STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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July 22, 2004

U.S. Army Corps of Engineers
Regulatory Field Office
6508 Falls of the Neuse Road
Suite 120
Raleigh, NC 27615

ATTN: Mr. Eric Alsmeyer
NCDOT Coordinator

Dear Sir:

Subject: **Application for Individual Section 404 and 401 permits**
For NC 109 from north of I-85 Business to north of SR 1798 (Old Greensboro Road), Davidson County, North Carolina
NCDOT Division 9
Federal Aid Project No STP-109(1)
State Project Number 8.1600901
TIP Project R-2568B
$475.00 Debit work order 8.1600901, WBS Element 34634.1.2

The North Carolina Department of Transportation (NCDOT) proposes to relocate NC 109 from north of I-85 Business in Thomasville to north of SR 1798 (Old Greensboro Road), a distance of 3.51 miles. This section of existing NC 109 is located in the northeastern part of Davidson County. This Urban Principal Arterial is proposed to be a four-lane divided facility with partial access control, and will be constructed partially on new location. The typical section for the proposed facility includes a 46-foot grassed median. This application consists of the cover letter, 8 ½ x 11-inch permit drawings (drawings, impact summary sheets, property owners, and mailing labels), ENG form 4345, Stormwater Management Plan, 4C minutes for permit drawing interagency review, 4C agency comments and post-meeting activities, natural stream design document, SHPO historical architecture concurrence letter, SHPO archaeology concurrence letter, USFWS concurrence request letter, EEP mitigation request letters, USACE Routine Wetland Determination Data Sheets, NCDWQ Wetland Rating Worksheets, USACE Stream Quality Assessment Worksheets, and NCDWQ Stream Classification Forms, and half-size project plan sheets.

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1 SOUTH WILMINGTON STREET
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Purpose and Need

The primary purpose of the proposed project is to upgrade the existing NC 109 corridor from I-85 Business in Thomasville to SR 1798 (Old Greensboro Road). This section of NC 109 has some of the poorest geometric conditions of any section of NC 109 in Davidson County. The proposed project is consistent with the local area's transportation plans and provides needed improvements to an existing transportation corridor within Davidson County. The existing facility is a two lane roadway which is below the current safe design standards and is inadequate to handle the projected traffic volumes within the growing areas of Davidson County.

Several alternatives to improving the NC 109 corridor were considered and evaluated as part of the environmental study. These alternatives include the No Build Alternative, Transportation Management Alternative, and the Mass Transit Alternative. Two Build Alternatives were also considered; Alternative 1, upgrade existing NC 109, and Alternative 2, a combination of upgrading existing NC 109 and constructing a multi-lane highway on new location. Alternative 2 was chosen, since it best fit the purpose and need of the project. A discussion of each alternative considered by NCDOT is detailed in the November 1996 Environmental Assessment (EA).

Project Schedule

The proposed R-2568B project improvements are scheduled in conjunction with four other sections (R-2568A, R-2568C, R-2568D, and R-2568E) of entire R-2568 project. The entire R-2568 project will improve existing NC 109 from Thomasville to the I-40 / US 311 interchange near High Point. Section A of the project includes the NC 109/I-85 Business interchange and has already been constructed. The construction letting date for the R-2568B portion of this project is scheduled for November 2004. Table 1 gives the project limits and projected let dates for each section of the R-2568 project.

Table 1 – R-2568 Project Schedule

Section	Project Limits	Let Date
R-2568A	South of I-85 Business to South of SR 1800	Completed
R-2568B	South of SR 1800 to North of Ledford J.H.S.	November 2004
R-2568C	North of Ledford J.H.S. to South of SR 1755	Post 2010
R-2568D	South of SR 1755 to North of SR 1723	Post 2010
R-2568E	North of SR 1755 to North of Fiddlers Creek	Post 2010
R-2568F	North of Fiddlers Creek to I-40/US 311	Post 2010

Summary of Impacts

- 0.75 acres of impact to non-riverine wetland, including 0.62 acres of permanent fill, 0.03 acres of excavation, and 0.1 acres of mechanized clearing.
- 0.36 acres of permanent fill in streams
- 0.03 acres of temporary fill in streams
- Permanent stream impacts total 2,987 linear feet, of which 1,405 linear feet require mitigation.

- 182 linear feet of temporary channel impacts associated with pipe/culvert installation
- No impacts to ponds

Summary of Mitigation

The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the National Environmental Policy Act (NEPA) and design processes. Detailed descriptions of these actions are presented elsewhere in this application. Compensatory mitigation for the remaining impacts includes the following:

- 315 linear feet of on-site stream relocation using natural channel design techniques,
- 1,090 linear feet of stream will be mitigated through the use of the North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (EEP), and
- 0.75 acres of impacts to non-riverine wetlands will be mitigated through the use of EEP.

NEPA DOCUMENT STATUS

An EA was completed by the NCDOT in compliance with the NEPA. The document addressed both the R-2568A and R-2568B portions of the project, from I-85 Business in Thomasville to just north of SR 1798 (Old Greensboro Road), in Davidson County. The EA explains the purpose and need for the project, provides a description of the alternatives considered and characterizes the social, economic, and environmental effects. After the approval of the EA (November 1996) and Finding of no Significant Impact (FONSI) (August 1997), copies were provided to regulatory review agencies involved in the approval process. Additional copies will be provided upon request.

INDEPENDENT UTILITY

R-2568B is in compliance with 23 CFR Section 771.111(f) which lists the Federal Highway Administration (FHWA) characteristics of independent utility of a project:

> (1) The project connects logical termini and is of sufficient length to address environmental matters on a broad scope;
> (2) The project is usable and a reasonable expenditure, even if no additional transportation improvements are made in the area; and
> (3) The project does not restrict consideration of alternatives for other reasonable foreseeable transportation improvements.

RESOURCE STATUS

History and Identification of Jurisdictional Features

During the preliminary field investigations (1994 and 1995) in preparation for the Natural Resources Technical Report (submitted June 1996) and subsequent EA, stream crossings were identified and wetland determinations were performed by NCDOT biologists. Field work was conducted for the R-2568A and R-2568B portions of the project, and both Alternative 1 and Alternative 2 of the R-2568B section were assessed. Alternative 2 became the selected alternative subsequent to the approval of the EA in November 1996. In 2001, NCDOT biologists returned to the field to delineate jurisdictional features along Alternative 2. At this time, several previously unrecorded jurisdictional features were located. The features identified in 2001 were incorporated into project planning, and minimization and avoidance of these features became part of the design process for R-2568B. Table 2 shows the relationship between the jurisdictional features located during the initial field investigation in 1995 and 1995, and those sites impacted by the current project design, listed from south to north. Detailed descriptions of each impact site are located in the "Wetlands" and "Surface Waters" sections of this letter.

Table 2 – Relationship of R-2568B Jurisdictional Features to EA and Permit Drawings

Permit Drawing Site and Feature*	EA Stream Site Name	EA Wetland Site Name	Station Number	Comment
---	UT1	---	---	Associated with R-2568A
---	Hunts Fork Creek	---	---	Associated with R-2568A
---	UT2	Wetland 1, Wetland 2	Near 25+60 –L-	Avoided during design
1 (S)	---	---	29+50 to 30+20 –L-	Not presented in EA
2 (W,S)	---	---	33+55 to 33+80 –L-	Not presented in EA
2a (W)	---	---	37+20 –L-	Not presented in EA, avoided during design
3 (W)	---	---	40+40 to 40+60 –L-	Not presented in EA
3a (S)	---	---	43+70 to 44+60 –L-	Not presented in EA
---	UT3	---	---	Associated with Alternative1 (not chosen)
4 (S)	UT5	---	46+60 to 47+80 –L-	
5 (W)	---	---	50+60 to 51+00 –L-	Not presented in EA
6 (S)**	---	---	10+60 to 11+00 –Y10-	Not presented in EA
6 (S)**	---	---	55+60 to 56+00 –L-	Not presented in EA
7 (S)	---	---	56+70 –L-	Not presented in EA
8 (S)	Rich Fork Creek	Wetland 3	61+31.50 –L-	Wetland avoided during design
9 (W,S)	UT4	---	64+00 to 66+00 –L-	
10 (S)	---	---	75+50 to 76+50 –L-	Not presented in EA

* S = Stream, W = Wetland

** At Site 6, one stream will be impacted by the project in two seperate locations.

Three wetlands and seven streams were located within the study corridors for R-2568A and R-2568B during the preliminary field investigations. UT1 and Hunt's Fork Creek lie within the R-2568A study area. UT3 is located within the study area associated with R-568B Alternative 1. Therefore, four streams and three wetlands were located within the R-2568B, Alternative 2 corridor. During the 2001 field investigations, five additional streams and five additional wetlands were located. After completion of the project design, a total of nine streams and four wetlands will be impacted by the proposed project.

Delineations

Wetland delineations were conducted by NCDOT biologists on February 1, 2001 using the criteria specified in the 1987 Corps of Engineers Wetland Delineation Manual. Guidance on the jurisdictional status of questionable areas was provided by USACE representative Eric Alsmeyer of the USACE Raleigh Regulatory Field Office during an August 28, 2001 on-site visit. During this field meeting Mr. Alsmeyer verified the jurisdictional wetland delineations.

As part of the on-site field verification meeting on August 28, 2001, stream channel segments were also reviewed by the USACE to confirm intermittent, perennial, or ephemeral status and to determine if mitigation would be required and at what ratio it would be required. During a field meeting on July 9, 2004, Brian Wrenn of NCDWQ, agreed to defer all stream determination and mitigation calls to the USACE.

As previously mentioned, jurisdictional impacts include 0.75 acres of permanent impacts to non-riverine wetlands, 2,987 linear feet of impacts to streams, no temporary wetland impacts, and no permanent impacts to ponds. Detailed descriptions of impacted areas including the type of impact incurred, can be found in the following sections of this letter. Table 3 shows a summary of permanent impacts associated with the proposed R-2568B project.

Of the ten channel segments reviewed, only three unnamed tributaries to Rich Fork Creek require mitigation. The seven stream crossings that do not require mitigation either have a degraded quality or will incur only temporary impacts. Mitigation will be provided for all impacts to streams deemed mitigable. A discussion of permanent impacts to jurisdictional wetlands and streams follows Table 3.

Table 3 – Summary of Permanent Impacts for R-2568B					
Permit Drawing Site	**Station Number**	**Non-Riverine Wetland Impacts (acres)***	**Stream Impacts (linear feet)**	**Stream Impacts Requiring Mitigation & Mitigation Ratios (linear feet)**	**Natural Channel Design (linear feet)**
1	29+50 to 30+20 –L-	0	427	0	0
2	33+55 to 33+80 –L-	0.02	223	0	0
2a**	37+20 –L-	0	0	0	0
3	40+40 to 40+60 –L-	0.05	0	0	0
3a	43+70 to 44+60 –L-	0	437	437 / 1:1	0
4	46+60 to 47+80 –L-	0	617	617 / 2:1	315
5	50+60 to 51+00 –L-	0.15	0	0	0
6	10+60 to 11+00 –Y10-	0	121	0	0
6	55+60 to 56+00 –L-	0	269	0	0
7	56+70 –L-	0	273	0	0
8	61+31.50 –L-	0	98	0	0
9	64+00 to 66+00 –L-	0.13	141	0	0
10	75+50 to 76+50 –L-	0	351	351 / 1:1	0
Total		**0.75**	**2,987**	**1,405**	**315**

* Includes fill, excavation, and mechanized clearing.

** No impacts will be incurred at Site 2A, however this site has been included with the permit drawings to demonstrate avoidance.

Wetlands

Table 4 shows a list of proposed permanent impacts to verified jurisdictional wetland resources, which include impacts resulting from fill and mechanized clearing. The impacted wetland areas are described in Table 4 by the Cowardin *et al.* classification, NCDWQ Fourth Version of Guidance for Rating the Wetlands in North Carolina, riverine or non-riverine status, and the Schafale and Weakley description. The calculations and drawings by NCDOT Hydraulics Unit are presented in the attached permit drawings. A site by site description of each wetland follows.

Table 4 – Permanent Wetland Impacts and Descriptions							
Site	**Station**	**Type of Impact**	**Wetland Impacts (acres)***	**Cowardin *et al.* description**	**NCDWQ Wetland Rating**	**Riverine (R) or Non-riverine (NR)**	**Schafale and Weakley description**
2	33+55 to 33+80 –L-	Fill, 48" pipe	0.02	PFO1C	56	NR	M
2a**	37+20 –L-	None	0	---	---	NR	---
3	40+40 to 40+60 –L-	Fill, Mechanized clearing	0.05	PFO1C/W	44	NR	B
5	50+60 to 51+00 –L-	Fill, 30" pipe, Mechanized clearing	0.15	PFO1B	60	NR	M
9	64+00 to 66+00 –L-	Fill, 42" pipe, Mechanized clearing	0.53	PFO1C	65	NR	B
Total impacts			**0.75**				

* Indicates total wetland impacts, including fill, excavation and mechanized clearing

** No impacts will be incurred at Site 2A, however this site has been included with the permit drawings to demonstrate avoidance.

USACE Routine Wetland Determination forms and NCDWQ Wetland Rating Worksheets have been completed for all wetlands and copies of these data sheets are included with this application for reference. The Cowardin classification for the wetlands is noted as PFO1, with additional saturation levels found in the project area.

PFO1-Palustrine, forested, broad-leaved deciduous
- -B Saturated
- -C Seasonally flooded
- -W Intermittently flooded/Temporary

Terrestrial community descriptions for these wetland areas (see Table 1) somewhat differ from the Schafale and Weakley descriptions due to their altered conditions. The wetlands within the project study area can be described as the following:

Mesic Oak-Hickory Forest (M) – wetter areas where a mix of oaks and hickories are the dominant tree species

Bottomland Hardwood Forest (B) – broad floodplain forest community

Site 2 (Sheet 7-8 of 40): This non-riverine wetland is located along an intermittent unnamed tributary to Hunt's Fork Creek. The canopy of this wetland is dominated by red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), tulip poplar (*Liriodendron tulipifera*), and ironwood (*Carpinus caroliniana*). Other dominant species include

Japanese honeysuckle (*Lonicera japonica*) and greenbriar (*Smilax* sp.). Japanese grass (*Microstegium vimineum*) dominates the herbaceous layer. Hydrology is indicated by drainage patterns. The jurisdictional features at Site 2 were not presented in the EA. This wetland will be permanently impacted by a 48-inch pipe and roadway fill.

Site 2a (Sheet 9-10 of 40): This non-riverine wetland will not be impacted by the proposed project, but has been included to exhibit avoidance. It is located north of SR 1800 (Midway School Road). It is dominated by trees and shrubs: black willow (*Salix nigra*), red maple, and sweetgum. The herbaceous layer is dominated by sedges (*Carex* sp.), cattail (*Typha latifolia*), and rush (*Juncus* sp.). Hydrology is indicated by inundation and drainage patterns. The jurisdictional feature at Site 2a was not presented in the EA.

Site 3 (Sheet 11-12 of 40): This non-riverine wetland is located adjacent to a pond north of SR 1800 (Midway School Road). It is dominated by red maple, sweetgum, Japanese honeysuckle, and Japanese grass. Hydrology is indicated by inundation and drainage patterns. The jurisdictional feature at Site 3 was not presented in the EA. This wetland will be permanently impacted by roadway fill and mechanized clearing.

Site 5 (Sheet 22-23 of 40): This is a fairly linear non-riverine wetland located west of NC 109. It is dominated by trees such as red maple, sycamore (*Platanus occidentalis*), sweetgum, black cherry (*Prunus serotina*), box elder (*Acer negundo*), and black gum (*Nyssa sylvatica*). No midstory is present, and the herbaceous layer is a monoculture of Japanese grass. Hydrology is indicated by drainage patterns. The jurisdictional feature at Site 5 was not presented in the EA. This wetland will be permanently impacted by a 30-inch pipe, roadway fill and mechanized clearing.

Site 9 (Sheet 29-33 of 40): This non-riverine wetland is located adjacent to NC 109 along an unnamed tributary to Rich Fork Creek. The canopy is dominated by sycamore, tulip poplar, red maple, sweetgum, and ironwood. The shrub layer is dominated by elderberry (*Sambucus canadensis*) and box elder. The herbaceous layer is a monoculture of Japanese grass. Hydrologic indicators include drainage patterns, oxidized root channels in the upper 12 inches, and buttressed tree trunks. The jurisdictional feature at Site 9 was not presented in the EA. This wetland will be permanently impacted by a 42-inch pipe, roadway fill and mechanized clearing.

Surface Waters

The project crosses through the Yadkin-Pee Dee River Basin (HUC 03040103), within the Piedmont physiographic province. Surface waters crossed by the proposed project include Rich Fork Creek (Index Number 12-119-7), six unnamed tributaries to Rich Fork Creek, and two unnamed tributaries to Hunt's Fork Creek (12-119-7-3). The NCDWQ Best Usage Classification for both these creeks is C. Unnamed tributaries carry the same classification and index number as their receiving stream.

No NCDWQ Stream Classification Forms or USACE Stream Quality Assessment Worksheets were completed for the streams during the initial surveys; however these

forms were completed by H.W. Lochner, Inc. biologists during a subsequent site visit on June 4, 2004. Stream determinations made in 2004 agreed with those determinations made during the August 2001 field verification meeting. During a field inspection on July 9, 2004, Brian Wrenn of NCDWQ, agreed to defer to the USACE for all stream determination and mitigation calls associated with this project. Copies of the USACE Stream Quality Assessment Worksheets and NCDWQ Stream Classification Forms are included with this application for reference.

Table 5 gives the stream name and jurisdictional status, the structure size and type, the fill in surface waters, linear feet of stream impact, and the NCDWQ and USACE scores for the streams at each permanent impact site. The calculations and drawings by NCDOT Hydraulics Unit are presented in the attached permit drawings. A site by site description of each stream follows.

Table 5 – Permanent Stream Impacts and Descriptions

Site	Stream Name and Jurisdictional Status *	Structure Size and Type	Fill in Stream (acres)	Existing Channel Impacted (Linear feet)	NCDWQ Score	USACE Score
1	UT Hunt's Fork Creek (I)	48" pipe	0.03	427	22.5	48
2	UT Hunt's Fork Creek (I)	48" pipe	0.02	223	18.5	48
3a	UT Rich Fork Creek (P)	66" pipe	0.05	437	31.5	57
4	UT Rich Fork Creek (P)	11' x 8' RCBC	0.14	617	35.5	48
6	UT Rich Fork Creek (I)	24" pipe	0.01	121	21.5	39
6	UT Rich Fork Creek (I)	30" pipe	0.02	289	21.5	39
7	UT Rich Fork Creek (I)	24" pipe	0.01	273	25.5	34
8	Rich Fork Creek (P)	2 @ 85' x 54' P/S Concrete girder bridge	0.05	98	43	60
9	UT Rich Fork Creek (I)	42" pipe	0.01	141	18.5	20
10	UT Rich Fork Creek (I,P)	36" pipe	0.02	351	21.5 (I), 32.5 (P)	33
Total Impacts			**0.36**	**2,987**		

* UT = Unnamed Tributary, I = intermittent, P = perennial

Site1 (Sheet 5-6 of 40): This intermittent unnamed tributary to Hunt's Fork Creek is crossed by the project approximately one-half mile northeast of its confluence with

Hunt's Fork Creek. This stream has a wide, forested riparian buffer, and is slightly incised. The jurisdictional feature at Site 1 was not presented in the EA. It will be impacted by a 48-inch pipe and associated roadway fill, and no mitigation will be required for these impacts.

Site 2 (Sheet 7-8 of 40): This intermittent unnamed tributary to Hunt's Fork Creek is crossed by the project approximately one mile northeast of its confluence with Hunt's Fork Creek. This stream has a wide, forested riparian buffer, and has weak geomorphology. A wetland is also associated with the impacts at Site 2. The jurisdictional features at Site 2 were not presented in the EA. The stream will be impacted by a 48-inch pipe and associated roadway fill, and no mitigation will be required for these impacts.

Site 3a (Sheet 13-14 of 40): This perennial unnamed tributary to Rich Fork Creek is crossed by the project approximately one and a half miles southeast of its confluence with Rich Fork Creek. This stream suffers from poor water quality, probably as a result of the numerous septic systems upslope at the stream's headwaters. The channel is also scoured due to stormwater runoff. Household garbage and white goods litter the stream banks. The jurisdictional feature at Site 3a was not presented in the EA. It will be impacted by a 66-inch pipe and associated roadway fill, and mitigation for these impacts will be required at a 1:1 ratio.

Site 4 (Sheet 15-21 of 40): This perennial unnamed tributary to Rich Fork Creek is crossed by the project approximately one and a half miles southeast of its confluence with Rich Fork Creek. This stream receives the drainage from the UT crossed at Site 3a. During the June 4, 2004 site visit, this stream was carrying a large amount of suspended sediment, giving the water a milky appearance. The jurisdictional feature at Site 4 was presented in the EA as UT5. It will be impacted by a 11-foot wide by 8-foot high reinforced concrete box culvert and associated roadway fill, and mitigation for these impacts will be required at a 2:1 ratio.

Approximately 315 linear feet of this impacted channel is targeted for on-site relocation and restoration. The stream design/classification for this stream reach is based on fluvial geomorphic principles and techniques. Existing stream conditions include a substrate of mostly gravel and course sand with some bedrock exposed at various locations; a bankful width of 11.1 feet; a mean depth of 1.6 feet; a cross-sectional area of 5.5 square feet, and a sinuosity of 1.2. The restored channel will be designed for stable pattern, dimension, and profile. More detailed descriptions of existing conditions and the proposed reach can be found on Sheets 19 through 21 of the attached permit drawings. Further detailed information on the existing stream, reference reach, and restoration techniques used can be found in the attached "Natural Stream Design" document.

Site 6 (Sheet 24-25 of 40): Site 6 consists of two crossings of the same intermittent unnamed tributary to Rich Fork Creek. This pair of crossings lies approximately 1,800 feet south of its confluence with Rich Fork Creek. This unnamed tributary shows some

incision and bank failures, but is stable overall. The jurisdictional feature at Site 6 was not presented in the EA. It will be impacted by 30-inch and 24-inch pipes and associated roadway fill, and no mitigation will be required for these impacts.

Site 7 (Sheet 24-25 of 40): This intermittent unnamed tributary to Rich Fork Creek is crossed by the project approximately 1,600 feet south of its confluence with Rich Fork Creek. This tributary receives stormwater from NC 109, and its watershed is composed of primarily residential land use. Consequently, this stream has a large amount of sediment in its bed. The jurisdictional feature at Site 7 was not presented in the EA. It will be impacted by a 24-inch pipe and associated roadway fill, and no mitigation will be required for these impacts.

Site 8 (Sheet 26-28 of 40): Rich Fork Creek is the perennial stream crossed by the project at Site 8. During the June 4, 2004 site visit, this stream was carrying a large amount of suspended sediment, giving the water a milky appearance. The stream channel is 30 to 45 feet in width, and the channel has been straightened in the past. This jurisdictional feature was presented in the EA using the same name (Rich Fork Creek).

The existing 103-foot long bridge on NC 109 over this stream will be removed and replaced with a new two-span bridge 170 feet in length. The bridge will span the water, as the middle pier will be right along the existing bank. A rock causeway will be used to construct the pier due to its close proximity to the water. Temporary channel impacts will be incurred as a result of the temporary rock causeway. A naturally-formed scour hole is present adjacent to the stream channel, and under the existing bridge. This surface water will be permanently filled during construction of the new bridge. No mitigation will be required for the impacts at this site.

Site 9 (Sheet 29-33 of 40): This intermittent unnamed tributary to Rich Fork Creek is crossed by the project approximately 500 feet north of its confluence with Rich Fork Creek. This stream receives a large amount of stormwater runoff from NC 109, and has an incised channel. A wetland is also associated with this impact site. The jurisdictional features at Site 9 were not presented in the EA. This stream will be impacted by 42-inch pipe and associated roadway fill, and no mitigation will be required for these impacts.

Approximately 315 linear feet of this stream channel will be relocated from Station 64+20 to 64+80 left of –L-, which will include both an ephemeral an intermittent portion of the stream. Although natural channel design techniques have been used in the design, the relocated portion of this stream will not be claimed as on-site mitigation. Sheet 31 of 40 depicts the natural channel design details.

Site 10 (Sheet 34-35 of 40): This unnamed tributary to Rich Fork Creek changes from an intermittent to a perennial stream at the culvert near Station 76+10. This stream receives stormwater runoff from NC 109 and SR 1756 (Lexington Avenue). The stream channel is scoured an incised. The intermittent portion of the stream has been straightened, while the perennial portion is fairly sinuous. The jurisdictional feature at Site 9 was presented

in the EA as UT4. It will be impacted by a 36-inch pipe and associated roadway fill, and mitigation for these impacts will be required at a 1:1 ratio.

Temporary Impacts

There are no temporary wetland impacts or ponds; however temporary stream impacts will be necessary for construction of the box culvert at Site 4, pipe installations at Sites 1, 2, 3a, 6, 7, 9 and 10, and for construction of the bridge over Rich Fork Creek. Temporary impacts associated with this project include 182 linear feet of channel impacts, and 0.0.3 acres of temporary fill.

At Site 4 (Sheet 15-21 of 40) 82 linear feet of temporary impact will be necessary for the installation of the culvert. Temporary impact will also be necessary to tie the newly created stream channel into the existing stream channel near Station 48+00 –L-.

At Sites 1 (Sheet 5-6 of 40), 2 (Sheet 7-8 of 40), 9 (Sheet 29-33 of 40), and 10 (Sheet 34-35 of 40), 10 linear feet of temporary impacts will be necessary for pipe installation at each Site. At Sites 3a (Sheet 11-12 of 40), 6 (Sheet 24-25 of 40), and 7 (Sheet 24-25 of 40), 20 linear feet of temporary impacts will be necessary for pipe installation at each Site. These temporary impacts will allow for any temporary dewatering necessary for installation of the structures, or for any other temporary channel impacts associated with construction. Structure type and locations are listed in Table 5 on page 9 of this letter.

At Site 8 (Site 8, Sheet 26-28 of 40) temporary fill in Rich Fork Creek will result from the construction of a rock causeway, necessary for the construction of the new bridge. More information on temporary impacts associated with this bridge are given below in the proposed project's restoration, removal, and disposal plan for the bridge over Rich Fork Creek.

Restoration Plan: The temporary fill will consist of Class II riprap. No permanent fill in Rich Fork Creek will result from the subject activity. (Permanent fill will be used in a naturally-formed scour hole adjacent to the Rich Fork Creek stream channel.) Following construction of the causeway, the construction of the interior bent will be completed. After the bent is completed all material used in the construction of the temporary causeway will be removed. Reference elevations are available for the area of proposed construction of the temporary causeways. In addition, profiles and cross sections of the streambed have been measured with the data including measurements of the stream thalweg. The NCDOT will restore the stream to its pre-project contours and elevations. The temporary impact area associated with the causeway is expected to recover naturally, since the natural streambed and plant material will not be removed. The NCDOT does not propose any additional planting in this area. The fill will be placed and removed with earth moving equipment.

Removal and Disposal Plan: The contractor will be required to submit a reclamation plan for the removal and disposal of all materials off-site at an upland location. The contractor will use excavating equipment to remove the riprap used for the temporary causeways.

Heavy-duty trucks, bulldozers, cranes and various other pieces of mechanical equipment necessary for construction of roadways and bridges will be used on site. All material placed in the river will be removed from the river at that time. The contractor will have the option of reusing any of the riprap that the engineer deems suitable in the construction of the project. After the temporary causeway is no longer needed all material will become the property of the contractor.

FEDERALLY PROTECTED SPECIES

Plants and animals with a Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. At the time of completion of the EA (November 1996) only Schweinitz's sunflower (*Helianthus schweinitzii*) was listed by the U.S. Fish and Wildlife Service (USFWS) as a protected species in Davidson County, NC. However as of January 29, 2003, the USFWS lists three federally protected species for Davidson County. Table 5 lists these species and their federal status. A letter requesting concurrence with these biological conclusions was mailed to USFWS on June 30, 2004, and a copy of this letter is attached with this application package.

Table 5 – Federally Protected Species in Davidson County, NC

Common Name	Scientific Name	Federal Status*	Biological Conclusion
Bald eagle	*Haliaeetus leucocephalus*	T (proposed for delisting)	No Effect
Bog turtle	*Clemmys muhlenbergii*	T(S/A)	Not Required
Schweinitz's sunflower	*Helianthus schweinitzii*	E	May Affect-Not Likely to Adversely Effect

* E=Endangered, T=Threatened, T(S/A)=Threatened due to similarity of appearance

A memorandum dated June 7, 2002 from Lynn Smith of the NCDOT Natural Systems Unit, to Jay McInnis, P.E. of the NCDOT Project Development Unit, provided further information on these federally protected species (including a biological conclusion for the bald eagle) as an update to the previously submitted EA.

Bald eagle

There are no large bodies of water or large river systems with a clear flight path to water within a half mile of the proposed project. A review of the North Carolina Natural Heritage Program (NCNHP) database on May 5, 2002 indicated that there are no known occurrences of bald eagle within 1.0 mile of the project study area. Therefore, a biological conclusion of "No Effect" was rendered for this species in the June 7, 2002 memo.

Bog turtle

Any species that is listed by USFWS as "T(S/A)" is a species that is threatened due to similarity of appearance with other rare species and is listed for its protection. These species are not biologically endangered or threatened and are not subject to Section 7 consultation. Therefore, a biological conclusion for this species is not required and no biological conclusion was issued in the June 7, 2002 memo.

Schweinitz's sunflower

In the EA (November 1996), a biological conclusion of "No Effect" was issued for Schweinitz's sunflower. However, due to the date of the last survey and the presence of suitable habitat in the project area, this biological conclusion was no longer valid. As a result, new surveys were conducted for this species on June 8 and 9, 2004.

Although these surveys were conducted several months prior to the optimal survey window, Dale Suiter of the USFWS advised that the species could be correctly identified during this time of year. A known population of this species was visited (June 8, 2004) prior to the initiation of field surveys.

Although appropriate habitat is present within the project right-of-way limits in the form of regularly maintained roadside shoulders, field or pasture edges, and utility easements, no individuals of this species or of the *Helianthus* genus were observed during the surveys. A review of the North Carolina Natural Heritage Program occurrence records on May 27, 2004 revealed no records of this species within 1 mile of the proposed project. The nearest known population of Schweinitz's sunflower is located adjacent to NC 109 in Davidson County approximately 16 miles south of the proposed project. Therefore, a biological conclusion of "May Affect, Not Likely to Adversely Affect" has been issued for this federally protected species. As stated above, a letter requesting concurrence with these biological conclusions was mailed to USFWS on June 30, 2004, and a copy of this letter is attached with this application package.

CULTURAL RESOURCES

Archaeology

1. Archaeological Survey: A survey was conducted to locate existing archaeological resources in the vicinity of the project area and to determine if any of these sites were potentially affected by the project. No additional archaeological investigations for these sites will be required.
2. Properties Identified: During the course of these surveys, several potential archaeological sites were identified; however, none of these sites were determined to meet the criteria for inclusion in the National Register of Historic Places. The N.C. State Historic Preservation Office (SHPO) has concurred with these findings in a letter dated March 21, 1997. A copy of this letter is attached with this application package.

Historic Architecture

Based on architectural surveys, there are no historic properties within the project's area of potential effect (APE) that are listed on the National Register of Historic Places. One property, the John Williams-Hyatt Farm, is located in the APE and was determined by the SHPO to be eligible for the National Register Criterion C in a letter dated November 12, 1996. A copy of this letter is attached with this application package.

Further coordination with the SHPO indicated that the proposed project will have no effect on the property. There will be no right-of-way required from within the designated historic boundaries of the John Williams-Hyatt Farm.

WILD AND SCENIC RIVERS

Rich Fork Creek and Hunts Fork Creek (and their unnamed tributaries) are not listed as a federal or state wild and scenic river.

ESSENTIAL FISH HABITAT

Based on the location, scope, and nature of impacts expected from this project, impacts to Essential Fish Habitat are not anticipated.

303(d) LIST

Section 303(d) of the Clean Water Act (CWA) requires states to develop a list of waters not meeting water quality standards or which have impaired uses. Both Rich Fork Creek and Hunts Fork Creek appear on the April 2004 303(d) Impaired Waters List. Within the project area Rich Fork Creek (Site 8, Sheet 36-38) is listed as impaired for aquatic life due to low dissolved oxygen. This stream will be bridged by the proposed project, and both permanent and temporary impacts to the stream channel will be incurred. Six of the unnamed tributaries to Rich Fork Creek will be directly impacted by culverting (one tributary will be crossed twice).

Hunts Fork Creek, which is crossed by the R-2568A project, is listed as having overall impairment due to impaired biological integrity; the stressors not being identified. This stream will not be directly impacted by the R-2568B project; however two of its unnamed tributaries will be culverted.

UTILITY IMPACTS

No utility relocations will result in additional impacts to wetlands or streams. Utilities will cross aerially at Rich Fork Creek on the east side of the roadway near or between Station 60+80 and Station 61+80.

FEMA COMPLIANCE

Davidson County is currently participating in the National Flood Insurance Regular Program. Rich Fork Creek and Hunt's Fork Creek are included in the detailed flood study, having an established 100-year floodplain and floodway. The unnamed tributaries to these streams are in a designated flood hazard zone. The floodplain of Rich Fork Creek is rural and undeveloped. There are no buildings in the vicinity of the stream crossing with floor elevations below the 100-year floodplain. According to the NCDOT Hydraulics Unit engineers, the NCDOT has achieved compliance with the Federal Emergency Management Agency for this proposed project. None of the drainage accommodations for the bridge replacement at this crossing will have any significant adverse affect on the existing floodplain, nor the associated flood hazard.

INDIRECT AND CUMULATIVE EFFECTS ANALYSIS

The Indirect and Cumulative Effects report dated July 16, 2004 is attached. Conclusions indicate that the proposed project is anticipated to have minimal or no effect on water quality as a result of potential land use changes within the Growth Impact Study Area (GISA).

Potential indirect and cumulative impacts are as follows:

- Based on the analysis, TIP R-2568B is unlikely to stimulate land development having complementary functions and will not serve any explicit economic development purpose or a specific development.
- The change in accessibility and mobility as a result of TIP R-2568B will be minimal, except for those parcels that gain new road frontage.
- Over the next twenty years, population growth within Davidson County should continue at rates just above 1% annually, therefore keeping demand for developable land in the area low.
- A generally weak market for development within the GISA limits the potential for land use change as a result of TIP R-2568B.
- Within the GISA, the most likely area for commercial or residential growth as a result of TIP R-2568B is at the new intersection of NC 109 and Midway School Road.
- Other planned transportation projects, such as the continuation of TIP R-2568 sections C-G, along with TIP U-2537, will improve regional accessibility throughout the eastern portion of Davidson County and the western portion of High Point.

MITIGATION OPTIONS

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were

implemented during the design phase to include the examination of appropriate and practicable steps to reduce adverse impacts from the project.

Avoidance

All wetland areas not affected by the project will be protected from unnecessary encroachment.

1. No staging of construction equipment or storage of construction supplies will be allowed in wetlands or near surface waters.
2. Aquatic Life Movement: The project was designed to avoid disturbance to aquatic life movements.
3. Site 2A (Sheet 9-10 of 40): Project design has allowed for avoidance of the wetland at Station 37+00 right of –L-. A preformed scour hole was added at the end of the rip rapped ditch at Station 37+15 right of –L- to disperse concentrated flow from the ditch before it enters the wetland.
4. As shown in Table 2 on Page 4 of this letter, two streams (UT2 anUT3) and three wetlands (Wetland 1, Wetland 2, and Wetland 3) that were listed in the EA were avoided during subsequent project design.

Minimization

Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts. General minimization techniques implemented include the following:

- Slopes: Fill slopes in wetlands are at a 2:1 ratio.
- Ditching: It is the policy of NCDOT to eliminate lateral ditching in wetlands as much as possible, thus preserving the hydrology of adjacent wetlands. There are no ditches in wetlands on this project.
- Pipe Culvert Design: Pipe culvert and box culvert inverts are to be buried 20% of the pipe diameter, up to 1 foot deep. All pipe culverts and box culverts will maintain the normal stream flow and channel characteristics. The design will allow unimpeded passage by fish and other aquatic organisms.
- BMPs: In order to minimize potential adverse impacts to wetlands and streams in the project area, the NCDOT's Best Management Practices for the Protection of Surface Waters and Sedimentation Control Guidelines will be strictly enforced during construction of the project. This will include:
    - Grassed roadway ditches and shoulders as opposed to a curb and gutter roadway system. Rip-rapped ditches were used where warranted to control erosion.
    - Ditches were ended in flat floodplain areas where possible to allow dispersal and infiltration.
    - Preformed scour holes were used to attenuate and disperse flow.
    - No bridge deck drains will be used directly over the surface water.

Site specific minimization efforts that have been employed in the project area include:

- Site 2 (Sheet 7-8 of 40): Rip rap at the outlet of the 48-inch pipe was removed from the streambed and placed only on the channel banks. Fill slopes in wetlands are at a 2:1 ratio.
- Site 3 (Sheet 11-12 of 40): A rock check dam was used to attenuate flow in lieu of preformed scour hole due to steep topography. Fill slopes in wetlands are at a 2:1 ratio.
- Site 4 (Sheet 15-21 of 40): A preformed scour hole was added at the end of the rip rapped ditch at Station 46+80 right of –L- to disperse concentrated flow from the ditch before it enters the floodplain. A preformed scour hole was also added at the outlet of the 16-inch pipe upslope from the restored stream channel at Station 46+80 left of –L- to disperse concentrated flow from the pipe before it enters the stream. Clearing will be limited to 10 feet beyond the top of the cut on the stream relocation. A cross vane rock weir was added to the stream relocation for grade control.
- Site 5 (Sheet 22-23 of 40): A preformed scour hole was added at the end of the rip rapped ditch at Station 50+60 left of –L- to disperse concentrated flow from the ditch before it enters the wetland. In addition, two preformed scour holes were added at Station 51+20 right of –L- to disperse from the base of the fill slope before entering the wetland. Fill slopes in wetlands are at a 2:1 ratio.
- Site 8 (Sheet 26-28 of 40): A preformed scour hole was added at the end of the rip rapped ditches at Station 61+00 left and right of –L- to attenuate and disperse concentrated flow from the ditch before it enters the floodplain.
- Site 9 (Sheet 29-33 of 40): Fill slopes in wetlands are at a 2:1 ratio.

Conservative use of culverts and sensitive placement of drainage structures will minimize further degradation of water quality and reduce adverse impacts on aquatic habitat viability in streams and tributaries.

Compensation

The primary emphasis of the compensatory mitigation is to reestablish a condition similar to what would have existed if the project were not built. Mitigation is limited to reasonable expenditures and practicable considerations related to highway operation. Mitigation is generally accomplished through a combination of methods designed to replace wetland functions and values lost as a result of construction of the project. These methods consist of creation of new wetlands from uplands, borrow pits, and other non-wetland areas; restoration of wetlands; and enhancement of existing wetlands. Where such options may not be available, or when existing wetlands and wetland-surface water complexes are considered to be important resources worthy of preservation, consideration is given to preservation as at least one component of a compensatory mitigation proposal.

Based upon the agreements stipulated in the "Memorandum of Agreement Among the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U.S. Army Corps of Engineers, Wilmington

District" (MOA), it is understood that the North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (EEP) will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for NCDOT projects that are listed in Exhibit 1 of the subject MOA during the EEP transition period which ends June 30, 2005, or in the additional list of 16 projects to be let during 2004-2005. A request letter dated June 18, 2004 was sent to EEP. However, due to additional project design, which resulted in a reduction of impacts to jurisdictional streams, a revised letter, dated July 21, 2004, has also been sent to EEP. Copies of both letters are attached with the application package.

Since the subject project is listed in Exhibit 1, the necessary compensatory mitigation to offset unavoidable impacts to waters that are jurisdictional under the federal Clean Water Act will be provided by the EEP. The offsetting mitigation will derive from an inventory of assets already in existence within the same 8-digit cataloging unit. The Department has avoided and minimized impacts to jurisdictional resources to the greatest extent possible as described above. The remaining, unavoidable impacts to 0.75 acres of jurisdictional wetlands and to 1,090 linear feet of jurisdictional streams will be offset by compensatory mitigation provided by the EEP program.

Table 2 on page 4 of this letter provides a summary of permanent impacts associated with the R-2568B project. Compensatory mitigation for this project consists of the following:

Wetland Mitigation: Wetland impacts total 0.75 acres to non-riverine wetlands. Compensatory mitigation will be mitigated through the use of EEP for 0.75 acres of wetland impacts.

Stream Mitigation: Stream impacts total 2,987 linear feet of impacts to first- and second-order perennial and intermittent streams. The following combination of on-site relocation and compensatory mitigation is proposed:

1. Mitigation for 1,405 feet of stream impacts will only be required at Site 3a (Sheet 11-12 of 40), Site 4 (Sheet 15-21 of 40), and Site 10 (Sheet 34-35 of 40). Mitigation for 788 feet of impacts at Site 3a and 10 will be required at a 1:1 ratio, while mitigation for 617 feet of impacts at Site 4 will be required at a 2:1 ratio.
2. Natural channel design will create 315 linear feet of new stream channel at a 1:1 mitigation ratio. This on-site mitigation which includes the relocation of a portion of an unnamed tributary to Rich Fork Creek is located at Site 4, Station 47+60 to 47+96 –L-, and is depicted on Sheet 15 of 40. Sheets 18-20 of 40 depict the natural channel design details, and Sheet 21 of 40 shows the morphological measurement table.
3. Compensatory mitigation will be mitigated through the use of EEP for the remaining 1,090 linear feet of stream impacts.

REGULATORY APPROVALS

Application is hereby made for a Department of the Army Individual 404 Permit as required for the above-described activities. We are also hereby requesting a 401 Water Quality Certification from the Division of Water Quality. In compliance with Section 143-215.3D(e) of the NCAC, we will provide $475.00 to act as payment for processing the Section 401 permit application previously noted in this application (see Subject line). We are providing seven copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their review.

If you have any questions or need additional information please call Ms. Deanna Riffey, Environmental Specialist at (919) 715-1409.

Sincerely,

Gregory J. Thorpe, Ph.D.,
Environmental Management Director
Project Development and Environmental Analysis Branch

cc: w/attachment
Mr. John Hennessey, NCDWQ (7 copies)
Ms. Marla Chambers, NCWRC
Ms. Becky Fox, USEPA – Whittier, NC
Mr. Ronald Mikulak, USEPA – Atlanta, GA
Ms. Marella Buncick, USFWS
Mr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. S.P. Ivey, P.E., Division Engineer
Ms. Diane Hampton, P.E., DEO
Mr. Ron Hancock, P.E., State Bridge Construction Engineer
w/o attachment
Mr. Jay Bennet, P.E., Roadway Design
Mr. Omar Sultan, Programming and TIP
Ms. Art McMillan, P.E., Highway Design
Mr. Mark Staley, Roadside Environmental
PDEA Project Planning Engineer
Ms. Beth Harmon, EEP
Mr. David Franklin, USACE
Mr. William D. Gilmore, P.E., EEP

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT *(33 CFR 325)*	OMB APPROVAL NO. 0710-0003 Expires December 31, 2004

The Public burden for this collection of information is sestimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection , Research and Sanctuaries Act, 33 USC 1413, Section 103. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE *(an agent is not required)*
NCDOT-PD&EA	
6. APPLICANT'S ADDRESS 1548 Mail Service Center, Raleigh NC, 27699-1548	9. AGENT'S ADDRESS
7. APPLICANT'S PHONE NOS. W/AREA CODE	10. AGENT'S PHONE NOS. W/AREA CODE
a. Residence	a. Residence
b. Business 919-733-3141	b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE DATE

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE *(see instructions)*

NC 109, from north of I-85 Business to just north of SR 1798 (Old Greensboro Road)NCDOT TIP No. R-2568 B

13. NAME OF WATERBODY, IF KNOWN *(if applicable)*	14. PROJECT STREET ADDRESS *(if applicable)*

15. LOCATION OF PROJECT

Davidson	North Carolina
COUNTY	STATE

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN, *(see instructions)*

A four-lane divided facility with partial access control, predominantly on new location.

17. DIRECTIONS TO THE SITE

Exit I-85 Business and head north on NC 109. The southern terminus of the project is on the north side of Hunts Fork Creek.

18. Nature of Activity *(Description of project, include all features)*

Improve the NC 109 corridor from north of I-85 Business in Thomasville to SR 1798 (Old Greensboro Rd.) One new bridge, two stream relocations, several culverts installed over stream crossings, and some wetland fill.

19. Project Purpose *(Describe the reason or purpose of the project, see instructions)*

The purpose of the project is to upgrade the this section of the NC 109 corridor in order to improve safety and serve the future traffic demands required for the growing areas of Davidson County.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Roadway fill, pipe/culvert construction, bridge construction (temporary impacts only)

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

roadway fill associated with 8 new pipe culverts, 1 box culvert.

22. Surface Area in Acres of Wetlands or Other Waters Filled *(see instructions)*

0.75 acres of Wetland impacts; 2,987 lf of stream impacts (1,405 lf of impact to mitigable streams and 1,582 lf of impact to non-mitigable streams)

23. Is Any Portion of the Work Already Complete? Yes [ ] No [x] IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

See property owner list in permit drawings

25. List of Other Certifications or Approvals/Denials Received from other Federal, State or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

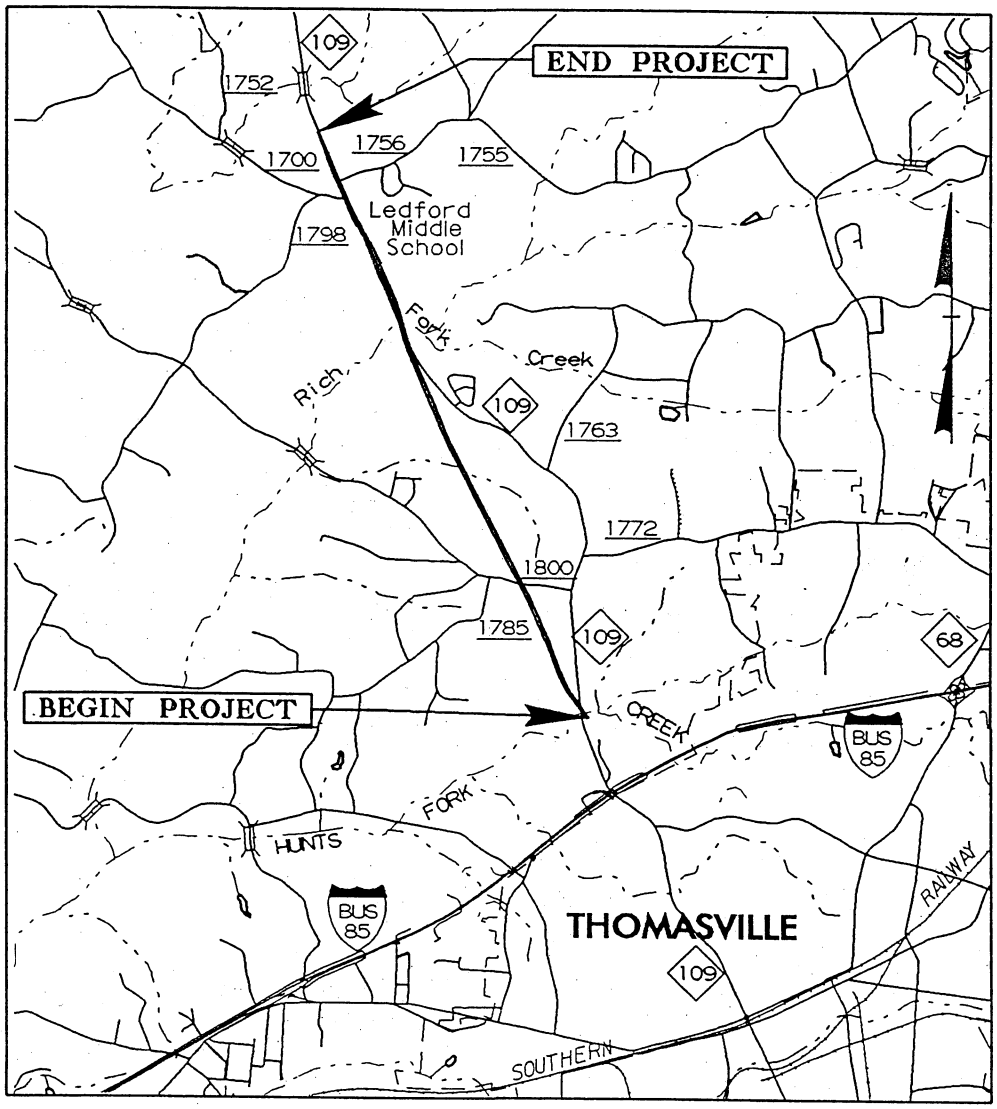
*Would include but is not restricted to zoning, building and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

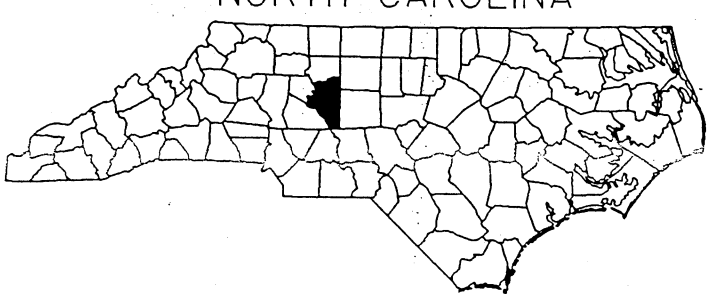
SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE
[signature]	7/22/09		

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.



VICINITY MAP



N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

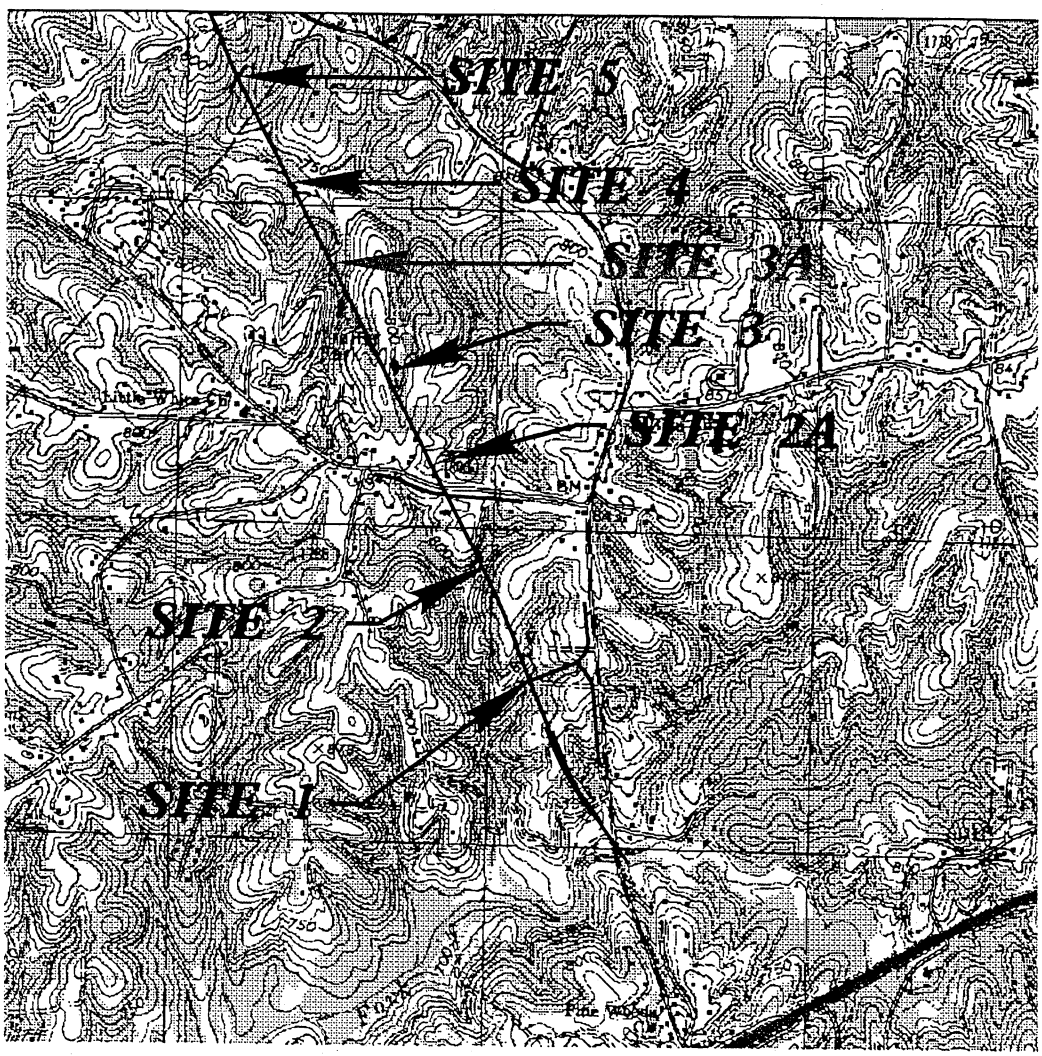
NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT #8.1600901 R-2568B

SHEET 1 OF 40

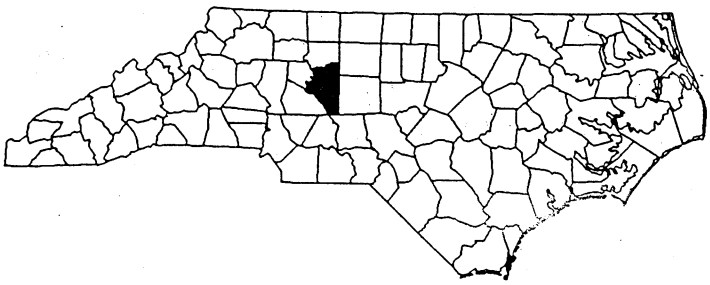
12/12/02

MATCHLINE



VICINITY MAP

(HIGH POINT WEST QUADRANGLE)



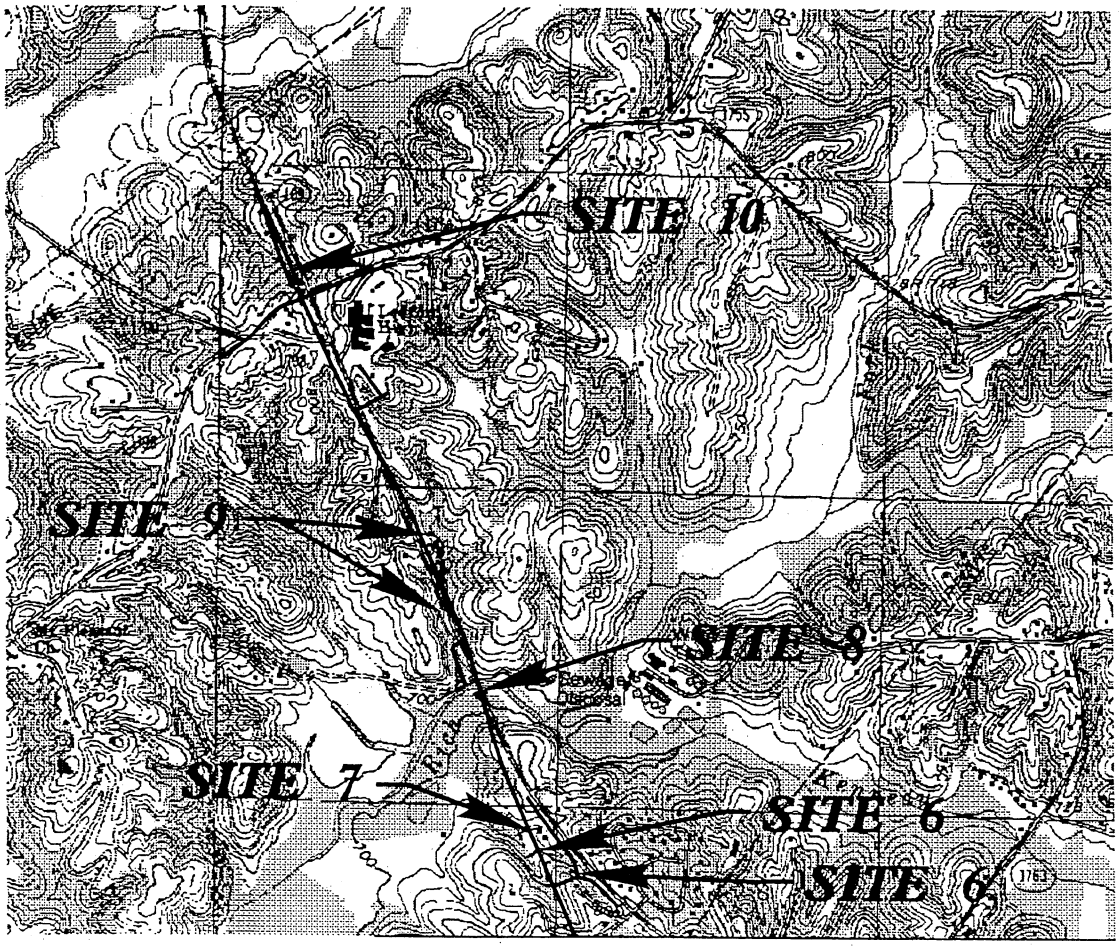
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

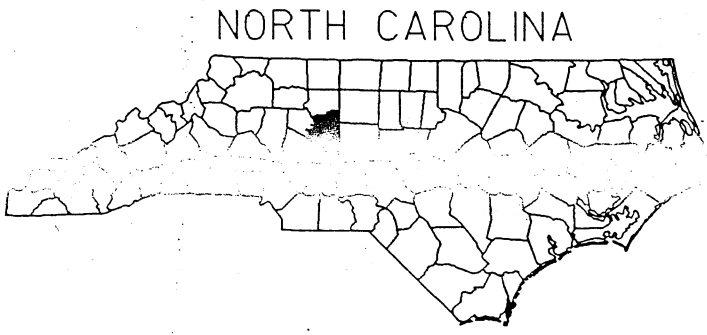
STATE PROJECT #8.1600901 R-2568B
SHEET 2 OF 40

060404



VICINITY MAP

MIDWAY AND HIGH POINT WEST QUADRANGLE



N.C.D.O.T.
DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NORTH OF SR1756
(LEXINGTON AVE.)
NORTH OF LEDFORD M.S.

STATE PROJECT #8.1600901 R-2568B
SHEET 3 OF 40

060404

WETLAND LEGEND

WLB — WETLAND BOUNDARY

WETLAND

DENOTES FILL IN WETLAND

DENOTES FILL IN SURFACE WATER

DENOTES FILL IN SURFACE WATER (POND)

DENOTES TEMPORARY FILL IN WETLAND

DENOTES EXCAVATION IN WETLAND

DENOTES TEMPORARY FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

FLOW DIRECTION

TB — TOP OF BANK

WE — EDGE OF WATER

C — PROP. LIMIT OF CUT

F — PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG — NATURAL GROUND

PL — PROPERTY LINE

TDE — TEMP. DRAINAGE EASEMENT

PDE — PERMANENT DRAINAGE EASEMENT

EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

EPB — EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

CORE FIBER ROLLS

DENOTES TEMPORARY SURFACE WATER IMPACTS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT
12"-48" PIPES
54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTNG STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 — ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE

LEVEL SPREADER (LS)

DITCH / GRASS SWALE

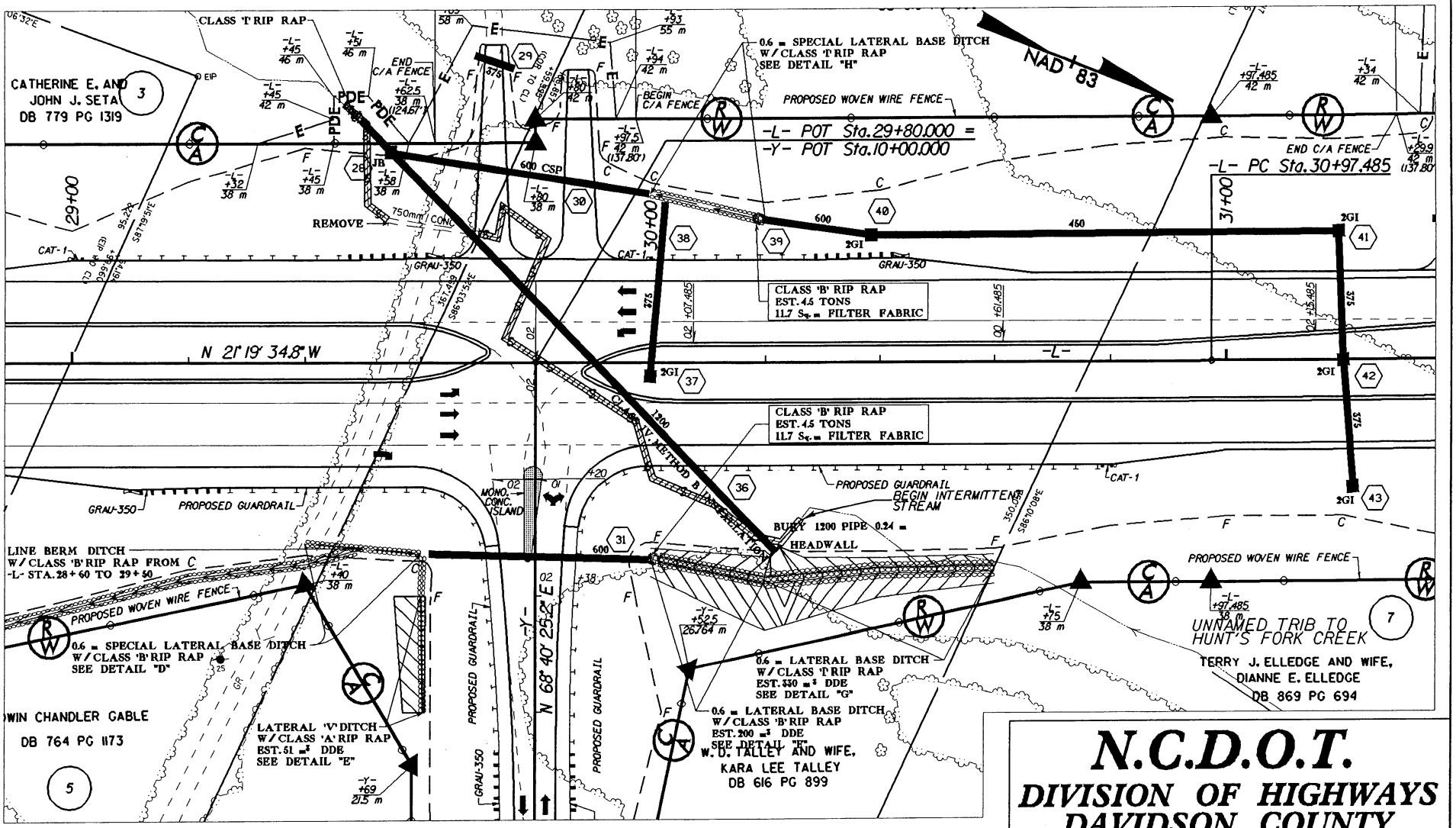
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT #8.1600901 R2568B
SHEET 4 OF 40

06/04/04



SITE 1

10m 0 20m SCALE

T T DENOTES TEMPORARY SURFACE WATER IMPACTS

S S DENOTES FILL IN SURFACE WATERS

N.C.D.O.T.

