STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT L. MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

May 29, 2013

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

ATTN: Mr. Monte Matthews
NCDOT Coordinator

Subject: **Application for Section 404 Nationwide Permit 23 and 33 and Section 401 Water Quality Certification** for the proposed replacement of Bridge No. 69 over Little Helton Creek on SR 1376 (Joe Thomas Road) in Ashe County, Federal Aid Project No. BRZ-1376(2), Division 11, TIP No. B-4705, Debit $570 from WBS 38480.1.1.

Dear Sir:

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 69 over Little Helton Creek on SR 1376 with a 42' long, 9'x6' triple-barrel reinforced concrete box culvert (RCBC) north of the existing alignment. Traffic will be maintained during construction via the existing bridge.

There will be 133 linear feet of permanent impacts due to the proposed RCBC and channel realignment into the baseflow cell, and <0.01 acre (29 linear feet) of temporary stream impacts due to a temporary disturbance from removal of the existing bridge bent.

Please see enclosed copies of the Pre-Construction Notification (PCN), EEP acceptance letter, avoidance and minimization checklist, stormwater management plan, permit drawings and design plans for the above-referenced project. The Categorical Exclusion (CE) was completed in April 2012 and distributed shortly thereafter. Additional copies are available upon request.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-707-6000
FAX: 919-212-5785

WEBSITE:NCDOT.GOV

LOCATION:
CENTURY CENTER, BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

This project is located in a trout county, therefore comments from the NCWRC will be required prior to authorization by the Corps of Engineers. By copy of this letter and attachment, NCDOT hereby requests NCWRC Review. NCDOT requests that NCWRC forward their comments to the Corps of Engineers and the NCDOT within 30 calendar days of receipt of this application.

This project calls for a letting date of January 21, 2014 and a review date of December 3, 2013; however, the let date may advance as additional funding becomes available.

A copy of this permit application and its distribution list will be posted on the NCDOT Website at: http://connect.ncdot.gov/resources/Environmental. If you have any questions or need additional information, please call Erin Cheely at (919) 707-6108.

Sincerely,

E. L. Luck

for Gregory J. Thorpe, Ph.D., Manager
Project Development and Environmental Analysis Unit

cc:
NCDOT Permit Application Standard Distribution List

Office Use Only:
Corps action ID no. _____
DWQ project no. _____
Form Version 1.3 Dec 10 2008

Pre-Construction Notification (PCN) Form

A. Applicant Information

1. Processing

1a. Type(s) of approval sought from the Corps:	☒ Section 404 Permit ☐ Section 10 Permit	
1b. Specify Nationwide Permit (NWP) number: 23 33 or General Permit (GP) number:		
1c. Has the NWP or GP number been verified by the Corps?		☐ Yes ☒ No
1d. Type(s) of approval sought from the DWQ (check all that apply): ☒ 401 Water Quality Certification – Regular ☐ Non-404 Jurisdictional General Permit ☐ 401 Water Quality Certification – Express ☐ Riparian Buffer Authorization		
1e. Is this notification solely for the record because written approval is not required?	For the record only for DWQ 401 Certification: ☐ Yes ☒ No	For the record only for Corps Permit: ☐ Yes ☒ No
1f. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts? If so, attach the acceptance letter from mitigation bank or in-lieu fee program.		☒ Yes ☐ No
1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.		☐ Yes ☒ No
1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?		☐ Yes ☒ No

2. Project Information

2a. Name of project:	Replacement of Bridge 69 over Little Helton Creek on SR 1376
2b. County:	Ashe
2c. Nearest municipality / town:	Helton
2d. Subdivision name:	*not applicable*
2e. NCDOT only, T.I.P. or state project no:	B-4705

3. Owner Information

3a. Name(s) on Recorded Deed:	North Carolina Department of Transportation
3b. Deed Book and Page No.	*not applicable*
3c. Responsible Party (for LLC i f applicable):	*not applicable*
3d. Street address:	1598 Mail Service Center
3e. City, state, zip:	Raleigh, NC 27699-1598
3f. Telephone no.:	(919) 707-6108
3g. Fax no.:	(919) 212-5785
3h. Email address:	ekcheely@ncdot.gov

4. Applicant Information (if different from owner)	
4a. Applicant is:	☐ Agent ☐ Other, specify:
4b. Name:	*not applicable*
4c. Business name (if applicable):	
4d. Street address:	
4e. City, state, zip:	
4f. Telephone no.:	
4g. Fax no.:	
4h. Email address:	
5. Agent/Consultant Information (if applicable)	
5a. Name:	*not applicable*
5b. Business name (if applicable):	
5c. Street address:	
5d. City, state, zip:	
5e. Telephone no.:	
5f. Fax no.:	
5g. Email address:	

B. Project Information and Prior Project History	
1. Property Identification	
1a. Property identification no. (tax PIN or parcel ID):	*not applicable*
1b. Site coordinates (in decimal degrees):	Latitude:36.57652 (DD.DDDDDD) Longitude: - 81.46488 (-DD.DDDDDD)
1c. Property size:	0.7 acres
2. Surface Waters	
2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Little Helton Creek
2b. Water Quality Classification of nearest receiving water:	C; Tr+
2c. River basin:	New
3. Project Description	
3a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application: The land use within the vicinity of the project consists of about 45% forest land (including mixed hardwood forests), 10% developed or disturbed lands (roadsides and residential areas) and 45% cultivated land (agricultural fields and pastures).	
3b. List the total estimated acreage of all existing wetlands on the property: 0	
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property: 170	
3d. Explain the purpose of the proposed project: The purpose of this project is to replace a structurally deficient (sufficiency rating of 28.2 of 100) and functionally obsolete (structural evaluation of 2 out of 9, deck geometry of 3 out of 9) bridge.	
3e. Describe the overall project in detail, including the type of equipment to be used: The project involves replacing a 35-foot two-span bridge with a 42' long, 3 @ 9'x6' reinforced concrete box culvert (RCBC) on a new alignment to the north of the existing bridge, maintaining traffic on the existing bridge during construction. Standard road building equipment, such as trucks, dozers, and cranes will be used.	
4. Jurisdictional Determinations	
4a. Have jurisdictional wetland or stream determinations by the Corps or State been requested or obtained for this property / project (including all prior phases) in the past? Comments: Only a perennial stream, no JD needed earlier	☐ Yes ☒ No ☐ Unknown
4b. If the Corps made the jurisdictional determination, what type of determination was made?	☐ Preliminary ☐ Final
4c. If yes, who delineated the jurisdictional areas? Name (if known): Erin Cheely	Agency/Consultant Company: NCDOT Other:
4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation.	
5. Project History	
5a. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past?	☐ Yes ☒ No ☐ Unknown
5b. If yes, explain in detail according to "help file" instructions.	
6. Future Project Plans	
6a. Is this a phased project?	☐ Yes ☒ No
6b. If yes, explain.	

C. Proposed Impacts Inventory

1. Impacts Summary

1a. Which sections were completed below for your project (check all that apply):

☐ Wetlands ☒ Streams - tributaries ☐ Buffers

☐ Open Waters ☐ Pond Construction

2. Wetland Impacts

If there are wetland impacts proposed on the site, then complete this question for each wetland area impacted.

2a. Wetland impact number – Permanent (P) or Temporary (T)	2b. Type of impact	2c. Type of wetland (if known)	2d. Forested	2e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	2f. Area of impact (acres)
Site 1 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
Site 2 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
Site 3 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
Site 4 ☐ P ☐ T			☐ Yes ☐ No	☐ Corps ☐ DWQ	
				2g. **Total wetland impacts**	0 Permanent 0 Temporary

2h. Comments: No wetlands within construction limits

3. Stream Impacts

If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.

3a. Stream impact number - Permanent (P) or Temporary (T)	3b. Type of impact	3c. Stream name	3d. Perennial (PER) or intermittent (INT)?	3e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	3f. Average stream width (feet)	3g. Impact length (linear feet)
Site 1 ☒ P ☐ T	Culvert (RCBC)	Little Helton Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	7	133
Site 2 ☐ P ☒ T	Existing bent removal	Little Helton Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	7	29 (<0.01ac)
Site 3 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 4 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 5 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 6 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
					3h. **Total stream and tributary impacts**	133 Perm 29 Temp

3i. Comments: Replace bridge with 3@9'x6' RCBC. Permanent impacts resulting from new RCBC itself and floodplain bench construction at outlet (primarily) & inlet. Channel shifted slightly at crossing to align with western baseflow cell. Temporary impacts are from temporary disturbance resulting from the removal of the existing bent on the west bank.

