ CLASS I RIPRAP EST 130 TONS EST 265 SY GEO SEE DETAIL#27

MATCHLINE -Y4- STA. 30+50 SHEET 24

MATCHLINE -Y4- STA. 43+65 SHEET 26

FORSYTH COUNTY / TOWN OF KERNERSVILLE

WHITE WALNUT, LLC DB 3078 PG 0373

WHITE WALNUT, LLC DB 3054 PG 1059

DENNIS H. PAYNE, JR. DAWN A. PAYNE DB 2797 PG 2978

DON ALLEN HARRIS LEXA LEIGH HARRIS DB 3084 PG 4432

THEODORE R. MEAD AMY J. MEAD DB 1862 PG 3875 PB 34 PG 103

PAGE AND ASSOCIATES, INC. DB 2704 PG 784

DAVID D. WEAVER DB 2480 PG 28 PB 34 PG 103

TIMOTHY A. KUBIAK SUSAN E. KUBIAK DB 1813 PG 130 PB 34 PG 103

THOMAS W. PRINCE ARNOLD G. KING DB 2056 PG 1310

WHITE WALNUT, LLC DB 2858 PG 0267 PB 42 PG 137

POND W.E. 8597 FISH HATCHERY

FUTURE U-5760 IMPROVEMENTS (BY OTHERS)

DETAIL #9
STANDARD BASE DITCH
(Not to Scale)

Natural Ground | 2H | D | 2H | Natural Ground | B

Min. D= 2 Ft.
B= 3 Ft.

FROM STA. 35+02 TO 35+27 -Y4- LT

DETAIL #27
TOE PROTECTION
(Not to Scale)

2H OR FLATTER | Fill Slope | d | 2H OR FLATTER | Fill Slope | Geotextile

d= 1Ft.

