STATE OF NORTH CAROLINA
# DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

August 22, 2008

Eric Alsmeyer
USACE Raleigh Regulatory Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27857

ATTN: Mr. Eric Alsmeyer
NCDOT Coordinator

Subject: **Application for Section 404 Nationwide Permits 23, 33, and Section 401 Permit** for Widening of SR 2028 (T.W. Alexander Drive) from SR 1121 (Cornwallis Road) to East of NC 147 in Durham County. Federal Aid Project Number STP-2028 (1), State Project No. 8.2352701, T.I.P No. U-3309A

Debit $570.00 from WBS No. 34916.1.1.

Dear Sir,

The North Carolina Department of Transportation (NCDOT) proposes to widen SR 2028 (T.W. Alexander Drive) from SR 1121 (Cornwallis Road) to east of NC 147 in Durham County to a four-lane divided shoulder section with a 30-foot raised grass median. The typical section includes 5-foot paved shoulders within 8-foot usable shoulders. Bicycle traffic will use the 5-foot paved shoulder without any additional widening except where there is an exclusive right turn lane.

Please see the enclosed copies of the Pre-Construction Notification, permit drawings and half size plan sheets. A Categorical Exclusion (CE) document was completed for this project in March 2005. It was distributed shortly thereafter. Additional copies are available upon request.

## IMPACTS TO WATERS OF THE UNITED STATES

The project is located in the Cape Fear River Basin (subbasin 03-06-05). This area is part of Hydrologic Cataloging Unit 03030002. Two intermittent Unnamed Tributaries (UTs) to Northeast Creek are located within the project area. UT 2 is located approximately 0.25 mile east of Cornwallis Road and UT 3 is located approximately 0.50 mile east of Cornwallis Road. Both UTs have been assigned a Best Usage Classification of C NSW and a North Carolina

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

TELEPHONE: 919-715-1334 or
919-715-1335

FAX: 919-715-5501

WEBSITE: WWW.NCDOT.ORG

**LOCATION:**
2728 CAPITAL BLVD. SUITE 240
RALEIGH NC 27604

Department of Water Quality (NCDWQ) Stream Index # 16-41-1-17-(0.3). Verification of the intermittent stream status as well as mitigation requirements for UT 2 and 3 were received from Eric Alsmeyer, of the USACE, on June 11, 2008. Rob Ridings, of the NCDWQ, on August 12, 2008 concurred with the USACE decision.

No designated Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supply I (WS-I) or Water Supply (WS-II) occur within 1.0 mile of the project area. Northeast Creek is not listed as a 303(d) stream according to the Final 2006 303(d) list for the Cape Fear River Basin nor does it drain into any 303(d) waters within 1-mile of the project.

*Permanent Impacts*

Site 1 permanent stream impacts of 140 feet result from:

- Placement of 42-inch re-enforced concrete pipe (RCP) extensions and the fill slope.

Site 2 permanent stream impacts of 276 feet result from:

- The extension of the existing 48-inch RCP on the upstream and downstream ends of the pipe that crosses under T.W. Alexander,
- A junction box that connects the 48-inch RCP on the downstream end of pipe to a 54-inch section of RCP (this junction box will account for additional drainage coming from the roadside),
- Addition of two 36-inch pipes where the stream crosses under the pedestrian trail, and
- A lateral V ditch connecting the 36-inch pipes with the upstream end of the 48-inch pipe.

There are no wetland impacts associated with this project.

*Temporary Impacts*

Site 1 and 2 temporary stream impacts of 20 and 25 feet result from the placement of new sections of pipe and pipe extensions.

*Utility Impacts*

There are no utility impacts associated with this project.

## MITIGATION OPTIONS

*Avoidance and Minimization and Compensatory Mitigation*

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.

According to the Clean Water Act (CWA) §404(b) (1) guidelines, NCDOT must avoid, minimize, and mitigate, in sequential order, impacts to waters of the US. The following is a list

of the project's jurisdictional stream avoidance/minimization activities proposed or completed by NCDOT:

Avoidance/Minimization

- Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of stringent erosion control methods and use of Best Management Practices (BMPs).
- Best Management Practices for Protection of Surface Waters will be implemented.

Compensatory Mitigation:

NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent possible as described above. The project will have 416 feet of permanent intermittent stream impacts (Site 1: 140 feet and Site 2: 276 feet). Per the June 2008 correspondence, the USACE is not requiring mitigation for either stream site due to low stream quality and no significant aquatic use. NCDWQ concurred with the USACE. NCDOT does not propose compensatory mitigation.

## FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. The USFWS lists two species for Durham County. Table 2 lists the species and their federal status.

**Table 2. Federally Protected Species in Durham County, NC**

| Common Name | Scientific Name | Federal Status* | Biological Conclusion | Habitat Present |
|---|---|---|---|---|
| Michaux's sumac | *Rhus michauxii* | E | No Effect | Yes |
| Smooth Coneflower | *Echinacea laevigata* | E | No Effect | Yes |

*E= endangered

A Biological Conclusion of "No Effect" was given in the CE for Michaux's sumac and smooth coneflower. A field survey for both species was conducted on June 4, 2008 by NCDOT biologists. Suitable habitat exists along the roadside shoulder. No populations of Michaux's sumac and smooth coneflower were found during the survey. Therefore, the Biological Conclusion of No Effect remains valid.

The bald eagle has been delisted as of August 8, 2007 and is not subject to Section 7 consultation and a biological conclusion is not required. However, the bald eagle remains protected by the Bald and Golden Eagle Protection Act. The location of the project is in both urban and disturbed areas within the City of Durham. No nesting or foraging habitat for bald eagles is present.

## SCHEDULE

The project calls for a letting of August 18, 2009 (review date of June 30, 2009) with a date of availability of September 29, 2009. It is expected that the contractor will choose to start construction in September.

## REGULATORY APPROVALS

Section 404 Permit: Application is hereby made for the Department of Army Section 404 for the issuance of Nationwide Permits 23 and 33 for the above-described activities.

Section 401 Permit: Section 401 General Water Quality Certification (WQCs) 3701 and 3688 will apply to this project. The NCDOT will adhere to all general conditions of the WQCs. Written concurrence from the NCDWQ is required. NCDOT is providing $570.00 for the application processing fee. In accordance with 15A NCAC 2H 0.0501(a) and 15A NCAC 2B 0.200 we are providing five copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their review and approval.

A copy of this permit application will be posted on the NCDOT Website at: http://www.ncdot.org/doh/preconstruct/pe/. If you have any questions or need additional information, please call Deanna Riffey at (919) 715-1409 or driffey@ncdot.gov.

Sincerely,

E. F. Luck

for Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA

W/attachment
- Mr. Brian Wrenn, NCDWQ (5 Copies)
- Mr. J. Wally Bowman, P.E., Division 5 Engineer
- Mr. Chris Murray, Division 5 DEO

W/o attachment (see website for attachments
- Dr. David Chang, P.E., Hydraulics
- Mr. Mark Staley, Roadside Environmental
- Mr. Greg Perfetti, P.E., Structure Design
- Mr. Victor Barbour, Project Services Unit
- Mr. Tim Johnson, P.E., Division 8 Engineer
- Mr. Art King, Division 8 Environmental Officer
- Mr. Jay Bennett, P.E., Roadway Design
- Mr. Majed Alghandour, P. E., Programming and TIP
- Mr. Art McMillan, P.E., Highway Design
- Mr. Scott McLendon, USACE, Wilmington
- Mr. Travis Wilson, NCWRC
- Mr. Gary Jordan, USFWS
- Mr. Steve Brown, PDEA

**Office Use Only:** Form Version March 08

**USACE Action ID No.** _____ **DWQ No.** _____

(If any particular item is not applicable to this project, please enter "Not Applicable" or "N/A".)

## I. Processing

1. Check all of the approval(s) requested for this project:
   - ☒ Section 404 Permit
   - ☐ Section 10 Permit
   - ☒ 401 Water Quality Certification
   - ☐ Riparian or Watershed Buffer Rules
   - ☐ Isolated Wetland Permit from DWQ
   - ☐ Express 401 Water Quality Certification

2. Nationwide, Regional or General Permit Number(s) Requested: Nationwide Permit 23 &33

3. If this notification is solely a courtesy copy because written approval for the 401 Certification is not required, check here: ☐

4. If payment into the North Carolina Ecosystem Enhancement Program (NCEEP) is proposed for mitigation of impacts, attach the acceptance letter from NCEEP, complete section VIII, and check here: ☐

5. If your project is located in any of North Carolina's twenty coastal counties (listed on page 4), and the project is within a North Carolina Division of Coastal Management Area of Environmental Concern (see the top of page 2 for further details), check here: ☐

## II. Applicant Information

1. Owner/Applicant Information
   Name: North Carolina Department of Transportation
   Mailing Address: Gregory J. Thorpe, Ph.D., Manager
   Project Development and Environmental Analysis Branch
   1598 Mail Service Center
   Raleigh, NC 27699-1598
   Telephone Number: 919-733-3141 Fax Number: 919-733-9794
   E-mail Address: gthorpe@dot.state.nc.us

2. Agent/Consultant Information (A signed and dated copy of the Agent Authorization letter must be attached if the Agent has signatory authority for the owner/applicant.)
   Name: _____
   Company Affiliation: _____
   Mailing Address: _____
   _____
   _____
   Telephone Number: _____ Fax Number: _____
   E-mail Address: _____

## III. Project Information

Attach a **vicinity map** clearly showing the location of the property with respect to local landmarks such as towns, rivers, and roads. Also provide a detailed **site plan** showing property boundaries and development plans in relation to surrounding properties. Both the vicinity map and site plan must include a scale and north arrow. The specific footprints of all buildings, impervious surfaces, or other facilities must be included. If possible, the maps and plans should include the appropriate USGS Topographic Quad Map and NRCS Soil Survey with the property boundaries outlined. Plan drawings, or other maps may be included at the applicant's discretion, so long as the property is clearly defined. For administrative and distribution purposes, the USACE requires information to be submitted on sheets no larger than 11 by 17-inch format; however, DWQ may accept paperwork of any size. DWQ prefers full-size construction drawings rather than a sequential sheet version of the full-size plans. If full-size plans are reduced to a small scale such that the final version is illegible, the applicant will be informed that the project has been placed on hold until decipherable maps are provided.

1. Name of project: Proposed Widening of SR 2028 (T.W. Alexander Drive) from SR 1121 (Cornwallis Road) to East of NC 147.

2. T.I.P. Project Number or State Project Number (NCDOT Only): U-3309 A

3. Property Identification Number (Tax PIN): N/A

4. Location
   County: Durham Nearest Town: Durham
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers/names, landmarks, etc.): 40 West to Exit 279 (T. W. Alexander). North on T.W. Alexander. Project starts between Corwallis Road and NC 147.

5. Site coordinates (For linear projects, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)
   Decimal Degrees (6 digits minimum): _____ °N _____ °W

6. Property size (acres): Please refer to attached drawings.

7. Name of nearest receiving body of water: Northeast Creek

8. River Basin: Cape Fear
   (Note – this must be one of North Carolina's seventeen designated major river basins. The River Basin map is available at http://h2o.enr.state.nc.us/admin/maps/.)

9. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: The local area surrounding the proposed project consists of gently rolling hills and land with commercial development.

10. Describe the overall project in detail, including the type of equipment to be used: NCDOT proposes to widen T.W. Alexander Drive to a four-lane divided facility from Cornwallis Road to east of NC 147. Heavy duty excavation equipment will be used such as trucks, dozers, cranes and other various equipment necessary for roadway construction.

11. Explain the purpose of the proposed work: The purpose of this project is to improve the capacity and safety. T.W. Alexander Drive is an important connection in the roadway network at Research Triangle Park.

