




STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

August 10, 2005

MEMORANDUM TO: Mr. M. L. Holder, P.E.
Division 12 Engineer

FROM: Philip S. Harris, III, P.E. 
Natural Environment Unit Head
Project Development and
Environmental Analysis Branch

SUBJECT: Catawba County, Newton-Conover Bypass from NC 16 to SR
1739 (Emmanuel Church Rd.); State Project No. 8.1792401;
Federal Aid Project No. MA-STP-16(2); TIP U-2404A

Attached is the modification to the DWQ Water Quality Certification for the above referenced project. All environmental permits have been received for the construction of this project.

PSH/gyb

Attachment

cc: Mr. Art McMillan, P.E.
Mr. Omar Sultan
Mr. Jay Bennett, P.E.
Mr. David Chang, P.E.
Mr. Randy Garris, P.E.
Mr. Greg Perfetti, P.E.
Mr. Mark Staley
Mr. John F. Sullivan, III, FHWA
Ms. Trish Simon, Division 12 DEO

PROJECT COMMITMENTS

Newton-Conover Bypass, Catawba County
From NC 16 to SR 1739 (Emmanuel Church Rd.)
Federal Aid Project No. MA-STP-16(2)
State Project No. 8.1792401
TIP No. U-2404A

In addition to the standard Individual Permit Conditions, Section 404 Only Conditions, Regional Conditions, State Consistency Conditions, General Certification Conditions, the Section 401 Conditions of Certification and Best Management Practices for Protection of Surface Waters, the following Environmental Commitments were developed through Project Development and Design and have been agreed to by NCDOT:

Commitments Developed through Project Development and Design

Design Services Unit/Division 12

Coordination with the cities of Newton and Conover will be maintained during design and construction to locate and minimize impacts to water and sewer lines.

Action taken: The Design Services Unit has coordinated and will continue to coordinate with the cities of Newton and Conover through the design stage of this project. The Division 12 office will coordinate with the cities of Newton and Conover through the construction stage of this project.

Coordination with the Norfolk-Southern Railroad will be maintained during design and construction of the new railroad bridge and realignment of the tracks.

Action taken: The Design Services Unit has coordinated and will continue to coordinate with the Norfolk-Southern Railroad through the design stage of this project. The Division 12 office will continue coordination with the Norfolk-Southern Railroad through the construction stage of this project.

Design Services Unit - Utilities Section/Right of Way - Utilities Section

Coordination with utility companies will be initiated prior to construction to ensure maintenance of services to the area during and following construction of the preferred alternative.

Action taken: Coordination with utility companies has been initiated and utility services will be maintained during and following construction.

Division 12

The NCDOT or its contractors will not excavate, fill, or perform land clearing activities within

Waters of the United States or any areas under the jurisdiction of the US Army Corps of Engineers (USACE), except as authorized by the USACE. To ensure that all borrow and waste activities occur on high ground, except as authorized by the permit, the NCDOT shall require its contractor to identify areas to be used for borrow material or for disposal of dredged or waste material. Documentation of the location and characteristics of all borrow and disposal sites associated with the project will be available to the USACE on request.

Project Development and Environmental Analysis

The intensive cultural resource assessment completed for the preferred alternative (March 1997) identified the potential for unmarked infant burials during the 1890s at Site 31CT199**. Prior to construction, NCDOT will assess the site for the presence of unmarked burials. If such remains are found, they will be relocated according to State guidelines.

Action taken: This commitment is associated with Section B of this project.

Division 12/Roadside Environmental Unit

The construction contract for this project will include the requirement that sediment and erosion control measures be placed outside wetlands unless necessary to adequately control sediment.

Hydraulics Unit

The proposed roadway will encroach into the floodway of the 100-year floodplain at McLin Creek, West Fork of McLin Creek, and Conover Creek. It is anticipated that these encroachments will require floodway modifications. The floodway modifications, if required, will be coordinated with the local community having land use jurisdictional authority and the Federal Emergency Management Agency (FEMA) during the final design phase of this project.

Action taken: The Hydraulics Unit has coordinated with the Cities of Newton and Conover and FEMA concerning floodway modifications and the modifications have been approved.

Geotechnical Unit-GeoEnvironmental Section, Right of Way

When right-of-way limits are established, an assessment will be performed of each hazardous materials site and underground storage tank site within the right-of-way to the degree necessary to determine the levels of contamination. If necessary, options to remediate the site will be evaluated, along with the associated acquisition costs. Resolution of problems associated with contamination will be coordinated with appropriate agencies and, prior to right-of-way acquisition, appropriate actions will be taken where applicable.

Action taken: Coordination to complete this commitment will continue as necessary.

Commitments Developed Through Permitting

Division 12

The permittee shall schedule a preconstruction meeting between their representatives, the contractor and a representative of the USACE, Asheville Regulatory Field Office prior to any work in jurisdictional waters and wetlands to ensure that there is a mutual understanding of all terms and conditions contained in this USACE permit. The permittee shall notify the USACE a minimum of thirty (30) days in advance of the meeting.

The permittee and his contractors and/or agents shall not excavate, fill or perform mechanized land clearing at any time in the construction or maintenance of this project within waters and/or wetlands except as authorized by this permit or any modification to this permit. There shall be no excavation from, waste disposal into, or degradation of jurisdictional waters or wetlands associated with this permit without the necessary modification of this permit to include appropriate compensatory mitigation. This prohibition applies to all borrow and fill activities associated with this project.

To ensure that all borrow and waste activities occur on uplands and do not result in the degradation of adjacent waters and wetlands, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material or to dispose of dredged, fill or waste material. The permittee shall ensure that all such areas comply with Special Condition No.4 of this permit and shall require and maintain documentation of the location and characteristics of all borrow and disposal sites associated with this project. This documentation will include data regarding soils, vegetation and hydrology sufficient to clearly demonstrate compliance with Special Condition No. 4 above. All information will be available to the USACE upon request. The permittee shall require its contractors to complete and execute reclamation plans for each waste and borrow site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the USACE within 10 days of the completion of the reclamation work.

The permittee shall require his/her contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project and shall provide each of his/her contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit.

The permittee will ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Any deviations in the construction design plans will be brought to the attention of the USACE, Asheville Regulatory Field Office prior to any active construction in waters or wetlands.

During the clearing phase of the project, heavy equipment must not be operated in surface waters or stream channels. Temporary stream crossings will be used to access the opposite sides of stream channels. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

All temporary diversion channels and stream crossings will be constructed of non-erodible materials. Any such structures located outside of the authorized construction limits of the project will be reported in writing to the USACE, Asheville Regulatory Field Office, together with a location map and restoration plan for any necessary permit modification.

All mechanized equipment operating near surface waters shall be regularly inspected to prevent contamination of streams from leakage of fuels, lubricants, hydraulic fluids or other toxic materials. No equipment staging or storage of construction material will occur in wetlands. Hydro-seeding equipment will not be discharged or washed out into any surface waters or wetlands.

The permittee will report any violations of the above conditions and any violation of Section 404 of the Clean Water Act from unauthorized work in writing to the Wilmington District, USACE within 24 hours of the violation.

NCDOT and its contractors and/or agents shall not excavate, fill, or perform mechanized land clearing at any time in the construction or maintenance of this project within waters and/or wetlands, except as authorized by this certification, or any modification to this certification. There shall be no excavation from or waste disposal into jurisdictional wetlands or waters associated with this certification without appropriate modification. If this occurs, compensatory mitigation will be required since it is a direct impact from road construction activities.

Excavation of stream crossings should be conducted in the dry unless demonstrated by the applicant or its authorized agent to be unfeasible. Sandbags, cofferdams, flexible pipe, or other diversion structures should be used to minimize excavation in flowing water.

Live or fresh concrete shall not come into contact with waters of the US until the concrete has hardened.

Discharging of hydro-seeding mixtures and washing out hydro-seeders and other equipment in or adjacent to surface waters is strictly prohibited.

Heavy equipment should be operated from the bank rather than in the stream channel unless demonstrated by the applicant or its authorized agent to be unfeasible. All mechanized equipment operated near surface waters should be inspected and maintained regularly to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids or other toxic substances.

Two copies of the final drawings shall be furnished to NCDWQ prior to the pre-construction meeting. Written verification shall be provided that the final construction drawings comply with the attached permit drawings contained in the application dated May 17, 2002.

NCDOT and its authorized agents shall conduct its activities in a manner consistent with state water quality standards (including any requirements resulting from compliance with Section 303(d) of the Clean Water Act) and any other appropriate requirements of state law and federal law. If DWQ determines that such standards or laws are not being met (including the failure to

sustain a designated or achieved use) or that state or federal law is being violated, or that further conditions are necessary to assure compliance, DWQ may reevaluate and modify this certification to include conditions appropriate to assure compliance with such standards and requirements in accordance with 15A NCAC 2H.0507(d). Before modifying the certification, DWQ shall notify NCDOT and the USACE, provide public notice in accordance with 15A NCAC 2H.0503 and provide opportunity for public hearing in accordance with 15A NCAC 2H.0504. Any new or revised conditions shall be provided to NCDOT in writing, shall be provided to the USACE for reference in any permit issued pursuant to Section 404 of the Clean Water Act, and shall also become conditions of the 404 Permit for the project.

Division 10/Roadside Environmental Unit

Adequate sedimentation and erosion control measures must be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures must be inspected and maintained regularly, especially following rainfall events.

Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation, operation, and maintenance of such Best Management Practices in order to protect surface water quality standards.

The erosion and sediment control measures for the this project must equal or exceed the proper design, installation, operation and maintenance outlined in the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*. These devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the projects included under this certification.

For borrow pit sites, the erosion and sediment control measures must equal or exceed the proper design, installation, operation and maintenance outlined in the most recent version of the *North Carolina Surface Mining Manual*. The reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

Sediment and erosion control measures shall not be placed in wetlands or waters to the maximum extent practicable. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, the devices shall be removed and the natural grade restored within 30 days after the division or Land Resources has released the project.

Riparian vegetation, using native trees and shrubs, must be re-established within the construction limits of the project by the end of the growing season following completion of construction to re-establish the riparian zone and to provide long-term erosion control.