4. Open Water Impacts

If there are proposed impacts to lakes, ponds, estuaries, tributaries, sounds, the Atlantic Ocean, or any other open water of the U.S. then individually list all open water impacts below.

4a. Open water impact number – Permanent (P) or Temporary (T)	4b. Name of waterbody (if applicable)	4c. Type of impact	4d. Waterbody type	4e. Area of impact (acres)
O1 ☐ P ☐ T				
O2 ☐ P ☐ T				
O3 ☐ P ☐ T				
O4 ☐ P ☐ T				
			4f. Total open water impacts	0 Permanent 0 Temporary

4g. Comments: No open water within construction limits.

5. Pond or Lake Construction

If pond or lake construction proposed, then complete the chart below.

5a. Pond ID number	5b. Proposed use or purpose of pond	5c. Wetland Impacts (acres)			5d. Stream Impacts (feet)			5e. Upland (acres)
		Flooded	Filled	Excavated	Flooded	Filled	Excavated	Flooded
P1								
P2								
	5f. Total							

5g. Comments:

5h. Is a dam high hazard permit required?	☐ Yes ☐ No If yes, permit ID no:
5i. Expected pond surface area (acres):	
5j. Size of pond watershed (acres):	
5k. Method of construction:	

6. Buffer Impacts (for DWQ)

If project will impact a protected riparian buffer, then complete the chart below. If yes, then individually list all buffer impacts below. If any impacts require mitigation, then you **MUST** fill out Section D of this form.

6a. Project is in which protected basin?			☐ Neuse ☐ Catawba	☐ Tar-Pamlico ☐ Randleman	☐ Other:
6b. Buffer impact number – Permanent (P) or Temporary (T)	6c. Reason for impact	6d. Stream name	6e. Buffer mitigation required?	6f. Zone 1 impact (square feet)	6g. Zone 2 impact (square feet)
B1 ☐ P ☐ T			☐ Yes ☐ No		
B2 ☐ P ☐ T			☐ Yes ☐ No		
B3 ☐ P ☐ T			☐ Yes ☐ No		
		6h. **Total buffer impacts**			
6i. Comments: This project is not located within a protected buffer area.					

D. Impact Justification and Mitigation

1. Avoidance and Minimization

1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing project.

Please see the attached 'Bridge to Culvert Avoidance and Minimization Summary Checklist' for a detailed summary of the avoidance and minimization measures. A culvert was chosen as the selected alternative due to the small stream size (7' wide), small drainage area (4.9 square miles) and cost of maintenance. SR 1376 is unpaved, and the bridge currently exists on a severe curve. Replacing with a culvert on a slightly new alignment just to the north eliminates the severe curve and crosses the stream on a better alignment, reducing the necessary length of the culvert. A bottomless culvert was proposed, but was not possible due to the lack of shallow enough bedrock at the site. The proposed RCBC will have low flow sills and baffles to maintain channel profile and velocities while facilitating fish passage.

1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques.

Best Management Practices (BMPs) will be utilized during construction to attempt to reduce the stormwater impacts to the receiving stream due to erosion and runoff. Traffic will be maintained via the existing bridge. Design Standards in Sensitive Watersheds will be implemented during construction. A trout moratorium from October 15 – April 15 will be adhered to in order to protect reproducing trout.

2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?	☒ Yes ☐ No If no, explain:
2b. If yes, mitigation is required by (check all that apply):	☐ DWQ ☒ Corps
2c. If yes, which mitigat ion option will be used for this project?	☐ Mitigation bank ☒ Payment to in-lieu fee program ☐ Permittee Responsible Mitigation

3. Complete if Using a Mitigation Bank

3a. Name of Mitigation Bank: not applicable

3b. Credits Purchased (attach receipt and letter)	Type	Quantity

3c. Comments:

4. Complete if Making a Payment to In-lieu Fee Program

4a. Approval letter from in-lieu fee program is attached.	☒ Yes
4b. Stream mitigation requested:	133 linear feet
4c. If using stream mitigation, stream temperature:	☐ warm ☐ cool ☒ cold
4d. Buffer mitigation requested (DWQ only):	0 square feet
4e. Riparian wetland mitigation requested:	0 acres
4f. Non-riparian wetland mitigation requested:	0 acres
4g. Coastal (tidal) wetland mitigation requested:	0 acres

4h. Comments: The NCDOT does not propose mitigation for the 29 linear feet (<0.01ac) temporary impacts from bridge removal. These temporary impacts do not require fill in the stream bed and; therefore, under Section 404 of the Clean Water Act, do not constitute Loss of Waters of the U.S. and are not subject to compensatory mitigation.

5. Complete if Using a Permittee Responsible Mitigation Plan

5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan.

6. Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ

6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?	☐ Yes ☒ No

6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that requires mitigation. Calculate the amount of mitigation required.

Zone	6c. Reason for impact	6d. Total impact (square feet)	Multiplier	6e. Required mitigation (square feet)
Zone 1			3 (2 for Catawba)	
Zone 2			1.5	
	6f. **Total buffer mitigation required:**			

6g. If buffer mitigation is required, discuss what type of mitigation is proposed (e.g., payment to private mitigation bank, permittee responsible riparian buffer restoration, payment into an approved in-lieu fee fund).

6h. Comments:

E. Stormwater Management and Diffuse Flow Plan (required by DWQ)	
1. Diffuse Flow Plan	
1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?	☐ Yes ☒ No
1b. If yes, then is a diffuse flow plan included? If not, explain why. Comments: If required from 1a, see attached buffer permit drawings.	☐ Yes ☐ No
2. Stormwater Management Plan	
2a. What is the overall percent imperviousness of this project?	N/A
2b. Does this project require a Stormwater Management Plan?	☒ Yes ☐ No
2c. If this project DOES NOT require a Stormwater Management Plan, explain why:	
2d. If this project DOES require a Stormwater Management Plan, then provide a brief, narrative description of the plan: See attached permit drawings.	
2e. Who will be responsible for the review of the Stormwater Management Plan?	☐ Certified Local Government ☐ DWQ Stormwater Program ☒ DWQ 401 Unit
3. Certified Local Government Stormwater Review	
3a. In which local government's jurisdiction is this project?	not applicable
3b. Which of the following locally-implemented stormwater management programs apply (check all that apply):	☐ Phase II ☐ NSW ☐ USMP ☐ Water Supply Watershed ☐ Other:
3c. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
4. DWQ Stormwater Program Review	
4a. Which of the following state-implemented stormwater management programs apply (check all that apply):	☐ Coastal counties ☐ HQW ☐ ORW ☐ Session Law 2006-246 ☐ Other:
4b. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No N/A
5. DWQ 401 Unit Stormwater Review	
5a. Does the Stormwater Management Plan meet the appropriate requirements?	☐ Yes ☐ No N/A
5b. Have all of the 401 Unit submittal requirements been met?	☐ Yes ☐ No N/A

F. Supplementary Information		
1. Environmental Documentation (DWQ Requirement)		
1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?	☒ Yes	☐ No
1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)?	☒ Yes	☐ No
1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) Comments: Categorical Exclusion (CE) approved 4/23/12	☒ Yes	☐ No
2. Violations (DWQ Requirement)		
2a. Is the site in violation of DWQ Wetland Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 2B .0200)?	☐ Yes	☒ No
2b. Is this an after-the-fact permit application?	☐ Yes	☒ No
2c. If you answered "yes" to one or both of the above questions, provide an explanation of the violation(s):		
3. Cumulative Impacts (DWQ Requirement)		
3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality?	☐ Yes ☒ No	
3b. If you answered "yes" to the above, submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent DWQ policy. If you answered "no," provide a short narrative description. Due to the minimal transportation impact resulting from this bridge replacement, this project will neither influence nearby land uses nor stimulate growth. Therefore, a detailed indirect or cumulative effects study will not be necessary.		
4. Sewage Disposal (DWQ Requirement)		
4a. Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility. not applicable		