## IV. Prior Project History

If jurisdictional determinations and/or permits have been requested and/or obtained for this project (including all prior phases of the same subdivision) in the past, please explain. Include the USACE Action ID Number, DWQ Project Number, application date, and date permits and certifications were issued or withdrawn. Provide photocopies of previously issued permits, certifications or other useful information. Describe previously approved wetland, stream and buffer impacts, along with associated mitigation (where applicable). If this is a NCDOT project, list and describe permits issued for prior segments of the same T.I.P. project, along with construction schedules. N/A

## V. Future Project Plans

Are any future permit requests anticipated for this project? If so, describe the anticipated work, and provide justification for the exclusion of this work from the current application.
N/A

## VI. Proposed Impacts to Waters of the United States/Waters of the State

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. Each impact must be listed separately in the tables below (e.g., culvert installation should be listed separately from riprap dissipater pads). Be sure to indicate if an impact is temporary. All proposed impacts, permanent and temporary, must be listed, and must be labeled and clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) should be shown on a delineation map, whether or not impacts are proposed to these systems. Wetland and stream evaluation and delineation forms should be included as appropriate. Photographs may be included at the applicant's discretion. If this proposed impact is strictly for wetland or stream mitigation, list and describe the impact in Section VIII below. If additional space is needed for listing or description, please attach a separate sheet.

1. Provide a written description of the proposed impacts: Please refer to attached letter.

2. Individually list wetland impacts. Types of impacts include, but are not limited to mechanized clearing, grading, fill, excavation, flooding, ditching/drainage, etc. For dams, separately list impacts due to both structure and flooding.

| Wetland Impact Site Number (indicate on map) | Type of Impact | Type of Wetland (e.g., forested, marsh, herbaceous, bog, etc.) | Located within 100-year Floodplain (yes/no) | Distance to Nearest Stream (linear feet) | Area of Impact (acres) |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Total Wetland Impact (acres) | | | | | |

3. List the total acreage (estimated) of all existing wetlands on the property: N/A

4. Individually list all intermittent and perennial stream impacts. Be sure to identify temporary impacts. Stream impacts include, but are not limited to placement of fill or culverts, dam construction, flooding, relocation, stabilization activities (e.g., cement walls, rip-rap, crib walls, gabions, etc.), excavation, ditching/straightening, etc. If stream relocation is proposed, plans and profiles showing the linear footprint for both the original and relocated streams must be included. To calculate acreage, multiply length X width, then divide by 43,560.

| Stream Impact Number (indicate on map) | Stream Name | Type of Impact | Perennial or Intermittent? | Average Stream Width Before Impact | Impact Length (linear feet) | Area of Impact (acres) |
|---|---|---|---|---|---|---|
| Site 1 | UT to Northeast Creek | Pipe extension | Intermittent | 3.5 feet | 140 | 0.02 |
| Site 2 | UT to Northeast Creek | Pipe extension | Intermittent | 2.0 feet | 276 | 0.08 |
| | | | | | | |
| | | | | | | |
| Total Stream Impact (by length and acreage) | | | | | 416 | 0.10 |

5. Individually list all open water impacts (including lakes, ponds, estuaries, sounds, Atlantic Ocean and any other water of the U.S.). Open water impacts include, but are not limited to fill, excavation, dredging, flooding, drainage, bulkheads, etc.

| Open Water Impact Site Number (indicate on map) | Name of Waterbody (if applicable) | Type of Impact | Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.) | Area of Impact (acres) |
|---|---|---|---|---|
| N/A | | | | |
| | | | | |
| Total Open Water Impact (acres) | | | | 0 |

6. List the cumulative impact to all Waters of the U.S. resulting from the project:

| | |
|---|---|
| Stream Impact (acres): | 0.10 |
| Wetland Impact (acres): | 0.0 |
| Open Water Impact (acres): | 0.00 |
| Total Impact to Waters of the U.S. (acres) | 0.10 |
| Total Stream Impact (linear feet): | 416 |

7. Isolated Waters
   Do any isolated waters exist on the property? ☐ Yes ☒ No
   Describe all impacts to isolated waters, and include the type of water (wetland or stream) and the size of the proposed impact (acres or linear feet). Please note that this section only applies to waters that have specifically been determined to be isolated by the USACE.
   N/A

8. Pond Creation
   If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.
   Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands
   Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.): N/A
   Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.): N/A
   Current land use in the vicinity of the pond: N/A
   Size of watershed draining to pond: N/A Expected pond surface area: N/A

## VII. Impact Justification (Avoidance and Minimization)

Specifically describe measures taken to avoid the proposed impacts. It may be useful to provide information related to site constraints such as topography, building ordinances, accessibility, and financial viability of the project. The applicant may attach drawings of alternative, lower-impact site layouts, and explain why these design options were not feasible. Also discuss how impacts were minimized once the desired site plan was developed. If applicable, discuss construction techniques to be followed during construction to reduce impacts.
With the exception of not building the project, there are no means of avoiding impacts to waters of the State. NCDOT will minimize impacts to the streams through the use of Best Management Practices.

## VIII. Mitigation

DWQ - In accordance with 15A NCAC 2H .0500, mitigation may be required by the NC Division of Water Quality for projects involving greater than or equal to one acre of impacts to freshwater wetlands or greater than or equal to 150 linear feet of total impacts to perennial streams.

USACE – In accordance with the Final Notice of Issuance and Modification of Nationwide Permits, published in the Federal Register on January 15, 2002, mitigation will be required when necessary to ensure that adverse effects to the aquatic environment are minimal. Factors including size and type of proposed impact and function and relative value of the impacted aquatic resource will be considered in determining acceptability of appropriate and practicable mitigation as proposed. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland and/or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferable in the same watershed.

If mitigation is required for this project, a copy of the mitigation plan must be attached in order for USACE or DWQ to consider the application complete for processing. Any application lacking a required mitigation plan or NCEEP concurrence shall be placed on hold as incomplete. An applicant may also choose to review the current guidelines for stream restoration in DWQ's Draft Technical Guide for Stream Work in North Carolina, available at http://h2o.enr.state.nc.us/ncwetlands/strmgide.html.

1. Provide a brief description of the proposed mitigation plan. The description should provide as much information as possible, including, but not limited to: site location (attach directions and/or map, if offsite), affected stream and river basin, type and amount (acreage/linear feet) of mitigation proposed (restoration, enhancement, creation, or preservation), a plan view, preservation mechanism (e.g., deed restrictions, conservation easement, etc.), and a description of the current site conditions and proposed method of construction. Please attach a separate sheet if more space is needed.
   N/A

2. Mitigation may also be made by payment into the North Carolina Ecosystem Enhancement Program (NCEEP). Please note it is the applicant's responsibility to contact the NCEEP at (919) 715-0476 to determine availability, and written approval from the NCEEP indicating that they are will to accept payment for the mitigation must be attached to this form. For additional information regarding the application process for the NCEEP, check the NCEEP website at http://h2o.enr.state.nc.us/wrp/index.htm. If use of the NCEEP is proposed, please check the appropriate box on page five and provide the following information:

   Amount of stream mitigation requested (linear feet): 0
   Amount of buffer mitigation requested (square feet): N/A
   Amount of Riparian wetland mitigation requested (acres): N/A
   Amount of Non-riparian wetland mitigation requested (acres): N/A
   Amount of Coastal wetland mitigation requested (acres): N/A

## IX. Environmental Documentation (required by DWQ)

1. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land? Yes ☒ No ☐
2. If yes, does the project require preparation of an environmental document pursuant to the requirements of the National or North Carolina Environmental Policy Act (NEPA/SEPA)? Note: If you are not sure whether a NEPA/SEPA document is required, call the SEPA coordinator at (919) 733-5083 to review current thresholds for environmental documentation. Yes ☒ No ☐

3. If yes, has the document review been finalized by the State Clearinghouse? If so, please attach a copy of the NEPA or SEPA final approval letter. Yes ☒ No ☐

## X. Proposed Impacts on Riparian and Watershed Buffers (required by DWQ)

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to required state and local buffers associated with the project. The applicant must also provide justification for these impacts in Section VII above. All proposed impacts must be listed herein, and must be clearly identifiable on the accompanying site plan. All buffers must be shown on a map, whether or not impacts are proposed to the buffers. Correspondence from the DWQ Regional Office may be included as appropriate. Photographs may also be included at the applicant's discretion.

1. Will the project impact protected riparian buffers identified within 15A NCAC 2B .0233 (Neuse), 15A NCAC 2B .0259 (Tar-Pamlico), 15A NCAC 02B .0243 (Catawba) 15A NCAC 2B .0250 (Randleman Rules and Water Supply Buffer Requirements), or other (please identify_____)? Yes ☐ No ☒

2. If "yes", identify the square feet and acreage of impact to each zone of the riparian buffers. If buffer mitigation is required calculate the required amount of mitigation by applying the buffer multipliers.

| Zone* | Impact (square feet) | Multiplier | Required Mitigation |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| Total | | | |

* Zone 1 extends out 30 feet perpendicular from the top of the near bank of channel; Zone 2 extends an additional 20 feet from the edge of Zone 1.

If buffer mitigation is required, please discuss what type of mitigation is proposed (i.e., Donation of Property, Riparian Buffer Restoration / Enhancement, or Payment into the Riparian Buffer Restoration Fund). Please attach all appropriate information as identified within 15A NCAC 2B .0242 or .0244, or .0260.

N/A

## XI. Stormwater (required by DWQ)

Describe impervious acreage (existing and proposed) versus total acreage on the site. Discuss stormwater controls proposed in order to protect surface waters and wetlands downstream from the property. If percent impervious surface exceeds 20%, please provide calculations demonstrating total proposed impervious level. N/A

## XII. Sewage Disposal (required by DWQ)

Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility.
N/A

## XIII. Violations (required by DWQ)

Is this site in violation of DWQ Wetland Rules (15A NCAC 2H .0500) or any Buffer Rules?
Yes ☐ No ☒

Is this an after-the-fact permit application? Yes ☐ No ☒

## XIV. Cumulative Impacts (required by DWQ)

Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality? Yes ☐ No ☒
If yes, please submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent North Carolina Division of Water Quality policy posted on our website at http://h2o.enr.state.nc.us/ncwetlands. If no, please provide a short narrative description:
N/A

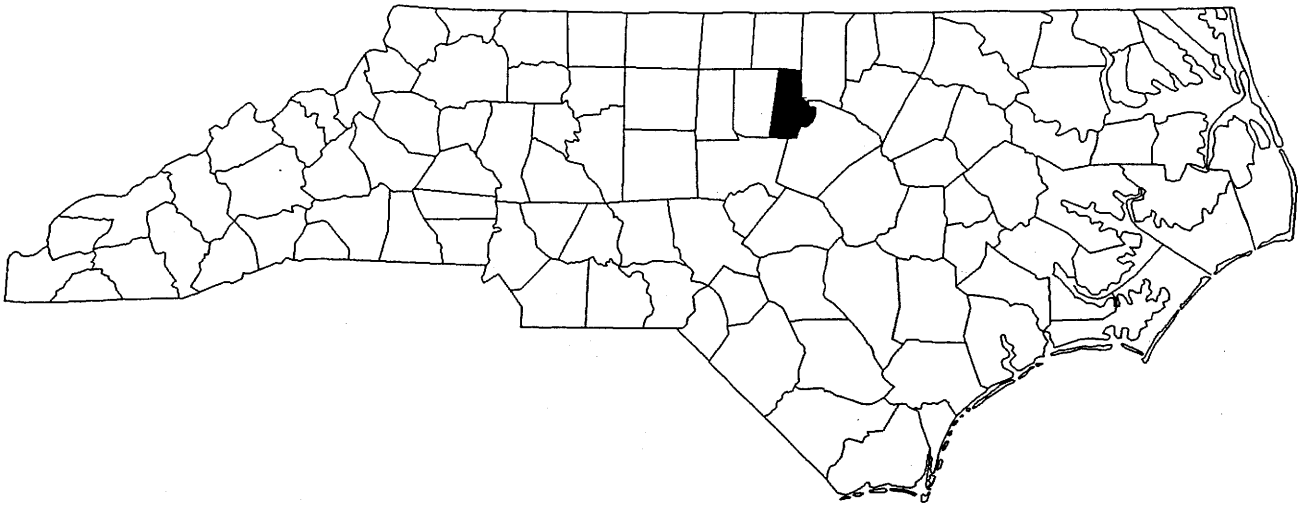
## XV. Other Circumstances (Optional):