Division 10/Hydraulics Unit

All authorized culverts will be installed to allow the passage of low stream flows and the continued movement of fish and other aquatic life as well as to prevent headcutting of the streambed. For all box culverts and for pipes greater than 48 inches in diameter, the bottom of

the pipe will be buried at least one foot below the bed of the stream. For culverts 48 inches in diameter or smaller, the bottom of the pipe must be buried below the bed of the stream to a depth equal to or greater than 20 percent of the diameter of the culvert. Double-cell box culverts will be designed and installed such that low flows are diverted through a single cell.

Stormwater shall not be routed to flow directly into streams. Stormwater shall be transported by vegetated conveyance or other means that are appropriate to the site conditions before being discharged into the streams. Existing wooded stream buffers shall not be mowed in order to allow them to provide diffuse stormwater flow and/or streambank stabilization.

The natural dimension, pattern and profile of the stream above and below the crossing should not be modified by widening the stream channel or changing the depth of the stream.

Division 10/Hydraulics Unit/Roadside Environmental Unit

In order to allow for the continued movement of bed load and aquatic organisms, existing stream channel widths and depths will be maintained at the inlet and outlet ends of culverts. Rip-rap armoring of streams at culvert inlets and outlets shall be minimized above the ordinary high water elevation in favor of bioengineering techniques such as bank sloping, erosion control matting and revegetation with deep-rooted, woody plants.

The removal of vegetation in riparian areas should be minimized. NCDOT is encouraged to use existing on-site vegetation and materials for stream bank stabilization and to minimize the use of rip-rap. Rip-rap shall not be placed in the stream bottom.

Placement of culverts and other structures in waters, streams, and wetlands shall be placed below the elevation of the streambed to allow low flow passage of water and aquatic life unless it can be shown to DWQ that providing passage would be impractical. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and downstream of the above structures. The applicant is required to provide evidence that equilibrium shall be maintained if requested in writing by DWQ.

Project Development and Environmental Analysis

Compensatory mitigation for unavoidable impacts to .22 acres of wetland and 2,128 linear feet of stream channel shall be provided by the Ecosystem Enhancement Program (EEP) as outlined in the October 6, 2003 letter from William D. Gilmore, EEP Transition Manager. The EEP will provide 2.2 acres of preservation of riverine wetlands and 21,280 linear feet of preservation of warm water stream channel in the Central Piedmont Eco-Region at the Harris Mitigation Site in Franklin County, the Eno River/Poplar Ridge Mitigation Site in Orange County, and the Haw River/Phillips Mitigation Site in Guilford County. These have been acquired and protected by the EEP. Pursuant to the EEP Memorandum of Agreement (MOA) between the State of North Carolina and the USACE signed on July 22, 2003, the EEP will provide a minimum of .22 acres of restoration of riverine wetlands and 2,128 linear feet of restoration of warm water stream channel in the Catawba River Basin (Hydrologic Cataloging Unit 03050102) by July 22, 2005

and half of the proposed preservation mitigation would be available at that time for mitigation for other project impacts. Construction within wetlands on the permitted highway project shall begin only after the EEP has provided written confirmation to the District Engineer that EEP and not NCDOT is responsible for providing the required mitigation, pursuant to Paragraph VI.B.7 of the MOA. NCDOT shall, within 30 days of the issue date of this permit, certify that sufficient funds have been provided to EEP to complete the required mitigation, pursuant to Paragraph V. of the MOA.

Commitments Developed through Permit Modification

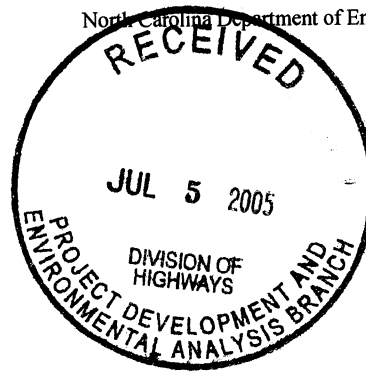
Division 12 Construction/Hydraulics Unit

All authorized culverts will be installed to allow the passage of low stream flows and the continued movement of fish and other aquatic life as to prevent headcutting of the streambed. For all box culverts and for pipes greater than 48 inches in diameter, the bottom of the pipe will be buried at least one foot below the bed of the stream. For culverts 48 inches in diameter or smaller, the bottom of the pipe must be buried below the bed of the stream to a depth equal to or greater than 20 percent of the diameter of the culvert. The double cell box culvert at Permit Site 9 will be designed and installed such that low flows are diverted through a single cell. Low flows through the double box culvert at Permit Site 8 will remain through both cells.

The rock cross vane weirs and rock cross vane step/pool structures shall be constructed as depicted in the application and shall be installed in such a manner that the original stream profiles are not altered (i.e., the depth of the channel must not be reduced by a widening of the streambed). Existing stream dimensions (including pattern and profile) are to be maintained above and below the location of the rock cross vane weirs and the rock cross vane step/pool structures. The structures shall be designed and installed to allow for wildlife movement as well as prevent headcutting of the stream.



Michael F. Easley, Governor
 William G. Ross Jr., Secretary
 North Carolina Department of Environment and Natural Resources
 Alan W. Klimek, P.E. Director
 Division of Water Quality



June 29, 2005

Dr. Gregory J. Thorpe, PhD, Manager
 Project Development and Environmental Analysis Branch
 North Carolina Department of Transportation
 1548 Mail Service Center
 Raleigh, NC 27699-1548

RE: Certification Pursuant to Section 401 of the Federal Clean Water Act, Modification to Newton/Conover Loop, TIP No. U-2404A, Federal Aid Project No. MA-STP-16(2), State Project No. 8.1792401, WQC Project No. 03-1048, Catawba County

Dear Dr. Thorpe:

Attached is a **second** modification to Certification No. 03-1048 originally issued to the North Carolina Department of Transportation (NCDOT) on October 8, 2003. The attached modification authorizes the construction of rock cross vane weirs and rock cross vane step/pool structures at Permit Sites 1, 3 and 5 as described in your permit modification application received by the Division of Water Quality (DWQ) on June 6, 2005. This modification is applicable only to the additional proposed activities. All of the authorized activities and conditions of certification associated with the original Water Quality Certification dated October 8, 2003, **and** the first modification issued March 10, 2004, still apply except where superceded by this certification.

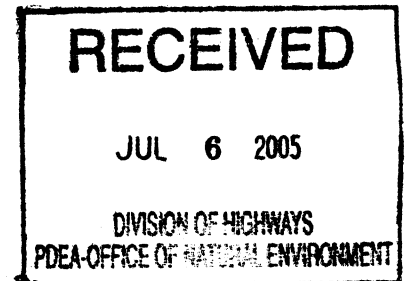
This letter completes the review of the Division of Water Quality under Section 401 of the Clean Water Act. If you have any questions, **please telephone Polly Lespinasse in the Mooresville Regional Office at 704-663-1699.**

Sincerely,

for Alan W. Klimek, P.E.

Attachments

cc: Steve Lund, USACE Asheville Field Office
 Rob Ridings, DWQ Wetlands Unit
 Bill Gilmore, NC Ecosystem Enhancement Program
 Central Files
 File Copy



NORTH CAROLINA 401 WATER QUALITY CERTIFICATION

This Certification is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 2H, Section .0500. The attached modification authorizes the construction of rock cross vane weirs at Permit Sites 1 and 3 and the construction of rock cross vane step/pool structures at Permit Site 5. This modification is applicable only to the additional proposed activities. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated October 8, 2003, and the first modification dated March 10, 2004, still apply except where superceded by this certification.

Should your project change, you are required to notify the DWQ and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H.0506(h)(6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) those required by Sediment and Erosion Control, Non-Discharge and Water Supply Watershed regulations. This Certification shall expire three (3) years from the date of the cover letter from DWQ or on the same day as the expiration date of the corresponding US Army Corps of Engineers (USACE) Permit, whichever is sooner.

Conditions of Certification:

1. The rock cross vane weirs and rock cross vane step/pool structures shall be constructed as depicted in the application and shall be installed in such a manner that the original stream profiles are not altered (i.e., the depth of the channel must not be reduced by a widening of the streambed). Existing stream dimensions (including pattern and profile) are to be maintained above and below the location of the rock cross vane weirs and the rock cross vane step/pool structures. The structures shall be designed and installed to allow for wildlife movement as well as prevent headcutting of the stream. The applicant may be required to provide evidence that the equilibrium has been maintained, if requested in writing by the DWQ.
2. Erosion and sediment control practices must utilize Best Management Practices (BMP) and be in full compliance with all specifications governing the proper design, installation, and operation and maintenance of such BMP in order to protect surface water standards:
 - a. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow pit sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
 - b. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
 - c. The reclamation measures and implementation of these measures must be in accordance with the requirements of the Sedimentation Pollution Control Act.
3. Sediment and erosion control measures shall not be placed in wetlands or waters to the maximum extent practicable. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, they shall be removed and the natural grade restored within 30 days after the Division of Land Resources has released the project.

4. Upon completion of the project, the NCDOT shall complete and return the enclosed "Certification of Completion Form" to notify the DWQ when all work included in the 401 Certification has been completed. The responsible party shall complete the attached form and return it to the 401/Wetlands Unit of the Division of Water Quality upon completion of the project.
5. All other conditions written into the previous Water Quality Certification, dated October 8, 2003, and the first modification dated March 10, 2004, for the project still apply.
6. Continuing Compliance. NCDOT shall conduct its activities in a manner so as not to contravene any state water quality standard [including any requirements for compliance with section 303(d) of the Clean Water Act] and any other appropriate requirements of state and federal law. If DWQ determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that state or federal law is being violated, or that further conditions are necessary to assure compliance, DWQ may reevaluate and modify this certification to include conditions appropriate to assure compliance with such standards and requirements in accordance with 15 A NCAC 2H.0507(d). Before codifying the certification, DWQ shall notify NCDOT and the USACE, provide public notice in accordance with 15A NCAC 2H.0503, and provide opportunity for public hearing in accordance with 15A NCAC 2H.0504. Any new or revised conditions shall be provided to NCDOT in writing, shall be provided to the USACE for reference in any permit issued pursuant to Section 404 of the Clean Water Act, and shall also become conditions of the 404 Permit for the project.

Violations of any condition herein set forth shall result in revocation of this Certification and may result in criminal and/or civil penalties. If you do not accept any of the conditions of this certification, you may ask for an adjudicatory hearing. You must act within 60 days of the date that you receive this letter. To ask for a hearing, send a written petition that conforms to Chapter 150B of the North Carolina General Statutes to the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. This certification and its conditions are final and binding unless you ask for a hearing.