Type of Liner= Class 'I' Rip-Rap

FROM STA. 40+30 TO RCBC -Y4- RT

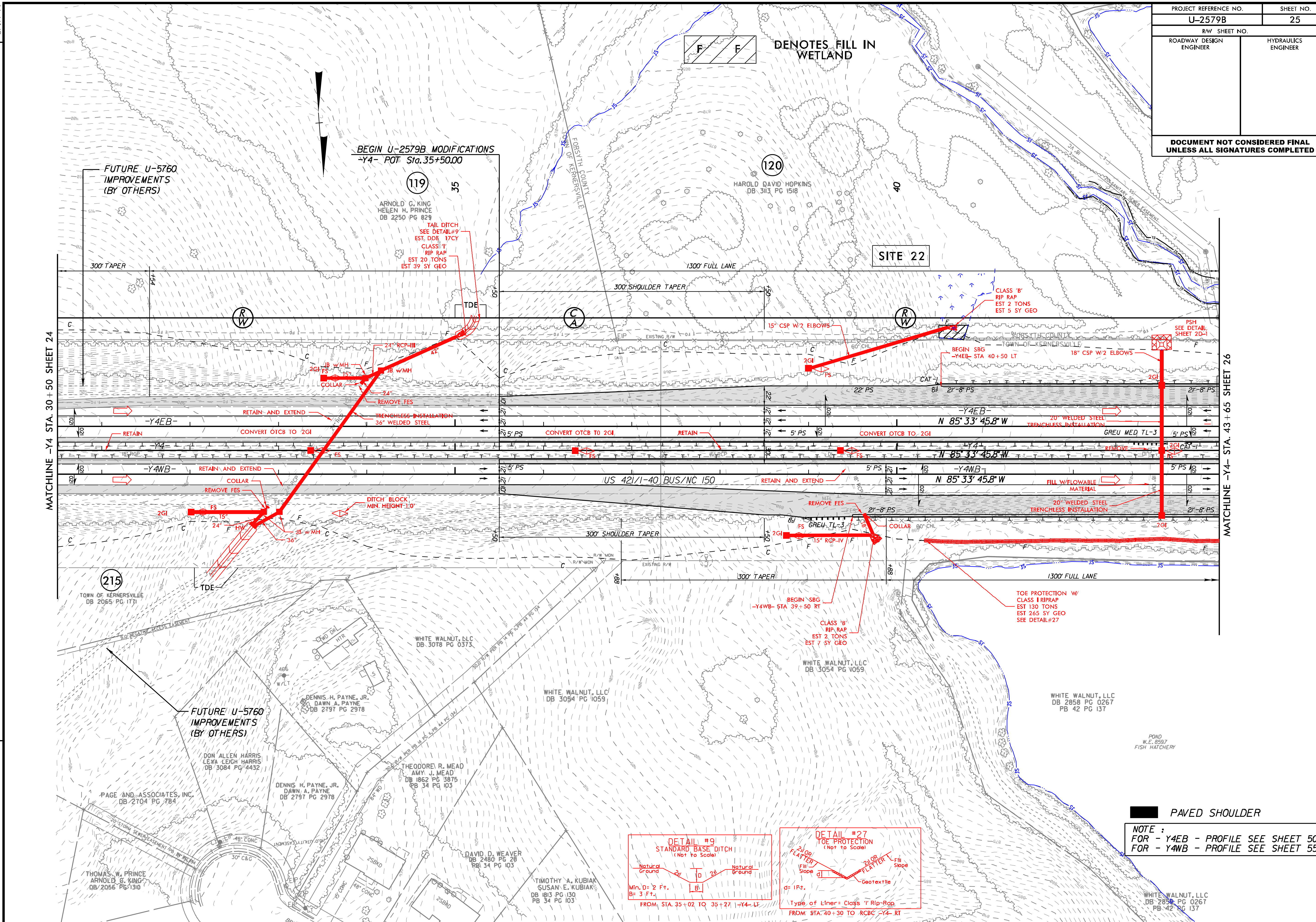
PAVED SHOULDER

NOTE :
FOR - Y4EB - PROFILE SEE SHEET 50
FOR - Y4WB - PROFILE SEE SHEET 55

REVISIONS
CONSTRUCTION REVISION – 11/16/18 – REVISED ROADWAY AND HYDRAULIC DESIGN TO ACCOUNT FOR FUTURE U-5760 PROJECT, BEGINNING AT -Y4- STA. 35+50.00 – RSH
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-2579B	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED


DENOTES FILL IN WETLAND
BEGIN U-2579B MODIFICATIONS
-Y4- POT Sta.35+50.00
FUTURE U-5760 IMPROVEMENTS (BY OTHERS)
ARNOLD G. KING
HELEN H. PRINCE
DB 2250 PG 829
HAROLD DAVID HOPKINS
DB 3113 PG 1518
SITE 22
TAIL DITCH SEE DETAIL #9 EST. DDE 17CY
CLASS 'I' RIP RAP EST 20 TONS EST 39 SY GEO
CLASS 'B' RIP RAP EST 2 TONS EST 5 SY GEO
300' TAPER
1300' FULL LANE
300' SHOULDER TAPER
15" CSP W/2 ELBOWS
18" CSP W/2 ELBOWS
PSH SEE DETAIL SHEET 2D-1
BEGIN SBG -Y4EB- STA 40+50 LT
FORSYTH COUNTY
TOWN OF KERNERSVILLE
MATCHLINE -Y4- STA. 30+50 SHEET 24
MATCHLINE -Y4- STA. 43+65 SHEET 26
-Y4EB-
-Y4-
-Y4WB-
N 85° 33' 45.8" W
US 421/I-40 BUS/NC 150
RETAIN AND EXTEND
CONVERT OTCB TO 2GI
RETAIN
REMOVE FES
TRENCHLESS INSTALLATION 36" WELDED STEEL
20" WELDED STEEL TRENCHLESS INSTALLATION
FILL W/FLOWABLE MATERIAL
GREU MED TL-3
GREU TL-3
COLLAR
DITCH BLOCK MIN. HEIGHT 1.0'
TOE PROTECTION W/ CLASS I RIPRAP EST 130 TONS EST 265 SY GEO SEE DETAIL #27
BEGIN SBG -Y4WB- STA 39+50 RT
CLASS 'B' RIP RAP EST 2 TONS EST 7 SY GEO
TOWN OF KERNERSVILLE DB 2065 PG 1771
WHITE WALNUT, LLC DB 3078 PG 0373
WHITE WALNUT, LLC DB 3054 PG 1059
WHITE WALNUT, LLC DB 2858 PG 0267 PB 42 PG 137
DENNIS H. PAYNE, JR. DAWN A. PAYNE DB 2797 PG 2978
DON ALLEN HARRIS LEXA LEIGH HARRIS DB 3084 PG 4432
THEODORE R. MEAD AMY J. MEAD DB 1862 PG 3875 PB 34 PG 103
PAGE AND ASSOCIATES, INC. DB 2704 PG 784
THOMAS W. PRINCE ARNOLD G. KING DB 2056 PG 1310
DAVID D. WEAVER DB 2480 PG 28 PB 34 PG 103
TIMOTHY A. KUBIAK SUSAN E. KUBIAK DB 1813 PG 130 PB 34 PG 103
POND W.E. 8597 FISH HATCHERY
DETAIL #9 STANDARD BASE DITCH (Not to Scale)
Min. D= 2 Ft. B= 3 Ft.
FROM STA. 35+02 TO 35+27 -Y4- LT
DETAIL #27 TOE PROTECTION (Not to Scale)
Type of Liner: Class 'I' Rip-Rap
FROM STA. 40+30 TO RCBC -Y4- RT
PAVED SHOULDER