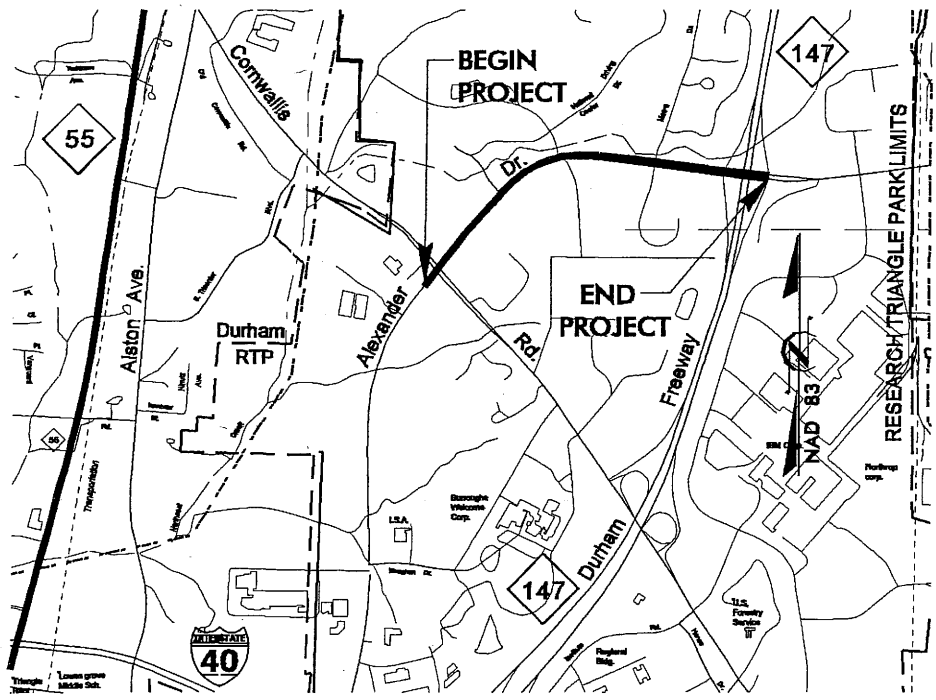
It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g., draw-down schedules for lakes, dates associated with Endangered and Threatened Species, accessibility problems, or other issues outside of the applicant's control).
N/A

E. L. Lusk 8-22-08

**Applicant/Agent's Signature** **Date**
(Agent's signature is valid only if an authorization letter from the applicant is provided.)

# NORTH CAROLINA






NOT TO SCALE

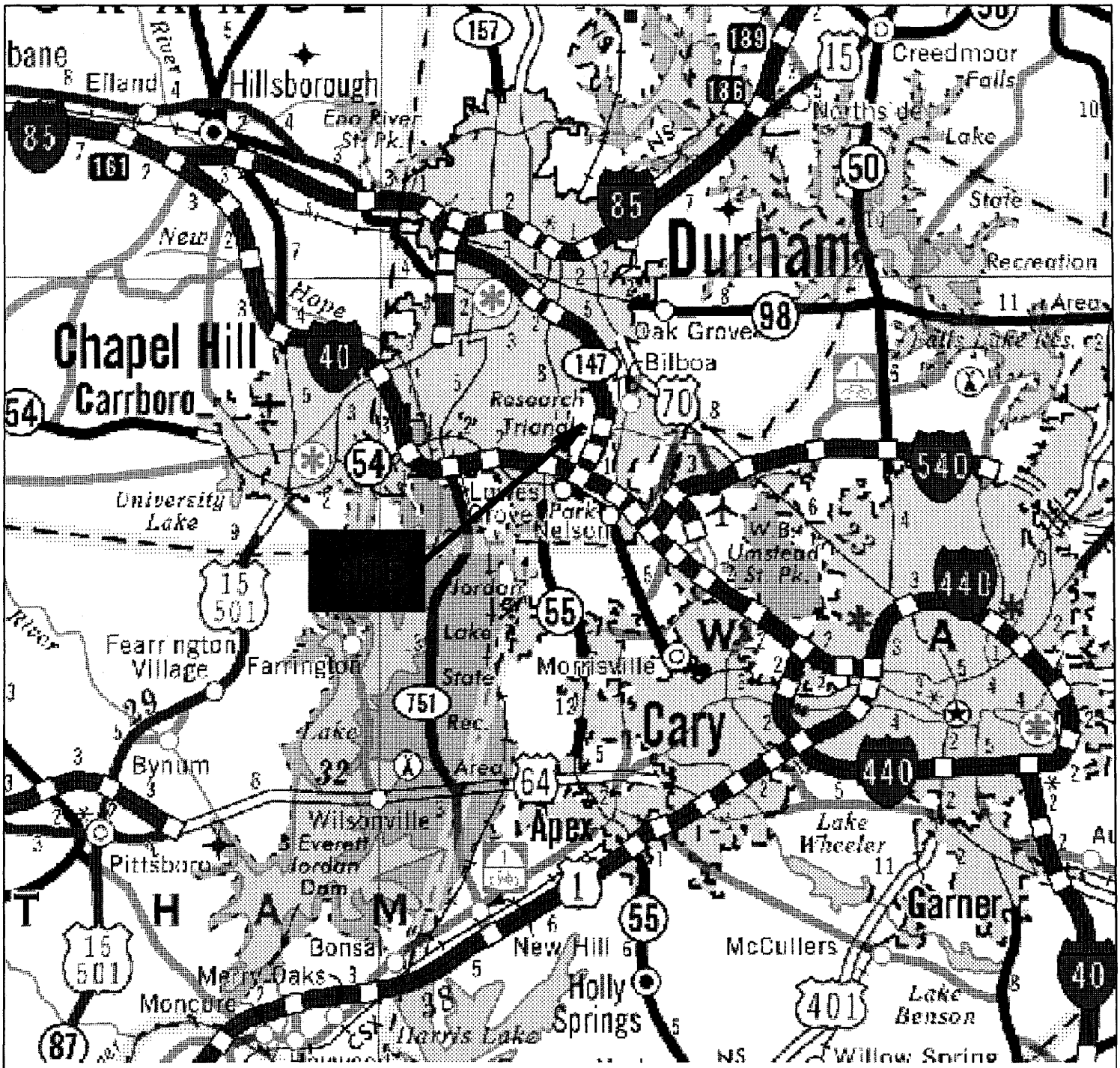
# WETLAND & STREAMS

# VICINITY

# MAPS

## NCDOT

**DIVISION OF HIGHWAYS**
**DURHAM COUNTY**
**PROJECT: 34916.1.1 (U-3309A)**
**SR 2028 WIDENING FROM SR 1121 TO NC 147**




# WETLAND & STREAM

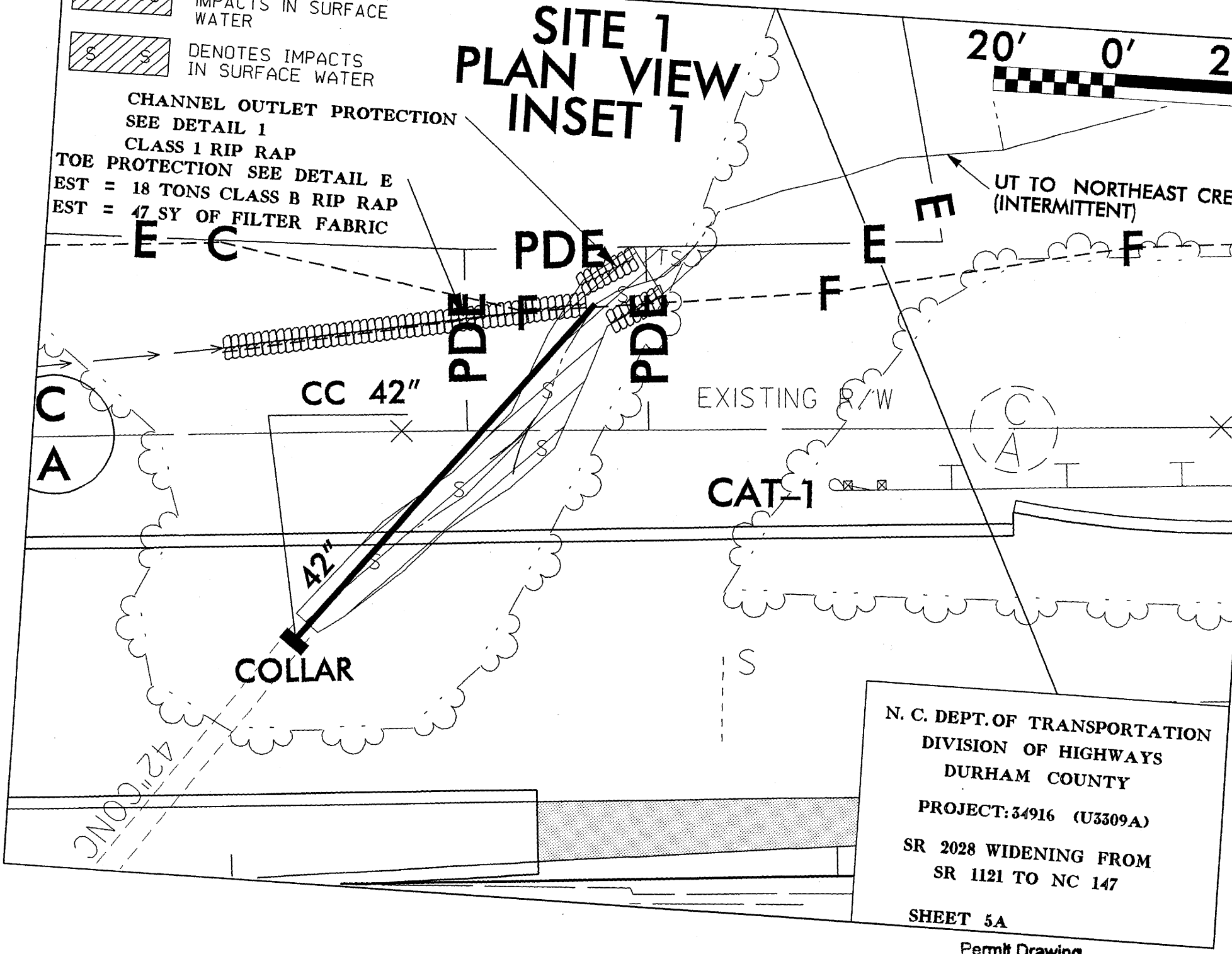
# LOCATION MAPS

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DURHAM COUNTY

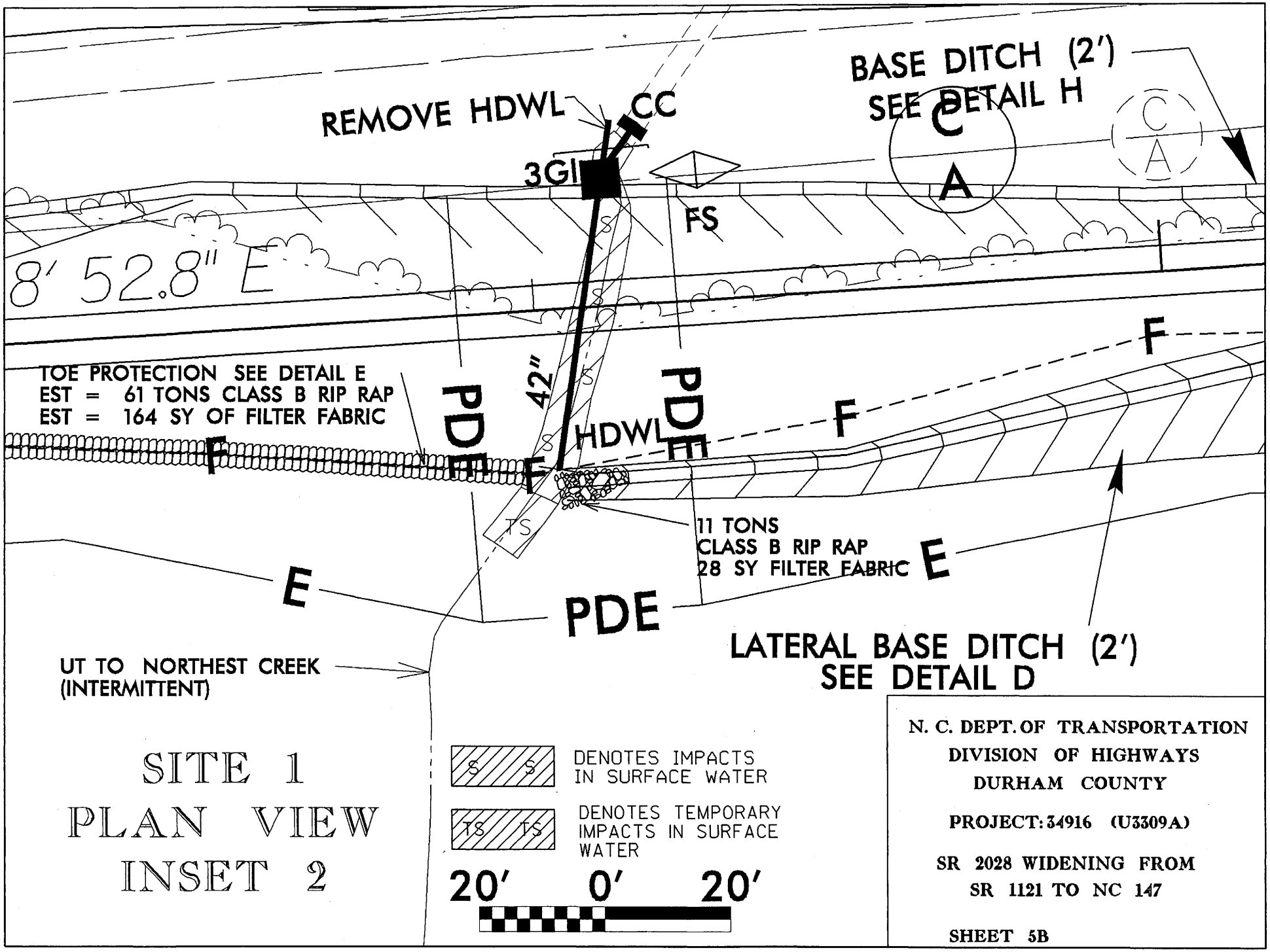
PROJECT: 34916.1.1 (U3309A)