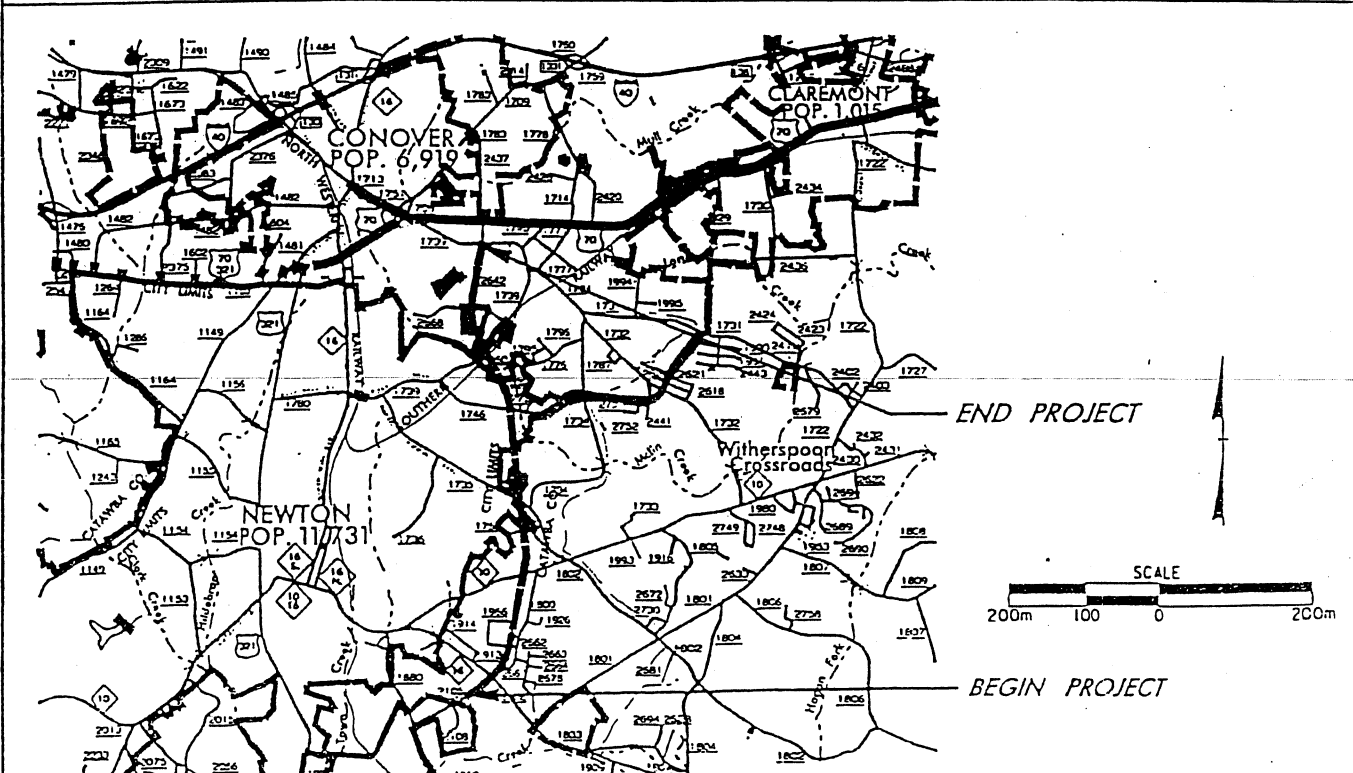
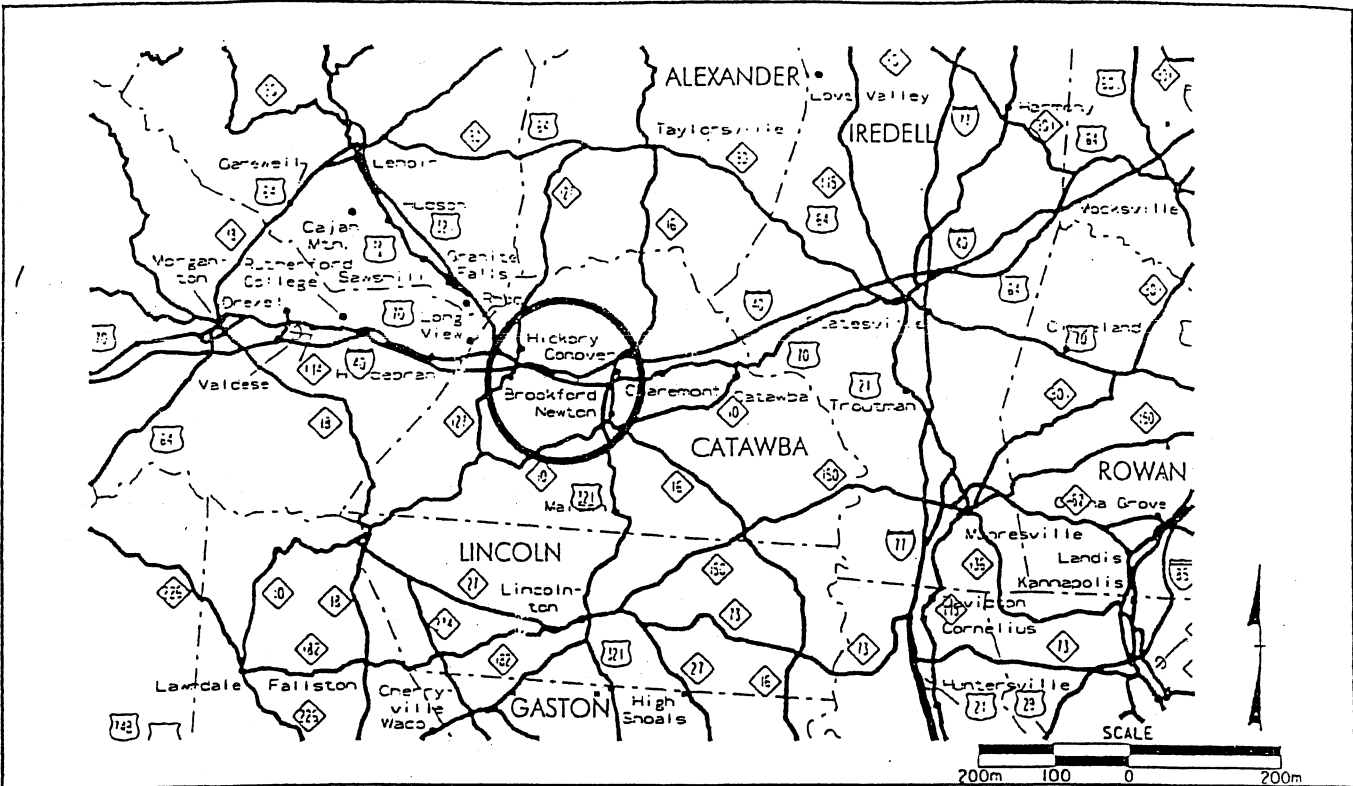
This, the 29th day of June 2005

DIVISION OF WATER QUALITY



for Alan W. Klimek, P.E.
Director

Modification to WQC No. 03-1048



VICINITY
MAPS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
CATAWBA COUNTY

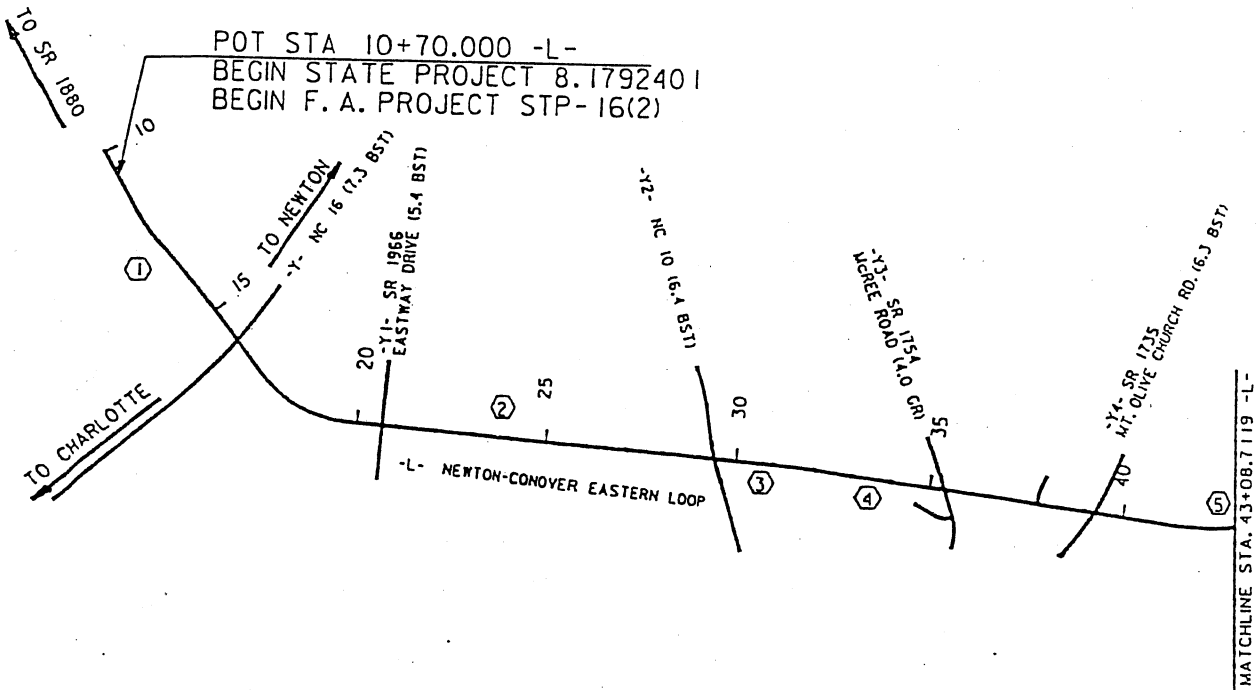
B.1792401 U-2404A

PROPOSED GRADING, STRUCTURE, CULVERTS, PAVING,
CURB AND GUTTER, DRAINAGE, LONG-LIFE PAVEMENT
MARKINGS, SNOWPLOWABLE PAVEMENT MARKERS,
SIGNALS AND TRACKWORK.