NOTE :
FOR -Y4EB- PROFILE SEE SHEET 50
FOR -Y4WB- PROFILE SEE SHEET 55

PROJECT REFERENCE NO.	SHEET NO.
U-2579B	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING MODIFICATION FOR SITE 23 AND 28

8/17/99

REVISIONS

CONSTRUCTION REVISION – 11/16/18 – REVISED ROADWAY AND HYDRAULIC DESIGN TO ACCOUNT FOR FUTURE U-5760 PROJECT, INCLUDING RETAINING WALL AND CULVERT ON NORTH SIDE OF -Y4- MATCHLINE MOVED TO -Y4- STA 57+25 (FROM 56+61) TO ILLUSTRATE ALL CHANGES ON PLAN SHEET 26. – RSH

MATCHLINE -Y4- STA. 43+65 SHEET 25

MATCHLINE -Y4- STA. 57+25 SHEET 27

LEGEND

- TS FS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- S S — DENOTES IMPACTS IN SURFACE WATER (CULVERT IMPACTS)
- S S — DENOTES IMPACTS IN SURFACE WATER (STREAMBANK STABILIZATION)

SITE 23 (PERMIT MOD)

SITE 23A

SITE 23B

SITE 28 (PERMIT MOD)

120 HAROLD DAVID HOPKINS DB 3113 PG 1518

121 HAROLD DAVID HOPKINS, JR. DB 3119 PG 1159

122 HAROLD D. CRANFILL PATTIE CRANFILL DB 1404 PG 661

123 JERRY M. PEGRAM NANCY B. PEGRAM DB 1864 PG 2389 DB 1950 PG 327

216 WHITE WALNUT, LLC DB 2858 PG 0267 PB 42 PG 137

127 RONALD LEE ANGEL SR. DB 1985 PG 81

END U-2579B MODIFICATIONS -Y4EB- POT Sta. 47+54.00 (36' LT)

END U-2579B MODIFICATIONS -Y4WB- POT Sta. 57+00.00 (36' RT)

ORIGINAL U-2579B IMPROVEMENTS

INLET CHANNEL IMPROVEMENTS CLASS II RIP RAP EST. 90 TONS EST 50 SY GEO SEE DETAIL 1SHEET 2D-7

RETAIN EXISTING SS MH AND USE CAUTION WHEN INSTALLING CHANNEL IMPROVEMENTS

PROPOSED 42" 3@8'x9' RCBC UPSTREAM EXTENSION SEE CULVERT PLANS C01-1 THRU C01-10

INLET CHANNEL IMPROVEMENTS CLASS II RIP RAP EST. 53 TONS EST 55 SY GFD SEE DETAIL 1SHEET 2D-7

TAIL DITCH SEE DETAIL#17 EST. DDE 235CY CLASS 'I' RIP RAP EST. 206 TONS 535 SY GEO

HEAD DITCH SEE DETAIL #7 EST. DDE 5CY

EARTH BERM SEE DETAIL#16

END SBG -Y4EB- STA 46+00 LT

DETAIL #16 EARTH BERM (Not to Scale)