SR 2028 WIDENING FROM
SR 1121 TO NC 147

SHEET 2 OF 14




Permit Drawing
Sheet 3 of 14




# SITE 1
# PLAN VIEW
# INSET 2

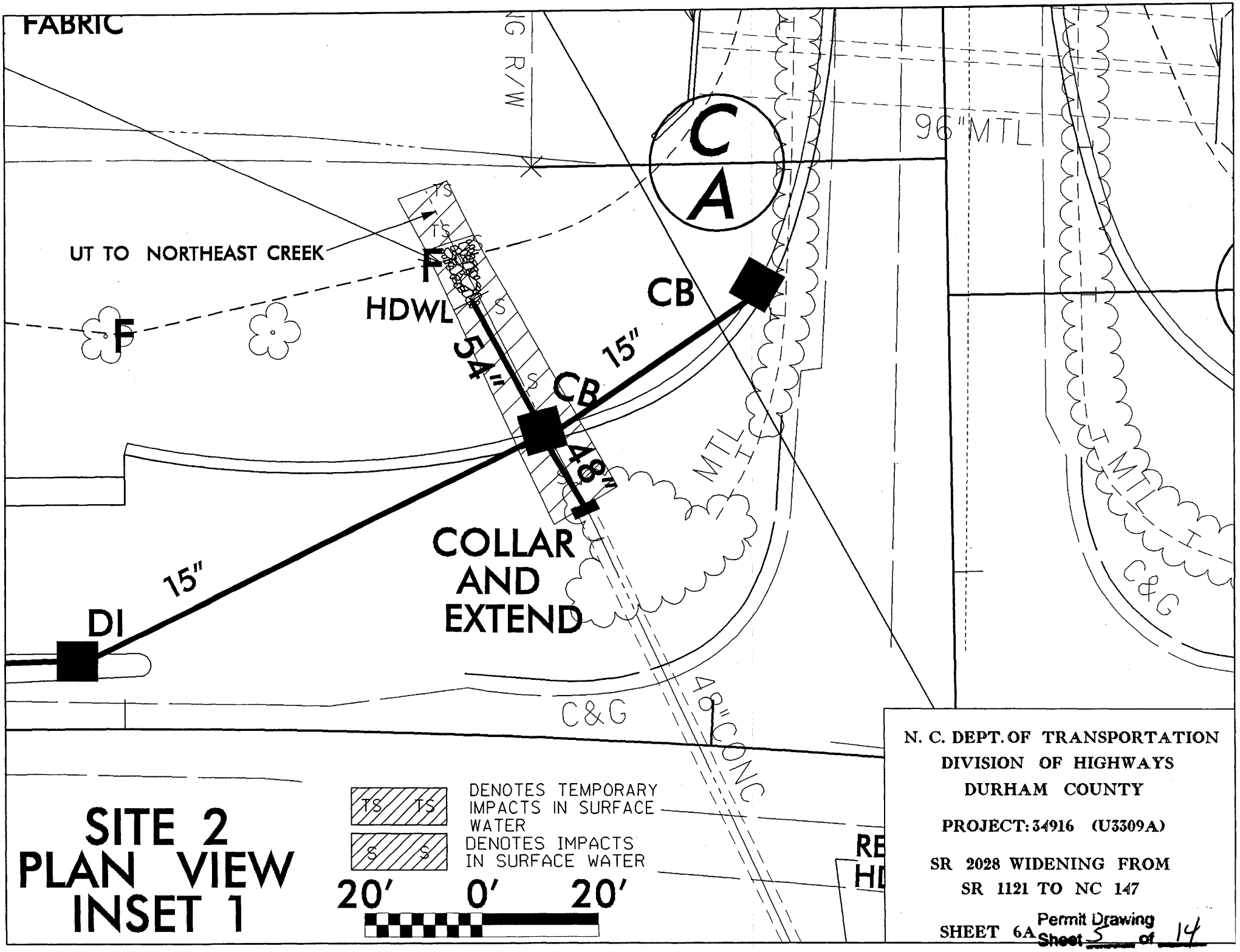
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DURHAM COUNTY

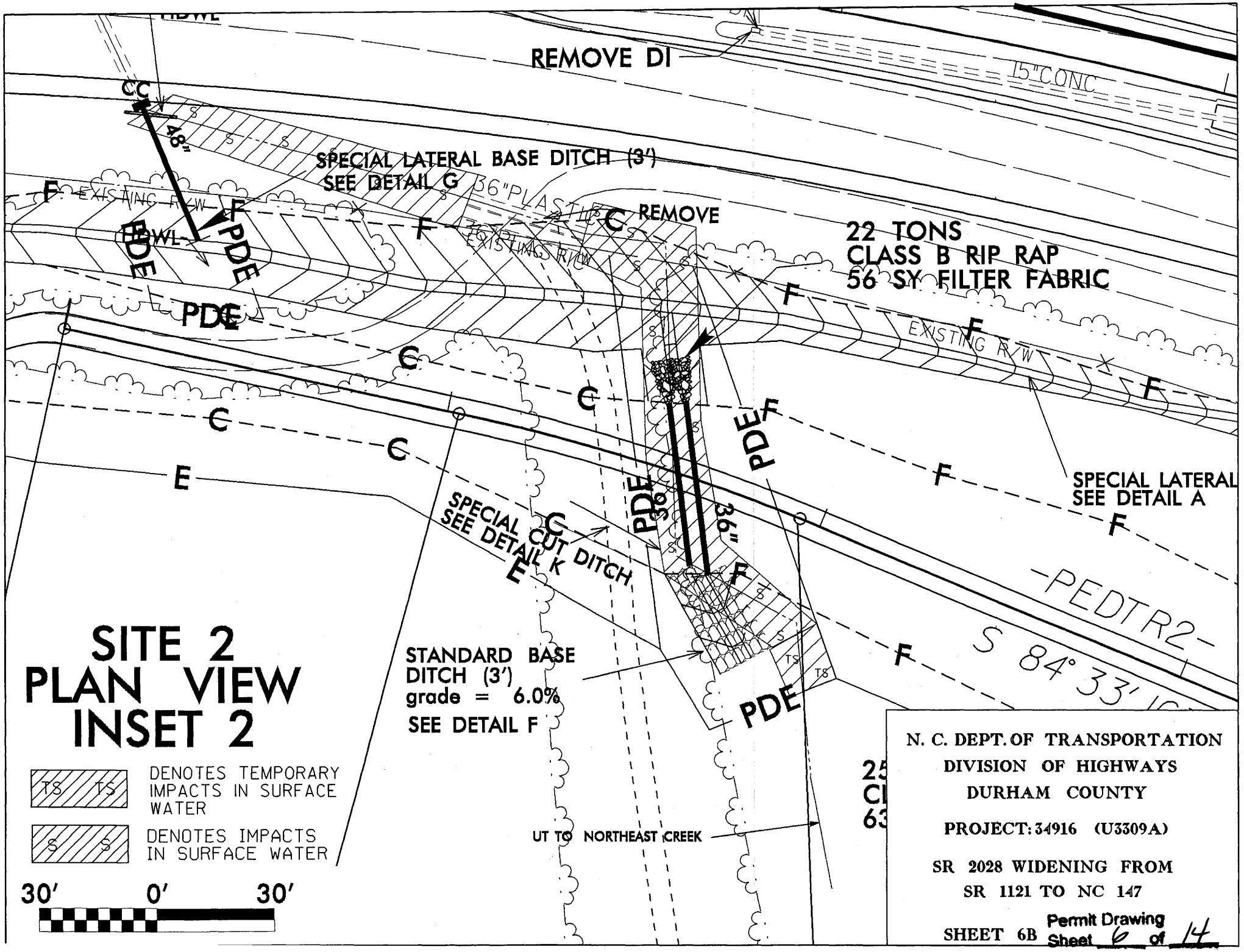
PROJECT: 34916 (U3309A)

SR 2028 WIDENING FROM
SR 1121 TO NC 147

SHEET 5B

Permit Drawing
Sheet 4 of 14


FABRIC
NG R/W
96"MTL
C
A
UT TO NORTHEAST CREEK
F
HDWL
F
TS
S
54"
CB
15"
CB
48"
MTL
COLLAR
AND
EXTEND
DI
15"
C&G
48"CONC
C&G
MTL
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
20' 0' 20'
SITE 2
PLAN VIEW
INSET 1
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DURHAM COUNTY
PROJECT: 34916 (U3309A)
SR 2028 WIDENING FROM
SR 1121 TO NC 147
SHEET 6A
Permit Drawing
Sheet 5 of 14


REMOVE DI
15"CONC
SPECIAL LATERAL BASE DITCH (3')
SEE DETAIL G
36"PLASTIC
REMOVE
22 TONS
CLASS B RIP RAP
56 SY FILTER FABRIC
EXISTING R/W
EXISTING R/W
48"
PDE
PDE
PDE
PDE
PDE
36"
SPECIAL LATERAL
SEE DETAIL A
SPECIAL CUT DITCH
SEE DETAIL K
STANDARD BASE
DITCH (3')
grade = 6.0%
SEE DETAIL F
UT TO NORTHEAST CREEK
PEDTR2
S 84° 33'
TS
TS
S
S
SITE 2
PLAN VIEW
INSET 2
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
30' 0' 30'
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DURHAM COUNTY
PROJECT: 34916 (U3309A)
SR 2028 WIDENING FROM
SR 1121 TO NC 147
SHEET 6B
Permit Drawing
Sheet 6 of 14

## WETLAND PERMIT IMPACT SUMMARY

| | | | WETLAND IMPACTS | | | | | SURFACE WATER IMPACTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site No. | Station (From/To) | Structure Size / Type | Permanent Fill In Wetlands (ac) | Temp. Fill In Wetlands (ac) | Excavation in Wetlands (ac) | Mechanized Clearing in Wetlands (ac) | Hand Clearing in Wetlands (ac) | Permanent SW impacts (ac) | Temp. SW impacts (ac) | Existing Channel Impacts Permanent (ft) | Existing Channel Impacts Temp. (ft) | Natural Stream Design (ft) |
| 1 | -L- 37+77 | 42" RCP | | | | | | 0.02 | 0.01 | 140 | 20 | |
| 2 | -L- 49+98 D14 | 48" and 54" RCP | | | | | | 0.08 | 0.01 | 276 | 25 | |
| | PEDTR2 11+64 | 2@36" RCP | | | | | | | | | | |
| TOTALS: | | | | | | | | 0.10 | 0.02 | 416 | 45 | |