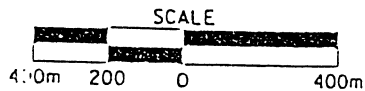
SCALE AS SHOWN

SHEET 1 OF 18

APRIL 13, 2000



SITE MAP



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 CATAWBA COUNTY
 8.1792401 U-2404A
 PROPOSED GRADING, STRUCTURE, CULVERTS, PAVING,
 CURB AND GUTTER, DRAINAGE, LONG-LIFE PAVEMENT
 MARKINGS, SNOWPLOWABLE PAVEMENT MARKERS,
 SIGNALS AND TRACKWORK.
 SCALE AS SHOWN
 SHEET 2 OF 18
 APRIL 13, 2000

AREA OF ROCK
CROSS VANE
STEP POOL
STRUCTURE

COCHRANE FURNITURE CO. INC.

NOTE: DO NOT PLACE RIP RAP OR FILTER FABRIC IN THE STREAM BED

GRADE TO DRAIN UPON COMPLETION OF PROJECT.

0.6 LATERAL BASE DITCH W/ CLASS B RIP RAP & FILTER FABRIC

42+00

HEWITT, MARIE P.

HEWITT, VELDA MAE

45

45

43+00

LATERAL DITCH

PROP. R/W

W/ 2' CURB

375

SPRING BOX

PROP. R/W

0.6 CLASS B RIP RAP & FILTER FABRIC

45

HEWITT, VELDA MAE
DB 1843 PC 675

SITE #5

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
CATAWBA COUNTY

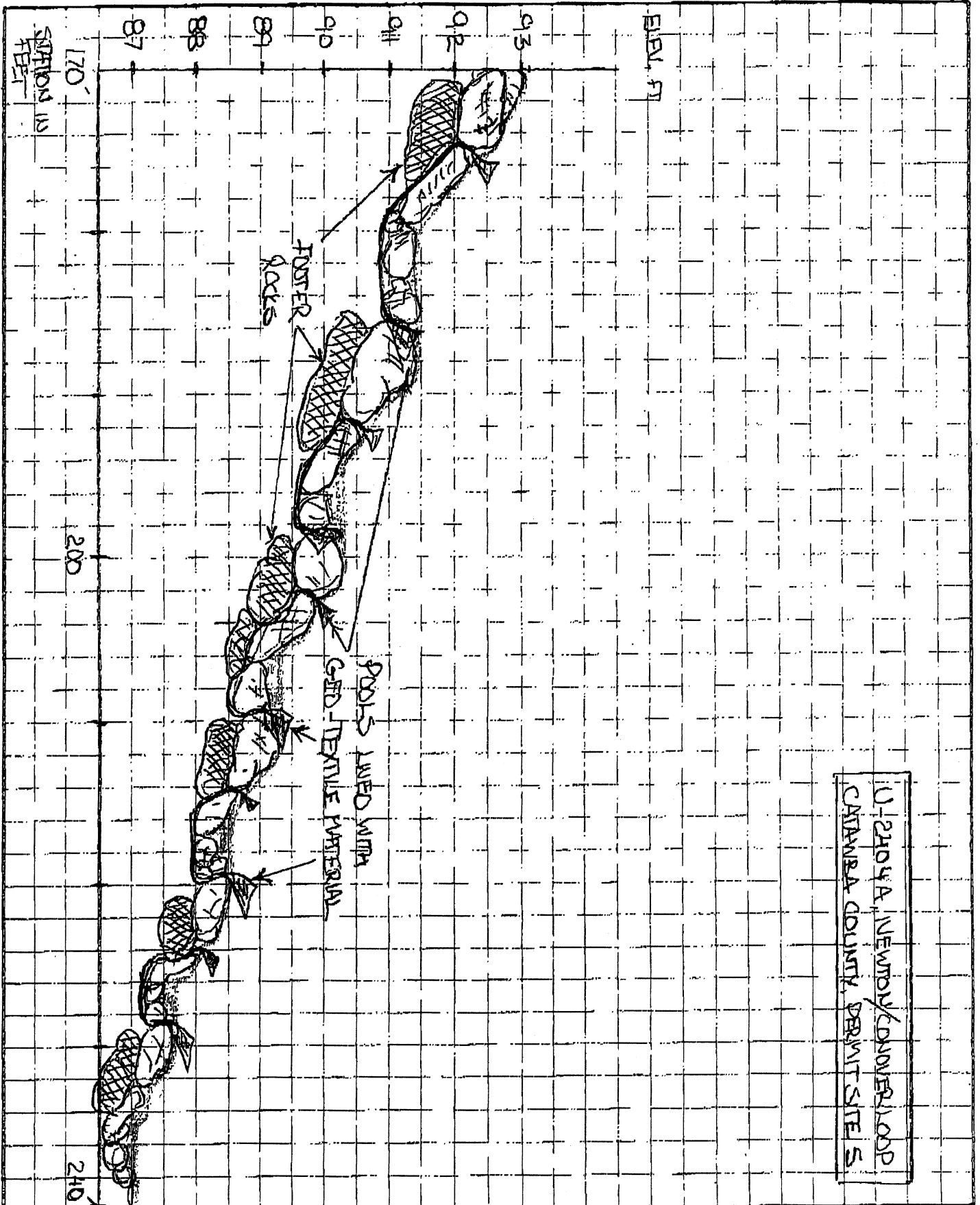
B. 1792401

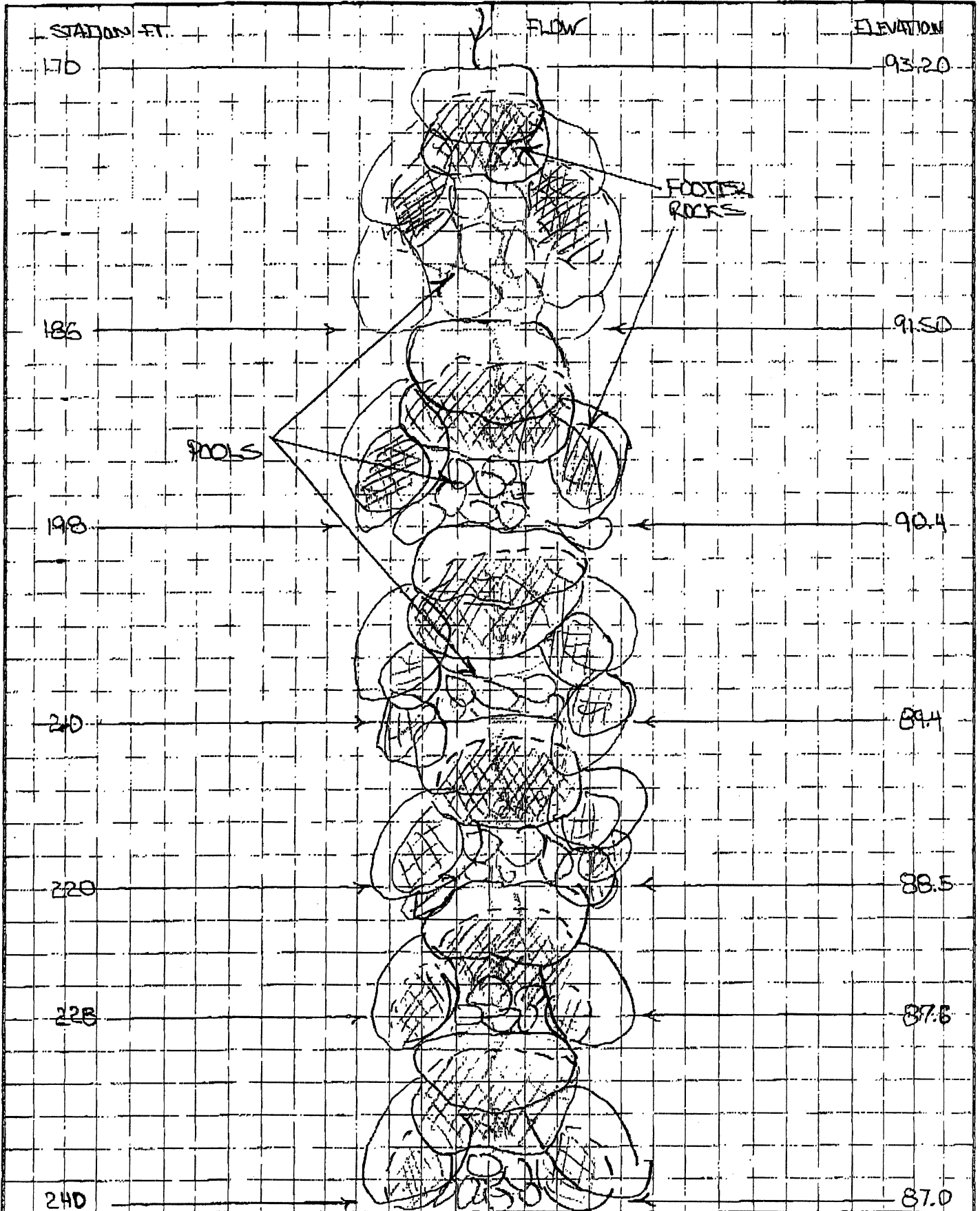
U-2404A

PROPOSED GRADING, STRUCTURE, CULVERTS, PAVING, CURB AND CUTTER, DRAINAGE, LONG-LIFE PAVEMENT MARKINGS, SNOWPLOWABLE PAVEMENT MARKERS, SIGNALS AND TRACKWORK.