STA. 47+93 -Y4- LT

DETAIL #17 STANDARD BASE DITCH (Not to Scale)

Type of Liner: Class 'I' Rip-Rap

FROM STA. 44+68 TO 47+53 -Y4- LT

DETAIL #3 LATERAL BASE DITCH (Not to Scale)

FROM STA 53+85 TO 54+50 -Y4- LT

TOE PROTECTION W/ CLASS 'B' RIPRAP EST 14 TONS EST 30 SY GEO SEE DETAIL#6

CLASS 'B' RIP RAP EST 2 TONS EST 7 SY GEO

LATERAL 2' BASE DITCH SEE DETAIL#3

SAG -Y4- STA. 54+47.45

CLASS 'B' RIP RAP EST 8 TONS EST 21 SY GEO

BERM DITCH STA 56+25 TO 59+50 -Y4- LT

US 421/I-40 BUS/NC 150 N 85° 33' 45.8" W

-Y4EB-

-Y4WB-

REMOVE 5' PS

REMOVE

REMOVE EX DI

PLUG

GRADE TO DRAIN

FILL W/FLOWABLE MATERIAL

18" RCP-IV PIPE INV. AT WALL 852.00'

18" RCP-III PIPE INV. AT WALL 843.50'

PROPOSED GRADING

18" RCP-III TRENCHLESS INSTALLATION

BLIND TB W/SAFE END

42" RCP-III PIPE INV. 837.00'

24" RCP-III

PROPOSED 32' 3@8'x9' RCBC DOWNSTREAM EXTENSION SEE CULVERT PLANS C01-1 THRU C01-10

BEGIN RETAINING WALL -Y4WB- STA 46+69.29 RT SEE SHEET RTW-1 FOR WALL DETAILS

RETAIN EXISTING INLINE DAM STRUCTURE

INLET CHANNEL IMPROVEMENT CLASS II RIP RAP EST 155 TONS EST 165 SY GFD SEE DETAIL 4SHEET 2D-7

END RETAINING WALL -Y4WB- STA 50+05.27 RT SEE DETAIL 4SHEET 2D-7

PROP 2 @ 10' X 10' RCBC WITH 1' SILLS WITH 1 @ 10' X 8' RCBC (NORTHERN MOST BARREL) SEE CULVERT PLANS C02-1 THRU C02-17

POND W.E. 847.2 FISH HATCHERY

INLET CHANNEL IMPROVEMENT CLASS II RIP RAP EST 42 TONS EST 45 SY GFD SEE DETAIL 3SHEET 2D-7

OUTLET CHANNEL IMPROVEMENT CLASS II RIP RAP EST 256 TONS EST 270 SY GFD SEE DETAIL 3SHEET 2D-7

EMBANKMENT PROTECTION CLASS II RIP RAP EST 15 TONS EST 30 SY GFD SEE DETAIL 18

OUTLET CHANNEL IMPROVEMENTS CLASS II RIP RAP EST 115 TONS EST 120 SY GFD SEE DETAIL 2SHEET 2D-7

CLASS II RIP RAP ALONG RETAINING WALL EST 186 TONS EST 255 SY GFD SEE DETAIL 2SHEET 2D-7

DETAIL 18 RIP RAP AT EMBANKMENT (Not to Scale)

Type of Liner = Class II Rip-Rap

STA. 56+50 -Y4- (RT)

DETAIL FALSE SUMP (Not to Scale)

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% to 4.0%	30'	Over 6.0%	50'

S=Ditch Slope G Proposed Ditch

STA. 39+48 -Y4-
STA. 43+13 -Y4-
STA. 46+63 -Y4-
STA. 50+14 -Y4-
STA. 52+63 -Y4-
STA. 56+37 -Y4-

DETAIL #6 TOE PROTECTION (Not to Scale)

d= 2 Ft.

Type of Liner= Class 'B' Rip-Rap

FROM STA. 53+05 TO 53+85 -Y4- LT

DETAIL #7 STANDARD 'V' DITCH (Not to Scale)

Min. D= 2 Ft.

