STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

December 13, 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

SUBJECT: **Individual Permit Application** for the widening of US 15-501 from north of SR 2294 (Mt. Moriah Road) to south of SR 1116 (Garrett Road), Durham County, TIP No. U-4012; State Project No. 8.1352301; Federal Aid Project No. NHF-15(8). Division 5. $475 to Work Order 8.1352301 (WBS Element 35012.1.1).

Dear Sir:

The NCDOT proposes to widen the existing four-lane US 15-501 to a six-lane facility with divided median from north of SR 2294 (Mt. Moriah Road) to south of SR 1116 (Garrett Road) in Durham County. US 15-501, both south of SR 2294 and north of SR 1116, is currently a six-lane facility. The project is approximately 0.9 mile long. The existing bridges over New Hope Creek will be replaced with 2 bridges approximately 300 feet in length and a minimum 10-foot vertical clearance. The proposed width of each of the dual bridges is 56 feet, including three 12-foot travel lanes and 10-foot offsets to both bridge rails. An on-site detour with temporary bridge will be utilized while the new bridges are constructed in phases.

An additional improvement included as part of this project will be the addition of a second right-turn lane on the I-40 westbound off-ramp at exit 270 to connect to US 15-501. A portion of SR 1126 (Service Road) to the southeast of US 15-501 and southwest of SR 1116 will also be removed due to the widening. The remainder of SR 1126 will be removed as part of TIP Project U-4009. Where space allows, the new outside paved shoulders on both sides of US 15-501 will be 10 feet thus accommodating bicycle passage. The travel lanes on US 15-501 will be 12 feet wide. Enclosed please find the ENG 4345 Form, 8 ½ x 11 drawings, half-sized plan sheets, US Fish and Wildlife Service concurrence letter, U.S. Army Corps of Engineers wetland data forms, and EEP confirmation letter. The Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) are available upon request.

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

TELEPHONE: 919-715-1500
FAX: 919-715-1501
WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD.
PARKER LINCOLN BUILDING, SUITE 168
RALEIGH NC 27604

Summary of Impacts: Impacts on jurisdictional areas consist of a total of 0.71 acre of permanent riverine wetland impacts. There will also be approximately 164 linear feet of jurisdictional stream impacts. There will also be approximately 0.19 acre of temporary fill in wetlands and 0.02 acre of temporary stream impacts.

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. We propose to use the Ecosystem Enhancement Program (EEP) to mitigate for 0.71 acre of wetland impacts and 164 linear feet of jurisdictional stream impacts.

Purpose and Need

The purpose of the project is to improve traffic flow, level of service, and safety on this section of US 15-501.

Alternatives: NCDOT investigated several alternatives for this project which were discussed in detail in Section IV of the EA. Alternative 4 was chosen (see page 10 of the FONSI).

Project Schedule

U-4012 is scheduled to be let to construction on April 19, 2005, with a date of availability of May 24, 2005.

NEPA Document Status

An EA for U-4012 was approved by the Federal Highway Administration (FHWA) on July 31, 2002. A FONSI for U-4012 was approved by FHWA on November 25, 2003. The EA explains the purpose and need for the project, provides a description of the project and characterizes the social, economic, and environmental effects of the project. Copies of the EA and FONSI have been provided to the regulatory agencies involved in the approval process. Additional copies will be provided upon request.

Independent Utility

According to 23 Code of Federal Regulations (CFR) 771.111(f), "...in order to ensure meaningful evaluation of alternatives and to avoid commitments to transportation improvements before they are fully evaluated, the action evaluated...shall:

(1) Connect logical termini and be of sufficient length to address environmental matters on a broad scope;

(2) Have an independent utility or independent significance, i.e., be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made; and,

(3) Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements."

The proposed project will connect a six-lane section of US 15-510 to a six-lane section of US 15-501. The locations of the proposed project's termini have been coordinated with other programmed TIP projects in the area. The locations of this project's termini do not preclude the development and assessment of multiple alternates for other programmed TIP projects in the area. In this regard, the proposed project demonstrates logical termini and independent utility.

This project can stand alone as a functioning project and is designed to be compatible with other TIP projects in the area. The environmental impacts of the other projects will be fully evaluated in separate environmental documents. NCDOT has determined this project meets the criteria set forth in 23 CFR 771.111(f).

Resource Status

Delineations: Field work for the wetland delineation was conducted during August 2000 by NCDOT biologists using the criteria specified in the 1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual. A jurisdictional wetland verification was conducted by USACE on October 4, 2000. In addition to the delineations, the streams were characterized and data recorded on both the NCDWQ Stream Classification Form and the USACE Intermittent Channel Evaluation Form. The following characterization of the jurisdictional sites summarizes the August 2000 wetland delineation including the data form, aforementioned forms, and field notes. The jurisdictional impacts including fill and mechanized clearing are summarized below.

Permanent Jurisdictional Impacts (Section 404)

Site	Station	Wetland Impacts (ac)	Stream Impacts (ft)
1	L Sta. 70+58	0.71	0
1	L Sta. 77+89	0	164
Total		**0.71**	**164**

Wetlands: Approximately 0.71 acre of wetlands will be permanently impacted due to roadway fill to accommodate the widening and 0.19 acre of wetlands will be temporarily impacted due to the construction of the temporary detour.

The vegetated wetlands identified in the study corridor are of the following Cowardin classifications:

PEM1SS1B-palustrine, emergent, persistent, scrub-shrub, broad-leaved deciduous, saturated

PEM2B-palustrine, emergent, nonpersistent, saturated

PEM2FO1B-palustrine, emergent, nonpersistent, forested, broad-leaved deciduous, saturated

PFO1B-palustrine, forested, broad-leaved deciduous, saturated

These wetlands are in a piedmont alluvial forest plant community. The DWQ scores for these wetlands range from 20-78.

The FONSI denoted 0.41 ac of permanent wetland impacts. This estimate did not account for mechanized clearing impacts in wetlands. The final estimate of 0.71 ac of permanent wetland impacts accounts for impacts from fill and mechanized clearing.

Streams: Approximately 164 feet of Mud Creek, a tributary to New Hope Creek, will be permanently impacted due to the culvert extension and 0.02 acre of New Hope Creek will be temporarily impacted due to the installation of coffer dams to remove the existing bridge piers. Both of these streams are perennial. The project corridor is contained within USGS Hydrologic Unit 03030002, which encompasses the New Hope Creek drainage.

Protected Species

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under provisions of Section 7 and Section 9 of the Endangered Species Act. As of January 29, 2003, a total of three federally-protected species are listed for Durham County (Table 1).

Table 1. Federally-protected species for Durham County

Scientific Name	Common Name	Status	Biological Conclusion
Haliaeetus leucocephalus	Bald eagle	Threatened (proposed for delisting)	No effect
Echinacea laevigata	Smooth coneflower	Endangered	May affect, not likely to adversely affect
Rhus michauxii	Michaux's sumac	Endangered	May affect, not likely to adversely affect

A Biological Conclusion of "No Effect" for the bald eagle was issued in several documents, including the EA. This conclusion was based on the fact that there is no suitable habitat present for bald eagle in the project area. The last survey for smooth coneflower and Michaux's sumac was done in July 2003. Habitat is present for both of these species, but neither species were observed during the surveys. The Natural Heritage Program (NHP) database does not denote any occurrence of smooth coneflower or Michaux's sumac within 1 mile of the project. The U.S. Fish and Wildlife Service (USFWS) concurred with a biological conclusion of "May Affect, Not Likely to Adversely Affect" for smooth coneflower and Michaux's sumac in a letter dated November 18, 2003.

Cultural Resources

Compliance Guidelines: This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and implemented by the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified as 36 CFR Part 800. Section 106 requires Federal agencies to take into account the effect of their undertakings (federally-funded, licensed, or permitted) on properties included in or eligible for inclusion in the

National Register of Historic Places and to afford the Advisory Council a reasonable opportunity to comment on such undertakings.

Historic Architecture: In their memo dated June 16, 2000, the State Historic Preservation Office (HPO) did not recommend historic architecture surveys for the project and stated that they were not aware of any historic properties that would be affected by the project. A copy of the memo is included in the appendix of the EA.

Archaeology: The HPO, in the same memo mentioned above, recommended that no archaeological investigation be conducted in connection with this project. The HPO stated that it is unlikely that any archaeological resources that may be eligible for inclusion in the National Register of Historic Places will be affected by the project construction.

FEMA Compliance

New Hope Creek and Mud Creek are involved with a FEMA Detailed Flood Insurance Study. The water surface elevation has been reduced substantially at the New Hope Creek crossing since the proposed bridges have been lengthened.

Wild and Scenic River System

The project will not impact any Designated Wild and Scenic Rivers or any rivers included in the list of study rivers (Public Law 90-542, as amended).

Indirect and Cumulative Impacts

No Indirect and Cumulative Impact study was done for this project. Indirect and cumulative impacts from the project will be minimal as the transportation improvements will not provide access to previously undeveloped land or provide any new interchanges.

Utilities

There are underground telephone cable relocations that will need to occur near Bridge No. 21. These relocations will be done using directional bore methods to minimize impacts.

There will be impacts to wetland areas as a result of relocating Duke Power transmission towers. A path approximately 68 feet wide and 1,500 feet long will need to be cleared to relocate the towers and aerial transmission lines. Only 1,000 feet of the proposed cleared path will be inside wetland areas. Therefore, approximately 1.6 acres of hand clearing (no grubbing) will occur in wetland areas. Also, four new transmission towers are proposed. Each tower's base is 30 feet by 30 feet. Each tower will be inside a wetland area. Therefore, approximately 0.08 acre of wetlands will be impacted as a result of these towers.

Mitigation Options

The Corps of Engineers has adopted, through the Council on Environmental Quality (CEQ), a wetland mitigation policy that embraces the concept of "no net loss of wetlands" and sequencing. The purpose of this policy is to restore and maintain the chemical, biological, and physical integrity of the Waters of the United States. Mitigation of wetland and surface water impacts has been defined by the CEQ to include: avoiding impacts, minimizing impacts, rectifying impacts,

reducing impacts over time, and compensating for impacts (40 CFR 1508.20). Executive Order 11990 (Protection of Wetlands) and Department of Transportation Order 5660.1A (Preservation of the Nations Wetlands), emphasize protection of the functions and values provided by wetlands. These directives require that new construction in wetlands be avoided as much as possible and that all practicable measures are taken to minimize or mitigate impacts to wetlands.

AVOIDANCE AND MINIMIZATION: 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 incorporated as part of the project design.

By the very nature of this project (widening), the ability to avoid and minimize impacts is limited. However, avoidance and minimization have been incorporated into the preliminary design as far as practicable. The decision was made to pursue a symmetrical widening alignment, due to the existing horizontal alignment. One lane is being added in each direction on the outside of the existing lanes because not enough room exists in the median for the new lanes.

Impacts to the wetlands and surface waters will be minimized to the extent practicable by:

- temporary silt fences, earth berms, and temporary ground cover during construction
- enforcement of sedimentation and erosion control Best Management Practices for the protection of surface waters and wetlands
- reduction of clearing and grubbing activity in and adjacent to water bodies and wetlands
- use of timber mats
- 2:1 fill slopes
- the temporary fill in wetlands will be removed and the area graded to current existing depth
- preformed scour holes are proposed near the bridge crossing to minimize impacts to the water quality and aquatic life in New Hope Creek

Wildlife Crossing

After coordinating with the public and the environmental regulatory agencies, NCDOT has committed to constructing bridges 300 feet in length and a minimum of 10 feet in vertical clearance over New Hope Creek to provide safe passage of wildlife under the bridges. The original design proposed to construct bridges 205 feet in length over New Hope Creek. NCDOT has also committed to installing high fencing (10 feet) along all four quadrants of New Hope Creek parallel to US 15-501 to provide safe passage of wildlife in this area.

The permanent and temporary bridges over New Hope Creek will span the stream. This serves to avoid impacts to this surface water. However, the roadway widening cannot avoid adjacent wetlands along the roadway since wetlands are located on both sides. The proposed alternative will greatly expand the area underneath the bridges available for wildlife passage, thus

minimizing impacts to wildlife. The proposed high fencing and deer ramps will also serve to channel wildlife to cross underneath the bridges.

COMPENSATION: The primary emphasis of the compensatory mitigation is to reestablish a condition that would have existed if the project were not built. As previously stated, 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.

FHWA STEP DOWN COMPLIANCE: All compensatory mitigation must be in compliance with 23 CFR Part 777.9, "Mitigation of Impacts" that describes the actions that should be followed to qualify for Federal-aid highway funding. This process is known as the FHWA "Step Down" procedures:

1. Consideration must be given to mitigation within the right-of-way and should include the enhancement of existing wetlands and the creation of new wetlands in the highway median, borrow pit areas, interchange areas and along the roadside.
2. Where mitigation within the right-of-way does not fully offset wetland losses, compensatory mitigation may be conducted outside the right-of-way including enhancement, creation, and preservation.

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 on June 30, 2005.

Since U-4012 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 cataloguing unit. The Department has avoided and minimized impacts to jurisdictional resources to the greatest extent possible as described above. The remaining, unavoidable impacts to 0.71 acre of jurisdictional wetlands and 164 feet of jurisdictional streams will be offset by compensatory mitigation provided by the EEP program.

Regulatory Approvals

Application is hereby made for a Section 404 Individual Permit as required for the above-mentioned activities. By copy of this letter, we are also requesting a 401 Water Quality Certification. In compliance with Section 143-215.3D(e) of the NCAC we will provide $475 to act as payment for processing the Section 401 permit application as previously noted in this application (see Subject line). Seven copies of the application are being provided to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their review.

Thank you for your assistance with this project. If you have any questions or need any additional information about this project, please contact Mr. Matt Haney at (919) 715-1428.

Sincerely,

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

GJT/mmh

Enclosure

w/attachment
Mr. John Hennessy, NCDWQ (7 copies)
Mr. Travis Wilson, NCWRC
Ms. Becky Fox, USEPA – Whittier, NC
Mr. Ronald Mikulak, USEPA – Atlanta, GA
Mr. Gary Jordan, USFWS
Dr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Jon Nance, P.E., Division 5 Engineer
Mr. Chris Murray, Division 5 DEO

w/o attachment
Mr. Jay Bennett, P.E., Roadway Design
Mr. Omar Sultan, Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Mark Staley, Roadside Environmental
Mr. David Franklin, USACE, Wilmington
Ms. Beth Smyre, PDEA
Ms. Beth Harmon, EEP

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)

OMB APPROVAL NO. 0710-003
Expires December 31, 2004

Public reporting burden for this collection of information is estimated 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

Authority: 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)
North Carolina Department of Transportation Project Development & Environmental Analysis	
6. APPLICANT'S ADDRESS	**9. AGENT'S ADDRESS**
1548 Mail Service Center Raleigh, NC 27699-1548	
7. APPLICANT'S PHONE NOs. W/AREA CODE	**10. AGENT'S PHONE NOs. W/AREA CODE**
a. Residence b. Business 919-733-3141	a. Residence 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 OR PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions
Widening of US 15-501 from north of SR 2294 (Mt. Moriah Road) to south of SR 1116 (Garrett Road) in Durham County

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
New Hope Creek, Mud Creek	
15. LOCATION OF PROJECT	
Durham (COUNTY) NC (STATE)	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) **Section, Township, Range, Lat/Lon, and/or Accessors's Parcel Number, for example.**

See cover letter

17. DIRECTIONS TO THE SITE
See vicinity map associated with permit drawings

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

Widening of US 15-501 from north of SR 2294 (Mt. Moriah Road) to south of SR 1116 (Garrett Road) in Durham County. The project is 0.9 mi in length. A six-lane divided facility with a 30 ft median is proposed. The proposed right of way width for the project is 200 ft.

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

To improve traffic flow, level of service, and safety on this section of US 15-501.

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

20. Reason(s) for Discharge

Roadway fill, pipe/culvert/bridge construction

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

Roadway fill

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)
Wetland impact: 0.71 ac riverine
Stream impact: 164 ft

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 listing of property owners associated with 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 _____

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.

STORMWATER MANAGEMENT PLAN

U-4012, State Project
Durham County
Hydraulics Project Manager: Andrew Nottingham, PE

Date: 7/1/04
Revised 8/24/04

ROADWAY DESCRIPTION

The project involves the widening of US 15-501 to a six lane facility with divided median from north of SR 2294 (Mt. Moriah Road) to south of SR 1116 (Garrett Road) in Durham. The project also includes the addition of a second right turn lane on I-40 westbound off ramp at exit 270. The overall length of the project is 0.97 miles. The proposed typical section is a 6 lane divided highway shoulder section with a 30-ft. grassed median. The project will involve replacing the existing 136-ft. long dual bridges over New Hope Creek with longer bridge structures to accommodate a greenway and wildlife passage. A temporary detour bridge will be required in order to facilitate replacement of the bridges over New Hope Creek. The project will also involve extending an existing 3 @ 9 ft. wide by 10 ft. high reinforced concrete box culvert (RCBC) on Mud Creek.

ENVIRONMENTAL DESCRIPTION

The project is located in the Cape Fear River Basin. There are two existing stream crossings on this project. The first crossing is an existing dual bridge over New Hope Creek. New Hope Creek is classified as Class C NSW waters. The second crossing is a RCBC on Mud Creek. Mud Creek is also classified as Class C NSW waters. Both crossings are perennial streams. In the vicinity of the project both creeks share the same floodplain as Mud Creek connects with New Hope Creek just downstream of the project. Approximately 240 ft. of existing stream will be impacted due to the project. Approximately 0.90 acres of wetlands will be impacted due to this project. All of the wetlands are located in various places of the floodplain of New Hope Creek and Muddy Creek both up and downstream of the project.

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 in floodplain areas to attenuate and disperse flow. No bridge deck drains will be used directly over the surface water. Shoulder berm gutter was used in high fill slope areas with 2:1 slopes in order to prevent erosion of the steep slopes from the roadway drainage runoff.

Stream Relocations

None

Bridges

Station 70+22 –L-

The existing 136-ft. long dual bridges on US 15-501 over New Hope Creek will be removed and replaced with new dual bridges 300 ft. in length. The new bridges will be 4-span steel I-beam bridges, which will span the water. Temporary cofferdams will be required around the existing piers in order to dewater the site for pier removal. Temporary deck drains will be required on the eastbound lane bridge during construction due to minimum shoulder widths being used in the traffic phasing. The deck drains will be connected into a temporary 16" PVC pipe that will discharge onto the riprap spill through slope away from the creek. The deck drains and 16" PVC pipe will be removed in the final phase.

Station 23+25 -Det1-

The proposed 166 ft. long temporary detour bridge over New Hope Creek will span the creek with no interior bents in the creek.

Culvert

Station 77+89 –L-

The existing 3 @ 9 ft. wide by 10 ft. high RCBC will be extended on the inlet and outlet ends to accommodate the roadway widening. 2-ft. high sills will be installed in the two outer barrels on the inlet end in order to maintain normal channel flow through the middle barrel. Flood plain benches will be constructed at the inlet and outlet ends of the culvert in order to maintain normal channel width at the inlet and outlet of the culvert. The stream will be temporarily diverted near the culvert entrance and outlet to allow for all dry construction.

12/1/2003

FINAL MINUTES OF INTERAGENCY HYDRAULIC DESIGN REVIEW MEETING FOR PROJECT U-4012, DURHAM COUNTY Held on 10/24/03

Team Members:
Andrew Nottingham-NCDOT Hydraulics (Present)
Eric Alsmeyer-USACE (Present)
John Hennessy-NCDWQ (Present)
Gary Jordan-USFWS (Absent)
Travis Wilson-NCWRC (Absent/provided written comments)
Chris Militscher-EPA (Absent)
Matt Haney-NCDOT PDEA (Absent)
Ron Allen-NCDOT Roadway Design (Present)

Participants:
Marc Shown-NCDOT Hydraulics
Elizabeth Lusk-NCDOT PDEA-ONE
Jason Davis-NCDOT Hydraulics
Marc Cheek-NCDOT Structures Design
Bryan Key-NCDOT Roadway Design
Beth Smyre-NCDOT PDEA
Jerry Beard-NCDOT Hydraulics
Rick Nelson-NCDOT Bridge Construction
Mark Staley-NCDOT Roadside Environmental

U-4012

DOT began the meeting with a brief overview of the project. The project involves widening US-15-501 north of Mt. Moriah Rd. to south of Garrett Rd. The existing 135 feet dual lane bridges over New Hope Creek will be replace with 300 feet long dual bridges and the existing 3 @ 9 feet by 10 feet reinforced concrete box culvert (RCBC) on Mud Creek will be extended approximately 26 feet upstream and 28 feet downstream.

The majority of the discussion centered on the construction of the bridges over New Hope Creek.

DOT noted that the temporary detour bridge over New Hope Creek could be specified in the plans to span the creek but that it would most likely require a wider bridge. Based on the present traffic phasing this may require that the temporary detour be shifted further from the proposed bridge which would increase wetland impacts. If the traffic phasing could be change so that all of the traffic could be placed on the North bound bridge once it is complete then the detour would not have to be shifted since it would be removed while they are constructing the South bound bridge. DOT will investigate the possibility to change the traffic phasing.

DOT noted that a minimum distance of 30 feet from the edge of the bridge deck would be required on the south side of the bridge to set the girders. DOT also noted that access would be needed on the south side of the roadway for a distance approximately 75 feet back from the proposed end bents of the bridge. It was noted that the width of the access should not extend beyond the existing waterline easement on the south side (downstream side) of the bridge. This would allow the approach fill to be placed on each end of the bridge.

DOT noted that timber mats could be used to access the site through wetland areas to get to the interior bents and that causeways would likely not be needed. USACOE and DWQ noted that the use of timber mats and method of clearing should be specified in the permit.

DOT noted that the existing high-powered utility lines on the west side of the creek might cause a construction problem since the bridge is being lengthened directly underneath them. DOT noted that it may be possible to build the bridge with the lines in place but it would likely require a temporary work bridge in the creek to access the interior bents during construction. DOT will investigate if the bridge can be built with the lines in place or if the lines can be moved. DWQ noted that if the utility lines need to be relocated and there are wetland impacts associated with it they should be included in the permit.

DOT noted that no deck drains were needed on the bridge. Since the meeting DOT has noted that there may be a need for temporary deck drains during construction if four lanes of traffic are put on the eastbound bridge.

USACOE noted that the wetland impacts due to the detour could be considered temporary and that once the detour fill is removed the ground should be ripped and replanted.

DWQ noted that preformed scour holes should be placed outside of wetland areas.

NCWRC asked if sills were recommended in the culvert at Mud Creek. DOT noted that sills would be used on the culvert at Mud Creek.

DOT will investigate all items noted above and present them during the permit drawing review meeting.

8/24/2004

FINAL MINUTES OF INTERAGENCY PERMIT DRAWING REVIEW MEETING FOR PROJECT U-4012, DURHAM COUNTY Held on 7/21/04

Team Members:
Andrew Nottingham-NCDOT Hydraulics (Present)
Eric Alsmeyer-USACE (Present)
Nicole Thomson-NCDWQ (Present)
Gary Jordan-USFWS (Absent)
Travis Wilson-NCWRC (Present)
Chris Militscher-EPA (Absent)
Matt Haney-NCDOT PDEA (Present)
Ron Allen-NCDOT Roadway Design (Absent)
Tracey Parrot-NCDOT Division 5 (Present)

Participants:
Marc Shown-NCDOT Hydraulics
David Smith -NCDOT Preconstruction
Jason Davis-NCDOT Hydraulics
John Duggins-NCDOT Structures Design
Bryan Key-NCDOT Roadway Design
Beth Smyre-NCDOT PDEA
Rick Nelson-NCDOT Bridge Construction
Mark Staley-NCDOT Roadside Environmental
Chris Murray-NCDOT Division 5
John Henessy-NCDWQ
David Chang-NCDOT Hydraulics

U-4012

NCDOT Hydraulics noted that the description of the bridge in the Stormwater Management Plan should list the bridge as a 4 span structure instead of a 3 span structure.

USACOE asked about the temporary stream impact shown for the culvert at site 1. They noted that the stream impact should be shown as a permanent impact since there will be rip rap below ordinary high water. The drawings will be changed to reflect this.

NCDOT Construction questioned if building the culvert wings would be considered a permanent channel impact. USACOE noted that the culvert wings would not be considered a permanent channel impact unless they effect the stream below the ordinary highwater mark.

NCDOT Construction also noted that the area around (above and behind) the culvert wings and headwall is sometimes hard to stabilize and may need to be rip rapped. They asked if this needed to be shown on the drawings. USACOE noted that it is not a permit

issue as long as it is minimized and stays out of the stream and would not need to be shown on the drawings. NCDWQ noted the same.

NCDWQ asked why a Preformed Scour Hole was not used at the outlet of the pipe right of station 66+50 –L-. NCDOT Hydraulics noted that it would conflict with a waterline located at the outlet of the pipe. NCDOT noted that rip rap would be used at the pipe outlet to dissipate energy.

USACOE asked about the timber mats in the wetland areas. NCDOT noted that it was shown where it was anticipated that construction equipment would have to cross wetland areas to access the bridge site.

NCWRC noted that the project commitment concerning the wildlife fencing should be included in the permit but that the fencing does not need to be shown on the plans since it will be done at a later date.

Removal of the existing piers was discussed. It was decided that rip rap would be shown where the existing piers are to be removed in order to help stabilize the stream bank. NCWRC noted that flattening the stream bank slopes to 2:1 and lining with rip rap would be acceptable. This will be shown on the plan and profile views.

USACOE requested that the mechanized clearing impact be reduced right of station 74+00 –L- and that the note about using timber mats in wetlands areas be shown at this location also. The drawings will be changed to reflect this.

NCDOT questioned if erosion control devices were allowed in wetlands in the mechanized clearing area. USACOE and NCDWQ noted that if sediment control basins or silt ditches were needed then they would have to be shown as excavation in wetlands. NCDOT will coordinate and determine what needs to be used.

USACOE asked if the temporary detour bridge would have any bents in the creek. NCDOT noted that no bents would be placed in the creek for the detour bridge.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: Chris Murray	Date: Aug 15, 2000 County: Durham 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: A Transect ID: upland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Lespedeza cuneata	H	UPL
2. Ambrosia artemesiifolia	H	FACU
3. Microstegium vimineum	H	FACT
4. Solidago sp.	H	–
5. Tripsacum dactyloides	H	FACT
6. Aster novae-boracensis	H	UPL
7. Erigeron canadensis	H	UPL
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 28

Remarks: prevalence of non-hydrophytic species at sampling point

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: wetland hydrology is not present at site

SOILS

Map Unit Name (Series and Phase): Chewaela — Drainage Class: SPD

Taxonomy (Subgroup): _____ 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	A1	10YR 3/2			loam
2-12+	A2	7.5YR 5/3	7.5YR 5/6	few distinct	clay (fill material)

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:

Non-hydric soil is present

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks:

Non-wetland site

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: Chris Murray	Date: Aug. 15, 2000 County: Durham 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: A Transect ID: wetland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Juncus effusus	H	FACW+
2. Solidago sp.	H	-
3. Carex sp.	H	-
4. Veronia noveboracensis	H	FACt
5. Fraxinus pennsylvanica	S/S	FACW
6. Ligustrum sinense	S/S	FACt
7. Salix nigra	S/S	OBL
8. Toxicodendron radicans	✓	FAC
9. Compsis radicans	✓	FAC
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: prevalence of hydrophytic species at 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:	9 (in.)
Depth to Saturated Soil:	0 (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: wetland hydrology is present at site

SOILS

Map Unit Name (Series and Phase): Cherada

Drainage Class: SPD

Taxonomy (Subgroup): _____

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.
0-6	A1	10YR 5/2	10YR 5/6	few distinct	Sandy clay
6-12+	A2	7.5YR 5/1			Sandy clay

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 soil is present at 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? (Yes) No (Circle)

Remarks:

Wetland site.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: C Murray	Date: 8/15/00 County: Durham 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: SiteB Transect ID: upland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Liquidambar styraciflua	T/S	FAC+
2. Acer rubrum	T/S	FAC
3. Platanus occidentalis	S	FACW-
4. Chasmanthium latifolium	H	FAC-
5. Betula nigra	T/S	FACW
6. Verbesina occidentalis	H	FACW
7. Lonicera japonica	V	FAC-
8. Dichanthelium arundinaceum	H	OBL
9. L. styraciflua	S/S	FAC+
10. Acer rubrum	S/S	FAC
11. Betula nigra	S/S	FACW
12.		
13.		
14.		
15.		
16.		