DENOTES FILL IN SURFACE WATER



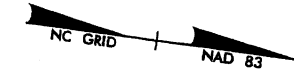
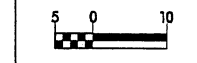


P.O. BOX 1624
CHARLOTTE, NORTH CAROLINA 28235

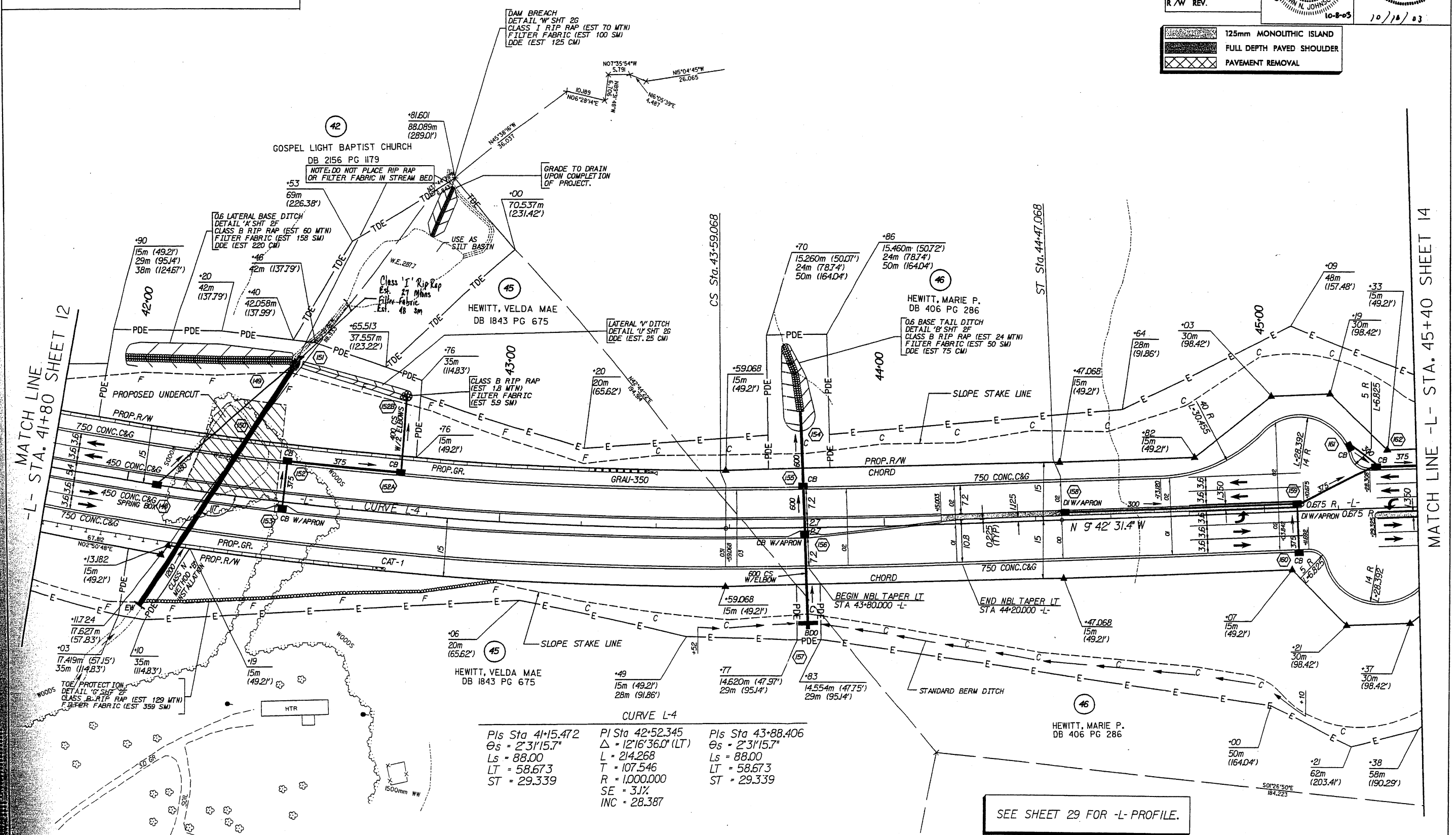
REVISIONS



PROJECT REFERENCE NO. U-2404A	SHEET NO. 13
R/W SHEET NO. 13	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST. REV.	
R/W REV.	



	125mm MONOLITHIC ISLAND
	FULL DEPTH PAVED SHOULDER
	PAVEMENT REMOVAL

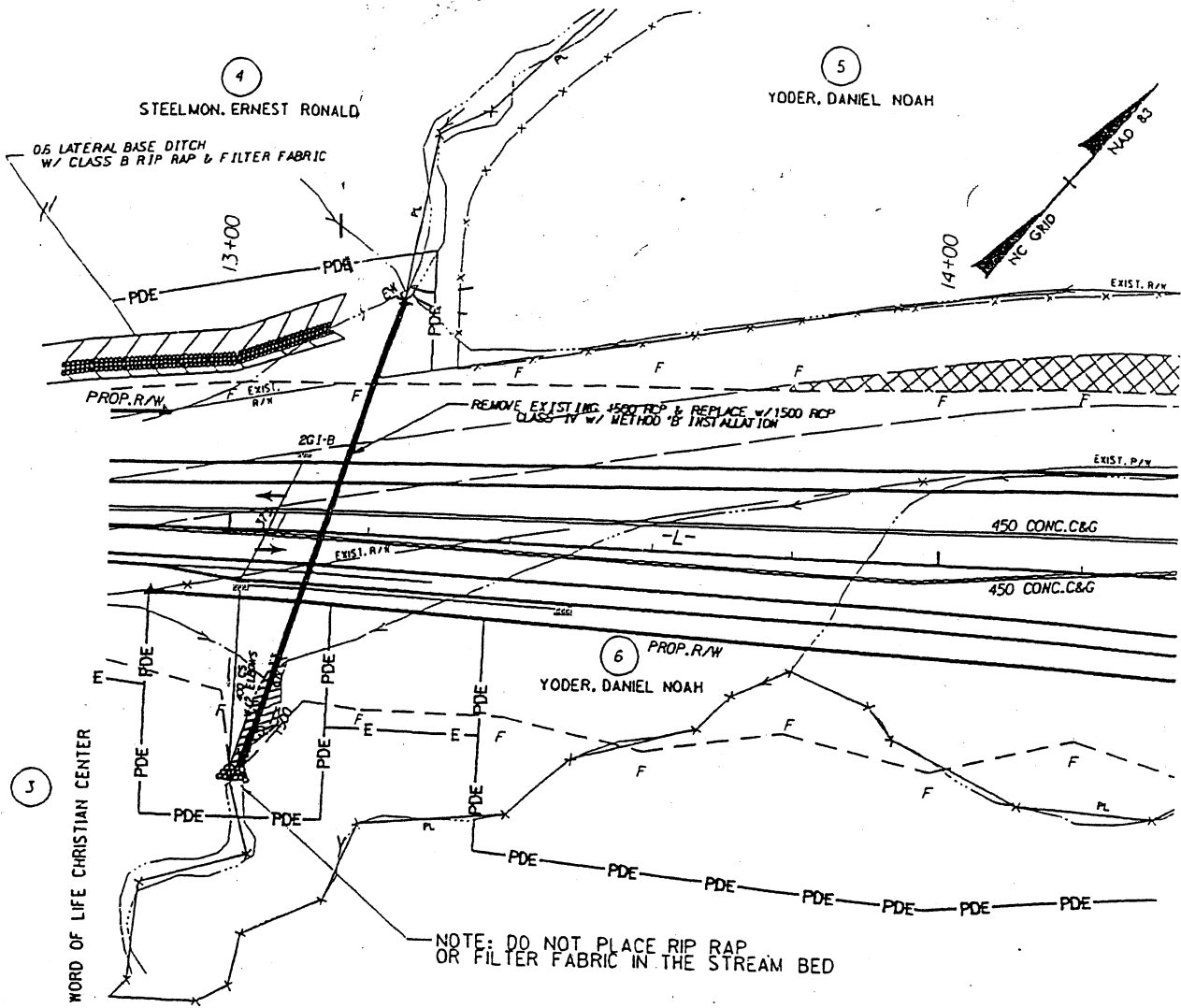


CURVE L-4		
Pts Sta 41+15.472	Pts Sta 42+52.345	Pts Sta 43+88.406
$\Theta_s = 2^\circ 31' 15.7"$	$\Delta = 12^\circ 16' 36.0" (LT)$	$\Theta_s = 2^\circ 31' 15.7"$
$L_s = 88.00$	$L = 214.268$	$L_s = 88.00$
$T = 58.673$	$T = 107.546$	$T = 58.673$
$ST = 29.339$	$R = 1,000.000$	$ST = 29.339$
	$SE = 3.1\%$	
	$INC = 28.387$	

SEE SHEET 29 FOR -L- PROFILE.


MATCH LINE -L- STA. 41+80 SHEET 12

MATCH LINE -L- STA. 45+40 SHEET 14



SITE # 1



 DENOTES FILL IN SURFACE WATER

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CATAWBA COUNTY

8.1792401

TIP U-2404A

PROPOSED GRADING, STRUCTURE, CULVERTS, PAVING,
CURB AND CUTTER, DRAINAGE, LONG-LIFE PAVEMENT
MARKINGS, SNOWPLOWABLE PAVEMENT MARKERS,
SIGNALS AND TRACKWORK.