5. Endangered Species and Designated Critical Habitat (Corps Requirement)		
5a. Will this project occur in or near an area with federally protected species or habitat?	☒ Yes	☐ No
5b. Have you checked with the USFWS concerning Endangered Species Act impacts?	☐ Yes	☒ No
5c. If yes, ind icate the USFWS Field Office you have contacted.	☐ Raleigh ☐ Asheville	
5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat? Of the nine federally listed species for Ashe County, only one species, Virginia spiraea, has potential habitat located within the construction limits of this project, albeit very marginal due to the small size of the stream. The project area was surveyed by NCDOT biologists in 2009 and 2011 for Virginia spiraea, and no individuals of this species were found. This project will have no effect on any Federally Threatened or Endangered species listed for Ashe County.		
6. Essential Fish Habitat (Corps Requirement)		
6a. Will this project occur in or near an area designated as essential fish habitat?	☐ Yes	☒ No
6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat? NMFS County Index		
7. Historic or Prehistoric Cultural Resources (Corps Requirement)		
7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)?	☐ Yes	☒ No
7b. What data sources did you use to determine whether your site would impact historic or archeological resources? NEPA Documentation		
8. Flood Zone Designation (Corps Requirement)		
8a. Will this project occur in a FEMA-designated 100-year floodplain?	☒ Yes	☐ No
8b. If yes, explain how project meets FEMA requirements: NCDOT Hydraulics Unit coordination with FEMA		
8c. What source(s) did you use to make the floodplain determination? FEMA Maps		

Dr. Gregory J. Thorpe, Ph D Applicant/Agent's Printed Name	E. P. Lusk Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	5·28·13 Date

Ecosystem Enhancement PROGRAM

May 7, 2013

Mr. Gregory J. Thorpe, Ph.D.
Manager, Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

B-4705, Replace Bridge Number 69 over Little Helton Creek on SR 1376, Ashe County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream mitigation for the subject project. Based on the information supplied by you on May 6, 2013, the impacts are located in CU 05050001 of the New River basin in the Northern Mountains (NM) Eco-Region, and are as follows:

New 05050001 NM	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	133.0	0	0	0	0	0	0	0

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

This impact and associated mitigation need were under projected by the NCDOT in the 2013 impact data. EEP will commit to implement 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 N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program 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 EEP.

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

Sincerely,

James B. Stanfill

James B. Stanfill
EEP Asset Management Supervisor

cc: Mr. Monte Matthews, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, Division of Water Quality, Wetlands/401 Unit
File: B-705

March 2013

Bridge to Culvert Avoidance and Minimization Summary Checklist

Project B-4705 Ashe County

Proposed Structure Summary
Drainage Area- *4.9 Sq. Mi.*
DWQ Stream Classification- *C; Tr; ORW*
Culvert Size and Type- *3 @ 9' x 6' Reinforced Concrete Box Culvert*
Culvert Length- *42'*
Minimization Efforts- *The proposed culvert will be buried 1-foot. Two of the three barrels will have 1-foot sills and the third barrel will have an alternating 3-foot wide by 0.5 feet high low flow sill for fish passage. The culvert maintains the existing stream slope, low flow channel dimensions, low flow velocities and provides a smooth transition from upstream to downstream with no sharp bends at the inlet or outlet.*

Stream Slope

Existing average stream slope - *0.50%.*
Proposed culvert slope - *0.46%*

Fish and/or Aquatic life Passage

Existing low flow channel dimensions in the stream- *The existing low flow channel width up and downstream is approximately 3 feet with an average depth of 0.4 feet.*
Proposed low flow dimensions through the culvert-*The culvert will have alternating low flow sills to facilitate fish passage. The low flow sills will provide a 3-foot wide by 0.5-foot deep low flow channel in the culvert.*
Existing low flow velocities in the stream- *1.0 ft/sec*
Proposed low flow velocities through the culvert- *1.1 ft/sec*
Alternating low flow sills/baffles- *The culvert will have alternating low flow sills to facilitate fish passage since the proposed total culvert width is larger than the existing low flow channel width.*

Culvert Burial

Existing streambed material- *Silt, Gravel and Cobbles.*
Proposed culvert burial- *1-foot*
Proposed sills/baffles- *Alternating low flow sills will be used. The low flow sills will be spaced approximately 13 feet apart and will provide a 3-foot wide by 0.5-foot deep low flow channel in the culvert. The culvert slope of 0.46% does not necessitate the uses of baffles to hold bed material, but they are being used to provide a low flow channel through culvert.*

Culvert/Stream Alignment

Stream patterns upstream and downstream of the culvert that could affect fish passage and bank stability- *The culvert is being placed in a curve in the existing stream channel.*
Bed forms impacted by culvert (riffles, pools glides etc.)- *There is a pool immediately upstream of the culvert location that transitions into a riffle at the culvert's proposed location.*
Establishment of a low flow floodplain bench required- *A low flow floodplain bench is required and has been provided up and downstream of the culvert.*
Culvert alignment with stream- *The culvert provides a smooth transition from the upstream to the downstream with no sharp bends at the entrance or outlet.*
Stream realignment necessary- *The stream at the outlet has been slightly realigned to provide for a smoother transition.*
Sharp bends at entrance and outlet- *No*
Bank stabilization- *Class I riprap on banks for 45 feet downstream.*

Outlet Velocities

Natural stream channel 2yr velocity- *2.5 ft/sec*
Proposed Culvert 2yr outlet velocity- *3.9 ft/sec*
Natural stream channel 10yr velocity- *4.9 ft/sec*
Proposed Culvert 10yr outlet velocity- *5.8 ft/sec*

Roadway Geometric Considerations

Evaluate/describe roadway geometric constraints- *N/A*

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: B-4705 **County(ies):** Ashe

General Project Information

Project No.:	B-4705	**Project Type:**	New Location	**Date:**	2/27/2013
NCDOT Contact:	Marshall Clawson, PE	**Contractor / Designer:**	Henry Wells, PE		
Address:	1590 Mail Service Center Raleigh, NC 27699-1590	**Address:**	915 Jones Franklin Road Raleigh, NC 27606		
Phone:	919-707-6713	**Phone:**	919-859-2243		
Email:	mclawson@ncdot.gov	**Email:**	hwells@sungatedesign.com		
City/Town:	West Jefferson	**County(ies):**	Ashe		
River Basin(s):	New	**CAMA County?**	No		
Primary Receiving Water:	Little Helton Creek	**NCDWQ Stream Index No.:**	10-2-27-4-1		
NCDWQ Surface Water Classification for Primary Receiving Water	**Primary:**	Class C			
	Supplemental:	Trout Waters (Tr)	Outstanding Resource Waters (ORW)		
Other Stream Classification:					
303(d) Impairments:					
Buffer Rules in Effect					

Project Description

Project Length (lin. Miles or feet):	0.066 Miles	**Surrounding Land Use:**	Agriculture
	Proposed Project	**Existing Site**	
Project Built-Upon Area (ac.)	0.14 ac.	0.00 ac.	
Typical Cross Section Description:	2 - 9 foot travel lanes (paved) and 7 foot (with guardrail) shoulders with 2:1 fill slopes.	12 foot gravel road with 2:1 fill slopes.	
Average Daily Traffic (veh/hr/day):	Design/Future: 100	Existing: 50	

General Project Narrative:

The proposed project realigns SR 1376 (Joe Thomas Road) in order to eliminate a severe roadway curve located at the existing crossing. The proposed crossing will be a 3 @ 9'x6' RCBC with a low flow sill and baffles. Impacts have been limited to the Jurisdictional Stream by using 2:1 fill slopes. The existing bridge and a portion of the existing roadway embankment will be removed. The stormwater from the pravement sheet flows down the 2:1 grassed embankment. The Special Cut Ditch along the eastern side of the project primarily carries stormwater from off-site. Unable to obtain velocities less than 2 ft/sec and a back slope of 3:1 in the Special Cut Ditch due to steepness of terrain. A BMP was not considered at the outlet of the 18" CSP due to limited space and steepness of terrain.