Look up current name for oak

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 73

Remarks: prevalence of hydrophytic species at 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: Wetland hydrology is not present at site

SOILS

Map Unit Name (Series and Phase): Chewacla

Drainage Class: SPD

Taxonomy (Subgroup): _____

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	A1	10YR 4/3	-	-	silty clay
2-12+	A2	10YR 5/3	7.5YR 3/2 7.5YR 5/6	few distinct	clay

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:

Non-hydric soil is present at site

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks:

Non-wetland; all parameters are not present.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: Chris Murray	Date: 8.15.00 County: Durham 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: Site B Transect ID: Wetland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Dulichium arundinaceum	H	OBL
2. Vitis rotundifolia	V	FAC
3. Carex sp	H	—
4. Boehmeria cylindrica	H	FACW+
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-). 100

Remarks:
prevalence of hydrophytic species at 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: _____ (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:
wetland hydrology is present at site.

SOILS

Map Unit Name (Series and Phase): Chewacla

Drainage Class: SPD

Taxonomy (Subgroup): _____

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	A	5YR 5/8	7.5YR 6/8	common/distinct	Clay
2-12	E	10YR 6/2	5YR 5/6		" "

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 soil is present at S1P

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

wetland; all parameters are present at S1P.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: C. Murray	Date: Aug 15, 2000 County: Sullivan 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: Site C Transect ID: upland Plot ID: 1

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Acer rubrum	T	FAC
2. Acer rubrum	S/S	FAC
3. Fraxinus pennsylvanica	S/S	FACW
4. Toxicodendron radicans	V	FAC
5. Rubus argutus	S	FACW+
6. Commelina sp	H	—
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: prevalence of hydrophytic species at sampling point

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: wetland hydrology is not present on site

SOILS

Map Unit Name (Series and Phase): Chewacla

Drainage Class: SPD

Taxonomy (Subgroup): _____

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.
0-6	A	7.5YR 6/4			Sand
6-12+	A	7.5YR 4/3			Sandy loam

recently deposited material

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:

Non-hydric soil is present at 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:

Non-wetland; all three parameters are not present

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: Chris Murray	Date: Aug 15, 2000 County: Durham 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: C Transect ID: Wetland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Liquidambar styraciflua	T	FAC+	9.		
2. Acer rubrum	T	FAC	10.		
3. Fraxinus pennsylvanica	S	FACW	11.		
4. Cinna arundinacea	H	FACW	12.		
5. Dulichium arundinaceae	H	OBL	13.		
6. L. styraciflua	S	FAC+	14.		
7. A. rubrum	S	FAC	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: prevalence of hydrophytic species at 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:	17	(in.)
Depth to Saturated Soil:	0	(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: Wetland hydrology is present at site

SOILS

Map Unit Name (Series and Phase): Chewacla

Drainage Class: SPD

Taxonomy (Subgroup): _____

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.
0-6	A	7.5YR 5/1			silty clay
6-12+	A	7.5YR 6/1	7.5YR 5/6	common/distinct	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 soil is present at 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:

wetland; all three parameters are present

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: Chris Murray	Date: 15 Aug 2000 County: Durham 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: D Transect ID: upland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Liriodendron tulipifera	T	FAC
2. Acer saccarhum (spelling?)	S	FACW-
3. Ulmus alatus	S	FACU+
4. Carpinus caroliniana	S	FAC
5. Ilex decidua	S	FACW-
6. Microstegium vimineum	H	FAC+
7. Parthenocissus quinquefolia	V	FAC
8. Carya tomentosa	T	UPL
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75

Remarks:
prevalence of hydrophytic species at 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:
wetland hydrology is not present at site

SOILS

Map Unit Name (Series and Phase): Chewacla Drainage Class: SPD

Taxonomy (Subgroup): _____ 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	A1	10YR 4/3			clay
4-10	A2	10YR 4/4			clay
10-12+	A3	10YR 4/4	10YR 6/3	common/faint	clay

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:

Non-hydric soil is present at 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? Yes (No) (Circle)

Remarks:

Non-wetland; all three parameters are not present at site

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: Chris Murray	Date: 15 Aug 2000 County: Durham 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: D Transect ID: wetland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Quercus lyrata	T	OBL	9.		
2. Liquidambar styraciflua	T	FAC+	10.		
3. Acer rubrum	T	FAC	11.		
4. Ulmus alata	T	FACU+	12.		
5. Smilax rotundifolia	V	FAC	13.		
6. Toxicodendron radicans	V	FAC	14.		
7. Liquidambar styraciflua	T	FAC+	15.		
8. Acer rubrum	S	FAC	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 88

Remarks:
prevalence of hydrophytic species at 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: 0 (in.)

Depth to Saturated Soil: 0 (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:
wetland hydrology is present at site.

SOILS

Map Unit Name (Series and Phase): Chewacla

Drainage Class: SPD

Taxonomy (Subgroup): _____

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+	A	10YR 5/2	7.5YR 5/6	common/distinct	silty 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:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: Chris Murray	Date: 15 Aug 2000 County: Durham 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: E Transect ID: upland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Acer rubrum	T	FAC	9.		
2. Carya tomentosa	T	UPL	10.		
3. Asimina triloba	S	FAC	11.		
4. Toxicodendron radicans	V	FAC	12.		
5. Smilax rotundifolia	V	FAC	13.		
6. Acer rubrum	S	FAC	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 83

Remarks: prevalence of hydrophytic species at 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: wetland hydrology is not present on site.

SOILS

Map Unit Name (Series and Phase): Chewacla

Drainage Class: SPD

Taxonomy (Subgroup): _____

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	A1	10YR 3/3	–	–	clay loam
2-8	AE	7.5YR 4/4	5YR 4/6	common/faint	clay loam
8-12+	E	10YR 5/4	–	–	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:

Non-hydric soil is present at 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:

Non-wetland; all three parameters are not present at site.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: Chris Murray	Date: 15 Aug 2000 County: Durham 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: E Transect ID: wetland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Acer rubrum	T/S	FAC
2. Liquidambar styraciflua	T	FACt
3. Quercus lyrata	T	OBL
4. Ulmus alata	S	FACu+
5. Smilax rotundifolia	H	FAC
6. Carex sp.	H	OBL
7. Carex sp.	H	—
8. Unidentified monocot	H	OBL
9. Liquidambar styraciflua	S	FACt
10. Q. lyrata	S	OBL
11. A. rubrum	S	FAC
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 90

Remarks:

prevalence of hydrophytic species at 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:	0 (in.)
Depth to Saturated Soil:	0 (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:

wetland hydrology is present at site.

SOILS

Map Unit Name (Series and Phase): Chewacla — Drainage Class: SPD

Taxonomy (Subgroup): _____ — 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	A1	10YR 4/2	-	-	silty clay
1-8	A2	7.5YR 4/6	10YR 5/1	common/distinct	clay loam
8-12+	E1	10YR 5/2	7.5YR 5/6	common/distinct	clay

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 soil is 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:

wetland, all parameters are present

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: C. Murray	Date: 9/6/00 County: Durham 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: Z Transect ID: Upland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Acer rubrum	s/s	FAC
2. Lonicera japonica	v	FAC-
3. Smilax rotundifolia	v	FAC
4. Solidago sp.	h	—
5. Acer negundo	s/s	PACW
6. Juncus effusus	h	FACW+
7. Solanum sp		—
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 80

Remarks:
prevalence of hydrophytic species at 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:

SOILS

Map Unit Name (Series and Phase): Chewacla Drainage Class: SPD

Taxonomy (Subgroup): _____ 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.
0-5		10YR 4/3			clay loam
5-12+		2.5Y 6/3	[illegible]	[illegible]	clay

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:

Non-hydric soil [illegible]

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:

Non-wetland; all three parameters are not present at S/P.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4017 Applicant/Owner: NCDOT Investigator: A. Murray	Date: 9/16/00 County: Durham 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: — Transect ID: wetland Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Fraxinus pennsylvanica	T	FACW+	9.		
2. Juncus effusus	H	FACW+	10.		
3. Salix nigra	sap	OBL	11.		
4. Acer rubrum	S/S	FAC	12.		
5. Cephalanthus occidentalis	H	OBL	13.		
6. Saururus cernuus	H	OBL	14.		
7. Carex sp.	H	—	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks:
prevalence of hydrophytic species at 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:	9	(in.)
Depth to Saturated Soil:	4	(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:
wetland hydrology is present at site

SOILS

Map Unit Name (Series and Phase): Chewaclo

Drainage Class: SPD

Taxonomy (Subgroup): _____

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.
0-5		10YR 6/2	7.5YR 5/6 10YR 6/3		cl
5-14+		10YR 6/2	7.5YR 5/6 10YR 6/1		cl

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:

a hydric soil is present at 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? (Yes) No (Circle)

Remarks:

Wetland; all parameters are present at site.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: C. Murray	Date: 9/6/00 County: Durham 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: P Transect ID: Upland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Toxicodendron radicans	V	FAC	9. Ulmus americana	S/S	FACW
2. Acer rubrum	S/S	FAC	10.		
3. Acer rubrum	T	FAC	11.		
4. Liquidambar styraciflua	T	FAC+	12.		
5. Liquidambar styraciflua	S/S	FAC+	13.		
6. Pinus taeda	T	FAC	14.		
7. Liriodendron tulipifera	T	FAC	15.		
8. Lonicera japonica	V	FAC-	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 89

Remarks:

prevalence of hydrophytic plants at 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:

wetland hydrology is not present at site

SOILS

Map Unit Name (Series and Phase): Chewacla

Drainage Class: SPD

Taxonomy (Subgroup): _____

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	A	10YR 6/3	10YR 6/8	common, distinct	clay loam
			10YR 7/1	common, distinct	

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:

Non-hydric soil is present at site

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

(Circle)
Is this Sampling Point Within a Wetland? Yes (No)

Remarks:

Non-wetland; all parameters are not present at site.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: W-4012 Applicant/Owner: NCDOT Investigator: J. Craig / C. Murray	Date: 9/6/00 County: Durham 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: Site P Transect ID: Upland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Acer rubrum	S/S	FAC	9.		
2. Liquidambar styr.	T	FACt	10.		
3. Liquidambar styr.	S/S	FACt	11.		
4. Carpinus caroliniana	S/S	FAC	12.		
5. Acer saccharum	S/S	FACU-	13.		
6. Toxicodendron radicans	V	FAC	14.		
7. Parthenocissus quinq.	V	FAC	15.		
8. Carex sp.	H	-	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 00/00

Remarks: prevalence of hydrophytic species at sampling point

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: Two primary indicators are present at site

SOILS

Map Unit Name (Series and Phase): Chewaclan — Drainage Class: SPD

Taxonomy (Subgroup): _____ — 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		10YR5/4	10YR5/8	few distinct	clay loam
4-12+		10YR5/2	10YR4/6	common distinct	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 soil is present at site

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No (Circle)		(Circle)
Wetland Hydrology Present?	(Yes) No	Is this Sampling Point Within a Wetland?	(Yes) No
Hydric Soils Present?	(Yes) No		

Remarks:

Site is a wetland; all three parameters are present at site

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: C. Murray / J. Gray	Date: 9/6/00 County: Durham 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: Q Transect ID: Upland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Toxicodendron radicans	V	FAC	9. Ulmus americana	S/L	FACW
2. Acer rubrum	S/S	FAC	10.		
3. Acer rubrum	T	FAC	11.		
4. Liquidambar styr.	T	FACT	12.		
5. Liquidambar styraci.	S/S	FACT	13.		
6. Pinus taeda	T	FAC	14.		
7. Liriodendron tulip.	T	FAC	15.		
8. Lonicera japonica	V	FAC-	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 89

Remarks:
prevalence of hydrophytic plants at sampling point

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:
wetland hydrology is not present at this

SOILS

Map Unit Name (Series and Phase): Clarinda — Drainage Class: SPD

Taxonomy (Subgroup): _____ 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+	A	10YR 6/3	10YR 6/8	common distinct	clay loam
			10YR 7/1	common distinct	

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:

Non-hydric soil is present on 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:

Non wetland; all three parameters are not present on site

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: U-4012 Applicant/Owner: NCDOT Investigator: C. MURRAY / J. Gray	Date: 9/6/00 County: Durham 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: 0 Transect ID: wetland Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Fraxinus pennsylvanica	S/S	FACW	9.		
2. Acer rubrum	S/S	FAC	10.		
3. Liquidambar styrac.	T	FAC+	11.		
4. Rubus argutus	S/S	FACU+	12.		
5. Carex sp.	H	—	13.		
6. Ulmus americana	T	FACW	14.		
7. Campsis radicans	V	FAC	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 83

Remarks:
prevalence of hydrophytic plants at 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:
Two primary indicators are present at site.

SOILS

Map Unit Name (Series and Phase): Chewacla — Drainage Class: SPD

Taxonomy (Subgroup): _____ — 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+	A	10YR 6/2	10YR 4/6	common, distinct	clay loam
			10YR 4/1	common, distinct	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 soil is present at site

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No (Circle)	(Circle)
Wetland Hydrology Present?	(Yes)	No	
Hydric Soils Present?	(Yes)	No	Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

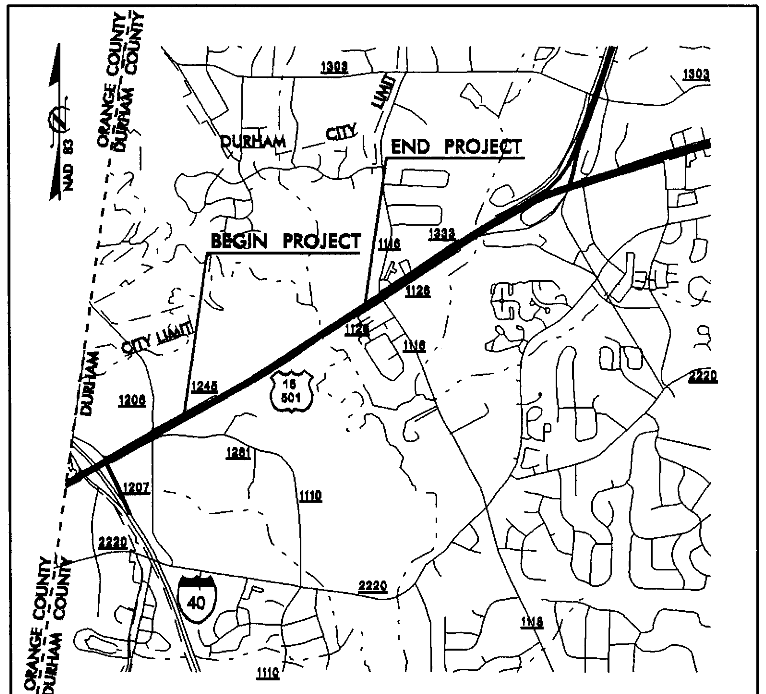
wetland; all three parameters are present at site.

Approved by HQUSACE 2/92

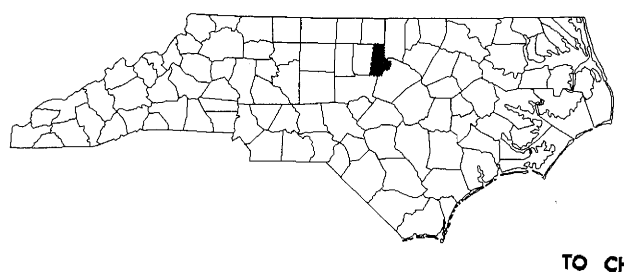
09/08/99

CONTRACT: C201206 TIP PROJECT: U-4012

See Sheet 1-A For Index of Sheets



VICINITY MAP



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

DURHAM COUNTY

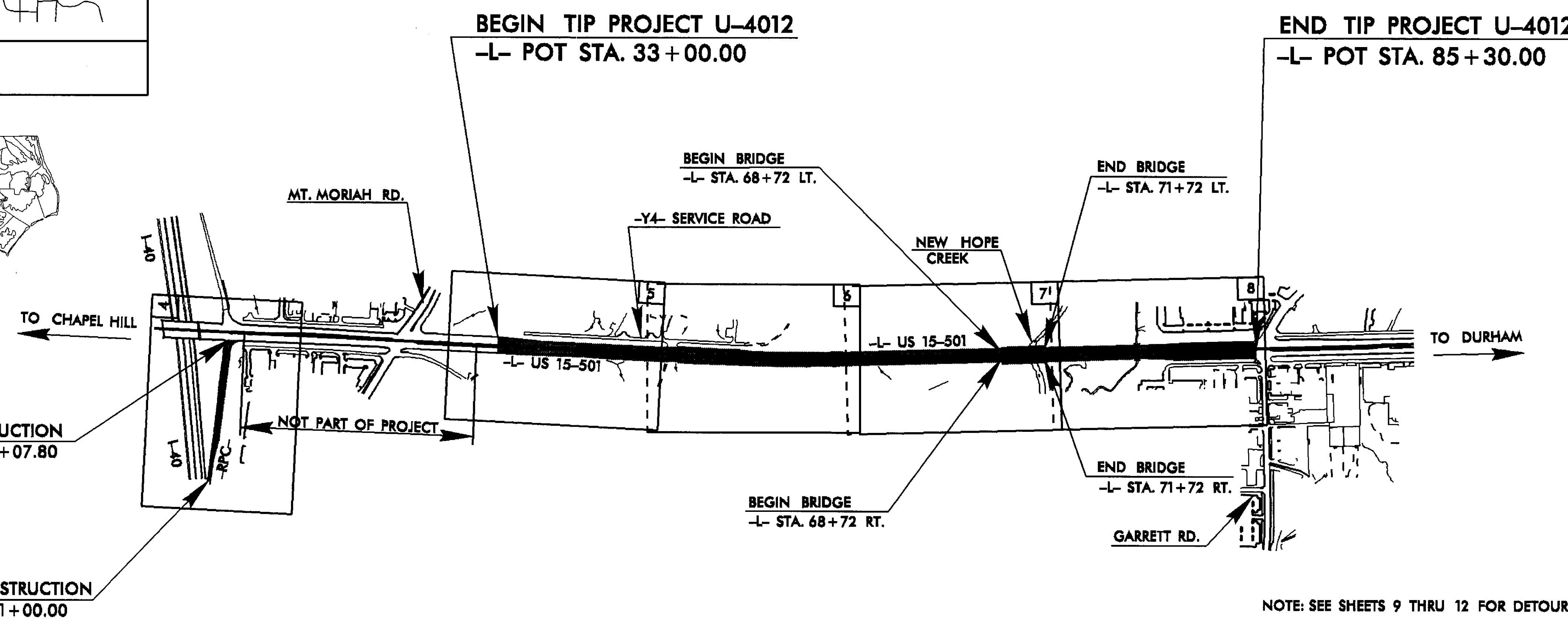
LOCATION: US 15-501 FROM NORTH OF MT MORIAH ROAD TO SOUTH OF GARRETT ROAD

TYPE OF WORK: GRADING, DRAINAGE, PAVING, WIDENING, RESURFACING, SIGNALS (MOD), STRUCTURES, AND CULVERT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4012	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
35012.1.1	MA-NHF-15(8)	PE
35012.2.2	NHF-15(8)	R/W, UTIL

NAD 83



NOTE: SEE SHEETS 9 THRU 12 FOR DETOURS

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF DURHAM.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2002 = 50,524
ADT 2025 = 99,100
DHV = 9 %
D = 60 %
T = 7 % *
V = 60 MPH
* TTST 4% DUAL 3%
FUNC. CLASS = ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-4012 = 0.913 MI
LENGTH STRUCTURE TIP PROJECT U-4012 = 0.057 MI
TOTAL LENGTH OF TIP PROJECT U-4012 = 0.970 MI

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

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

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

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 30, 2004

LETTING DATE:
APRIL 19, 2005

RONALD D. ALLEN, P.E.
PROJECT ENGINEER

BRYAN KEY, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

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

25-AUG-2004 13:27
R:\Proj\u4012_tsh
jmdavis AT HY206434

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
U-4012	1-B

*S.U.E = SUBSURFACE UTILITY ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

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
- 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 — RB
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Shoreline
- Falls, Rapids
- Prop Lateral, Tail, Head 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
- U/G Telephone Cable Hand Hold — TH
- Cable TV Pedestal — C
- U/G TV Cable Hand Hold — TH
- U/G Power Cable Hand Hold — TH
- Hydrant
- Satellite Dish
- Exist. Water Valve
- Sewer Clean Out
- Power Manhole
- Telephone Booth
- Cellular Telephone Tower
- 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.*) — ATTUR
- Abandoned According to U/G Record — E.O.I.
- End of Information

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
- High Quality Wetland Boundary — HQ WLB
- Medium Quality Wetland Boundaries — MQ WLB
- Low Quality Wetland Boundaries — LQ 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

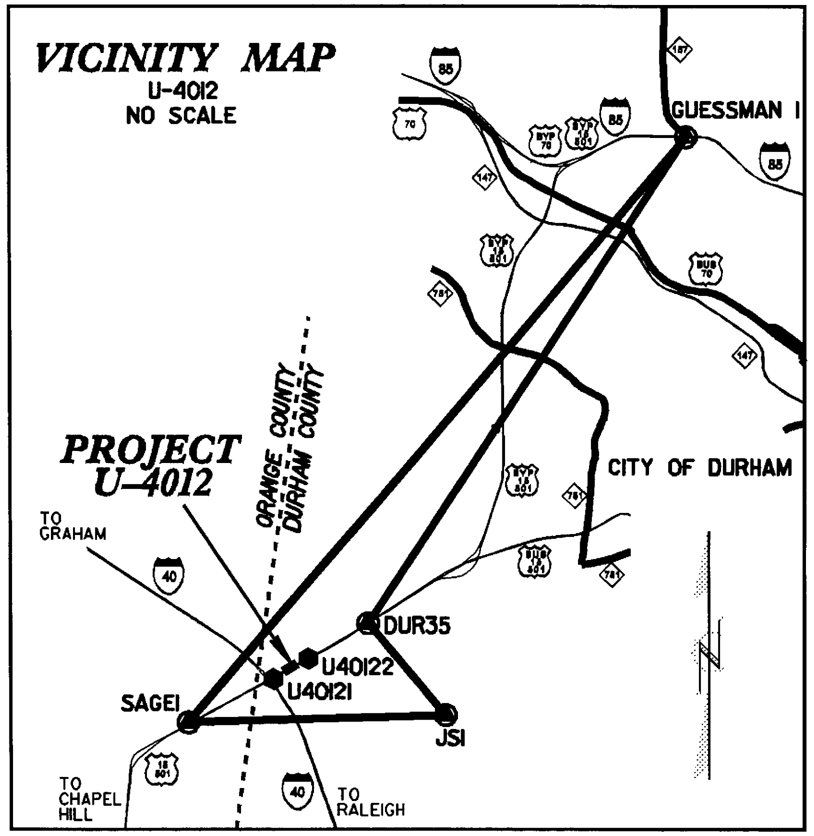
revised 02/02/00

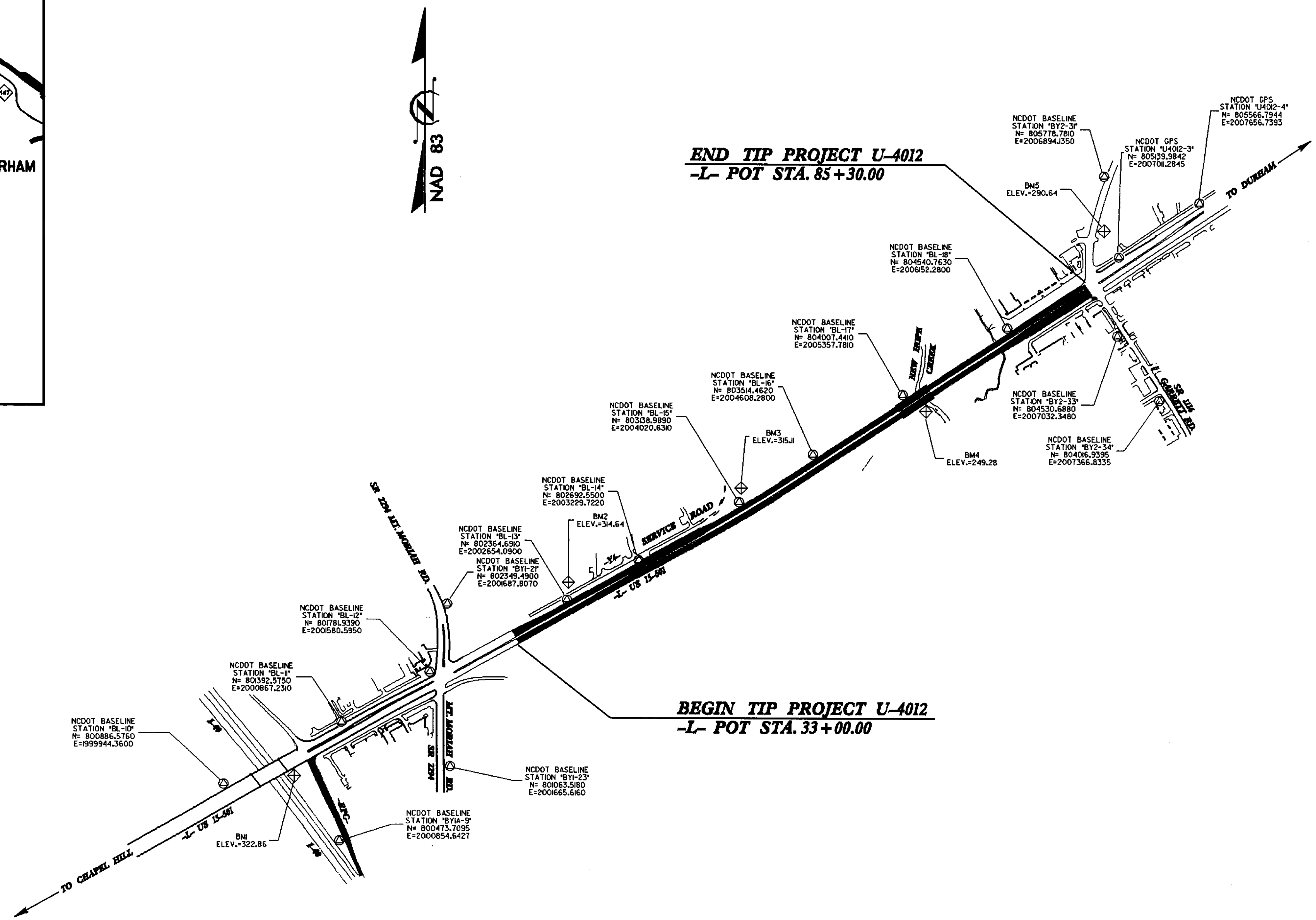
PROJECT REFERENCE NO.	SHEET NO.
U-4012	I-C
LOCATION AND SURVEYS	

U-4012 SURVEY CONTROL SHEET

VICINITY MAP

U-4012
NO SCALE





NOTES

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAYBE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.

2. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   THE FILES TO BE FOUND ARE AS FOLLOWS:

   U4012_LS_GPSCALIB_040122.TXT
   U4012_LS_WGS84_040122.TXT
   U4012_LS_LOCAL_040122.TXT
   U4012_LS_BASELINE_040122.TXT

   THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "CAPRI"
WITH NAD 83 STATE PLANE GRID COORDINATES OF
NORTHING: 805205.9355(ft) EASTING: 2007271.7129(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99994124
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "CAPRI" TO -L- STATION 33+00.00 IS
S 58° 11' 00.7" W 5927.8674'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

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

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION.

SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

1/22/04

PROJECT REFERENCE NO.	SHEET NO.
U-4012	1-D
LOCATION AND SURVEYS	

SURVEY CONTROL SHEET U-4012

GPS CALIBRATION REPORT

PROJECT = U4012

TIP NUMBER
USER NAME KHUDSON DATE & TIME 2:50:22 PM 1/14/04

COORDINATE SYSTEM US STATE PLANE 1983 ZONE NORTH CAROLINA 3200
HORIZONTAL DATUM NAD 1983 (CONUS)
VERTICAL DATUM GEOID MODEL GEOID99 (CONUS)
COORDINATE UNITS US SURVEY FEET
DISTANCE UNITS US SURVEY FEET
HEIGHT UNITS US SURVEY FEET

LOCAL SITE INFORMATION

LOCALIZED AROUND NCGS 'CAPRI'
NORTHING 805205.9355
EASTING 2007271.7729
SITE SCALE FACTOR 1.000058763

THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION USES A LOCALIZED COORDINATE SYSTEM
WHICH IS VERY SIMILAR TO NORTH CAROLINA ZONE 3200 FROM WHICH IT IS DERIVED.
PLEASE TAKE CARE IN UTILIZING THESE COORDINATES TO ELIMINATE CONFUSION OF THE TWO SYSTEMS.
THIS FILE IS TO AID IN THE USE OF REAL TIME KINEMATIC (RTK) GPS DURING CONSTRUCTION LAYOUT.