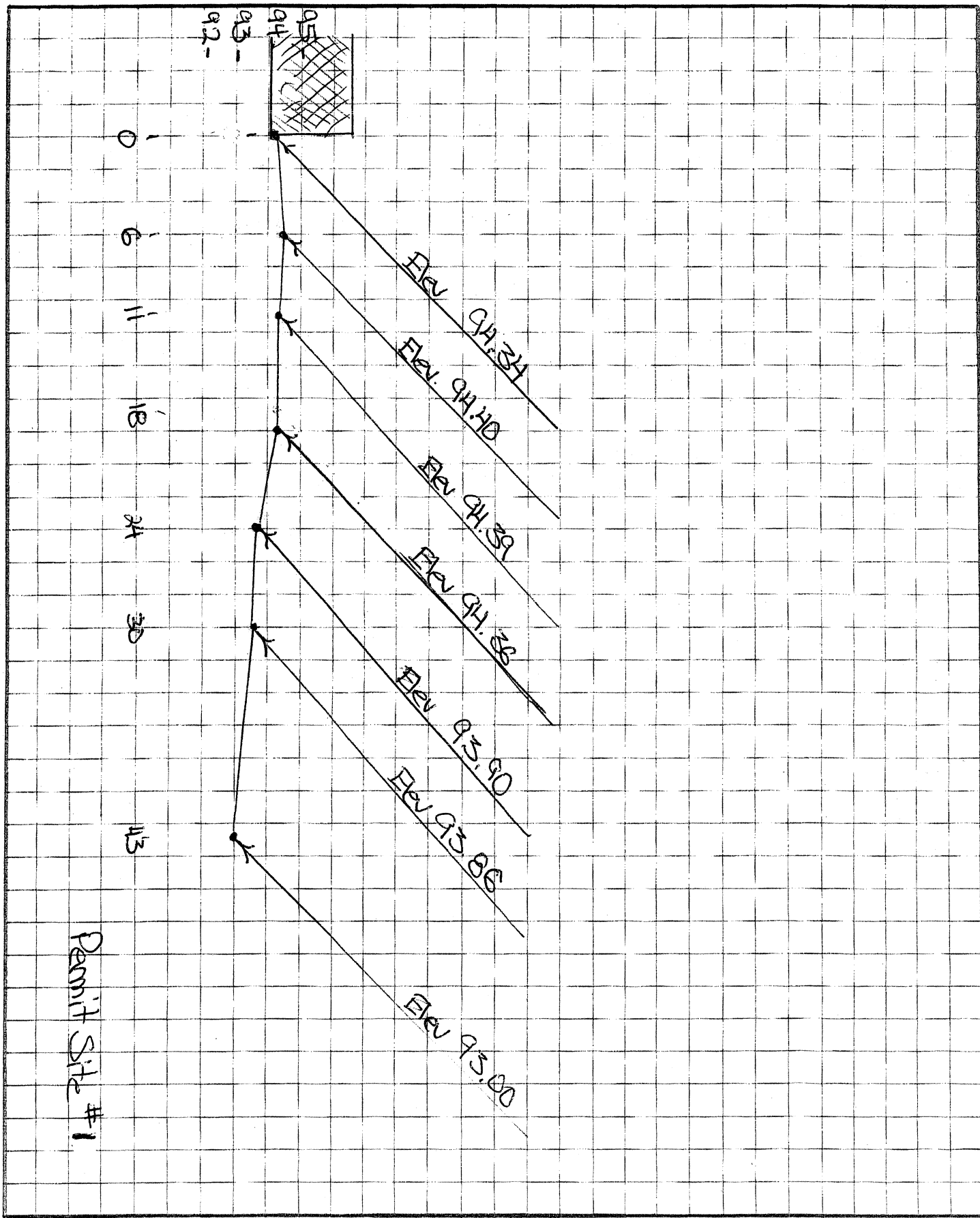
SCALE AS SHOWN

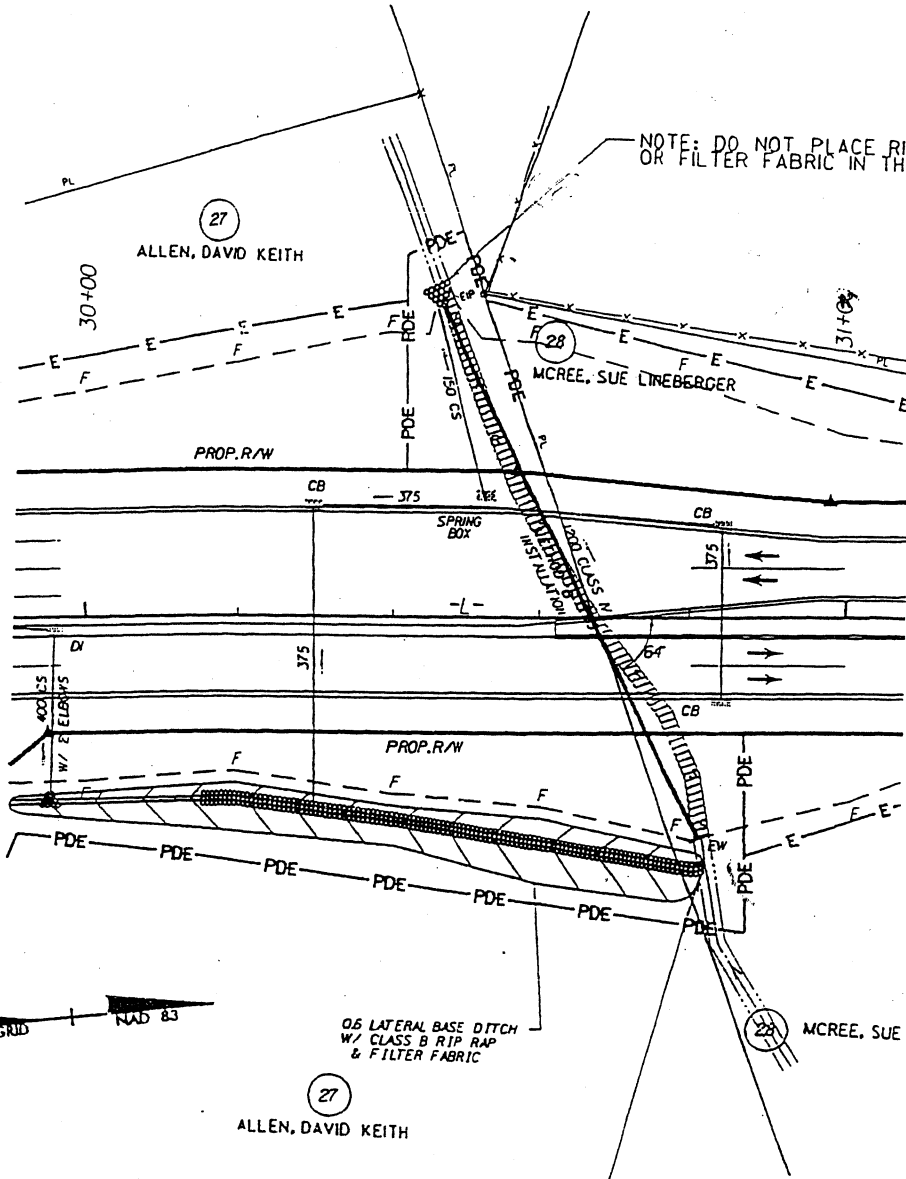
SHEET 5 OF 13

August, 2005

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
HIGHWAY BUILDING
P. O. BOX 25201
RALEIGH, NORTH CAROLINA 27611

SUBJECT Streambed Elevation PROJECT U2404A
for rock crossvane Permit Site #1 Catawba COUNTY
PREPARED BY _____ DATE _____ STATION _____
CHECKED BY _____ DATE _____ STR NO. _____ SHEET _____ OF _____

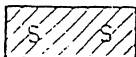
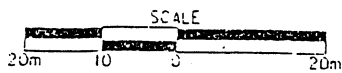




0.5 LATERAL BASE DITCH
W/ CLASS B RIP RAP
& FILTER FABRIC

NOTE: DO NOT PLACE RIP RAP
OR FILTER FABRIC IN THE STREAM BED

SITE #3



DENOTES FILL IN
SURFACE WATER

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CATAWBA COUNTY

B.1792401

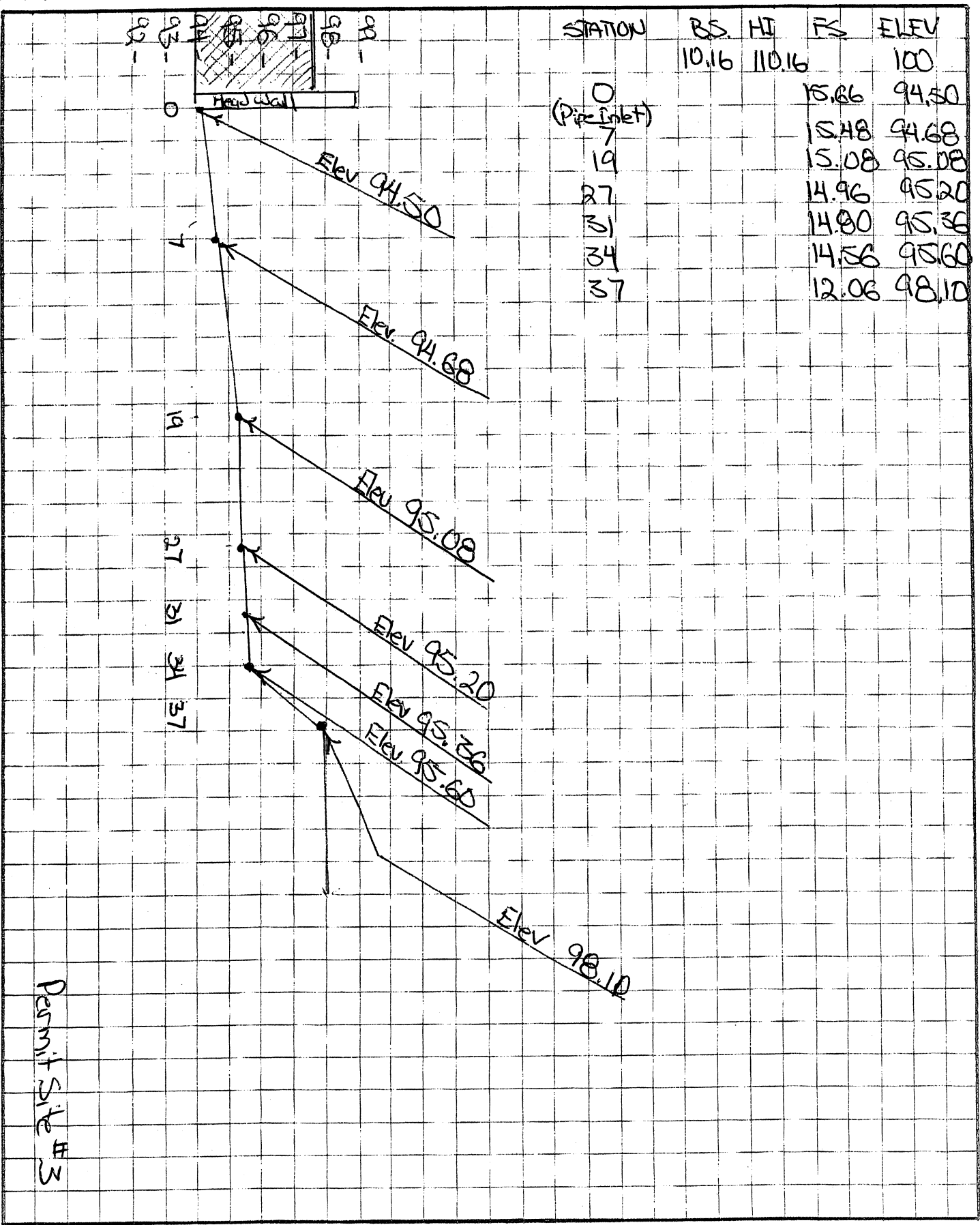
TIP U-2404A

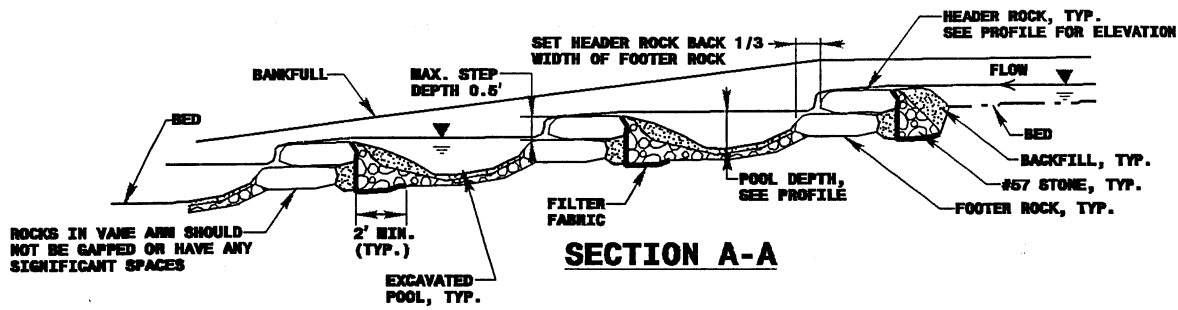
PROPOSED GRADING, STRUCTURE, CULVERTS, PAVING,
CURB AND GUTTER, DRAINAGE, LONG-LIFE PAVEMENT
MARKINGS, SNOWPLOWABLE PAVEMENT MARKERS,
SIGNALS AND TRACKWORK.