References

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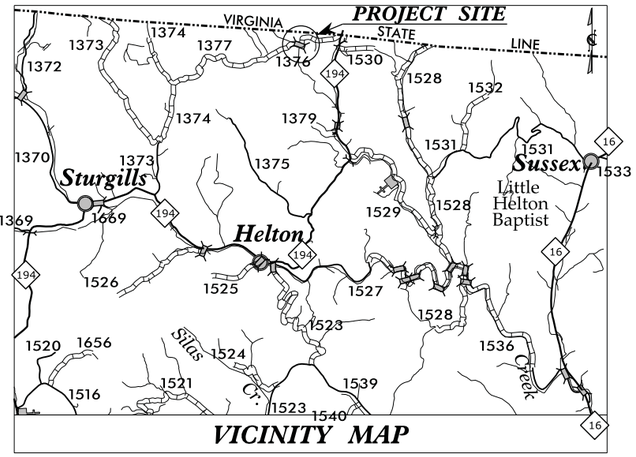
09/08/99

TIP PROJECT: B-4705

CONTRACT: C203295

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ASHE COUNTY

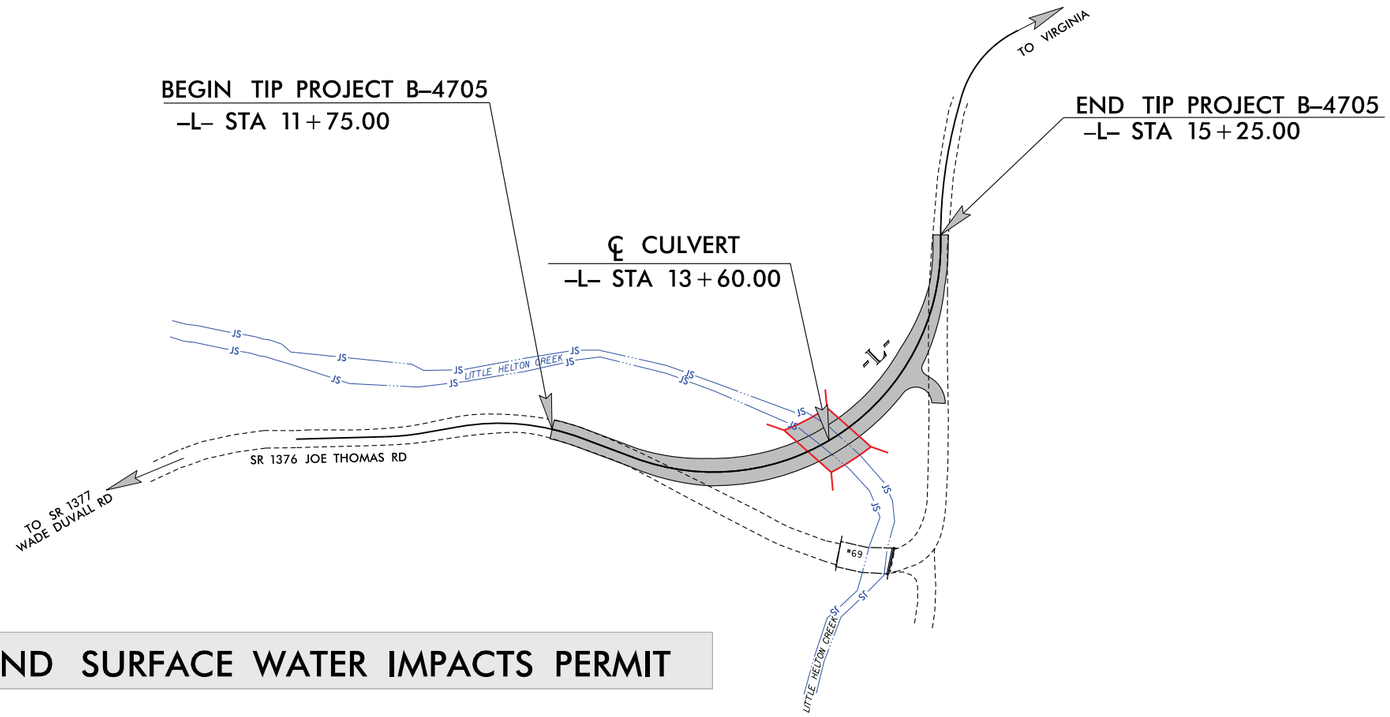
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4705	1	

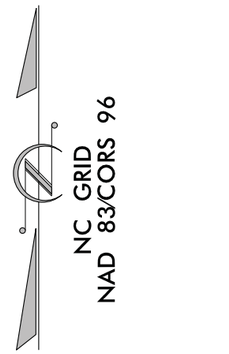
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38480.1.1	BRZ-1376 (2)	PE
38480.2.1	BRZ-1376 (2)	R/W, UTIL
38480.3.1	BRZ-1376(2)	CONST.

LOCATION: BRIDGE 69 OVER LITTLE HELTON CREEK ON SR 1376 (JOE THOMAS RD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND CULVERT

PERMIT DRAWING
SHEET 1 OF 7





WETLAND AND SURFACE WATER IMPACTS PERMIT

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARY

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

30 15 0 30 60
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2009 = 50
ADT 2035 = 100
DHV = 10 %
D = 60 %
T = 3 % *
V = 25 MPH
* TTST =1 DUAL 2
FUNC CLASS = LOCAL
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4705 = 0.061 MI
LENGTH OF STRUCTURE TIP PROJECT B-4705 = 0.005 MI
TOTAL LENGTH OF TIP PROJECT B-4705 = 0.066 MI

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 18, 2012

LETTING DATE:
JANUARY 21, 2014

JASON MOORE, PE
PROJECT ENGINEER

BRYAN KEY, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

3/11/2013
B4705_Hyd_prm_wet_psh_01.dgn
User: jharvey

PROJECT REFERENCE NO.	SHEET NO.
B-4705	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 2 OF 7

8/17/99

REVISIONS

DETAIL
(NOT TO SCALE)

MULTI-BARREL LOW FLOW CHANNEL, SILLS AND FLOOD PLAIN

*NOTES:

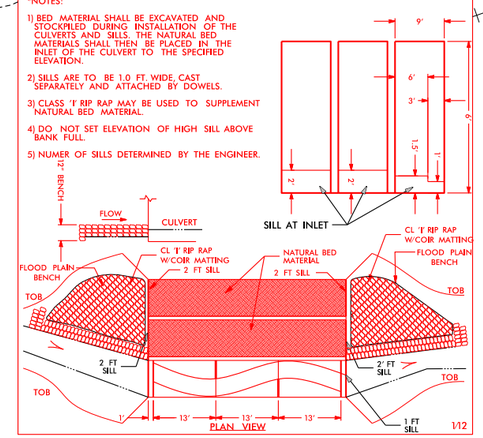
1) BED MATERIAL SHALL BE EXCAVATED AND STOCKPILED DURING INSTALLATION OF THE CULVERTS AND SILLS. THE NATURAL BED MATERIALS SHALL THEN BE PLACED IN THE INLET OF THE CULVERT TO THE SPECIFIED ELEVATION.

2) SILLS ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

3) CLASS 'I' RIP RAP MAY BE USED TO SUPPLEMENT NATURAL BED MATERIAL.

4) DO NOT SET ELEVATION OF HIGH SILL ABOVE BANK FULL.

5) NUMER OF SILLS DETERMINED BY THE ENGINEER.



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

RIP RAP

NAD 83

FLORENCE THOMAS
DB JJ PG 432

-L- POT Sta. 10+00.00
N 88° 27' 04.8" E

-L- PC Sta. 10+58.82

-L- PT Sta. 10+84.27
N 80° 07' 12.4" E

-L- PT Sta. 16+14.58

-L- PC Sta. 16+14.13
N 15° 06' 03.7" E
-L- PT Sta. 16+04.12

TIE TO EXISTING DITCH

-L- PC Sta. 15+22.26
N 0° 01' 45.2" W
-L- PT Sta. 15+16.54

TO SR 1378 SHIPPLEY'S BRANCH RD

FLOODPLAIN BENCH W/CL 'I' RIP RAP EST +/- 22 TONS W/ +/- 23 SY COIR MATTING

15+00

JS JS JS

PROJECT REFERENCE NO.	SHEET NO.
B-4705	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 3 OF 7

8/17/99

REVISIONS

DETAIL
(NOT TO SCALE)

MULTI-BARREL LOW FLOW CHANNEL, SILLS AND FLOOD PLAIN

*NOTES:

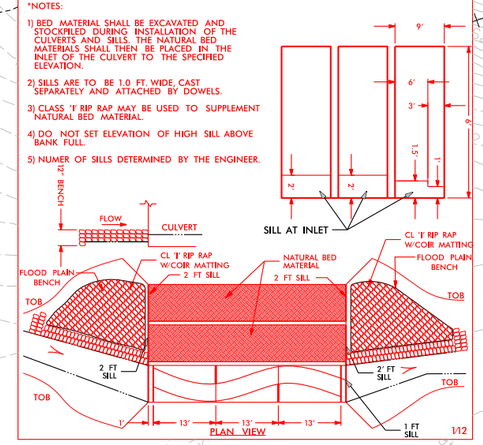
1) BED MATERIAL SHALL BE EXCAVATED AND STOCKPILED DURING INSTALLATION OF THE CULVERTS AND SILLS. THE NATURAL BED MATERIALS SHALL THEN BE PLACED IN THE INLET OF THE CULVERT TO THE SPECIFIED ELEVATION.