DATUM TRANSFORMATION PARAMETERS

DATUM TRANSFORMATION COMPUTATION NOT REQUESTED

UPDATED DEFAULT PROJECTION (TRANSVERSE MERCATOR) DEFINITION

UPDATED DEFAULT PROJECTION NOT REQUESTED

HORIZONTAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ROTATION CENTER	805648.477SFT
EASTING COORDINATE OF ROTATION CENTER	2006308.411SFT
ROTATION ABOUT THE CENTER POINT	0°00'00"
TRANSLATION NORTH	-0.016SFT
TRANSLATION EAST	0.033SFT
SCALE FACTOR	1.00005066

VERTICAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ORIGIN POINT	798805.431SFT
EASTING COORDINATE OF ORIGIN POINT	1996126.909SFT
VERTICAL SEPARATION AT ORIGIN	-0.007SFT
SLOPE NORTH	3.957PPM
SLOPE EAST	-2.711PPM

GEOID MODEL DEFINITION

GEOID99 (CONUS)

RESIDUAL DIFFERENCES BETWEEN GPS (WGS84) AND LOCAL COORDINATES

SUMMARY

	MAXIMUM ERROR	ROOT MEAN SQUARE ERROR	POINT
HORIZONTAL	0.102SFT	0.014	SAGE - WGS84
VERTICAL	0.048SFT	0.008	SAGE - WGS84
THREE-DIMENSIONAL	0.113SFT	0.017	SAGE - WGS84

POINT RESIDUALS

WGS84 COORDINATES		CALCULATED POINT FOR DISPLAY ONLY		LOCAL COORDINATES	
POINT	SAGE - WGS84	NORTHING	798805.431SFT	POINT	SAGE - LOCAL
LATITUDE	35°56'41.29031"N	EASTING	1996126.909SFT	NORTHING	798805.422SFT
LONGITUDE	79°00'47.09912"W	ELEVATION	334.484SFT	EASTING	1996127.010SFT
HEIGHT	232.641SFT	HORZ ERROR	0.102SFT	ELEVATION	334.436SFT
		VERT ERROR	0.048SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.113SFT	QUALITY CONTROL	QUALITY
POINT	44 JS 1 - WGS84	NORTHING	799179.552SFT	POINT	44 JS 1 - LOCAL
LATITUDE	35°56'44.97749"N	EASTING	2009418.841SFT	NORTHING	799179.541SFT
LONGITUDE	78°58'05.44827"W	ELEVATION	316.905SFT	EASTING	2009418.769SFT
HEIGHT	214.609SFT	HORZ ERROR	0.073SFT	ELEVATION	316.870SFT
		VERT ERROR	0.035SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.081SFT	QUALITY CONTROL	QUALITY
POINT	GUESSMAN - WGS84	NORTHING	829385.437SFT	POINT	GUESSMAN - LOCAL
LATITUDE	36°01'42.82700"N	EASTING	2021989.360SFT	NORTHING	829385.469SFT
LONGITUDE	78°55'32.29549"W	ELEVATION	396.574SFT	EASTING	2021989.387SFT
HEIGHT	294.442SFT	HORZ ERROR	0.037SFT	ELEVATION	396.558SFT
		VERT ERROR	0.016SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.041SFT	QUALITY CONTROL	QUALITY
POINT	DUR 35 - WGS84	NORTHING	803985.433SFT	POINT	DUR 35 - LOCAL
LATITUDE	35°57'32.51379"N	EASTING	2005390.042SFT	NORTHING	803985.437SFT
LONGITUDE	78°58'54.43419"W	ELEVATION	259.572SFT	EASTING	2005390.029SFT
HEIGHT	157.519SFT	HORZ ERROR	0.014SFT	ELEVATION	259.583SFT
		VERT ERROR	0.011SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.018SFT	QUALITY CONTROL	QUALITY
POINT	U-4012-1 - WGS84	NORTHING	801072.437SFT	POINT	U-4012-1 - LOCAL
LATITUDE	35°57'03.71159"N	EASTING	2000541.762SFT	NORTHING	801072.434SFT
LONGITUDE	78°59'53.40748"W	ELEVATION	322.319SFT	EASTING	2000541.762SFT
HEIGHT	220.374SFT	HORZ ERROR	0.003SFT	ELEVATION	322.336SFT
		VERT ERROR	0.017SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.017SFT	QUALITY CONTROL	QUALITY
POINT	U-4012-2 - WGS84	NORTHING	802132.613SFT	POINT	U-4012-2 - LOCAL
LATITUDE	35°57'14.19496"N	EASTING	2002332.587SFT	NORTHING	802132.609SFT
LONGITUDE	78°59'31.62571"W	ELEVATION	310.590SFT	EASTING	2002332.569SFT
HEIGHT	208.605SFT	HORZ ERROR	0.018SFT	ELEVATION	310.610SFT
		VERT ERROR	0.020SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.027SFT	QUALITY CONTROL	QUALITY

POINT	U-4012-3 - WGS84	NORTHING	805139.986SFT	POINT	U-4012-3 - LOCAL
LATITUDE	35°57'43.92793"N	EASTING	2007011.301SFT	NORTHING	805139.984SFT
LONGITUDE	78°58'34.71046"W	ELEVATION	280.445SFT	EASTING	2007011.286SFT
HEIGHT	178.359SFT	HORZ ERROR	0.015SFT	ELEVATION	280.463SFT
		VERT ERROR	0.018SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.024SFT	QUALITY CONTROL	QUALITY

POINT	U-4012-4 - WGS84	NORTHING	805566.796SFT	POINT	U-4012-4 - LOCAL
LATITUDE	35°57'48.14711"N	EASTING	2007656.749SFT	NORTHING	805566.796SFT
LONGITUDE	78°58'26.85782"W	ELEVATION	272.729SFT	EASTING	2007656.739SFT
HEIGHT	170.630SFT	HORZ ERROR	0.010SFT	ELEVATION	272.762SFT
		VERT ERROR	0.033SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.034SFT	QUALITY CONTROL	QUALITY

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "CAPRI" WITH NAD 1983 STATE PLANE GRID COORDINATES OF NORTHING: 805205.9355(ft) EASTING: 2007271.7729(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999941240
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "CAPRI" TO -L- STATION 33+00.00 IS
S 58°11'00.7" W 5927.867'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NOTES

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAYBE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.

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   THE FILES TO BE FOUND ARE AS FOLLOWS:

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   U4012_LS_WGS84_040122.TXT
   U4012_LS_LOCAL_040122.TXT
   U4012_LS_BASELINE_040122.TXT

   THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

25-AUG-2004 13:27
R:\Proj\u4012_pshld.dgn
davis AT HY2K2434

1/22/04

PROJECT REFERENCE NO.	SHEET NO.
U-4012	I-E
LOCATION AND SURVEYS	

SURVEY CONTROL SHEET

BASELINE DATA

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
10		800886.5760	1999944.3600	328.82	OUTSIDE PROJECT LIMITS	
11		801392.5750	2000867.2310	320.04	17+70.36	59.74 LT
12		801781.9390	2001580.5950	312.60	25+83.06	55.12 LT
13		802364.6910	2002654.0900	312.92	38+04.49	45.39 LT
14		802692.5500	2003229.7220	311.11	44+66.89	53.62 LT
15		803138.9890	2004020.6310	314.39	53+77.53	49.21 LT
16		803514.4620	2004608.2800	296.56	60+76.40	44.99 LT
17		804007.4410	2005357.7810	259.28	69+73.49	44.46 LT
18		804540.7630	2006152.2800	258.97	79+30.36	52.87 LT
3		805139.9840	2007011.2840	280.46	89+77.34	80.84 LT
4		805566.7940	2007656.7390	272.76	97+51.15	82.28 LT

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
21		802349.4900	2001687.8070	316.91	29+51.61	499.84 LT
120		801781.9390	2001580.5950	312.60	25+83.06	55.12 LT
23		801063.5180	2001665.6160	299.19	23+09.68	614.68 RT

BY1A

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
110		800886.5760	1999944.3600	328.82	OUTSIDE PROJECT LIMITS	
9		800473.7095	2000854.6428	306.85	13+14.55	738.20 RT

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	BY2 STATION	OFFSET
31		805778.7810	2006894.1350	303.63	5+00.00	0.00
130		805139.9842	2007011.2845	280.46	11+49.45	0.00
33		804530.6880	2007032.3480	267.77	17+59.11	0.00
34		804016.9395	2007366.8335	258.13	23+72.15	0.00

BENCHMARK DATA

BM1 ELEVATION = 322.86
N 801017 E 2000444
L STATION 12+18 64 RIGHT
SQUARE CUT IN CONCRETE BRIDGE NORTHEAST WINGWALL

BM2 ELEVATION = 314.64
N 802462 E 2002597
L STATION 38+02 158 LEFT
RR SPIKE SET IN BASE OF 20" DOUBLE HICKORY

BM3 ELEVATION = 315.11
N 803255 E 2003958
L STATION 53+85 181 LEFT
RR SPIKE SET IN BASE OF 19" PINE

BM4 ELEVATION = 249.28
N 803932 E 2005499
L STATION 70+50 96 RIGHT
RR SPIKE SET IN BASE OF 18" RED OAK

BM5 ELEVATION = 290.64
N 805353 E 2006845
L STATION 89+56 350 LEFT
RR SPIKE SET IN BASE OF 12" PINE

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "CAPRI"
WITH NAD 83 STATE PLANE GRID COORDINATES OF
NORTHING: 805205.9355(ft) EASTING: 2007271.7729(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999941240
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM "CAPRI" TO -L- STATION 33+00.00 IS
S 58° 11' 00.7" W 5,927.8674'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NOTES

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAYBE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.

2. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   THE FILES TO BE FOUND ARE AS FOLLOWS:

   U4012_LS_GPSCALIB_040122.TXT
   U4012_LS_WGS84_040122.TXT
   U4012_LS_LOCAL_040122.TXT
   U4012_LS_BASELINE_040122.TXT

   THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

25-AUG-2004 13:27
R:\Proj\u4012-pshle.dgn
ndavis AT HY206434

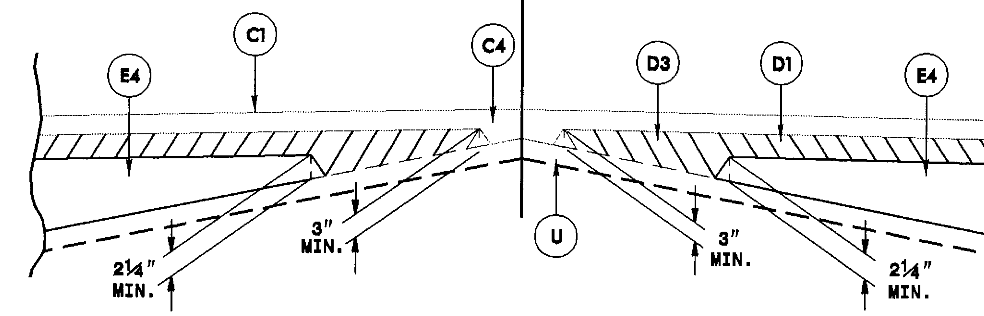
PROJECT REFERENCE NO.	SHEET NO.
U-4012	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

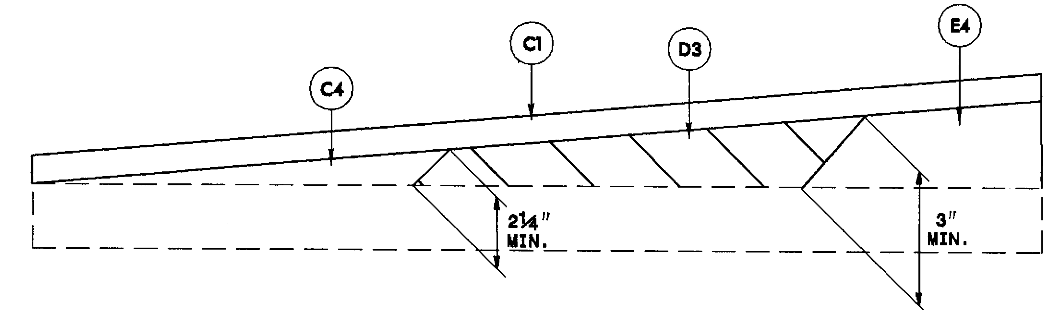
PAVEMENT SCHEDULE

C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	J1	PROP. 8" AGGREGATE BASE COURSE.
C2	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C AT AN AVERAGE RATE OF 140 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	J2	PROP. 10" AGGREGATE BASE COURSE.
C3	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	R1	2'-6" CONCRETE CURB AND GUTTER.
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1½" IN DEPTH.	R2	4' EXPRESSWAY GUTTER
C5	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B AT AN AVERAGE RATE OF 140 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	R3	5 " MONOLITHIC CONCRETE ISLAND.
D1	PROP. APPROX. 2½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	T	EARTH MATERIAL.
D2	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	U	EXISTING PAVEMENT.
D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2¼" IN DEPTH OR GREATER THAN 4" IN DEPTH.	V	MILLING BITUMINOUS PAVEMENT. 1½" DEPTH.
D4	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	W	VARIABLE DEPTH ASPHALT PAVEMENT. (SEE STANDARD WEDGING DETAIL, SHEET NO. 2)
E1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE B25.0C AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.		
E2	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.		
E3	PROP. APPROX. 9½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C AT AN AVERAGE RATE OF 541.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.		
E4	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.		
E5	PROP. APPROX. 4" ASPHALT CONCRETE SURFACE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.		

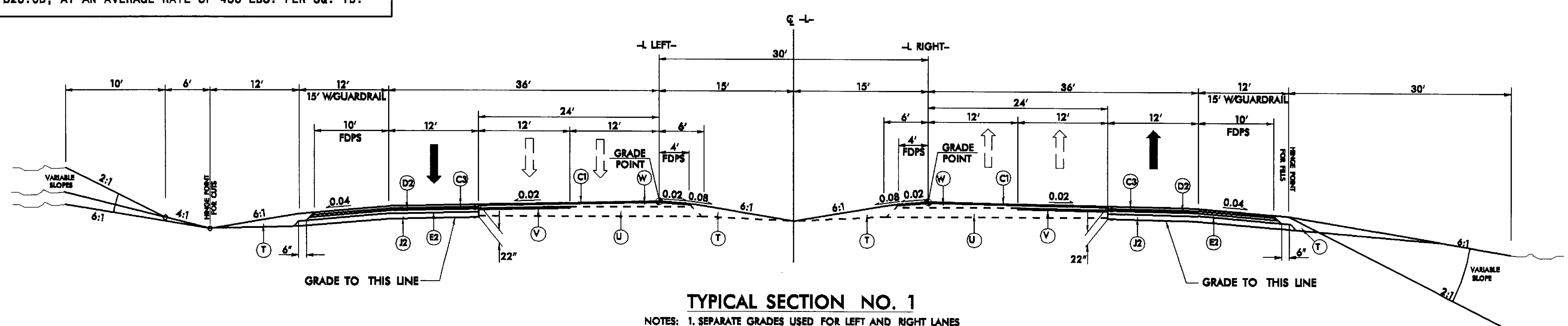
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



Detail Showing Method of Wedging



Wedging Detail For Resurfacing



TYPICAL SECTION NO. 1

NOTES: 1. SEPARATE GRADES USED FOR LEFT AND RIGHT LANES
2. MILL OUTSIDE 12' LANE AND RESURFACE FROM MT. MORIAH ROAD TO BEGIN PROJECT.

USE TYPICAL SECTION NO. 1 AS FOLLOWS:

-L- STA. 34+00.00 TO -L- STA. 35+00.00
-L- STA. 50+50.00 TO -L- STA. 60+00.00 RT.
-L- STA. 50+50.00 TO -L- STA. 62+00.00 LT.
-L- STA. 77+00.00 LT. TO -L- STA. 86+30.00
-L- STA. 79+00.00 RT. TO -L- STA. 86+30.00

USE INSET "A" FROM -L- STA. 80+50.00 TO -L- STA. 86+30.00
(SEE SHEET 2-A)

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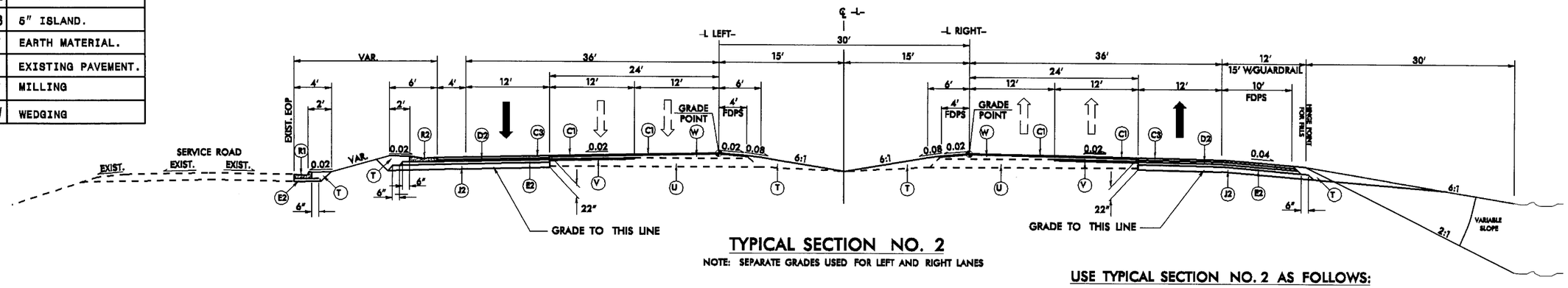
9 lmdavis AT HY206434

6/2/99

C1	1½" TYPE S9.5C
C3	3" TYPE S9.5C
D2	4" TYPE I19.0C
E2	5" TYPE B25.0C
J2	10" ABC
R1	2'-6" CURB & GUTTER.
R2	4' EXP. GUTTER
R3	5" ISLAND.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	MILLING
W	WEDGING

PROJECT REFERENCE NO.	SHEET NO.
U-4012	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

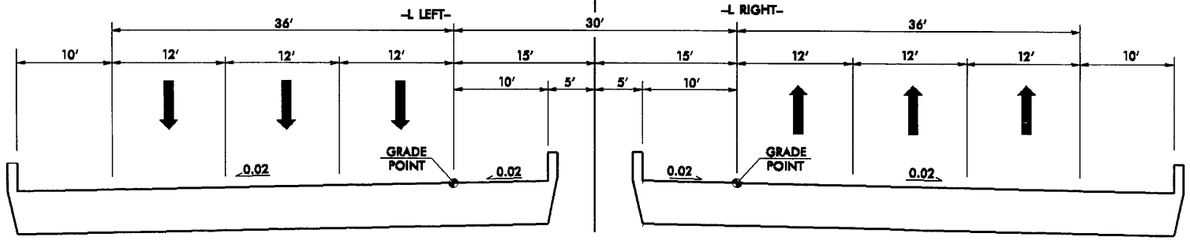


TYPICAL SECTION NO. 2

NOTE: SEPARATE GRADES USED FOR LEFT AND RIGHT LANES

USE TYPICAL SECTION NO. 2 AS FOLLOWS:

-L- STA. 35+00.00 TO -L- STA.50+50.00
USE INSET "A" FROM -L- STA. 40+55.00 TO -L- STA. 44+85.00
USE INSET "A" FROM -L- STA. 45+70.00 TO -L- STA. 50+00.00 (MIRROR)

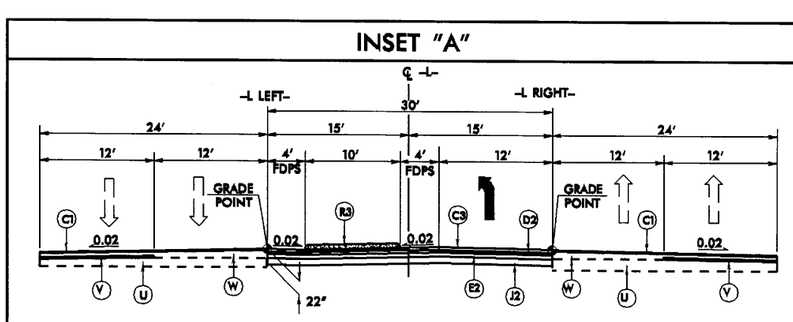


TYPICAL SECTION ON STRUCTURE

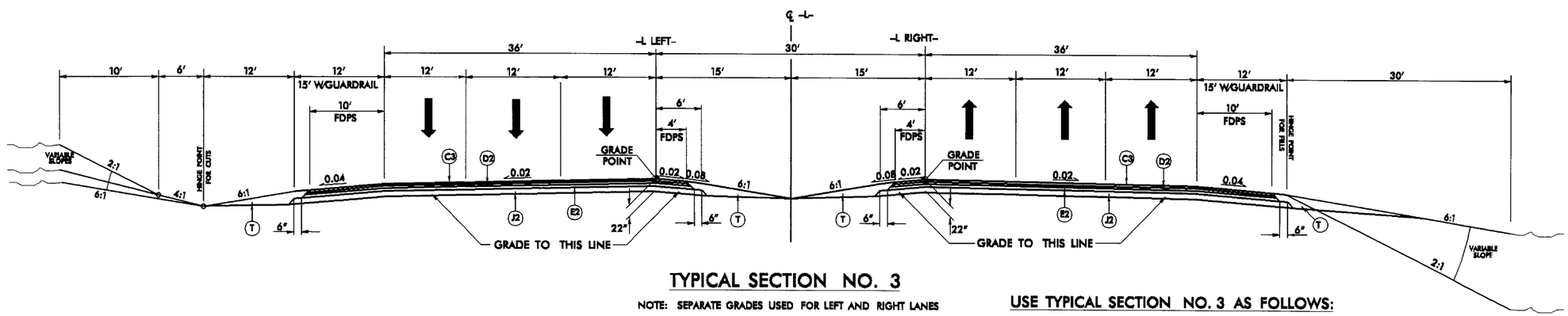
-L- STA. 68+72 LT. (BEGIN BRIDGE) TO -L- STA. 71+72 LT. (END BRIDGE)
-L- STA. 68+72 RT. (BEGIN BRIDGE) TO -L- STA. 71+72 RT. (END BRIDGE)

NOTE: SEE SHEET 2-C FOR BRIDGE CONSTRUCTION STAGING CONCEPT.

INSET "A"



CENTER TURN LANE AND ISLAND



TYPICAL SECTION NO. 3

NOTE: SEPARATE GRADES USED FOR LEFT AND RIGHT LANES

USE TYPICAL SECTION NO. 3 AS FOLLOWS:

-L- STA. 62+00.00 LT. TO -L- STA. 68+72 LT. (BEGIN BRIDGE)
-L- STA. 60+00.00 RT. TO -L- STA. 68+72 RT. (BEGIN BRIDGE)
-L- STA. 71+72 LT. (END BRIDGE) TO -L- STA. 77+00.00 LT.
-L- STA. 71+72 RT. (END BRIDGE) TO -L- STA. 79+00.00 RT.

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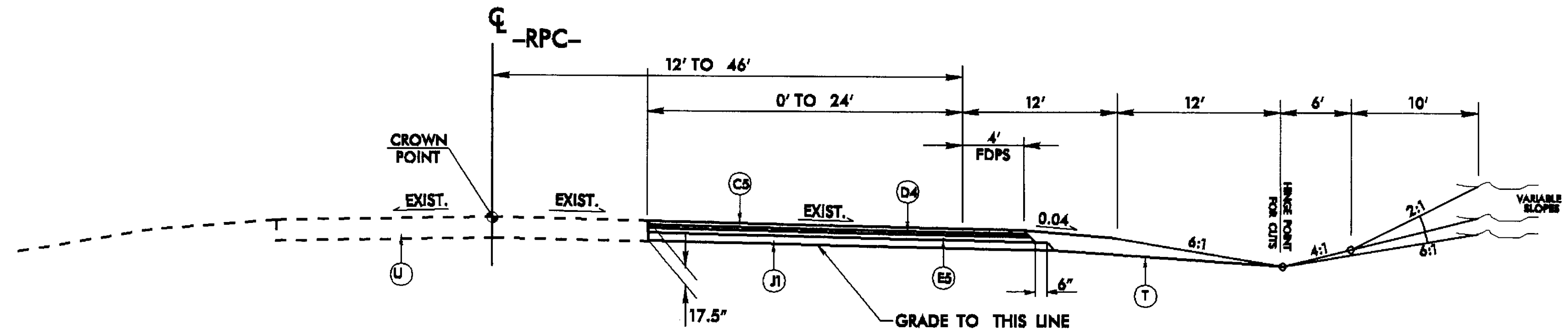
jmdavis AT HYP06434

C1	1½" TYPE S9.5C
C2	2½" TYPE S9.5C
C3	3" TYPE S9.5C
C5	2½" TYPE S9.5B
D1	2½" TYPE I19.0C
D2	4" TYPE I19.0C
D4	3" TYPE I19.0B
E1	3" TYPE B25.0C
E2	5" TYPE B25.0C
E5	4" TYPE B25.0B
J1	8" ABC
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.