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

DURHAM COUNTY
WBS - 34916 (U-3309A)



8/12/2008

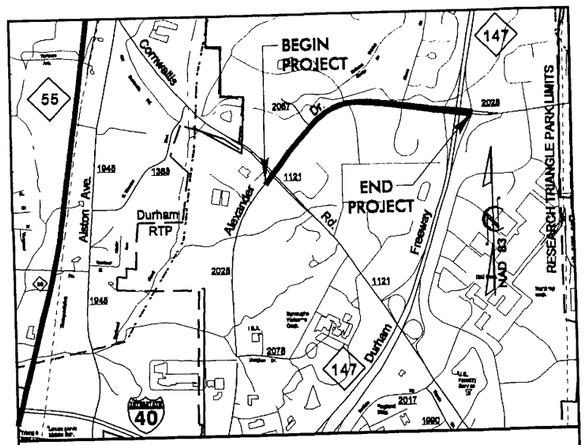
ATN Revised 3/31/05

09/08/99

TIP PROJECT: U-3309A

CONTRACT: C202064

See Sheet 1-A For Index of Sheets




VICINITY MAP

# STATE OF NORTH CAROLINA
# DIVISION OF HIGHWAYS

# DURHAM COUNTY

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | U-3309A | 1 | |

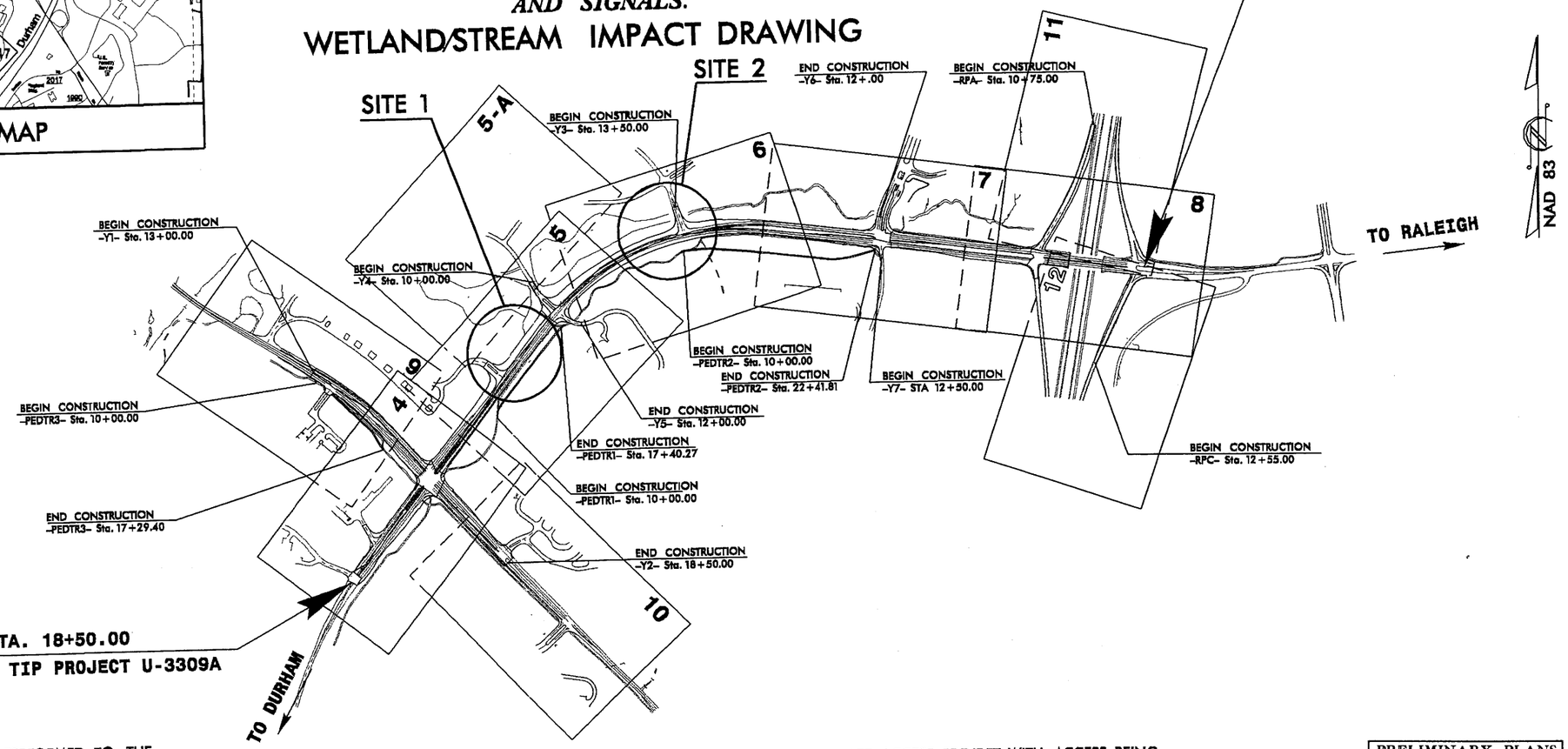
| STATE PROJ. NO. | F. A. PROJ. NO. | DESCRIPTION |
|---|---|---|
| 34916.1.1 | STP-2028(1) | P.E. |
| 34916.2.1 | STP-2028(1) | R/W - UTIL |

Permit Drawing
Sheet 8 of 14

***LOCATION:*** *SR 2028 (T.W. ALEXANDER DRIVE) FROM SR 1121 (CORNWALLIS ROAD) TO NC 147*

***TYPE OF WORK:*** *GRADING, DRAINAGE, PAVING, WIDENING, RESURFACING, CURB & GUTTER, GUARDRAIL AND SIGNALS.*

## WETLAND/STREAM IMPACT DRAWING



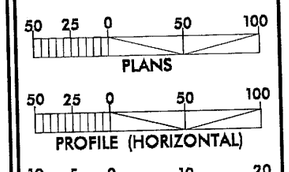

NOTES:
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

UPGRADE EXIST SIGNALS

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

***GRAPHIC SCALES***




***DESIGN DATA***

ADT 2005 = 16,800
ADT 2030 = 33,100
DHV = 11 %
D = 75 %
T = 3 % *
V = 60 MPH
* TTST 1 DUAL 2
CLASS = URBAN COLLECTOR

***PROJECT LENGTH***

LENGTH ROADWAY TIP PROJECT U-3309A = 1.072 MI
TOTAL LENGTH STATE ROADWAY TIP PROJECT U-3309A = 1.072 MI

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

2006 STANDARD SPECIFICATIONS

*RIGHT OF WAY DATE:* OCTOBER 19, 2007

*LETTING DATE:* FEBRUARY 17, 2009

JASON MOORE, P.E.
*PROJECT ENGINEER*

BRYAN KEY, P.E.
*PROJECT DESIGN ENGINEER*

***HYDRAULICS ENGINEER***

SIGNATURE:

***ROADWAY DESIGN ENGINEER***

SIGNATURE:

***DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA***

STATE HIGHWAY DESIGN ENGINEER

30-APR-2008 07:35
r:\hydraulics\permits\environmental\drawings\permit\u-3309a_hyd_prm_buf_tsh.dgn
manguyen AT HY22155

8/17/99

REVISIONS

PROJECT REFERENCE NO. U-3309A

SHEET NO.

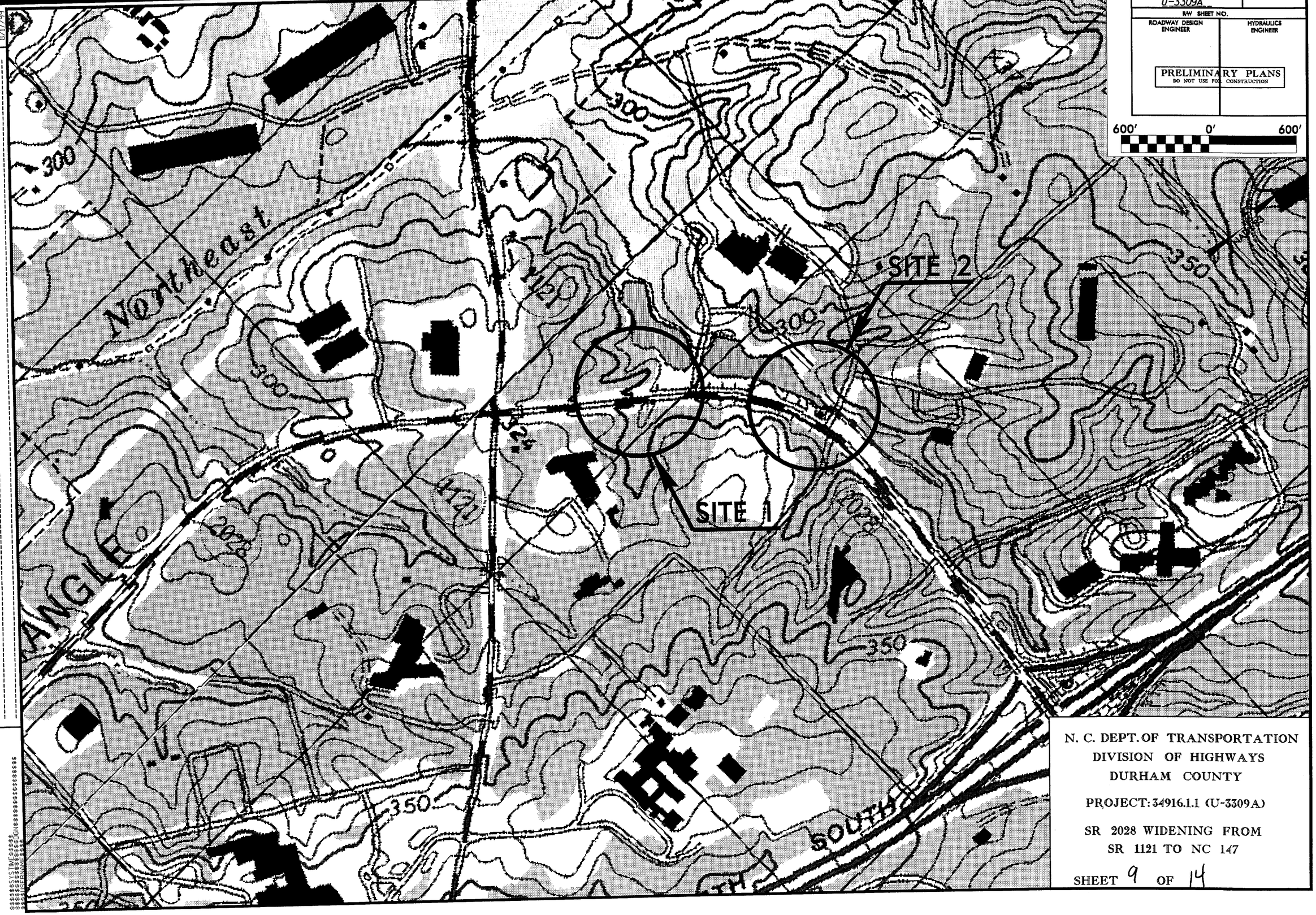
RW SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

600' 0' 600'




N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DURHAM COUNTY

PROJECT: 34916.1.1 (U-3309A)

SR 2028 WIDENING FROM
SR 1121 TO NC 147

SHEET 9 OF 14

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 5 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

50' 0' 50' 100' 150'
ENGLISH

8/17/99

MATCHLINE SEE SHEET 5-A

MATCHLINE SEE SHEET 5-A

SEE INSET 1
ON SHEET 5A FOR DETAIL

-Y4- POT Sta. 10+00.00

-L- POC Sta. 40+78.32

-Y4- POT Sta. 13+36.72

-L- PC Sta. 39+48.47

-Y4- PC Sta. 11+44.76

-Y4- PT Sta. 12+67.84

ELI LILLY & COMPANY

DUPONT DE NEMOURS & COMPANY LLC

UT TO NORTHEAST CREEK (INTERMITTENT)

TOE PROTECTION SEE DETAIL B
EST = 18 TONS CLASS B RIPRAP
EST = 47 SY OF FILTER FABRIC

2 TONS CLASS B RIPRAP
7 SY FILTER FABRIC

CHANNEL OUTLET PROTECTION SEE DETAIL I CLASS I RIPRAP

SPECIAL CUT DITCH SEE DETAIL C

TIE TO EXIST. DITCHLINE

LATERAL BASE DITCH (2') SEE DETAIL D

CLASS B RIPRAP 14 SY FILTER FAB.