FROM STA. 45+14 TO STA. 45+18 -Y4- LT

STA. 29+15 -Y4- LT

STA. 38+89 -Y4- RT

ZOOM 1.5X

TOP OF CONCRETE SLAB WITHOUT COVER

ARMORFLEX TO BE PINNED TO RCBC WHERE THEY INTERFACE

PROPOSED SPILLWAY CHANNEL LINED WITH CLASS 40, 4.75" ARMORFLEX SEE DETAILS ON SHEET 2D-8 – 2D-10

FOR -Y4EB- PROFILE SEE SHEET 50-51

FOR -Y4WB- PROFILE SEE SHEET 55-56

REVISIONS

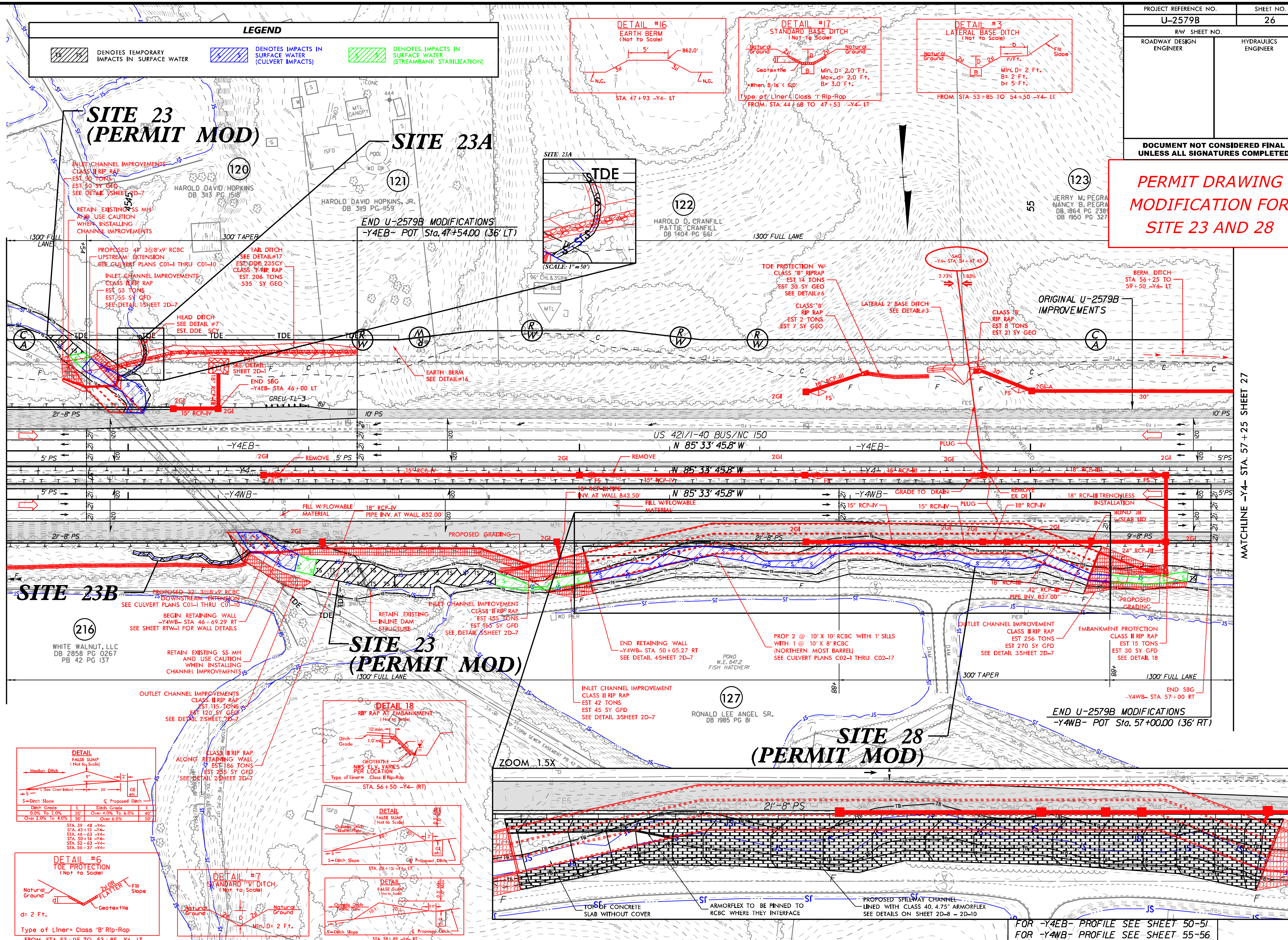
CONSTRUCTION REVISION - 11/6/18 - REVISED ROADWAY AND HYDRAULIC DESIGN TO ACCOUNT FOR FUTURE U-5760 PROJECT, INCLUDING RETAINING WALL AND CULVERT ON NORTH SIDE OF -Y4- MATCHLINE MOVED TO -Y4- STA 57+25 (FROM 56+61) TO ILLUSTRATE ALL CHANGES ON PLAN SHEET 26. - RSH