PROJECT REFERENCE NO.	SHEET NO.
U-4012	2-B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

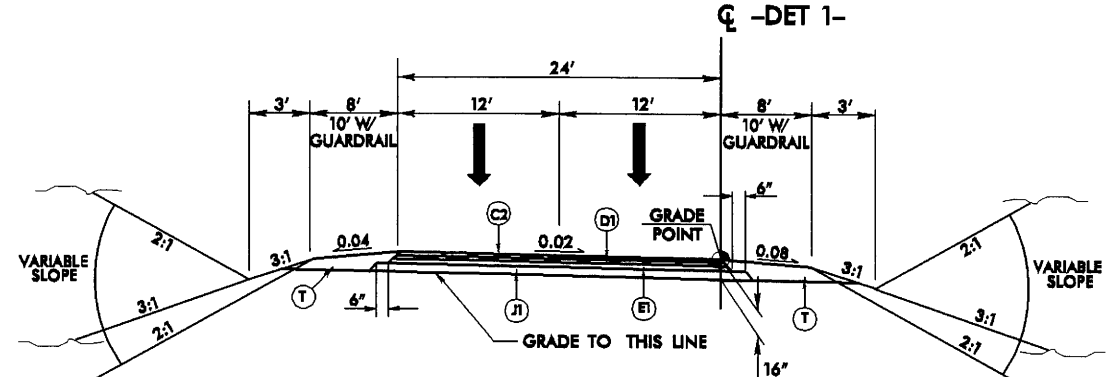
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4 AS FOLLOWS:

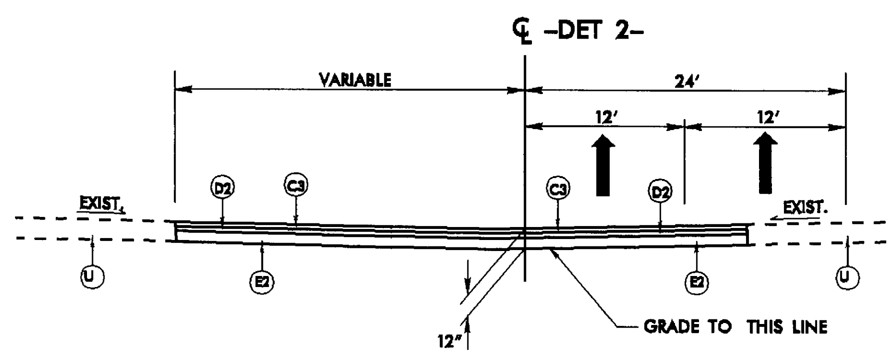
-RPC- STA. 11+00.00 TO -RPC- STA. 21+08.80



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5 AS FOLLOWS:

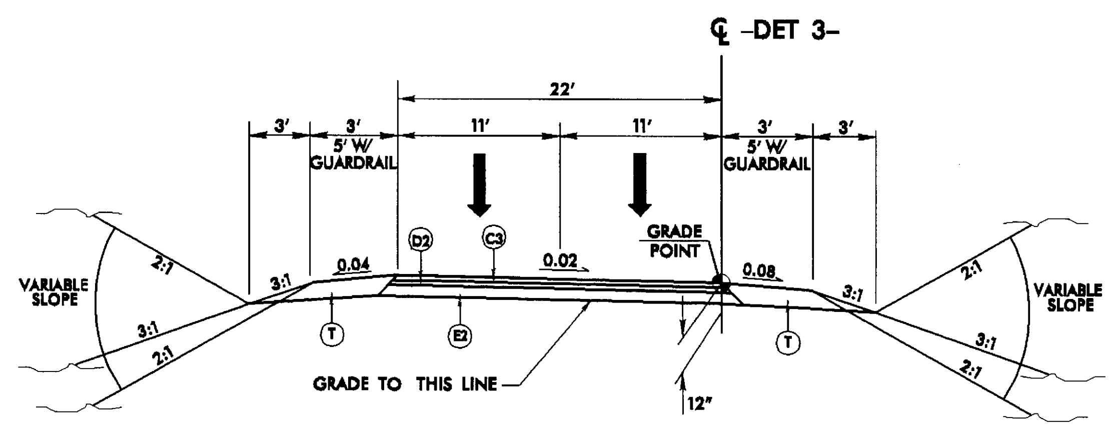
-DET1- STA. 12+88.37 TO -DET1- STA. 22+26.34 (BEGIN BRIDGE)
-DET1- STA. 23+76.40 (END BRIDGE) TO -DET1-STA. 30+07.03



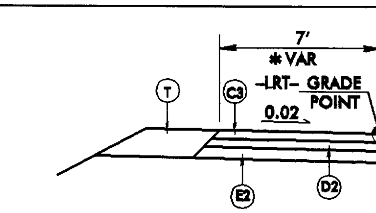
TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6 AS FOLLOWS:

-DET2- STA. 10+97.39 TO -DET2- STA. 16+07.78
-DET2- STA. 29+79.11 TO -DET2- STA. 34+74.79



TYPICAL SECTION NO. 7



INSET B1

USE TYPICAL SECTION NO. 7 AS FOLLOWS:

-DET3- STA. 10+00.00 TO -DET3- STA. 13+30.52
*USE INSET B1 FROM -DET3- STA. 13+30.52 TO -DET3- STA. 15+71.65
USE INSET B1 FROM -DET3- STA. 15+71.65 TO -DET3- STA. 29+94.63
*USE INSET B1 FROM -DET3- STA. 29+94.63 TO -DET3- STA. 32+65.24
-DET3- STA. 32+65.24 TO -DET3- STA. 35+81.55

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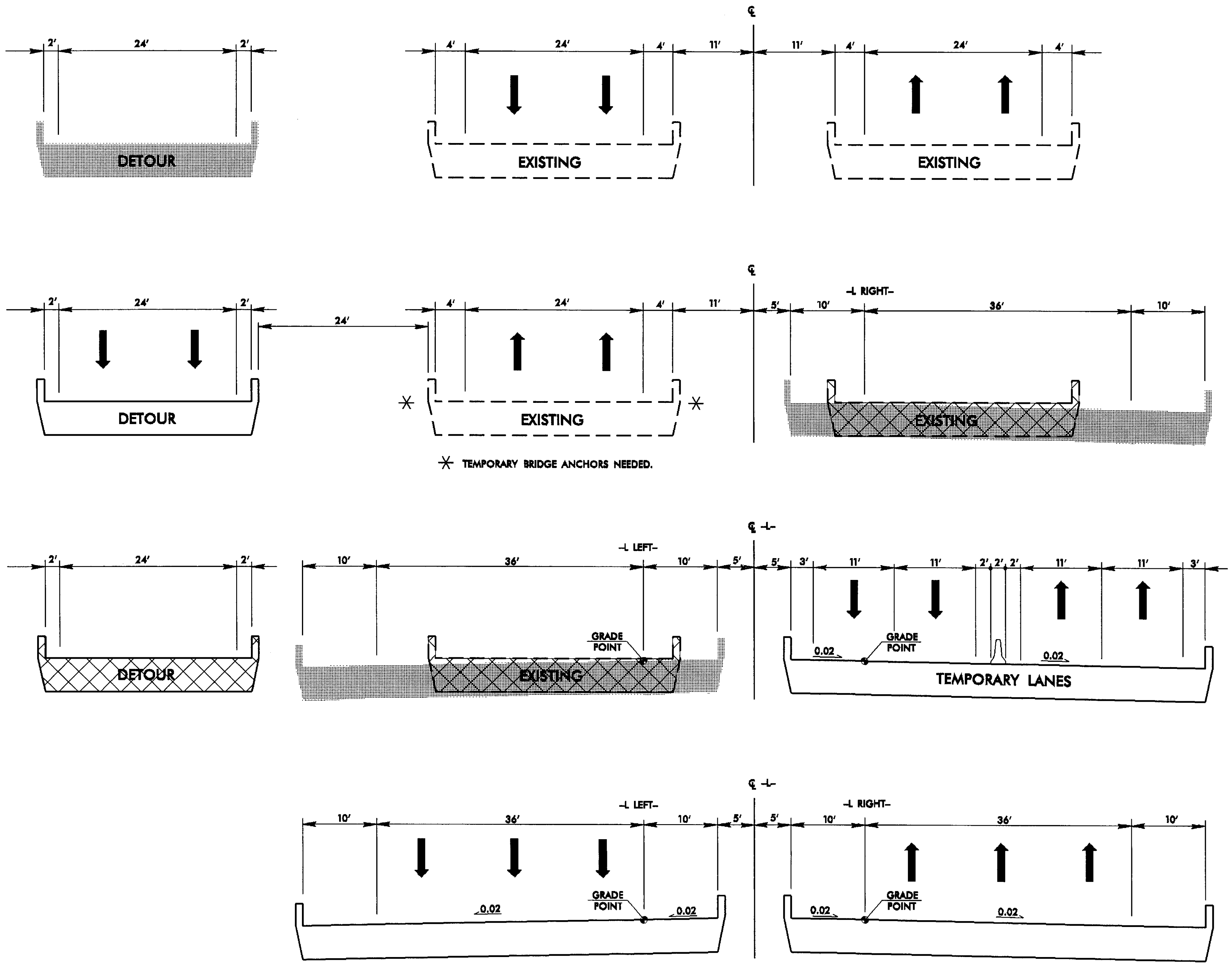
lmdavis AT HY206434

PROJECT REFERENCE NO.	SHEET NO.
U-4012	2-C
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



BRIDGE CONSTRUCTION STAGING

LEGEND

UNDER CONSTRUCTION

BRIDGE REMOVAL

6/2/99

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jmdavis AT HT206434

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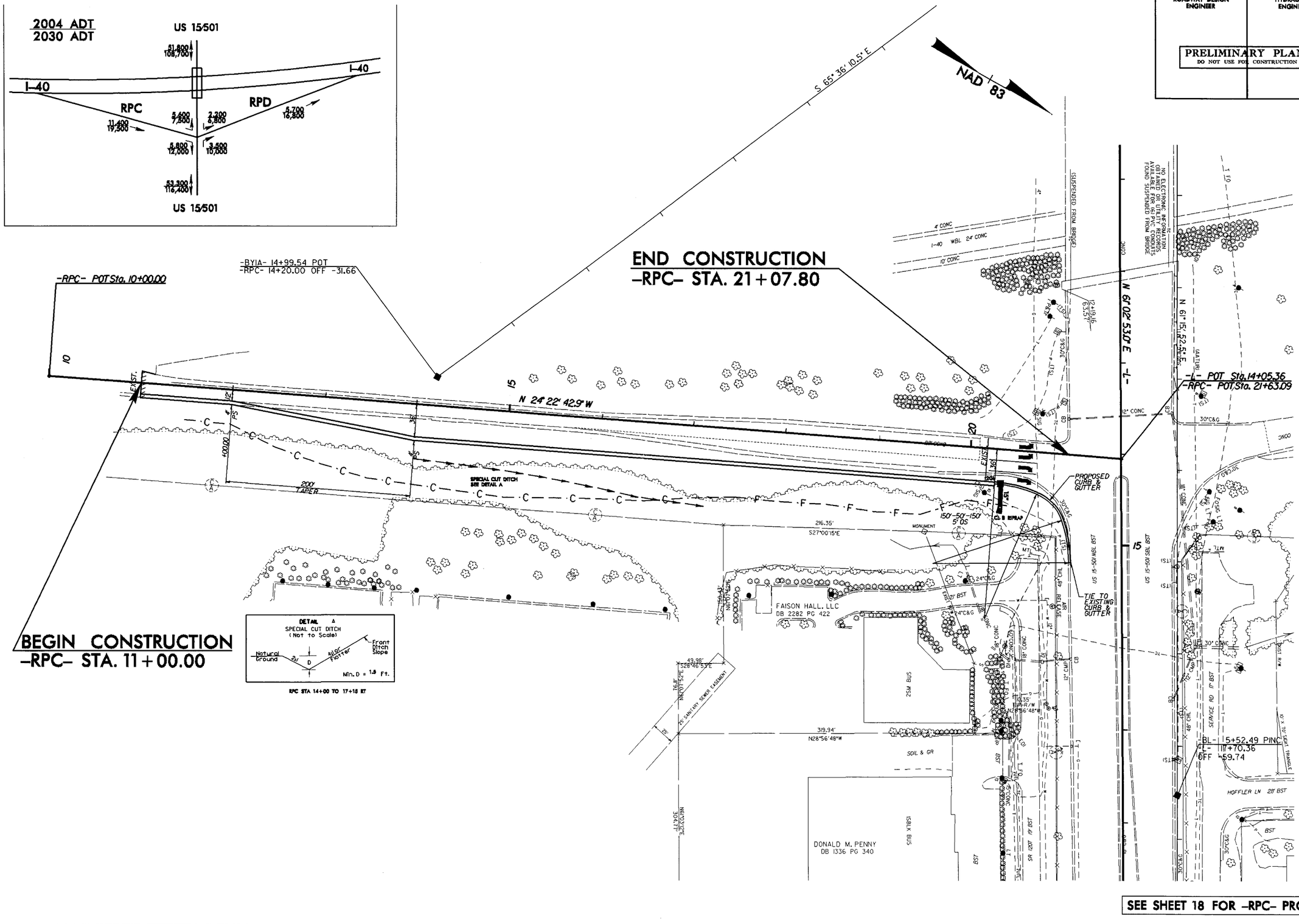
PROJECT REFERENCE NO.	SHEET NO.
U-4012	4
R/W SHEET NO.	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



BEGIN CONSTRUCTION
-RPC- STA. 11+00.00

SEE SHEET 18 FOR -RPC- PROFILE

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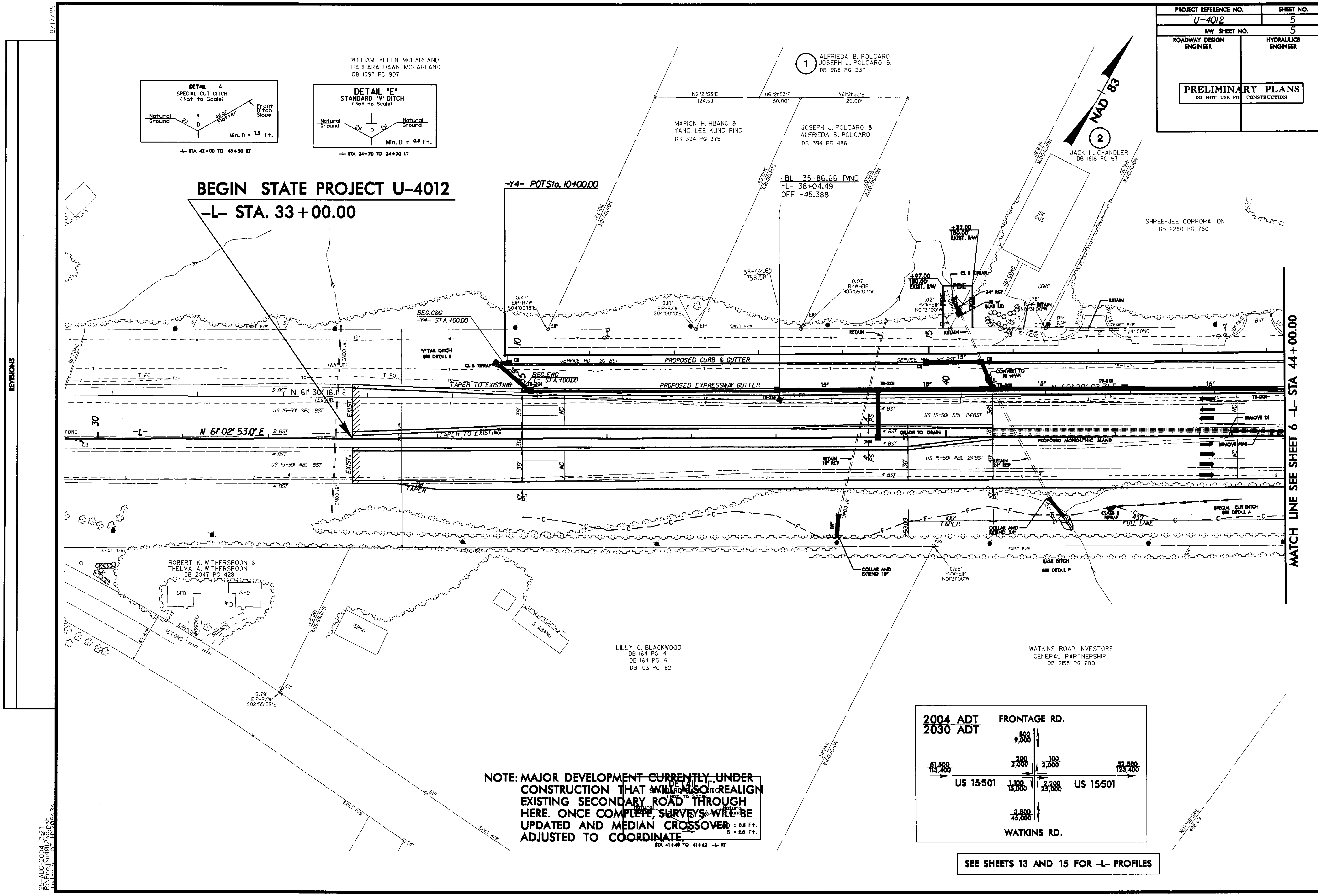
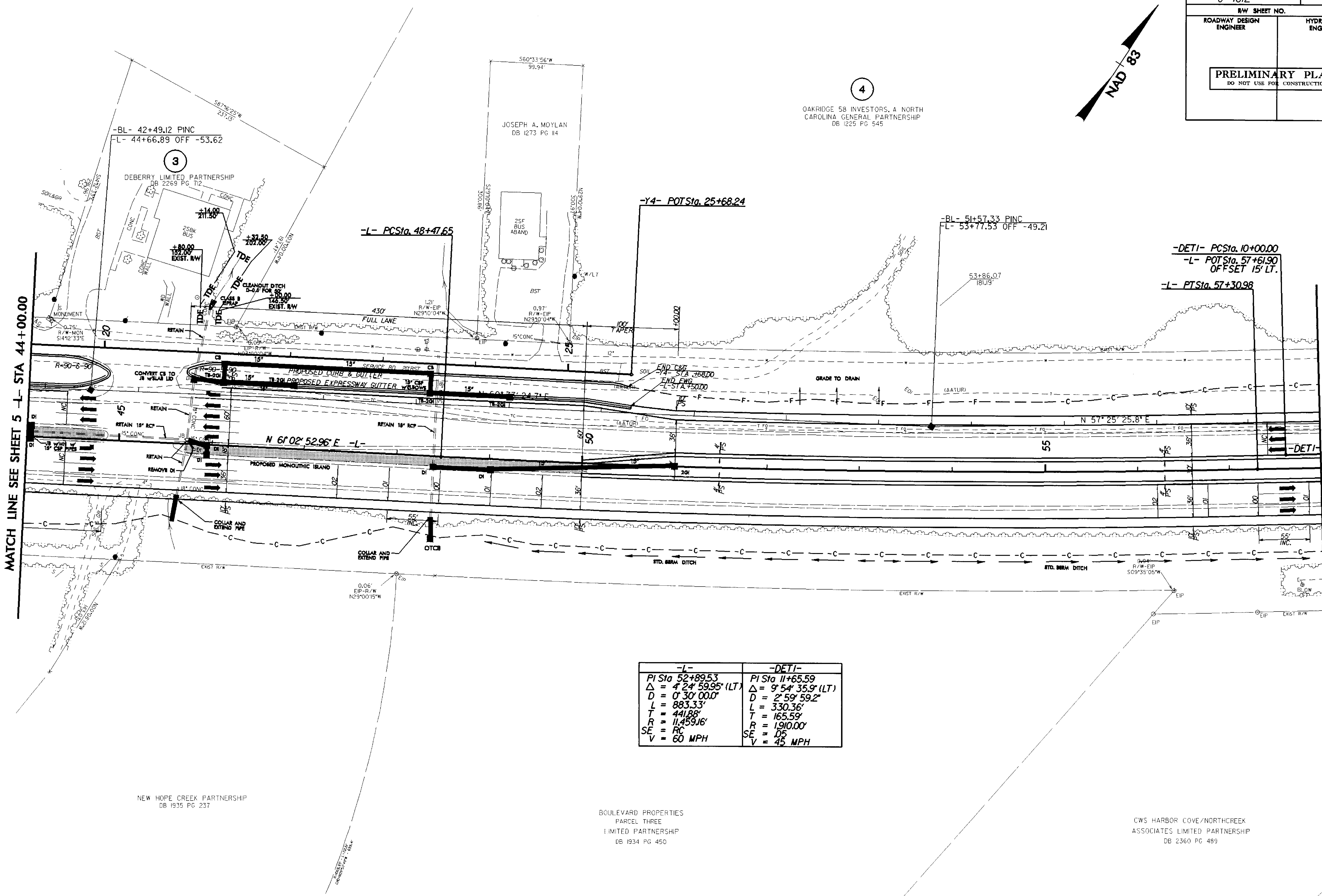
mdavis AT HY206434



PROJECT REFERENCE NO. U-4012
SHEET NO. 5
R/W SHEET NO. 5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
8/17/99
REVISIONS
NAD 83
DETAIL A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
Min. D = 1.5 Ft.
-L- STA 42+00 TO 43+50 RT
DETAIL "E"
STANDARD 'V' DITCH
(Not to Scale)
Min. D = 0.5 Ft.
-L- STA 34+20 TO 34+70 LT
WILLIAM ALLEN MCFARLAND
BARBARA DAWN MCFARLAND
DB 1097 PG 907
ALFRIEDA B. POLCARO
JOSEPH J. POLCARO &
DB 968 PG 237
MARION H. HUANG &
YANG LEE KUNG PING
DB 394 PG 375
JOSEPH J. POLCARO &
ALFRIEDA B. POLCARO
DB 394 PG 486
JACK L. CHANDLER
DB 1818 PG 67
SHREE-JEE CORPORATION
DB 2280 PG 760
BEGIN STATE PROJECT U-4012
-L- STA. 33+00.00
-Y4- POT Sta. 10+00.00
-BL- 35+86.66 PINC
-L- 38+04.49
OFF -45.388
38+02.65
158.58'
PROPOSED CURB & GUTTER
PROPOSED EXPRESSWAY GUTTER
TAPER TO EXISTING
US 15-501 SBL BST
US 15-501 NBL BST
N 61° 02' 53.0" E
PROPOSED MONOLITHIC ISLAND
MATCH LINE SEE SHEET 6 -L- STA 44+00.00
ROBERT K. WITHERSPOON &
THELMA A. WITHERSPOON
DB 2047 PG 428
LILLY C. BLACKWOOD
DB 164 PG 14
DB 164 PG 16
DB 103 PG 182
WATKINS ROAD INVESTORS
GENERAL PARTNERSHIP
DB 2155 PG 680
NOTE: MAJOR DEVELOPMENT CURRENTLY UNDER CONSTRUCTION THAT WILL ALSO REALIGN EXISTING SECONDARY ROAD THROUGH HERE. ONCE COMPLETE, SURVEYS WILL BE UPDATED AND MEDIAN CROSSOVER ADJUSTED TO COORDINATE.
2004 ADT
2030 ADT
FRONTAGE RD.
US 15/501
WATKINS RD.
SEE SHEETS 13 AND 15 FOR -L- PROFILES
25-AUG-2004 13:27

PROJECT REFERENCE NO.	SHEET NO.
U-4012	6
R/W SHEET NO.	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



NAD 83
MATCH LINE SEE SHEET 5 -L- STA 44+00.00
MATCH LINE SEE SHEET 7 -L- STA. 58+00.00
3
DEBERRY LIMITED PARTNERSHIP
DB 2269 PG 712
-BL- 42+49.12 PINC
-L- 44+66.89 OFF -53.62
JOSEPH A. MOYLAN
DB 1273 PG 114
4
OAKRIDGE 58 INVESTORS, A NORTH CAROLINA GENERAL PARTNERSHIP
DB 1225 PG 545
-Y4- POT Sta. 25+68.24
-L- PCSta. 48+47.65
-BL- 51+57.33 PINC
-L- 53+77.53 OFF -49.21
-DET1- PCSta. 10+00.00
-L- POT Sta. 57+61.90 OFFSET 15' LT.
-L- PT Sta. 57+30.98
PROPOSED CURB & GUTTER
PROPOSED EXPRESSWAY GUTTER
PROPOSED MONOLITHIC ISLAND
N 61° 02' 52.96" E -L-
N 57° 25' 25.8" E
430' FULL LANE
100' TAPER
GRADE TO DRAIN
COLLAR AND EXTEND PIPE
STD. BERM DITCH
EXIST R/W
NEW HOPE CREEK PARTNERSHIP
DB 1935 PG 237
BOULEVARD PROPERTIES
PARCEL THREE
LIMITED PARTNERSHIP
DB 1934 PG 450
CWS HARBOR COVE/NORTHCREEK
ASSOCIATES LIMITED PARTNERSHIP
DB 2360 PG 489

-L-	-DET1-
PI Sta 52+89.53	PI Sta 11+65.59
Δ = 4° 24' 59.95" (LT)	Δ = 9° 54' 35.9" (LT)
D = 0° 30' 00.0"	D = 2° 59' 59.2"
L = 883.33'	L = 330.36'
T = 441.88'	T = 165.59'
R = 11,459.16'	R = 1,910.00'
SE = RC	SE = .05
V = 60 MPH	V = 45 MPH

SEE SHEETS 13 AND 16 FOR -L- PROFILES

REVISIONS

8/17/99

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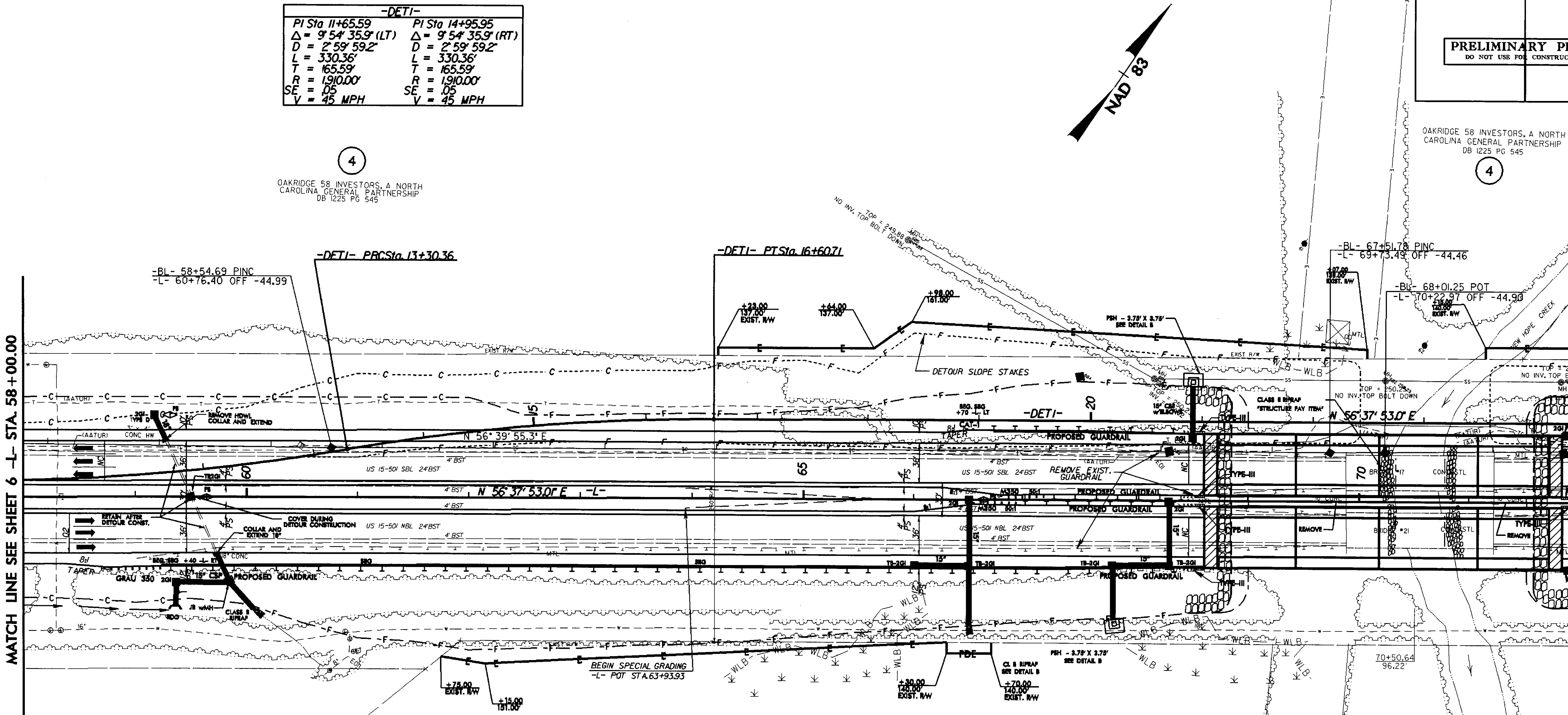
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-4012	7
R/W SHEET NO.	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

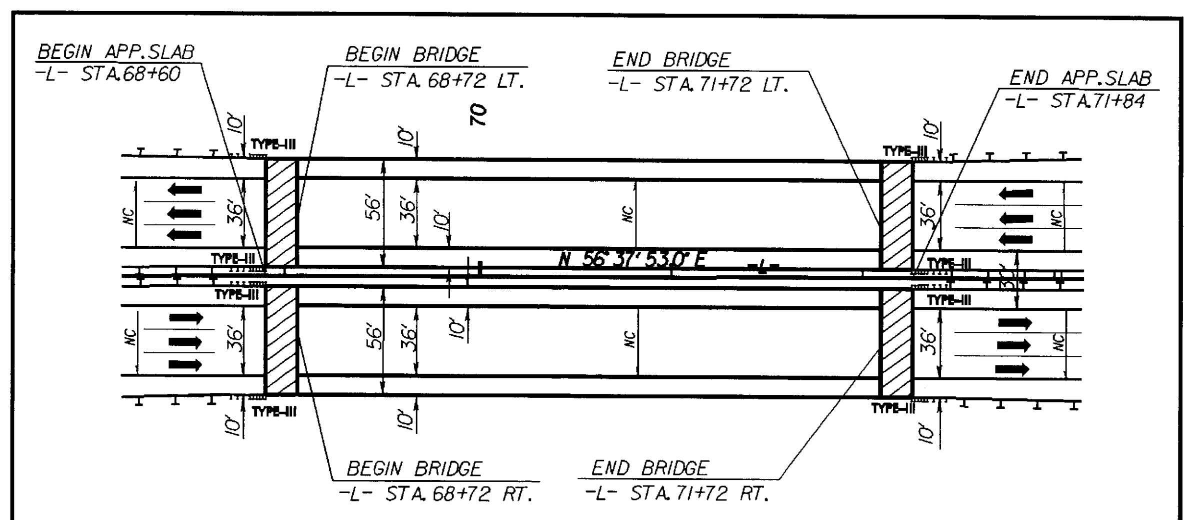
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