2) SILLS ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

3) CLASS 'I' RIP RAP MAY BE USED TO SUPPLEMENT NATURAL BED MATERIAL.

4) DO NOT SET ELEVATION OF HIGH SILL ABOVE BANK FULL.

5) NUMER OF SILLS DETERMINED BY THE ENGINEER.



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

RIP RAP

NAD 83

FLORENCE THOMAS
DB JJ PG 432

-L- POT Sta. 10+00.00
N 88° 27' 04.8" E

-L- PC Sta. 10+58.82

-L- PT Sta. 10+84.27
N 80° 07' 12.4" E

JS JS JS

PROJECT REFERENCE NO.	SHEET NO.
B-4705	04A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 4 OF 7

REVISIONS 8/17/99

FLOODPLAIN BENCH
W/CL 'I' RIP RAP
APPROX 22 TONS
W/23 SY COIR MATTING

2 FT SILL

1 FT SILL

3@9'x6' RCBC

SPEC CUT DITCH

FLOODPLAIN BENCH
W/CL 'I' RIP RAP
APPROX 37 TONS
W/60 SY COIR MATTING

CL 'I' RIP RAP
EST +/-45 TONS

ROAD EXCAVATION
FILL TO NATURAL GROUND
EST +/-40 CY

CL 'B' RIP RAP

STREAM BANK STABILIZATION
COIR FIBER MATTING
EST +/-24 SY
NOT TO GO BELOW WATER LINE

18" CSP

18" CMP

12' MTL GATE

8' MTL GATE

13' GRAVEL

JOE THOMAS SR.

#69

16.00' EXISTING R/W

5SBW

5SELEC

AT-1

SCALE: 1"= 25'

3/20/2013
B4705_std_prm_wet_psh_04B.dgn
User: harvey

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-4705	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 5 OF 7

BM 1
8" SPIKE IN 16" LOCUST TREE
94.29' RIGHT OF -L- STA 12+92.05
ELEV. 2748.03'

-L-

END GRADE
-L- STA. 15+25.00
ELEV. 2771.47

BEGIN GRADE
-L- STA. 11+75.00
ELEV. 2,754.75

PI = 13+23.04
EL = 2,741.05'
VC = 250'
K = 10
15 MPH

LOW POINT ON PROP.GRADE
-L- STA.12+93.18
ELEV.2,748.22

(+)15.062%

(-)9.254%

3@9'x6' RCBC

-L- STA.13+60.00+/-
PROPOSED CULVERT
INVERT ELEV.2740.50

2,790
2,780
2,770
2,760
2,750
2,740
2,730
10
11
12
13
14
15
16

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1300	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 2748.9	FT
BASE DISCHARGE	= 1800	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2750.2	FT
OVERTOPPING DISCHARGE	= <950	CFS
OVERTOPPING FREQUENCY	= <10	YRS
OVERTOPPING ELEVATION	= 2748.6	FT

SEE SHEET 4 FOR PLAN VIEW

-DRIVE-

BEGIN GRADE
-DRIVE- STA. 10+09.02
-L- STA.14+13.31
ELEV. 2755.76

END GRADE
-DRIVE- STA. 10+92.00
ELEV. 2751.03

PI = 10+34.00
EL = 2,756.26'
VC = 45'
N/A MPH

(+)2.001%

(-)9.017%

(-)4.76%

(-)9.40

BEG. SPEC. CUT
DITCH STA.10+25 RT
EL=2754.42

SPEC. CUT
DITCH STA.10+50 RT
EL=2753.23

END SPEC. CUT
DITCH STA.10+75 RT
EL=2750.88

2,760
2,750
2,740
2,730
2,720
10
11

SEE SHEET 4 FOR PLAN VIEW

3/4/2013
B4705_hyd_prm_wet_psh_05.dgn
User: jhevey

8/17/99

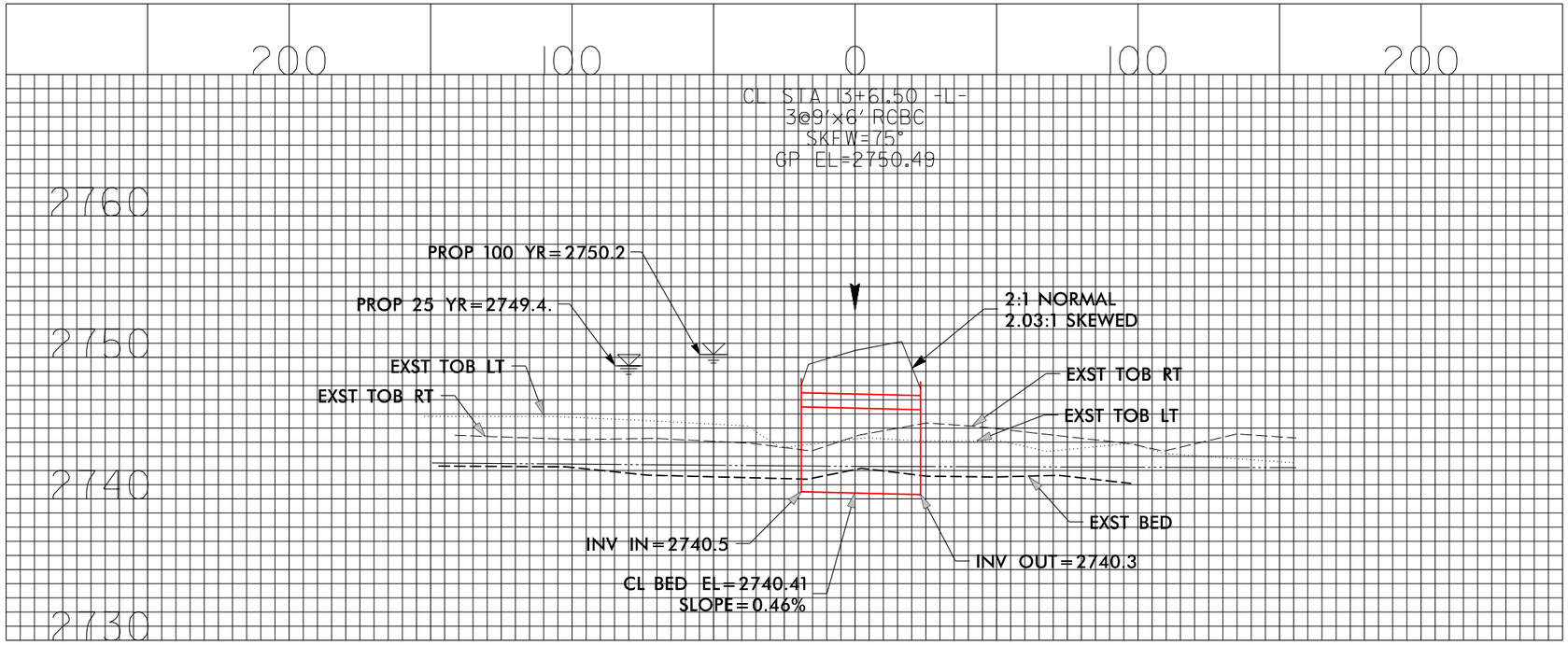
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4705	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 6 OF 7



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B4705_std_prm_wet_psh_sect.dgn

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	13+50 -L-	3 @ 9'x6' RCBC						0.03	0.00	133	29	
TOTALS:								0.03	0.00	133	29	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

ASHE COUNTY
WBS - 38480.1.1 (B-4705)