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-2579B	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING MODIFICATION FOR SITE 23 AND 28



WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	28+00 -Y1-	ROAD FILL	0.03		< 0.01	0.02		0.02		142		
2	16+00 -Y1RPD-	ROAD FILL - INTERMITTENT						0.01		109		
		ROAD FILL - PERENNIAL						0.02		208		
		STREAMBANK STABILIZATION						< 0.01	< 0.01	10	37	
3	21+56-25+22 -Y1-	2 @ 7'x6' RCBC						0.06	< 0.01	438	33	
3A	17+36-21+53 -Y1-	DETOUR - ROAD FILL							0.08		545	
3B	20+55-21+32 -Y1-	DETOUR - ROAD FILL							0.03		194	
4	501+51-503+21 -L-	ROAD FILL						0.03	< 0.01	493	18	
		STREAMBANK STABILIZATION						< 0.01	< 0.01	9	31	
5	503+85-507+80 -L-	ROAD FILL						0.05	< 0.01	740	22	
5A	507+39-509+64 -L-	ROAD FILL						0.01		306		
6	523+00 -L-	ROAD FILL	0.03			< 0.01		0.02	< 0.01	312	42	
7	527+00 -L-	ROAD FILL	0.52			0.01						
		ROAD FILL-POND						0.59				
8	559+75 -L-	2 @ 10'x6' RCBC						0.06	< 0.01	442	53	
		STREAMBANK STABILIZATION						< 0.01	< 0.01	58	44	
9	560+75 -L-	ROAD FILL	0.03			0.01						
10	560+50-568+74 -L-	ROAD FILL	0.01					0.07	< 0.01	783	22	
10A	566+84-572+75 -L-	ROAD FILL						0.05		684		
11	615+00 -L-	3 @ 10'x9' RCBC						0.43	0.02	808	57	
11A	19+76-21+44 -Y4RPBD-	CHANNEL CHANGE						0.08	0.01	223	41	
12	15+84-18+86 -Y4RPBD-	CHANNEL CHANGE						0.01	0.02	88	205	
SUBTOTALS*:			0.62		< 0.01	0.05		1.53	0.19	5853	1344	

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
6-2-14
U-2579B FORSYTH COUNTY
WINSTON SALEM NORTHERN BELTWAY
(EASTERN SECTION) (FUTURE I-74)

ATN Revised 3/12/13

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
13	20+00-21+40 -Y4RPBD-	ROAD FILL	0.33									
14	629+95-635+90 -L-	ROAD FILL	0.04					0.05		688		
15	636+32-641+55 -L-	ROAD FILL	0.18					0.04		332		
		ROAD FILL-POND						2.38				
15A	644+00-645+00 -L-	ROAD FILL						< 0.01		108		
16	643+56-644+61 -L-	ROAD FILL						< 0.01		104		
		ROAD FILL-POND						0.16				
17	663+65-667+00 -L-	ROAD FILL	0.09			< 0.01		0.06		928		
18	667+15 -L-	3 @ 12'x10' RCBC						0.06	0.02	377	67	
		STREAMBANK STABILIZATION						0.02	0.01	80	59	
19	668+50 -L-	ROAD FILL	0.47			0.01						
20	687+80-691+59 -L-	ROAD FILL						0.03		163		
		ROAD FILL-POND						0.85				450
21	22+50 -Y1-	ROAD FILL	0.02									
22	40+50 -Y4-	OUTLET PAD	0.01									
23 *	~~45+65 -Y4-~~	~~CULVERT EXTENSION~~						~~0.06~~	~~0.01~~	~~100~~	~~32~~	
		~~STREAMBANK STABILIZATION~~						~~0.02~~	~~0.06~~	~~54~~	~~89~~	
23A	44+95-45+18 -Y4-	ROAD FILL						< 0.01		57		
23B	45+07-46+34 -Y4-	ROAD FILL						0.01		135		
24	80+73-81+57-Y4RPBD-	ROAD FILL						0.02		202		
24A	80+50-81+51-Y4RPBD-	ROAD FILL	0.06									
25	37+31 -Y4RPA-	30" RCP						< 0.01		73		
		STREAMBANK STABILIZATION						< 0.01	< 0.01	21	16	
SUBTOTALS*:			1.20			0.02		3.67	0.03	3268	142	450