-DETI-	
PI Sta 11+65.59	PI Sta 14+95.95
Δ = 9° 54' 35.9" (LT)	Δ = 9° 54' 35.9" (RT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 330.36'	L = 330.36'
T = 165.59'	T = 165.59'
R = 1,910.00'	R = 1,910.00'
SE = .05	SE = .05
V = 45 MPH	V = 45 MPH



NAD 83
4
OAKRIDGE 58 INVESTORS, A NORTH CAROLINA GENERAL PARTNERSHIP DB 1225 PG 545
-BL- 58+54.69 PINC
-L- 60+76.40 OFF -44.99
-DETI- PRCSta. 13+30.36
-DETI- PTSta. 16+60.71
-BL- 67+51.78 PINC
-L- 69+73.49 OFF -44.46
-BL- 68+01.25 POT
-L- 70+22.97 OFF -44.90
MATCH LINE SEE SHEET 6 -L- STA. 58+00.00
MATCH LINE SEE SHEET 8 -L- STA. 72+00.00
N 56° 39' 55.3" E
N 56° 37' 53.0" E -L-
US 15-501 SBL 24'BST
US 15-501 NBL 24'BST
DETOUR SLOPE STAKES
PROPOSED GUARDRAIL
REMOVE EXIST. GUARDRAIL
RETAIN AFTER DETOUR CONST.
COVER DURING DETOUR CONSTRUCTION
COLLAR AND EXTEND 18"
REMOVE HDWL COLLAR AND EXTEND
BEGIN SPECIAL GRADING
-L- POT STA.63+93.93
PSH - 3.75' X 3.75' SEE DETAIL B
CLASS II RIPRAP "STRUCTURE PAY ITEM"
NEW HOPE CREEK
TYPE-III
WLB
CWS HARBOR COVE/NORTHCREEK ASSOCIATES LIMITED PARTNERSHIP DB 2360 PG 489
70+50.64
96.22'
5
THE COUNTY OF DURHAM, NORTH CAROLINA DB 2047 PG 579



SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP

- -SEE SHEET 2-C FOR STRUCTURE STAGING
- -SEE SHEET 2- FOR SPECIAL MEDIAN GRADING DETAIL
- -SEE SHEETS 9 THRU 12 FOR DETOURS
- -SEE SHEETS 14 AND 16 FOR -L- PROFILES
- -SEE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

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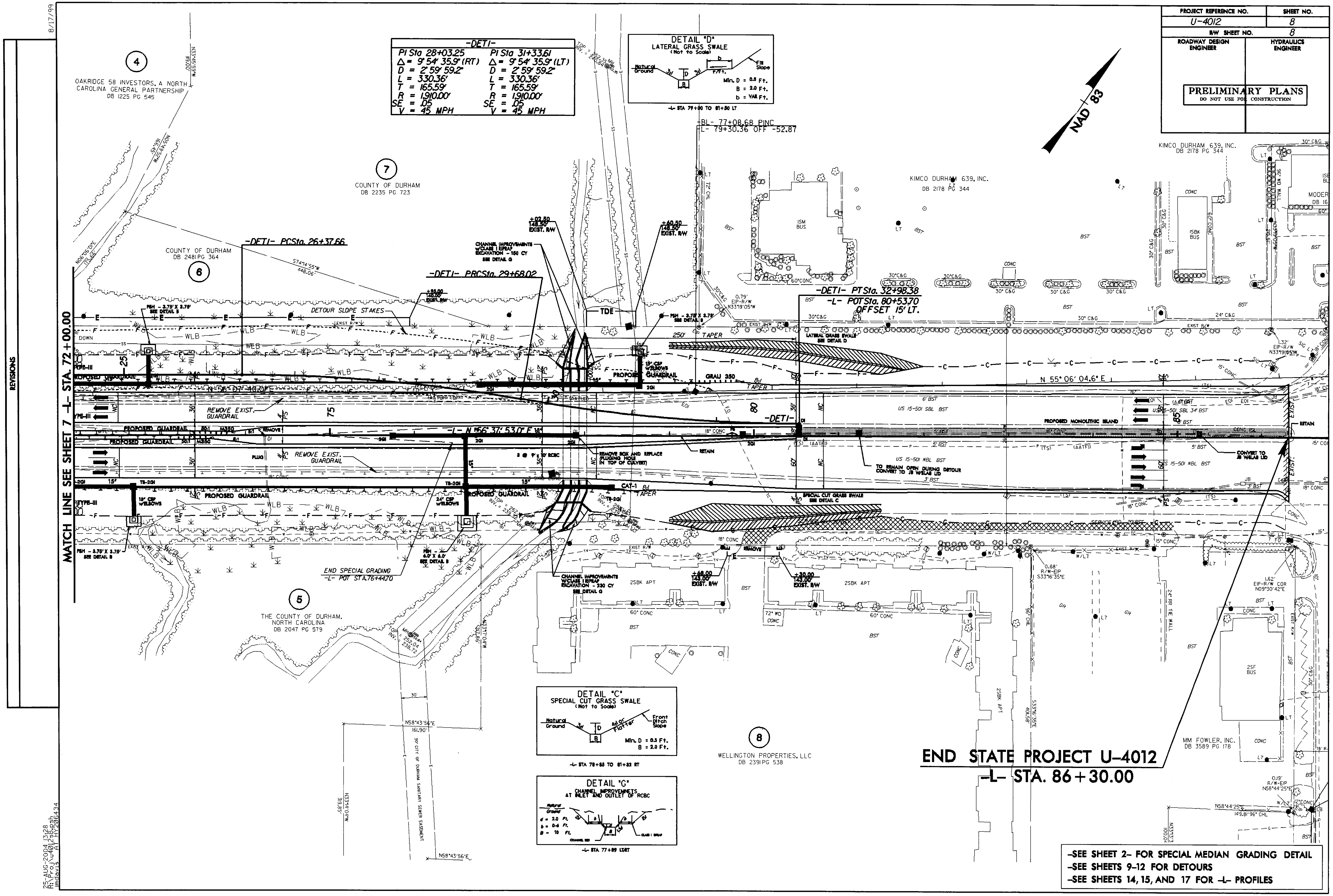
PROJECT REFERENCE NO. U-4012
SHEET NO. 8
R/W SHEET NO. 8
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
NAD 83
8/17/99
REVISIONS
-DET1-
PI Sta 28+03.25
Δ = 9° 54' 35.9" (RT)
D = 2° 59' 59.2"
L = 330.36'
T = 165.59'
R = 1,910.00'
SE = .05
V = 45 MPH
PI Sta 31+33.61
Δ = 9° 54' 35.9" (LT)
D = 2° 59' 59.2"
L = 330.36'
T = 165.59'
R = 1,910.00'
SE = .05
V = 45 MPH
DETAIL "D"
LATERAL GRASS SWALE
(Not to Scale)
Min. D = 0.5 Ft.
B = 2.0 Ft.
b = VAR Ft.
-L- STA 79+00 TO 81+50 LT
-BL- 77+08.68 PINC
-L- 79+30.36 OFF -52.87
OAKRIDGE 58 INVESTORS, A NORTH CAROLINA GENERAL PARTNERSHIP
DB 1225 PG 545
COUNTY OF DURHAM
DB 2235 PG 723
KIMCO DURHAM 639, INC.
DB 2178 PG 344
COUNTY OF DURHAM
DB 2481 PG 364
-DET1- PCSta. 26+37.66
-DET1- PRCSta. 29+68.02
-DET1- PTSta. 32+98.38
-L- POTSta. 80+53.70
OFFSET 15' LT.
DETOUR SLOPE STAKES
CHANNEL IMPROVEMENTS W/CLASS I RIPRAP EXCAVATION - 150 CY SEE DETAIL G
LATERAL GRASS SWALE SEE DETAIL D
250' TAPER
N 55° 06' 04.6" E
MATCH LINE SEE SHEET 7 -L- STA. 72+00.00
PROPOSED GUARDRAIL
REMOVE EXIST. GUARDRAIL
-L- N 56° 37' 53.0" E
US 15-501 SBL BST
US 15-501 NBL BST
PROPOSED MONOLITHIC ISLAND
TO REMAIN OPEN DURING DETOUR CONVERT TO JB W/SLAB LID
REMOVE BOX AND REPLACE (PLUGGING HOLE IN TOP OF CULVERT)
SPECIAL CUT GRASS SWALE SEE DETAIL C
END SPECIAL GRADING
-L- POT STA.76+44.70
CHANNEL IMPROVEMENTS W/CLASS I RIPRAP EXCAVATION - 230 CY SEE DETAIL G
THE COUNTY OF DURHAM, NORTH CAROLINA
DB 2047 PG 579
2SBK APT
WELLINGTON PROPERTIES, LLC
DB 2391 PG 538
MM FOWLER, INC.
DB 3589 PG 178
DETAIL "C"
SPECIAL CUT GRASS SWALE
(Not to Scale)
Min. D = 0.5 Ft.
B = 2.0 Ft.
-L- STA 78+85 TO 81+32 RT
DETAIL "G"
CHANNEL IMPROVEMENTS AT INLET AND OUTLET OF RCBC
-L- STA 77+89 LT/RT
END STATE PROJECT U-4012
-L- STA. 86+30.00
-SEE SHEET 2- FOR SPECIAL MEDIAN GRADING DETAIL
-SEE SHEETS 9-12 FOR DETOURS
-SEE SHEETS 14, 15, AND 17 FOR -L- PROFILES
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
U-4012	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL OF TEMPORARY DETOURS

DETOUR DESIGN SPEED = 45 mph

NAD 83

-DET1-	
PI Sta 11+65.59	PI Sta 14+95.95
Δ = 9° 54' 35.9" (LT)	Δ = 9° 54' 35.9" (RT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 330.36'	L = 330.36'
T = 165.59'	T = 165.59'
R = 1,910.00'	R = 1,910.00'
SE = .05	SE = .05
V = 45 MPH	V = 45 MPH

-DET2-	
PI Sta 11+67.37	PI Sta 14+91.19
Δ = 10° 00' 56.2" (LT)	Δ = 9° 25' 01.0" (RT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 333.88'	L = 313.92'
T = 167.37'	T = 157.32'
R = 1,910.00'	R = 1,910.00'

4

OAKRIDGE 58 INVESTORS, A NORTH CAROLINA GENERAL PARTNERSHIP
DB 1225 PG 545

-DET1- PCSta. 10+00.00
-L- POTSta. 57+61.90
OFFSET 15' LT.

-L- PTSta. 57+30.98

-BL- 58+54.69 PINC
-L- 60+76.40 OFF -44.99

-DET1- PRCSta. 13+30.36

-DET1- PTSta. 16+60.71

-DET2- PCSta. 10+00.00
-L- POCSta. 56+11.24
OFFSET 15' RT.

-DET2- PRCSta. 13+33.88

-DET2- PTSta. 16+47.80

CWS HARBOR COVE/NORTHCREEK ASSOCIATES LIMITED PARTNERSHIP
DB 2360 PG 489

CWS HARBOR COVE/NORTHCREEK ASSOCIATES LIMITED PARTNERSHIP
DB 2360 PG 489

5

THE COUNTY OF DURHAM, NORTH CAROLINA
DB 2047 PG 579

MATCH LINE SEE SHEET 10 -L- STA. 69+50.00

-SEE SHEETS 6 AND 7 FOR -L- DESIGN
-SEE SHEETS 13, 14, AND 16 FOR -L- PROFILES
-SEE SHEET 19 FOR -DET 1- PROFILE

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mdavis AT HY2054.34

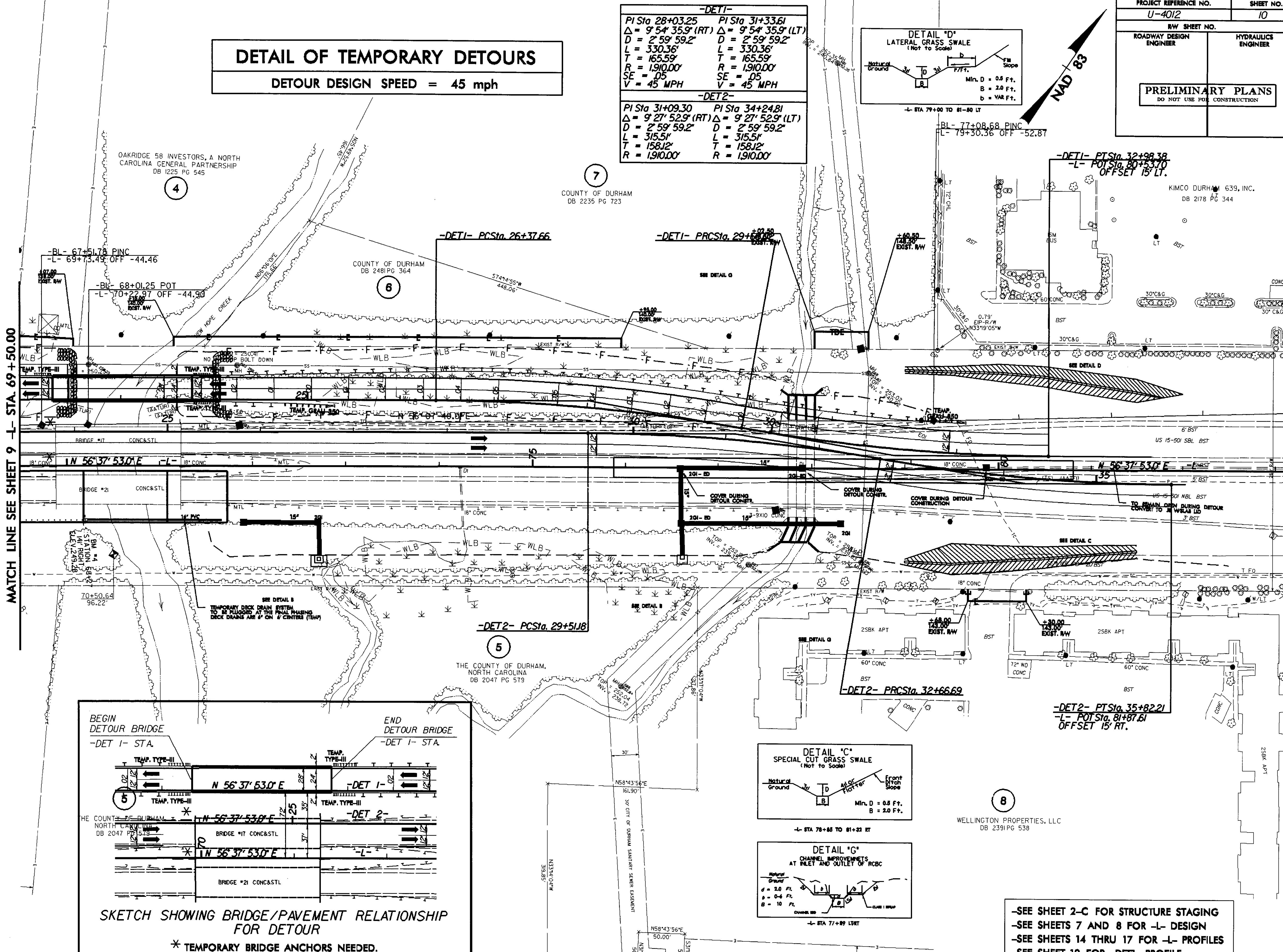
DETAIL OF TEMPORARY DETOURS

DETOUR DESIGN SPEED = 45 mph

PROJECT REFERENCE NO.	SHEET NO.
U-4012	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET1-	
PI Sta 28+03.25	PI Sta 31+33.61
Δ = 9° 54' 35.9" (RT)	Δ = 9° 54' 35.9" (LT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 330.36'	L = 330.36'
T = 165.59'	T = 165.59'
R = 1,910.00'	R = 1,910.00'
SE = .05	SE = .05
V = 45 MPH	V = 45 MPH
-DET2-	
PI Sta 31+09.30	PI Sta 34+24.81
Δ = 9° 27' 52.9" (RT)	Δ = 9° 27' 52.9" (LT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 315.51'	L = 315.51'
T = 158.12'	T = 158.12'
R = 1,910.00'	R = 1,910.00'



DETAIL "D"
LATERAL GRASS SWALE
(Not to Scale)
Min. D = 0.5 Ft.
B = 2.0 Ft.
b = VAR Ft.
-L- STA 79+00 TO 81+80 LT
NAD 83
MATCH LINE SEE SHEET 9 -L- STA. 69+50.00
OAKRIDGE 58 INVESTORS, A NORTH CAROLINA GENERAL PARTNERSHIP
DB 1225 PG 545
COUNTY OF DURHAM
DB 2481 PG 364
COUNTY OF DURHAM
DB 2235 PG 723
KIMCO DURHAM 639, INC.
DB 2178 PG 344
THE COUNTY OF DURHAM, NORTH CAROLINA
DB 2047 PG 579
WELLINGTON PROPERTIES, LLC
DB 2391 PG 538
-BL- 67+51.78 PINC
-L- 69+73.49 OFF -44.46
-BL- 68+01.25 POT
-L- 70+22.97 OFF -44.90
-BL- 77+08.68 PINC
-L- 79+30.36 OFF -52.87
-DET1- PCSta. 26+37.66
-DET1- PRCSta. 29+67.00
-DET1- PTSta. 32+98.38
-L- POT Sta. 80+53.70
OFFSET 15' LT.
-DET2- PCSta. 29+51.18
-DET2- PRCSta. 32+66.69
-DET2- PTSta. 35+82.21
-L- POT Sta. 81+87.61
OFFSET 15' RT.
N 56° 37' 53.0" E
NEW HOPE CREEK
US 15-501 SBL BST
US 15-501 NBL BST
BRIDGE #17 CONC&STL
BRIDGE #21 CONC&STL
TEMP. TYPE-III
COVER DURING DETOUR CONSTR.
COVER DURING DETOUR CONSTRUCTION
TO REMAIN OPEN DURING DETOUR
TEMPORARY DECK DRAIN SYSTEM TO BE PLUGGED AT THE FINAL PHASING. DECK DRAINS ARE 6' ON 6' CENTERS (TEMP)
SEE DETAIL B
SEE DETAIL C
SEE DETAIL D
SEE DETAIL G
2SBK APT
BEGIN DETOUR BRIDGE
-DET 1- STA.
END DETOUR BRIDGE
-DET 1- STA.
SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP FOR DETOUR
* TEMPORARY BRIDGE ANCHORS NEEDED.
DETAIL "C"
SPECIAL CUT GRASS SWALE
(Not to Scale)
Min. D = 0.5 Ft.
B = 2.0 Ft.
-L- STA 78+85 TO 81+22 RT
DETAIL "G"
CHANNEL IMPROVEMENTS AT INLET AND OUTLET OF RCBC
-L- STA 77+89 LT&RT
30' CITY OF DURHAM SANITARY SEWER EASEMENT

- SEE SHEET 2-C FOR STRUCTURE STAGING
- SEE SHEETS 7 AND 8 FOR -L- DESIGN
- SEE SHEETS 14 THRU 17 FOR -L- PROFILES
- SEE SHEET 19 FOR -DET1- PROFILE

REVISIONS

8/17/99

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lmdavis AT HY206434

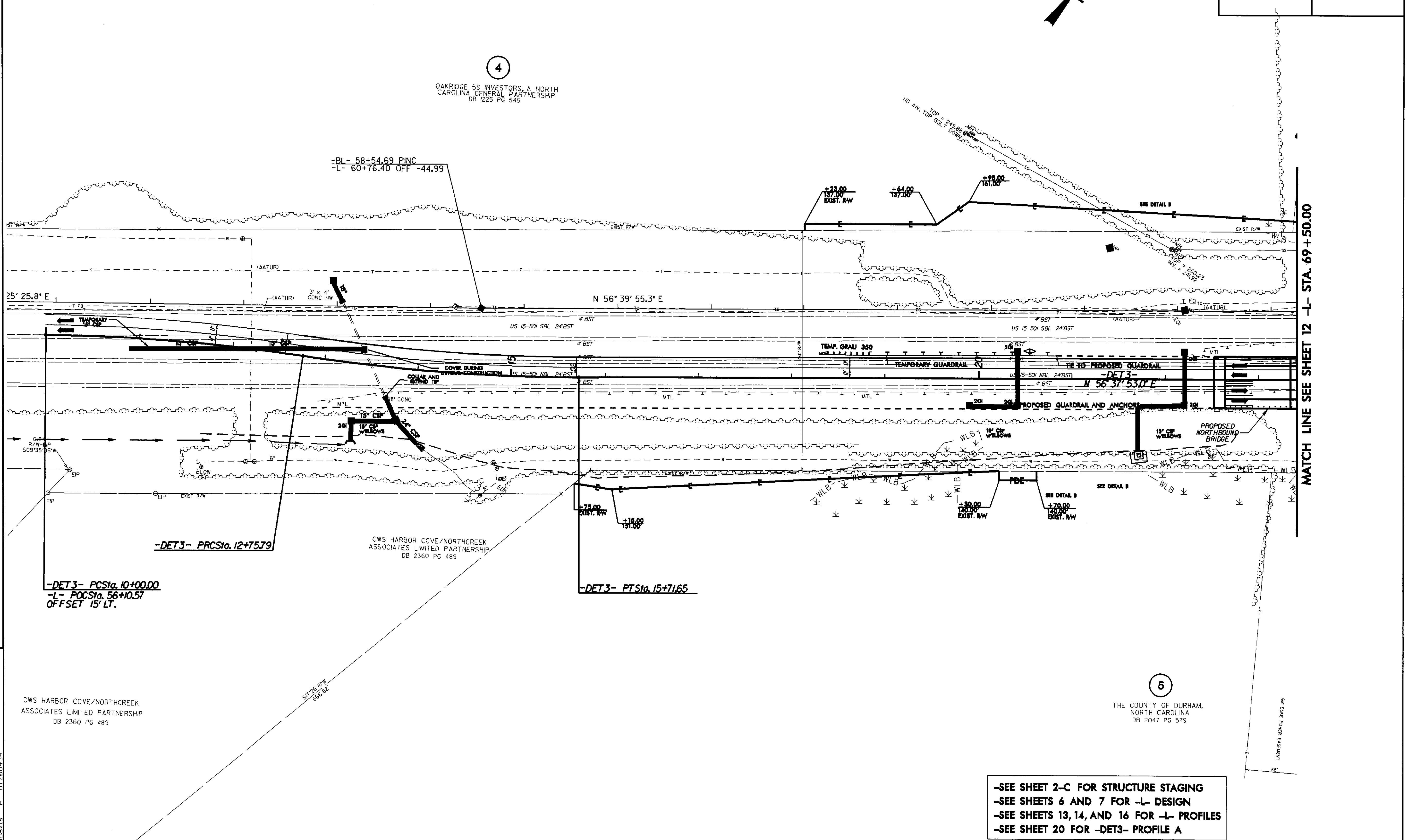
DETAIL OF TEMPORARY DETOURS

DETOUR DESIGN SPEED = 45 mph

-DET3-	
PI Sta 11+38.13	PI Sta 14+24.02
Δ = 8° 16′ 23.1″ (RT)	Δ = 8° 52′ 30.5″ (LT)
D = 2° 59′ 59.2″	D = 2° 59′ 59.2″
L = 275.79′	L = 295.86′
T = 138.13′	T = 148.23′
R = 1,910.00′	R = 1,910.00′

PROJECT REFERENCE NO.	SHEET NO.
U-4012	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-SEE SHEET 2-C FOR STRUCTURE STAGING
-SEE SHEETS 6 AND 7 FOR -L- DESIGN
-SEE SHEETS 13, 14, AND 16 FOR -L- PROFILES
-SEE SHEET 20 FOR -DET3- PROFILE A

REVISIONS

8/17/99

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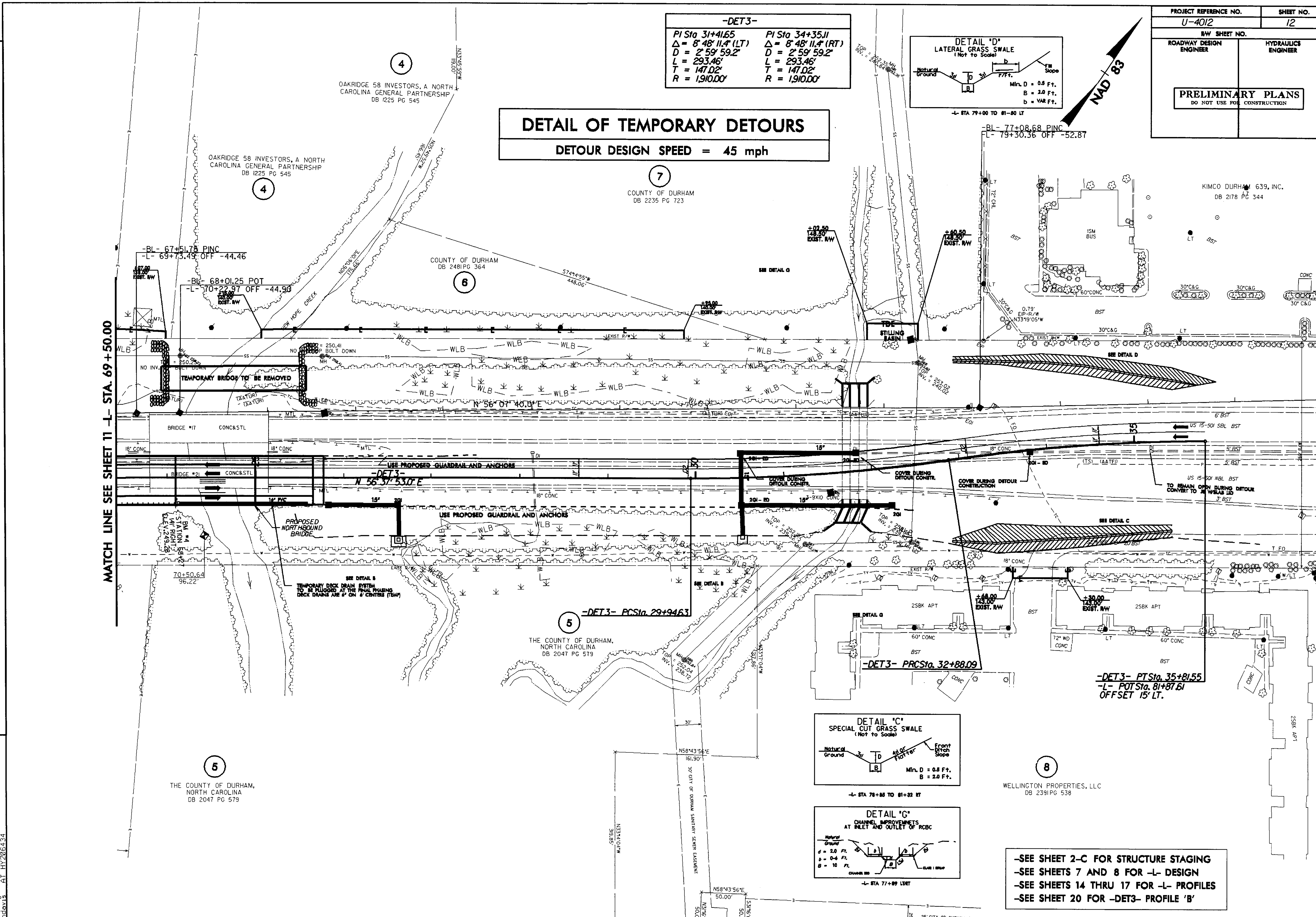
PROJECT REFERENCE NO.	SHEET NO.
U-4012	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL OF TEMPORARY DETOURS

DETOUR DESIGN SPEED = 45 mph

-DET3-	
PI Sta 31+41.65	PI Sta 34+35.11
Δ = 8° 48' 11.4" (LT)	Δ = 8° 48' 11.4" (RT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 293.46'	L = 293.46'
T = 147.02'	T = 147.02'
R = 1,910.00'	R = 1,910.00'



NAD 83
DETAIL "D" LATERAL GRASS SWALE (Not to Scale)
Natural Ground
Min. D = 0.5 Ft.
B = 2.0 Ft.
b = VAR Ft.
-L- STA 79+00 TO 81-50 LT
OAKRIDGE 58 INVESTORS, A NORTH CAROLINA GENERAL PARTNERSHIP DB 1225 PG 545
COUNTY OF DURHAM DB 2235 PG 723
COUNTY OF DURHAM DB 2481PG 364
KIMCO DURHAM 639, INC. DB 2178 PG 344
-BL- 77+08.68 PINC
-L- 79+30.36 OFF -52.87
-BL- 67+51.78 PINC
-L- 69+73.49 OFF -44.46
-BL- 68+01.25 POT
-L- 70+22.97 OFF -44.90
TEMPORARY BRIDGE TO BE REMOVED
BRIDGE #17 CONC&STL
BRIDGE #21 CONC&STL
N 56° 07' 40.9" E
-DET3-
N 56° 37' 53.0" E
USE PROPOSED GUARDRAIL AND ANCHORS
COVER DURING DETOUR CONSTR.
TO REMAIN OPEN DURING DETOUR CONVERT TO JB W/SLAB LID
US 15-501 SBL BST
US 15-501 NBL BST
PROPOSED NORTHBOUND BRIDGE
TEMPORARY DECK DRAIN SYSTEM TO BE PLUGGED AT THE FINAL PHASING DECK DRAINS ARE 6' ON 6' CENTERS (TEMP)
MATCH LINE SEE SHEET 11 -L- STA. 69+50.00
-DET3- PCSta. 29+94.63
-DET3- PRCSta. 32+88.09
-DET3- PTSta. 35+81.55
-L- POTSta. 81+87.61
OFFSET 15' LT.
THE COUNTY OF DURHAM, NORTH CAROLINA DB 2047 PG 579
WELLINGTON PROPERTIES, LLC DB 2391PG 538
2SBK APT
DETAIL "C" SPECIAL CUT GRASS SWALE (Not to Scale)
Min. D = 0.5 Ft.
B = 2.0 Ft.
-L- STA 78+85 TO 81+32 RT
DETAIL "G" CHANNEL IMPROVEMENETS AT INLET AND OUTLET OF RCBC
-L- STA 77+89 L'DET

- SEE SHEET 2-C FOR STRUCTURE STAGING
- SEE SHEETS 7 AND 8 FOR -L- DESIGN
- SEE SHEETS 14 THRU 17 FOR -L- PROFILES
- SEE SHEET 20 FOR -DET3- PROFILE 'B'

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-4012	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L LEFT-

PI = 36+10.00
EL = 314.75'
VC = 260'
K = 175
V = 60+MPH

MIN. RESURFACING

BEGIN MIN. RESURFACING
-L- STA. 33+00.00

BEGIN GRADE
END MIN. RESURFACING
-L- STA. 34+00.00
ELEV. = 312.26

BM#2 R/R SPIKE IN BASE OF 20" DOUBLE HICKORY
113' LT OF BL STA. 35+83.00, EL = 314.64

(+)1.1657%
(-)0.3006%

312.53

END DITCH
STA. 34+20 ELEV. 305.20

BEGIN DITCH
STA. 34+70 ELEV. 306.80

LEFT DITCH — - - —

SEE SHEET 5 FOR PLANS

350 340 330 320 310 300 290 280 270 260

30 31 32 33 34 35 36 37 38 39 40 41 42 43 44

-L LEFT-

PI = 44+85.00
EL = 312.12'
VC = 380'
K = 360
V = 60+MPH

PI = 51+50.00
EL = 317.15'
VC = 340'
K = 311
V = 60+MPH

PI = 55+35.00
EL = 315.85'
VC = 420'
K = 164
V = 60+MPH

312.43

(-)0.3066%
(+)0.7564%
(+)0.7554%
(-)0.3377%
(-)0.3377%
(-)2.5632%

308.15

BM#3 R/R SPIKE IN BASE OF 19" PINE
113' LT OF BL STA. 51+67.00, EL = 315.11

SEE SHEET 6 FOR PLANS

350 340 330 320 310 300 290 280 270 260

44 45 46 47 48 49 50 51 52 53 54 55 56 57 58

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mdavis AT HY2064434

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PROJECT REFERENCE NO.	SHEET NO.
U-4012	14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L LEFT-

PI = 60+00.00
EL = 302.35'
VC = 440'
K = 192
V = 60+MPH

PI = 67+85.00
EL = 261.57'
VC = 1,130'
K = 206
V = 60+MPH

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 8,440 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 254.87 FT
BASE DISCHARGE	= 10,068CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 256.93 FT
OVERTOPPING DISCHARGE	= N/A
OVERTOPPING FREQUENCY	= N/A
OVERTOPPING ELEVATION	= N/A

BEGIN BRIDGE
-L- STA. 68+72.48+/- LT.