+30.00 EX. R/W 110.00

SR 2028 ALEXANDER DR

REMOVE AND REPLACE 30" W/H/T TUB W/H/T

REMOVE DI

2 GI TYPE D 90°

SEE SHEET 4
MATCHLINE -L- STA. 31+00.00

MATCHLINE -L- STA. 44+00.00
SEE SHEET 6

N 38° 24' 33.9" E

N 39° 28' 52.8" E

N 5° 43' 21.8" E

N 46° 56' 27.0" E

N 77° 46' 52.6" E

N 12° 07' 13.7" E

-L- POC Sta. 40+86.52

-Y5- POT Sta. 10+00.00

-Y5- PC Sta. 10+89.76

-Y5- PT Sta. 12+38.66

-Y5- POT Sta. 12+75.02

-PEDTRI- PC Sta. 10+09.06

-PEDTRI- PT Sta. 10+68.85

-PEDTRI- PC Sta. 17+04.21

-PEDTRI- PT Sta. 17+37.63

END CONST.
-PEDTRI- POT Sta. 17+40.27

BEG. CONST.
-PEDTRI- POT Sta. 10+00.00

TRIANGLE UNIVERSITIES CTR FOR ADVANCE STUDIES

SEE INSET 2
ON SHEET 5B FOR DETAIL

# SITE 1
# PLAN VIEW

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DURHAM COUNTY

PROJECT: 34916.1.1 (U3309A)

SR 2028 WIDENING FROM
SR 1121 TO NC 147

SHEET 10 OF 14

$$$$SYSTIME$$$$
$$$$USERNAME$$$$
$$$$BEGIN$$$$
$$$$END$$$$

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 5 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

50' 0' 50' 100' 150'
ENGLISH

8/17/99

MATCHLINE SEE SHEET 5-A

MATCHLINE SEE SHEET 5-A

SEE INSET 1
ON SHEET 5A FOR DETAIL

-Y4- POT Sta. 10+00.00

-L- POC Sta. 40+78.32

-Y4- POT Sta. 13+36.72

-Y4- PC Sta. 11+44.76

-L- BC Sta. 39+48.47

-Y4- PT Sta. 12+67.84

ELI LILLY & COMPANY

DUPONT DE NEMOURS & COMPANY LLC

UT TO NORTHEAST CREEK (INTERMITTENT)

TIE TO EXIST. DITCHLINE

LATERAL BASE DITCH (2') SEE DETAIL D

CLASS B RIPRAP 14 SY FILTER FAB.

+30.00 EX. R/W 110.00

NAD 83

SEE SHEET 4
MATCHLINE -L- STA. 31+00.00

MATCHLINE -L- STA. 44+00.00
SEE SHEET 6

N 38° 24' 33.9" E

S 46° 56' 46.5" E

N 39° 28' 52.8" E

S 46° 56' 27.0" E

N 5° 13' 21.9" E

-L- POC Sta. 40+86.52

-Y5- POT Sta. 10+00.00

-Y5- PG Sta. 10+89.76

-Y5- PT Sta. 12+38.66

-Y5- POT Sta. 12+75.02

N 72° 07' 13.7" E

N 77° 46' 52.6" E

-PEDTRI- PT Sta. 10+68.85

-PEDTRI- PC Sta. 10+09.08

BEG. CONST. -PEDTRI- POT Sta. 10+00.00

-PEDTRI- PC Sta. 17+04.21

-PEDTRI- PT Sta. 17+37.63

END CONST. -PEDTRI- POT Sta. 17+40.27

TRIANGLE UNIVERSITIES CTR FOR ADVANCE STUDIES

SEE INSET 2
ON SHEET 5B FOR DETAIL

# SITE 1
# PLAN VIEW

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DURHAM COUNTY

PROJECT: 34916.1.1 (U3309A)

SR 2028 WIDENING FROM
SR 1121 TO NC 147

SHEET 11 OF 14

8/17/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 6 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

SEE INSET 1
ON SHEET 6A FOR DETAIL

DUPONT DE NEMOURS & COMPANY LLC

STATE OF NORTH CAROLINA

-Y3- PT Sta. 13+88.64

-L- POC Sta. 50+42.23

-Y3- POT Sta. 16+33.10

S 18°10'27.6" E

TIE TO EXISTING HEADWALL

SAN LIFT STATION

33 TONS CLASS I RIPRAP
62 SY FILTER FABRIC

COLLAR AND EXTEND

REMOVE DI

REMOVE (2) 24" CONC

22 TONS CLASS B RIP RAP
36 SY FILTER FABRIC

1 TON CLASS B RIPRAP
5 SY FILTER FABRIC

-L- PT Sta. 55+94.75

SPECIAL LATERAL BASE DITCH (2')
SEE DETAIL A

STANDARD BASE DITCH (3')
grade = 4.0%
SEE DETAIL F

25 TONS CLASS B RIP RAP
48 SY FILTER FABRIC

UT TO NORTHEAST CREEK

-PEDTR2-
S 84° 33' 16.7" E

-PEDTR2-
PC Sta. 11+03.00

-PEDTR2-
PT Sta. 11+94.63

-PEDTR2-
PC Sta. 14+24.74

BEG. CONST.
-PEDTR2-
POT Sta. 10+00.00
N 84° 56' 41.3" E

TRIANGLE UNIVERSITIES CTR FOR ADVANCE STUDIES

MATCHLINE -L- STA. 44+00.00
SEE SHEET 5

MATCHLINE -L- STA. 56+00.00
SEE SHEET 7

SEE INSET 2
ON SHEET 6B FOR DETAIL

# SITE 2
## PLAN VIEW

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DURHAM COUNTY

PROJECT: 34916 (U-3309A)

SR 2028 WIDENING FROM
SR 1121 TO NC 147

SHEET 12 OF 14

$$$$SYSTIME$$$$
$$$$FILENAME$$$$

8/17/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 6 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

SEE INSET 1
ON SHEET 6A FOR DETAIL

DUPONT DE NEMOURS & COMPANY LLC

STATE OF NORTH CAROLINA

-Y3- PT Sta. Y3+88.64

-L- POC Sta. 50+82.23

-Y3- POT Sta. 16+33.10

S 18° 10' 27.6" E

50+00

45+00

55+00

15+00

-L- PT Sta. 55+9475

33 TONS CLASS I RIPRAP 62 SY FILTER FABRIC

15 TON CLASS B RIPRAP 8 SY FILTER FABRIC

SAN LEVEL STATION

TIE TO EXISTING HEADWALL

CONSTRUCT AND EXTEND

REMOVE 22" CONC

REMOVE DI

REMOVE DROP INLET

REMOVE CB

22 TONS CLASS B RIP RAP 55 SY FILTER FABRIC

SPECIAL LATERAL BASE DITCH (2') SEE DETAIL A

STANDARD V-SHAPE DITCH (9') SEE DETAIL F

25 TONS CLASS B RIP RAP 28 SY FILTER FABRIC

UT TO NORTHEAST CREEK

-PEDTR2- PC Sta. 11+03.00

-PEDTR2- PT Sta. 11+94.63

-PEDTR2- PC Sta. 14+24.74

S 64° 33' 16.7" E

MATCHLINE -L- STA. 44+00.00
SEE SHEET 5

MATCHLINE -L- STA. 56+00.00
SEE SHEET 7

BEG. CONST. -PEDTR2- POT Sta. 10+00.00
N 84° 56' 41.3" E

TRIANGLE UNIVERSITIES CTR FOR ADVANCE STUDIES

SEE INSET 2
ON SHEET 6B FOR DETAIL

# SITE 2
## PLAN VIEW

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DURHAM COUNTY

PROJECT: 34916 (U-3309A)

SR 2028 WIDENING FROM
SR 1121 TO NC 147

SHEET 13 OF 14

$$$$$$SYSTIME$$$$
$$$$$$USERNAME$$$$
$$$$$$DGNS$$$$$$

| U-3309A | 13 |
|---|---|
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

Permit Drawing
Sheet 14 of 14

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5/28/99

BEGIN CONSTRUCTION
BEGIN MIN. RESURFACING
PI = STA 18+50.00
EL = 306.91

BEGIN GRADE
PI = STA 19+50.00
EL = 309.36

BEG. LT. DITCH GRADE
PI = 19+70.000
EL = 306.82

PI = 20+00.000
EL = 307.26

PI = 20+50.000
EL = 308.89

BEG. LT. DITCH GRADE
PI = 22+75.000
EL = 314.50

END LT. DITCH GRADE
PI = 21+00.000
EL = 310.50

PI = 24+50.600
EL = 319.43

END LT. DITCH GRADE
PI = 25+00.000
EL = 320.10

PI = 25+70.00
EL = 322.70
K = 114
VC = 670'
V = 55 MPH

-L- POT Sta. 27+17.63
-Y1- POT Sta. 23+29.72

-L- POT Sta. 27+20.30
-Y2- POT Sta. 10+00.00

BEG. RT. DITCH GRADE
PI = 28+71.000
EL = 318.05

PI = 29+00.000
EL = 317.50

LEFT DITCH
RIGHT DITCH
FOR PLAN VIEW, SEE SHEET NO. 4

PI = 33+00.00
EL = 310.84
K = 332
VC = 180'
V = 60 MPH

BEG. LT. DITCH GRADE
PI = 37+22.000
EL = 295.78

END LT. DITCH GRADE
PI = 38+00.000
EL = 294.00

PI = 38+65.00
EL = 296.60'
K = 145
VC = 269'
V = 60 MPH

-L- POC Sta. 40+78.32
-Y4- POT Sta. 13+56.72

-L- POC Sta. 40+86.82
-Y5- POT Sta. 10+00.00

BEG. RT. DITCH GRADE
PI = 42+00.000
EL = 288.45

END RT. DITCH GRADE
PI = 43+00.000
EL = 288.34

PI = 42+50.000
EL = 288.00

BEG. LT. DITCH GRADE
PI = 41+25.000
EL = 282.87

END LT. DITCH GRADE
PI = 42+20.000
EL = 284.00

END RT. DITCH GRADE
PI = 40+20.000
EL = 289.00

LEFT DITCH
RIGHT DITCH
FOR PLAN VIEW, SEE SHEET NO. 4 & 5

$$$$$$$$SYSTIME$$$$$$$$
$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$$$CELLNAME$$$$$$$$

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

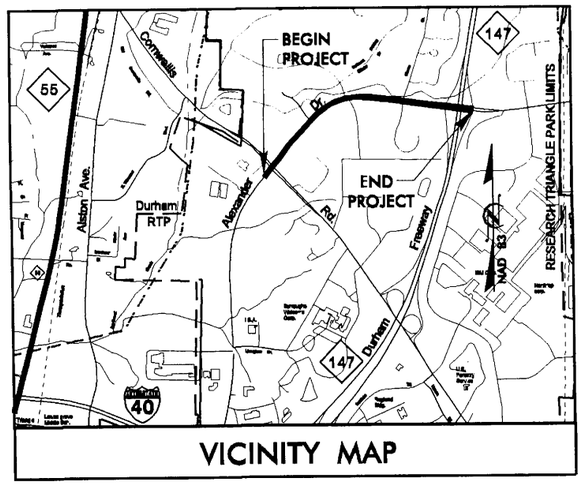
# DURHAM COUNTY

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | U-3309A | 1 | |

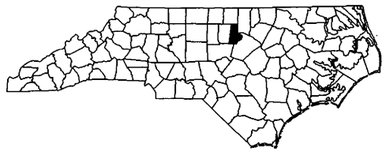
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION |
|---|---|---|
| 34916.1.1 | STP-2028(1) | P.E. |
| 34916.2.1 | STP-2028(1) | R/W – UTIL |