3/11/2013

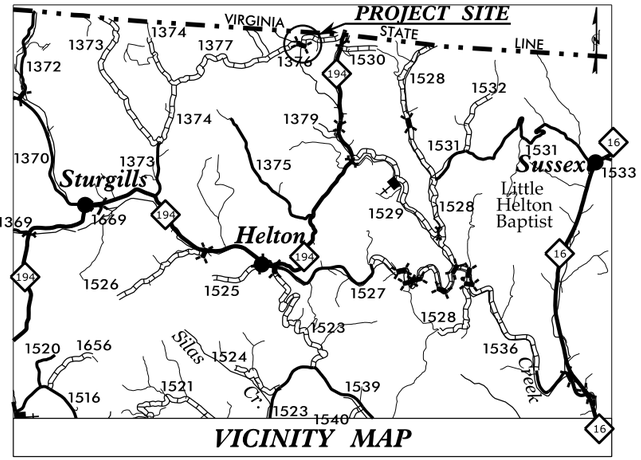
ATN Revised 3/31/05

09/08/99

TIP PROJECT: B-4705

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

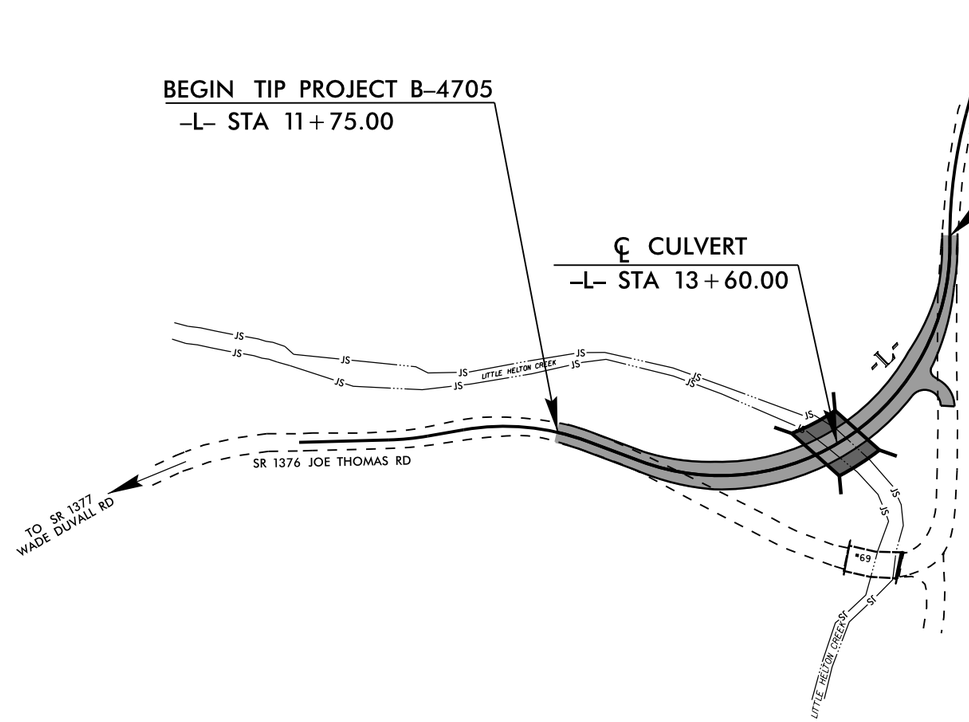
ASHE COUNTY

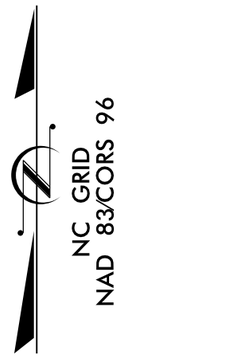
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4705	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38480.1.1	BRZ-1376 (2)	PE
38480.2.1	BRZ-1376 (2)	R/W, UTIL

LOCATION: REPLACE BRIDGE 69 OVER LITTLE HELTON CREEK ON SR 1376 (JOE THOMAS RD)

TYPE OF WORK: GRADING, PAVING, GUARDRAIL, DRAINAGE AND CULVERT





THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARY
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS 30 15 0 30 60
PROFILE (HORIZONTAL) 50 25 0 50 100
PROFILE (VERTICAL) 10 5 0 10 20

DESIGN DATA

ADT 2009 = 50
ADT 2035 = 100
DHV = 10 %
D = 60 %
T = 3 % *
V = 25 MPH
* TTST =1 DUAL 2
FUNC CLASS = LOCAL
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4705 = 0.061 MI
LENGTH OF STRUCTURE TIP PROJECT B-4705 = 0.005 MI
TOTAL LENGTH OF TIP PROJECT B-4705 = 0.066 MI

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: DECEMBER 18, 2012

LETTING DATE: JANUARY 21, 2014

JASON MOORE, PE
PROJECT ENGINEER

BRYAN KEY, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

14-DEC-2012 18:25
R:\Roadway\Proj\B4705_Rdy_tsh.dgn
$$$$USERNAME$$$$

04/16/11

PROJECT REFERENCE NO.	SHEET NO.
B-4705	1-B

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Known Soil Contamination: Area or Site
- Potential Soil Contamination: Area or Site

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — TH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — TH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

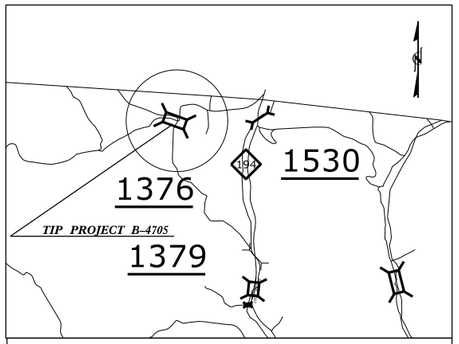
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4705	1-C
Location and Surveys	

SURVEY CONTROL SHEET B-4705



VICINITY MAP

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
BL3	BL-3	1037855.8534	1275732.0820	2764.02	OUTSIDE PROJECT LIMITS	
BL4	BL-4	1037874.7840	1275896.7968	2763.08	11+01.48	7.47 LT
BL5	BL-5	1037776.5095	1276210.1127	2749.41	13+67.15	102.79 RT
BL6	BL-6	1038117.7501	1276241.2571	2788.67	16+43.77	10.43 LT

BM#1 ELEVATION = 2748.03
N 1037745. E 1276091.
L STATION 12+92.00 94' RIGHT
8" SPIKE IN 16" LOCUST TREE

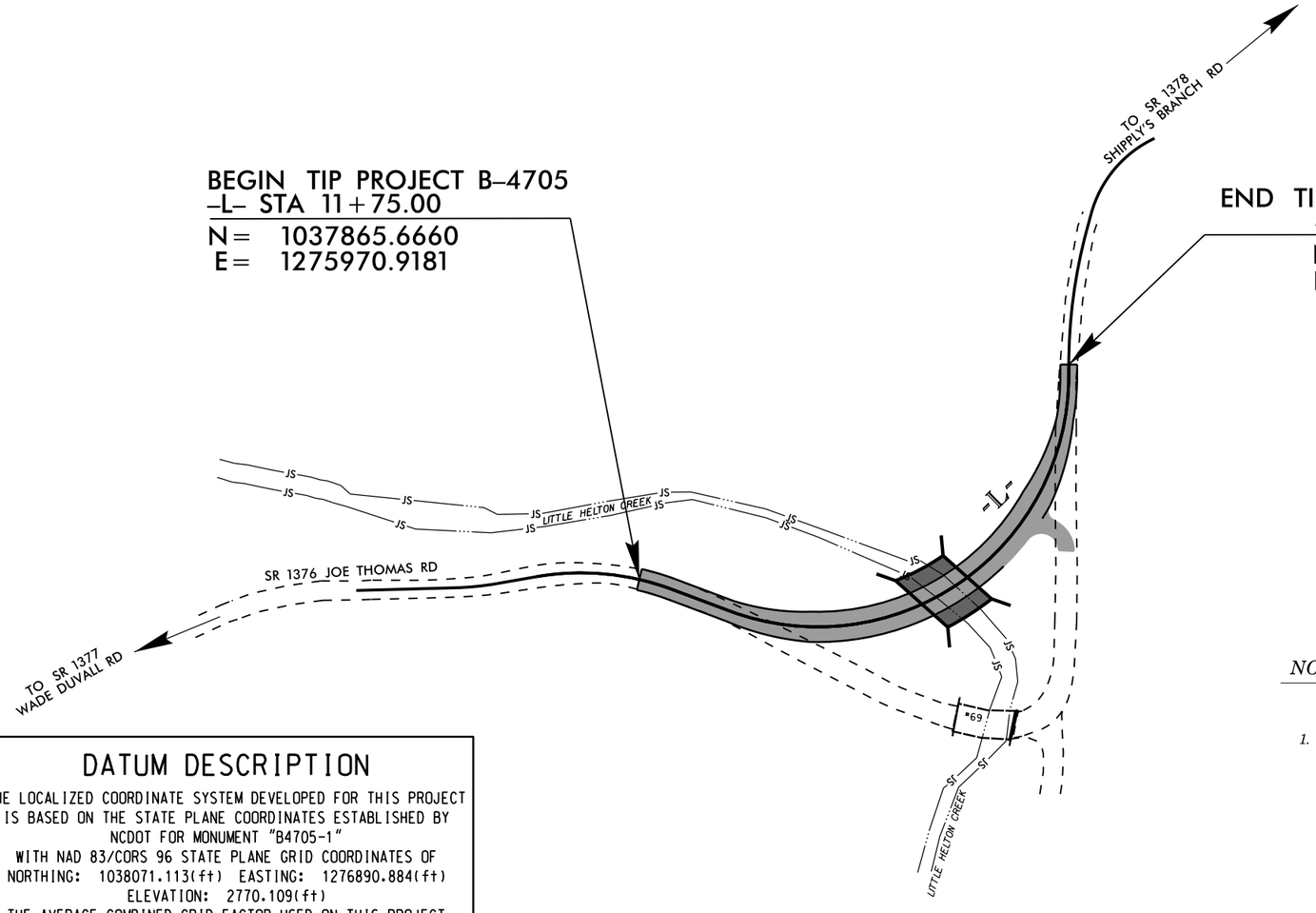
NC DOT GPS STATION B4705-2
LOCALIZED COORDINATES
N = 1039331.8680
E = 1276948.5790