END BRIDGE
-L- STA. 71+72.48+/- LT.

308.15

263.37

(-)9.9032%

(-)5.1946%

(-)5.1946%

(-)00.3007%

BM#4 R/R SPIKE IN BASE OF 18" RED OAK
114' RT OF BL STA. 68+27.00 EL = 249.28

NOTE: EXCAVATE EXISTING ROADWAY FILL UNDER NEW BRIDGE TO MATCH FLOODPLAIN ELEVATION +/- 248.0'

TEMPORARY COFFER DAMS

SEE SHEET 7 FOR PLANS

320 310 300 290 280 270 260 250 240 230

58 59 60 61 62 63 64 65 66 67 68 69 70 71 72

-L LEFT-

PI = 75+00.00
EL = 263.72'
VC = 300'
K = 250
V = 60++MPH

PI = 80+00.00
EL = 259.23'
VC = 700'
K = 240
V = 60++MPH

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 8,440 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 254.87 FT
BASE DISCHARGE	= 10,068CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 256.93 FT
OVERTOPPING DISCHARGE	= N/A
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= N/A

END GRADE STA. 85+20.00
BEGIN MIN. RESURFACING
ELEV. = 249.75

MIN. RESURFACING

263.37

(+)0.3007%

(-)0.8980%

(-)0.8980%

(+)2.0231%

2.36 %

LEFT DITCH — - — -

BEGIN DITCH
STA. 81+50 ELEV. 256.89

END DITCH
STA. 79+00 ELEV. 251.00

SEE SHEET 8 FOR PLANS

330 320 310 300 290 280 270 260 250 240

72 73 74 75 76 77 78 79 80 81 82 83 84 85 86

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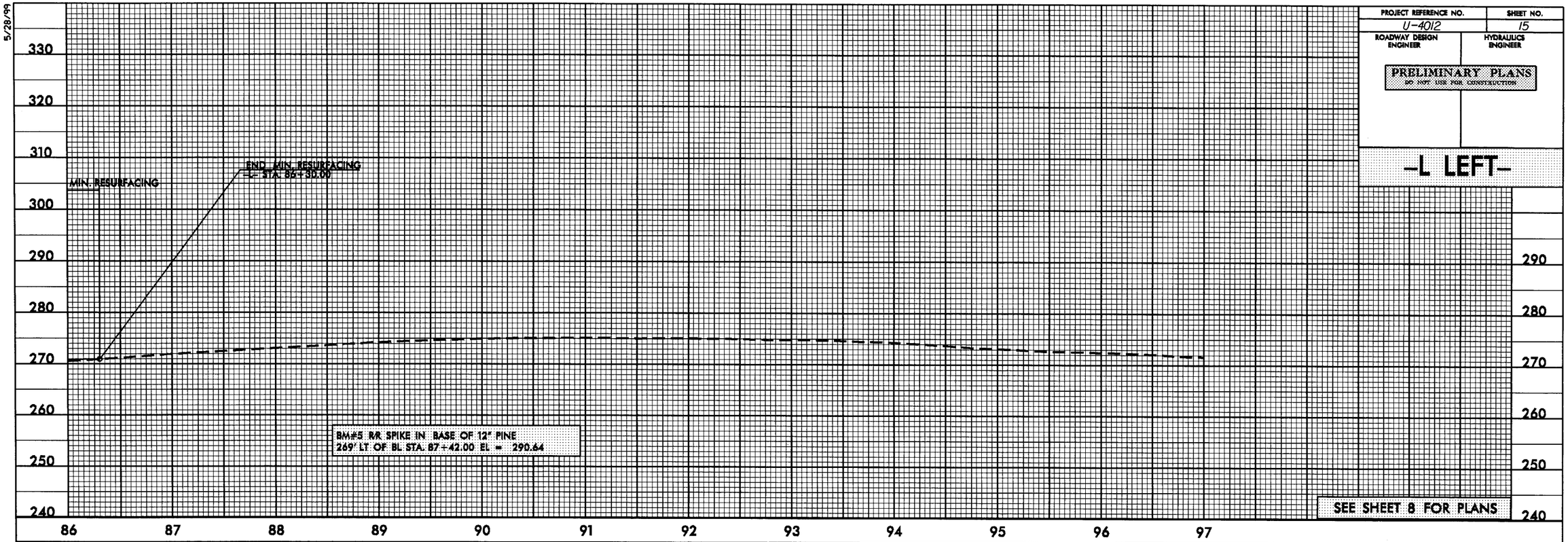
imdavis $1 $2 $3 $4 $5 $6 $7 $8 $9 $10 $11 $12 $13 $14 $15 $16 $17 $18 $19 $20 $21 $22 $23 $24 $25 $26 $27 $28 $29 $30 $31 $32 $33 $34

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
U-4012	15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

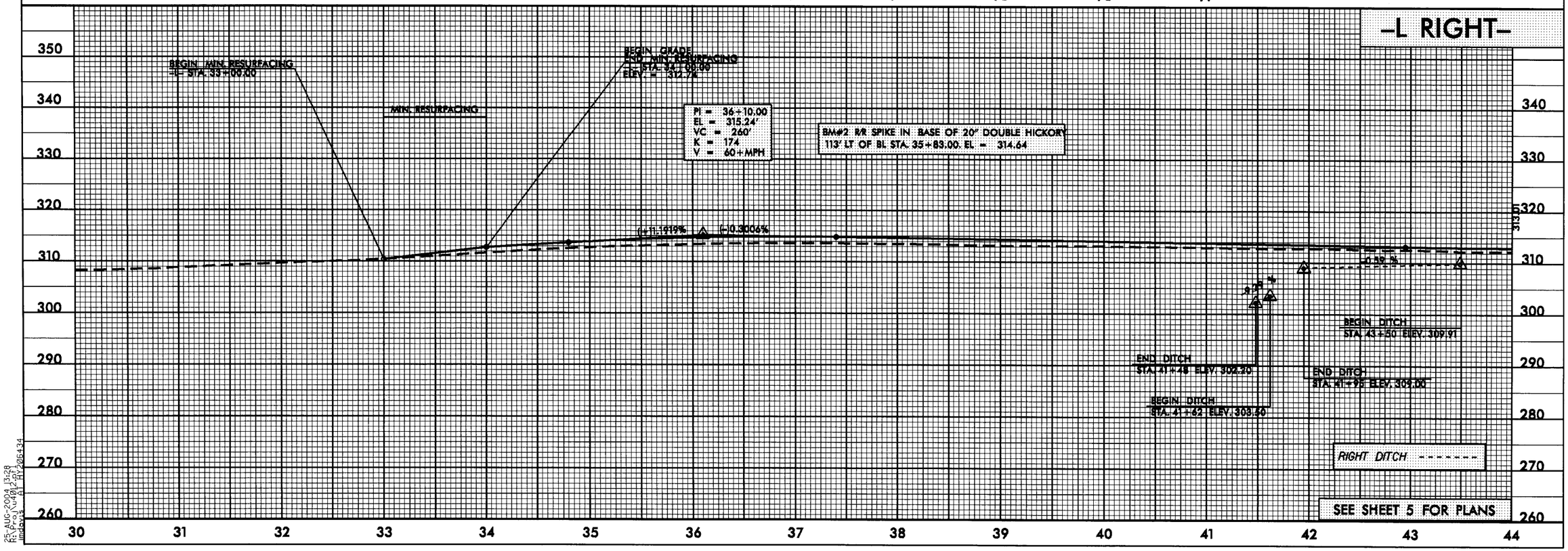
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L LEFT-



SEE SHEET 8 FOR PLANS

-L RIGHT-



SEE SHEET 5 FOR PLANS

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jmdavis AT HY2064434

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PROJECT REFERENCE NO.	SHEET NO.
U-4012	16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L RIGHT-

PI = 44+85.00
EL = 312.61'
VC = 380'
K = 383
V = 60+MPH

PI = 51+50.00
EL = 317.21'
VC = 340'
K = 342
V = 60+MPH

PI = 55+35.00
EL = 316.05'
VC = 420'
K = 172
V = 60+MPH

313.01

(+)0.3006% (+)0.6917% (+)0.6917% (-)0.3013% (-)0.3013% (-)2.7376%

308.78

BM#3 RR SPIKE IN BASE OF 19" PINE
113' LT OF BL STA. 51+67.00. EL = 315.11

SEE SHEET 6 FOR PLANS

44 45 46 47 48 49 50 51 52 53 54 55 56 57 58

-L RIGHT-

PI = 60+00.00
EL = 303.32'
VC = 440'
K = 170
V = 60 MPH

308.78

(-)2.7376% (-)5.3270% (-)5.3270% (+)0.3021%

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 8,440 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 254.87 FT
BASE DISCHARGE	= 10,068 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 256.93 FT
OVERTOPPING DISCHARGE	= N/A
OVERTOPPING FREQUENCY	= N/A
OVERTOPPING ELEVATION	= N/A

BEGIN BRIDGE
-L- STA. 68+72.60+/- RT.

END BRIDGE
-L- STA. 71+72.60+/- RT.

PI = 67+85.00
EL = 261.55'
VC = 1,130'
K = 201
V = 60+MPH

263.36

BM#4 RR SPIKE IN BASE OF 18" RED OAK
114' RT OF BL STA. 68+27.00 EL = 249.28

NOTE: EXCAVATE EXISTING ROADWAY FILL UNDER NEW BRIDGE TO MATCH FLOODPLAIN ELEVATION (+/- 248.0')

TEMPORARY COFFER DAMS

SEE SHEET 7 FOR PLANS

58 59 60 61 62 63 64 65 66 67 68 69 70 71 72

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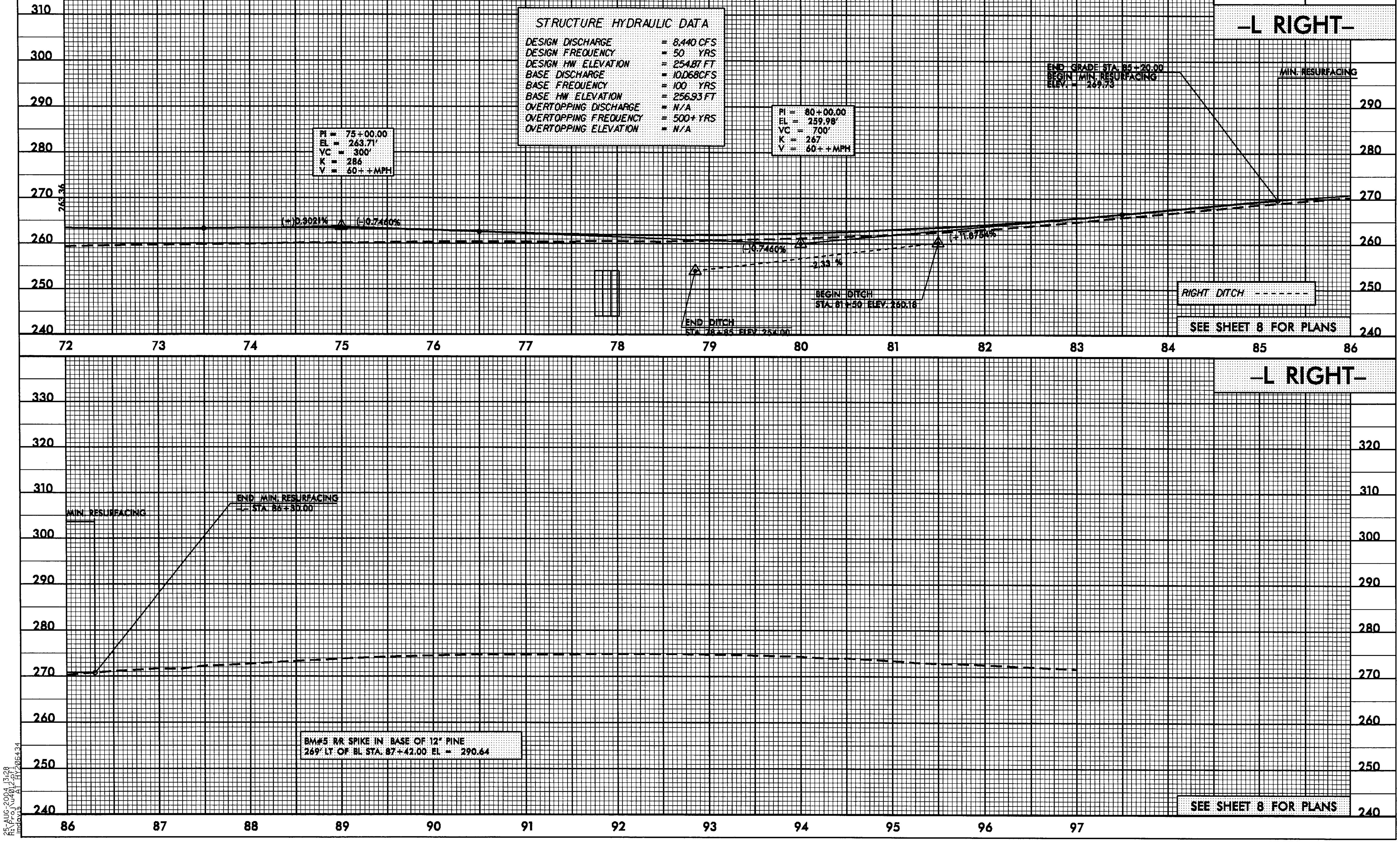
jmdavis AT HY206434

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
U-4012	17

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-L RIGHT-
STRUCTURE HYDRAULIC DATA
DESIGN DISCHARGE = 8,440 CFS
DESIGN FREQUENCY = 50 YRS
DESIGN HW ELEVATION = 254.87 FT
BASE DISCHARGE = 10,068 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 256.93 FT
OVERTOPPING DISCHARGE = N/A
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING ELEVATION = N/A
PI = 75+00.00
EL = 263.71'
VC = 300'
K = 286
V = 60+ +MPH
PI = 80+00.00
EL = 259.98'
VC = 700'
K = 267
V = 60+ +MPH
263.36
(+)0.3021%
(-)0.7460%
(-)0.7460%
(+)1.8754%
2.33 %
END DITCH
STA. 78+85 ELEV. 254.00
BEGIN DITCH
STA. 81+50 ELEV. 260.18
END GRADE STA. 85+20.00
BEGIN MIN. RESURFACING
ELEV. = 269.73
MIN. RESURFACING
RIGHT DITCH
SEE SHEET 8 FOR PLANS
-L RIGHT-
MIN. RESURFACING
END MIN. RESURFACING
-L- STA. 86+50.00
BM#5 RR SPIKE IN BASE OF 12" PINE
269' LT OF BL STA. 87+42.00 EL = 290.64
SEE SHEET 8 FOR PLANS

25-AUG-2004 13:28
R:\Proj\u4012.pf1
lmdavis AT HY206434

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
U-4012	18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RPC-

340
330
320
310
300
290
280

11 12 13 14 15 16 17 18 19 20 21

BEG. WIDENING
-RPC- STA. 11+00.00

END WIDENING
-RPC- STA. 21+05.54

BEGIN DITCH
STA. 14+00 ELEV. 304.28

STA. 16+50.00
ELEV. 303.66

END DITCH
STA. 17+15.00
ELEV. 303.50

RIGHT DITCH - - - - - - -

SEE SHEET 4 FOR PLANS

5/28/99

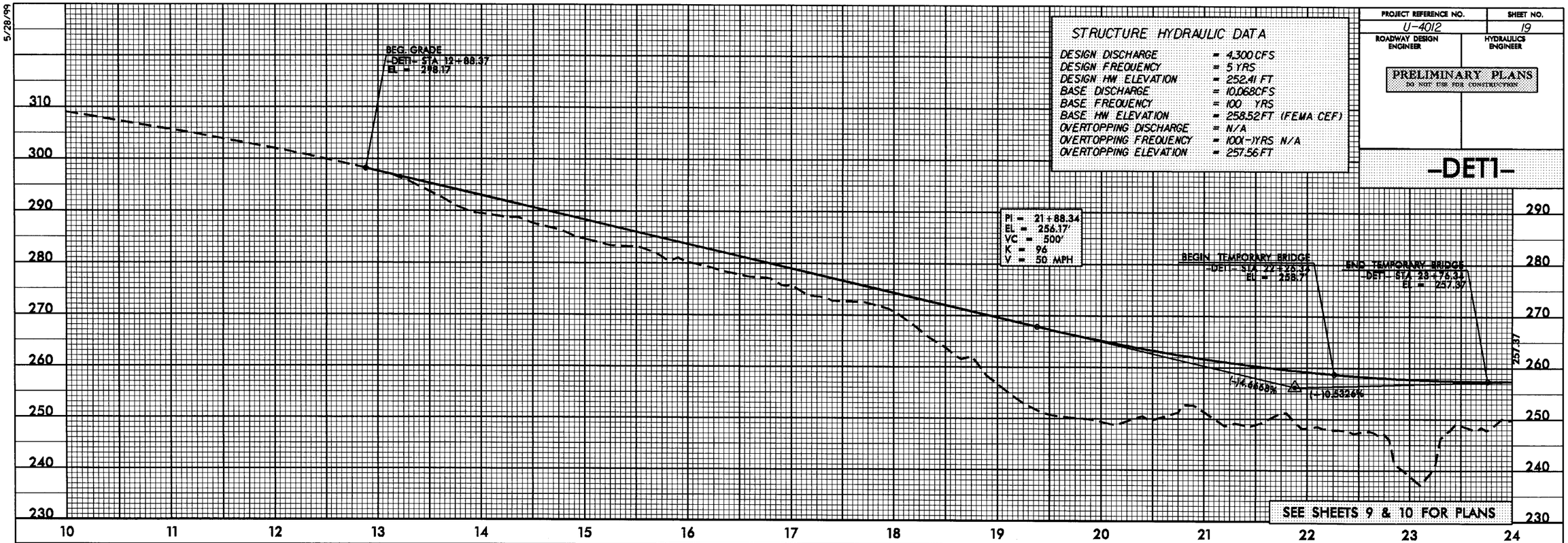
PROJECT REFERENCE NO.	SHEET NO.
U-4012	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

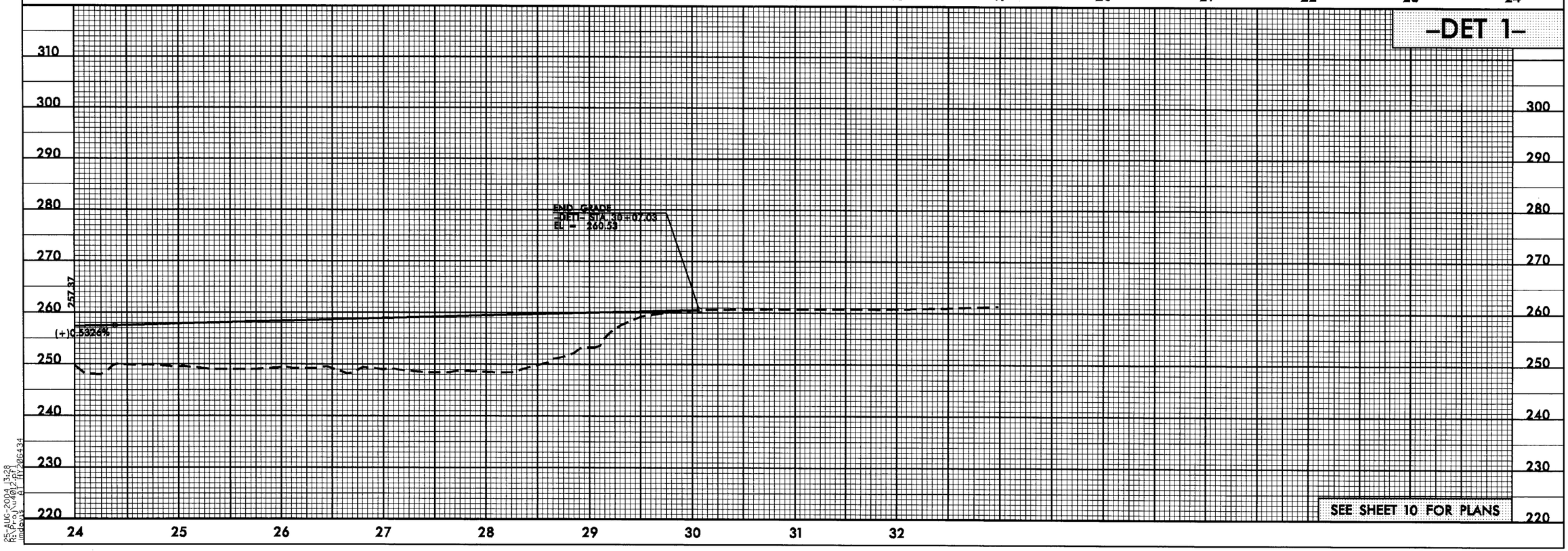
STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 4,300 CFS
DESIGN FREQUENCY	= 5 YRS
DESIGN HW ELEVATION	= 252.41 FT
BASE DISCHARGE	= 10,068 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 258.52 FT (FEMA CEF)
OVERTOPPING DISCHARGE	= N/A
OVERTOPPING FREQUENCY	= 100(-)YRS N/A
OVERTOPPING ELEVATION	= 257.56 FT

-DET1-



-DET 1-



25-AUG-2004 13:28
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mdavis AT HY2064.34

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
U-4012	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

–DET3–

PI = 12+32.17
EL = 307.84'
VC = 195'
K = 133
V = 55 MPH

(-)2.2010%

(-)3.6719%

BEG. GRADE 'A'
-DET2- STA. 10+00.00
EL = 312.95

END GRADE 'A'
-DET3- STA. 13+30.52
EL = 304.29
BEGIN WIDENING OFF LRT GRADE
-L- STA. 39+39.81

SEE SHEET 11 FOR PLANS

–DET 3–

PI = 33+00.00
EL = 261.89'
VC = 65'
K = 96
V = 50 MPH

PI = 34+25.00
EL = 261.15'
VC = 175'
K = 97
V = 50 MPH

REG. GRADE 'B'
-DET3- STA. 32+65.24
EL = 261.86
END WIDENING OFF LRT GRADE
-L- STA. 78+72.69

(+)0.0380%

(-)0.5911%

(+)1.2137%

END GRADE 'B'
-DET3- STA. 35+81.56
EL = 263.05

SEE SHEET 12 FOR PLANS

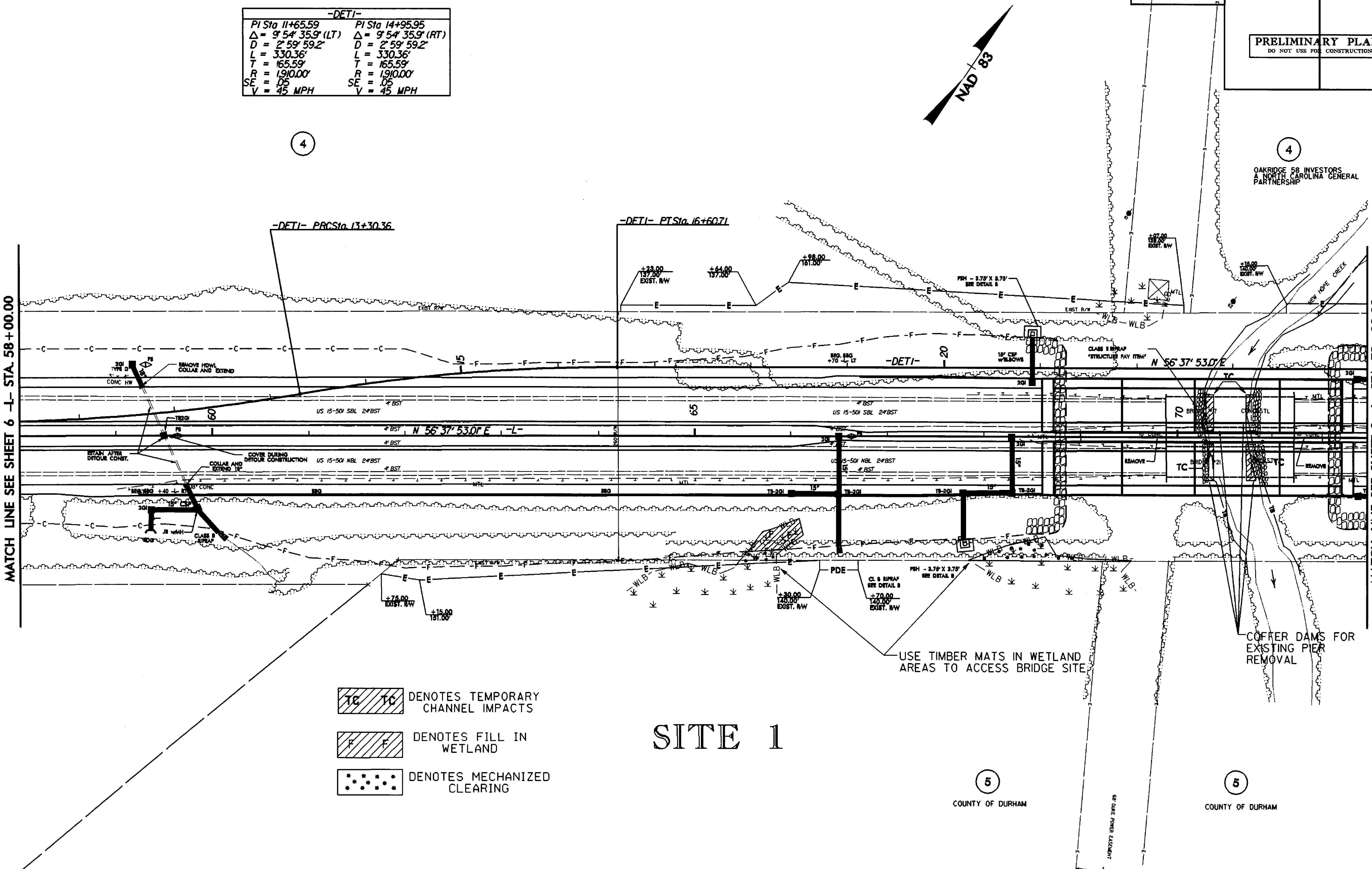
25-AUG-2004 13:28
R:\Proj\U4012.prt
mdavis AT HY2064-24