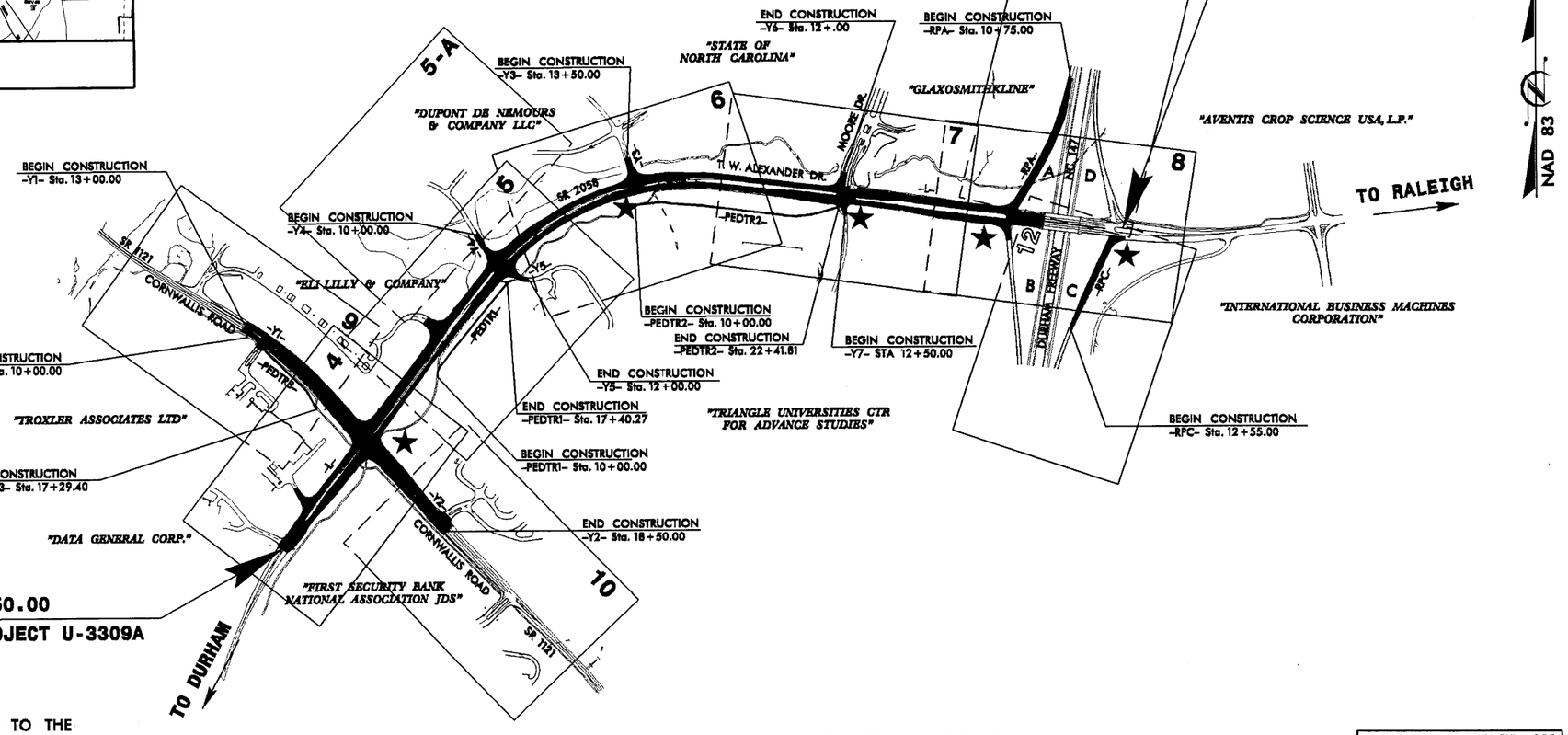
***LOCATION:*** *SR 2028 (T.W. ALEXANDER DRIVE) FROM SR 1121 (CORNWALLIS ROAD) TO NC 147*

***TYPE OF WORK:*** *GRADING, DRAINAGE, PAVING, WIDENING, RESURFACING, CURB & GUTTER, GUARDRAIL AND SIGNALS.*




VICINITY MAP






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

★ UPGRADE EXIST SIGNALS

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

***GRAPHIC SCALES***

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

***DESIGN DATA***

ADT 2005 = 16,800
ADT 2030 = 33,100
DHV = 11 %
D = 75 %
T = 3 % *
V = 60 MPH
* TTST 1 DUAL 2
CLASS = URBAN COLLECTOR

***PROJECT LENGTH***

LENGTH ROADWAY TIP PROJECT U-3309A = 1.072 MI
TOTAL LENGTH STATE ROADWAY TIP PROJECT U-3309A = 1.072 MI

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

2006 STANDARD SPECIFICATIONS

*RIGHT OF WAY DATE:* OCTOBER 19, 2007

*LETTING DATE:* FEBRUARY 17, 2009

JASON MOORE, 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 OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

P.E.
*STATE HIGHWAY DESIGN ENGINEER*

***TIP PROJECT: U-3309A***

***CONTRACT: C202064***

03/08/99
07-MAY-2008 10:43
:\roadway\proj\u3309a_rdy_tsh.dgn
:$$$USERNAME$$$$

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 1-B |

***Note: Not to Scale***

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

# CONVENTIONAL PLAN SHEET SYMBOLS

## *BOUNDARIES AND PROPERTY:*

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 23
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing High Quality Wetland Boundary — HQ WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

## *BUILDINGS AND OTHER CULTURE:*

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

## *HYDROLOGY:*

- Stream or Body of Water
- Hydro, Pool or Reservoir
- River Basin Buffer — RBB
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

## *RAILROADS:*

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

## *RIGHT OF WAY:*

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

## *ROADS AND RELATED FEATURES:*

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

## *VEGETATION:*

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

## *EXISTING STRUCTURES:*

MAJOR:

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

MINOR:

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

## *UTILITIES:*

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

6/2/99

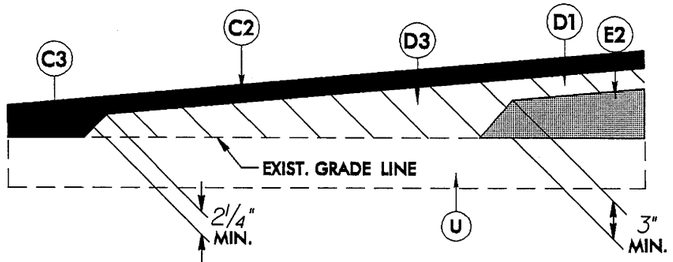
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 2 |
| ROADWAY DESIGN ENGINEER | PAVEMENT DESIGN ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

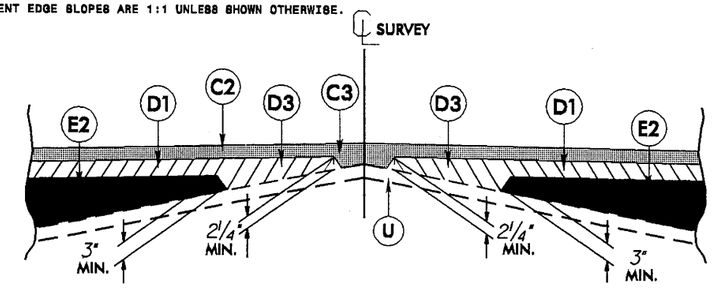
# PAVEMENT SCHEDULE

| | | | |
|---|---|---|---|
| C1 | PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. IN EACH OF TWO LAYERS. | J2 | PROP. 6" AGGREGATE BASE COURSE. |
| C2 | PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS. | P | PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD. |
| C3 | PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1¼" IN DEPTH OR GREATER THAN 1½" IN DEPTH. | R1 | 2'-6" CONCRETE CURB AND GUTTER. |
| D1 | PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD. | R2 | 2'-6" CONCRETE CURB AND GUTTER. |
| D2 | PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD. | R3 | 5" MONOLITHIC CONCRETE ISLAND (Keyed In) |
| D3 | PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, 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. | T | EARTH MATERIAL. |
| E1 | PROP. APPROX. 4½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD. | U | EXISTING PAVEMENT. |
| E2 | PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, 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 4½" IN DEPTH. | V | VAR. MILLING 0 TO 3" |
| J1 | PROP. 10" AGGREGATE BASE COURSE. | W | VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL) |

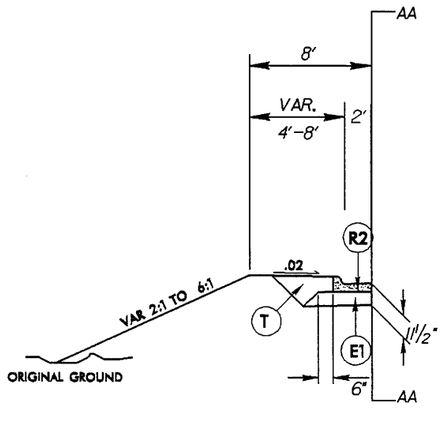
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

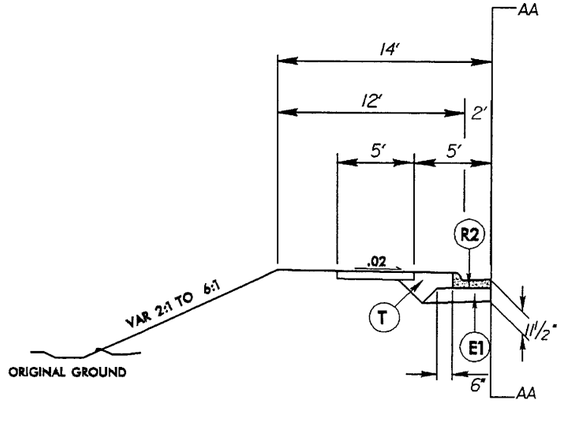



WEDGING DETAIL FOR RESURFACING




DETAIL SHOWING METHOD OF WEDGING




## SECTION AA

TO BE USED IN CONJUCTION WITH TYPICALS SECTIONS 1,2, AND 3 AND ALL -Y- LINES TURNOUTS

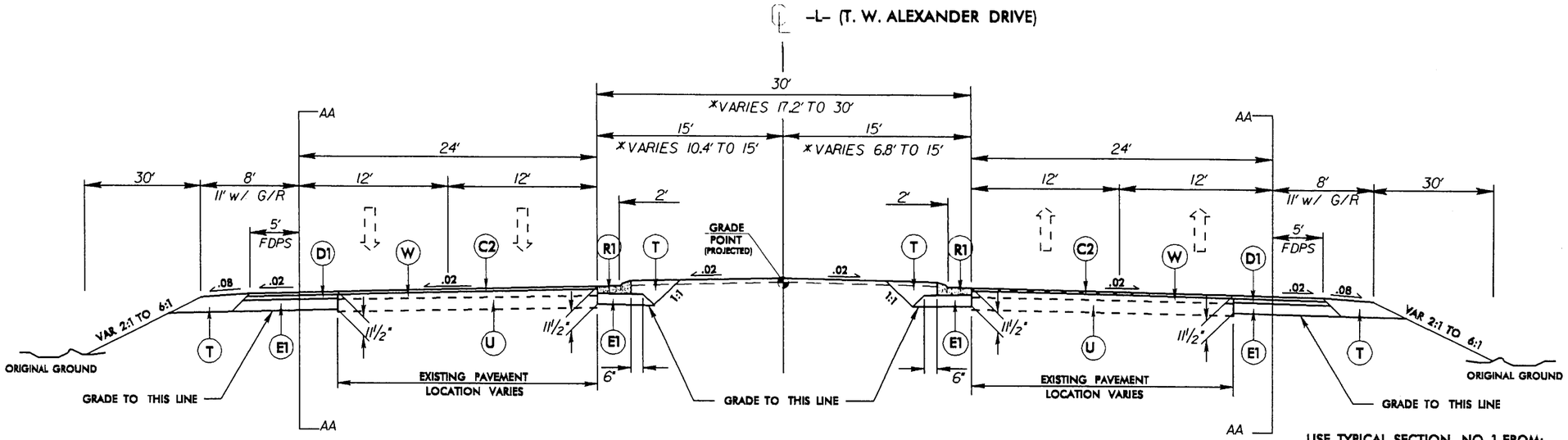
-L- LT. STA. 64+00.00 TO 72+50.00

27-MAY-2008 10:44
$$$$USERNAME$$$$
$$$$DESIGN$$$$

6/2/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 2-A |
| ROADWAY DESIGN ENGINEER | PAVEMENT DESIGN ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION