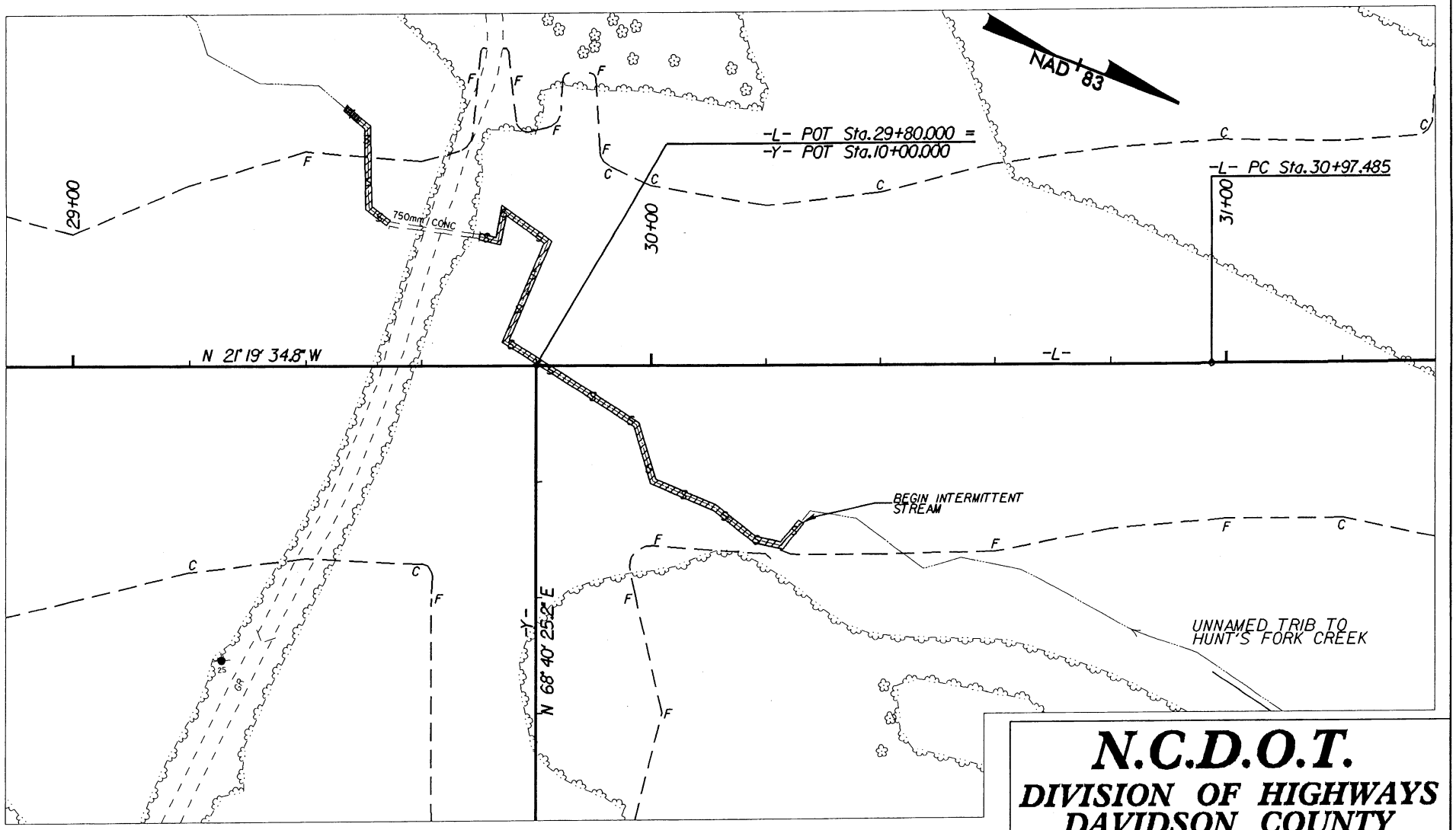
DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B

SHEET 5 OF 40

07/14/04



SITE 1 IMPACTS

10m 0 20m SCALE

F F DENOTES TEMPORARY SURFACE WATER IMPACTS

S S DENOTES FILL IN SURFACE WATERS

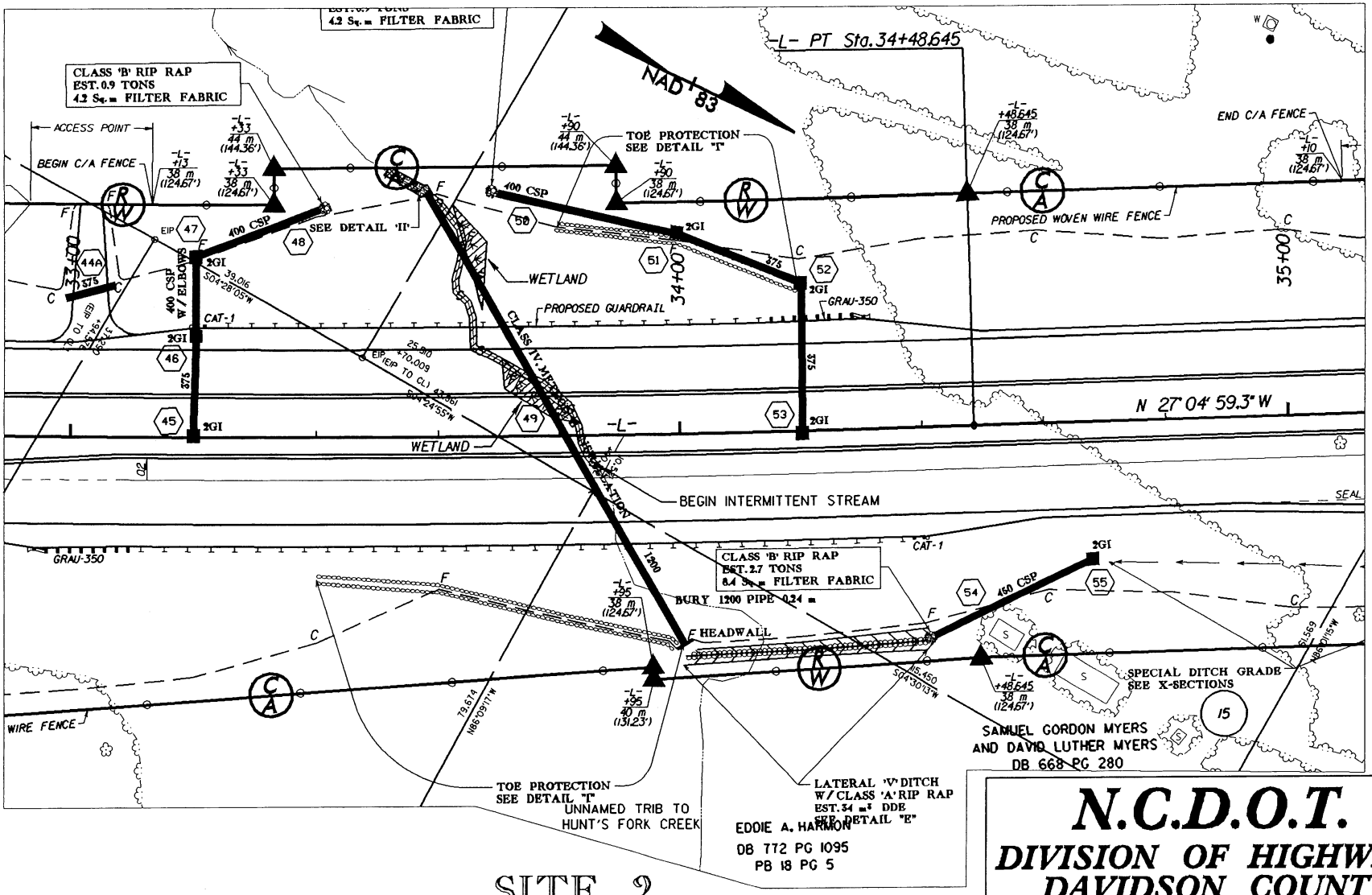
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 6 OF 40

07/14/04



SITE 2

DENOTES TEMPORARY SURFACE WATER IMPACTS

DENOTES FILL IN WETLANDS

DENOTES FILL IN SURFACE WATERS

10m 0 20m SCALE

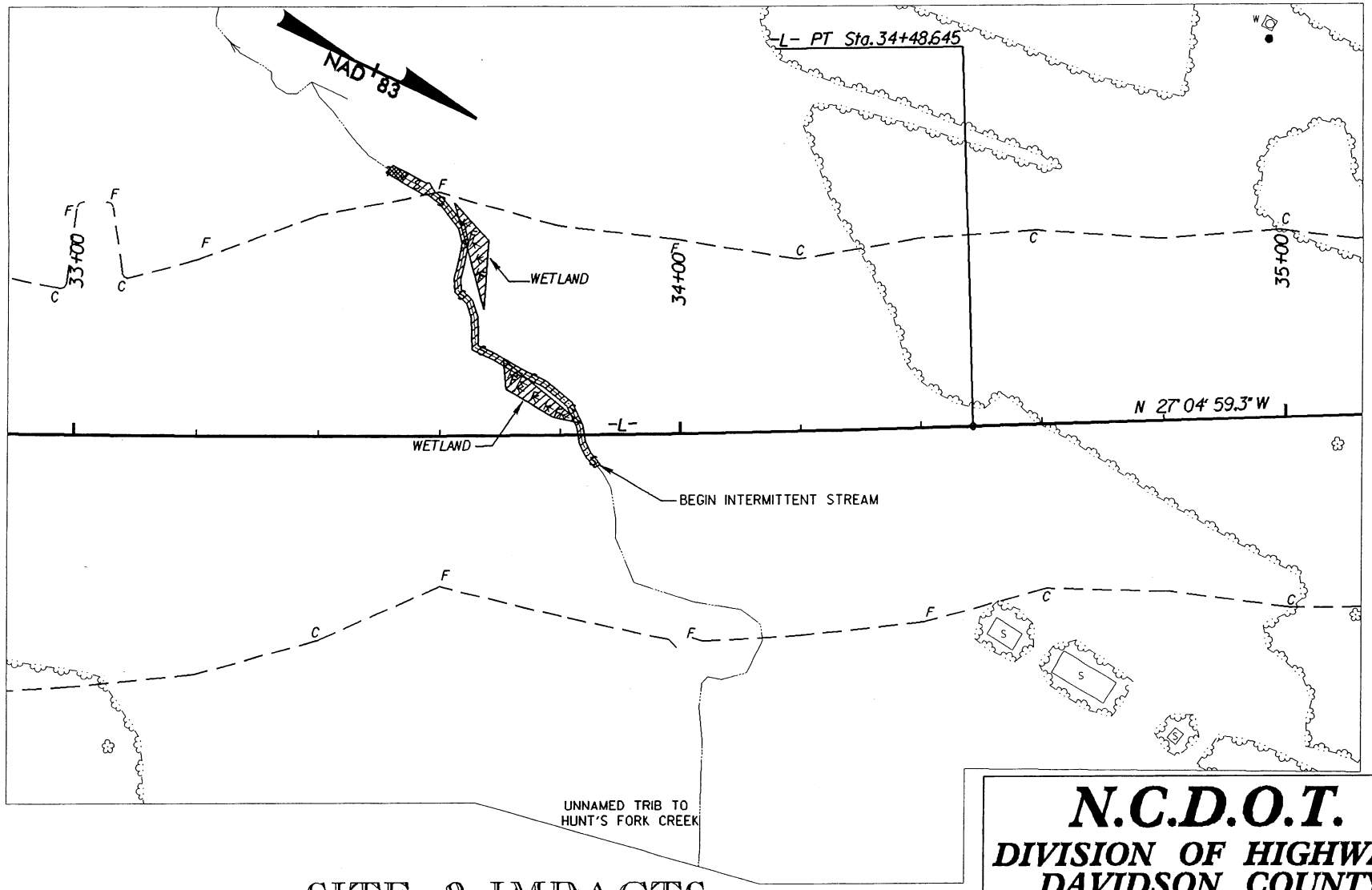
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 7 OF 40

07/14/04



SITE 2 IMPACTS

DENOTES TEMPORARY SURFACE WATER IMPACTS

DENOTES FILL IN WETLANDS

DENOTES FILL IN SURFACE WATERS

10m 0 20m

SCALE

N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 8 OF 40

07/14/04

2.5 0 2.5 5

METRIC

PROJECT REFERENCE NO.	SHEET
R-2568B	

SITE 2

WIDENED SHOULDER

0.02

248.260
4784.1 6:1

0.02

0.02

WIDENED SHOULDER

4:1

2:1

241.56

34+00.000

240.639

WIDENED SHOULDER

0.02

248.014
4784.1 6:1

0.02

0.02

WIDENED SHOULDER

2:1

2:1

wetland

239.414

33+80.000

WIDENED SHOULDER

0.02

247.775
4784.1 6:1

0.02

0.02

WIDENED SHOULDER

4:1

2:1

243.224

33+60.000

250
245
240

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kmgillespie
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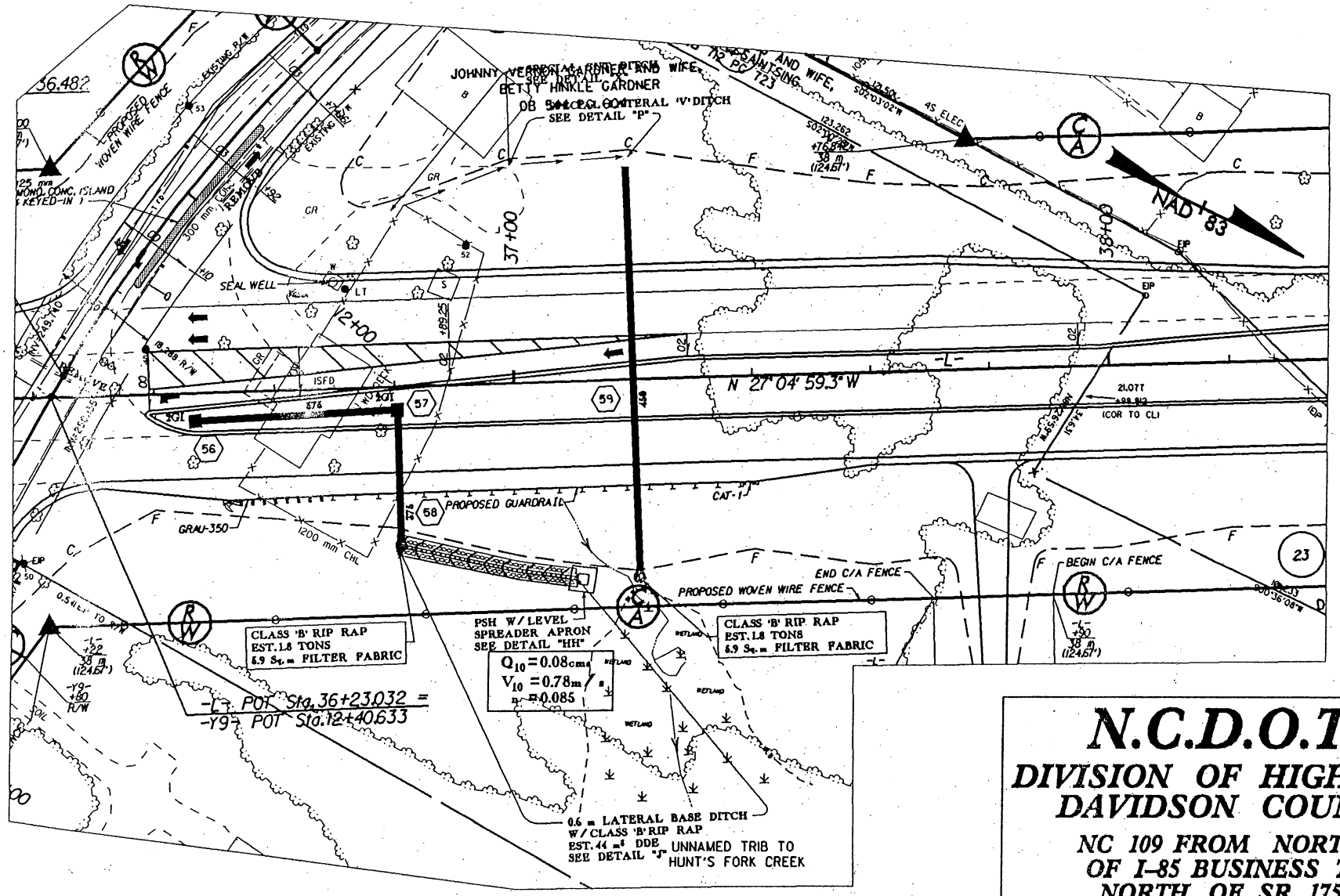
6/4/04



SITE 2A

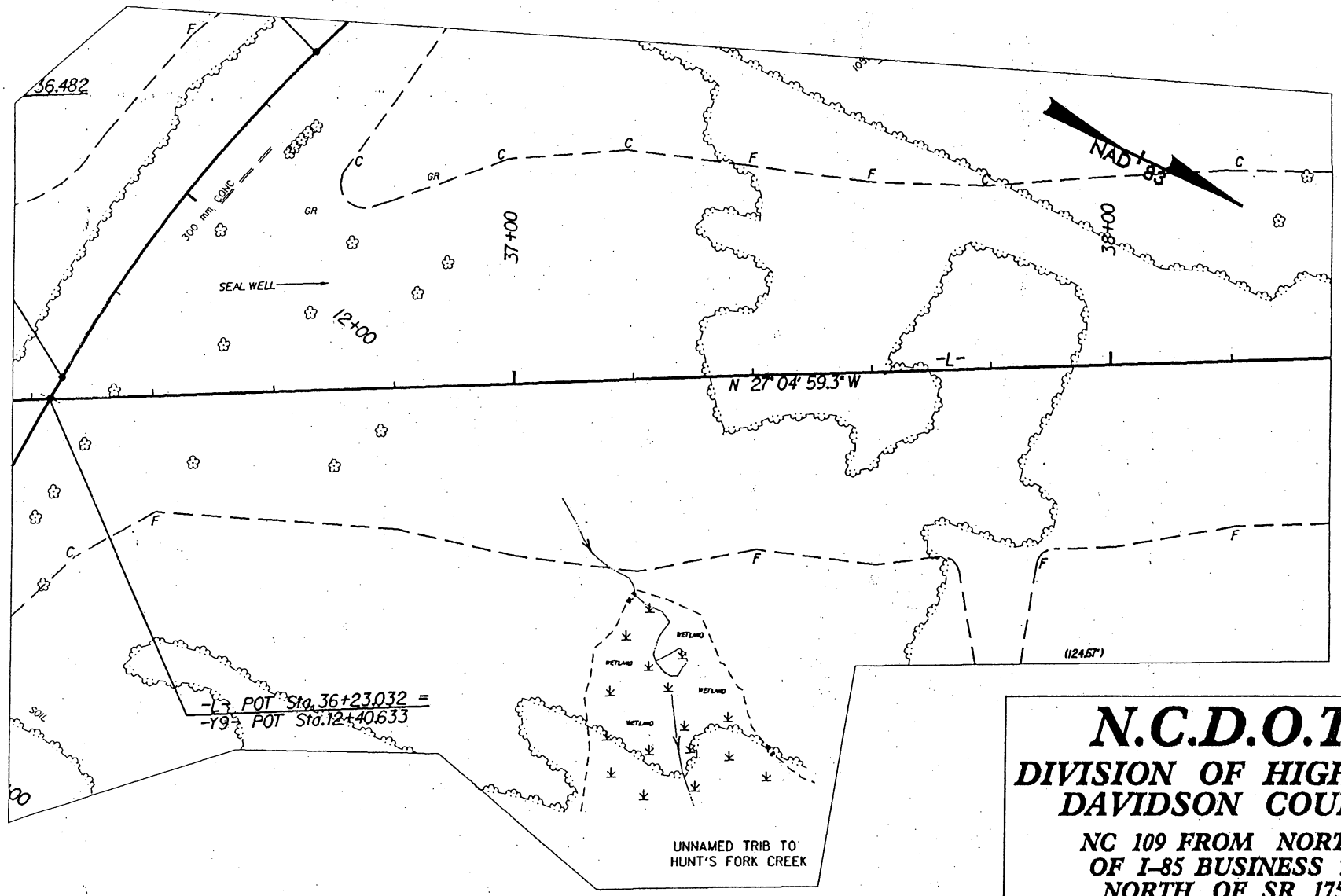
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 9 OF 10

060404



10m 0 20m

SCALE

SITE 2A IMPACTS

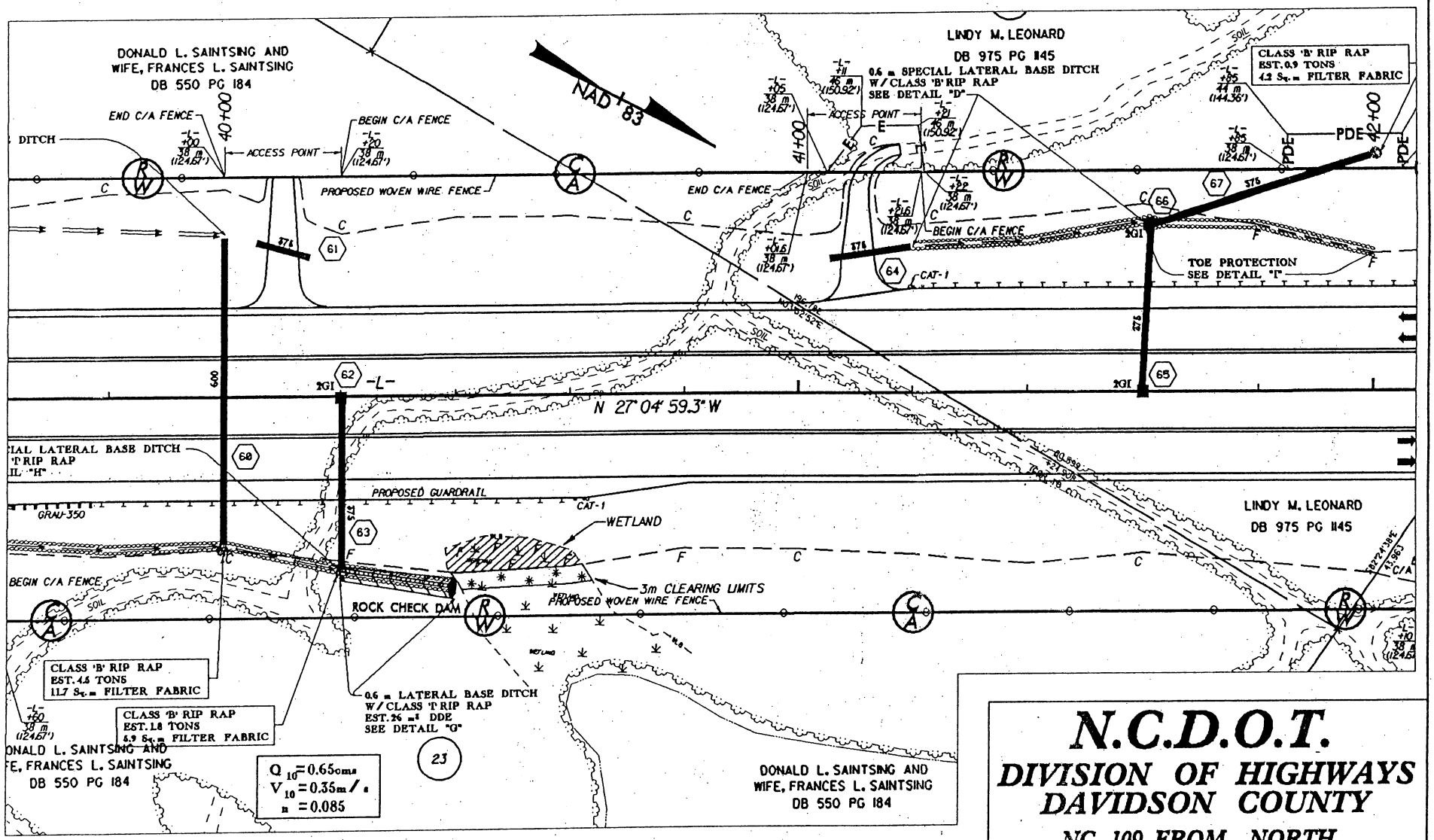
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH
OF I-85 BUSINESS TO
NORTH OF SR 1756
(LEXINGTON AVE.)
NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 10 OF 40

060404



SITE 3

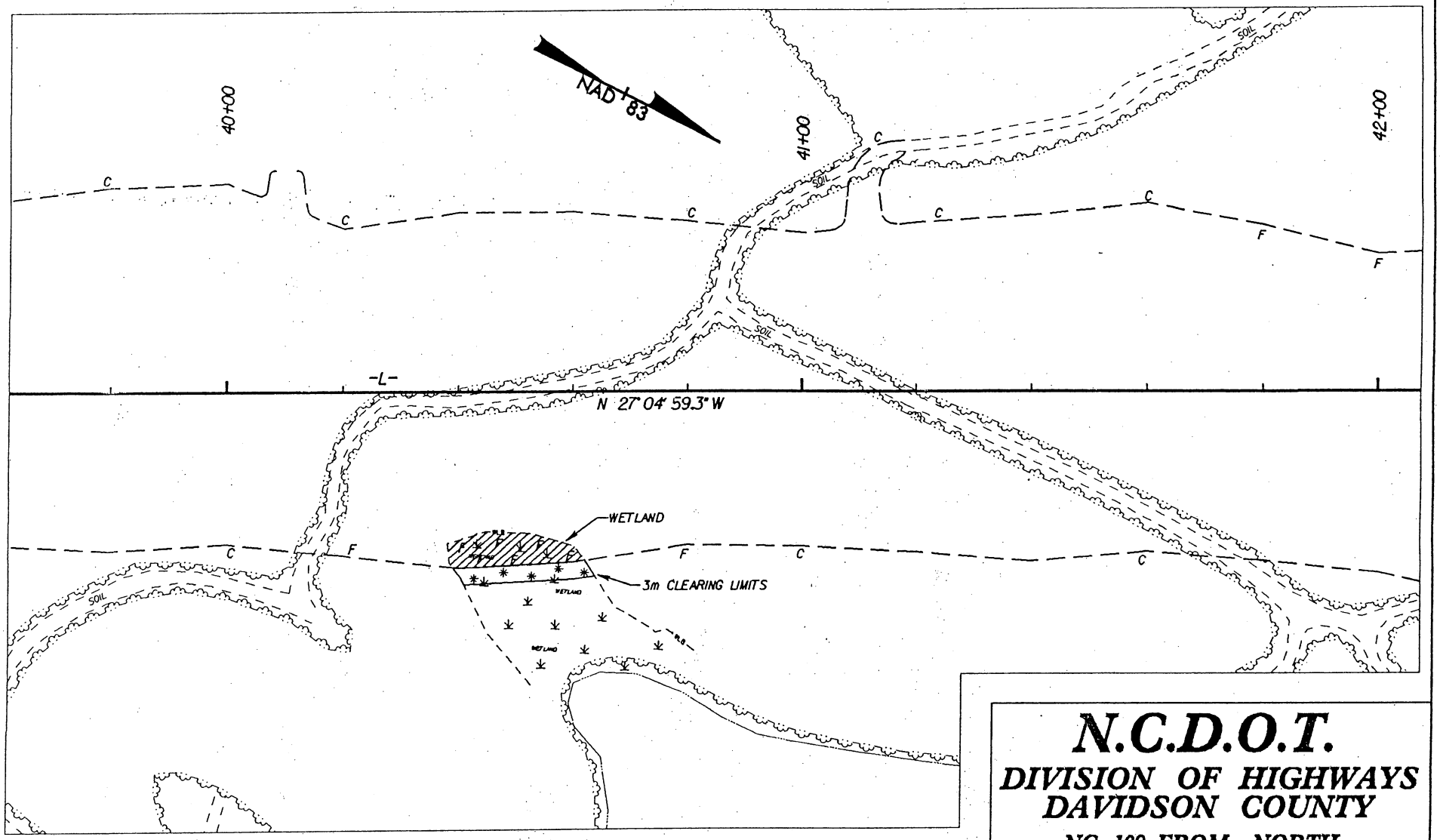
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 11 OF 40

0604/04



DENOTES FILL IN WETLANDS

DENOTES MECHANIZED CLEARING IN WETLANDS

10m 0 20m

SCALE

SITE 3 IMPACTS

N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B

SHEET 12 OF 40

060404

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METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	

SITE 3

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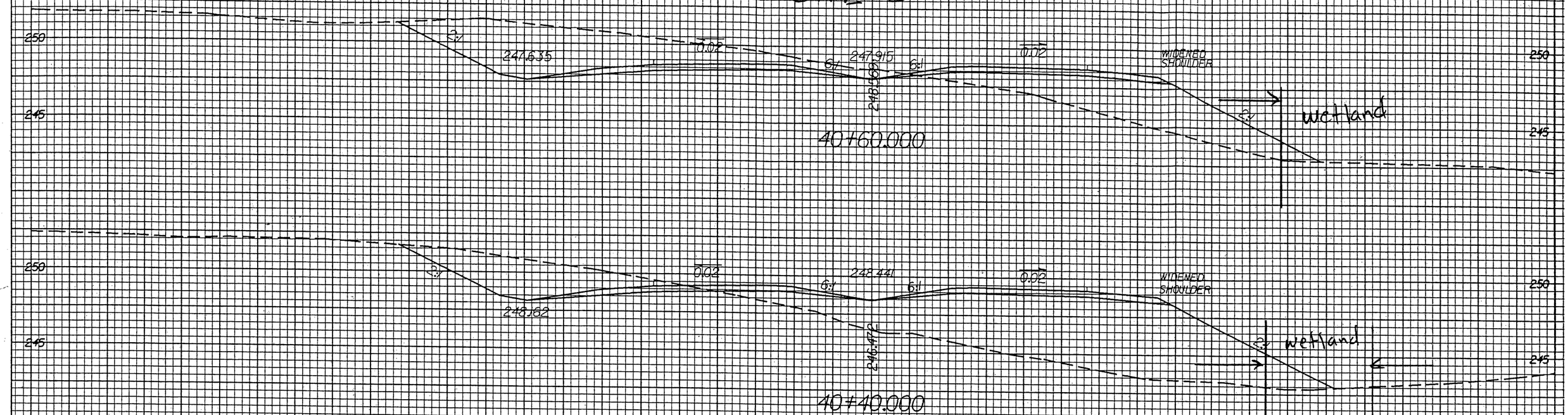

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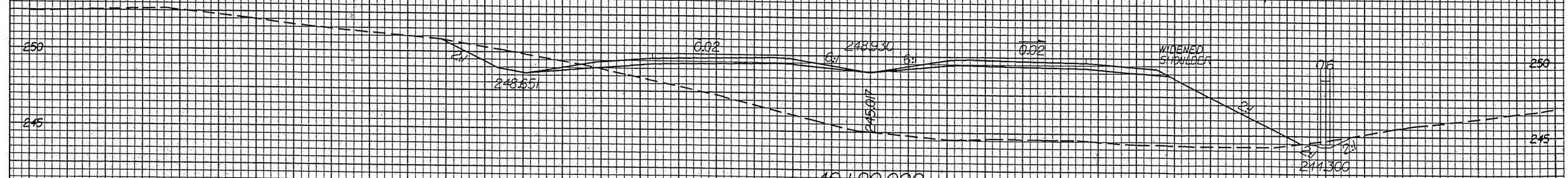
40+20.000



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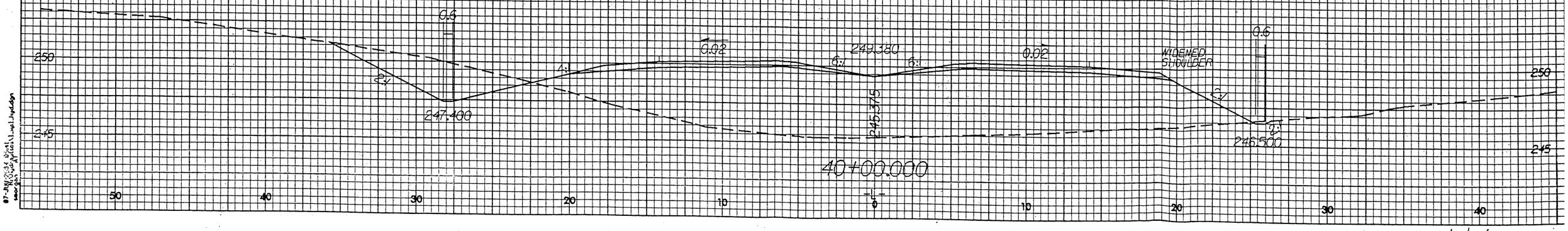

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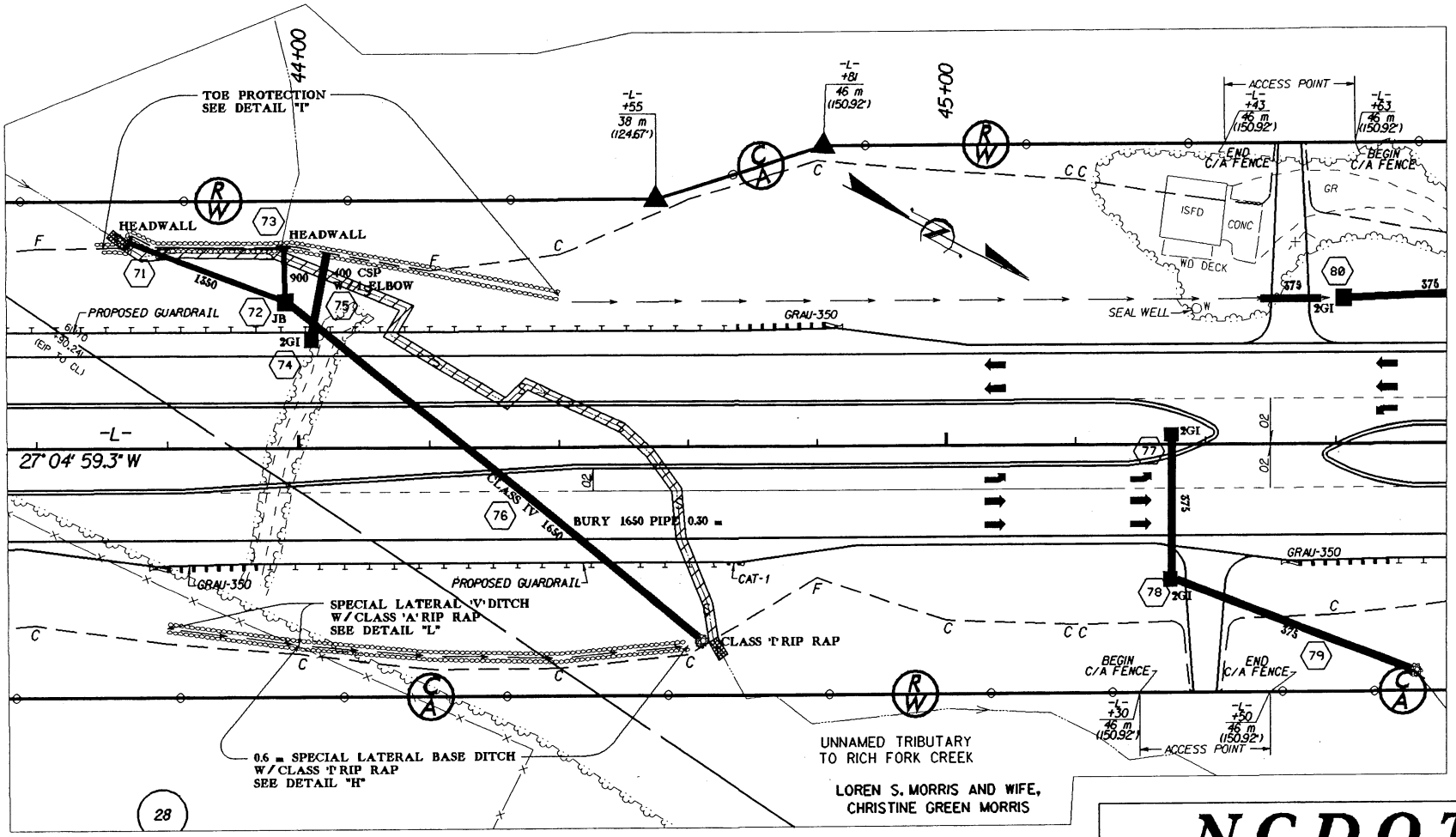


SITE 3A

10m 0 20m
SCALE

DENOTES FILL IN SURFACE WATERS

DENOTES FILL IN SURFACE WATERS

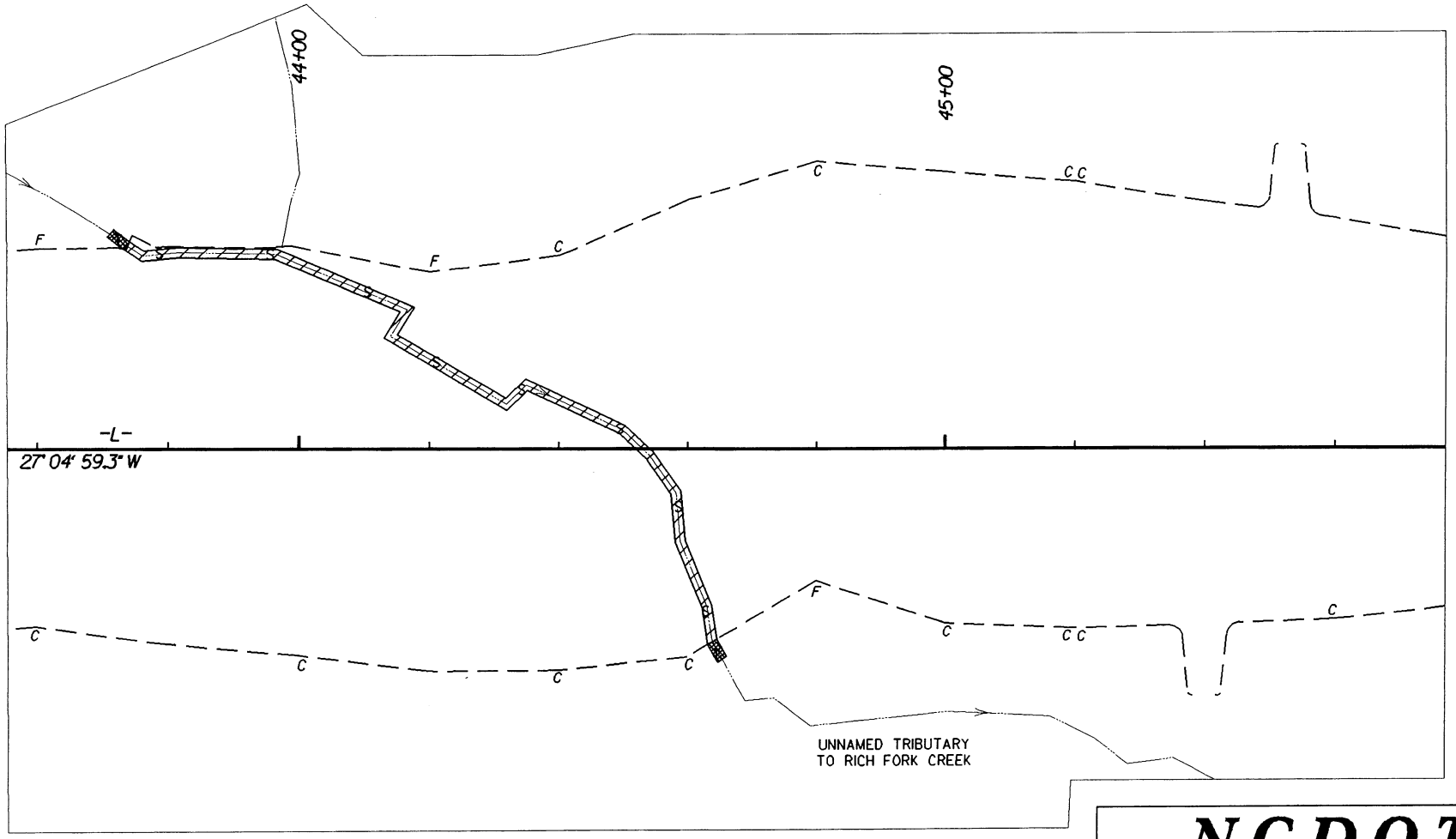
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 13 OF 40

07/14/04



SITE 3A IMPACTS

10m 0 20m

SCALE

F F DENOTES FILL IN SURFACE WATERS

S S DENOTES FILL IN SURFACE WATERS

N.C.D.O.T.

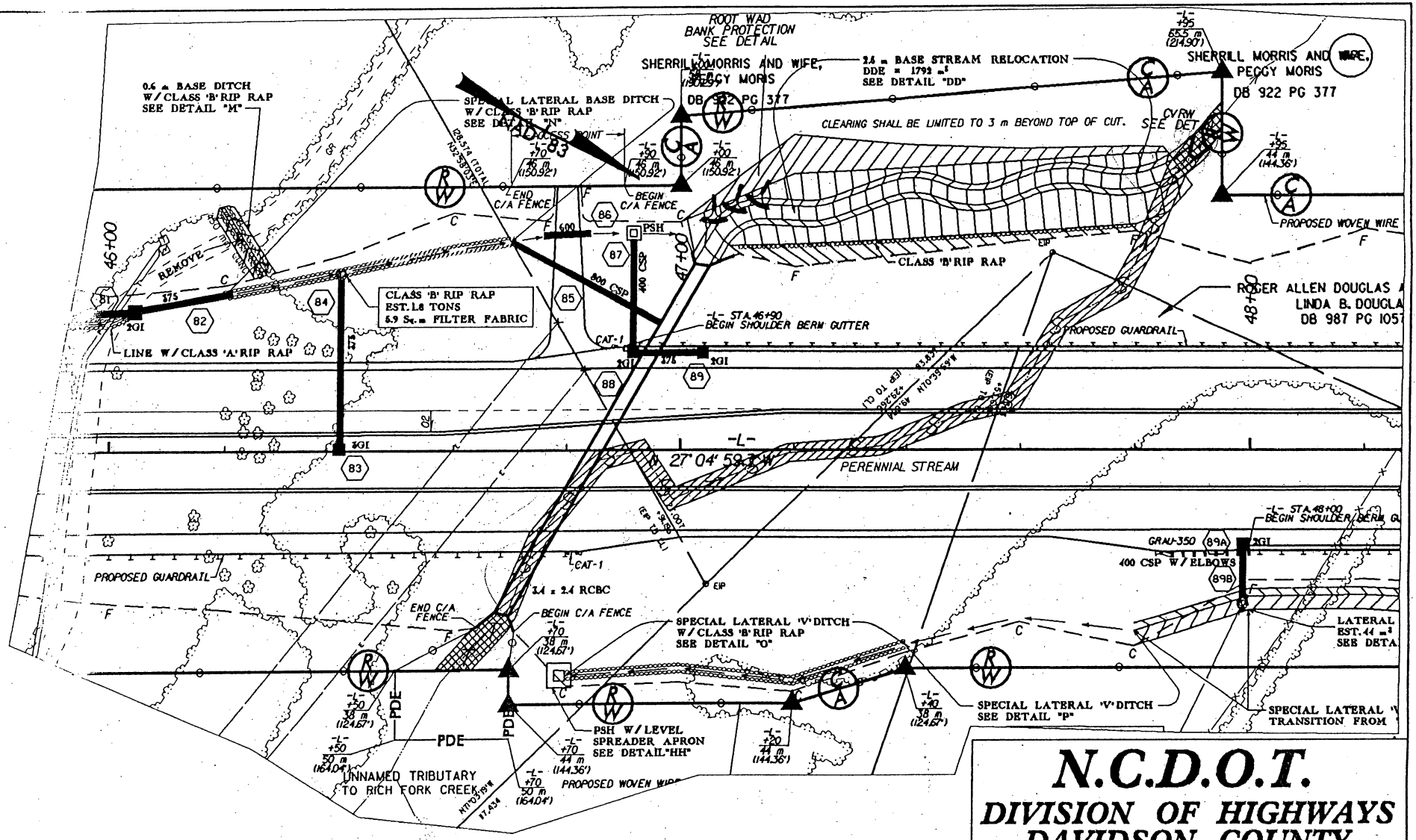
DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B

SHEET 14 OF 40

07/14/04



DENOTES TEMPORARY SURFACE WATER IMPACTS

DENOTES FILL IN SURFACE WATERS

10m 0 20m

SCALE

SITE 4

N.C.D.O.T.

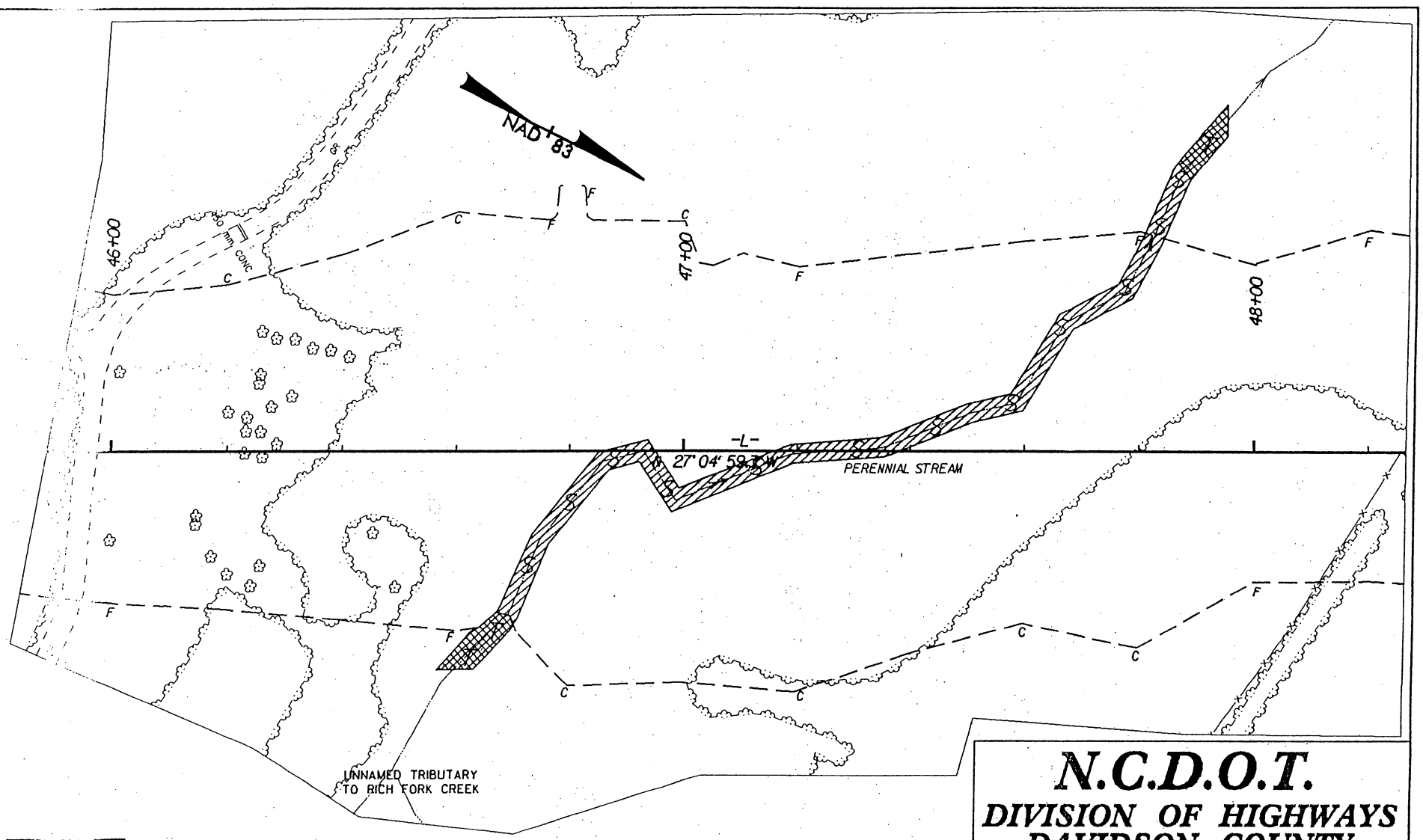
DIVISION OF HIGHWAYS DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B

SHEET 15 OF 40

06/04/04



DENOTES TEMPORARY SURFACE WATER IMPACTS

SITE 4 IMPACTS

10m 0 20m SCALE

DENOTES FILL IN SURFACE WATERS

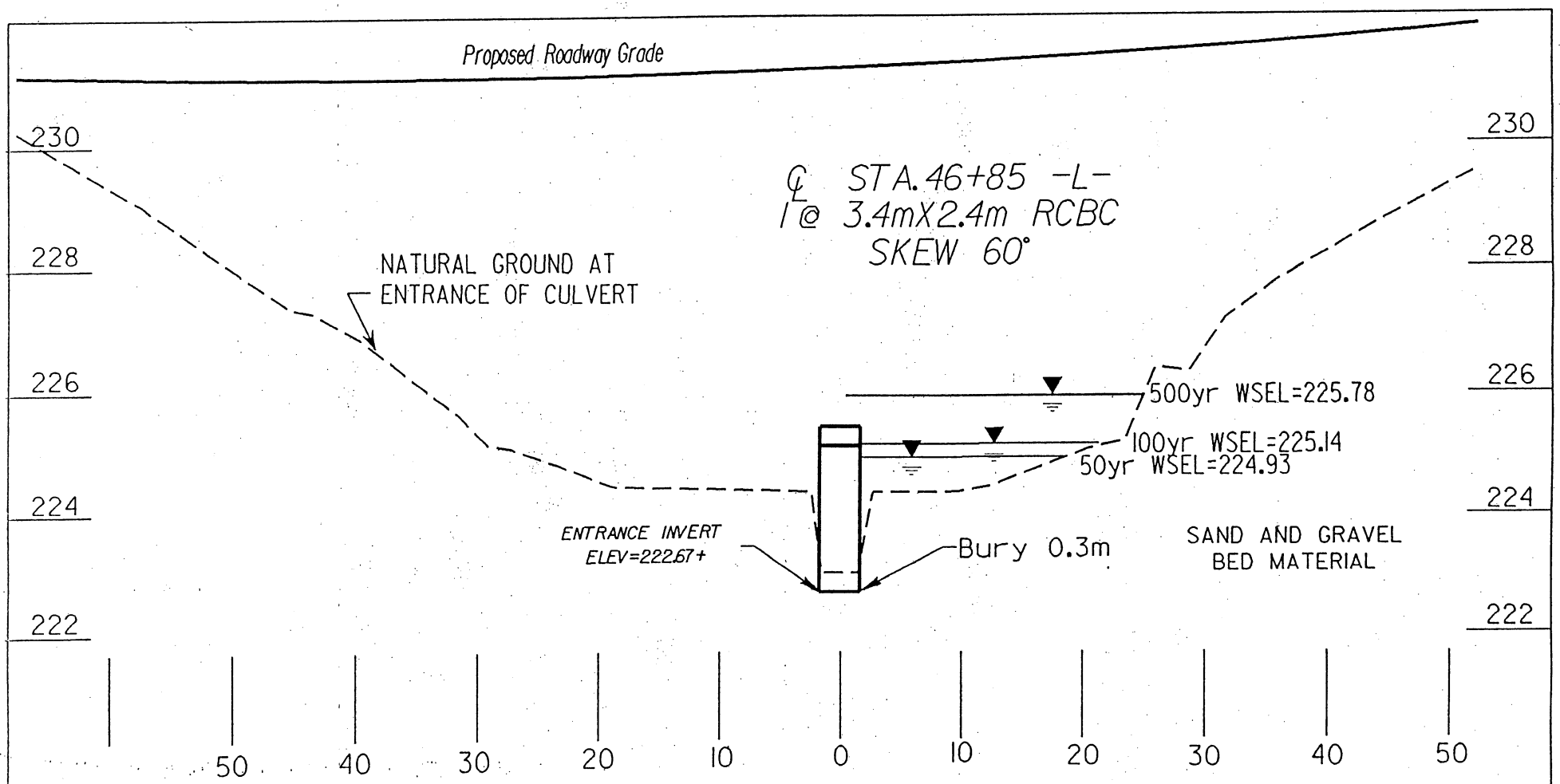
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 16 OF 40

060404



SITE 4 PROFILE

5m 0 10m
SCALE

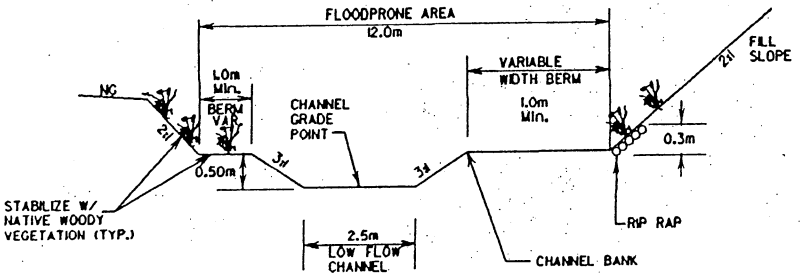
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD MIDDLE SCHOOL

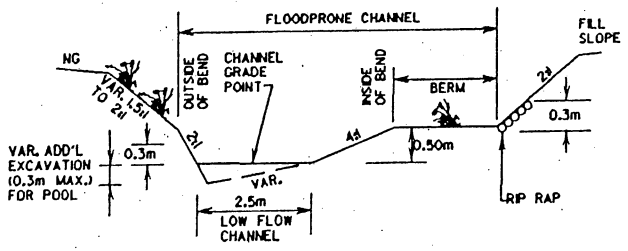
STATE PROJECT#8.1600901 R-2568B
SHEET 17 OF 40 *12/12/02*

RIFFLE SECTION
(NOT TO SCALE)

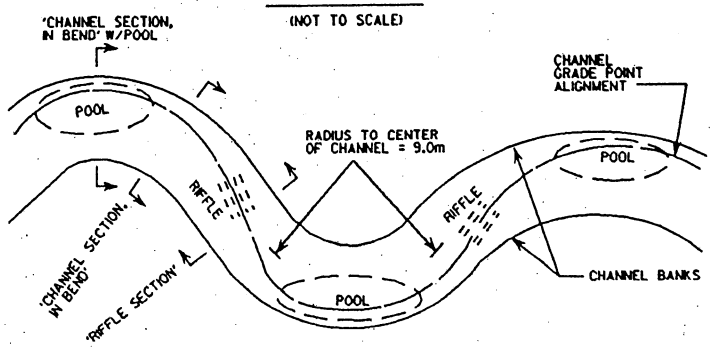


LOW FLOW CHANNEL IS TO BE SHIFTED WITHIN FLOODPRONE CHANNEL BY VARYING BERM WIDTHS SO THAT LOW FLOWCHANNEL WILL SHIFT TOWARDS THE OUTSIDE OF THE MEANDER. ADDITIONALLY, LOW FLOW CHANNEL SIDE SLOPES ARE TO BE VARIED AS SHOWN BELOW.

CHANNEL SECTION, IN BEND
(NOT TO SCALE)



PLAN VIEW
(NOT TO SCALE)



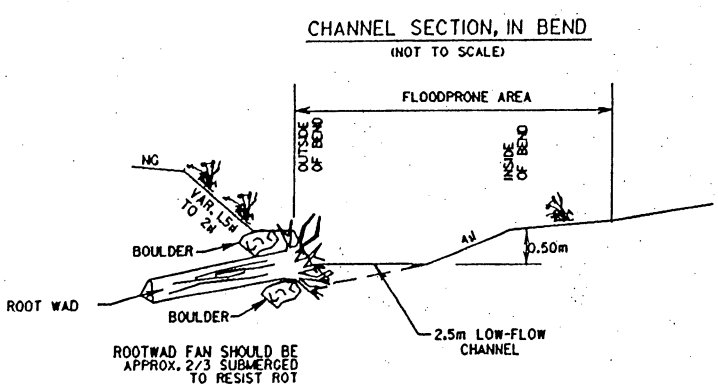
CHANNEL TO BE GRADED TO MATCH 'RIFFLE SECTION' AND 'CHANNEL SECTION, IN BEND' THROUGHOUT, PROVIDING A SMOOTH TRANSITION BETWEEN EACH SECTION. EACH BEND SHOULD HAVE A POOL LOCATED ON THE OUTSIDE OF THE BEND.

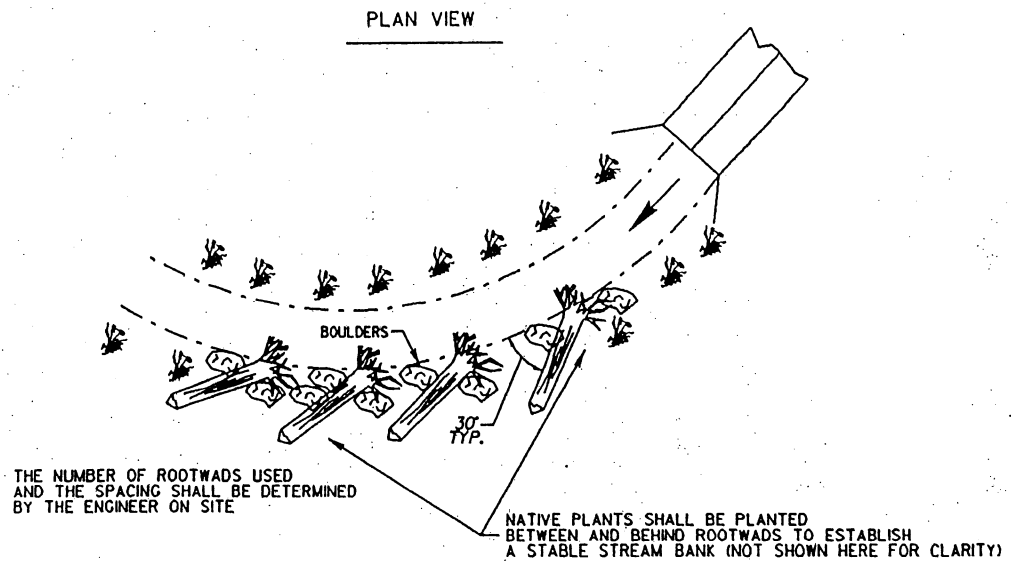
NATURAL CHANNEL DESIGN DETAILS
STA 47+20 TO STA 47+80 -L- LT.
SITE 4

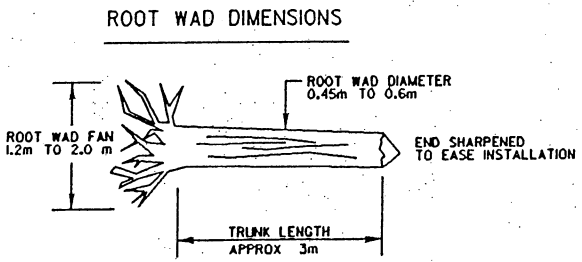
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DAVIDSON COUNTY
PROJECT: 8.1600901 (R-2568B)

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR1756 (LEXINGTON AVE.) NORTH OF LEDFORD MIDDLE SCHOOL

 12/12/02







NATURAL CHANNEL DESIGN DETAILS
OUTLET OF CULVERT AT -L- 47+20 (LT)

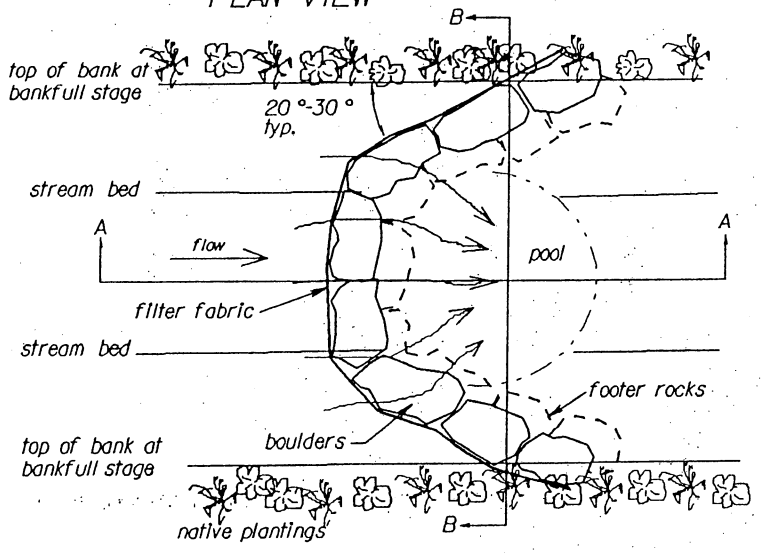
SITE 4

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DAVIDSON COUNTY
PROJECT: 8.1600901 (R-2568B)
NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD MIDDLE SCHOOL

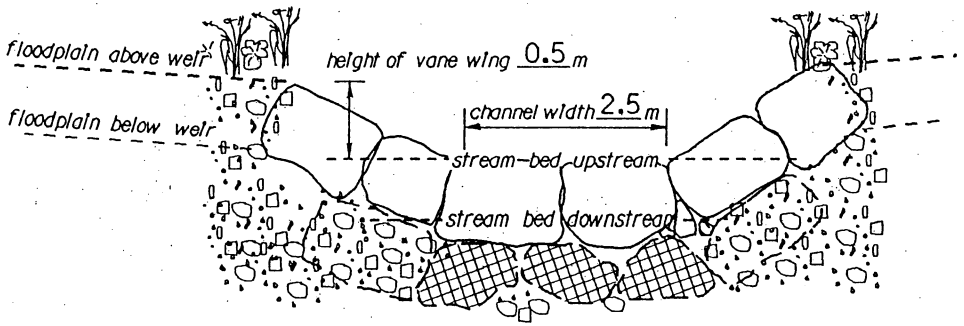
SHEET 19 OF 40 12/12/02

CROSS VANE ROCK WEIR DETAIL
SITE 4

PLAN VIEW



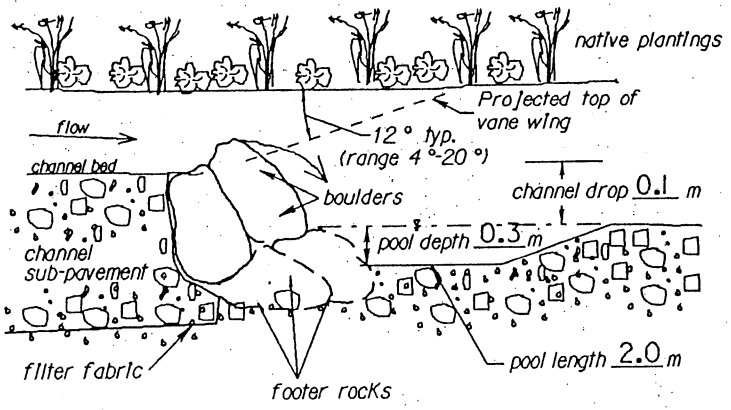
SECTION B-B



Note: Boulders should be native stone or shot rock, angular and oblong with axis approximately 1.2 m in length

Note: Rocks should fit tightly.
Trim filter fabric flush with top of rocks.

SECTION A-A



N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

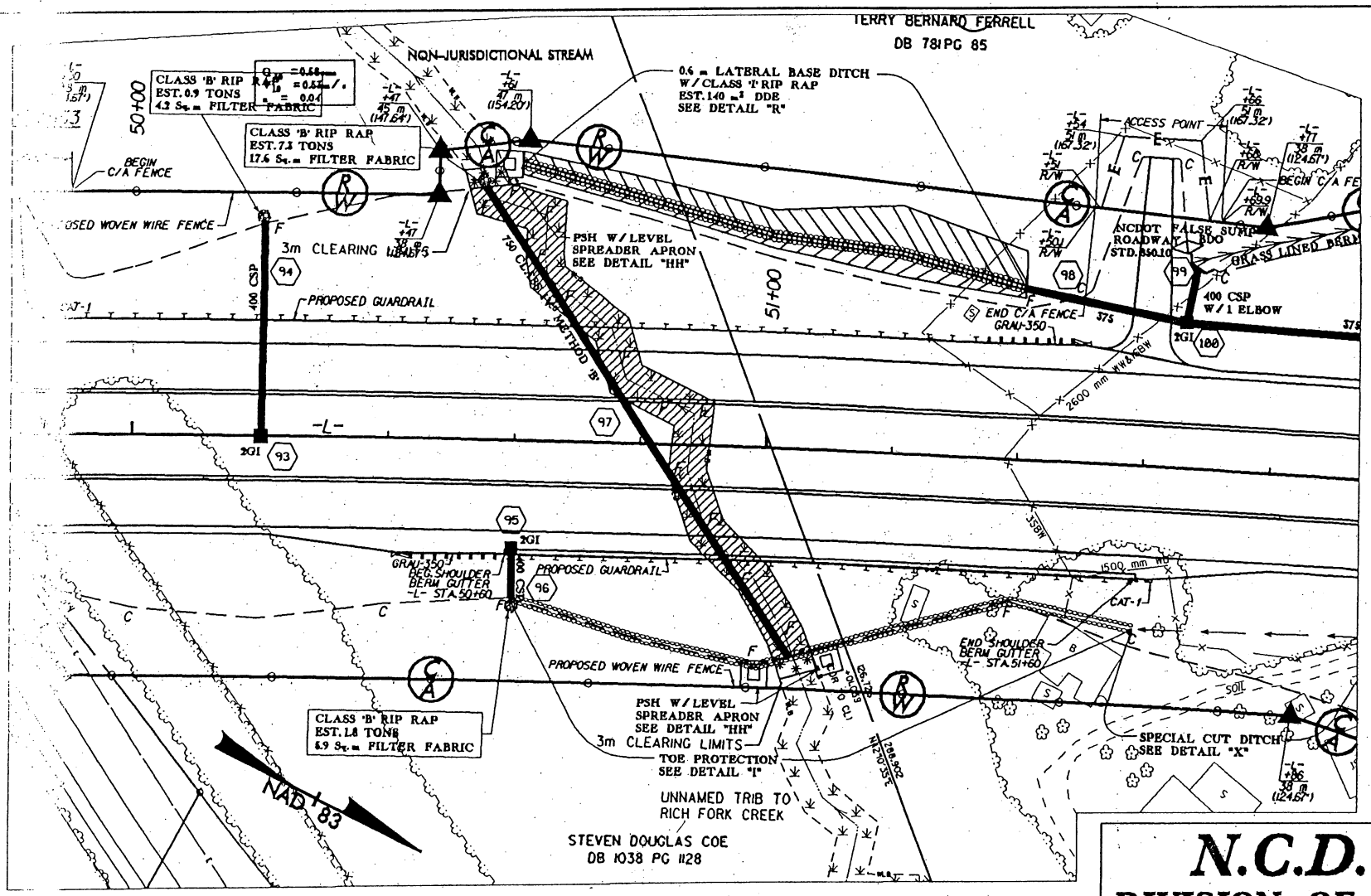
STATE PROJECT#8.1600901 R-2568B
SHEET 20 OF 40

12/12/02

SITE 4
MORPHOLOGICAL MEASUREMENT TABLE

VARIABLES	EXISTING CHANNEL	PROPOSED REACH	USGS STATION	REFERENCE REACH
1) STREAM TYPE	G4c	C4		E4
2) DRAINAGE AREA	119ha	119ha		78ha
3) BANKFULL WIDTH	3.4m	5.5m		3.7m
4) BANKFULL MEAN DEPTH	0.5m	0.36m		0.45m
5) WIDTH/DEPTH RATIO	6.8	15.3		8.2
6) BANKFULL CROSS-SECTIONAL AREA	$1.7m^2$	$2.12m^2$		$1.66m^2$
7) BANKFULL MEAN VELOCITY	1.5m/s	0.95m/s		1.43m/s
8) BANKFULL DISCHARGE, cfs	$2.6m^3/s$	$2.0m^3/s$		$1.70m^3/s$
9) BANKFULL MAX. DEPTH	0.57m	0.5m		0.52m
10) WIDTH OF FLOODPRONE AREA	4.0m	14m		8m
11) ENTRENCHMENT RATIO	1.2	2.5		2.2
12) MEANDER LENGTH	30m	27m		24m
13) RATIO OF MEANDER LENGTH TO BANKFULL WIDTH	8.8	4.9		6.5
14) RADIUS OF CURVATURE	11.6m	9m		6m
15) RATIO OF RADIUS OF CURVATURE TO BANKFULL WIDTH	3.4	1.6		1.62
16) BELT WIDTH	6.0m	12m		8m
17) MEANDER WIDTH RATIO	1.7	2.2		2.2
18) SINUOSITY (STREAM LENGTH/VALLEY LENGTH	1.2	1.2		1.16
19) VALLEY SLOPE	0.0079	0.006		0.0129
20) AVERAGE SLOPE	0.0066	0.005		0.0111
21) POOL SLOPE	0.0022	0.002		0.004
22) RATIO OF POOL SLOPE TO AVERAGE SLOPE	0.33	0.40		0.36
23) MAXUMUM POOL DEPTH	0.15m	0.3m		0.24m
24) RATIO OF POOL DEPTH TO AVERAGE BANKFULL DEPTH	0.3	0.8		0.53
25) POOL WIDTH	2.0m	2.0m		1.8m
26) RATIO OF POOL WIDTH TO BANKFULL WIDTH	0.6	0.4		0.5
27) POOL TO POOL SPACING	17m	13m		15m
28) RATIO OF POOL TO POOL SPACING TO BANKFULL WIDTH	5.0	2.4		4.1
29) RATIO OF LOWEST BANK HEIGHT TO BANKFULL HEIGHT (OR MAX BANKFULL DEPTH)	2.3	1.0		1.8

NCDOT
DIVISION OF HIGHWAYS
DAVIDSON COUNTY
PROJECT: 8.1600901 (R-2568B)
NC 109 FROM NORTH
OF I-85 BUSINESS TO
NORTH OF SR 1756
(LEXINGTON AVE.)
NORTH OF LEDFORD M.S.



SITE 5

10m 0 20m SCALE

DENOTES FILL IN WETLANDS

DENOTES MECHANIZED CLEARING IN WETLANDS

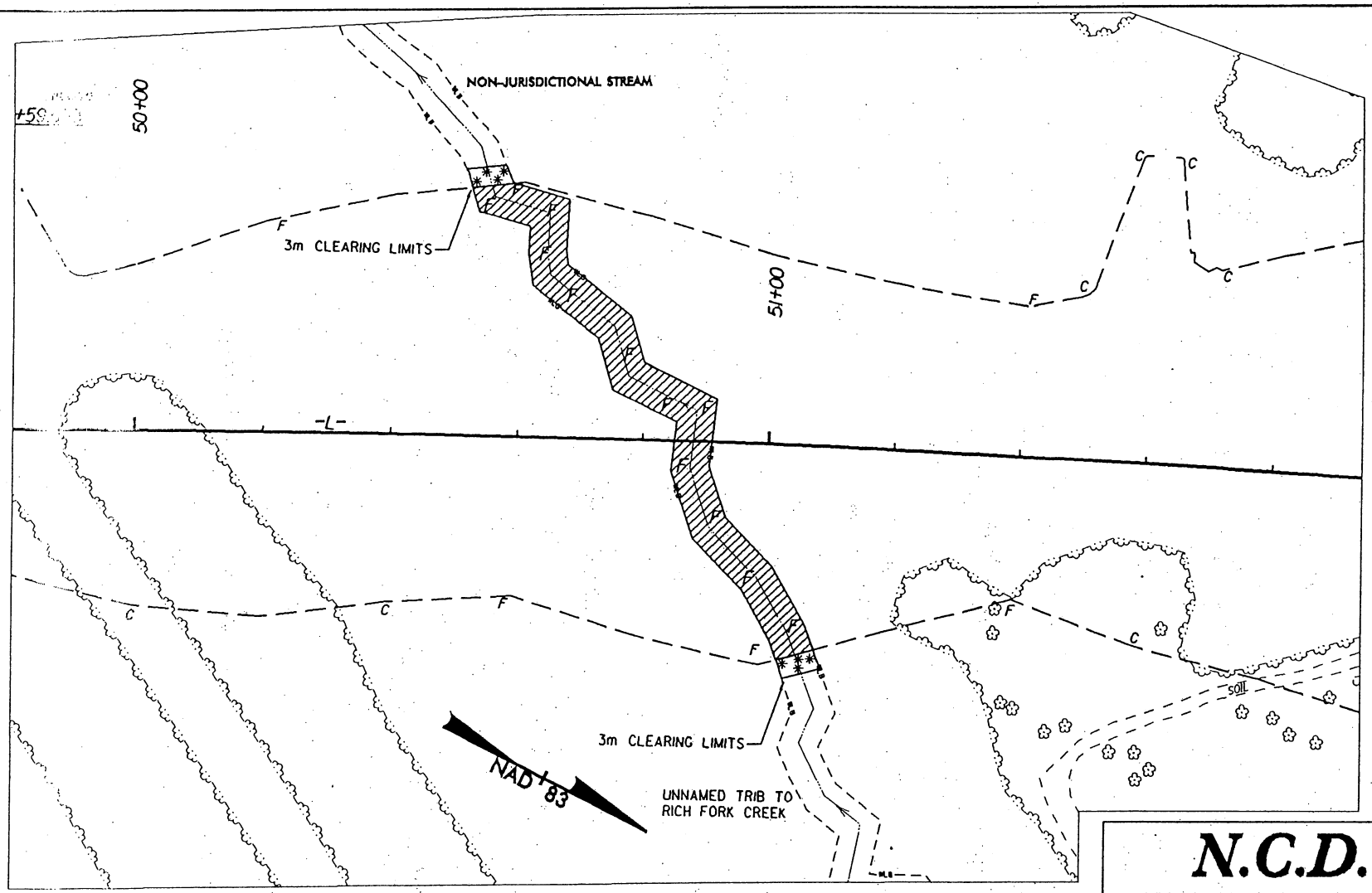
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 22 OF 40

060404



SITE 5 IMPACTS

10m 0 20m SCALE

F F DENOTES FILL IN WETLANDS

* * * * DENOTES MECHANIZED CLEARING IN WETLANDS

N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 23 OF 40

060404

PROJECT REFERENCE NO. R-2568B

SHEET

METRIC

2.5 0 2.5 5

SITE 5

WIDENED SHOULDER

0.02

6:1

5.540:1

0.02

WIDENED SHOULDER

DP. 239.724

2:1

2:1

231.100

wetland

239.539

50+80.000

WIDENED SHOULDER

0.02

6:1

5.540:1

0.02

WIDENED SHOULDER

DP. 239.488

2:1

2:1

228.900

wetland

239.333

50+60.000

WIDENED SHOULDER

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6:1

5.540:1

0.02

6:1

6:1

DP. 239.216

239.074

2:1

239.098

50+40.000

240

235

230

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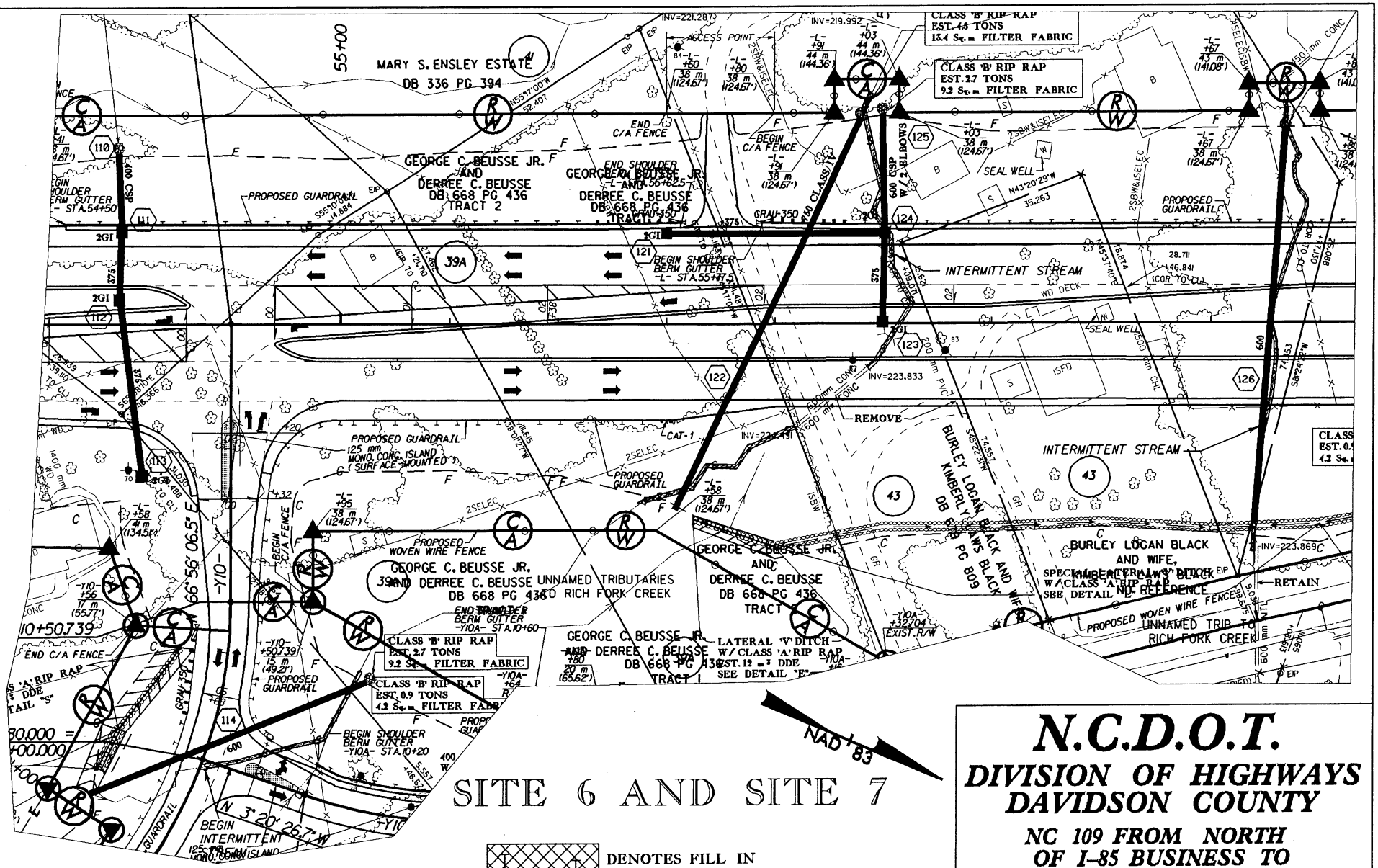


SITE 6 AND SITE 7

DENOTES FILL IN SURFACE WATERS

DENOTES FILL IN SURFACE WATERS

10m 0 20m

SCALE

N.C.D.O.T.