*Rounded totals are sum of actual impacts

NOTES:
Revised: 5-18-14

SEE SHEET 64 FOR PERMIT IMPACTS QUANTITIES FOR SITES 23 AND 23A. PREVIOUS IMPACTS FOR SHEET 63 FOR PERMANENT SURFACE WATER IMPACTS: 3.77 AC, TEMP. SURFACE WATER IMPACTS: 0.9 AC, EXISTING CHANNEL IMPACTS PERMANENT: 3422 LF, EXISTING CHANNEL IMPACTS TEMP.: 263 LF

ATN Revised 3/12/13

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
6-2-14 (Revised 11-19-18)
U-2579B FORSYTH COUNTY
WINSTON SALEM NORTHERN BELTWAY
(EASTERN SECTION) (FUTURE I-74)
SHEET 63 OF 64

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
26	29+16-31+12 -Y4RPC-	ROAD FILL-POND						0.38				
27A	104+62 - 107+53 -Y4-	ROAD FILL						0.02		205		
27B	107+60 -Y4-	42" WELDED STEEL	0.05					0.01	< 0.01	130	14	
27C	107+58 - 108+44 -Y4-	30" RCP						< 0.01		116		
~~28*~~	~~50+50 - 56+00 -Y4- Rt~~	~~STREAMBANK STABILIZATION~~						~~0.02~~	~~0.15~~	~~365~~	~~188~~	
29	145+62 -Y4-	ROAD FILL				< 0.01						
30	64+34 -Y4-	STREAMBANK STABILIZATION						< 0.01		28		
31	557+28 -L-	STREAMBANK STABILIZATION						< 0.01		21		
Permit Modifications*												
23	44+10 to 47+96 -Y4-	3 @ 8' x 9' RCBC Extension						0.06		151		
		Streambank Stabilization						0.02	0.05	36	121	
28	47+96 to 56+85 -Y4-	2 @ 10' x 10' RCBC and 1 @ 10' x 8' RCBC						0.12		598	127	
		Streambank Stabilization						0.04	<0.01	194		
SUBTOTALS*:			0.05			< 0.01		0.66	0.06	1479	262	
SUBTOTALS FROM PAGE 1*:			0.62		< 0.01	0.05		1.53	0.19	5853	1344	
SUBTOTALS FROM PAGE 2*:			1.20			0.02		3.67	0.03	3268	142	450
TOTALS*:			1.87		< 0.01	0.08		5.86	0.28	10600	1748	450

*Rounded totals are sum of actual impacts

NOTES:
Revised: 5-18-14

PREVIOUS IMPACTS FOR SHEET 64 FOR PERMANENT SURFACE WATER IMPACTS: 0.44 AC, TEMP. SURFACE WATER IMPACTS: 0.16 AC, EXISTING CHANNEL IMPACTS PERMANENT: 865 LF, EXISTING CHANNEL IMPACTS TEMP.: 202 LF

PREVIOUS TOTAL IMPACTS FOR SHEET 64 FOR PERMANENT SURFACE WATER IMPACTS: 5.73 AC, TEMP. SURFACE WATER IMPACTS: 0.44 AC, EXISTING CHANNEL IMPACTS PERMANENT: 10140 LF, EXISTING CHANNEL IMPACTS TEMP.: 1809 LF

ATN Revised 3/12/13

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
6-2-14 (Revised 11-19-18)
U-2579B FORSYTH COUNTY
WINSTON SALEM NORTHERN BELTWAY
(EASTERN SECTION) (FUTURE I-74)
SHEET 64 OF 64