NC GRID
NAD 83/CORS 96

BEGIN TIP PROJECT B-4705
-L- STA 11+75.00
N = 1037865.6660
E = 1275970.9181

END TIP PROJECT B-4705
-L- STA 15+25.00
N = 1037997.1335
E = 1276222.5606

NC DOT GPS STATION B4705-1
LOCALIZED COORDINATES
N = 1038071.1130
E = 1276890.8840



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4705-1"
WITH NAD 83/CORS 96 STATE PLANE GRID COORDINATES OF
NORTHING: 1038071.113(ft) EASTING: 1276890.884(ft)
ELEVATION: 2770.109(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.00001278
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4705-1" TO -L- STATION 11+75.00 IS S 77°24'40.5" W 942.63'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/*

   THE FILES TO BE FOUND ARE AS FOLLOWS: B4705_LS_CONTROL_120313.TXT

   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

◎ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

14-DEC-2012 18:25
R:\Roadway\PCs\B-4705_ls_lc.dgn
$$$$USERNAME$$$$

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4705	1-D
Location and Surveys	

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	11+75.00	-8.00	1037873.3984	1275972.9698
L	11+75.00	-25.00	1037889.8299	1275977.3294
L	11+75.00	8.00	1037857.9335	1275968.8665
L	11+75.00	25.00	1037841.5020	1275964.5068
L	12+27.12	25.00	1037824.6994	1276011.2059
L	12+86.00	30.66	1037808.0423	1276078.7645
L	13+10.00	-40.00	1037880.6662	1276093.8013
L	13+24.00	65.07	1037782.3678	1276133.5826
L	13+35.25	77.08	1037776.2836	1276153.1224
L	13+55.07	96.22	1037771.9143	1276189.4874
L	13+64.56	100.15	1037776.4036	1276205.0317
L	13+74.31	98.84	1037786.5227	1276217.7787
L	13+81.26	93.24	1037797.8593	1276223.5019
L	13+88.95	83.89	1037812.8729	1276226.9036
L	13+95.00	-40.00	1037908.9426	1276148.4184
L	14+00.93	67.86	1037836.8999	1276228.9302
L	14+46.56	25.00	1037909.9638	1276228.8929
L	15+16.54	25.00	1037988.6836	1276247.5527
L	15+25.00	25.00	1037996.9250	1276247.5597
L	15+25.00	-8.31	1037997.2027	1276214.2543
L	15+25.00	-25.00	1037997.3419	1276197.5614
L	15+25.00	7.72	1037997.0691	1276230.2841

L

TYPE	STATION	NORTH	EAST
POT	10+00.00	1037860.3449	1275797.0228
PC	10+58.82	1037861.9346	1275855.8204
PT	10+84.27	1037864.4660	1275881.1178
PC	11+08.07	1037868.5510	1275904.5726
PT	11+90.32	1037861.0138	1275985.5037
PC	12+27.12	1037848.1130	1276019.9697
PT	15+16.54	1037988.6709	1276222.5527
PC	15+22.26	1037994.3903	1276222.5498
PT	16+04.12	1038075.3103	1276233.2547
PC	16+14.13	1038084.9783	1276235.8636
PT	16+74.98	1038130.1336	1276273.7568

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4705-1" WITH NAD 83/CORS 96 STATE PLANE GRID COORDINATES OF NORTHING: 1038071.113(ft) EASTING: 1276890.884(ft) ELEVATION: 2770.109(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.00001278 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4705-1" TO -L- STATION 11+75.00 IS S 77°24'40.5" W 942.63' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:
B4705_LS_CONTROL_120313.TXT

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

◎ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

PRELIMINARY TABLES

14-DEC-2012 18:25
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$$$$USERNAME$$$$

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4705	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PAVEMENT SCHEDULE

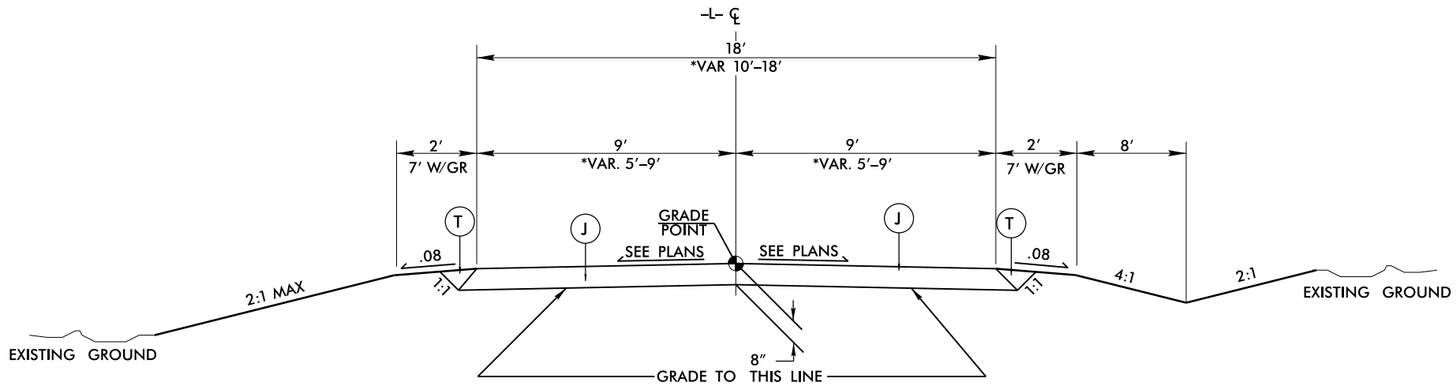
FINAL PAVEMENT DESIGN

J	PROP. 8" AGGREGATE BASE COURSE.
T	EARTH MATERIAL

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

USE TYPICAL SECTION NO. 1 AS FOLLOWS

* –L– STA. 11+75.00 TO STA. 12+77.12
–L– STA. 12+77.12 TO STA. 14+40.00
* –L– STA. 14+40.00 TO STA. 15+25.00



TYPICAL SECTION NO. 1

NOTE:
TRANSITION TO EXISTING DITCH BEGIN AND END
(SEE CROSS SECTIONS)