SCALE AS SHOWN

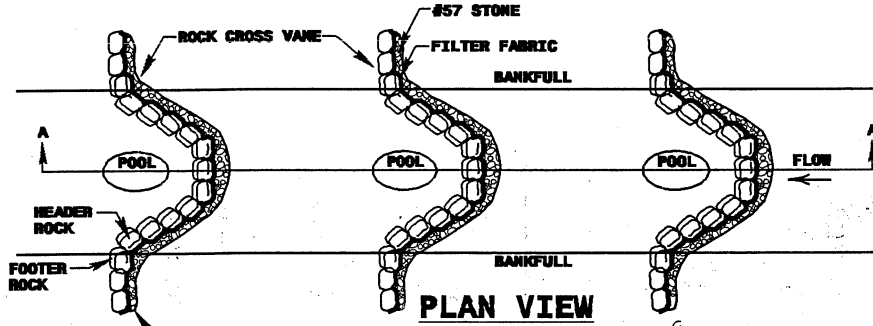
SHEET 7 OF 18

August, 2003





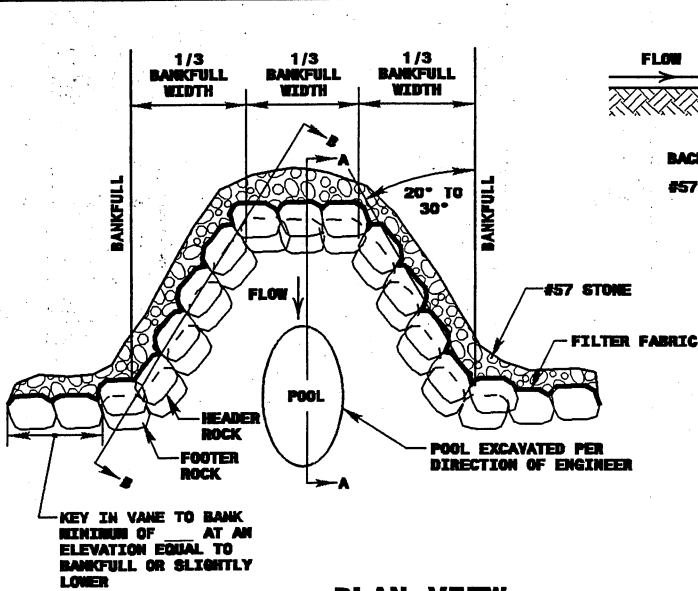
SECTION A-A



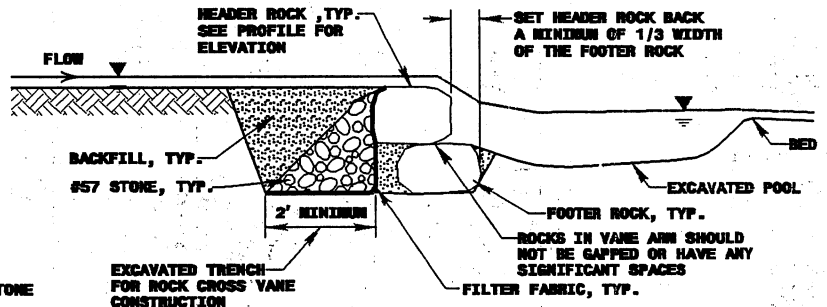
PLAN VIEW

STEP POOL DETAIL
NOT TO SCALE

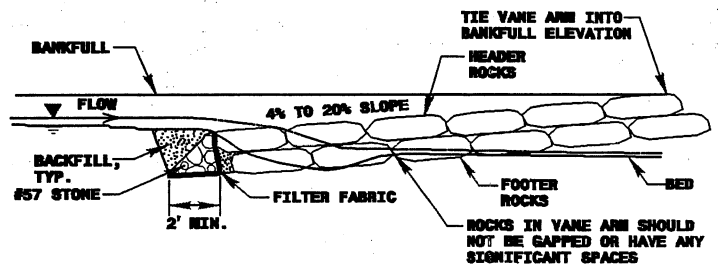
- NOTES:**
1. STEPS TO BE SHORT, FREQUENT, AND CLOSELY SPACED.
 2. POOL SPACING SHALL BE INVERSELY PROPORTIONAL TO STREAM SLOPE, AND DIRECTLY PROPORTIONAL TO BANKFULL WIDTH.
 3. POOL DEPTHS AT BANKFULL ELEVATION SHALL BE TYPICALLY 2 TO 3 TIMES DEEPER THAN STEP DEPTHS AT BANKFULL ELEVATION.
 4. ADEQUATE NUMBER OF FOOTER BOULDERS TO BE USED IN ORDER TO HOLD UP THE BOULDERS AT HEAD OF STEPS DURING HIGH ENERGY/HIGH FLOW EVENTS.
 5. STEP POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.



PLAN VIEW



SECTION A-A



SECTION B-B

- NOTES:**
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
 2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
 3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
 4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
 5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

NOT TO SCALE

ROCK CROSS VANE DETAIL FOR STEP POOLS

STATION	BOULDER DIMENSIONS (FEET)		
	HEIGHT	LENGTH	WIDTH

P.O. BOX 1841
CHARLOTTE, NORTH CAROLINA 28215

REVISIONS

METRIC

5 0 10

CONST. REV.

R/W REV.

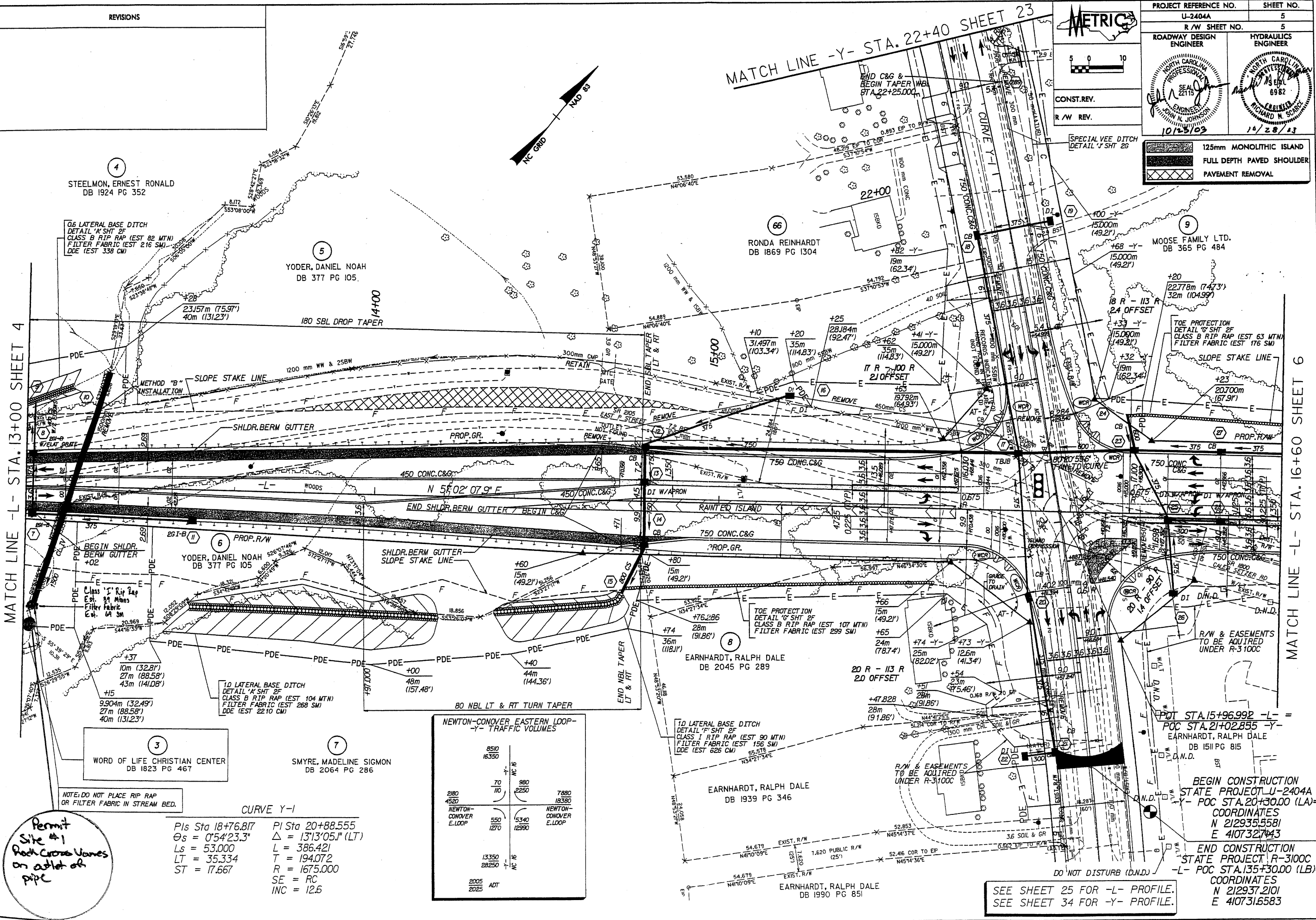
PROJECT REFERENCE NO. U-2404A	SHEET NO. 5
R/W SHEET NO. 5	
ROADWAY DESIGN ENGINEER <i>[Signature]</i> 10/25/03	HYDRAULICS ENGINEER <i>[Signature]</i> 10/28/03
125mm MONOLITHIC ISLAND	FULL DEPTH PAVED SHOULDER
	PAVEMENT REMOVAL

MATCH LINE -Y- STA. 22+40 SHEET 23

MATCH LINE -L- STA. 13+00 SHEET 4

MATCH LINE -L- STA. 16+60 SHEET 6

MATCH LINE -L- STA. 34+60 SHEET 11



4 STEELMON, ERNEST RONALD
DB 1924 PG 352

5 YODER, DANIEL NOAH
DB 377 PG 105

6 RONDA REINHARDT
DB 1869 PG 1304

9 MOOSE FAMILY LTD.
DB 365 PG 484

6 YODER, DANIEL NOAH
DB 377 PG 105

8 EARNHARDT, RALPH DALE
DB 2045 PG 289

3 WORD OF LIFE CHRISTIAN CENTER
DB 1823 PG 467

7 SMYRE, MADELINE SIGMON
DB 2064 PG 286

NEWTON-CONOVER EASTERN LOOP -Y- TRAFFIC VOLUMES

8510	16350	980	7880
2180	70	2250	18380
NEWTON-CONOVER E. LOOP	550	15340	NEWTON-CONOVER E. LOOP
	1270	12890	
13350			
20250			
2005	ADT		
2025			

NOTE: DO NOT PLACE RIP RAP OR FILTER FABRIC IN STREAM BED.