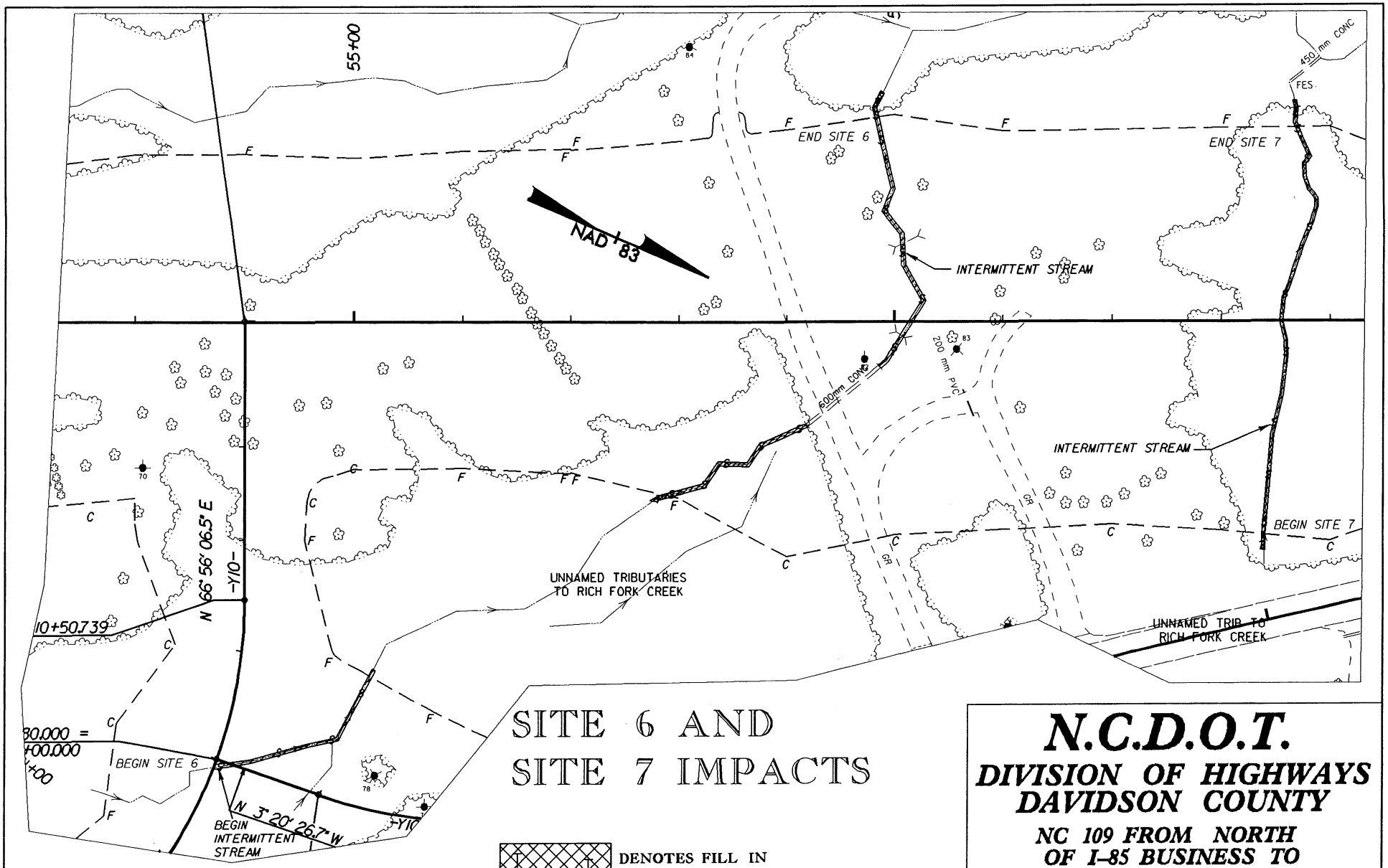
DIVISION OF HIGHWAYS DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B

SHEET 24 OF 40

07/14/04



SITE 6 AND SITE 7 IMPACTS

DENOTES FILL IN SURFACE WATERS

DENOTES FILL IN SURFACE WATERS

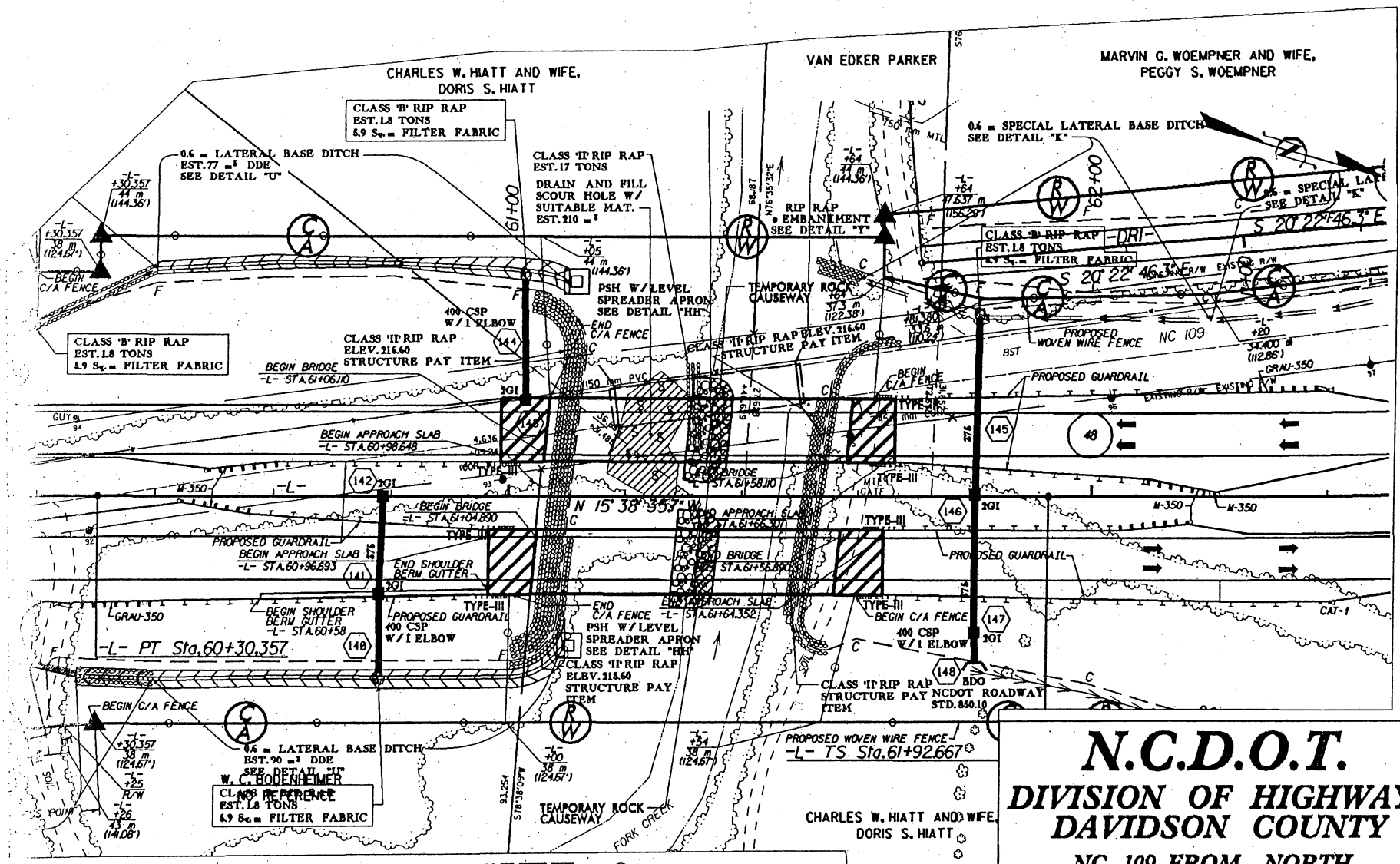
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 25 OF 40

07/14/04



SITE 8

0 20m

SCALE

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY FILL IN SURFACE WATER

N.C.D.O.T.

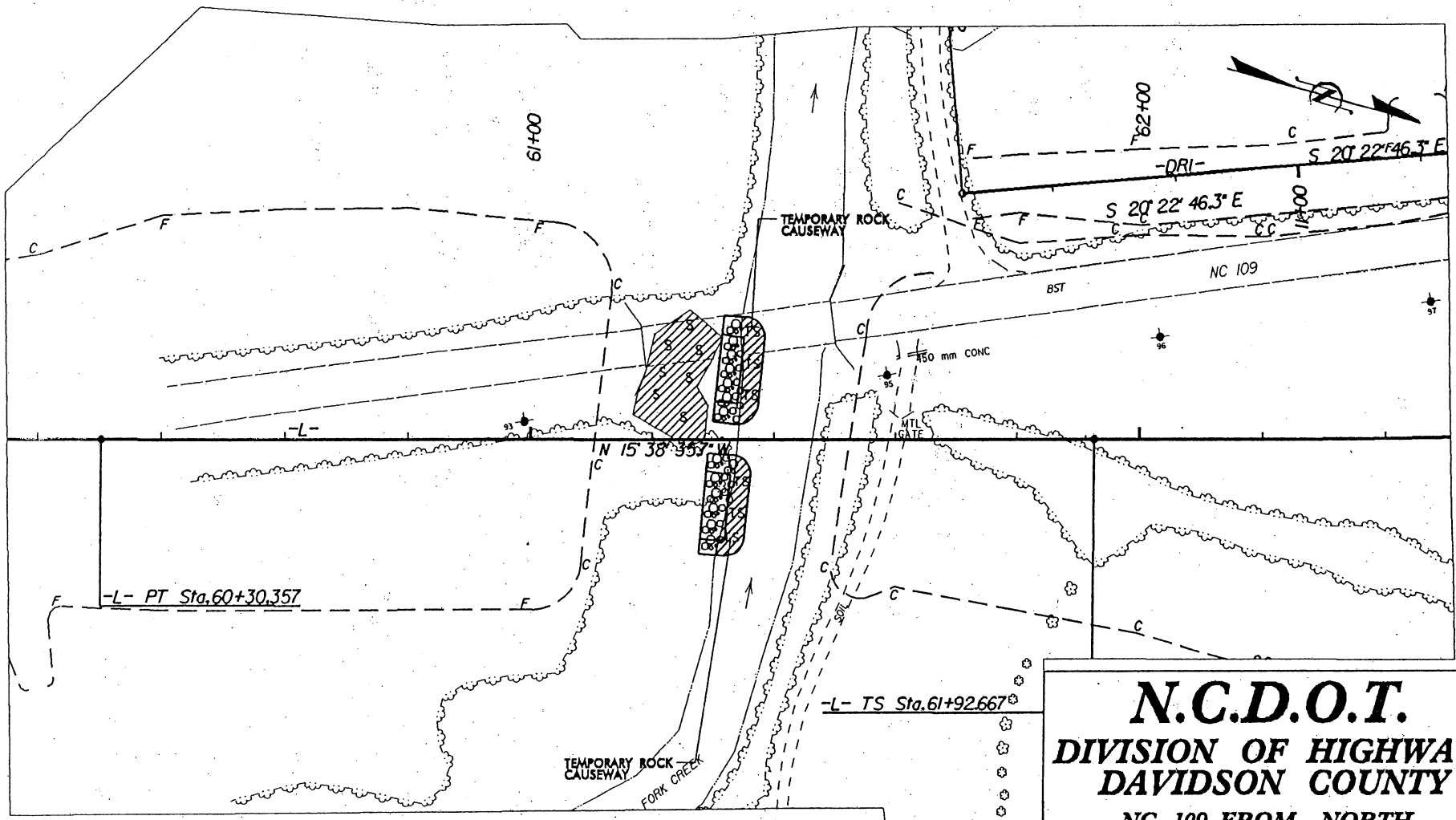
DIVISION OF HIGHWAYS DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B

SHEET 26 OF 40

060404



SITE 8 IMPACTS

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY FILL IN SURFACE WATER

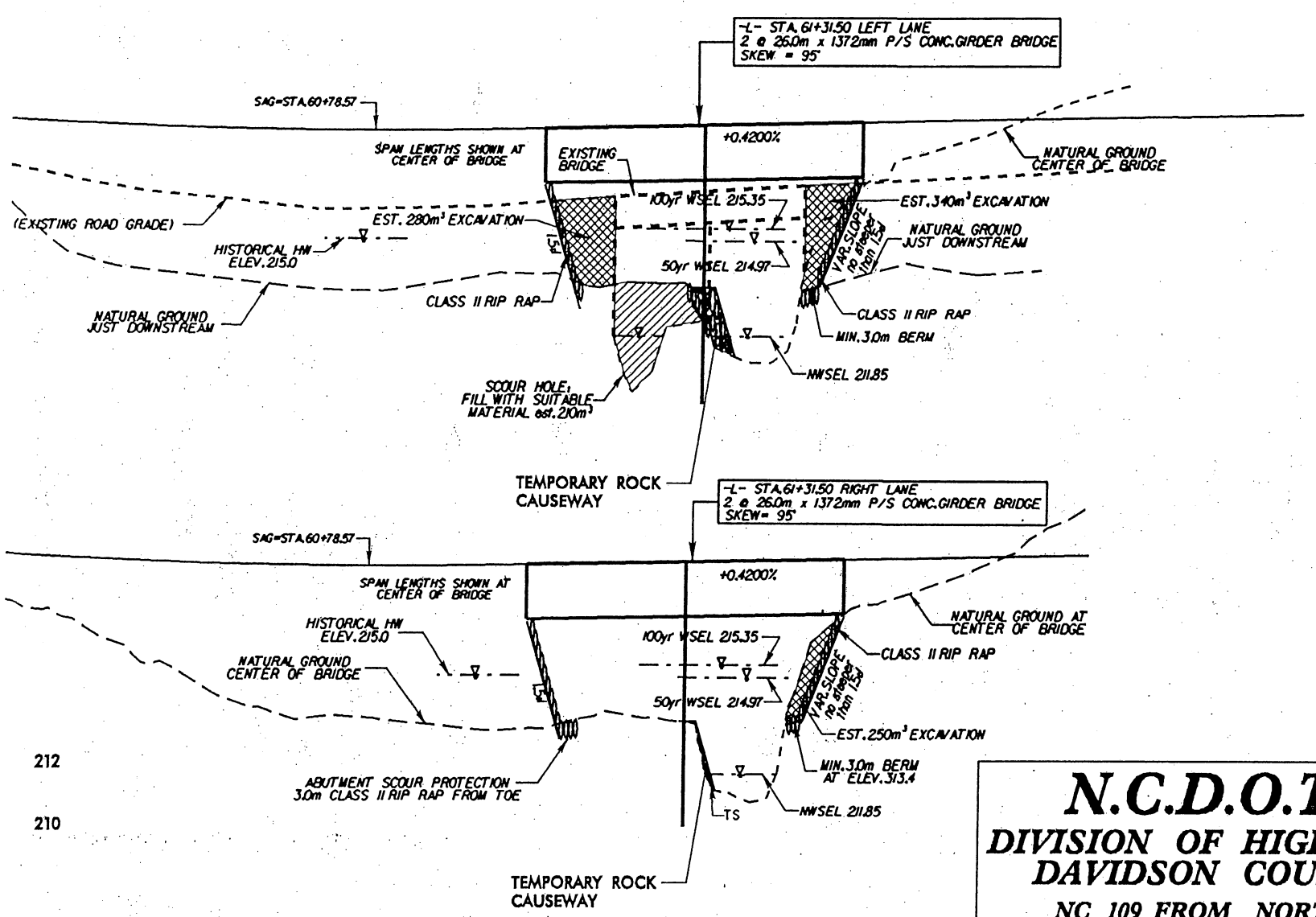
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 27 OF 40

06/04/04



SITE 8 PROFILE

10m 0 20m

SCALE

TS DENOTES TEMPORARY FILL IN SURFACE WATER

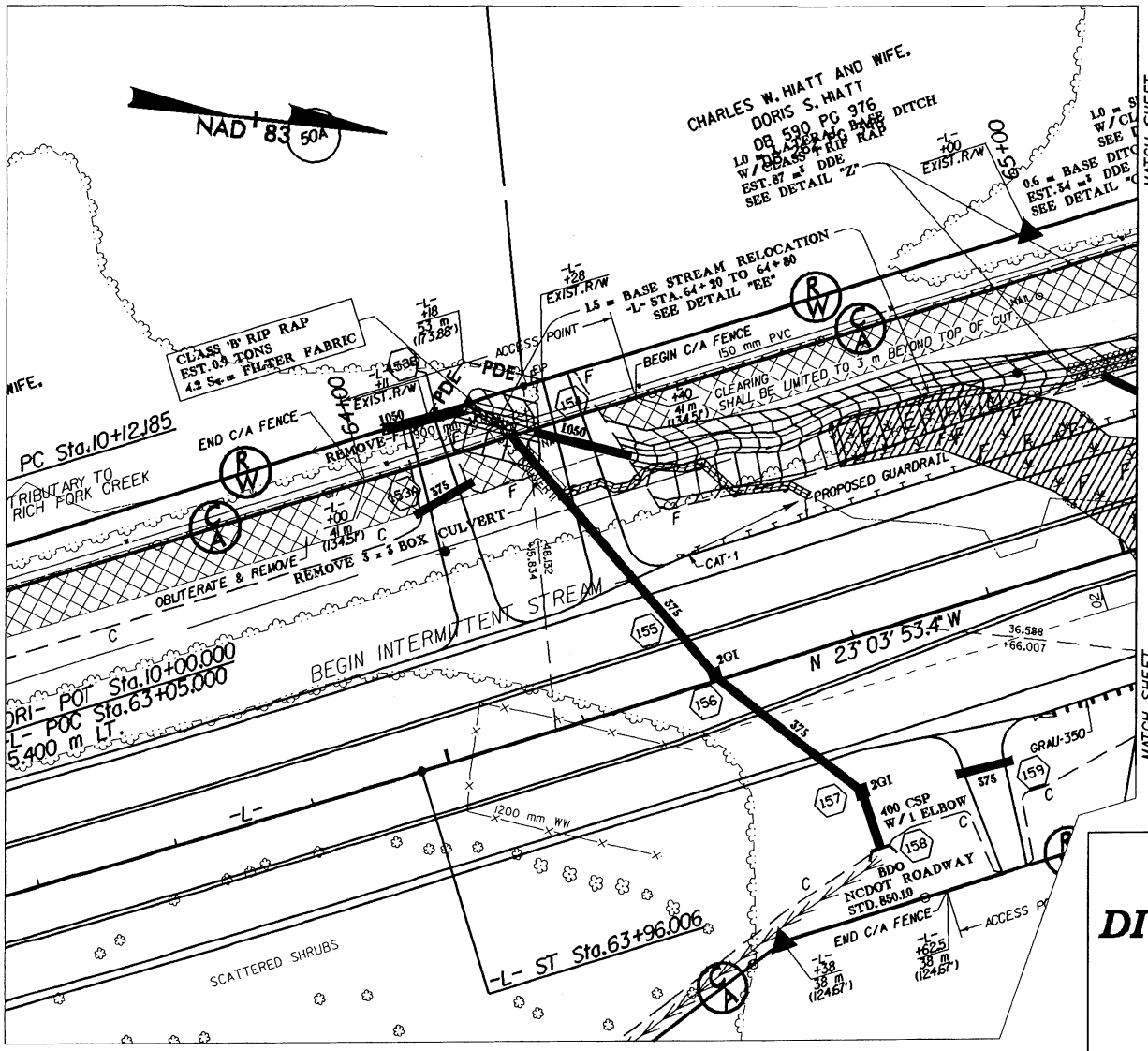
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 28 OF 40

12/12/02



SITE 9

10m 0 20m

SCALE

DENOTES FILL IN WETLANDS

DENOTES FILL IN SURFACE WATERS

DENOTES TEMPORARY SURFACE WATER IMPACTS

DENOTES EXCAVATION IN WETLAND

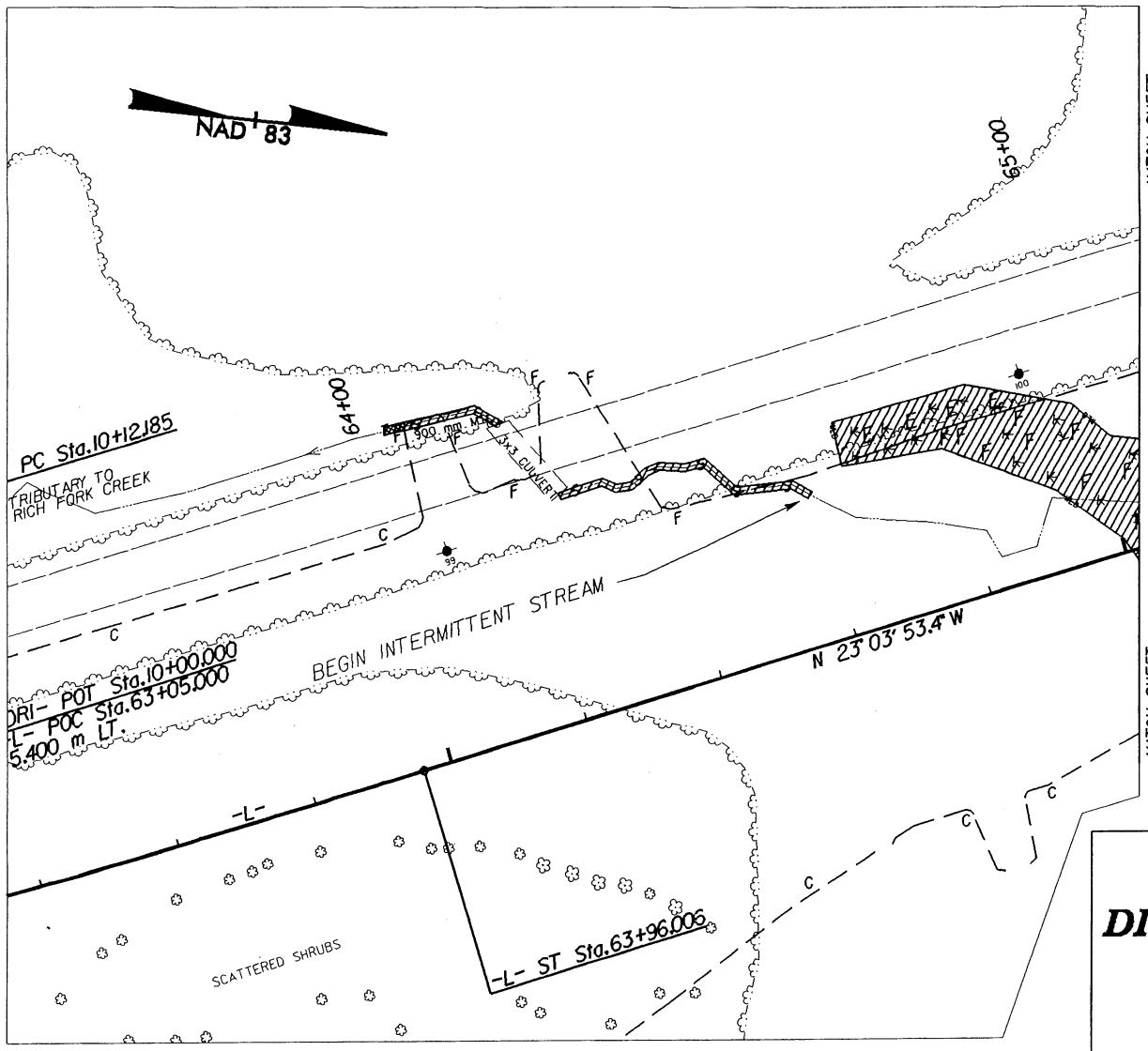
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 29 OF 40

07/14/04



DENOTES TEMPORARY SURFACE WATER IMPACTS

DENOTES EXCAVATION IN WETLAND

SITE 9 IMPACTS

10m 0 20m

SCALE

DENOTES FILL IN WETLANDS

DENOTES FILL IN SURFACE WATERS

N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

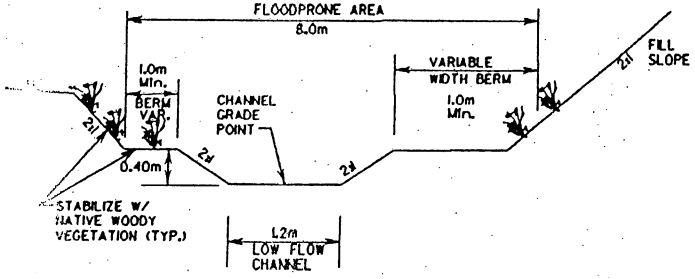
NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B

SHEET 30 OF 40

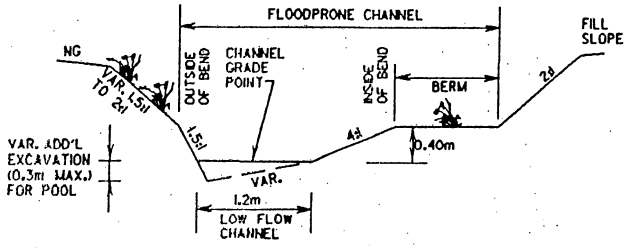
07/14/04

RIFFLE SECTION
(NOT TO SCALE)

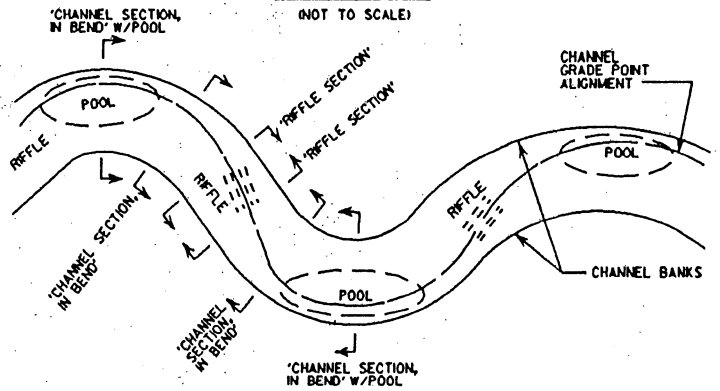


LOW FLOW CHANNEL IS TO BE SHIFTED WITHIN FLOODPRONE CHANNEL BY VARYING BERM WIDTHS SO THAT LOW FLOWCHANNEL WILL SHIFT TOWARDS THE OUTSIDE OF THE MEANDER. ADDITIONALLY, LOW FLOW CHANNEL SIDE SLOPES ARE TO BE VARIED AS SHOWN BELOW.

CHANNEL SECTION, IN BEND
(NOT TO SCALE)



PLAN VIEW
(NOT TO SCALE)



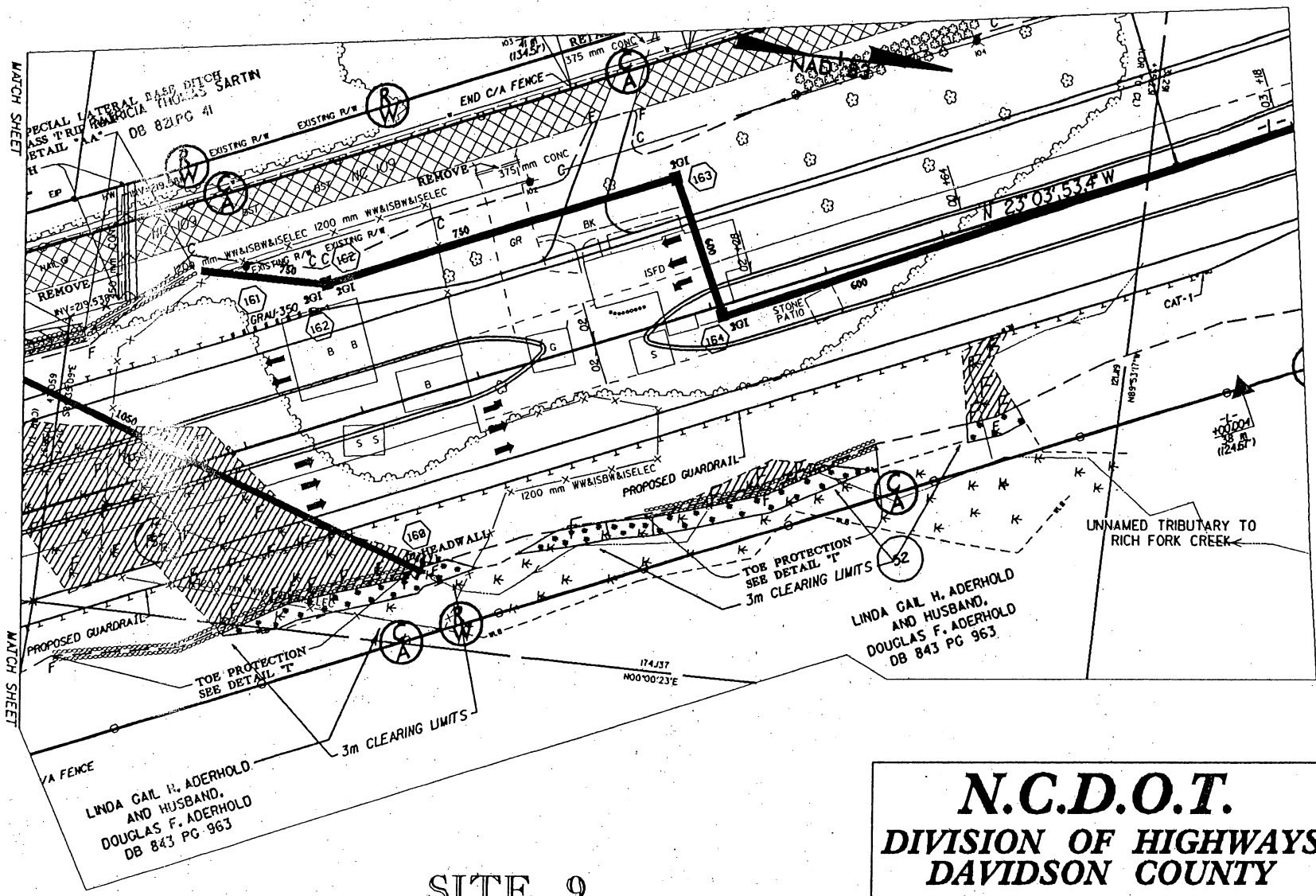
CHANNEL TO BE GRADED TO MATCH 'RIFFLE SECTION' AND 'CHANNEL SECTION, IN BEND' THROUGHOUT, PROVIDING A SMOOTH TRANSITION BETWEEN EACH SECTION. EACH BEND SHOULD HAVE A POOL LOCATED ON THE OUTSIDE OF THE BEND.

NATURAL CHANNEL DESIGN DETAILS
STA 64+20 TO STA 64+80 -L- LT.
SITE 9

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DAVIDSON COUNTY
PROJECT: 8.1600901 (R-2568B)

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD MIDDLE SCHOOL

SHEET 31 OF 40 12/12/02



SITE 9

DENOTES CLEARING IN WETLANDS

DENOTES FILL IN WETLANDS

10m 0 20m

SCALE

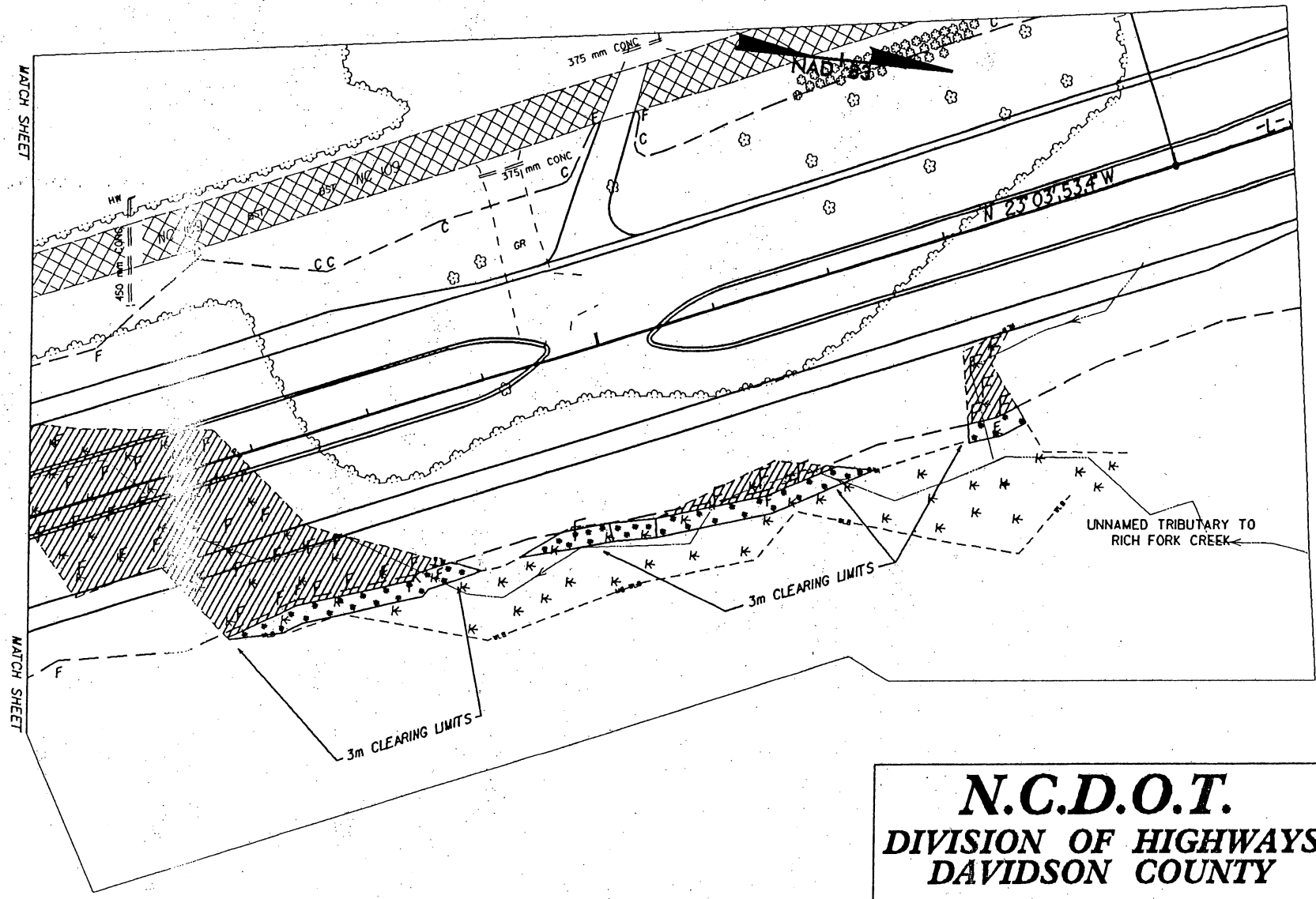
N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 32 OF 40

060404



SITE 9 IMPACTS

10m 0 20m

SCALE

DENOTES CLEARING IN WETLANDS

DENOTES FILL IN WETLANDS

N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 33 OF 40

06/04/04

2.5 0 2.5 5

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-25688	

SITE 9

66+20.000

EP EP 225.598 6:1 2:1 0.02 0.02 226.054 473 sf 0.02 WIDENED SHOULDER 2:1 wetland

66+00.000

EP EP 46% DRIVE 224.798 3:1 0.02 0.02 0.02 0.02 225.538 WIDENED SHOULDER 3:1 wetland

65+80.000

EP EP 223.998 6:1 0.02 224.451 469 sf 6:1 0.02 0.02 224.451 WIDENED SHOULDER 2:1 wetland

65+60.000

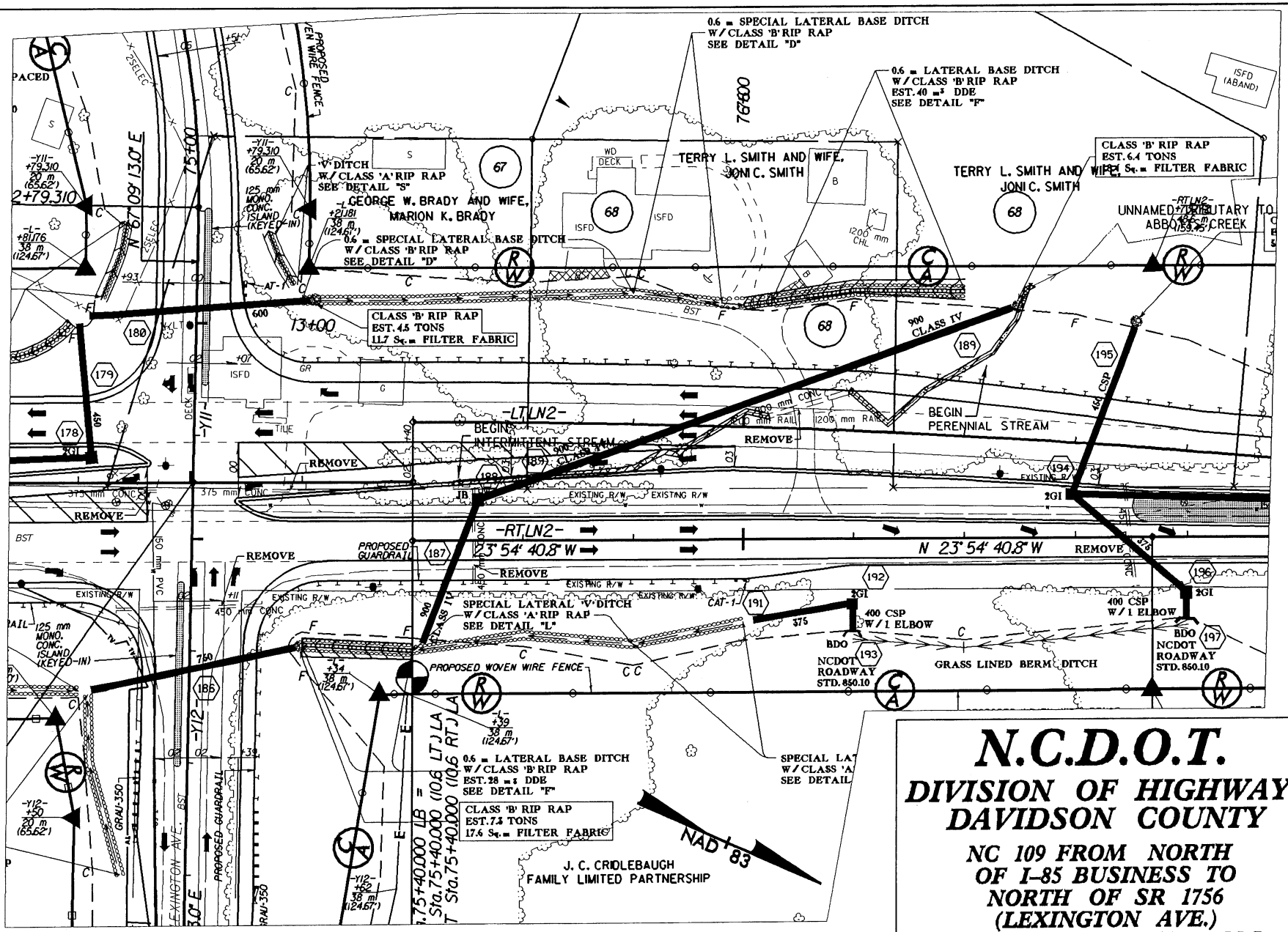
EP EP 6:1 223.198 0.02 223.633 478 sf 6:1 0.02 0.02 223.633 WIDENED SHOULDER 2:1 wetland

65+40.000

EP EP 6:1 221 0.02 222.833 478 sf 6:1 0.02 0.02 222.833 WIDENED SHOULDER 3:1 wetland

04-JUN-2004 08:25
kingsledge
XFC1_solign

6/4/04



10m 0 20m SCALE

SITE 10

T T DENOTES TEMPORARY SURFACE WATER IMPACTS

S S DENOTES FILL IN SURFACE WATERS

N.C.D.O.T.

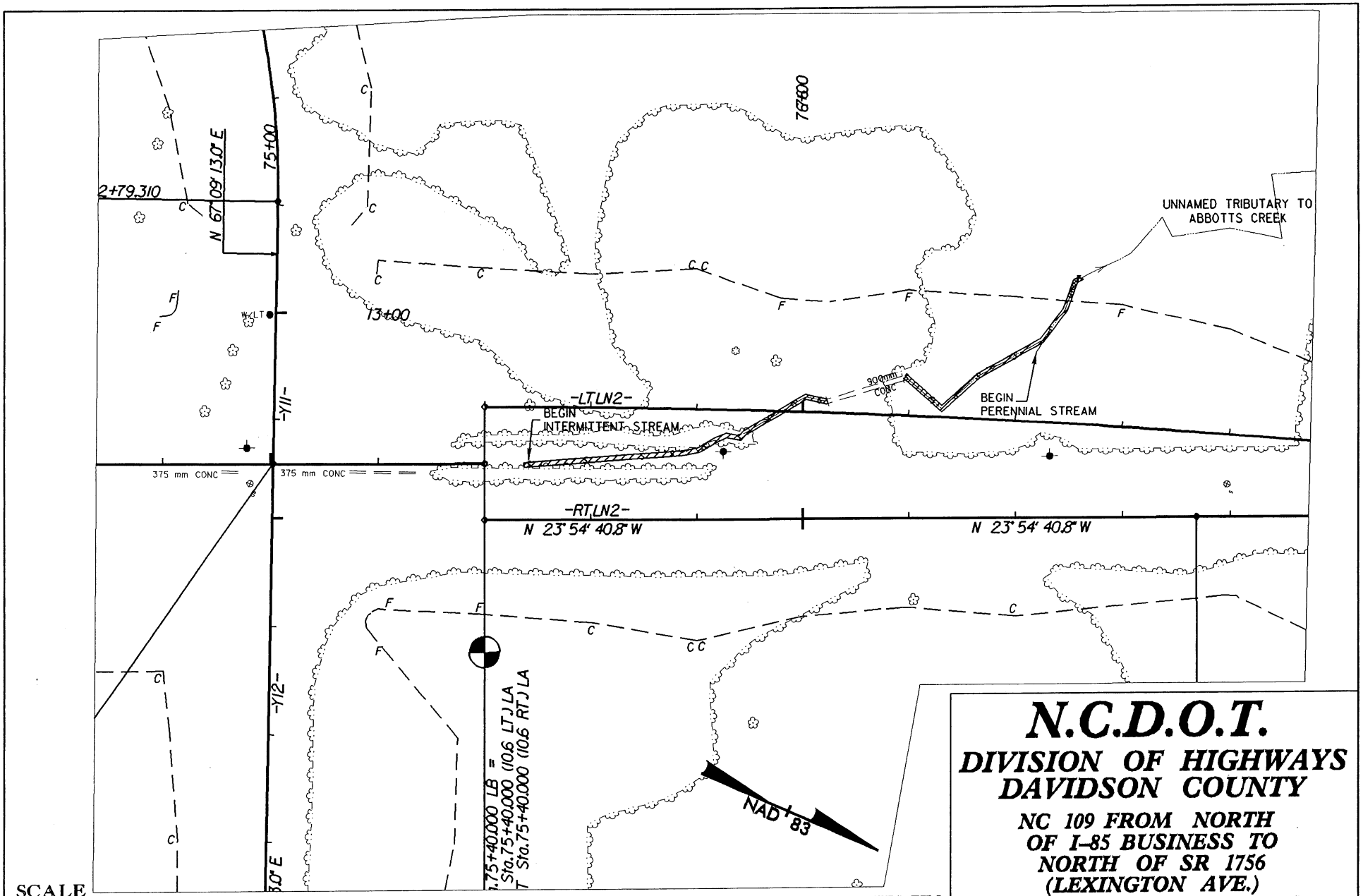
DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B

SHEET 34 OF 40

07/14/04



N.C.D.O.T.

DIVISION OF HIGHWAYS
DAVIDSON COUNTY

NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD M.S.

STATE PROJECT#8.1600901 R-2568B
SHEET 35 OF 40

07/14/04

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS				
			Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Fill In SW (Natural) (ha)	Fill In SW (Pond) (ha)	Temp. Fill In SW (ha)	Existing Channel Impacted (m)	Natural Stream Design (m)
1	29+50-30+20 -L-	1200mm Pipe					0.0130			130	
2	33+55-33+80 -L-	1200mm Pipe	0.0071				0.0070			71	
2a***	37+20 -L-	no structure			.						
3	40+40-40+60 -L-	no structure	0.0110			0.0068					
3a	43+70-44+60 -L-	1650mm Pipe					0.0191			133	
4*	46+60-47+80 -L-	3.35 m X 2.44 m RCBC					0.0550			188	96
5	50+60-51+00 -L-	750mm Pipe	0.0585			0.0038					
6	10+60-11+00 -Y10-	600mm Pipe					0.0023			37	
6	55+60-56+00 -L-	750mm Pipe					0.0063			88	
7	56+70 -L-	600mm Pipe					0.0047			83	
8**	61+31.50 -L-	2@26mX1372mm P/S					0.0198		0.0102	30	
		Conc. Girder Bridge									
9	64+00-66+60 -L-	1050mm Pipe	0.1754		0.0136	0.0276	0.0060			43	
10	75+50-76+50 -L-	900mm Pipe					0.0091			107	
TOTALS:			0.252	0	0.0136	0.038	0.142		0.010	910.5	96

Sites 1, 2, 9, 10: Includes 3m of Temporary impacts for pipe installation for each site.

Sites 3a, 6 & 7: Includes 6m of Temporary impacts for pipe installation for each site.

* Site 4: Includes 25m of temporary impact for culvert/stream construction.

** Site 8: Channel impacts are temporary only. Permanent impacts at this site are associated with the fill of a natural scour hole adjacent to the stream channel.

*** Site 2a: Although no impacts will occur at this site, it has been included in the permit drawings to demonstrate avoidance.

Form Revised 3/22/01

Revised 07/14/04

NCDOT

DIVISION OF HIGHWAYS
DAVIDSON COUNTY
PROJECT 8.1600901 (R-2568B)
NC 109 FROM NORTH OF I-85
BUSINESS TO NORTH OF SR1756
(LEXINGTON AVE.) NORTH OF
LEDFORD MIDDLE SCHOOL

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Fill In Wetlands (ac)	WETLAND IMPACTS: Temp. Fill In Wetlands (ac)	WETLAND IMPACTS: Excavation In Wetlands (ac)	WETLAND IMPACTS: Mechanized Clearing (Method III) (ac)	SURFACE WATER IMPACTS: Fill In SW (Natural) (ac)	SURFACE WATER IMPACTS: Fill In SW (Pond) (ac)	SURFACE WATER IMPACTS: Temp. Fill In SW (ac)	SURFACE WATER IMPACTS: Existing Channel Impacted (ft)	SURFACE WATER IMPACTS: Natural Stream Design (ft)
1	29+50-30+20 -L-	48" Pipe					0.03			427	
2	33+55-33+80 -L-	48" Pipe	0.02				0.02			233	
2a***	37+20 -L-	no structure									
3	40+40-40+60 -L-	no structure	0.03			0.02					
3a	43+70-44+60 -L-	66" Pipe					0.05			437	
4*	46+60-47+80 -L-	11' X 8' m RCBC					0.14			617	315
5	50+60-51+00 -L-	30" Pipe	0.14			0.01					
6	10+60-11+00 -Y10-	24" Pipe					0.01			121	
6	55+60-56+00 -L-	30" Pipe					0.02			289	
7	56+70 -L-	24" Pipe					0.01			273	
8**	61+31.50 -L-	2@85' X 54" P/S Conc. Girder Bridge					0.05		0.030	98	
9	64+00-66+60 -L-	42" Pipe	0.43		0.03	0.07	0.01			141	
10	75+50-76+50 -L-	36" Pipe					0.02			351	
TOTALS:			0.62		0.03	0.100	0.36		0.03	2987	315

Sites 1, 2, 9, 10: Includes 10ft of Temporary impacts for pipe installation for each site.

Sites 3a, 6 & 7: Includes 20ft of Temporary impacts for pipe installation for each site.

* Site 4: Includes 82 feet of Temporary impact for culvert/stream construction.

** Site 8: Channel impacts are temporary only. Permanent impacts at this site are associated with the fill of a natural scour hole adjacent to the stream channel.

*** Site 2a: Although no impacts will occur at this site, it has been included in the permit drawings to demonstrate avoidance.

Form Revised 3/22/01

Revised 07/14/04

NCDOT

DIVISION OF HIGHWAYS
DAVIDSON COUNTY
PROJECT 8.1600901 (R-2568B)
NC 109 FROM NORTH OF I-85
BUSINESS TO NORTH OF SR1756
(LEXINGTON AVE.) NORTH OF
LEDFORD MIDDLE SCHOOL

7/14/04

Site No.	Property Owner Name	Property Owner Address
1	John J. and Catherine E. Seta	3620 Dunhurst Dr., Pfaftown, NC 27040
	Edwin Chandler Gable	PO Box 5393, High Point, NC 27262-5393
	W.D. Talley and wife Kara Lee Talley	257 Reese Road, High Point, NC 27265-9262
	Terry J. Elledge and wife Dianne E. Elledge	PO Box 1535, Welcome, NC 27374
2	Juanita S. Thomas and Wilma S. Brown	1224 Sunset Dr., Asheboro, NC 27203-5126
	Terry L. LaBonte and wife Kimberly J. LaBonte	6810 Colonial Club Dr., Thomasville, NC 27360
	Samuel Gordon Myers and David Luther Myers	514 Garner Towers Lane, Garner, NC 27529
	Eddie A. Harmon	7266 Midway Sch. Rd., Thomasville, NC 27360
2A	Johnny Vernon Gardner and wife, Betty Hinkle Gardner	7157 Midway Sch. Rd., Thomasville, NC 27360
3	Donald L. Saintsing and wife Frances L. Saintsing	7026 Midway Sch. Rd., Thomasville, NC 27360
	Lindy M. Leonard	6919 Midway Sch. Rd., Thomasville, NC 27360
3A	Loren S. Morris and wife Christine Green Morris	795 Echo Trail, Thomasville, NC 27360
4	Loren S. Morris and wife Christine Green Morris	795 Echo Trail, Thomasville, NC 27360
	Sherrill Morris and wife Peggy Morris	123 Von Logan Dr., Thomasville, NC 27360
	Roger Allen Douglas and wife Linda B. Douglas	200 Echo Trail, Thomasville, NC 27360

List of Property Owners

NC Dept. of Transportation
Division of Highways
Davidson County
Project:8.1600901 (R-2568B)

NC 109 From North of I-85 Business to North of SR 1756 (Lexington Ave.) North of Ledford M.S

Site No.	Property Owner Name	Property Owner Address
5	Steven Douglas Coe Terry Bernard Ferrell	273 Reese Road, High Point, NC 27265-9262 2651 N NC Hwy 109, Thomasville, NC 27360-9804
6 & 7	Troy Lee Curry George C. Beusse Jr. and Derree C. Beussse Burley Logan Black and wife Kimberly Laws Black Kenneth Michael Darr and wife Tamara Ingram Darr	168 Troy's Haven, Thomasville, NC 27360-9804 140 Troy's Haven, Thomasville, NC 27360-9804 2887 N NC Hwy 109, Thomasville, NC 27360-9804 PO Box 7163, High Point, NC 27264
8	Charles W. Hiatt and wife Doris S. Hiatt Marvin G. Woempner and wife Peggy S. Woempner W. C. Bodenheimer	3490 N NC Hwy 109, Thomasville, NC 27360-9255 345 Lloyd Murphy Rd., Thomasville, NC 27360-9243 528 Glenn Drive, Thomasville, NC 27360-9247
9	Marvin G. Woempner and wife Peggy S. Woempner Charles W. Hiatt and wife Doris S. Hiatt Patricia Thomas Sartin Linda Gail H. Aderhold and husband Douglas F. Aderhold E.S. Welborn and wife Frances M. Welborn	345 Lloyd Murphy Rd.,Thomasville, NC 27360 3490 N Hwy 109, Thomasville, NC 27360-9255 3475 N Hwy 109, Thomasville, NC 27360 3490 N Hwy 109, Thomasville, NC 27360 4890 W. Lexington Ave.,High Point, NC 27265-9238
10	Davidson Co. Board of Education E.S. Welborn and wife Frances M. Welborn	3954 N Hwy 109, Thomasville, NC 27360 4890 W. Lexington Ave.,High Point, NC 27265-9238

List of Property Owners

NC Dept. of Transportation
Division of Highways
Davidson County
Project:8.1600901 (R-2568B)

NC 109 From North of I-85 Business to North of SR 1756 (Lexington Ave.) North of Ledford M.S

Site No.	Property Owner Name	Property Owner Address
10	Thomas Woodrow Branson	7401 Old Greensboro Rd., Thomasville, NC
	George W. Brady and wife Marion K. Brady	4043 N Hwy 109, Thomasville, NC 27360
	Terry L. Smith and wife Joni C. Smith	4083 N Hwy 109, Thomasville, NC 27360
	J. C. Cridlebaugh Family Limited Partnership	3632 W. Lexington Ave. Extension. High Point, NC 27265

List of Property Owners

NC Dept. of Transportation
Division of Highways

Davidson County
Project:8.1600901 (R-2568B)

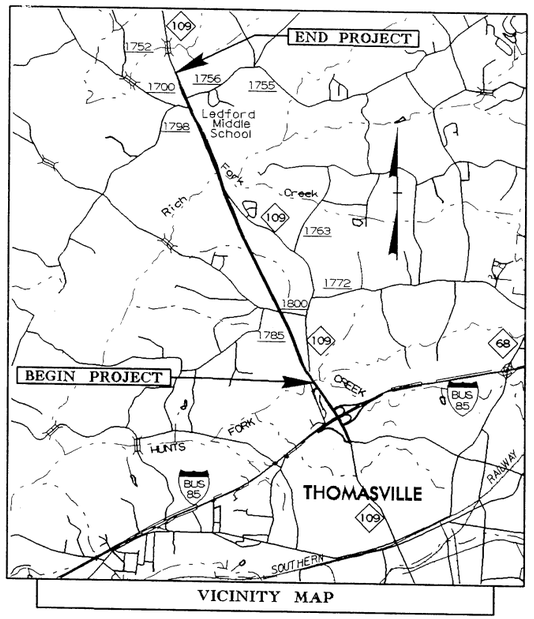
NC 109 From North of I-85 Business to North of SR 1756 (Lexington Ave.) North of Ledford M.S

06/04/04

TIP PROJECT: R-2568B

CONTRACT: C201069

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

DAVIDSON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2568B	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34468.1.3	STP-109(1)	P.E.
34468.2.3	STP-109(5)	R/W & UTIL

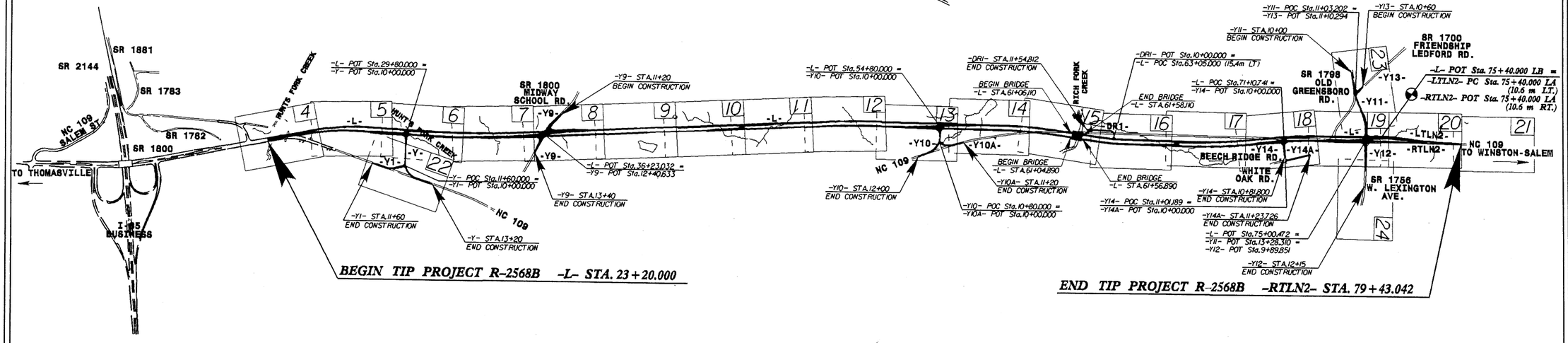
METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

LOCATION: *NC 109 FROM NORTH OF I-85 BUSINESS TO NORTH OF SR 1756 (LEXINGTON AVE.) NORTH OF LEDFORD MIDDLE SCHOOL*

TYPE OF WORK: *GRADING, DRAINAGE, PAVING, STRUCTURES, AND SIGNALS*

NAD 83



NOTE: THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS

GRAPHIC SCALES

PLANS 5 0 10

PROFILE (HORIZONTAL) 5 0 10

PROFILE (VERTICAL) 1 0 2

DESIGN DATA

ADT 2004 = 8,500 - 12,500
ADT 2030 = 19,900 - 26,000
DHV = 10 %
D = 60 %
T = 11 % *
V = 100 km/h

* TTST 6% DUAL 5%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2568B = 5.571 km
LENGTH STRUCTURES TIP PROJECT R-2568B = 0.052 km
TOTAL LENGTH OF TIP PROJECT R-2568B = 5.623 km

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

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 26, 2002

LETTING DATE: NOVEMBER 16, 2004

ROGER D. THOMAS, P.E.
PROJECT ENGINEER

MICHAEL W. LITTLE, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

15-JUN-2004 07:01
R:\Projects\2568b\Roadway\Plans\2568b_title.dgn

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

PROJ. REFERENCE NO.	SHEET NO.
R-2568B	1 - B

*S.U.E = SUBSURFACE UTILITY ENGINEER

ROADS & RELATED ITEMS

- Edge of Pavement
- Curb
- Prop. Slope Stakes Cut — C
- Prop. Slope Stakes Fill — F
- Prop. Woven Wire Fence
- Prop. Chain Link Fence
- Prop. Barbed Wire Fence
- Prop. Wheelchair Ramp — WCR
- Curb Cut For Future Wheelchair Ramp — CCFR
- Exist. Guardrail
- Prop. Guardrail
- Exist. Cable Guiderail
- Prop. Cable Guiderail
- Equality Symbol
- Pavement Removal

RIGHT OF WAY

- Baseline Control Point
- Existing Right of Way Marker
- Exist. Right of Way Line w/Marker
- Prop. Right of Way Line with Proposed R/W marker (Iron Pin & Cap)
- Prop. Right of Way Line with Proposed (Concrete or Granite) R/w Marker
- Exist. Control of Access Line — CA
- Prop. Control of Access Line — CA
- Exist. Easement Line — E
- Prop. Temp. Construction Easement Line — E
- Prop. Temp. Drainage Easement Line — TDE
- Prop. Perm. Drainage Easement Line — PDE

HYDROLOGY

- Stream or Body of Water
- River Basin Buffer — BZ
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Shoreline
- Falls, Rapids
- Prop. Lateral, Tail, Head Ditches — FLOW
- Prop. Berm Ditches — FLOW

STRUCTURES

MAJOR

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

MINOR

- Head & End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Boxes — CB
- Paved Ditch Gutter

UTILITIES

- Exist. Pole
- Exist. Power Pole
- Prop. Power Pole
- Exist. Telephone Pole
- Prop. Telephone Pole
- Exist. Joint Use Pole
- Prop. Joint Use Pole
- Telephone Pedestal — T
- Cable TV Pedestal — C
- Hydrant
- Satellite Dish
- Exist. Water Valve
- Sewer Clean Out
- Power Manhole — P
- Telephone Booth
- Water Manhole — W
- Light Pole
- H-Frame Pole
- Power Line Tower
- Pole with Base
- Gas Valve
- Gas Meter
- Telephone Manhole — T
- Power Transformer
- Sanitary Sewer Manhole
- Storm Sewer Manhole — S
- Tank; Water, Gas, Oil
- Water Tank With Legs
- Traffic Signal Junction Box — S
- Fiber Optic Splice Box — F
- Television or Radio Tower
- Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement — TS TS

- Recorded Water Line — W W
- Designated Water Line (S.U.E.*) — W W
- Sanitary Sewer — SS SS
- Recorded Sanitary Sewer Force Main — FSS FSS
- Designated Sanitary Sewer Force Main(S.U.E.*) — FSS FSS
- Recorded Gas Line — G G
- Designated Gas Line (S.U.E.*) — G G
- Storm Sewer — S S
- Recorded Power Line — P P
- Designated Power Line (S.U.E.*) — P P
- Recorded Telephone Cable — T T
- Designated Telephone Cable (S.U.E.*) — T T
- Recorded U/G Telephone Conduit — TC TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC TC
- Unknown Utility (S.U.E.*) — ?UTL ?UTL
- Recorded Television Cable — TV TV
- Designated Television Cable (S.U.E.*) — TV TV
- Recorded Fiber Optics Cable — FO FO
- Designated Fiber Optics Cable (S.U.E.*) — FO FO
- Exist. Water Meter
- U/G Test Hole (S.U.E.*)
- Abandoned According to U/G Record — ATTUR
- End of Information — E.O.I.

BOUNDARIES & PROPERTIES

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Property Line Symbol — PL
- Exist. Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Property Number — 123
- Parcel Number — 6
- Fence Line — WW & ISBW
- Existing Wetland Boundaries — WLB
- Proposed Wetland Boundaries — WLB
- Existing Endangered Animal Boundaries — EAB
- Existing Endangered Plant Boundaries — EPB

BUILDINGS & OTHER CULTURE

- Buildings
- Foundations
- Area Outline
- Gate
- Gas Pump Vent or U/G Tank Cap
- Church
- School
- Park
- Cemetery
- Dam
- Sign — S
- Well — W
- Small Mine
- Swimming Pool

TOPOGRAPHY

- Loose Surface
- Hard Surface
- Change in Road Surface
- Curb
- Right of Way Symbol — R/W
- Guard Post — GP
- Paved Walk
- Bridge
- Box Culvert or Tunnel
- Ferry
- Culvert
- Footbridge
- Trail, Footpath
- Light House

VEGETATION

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

RAILROADS

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

revised 02/21/02

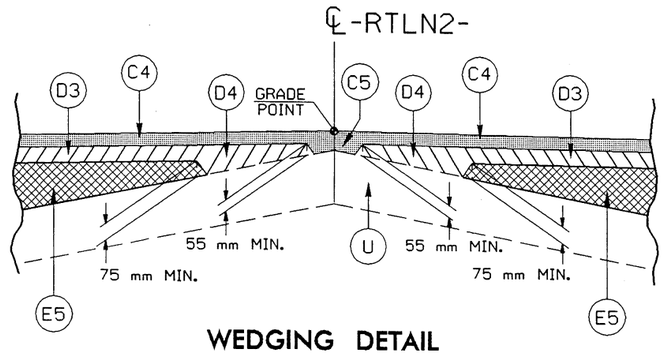
PROJECT REFERENCE NO.	SHEET NO.
R-2568B	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA — PRELIMINARY PLANS — NOT FOR CONSTRUCTION — SEAL 22557 — ENGINEER — MICHAEL W. LITTLE

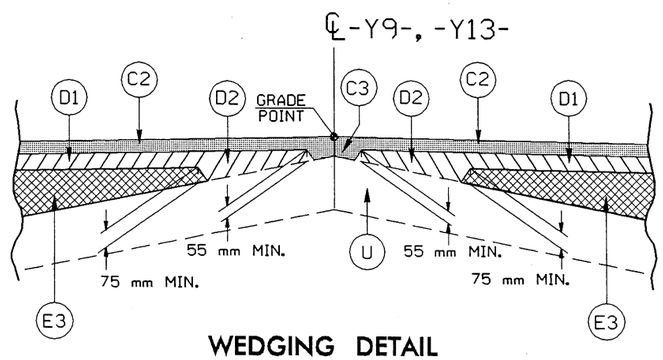
PAVEMENT SCHEDULE

C1	PROP. APPROX. 40 mm ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 96 kg PER SQ. METER	J1	PROP. 150 mm AGGREGATE BASE COURSE.
C2	PROP. APPROX. 80 mm ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 96 kg PER SQ. METER IN EACH OF TWO LAYERS.	J2	PROP. 200 mm AGGREGATE BASE COURSE.
C3	PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 2.40 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 40 mm IN DEPTH.	K	BASE TO BE TREATED WITH LIME TO A DEPTH OF 200 mm, AT A RATE OF 11 kg PER SQ. METER AS DIRECTED BY THE ENGINEER. OR BASE TO BE TREATED WITH AGGREGATE AT A RATE OF 135 kg PER SQ. METER AND CEMENT AT A RATE OF 30 kg PER SQ. METER TO A DEPTH OF 180 mm AS DIRECTED BY THE ENGINEER.
C4	PROP. APPROX. 80 mm ASPHALT CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 96 kg PER SQ. METER IN EACH OF TWO LAYERS.		
C5	PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 2.40 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 40 mm IN DEPTH.	P1	PRIME COAT AT THE RATE OF 1.58 L PER SQ. METER.
D1	PROP. APPROX. 65 mm ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 159 kg PER SQ. METER.	R1	750 mm CONCRETE CURB AND GUTTER.
D2	PROP. VAR. DEPTH ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 2.45 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 55 mm OR GREATER THAN 110 mm IN DEPTH.	R2	SHOULDER BERM GUTTER.
D3	PROP. APPROX. 80 mm ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 196 kg PER SQ. METER.	T	EARTH MATERIAL.
D4	PROP. VAR. DEPTH ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 2.45 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 55 mm OR GREATER THAN 110 mm IN DEPTH.	U	EXISTING PAVEMENT.
E1	PROP. APPROX. 100 mm ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 245 kg PER SQ. METER.	W	VARIABLE DEPTH ASPHALT PAVEMENT. (SEE STANDARD WEDGING DETAIL THIS SHEET)
E2	PROP. APPROX. 120 mm ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE 294 kg PER SQ. METER.		
E3	PROP. VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 2.45 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 75 mm IN DEPTH OR GREATER THAN 140 mm IN DEPTH.		
E4	PROP. APPROX. 90 mm ASPHALT CONC. BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE 221 kg PER SQ. METER.		
E5	PROP. VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 2.45 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 75 mm IN DEPTH OR GREATER THAN 140 mm IN DEPTH.		