PROJECT REFERENCE NO.	SHEET NO.
U-4012	3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ENGLISH

-DET1-	
PI Sta 11+65.59	PI Sta 14+95.95
Δ = 9° 54' 35.9" (LT)	Δ = 9° 54' 35.9" (RT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 330.36'	L = 330.36'
T = 165.59'	T = 165.59'
R = 1,910.00'	R = 1,910.00'
SE = .05	SE = .05
V = 45 MPH	V = 45 MPH



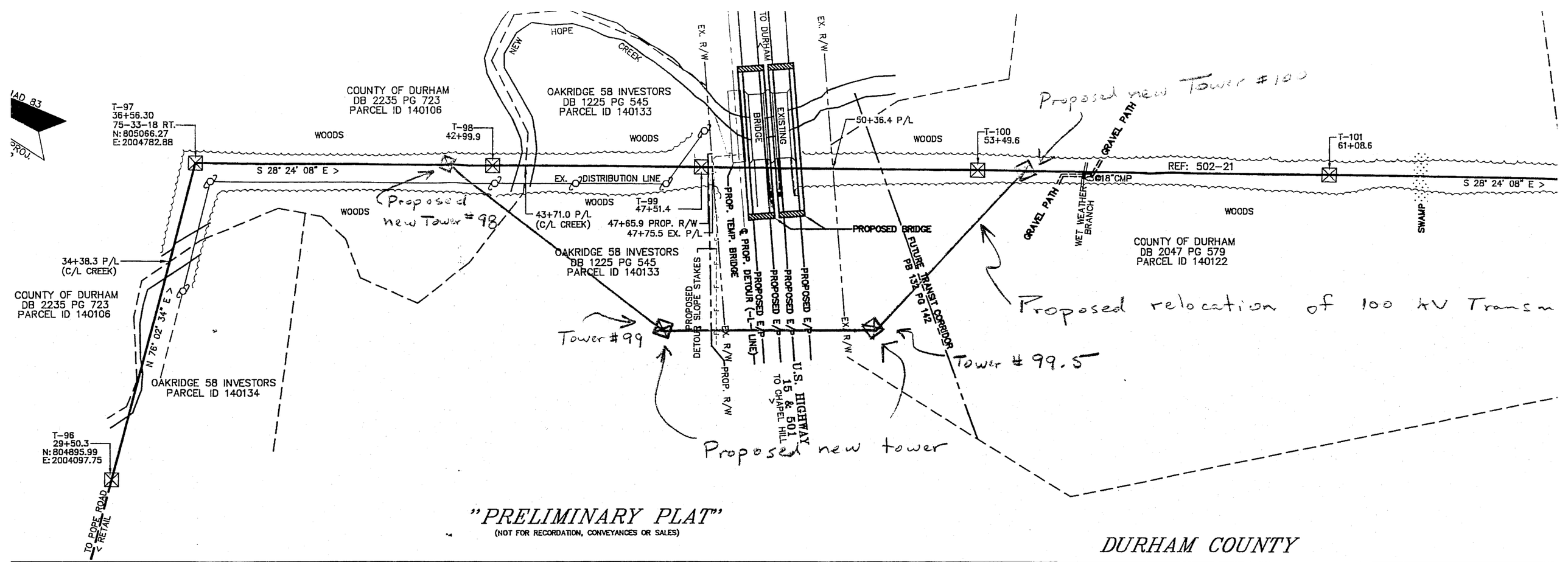
TC TC	DENOTES TEMPORARY CHANNEL IMPACTS
F F	DENOTES FILL IN WETLAND
* * *	DENOTES MECHANIZED CLEARING

SITE 1

-SEE SHEET 2-C FOR STRUCTURE STAGING
-SEE SHEET 2- FOR SPECIAL MEDIAN GRADING DETAIL
-SEE SHEETS 9 THRU 12 FOR DETOURS
-SEE SHEETS 14 AND 16 FOR -L- PROFILES
-SEE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

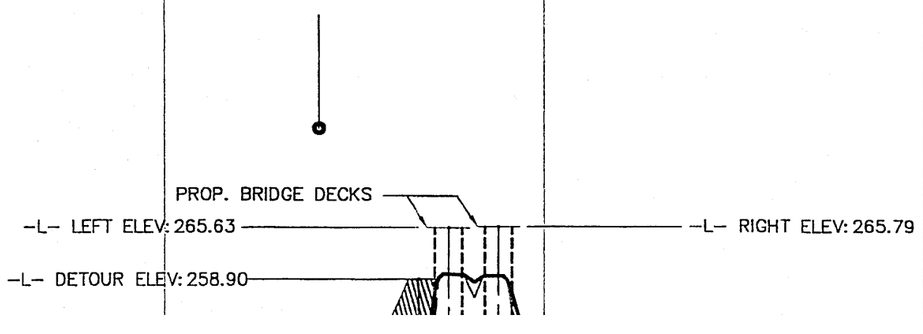
REVISIONS

8/17/99



"PRELIMINARY PLAT"
(NOT FOR RECORDATION, CONVEYANCES OR SALES)

DURHAM COUNTY



NCDOT
DIVISION OF HIGHWAYS
DURHAM COUNTY
PROJECT: WBS 35010.1.1 (U-4012)

US 15-501 WIDENING
UTILITY IMPACTS

SHEET 3A OF 15 8/15/04

PROJECT REFERENCE NO.	SHEET NO.
U-4012	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT PLANS
DO NOT USE FOR CONSTRUCTION

-DET1-

PI Sta 28+03.25	PI Sta 31+33.61
Δ = 9° 54' 35.9" (RT)	Δ = 9° 54' 35.9" (LT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 330.36'	L = 330.36'
T = 165.59'	T = 165.59'
R = 1,910.00'	R = 1,910.00'
SE = .05	SE = .05
V = 45 MPH	V = 45 MPH

DETAIL "D"
LATERAL GRASS SWALE
(Not to Scale)
Min. D = 0.5 Ft.
B = 2.0 Ft.
b = VAR Ft.
-L- STA 79+40 TO 81+50 LT

DETAIL "C"
SPECIAL CUT GRASS SWALE
(Not to Scale)
Min. D = 0.5 Ft.
B = 2.0 Ft.
-L- STA 78+85 TO 81+33 RT

DETAIL "G"
CHANNEL IMPROVEMENTS AT INLET AND OUTLET OF RCBC
d = 2.0 Ft.
b = 0-6 Ft.
B = 10 Ft.
-L- STA 77+89 LT&RT

SITE 1

PC PC	DENOTES PERMANENT CHANNEL IMPACTS
S S	DENOTES FILL IN SURFACE WATER
F F	DENOTES FILL IN WETLAND
∗ ∗ ∗	DENOTES MECHANIZED CLEARING

- -SEE SHEET 2- FOR SPECIAL MEDIAN GRADING DETAIL
- -SEE SHEETS 9-12 FOR DETOURS
- -SEE SHEETS 14, 15, AND 17 FOR -L- PROFILES

REVISIONS

8/17/99

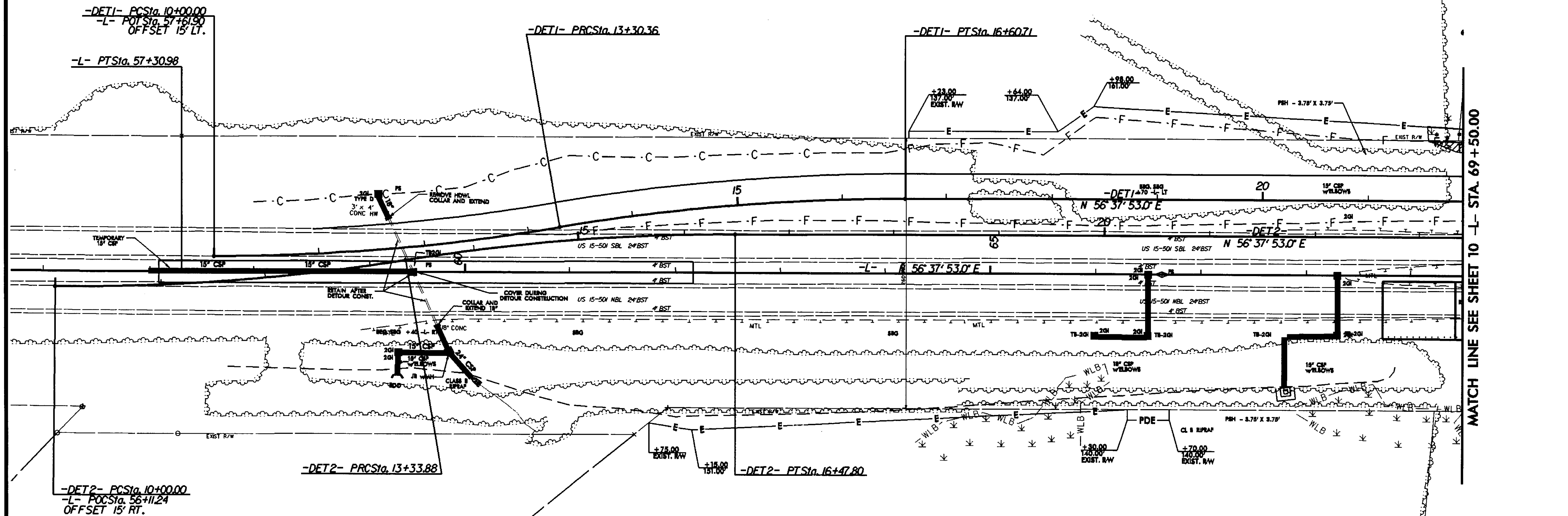
PROJECT REFERENCE NO.	SHEET NO.
U-4012	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

NAD 83

PERMIT PLANS
DO NOT USE FOR CONSTRUCTION

-DET1-	
PI Sta 11+65.59	PI Sta 14+95.95
Δ = 9° 54' 35.9" (LT)	Δ = 9° 54' 35.9" (RT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 330.36'	L = 330.36'
T = 165.59'	T = 165.59'
R = 1,910.00'	R = 1,910.00'
SE = .05	SE = .05
V = 45 MPH	V = 45 MPH
-DET2-	
PI Sta 11+67.37	PI Sta 14+91.19
Δ = 10° 00' 56.2" (LT)	Δ = 9° 25' 01.0" (RT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 333.88'	L = 313.92'
T = 167.37'	T = 157.32'
R = 1,910.00'	R = 1,910.00'



4
-DET1- PCSta. 10+00.00
-L- POTSta. 57+61.90
OFFSET 15' LT.
-L- PTSta. 57+30.98
-DET1- PRCSta. 13+30.36
-DET1- PTSta. 16+60.71
-DET1- N 56° 37' 53.0" E
-DET2- N 56° 37' 53.0" E
-L- N 56° 37' 53.0" E
US 15-501 SBL 24'BST
US 15-501 NBL 24'BST
TEMPORARY 15" CSP
RETAIN AFTER DETOUR CONST.
COVER DURING DETOUR CONSTRUCTION
COLLAR AND EXTEND 15"
REMOVE HDWL COLLAR AND EXTEND
3' x 4' CONC HW
CLASS B RIPRAP
CL B RIPRAP
15" CSP W/ELBOWS
PSH - 3.75' X 3.75'
PDE
EXIST. R/W
-DET2- PRCSta. 13+33.88
-DET2- PTSta. 16+47.80
-DET2- PCSta. 10+00.00
-L- POCSta. 56+11.24
OFFSET 15' RT.
MATCH LINE SEE SHEET 10 -L- STA. 69+50.00

DETOUR IMPACTS
SITE 1

DENOTES TEMP FILL IN WETLAND

DENOTES MECHANIZED CLEARING

5
COUNTY OF DURHAM

-SEE SHEETS 6 AND 7 FOR -L- DESIGN
-SEE SHEETS 13, 14, AND 16 FOR -L- PROFILES
-SEE SHEET 19 FOR -DET 1- PROFILE

REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-4012	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET1-	
PI Sta 28+03.25	PI Sta 31+33.61
Δ = 9° 54' 35.9" (RT)	Δ = 9° 54' 35.9" (LT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 330.36'	L = 330.36'
T = 165.59'	T = 165.59'
R = 1,910.00'	R = 1,910.00'
SE = .05	SE = .05
V = 45 MPH	V = 45 MPH

-DET2-	
PI Sta 31+09.30	PI Sta 34+24.81
Δ = 9° 27' 52.9" (RT)	Δ = 9° 27' 52.9" (LT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 315.51'	L = 315.51'
T = 158.12'	T = 158.12'
R = 1,910.00'	R = 1,910.00'

DETOUR IMPACTS
SITE 1

▨ DENOTES TEMP FILL IN WETLAND

⁘ DENOTES MECHANIZED CLEARING

- -SEE SHEET 2-C FOR STRUCTURE STAGING
- -SEE SHEETS 7 AND 8 FOR -L- DESIGN
- -SEE SHEETS 14 THRU 17 FOR -L- PROFILES
- -SEE SHEET 19 FOR -DET1- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
U-4012	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

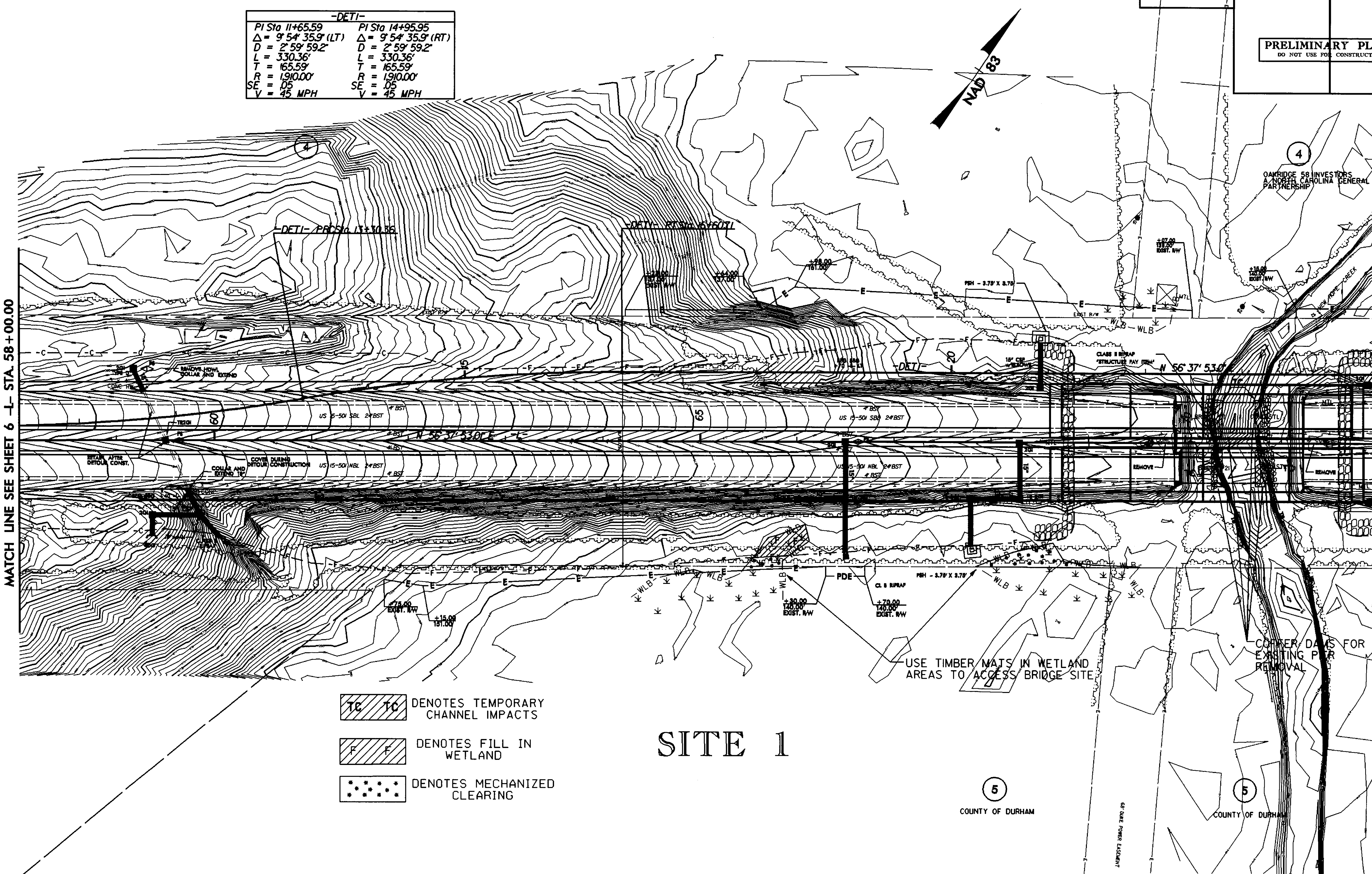
ENGLISH

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

8/17/99

-DET1-	
PI Sta 11+65.59	PI Sta 14+95.95
Δ = 9° 54′ 35.9″ (LT)	Δ = 9° 54′ 35.9″ (RT)
D = 2° 59′ 59.2″	D = 2° 59′ 59.2″
L = 330.36′	L = 330.36′
T = 165.59′	T = 165.59′
R = 1,910.00′	R = 1,910.00′
SE = .05	SE = .05
V = 45 MPH	V = 45 MPH



TC TC	DENOTES TEMPORARY CHANNEL IMPACTS
F F	DENOTES FILL IN WETLAND
* * *	DENOTES MECHANIZED CLEARING

SITE 1

- -SEE SHEET 2-C FOR STRUCTURE STAGING
- -SEE SHEET 2- FOR SPECIAL MEDIAN GRADING DETAIL
- -SEE SHEETS 9 THRU 12 FOR DETOURS
- -SEE SHEETS 14 AND 16 FOR -L- PROFILES
- -SEE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

$$$$$$$SYSTIME$$$$
$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
U-4012	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

PERMIT PLANS
DO NOT USE FOR CONSTRUCTION

-DETI-

PI Sta 28+03.25	PI Sta 31+33.61
Δ = 9° 54' 35.9" (RT)	Δ = 9° 54' 35.9" (LT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 330.36'	L = 330.36'
T = 165.59'	T = 165.59'
R = 1,910.00'	R = 1,910.00'
SE = .05	SE = .05
V = 45 MPH	V = 45 MPH

SITE 1

PC PC	DENOTES PERMANENT CHANNEL IMPACTS
S S	DENOTES FILL IN SURFACE WATER
F F	DENOTES FILL IN WETLAND
* * *	DENOTES MECHANIZED CLEARING

END STATE PROJECT U-4012
-L- STA. 86+30.00

- -SEE SHEET 2- FOR SPECIAL MEDIAN GRADING DETAIL
- -SEE SHEETS 9-12 FOR DETOURS
- -SEE SHEETS 14, 15, AND 17 FOR -L- PROFILES

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-4012	9

R/W SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PERMIT PLANS
DO NOT USE FOR CONSTRUCTION

ENGLISH

REVISIONS

-DET1-	
PI Sta 11+65.59	PI Sta 14+95.95
Δ = 9° 54′ 35.9″ (LT)	Δ = 9° 54′ 35.9″ (RT)
D = 2° 59′ 59.2″	D = 2° 59′ 59.2″
L = 330.36′	L = 330.36′
T = 165.59′	T = 165.59′
R = 1,910.00′	R = 1,910.00′
SE = .05	SE = .05
V = 45 MPH	V = 45 MPH
-DET2-	
PI Sta 11+67.37	PI Sta 14+91.19
Δ = 10° 00′ 56.2″ (LT)	Δ = 9° 25′ 01.0″ (RT)
D = 2° 59′ 59.2″	D = 2° 59′ 59.2″
L = 333.88′	L = 313.92′
T = 167.37′	T = 157.32′
R = 1,910.00′	R = 1,910.00′

DETOUR IMPACTS
SITE 1

▨ DENOTES TEMP FILL IN WETLAND

⁘ DENOTES MECHANIZED CLEARING

-SEE SHEETS 6 AND 7 FOR -L- DESIGN
-SEE SHEETS 13, 14, AND 16 FOR -L- PROFILES
-SEE SHEET 19 FOR -DET 1- PROFILE

$$$$$$SYSTIME$$$$$
$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
U-4012	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

NAD 83

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET1-	
PI Sta 28+03.25	PI Sta 31+33.61
Δ = 9° 54' 35.9" (RT)	Δ = 9° 54' 35.9" (LT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 330.36'	L = 330.36'
T = 165.59'	T = 165.59'
R = 1,910.00'	R = 1,910.00'
SE = .05	SE = .05
V = 45 MPH	V = 45 MPH
-DET2-	
PI Sta 31+09.30	PI Sta 34+24.81
Δ = 9° 27' 52.9" (RT)	Δ = 9° 27' 52.9" (LT)
D = 2° 59' 59.2"	D = 2° 59' 59.2"
L = 315.51'	L = 315.51'
T = 158.12'	T = 158.12'
R = 1,910.00'	R = 1,910.00'

DETOUR IMPACTS
SITE 1

▨ DENOTES TEMP FILL IN WETLAND

⁘ DENOTES MECHANIZED CLEARING

-SEE SHEET 2-C FOR STRUCTURE STAGING
-SEE SHEETS 7 AND 8 FOR -L- DESIGN
-SEE SHEETS 14 THRU 17 FOR -L- PROFILES
-SEE SHEET 19 FOR -DET1- PROFILE

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
U-4012	11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L LEFT-

PI = 60+00.00
EL = 302.35'
VC = 440'
K = 192
V = 60+MPH

308.15

(-)2.9032%

(-)5.1949%

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 8,440 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 254.87 FT
BASE DISCHARGE	= 10,068 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 256.93 FT
OVERTOPPING DISCHARGE	= N/A
OVERTOPPING FREQUENCY	= N/A
OVERTOPPING ELEVATION	= N/A

PI = 67+85.00
EL = 261.37'
VC = 1,130'
K = 206
V = 60+MPH

BEGIN BRIDGE
-L- STA. 68+72.48+/- LT.

END BRIDGE
-L- STA. 71+72.48+/- LT.

263.37

(-)5.1949%

(+)0.3007%

CLASS II RIPRAP

CLASS II RIPRAP

2:1

2:1

NWS - 243.74'

TEMPORARY COFFER DAMS

BM#4 BR SPIKE IN BASE OF 18" RED OAK
114' RT OF BL STA. 68+27.00 EL = 249.28

NOTE: EXCAVATE EXISTING ROADWAY FILL UNDER NEW BRIDGE TO MATCH FLOODPLAIN ELEVATION (+/- 248.0')

SEE SHEET 7 FOR PLANS

58 59 60 61 62 63 64 65 66 67 68 69 70 71 72

320 310 300 290 280 270 260 250 240 230

-L LEFT-

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 8,440 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 254.87 FT
BASE DISCHARGE	= 10,068 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 256.93 FT
OVERTOPPING DISCHARGE	= N/A
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= N/A

PI = 75+00.00
EL = 263.72'
VC = 300'
K = 250
V = 60+ +MPH

PI = 80+00.00
EL = 259.23'
VC = 700'
K = 240
V = 60+ +MPH

END GRADE STA. 85+20.00
BEGIN MIN. RESURFACING
ELEV = 269.75

MIN. RESURFACING

263.37

(+)0.3007%

(-)0.8980%

(-)0.8980%

(+)2.0231%

NOTE: 2' HIGH SILLS AT ENTRANCE OF CULVERT IN OUTER BARRELS

SEE SHEET 8 FOR PLANS

72 73 74 75 76 77 78 79 80 81 82 83 84 85 86

330 320 310 300 290 280 270 260 250 240

12-AUG-2004 14:33
K:\Projects\4012\Hydraulics\4012_Hydraulics_Sheet11.dgn
mdavis

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

November 18, 2003

Matt Haney
North Carolina Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Mr. Haney:

This letter is in response to your letter of November 4, 2003 which provided the U.S. Fish and Wildlife Service (Service) with the biological conclusion of the North Carolina Department of Transportation (NCDOT) that the proposed widening of US 15-501 from north of SR 2294 (Mt. Moriah Road) to south of SR 1116 (Garrett Road), Durham County (TIP No. U-4012) may affect, but is not likely to adversely affect the federally-endangered smooth coneflower (*Echinacea laevigata*) and Michaux's sumac (*Rhus michauxii*). These comments are provided in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

According to the information you submitted, a plant survey was conducted at the project site on July 23, 2003. No specimens of smooth coneflower or Michaux's sumac were observed. Based on the negative survey results, additional information provided via a telephone conversation between you and Mr. Gary Jordan on November 17, 2003, and other available information, the Service concurs that the project may affect, but is not likely to adversely affect the smooth coneflower or Michaux's sumac. We believe that the requirements of section 7 (a)(2) of the ESA have been satisfied for now. However, if the project will not be completed within two years of the survey, the site should be surveyed again within two years of the let date. We remind you that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered in this review; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by this identified action.

The Service requests that, in the future, the following information be included in your letters requesting concurrence with NCDOT biological conclusions: map location, survey methodologies, survey results, qualifications of surveyors, analysis of the effects of the action on listed species to include direct, indirect and cumulative effects.

The Service appreciates the opportunity to review this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520 (Ext. 32).

Sincerely,

Garland B. Pardue, Ph.D.
Ecological Services Supervisor

cc: Eric Alsmeyer, USACE, Raleigh, NC
David Franklin, USACE, Wilmington, NC
John Hennessy, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militscher, USEPA, Raleigh, NC

Ecosystem Enhancement PROGRAM

December 9, 2004

Mr. Eric Alsmeyer
US Army Corps of Engineers
Raleigh Regulatory Field Office
6508 Falls of the Neuse Road, Suite 120
Raleigh, North Carolina 27615

Dear Mr. Alsmeyer:

Subject: EEP Mitigation Acceptance Letter:

U-4012, US 15-501 Widening, Durham County; Cape Fear River Basin (Cataloging Unit 03030002); Central Piedmont Eco-Region

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide mitigation for the 0.71 acre of unavoidable riverine wetland impact and 164 feet of unavoidable warm stream impacts associated with the above referenced project.

The subject project is listed in Exhibit 2 of 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 dated July 22, 2003; however, EEP intends to provide riverine wetland and stream compensatory mitigation at a ratio up to 2:1 in Cataloging Unit 03030002 of the Cape Fear River Basin

If you have any questions or need additional information, please contact Ms. Beth Harmon at (919) 715-1929.