CURVE Y-1

PI Sta 18+76.817
 $\theta_s = 0^{\circ}54'23.3''$
 $L_s = 53.000$
 $LT = 35.334$
 $ST = 17.667$

PI Sta 20+88.555
 $\Delta = 13^{\circ}13'05.1''$ (LT)
 $L = 386.421$
 $T = 194.072$
 $R = 1675.000$
 $SE = RC$
 $INC = 12.6$

Permit Site #1 Rock Cross Vanes on outlet of pipe

SEE SHEET 25 FOR -L- PROFILE.
SEE SHEET 34 FOR -Y- PROFILE.

BEGIN CONSTRUCTION STATE PROJECT U-2404A
 Y- POC STA. 20+30.00 (LA)=
 COORDINATES
 N 212935.5581
 E 4107327.743

END CONSTRUCTION STATE PROJECT R-3100C
 -L- POC STA. 135+30.00 (LB)=
 COORDINATES
 N 212937.2101
 E 410731.6583

DITCH BANK TURBED EXCEPT PE OUTLET
+35.648
53.080m (174.15')

+54.947
15m (49.21')
+50
247.61m (812.4')

+1350
+1125
+1100
+1075
+1050
+1025
+1000
+975
+950
+925
+900
+875
+850
+825
+800
+775
+750
+725
+700
+675
+650
+625
+600
+575
+550
+525
+500
+475
+450
+425
+400
+375
+350
+325
+300
+275
+250
+225
+200
+175
+150
+125
+100
+75
+50
+25
0
-25
-50
-75
-100
-125
-150
-175
-200
-225
-250
-275
-300
-325
-350
-375
-400
-425
-450
-475
-500
-525
-550
-575
-600
-625
-650
-675
-700
-725
-750
-775
-800
-825
-850
-875
-900
-925
-950
-975
-1000
-1025
-1050
-1075
-1100
-1125
-1150
-1175
-1200
-1225
-1250
-1275
-1300
-1325
-1350

METRIC

PROJECT REFERENCE NO. U-2404A SHEET NO. 9
R/W SHEET NO. 9

ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER

SEAL 22115
SEAL 6982

12/10/03

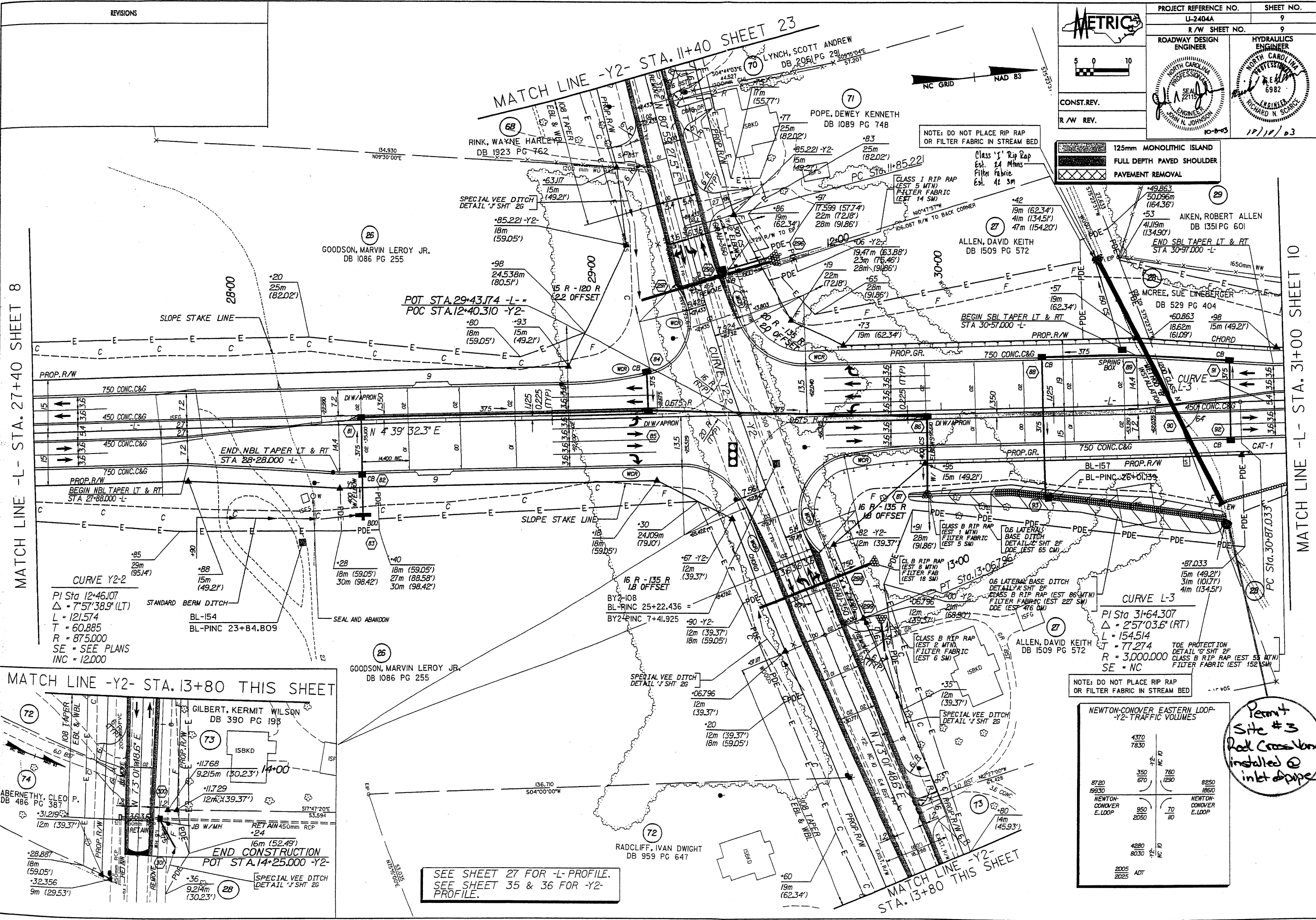
CONST. REV.
R/W REV.

MATCH LINE -Y2- STA. 11+40 SHEET 23

MATCH LINE -L- STA. 27+40 SHEET 8

MATCH LINE -L- STA. 31+00 SHEET 10

MATCH LINE -L- STA. 34+60 SHEET 11



NOTE: DO NOT PLACE RIP RAP OR FILTER FABRIC IN STREAM BED

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

Class 'I' Rip Rap
Est. 24 Mths
Filter fabric
Est. 4L 3M

CLASS I RIP RAP
(EST 5 MTN)
FILTER FABRIC
(EST 14 SM)

106.067 R/W TO BACK CORNER

19.47m (63.88')
23m (75.46')
28m (91.86')

19m (62.34')
41m (134.51')
47m (154.20')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

19m (62.34')

DITCH BANK
TURBED EXCEPT
PE OUTLET

+35.648
53.080m
(174.15')

+54.947
15m
(49.21')

+50
247.61m
(812.4')

P.R.W.
AU-357

1.350

1.125

1.17

PDE

PDE

PDE

PDE

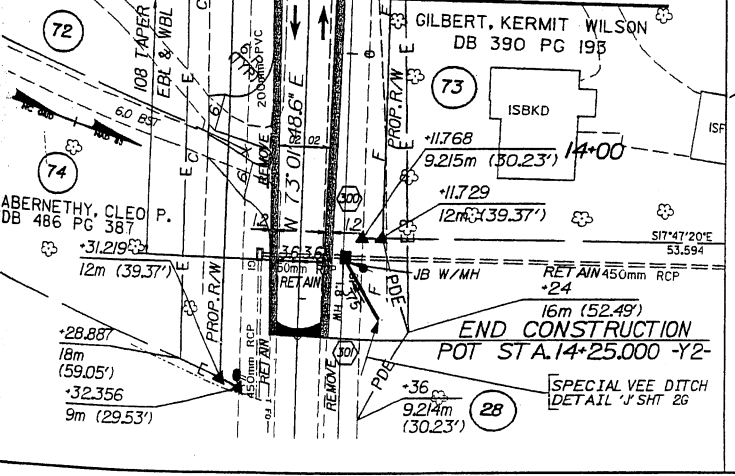
PDE

PDE

PDE

PDE

MATCH LINE -Y2- STA. 13+80 THIS SHEET



SEE SHEET 27 FOR -L-PROFILE.
SEE SHEET 35 & 36 FOR -Y2-PROFILE.

NOTE: DO NOT PLACE RIP RAP OR FILTER FABRIC IN STREAM BED

NEWTON-CONOVER EASTERN LOOP -Y2- TRAFFIC VOLUMES

4370 7830	-Y2- NC RD	760 1290	8250 18610
8720 19330	350 670	70 110	NEWTON-CONOVER E. LOOP
4280 8030	-Y2- NC RD	ADT	

Permit
Site # 3
Road Cross Lane
installed @
inlet pipe