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



WEDGING DETAIL



WEDGING DETAIL

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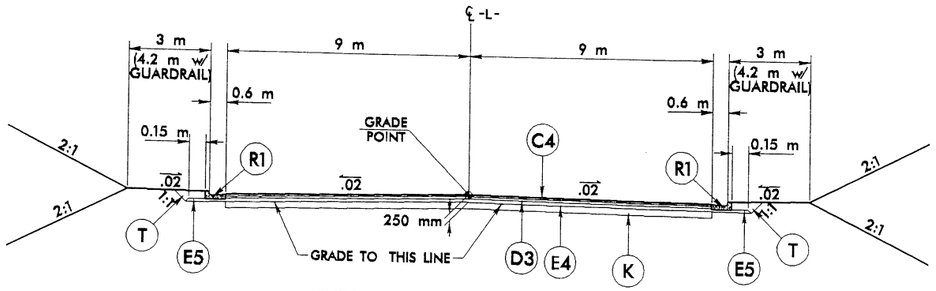
PAVEMENT SCHEDULE	
C4	80 mm S9.5C
D3	80 mm I19.0C
E4	90 mm B25.0C
K	200 mm LIME OR 180 mm AGGREGATE
R1	750 mm CONC. C&G
T	EARTH



TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1

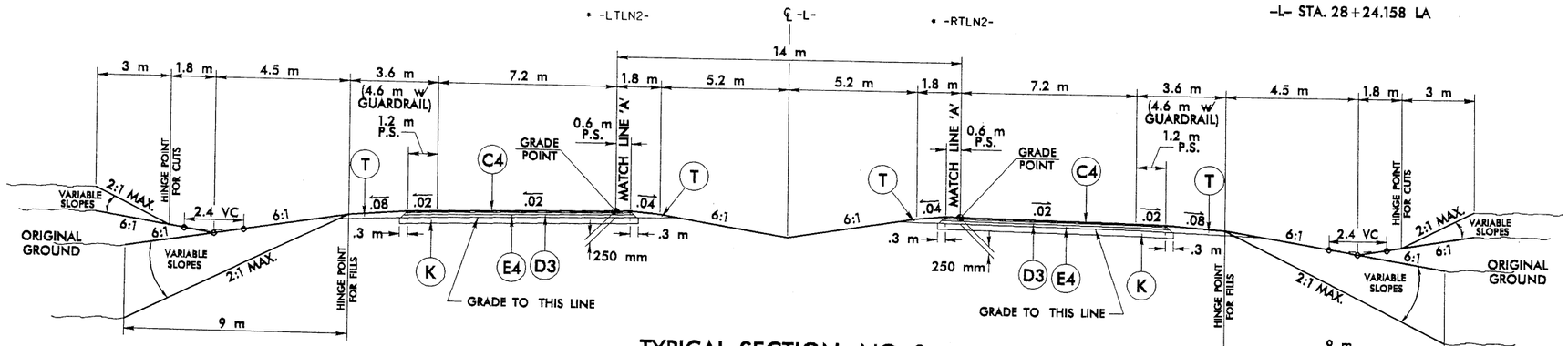
-L- STA. 23+20.000 TO -L- STA. 24+77.475 LB =
-RTLN1- STA. 24+77.475 LA

-L- STA. 23+20.000 TO -L- STA. 24+99.126 LB =
-LTLN1- STA. 24+99.126 LA

TRANSITION FROM T.S. NO. 1 TO T.S. NO. 2

* -RTLN1- STA. 24+77.475 LA TO -RTLN1- STA. 28+02.508 LB =
-L- STA. 28+03.591 LA

* -LTLN1- STA. 24+99.126 LA TO -LTLN1- STA. 28+25.243 LB =
-L- STA. 28+24.158 LA



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

-L- STA. 28+03.591 RT. TO -L- STA. 61+04.890 RT.

-L- STA. 28+24.158 LT. TO -L- STA. 61+06.110 LT.

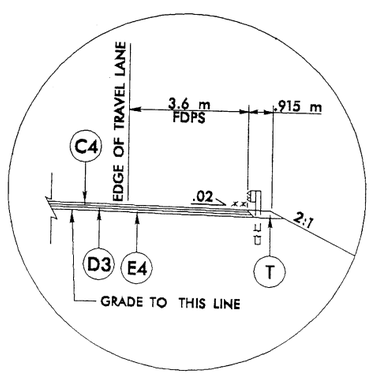
-L- STA. 61+56.890 RT. TO -L- STA. 75+40.000 LB =
-RTLN2- STA. 75+40.000 LA

-L- STA. 61+58.110 LT. TO -L- STA. 75+40.000 LB =
-LTLN2- STA. 75+40.000 LA

TRANSITION FROM T.S. NO. 2 TO EXISTING

* -RTLN2- STA. 75+40.000 LA TO -RTLN2- STA. 79+43.024

* -LTLN2- STA. 75+40.000 LA TO -LTLN2- STA. 79+34.562



INSET NO. 1

USE INSET NO. 1 AT THE FOLLOWING LOCATIONS:

-L- STA. 29+00.000 (LT.) TO -L- STA. 29+47.700 (LT.)
-L- STA. 29+25.310 (RT.) TO -L- STA. 29+58.669 (RT.)
-L- STA. 29+99.925 (LT.) TO -L- STA. 30+28.575 (LT.)
-L- STA. 29+99.987 (RT.) TO -L- STA. 30+80.485 (RT.)
-L- STA. 33+09.719 (RT.) TO -L- STA. 34+40.075 (RT.)
-L- STA. 33+19.915 (LT.) TO -L- STA. 34+15.449 (LT.)
-L- STA. 36+67.496 (RT.) TO -L- STA. 37+40.205 (RT.)
-L- STA. 39+76.960 (RT.) TO -L- STA. 40+62.760 (RT.)
-L- STA. 41+19.925 (LT.) TO -L- STA. 44+67.524 (LT.)
-L- STA. 43+93.705 (RT.) TO -L- STA. 44+68.075 (RT.)
-L- STA. 45+67.740 (RT.) TO -L- STA. 46+82.115 (RT.)
-L- STA. 46+88.495 (LT.) TO -L- STA. 48+73.275 (LT.)
-L- STA. 48+00.000 (RT.) TO -L- STA. 49+61.543 (RT.)
-L- STA. 49+87.4548 (LT.) TO -L- STA. 51+49.697 (LT.)
-L- STA. 50+57.940 (RT.) TO -L- STA. 51+61.990 (RT.)
-L- STA. 53+59.330 (LT.) TO -L- STA. 54+04.761 (LT.)
-L- STA. 54+39.925 (LT.) TO -L- STA. 55+47.257 (LT.)
-L- STA. 55+00.541 (RT.) TO -L- STA. 55-60.985 (RT.)
-L- STA. 55+92.743 (LT.) TO -L- STA. 57+31.452 (LT.)
-L- STA. 64+39.925 (LT.) TO -L- STA. 65+43.068 (LT.)
-L- STA. 64+97.740 (RT.) TO -L- STA. 67+00.000 (RT.)
-L- STA. 70+47.647 (RT.) TO -L- STA. 70+88.391 (RT.)
-L- STA. 70+79.945 (LT.) TO -L- STA. 71+62.518 (LT.)
-L- STA. 71+30.018 (RT.) TO -L- STA. 72-24.398 (RT.)
-L- STA. 74+56.885 (RT.) TO -L- STA. 74+78.859 (RT.)
-L- STA. 75+20.933 (RT.) TO -L- STA. 75+40.000 LB =
-RTLN2- STA. 75+40.000 LA TO -RTLN2- STA. 76+00.480 (RT.)
-L- STA. 75+22.085 (LT.) TO -L- STA. 75+40.000 LB =
-LTLN2- STA. 75+40.000 LA TO -LTLN2- STA. 77+15.396 (LT.)

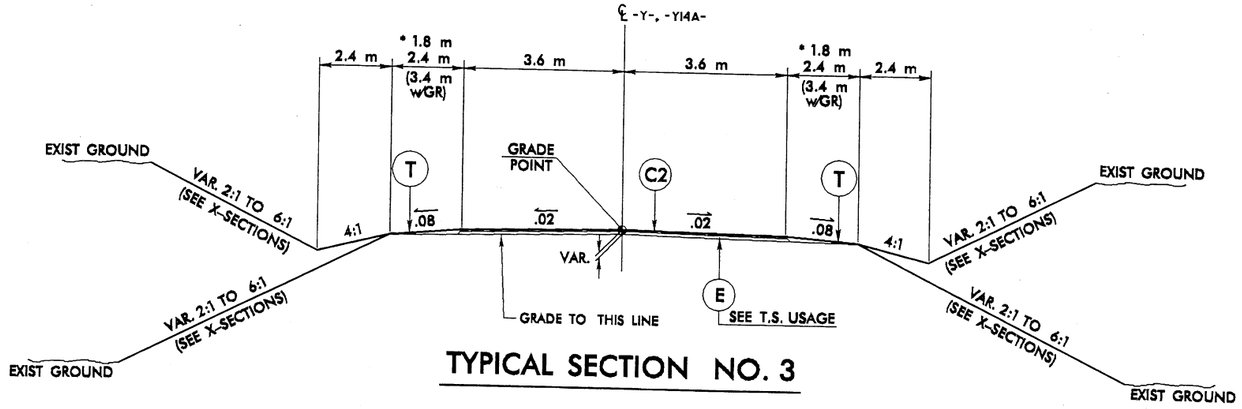
xx See Plans For Shoulder Berm Gutter Locations, use Standard 820.04

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	2-A

ROADWAY DESIGN ENGINEER

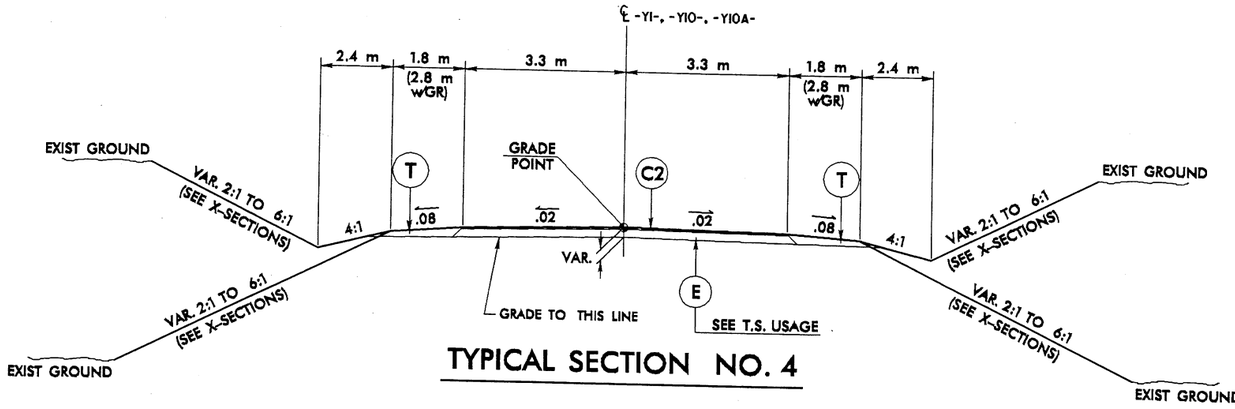
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SEAL 22557 ENGINEER MICHAEL W. LITTLE

PAVEMENT SCHEDULE	
C2	80 mm S9.5B
D1	65 mm I19.0B
E1	100 mm B25.0B
E2	120 mm B25.0B
T	EARTH
U	EXISTING PAVEMENT
W	WEDGING



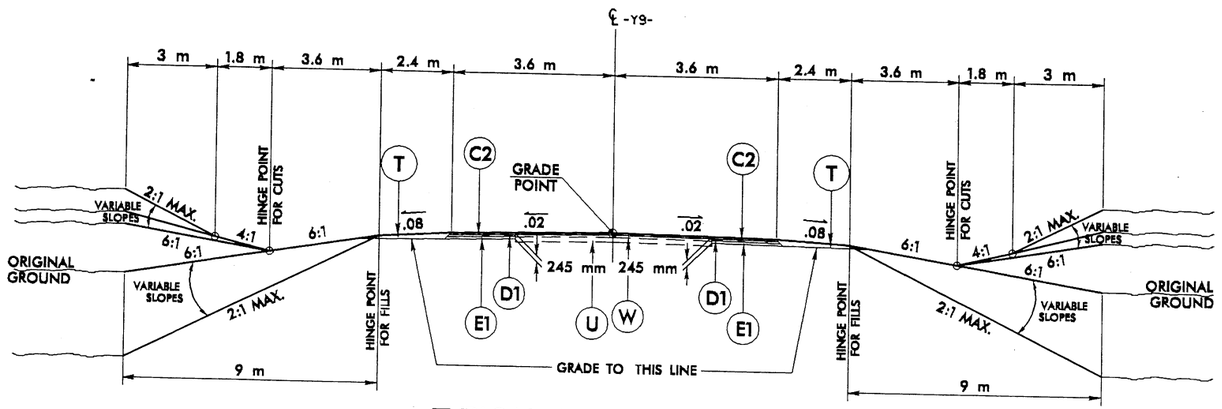
TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3
-Y- STA. 10+31.000 TO -Y- STA. 12+12.000 (E2)
* -Y14A- STA. 10+03.200 TO -Y14A- STA. 11+23.726 (E1)
TRANSITION FROM T.S. NO. 3 TO EXISTING
-Y- STA. 12+12.000 TO -Y- STA. 13+20.000



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4
-Y1- STA. 10+13.600 TO -Y1- STA. 10+66.500 (E2)
-Y10- STA. 10+32.000 TO -Y10- STA. 11+28.000 (E1)
-Y10A- STA. 10+13.300 TO -Y10A- STA. 10+50.000 (E1)
TRANSITION FROM T.S. NO. 4 TO EXISTING
-Y1- STA. 10+66.500 TO -Y1- STA. 11+60.000
-Y10- STA. 11+28.000 TO -Y10- STA. 12+00.000
-Y10A- STA. 10+50.000 TO -Y10A- STA. 11+20.000



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5
-Y9- STA. 11+40.000 TO -Y9- STA. 11+84.000
-Y9- STA. 12+90.000 TO -Y9- STA. 13+20.000
TRANSITION FROM EXISTING TO T.S. NO. 5
-Y9- STA. 11+20.000 TO -Y9- STA. 11+40.000
TRANSITION FROM T.S. NO. 5 TO EXISTING
-Y9- STA. 13+20.000 TO -Y9- STA. 13+40.000

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	2-B

ROADWAY DESIGN ENGINEER

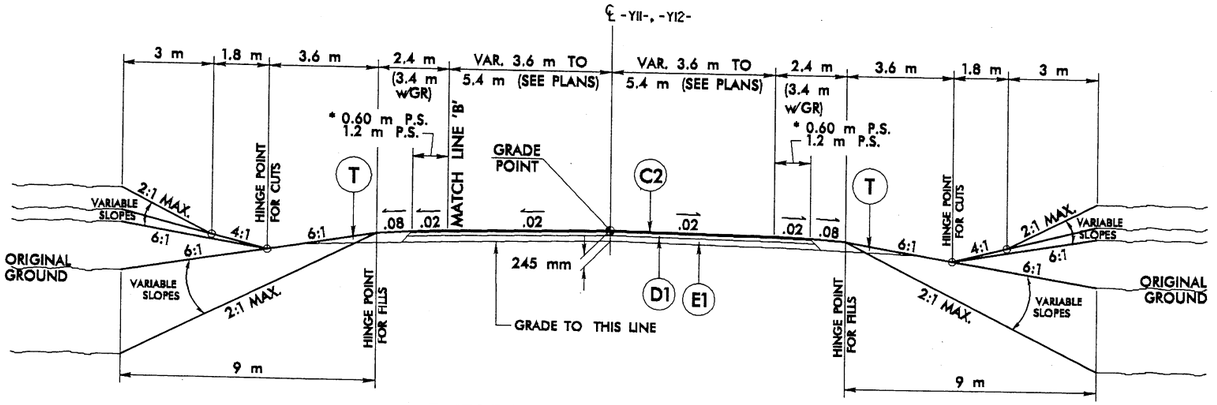
NORTH CAROLINA PRELIMINARY PLANS NOT FOR CONSTRUCTION SEAL 22557 ENGINEER MICHAEL W. LITTLE

PAVEMENT SCHEDULE	
C2	80 mm S9.5B
D1	65 mm I19.0B
E1	100 mm B25.0B
T	EARTH
U	EXISTING PAVEMENT
W	WEDGING

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	2-C

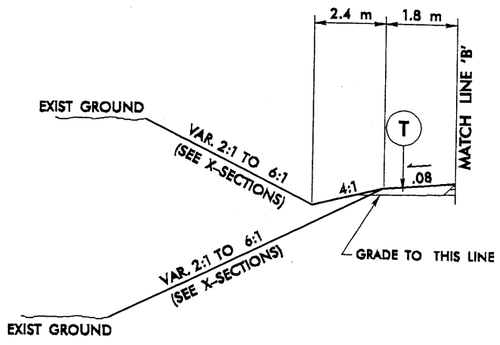
ROADWAY DESIGN ENGINEER

NORTH CAROLINA — PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION — SEAL 22557 — ENGINEER — MICHAEL W. LITTLE



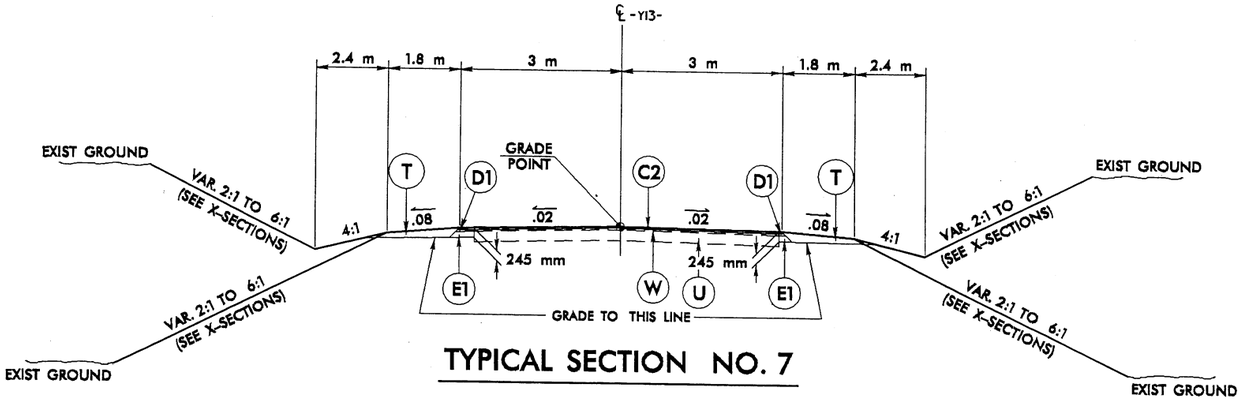
TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6
-Y11- STA. 10+60.000 TO -Y11- STA. 12+93.000
* -Y12- STA. 10+23.000 TO -Y12- STA. 11+40.000
TRANSITION FROM EXISTING TO T.S. NO. 6
-Y11- STA. 10+00.000 TO -Y11- STA. 10+60.000
TRANSITION FROM T.S. NO. 6 TO EXISTING
* -Y12- STA. 11+20.000 TO -Y12- STA. 11+40.000



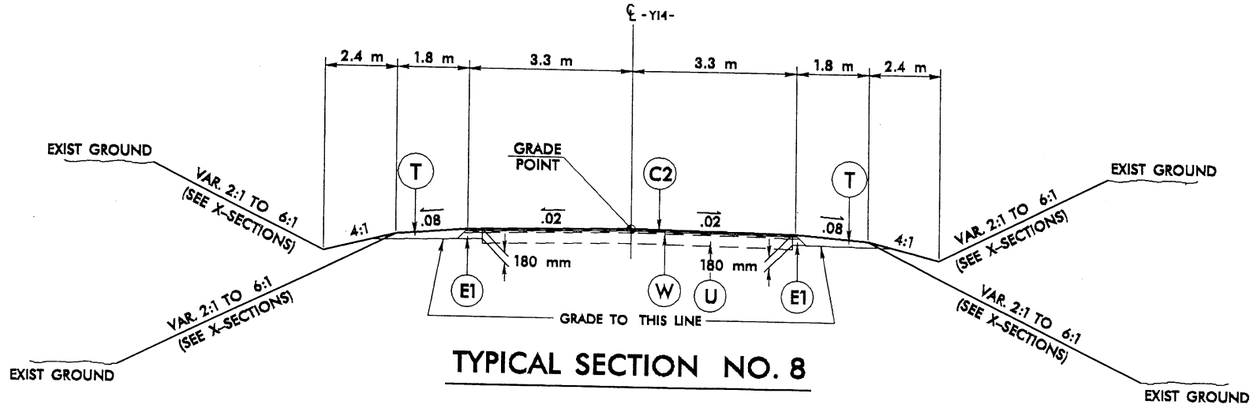
TYPICAL SECTION NO. 6A

USE TYPICAL SECTION NO. 6A
-Y11- STA. 10+20.000 LT. TO -Y11- STA. 10+79.500 LT.
-Y12- STA. 11+40.000 LT. TO -Y12- STA. 12+15.000 LT.



TYPICAL SECTION NO. 7

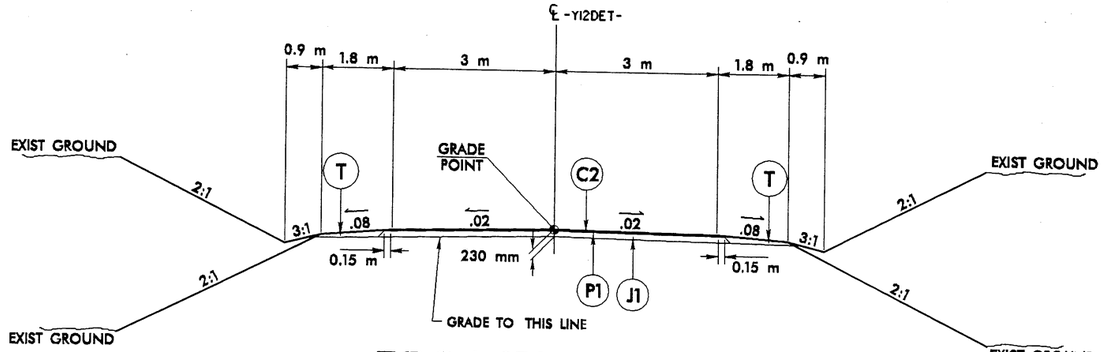
USE TYPICAL SECTION NO. 7
-Y13- STA. 10+80.000 TO -Y13- STA. 10+87.000
TRANSITION FROM EXISTING TO T.S. NO. 7
-Y13- STA. 10+60.000 TO -Y13- STA. 10+80.000



TYPICAL SECTION NO. 8

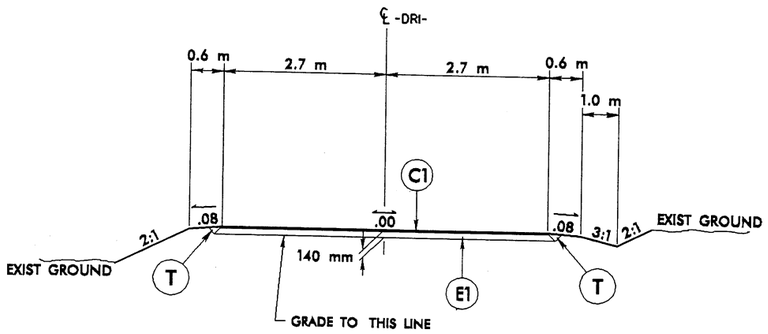
USE TYPICAL SECTION NO. 8
-Y14- STA. 10+33.000 TO -Y14- STA. 10+81.800

PAVEMENT SCHEDULE	
C1	40 mm S9.5B
C2	80 mm S9.5B
E1	100 mm B25.0B
J1	150 mm ABC
J2	200 mm ABC
P1	PRIME COAT @ 1.58 L
T	EARTH
U	EXISTING PAVEMENT
W	WEDGING



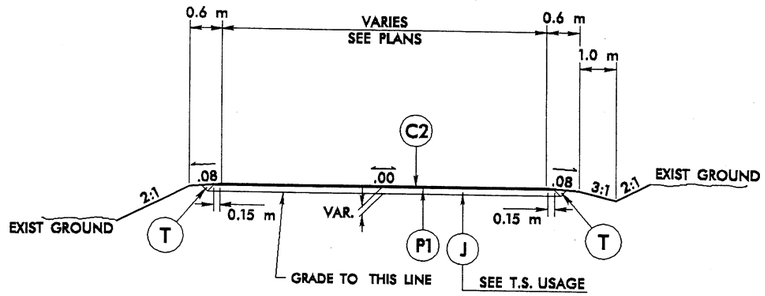
TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9
-Y12DET- STA. 10+16.252 TO -Y12DET- STA. 12+15.832
TRANSITION FROM T.S. NO. 9 TO EXISTING
-Y12DET- STA. 12+15.832 TO -Y12DET- STA. 12+45.860



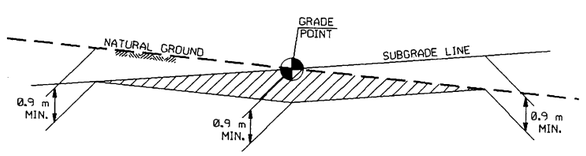
TYPICAL SECTION NO. 10

USE TYPICAL SECTION NO. 10
-DR1- STA. 10+00.000 TO -DR1- STA. 11+54.812



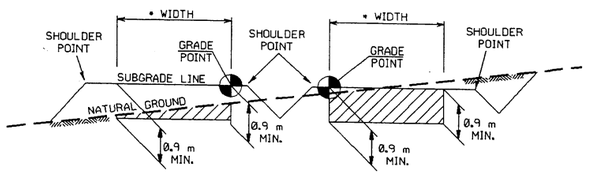
TYPICAL SECTION NO. 11

USE TYPICAL SECTION NO. 10
ALL DRIVES 7% AND UNDER (J1)
ALL DRIVES OVER 7% (J2)



PROFILE VIEW

DEPTH AND LOCATION TO BE DETERMINED BY THE ENGINEER



CROSS-SECTION VIEW

* WIDTH TO BE DETERMINED BY THE ENGINEER

DETAIL OF GRADE POINT UNDERCUT

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	2-D

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION SEAL 22557 ENGINEER MICHAEL W. LITTLE

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MLittle
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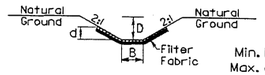
PROJECT REFERENCE NO.	SHEET NO.
R-2568B	2-F
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL "A"
BASE DITCH
(Not to Scale)

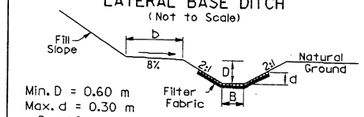


Min. D = 0.60 m
Max. d = 0.30 m
B = 1.5 m

Type of Liner = CLASS "I" RIP RAP

-L- STA.23+60 TO -L- STA.23+70 (LT)

DETAIL "B"
LATERAL BASE DITCH
(Not to Scale)

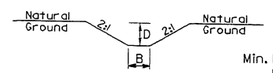


Min. D = 0.60 m
Max. d = 0.30 m
B = 1.2 m
b = vary

Type of Liner = CLASS "B" RIP RAP

-RTLN1- STA.25+40 TO -RTLN1- STA.25+80 (RT)

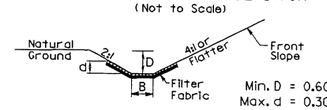
DETAIL "C"
BASE DITCH
(Not to Scale)



Min. D = 0.60 m
B = 0.60 m

-L- STA.28+60 TO -L- STA.28+77 (LT)
-L- STA.65+35 (LT)

DETAIL "D"
SPECIAL LATERAL BASE DITCH
(Not to Scale)

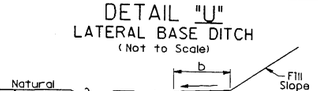


Min. D = 0.60 m
Max. d = 0.30 m
B = 0.60 m

Type of Liner = CLASS "B" RIP RAP

-L- STA.29+40 TO -L- STA.29+60 (RT) Reverse Detail
-L- STA.41+20 TO -L- STA.41+60 (LT)
-L- STA.75+20 TO -RTLN2- STA.76+00 (LT)

DETAIL "E"
LATERAL 'V' DITCH
(Not to Scale)



Min. D = 0.60 m
Max. d = 0.30 m
b = 1.0 m

Type of Liner = CLASS "A" RIP RAP

-Y- STA.10+40 TO -Y- STA.10+60 (RT)
-L- STA.34+00 TO -L- STA.34+40 (RT)
-L- STA.55+65 TO -L- STA.55+80 (RT)

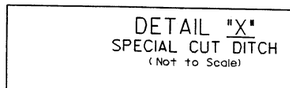
DETAIL "F"
LATERAL BASE DITCH
(Not to Scale)

Min. D = 0.60 m
Max. d = 0.30 m
B = 0.60 m
b = 1.0 m

Type of Liner = CLASS "B" RIP RAP

-L- STA.30+00 TO -L- STA.30+20 (RT) Reverse Detail
-L- STA.53+60 TO -L- STA.54+00 (LT)
-L- STA.75+20 TO -L- STA.75+40 (RT) Reverse Detail
-RTLN2- STA.76+20 TO -RTLN2- STA.76+40 (LT)

DETAIL "G"
LATERAL BASE DITCH
(Not to Scale)



Min. D = 0.60 m
Max. d = 0.30 m
B = 0.60 m
b = 1.0 m

Type of Liner = CLASS "I" RIP RAP

-L- STA.30+20 TO -L- STA.30+60 (RT) Reverse Detail
-L- STA.40+20 TO -L- STA.40+40 (RT) Reverse Detail
-L- STA.48+40 TO -L- STA.48+80 (LT)

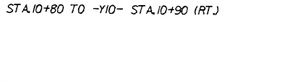
DETAIL "H"
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Min. D = 0.60 m
Max. d = 0.30 m
B = 0.60 m

Type of Liner = CLASS "I" RIP RAP

-L- STA.30+00 TO -L- STA.30+20 (LT)
* -L- STA.39+60 TO -L- STA.40+20 (RT) Reverse Detail (2:1 Slope)
-L- STA.44+00 TO -L- STA.44+60 (RT) Reverse Detail

DETAIL "I"
TOE PROTECTION
(Not to Scale)



d = 0.30 m

Type of Liner = CLASS "B" RIP RAP

-L- STA.33+40 TO -L- STA.34+00 (RT)
-L- STA.33+80 TO -L- STA.34+20 (LT)
-L- STA.41+60 TO -L- STA.42+00 (LT)
-L- STA.43+70 TO -L- STA.44+40 (LT)
-L- STA.48+90 TO -L- STA.49+15 (RT)
-L- STA.50+60 TO -L- STA.51+60 (RT)
-L- STA.56+80 TO -L- STA.57+20 (RT)
-L- STA.65+00 TO -L- STA.65+60 (RT)
-L- STA.66+00 TO -L- STA.66+40 (RT)

DETAIL "J"
LATERAL BASE DITCH
(Not to Scale)

Min. D = 0.60 m
Max. d = 0.30 m
B = 0.60 m
b = 1.5 m

Type of Liner = CLASS "B" RIP RAP

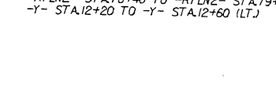
-L- STA.36+80 TO -L- STA.37+10 (RT)
-L- STA.60+27 TO -L- STA.60+40 (RT)

DETAIL "K"
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Min. D = 0.60 m
B = 0.60 m

-L- STA.39+00 TO -L- STA.40+00 (LT)
-L- STA.61+60 TO -L- STA.63+00 (LT)

DETAIL "L"
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D = 0.60 m
Max. d = 0.30 m

Type of Liner = CLASS "A" RIP RAP

-L- STA.43+80 TO -L- STA.44+00 (RT) Reverse Detail
-L- STA.55+80 TO -L- STA.56+80 (RT) Reverse Detail
-L- STA.60+20 TO -L- STA.60+40 (LT)
-L- STA.67+40 TO -L- STA.67+80 (RT) Reverse Detail
-L- STA.71+25 TO -L- STA.71+80 (RT) Reverse Detail
-RTLN2- STA.75+40 TO -RTLN2- STA.76+00 (RT) Reverse Detail

DETAIL "M"
BASE DITCH
(Not to Scale)

Min. D = 0.60 m
Max. d = 0.30 m
B = 0.60 m

Type of Liner = CLASS "B" RIP RAP

-L- STA.46+20 (LT)
-RTLN2- STA.78+22 TO -RTLN2- STA.78+30 (RT)

DETAIL "N"
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Min. D = 0.60 m
Max. d = 0.30 m
B = 1.0 m

Type of Liner = CLASS "B" RIP RAP

-L- STA.46+20 TO -L- STA.46+70 (LT)

DETAIL "O"
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Min. D = 0.60 m
Max. d = 0.30 m

Type of Liner = CLASS "B" RIP RAP

-L- STA.46+80 TO -L- STA.47+40 (RT)
-Y12- STA.10+28 TO -Y12- STA.10+60 (RT)

DETAIL "P"
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Min. D = 0.60 m

-L- STA.37+00 TO -L- STA.37+20 (LT)
-L- STA.47+40 TO -L- STA.47+80 (RT) Reverse Detail

DETAIL "R"
LATERAL BASE DITCH
(Not to Scale)

Min. D = 0.60 m
Max. d = 0.30 m
B = 0.60 m
b = 1.50 m

Type of Liner = CLASS "I" RIP RAP

-L- STA.50+60 TO -L- STA.51+40 (LT)

DETAIL "S"
'V' DITCH
(Not to Scale)

Min. D = 0.60 m
Max. d = 0.30 m

Type of Liner = CLASS "A" RIP RAP

-Y10- STA.10+60 TO -Y10- STA.10+80 (RT)
-L- STA.74+60 TO -L- STA.74+80 (LT)
-Y11- STA.12+85 TO -Y11- STA.12+95 (LT.& RT.)

DETAIL "T"
LATERAL BASE DITCH
(Not to Scale)

Min. D = 0.60 m
Max. d = 0.30 m
B = 0.60 m
b = 1.0 m

Type of Liner = CLASS "A" RIP RAP

-Y10- STA.10+80 TO -Y10- STA.10+90 (RT)

DETAIL "U"
LATERAL BASE DITCH
(Not to Scale)

Min. D = 0.60 m
B = 0.60 m
b = 1.50 m

-L- STA.60+40 TO -L- STA.61+10 (LT)
-L- STA.60+40 TO -L- STA.61+10 (RT) Reverse Detail

DETAIL "W"
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Min. D = 0.60 m
Max. d = 0.35 m

Type of Liner = CLASS "A" RIP RAP

-L- STA.71+80 TO -L- STA.72+20 (RT)
-L- STA.73+80 TO -L- STA.74+80 (RT)

DETAIL "X"
SPECIAL CUT DITCH
(Not to Scale)

Min. D = 0.60 m

-L- STA.36+80 TO -L- STA.37+00 (LT)
-L- STA.51+60 TO -L- STA.52+40 (RT) Reverse Detail
-RTLN2- STA.78+40 TO -RTLN2- STA.79+00 (RT) Reverse Detail
-Y- STA.12+20 TO -Y- STA.12+60 (LT)

DETAIL "Y"
RIP RAP @ EMBANKMENT
(Not to Scale)

Type of Liner = CLASS "II" RIP RAP Est. 30 Tons

SEE PLANS (SHEET 15)

DETAIL "Z"
LATERAL BASE DITCH
(Not to Scale)

Min. D = 0.60 m
Max. d = 0.30 m
B = 1.0 m
b = 1.0 m

Type of Liner = CLASS "I" RIP RAP

-L- STA.65+00 TO -L- STA.65+20 (LT)

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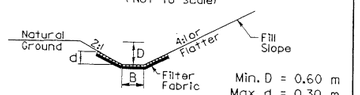
M:\title R:\2568B\roadway\dgn\2568b_details.dgn
kaf PROJECT 2568B

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	2-F
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL "AA"
SPECIAL LATERAL BASE DITCH
(Not to Scale)

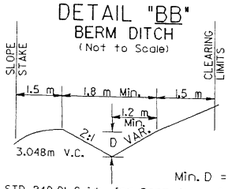


Min. D = 0.60 m
Max. d = 0.30 m
B = 1.0 m

Type of Liner = CLASS 'I' RIP RAP

-L- STA.65+20 TO -L- STA.65+40 (LT)

DETAIL "BB"
BERM DITCH
(Not to Scale)

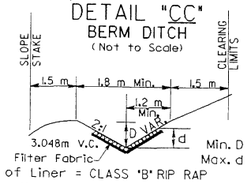


Min. D = 0.30 m

Also, see STD. 240.01, Guide for Berm Ditch Construction

-L- STA.26+00 TO -L- STA.26+40 (LT)
-L- STA.28+00 TO -L- STA.28+60 (RT) Reverse Detail
-L- STA.51+65 TO -L- STA.52+00 (LT)
-L- STA.73+00 TO -L- STA.73+40 (LT)
-RTLN2- STA.76+20 TO -RTLN2- STA.76+80 (RT) Reverse Detail

DETAIL "CC"
BERM DITCH
(Not to Scale)



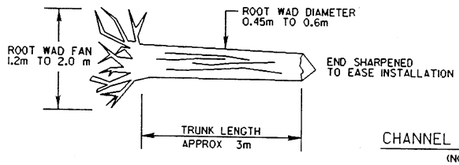
Min. D = 0.60 m
Max. d = 0.30 m

Type of Liner = CLASS 'B' RIP RAP

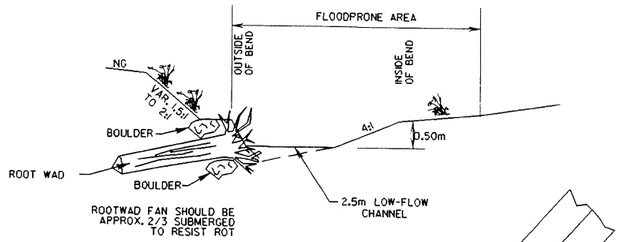
Also, see STD. 240.01, Guide for Berm Ditch Construction

-L- STA.28+60 TO -L- STA.29+50 (RT) Reverse Detail
-L- STA.52+80 TO -L- STA.53+40 (LT)
-L- STA.53+00 TO -L- STA.53+60 (RT) Reverse Detail
-L- STA.61+80 TO -L- STA.64+40 (RT) Reverse Detail

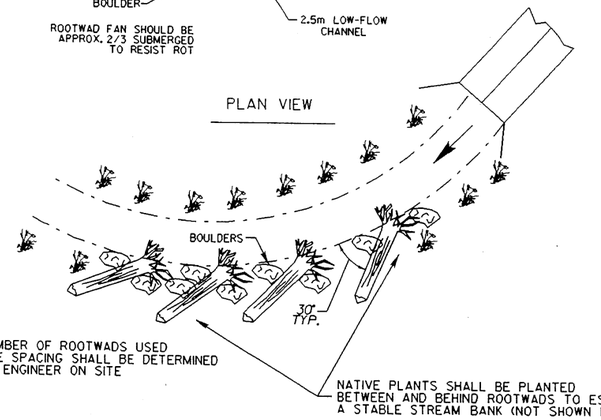
ROOT WAD DIMENSIONS



CHANNEL SECTION, IN BEND
(NOT TO SCALE)



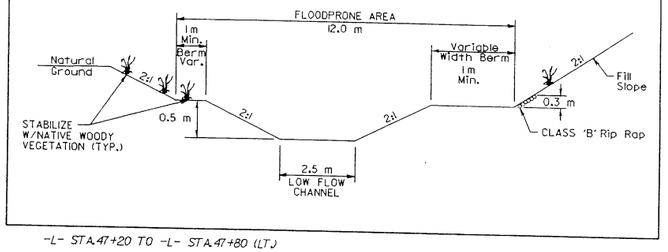
PLAN VIEW



THE NUMBER OF ROOTWADS USED AND THE SPACING SHALL BE DETERMINED BY THE ENGINEER ON SITE

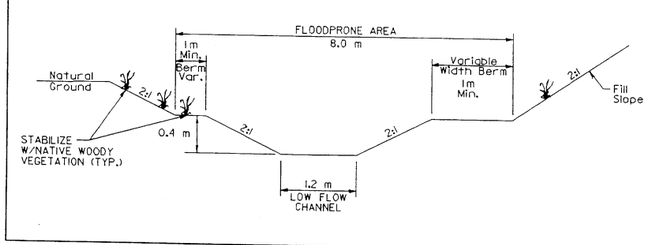
NATIVE PLANTS SHALL BE PLANTED BETWEEN AND BEHIND ROOTWADS TO ESTABLISH A STABLE STREAM BANK (NOT SHOWN HERE FOR CLARITY)

DETAIL "DD"
2.5 m BASE STREAM RELOCATION
(Not to Scale)



-L- STA.47+20 TO -L- STA.47+80 (LT)

DETAIL "EE"
1.2 m BASE STREAM RELOCATION
(Not to Scale)

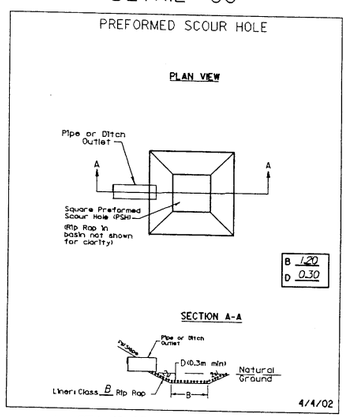


-L- STA.64+20 TO -L- STA.64+80 (LT)

DETAIL "FF"
FALSE SUMP
(Not to Scale)

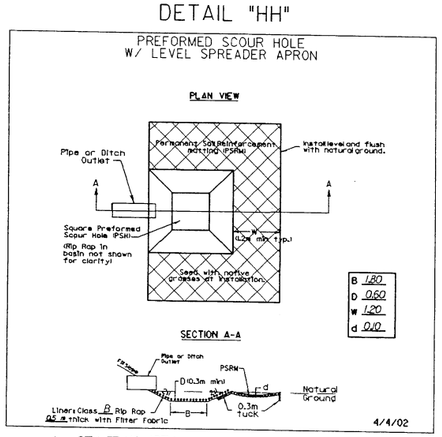
-L- STA.51+65 (LT)

DETAIL "GG"
PREFORMED SCOUR HOLE



-L- STA 46+93 (LT)

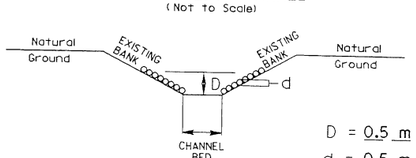
DETAIL "HH"
PREFORMED SCOUR HOLE
W/ LEVEL SPREADER APRON



-L- STA.37+15 (RT)
-L- STA 40+40 (RT)
-L- STA 46+80 (RT)
-L- STA 50+60 (RT)

2@-L- STA.51+00 (RT)
-L- STA 61+00 (RT)
-L- STA 61+00 (LT)

DETAIL "II"
PIPE OUTLET CHANNEL
(Not to Scale)

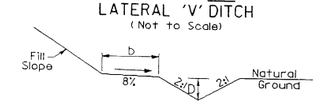


D = 0.5 m
d = 0.5 m

Length = 4.8 m
Est. = 2.0 Tons of Class B RipRap

-L- STA.33+60 (LT)

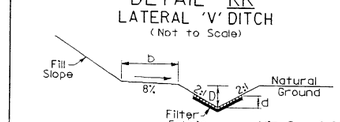
DETAIL "JJ"
LATERAL 'V' DITCH
(Not to Scale)



Min. D = 0.60 m
b = 1.50 m

-L- STA.48+00 TO -L- STA.48+60 (RT)

DETAIL "KK"
LATERAL 'V' DITCH
(Not to Scale)



Min. D = 0.60 m
Max. d = 0.30 m
b = 1.50 m

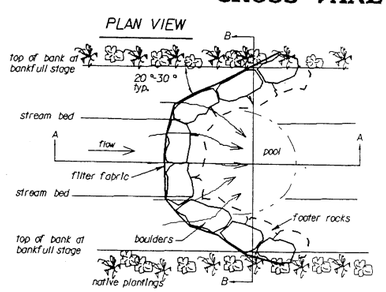
Type of Liner = CLASS 'B' RIP RAP

-L- STA.48+60 TO -L- STA.48+90 (RT)

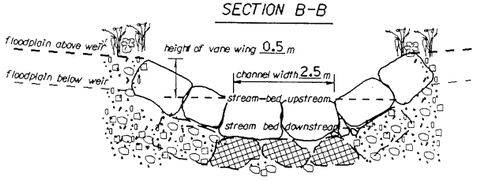
NATURAL CHANNEL DESIGN DETAILS
OUTLET OF CULVERT AT -L- 47+20 (LT)

CROSS VANE ROCK WEIR DETAIL

PLAN VIEW



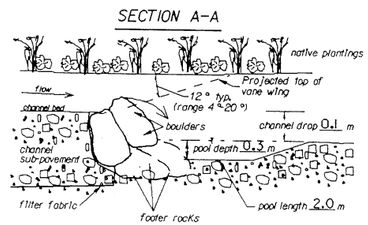
SECTION B-B



Note: Boulders should be native stone or shot rock, angular and oblong with axis approximately 1.2 m in length

Note: Rocks should fit tightly. Trim filter fabric flush with top of rocks.

SECTION A-A



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M.Little
R2568B

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	4
R/W SHEET NO.	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

-L-
Pls Sta. 25+59.134
Os = 2°56'47.9"
Ls = 90.000
LT = 60.008
ST = 30.008

-LTLNI-
Pls Sta. 25+80.786
Os = 2°56'47.9"
Ls = 90.000
LT = 60.008
ST = 30.008

-RTLNI-
Pls Sta. 25+37.483
Os = 2°56'47.9"
Ls = 90.000
LT = 60.008
ST = 30.008

NAD 83

WOODS

NC 109 SALEM ST. 66 BST

APPROXIMATE LOCATION OF FORCE MAIN

APPROXIMATE LOCATION

-L- POT Sta. 23+20.000

HUNTS FORK CREEK

1800 mm CHL&3.5%SW SANITARY SEWER STATION (INACCESSIBLE)

TOP=217.599
INV=214.444

1.5 m BASE DITCH W/CLASS 'I' RIP RAP SEE DETAIL "A" EST. 58 m³ DDE S = 8.00%

PROPOSED GUARDRAIL

PROPOSED C&G

REMOVE EXISTING GUARDRAIL

OBLITERATE & REMOVE

GUARDRAIL BARRICADE

EXISTING R/W

CAT-1

GRAU-350

R-2568A

N 35° 22' 11.0" W
-LTLNI-

-RTLNI-

BEGIN WW C/A FENCE

END C&G

REMOVE 200 mm CMP

PROP. TURNAROUND

PROPOSED WOVEN WIRE FENCE

12 m LATERAL BASE DITCH W/ CLASS 'B' RIP RAP EST. 89 m³ DDE SEE DETAIL "B"

EXIST. R/W 15.5 m (50.85')

ELLIS R. KENNERLY AND WIFE, LINDA R. KENNERLY
DB 383 PG 561

ELLIS R. KENNERLY AND WIFE, LINDA R. KENNERLY
DB 552 PG 630

CATHERINE E. AND JOHN J. SETA
DB 779 PG 1319

LILLIE MAE PARSONS
DB. 464 PG. 8

FRED P. VEACH AND WIFE, CHRISTINE S. VEACH
DB 304 PG 620

CALVIN R. HILL AND WIFE, DOROTHY MAY HILL
DB 334 PG 249

LLOYD SINK AND WIFE, PEGGY P. SINK
DB 172 PG 544
DB 305 PG 585

VEACH FARM RD.

IDENTITY:
-L- TS Sta. 24+99.126 LB =
-LTLNI- POT Sta. 24+99.126 (1.8m LT) LA

-LTLNI- TS Sta. 25+20.777

IDENTITY:
-L- POT Sta. 24+77.475 LB =
-RTLNI- TS Sta. 24+77.475 (1.8m RT) LA

-L- STA. 25+60

MATCH TO SHEET NO. 5

BEGIN PROJECT R-2568B
-L- STA. 23+20.000

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "WALLBURG RM 2" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 251,275.090(m) EASTING: 506,740.831(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999919580
THE N.C. LAMBERT GRID BEARING LOCALIZED HORIZONTAL GROUND DISTANCE FROM "WALLBURG RM 2" TO -L- STATION 23+20.000 IS S 18° 26' 14.85" E 12,112.371 m
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NOTES: (1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 26 FOR -L-, -LTLNI- & -RTLNI- PROFILES

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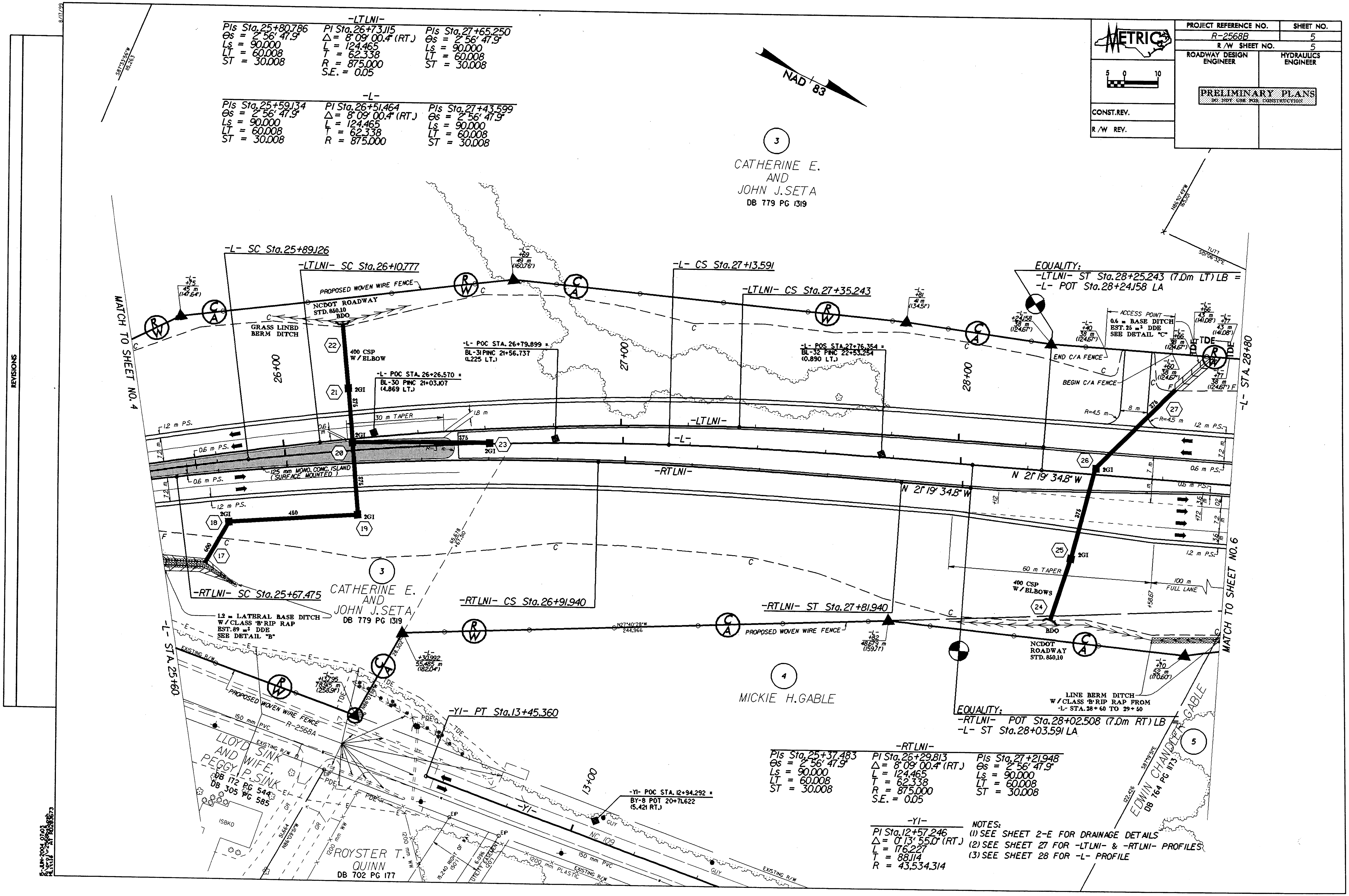

METRIC
PROJECT REFERENCE NO. R-2568B
SHEET NO. 5
R/W SHEET NO. 5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
5 0 10
REVISIONS
8/17/99
-LTLNI-
PIs Sta.25+80.786 Θs = 2°56' 47.9" Ls = 90.000 LT = 60.008 ST = 30.008
PI Sta.26+73.115 Δ = 8°09' 00.4" (RT.) L = 124.465 T = 62.338 R = 875.000 S.E. = 0.05
PIs Sta.27+65.250 Θs = 2°56' 47.9" Ls = 90.000 LT = 60.008 ST = 30.008
-L-
PIs Sta.25+59.134 Θs = 2°56' 47.9" Ls = 90.000 LT = 60.008 ST = 30.008
PI Sta.26+51.464 Δ = 8°09' 00.4" (RT.) L = 124.465 T = 62.338 R = 875.000
PIs Sta.27+43.599 Θs = 2°56' 47.9" Ls = 90.000 LT = 60.008 ST = 30.008
NAD 83
CATHERINE E. AND JOHN J.SETA DB 779 PG 1319
MATCH TO SHEET NO. 4
MATCH TO SHEET NO. 6
-L- SC Sta.25+89.126
-LTLNI- SC Sta.26+10.777
-L- CS Sta.27+13.591
-LTLNI- CS Sta.27+35.243
EQUALITY: -LTLNI- ST Sta.28+25.243 (7.0m LT) LB = -L- POT Sta.28+24.158 LA
PROPOSED WOVEN WIRE FENCE
NCDOT ROADWAY STD. 850.10
GRASS LINED BERM DITCH
400 CSP W/ELBOW
-L- POC STA. 26+26.570 = BL-30 PINC 21+03.107 (4.869 LT.)
-L- POC STA. 26+79.899 = BL-31 PINC 21+56.737 (1.225 LT.)
-L- POS STA.27+76.354 = BL-32 PINC 22+53.254 (0.890 LT.)
ACCESS POINT
0.6 m BASE DITCH EST. 25 m³ DDE SEE DETAIL "C"
END C/A FENCE
BEGIN C/A FENCE
125 mm MONO. CONC. ISLAND (SURFACE MOUNTED)
N 21° 19' 34.8" W
-RTLNI- SC Sta.25+67.475
-RTLNI- CS Sta.26+91.940
-RTLNI- ST Sta.27+81.940
1.2 m LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST. 89 m³ DDE SEE DETAIL "B"
60 m TAPER
100 m FULL LANE
400 CSP W/ELBOWS
NCDOT ROADWAY STD. 850.10
LINE BERM DITCH W/CLASS 'B' RIP RAP FROM -L- STA. 28+60 TO 29+50
EQUALITY: -RTLNI- POT Sta.28+02.508 (7.0m RT) LB = -L- ST Sta.28+03.591 LA
-L- STA. 25+60
-L- STA. 28+80
MICKIE H.GABLE
-Y1- PT Sta.13+45.360
-Y1- POC STA. 12+94.292 = BY-8 POT 20+71.622 (5.421 RT.)
LLOYD SINK AND WIFE, PEGGY P. SINK DB 172 PG 544 DB 305 PG 585
ROYSTER T. QUINN DB 702 PG 177
EDWIN CHANDLER GABLE DB 764 PG 1173
NC 109
-RTLNI-
PIs Sta.25+37.483 Θs = 2°56' 47.9" Ls = 90.000 LT = 60.008 ST = 30.008
PI Sta.26+29.813 Δ = 8°09' 00.4" (RT.) L = 124.465 T = 62.338 R = 875.000 S.E. = 0.05
PIs Sta.27+21.948 Θs = 2°56' 47.9" Ls = 90.000 LT = 60.008 ST = 30.008
-Y1-
PI Sta.12+57.246 Δ = 0°13' 55.0" (RT.) L = 176.227 T = 88.114 R = 43,534.314
NOTES:
(1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 27 FOR -LTLNI- & -RTLNI- PROFILES
(3) SEE SHEET 28 FOR -L- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	6
R/W SHEET NO.	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

REVISIONS

6/17/93

TRAFFIC DIAGRAM

12,500 / 26,000 — 11,100 / 23,100 — -L-

1,400 / 2,900 — <100 / <100

2004 ADT / 2030 ADT — 1,400 / 2,900

-Y-

-L-
PI Sta. 32+73.213
Δ = 5° 45' 24.5" (LT.)
L = 351.160
T = 175.728
R = 3,495.000
S.E. = RC
RUNOFF = 54

NAD 83

105.293
S04°13'41"W

S04°08'39"W

105.293

EDWIN CHANDLER GABLE
DB 764 PG 1173
5

W.D.TALLEY AND WIFE,
KARA LEE TALLEY
DB 616 PG 899
6

TERRY J.ELLEDGE AND WIFE,
DIANNE E.ELLEDGE
DB 869 PG 694
7

CATHERINE E. AND JOHN J.SETA
DB 779 PG 1319
3

N.C.D.O.T.
12

-L- STA. 28+80

-L- STA. 32+20

29+00

30+00

31+00

32+00

MATCH TO SHEET NO. 5

MATCH TO SHEET NO. 7

MATCH TO SHEET NO. 22

-Y- STA. 11+00

CLASS 'I' RIP RAP

ACCESS POINT

END C/A FENCE

BEGIN C/A FENCE

PROPOSED WOVEN WIRE FENCE

0.6 m SPECIAL LATERAL BASE DITCH
W/CLASS 'I' RIP RAP
SEE DETAIL "H"

-L- POT Sta. 29+80.000 =
-Y- POT Sta. 10+00.000

-L- POT STA. 29+92.716 =
BL-34 PINC 24+69.627
(0.046 RT.)

-L- PC Sta. 30+97.485

60D CSP

750 mm CONC.
REMOVE
INV=231.023

CLASS 'B' RIP RAP
EST. 4.5 TONS
11.7 Sq.m FILTER FABRIC

N 21° 19' 34.8" W

-L- POT STA. 29+03.742 =
BL-33 PINC 23+80.653
(0.428 RT.)

Class IV Method B Installation

BURY 1200 PIPE 0.24 m
HEADWALL

N 68° 40' 25.2" E

PROPOSED GUARDRAIL

LINE BERM DITCH
W/CLASS 'B' RIP RAP FROM C
-L- STA. 28+60 TO 29+50

100 m FULL LANE

0.6 m SPECIAL LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
SEE DETAIL "D"

LATERAL 'V' DITCH
W/CLASS 'A' RIP RAP
EST. 51 m³ DDE
SEE DETAIL "E"

0.6 m LATERAL BASE DITCH
W/CLASS 'I' RIP RAP
EST. 330 m³ DDE
SEE DETAIL "G"

0.6 m LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST. 200 m³ DDE
SEE DETAIL "F"

-L- POT STA. 30+94.655 =
BL-35 PINC 25+68.566
(0.135 RT.)

-L- POC STA. 31+78.805 =
BL-36 PINC 26+55.716
(0.085 RT.)

NOTES:
(1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 28 FOR -L- PROFILE
(3) SEE SHEET 38 FOR -Y- PROFILE

5-JAN-2004 07:03
R:\R2568B_25\R2568B_25.DGN

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	7
R/W SHEET NO.	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST. REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

8/17/98

NAD '83

13
L. PAUL BRAYTON

15
SAMUEL GORDON MYERS
AND DAVID LUTHER MYERS
DB 668 PG 280

DONALD WILBORNE, SR.
AND WIFE,
EDNA R. WILBORNE
DB 635 PG 881

18

105.293
S04°08'39"W
CONC MON

350.026
N88°09'20"W

90.532
S04°30'07"W

217.651
S41°55'51"E

-L- PT Sta. 34+48.645

-L- STA. 32+20

-L- STA. 35+40

34+00

35+00

CLASS 'B' RIP RAP
EST. 0.9 TONS
4.2 Sq.m FILTER FABRIC

CLASS 'B' RIP RAP
EST. 0.9 TONS
4.2 Sq.m FILTER FABRIC

ACCESS POINT

BEGIN C/A FENCE

END C/A FENCE

-L- +33
44 m
(144.36')

-L- +13
38 m
(124.67')

-L- +33
38 m
(124.67')

-L- +93
38 m
(124.67')

-L- +90
44 m
(144.36')

TOE PROTECTION
SEE DETAIL 'T'

-L- +30
38 m
(124.67')

-L- +48.645
38 m
(124.67')

-L- +10
38 m
(124.67')

-L- +30
38 m
(124.67')

SEE DETAIL 'I'

400 CSP

2GI

PROPOSED WOVEN WIRE FENCE

PROPOSED GUARDRAIL

CLASS IV, METHOD 'A' INSTALLATION

-L- POC STA. 32+85.909 =
BL-37 PINC 27+62.828
(0.599 RT.)

-L- POC STA. 33+58.111 =
BL-38 PINC 28+35.037
(0.053 LT.)

-L- POT STA. 35+13.423 =
BL-40 PINC 29+90.387
(1.739 RT.)

-L- POT STA. 34+66.591 =
BL-39 PINC 29+43.554
(2.014 RT.)

N 27° 04' 59.3" W

SEAL WELL

90 m TAPER

CLASS 'B' RIP RAP
EST. 2.7 TONS
8.4 Sq.m FILTER FABRIC

BURY 1200 PIPE 0.24 m

F HEADWALL

450 CSP

SPECIAL DITCH GRADE
SEE X-SECTIONS

LATERAL 'V' DITCH
W/ CLASS 'A' RIP RAP
EST. 34 m³ DDE
SEE DETAIL 'E'

TOE PROTECTION
SEE DETAIL 'T'

-L-
PI Sta. 32+73.213
Δ = 5° 45' 24.5" (LT.)
L = 351.160
T = 175.728
R = 3,495.000
S.E. = RC
RUNOFF = 54

MATCH TO SHEET NO. 6

MATCH TO SHEET NO. 8

12
N.C.D.O.T.

14
RICHARD WEST

16
EDDIE A. HARMON
DB 772 PG 1095
PB 18 PG 5

JUANITA S. THOMAS
AND WILMA S. BROWN
DB 993 PG 582
PB 18 PG 5

SAMUEL GORDON MYERS
AND DAVID LUTHER MYERS
DB 668 PG 280

17
JOAN C. SAINTSING
DB 887 PG 667

ISRMD

POND

GR

CONC

LT

DRIVE

NOTES:
(1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 29 FOR -L- PROFILE

E-SIM-2004.0704
R-2568B 29 Rdwy.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	8
R/W SHEET NO.	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

8/11/99

REVISIONS

CHARLES DOUGLAS SAINTSING AND WIFE, ALICE P. SAINTSING
DB 595 PG 461

BERTIE MAE HARRIS
DB 476 PG 707

DONALD WILBORNE, SR. AND WIFE, EDNA R. WILBORNE
DB 635 PG 881

N.C.D.O.T.

MARK A. WOOD AND WIFE, KIMBERLY F. WOOD
DB 866 PG 90

VIRGIL MELVIN HILTON
DB 596 PG 474

DONALD L. SAINTSING AND WIFE, FRANCIS L. SAINTSING
DB 712 PG 723

SAMUEL GORDON MYERS AND DAVID LUTHER MYERS
DB 668 PG 280

JOAN C. SAINTSING
DB 887 PG 667

ARTHUR A. SHICK, SR. AND WIFE, E. LEA SHICK
DB 708 PG 1429

ARTHUR ALLEN SHICK, SR. AND WIFE, ELIZABETH LEA SHICK
DB 783 PG 1492

WILLIAM W. SAINTSING
DB 550 PG 184

MIDWAY SCHOOL RD. SR1580

NAD 83

-L- STA. 35+40

-L- STA. 38+80

MATCH TO SHEET NO. 7

MATCH TO SHEET NO. 9

-Y9- PCC Sta. 10+60.678

-Y9- POC STA. 10+65.834 = BY9-101 PINC 5+61.403 (4.967 RT.)

-Y9- PT Sta. 10+88.025

-Y9- STA. 11+20 BEGIN CONSTRUCTION

-Y9- POT STA. 11+60.673 = BY9-5 PINC 6+56.006 (5.330 RT.)

-Y9- PC Sta. 11+68.161

-Y9- PT Sta. 12+36.482

-L- POT STA. 36+16.933 = BL-42 PINC 30+93.952 (0.289 LT.)

-Y9- POT STA. 12+43.518 = BY9 PINC 7+40.021 (5.381 RT.)

-L- POT STA. 35+66.558 = BL-41 PINC 30+43.575 (0.645 LT.)

-L- POT Sta. 36+23.032 = -Y9- POT Sta. 12+40.633

-Y9- STA. 13+40 END CONSTRUCTION

-Y9- PC Sta. 13+61.731

-Y9- POC STA. 13+68.642 = BY9-102 PINC 8+65.125 (5.087 RT.)

-L- POT STA. 37+96.206 = BL-44 PINC 32+88.468 (0.263 RT.)

-L- POT STA. 38+76.598 = BL-45 PINC 33+68.861 (0.425 RT.)

PROPOSED WOVEN WIRE FENCE

REMOVE

RETAIN

SEAL WELL

PROPOSED GUARDRAIL

SPECIAL CUT DITCH SEE DETAIL "X"

SPECIAL LATERAL "V" DITCH SEE DETAIL "P"

SPECIAL DITCH SEE X-SECTIONS

CLASS 'B' RIP RAP EST. 1.8 TONS 5.9 Sq.m FILTER FABRIC

PSH W/LEVEL SPREADER APRON SEE DETAIL "HH"

0.6 m LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST. 44 m² DDE SEE DETAIL "J"

125 mm MONO. CONC. ISLAND (KEYED-IN)

90 m TAPER

60 m TAPER

100 m FULL LANE

-Y9- +20 EXIST. R/W

-Y9- +80 R/W

-Y9- +0.009 EXIST. R/W

-Y9- +1.4 EXIST. R/W

-Y9- +0.024 EXIST. R/W

-Y9- +26.057 EXIST. R/W

-Y9- +64.161 (64.96')

-Y9- +0.024 (24.67')

-Y9- +1.585 (24.67')

-Y9- +22 (24.67')

-Y9- +30 (24.67')

-Y9- +70 (24.67')

-L- +23.700 (24.67')

-L- +16.542 (24.67')

-L- +30.570

-L- +30.003

-Y9- PI Sta. 10+74.355
Δ = 3° 15' 01.4" (RT.)
L = 27.346
T = 13.677
R = 482.044

-Y9- PI Sta. 12+02.573
Δ = 16° 56' 45.4" (LT.)
L = 68.321
T = 34.412
R = 231.000
S.E. = 0.03
INCREMENT = 6

-Y9- PI Sta. 14+14.824
Δ = 3° 34' 47.1" (RT.)
L = 106.151
T = 53.093
R = 1,699.000

TRAFFIC DIAGRAM

-Y9-
6,500 / 12,500
11,000 / 23,000
4,300 / 8,500
500 / 1,100
8,300 / 17,700
-L-
<100 / <100
1,000 / 2,000
2004 ADT / 2030 ADT
2,700 / 5,000

NOTES:
(1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 29 FOR -L- PROFILE
(3) SEE SHEET 40 FOR -Y9- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	9
R/W SHEET NO.	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

8/17/99

NAD 83

N 27° 04' 59.3" W

-L- STA. 38+80

-L- STA. 42+20

MATCH TO SHEET NO. 8

MATCH TO SHEET NO. 10

N01°W 25'W 83.975

S84°53'27"E 135.393

97.165 N03°52'52"E

17.486 N86°42'55"E

3.592.92.598

24

VIRGIL MELVIN HILTON
DB 596 PG 474

23

LINDY M. LEONARD
DB 922 PG 1268

26

LINDY M. LEONARD
DB 975 PG 1145

22

MARK A. WOOD AND WIFE,
KIMBERLY F. WOOD
DB 866 PG 90

23

DONALD L. SAINTSING
AND WIFE,
FRANCES L. SAINTSING

27

RICHARD D. CALLICUTT, II
AND WIFE, JOHNIA J. CALLICUTT
DB 952 PG 1132

WILLIAM W. SAINTSING
DB 550 PG 184

0.6 m SPECIAL LATERAL BASE DITCH
SEE DETAIL "K"

END C/A FENCE

BEGIN C/A FENCE

ACCESS POINT

PROPOSED WOVEN WIRE FENCE

-L- POT STA. 39+76.710 =
BL-46 PNC 34+68.974
(0.13) LT.)

0.6 m SPECIAL LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
SEE DETAIL "D"

CLASS 'B' RIP RAP
EST. 0.9 TONS
4.2 Sq.m FILTER FABRIC

-L- POT STA. 42+16.180 =
BL-48 PNC 37+08.457
(1.07) RT.)

TOE PROTECTION
SEE DETAIL "I"

0.6 m SPECIAL LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
SEE DETAIL "H"

PROPOSED GUARDRAIL

-L- POT STA. 41+00.742 =
BL-47 PNC 35+93.007
(0.64 LT.)