14-DEC-2012 18:25
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-4705	4

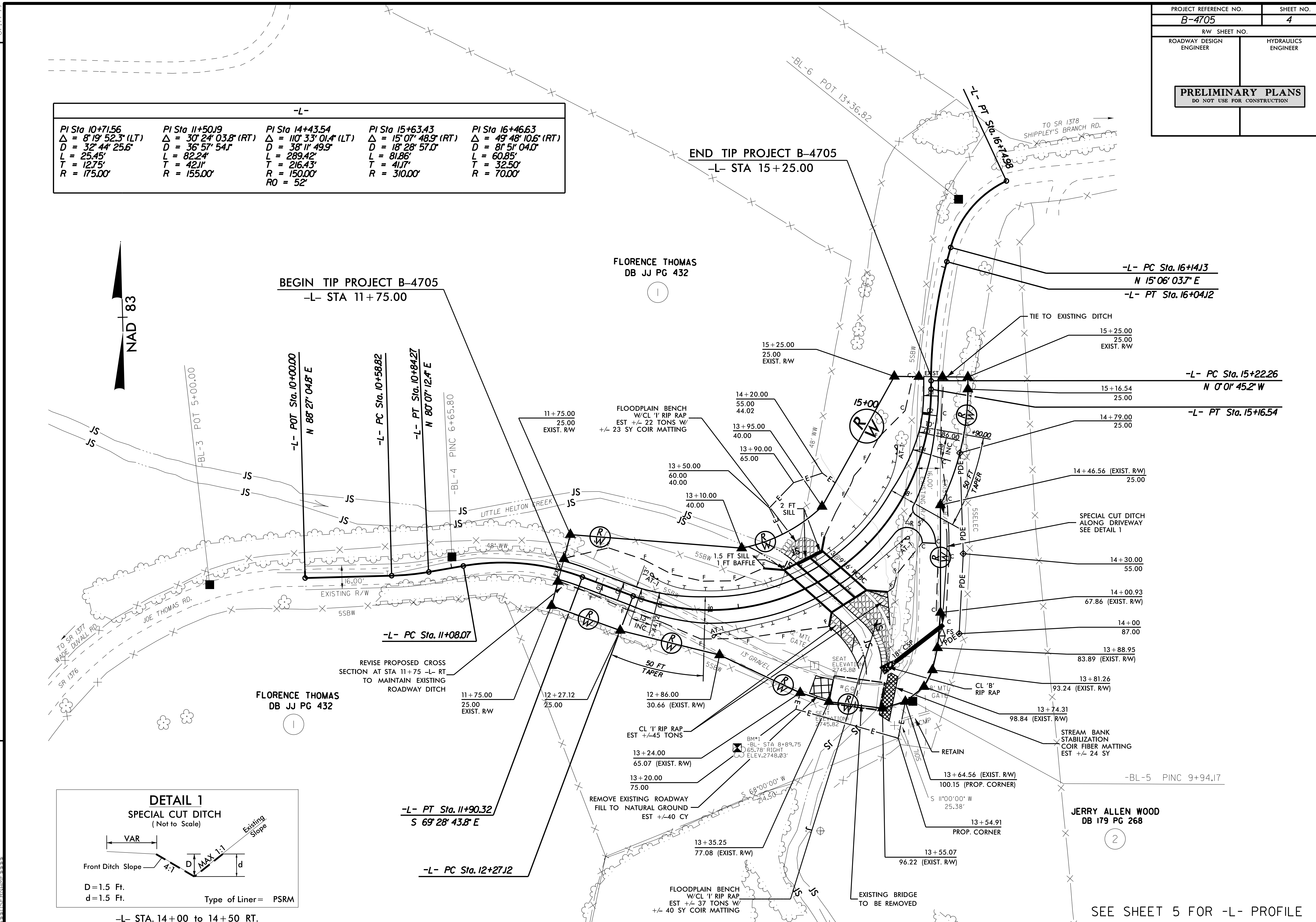
R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

PI Sta 10+71.56	PI Sta 11+50.19	PI Sta 14+43.54	PI Sta 15+63.43	PI Sta 16+46.63
Δ = 8°19' 52.3" (LT)	Δ = 30°24' 03.8" (RT)	Δ = 110°33' 01.4" (LT)	Δ = 15°07' 48.9" (RT)	Δ = 49°48' 10.6" (RT)
D = 32°44' 25.6"	D = 36°57' 54.1"	D = 38°11' 49.9"	D = 18°28' 57.0"	D = 81°51' 04.0"
L = 25.45'	L = 82.24'	L = 289.42'	L = 81.86'	L = 60.85'
T = 12.75'	T = 42.11'	T = 216.43'	T = 41.17'	T = 32.50'
R = 175.00'	R = 155.00'	R = 150.00'	R = 310.00'	R = 70.00'
		RO = 52'		



SEE SHEET 5 FOR -L- PROFILE

REVISIONS

8/17/99

14-DEC-2012 18:25

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-4705	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BM 1
8" SPIKE IN 16" LOCUST TREE
94.29' RIGHT OF –L– STA 12+92.05
ELEV. 2748.03'

–L–

BEGIN GRADE
–L– STA. 11+75.00
ELEV. 2,754.75

PI = 13+23.04
EL = 2,741.05'
VC = 250'
K = 10
15 MPH

END GRADE
–L– STA. 15+25.00
ELEV. 2771.47

LOW POINT ON PROP.GRADE
–L– STA.12+93.18
ELEV.2748.22

(+)5.0624%

(-)9.2543%

–L– STA.13+60.00+/–
PROPOSED CULVERT
INVERT ELEV.2740.50

2,790
2,780
2,770
2,760
2,750
2,740
2,730

10+00 11+00 12+00 13+00 14+00 15+00 16+00

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1300	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 2748.9	FT
BASE DISCHARGE	= 1800	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2750.2	FT
OVERTOPPING DISCHARGE	= >950	CFS
OVERTOPPING FREQUENCY	= 10+	YRS
OVERTOPPING ELEVATION	= 2748.6	FT

SEE SHEET 4 FOR PLAN VIEW

14-DEC-2012 18:25
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$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4705	X-1

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2800
2795
2790
2785
2780
2775
2770
2765
2760
2755
2750
2745
2740

2757.37

11+50.00

—L—

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

14-DEC-2012 18:26
R:\Roadway\XSC\B-4705_Rdy_xpl_L.dgn
$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4705	X-2

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2795 2790 2785 2780 2775 2770 2765 2760 2755 2750 2745 2740

0.020 0.010 2:1

2754.75

11+75.00

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R:\Roadway\XSC\B-4705_Rdy_xpl_L.dgn
$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4705	X-3

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2800
2795
2790
2785
2780
2775
2770
2765
2760
2755
2750
2745
2740

0.020 0.010 3.66:1

2752.49

2751.99

2:1

12+00.00

14-DEC-2012 18:26
R:\Roadway\XSC\B-4705_Rdy_xpl_L.dgn
$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4705	X-4

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2780 2775 2770 2765 2760 2755 2750 2745 2740 2790 2785

0.040 0.040

2:1 2:1

2748.61

12 + 50.00

0.025 0.025

2:1 2:1

2750.47

12 + 25.00

—4—

14-DEC-2012 18:26
R:\Roads\$\$\$\$USERNAME\$\$\$\$\B-4705_Rdy_xpl_L.dgn

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4705	X-5

2743.51
13+75.00

2743.18
13+50.00

2744.97
13+25.00

2745.89
13+00.00

2745.85
12+75.00

14-DEC-2012 18:26
R:\Roadway\SC\B-4705_Rdy_xpl_L.dgn
$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4705	X-6

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2780
2775
2770
2765
2760
2755
2750
2745
2740

0.040 0.040

2:1

2749.81

14+25.00

4:1

EXISTING (1:1)

2756.061

0.040 0.040

2:1

2:1

2745.83

14+00.00

4:1

EXISTING

2751.806

—4—

14-DEC-2012 18:26
R:\Roadway\XSC\B-4705_Rdy_xpl_L.dgn
$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4705	X-7

14+75.00

2765.16

0.038

0.038

3.17a:1

EXISTING (1.523:1)

2:1

2763.156

14+50.00

2761.91

0.040

0.040

4:1

EXISTING (1.358:1)

2:1

2758.811

14-DEC-2012 18:26
R:\Roadway\XSC\B-4705_Rdy_xpl_L.dgn
$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4705	X-8

0.000 0.000

2771.47

2771.446

15+25.00

0.019 0.019 2:1

2768.35

EXISTING (1.35:1)

2767.261

15+00.00

—4—

14-DEC-2012 18:26
R:\Roadway\SCL\B-4705_Rdy_xpl_L.dgn
$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4705	X-9

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

2795 2790 2785 2780 2775 2770 2765 2760 2755

2775.15

2774.433

15+50.00

14-DEC-2012 18:26
R:\Roadway\XSC\B-4705_Rdy_xpl_L.dgn
$$$$USERNAME$$$$