Sincerely,

William D. Gilmore, P.E.
EEP Director

cc: Mr. Phil Harris, Office of Natural Environment, NCDOT
Mr. John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: U-4012

Ecosystem Enhancement PROGRAM

December 9, 2004

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

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

U-4012, US 15-501 Widening, Durham County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide stream mitigation for the subject project. Based on the information supplied by you in a letter dated November 5, 2004, the impacts are located in CU 03030002 of the Cape Fear River Basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Riverine Wetland Impacts:	0.71 acre
Stream Impacts:	164 feet

As stated in your letter, the subject project is listed in Exhibit 2 of 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 dated July 22, 2003. The mitigation for the subject project will be provided in accordance with this agreement.

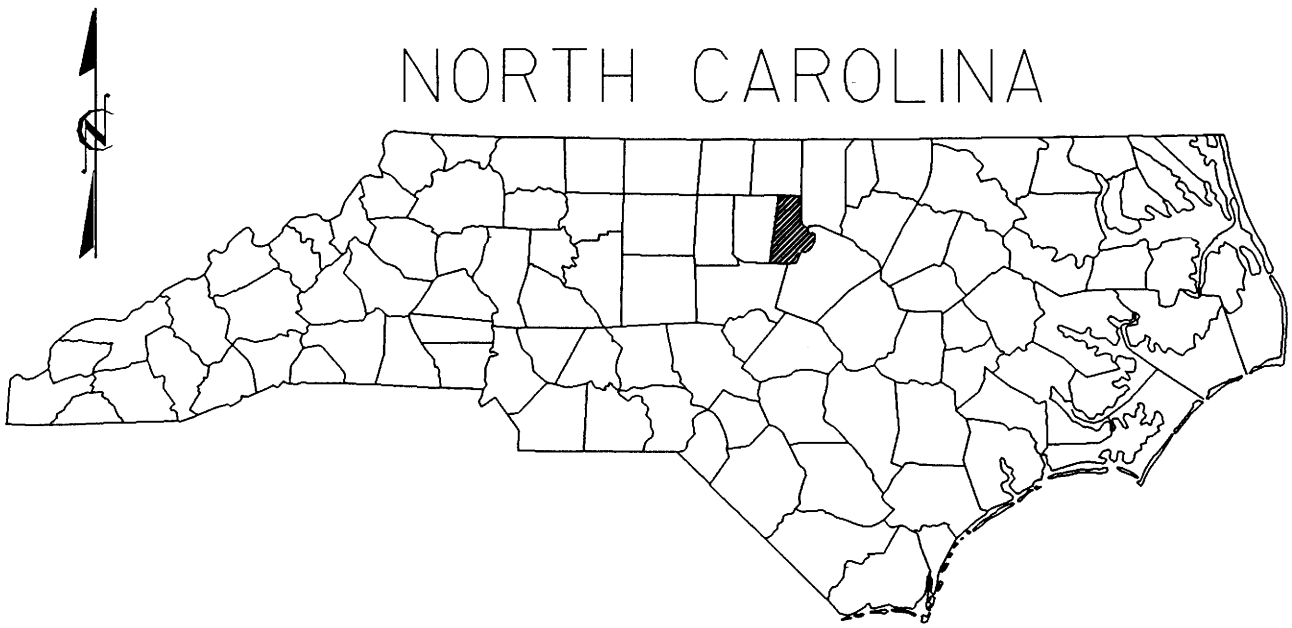
If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

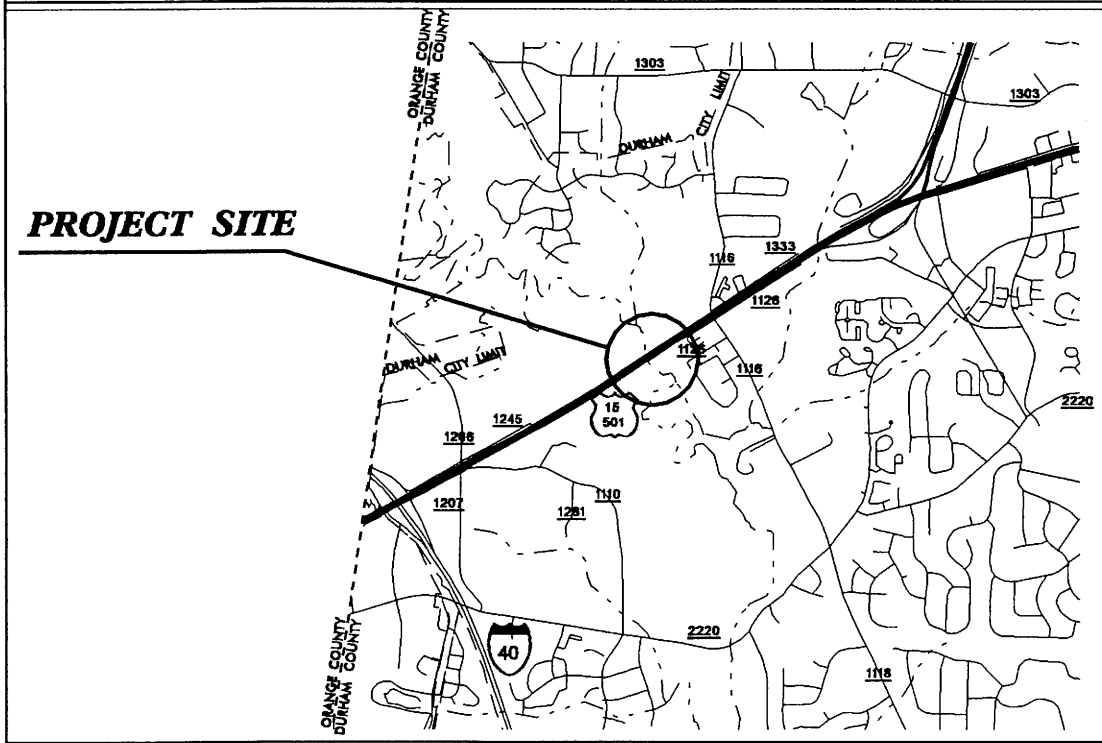
Sincerely,

William D. Gilmore

William D. Gilmore, P.E.
EEP Director

cc: Mr. Eric Alsmeyer, USACE-Raleigh
Mr. John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: U-4012





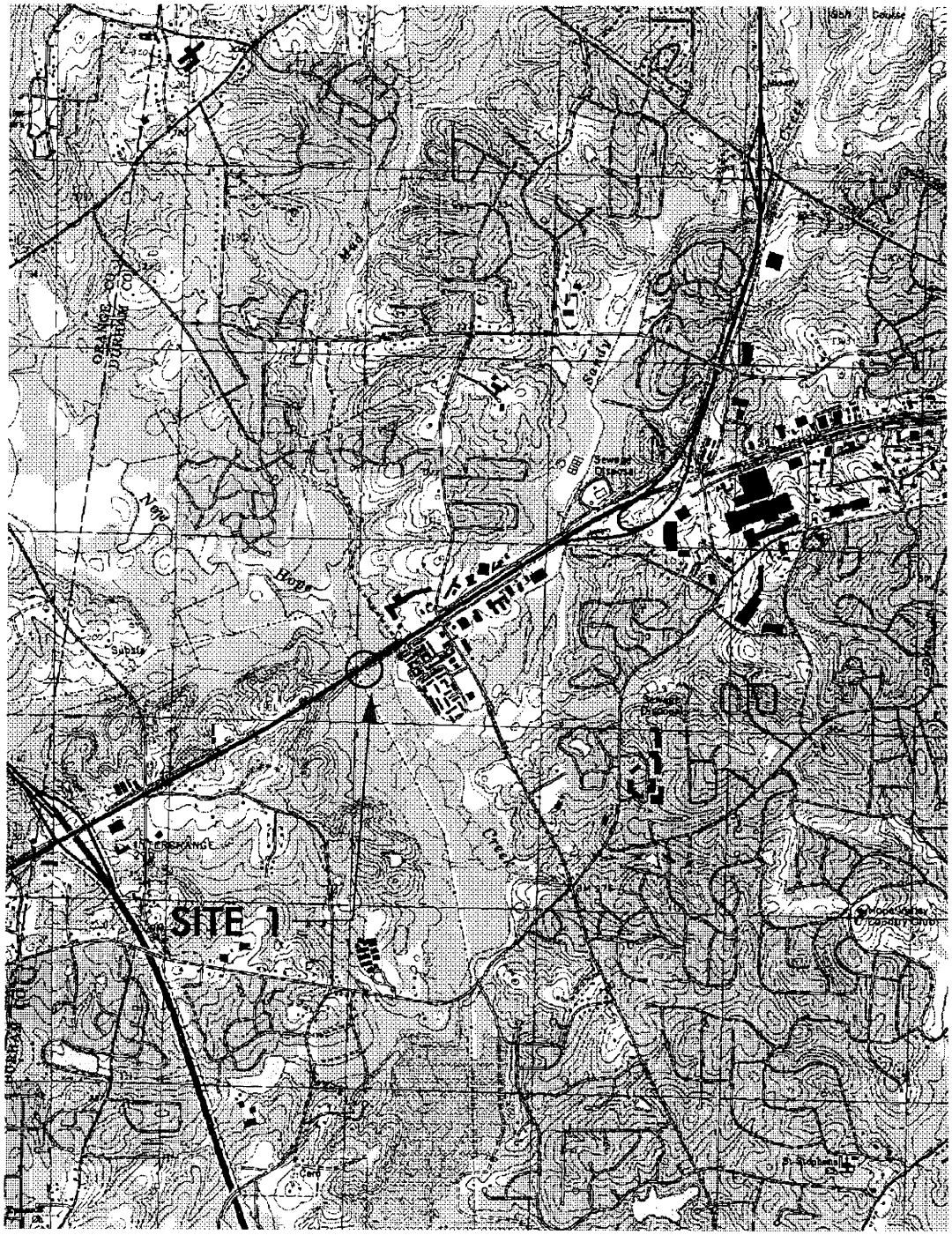
VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS
DURHAM COUNTY
PROJECT: WBS 35010.1.1 (U-4012)

US 15-501 WIDENING

SHEET 1 **OF** 15 **8/15/04**



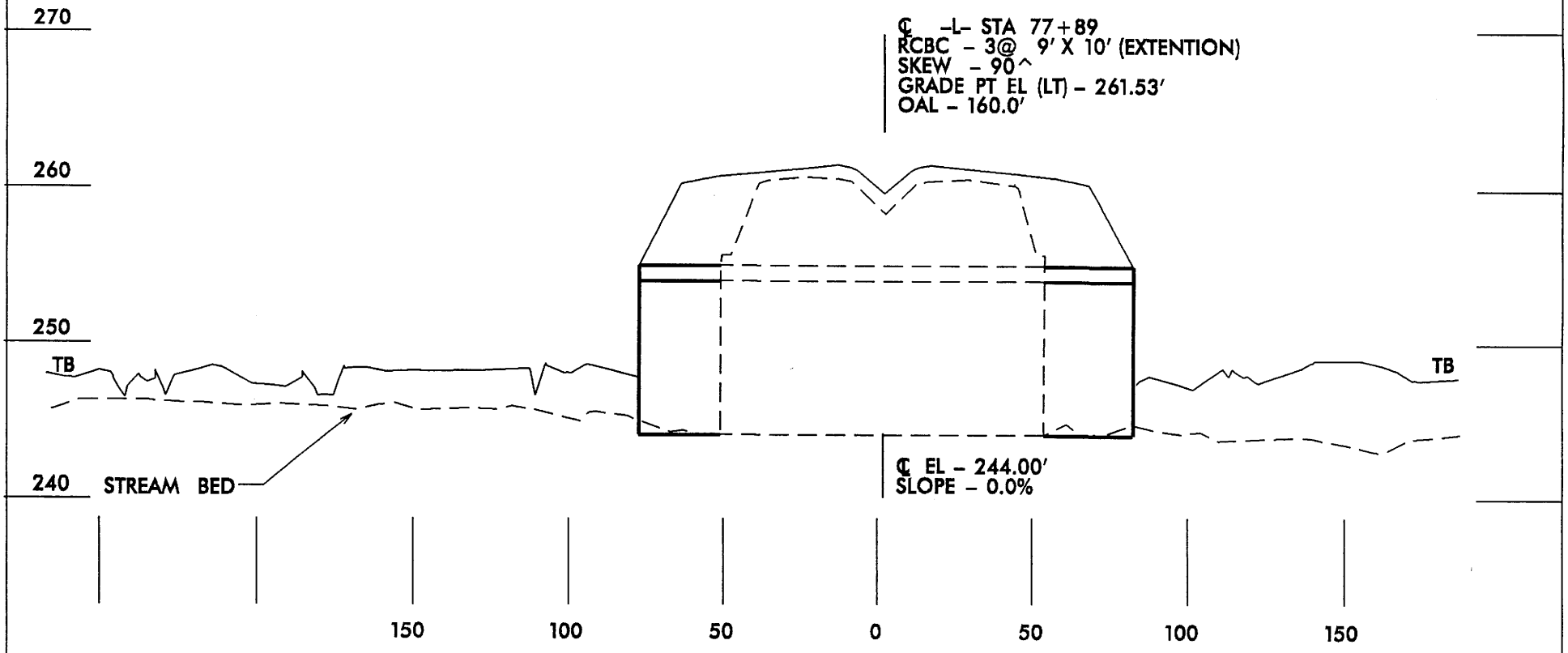
QUAD MAP

NOT TO SCALE

NCDOT

DIVISION OF HIGHWAYS
DURHAM COUNTY
PROJECT: WBS 35010.1.1 (U-4012)

US 15-501 WIDENING



CULVERT CROSS SECTION
-L- STA 77+89

SCALE - 1:40

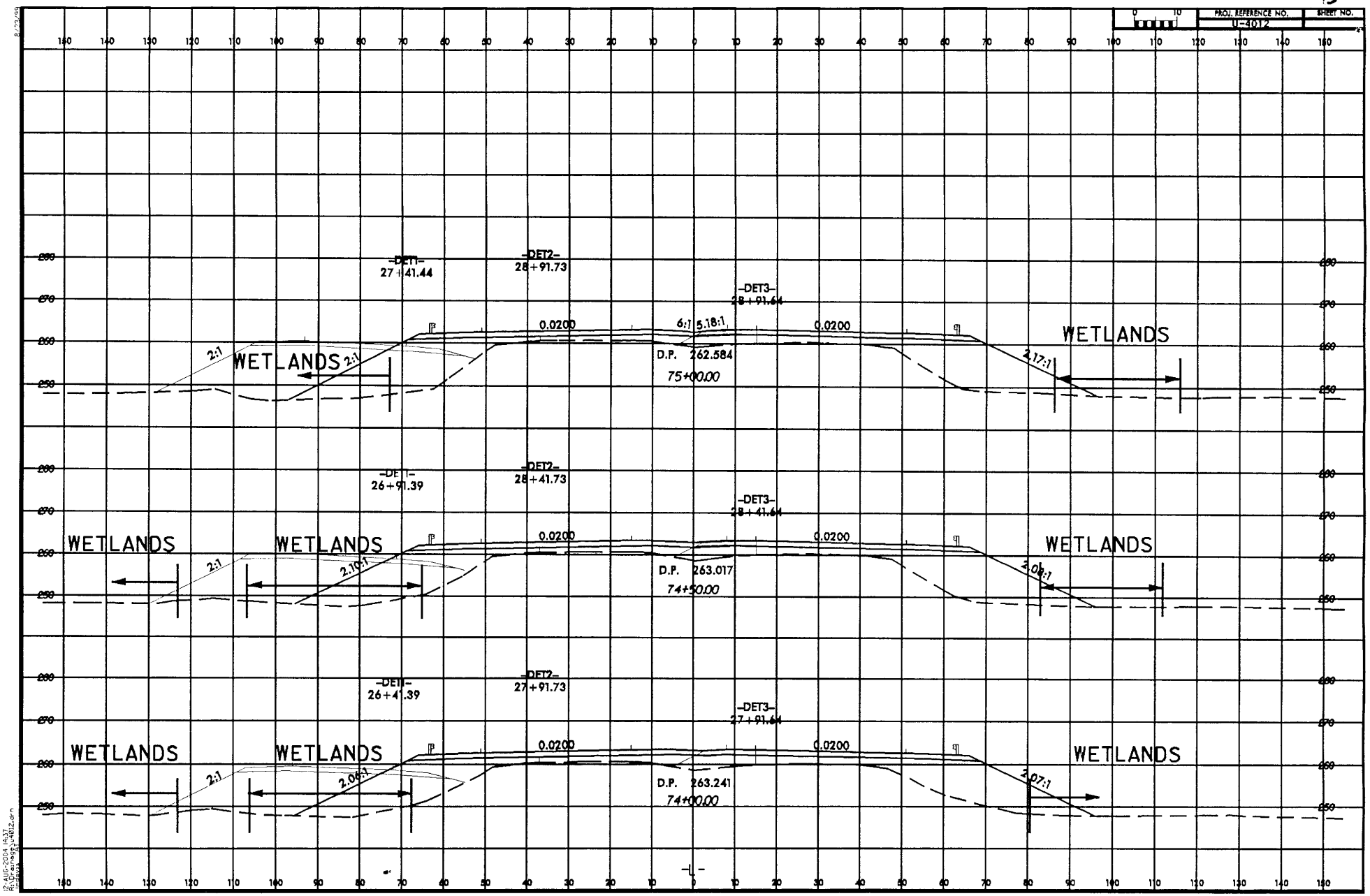
NCDOT
DIVISION OF HIGHWAYS
DURHAM COUNTY
PROJECT: WBS 35010.1.1 (U-4012)

US 15-501 WIDENING

SHEET 12 OF 15 8/15/04

PROJ. REFERENCE NO. U-4012

SHEET NO.



PHASING FOR RCBC EXTENTION (-L- STA 77+89 LT/RT)
U-4012 DURHAM CO. (35010.1.1)

1) INSTALL STILLING BASINS AND OTHER EROSION CONTROL METHODS.

2) INSTALL IMPERVIOUS DIKE (A) AND DIVERT FLOW INTO BOXES B AND C.

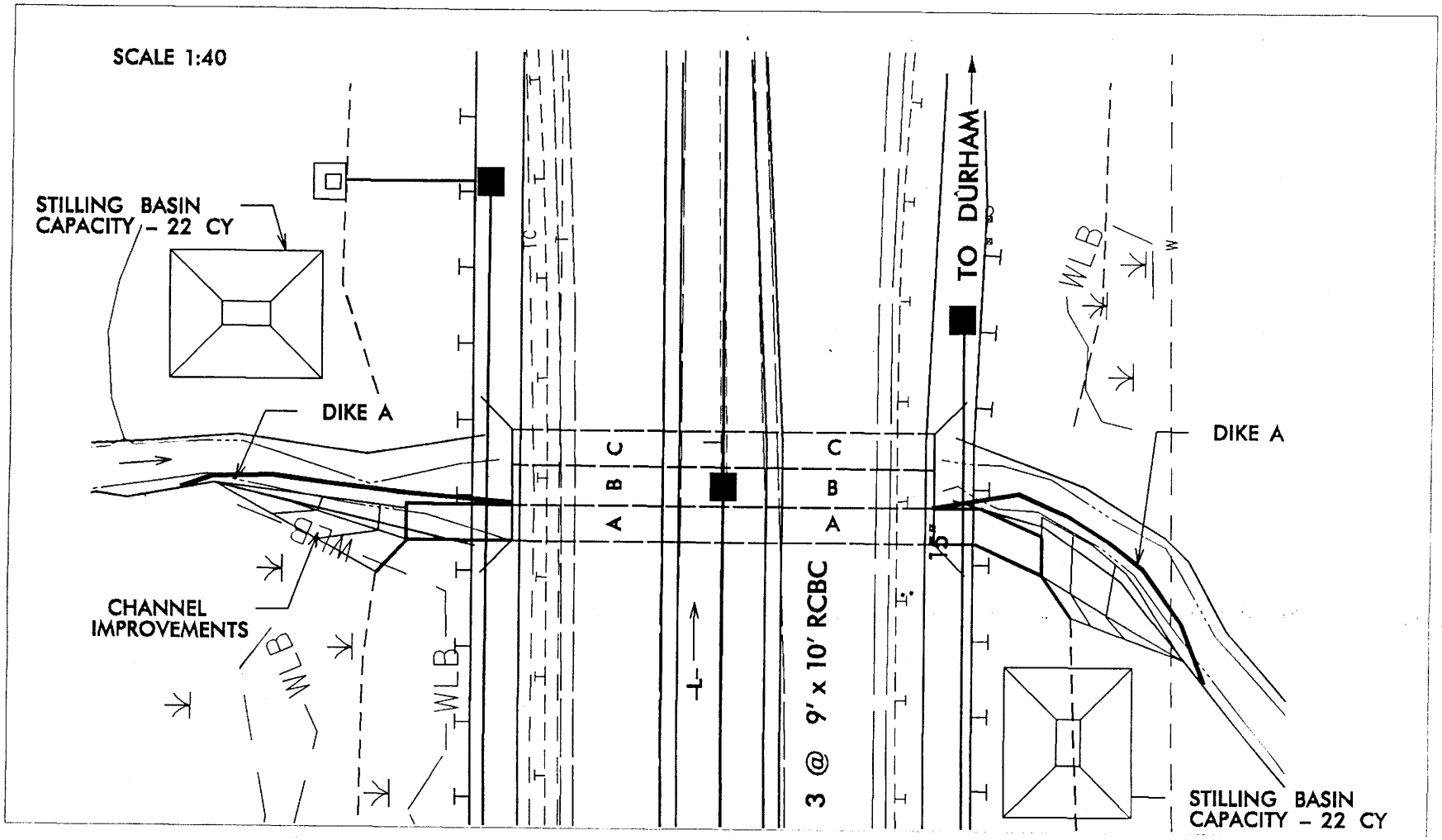
3) CONSTRUCT UP AND DOWNSTREAM EXTENTION ON BARREL A, ALONG WITH RIGHT BANK CHANNEL IMPROVEMENTS. (**PHASE I**)

4) REMOVE IMPERVIOUS DIKE A AND CONSTRUCT DIKE BC, ALLLOWING FLOW THROUGH THE BARREL A.

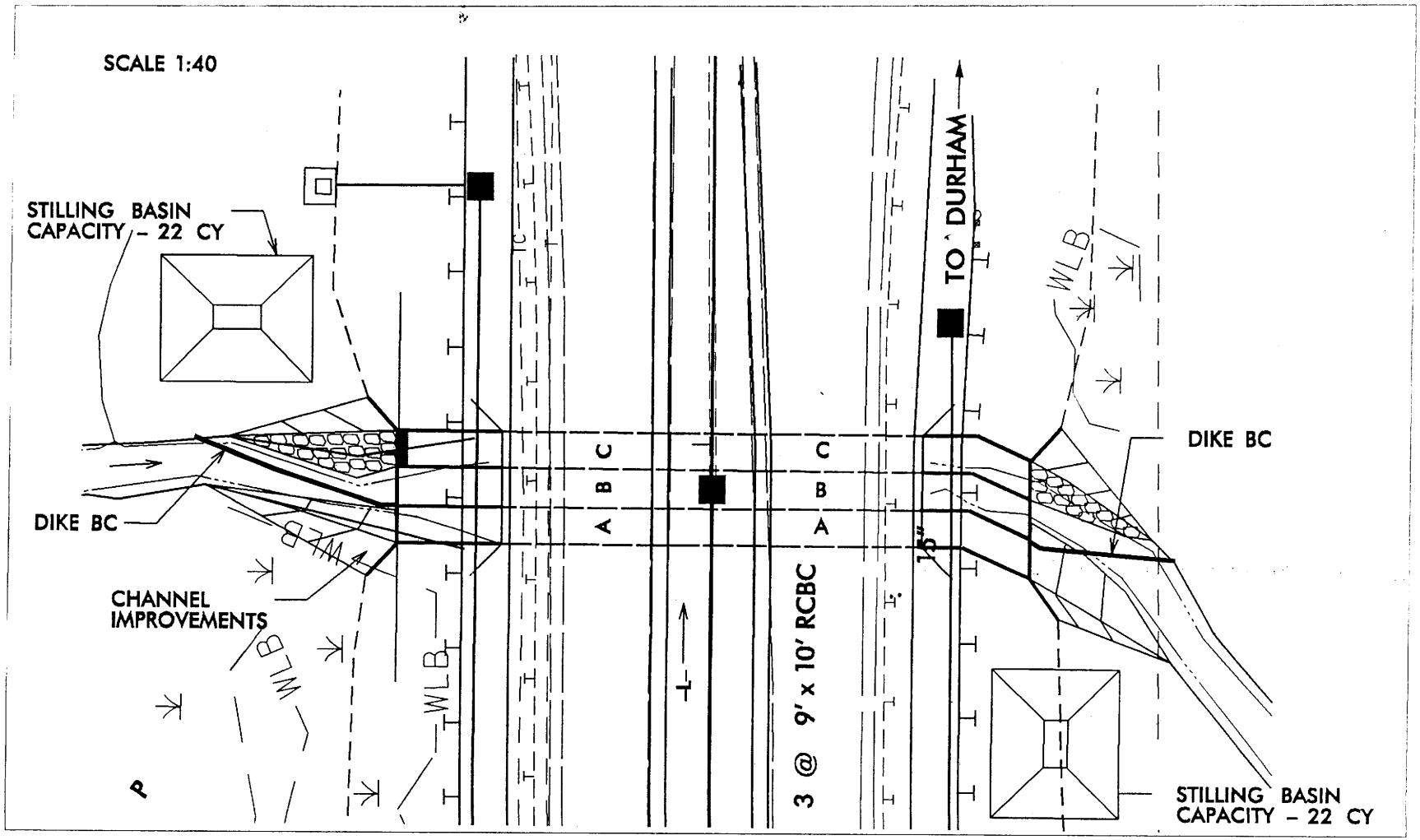
5) CONSTRUCT EXTETIONS OF BARRELS B AND C, ALONG WITH LEFT BANK CHANNEL IMPROVEMENTS. (**PHASE II**)

6) REMOVE IMPERVIOUS DIKE BC AND ALLOW FULL FLOW THROUGH NEWLY EXTENDED BARRELS A, B AND C.

7) REMOVE EROSION CONTROL DEVICES.


SCALE 1:40
STILLING BASIN CAPACITY – 22 CY
DIKE A
CHANNEL IMPROVEMENTS
WLB
3 @ 9' x 10' RCBC
TO DURHAM
A
B
C
15°
DIKE A
STILLING BASIN CAPACITY – 22 CY

PHASE I


SCALE 1:40
STILLING BASIN CAPACITY – 22 CY
DIKE BC
CHANNEL IMPROVEMENTS
WLB
WLB
WLB
A B C
C
B
A
3 @ 9' x 10' RCBC
15"
TO DURHAM
WLB
DIKE BC
STILLING BASIN CAPACITY – 22 CY

PHASE II

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
4	OAKRIDGE 58 INVESTORS A NORTH CAROLINA GENERAL PARTNERSHIP	3508 HORTON ST. RALEIGH, NC 27614
5	COUNTY OF DURHAM	200 E. MAIN ST. 4th FLOOR DURHAM, NC 27701
6	COUNTY OF DURHAM	200 E. MAIN ST. 4th FLOOR DURHAM, NC 27701
7	COUNTY OF DURHAM	200 E. MAIN ST. 4th FLOOR DURHAM, NC 27701
8	WELLINGTON PROPERTIES, LLC	2804 CASTLE PINES CREEK HAMPTON COVE, AL

NCDOT

DIVISION OF HIGHWAYS

DURHAM COUNTY

PROJECT: WBS 35010.1.1 (U-4012)

US 15-501 WIDENING

8/18/04

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS				SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Fill In Wetlands Permanent (ac)	Fill In Wetlands Temporary (ac)	Excavation In Wetlands (ac)	Mechanized Clearing (Method III) (ac)	Fill In SW (Natural) Permanent (ac)	Fill In SW (Natural) Temporary (ac)	Existing Channel Impacted Permanent (ft)	Existing Channel Impacted Temporary (ft)	Natural Stream Design (ft)
1	L Sta 70+58	Steel Girder Bridge - OAL = 300'	0.376	0.194		0.331		0.02			
	L Sta 77+89	3 @ 9' X 10' RCBC Extention					0.015		164.00		
TOTALS:			0.376	0.194	0.000	0.331	0.015	0.02	164.000	0	0.000

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

DURHAM COUNTY
WBS - 35010.1.1 (U4012)

08/24/04

Form Revised 3/22/01