CLASS 'B' RIP RAP
EST. 4.5 TONS
11.7 Sq.m FILTER FABRIC

CLASS 'B' RIP RAP
EST. 1.8 TONS
5.9 Sq.m FILTER FABRIC

0.6 m LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST. 26 m³ DDE
SEE DETAIL "G"

PSH W/LEVEL
SPREADER APRON
SEE DETAIL "EHH"

POND

END C/A FENCE

ACCESS POINT

NOTES:
(1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 30 FOR -L- PROFILE

5-JAN-2004 07:06
R:\2568B\C\2568BSHT9.DGN

8/17/99

REVISIONS

METRIC	PROJECT REFERENCE NO.	SHEET NO.
5 0 10	R-2568B	10
	R/W SHEET NO.	10
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R/W REV.	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

NAD 83

26
LINDY M.LEONARD
DB 975 PG 1145

29
LINDY M.LEONARD AND
WILIAM PHIL LEONARD
DB 926 PG 947

903
CHRISTINE AND LOREN MORRIS

28
RICHARD T.PUGH AND WIFE,
DAWN LOWDER PUGH
DB 946 PG 1387

27
RICHARD D.CALLICUTT,II
AND WIFE,JOHNIA J.CALLICUTT
DB 952 PG 1132

CHRISTINE AND
LOREN MORRIS

POND

CLASS 'B' RIP RAP
EST. 0.9 TONS
4.2 Sq.m FILTER FABRIC

TOE PROTECTION
SEE DETAIL "I"

PROPOSED WOVEN WIRE FENCE

PROPOSED GUARDRAIL

HEADWALL

HEADWALL

.400 CSP
W/ 1 ELBOW

-L- POT STA. 43+39.542 =
BL-49 PNC 38+31.837
(0.974 LT.)

-L- POT STA. 44+72.035 =
BL-50 PNC 39+64.334
(0.047 RT.)

-L- POT STA. 45+18.354 =
BL-51PNC 40+10.655
(0.307 RT.)

-L- STA. 42+20

-L- STA. 45+20

43+00

44+00

45+00

N 27° 04' 59.3" W

-L-

CLASS 'A' 1650

BURY 1650 PIPE 0.30 =

SPECIAL LATERAL 'W' DITCH
W/ CLASS 'A' RIP RAP
SEE DETAIL "L"

CLASS 'I' RIP RAP

0.6 = SPECIAL LATERAL BASE DITCH
W/ CLASS 'I' RIP RAP
SEE DETAIL "H"

BEGIN C/A FENCE

ACCESS POINT

MATCH TO SHEET NO. 9

MATCH TO SHEET NO. 11

214.40' (TOTAL)
S06°57'44"W

NOTES:
(1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 30 FOR -L- PROFILE

5-JAN-2004 07:07
R:\2568B_25FINAL\sht03

METRIC	PROJECT REFERENCE NO.	SHEET NO.
5 0 10	R-2568B	11
	R/W SHEET NO.	11
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R/W REV.	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

REVISIONS

8/17/98

GEORGE O. JORDON
DB 356 PG 359

NAD 83

CHRISTINE AND LOREN MORRIS

SHERRILL MORRIS AND WIFE, PEGGY MORRIS
DB 922 PG 377

AMY GRANT
DB 1235 PG 325

-L- STA 45+20

-L- STA 48+60

MATCH TO SHEET NO. 10

MATCH TO SHEET NO. 12

-L- POT STA. 46+00.126 = BL-52 PNC 40+92.435 (0.968 LT.)

-L- POT STA. 47+76.933 = BL-54 PNC 42+69.257 (0.071 RT.)

-L- POT STA. 46+80.724 = BL-53 PNC 41+73.047 (0.502 RT.)

-L- POT STA. 48+43.336 = BL-55 PNC 43+35.661 (0.409 LT.)

0.6 m BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "M"

SPECIAL LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "N"

2.5 m BASE STREAM RELOCATION DDE = 1792 m² SEE DETAIL "DD"

CLEARING SHALL BE LIMITED TO 3 m BEYOND TOP OF CUT.

0.6 m LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "G"

PROPOSED WOVEN WIRE FENCE

CLASS 'B' RIP RAP EST. 1.8 TONS 5.9 Sq.m FILTER FABRIC

LINE W/CLASS 'A' RIP RAP

CLASS 'B' RIP RAP

-L- STA. 46+90 BEGIN SHOULDER BERM GUTTER

PROPOSED GUARDRAIL

-L- STA. 48+00 BEGIN SHOULDER BERM GUTTER

400 CSP W/ELBOWS

3.4 x 2.4 RCBC

PSH W/LEVEL SPREADER APRON SEE DETAIL "HH"

SPECIAL LATERAL 'V' DITCH W/CLASS 'B' RIP RAP SEE DETAIL "O"

SPECIAL LATERAL 'V' DITCH SEE DETAIL "P"

CLASS 'B' RIP RAP EST. .2 TONS 6 Sq.m FILTER FABRIC

LATERAL 'V' DITCH EST. 44 m DDE SEE DETAIL "JJ"

SPECIAL LATERAL 'V' DITCH TRANSITION FROM "P" TO "JJ"

CLASS 'B' RIP RAP EST. 0.9 TONS 4.2 Sq.m FILTER FABRIC

ACCESS POINT

BEGIN C/A FENCE

END C/A FENCE

ISFD CONC

WD DECK

SEAL WELL

12 m P.S.

0.6 m P.S.

GRAU-350 50M

CAT-1

REMOVE

INV=225.138

INV=224.997

450 mm CONC

400 CSP

600 CSP

PSH

PDE

EIP

GR

903 CHRISTINE AND LOREN MORRIS

903 CHRISTINE AND LOREN MORRIS

903 CHRISTINE AND LOREN MORRIS

30 ROGER ALLEN DOUGLAS AND WIFE, LINDA B. DOUGLAS DB 1052 PG 1603

32 ROGER ALLEN DOUGLAS AND WIFE, LINDA B. DOUGLAS DB 987 PG 1057

S.R. 1136 ACCESS EASEMENT (30')

214.407 (TOTAL) S06°37'44"W

S42°15'48"E 55.162

N 27° 04' 59.3" W

S83°49'59"W 440.467

N03°07'14"W 143.169

S83°49'59"W 201.186

S85°52'24"E

NOTES: (1) SEE SHEETS 2-E & 2-F FOR DRAINAGE DETAILS
(2) SEE SHEET 31 FOR -L- PROFILE

R-2568B_GD01
PROJECT REFERENCE NO.
R-2568B
R/W SHEET NO.
11
ROADWAY DESIGNER
ENGINEER

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	12
R/W SHEET NO.	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

R/W REVISION : PARCEL 31A - DRIVEWAY & 20 m ACCESS ADDED - 05-13-04 MWL

8/17/93

-L-
PI Sta. 50+82.160
Δ = 4° 01' 05.8" (RT)
L = 245.112
T = 122.606
R = 3,495.000
S.E. = RC
RUNOFF = 54

NAD 83

MATCH TO SHEET NO. 11

-L- STA. 48+60

-L- STA. 52+00

MATCH TO SHEET NO. 13

-L- PC Sta. 49+59.553

49+00

50+00

51+00

0.6 m LATERAL BASE DITCH W/CLASS 'I' RIP RAP EST. 50 m³ DDE SEE DETAIL "G"

CLASS 'B' RIP RAP EST. 1.8 TONS 5.9 Sq.m FILTER FABRIC

CLASS 'B' RIP RAP EST. 10.0 TONS 32.4 Sq.m FILTER FABRIC

CLASS 'B' RIP RAP EST. 0.9 TONS 4.2 Sq.m FILTER FABRIC

CLASS 'B' RIP RAP EST. 7.3 TONS 17.6 Sq.m FILTER FABRIC

0.6 m LATERAL BASE DITCH W/CLASS 'I' RIP RAP EST. 140 m³ DDE SEE DETAIL "R"

ACCESS POINT

BEGIN C/A FENCE

END C/A FENCE

PROPOSED WOVEN WIRE FENCE

PROPOSED GUARDRAIL

-L- POT STA. 49+22.199
BL-56 PNC 44+14.525
(0.58 LT.)

-L- POC STA. 49+99.850
BL-57 PNC 44+92.178
(0.28 RT.)

-L- POC STA. 50+99.302
BL-58 PNC 45+91.615
(0.693 RT.)

-L- STA. 48+80
END SHOULDER BERM GUTTER

-L- STA. 49+60
END SHOULDER BERM GUTTER

-L- STA. 51+50
END SHOULDER BERM GUTTER

GRAU-350

GRAU-150 BEG. SHOULDER BERM GUTTER

PSH W/LEVEL SPREADER APRON SEE DETAIL "HH"

TOE PROTECTION SEE DETAIL "T"

HEADWALL

400 CSP W/ELBOWS

400 CSP W/1 ELBOW

730 CLASS III REINF. CONC. PIPE

900 CLASS II

SCDOT ROADWAY STD. 850.10 FALSE SUMP

GRASS LINED BERM DITCH

SPECIAL CUT DITCH SEE DETAIL "X"

LATERAL 'V' DITCH W/CLASS 'B' RIP RAP EST. 22 m² DDE SEE DETAIL "KK"

CLASS 'B' RIP RAP EST. 1.8 TONS 5.9 Sq.m FILTER FABRIC

CAT-1

15.240 GAS EASEMENT (ISD)

650 mm STEEL

350 mm STEEL

250 mm STEEL

1200 mm WWMP/SSW

1500 mm WWMP/SSW

N 27°04' 59.3" W

S 27°04' 59.3" E

228.930
S 04°53' 29" W

N 87°44' 37" W
34.747

S 89°37' 35" E
180.685

S 25°57' 00" W
93.419

S 14°44' 24" E
75.023

N 42°07' 35" E
228.587

N 47°52' 25" W
105.524 (TOTAL)

S 48°07' 20" E
105.442 (TOTAL)

N 42°07' 35" E
288.592

S 25°31' 26" E
203.186

NOTES: (1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 31 FOR -L- PROFILE

34
STEVEN DOUGLAS COE
DB 1038 PG 128

35
TERRY BERNARD FERRELL
DB 781 PG 85

31A
AMY GRANT
DB 1235 PG 325

32
ROGER ALLEN DOUGLAS AND WIFE, LINDA B. DOUGLAS
DB 987 PG 1057

33
DAVID AND MARGARET RIDDLE

CHARLES STEPHEN SMALL AND WIFE, KAREN SUE SMALL
DB 1053 PG 1256
PB 15 PG 50

ROY H. FREEMAN AND WIFE, LILLIE LIVINGWOOD FREEMAN
DB 423 PG 15

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PROJECT REFERENCE NO.	SHEET NO.
R-2568B	13
R/W SHEET NO.	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

-L-
PI Sta. 50+82.160
Δ = 4° 01' 05.8" (RT.)
L = 245.112
T = 122.606
R = 3,495.000
S.E. = RC
RUNOFF = 54

-L- PT Sta. 52+04.665

-L- STA. 52+00

-L- STA. 53+00

-L- STA. 54+00

-L- STA. 55+00

-L- STA. 55+40

-L- POT Sta. 54+80.000 =
-Y10- POT Sta. 10+00.000

-L- POT STA. 54+83.540 =
BL-60 PINC 49+75.822
(0.071 RT.)
-Y10- POT STA. 10+00.071=
BL-60 PINC 49+75.822
(3.540 LT.)

NAD 83

TROY LEE CURRY
DB 434 PG 80
TRACT 3

TROY LEE CURRY
DB 434 PG 80
TRACT 1

TROY LEE CURRY JR.
DB 570 PG 187

TERRY BERNARD FERRELL
DB 781 PG 85

MICHELLE ENSLEY

N.C.D.O.T.

GEORGE C. BEUSSE JR. AND DERREE C. BEUSSE

ROY H. FREEMAN AND WIFE, LILLIE LIVINGWOOD FREEMAN
DB 423 PG 15

STEVEN DOUGLAS COE
DB 1038 PG 1128

VICTOR RAY MURPHY AND WIFE, KATHLEEN J. MURPHY
DB 679 PG 807

0.6 m LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST. 128 m³ DDE
SEE DETAIL "F"

CLASS 'B' RIP RAP
EST. 0.9 TONS
4.2 Sq.m FILTER FABRIC

ACCESS POINT

BEGIN C/A FENCE

END C/A FENCE

NCDOT ROADWAY
STD. 850.10
BERM DITCH
W/CLASS "B" RIP RAP

400 CSP W/1 ELBOW

BDO

OBLITERATE & REMOVE

PROPOSED WOVEN WIRE FENCE

SPECIAL CUT DITCH
SEE DETAIL "X"

GRASS LINED BERM DITCH

BEGIN SHOULDER BERM GUTTER
-L- STA.54+50

PROPOSED GUARDRAIL

90 m TAPER

POOL

-Y10- PC Sta. 10+50.739

END C/A FENCE

CLASS 'B' RIP RAP
EST. 2.7 TONS
9.2 Sq.m FILTER FABRIC

CLASS 'B' RIP RAP
EST. 0.9 TONS
4.2 Sq.m FILTER FABRIC

END SHOULDER BERM GUTTER
-Y10A- STA.10+60

'V' DITCH
W/CLASS 'A' RIP RAP
EST. 51 m³ DDE
SEE DETAIL "S"

-Y10- POC Sta. 10+80.000 =
-Y10A- POT Sta. 10+00.000

0.6 m LATERAL BASE DITCH
W/CLASS 'A' RIP RAP
EST. 23 m³ DDE
SEE DETAIL "T"

BEGIN SHOULDER BERM GUTTER
-Y10A- STA.10+20

400 CSP W/1 ELBOW

125 mm MDMO. CONC. ISLAND SURFACE MOUNTED

-Y10A- PT Sta. 10+72.961

-Y10A- PC Sta. 10+19.757

-Y10- PT Sta. 11+52.930

-Y10- POT STA. 11+66.786 =
BY10-105 POT 1+66.101
(5.151 RT.)

-Y10- PI Sta. 11+09.031
Δ = 68° 53' 02.7" (RT.)
L = 102.192
T = 58.292
R = 85.000
S.E. = 0.06
RUNOFF = 36

-Y10A- PI Sta. 10+47.263
Δ = 35° 51' 47.4" (LT.)
L = 53.204
T = 27.506
R = 85.000
S.E. = 0.06
RUNOFF = 36

-Y10- STA. 12+00
END CONSTRUCTION

-Y10- POT Sta. 12+46.040

REMOVE PORTION OF 375 mm CONC

RETAIN FOR APTS.

ISBKAPT

150 mm PVC

INGRESS, EGRESS AND REGRESS EASEMENT
DB 1038 PG 1128
DB 781 PG 85

TRAFFIC DIAGRAM
8,300 / 17,700 — 8,800 / 18,900 — -L-
≤100 / 100 — 500 / 1,300
2004 ADT / 2030 ADT — 500 / 1,400
-Y10-

NOTES: (1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 32 FOR -L- PROFILE
(3) SEE SHEET 41 FOR -Y10- & -Y10A- PROFILES

MATCH TO SHEET NO. 12

MATCH TO SHEET NO. 14

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H 1"=10'
V 1"=10'

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	14
R/W SHEET NO.	14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

8/17/99

-L-
PI Sta. 59+17.176
Δ = 7° 25' 17.7" (RT.)
L = 226.680
T = 113.499
R = 1750.000
S.E. = 0.03
RUNOFF = 54

NAD 83

MICHELLE ENSLEY

N.C.D.O.T.

KENNETH MICHAEL DARR AND WIFE, TAMARA INGRAM DARR
DB 679 PG 808
PB 25 PG 31

GLENN BODENHEIMER

VICTOR RAY MURPHY AND WIFE, KATHLEEN J. MURPHY
DB 679 PG 807

VICTOR RAY MURPHY AND WIFE, KATHLEEN J. MURPHY
DB 211 PG 285

-L- POT STA. 55+84.58 = BL-61 PINC 50+76.795 = BYID PINC 5+00.000 (0.001 RT.)

-L- POT STA. 56+67.357 = BL-62 PINC 51+60.016 (7.511 LT.)

-L- POT STA. 57+61.175 = BL-63 PINC 52+54.146 (0.260 LT.)

-L- POT STA. 58+00.110 = BL-64 PINC 52+96.859 (17.824 LT.)

-L- POC STA. 58+53.697 = BL-65 PINC 53+53.275 (0.962 LT.)

-L- PC Sta. 58+03.677

-L- STA. 55+40

-L- STA. 58+80

CLASS 'B' RIP RAP EST. 4.5 TONS 13.4 Sq.m FILTER FABRIC

CLASS 'B' RIP RAP EST. 2.7 TONS 9.2 Sq.m FILTER FABRIC

CLASS 'B' RIP RAP EST. 2.7 TONS 9.2 Sq.m FILTER FABRIC

CLASS 'B' RIP RAP EST. 0.9 TONS 4.2 Sq.m FILTER FABRIC

PROPOSED WOVEN WIRE FENCE

PROPOSED GUARDRAIL

END C/A FENCE

BEGIN C/A FENCE

ACCESS POINT

END SHOULDER BERM GUTTER -L- STA. 55+62.5

BEGIN SHOULDER BERM GUTTER -L- STA. 55+77.5

SEAL WELL

REMOVE

OBLITERATE & REMOVE

PROPOSED TURNAROUND

GR BARRICADE

TOE PROTECTION SEE DETAIL "F"

SPECIAL LATERAL 'V' DITCH EP W/CLASS 'A' RIP RAP SEE DETAIL "L"

LATERAL 'V' DITCH W/CLASS 'A' RIP RAP EST. 12 m² DDE SEE DETAIL "E"

-Y10A- STA. 11+20 END CONSTRUCTION

-Y10A- PC Sta. 11+09.012

-Y10A- POT Sta. 13+06.138

-Y10A- PT Sta. 12+70.915

-Y10A- POT STA. 8+30.812 = BYID-101 PINC 5+65.979 (7.665 LT.)

-Y10A- STA. 10+80

-L- N 23° 03' 53.5" W

N 39° 12' 14.1" W

N 33° 09' 10.6" W

-Y10A-
PI Sta. 11+90.043
Δ = 06° 11' 03.3" (RT.)
L = 161.903
T = 81.030
R = 1500.000

NOTES: (1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 32 FOR -L- PROFILE
(3) SEE SHEET 41 FOR -Y10A- PROFILE

MATCH TO SHEET NO. 13

MATCH TO SHEET NO. 15

POND

NC 109

SOIL

ISFD

GR

BST

450 mm CONC

600 mm CMP

600 mm PVC

150 mm PVC

375 mm CONC

1200 mm WW&ISBW

COULD NOT LOCATE INV (BURIED)

INV=221.287

INV=219.992

INV=223.833

INV=224.491

INV=223.869

INV=225.525

INV=227.108

EXISTING R/W

25BW&SELEC

25W&SELEC

ISBW

GRAU-350

R=4.5 m

12 m P.S.

0.6 m P.S.

7.2 m

3.6 m

3.40 m

20 m TAPER LT. & RT.

S44°20'29"W 35.263

S39°44'22"E 132.685

S64°57'52"E 98.811

N43°32'19"E 182.324

S45°22'14"W 144.553

S39°44'22"W 39.214

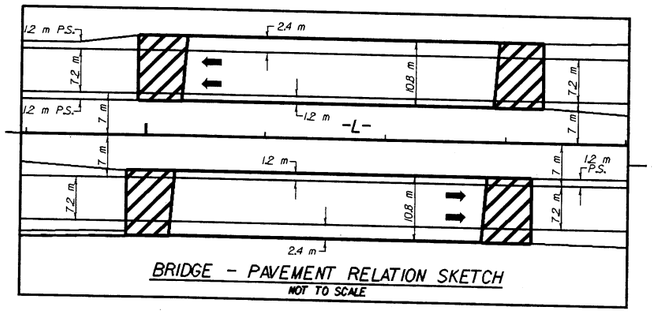
S64°40'22"E 106.144

S87°12'52"W 68.133

N13°14'41"E 38.814

N63°11'41"E 28.111

S63°10'01"E 26.088



-L-
PI Sta. 59+17.176
Δ = 7° 25' 17.7" (RT.)
L = 226.680
T = 113.499
R = 1,750.000
S.E. = 0.03
RUNOFF = 54

-L-
PIs Sta. 62+52.675
θs = 2° 56' 47.9"
Ls = 90.000
LT = 60.008
ST = 30.008

NAD 83

METRIC	PROJECT REFERENCE NO.	SHEET NO.
5 0 10	R-2568B	15
CONST.REV.	R/W SHEET NO.	15
R/W REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

MATCH TO SHEET NO. 14

MATCH TO SHEET NO. 16

-L- STA. 58+80

-L- STA. 62+20

-DRI- POT Sta. 11+54.812

VAN EDKER PARKER
DB 863 PG 1285

LEONARD BLEVINS
& WIFE, TERRI BLEVINS

GLENN BODENHEIMER

DORIS HIATT

LEDFORD DOWNS, LLC

RICH FORK CREEK

NC 109

-L- POS STA. 62+09.448 = BL-68 PINC 57+09.300 (2.968 LT.)

-L- POC STA. 59+46.510 = BL-66 PINC 54+46.097 (1.790 RT.)

-L- POT STA. 61+32.286 = BL-67 PINC 56+32.053 (6.726 LT.)

-L- PT Sta. 60+30.357

-L- TS Sta. 61+92.667

BEGIN BRIDGE -L- STA. 61+06.10

END BRIDGE -L- STA. 61+58.10

BEGIN APPROACH SLAB -L- STA. 60+98.648

END APPROACH SLAB -L- STA. 61+64.352

BEGIN BRIDGE -L- STA. 61+04.890

END BRIDGE -L- STA. 61+56.890

BEGIN APPROACH SLAB -L- STA. 60+96.693

END APPROACH SLAB -L- STA. 61+66.307

SPECIAL LATERAL 'V' DITCH W/CLASS 'A' RIP RAP SEE DETAIL "L"

0.6 m LATERAL BASE DITCH EST. 77 m³ DDE SEE DETAIL "U"

CLASS 'B' RIP RAP EST. 1.8 TONS 5.9 Sq. m FILTER FABRIC

REMOVE EXISTING BRIDGE

CLASS 'I' RIP RAP EST. 17 TONS

DRAIN AND FILL SCOUR HOLE W/ SUITABLE MAT. EST. 210 m³

RIP RAP @ EMBANKMENT SEE DETAIL "Y"

PSH W/ LEVEL SPREADER APRON SEE DETAIL "HH"

400 CSP W/ 1 ELBOW

CLASS 'I' RIP RAP ELEV. 215.60 STRUCTURE PAY ITEM

CLASS 'I' RIP RAP STRUCTURE PAY ITEM NCDOT ROADWAY STD. 850.10

0.6 m LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST. 33 m³ DDE SEE DETAIL "J"

PROPOSED WOVEN WIRE FENCE

PROPOSED GUARDRAIL

END C/A FENCE

BEGIN C/A FENCE

ACCESS POINT

PROPOSED 150 mm PVC

EXISTING R/W

SEAT ELEV=214.95

INV=212.265

INV=212.549

S 20° 22' 46.3" E

N 15° 38' 35.7" W

NOTES:
(1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 33 FOR -L- PROFILE
(3) SEE SHEET 44 FOR -DRI- PROFILE
(4) SEE SHEETS S-1 TO S- FOR STRUCTURE DETAILS

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PROJECT REFERENCE NO.	SHEET NO.
R-2568B	16
R/W SHEET NO.	16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

9/17/99

NAD 83

-DRI- PT Sta.10+43.716

LEONARD BLEVINS
& WIFE, TERRI BLEVINS
DB 1329 PG 355

ALEXANDER SPRINKLE
& WIFE, TRINA SPRINKLE
DB 1431 PG 502

LINDA GAIL H. ADERHOLD
DOUGLAS F. ADERHOLD

PATRICIA SARTIN SCHMIDLIN
DB 821 PG 41
(HISTORIC)

CLASS 'B' RIP RAP
EST. 2.7 TONS
8.4 Sq.m FILTER FABRIC

CLASS 'B' RIP RAP
EST. 0.9 TONS
4.2 Sq.m FILTER FABRIC

0.6 m SPECIAL LATERAL BASE DITCH
SEE DETAIL "E"

1.0 m LATERAL BASE DITCH
W/CLASS 'I' RIP RAP
EST. 87 m³ DDE
SEE DETAIL "Z"

1.0 m SPECIAL LATERAL BASE DITCH
W/CLASS 'I' RIP RAP
SEE DETAIL "AA"

0.6 m BASE DITCH
EST. 34 m³ DDE
SEE DETAIL "C"

1.5 m BASE STREAM RELOCATION
-L- STA. 64+20 TO 64+80
SEE DETAIL "EE"

-L- STA. 62+20

-L- STA. 65+60

S 20° 22' 46.3" E

-DRI-

-DRI- PC Sta.10+12.185

-DRI- POT Sta.10+00.000
-L- POC Sta.63+05.000
15.400 m LT.

-L- POS STA. 62+79.795 =
BL-69 PNC 57+79.475
(5.157 LT.)

-L- POT STA. 64+00.871 =
BL-70 PNC 59+00.265
(4.212 LT.)

-L- POT STA. 64+83.956 =
BL-71 PNC 59+83.350
(4.398 LT.)

-L- SC Sta.62+82.667

-L- CS Sta.63+06.006

-L- ST Sta.63+96.006

N 23° 03' 53.4" W

N.C.D.O.T.

SCATTERED SHRUBS

REMOVE 3 - 3 BOX CULVERT
INV=215.362

REMOVE
EIP INV=219.536

OBLITERATE & REMOVE

PROPOSED WOVEN WIRE FENCE

PROPOSED GUARDRAIL

CLEARING SHALL BE LIMITED TO 3 m BEYOND TOP OF CUT

BEGIN C/A FENCE
150 mm PVC

END C/A FENCE

BEGIN C/A FENCE

ACCESS POINT

STONE

400 CSP
W/1 ELBOW

BDO
NCDOT ROADWAY
STD. 850.10

GRASS LINED BERM DITCH

TOE PROTECTION
SEE DETAIL "I"

MATCH TO SHEET NO. 15

MATCH TO SHEET NO. 17

LEDFORD DOWNS, LLC

DORIS HIATT

LEDFORD DOWNS, LLC

-DRI-
PI Sta 10+32.300
Δ = 90° 19' 38.0" (LT)
L = 31.530
T = 20.115
R = 20.000

-L-

PIs Sta.62+52.675	PI Sta.62+94.337	PIs Sta.63+36.014
Es = 2° 56' 47.9"	Δ = 1° 31' 41.9" (LT)	Es = 2° 56' 47.9"
Ls = 90.000	L = 23.340	Ls = 90.000
LT = 60.008	T = 11.671	LT = 60.008
ST = 30.008	R = 875.000	ST = 30.008
	S.E. = 0.05	

NOTES:
(1) SEE SHEETS 2-E & 2-F FOR DRAINAGE DETAILS
(2) SEE SHEET 33 FOR -L- PROFILE
(3) SEE SHEET 44 FOR -DRI- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-2568B	17
R/W SHEET NO.	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

8/17/99

NAD 83

-L-
PI Sta.68+05.000
Δ = 6° 52' 01" (LT)
L = 209.740
T = 104.996
R = 1,750.000
S.E. = 0.03
RUNOFF = 54

53
PATRICIA SARTIN SCHMIDLIN
(HISTORIC)

51
LEDFORD DOWNS, LLC

53
PATRICIA SARTIN SCHMIDLIN
(HISTORIC)

MATCH TO SHEET NO. 18

MATCH TO SHEET NO. 16

-L- STA. 65+60

-L- STA. 69+00

-L- PC Sta.67+00.004

66+00

67+00

68+00

S88°51'03"E 30.068

S88°51'03"E 30.834

N05°56'10"E 30.536

S25°26'18"W 84.855

N 23° 03' 53.4" W

ACCESS POINT

RETAIN

375 mm CONC

BEGIN C/A FENCE

END C/A FENCE

OBLITERATE & REMOVE

EXISTING R/W

REMOVE

150 mm PVC

INV=235.245

PROPOSED WOVEN WIRE FENCE

1200 mm WW&ISBW&ISELEC

375? mm CONC

750

2GI

R=45 m

BK

GR

12 m P.S.

0.6 m P.S.

ISFD

STONE PATIO

600

450

-L- POC STA. 67+53.645 = BL-74 PINC 62+54.932 (1.625 LT.)

REMOVE PORTION

INV=231.555

INV=238.268 12 m P.S.

HEADWALL

PROPOSED GUARDRAIL

-L- POT STA. 66+53.300 = BL-73 PINC 61+54.466 (3.543 RT.)

CAT-1

-L- POT STA. 65+89.184 = BL-72 PINC 60+89.606 (12.343 RT.)

TOE PROTECTION SEE DETAIL "I"

SPECIAL LATERAL 'V' DITCH W/CLASS 'A' RIP RAP SEE DETAIL "L"

POND

52
LEDFORD DOWNS, LLC

51
LEDFORD DOWNS, LLC

51
LEDFORD DOWNS, LLC

NOTES:
(1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 34 FOR -L- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	18
R/W SHEET NO.	18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

8/17/99

NAD 83

-L- PI Sta.68+05.000
Δ = 6° 52' 01" (LT.)
L = 209.740
T = 104.996
R = 1,750.000
S.E. = 0.03
RUNOFF = 54

-L- PI Sta.71+65.141
Δ = 6° 01' 13.8" (RT.)
L = 183.885
T = 92.027
R = 1,750.000
S.E. = 0.03
RUNOFF = 54

53 PATRICIA SARTIN SCHMIDLIN (HISTORIC)

55 WILLIAM L. HIATT AND WIFE, BETTY GOBBLE HIATT
DB 1200 PG 26

55 WILLIAM L. HIATT AND WIFE, BETTY GOBBLE HIATT
DB 504 PG 766
DB 563 PG 198
PB 32 PG35

-L- STA. 69+00

-L- STA. 72+40

MATCH TO SHEET NO. 17

MATCH TO SHEET NO. 19

-L- PT Sta.69+09.744

-L- PC Sta.70+73.113

-L- POC Sta.71+10.741 = -Y14- POT Sta.10+00.000

-L- POC Sta.71+05.667 = BL-77 PINC 66+07.372 (15.302 RT.)

-Y14- POT Sta.10+15.492 = BL-77 PINC 66+07.372 (4.435 RT.)

-L- POT Sta.69+32.069 = BL-75 PINC 64+33.965 (9.940 RT.)

-L- POT Sta.70+05.858 = BL-76 PINC 65+07.813 (12.909 RT.)

-L- POC Sta.71+35.701 = BL-78 PINC 66+96.190 (8.464 RT.)

-Y14- PC Sta.10+53.770

-Y14- PCC Sta.10+97.604

-Y14- STA.10+81.800
END CONSTRUCTION

-Y14- POC Sta.11+01.189

-Y14A- POT Sta.10+00.000

-Y14A- POT Sta.11+23.726

-Y14- PT Sta.11+17.236

PI Sta.10+75.689
Δ = 2° 00' 33.2" (LT.)
L = 43.834
T = 21.919
R = 1,250.000

PI Sta.11+07.509
Δ = 18° 44' 41.1" (LT.)
L = 19.632
T = 9.904
R = 60.007

LEDFORD DOWNS, LLC

DAV-RAN ENTERPRISES, INC.
DB 799 PG 462
PB 25 PG 31

WILLIARD-STEWART, INC.
DB 1028 PG 1896
PB 25 PG 31

JOSEPH MITCHELL

N.C.D.O.T.

EVELYN H. BALDWIN
DB 787 PG 1153

DAVIDSON COUNTY BD. OF ED.
DB 286 PG 80
DB 286 PG 97
DB 113 PG 115
DB 94 PG 541

WHITE OAK RD.

BEECH RIDGE RD.

NOTES:
(1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 34 FOR -L- PROFILE
(3) SEE SHEET 43 FOR -Y14- PROFILE
(4) SEE SHEET 44 FOR -Y14A- PROFILE

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8/17/99

REVISIONS

-L-	-Y11-	-LTLN2-
PI Sta.71+65.141	PI Sta.12+44.647	PI Sta.76+26.904
Δ = 6° 01' 13.8" (RT.)	Δ = 25° 14' 31.1" (RT.)	Δ = 5° 41' 09.2" (RT.)
L = 183.885	L = 70.489	L = 173.666
T = 92.027	T = 35.826	T = 86.904
R = 1,750.000	R = 160.000	R = 1,750.000
S.E. = 0.03	S.E. = 0.06	S.E. = 0.03
RUNOFF = 54	RUNOFF = 42	RUNOFF = 54

METRIC
5 0 10

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	19
R/W SHEET NO.	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

NAD 83

MATCH LINE

MATCH TO SHEET NO. 23

MATCH TO SHEET NO. 18

MATCH TO SHEET NO. 20

MATCH TO SHEET NO. 24

-L- STA. 72+40

-L- STA. 75+80

-RTLN2- STA. 75+80

-Y11- STA. 12+20

-Y12- STA. 11+00

-L- PT Sta.72+56.999

-Y11- PT Sta.12+79.310

-Y12DET- PT Sta.10+81.626

-L- POT Sta.75+00.472 =
-Y11- POT Sta.13+28.310 =
-Y12- POT Sta.9+89.851

-L- POT STA. 73+21.877 = BL-79 PINC 68+22.582 = BY11PINC 8+72.430 (15.300 RT.)

-L- POT STA. 74+96.169 = BL-80 PINC 69+97.256 (3.749 RT.)

-Y12- POT STA. 9+93.680 = BY12 PINC 5+00.000 (4.233 RT.)

-Y12DET- POT Sta.10+00.000 = -L- POT Sta.75+30.000 (10.6 LT.) LA
-Y12DET- PC Sta.10+38.255 = -L- POT Sta.75+40.000 (10.6 RT.) LA

EQUALITY
-L- POT Sta.75+40.000 LB (10.6 LT.) LA
-LTLN2- PC Sta.75+40.000 (10.6 RT.) LA
-RTLN2- POT Sta.75+40.000 (10.6 RT.) LA

55 WILLIAM L. HIATT AND WIFE, BETTY GOBBLE HIATT
DB 1257 PG 1840

60 N.C.D.O.T.

61 LINDA EGGERS

59 DAVIDSON COUNTY BD. OF ED.
DB 286 PG 80
DB 286 PG 97
DB 113 PG 115
DB 94 PG 541

66 J.C. CRIDLEBAUGH FAMILY LIMITED PARTNERSHIP

67 N.C.D.O.T.
DB 839 PG 737

68 N.C.D.O.T.

NOTE: USE 0.3 m SLOTS SPACED 3.0 m ON CENTER IN MONOLITHIC ISLAND -Y11- STA. 12+80 TO 13+10

NOTE: USE 0.3 m SLOTS SPACED 3.0 m ON CENTER IN MONOLITHIC ISLAND -Y12- STA. 10+08 TO 10+40

NOTES:
(1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 35 FOR -L-, -LTLN2- & -RTLN2- PROFILES
(3) SEE SHEET 42 FOR -Y11- & -Y12- PROFILES
(4) SEE SHEET 25 FOR -Y12DET-

TRAFFIC DIAGRAM
-Y11-
3,600 / 9,200
1,100 / 2,100
900 / 3,000
8,800 / 18,900
8,500 / 19,900
-L-
1,200 / 2,000
1,100 / 2,100
2004 ADT / 2030 ADT
3,900 / 8,200
-Y12-

PROPOSED WOVEN WIRE FENCE
PROPOSED CHAIN LINK FENCE
PROPOSED GUARDRAIL
OBLITERATE & REMOVE
REMOVE UNDERGROUND JB COULD NOT LOCATE
SEAL WELL
GRASS LINED BERM DITCH NCDOT ROADWAY STD. 850.10
'V' DITCH W/CLASS 'A' RIP RAP SEE DETAIL "S"
SPECIAL LATERAL 'V' DITCH W/CLASS 'A' RIP RAP SEE DETAIL "W"
SPECIAL LATERAL 'V' DITCH W/CLASS 'B' RIP RAP SEE DETAIL "O"
CLASS 'B' RIP RAP EST. 45 TONS 11.7 Sq.m FILTER FABRIC
0.6 m LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST. 28 m DDE SEE DETAIL "F"
CLASS 'B' RIP RAP EST. 7.5 TONS 17.6 Sq.m FILTER FABRIC
SPECIAL LATERAL 'V' DITCH W/CLASS 'A' RIP RAP SEE DETAIL "L"
400 CSP W/1 ELBOW
125 mm MONO. CONC. ISLAND (KEYED-IN)
OLD GREENSBORO RD. SR 1798
NC 109
SR 1756
W. LEXINGTON AVE.
ISBK SCHOOL
GREEN HOUSE
1200 mm CONC POST
1800 mm CHL & SBW
200 mm CONC CURB
300 mm CONC
150 mm PVC
600 mm CONC
375 mm CONC
1200 mm RAIL
60 m TAPER
100 m FULL LANE
12 m P.S.
0.6 m P.S.
EXISTING R/W
BST
CONC
ISFD
GRAU-350
T/LE
DECK

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PROJECT REFERENCE NO.	SHEET NO.
R-2568B	20
R /W SHEET NO.	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.

REVISIONS

8/17/99

-LTLN2-
PI Sta.76+26.904
Δ = 5° 41' 09.2" (RT.)
L = 173.666
T = 86.904
R = 1,750.000
S.E. = 0.03
RUNOFF = 54

-LTLN2-
PI Sta.78+60.159
Δ = 4° 52' 29.8" (LT.)
L = 148.897
T = 74.493
R = 1,750.000
S.E. = 0.03
RUNOFF = 54

NAD 83

-RTLN2- STA. 75+80

-RTLN2- STA. 79+20

MATCH TO SHEET NO. 19

MATCH TO SHEET NO. 21

0.6 m SPECIAL LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "D"

0.6 m LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST. 40 m² DDE SEE DETAIL "F"

CLASS 'B' RIP RAP EST. 6.4 TONS 18.4 Sq. m FILTER FABRIC

CLASS 'B' RIP RAP EST. 1.8 TONS 8.9 Sq. m FILTER FABRIC

PROPOSED WOVEN WIRE FENCE

-LTLN2- PT Sta.77+13.666

-LTLN2- PC Sta.77+85.666

-RTLN2- PC Sta.76+73.772

-RTLN2- PT Sta.77+72.706

-RTLN2- POC STA. 76+79.410 = BL-13 POT 71+80.504 (6.353 LT.)

-RTLN2- +73.772 27.4 m (89.90')

-RTLN2- +100 27.4 m (89.90')

-RTLN2- +132 33 m (108.27')

-RTLN2- +172.706 27.4 m (89.90')

-RTLN2- +525 48.6 m (159.45')

-RTLN2- +728 48.6 m (159.45')

-RTLN2- +811 48.6 m (159.45')

-RTLN2- +683 27.4 m (89.90')

-RTLN2- +465 27.4 m (89.90')

BEGIN C/A FENCE

END C/A FENCE

ACCESS POINT 3.6 m

GRASS LINED BERM DITCH

SPECIAL LATERAL 'V' DITCH W/CLASS 'A' RIP RAP SEE DETAIL "L"

7.2 TONS CLASS 'B' RIP RAP

0.6 m BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "M"

SPECIAL CUT DITCH SEE DETAIL "X"

REMOVE

COLLAR

BORE & JACK 600 WSP

900 CLASS IV

600 mm CLAY

400 CSP W/1 ELBOW

300 mm CONC

150 mm PVC

125 mm MONO. CONC. ISLAND (SURFACE MOUNTED)

100 m FULL LANE

60 m TAPER

GRAU-350

12 m P.S.

0.6 m P.S.

EXISTING R/W

N 23° 54' 40.8" W

N 18° 13' 31.6" W

N 23° 06' 01.4" W

N 23° 08' 32" W 66.351

N 65° 59' 27" E 1200' mm CHL

S 10° 57' 25" W 62.285

N 65° 14' 56" E 70.814

S 28° 33' 36" E 148.717

S 51° 29' 19" E 278.339

N 23° 08' 32" W 124.87

S 05° 00' 49" W

N 18° 30' 48" E

61 LINDA EGGERS

68 N.C.D.O.T.

70 N.C.D.O.T.

66 J.C. CRIDLEBAUGH FAMILY LIMITED PARTNERSHIP

71 BILLY AND AMY LETHCO DB 1116 PG 674

71A RICHARD D. CALLICUTT AND WIFE, BARBARA F. CALLICUTT DB 517 PG 750

72 RICHARD D. CALLICUTT AND WIFE, BARBARA F. CALLICUTT DB 517 PG 750

ISFD (ABAND)

ISFD

DECK

-RTLN2-
PI Sta.77+23.240
Δ = 0° 48' 39.4" (RT.)
L = 98.934
T = 49.468
R = 6,990.000

NOTES:
(1) SEE SHEET 2-E FOR DRAINAGE DETAILS
(2) SEE SHEET 36 FOR -LTLN2- & -RTLN2- PROFILES

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PROJECT REFERENCE NO.	SHEET NO.
R-2568B	21
R/W SHEET NO.	21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

8/17/99

-LTLN2-
PI Sta.78+60.159
Δ = 4°52'29.8" (LT.)
L = 148.897
T = 74.493
R = 1,750.000
S.E. = 0.03
RUNOFF = 54

NAD 83

-RTLN2- STA. 79+20

COLONIAL PIPE LINE

APPROX. LOC. 900mm PETROLEUM LINE

APPROX LOC. 1000mm PETROLEUM LINE

MEASURED 874.89

2SELEC

-RTLN2- +53.571 48.8 m (159.45')

END WOVEN WIRE C/A FENCE

-RTLN2- +43.042 48.8 m (159.45')

-RTLN2- POT Sta.79+33.659 =
-LTLN2- PT Sta.79+34.562

-RTLN2- POT Sta.79+43.042

N.C.D.O.T.

TO

INV. UNKNOWN END NOT FOUND

-RTLN2- +77.012 EXIST. R/W

60 m TAPER LT. & RT.

12 m P.S.

450 mm RCP

450 mm CONC.

NC 109

1000 mm STEEL ENCASEMENT

GAS LINE VENTS

INV=230.78T

EXISTING R/W

N 23°06' 01.4" W

3SELEC&ISBW

-RTLN2- 150 27.4 m (89.90')

END C/A FENCE

MATCH TO SHEET NO. 20

72

RICHARD D. CALLICUTT AND WIFE, BARBARA F. CALLICUTT
DB 517 PG 750

-RTLN2- 27.4 m (89.90')

96.2m N69°25'00"E

ISFD

BARN

A/G FUEL TANK

S

DOG KENNEL

VAN E. PARKER
DB 682 PG 727

GRAVEL

ISFBUS.

END PROJECT R-2568B
-RTLN2- STA. 79 + 43.042

EXISTING R/W

375 PLASTIC

NC 109

TO WINSTON-SALEM

EIP

EXISTING R/W

℄ EXIST. R/W

2SFD

CONC.

GARAGE

S

50'L

150'L

97.028 S65°40'57"W

104.236 N22°44'21"W

NOTE: SEE SHEET 37 FOR -LTLN2- & -RTLN2- PROFILES

5-JAN-2004 07:4
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PROJECT REFERENCE NO.	SHEET NO.
R-2568B	22
R/W SHEET NO.	22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

8/11/98

MATCH TO SHEET NO. 6

NAD 83

-Y- STA. 11+00

-Y- PC Sta. 11+36.765

-Y- POC Sta. 11+60.000 =
-Y1- POT Sta. 10+00.000

-Y1- PC Sta. 10+52.613

-Y1- POC STA. 10+95.359 =
BY-9
PINC 22+70.358 (3.924 RT.)

-Y- PT Sta. 12+46.985

-Y- POT Sta. 13+58.816

-Y- STA. 13+20
END CONSTRUCTION

-Y1- STA. 11+60
END CONSTRUCTION

-Y1- PC Sta. 11+69.132

-Y1- PT Sta. 10+99.390

N 68° 40' 25.2" E

S 36° 59' 17.5" E

S 5° 27' 26.2" E

N 5° 37' 19.2" W

SPECIAL CUT DITCH
SEE DETAIL "X"

REMOVE

OBLITERATE & REMOVE

GRADE TO DRAIN

PROPOSED GUARDRAIL

NC 109

NC 109 BST

5 — EDWIN CHANDLER GABLE
DB 764 PG 1173

MICKIE H. GABLE
DB 617 PG 63

6 — W.D. TALLEY AND WIFE, KARA LEE TALLEY
DB 616 PG 899

7 — TERRY J. ELLEDGE AND WIFE, DIANNE E. ELLEDGE
DB 869 PG 694

12 — JUANITA S. THOMAS AND WILMA S. BROWN
DB 993 PG 582
PB 18 PG 5

8 — CHRISTIAN LIFE CENTER ASSEMBLY OF GOD
DB 819 PG 117

9 — GEORGE W. SAINTSING AND WILLARD A. SAINTSING
DB 617 PG 154

10 — DELORES B. SAINTSING
DB 616 PG 274

11 — THOMASVILLE CHURCH OF CHRIST, INC.
DB 619 PG 545
PB 18 PG 5

ISBK CHURCH

-Y1-
PI Sta. 12+57.246
Δ = 0° 13' 55.0" (RT.)
L = 176.227
T = 88.114
R = 43,534.314

PI Sta. 10+76.610
Δ = 31° 31' 51.3" (RT.)
L = 46.777
T = 23.997
R = 85.000
S.E. = 0.06
RUNOFF = 36

-Y-
PI Sta. 12+01.162
Δ = 74° 17' 44.4" (LT.)
L = 110.220
T = 64.397
R = 85.000
S.E. = 0.06
RUNOFF = 36

NOTES: (1) SEE SHEET 38 FOR -Y- PROFILE
(2) SEE SHEET 39 FOR -Y1- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	23
R/W SHEET NO.	23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

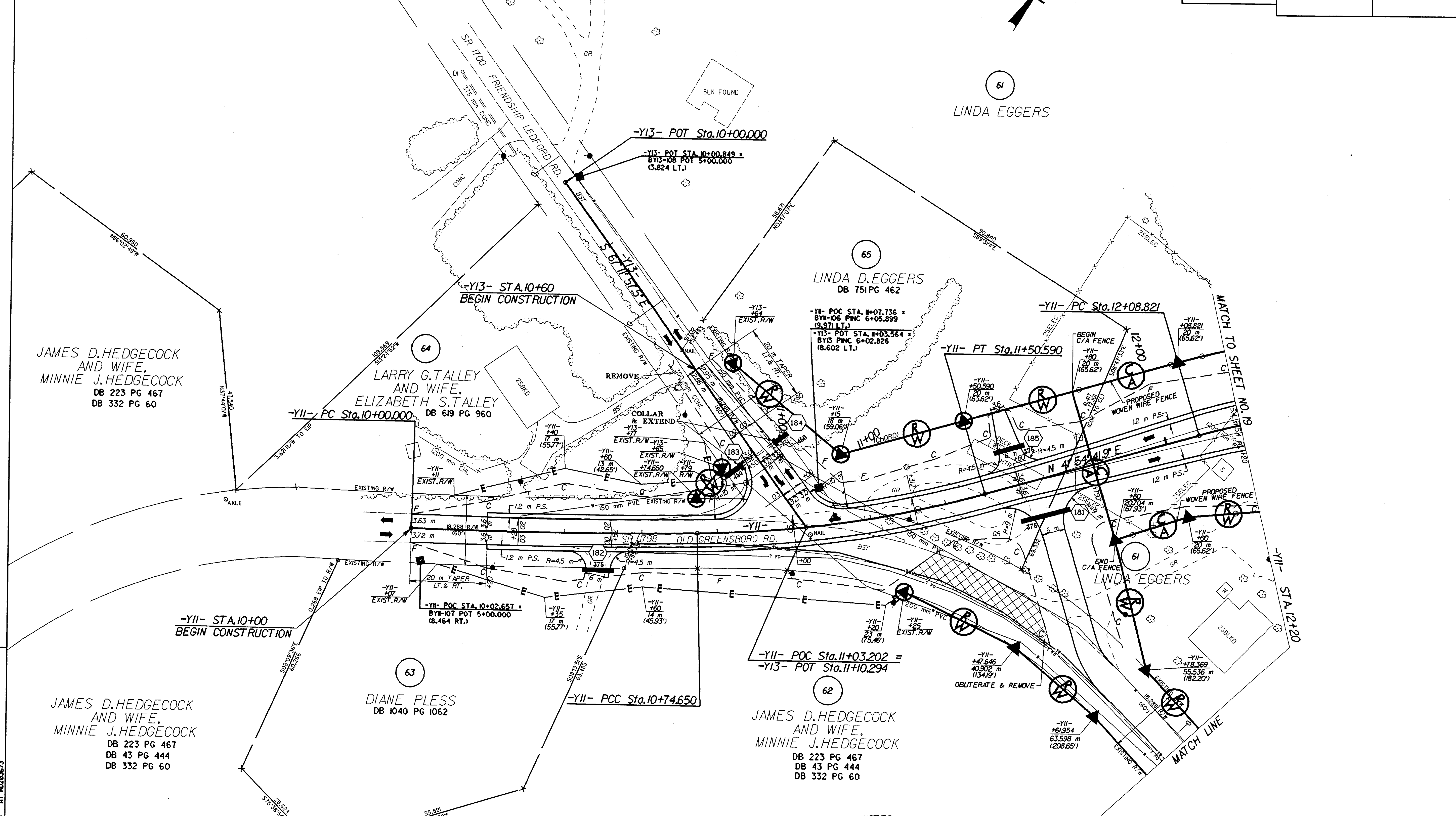
CONST. REV.

R/W REV.

REVISIONS

-Y11-

PI Sta. 10+37.333	PI Sta. 11+12.831	PI Sta. 12+44.647
Δ = 2° 53' 01.5" (LT.)	Δ = 14° 44' 57.0" (LT.)	Δ = 25° 14' 31.1" (RT.)
L = 74.650	L = 75.939	L = 70.489
T = 37.333	T = 38.181	T = 35.826
R = 1,483.196	R = 295.000	R = 160.000
S.E. = VAR.	S.E. = 0.06	S.E. = 0.06
	RUNOFF = 48	RUNOFF = 42



NOTES:
(1) SEE SHEET 42 FOR -Y11- PROFILE
(2) SEE SHEET 43 FOR -Y13- PROFILE

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	24
R/W SHEET NO.	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

-Y12-
PI Sta.11+36.157
Δ = 1°13' 48.7" (RT.)
L = 62.513
T = 31.258
R = 2911.508
S.E. = NC

PI Sta.12+28.334
Δ = 8°05' 58.2" (RT.)
L = 121.641
T = 60.922
R = 860.484

NAD 83

66
J.C.CRIDLEBAUGH FAMILY
LIMITED PARTNERSHIP

ROBERT CALICUTT

-Y12- STA.12+15
END CONSTRUCTION

-Y12- POC Sta.12+02.525 (EX. LT.EOP) =
-Y12DET- POT Sta.12+15.832

-Y12- STA.11+00

-Y12DET-

N 67° 09' 13.0" E

N 77° 30' 27.4" E

-Y12- POC Sta.12+40.000 =
-Y12DET- POT Sta.12+53.560

-Y12- POT Sta.13+08.027

N 76° 28' 59.9" E

SR 1756 W.LEXINGTON AVE.

EXISTING R/W

BEGIN WOVEN WIRE C/A FENCE

END CHAIN LINK C/A FENCE

20 m TAPER LT.& RT.

-Y12- PC Sta.11+04.899

-Y12- PCC Sta.11+67.412

-Y12- POT STA.11+58.612 =
BY12-109 PINC 6+64.844
(4.763 RT.)

-Y12- PT Sta.12+89.053

-Y12- POT STA.12+96.762 =
BY12-110 POT 8+02.118
(5.533 RT.)

R/W MON

ISBKD

CONC

1200 mm RAIL

1800 mm CHL

3.0 CHL

375 mm CONC

150 mm PVC

BST

12+00

13+00

73.999 S85°19'26"E

39.553 S05°00'00"W

456.164 S00°45'04"W

77.482 S00°45'04"W

246.023 S00°45'50"W

MATCH TO SHEET NO. 19

59
DAVIDSON COUNTY BD.OF ED.
DB 286 PG 80
DB 286 PG 97
DB 113 PG 115
DB 94 PG 541

NOTES: (1) SEE SHEET 42 FOR -Y12- PROFILE
(2) SEE SHEET 25 FOR -Y12DET-

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-Y12- DETOUR

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	25
R/W SHEET NO.	25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

NAD 83

REVISIONS

-Y12DET-
PI Sta 10+60.000
Δ = 10° 21' 14.5" (RT)
L = 43.371
T = 21.745
R = 240.000
S.E. = 0.06
R.O. = 30

-L- POT Sta.75+30.000 =
-Y12DET- POT Sta.10+00.000

-Y12DET- PC Sta.10+38.255

-Y12DET- PT Sta.10+81.626

-Y12- POC Sta.12+02.525 (EX. LT. EOP) =
-Y12DET- POT Sta.12+15.832

-Y12- POC Sta.12+40.000 =
-Y12DET- POT Sta.12+53.560

-Y12- PC Sta.11+04.899

-Y12- PCC Sta.11+67.412

-Y12- PT Sta.12+89.053

-Y12- POT Sta.13+08.027

-L- POT Sta.75+00.472 =
-Y11- POT Sta.13+28.310 =
-Y12- POT Sta.9+89.851

-Y12-
PI Sta 11+36.157
Δ = 1° 13' 48.7" (RT)
L = 62.513
T = 31.258
R = 2,911.508
S.E. = NC

PI Sta 12+28.334
Δ = 8° 05' 58.2" (RT)
L = 121.641
T = 60.922
R = 860.484

NOTE:
SEE SHEET 43 FOR -Y12DET- PROFILE

68 TERRY L. SMITH AND WIFE, JONI C. SMITH DB 959 PG 164

68 TERRY L. SMITH AND WIFE, JONI C. SMITH DB 814 PG 787

66 J.C. CRIDLEBAUGH FAMILY LIMITED PARTNERSHIP

67 GEORGE W. BRADY AND WIFE, MARION K. BRADY DB 839 PG 737

61 LINDA EGGERS

60 N.C.D.O.T.

59 DAVIDSON COUNTY BOARD OF EDUCATION
DB 286 PG 80
DB 286 PG 97
DB 113 PG 115
DB 94 PG 541

ROBERT CALICUTT

N 67° 09' 13.0" E

N 77° 30' 27.4" E

N 76° 28' 59.9" E

N 23° 54' 40.8" W

W.LEXINGTON AVE. SR 1756

NC 109

18.288 R/W (60')

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6/10/99

BM #5 - RR SPIKE IN BASE OF 275 mm PECAN TREE
R-2568A -L- 22+95.709, 36.973 m LT.
EL = 219.990

METRIC
5 0 10

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION
SEAL 22557 ENGINEER MICHAEL W. LITTLE

CONST.REV.

R /W REV.

-LT LN1-

-L-

-RT LN1-

PI = 23+50.000
EL = 220.851 m
VC = 60 m
K = 32

PI = 24+10.000
EL = 221.033 m
VC = 54 m
K = 31

BEGIN BASE DITCH GRADE STA 23+00.000 EL 216.456

END BASE DITCH GRADE STA 23+60.000 EL 217.240

BEGIN SPECIAL BASE DITCH STA 25+10.000 EL 221.150

-1.579%
+0.303%
+0.303%
+2.043%
+2.080%
+2.080%
+2.017%
-3.175%

FOR -L-, -LT LN1- & -RT LN1- PLAN VIEW SEE SHEET 4

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MLittle
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6/03/99

-LTLN1-

METRIC	PROJECT REFERENCE NO.	SHEET NO.
5 0 10	R-2568B	27
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R /W REV.	PRELIMINARY PLANS NOT FOR CONSTRUCTION	
	SEAL 22557 ENGINEER MICHAEL W. LITTLE	

PI = 26+00.000
EL = 224.935 m
VC = 120 m
K = 31

+6.0808%

+6.0000%

224.69

EQUATION
-LTLN1- STA 28+25.243 LB =
-LT- STA 28+24.458 LT, RECORDED

IMAGINARY PI = 29+01.085
EL = 243.000 m
VC = 480 m
K = 100

+6.0000%

+12.0000%

FOR -LTLN1- PLAN VIEW
SEE SHEET 5

+60 +80 26 +20 +40 +60 +80 27 +20 +40 +60 +80 28 +20

222 224 226 228 230 232 234 236 238 240 242 244 246

-RTLN1-

PI = 25+96.389
EL = 224.848 m
VC = 125 m
K = 32

224.69

EQUATION
-RTLN1- STA 28+96.389 LB =
-RT- STA 28+95.605 RT, RECORDED

+6.0000%

+6.0794%

RT
(4) 3.75%

IMAGINARY PI = 28+96.917
EL = 243.000 m
VC = 480 m
K = 100

+6.0000%

+12.0000%

FOR -RTLN1- PLAN VIEW
SEE SHEET 5

+60 +80 26 +20 +40 +60 +80 27 +20 +40 +60 +80 28

222 224 226 228 230 232 234 236 238 240 242 244 246

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6/09/99

METRIC

5 0 10

CONST.REV.

R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

SEAL 22557 ENGINEER MICHAEL W. LITTLE

-L-

PI = 29+00.000
EL = 243.000 m
VC = 480 m
K = 100

+6.000%

-2.000%

+2.000%

-1.500%

259.180

BEGIN SPECIAL DITCH GRADE STA 28+36.000 EL 236.600

END SPECIAL DITCH GRADE STA 28+96.000 EL 237.320

BEGIN SPECIAL DITCH GRADE STA 29+40.000 EL 239.400

END SPECIAL DITCH GRADE STA 29+60.000 EL 238.800

BEGIN SPECIAL DITCH GRADE STA 30+00.000 EL 237.600

END SPECIAL DITCH GRADE STA 30+20.000 EL 238.200

EQUATION STA 28+36.000 BK = EQUATION STA 28+36.000 AH

EQUATION STA 28+96.000 BK = EQUATION STA 28+96.000 AH

EQUATION STA 29+40.000 BK = EQUATION STA 29+40.000 AH

EQUATION STA 29+60.000 BK = EQUATION STA 29+60.000 AH

EQUATION STA 30+00.000 BK = EQUATION STA 30+00.000 AH

EQUATION STA 30+20.000 BK = EQUATION STA 30+20.000 AH

259.180

+4.000%

+2.000%

-1.500%

END SPECIAL DITCH GRADE STA 28+36.000 EL 236.600

BEGIN SPECIAL DITCH GRADE STA 28+96.000 EL 237.320

END SPECIAL DITCH GRADE STA 29+40.000 EL 239.400

BEGIN SPECIAL DITCH GRADE STA 29+60.000 EL 238.800

END SPECIAL DITCH GRADE STA 30+00.000 EL 237.600

BEGIN SPECIAL DITCH GRADE STA 30+20.000 EL 238.200

260.320

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 36

DRAINAGE AREA	= 8.7	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 17	CMS
DESIGN HW ELEVATION	= 234.80	m
100 YEAR DISCHARGE	= 20	CMS
100 YEAR HW ELEVATION	= 234.90	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 242.50	m

FOR -L- PLAN VIEW SEE SHEET 5

FOR -L- PLAN VIEW SEE SHEET 6

28 +20 +40 +60 +80

+80 29 +20 +40 +60 +80 30 +20 +40 +60 +80 31 +20 +40 +60 +80 32 +20

244 242 240 238 236

254 252 250 248 246 244 242 240 238 236 234 232

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MLittle
AT RD20 3673

6/09/99

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 23615 MICHAEL W. LITTLE

PRELIMINARY PLANS NOT FOR CONSTRUCTION

BM #11 - RR SPIKE IN 12" RED OAK
-BL- 28+95.337 m LT.
-L- 34+18.8.33.0 m LT.
EL.= 250.357

-L-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.49

DRAINAGE AREA	= 10.6	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 2.4	CMS
DESIGN HW ELEVATION	= 240.80	m
100 YEAR DISCHARGE	= 2.4	CMS
100 YEAR HW ELEVATION	= 241.00	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 249.00	m

FOR -L- PLAN VIEW SEE SHEET 7

BM #12 - RR SPIKE IN 48" WILLOW OAK
-BL- 32+97.180.4 m LT.
-L- 38+051.180.1 m LT.
EL.= 257.203

-L-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.59

DRAINAGE AREA	= 1.43	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.19	CMS
DESIGN HW ELEVATION	= 250.19	m
100 YEAR DISCHARGE	= 0.20	CMS
100 YEAR HW ELEVATION	= 250.24	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 251.80	m

FOR -L- PLAN VIEW SEE SHEET 8

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MLittle
AT R0203673

P.I. = 39+10.000
EL = 255.120 m
VC = 525 m
K = 105

-L-

+2.000%

-3.800%

-1.250%

-1.500%

-2.100%

-3.500%

-1.600%

-1.650%

-1.400%

-2.450%

-3.800%

BEGIN SPECIAL DITCH GRADE STA. 39+00.000 EL. 249.000

BEGIN SPECIAL DITCH GRADE STA. 39+50.000 EL. 248.300

END SPECIAL DITCH GRADE STA. 40+00.000 EL. 248.400

PI = 38+95.000 EL 248.000

PI = 39+90.000 EL 248.300

1800 RCP

PI = 40+00.000 EL 246.500

PI = 40+30.000 EL 246.500

BEGIN SPECIAL DITCH GRADE STA. 40+40.000 EL. 242.500

END SPECIAL DITCH GRADE STA. 41+40.000 EL. 242.500

BEGIN SPECIAL DITCH GRADE STA. 41+80.000 EL. 245.500

PI = 41+90.000 EL 246.700

END SPECIAL DITCH GRADE STA. 42+40.000 EL. 243.400

242.186

245.340

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.60

DRAINAGE AREA	= 3.3	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.67	CMS
DESIGN HW ELEVATION	= 248.38	m
100 YEAR DISCHARGE	= 0.72	CMS
100 YEAR HW ELEVATION	= 248.46	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 249.50	m

FOR -L- PLAN VIEW SEE SHEET 9

+80 39 +20 +40 +60 +80 40 +20 +40 +60 +80 41 +20 +40 +60 +80 42 +20

BM #J3 - RR SPIKE IN 24" SWEET GUM
-BL- 38+91.75.9 m RT.
-L- 43+98J.75.4 m RT.
EL= 234.913

-L-

245.340

-3.800%

-3.800%

-3.800%

BEGIN SPECIAL DITCH GRADE STA. 43+00.000 EL. 235.500

PI = 44+00.000 EL 234.000

(2 PIPES) 1350 RCP 900 RCP

PI = 44+40.000 EL 233.100

1650 CLASS IV RCP

PI = 44+80.000 EL 234.100

END SPECIAL DITCH GRADE STA. 44+80.000 EL. 233.500

296.892

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.76

DRAINAGE AREA	= 24	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 4.4	CMS
DESIGN HW ELEVATION	= 230.50	m
100 YEAR DISCHARGE	= 5.2	CMS
100 YEAR HW ELEVATION	= 230.70	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 237.10	m

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.71

DRAINAGE AREA	= 17.7	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 3.3	CMS
DESIGN HW ELEVATION	= 231.73	m
100 YEAR DISCHARGE	= 3.9	CMS
100 YEAR HW ELEVATION	= 231.98	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 237.50	m

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.73

DRAINAGE AREA	= 5.6	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1.4	CMS
DESIGN HW ELEVATION	= 231.40	m
100 YEAR DISCHARGE	= 1.5	CMS
100 YEAR HW ELEVATION	= 231.47	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 237.50	m

FOR -L- PLAN VIEW SEE SHEET 10

+20 +40 +60 +80 43 +20 +40 +60 +80 44 +20 +40 +60 +80 45 +20

5/09/95

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R /W REV.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 23857 MICHAEL W. LITTLE

PRELIMINARY PLANS NOT TO BE USED FOR CONSTRUCTION

—L—

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	=	15.0 CMS
DESIGN FREQUENCY	=	50 YRS
DESIGN HW ELEVATION	=	224.93 m
BASE DISCHARGE	=	17.3 CMS
BASE FREQUENCY	=	100 YRS
BASE HW ELEVATION	=	225.14 m
OVERTOPPING DISCHARGE	=	25.5 CMS
OVERTOPPING FREQUENCY	=	>500 YRS
OVERTOPPING ELEVATION	=	231.11 m

PI = 46+30.000
EL = 227.760 m
VC = 370 m
K = 51

-5.800%
-5.460%
-2.500%
0.000%
+1.500%
+4.600%
+1.400%
+2.700%
+0.350%
+0.060%
+0.852%
+0.045%
+1.000%
+1.500%
+1.000%
+0.500%

BEGIN SPECIAL DITCH GRADE STA 46+20.000 EL 229.500

END SPECIAL DITCH GRADE STA 47+10.000 EL 225.000

BEGIN LATERAL "A" DITCH STA 46+40.000 EL 229.500

BEGIN LATERAL "A" DITCH STA 46+40.000 EL 229.500

PI = 46+60.000 EL 229.000

PI = 47+00.000 EL 226.000

PI = 47+40.000 EL 225.870

PI = 47+50.000 EL 229.000

END LATERAL "A" DITCH STA 47+40.000 EL 225.500

PI = 47+80.000 EL 230.340

BEGIN SPECIAL DITCH GRADE STA 47+40.000 EL 225.500

PI = 48+20.000 EL 229.800

PI = 48+40.000 EL 230.000

PI = 48+50.000 EL 230.200

BEGIN SPECIAL DITCH GRADE STA 48+40.000 EL 230.500

PI = 48+60.000 EL 230.700

PI = 48+80.000 EL 231.200

C/L -L- STA 46+85 2-1.8 m X 2.4 m RCBC SKEW 60°

FOR -L- PLAN VIEW SEE SHEET 11

BM #J4 - RR SPIKE IN 20" SWEET GUM
-BL- 45+65.102.7 m RT.
-L- 50+72.9.103.5 m RT.
EL = 242.380

—L—

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.92

DRAINAGE AREA	= 5.6	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1.3	CMS
DESIGN HW ELEVATION	= 230.40	m
100 YEAR DISCHARGE	= 1.5	CMS
100 YEAR HW ELEVATION	= 230.49	m
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 236.80	m

+3.460%
+3.500%
+1.000%
+0.500%
+1.000%
+0.500%
+1.000%
+0.500%
+1.000%
+0.500%
+1.000%
+0.500%
+1.000%
+0.500%
+1.000%
+0.500%
+1.000%
+0.500%

PI = 51+80.000
EL = 246.790 m
VC = 640 m
K = 92

END SPECIAL DITCH GRADE STA 51+40.000 EL 237.900

PI = 51+20.000 EL 235.800

BEGIN SPECIAL DITCH GRADE STA 51+40.000 EL 239.500

PI = 50+80.000 EL 237.700

PI = 50+60.000 EL 237.200

PI = 50+40.000 EL 236.700

PI = 50+00.000 EL 235.500

PI = 49+60.000 EL 234.200

PI = 49+40.000 EL 233.800

PI = 49+20.000 EL 233.200

PI = 49+00.000 EL 232.600

PI = 48+80.000 EL 232.300

END LATERAL "C" DITCH STA 48+60.000 RT. EL 230.500

PI = 48+60.000 EL 230.300

PI = 48+40.000 EL 230.200

BEGIN SPECIAL DITCH GRADE STA 48+40.000 EL 230.200

600 CLASS IV RCP

750 CLASS IV RCP

END SPECIAL DITCH GRADE STA 48+80.000 EL 228.300

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.97

DRAINAGE AREA	= 2.85	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.71	CMS
DESIGN HW ELEVATION	= 233.33	m
100 YEAR DISCHARGE	= 0.77	CMS
100 YEAR HW ELEVATION	= 233.38	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 240.00	m

FOR -L- PLAN VIEW SEE SHEET 12

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AT R0203673

-L-

252 250 248 246 244 242 240 238 236 234 232 230

52 +20 +40 +60 +80 53 +20 +40 +60 +80 54 +20 +40 +60 +80 55 +20 +40

244.65

-3.5000%

-1.5000%

-2.5000%

-3.5000%

234.90

-L- 52+50.00 RT.

END SPECIAL DITCH GRADE STA. 52+20.000 EL. 238.880

BEGIN SPECIAL DITCH GRADE STA. 53+60.000 EL. 233.500

PI = 54+60.000 EL. 231.200

(+) 1.50%

(-) 2.50%

END SPECIAL DITCH GRADE STA. 54+10.000 EL. 231.500

PI = 55+40.000 EL. 234.500

-L- 55+48.49 RT.

FOR -L- PLAN VIEW SEE SHEET 13

BM #J5 - RR SPIKE IN 24" RED OAK
-BL- 52+48.77 m RT.
-L- 57+48.86 m RT.
EL. = 231.146

-L-

236 234 232 230 228 226 224 222 220 218

+40 +60 +80 56 +20 +40 +60 +80 57 +20 +40 +60 +80 58 +20 +40 +60 +80

234.88

-3.5000%

-3.5000%

222.80

BEGIN SPECIAL DITCH GRADE STA. 56+40.000 EL. 229.900

END SPECIAL DITCH GRADE STA. 56+80.000 EL. 228.500

BEGIN SPECIAL DITCH GRADE STA. 57+00.000 EL. 228.000

END SPECIAL DITCH GRADE STA. 57+40.000 EL. 226.600

(+) 1.00%

(+) 1.00%

(-) 3.50%

(-) 1.50%

(-) 2.50%

PI = 56+40.000 EL. 228.700

PI = 56+80.000 EL. 229.000

PI = 57+00.000 EL. 228.500

PI = 57+40.000 EL. 226.500

750 CLASS IV RCP

600 RCP

END SPECIAL DITCH GRADE STA. 56+60.000 EL. 229.400

FOR -L- PLAN VIEW SEE SHEET 14

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 122

DRAINAGE AREA	= 4.5	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.93	CMS
DESIGN HW ELEVATION	= 226.96	m
100 YEAR DISCHARGE	= 1.0	CMS
100 YEAR HW ELEVATION	= 227.02	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 232.00	m

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 126

DRAINAGE AREA	= 2.2	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.55	CMS
DESIGN HW ELEVATION	= 224.59	m
100 YEAR DISCHARGE	= 0.59	CMS
100 YEAR HW ELEVATION	= 224.45	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 228.40	m

5/09/96

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	33

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

METRIC

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CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 22857 ENGINEER MICHAEL W. LITTLE

PRELIMINARY PLANS NOT FOR CONSTRUCTION

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 134.0 CMS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 214.97 m
BASE DISCHARGE	= 174.0 CMS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 215.35 m
OVERTOPPING DISCHARGE	= >242.0 CMS
OVERTOPPING FREQUENCY	= >500 YRS
OVERTOPPING ELEVATION	= 218.46 m

-L-

PI = 60+00.000
EL = 218.090 m
VC = 200 m
K = 51

-3.500%

+0.4200%

-L- STA 61+04.890 RT. BEGIN BRIDGE

-L- STA 61+56.890 RT. END BRIDGE

BEGIN SPECIAL DITCH GRADE STA 60+40.000 EL 220.000

END SPECIAL DITCH GRADE STA 60+40.000 EL 223.300

PI = 60+40.000 EL 223.500

PI = 60+80.000 EL 223.000

END SPECIAL DITCH GRADE STA 61+10.000 EL 223.300

BEGIN SPECIAL DITCH GRADE STA 61+10.000 EL 223.300

END SPECIAL DITCH GRADE STA 61+40.000 EL 223.300

PI = 61+40.000 EL 223.500

PI = 64+80.000 EL 226.500

BEGIN SPECIAL DITCH GRADE STA 64+80.000 EL 226.500

PI = 65+40.000 EL 226.600

END SPECIAL DITCH GRADE STA 65+40.000 EL 227.000

FOR -L- PLAN VIEW SEE SHEET 15

-L-

PI = 64+50.000
EL = 219.980 m
VC = 200 m
K = 56

+0.4200%

+4.0000%

PI = 62+60.000 EL 226.300

PI = 62+80.000 EL 226.500

END SPECIAL DITCH GRADE STA 63+00.000 EL 226.700

BEGIN STREAM RELOCATION STA 63+00.000 EL 226.700

PI = 63+40.000 EL 226.900

PI = 63+60.000 EL 226.950

PI = 64+40.000 EL 226.900

END STREAM RELOCATION STA 64+80.000 EL 227.600

BEGIN SPECIAL DITCH GRADE STA 64+80.000 EL 228.300

PI = 65+20.000 EL 228.900

1050 RCP

END SPECIAL DITCH GRADE STA 65+40.000 EL 229.000

224.080

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 160

DRAINAGE AREA	= 9.69	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1.85	CMS
DESIGN HW ELEVATION	= 221.05	m
100 YEAR DISCHARGE	= 2.15	CMS
100 YEAR HW ELEVATION	= 221.20	m
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 2.15	CMS
OVERTOPPING ELEVATION	= 221.10	m

FOR -L- PLAN VIEW SEE SHEET 16

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5/09/2

BM "J6 - RR SPIKE IN 24" RED CEDAR
-BL- 61+68.104.2 m LT.
-L- 66+60.6.101.3 m LT.
EL.= 228.588

—L—

METRIC

5 0 10

CONST.REV.

R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	34

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 23857 ENGINEER MICHAEL W. LITTLE

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

238 236 234 232 230 228 226 224 222

+60 +80 66 +20 +40 +60 +80 67 +20 +40 +60 +80 68 +20 +40 +60 +80 69

277.968

224.380

+4.000%

+5.50%

BEGIN SPECIAL DITCH GRADE STA. 67+40.000 EL. 229.900

END SPECIAL DITCH GRADE STA. 67+80.000 EL. 232.100

FOR -L- PLAN VIEW SEE SHEET 17

PI = 71+80.000
EL = 249.180 m
VC = 590 m
K = 95

—L—

250 248 246 244 242 240 238 236 234 232 230

69 +20 +40 +60 +80 70 +20 +40 +60 +80 71 +20 +40 +60 +80 72 +20 +40

277.968

+4.000%

+2.8200%

+4.65%

BEGIN SPECIAL DITCH GRADE STA. 71+23.000 EL. 236.350

(+) 0.3333%

PI = 71+40.000 EL. 236.600

(+) 0.50%

PI = 71+60.000 EL. 236.500

(+) 0.60%

PI = 71+80.000 EL. 241.000

(+) 2.65%

PI = 71+90.000 EL. 243.650

END SPECIAL DITCH GRADE STA. 71+93.000 EL. 243.530

FOR -L- PLAN VIEW SEE SHEET 18

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MLittle AT RD2003673

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	35

METRIC

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

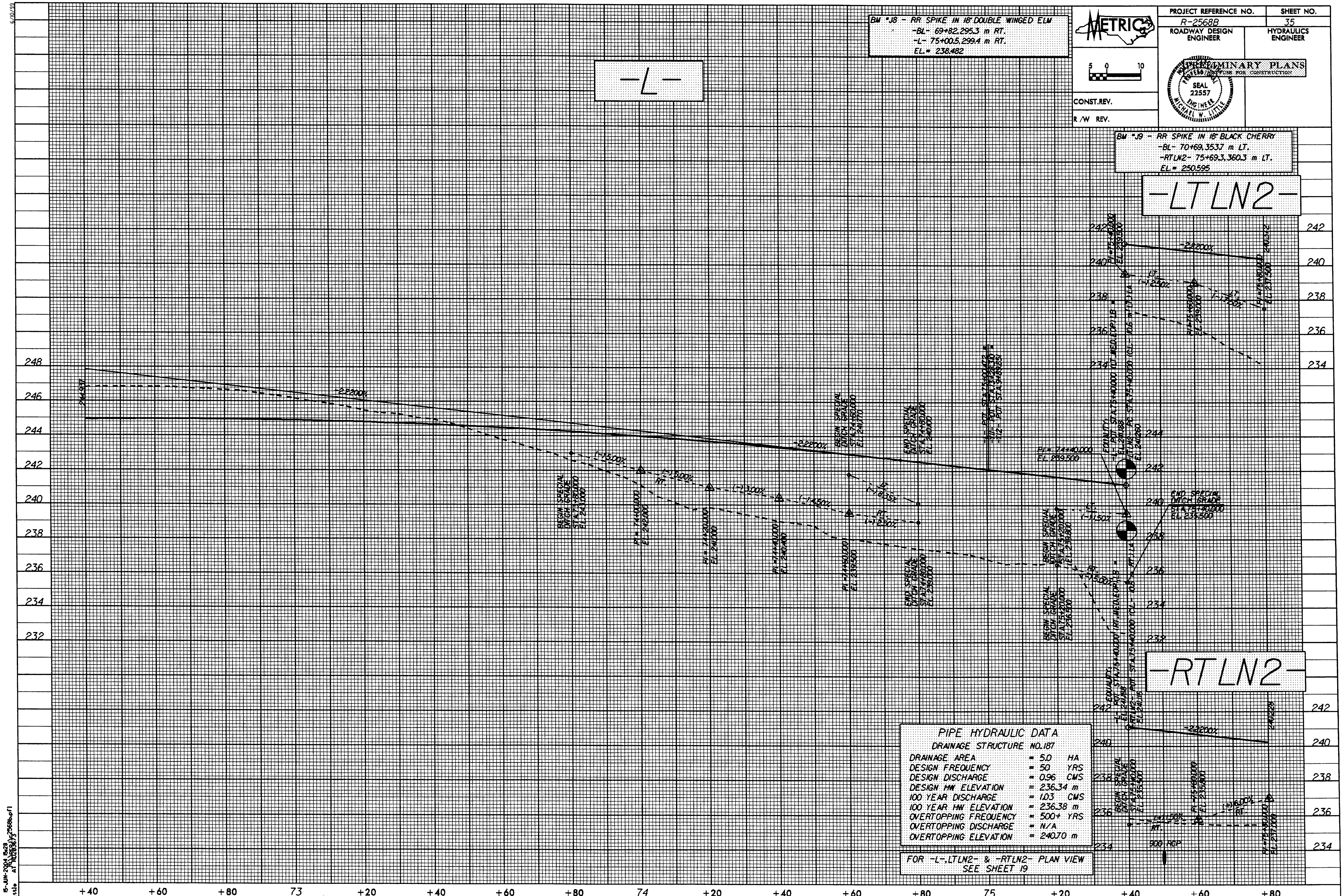
SEAL 22557 — ENGINEER — MICHAEL W. LITTLE

CONST. REV.

R/W REV.

BM #J8 - RR SPIKE IN 18" DOUBLE WINGED ELM
-BL- 69+82, 295.3 m RT.
-L- 75+00.5, 299.4 m RT.
EL.= 238.482

BM #J9 - RR SPIKE IN 18" BLACK CHERRY
-BL- 70+69, 353.7 m LT.
-RTLN2- 75+69.3, 360.3 m LT.
EL.= 250.595



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 187

DRAINAGE AREA	= 5.0	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.96	CMS
DESIGN HW ELEVATION	= 236.34	m
100 YEAR DISCHARGE	= 1.03	CMS
100 YEAR HW ELEVATION	= 236.38	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 240.70	m

FOR -L-, LTLN2- & -RTLN2- PLAN VIEW SEE SHEET 19

5/09/99

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	36

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 23863 MICHAEL W. LITTLE

PRELIMINARY PLANS NOT FOR CONSTRUCTION

CONST.REV.

R /W REV.

5 0 10

-LTLN2-

PI = 77+00.000
EL = 237.708 m
VC = 60 m
K = 247

PI = 78+60.000
EL = 233.767 m
VC = 148 m
K = 40

END SPECIAL DITCH GRADE STA 76+00.000 EL 237.900

BEGIN SPECIAL DITCH GRADE STA 76+40.000 EL 237.500

PI = 76+60.000 EL 237.300

END SPECIAL DITCH GRADE STA 77+40.000 EL 237.100

-2.200%

-2.200%

-2.400%

+2.300%

FOR -LTLN2- PLAN VIEW SEE SHEET 20

-RTLN2-

PI = 75+80.000
EL = 237.900

PI = 78+70.000
EL = 233.790 m
VC = 140 m
K = 39

END SPECIAL DITCH GRADE STA 76+00.000 EL 237.500

-2.200%

-2.200%

(+)0.50% RT.

(+)0.80% RT.

(+)0.50% RT.

(-)0.20% RT.

+2.300%

600 RCP

BEGIN SPECIAL DITCH GRADE STA 78+40.000 EL 235.100

PI = 78+60.000 EL 235.300

PI = 78+80.000 EL 235.500

END SPECIAL DITCH GRADE STA 79+40.000 EL 235.339

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE FROM NO.200 TO 201

DRAINAGE AREA	= 2.86	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.58	CMS
DESIGN HW ELEVATION	= 232.75	m
100 YEAR DISCHARGE	= 0.81	CMS
100 YEAR HW ELEVATION	= 232.79	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 234.50	m

FOR -RTLN2- PLAN VIEW SEE SHEET 20

248 246 244 242 240 238 236 234 232 230 228 226

+80 76 +20 +40 +60 +80 77 +20 +40 +60 +80 78 +20 +40 +60 +80 79 +20

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MLittle AT R0203673

6/10/98

-LTLN2-

238
236
234
232

234.569

+12500%

EXIST LT
-LTLN2_ PVI STA 79+13.45 LT
-RTLN2_ PVI STA 79+13.59 RT
EL 234.484

+41.42%

FEATHER

238
236
234
232

234.340

+39.91%

EXIST LT
-RTLN2_ PVI STA 79+40.00 LT
EL 232.78

+41.42%

FEATHER

-RTLN2-

79+20 +40

FOR -LTLN2- & -RTLN2- PLAN VIEW
SEE SHEET 21

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METRIC

5 0 10

CONST. REV.

R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	37

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NORTH CAROLINA PROFESSIONAL SEAL 22557 ENGINEER MICHAEL W. LITTLE

6/10/03

METRIC

5 0 10

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	38
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

SEAL 22557 ENGINEER MICHAEL W. LITTLE

-Y-

PI = 10+30.000
EL = 242.479 m
VC = 30 m
K = 9

PI = 11+90.000
EL = 249.685 m
VC = 60 m
K = 20

PI = 12+70.000
EL = 250.885 m
VC = 60 m
K = 17

BEGIN SPECIAL DITCH GRADE STA 10+00.000 EL 242.329

PT STA 10+30.000

PC STA 11+60.000

END SPECIAL DITCH GRADE STA 11+90.000 EL 249.685

BEGIN SPECIAL DITCH GRADE STA 11+40.000 EL 247.500

END SPECIAL DITCH GRADE STA 12+40.000 EL 248.800

END SPECIAL DITCH GRADE STA 13+00.000 EL 249.938

FEATHER

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 31

DRAINAGE AREA	= 1.5	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.38	CMS
DESIGN HW ELEVATION	= 238.59	m
100 YEAR DISCHARGE	= 0.40	CMS
100 YEAR HW ELEVATION	= 238.61	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 242.50	m

FOR -Y- PLAN VIEW SEE SHEETS 6 & 22

15-JUN-2004 15:29
M:\roads\y2568by2568bp01.dgn

260 258 256 254 252 250 248 246 244 242 240 238 236 234 232 230 228 226

10 +20 +40 +60 +80 11 +20 +40 +60 +80 12 +20 +40 +60 +80 13 +20 +40

6/10/99

METRIC	PROJECT REFERENCE NO.	SHEET NO.
5 0 10	R-2568B	39
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R/W REV.	PRELIMINARY PLANS NOT FOR CONSTRUCTION	

SEAL 22557 ENGINEER MICHAEL W. LITTLE

-Y1-

PI = 10+70.000
EL = 250.724 m
VC = 115 m
K = 12

BEGIN GRADE
STA 10+03.560
EL 248.235

-3.27%

5.00%

END GRADE
STA 11+40.000
EL 246.852

← FEATHER →

254
252
250
248
246
244
242
240
238
236
234
232
230

10 +20 +40 +60 +80 11 +20 +40 +60 +80 12 +20 +40 +60 +80 13 +20 +40

FOR -Y1- PLAN VIEW SEE SHEET 22

5-JUN-2004 15:30
$DGN/R2568Y1-2568b.dgn
Microstation

5/09/99

BM #12 - RR SPIKE IN 48" WILLOW OAK
-BL- 32+97.180.4 m LT.
-L- 38+05.1.180.1 m LT.
EL= 257.203

-Y9-

PROJECT REFERENCE NO. R-2568B | SHEET NO. 40

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 23651 MICHAEL W. LITTLE

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

FEATHER

BEGIN GRADE
-Y9- POT STA 10+40.000
EL 254.805

PI = 12+00.000
EL = 251.401 m
VC = 45 m
K = 24

-Y9- POT STA 11+83.370
EL 251.139

-Y9- POT STA 12+67.184
EL 250.930

PI = 12+80.000
EL = 251.319 m
VC = 45 m
K = 27

END GRADE
-Y9- POT STA 13+30.000
EL 251.787

FEATHER

0.69000%

-0.59918%

-0.48106%

+1.00000%

256
254
252
250

10 +20 +40 +60 +80 11 +20 +40 +60 +80 12 +20 +40 +60 +80 13 +20 +40

FOR -Y9- PLAN VIEW
SEE SHEET 8

-Y9-

256
254
252
250

+40 +60 +80 14 +20 +40 +60 +80

FOR -Y9- PLAN VIEW
SEE SHEET 8

15-JUN-2004 15:30
R:\projV\2568B\
MLittle A1 R0203673

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	41

METRIC

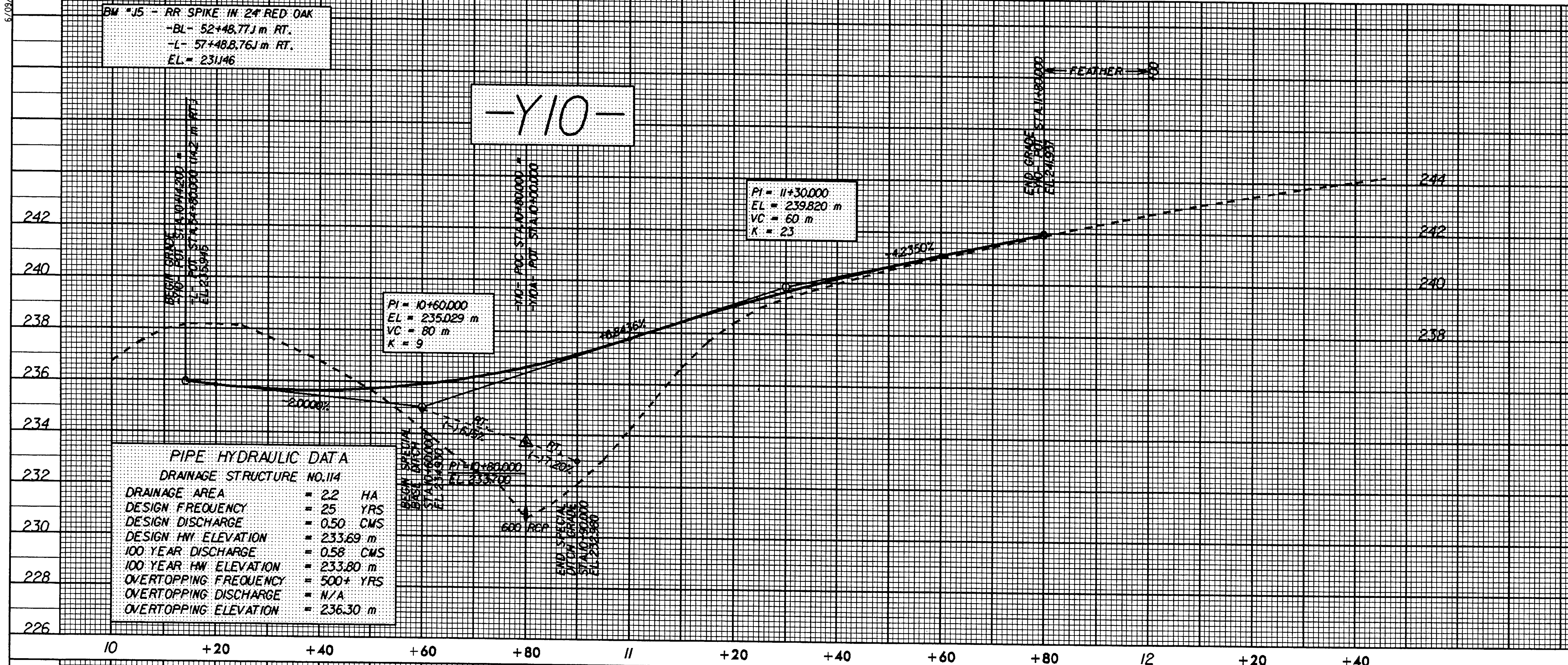
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

CONST.REV.

R /W REV.

NORTH CAROLINA PROFESSIONAL ENGINEER MICHAEL W. LITTLE

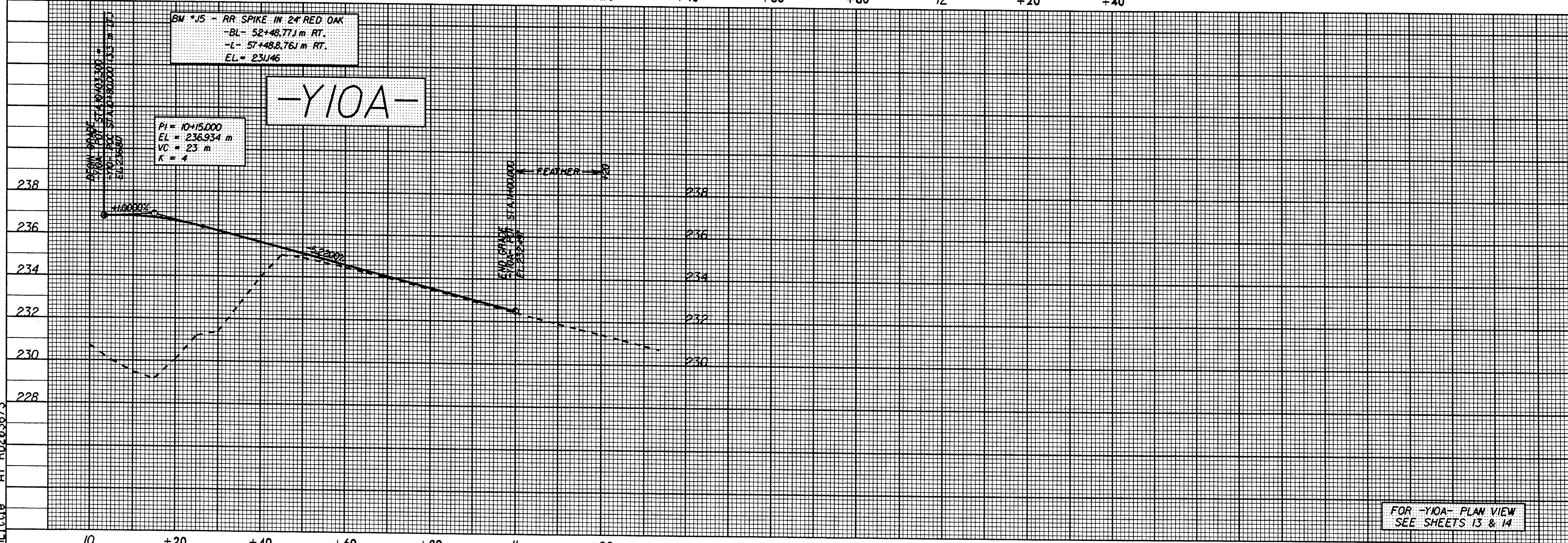
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.114

DRAINAGE AREA	= 2.2 HA
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 0.50 CMS
DESIGN HW ELEVATION	= 233.69 m
100 YEAR DISCHARGE	= 0.58 CMS
100 YEAR HW ELEVATION	= 233.80 m
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= N/A
OVERTOPPING ELEVATION	= 236.30 m



15-JUN-2004 15:31

6/03/03

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	42
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 23961 MICHAEL W. LITTLE

PRELIMINARY PLANS NOT FOR CONSTRUCTION

-Y11-

PI = 10+70.000
EL = 253.046 m
VC = 100 m
K = 14

BM "J8 - RR SPIKE IN 18" DOUBLE WINGED ELM
-BL- 69+82.295.3 m RT.
-L- 75+00.5.299.4 m RT.
EL= 238.482

-L- STA 10+70.000
EL 253.046

-L- STA 10+20.000
EL 252.258

BEGIN GRADE -L- STA 10+00.000 EL 251.858

-L- STA 11+20.000 EL 242.150

-L- STA 11+40.000 EL 241.950

-L- STA 11+60.000 EL 241.750

-L- STA 11+80.000 EL 241.550

-L- STA 12+00.000 EL 241.350

-L- STA 12+20.000 EL 241.150

-L- STA 12+40.000 EL 240.950

-L- STA 12+60.000 EL 240.750

-L- STA 12+80.000 EL 240.550

-L- STA 13+00.000 EL 240.350

END GRADE -L- STA 13+00.736 (142 m RT.) EL 242.206

PI = 13+00.000
EL = 242.406 m
VC = 25 m
K = 14

-27.900%

-16.400%

-16.860%

-2.800%

600 RCP

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.180

DRAINAGE AREA	= 2.1	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.54	CMS
DESIGN HW ELEVATION	= 241.05	m
100 YEAR DISCHARGE	= 0.57	CMS
100 YEAR HW ELEVATION	= 241.12	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 242.50	m

FOR -Y11- PLAN VIEW SEE SHEETS 19 & 23

10 +20 +40 +60 +80 11 +20 +40 +60 +80 12 +20 +40 +60 +80 13 +20

232 234 236 238 240 242 244 246 248 252

-Y12-

BM "J8 - RR SPIKE IN 18" DOUBLE WINGED ELM
-BL- 69+82.295.3 m RT.
-L- 75+00.5.299.4 m RT.
EL= 238.482

PI = 10+35.000
EL = 242.203 m
VC = 60 m
K = 21

BEGIN GRADE -L- STA 10+04.063 EL 241.854

-L- STA 10+35.000 EL 241.954

-L- STA 10+66.206 (142 m RT.) EL 242.206

+10.000%

+1.750%

-1.000%

750 RCP

BEGIN SPECIAL DITCH GRADE STA 10+28.000 EL 240.801

PI = 10+40.000 EL 240.880

END SPECIAL DITCH GRADE STA 10+60.000 EL 242.300

END GRADE -L- STA 11+60.000 EL 246.623

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.186

DRAINAGE AREA	= 3.2	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1.12	CMS
DESIGN HW ELEVATION	= 239.96	m
100 YEAR DISCHARGE	= 1.21	CMS
100 YEAR HW ELEVATION	= 240.07	m
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	
OVERTOPPING ELEVATION	= 242.15	m

FOR -Y12- PLAN VIEW SEE SHEETS 19 & 24

10 +20 +40 +60 +80 11 +20 +40 +60 +80 12 +20 +40 +60 +80 13

230 232 234 236 238 240 242 244 246 248

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5/03/99

BM #J8 - RR SPIKE IN 18" DOUBLE WINGED ELM
-BL- 69+82.295.3 m RT.
-L- 75+00.5.299.4 m RT.
EL= 238.482

-Y13-

-Y14-

-Y12DET-

METRIC

5 0 10

CONST.REV.

R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 23615 ENGINEER MICHAEL W. LITTLE

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

FEATHER

BEGIN GRADE SHOULDER -Y13- STA 10+80.000 EL 250.389

END GRADE SHOULDER -Y13- STA 10+90.000 EL 250.796

-Y13- PROJ STA 10+90.235 (0.6 m LT)

PI = 10+90.000
EL = 250.801 m
VC = 20 m
K = 5

-10.800%

+2.200%

FOR -Y13- PLAN VIEW
SEE SHEET 23

BEGIN GRADE SHOULDER -Y14- STA 10+40.000 EL 242.196

-Y14- PROJ STA 10+40.235 (0.6 m RT)

PI = 10+40.000
EL = 242.196 m
VC = 40 m
K = 6

END GRADE SHOULDER -Y14- STA 10+90.000 EL 242.537

-5.025%

+1.050%

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	2.25 HA
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	0.50 CMS
DESIGN HW ELEVATION	=	240.03 m
100 YEAR DISCHARGE	=	0.54 CMS
100 YEAR HW ELEVATION	=	240.08 m
OVERTOPPING FREQUENCY	=	500+ YRS
OVERTOPPING DISCHARGE	=	N/A
OVERTOPPING ELEVATION	=	242.10 m

FOR -Y14- PLAN VIEW
SEE SHEET 18

PI = 11+90.000
EL = 247.716 m
VC = 50 m
K = 5

+12.682%

-2.436%

BEGIN GRADE SHOULDER -Y12DET- STA 10+00.000 = -Y12- PROJ STA 9+78.668 (6.6 m LT)
EL 235.367

PI = 10+25.000
EL = 235.954 m
VC = 17 m
K = 3

+1.000%

+12.682%

END GRADE SHOULDER -Y12DET- STA 12+15.332 = -Y12- PROJ STA 12+02.525 (6.6 m LT)
EL 241.166

FOR -Y12DET- PLAN VIEW
SEE SHEET 25

254 252 250 248 246 244 242 240 238 236 234

10 +20 +40 +60 +80 11 12 13

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5/09/03

METRIC

5 0 10

PROJECT REFERENCE NO.	SHEET NO.
R-2568B	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22863 MICHAEL W. LITTLE

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

-Y14A-

-DRI-

BEGIN GRADE -Y14A- POT STA.10+100.000 = -Y14- POT STA.11+40.089 EL= 242.538

PI = 10+40.000
EL = 243.900 m
VC = 40 m
K = 7

PI = 10+80.000
EL = 241.000 m
VC = 40 m
K = 4

END GRADE -Y14A- POT STA.11+20.126 EL= 240.868

BEGIN GRADE -DRI- POT STA.63+50.000 = -L- POT STA.63+50.000 (BK) EL= 216.938

PI = 10+60.000
EL = 215.951 m
VC = 100 m
K = 25

END GRADE -DRI- POT STA.11+54.822 EL= 214.050

+2.450%

-1.500%

-1.500%

-2.250%

-3.000%

-0.950%

248
246
244
242
240

218
216
214
212

10 +20 +40 +60 +80 11 +20

10 +20 +40 +60 +80 11 +20 +40

FOR -Y14A- PLAN VIEW SEE SHEET 18

FOR -DRI- PLAN VIEW SEE SHEETS 15 & 16

15-JUN-2004 15:32
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STORMWATER MANAGEMENT PLAN

R-2568B, State Project 8.1600901
Davidson County
Hydraulics Project Manager: Andrew Nottingham, PE

Date:7/24/02
Revised 6/4/04
Revised7/15/04

ROADWAY DESCRIPTION

The project involves the construction of NC 109 from north of I-85 Business near Thomasville to north of SR 1756 (Lexington Ave.) north of Ledford Middle School. The overall length of the project is 3.51 miles. R2568B is part of project R2568 which will widen the existing NC 109 from two-lanes to a multi-lane highway from Thomasville to High Point. About half of the project is on new location and the other half approximately follows the existing alignment. The proposed typical section is a four lane divided highway with grass shoulders and ditches and a 46-ft. grass median. The project ties into a 5-lane curb and gutter section at the beginning and a two-lane shoulder section at the end. There are two major stream crossings consisting of a new box culvert and a new bridge.

ENVIRONMENTAL DESCRIPTION

Land Use

The project area is generally rural, but is experiencing increased residential suburban development due to growth in nearby Winston-Salem, High Point, and Thomasville. It is anticipated the suburban growth will continue, with commercial/industrial districts near the southern terminus near Thomasville and at other locations along the project in the future.[1]

Topography and Water Resources

The project is located in the Yadkin-PeeDee River Basin in the Piedmont Physiographic Province. In most places a thick layer of soil and soft weathered rock is underlain by bedrock. The terrain is gently to severely rolling. Erosion rates are high for exposed areas. The streams are moderately swift and tend to flow southward and southwestward in fairly broad interstream areas.[1] There are nine stream crossings on this project, which are all classified as Class C waters. Five of the streams are intermittent, three are perennial, and one stream changes from intermittent to perennial within the impact area. The two perennial stream crossings will require a new bridge at Rich Fork Creek (at approximately the same location as the existing bridge crossing) and a new culvert at a Tributary to Rich Fork Creek (on new roadway location). The intermittent streams will utilize pipe culvert crossings. Approximately 2707 ft. of existing stream will be permanently impacted due to the project resulting in 0.36 ac. of fill in surface waters. Temporary stream impacts will total approximately 280 ft. with 0.03 ac. of temporary fill in surface waters. Two sites will require stream relocations. Four wetland sites will be impacted. Approximately 0.75 acres of wetlands will be impacted due to this project which includes 0.62 ac. of fill in wetlands, 0.03 ac. of excavation in wetlands and 0.10 ac. of mechanized clearing in wetlands

[1] Draft Environmental Assessment, NCDOT

BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES

Best Management Practices (BMPs) and measures used on the project are an attempt to reduce the stormwater impacts to the receiving streams due to erosion and runoff. The primary BMP is the use of grassed roadway ditches and shoulders, as opposed to a curb and gutter roadway system. Rip rapped ditches were used where warranted to control erosion. Ditches were ended in flat floodplain areas where possible to allow dispersal and infiltration. Preformed scour holes were used to attenuate and disperse flow. The inverts of all new culverts on jurisdictional streams or wetlands will be buried 20% of the pipe diameter up to 1 ft. deep. No bridge deck drains will be used directly over the surface water.

Stream Relocations

Station 47+00 to station 47+80 –L- Lt.
Approximately 315 ft of perennial stream will be relocated using natural stream design.

Station 64+20 to station 65+00 –L- Lt.
Approximately 315 ft of intermittent stream will be relocated.

Bridges

Station 61+31.5 –L- Lt.
The existing 103 ft. long bridge on NC 109 over Rich Fork Creek will be removed and replaced with a new bridge 170 ft. in length. The new bridge will be a two span bridge, which will span the water. The middle pier will be right along the existing bank and a rock causeway will likely be required to construct the pier due to its close proximity to the water.

Culvert

Station 46+85 –L-
The proposed 11-ft wide by 8 ft. high box culvert on a Tributary to Rich Fork Creek will be buried 1 ft. below the stream bed. The stream will be temporarily diverted near the culvert entrance to allow all dry construction.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 18, 2004

Mr. William D. Gilmore, P.E.
EEP Transition Manager
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Dear Sir:

Subject: Improvement of NC 109 from North of I-85 Business to North of SR 1798 (Old Greensboro Road) in Davidson County, Federal Project No. STP-109 (1), State Project No. 8.1900901, WBS Element 34468.1.1, T.I.P. No.R-2568B.

The purpose of this letter is to request that the North Carolina Ecosystem Enhancement Program (EEP) provide confirmation that the EEP is willing to provide compensatory mitigation for the project in accordance with the Memorandum of Agreement (MOA) signed July 22, 2003 by the USACE, the NCDENR and the NCDOT. This project was one of the 16 additional projects to be let during 2004-2005 that was included on the "Transition List" for the MOA.

The North Carolina Department of Transportation (NCDOT) proposes to relocate NC 109 from north of I-85 Business in Thomasville to north of SR 1798 (Old Greensboro Road), a distance of 3.51 miles. This section of existing NC 109 is located in the northeastern part of Davidson County. This Urban Principal Arterial is a four-lane divided facility with partial access control, and will be constructed partially on new location. The typical section for the proposed facility includes a 46-foot grassed median.

RESOURCES UNDER THE JURISDICTION OF SECTION 404 AND 401 OF THE CLEAN WATER ACT.

We have avoided and minimized the impacts to jurisdictional resources to the greatest extent possible as described in the permit application. A copy of the permit application can be found at http://www.ncdot.org/planning/pe/naturalunit/Applications.html. Although there will be 315 feet if onsite mitigation created by a new stream channel, the remaining impacts to jurisdictional resources will be compensated for by mitigation provided by the EEP program.

Wetlands

Table 1 lists the impacts to jurisdictional wetland resources, which include impacts resulting from fill, excavation, and mechanized clearing and wetland descriptions. We estimate 0.75 acres of unavoidable impacts to jurisdictional wetlands for this project. We are requesting compensatory mitigation from EEP for the unavoidable impacts to the wetlands.

Table 1 – Wetland Impacts and Descriptions

Site	Wetland Impacts (acres)*	Cowardin *et al.* description	NCDWQ Wetland Rating	Riverine (R) or Non-riverine (NR)	Schafale and Weakley description
2	0.02	PFO1C	56	NR	MO
3	0.05	PFO1C/W	44	NR	B
5	0.15	PFO1B	60	NR	MO
9	0.53	PFO1C	65	NR	B
Total impacts	**0.75**				

* Indicates total wetland impacts, including fill, excavation and mechanized clearing

The Cowardin classification for the wetlands is noted as PFO1, with additional saturation levels found in the project area.

PFO1-Palustrine, forested, broad-leaved deciduous

- -B Saturated
- -C Seasonally flooded
- -W Intermittently flooded/Temporary

Schafale and Weakley descriptions:

Mesic Oak-Hickory Forest (MO) – wetter areas where a mix of oaks and hickories are the dominant tree species

Bottomland Hardwood Forest (B) – broad floodplain forest community

Surface Waters

The project is located in the Piedmont Physiographic Province in Davidson County in the Yadkin-Pee Dee River Basin in Hydrological Cataloguing Unit 03040103. Surface waters crossed by the proposed project include Rich Fork Creek (index Number 12-119-7), six unnamed tributaries to Rich Fork Creek, and two unnamed tributaries to Hunt's Fork Creek (12-119-7-3). The North Carolina Division of Water Quality Best Usage Classification for both these creeks is C.

After verification and review by the United States Army Core of Engineers (ACOE) on August 28, 2001, only three unnamed tributaries to Rich Fork Creek require mitigation. The remaining seven channels did not require mitigation based on degraded quality or incurrence to only temporary impacts. There are 1,992 total impacts requiring compensatory mitigation. Natural channel design will create 315 linear feet of new stream channel within the project area and will offset only part of the compensatory mitigation. Therefore, we are requesting compensatory mitigation from EEP for the remaining 1,677 feet of jurisdictional streams impacts.

Please send the letter of confirmation to Mr. Eric Alsmeyer (USACE Coordinator) at U. S. Army Corps of Engineers Raleigh Regulatory Field Office, 6508 Falls of the Neuse Road Suite 120 Raleigh, NC 27615. Mr. Alsmeyer's FAX number (919) 876-5823. The current let date for the project is November 16, 2004 for which the let review date is September 28, 2004.

In order to satisfy regulatory assurances that mitigation will be performed; the NCDWQ requires a formal letter from EEP indicating their willingness and ability to provide the mitigation work requested by NCDOT. The NCDOT requests such a letter of confirmation be addressed to Mr. John Hennessy of NCDWQ, with copies submitted to NCDOT.

If you have any questions or need additional information please call Deanna Riffey at (919) 715-4109.

Sincerely,

Gregory J. Thorpe, Ph.D.,
Environmental Management Director
Project Development & Environmental Analysis Branch

cc:

Mr. John Hennessy, Division of Water Quality
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Mr. David Franklin, USACE, Wilmington
Mr. Eric Alsmeyer, USACE, Raleigh

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

July 22, 2004

Mr. William D. Gilmore, P.E.
EEP Transition Manager
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Dear Sir:

Subject: Mitigation Compensation Change Request for Improvement of NC 109 from North of I-85 Business to North of SR 1798 (Old Greensboro Road) in Davidson County, Federal Project No. STP-109 (1), State Project No. 8.1900901, WBS Element 34468.1.1, T.I.P. No.R-2568B.

The purpose of this letter is to request a change to the compensatory mitigation request letter dated June 18, 2004. According to the June 18th letter, NCDOT requested the Ecosystem Enhancement Program (EEP) provide confirmation for compensatory mitigation for 0.75 acres of wetland impacts and 1,677 feet of jurisdictional stream impacts.

The compensatory mitigation request for the wetland impacts remains unchanged at 0.75 acres However, the total jurisdictional stream impacts requiring compensatory mitigation has been reduced from 1,992 to 1,405 feet due to design changes. Onsite natural channel design will still create 315 linear feet of new stream channel within the project area and will offset a portion of the required compensatory mitigation. Therefore, we are requesting compensatory mitigation from EEP for the remaining 1,090 feet of jurisdictional stream impacts.

Please send the letter of confirmation to Mr. Eric Alsmeyer (USACE Coordinator) at U. S. Army Corps of Engineers Raleigh Regulatory Field Office, 6508 Falls of the Neuse Road Suite 120 Raleigh, NC 27615. Mr. Alsmeyer's FAX number (919) 876-5823. The current let date for the project is November 16, 2004 for which the let review date is September 28, 2004.

In order to satisfy regulatory assurances that mitigation will be performed; the NCDWQ requires a formal letter from EEP indicating their willingness and ability to provide the mitigation work requested by NCDOT. The NCDOT requests such a letter of confirmation be addressed to Mr. John Hennessy of NCDWQ, with copies submitted to NCDOT.

If you have any questions or need additional information please call Deanna Riffey at (919) 715-4109.

Sincerely,

Gregory J. Thorpe, Ph.D.,
Environmental Management Director
Project Development & Environmental Analysis Branch

cc:

Mr. John Hennessy, Division of Water Quality
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Mr. David Franklin, USACE, Wilmington
Mr. Eric Alsmeyer, USACE, Raleigh

Minutes for Permit Drawing Review
(Interagency 4C Review)
R-2568B

State Project 8.1600901
NC 109 North of Thomasville, Davidson County

A Permit Review Meeting was held on Thursday, July 25, 2002 in the Location and Surveys conference room at the NCDOT Century Center Complex, Raleigh.

Team members:
Andrew Nottingham-NCDOT Hydraulics (Present)
Eric Alsmeyer-USACE (Present)
Cynthia Van Der Wiele-NCDWQ (Present)
Marella Buncick-USFWS (Present)
David Cox for Marla Chambers-NCWRC (Present)
Chris Miltischer-EPA (Absent)
Lynn Smith-NCDOT PDEA (Present)

Participants:
David Chang-NCDOT Hydraulics
Mike Little-NCDOT Roadway Design
Roger Thomas-NCDOT Roadway Design
Stephen Morgan-NCDOT Hydraulics
Karen Gulledge-NCDOT Hydraulics

The meeting began at 3:15 with Mr. Nottingham distributing the storm water management plan for the project and presenting a project overview including the Best Management Practices used. He then went through the permit drawings site by site. The discussion and comments for each site are as follows:

Site 1

Mr. Nottingham advised the 1050mm (42") pipe crossing would be upgraded one pipe size to allow burial of the invert in the stream. He stated the new policy for jurisdictional streams in non-CAMA counties with a pipe crossing is that the pipe will be buried 20% of the pipe diameter, up to a maximum burial of one foot. (For a 48" pipe, the invert would be buried 0.8'). He noted the stream, labeled a tributary to Hank's Fork Creek, should be labeled a tributary to Hunt's Fork Creek. There were no further comments.

Site 2

Mr. Nottingham noted the 1050mm (42") pipe crossing would be upgraded to a 48" pipe to allow burial as in Site 1. He also noted a possible concern with rip rap at the pipe outlet. Ms. Buncick, Mr. Cox, and Ms. Van Der Wiele also expresses their concern with rip rap in the stream. Mr. Nottingham recommended investigating the need for rip rap at the outlet of the pipe.

Site 2A

Mr. Nottingham suggested a Preformed Scour Hole at the end of the rip rapped ditch right of 37+15 would attenuate and disperse concentrated flow from the ditch before it enters the wetland. The team members agreed.

Site 3

Mr. Nottingham suggested a Preformed Scour Hole at the end of the rip rapped ditch right of 40+40 would attenuate and disperse concentrated flow from the ditch before it enters the wetland. The team members agreed.

Site 4

Mr. Nottingham suggested a Preformed Scour Hole at the end of the rip rapped ditch right of 46+80 could be added to attenuate and disperse concentrated flow from the ditch before it enters the floodplain. The team members agreed. Ms. Buncick and Ms. Van Der Wiele expressed concern over the potential clearing limits for the stream relocation, noting that many times the entire Right-of-Way is cleared. Mr. Nottingham and Mr. Thomas suggested a note could be added to the plans to limit the clearing to 10' beyond the top of the cut. A revised morphological table was presented to the team members for the stream relocation. Mr. Nottingham noted that he would include documentation addressing sediment transport evaluations with the permit drawings.

Site 5

Ms. Van Der Wiele and Ms. Buncick questioned the linear wetland apparently adjacent to a stream, but no stream impacts were noted. Mr. Alsmeyer related seeing the site and noted no stream was present, but wetland impacts were appropriate. Ms. Buncick expressed concern about erosion at the end of the ditches draining to the site. Mr. Nottingham suggested a Preformed Scour Hole could be added to the ditch left of 50+60. The team members agreed that the 750mm (36") cross pipe did not need to be buried at this site.

Site 6&7

Team members noted the sheet was cluttered. Mr. Morgan commented that the site was a true clipped portion of the latest design, with no "cleanup". He added the Site Impact sheet showing only the existing topography with the proposed centerline, slope stake line, and impacts, was included for this site as well all other sites to clarify any clutter. Team members agreed the concept was helpful, especially for these two sites. Ms. Smith mentioned the sites were streams not requiring mitigation. Mr. Alsmeyer concurred.

Site 8

Mr. Alsmeyer questioned the need for temporary fill (Rock Causeways) at this site. Mr. Nottingham stated that if drilled shafts were recommended, their proximity to the bank would require a temporary rock causeway. Mr. Morgan added the foundation recommendation has not yet been received, but would most likely be drilled shafts based on other projects in the region. Mr. Nottingham suggested the temporary fill could possibly be eliminated should driven piles be recommended. Mr. Nottingham recommended adding Preformed Scour Holes at the end of the ditches left and right of Station 61+00 to attenuate and disperse flow before it enters the floodplain.

Site 9

Ms. Smith mentioned the relocated stream length in English units did not match the converted metric length. Ms. Gulledge said this could be an error in the conversion, and this would be corrected. Mr. Nottingham questioned the need for stream relocation since the impacted stream was only partially intermittent and partially ephemeral. Mr. Alsmeyer, Ms. Van Der Weile and Ms. Buncick indicated natural stream design would not be required. Mr. Nottingham mentioned that natural stream techniques had been used in the design of the channel, and the design would remain the same anyway since it was practicable to do so. Mr. Alsmeyer questioned the alignment in this area, as its location east of the existing road impacts the wetland site. Mr. Little acknowledged the impacted wetland, but added avoidance of a historic property east of the existing road in this area prevented alternative designs. Mr. Alsmeyer inquired as to the relative invert of the 1050mm (42") pipe crossing to the wetland. Mr. Nottingham said the invert of the pipe should match the ground surface, with no burial. Mr. Alsmeyer indicated this would be preferred, as he did not want to drain the remaining wetland system by setting the pipe invert too low. Mr. Alsmeyer noted that the stream at this site would not require mitigation.

Site 10

No comment.

Additional Discussion

Mr. Alsmeyer inquired if the feature crossed at Station 44+00 was also a stream. Ms. Smith noted that the original delineation fact sheet made no mention of the site, but she had recently received correspondence from Mr. Philip Todd, NCDOT PD&EA biologist, that the site was in fact jurisdictional and needed to be added. (verified 7/26/02) Mr. Nottingham said the site will be added. While looking at this additional site, the team members inquired about the hydraulic design- specifically the two pipes (structures 81 and 83) with a junction box. Ms. Gulledge and Mr. Nottingham presented the contour mapping showing the ridge between the two drainages, noting another option would have been a stream relocation, but it would require a cut approximately 15' deep.

The meeting was adjourned at 4:10pm.

Prepared By: Stephen Morgan

August 16, 2002

II. 4C AGENCY COMMENTS AND POST-MEETING ACTIVITIES

Date: 12/12/02 (Revised 06/04/04)

Draft meeting minutes for the 4C meeting on 7/25/2002 were sent out to Team Members on 7/31/2002 for review and comment. No revisions or comments were received as of 12/10/2002.

The following is a summary of the changes made to the permit and plans in response to comments made at the 4C meeting:

Site 1: Changes were made to the permit and plans as recommended in the 4C meeting minutes.

Site 2: Changes were made to the permit and plans as recommended in the 4C meeting minutes. The need for rip rap at the outlet of the 48" pipe was investigated and it was decided that the rip rap will be removed from the streambed at the outlet of the 48" pipe and placed only on the channel banks.

Site 2A: Preformed scour hole added to the permit and plans as noted in the 4C meeting minutes.

Site 3: Rock check dam used to attenuate flow in lieu of Preformed scour hole due to steep topography. Rock check dam added to the permit and plans.

Site 3A: This site was added as noted in the additional discussion section of the 4C meeting minutes.

Site 4: Preformed scour hole added to the permit and plans as noted in the 4C meeting minutes. A note was added to the permit drawings and plans to limit clearing to 10 feet beyond top of the cut on the stream relocation. Natural stream design summary addressing sediment transport and a revised morphological table are included with permit drawings. Also a cross vane rock weir was added to the stream relocation for grade control.

Site 5: Preformed scour holes added to outlet of ditches prior to entering wetlands.

Site 6&7: No revisions requested.

Site 8: Preformed scour holes added to the permit and plans as noted in the 4C meeting minutes.

Site 9: Natural stream design lengths removed from summary table since natural stream design is not being claimed.

Site 10: No revisions requested.

Natural Stream Design
Station 47+20 to 47+88
R-2568B

Existing Stream

The majority of the existing stream is entrenched with a low-to-moderate width to depth ratio, and low-to-moderate sinuosity. The bed consists of mostly gravel and coarse sand with some bedrock exposed at various locations. Old tobacco barns located nearby suggest the area was once used for agriculture. The flood plain is wooded with a valley type X - wide with gentle elevation relief and constructed of alluvial materials by riverine processes. The typical floodplain is 35m to 42m wide. The drainage area near the centerline of the proposed road is 119 hectares (294 acres). There are areas along the existing stream that are characteristic of the stable "E" stream- slightly entrenched with low width to depth ratio but with low sinuosity, or even straight. Other areas are characteristic of a stable "B" stream with moderate entrenchment and sinuosity, but the width to depth ratio is too low. Other areas are more characteristic of a "C" stream with moderate width to depth ratios, sandbar deposition and moderate sinuosity, but the channel is entrenched. The existing stream is best described as a "G4c" stream.

If the width to depth ratio were slightly higher (12 instead of 8), and the entrenchment ratio were slightly higher (2.2 instead of 2.0), the stream would fall in the stable "C" range. The entrenchment ratio is based on a floodprone area that is twice the depth of the maximum bankfull depth. For typical "G" streams, most floods including those greater than 10yr floods are contained within the floodprone area. For the existing stream, a two-year to five-year event would find relief on the floodplain, thus reducing shear stresses along the banks.

"G" streams are most commonly associated with rapid bank erosion. High rates of bank erosion are not occurring along the existing stream. Stability comes from well-established bank vegetation, relatively low bank heights, and interspersed bedrock in the streambed acting as grade control. Two areas where noticeable bank erosion has occurred are near the centerline at station 47+00 and just left of the centerline at station 47+60. A severe bend near station 47+00 and loss of bank vegetation near an old forded stream crossing likely contribute to the erosion. At station 47+60 the stream has migrated close to the edge of the floodplain and formed an escarpment. It is the conclusion that the existing stream with few exceptions is stable.

Reference Reach

The proposed stream relocation is based on a reference reach on the existing stream located upstream of the proposed road and just above a private drive crossing of the creek. The drive crossing consists of a single 60" concrete pipe with two perched 24" concrete pipes. The drainage area is approximately 78 hectares (193 acres). The reference reach parameters are consistent with an "E" classification.

Stream Restoration Techniques Used

The new stream will be considered a Priority 2 restoration since the existing stream is slightly incised. To provide shear stress relief in the newly formed channel, a "C" channel with low bank heights will be designed to provide lower velocities immediately following construction. Natural sandbar deposition is expected following several storm events, which will increase the sinuosity and begin to decrease the width to depth ratio. Theoretically, the channel could eventually form an "E" channel, but if not, the "C" channel will maintain its stability. Relief at bankfull stage will provide additional stability compared to the existing stream. The major floodplain will be available for storms greater than a 10 year event. A stream reforestation schedule will be included with the final construction plans. In addition, the use of root wads at the culvert outlet will aid in bank stability and provide fish habitat. No additional grade control structure is needed at the inlet of the culvert due to exposed bedrock just upstream. A cross-vane rock weir will be added near the end of the stream relocation for grade control.

Sediment Transport

A stable stream is one that will function sufficiently to maintain its dimension, pattern and profile, while neither aggrading nor degrading over time. The wash load is normally composed of fine sands, silts and clay and is transported according to supply limitations. The sediment is composed of larger sized particles that make up the channel bed. The amount of shear stress needed to move these larger particles is an effective measure of stream stability since the process is hydraulically controlled rather that supply limited.

Shear stress for the proposed riffle section was calculated using the Shields Curve. The critical shear stress has to be sufficient to move the D_{84} of the bed material. The computed shear stress for the proposed reach is 0.40 lb/ft^2. This is sufficient to move particles 35mm in diameter. Since the D_{84} of the proposed stream will be gravel, the stream will have the competency to move its bed load according to Shields curve criteria and design calculations.

Conclusion

The proposed reach is based on a stable reference reach on the same stream. From the reference reach ratios were derived to relate to the proposed stream. The most important feature the proposed stream has versus the existing stream is relief at bankfull stage, which decreases shear stress on the banks until adequate vegetation can be established. Sediment transport in the proposed stream will be sufficient to maintain stability as well. No hard structures will be used in the proposed stream except for one cross-vane rock weir at the tie-in for grade control. A floodplain reforestation schedule will accompany the final construction plans. It is therefore the conclusion that the design meets all the requirements of natural stream design.

Calculations

Shear stress computations

$\tau = \gamma R s$

γ = density of water (62.4 lb/ft^2)
R = hydraulic radius = Area/Wetted Perimeter
= 21.5 ft^2/18.6ft
= 1.16ft
s = slope = 0.0055ft/ft

$\tau = (62.4 \text{ lb/ft}^3)(1.16\text{ft})(0.0055\text{ft/ft})$

$\tau = 0.40\text{lb/ft}^2$

Friction Factor[1] ; u/u*

u = mean velocity = 3.31ft/s
u* = shear velocity = $(gRs)^{1/2}$

s = slope = 0.0055ft/ft
R = hydraulic radius = 1.16ft
g = gravitational constant = 32.2 ft/s^2

$u/u^* = 3.31\text{ft/s} \div (32.2 \text{ ft/s}^2 \times 1.16\text{ft} \times 0.0055\text{ft/ft})^{1/2}$

$u/u^* = 7.3$

Note: the friction factor is consistent with "C4" streams plotted on the graph by Leopold[1]; Manning's rougness "n" = 0.035

[1] Rosgen, The Reference Reach Field Book p. 189 (Leopold,1997)

North Carolina Department of Cultural Resources

James B. Hunt Jr., Governor
Betty Ray McCain, Secretary

Division of Archives and History
Jeffrey J. Crow, Director

November 12, 1996

Nicholas L. Graf
Division Administrator
Federal Highway Administration
Department of Transportation
310 New Bern Avenue
Raleigh, N.C. 27601-1442

Re: NC 109 from I-85 Business to I-40/US 311 in Winston-Salem, Davidson and Forsyth Counties, R-2568, Federal Aid Project STP-109(1), State Project 8.1600901, ER 97-7686

Dear Mr. Graf:

Thank you for your letter of October 28, 1996, transmitting the historic structures survey report by Ed Davis concerning the above project.

For purposes of compliance with Section 106 of the National Historic Preservation Act, we concur that the following property is eligible for the National Register of Historic Places under the criterion cited:

> John William Hiatt Farm. This property is significant under Criterion C because its rare collection of outbuildings, particularly the extant "street" of tobacco barns, is exemplary of middle class tobacco farms in Davidson County.

The report in general meets our office's guidelines and those of the Secretary of the Interior.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763.

Sincerely,

David Brook
Deputy State Historic Preservation Officer

DB:slw

cc: H. F. Vick
B. Church

R-2568 A&B

North Carolina Department of Cultural Resources

James B. Hunt Jr., Governor
Betty Ray McCain, Secretary

Division of Archives and History
Jeffrey J. Crow, Director

March 21, 1997

MEMORANDUM

TO: H. Franklin Vick, P.E., Manager
Planning and Environmental Branch
Division of Highways
Department of Transportation

FROM: David Brook
Deputy State Historic Preservation Officer

SUBJECT: NC 109 from I-85 Business in Thomasville to just north of SR 1798 (Old Greensboro Road), Davidson County, Federal Aid Project STP-109(1), State Project 8.1600901, TIP R-2568A&B, 97-E-4220-0534

We have received information concerning the above project from the State Clearinghouse.

The archaeological survey conducted for this project did not identify potentially significant archaeological sites within the proposed build alternatives. In comments of February 28, 1996, we concurred that none of the identified sites were eligible for nomination to the National Register of Historic Places, but we also cautioned that eleven sites located outside the proposed right-of-way had not been evaluated for National Register eligibility. These sites were 31FY840, 31DV489, 492, 493, 495, 571, 572, 574-577. Should the alignment change, these sites will require additional investigation.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763.

DB:slw
cc: State Clearinghouse
N. Graf
✓T. Padgett

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 30, 2004

Marella Buncick
US Fish and Wildlife Service
160 Zillicoa Street
Asheville, NC 28801

Dear Ms. Buncick:

Subject: NC 109 from north of I-85 Business to north of SR 1798 (Old Greensboro Road), Davidson County, North Carolina
Federal Aid Project No STP-109(1)
State Project Number 8.1600901
TIP Project R-2568B

This letter is in reference to the proposed improvements to NC 109 in Davidson County (TIP Number R-2568B). The enclosed vicinity map (Figure 1) depicts the R-2568B project right-of-way. The purpose of this letter is to summarize federally protected species surveys that have been conducted to date and to request concurrence from the United States Fish and Wildlife Service (USFWS) pursuant to Endangered Species Act (ESA) §7 (16 U.S.C. 1531 *et seq.*).

The Environmental Assessment (EA) for this project was completed in November 1996; however, subsequent surveys for federally protected species were conducted in 2002 and 2004. At the time of completion of the EA only Schweinitz's sunflower (*Helianthus schweinitzii*) was listed by as a protected species in Davidson County, NC. However as of January 29, 2003, the USFWS lists three federally protected species for Davidson County. The current USFWS listing of protected species (January 29, 2003) and updated Biological Conclusions are listed in the following table:

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

TELEPHONE: 919-733-3141
FAX: 919-733-9794

WEBSITE: WWW.NCDOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

Federally Protected Species in Davidson County, NC			
Common Name	**Scientific Name**	**Federal Status***	**Biological Conclusion**
Bald eagle	*Haliaeetus leucocephalus*	T (proposed for delisting)	No Effect
Bog turtle	*Clemmys muhlenbergii*	T(S/A)	Not Required
Schweinitz's sunflower	*Helianthus schweinitzii*	E	May Affect-Not Likely to Adversely Effect
* E=Endangered, T=Threatened, T(S/A)=Threatened due to similarity of appearance			

For each of these species, analysis of the possible presence of and impacts to each species was conducted as an evaluation of existing information and analysis by the primary investigators of the habitat requirements and occurrence of each species in North Carolina.

In a June 7, 2002 internal NCDOT Right-of-Way Consultation memo written by Lynn Smith, NCDOT Natural Systems Specialist, the previously submitted EA was updated for all federally protected species listed in Davidson County. The information given below for bald eagle (*Haliaeetus leucocephalus*) and bog turtle (*Clemmys muhlenbergii*) has been obtained from that memo.

Bog Turtle (*Clemmys muhlenbergii*)
Threatened due to Similarity of Appearance
Family: Emydidae
Date Listed: May 1, 1997

The bog turtle is North Carolina's smallest turtle, measuring 3 to 4 inches in length. It has a dark brown carapace and a black plastron. The bright orange or yellow blotch on each side of the head and neck is a readily identifiable characteristic. The bog turtle inhabits damp grassy fields, bogs, and marshes in the mountains and western Piedmont.

The bog turtle is shy and secretive and will burrow rapidly in mud or debris when disturbed. The bog turtle forages on insects, worms, snails, amphibians and seeds. In June or July, three to five eggs are laid in a shallow nest in moss or loose soil. The eggs hatch in about 55 days.

BIOLOGICAL CONCLUSION: **Not Applicable**
The bog turtle is listed as Threatened due to Similarity of Appearance, T(S/A). This is due to its similarity of appearance to another rare species that is listed for protection. Species designated as T(S/A) are not subject to ESA §7 Consultation and a Biological Conclusion for this species is not required.

Bald Eagle (*Haliaeetus leucocephalus*)
Threatened

Family: Accipitridae
Date Listed: March 11, 1967

Adult bald eagles can be identified by their large white head and short white tail. The body plumage is dark-brown to chocolate-brown in color. Immature eagles lack the white head plumage; the body plumage has a uniform brownish to blackish color with blotchy white on the underside of the wings, belly, and tail. In flight bald eagles can be identified by their flat wing soar. Adults range in length from 27-37 inches and have a wingspan ranging from 2.3 - 7.5 ft.

Eagle nests are found in proximity to water (within a half mile) with a clear flight path to water, in the largest living tree in an area, and have an open view of the surrounding land. Human disturbance can cause an eagle to abandon otherwise suitable habitat. Eagle nests are approximately three meters across. The breeding season for the bald eagles begins in December or January. Fish are the major food source for bald eagles. Other sources include coots, herons, and wounded ducks. Food may be live or carrion.

BIOLOGICAL CONCLUSION: **No Effect**

Suitable nesting habitat in the form of large trees with a clear flight path to water is not present within the project study area. There are no large bodies of water or large river systems within a half mile, with a clear flight path to water, of the proposed project. A review of the North Carolina Natural Heritage Program (NCNHP) database on May 5, 2002 indicated that there are no known occurrences of bald eagle within 1.0 mile of the project study area. Therefore, NCDOT renders a Biological Conclusion of No Effect for the bald eagle.

Schweinitz's sunflower (*Helianthus schweinitzii*)
Endangered

Family: Asteraceae
Date Listed: May 7, 1991

Schweinitz's sunflower is a rhizomatous perennial herb that grows from 3 to 6 ft (1 to 2 m) tall from a cluster of carrot-like tuberous roots. Stems are usually solitary, branching only at or above mid-stem. The stem is usually pubescent but can be nearly glabrous; it is often purple. The lanceolate leaves are opposite on the lower stem, changing to alternate above. They are variable in size, being generally larger on the lower stem, and gradually reduced upwards. The pubescence of the underside of the leaves is distinctive and is one of the best characters to distinguish Schweinitz's sunflower from its relatives. The upper surface of the leaves is rough, with the broad-based spinose hairs directed toward the tip of the leaf. From September to frost, Schweinitz's sunflower blooms with comparatively small heads of yellow flowers.

The species occurs in clearings and edges of upland woods on moist to dryish clays, clay-loams, or sandy clay-loams that often have high gravel content and are moderately podzolized. Schweinitz's sunflower usually grows in open habitats not typical of the current general landscape in the piedmont of the Carolinas. Some of the associated species, many of which are also rare, have affinities to glade and prairie habitats of the Midwest. Other species are associated with fire-maintained sandhills and savannas of the Atlantic Coastal Plain and piedmont. The habitat of this sunflower tends to be dominated by members of the aster, pea, and grass families, an association emphasizing affinities of the habitat to both longleaf pine-dominated sandhills and savannas of the southeastern coastal plain and to glades, barrens, and prairies of the Midwest and Plains (Weakley and Houk, 1992).

BIOLOGICAL CONCLUSION: May Affect-Not Likely to Adversely Affect
In the Environmental Assessment (November 1996), a biological conclusion of No Effect was issued for Schweinitz's sunflower. However, due to the date of the last survey and the presence of suitable habitat in the project area, this biological conclusion is no longer valid. As a result, new surveys were conducted for this species on June 8 and 9, 2004. Although these surveys were conducted several months prior to the optimal survey window, Dale Suiter of the USFWS advised that the species could be correctly identified during this time of year. A known population of Schweinitz's sunflower in Randolph County was visited (June 8, 2004) prior to the initiation of field surveys.

Although appropriate habitat is present within the project right-of-way limits in the form of regularly maintained roadside shoulders, field or pasture edges, and utility easements, no individuals of this species or individuals of the *Helianthus* genus were observed during the June 2004 surveys. A NCNHP element occurrence records search on May 27, 2004 revealed no element occurrences of this species within 1 mile of the proposed project. The nearest known population of Schweinitz's sunflower is located on NC 109 in Davidson County, approximately 16 miles south of the proposed project. Therefore, it can be concluded that the proposed project will have a Biological Conclusion of May Affect-Not Likely to Adversely Affect for this federally protected species.

SURVEY METHODOLOGY
Field surveys for Schweinitz's sunflower were conducted within the project right-of-way limits, depicted in red on Figure 1. These right-of-way limits range from a width of 225 feet (75 m) to 330 feet (100 m). Aerial photographs were used to aid in identification of appropriate habitat. A walking visual search was conducted by two H.W. Lochner, Inc. biologists trained in identification of this species. The two biologists spent a combined 30 man-hours searching habitat of Schweinitz's sunflower and surveying for the plant where habitat existed.

Qualifications of the Principal Investigators

Investigator:	Heather Renninger
Education	B.S., Ecology, Appalachian State University
Experience	5 years
Expertise	Natural resources surveys, endangered species surveys, wildlife biology, wetlands delineations.
Investigator:	Emily Fentress
Education	B.S., Biology, University of Tennessee
Experience	2.5 years
Expertise	Natural resources surveys, botany, field biology, wetlands delineations.
Investigator:	Brian Dustin
Education	B.S., Forest Management, North Carolina State University
Experience	1 year
Expertise	Natural resources surveys, wetlands delineations, dendrology, endangered species surveys, GPS.

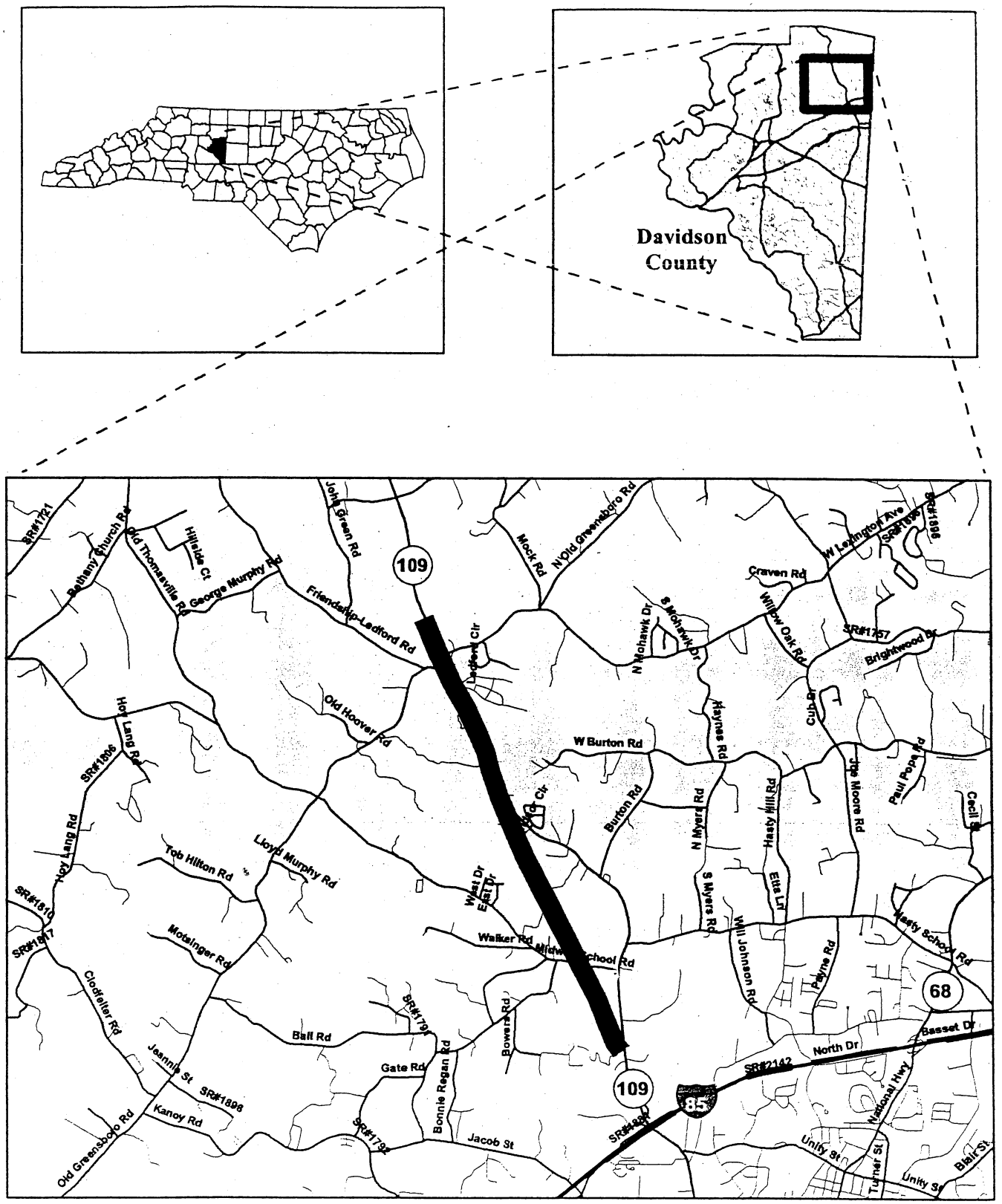
Based on recent field surveys, it is known that the project area contains no federally listed species known to occur in Davidson County. The NCDOT concludes that the proposed project will have Biological Conclusions of May Affect-Not Likely to Adversely Affect for Schweinitz's sunflower and No Effect for bald eagle. We believe that the requirements of Section 7(a)(2) of the ESA have been satisfied and hereby request your concurrence. Please provide a written copy of your conclusions to the United States Army Corps of Engineers-Raleigh District Field Office in order to expedite the Clean Water Act §404 permitting process.

Sincerely,

Deanna Riffey

Deanna Riffey
Environmental Specialist
Office of Natural Environment, PDEA Branch, NCDOT

cc: Mr. Eric Alsmeyer, USACE-Raleigh District Field Office
Mr. Michael Goins, P.E., Project Planning Engineer, NCDOT-PDEA Branch
File


Davidson
County
109
Mock Rd
N Old Greensboro Rd
W Lexington Ave
SR#1896
Craven Rd
Willow Oak Rd
SR#1757
Brightwood Dr
Cub Dr
Haynes Rd
W Burton Rd
Joe Moore Rd
Paul Pope Rd
Cecil St
Hasty Hill Rd
Elite Ln
Will Johnson Rd
Hasty School Rd
Payne Rd
68
Basset Dr
North Dr
SR#2142
National Hwy
85
Unity St
Turner St
Blair St
Unity St
Jacob St
SR#1794
Bonnie Regan Rd
Bowers Rd
Gate Rd
Ball Rd
SR#1794
Jeannie St
SR#1898
Kanoy Rd
Old Greensboro Rd
Clodfelter Rd
Motsinger Rd
Walker Rd
Midway School Rd
West Dr
East Dr
Lloyd Murphy Rd
Tob Hilton Rd
SR#1810
SR#1917
Hoy Lang Rd
SR#1806
Old Hoover Rd
Burton Rd
N Myers Rd
S Myers Rd
Friendship-Ledford Rd
Dogwood Cir
N Mohawk Dr
S Mohawk Dr
George Murphy Rd
Old Thomasville Rd
Hillside Ct
John Green Rd
Bethany Church Rd
SR#1791
Right-of-Way for Proposed
NC 109 New Location / Widening
N
W
E
S
Feet
0
2,500
5,000
Meters
0
750
1,500
North Carolina
Department of Transportation
NC 109 From North of I-85 Business
to North of SR 1798 (Old Greensboro Rd)
Davidson County, NC
State Project No. 8.1800901
T.I.P. Project No. R-2568B
Figure 1
Project Vicinity

NY 1-4 Stat. 3 St 80

Alluvial

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Site 2

Project/Site: R-2568
Applicant/Owner: NCDOT
Investigator: Phillip Todd, Jared Brau

Date: 2/1/01
County: DAVIDSON
State: NC

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: 33180
Transect ID: wetland
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. MICROSTEGIUM VIMINEUM	H	FAC+
2. GREENBRIER	V	FAC
3. RED MAPLE	T	FAC
4. SWEETGUM	T	FAC+
5. TULIP POPLAR	T	FAC
6. JAPANESE HONEYSUCKLE	T	FAC-
7. IRONWOOD	T	FAC
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 6/7 = 86%

Remarks: prevalence of hydrophytic vegetation at sampling site

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: wet pockets along drainage
Evidence of hydrology is present

SOILS

Map Unit Name (Series and Phase): Poindexter + Zims sandy loams — Drainage Class: WD

Taxonomy (Subgroup): Typic + Ultic Hapludalfs — Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4		10YR 4/3	5YR 3/4		clay loam
4-12+		2.5Y 5/2	10YR 4/3		clay loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

hydric soils are present

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks:

All 3 parameters are present: Site is a wetland

Approved by HQUSACE 3/92

WY 1-41 Stat 2?'0?

Site 2

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: R-2568	Date: 2/1/01
Applicant/Owner: NCDOT	County: Davidson
Investigator: Phillip Todd, Jared Gray	State: NC
Do Normal Circumstances exist on the site? (Yes) No	Community ID: WP-33+80
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID: upland
Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. American beech	T	NI
2. tulip poplar	T	FAC
3. white oak	T	FACU
4. Japanese honeysuckle	V	FAC-
5. greenbrier	V	FAC
6. Christmas fern	H	FAC
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 3/6 = 50%

Remarks: hydrophytic vegetation is present at sampling site

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: _____(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

No evidence of hydrology present

SOILS

Map Unit Name (Series and Phase): Poindexter + Zion sandy loams

Drainage Class: WD

Taxonomy (Subgroup): Typic + Ultic Haplandalfs

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2		10YR 4/2			sandy loam
2-7		2.5Y 5/4			sandy loam
7-12+		2.5 Y 5/4			sandy clay loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

hydric soils not present

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)

Wetland Hydrology Present? Yes (No)

Hydric Soils Present? Yes (No)

Is this Sampling Point Within a Wetland? (Circle) Yes (No)

Remarks:

All 3 parameters not present at sampling site. Site is not a wetland

Site 2

STATION # 33+80 ALONG INTERMITTENT STREAM

ALLUVIAL WETLANDS

WETLAND RATING WORKSHEET (4th VERSION)

Project Name: R-2568 B WETLAND SITE WY
County: DAVIDSON
Nearest Road:
Date: 2/1/01
Wetland Area (ac):
Wetland Width (ft):
Name of Evaluator(s): P. Todd (2001), H. Renninger (2004)

Wetland Location:

___ on sound or estuary pond or lake
___ on perennial stream
✓ on intermittent stream
___ within interstream divide
___ other

Adjacent Land Use:

(Within 1/2 mi upstream, upslope, or radius)

80 forested/natural veg. ___%
18 agriculture/urbanized ___%
2 impervious surface ___%

Adjacent Special Natural Areas

Soils

Soil Series Poindexter and Zion sandy loam

___ predominantly organic (humus, muck or peat)
X predominantly mineral (non-sandy)
___ predominantly sandy

Dominant Vegetation

(1) Microstegium vimineum
(2) Smilax sp.
(3) Acer rubrum

Hydraulic Factors

X freshwater ___ brackish
___ steep topography
___ ditched or channelized
___ total wetland width ≥ 100 feet.

Flooding and Wetness

___ semipermanently to permanently flooded or inundated
✓ seasonally flooded or inundated
___ intermittently flooded or temporary surface water
___ no evidence of flooding or surface water

Wetland Type (select one)*

___ Bottomland Hardwood Forest
___ Swamp Forest
___ Carolina Bay
___ Pocosin
___ Pine Savannah
___ Freshwater Marsh
___ Bog/Fen
___ Headwater Forest
___ Bog Forest
___ Ephemeral Wetland
✓ Other: ALLUVIAL FOREST

*The rating system cannot be applied to salt or brackish marshes or stream channels.

	DEM RATING		
WATER STORAGE	3	x 4.00 =	12
BANK/SHORELINE STABILIZATION	3	x 4.00 =	12
POLLUTANT REMOVAL	3 *	x 5.00 =	15
WILDLIFE HABITAT	2	x 2.00 =	4
AQUATIC LIFE VALUE	3	x 4.00 =	12
RECREATION/EDUCATION	1	x 1.00 =	1

WETLAND SCORE = 56 (TOTAL)

* Add 1 point if in sensitive watershed and >10% nonpoint disturbance within 1/2 mile upstream, upslope, or radius.

Site 2a

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: R-2568 B
Applicant/Owner: NCDOT
Investigator: Phillip Todd, Jared Gray

Date: 1/31/01
County: DAVIDSON
State: NC

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: 70+80-F
Transect ID: wetland
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Carex sp.	H	—
2. Typhus	H	
3. Salix nigra	T	OBL
4. Juncus	H	
5. red maple	S/S	FAC
6. sweetgum	S/S	FAC*
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: prevalence of hydrophytic vegetation at sampling site

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)
Depth to Free Water in Pit: 8 (in.)
Depth to Saturated Soil: 6 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
X Inundated in Areas
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Old Silt Basin - wet area off 450mm pipe
Stormwater - drainage below basin
Evidence of hydrology is present at sampling site

SOILS

Map Unit Name
(Series and Phase): Poindexter + 2 ons sandy loams Drainage Class: WD

Taxonomy (Subgroup): Typic + Ultic Hapludalfs Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
		2.5 YR 4/2			fine sandy loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:
hydric soils are present

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Yes) No (Circle)

Remarks:
All 3 parameters are present: site is a wetland

Approved by HQUSACE 3/92

Site 2a

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: R-2568B
Applicant/Owner: NCDOT
Investigator: Phillip Todd, Jared Gray

Date: 1/31/01
County: DAVIDSON
State: NC

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: 701.80 - RP
Transect ID: upland
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Tulip poplar	T	FAC
2. Sweetgum	T	FAC+
3. red maple	T	FAC
4. Japanese honeysuckle	V	FAC-
5. greenbrier	V	FAC
6.		
7.		
8.		

Dominant Plant Species	Stratum	Indicator
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 4/5 = 80%

Remarks: Prevalence of hydrophytic vegetation at sampling site

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Evidence of hydrology is not present

SOILS -

Map Unit Name (Series and Phase): Pondexter + Zion sandy loams

Drainage Class: WD

Taxonomy (Subgroup): Typic + Ultic Hapludalfs

Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-3		10YR3/1			sandy loam
3-12+		2.5 Y 5/3			sandy loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:
hydric soils are not present at sampling site

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No (Circle)	
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	
Is this Sampling Point Within a Wetland?		(Circle) Yes (No)

Remarks:
All 3 parameters are not present; site is not a wetland

Approved by HQUSACE 3/92

St 40+40(-L-)Right
WA 1-3

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Site 3

Project/Site: R-2568B
Applicant/Owner: NCDOT
Investigator: Phillip Todd, Jared Grau

Date: 10/29/00
County: DAVIDSON
State: NC

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: 40+40 (WA)
Transect ID: wetland
Plot ID:
headwater of pond

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. RED MAPLE	T	FAC
2. MICROSTEGIUM VIMINEUM	H	FAC+
3. JAPANESE HONEYSUCKLE	V	FAC-
4. SWEETGUM	T	FAC+
5.		
6.		
7.		
8.		

Dominant Plant Species	Stratum	Indicator
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 3/4 = 75%

Remarks: prevalence of hydrophyte vegetation at sampling site.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
X Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Evidence of hydrology is present at sampling site.

SOILS

Map Unit Name
(Series and Phase): Poindexter and Zion sandy loams Drainage Class: WD

Taxonomy (Subgroup): Typic + Ultic Hapludalfs Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
		2.5YR 4/1	7.5YR 4/3		

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Hydric soils are present at sampling site

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks:

All 3 parameters are present at sampling site site is a wetland

Approved by HQUSACE 3/92

+ 40+40 (L-) Right

VA L-3

at 3

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Site 3

Project/Site: R-2568 B
Applicant/Owner: NC DOT
Investigator: Phillip Todd, Jared Gray

Date: 10/24/00
County: DAVIDSON
State: NC

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: 40+40 (3) WL
Transect ID: upland
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Poison Ivy	H/V	FAC
2. Japanese honeysuckle	V	FAC-
3. red maple	T	FAC
4. Sycamore	T	FACW-
5. Loblolly pine	T	FAC
6. trumpet creeper	V	FAC
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 5/6 = 83%

Remarks: prevalence of hydrophytic vegetation at sampling site

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:
No evidence of hydrology at sampling site

SOILS

Map Unit Name (Series and Phase): Poindexter + Elon sandy loams

Drainage Class: WD

Taxonomy (Subgroup): Typic + Ultic Hapludalfs

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes No

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

Approved by HQUSACE 3/92

STATION # 40+40 -L- (RIGHT) Site 3

WET AREA ASSOCIATED W/ HEAD OF POND

WETLAND RATING WORKSHEET (4th VERSION)

Project Name: R-2568B FAGG WA
Forest Road:
Wetland Area (ac):
Name of Evaluator(s): P. Todd (2000) H. Renninger (2004)

County: DAVIDSON
Date: 10/24/00
Wetland Width (ft):

Wetland Location:
- X on sound or estuary
  - (pond) or lake
- ___ on perennial stream
- ___ on intermittent stream
- ___ within interstream divide
- ___ other

Adjacent Land Use:
(Within 1/2 mi ~~upstream~~, upslope, or radius)
- 70 forested/natural veg. ___%
- 20 agriculture/urbanized ___%
- 10 impervious surface ___%

Adjacent Special Natural Areas

Soils
Soil Series: Poindexter and Ziom sandy loam
- ___ predominantly organic (humus, muck or peat)
- ✓ predominantly mineral (non-sandy)
- ___ predominantly sandy

Dominant Vegetation
(1) Acer rubrum
(2) Microstegium vimineum
(3) Lonicera japonica

Hydraulic Factors
- X freshwater
- ___ brackish
- ___ steep topography
- ___ ditched or channelized
- ___ total wetland width ≥ 100 feet.

Flooding and Wetness
- ___ semipermanently to permanently flooded or inundated
- ✓ seasonally flooded or inundated
- ✓ intermittently flooded or temporary surface water
- ___ no evidence of flooding or surface water

Wetland Type (select one)*
- ___ Bottomland Hardwood Forest
- ___ Swamp Forest
- ___ Carolina Bay
- ___ Pocosin
- ___ Pine Savannah
- ___ Freshwater Marsh
- ___ Bog/Fen
- ✓ Headwater Forest @ HEAD OF POND
- ___ Bog Forest
- ___ Ephemeral Wetland
- ___ Other:

*The rating system cannot be applied to salt or brackish marshes or stream channels.

	DEM RATING		
WATER STORAGE	3	x 4.00 =	12
BANK/SHORELINE STABILIZATION	3	x 4.00 =	12
POLLUTANT REMOVAL	1 *	x 5.00 =	5
WILDLIFE HABITAT	3	x 2.00 =	6
AQUATIC LIFE VALUE	2	x 4.00 =	8
RECREATION/EDUCATION	1	x 1.00 =	1

WETLAND SCORE (TOTAL) = 44

* Add 1 point if in sensitive watershed and >10% nonpoint disturbance within 1/2 mile upstream, upslope, or radius.

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Site 5

p12

Project/Site: R-2568B
Applicant/Owner: NCDOT
Investigator: Phillip Todd, Jared Gray

Date: 10/24/00
County: DAVIDSON
State: NC

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: 50+90.C-Wetland
Transect ID:
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Microstegium vimineum	H	FAC+
2. Red Maple	T	FAC
3. Sycamore	T	FACW-
4. sweetgum	T	FAC+
5. black cherry	T	FACU
6. box elder	T	FACW
7. black gum	T	FAC
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 6/7 = 86%

Remarks: Prevalence of hydrophytic vegetation at sampling site

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)
Depth to Free Water in Pit: ____ (in.)
Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: 20 ft wide swath along drainage channel (10 ft either side)
-groundwater discharge
-Evidence of hydrology is present

SOILS

Map Unit Name (Series and Phase): Poindexter and Zion sandy loams Drainage Class: WD

Taxonomy (Subgroup): Typic + Ultic Hapludalfs Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12		2.5 YR 6/2	7.5 YR 3/4		Sandy loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

hydric soils are present

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No (Circle)	Is this Sampling Point Within a Wetland? (Circle) (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

All 3 parameters are present: site is a wetland

Approved by HQUSACE 3/92

Site 5

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: R-2568B
Applicant/Owner: NC DOT
Investigator: Phillip Todd, Jared Gray

Date: 10/24/00
County: DAVIDSON
State: NC

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: 50+90 - L -
Transect ID: upland
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. AMERICAN BEECH	T	NI
2. Red Maple	T	FAC
3. NORTHERN RED OAK	T	FACU
4. WHITE OAK	T	FACU
5. SOUR WOOD	S/S	NI
6. JAPANESE HONEYSUCKLE	V	FAC-
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 1/5 = 20%

Remarks: hydrophytic vegetation is not prevalent at sampling site

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: No evidence of hydrology at sampling site

SOILS

Map Unit Name (Series and Phase): Poindexter + Zion sandy loams

Drainage Class: WD

Taxonomy (Subgroup): Typic + Ultic Hapludalfs

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12		2.5YR5/3		SAND	

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

hydric soils not present

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)

Wetland Hydrology Present? Yes (No)

Hydric Soils Present? Yes (No)

Is this Sampling Point Within a Wetland? (Circle) Yes (No)

Remarks:

All 3 parameters not present: site is not a wetland

Approved by HQUSACE 3/92

Site 5

STATION # 50+90 ALONG DRAINAGE CHANNEL

WETLAND RATING WORKSHEET (4th VERSION)

R-2568 B

ject Name: _____ County: Davidson
irest Road: _____ Date: 10/24/00
etland Area (ac): _____ Wetland Width (ft): _____
Name of Evaluator(s): P. Todd (2000) H. Renninger (2004)

Wetland Location:
___ on sound or estuary
pond or lake
___ on perennial stream
___ on intermittent stream
___ within interstream divide
X other ephemeral drainage

Adjacent Land Use:
(Within 1/2 mi upstream, upslope, or radius)
75 forested/natural veg. ___%
20 agriculture/urbanized ___%
5 impervious surface ___%
Adjacent Special Natural Areas
_____

Soils
Soil Series Poindexter and Zion sandy loam
___ predominantly organic (humus, muck or peat)
X predominantly mineral (non-sandy)
___ predominantly sandy

Dominant Vegetation
(1) Microstegium vimineum
(2) Acer rubrum
(3) Platanus occidentalis

Hydraulic Factors
___ freshwater ___ brackish
___ steep topography
___ ditched or channelized
___ total wetland width ≥ 100 feet.

Flooding and Wetness
___ semipermanently to permanently flooded or inundated
___ seasonally flooded or inundated
X intermittently flooded or temporary surface water
___ no evidence of flooding or surface water

Wetland Type (select one)*
___ Bottomland Hardwood Forest
___ Swamp Forest
___ Carolina Bay
___ Pocosin
___ Pine Savannah
___ Freshwater Marsh
___ Bog/Fen
✓ Headwater Forest
___ Bog Forest
___ Ephemeral Wetland
___ Other:

*The rating system cannot be applied to salt or brackish marshes or stream channels.

	DEM RATING		
WATER STORAGE	2	x 4.00 =	8
BANK/SHORELINE STABILIZATION	3	x 4.00 =	12
POLLUTANT REMOVAL	4 *	x 5.00 =	20
WILDLIFE HABITAT	4	x 2.00 =	8
AQUATIC LIFE VALUE	3	x 4.00 =	12
RECREATION/EDUCATION	0	x 1.00 =	0

WETLAND SCORE = 60
(TOTAL)

* Add 1 point if in sensitive watershed and >10% nonpoint disturbance within 1/2 mile upstream, upslope, or radius.

64440 -LL

Site 4

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: R-2568B
Applicant/Owner: NCDOT
Investigator: Phillip Todd, Jared Gray

Date: 1/31/01
County: DAVIDSON
State: NC

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: WZ 64+40-L-
Transect ID: wetland
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Microstegium vimineum	H	FAC+
2. sycamore	T	FACW-
3. tulip poplar	T	FAC
4. red maple	T	FAC
5. sweetgum	T	FAC+
6. elderberry	S/S	FACW-
7. ironwood	T	FAC
8. box elder	S/S	FACW

Dominant Plant Species	Stratum	Indicator
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 8/8 = 100%

Remarks: prevalence of hydrophytic vegetation at sampling site

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
X Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)
* buttressed trunks

Remarks: There is evidence of hydrology at sampling site

SOILS

Map Unit Name (Series and Phase): Poindexter + Zion sandy loam

Drainage Class: WD

Taxonomy (Subgroup): Typic + Ultic Hapludalfs

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1		10YR 4/3	10YR 5/6	MZD	FINE SANDY LOAM
1-8		10 YR 4/3			SANDY LOAM
8-12+		2.5Y 5/2	5YR 4/6		SANDY CLAY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Hydric Soils are present at sampling site

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks: All 3 parameters are present: site is a wetland

Approved by HQUSACE 3/92

IE 1-F
IE 100-
NE 200-217
40-L-

site 4

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: R-2568B
Applicant/Owner: NCDOT
Investigator: Phillip Todd, Jared Gray

Date: 1/31/01
County: DAVIDSON
State: NC

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: WZ 64+ 40-L-
Transect ID: upland
Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Vitis rotundifolia	V	FAC
2. red oak	T	FACU
3. white oak	T	FACU
4. Japanese honeysuckle	V	FAC-
5. red cedar	T	FACU-
6.		
7.		
8.		

Dominant Plant Species	Stratum	Indicator
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 1/5 = 20%

Remarks: hydrophytic vegetation is not prevalent at sampling site

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:
No evidence of hydrology at sampling site

SOILS

Map Unit Name (Series and Phase): Poindexter + Zion sandy loams Drainage Class: WD

Taxonomy (Subgroup): Typic + Ultic Hapludalfs Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1		10YR 3/2			sandy loam
1-10		7.5YR 4/6	7.5YR 5/3		sandy clay loam
10-12+		7.5YR 4/6			sandy clay loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point Within a Wetland? (Circle) Yes (No)

Remarks:

All 3 parameters are not present: site is not a wetland

Approved by HQUSACE 3/92

Site 4

STATION # 64+40 ALONG DRAINAGE CHANNEL (STORMWATER DRIVEN)

WETLAND RATING WORKSHEET (4th VERSION)

Project Name: R-2568B FLAGS W7
Forest Road:
Wetland Area (ac):
Name of Evaluator(s): P. Todd (2001) H. Renninger (2004)

County: Davidson
Date: @ 1/31/01
Wetland Width (ft):

Wetland Location:
___ on sound or estuary pond or lake
___ on perennial stream
X on intermittent stream
___ within interstream divide
___ other

Adjacent Land Use:
(Within 1/2 mi upstream, upslope, or radius)
40 forested/natural veg. ___%
40 agriculture/urbanized ___%
20 impervious surface ___%
Adjacent Special Natural Areas

Soils
Soil Series Poindexter and Zion sandy loam
___ predominantly organic (humus, muck or peat)
X predominantly mineral (non-sandy)
___ predominantly sandy

Dominant Vegetation
(1) Microstegium vimineum
(2) Platanus occidentalis
(3) Liriodendron tulipifera

Hydraulic Factors
X freshwater ___ brackish
___ steep topography
___ ditched or channelized
___ total wetland width ≥ 100 feet.

Flooding and Wetness
___ semipermanently to permanently flooded or inundated
___ seasonally flooded or inundated
X intermittently flooded or temporary surface water
___ no evidence of flooding or surface water

Wetland Type (select one)*
___ Bottomland Hardwood Forest
___ Swamp Forest
___ Carolina Bay
___ Pocosin
___ Pine Savannah
___ Freshwater Marsh
___ Bog/Fen
✓ Headwater Forest
___ Bog Forest
___ Ephemeral Wetland
___ Other:

*The rating system cannot be applied to salt or brackish marshes or stream channels.

	DEM RATING		
WATER STORAGE	3	x 4.00 =	12
BANK/SHORELINE STABILIZATION	~~3~~ 3	x 4.00 =	~~12~~ 12
POLLUTANT REMOVAL	4 *	x 5.00 =	20
WILDLIFE HABITAT	4	x 2.00 =	8
AQUATIC LIFE VALUE	3	x 4.00 =	12
RECREATION/EDUCATION	1	x 1.00 =	1
		WETLAND SCORE = (TOTAL)	65

44

* Add 1 point if in sensitive watershed and >10% nonpoint disturbance within 1/2 mile upstream, upslope, or radius.

USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

1

STREAM QUALITY ASSESSMENT WORKSHEET

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: H. Renninger
3. Date of evaluation: 6-4-04
4. Time of evaluation: 9:45
5. Name of stream: UT Hunts Fork Creek
6. River basin: Yadkin
7. Approximate drainage area: ———
8. Stream order: 1st
9. Length of reach evaluated: ~751'
10. County: Davidson
11. Site coordinates (if known): ———
12. Subdivision name (if any): ———
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): Site 1, Station 29+50 → 30+20
14. Proposed channel work (if any): 48" pipe
15. Recent weather conditions: rain this AM
16. Site conditions at time of visit: cloudy, 70's, slight drizzle
17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters ___Nutrient Sensitive Waters ___Water Supply Watershed ____(I-IV)
18. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area: _____
19. Does channel appear on USGS quad map? YES (NO)
20. Does channel appear on USDA Soil Survey? (YES) NO
21. Estimated watershed land use: 10 % Residential 10 % Commercial ___% Industrial 10 % Agricultural 70 % Forested ___% Cleared / Logged ___% Other (_____)
22. Bankfull width: 4'
23. Bank height (from bed to top of bank): 3'
24. Channel slope down center of stream: ___Flat (0 to 2%) X Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)
25. Channel sinuosity: ____Straight ___Occasional bends X Frequent meander ___Very sinuous ___Braided channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 48 **Comments:** Intermittent

Evaluator's Signature H. Renninger **Date** 6-4-04

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

		CHARACTERISTICS	ECOREGION POINT RANGE: Coastal	Piedmont	Mountains	SCORE
PHYSICAL/CHEMICAL	1	Presence of flow/persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0–30	0–30	0–30	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0–30	0–30	0–30	4
	3	Riparian zone (no buffer = 0; wide buffer = max points)	0–30	0–30	0–30	4
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0–30	0–30	0–30	4
	5	Groundwater discharge (no discharges = 0; springs, seeps, or wetlands = max points)	0–30	0–30	0–30	1
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0–30	0–30	0–30	2
	7	Entrenchment/incision of the stream (deeply entrenched = 0; frequent riffles = max points)	0–30	0–30	0–30	1
	8	Presence of adjacent wetlands (no wetlands = 0; large and well-developed wetlands = max points)	0–30	0–30	0–30	0
	9	Channel sinuosity (straight and channelized = 0; frequent bends = max points)	0–30	0–30	0–30	4
	10	Sediment input (heavy deposits = 0; little or no sediment = max points)	0–30	0–30	0–30	1
	11	Size and diversity of channel substrate (mud, bedrock only = 0; large diverse substrate = max points)	0–30	0–30	0–30	2
	12	Evidence of channel modification (straightening, riprap, etc. = 0; unaltered & banks = max points)	0–30	0–30	0–30	2
	13	Presence of major point sources (severe problems = 0; no point sources = max points)	0–30	0–30	0–30	4
	14	Root depth and density of bank trees (no visible roots = 0; dense roots throughout = max points)	0–30	0–30	0–30	2
	15	Impact by agriculture, livestock, or other production (substantial impact = 0; no evidence = max points)	0–30	0–30	0–30	4
HABITAT	16	Presence of riffle-pool/ripple-pool complexes (no riffles, ripples or pools = 0; well developed = max points)	0–30	0–30	0–30	1
	17	Habitat complexity (little or no habitat = 0; frequent, good habitats = max points)	0–30	0–30	0–30	3
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0–30	0–30	0–30	5
	19	Substrate embeddedness (completely embedded = 0; loose structure = max)	0–30	0–30	0–30	1
BIOLOGY	20	Presence of stream invertebrates (see below) (no evidence = 0; common, numerous types = max points)	0–30	0–30	0–30	0
	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0–30	0–30	0–30	0
	22	Presence of fish* (no evidence = 0; common, numerous types = max points)	0–30	0–30	0–30	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0–30	0–30	0–30	1
		Total Points Possible	100	100	100	
		TOTAL SCORE (add scores in each column)				48

* These characteristics are not assessed in coastal streams.

NCDWQ Stream Classification Form

Project Name: R-2568B River Basin: Yadkin County: Davidson Evaluator: Tim Baucom

DWQ Project Number: Nearest Named Stream: Hunts Fork Creek Latitude: Signature: Tim Baucom

Date: 6-4-04 USGS QUAD: High Point West Longitude: Location/Directions: Site 1, St. 29+50

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	1	2	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	2	3
3) Are Natural Levees Present?	0	1	2	3
4) Is The Channel Sinuous?	0	1	2	3
5) Is There An Active (Or Relic) Floodplain Present?	0	1	2	3
6) Is The Channel Braided?	0	1	2	3
7) Are Recent Alluvial Deposits Present?	0	1	2	3
8) Is There A Bankfull Bench Present?	0	1	2	3
9) Is A Continuous Bed & Bank Present?	0	1	2	3
*(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*				
10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present?	*Yes=3*		*No=0*	

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 9

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	1	2	3

PRIMARY HYDROLOGY INDICATOR POINTS: 1

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	3	2	1	0
2) Are Rooted Plants Present In Streambed?	3	2	1	0
3) Is Periphyton Present?	0	1	2	3
4) Are Bivalves Present?	0	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 6

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	0	.5	1	1.5
2) Is There A Grade Control Point In Channel?	0	.5	1	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	.5	1	1.5

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 3

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	1.5	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	0	.5	1	1.5
3) Are Wrack Lines Present?	0	.5	1	1.5
4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #11 Above Skip This Step And #5 Below*)*	0	.5	1	1.5
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0	.5	1	1.5
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?	*Yes=1.5*		*No=0*	

rain <1 hr ago

SECONDARY HYDROLOGY INDICATOR POINTS: 4

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	0	.5	1	1.5
2) Are Amphibians Present?	0	.5	1	1.5
3) Are AquaticTurtles Present?	0	.5	1	1.5
4) Are Crayfish Present?	0	.5	1	1.5
5) Are Macrobenthos Present?	0	.5	1	1.5
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	.5	1	1.5
7) Is Filamentous Algae Present?	0	.5	1	1.5
8) Are Wetland Plants In Streambed?	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*).*	2	1	.75	.5	0	0

N/A

SECONDARY BIOLOGY INDICATOR POINTS: 2 ~~2~~ 0.5

TOTAL POINTS (Primary + Secondary) = 22.5 (If Greater Than or = 19 Points The Stream Is At Least Intermittent).

USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

STREAM QUALITY ASSESSMENT WORKSHEET

(2)

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: H. Renninger
3. Date of evaluation: 6-4-04
4. Time of evaluation: 11:30
5. Name of stream: UT Hunts Fork Creek
6. River basin: Yadkin
7. Approximate drainage area: ——
8. Stream order: 1st
9. Length of reach evaluated: 200'
10. County: Davidson
11. Site coordinates (if known): ——
12. Subdivision name (if any): ——
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): Site 2, Station 33+55 ⇒ 33+80
14. Proposed channel work (if any): 48" pipe
15. Recent weather conditions: drizzle all morning
16. Site conditions at time of visit: raining
17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters ___Nutrient Sensitive Waters ___Water Supply Watershed ____(I-IV)
18. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area: ____
19. Does channel appear on USGS quad map? YES (NO)
20. Does channel appear on USDA Soil Survey? (YES) NO
21. Estimated watershed land use: 10% Residential ___% Commercial ___% Industrial ___% Agricultural 80% Forested 10% Cleared / Logged ___% Other (____)
22. Bankfull width: 2'
23. Bank height (from bed to top of bank): 1 – 3'
24. Channel slope down center of stream: ___Flat (0 to 2%) X Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)
25. Channel sinuosity: ___Straight X Occasional bends ___Frequent meander ___Very sinuous ___Braided channel

nstructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on ocation, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to ach characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics dentified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot e evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where here are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may e divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned o a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

otal Score (from reverse): 48 **Comments:** Intermittent

valuator's Signature Heather Renninger **Date** 6-4-04

his channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in athering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream uality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a articular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

	CHARACTERISTICS	ECOREGION POINT RANGE: Coastal	Piedmont	Mountain	SCORE
PHYSICAL	1. Presence of flow/persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0	0	0	1
	2. Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0	0	0	4
	3. Riparian zone (none/little = 0; conspicuous wide buffer = max points)	0	0	0	4
	4. Evidence of nonpoint or point discharges (extensive discharges = 0; no discharges = max points)	0	0	0	4
	5. Groundwater discharge (no discharge = 0; springs, seeps, or wetlands = max points)	0	0	0	2
	6. Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0	0	0	3
	7. Entrenchment/floodplain access (deeply entrenched = 0; accessible floodplain = max points)	0	0	0	3
	8. Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0	0	0	1
	9. Channel sinuosity (recently channelized = 0; natural meander = max points)	0	0	0	3
	10. Sediment input (extensive deposits = 0; little or no sediment = max points)	0	0	0	3
	11. Size and stability (unstable, many eroding banks = 0; stable, few eroding banks = max points)	0	0	0	1
	12. Evidence of channel incision or widening (deeply incised = 0; stable banks = max points)	0	0	0	2
BIOLOGICAL	13. Presence of large woody debris (none or rare = 0; common = max points)	0	0	0	4
	14. Root depth and density on banks (no visible roots = 0; deep roots throughout = max points)	0	0	0	2
	15. Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0	0	0	0
	16. Presence of riffle-pool/ripple-pool complex (no riffles/ripples or pools = 0; well developed = max points)	0	0	0	1
	17. Habitat complexity (little or no habitat = 0; frequent variety of habitat = max points)	0	0	0	2
	18. Canopy cover over streambed (no shading vegetation = 0; continuous canopy = max points)	0	0	0	5
	19. Substrate embeddedness (deeply embedded = 0; loose, clean = max)	0	0	0	2
	20. Presence of stream invertebrates (see Q4) (no evidence = 0; common, numerous types = max points)	0	0	0	0
	21. Presence of amphibians (no evidence = 0; common, numerous types = max points)	0	0	0	0
	22. Presence of fish (no evidence = 0; common, numerous types = max points)	0	0	0	0
	23. Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0	0	0	1
	Total Points Possible	100	100	100	
	TOTAL SCORE (also enter on first page)				48

* These characteristics are not assessed in coastal streams.

(2)

NCDWQ Stream Classification Form

Project Name: R-2568B | River Basin: Yadkin | County: Davidson | Evaluator:

DWQ Project Number: | Nearest Named Stream: Hunts Fork Creek | Latitude: | Signature: Tim Bassette

Date: 6-4-04 | USGS QUAD: High Point West | Longitude: | Location/Directions: SR. 3345

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	(0)	1	2	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	(1)	2	3
3) Are Natural Levees Present?	(0)	1	2	3
4) Is The Channel Sinuous?	0	(1)	2	3
5) Is There An Active (Or Relic) Floodplain Present?	0	(1)	2	3
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	(0)	1	2	3
8) Is There A Bankfull Bench Present?	0	(1)	2	3
9) Is A Continuous Bed & Bank Present? *(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*	0	(1)	2	3
10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present?	*Yes*=3		*No*=(0)	

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 5

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	(1)	2	3

PRIMARY HYDROLOGY INDICATOR POINTS: 1

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	(3)	2	1	0
2) Are Rooted Plants Present In Streambed?	(3)	2	1	0
3) Is Periphyton Present?	(0)	1	2	3
4) Are Bivalves Present?	(0)	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 6

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	0	.5	(1)	1.5
2) Is There A Grade Control Point In Channel?	0	.5	(1)	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	.5	(1)	1.5

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 3

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	(1.5)	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	(0)	.5	1	1.5
3) Are Wrack Lines Present?	(0)	.5	1	1.5
4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #11 Above Skip This Step And #5 Below*)*	(0)	.5	1	1.5
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	(0)	.5	1	1.5
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?	(*Yes*=1.5)		*No*=0	

currently raining

SECONDARY HYDROLOGY INDICATOR POINTS: 3.0

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	(0)	.5	1	1.5
2) Are Amphibians Present?	(0)	.5	1	1.5
3) Are AquaticTurtles Present?	(0)	.5	1	1.5
4) Are Crayfish Present?	(0)	.5	1	1.5
5) Are Macrobenthos Present?	(0)	.5	1	1.5
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	(.5)	1	1.5
7) Is Filamentous Algae Present?	(0)	.5	1	1.5

N/A

8) Are Wetland Plants In Streambed? *(* NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*).*	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
	2	1	.75	.5	0	0

SECONDARY BIOLOGY INDICATOR POINTS: 0.5

TOTAL POINTS (Primary + Secondary) = 19.5 (If Greater Than or = 19 Points The Stream Is At Least Intermittent).

USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

3A

STREAM QUALITY ASSESSMENT WORKSHEET

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: H. Renninger
3. Date of evaluation: 6-4-04
4. Time of evaluation: 12:30
5. Name of stream: UT Rich Fork Creek
6. River basin: Yadkin
7. Approximate drainage area: —
8. Stream order: 1st
9. Length of reach evaluated: ~300'
10. County: Davidson
11. Site coordinates (if known): —
12. Subdivision name (if any): —
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): Site 3A, Station 43+70 → 44+60
14. Proposed channel work (if any): 66" pipe
15. Recent weather conditions: rain all AM
16. Site conditions at time of visit: raining
17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters ___Nutrient Sensitive Waters ___Water Supply Watershed ____(I-IV)

Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area:_____

Does channel appear on USGS quad map? YES (NO)

20. Does channel appear on USDA Soil Survey? YES (NO)

Estimated watershed land use: 60 % Residential ___% Commercial ___% Industrial 25 % Agricultural 25 % Forested ___% Cleared / Logged ___% Other (_____)

Bankfull width: 2-4'

23. Bank height (from bed to top of bank): 2-4'

Channel slope down center of stream: ___Flat (0 to 2%) ___Gentle (2 to 4%) X Moderate (4 to 10%) ___Steep (>10%)

Channel sinuosity: ____Straight ___Occasional bends X Frequent meander ___Very sinuous ___Braided channel

uctions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on ion, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics ified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot aluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may ided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned ream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Score (from reverse): 57 **Comments:** low water quality; many septic systems uphill; scoured channel downstream

Perennial

tor's Signature Heath L Renninger **Date** 6-4-04

ıannel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in ng the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream . The total score resulting from the completion of this form is subject to USACE approval and does not imply a lar mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

		#	CHARACTERISTICS	ECOREGION POINT RANGE: Coastal	Piedmont	Mountain	SCORE
HYDROLOGY		1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 6	0 – 4	0 – 6	3
		2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	4
		3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 4	3
		4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	1
		5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 5	0 – 4	0 – 4	2
		6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 6	0 – 4	0 – 4	1
		7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 5	2
		8	**Presence of adjacent wetlands** (no wetlands = 0; large, adjacent wetlands = max points)	0 – 6	0 – 4	0 – 5	0
		9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 5	2
		10	**Sediment input** (extensive deposition = 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	4
STABILITY		11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max. points)	NA*	0 – 4	0 – 5	4
		12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	1
		13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	3
		14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 5	0 – 4	0 – 5	2
		15	**Impact by agriculture, livestock, or timber production** (substantial impact = 0; no evidence = max points)	0 – 5	0 – 4	0 – 5	4
HABITAT		16	**Presence of riffle-pool/ripple-pool complexes** (no riffles, ripples, or pools = 0; well-developed = max points)	0 – 5	0 – 5	0 – 6	4
		17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 20	0 – 16	0 – 16	4
		18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	5
		19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	3
BIOLOGY		20	**Presence of stream invertebrates** (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	2
		21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	3
		22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
		23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	0
			Total Points Possible	100	100	100	
			TOTAL SCORE (also enter on first page)				57

* These characteristics are not assessed in coastal streams.

(OH)

NCDWQ Stream Classification Form

Project Name: R-2568B River Basin: Yadkin County: Davidson Evaluator: Tim Bassette

DWQ Project Number: Nearest Named Stream: Richfork Creek Latitude: Signature: Tim Bassette

Date: 6-4-04 USGS QUAD: High Point West Longitude: Location/Directions: St. 43470

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	1	(2)	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	2	(3)
3) Are Natural Levees Present?	(0)	1	2	3
4) Is The Channel Sinuous?	0	1	(2)	3
5) Is There An Active (Or Relic) Floodplain Present?	0	1	(2)	3
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	(0)	1	2	3
8) Is There A Bankfull Bench Present?	0	1	2	(3)
9) Is A Continuous Bed & Bank Present?	0	1	2	(3)
*(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*				
10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present?	*Yes=3*		*No=0*	

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 15

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	(1)	2	3

PRIMARY HYDROLOGY INDICATOR POINTS: 1

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	(3)	2	1	0
2) Are Rooted Plants Present In Streambed?	(3)	2	1	0
3) Is Periphyton Present?	(0)	1	2	3
4) Are Bivalves Present?	(0)	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 6

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
w/in ROW → 1) Is There A Head Cut Present In Channel?	(0)	.5	1	1.5
2) Is There A Grade Control Point In Channel?	0	.5	1	(1.5)
3) Does Topography Indicate A Natural Drainage Way?	0	.5	1	(1.5)

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 3

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	1.5	(1)	.5	0
2) Is Sediment On Plants (Or Debris) Present?	(0)	.5	1	1.5
3) Are Wrack Lines Present?	0	(.5)	1	1.5
currently raining → 4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #11 Above Skip This Step And #5 Below*)*	(0)	.5	1	1.5
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0	.5	(1)	1.5
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?		*Yes=1.5*	*No=0*	

SECONDARY HYDROLOGY INDICATOR POINTS: 4

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	(0)	.5	1	1.5
2) Are Amphibians Present?	0	(.5)	1	1.5
3) Are AquaticTurtles Present?	(0)	.5	1	1.5
4) Are Crayfish Present?	(0)	.5	1	1.5
5) Are Macrobenthos Present?	0	.5	1	(1.5)
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	(.5)	1	1.5
7) Is Filamentous Algae Present?	(0)	.5	1	1.5

8) Are Wetland Plants In Streambed?	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*).*	2	1	.75	.5	0	0

N/A

SECONDARY BIOLOGY INDICATOR POINTS: 2.5

TOTAL POINTS (Primary + Secondary) = 31.5 (If Greater Than or = 19 Points The Stream Is At Least Intermittent).

USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

(4)

STREAM QUALITY ASSESSMENT WORKSHEET

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: H. Renninger
3. Date of evaluation: 6-4-04
4. Time of evaluation: 1:30
5. Name of stream: UT Rich Fork Creek
6. River basin: Yadkin
7. Approximate drainage area: ——
8. Stream order: 2nd
9. Length of reach evaluated: ~200'
10. County: Davidson
11. Site coordinates (if known): ——
12. Subdivision name (if any): ——
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): Site 4 ; Station 46+60 → 47+80
14. Proposed channel work (if any): 11' x 8' RCBC
15. Recent weather conditions: ~~No rain past 24h~~ rain all AM
16. Site conditions at time of visit: raining
17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters ___ Nutrient Sensitive Waters ___Water Supply Watershed ____(I-IV)
18. Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area:_____
19. Does channel appear on USGS quad map? (YES) NO
20. Does channel appear on USDA Soil Survey? (YES) NO
21. Estimated watershed land use: 20 % Residential ___% Commercial ___% Industrial 5 % Agricultural 60 % Forested 15 % Cleared / Logged ___% Other (_____)
22. Bankfull width: 7-8'
23. Bank height (from bed to top of bank): 3-4'
24. Channel slope down center of stream: ___Flat (0 to 2%) X Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)
25. Channel sinuosity: ____Straight ___Occasional bends X Frequent meander ___Very sinuous ___Braided channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 48 **Comments:** lots of suspended sediment in water; milky appearance; runoff from adjacent dirt road

Perennial

Evaluator's Signature Heather Renninger **Date** 6-4-04

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGES: Coastal	Piedmont	Mountain	SCORE
PHYSICAL	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	4
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	2
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	2
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 5	3
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands etc. = max points)	0 – 3	0 – 4	0 – 6	3
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	4
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	2
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 4	0
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 5	2
	10	**Sediment input** (extensive deposition = 0; little or no sediment = max points)	0 – 6	0 – 4	0 – 4	0
STABILITY	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 5	0 – 5	1
	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	2
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	2
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 5	0 – 4	0 – 5	1
	15	**Impact by agriculture, livestock or timber production** (substantial impact = 0; no evidence = max points)	0 – 5	0 – 4	0 – 5	1
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	3
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	4
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 3	0 – 5	0 – 5	5
	19	**Substrate embeddedness*** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	2
BIOLOGY	20	**Presence of stream invertebrates** (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	3
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	1
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	1
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on first page)				48

* These characteristics are not assessed in coastal streams.

(4)

NCDWQ Stream Classification Form

Project Name: R2568B | River Basin: Yadkin | County: Davidson | Evaluator: Tim Bassette

DWQ Project Number: | Nearest Named Stream: Rich Fork Creek | Latitude: | Signature: Tim Bassette

Date: 6-4-04 | USGS QUAD: High Point West | Longitude: | Location/Directions: ≤1.46+60

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	1	(2)	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	(2)	3
3) Are Natural Levees Present?	(0)	1	2	3
4) Is The Channel Sinuous?	0	1	(2)	3
5) Is There An Active (Or Relic) Floodplain Present?	0	1	2	(3)
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	0	1	(2)	3
8) Is There A Bankfull Bench Present?	0	1	2	(3)
9) Is A Continuous Bed & Bank Present?	0	1	2	(3)

*(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*

10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present? *Yes=3* *No=(0)*

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 17

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	1	(2)	3

PRIMARY HYDROLOGY INDICATOR POINTS: 2

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	(3)	2	1	0
2) Are Rooted Plants Present In Streambed?	(3)	2	1	0
3) Is Periphyton Present?	(0)	1	2	3
4) Are Bivalves Present?	(0)	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 6

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel? (in Row)	(0)	.5	1	1.5
2) Is There A Grade Control Point In Channel?	0	.5	(1)	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	.5	1	(1.5)

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 2.5

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	(1.5)	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	0	.5	1	(1.5)
3) Are Wrack Lines Present?	0	(.5)	1	1.5
4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #11 Above Skip This Step And #5 Below*)* (Currently raining)	0	.5	1	1.5
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0	.5	1	(1.5)

6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)? *Yes=(1.5)* *No=0*

SECONDARY HYDROLOGY INDICATOR POINTS: 6.5

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	(0)	.5	1	1.5
2) Are Amphibians Present?	(0)	.5	1	1.5
3) Are AquaticTurtles Present?	(0)	.5	1	1.5
4) Are Crayfish Present?	(0)	.5	1	1.5
5) Are Macrobenthos Present?	0	.5	1	(1.5)
6) Are Iron Oxidizing Bacteria/Fungus Present?	(0)	.5	1	1.5
7) Is Filamentous Algae Present?	(0)	.5	1	1.5

8) Are Wetland Plants In Streambed? (N/A)

SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
2	1	.75	.5	0	0

(NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*).*

SECONDARY BIOLOGY INDICATOR POINTS: 1.5

TOTAL POINTS (Primary + Secondary) = 35.5 (If Greater Than or = 19 Points The Stream Is At Least Intermittent).

USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

STREAM QUALITY ASSESSMENT WORKSHEET (6)

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: Tim Bassette
3. Date of evaluation: 6-4-04
4. Time of evaluation: 2:00pm
5. Name of stream: UT Rich Fork Creek
6. River basin: Yadkin
7. Approximate drainage area: —
8. Stream order: 1st
9. Length of reach evaluated: 500ft
10. County: Davidson
11. Site coordinates (if known): —
12. Subdivision name (if any): —
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): Sta 6 (2 of them); Stations 10+60 → 11+00 - Y10 and 55+60 → 56+00 - L
14. Proposed channel work (if any): 24" Pipe and 30" pipe
15. Recent weather conditions: ~~Before, past 24 h.~~ just rained
16. Site conditions at time of visit: drizzly, cloudy, 80° F.
17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters ___Nutrient Sensitive Waters ___Water Supply Watershed ____(I-IV)
18. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area: _____
19. Does channel appear on USGS quad map? YES (NO)
20. Does channel appear on USDA Soil Survey? (YES) NO
21. Estimated watershed land use: 20% Residential ___% Commercial ___% Industrial 10% Agricultural 70% Forested ___% Cleared / Logged ___% Other (_____)
22. Bankfull width: 1ft - 3ft
23. Bank height (from bed to top of bank): 6in - 2 ft
24. Channel slope down center of stream: X Flat (0 to 2%) ___Gentle (2 to 4%) and X Moderate (4 to 10%) ___Steep (>10%)
25. Channel sinuosity: ____Straight X Occasional bends ___Frequent meander ___Very sinuous ___Braided channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 39 **Comments:** intermittent
The same stream is crossed twice by the project.

Evaluator's Signature Tim Bassette **Date** 6-4-04

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE: Coastal	Piedmont X	Mountain	SCORE
PHYSICAL	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	2
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	1
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	3
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	1
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands etc. = max points)	0 – 3	0 – 4	0 – 4	2
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 1	0 – 4	0 – 2	2
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	2
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	0
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 3	1
	10	**Sediment input** (extensive deposition = 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	2
STABILITY	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	2
	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	2
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	2
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	3
	15	**Impact by agriculture, livestock or timber production** (substantial impact = 0; no evidence = max points)	0 – 5	0 – 4	0 – 5	3
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	0
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	1
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	2
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	2
BIOLOGY	20	**Presence of stream invertebrates** (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	4
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	2
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on first page)				39

* These characteristics are not assessed in coastal streams.

(6)

NCDWQ Stream Classification Form

Project Name: R-2568B | River Basin: Yadkin | County: Davidson | Evaluator: Tim Bassett

DWQ Project Number: | Nearest Named Stream: Rich Fork Creek | Latitude: | Signature: Tim Bassett

Date: 6-4-04 | USGS QUAD: High Point West | Longitude: | Location/Directions: St. 10+60 -Y10 - and 55+60 - L -

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	(0)	1	2	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	(1)	2	3
3) Are Natural Levees Present?	(0)	1	2	3
4) Is The Channel Sinuous?	0	(1)	2	3
5) Is There An Active (Or Relic) Floodplain Present?	0	1	(2)	3
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	(0)	1	2	3
8) Is There A Bankfull Bench Present?	0	(1)	2	3
9) Is A Continuous Bed & Bank Present?	0	(1)	2	3

*(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*

10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present? *Yes=3* *No=(0)*

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 6

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	1	(2)	3

PRIMARY HYDROLOGY INDICATOR POINTS: 2

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	3	(2)	1	0
2) Are Rooted Plants Present In Streambed?	3	(2)	1	0
3) Is Periphyton Present?	(0)	1	2	3
4) Are Bivalves Present?	(0)	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 4

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	0	.5	(1)	1.5
2) Is There A Grade Control Point In Channel?	0	.5	1	(1.5)
3) Does Topography Indicate A Natural Drainage Way?	0	.5	(1)	1.5

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 3.5

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	1.5	(1)	.5	0
2) Is Sediment On Plants (Or Debris) Present?	0	(.5)	1	1.5
3) Are Wrack Lines Present?	0	(.5)	1	1.5
4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #11 Above Skip This Step And #5 Below*)*	(0)	.5	1	1.5
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0	(.5)	1	1.5

just rained →

6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)? *Yes=(1.5)* *No=0*

SECONDARY HYDROLOGY INDICATOR POINTS: 2.5

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	(0)	.5	1	1.5
2) Are Amphibians Present?	(0)	.5	1	1.5
3) Are AquaticTurtles Present?	(0)	.5	1	1.5
4) Are Crayfish Present?	(0)	.5	1	1.5
5) Are Macrobenthos Present?	0	.5	1	(1.5)
6) Are Iron Oxidizing Bacteria/Fungus Present?	(0)	.5	1	1.5
7) Is Filamentous Algae Present?	(0)	.5	1	1.5

8) Are Wetland Plants In Streambed?	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*).*	2	(1)	.75	.5	0	0

SECONDARY BIOLOGY INDICATOR POINTS: 2.5

TOTAL POINTS (Primary + Secondary) = 21.5 (If Greater Than or = 19 Points The Stream Is At Least Intermittent).

USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

(7)

STREAM QUALITY ASSESSMENT WORKSHEET

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: H. Runninger
3. Date of evaluation: 6-4-04
4. Time of evaluation: 2:00
5. Name of stream: UT Rich Fork Creek
6. River basin: Yadkin
7. Approximate drainage area: —
8. Stream order: 1st
9. Length of reach evaluated: 2100'
10. County: Davidson
11. Site coordinates (if known): —
12. Subdivision name (if any): —
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): Site 7; Station 51+70
14. Proposed channel work (if any): 24" Pipe
15. Recent weather conditions: ~~Dorain past 24h.~~ rain all AM
16. Site conditions at time of visit: raining
17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters ___Nutrient Sensitive Waters ___Water Supply Watershed ____(I-IV)
18. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area:_____
19. Does channel appear on USGS quad map? YES (NO)
20. Does channel appear on USDA Soil Survey? YES (NO)
21. Estimated watershed land use: 80 % Residential ___% Commercial ___% Industrial ___% Agricultural 10 % Forested ___% Cleared / Logged 10 % Other (NC 109)
22. Bankfull width: 2.5'
23. Bank height (from bed to top of bank): 1'
24. Channel slope down center of stream: ___Flat (0 to 2%) X Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)
25. Channel sinuosity: ___Straight X Occasional bends ___Frequent meander ___Very sinuous ___Braided channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 34 from NC109 **Comments:** receives a lot of Stormwater Intermittent

Evaluator's Signature Heather Renninger **Date** 6-4-04

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STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE: Coastal	Piedmont	Mountain	SCORE
PHYSICAL	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 6	0 – 4	0 – 6	1
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	1
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	2
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	2
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	1
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	3
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 3	3
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 5	0 – 4	0 – 4	0
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 3	1
	10	**Sediment input** (extensive deposition = 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	1
	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	1
STABILITY	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	2
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	4
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 5	0 – 4	0 – 5	1
	15	**Impact by agriculture, livestock, or timber production** (substantial impact = 0; no evidence = max points)	0 – 5	0 – 4	0 – 5	3
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	1
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 10	0 – 6	0 – 6	1
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	3
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	2
BIOLOGY	20	**Presence of stream invertebrates** (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	0
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	1
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on first page)				34

* These characteristics are not assessed in coastal streams.

(7)

NCDWQ Stream Classification Form

Project Name: R-2568B | River Basin: Yadkin | County: Davidson | Evaluator: H. Renninger

DWQ Project Number: | Nearest Named Stream: Rich Fork Creek | Latitude: | Signature:

Date: 6-4-04 | USGS QUAD: High Point West | Longitude: | Location/Directions: St 56+70

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	(1)	2	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	(1)	2	3
3) Are Natural Levees Present?	(0)	1	2	3
4) Is The Channel Sinuous?	0	(1)	2	3
5) Is There An Active (Or Relic) Floodplain Present?	0	1	(2)	3
6) Is The Channel Braided?	0	(1)	2	3
7) Are Recent Alluvial Deposits Present?	0	1	(2)	3
8) Is There A Bankfull Bench Present?	0	1	(2)	3
9) Is A Continuous Bed & Bank Present?	0	1	(2)	3
*(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*				
10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present?	*Yes=3*		*No=0*	

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 12

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	(1)	2	3

PRIMARY HYDROLOGY INDICATOR POINTS: 1

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	(3)	2	1	0
2) Are Rooted Plants Present In Streambed?	(3)	2	1	0
3) Is Periphyton Present?	(0)	1	2	3
4) Are Bivalves Present?	(0)	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 6

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	0	.5	(1)	1.5
2) Is There A Grade Control Point In Channel?	0	.5	(1)	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	(.5)	1	1.5

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 2.5

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	(1.5)	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	0	.5	(1)	1.5
3) Are Wrack Lines Present?	0	.5	(1)	1.5
4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #11 Above Skip This Step And #5 Below*)*	0	.5	1	1.5 raining now
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0	(.5)	1	1.5
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?	*Yes=1.5*		*No=0*	

SECONDARY HYDROLOGY INDICATOR POINTS: 4

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	(0)	.5	1	1.5
2) Are Amphibians Present?	(0)	.5	1	1.5
3) Are AquaticTurtles Present?	(0)	.5	1	1.5
4) Are Crayfish Present?	(0)	.5	1	1.5
5) Are Macrobenthos Present?	(0)	.5	1	1.5
6) Are Iron Oxidizing Bacteria/Fungus Present?	(0)	.5	1	1.5
7) Is Filamentous Algae Present?	(0)	.5	1	1.5

8) Are Wetland Plants In Streambed?	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*)*	2	1	.75	.5	0	0

SECONDARY BIOLOGY INDICATOR POINTS: 0

TOTAL POINTS (Primary + Secondary) = 25.5 (If Greater Than or = 19 Points The Stream Is At Least Intermittent).

USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

(8)

STREAM QUALITY ASSESSMENT WORKSHEET

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: Tim Bassette
3. Date of evaluation: 6-4-04
4. Time of evaluation: 2:30 pm
5. Name of stream: Rich Fork Creek
6. River basin: Yadkin
7. Approximate drainage area: ____
8. Stream order: at least third order
9. Length of reach evaluated: 400 linear ft
10. County: Davidson
11. Site coordinates (if known): ____
12. Subdivision name (if any): ____
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): Site 8; Station 61+31.5
14. Proposed channel work (if any): 2 @ 85' x 54' P/S Conc. girder bridge
15. Recent weather conditions: rained past 24h. (creek hrs. ago
16. Site conditions at time of visit: cloudy; no rain; creek relatively fast flowing & sediment laden
17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters ___Nutrient Sensitive Waters ___Water Supply Watershed ____(I-IV)
18. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area: N/A
19. Does channel appear on USGS quad map? (YES) NO
20. Does channel appear on USDA Soil Survey? (YES) NO
21. Estimated watershed land use: 20 % Residential ___% Commercial ___% Industrial 10 % Agricultural 10 % Forested ___% Cleared / Logged ___% Other (_____)
22. Bankfull width: 55 ft
23. Bank height (from bed to top of bank): unknown
24. Channel slope down center of stream: X Flat (0 to 2%) ___Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)
25. Channel sinuosity: ____Straight X Occasional bends ____Frequent meander ____Very sinuous ____Braided channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 60 **Comments:** perennial; receives lots of sediment inputs

Evaluator's Signature Tim Bassette **Date** 6-4-04

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STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE: Coastal	Piedmont	Mountain	SCORE
PHYSICAL	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	4
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	3
	3	**Riparian zone** (no buffer = 0; contiguous wide buffer = max points)	0 – 6	0 – 4	0 – 5	4
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	0
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	4
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 5	4
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 5	1
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 5	0
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 5	1
	10	**Sediment input** (extensive deposition = 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	0
STABILITY	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	0
	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	2
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	2
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	4
	15	**Impact by agriculture, livestock, or timber production** (substantial impact = 0; no evidence = max points)	0 – 5	0 – 4	0 – 5	2
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	0
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	6
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	5
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	0
BIOLOGY	20	**Presence of stream invertebrates** (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	5
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	4
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	4
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	5
		Total Points Possible	= 100	= 100	= 100	
		TOTAL SCORE (also enter on first page)				60

* These characteristics are not assessed in coastal streams.

NCDWQ Stream Classification Form

Project Name: A-2568 River Basin: Yadkin County: Davidson Evaluator: H. Ruppinger

DWQ Project Number: Nearest Named Stream: Rich Fork Creek Latitude: Signature: HR

Date: 6-4-04 USGS QUAD: High Point West Longitude: Location/Directions: St. 61+31.5

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	1	2	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	2	(3)
3) Are Natural Levees Present?	0	1	(2)	3
4) Is The Channel Sinuous?	0	1	(2)	3
5) Is There An Active (Or Relic) Floodplain Present?	0	1	2	(3)
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	0	1	2	(3)
8) Is There A Bankfull Bench Present?	0	(1)	2	3
9) Is A Continuous Bed & Bank Present?	0	1	2	(3)

*(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*

10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present? *Yes=3* (3) *No=0*

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 18

floodplain Caused

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	1	2	(3)

PRIMARY HYDROLOGY INDICATOR POINTS: 3

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	(3)	2	1	0
2) Are Rooted Plants Present In Streambed?	(3)	2	1	0
3) Is Periphyton Present?	(0)	1	2	3
4) Are Bivalves Present?	(0)	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 6

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	(0)	.5	1	1.5
2) Is There A Grade Control Point In Channel?	(0)	.5	1	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	.5	1	(1.5)

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 1.5

not wli Row

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	(1.5)	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	0	.5	1	(1.5)
3) Are Wrack Lines Present?	0	.5	1	(1.5)
4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #11 Above Skip This Step And #5 Below*)*	0	.5	1	1.5
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0	.5	1	(1.5)

6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)? *Yes=1.5* *No=0*

SECONDARY HYDROLOGY INDICATOR POINTS: 6

raining

flooded

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	0	.5	1	(1.5)
2) Are Amphibians Present?	0	.5	1	(1.5)
3) Are AquaticTurtles Present?	0	.5	1	(1.5)
4) Are Crayfish Present?	0	.5	1	(1.5)
5) Are Macrobenthos Present?	0	.5	1	(1.5)
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	.5	1	1.5
7) Is Filamentous Algae Present?	0	.5	1	1.5

8) Are Wetland Plants In Streambed?	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*).*	2	1	.75	.5	0	0

SECONDARY BIOLOGY INDICATOR POINTS: 7.5

TOTAL POINTS (Primary + Secondary) = 43 (If Greater Than or = 19 Points The Stream Is At Least Intermittent).

USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

(9)

STREAM QUALITY ASSESSMENT WORKSHEET

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: H. Renninger
3. Date of evaluation: 6-4-04
4. Time of evaluation: 2:54
5. Name of stream: UT Rich Fork Creek
6. River basin: Yadkin
7. Approximate drainage area: ——
8. Stream order: 1st
9. Length of reach evaluated: ~100'
10. County: Davidson
11. Site coordinates (if known): ——
12. Subdivision name (if any): ——
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): Site 9; Station 64+00 → 66+60
14. Proposed channel work (if any): 42" pipe
15. Recent weather conditions: raining all AM
16. Site conditions at time of visit: drizzle
17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters ___Nutrient Sensitive Waters ___Water Supply Watershed ____(I-IV)
18. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area:_____
19. Does channel appear on USGS quad map? YES (NO)
20. Does channel appear on USDA Soil Survey? (YES) NO
21. Estimated watershed land use: 50 % Residential ___% Commercial ___% Industrial 20 % Agricultural 30 % Forested ___% Cleared / Logged ___% Other (_____)
22. Bankfull width: 2'
23. Bank height (from bed to top of bank): 1'
24. Channel slope down center of stream: ___Flat (0 to 2%) ___Gentle (2 to 4%) X Moderate (4 to 10%) ___Steep (>10%)
25. Channel sinuosity: ____Straight X Occasional bends ___Frequent meander ___Very sinuous ___Braided channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 20 **Comments:** receives stormwater from NC109; lots of trash in channel Intermittent

Evaluator's Signature Heather Rennin **Date** 6-4-04

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE: Coastal	Piedmont	Mountain	SCORE
PHYSICAL STABILITY	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0–4	0–4	0–4	1
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0–6	0–5	0–5	2
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0–6	0–4	0–4	1
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0–5	0–4	0–4	1
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands = max points)	0–6	0–4	0–4	1
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0–4	0–4	0–2	0
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0–6	0–5	0–5	1
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0–6	0–4	0–4	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0–6	0–5	0–5	1
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0	0–4	0–4	1
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0–5	0–5	0
	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0–5	0–4	0–5	1
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0	0–5	0–5	1
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0–3	0–4	0–5	1
	15	Impact by agriculture, livestock or timber production (substantial impact = 0; no evidence = max points)	0	0–4	0–5	4
HABITAT	16	Presence of riffle-pool/ripple-pool complexes (no riffles, ripples or pools = 0; well developed = max points)	0	0–5	0–5	1
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0–6	0–6	0–6	1
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0–5	0–5	0–5	1
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0–4	0–20	1
BIOLOGY	20	Presence of stream invertebrates (see page 4 for) (no evidence = 0; common, numerous types = max points)	0–4	0–5	0–5	0
	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0–4	0–4	0–4	0
	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0–4	0–4	0–4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0–6	0–6	0–6	0
		Total Points Possible	100*	100	100	
		TOTAL SCORE (also enter on first page)				20

* These characteristics are not assessed in coastal streams.

9

NCDWQ Stream Classification Form

Project Name: R-2568B | River Basin: Yadkin | County: Davidson | Evaluator: Tim Bassett
DWQ Project Number: | Nearest Named Stream: Rich Fork Creek | Latitude: | Signature: Tim Bassett
Date: 6-4-04 | USGS QUAD: High Point West | Longitude: | Location/Directions: St. 64+00

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	1	2	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	2	3
3) Are Natural Levees Present?	0	1	2	3
4) Is The Channel Sinuous?	0	1	2	3
5) Is There An Active (Or Relic) Floodplain Present?	0	1	2	3
6) Is The Channel Braided?	0	1	2	3
7) Are Recent Alluvial Deposits Present?	0	1	2	3
8) Is There A Bankfull Bench Present?	0	1	2	3
9) Is A Continuous Bed & Bank Present?	0	1	2	3
*(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*				
10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present?	*Yes=3*		*No=0*	

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 10

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	1	2	3

PRIMARY HYDROLOGY INDICATOR POINTS: 2

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	3	2	1	0
2) Are Rooted Plants Present In Streambed?	3	2	1	0
3) Is Periphyton Present?	0	1	2	3
4) Are Bivalves Present?	0	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 6

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
w/in Bowls 1) Is There A Head Cut Present In Channel?	0	.5	1	1.5
2) Is There A Grade Control Point In Channel?	0	.5	1	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	.5	1	1.5

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 1

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	1.5	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	0	.5	1	1.5
3) Are Wrack Lines Present?	0	.5	1	1.5
just rained 4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #11 Above Skip This Step And #5 Below*)*	0	.5	1	1.5
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0	.5	1	1.5
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?	*Yes=1.5*		*No=0*	

SECONDARY HYDROLOGY INDICATOR POINTS: 3.5

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	0	.5	1	1.5
2) Are Amphibians Present?	0	.5	1	1.5
3) Are AquaticTurtles Present?	0	.5	1	1.5
4) Are Crayfish Present?	0	.5	1	1.5
5) Are Macrobenthos Present?	0	.5	1	1.5
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	.5	1	1.5
7) Is Filamentous Algae Present?	0	.5	1	1.5

8) Are Wetland Plants In Streambed? N/A	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*).*	2	1	.75	.5	0	0

SECONDARY BIOLOGY INDICATOR POINTS: 0

TOTAL POINTS (Primary + Secondary) = 19.5 (If Greater Than or = 19 Points The Stream Is At Least Intermittent).

USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

(10)

STREAM QUALITY ASSESSMENT WORKSHEET

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: H. Renninger
3. Date of evaluation: 6-4-04
4. Time of evaluation: 3:30
5. Name of stream: UT Rich Fork Creek
6. River basin: Yadkin
7. Approximate drainage area: ——
8. Stream order: 1st
9. Length of reach evaluated: 250'
10. County: Davidson
11. Site coordinates (if known): ——
12. Subdivision name (if any): ——
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): Site 10; Station 75+50 → 76+50
14. Proposed channel work (if any): 36" pipe
15. Recent weather conditions: rain all AM
16. Site conditions at time of visit: drizzle
17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters ___Nutrient Sensitive Waters ___Water Supply Watershed ____(I-IV)
18. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area:_____
19. Does channel appear on USGS quad map? YES (NO)
20. Does channel appear on USDA Soil Survey? (YES) NO
21. Estimated watershed land use: 40 % Residential ___% Commercial ___% Industrial ___% Agricultural 25 % Forested 5 % Cleared / Logged 30 % Other (impervious surf.)
22. Bankfull width: 4'
23. Bank height (from bed to top of bank): 2-4'
24. Channel slope down center of stream: ___Flat (0 to 2%) X Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)
25. Channel sinuosity: ___Straight X Occasional bends X Frequent meander ___Very sinuous ___Braided channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 33 **Comments:** intermittent upstream of culvert at Sta. 76+10; perennial downstream

Evaluator's Signature H. Renninger **Date** 6-4-04

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STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE: Coastal	Piedmont	Mountain	SCORE
PHYSICAL STABILITY	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	3
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	0
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	1
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	2
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	1
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	0
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	1
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	0
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 5	2
	10	**Sediment input** (extensive deposition = 0; little or no sediment = max points)	0 – 6	0 – 4	0 – 5	2
	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 5	0 – 5	2
	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	1
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 7	0 – 6	0 – 5	1
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0	1
	15	**Impact by agriculture, livestock or timber production** (substantial impact = 0; no evidence = max points)	0 – 5	0 – 4	0 – 5	4
BIOLOGY HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	2
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	3
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	2
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	2
	20	**Presence of stream invertebrates** (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 2	0 – 5	0 – 5	3
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 6	0 – 4	0 – 4	0
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	0
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on first page)				33

* These characteristics are not assessed in coastal streams.

10

upstream of driveway culvert

intermittent

NCDWQ Stream Classification Form

Project Name: R 2568B | River Basin: Yadkin | County: Davidson | Evaluator: Tim Bassett

DWQ Project Number: | Nearest Named Stream: Rich Fork Creek | Latitude: | Signature: Tim Bassett

Date: 6-4-04 | USGS QUAD: High Point West | Longitude: | Location/Directions: S+ 75 + SC

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	(1)	2	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	(1)	2	3
3) Are Natural Levees Present?	(0)	1	2	3
4) Is The Channel Sinuous?	(0) →	1	2	3
5) Is There An Active (Or Relic) Floodplain Present?	0 ←	(1)	2	3
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	(0)	1	2	3
8) Is There A Bankfull Bench Present?	0	1	(2)	3
9) Is A Continuous Bed & Bank Present?	0	1	(2)	3
*(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*				
10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present?	*Yes*=3		*No*=0	

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 7

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	(1)	2	3

PRIMARY HYDROLOGY INDICATOR POINTS: 1

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	(3)	2	1	0
2) Are Rooted Plants Present In Streambed?	(3)	2	1	0
3) Is Periphyton Present?	(0)	1	2	3
4) Are Bivalves Present?	(0)	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 6

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	0	(.5)	1	1.5
2) Is There A Grade Control Point In Channel?	0	.5	(1)	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	(.5)	1	1.5

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 2

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	(1.5)	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	(0)	.5	1	1.5
3) Are Wrack Lines Present?	(0)	.5	(1)	1.5
4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #11 Above Skip This Step And #5 Below*)*	(0)	.5	1	1.5
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0 ←	(.5)	1	1.5
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?	*Yes*=1.5		*No*=0	

just rained →

SECONDARY HYDROLOGY INDICATOR POINTS: 4.5

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	(0)	.5	1	1.5
2) Are Amphibians Present?	(0)	.5	1	1.5
3) Are AquaticTurtles Present?	(0)	.5	1	1.5
4) Are Crayfish Present?	(0)	.5	1	1.5
5) Are Macrobenthos Present?	0	.5	(1)	1.5
6) Are Iron Oxidizing Bacteria/Fungus Present?	(0)	.5	1	1.5
7) Is Filamentous Algae Present?	(0)	.5	1	1.5

N/A →

8) Are Wetland Plants In Streambed?	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*).*	2	1	.75	.5	0	0

SECONDARY BIOLOGY INDICATOR POINTS: 1

TOTAL POINTS (Primary + Secondary) = 21.5 (If Greater Than or = 19 Points The Stream Is At Least Intermittent).

NCDWQ Stream Classification Form

10 downstream of driveway culvert

perennial 2

Project Name: R-2568B | River Basin: Yadkin | County: Davidson | Evaluator: Tim Basselle

DWQ Project Number: | Nearest Named Stream: Rich Fork Creek | Latitude: | Signature: Tim Basselle

Date: 6/4/2004 | USGS QUAD: High Point West | Longitude: | Location/Directions: St. 75+50

Primary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	1	(2)	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	2	(3)
3) Are Natural Levees Present?	(0)	1	2	3
4) Is The Channel Sinuous?	0	(1)	2	3
5) Is There An Active (Or Relic) Floodplain Present?	0	1	(2)	3
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	0	(1)	2	3
8) Is There A Bankfull Bench Present?	0	1	2	(3)
9) Is A Continuous Bed & Bank Present?	0	1	2	(3)

*(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*

10) Is A 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present? *Yes=3* (15) *No=0*

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 15

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	1	(2)	3

PRIMARY HYDROLOGY INDICATOR POINTS: 2

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	(3)	2	1	0
2) Are Rooted Plants Present In Streambed?	(3)	2	1	0
3) Is Periphyton Present?	(0)	1	2	3
4) Are Bivalves Present?	(0)	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 6

Secondary Field Indicators: *(Circle One Number Per Line)*

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	(0)	.5	1	1.5
2) Is There A Grade Control Point In Channel?	0	.5	1	(1.5)
3) Does Topography Indicate A Natural Drainage Way?	0	.5	(1)	1.5

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 2.5

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaflitter Present In Streambed?	(1.5)	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	(0)	.5	1	1.5
3) Are Wrack Lines Present?	0	.5	(1)	1.5
4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #11 Above Skip This Step And #5 Below*)*	(0)	.5	1	1.5
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0	.5	1	(1.5)

rained w/in couple hrs!

6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)? (*Yes=1.5*) *No=0*

SECONDARY HYDROLOGY INDICATOR POINTS: 5.5

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	(0)	.5	1	1.5
2) Are Amphibians Present?	(0)	.5	1	1.5
3) Are AquaticTurtles Present?	(0)	.5	1	1.5
4) Are Crayfish Present?	(0)	.5	1	1.5
5) Are Macrobenthos Present?	0	.5	1	(1.5) caddisfly (2 sp)
6) Are Iron Oxidizing Bacteria/Fungus Present?	(0)	.5	1	1.5
7) Is Filamentous Algae Present?	(0)	.5	1	1.5

8) Are Wetland Plants In Streambed?	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*).*	2	1	.75	.5	0	0

N/A

SECONDARY BIOLOGY INDICATOR POINTS: 1.5

TOTAL POINTS (Primary + Secondary) = 32.5 (If Greater Than or = 19 Points The Stream Is At Least Intermittent).

FINAL

QUALITATIVE INDIRECT AND CUMULATIVE EFFECTS ASSESSMENT

NC 109 RELOCATION AND WIDENING

TIP R-2568B

Davidson County, North Carolina

Prepared for

North Carolina Department of Transportation

Office of Human Environment

Prepared by:

HNTB North Carolina, PC

2108 South Boulevard

Suite 108

Charlotte, North Carolina 28203

July 16, 2004

HNTB

TABLE OF CONTENTS

North Carolina Department of Transportation
Office of Human Environment

Qualitative Indirect and Cumulative Effects Assessment
TIP R-2568B, Davidson County, NC

I. EXECUTIVE SUMMARY

TIP R-2568B is a 3.7-mile relocation and widening of NC 109 to a four-lane facility from south of Midway Road (SR 1800) to north of SR 1798 (Old Greensboro Road) in Davidson County. The purpose of the project is to straighten roadway alignment, increase roadway capacity, and to improve roadway safety. NC 109 is an important link between Winston-Salem and Thomasville, and the widening will improve access to I-85 Business in Thomasville. A 250-foot right-of-way with a 46-foot median is proposed. Existing right-of-way is generally 40 feet. Construction of R-2568B is scheduled to begin in 2005.

This report is intended to provide a preliminary analysis of the potential for indirect and cumulative effects (particularly land use change) associated with TIP R-2568B. The analysis will also provide information to the North Carolina Department of Environment and Natural Resources (DENR), Division of Water Quality (DWQ) relating to potential downstream water quality impacts, which will assist them in their determination of Section 401 Water Quality Certification.

Existing Conditions

- Population in the Demographic Area grew by 14.8% between 1990 and 2000. This percentage is lower than Davidson County (16.2%) and the State of North Carolina (21.4%).
- Davidson County employment grew slightly with a 0.05% increase between 1990 and 2002. The health care and social assistance industry experienced the largest employment increase with 1,391 new jobs, and the government industry experienced the second largest increase with 1,135 new jobs. The largest decrease was in the manufacturing industry, which lost 5,503 jobs.
- According to the North Carolina Natural Heritage Program database, the USGS Quads that encompass the Growth Impact Study Area (GISA) include five state or federally protected species.
- There are several 303(d) impaired water bodies within the GISA; Rich Creek, Hunts Fork Creek, and North Hamby Creek. TIP R-2568B crosses both Rich Creek and Hunts Fork Creek.
- Water and sewer are available in the southern portion of the GISA, mainly within the City of Thomasville, and is planned for expansion in those areas close to Thomasville and west of High Point.
- The existing character around TIP R-2568B is mainly rural with agriculture, open fields, forests and some residential subdivisions.

- Abbotts Creek Water Supply (WS) III Watershed covers around one-third of the GISA. Stricter than State regulations, Davidson County allows an overall density of one unit per acre and a minimum of 40,000-square foot lots within both the critical area and the balance of WS-III Watersheds. The built-upon area cannot exceed 24% for multi-family and non-residential development. Within the critical area, the built-upon area cannot exceed 12% for multi-family and non-residential.

Potential Indirect and Cumulative Effects

- Based on the analysis, TIP R-2568B is unlikely to stimulate land development having complementary functions and will not serve any explicit economic development purpose or a specific development.
- The change in accessibility and mobility as a result of TIP R-2568B will be minimal, except for those parcels that gain new road frontage.
- Over the next twenty years, population growth within Davidson County should continue at rates just above 1% annually, therefore keeping demand for developable land in the area low.
- A generally weak market for development within the GISA limits the potential for land use change as a result of TIP R-2568B.
- Within the GISA, the most likely area for commercial or residential growth as a result of TIP R-2568B is at the new intersection of NC 109 and Midway School Road.
- Other planned transportation projects, such as the continuation of TIP R-2568 sections C-G, along with TIP U-2537, will improve regional accessibility throughout the eastern portion of Davidson County and the western portion of High Point.
- Based on this assessment, TIP R-2568B is anticipated to have minimal or no effect on water quality as a result of potential land use changes within the GISA.

II. PROJECT DOCUMENTATION AND BACKGROUND

TIP R-2568B is a proposed relocation and widening of NC 109 to a four-lane facility from south of Midway School Road (SR 1800) to north of Old Greensboro Road (SR 1798) in northeastern Davidson County (see Figure 1). The purpose of the project is to increase roadway capacity and improve roadway safety by strengthening the roadway alignment. The proposed right-of-way for TIP R-2568B is 250 feet with four, 12-foot lanes, a 46-foot median, and two, 10-foot paved shoulders. Access will be partially controlled with left turn lane breaks within the median. The majority of the project will be on new location. The project will be posted with a speed limit of 55 miles per hour.

NC 109 Looking North From Old Greensboro Road

III. STUDY AREA BOUNDARIES

Identification of the Growth Impact Study Area

The North Carolina DOT's and North Carolina Department of Environment and Natural Resources' (DENR) *Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina* indicates that the development effects of a new roadway facility are most often found up to one mile around an interchange, and up to two to five miles along major feeder roadways to the interchange. Based on this guidance and an initial review of project area conditions, it was determined that the potential for growth impact as a result of this project would primarily be within a three-mile radius of the project. This three-mile radius, referred to as the Growth Impact Study Area (GISA), determines the data collection and analysis area, but is not necessarily the extent to which growth impacts are expected to occur (see Figure 2).

More specific areas within the GISA that are most likely to experience land use changes over the next 20-25 years as a result of the roadway improvements will be identified later in this report. The *Guidance* indicates that this timeframe is reasonable since it is used in most Metropolitan Planning Organization (MPO) and local transportation plans.

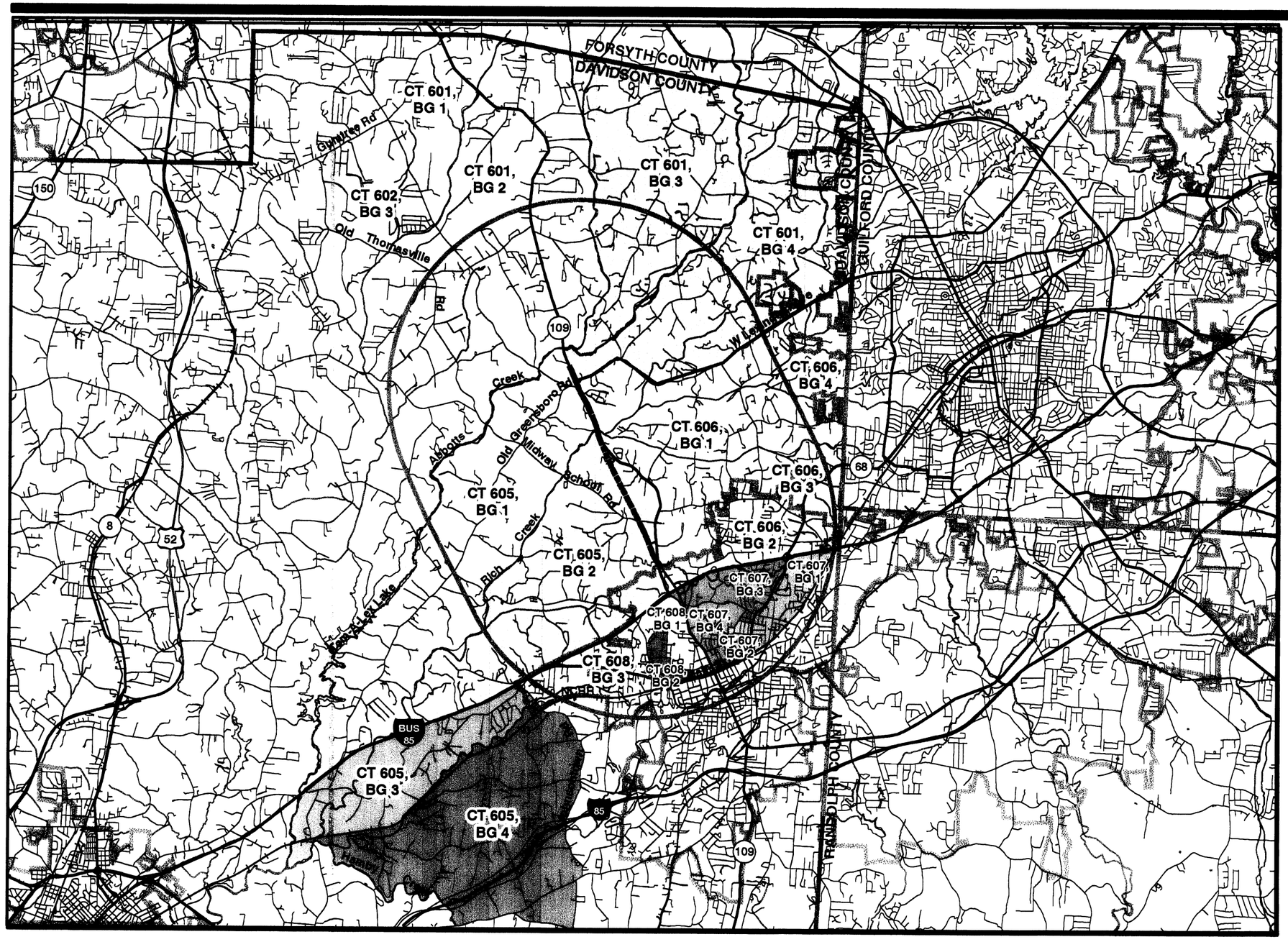


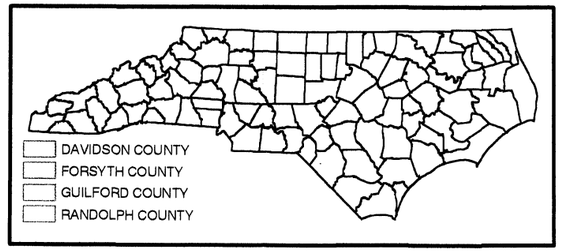
FIGURE 2 - DEMOGRAPHIC AREA

- TIP R-2568B
- HIGHWAYS
- ROADS
- RAILROADS
- RIVERS
- WATER BODIES
- COUNTY BOUNDARIES
- MUNICIPALITIES
- GROWTH IMPACT STUDY AREA

2 1 0 2 Miles

N

MAP SOURCES:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI)
US CENSUS BUREAU
DAVIDSON COUNTY
HIGH POINT
HNTB NORTH CAROLINA, P.C.



Identification of Demographic Area

The Demographic Area for TIP R-2568B is partially located within Davidson County, the City of Thomasville, and the City of High Point. It was created to assess the socioeconomic growth trends within the GISA, which the Demographic Area encompasses (see Figure 2). This area is generally bounded by Old Thomasville Road, Abbotts Creek, Tom-A-Lex Lake, and Hamby Creek to the west, the Davidson/Forsyth County Line to the north, the Davidson/Randolph County Line and Rich Creek to the east, and North Carolina Railrorad (NCRR), SR 2031, Cunningham Road, SR 2118, and SR 2010 to the south. The following 2000 US Census Bureau Census Tracts (CT) and Block Groups (BG) are included in the Demographic Area for TIP R-2568B:

- CT 601, BG 1
- CT 601, BG 2
- CT 601, BG 3
- CT 601, BG 4
- CT 602, BG 3
- CT 605, BG 1
- CT 605, BG 2
- CT 605, BG 3
- CT 605, BG 4
- CT 606, BG 1
- CT 606, BG 2
- CT 606, BG 3
- CT 606, BG 4
- CT 607, BG 1
- CT 607, BG 2
- CT 607, BG 3
- CT 607, BG 4
- CT 608, BG 1
- CT 608, BG 2
- CT 608, BG 3

IV. STUDY AREA DIRECTION AND GOALS

The study area directions and goals were determined by analyzing existing conditions and trends of the area surrounding TIP R-2568B. Information was gathered from the US Census Bureau, the Employment Security Commission of North Carolina, a site visit to the project area, and interviews with planners from Davidson County, the City of Thomasville, and the High Point Urban Area Metropolitan Planning Organization (HPMPO). Research gathered from these sources, as well as from NCDOT project staff and local staff, was used to help determine the potential for and nature of any indirect or cumulative impacts of the project on the surrounding community.

Regional Location Influences and Implications

The City of Thomasville is located within the Piedmont Triad of North Carolina and continues to grow at a steady pace. Most of the population growth has occurred within or near the City of Thomasville, but has also started to spread to the northern and western peripheries. Growth has also occurred to the west of High Point, with sewer lines being extended to those land owners that sign voluntary annexation agreements with the City of High Point.

Thomasville is a small working class city that is known for its furniture industry. Thomasville Furniture Industries is the leading employer with over 2,500 employees. Besides the furniture industry, one of the leading employers in Davidson County is the

Community General Hospital in Thomasville. The area to the north of Thomasville where TIP R-2538B is located is more rural with houses on larger lots. There is a mixture of farmland, open fields, forested areas, and houses. The further away from Thomasville, the more rural the area becomes with houses spread farther apart. Land to the north of Thomasville is generally hilly with steep slopes, making development more difficult.

Farmland on Jacob Street

Local Influences and Development Patterns

Key roads in the vicinity besides NC 109 include the following: Business 85, NC 68, W. Lexington Road, Main Street in Thomasville, and I-85. Based on the site visit, most local traffic utilizing NC 109 either is traveling to Thomasville or accessing Business 85. NC 109 is a main commuter route between Thomasville and Winston-Salem and NC 109 also serves as a main access route for I-85. The area along TIP R-2568B is mainly rural with agriculture, open fields, forests and some scattered residential uses. Ledford Middle School is located at the southeast corner of NC 109 and W. Lexington Road, across from Old Greensboro Road. There are two larger subdivisions on the east side of NC 109, one of which is just south of Ledford Middle School. A gas station/convenience store is located at the southwest corner of NC 109 and Midway School Road.

Ledford Middle School Located On NC 109, Just North of Old Greensboro Road

The first major intersection to the south of TIP R-2568B is the recently completed TIP R-2568A, which is the Business 85 and NC 109 interchange. The southeast quadrant of the interchange includes a gas station/convenience store. The northeast corner has the most potential for future development because new road access was created for this parcel when the interchange was built. However, most of this development will be a result of the interchange construction of TIP R-2568A and not from R-2568B. The City of Thomasville's golf course is just west of NC 109 and north of Business 85.

Property within the GISA is very hilly with steep slopes, making development more difficult. Also, there are poor soils for septic tanks, which makes the availability of sewer key for development. TIP R-2568B will provide some new access to undeveloped land, although local planners indicated that growth is still more dependent upon sewer availability. Sewer service expansion is planned as development occurs, and will be dependent upon voluntary annexation agreements.

NC 109 Looking South, Just South of Old Greensboro Road

Population and Employment Trends

Table 1 below indicates population growth trends between 1990 and 2000 for the Demographic Area, as well as for the City of Thomasville, Davidson County, and North Carolina. The Demographic Area grew by 14.8%, slightly less than Davidson County (16.2%) during this timeframe. The Demographic Area and Davidson County both grew at a slower rate than North Carolina (21.4%), but the City of Thomasville grew at a faster rate (24.3%) than the State. Thomasville government staff indicated that a lot of their growth was due to annexation of unincorporated county land, which may explain why Thomasville's growth rate was higher than Davidson County and the Demographic Area.

Table 1. Population Growth, 1990-2000

	Population		Growth 1990-2000	
Area	1990	2000	#	% Change
Demographic Area	24,256	27,855	3,599	14.8%
City of Thomasville	15,915	19,788	3,873	24.3%
Davidson County	126,677	147,246	20,569	16.2%
North Carolina	6,628,637	8,049,313	1,420,676	21.4%

Source: US Census Bureau

The North Carolina Office of State Budget and Management indicates that in 1980, the population of Davidson County was 113,162, and the population grew by 30.1% to 147,246 in 1990 (see Table 2). In comparison, the population of North Carolina was 5,880,095 in 1980, and it grew 36.9% between 1980 and 2000.

Overall growth is expected to be less during the next twenty years (2000–2020) for both geographies, with the growth rate in Davidson County being less than that of North Carolina. The North Carolina Office of State Budget and Management forecasts that the population of Davidson County will be approximately 166,833 in 2010 and 186,335 in 2020. That equates to a 26.5% growth rate for Davidson County. Comparatively, the population of North Carolina is expected to be approximately 9,491,374 in 2010 and 10,966,138 in 2020, translating into a growth rate of 36.2%.

Table 2. Population Growth Trends and Projections, 1980-2020

Population	Davidson County	North Carolina
1980	113,162	5,880,095
1990	126,677	6,632,448
Percentage Growth 1980-1990	11.9%	12.8%
2000	147,246	8,049,313
Percentage Growth 1990-2000	16.2%	21.4%
Population Projections*	**Davidson County**	**North Carolina**
2010	166,833	9,491,374
Percentage Growth 2000-2010	13.3%	17.9%
2020	186,335	10,966,138
Percentage Growth 2010-2020	11.7%	15.5%

Source: US Census Bureau, *North Carolina State Demographics, May 30, 2002, Internet accessed 6/7/04, http://demog.state.nc.us/

Traffic Analysis Zone (TAZ) data shows slow residential and commercial growth throughout Davidson County, except in the areas closer to I-85. Due to High Point's annexation policies, residential growth is increasing in eastern Davidson County while residential growth in western Davidson County continues at a relatively slower pace.

Table 3 shows employment growth figures by industry sector for Davidson County between 1990 and 2002. According to data from the North Carolina Employment Security Commission, Davidson County gained only 23 jobs between 1990 and 2002, resulting in a 0.05% growth rate. This was predominantly due to a loss of more than 5,500 manufacturing sector jobs and over 650 management of companies and enterprise sector jobs. The health care and social assistance sector, similar to most counties throughout North Carolina, is showing steady growth within Davidson County. The sector that experienced the largest percentage increase was arts, entertainment, and recreation, with a 425.7% increase in employment from 1990 to 2002. According to local planners, this growth was mainly a result of increased tourism activity.

Table 3. Employment By Sector Growth, Davidson County

Sector	Employment		Change, '90-'02	
	1990	2002	#	%
Agriculture, Forestry, Fishing & Hunting	24	37	13	54.2%
Mining	53	41	-12	-22.6%
Utilities	167	129	-38	-22.8%
Construction	1,693	2,196	503	29.7%
Manufacturing	21,932	16,429	-5,503	-25.1%
Wholesale Trade	1,339	1,641	302	22.6%
Retail Trade	4,575	5,022	447	9.8%
Transportation and Warehousing	1,018	1,248	230	22.6%
Information	376	407	31	8.2%
Finance and Insurance	748	646	-102	-13.6%
Real Estate and Rental and Leasing	235	357	122	51.9%
Professional and Technical Services	658	671	13	2.0%
Management of Companies and Enterprises	1,726	1,048	-678	-39.3%
Administrative and Waste Services	561	1,407	846	150.8%
Educational Services	*	189	N/A	N/A
Health Care and Social Assistance	2,752	4,143	1,391	50.5%
Arts, Entertainment, and Recreation	105	552	447	425.7%
Accommodation and Food Services	2,455	2,998	543	22.1%
Other Services, Ex. Public Administration	732	922	109	26.0%
Unclassified	*	43	N/A	N/A
Government	5,301	6,436	1,135	21.4%
Total**	**46,496**	**46,519**	**23**	**0.05%**

Source: North Carolina Employment Security Commission (NCESC)

* - Indicates disclosure suppression

N/A - Not Applicable

** - 1990 total includes data for * sectors

Table 5 illustrates that North Carolina only lost employment in two industry sectors (manufacturing and utilities) between 1990 and 2002. As stated earlier, the loss in manufacturing for the State was less than that for Davidson County, but the utilities sector loss for the State was a larger percentage (-46.1%) than that of Davidson County (-22.8%). North Carolina employment sectors grew more rapidly (higher percent growth) than Davidson County in two-thirds of the industry sectors, with the most notable exceptions being Arts, Entertainment, and Recreation and Administrative and Waste Services.

Table 4. Employment By Sector Growth, North Carolina

Sector	Employment		Change, 1990-2002	
	1990	2002	#	%
Agriculture, Forestry, Fishing & Hunting	21,827	31,376	9,549	43.7%
Mining	3,993	4,203	210	5.3%
Utilities	26,626	14,342	-12,284	-46.1%
Construction	166,733	219,036	52,303	31.4%
Manufacturing	820,239	643,963	-176,276	-21.5%
Wholesale Trade	139,697	162,233	22,536	16.1%
Retail Trade	377,026	437,775	60,749	16.1%
Transportation and Warehousing	82,772	108,388	25,616	30.9%
Information	57,615	79,124	21,509	37.3%
Finance and Insurance	102,412	137,441	35,029	34.2%
Real Estate and Rental and Leasing	32,488	47,195	14,707	45.3%
Professional and Technical Services	89,618	146,022	56,404	62.9%
Management of Companies and Enterprises	35,104	63,565	28,461	81.1%
Administrative and Waste Services	108,590	207,329	98,739	90.9%
Educational Services	22,091	44,507	22,416	101.5%
Health Care and Social Assistance	203,641	350,934	147,293	72.3%
Arts, Entertainment, and Recreation	27,952	45,590	17,638	63.1%
Accommodation and Food Services	205,943	287,393	81,450	39.5%
Other Services, Ex. Public Administration	77,172	97,728	20,556	26.6%
Unclassified	*	9,515	N/A	N/A
Government	476,906	619,456	142,550	29.9%
Total**	**3,079,017**	**3,757,115**	**678,098**	**22.0%**

Source: North Carolina Employment Security Commission (NCESC)

* - Indicates disclosure suppression

N/A - Not Applicable

** - 1990 total includes data for * sectors

Transportation Plans

North Carolina Department of Transportation's Transportation Improvement Program projects in the GISA include (see Figure 1):

- **R-2568A** – Recently constructed interchange at NC 109 and Business 85.
- **R-2568C-F** – NC 109 widening to multi-lane facility from north of Old Greensboro Road to I-40/US 311 in Forsyth County. A bypass of Wallburg on new location is included. This project is currently in the planning phase, with construction to start in Post Years.
- **R-2808** – US 29-70 and I-85 Business. Upgrade, safety improvements, and replacement of 3 bridges. Bridges projects include B-2163 at SR 1627, B-3159 at US 29-64-70/I-85 Business Loop, and B-2832 at SR 1480 (Vickery Chapel Road). Construction to start in Post Years.
- **U-2537** – Westside Thoroughfare, I-85 to US 311 Bypass multi-lanes on new location. There is a Feasibility Study that was done in May of 1999, and an Environmental Impact Study is being prepared. Construction to start in Post Years.

The 2001 HPMPO Thoroughfare Plan shows TIP R-2568B as a proposed project. It also includes recommendations for the following projects, all of which are within the GISA:

- **NC 109 Connector** – an unfunded project that would connect NC 109 to the future Westside Thoroughfare via a new road that would follow Rich Creek.
- **West Loop** – an unfunded project that would start from the same intersection of the NC 109 Connector and NC 109; it would then loop to the west connecting to the intersection of Business 85 and Pilot School Road.
- **Midway School and Hasty School Connection** – unfunded and would realign Midway School Road to intersect with Hasty School Road.
- **Ballpark Road Extension** – unfunded project that would extend Ballpark Road to intersect with NC 109.
- **Unity Street Extension** – unfunded project to extend Unity Street to the intersection of Jacobs Street and Business 85.

Local Land Use Plans and Zoning

Existing Land Use

Most of the existing land use within the unincorporated portion of the GISA is either vacant or rural homesite (see Figure 3). There are several single family residential subdivisions along and near the area of Shady Grove Church Road and NC 109. Two newer residential subdivisions are on either side of Ledford Middle School at NC 109 and West Lexington Avenue. Several churches are located along NC 109 and scattered throughout the area. The larger industrial land uses are within the City of Thomasville and in the Jacob Street area. (Jacob Street is located north of Business 85 and west of NC 109). A few commercial land uses are located in the unincorporated portion of the GISA. Most of the commercial land uses are within the City of Thomasville along NC 68 or Main Street. A gas station/convenience store is located at the southwest corner of NC 109 and Midway School Road. Just north of Business 85 and west of NC 190 is a large parcel that is shown as an institutional land use, this is the city's golf course. Another golf course is located in the northeast portion of the GISA at Dorado Drive.

Davidson Forward, Davidson County Land Development Plan, November 2001

The Davidson Forward plan was developed because of the steady growth that Davidson had seen in the past 20 years and because of the continued anticipated growth for the future. The County is hoping to "foster and maintain a favorable business climate" and to help plan for how the community will grow. TIP R-2568B is identified in the Davidson Forward Plan as part of future improvements to transportation. A Development Area Suitability Map shows areas to the west of NC 109 and south of Old Greensboro Road as having the potential for future sewer service. Development in that area could be limited as a result of flood prone areas along Rich Fork Creek. The Abbotts Creek Water Supply Watershed III will also limit development densities to the north of Old Greensboro Road. The area east of NC 109 and south of Old Greensboro Road is shown as an existing sewer service area for the City of High Point, which has sewer trunk lines along Rich Creek, Rich Fork Creek, and Kennedy Mill Creek. Extension of these lines depends on

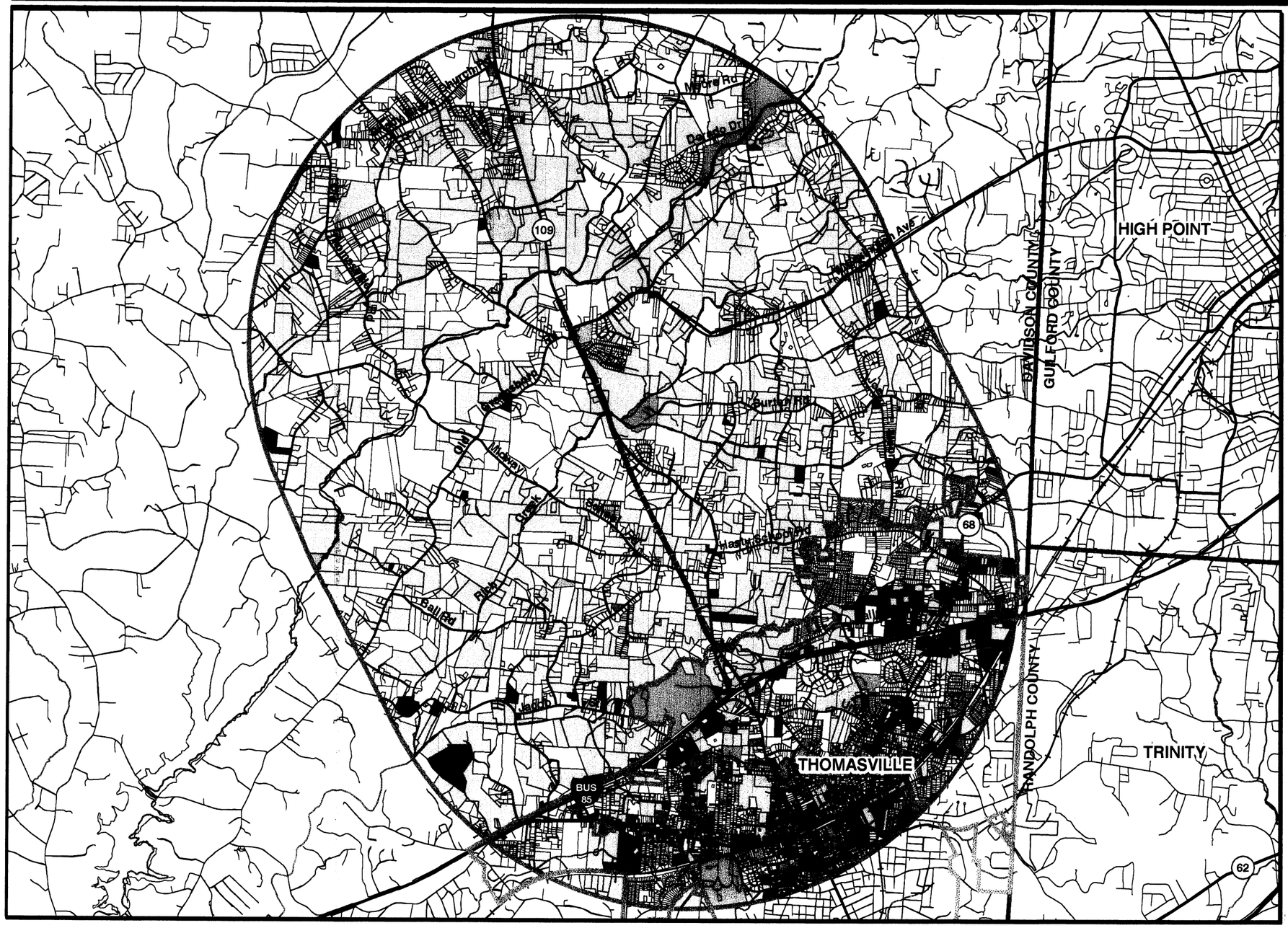


FIGURE 3 - EXISTING LAND USE

- TIP R-2568B
- RIVERS
- WATER BODIES
- COUNTY BOUNDARIES
- THOMASVILLE
- GROWTH IMPACT STUDY AREA

EXISTING LAND USE

- VACANT
- RURAL HOMESITE
- SINGLE FAMILY RESIDENTIAL
- MULTI-FAMILY
- COMMERCIAL
- OFFICE
- INDUSTRIAL
- INSTITUTIONAL
- CHURCH
- SCHOOL/DAY CARE
- ELDERLY LIVING

1 0.5 0 1 Miles

N

MAP SOURCES:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI)
US CENSUS BUREAU
DAVIDSON COUNTY
HIGH POINT
THOMASVILLE
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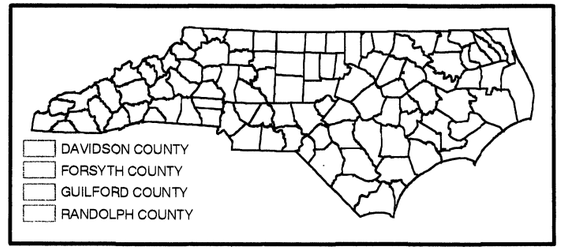

property owners signing voluntary annexation agreements with the City of High Point, and they must be located within their annexation boundary.

The plan includes a Land Development Strategy Map. It shows the area south of Old Greensboro Road and north of Thomasville as an Area of Traditional or Greenspace Development. This category is defined as allowing for a "traditional post war pattern" with 30,000-square foot suburban lots. It also provides an opportunity for greenspace preservation, where the overall development density remains at 30,000-square feet of land per dwelling unit, but the units are clustered on lots smaller than 30,000 square feet in order to preserve the remaining land as open space.

A Preferred Conservation area is shown along Rich Creek and Rich Fork Creek. The Preferred Conservation area is defined as "best left in a condition as close as possible to their natural state." Lastly, the area north of Old Greensboro Road is shown as Preferred Rural/Agricultural Areas. This category is defined as an area that does not currently have water and sewer services, nor are there plans on providing these services within the next 20 years. Therefore, it is best "suited for rural and agricultural preservation." Since the area north of Old Greensboro Road is also within Abbotts Creek Water Supply Watershed III, the minimum lot size required is 40,000 square feet, and larger lot sizes are encouraged to help protect farming and prime farmland areas.

The Davidson Forward Plan also identifies Development Centers and Corridors. There is only one center within the GISA, a Commercial Service Center surrounding the intersection of NC 68 (National Highway) and Hasty School Road. This area already has commercial services with the potential to add more.

Northeast Davidson Area Plan, December, 2002
This plan covers the area east of Joe Morris Road and Chestnut Street in Davidson County. The plan identifies most of the land within this portion of the GISA as Future Growth. This category is for those areas that are too far away from existing utilities to consider them for future utilities or annexation. Densities within the Future Growth area would be very low. A small amount of Residential Low Density is within the GISA, just east of the Future Growth area and west of the future Westside Thoroughfare.

City of Thomasville Zoning, June 2004
Zoning along NC 109 within the Thomasville jurisdiction just south of R-2568B is residential with 15,000 square foot lots, the lowest density zoning category for Thomasville (see Figure 4). Land further west of NC 109 is zoned as Industrial, both to the north and south of Business 85. Land to the east of NC 109 is mostly zoned as R-10, except for the areas along Ball Park Road, which are zoned as Industrial, and the areas along NC 68, which are zoned as Commercial.

Davidson County Zoning, June 2004
Most of the zoning within the unincorporated Davidson County portion of the GISA is designated as Rural Agriculture, with some Low Density Residential districts and small pockets of Medium to High Density Residential districts (see Figure 4). There is some

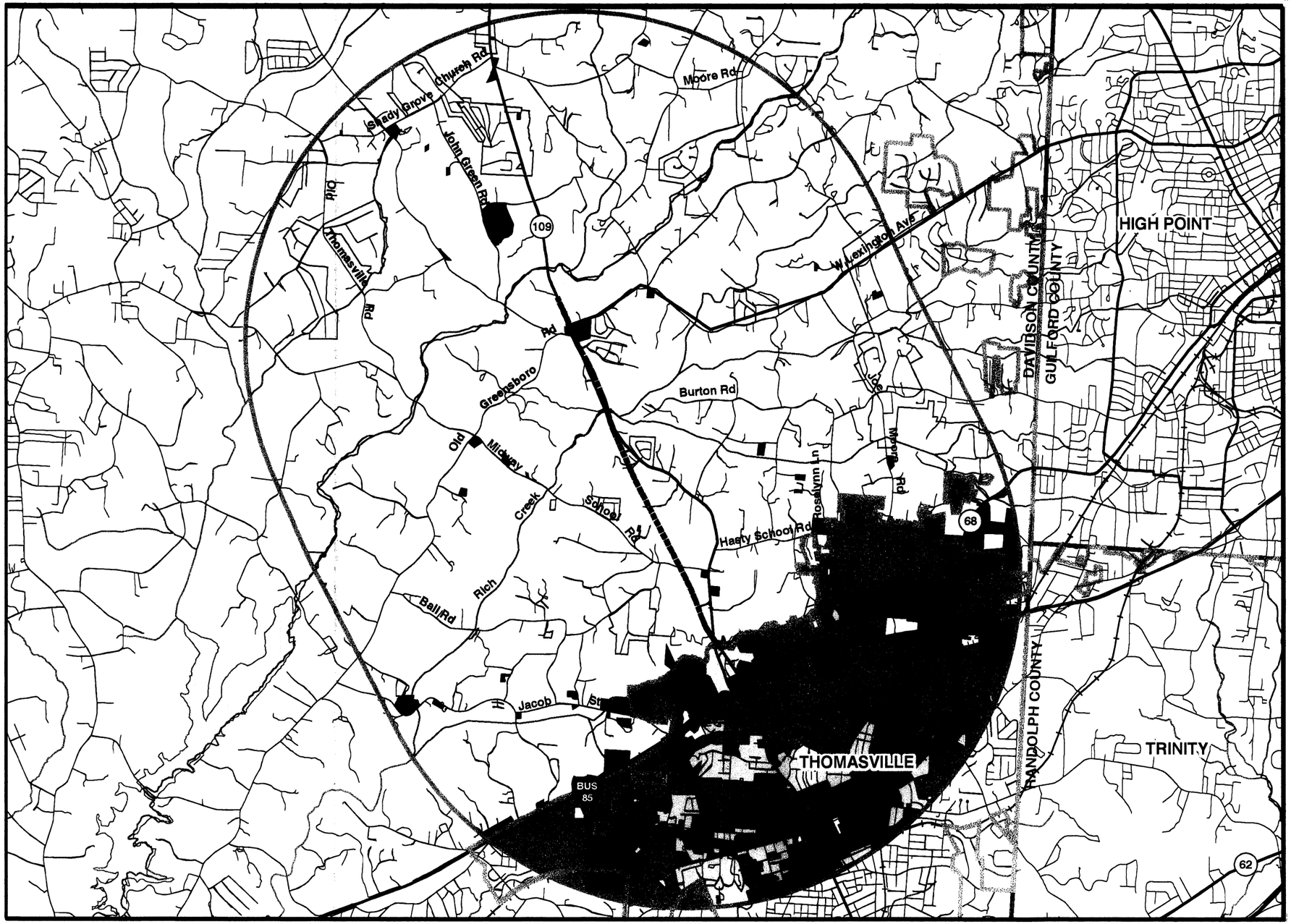

FIGURE 4 - ZONING

- TIP R-2568B
- RIVERS
- WATER BODIES
- COUNTY BOUNDARIES
- GROWTH IMPACT STUDY AREA
- MUNICIPALITIES
- RURAL AGRICULTURE
- LOW DENSITY RESIDENTIAL
- MEDIUM-HIGH DENSITY RESIDENTIAL
- R-15 (15,000 SQUARE FOOT LOTS)
- R-10 (10,000 SQUARE FOOT LOTS)
- R-8 (8,000 SQUARE FOOT LOTS)
- R-6 (6,000 SQUARE FOOT LOTS)
- COMMERCIAL
- INDUSTRIAL
- OFFICE/INSTITUTIONAL

1 0.5 0 1 Miles

MAP SOURCES:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI)
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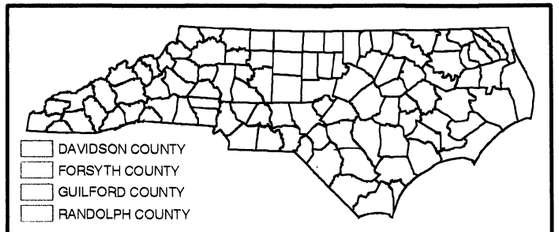

Office/Institutional zoning along John Green Road, W. Lexington Avenue and NC 109, as well as Hasty School Road and Roselynn Lane. Commercial zoning is scattered on mostly small sites throughout the GISA, with the largest cluster along NC 68 near the county border.

Environmental Regulations

State Regulations

North Carolina Division of Land Resources - Sediment and Erosion Control Act
This act requires that any person planning to disturb more than one acre of land within the State of North Carolina must submit a Sedimentation and Erosion Control Plan to the Division of Land Resources. Local governments may review and enforce the program within their jurisdiction, but the program has to be as strict as the Division of Land Resources program.

The TIP R-2568B GISA falls within the Yadkin River Basin. A search using NCDOT Statewide Planning GIS information reveals that the Abbotts Creek Water Supply (WS) III Watershed is within the GISA (see Figure 5). According to State regulations, within WS-III Watersheds, development regulations allow for a residential density of approximately two dwelling units per acre. For other residential (multi-family) and non-residential development, the built-upon area cannot exceed 50%. The 10/70 provision is permitted within this classification of water supply watershed, which allows 10% of the balance of the watershed to be developed at a 70% built-upon rate.

A small portion of Abbotts Creek WS III Watershed critical area is within the GISA, just west of R-2568B. Residential development can take place within the critical area at one unit per acre for single family dwellings (40,000 square feet excluding roadway right-of-way). For other residential (multi-family) and non-residential development, the built-upon area cannot exceed 30%.

According to the National Wetland Inventory GIS information, there are wetlands along Rich Creek, Rich Fork Creek, Kennedy Mill Creek, Hunts Fork Creek, and Abbotts Creek. Other small wetland areas are scattered throughout the GISA (see Figure 5). According to the March 1997 NCDOT Best Management Practices For Protection of Surface Waters report, BMPs include activities, practices, and procedures undertaken to prevent or reduce water pollution, such as: on-site detention areas, vegetative buffers, culverts, and erosion control.

The 303(d) list is a product of the Clean Water Act, which requires states to identify those waters that do not meet water quality standards, or those that have impaired uses. If control strategies for point and non-point source pollution exist for impaired waters, they may be excluded from the 303(d) list.

There are three 303(d) waterbodies within the GISA for TIP R-2568B. NCDOT Transportation Planning Branch GIS information shows Rich Fork as a 303d impaired

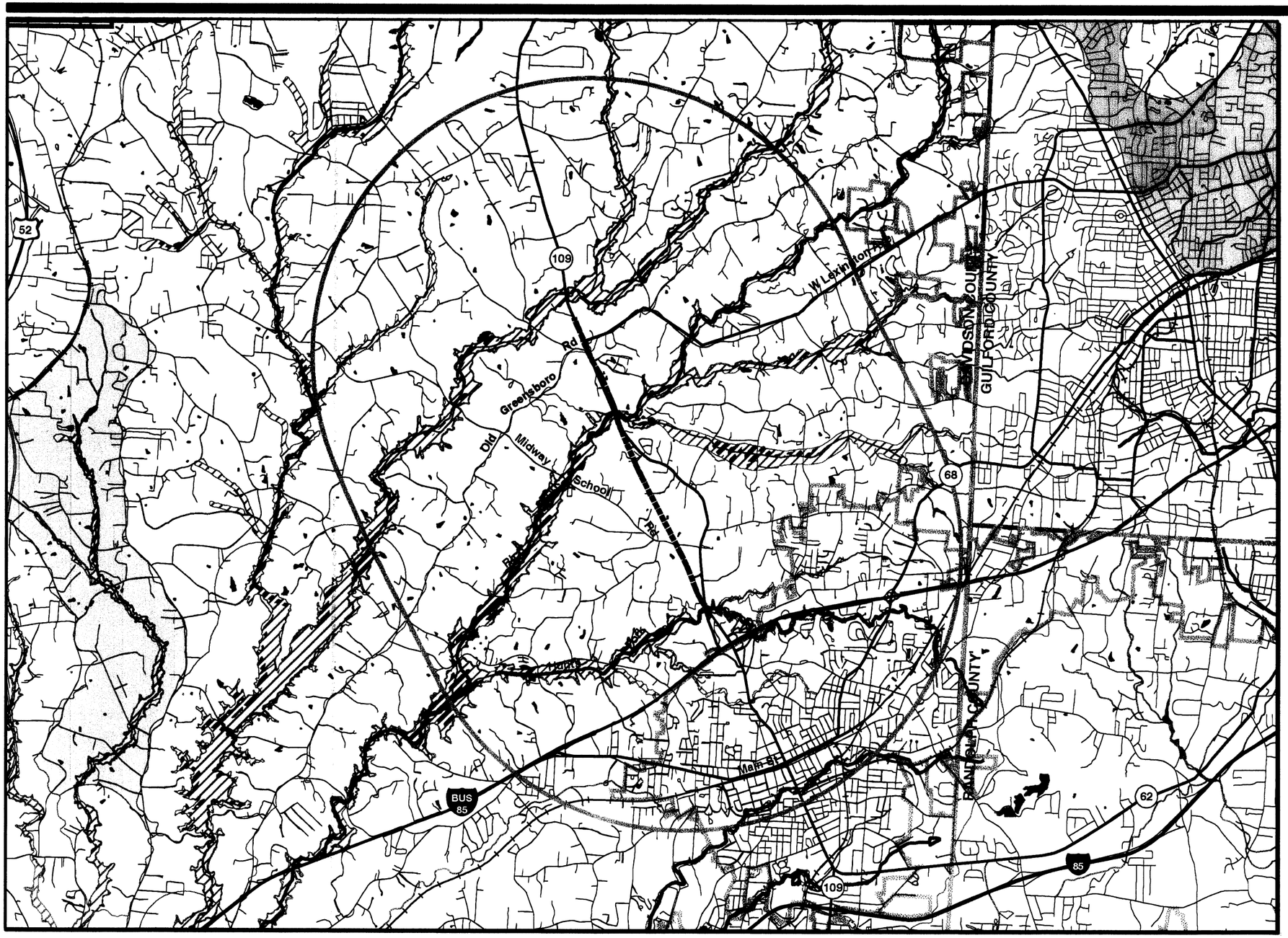

FIGURE 5 - ENVIRONMENTAL FEATURES

- TIP R-2568B
- RIVERS
- WATER BODIES
- COUNTY BOUNDARIES
- MUNICIPALITIES
- GROWTH IMPACT STUDY AREA
- 303D LIST
- 100 YEAR FLOOD ZONE
- WETLANDS

WATER SUPPLY WATERSHED IV

- DEEP RIVER (RANDLEMAN LAKE)
- EAST FORK DEEP RIVER (HIGH POINT LAKE)
- WEST FORK DEEP RIVER

WATER SUPPLY WATERSHED III

- ABBOTTS CREEK
- LEONARD CREEK
- UWHARRIE RIVER (LAKE REESE)
- CRITICAL AREA

1 0.5 0 1 Miles

MAP SOURCES:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI)
US CENSUS BUREAU
DAVIDSON COUNTY
HIGH POINT
HNTB NORTH CAROLINA, P.C.
NATIONAL WETLANDS INVENTORY

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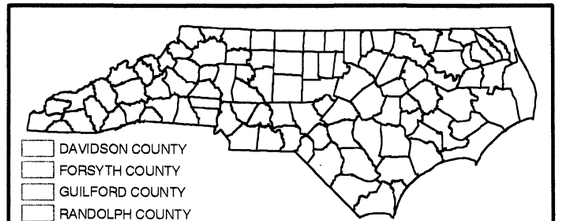


water from its source to Abbotts Creek (see Figure 5). It is considered Class C with a low priority. The cause for impairment is listed as fecal coliform, and the length of the impaired water is 20.7 miles. Hunts Fork Creek is also a 303(d) water from its source to Rich Fork Creek, and is Class C with a low priority. The cause for impairment is listed as unknown, and the length of the impaired water is 7.5 miles. Lastly, North Hamby Creek is also a 303(d) water from its source to Hamby Creek, and is considered a Class C with a low priority. The cause for impairment is unknown, and the length of the impaired water is 6.1 miles.

Local Regulations

In addition to State regulations, Davidson County only allows one dwelling unit per acre for a single family residential development with no lots less than 40,000 square feet for those areas within the WS-III Watersheds. For other residential and non-residential development the built-upon area cannot exceed 24%. Although, 10% of the balance watershed can be developed at a 70% built-upon rate when the County approves a special non-residential intensity allocation (SNIA). A small portion of Abbotts Creek Critical area is within the GISA, to the west of R-2568B. Development can take place within the critical area at one unit per acre for single family residential (40,000 square feet excluding roadway right-of-way) and for other residential and non-residential the built-upon area cannot exceed 12%.

Future development within the City of Thomasville and Davidson County which might result from the completion of the project will be governed by the provisions of the Davidson County Watershed Protection Ordinances. Mechanisms included in this ordinance are 50-foot vegetative buffer along all perennial waters, impervious surface limits, density limits, storm water management regulations, and other Best Management Practices (BMP's). Furthermore, the City of Thomasville requires that a small amount of open space be dedicated per residential subdivision

V. INVENTORY OF NOTABLE FEATURES

This section is based on review of the Geographic Information System (GIS) data provided by the Transportation Planning Branch of the NCDOT, and a database search of the TIP R-2568B GISA (see Appendix). Among other things, the inventory identifies federally-protected species and natural communities that are found within the USGS Quads that encompass the GISA.

VI. ACTIVITIES THAT CAUSE EFFECTS

Previous Conclusions

Environmental Assessment (EA), November 1996

According to the EA for R-2568 A and B, a No Build Alternative Transportation System Management Alternative, Mass Transit Alternative, and two Build Alternatives (1 & 2)

were analyzed. Alternate 1 was a widening of existing NC 109 to four-lanes with a center turn lane, while Alternative 2 was a combination of widening existing NC 109 to four-lanes with a center median and partial construction on new location. Alternative 2 had less impacts to the urban environment than Alternative 1, but Alternative 2 had more impacts to the natural environment. Alternative 2 was chosen as the Preferred Alternative because "it will provide the operational advantages of a four-lane divided roadway while its cost and impacts are very similar to Alternative 1." Specific indirect and cumulative effects were not disclosed.

According to the EA, the Schweinitz's sunflower is the only federally-protected species found in Davidson County, and the initial biological conclusion was no effect for the TIP R-2568 A & B project area. After further discussions with NCDOT Natural Systems staff, a request was submitted to change the "no effect" to "may effect, but not likely to adversely effect."

Finding of No Significant Impact (FONSI), August 1997

The FONSI for TIP R-2568 A and B stated that there would be 1.14 acres of wetland impacts and there would be no effect upon archaeological or historic architecture resources within the TIP project corridor. The removal of two underground storage tanks would also be required. The relocation of 21 residences and 1 business will occur from the project. Prime farmland should not be impacted, but 16.6 acres of farmland that is considered statewide or of local importance will be converted within the TIP project area. Direct impacts to natural resources within the TIP corridor will affect 45.1 acres of maintained habitat, 61.1 acres of dry mesic oak-hickory forest, 2.4 acres of bottomland hardwood forest, and 2.7 acres of alluvial forest. Specific indirect and cumulative effects were not disclosed.

Development Trends

According to local planners, there are no new major developments planned within the GISA. New residential growth is occurring in the western portion of Thomasville where sewer lines have recently been extended. Recent residential development also has been occurring on the northern edge of Thomasville in the area of Hasty School Road. Unilin, a large flooring manufacturer, is building a new plant outside of the GISA on land bounded by I-85 and NC 62 just west of the Randolph County border. This development could influence additional commercial as well as residential growth within the GISA.

VII. POTENTIAL INDIRECT AND CUMULATIVE EFFECTS

The North Carolina DOT, in their April 2001 handbook titled "*Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina,*" outline a set of factors that need to be evaluated to determine whether or not a more detailed indirect and cumulative impact analysis (ICI) may be necessary for specific projects. The following is an assessment of those factors as they relate to TIP R-2568B.

Conflict with local plan:
TIP R-2568B is consistent with the HPMPO's High Point Urbanized Area Thoroughfare Plan, the Northeast Davidson Area Plan, and the Davidson Forward Plan, all of which indicate the project as being needed.

Explicit economic development purpose:
There is no explicit economic development purpose associated with TIP R-2568B. According to local planners, the project serves more of a safety purpose. The project will improve the geometrics, alignment, and blind intersections to reduce the number of accidents along NC 109.

Planned to serve specific development:
As stated above, the purpose for TIP R-2568B is to improve safety and increase capacity The project is not planned to serve a specific development.

Likely to stimulate land development having complementary functions:
The assessment of this factor involves the evaluation of a subset of factors related to location and infrastructure. This subset includes:

- Distance to a major urban center
- Traffic volumes on intersecting roadways
- Presence of frontage roads
- Availability of water/sewer

This project is located near several major urban centers, including the City of Winston-Salem, which is located about 18 miles to the northwest, the City of High Point, which is approximately six miles to the east, the City of Greensboro, which is 20 miles to the east, and the City of Thomasville, which borders the southern terminus of the project. NCDOT Transportation Planning Branch indicates that 2020 traffic volumes on Midway School Road are projected to be 11,000 Average Daily Trips (ADT), while Hasty School Road will be 6,500 ADT, Burton Road will be 1,300 ADT, and Old Greensboro Road will be 7,600 ADT.

There are no plans to include frontage roads as part of TIP R-2568B.

Water and sewer services are provided within the southern portion of the GISA, predominantly within Thomasville or just outside of its city limits (see Figure 6). A voluntary annexation agreement is required for those parcels to receive sewer service outside of the city boundaries. Sewer is also available from High Point, which has existing sewer trunk lines along Rich Creek, Rich Fork Creek, and Kennedy Mill Creek all starting from the Westside Sewer Treatment Plant on Kennedy Mill Creek. The city is willing to extend services to the edge of its annexation boundary and a voluntary annexation agreement is also required for connection.

Based on this assessment, even though there are several major urban centers nearby, water and sewer service is only available in the already developed areas of Thomasville,

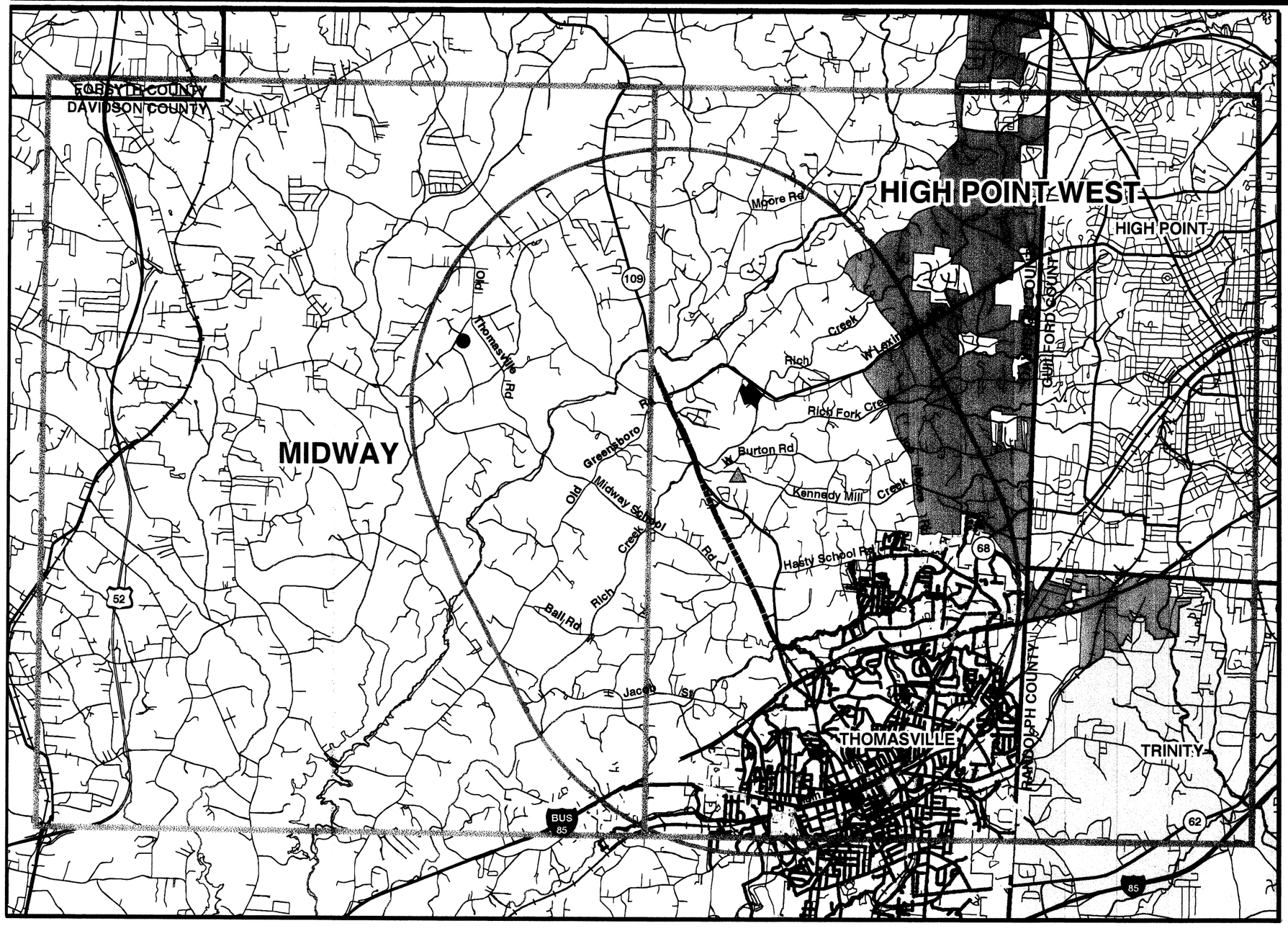


FIGURE 6 - NOTABLE FEATURES

- TIP R-2568B
- HIGHWAYS
- ROADS
- RAILROADS
- RIVERS
- WATER BODIES
- COUNTY BOUNDARIES
- GROWTH IMPACT STUDY AREA
- USGS QUADS
- NATIONAL REGISTER STRUCTURES
- NATIONAL REGISTER DISTRICT
- HIGH POINT ANNEXATION BOUNDARY
- WESTSIDE SEWER TREATMENT PLANT

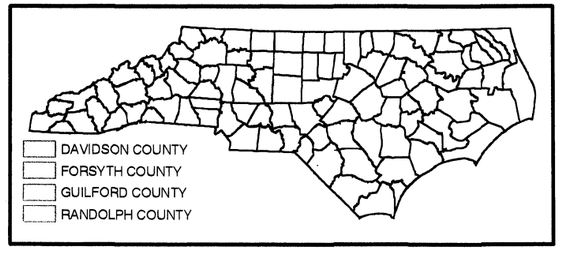
THOMASVILLE UTILITIES

- SEWER LINES
- WATER LINES

1 0.5 0 1 Miles

N

MAP SOURCES:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI)
US CENSUS BUREAU
DAVIDSON COUNTY
HIGH POINT
THOMASVILLE
HNTB NORTH CAROLINA, P.C.



and there are low traffic volumes on intersecting roadways. Thus, TIP R-2568B has a low potential to stimulate complementary land development.

Likely to influence intraregional land development location decisions:
Typically, if the conditions are favorable for development and/or a region is currently undergoing urbanization, an improvement in the transportation infrastructure is likely to influence where development will occur. In this case, land to the south of TIP R-2568B within Thomasville is already developed, but in the immediate vicinity of the project and to the north, land is less developed. Thomasville and Davidson County planners indicated that they do not believe TIP R-2568B will influence growth for the area. They see the project more as a safety improvement and believe that where sewer is extended will be much more influential upon new growth.

Notable feature present in Growth Impact Study Area:
There are five state or federally protected species present in the two USGS quadrants (Midway and High Point West) that encompass the GISA and there is one species that is mentioned within the EA (see Figure 6). There are no superfund sites. There are six National Register structures, and two National Register districts within the GISA including Brummel's Inn, a former stage coach stop. Also, there are three 303(d) streams, which include Rich Creek, Hunts Fork Creek, and North Hamby Creek. A small portion of Abbotts Creek WS III Watershed critical area is within the GISA

Notable feature impacted:
Since minimal induced development growth is anticipated from R-2568B, and the exact location of federally protected species within the GISA is unknown, it is difficult to assess impacts to federally protected species at this time. The National Register structures and districts are not anticipated to be affected because they are not within anticipated growth areas. It is unlikely that the 303(d) streams or the critical area of Abbotts Creek WS III Watershed will be impacted from the small amount of indirect growth that may occur from TIP R-2568B.

VIII. ANALYSIS OF INDIRECT AND CUMULATIVE EFFECTS

To further determine what the potential extent of indirect and cumulative effects will be as a result of TIP R-2568B, an analysis of a set of environmental and economic conditions was completed. This analysis attempts to somewhat quantify the potential for land use change over the 20-year timeframe. A strong rating indicates a high likelihood of land use change related to transportation investments. Table 6 indicates the results of this rating analysis.

Table 6. Potential for Land Use Change, 2000-2020

Rating	Change in Accessibility	Change in Property Values	Forecasted Growth	Land Supply vs. Land Demand	Water/Sewer Availability	Market For Development	Public Policy
Strong	Travel Time Savings > 10 min.	> 50% Increase	> 3% Annual Pop. Growth	< 10-Year Supply of Land	Current Services Exist	Extremely High Potential	Less Stringent; No Growth Management
^							X
"							
"	X	X	X		X	X	
"				X			
Weak	Travel Time Savings < 2 min.	No Change	< 1% Annual Pop. Growth	> 20-Year Supply of Land	No Plans For Future Service	Extremely Low Potential	More Stringent; Growth Management

Amount of Potential Land Use Change

Travel time savings as a result of TIP R-2568B is anticipated to be low, much closer to two minutes than five minutes for the duration of the project length. Any existing or future development on the parcels fronting the new location portion of the project should experience the largest improvement in accessibility, since previously they would have not had direct access to a major thoroughfare. Property values may increase for parcels fronting the new alignment; otherwise, little change is anticipated. The projected annual growth rate for Davidson County from 2000 to 2010 is 1.3%, which is considered weak. The Demographic Area and GISA should continue to experience low growth rates whether R-2568B is built or not. Since growth has been relatively slow over the last decade, developable land is abundant.

Water and sewer service is available within the southern portion of the GISA, mostly within the City of Thomasville. Water and sewer will most likely be extended to those areas closest to Thomasville as development occurs and they are annexed. High Point could also potentially extend their water and sewer lines to the western portion of their annexation boundary (see Figure 6).

Local planners and population/employment growth trends indicate that the market for development is relatively low within the GISA. Local government zoning and land use plans support growth, but do limit development densities in certain areas, particularly within the water supply watershed. Furthermore, as mentioned before, the City of Thomasville requires that a small amount of open space be dedicated per residential subdivision.

Location of Potential Land Use Change

The majority of the land within the GISA north of Midway School Road (SR 1800) is agriculture, open fields, forests, or residential in nature, while south of Midway School Road in Thomasville land is a mixture of industrial, commercial, office, and residential uses. Because of the large amount of agriculture, open fields, and forests, a majority of the land north of the City of Thomasville is available for future development, (see Figure 3). There are some larger residential subdivisions that are along Shady Grove Church Road, a few along NC 109, and a few others scattered throughout the GISA. But mainly there are scattered houses along the main roadways.

Midway School Road, Looking East Where The New NC 109 Will Cross

The greatest potential for induced commercial growth is at the new intersection of NC 109 and Midway School Road. This location is the only major new intersection created by the portion of NC 109 that is on new alignment, and developable land will be available at this intersection. Midway School Road is also a main route to the west, and will connect to existing NC 109 to the east as well. Both sides of Midway School Road, just west of existing NC 109 are designated as potential Sewer Service Area.

Development throughout the area is restricted by very hilly terrain with steep slopes and poor soils for septic tanks. Therefore, potential for induced residential growth is minimal, with most development still dependent upon sewer service. Areas along the periphery of Thomasville where sewer can be extended are the most likely candidates for any type of residential development resulting from the new project.

Example of Rural Housing North of Midway School Road

IX. EVALUATION OF ANALYSIS RESULTS

Consideration of Indirect Effects

Change in accessibility and mobility as a result of TIP R-2568B will be minimal, except for those parcels that gain new road frontage. Population growth within Davidson County should continue at rates just above 1% annually, therefore keeping demand for developable land in the area low. A generally weak market for development within the GISA limits the potential for land use change as a result of TIP R-2568B.

The most likely area for commercial or residential growth as a result of TIP R-2568B is at the new intersection of NC 109 and Midway School Road. Any growth surrounding this intersection is unlikely to have indirect effects on water quality and/or National Register structures or districts within the GISA. Since little induced growth is anticipated

from R-2568B, it is also unlikely that the federally protected species and 303(d) streams will be impacted. In addition, the aforementioned state and local environmental regulations would mitigate any potential effects incurred.

TIP R-2568B may induce some residential development on land that is provided new road access along the project corridor, particularly within the northern portion of the GISA closer to Winston-Salem. Future commercial growth is more likely to develop in the southern portion of the GISA closer to Thomasville and the Business 85 and I-85 corridors.

Consideration of Cumulative Effects

TIP R-2568's proximity to two major urban centers (High Point and Winston-Salem) solidifies its potential as a future residential/commercial development corridor, particularly when considered with the fact that expansion of public sewer service within portions of the GISA is possible. TIP R-2568B, when combined with all of the other transportation projects within or partially within the GISA, may improve access to the regional interstate network (I-85, I-40, future I-73/74 corridor), creating opportunities for industrial/distribution-related development.

The cumulative impact of TIP R-2568B increases when considered along with TIP R-2568 C-G and TIP U-2537 (Westside Thoroughfare). By improving regional accessibility throughout the eastern portion of Davidson County and the western portion of High Point and serving commuters with destinations of employment centers in Winston-Salem, an increase in residential development may result in northern Davidson County.

Factors used to evaluate indirect and cumulative impacts indicate that the potential for land use change resulting from Tip R-2568B alone is relatively weak. Therefore, it is unlikely that TIP R-2568B will cause substantial indirect impacts to water quality. Some development is already occurring within the GISA, and this project is unlikely to induce new development without other contributing factors, such as public utility extensions or connecting roadway improvements.

APPENDIX
Notable Features Tables
Davidson County / R-2568B

State and Federally-Protected Species

Common Name	Scientific Name	Federal Status	State Status	USGS Quad Map
Plant:				
Dissected Toothwort	*Cardamine dissecta*	-	SR-P	Midway
Heller's Rabbit Tobacco	*Gnaphalium helleri var helleri*	-	SR-P	Midway
Carolina Birdfoot-trefoil	*Lotus helleri*	FSC	SR-T	Midway
Schweinitz's sunflower*	*Helianthus schweinitzii*	E	N/A	N/A
Reptile:				
Bog Turtle	*Glyptemys muhlenbergii*	T (S/A)	T	Midway
Crustacean				
Greensboro Burrowing Crayfish	*Cambarus catagius*	-	SC	High Point West

Source: North Carolina National Heritage Program, Midway and High Point West USGS topographic quadrangles (June 2004) http://ils.unc.edu/parkingproject/nhp
*North Carolina Department of Transportation, Planning and Environmental Branch, Environmental Assessment, Davidson County, North Carolina, TIP No. R-2568A and B, November, 1996.

Natural Communities

Name	USGS Quad Map
Basic Mesic Forest (Piedmont Subtype)	Midway
Piedmont/Low Mountain Alluvial Forest	Midway

Source: North Carolina National Heritage Program, Midway and High Point West USGS topographic quadrangles (June 2004) http://ils.unc.edu/parkingproject/nhp

Architectural Features and Historic Sites in Growth Impact Study Area

Name	Address	Status
Bethany Reformed & Lutheran Church Cemetery	Old Thomasville Road & Bethany Church Road	National Register Structure
Brummel's Inn	West Lexington Avenue, east of NC 109	National Register District
Church Street School	Jasper Street, west of Church Street	National Register Structure
Mitchell House	411 Biggs Avenue, Thomasville	National Register
Smith Clinic	17 Randolph Street, Thomasville	National Register Structure
Adam Spach Rock House Site (Archaeology)	Friedberg Vicinty (near Winston-Salem)	National Register
Thomasville Railroad Passenger Depot	West Main Street, Thomasville	National Register Structure
Thomasville Historic District		

Source: NCDOT – Transportation Planning Branch (Last updated June 2003).
North Carolina State Office of Historic Preservation (May 2003), http://www.hpo.dcr.state.nc.us/

Solid Waste Facilities
Davidson County in Growth Impact Study Area

Permit	Name	Type	Location	Contact
29A	Hill & Sons Demo Site	LCID	Midway Township	Phillip Hill Route 11 Box 297 B Winston-Salem, NC 27107

Source: North Carolina Department of Environmental and Natural Resources, Davidson County (Last updated October 2003), http://wastenot.enr.state.nc.us/DATARPTS2003_3ColA.HTM.

Streams and Water Quality in Growth Impact Study Area

Stream	Affected Portion	Water Classification	Cause of Impairment	Priority
Rich Fork	From its source to Abbotts Creek	C	Fecal coliform	Low
Hunts Fork	From its source to Rich Ford	C	Unknown	Low
North Hamby Creek	From its source to Hamby Creek	C	Unknown	Low

Source: North Carolina Department of Transportation – Transportation Planning Branch (August 2001)

Potential Hazardous Material Sites
Underground Storage Tank (UST) Locations
Davidson County

UST Name	Location
Big R North	1269 N. NC Highway 109, Thomasville, NC
Big R Pilot - B	4279 Old Highway 29, Thomasville, NC
Coastal Mart #441	1032 Randolph Street, Thomasville, NC
Country Food Mart	610 Jacob Street, Thomasville, NC
Etna #491	705 National Hwy., Thomasville, NC
Henderson Property, Tyrone	622 Nance Drive, Thomasville, NC
Hicks Grocery And Service	10693 E. Highway 64, Thomasville, NC
Leonard Block Company	2390 Midway School
Thomasville - Public Works Building	512 Doak Street, Thomasville, NC
Wilson Property, Robert	622 Nance Drive, Thomasville, NC

Source: North Carolina Department of Environmental and Natural Resources, October 2003, http://www.enr.state.nc.us/

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