## TYPICAL SECTION NO. 1

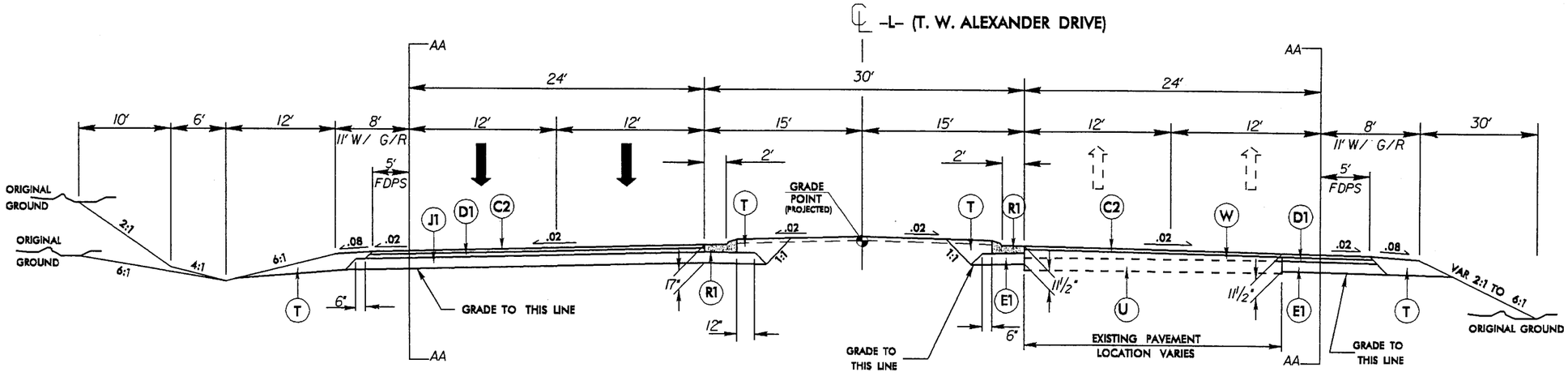
NOTE: SEE PLANS FOR TURN LANES AND TAPERS
NOTE: SEE SHEET 2 FOR SECTION AA

**USE TYPICAL SECTION NO. 1 FROM:**

* -L- STA. 19+50.00 TO 24+10.00
-L- STA. 24+10.00 TO 34+50.00
-L- STA. 40+00.00 TO 42+00.00
-L- STA. 47+50.00 TO 53+00.00
-L- STA. 57+50.00 TO 72+50.00

### PAVEMENT SCHEDULE

| | |
|---|---|
| C1 | 2" TYPE S9.5B |
| C2 | 3" TYPE S9.5B |
| C3 | VAR. DEPTH TYPE S9.5B |
| D1 | 4" TYPE I19.0B |
| D2 | 3" TYPE I19.0B |
| D3 | VAR. DEPTH TYPE I19.0B |
| E1 | 4½" TYPE B25.0B |
| E2 | VAR. DEPTH TYPE B25.0B |
| J1 | 10" ABC |
| J2 | 8" ABC |
| P | PRIME COAT |
| R1 | 2'-9" CONC CURB AND GUTTER. |
| R2 | 2'-6" CONC CURB AND GUTTER. |
| R3 | 5" MONO. CONC. ISLAND (Keyed In) |
| T | EARTH MATERIAL. |
| U | EXISTING PAVEMENT. |
| W | VARIABLE DEPTH ASPHALT PAVEMENT |




## TYPICAL SECTION NO. 2

NOTE: SEE PLANS FOR TURN LANES AND TAPERS
NOTE: SEE SHEET 2 FOR SECTION AA

**USE TYPICAL SECTION NO. 2 FROM:**

-L- STA. 34+50.00 TO 40+00.00
-L- STA. 42+00.00 TO 47+50.00
-L- STA. 53+00.00 TO 57+50.00

27-MAY-2008 10:44
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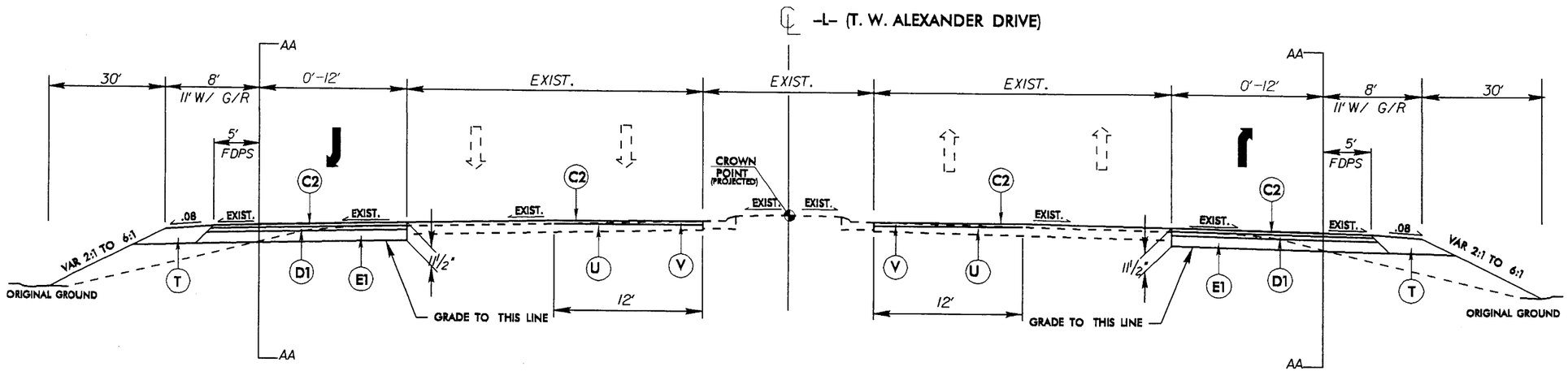
6/2/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 2-B |
| ROADWAY DESIGN ENGINEER | PAVEMENT DESIGN ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



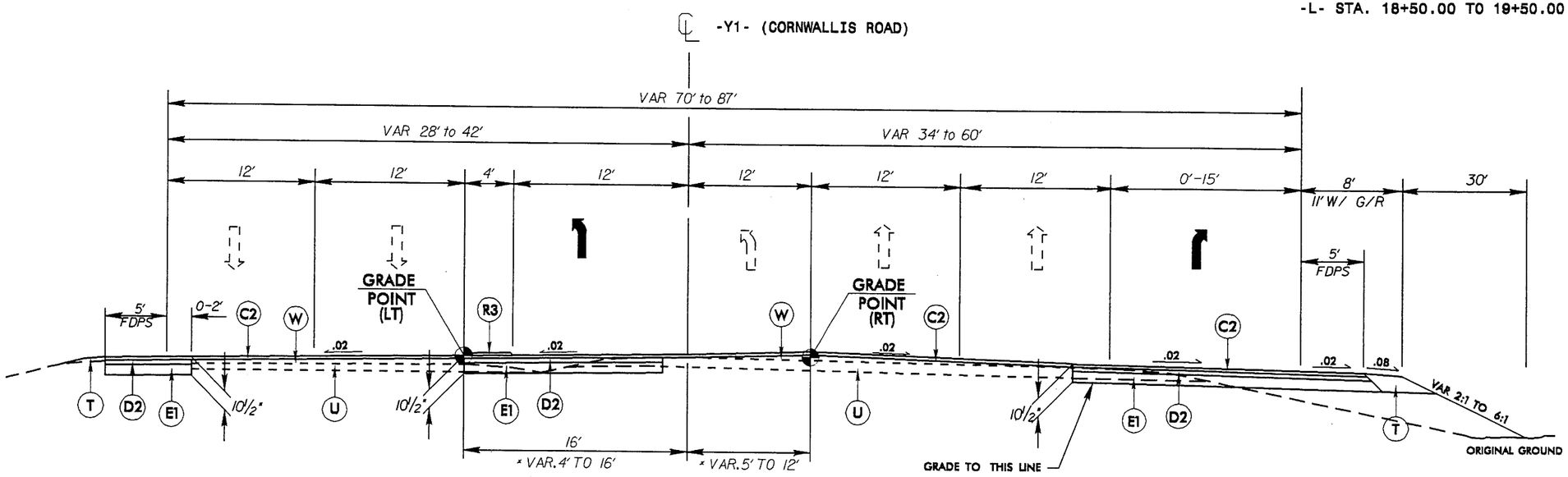

## TYPICAL SECTION NO. 3

NOTE: SEE PLANS FOR TURN LANES AND TAPERS
NOTE: SEE SHEET 2 FOR SECTION AA

**USE TYPICAL SECTION NO. 3 FROM:**

-L- STA. 72+50.00 TO 75+10.92
-L- STA. 18+50.00 TO 19+50.00

| PAVEMENT SCHEDULE | |
|---|---|
| C1 | 2" TYPE S9.5B |
| C2 | 3" TYPE S9.5B |
| C3 | VAR. DEPTH TYPE S9.5B |
| D1 | 4" TYPE I19.0B |
| D2 | 3" TYPE I19.0B |
| D3 | VAR. DEPTH TYPE I19.0B |
| E1 | 4½" TYPE B25.0B |
| E2 | VAR. DEPTH TYPE B25.0B |
| J1 | 10" ABC |
| J2 | 6" ABC |
| P | PRIME COAT |
| R1 | 2'-6" CONC CURB AND GUTTER. |
| R2 | 2'-6" CONC CURB AND GUTTER. |
| R3 | 5" MONO. CONC. ISLAND (Keyed In) |
| T | EARTH MATERIAL. |
| U | EXISTING PAVEMENT. |
| V | VAR. MILLING 0 to 3" |
| W | VARIABLE DEPTH ASPHALT PAVEMENT |




## TYPICAL SECTION NO. 4

NOTE: SEE PLANS FOR TURN LANES AND TAPERS

**USE TYPICAL SECTION NO. 4 FROM:**

-Y1- STA 16+72.00 TO 22+85.53

RESURFACE AND TRANSITION TO EXISTING FROM
* -Y1- STA. 13+00.00 TO 16+72.00

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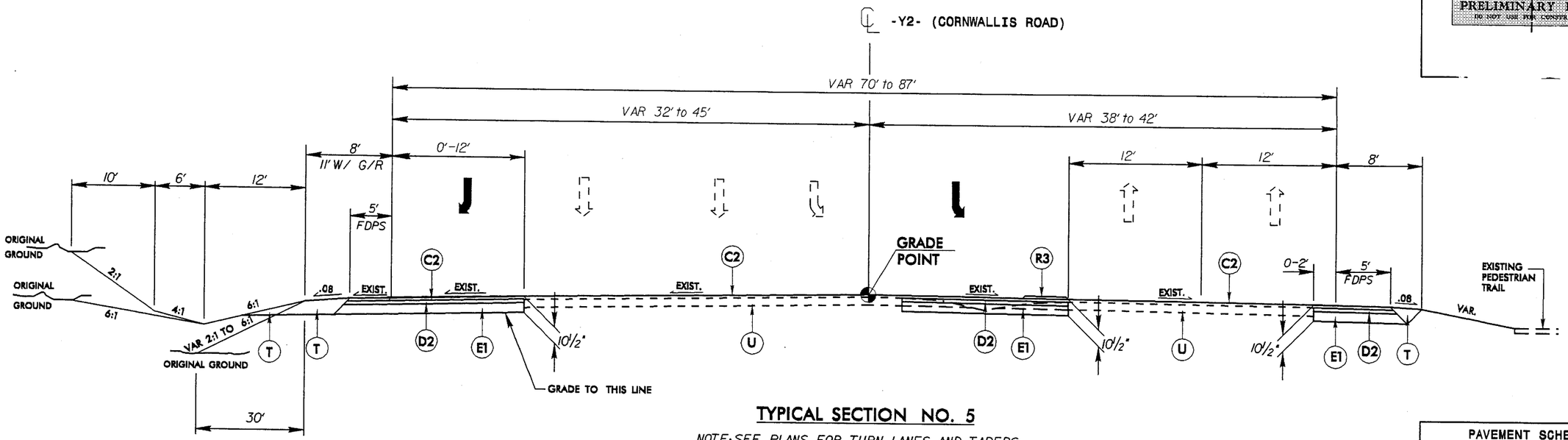
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 2-C |
| ROADWAY DESIGN ENGINEER | PAVEMENT DESIGN ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

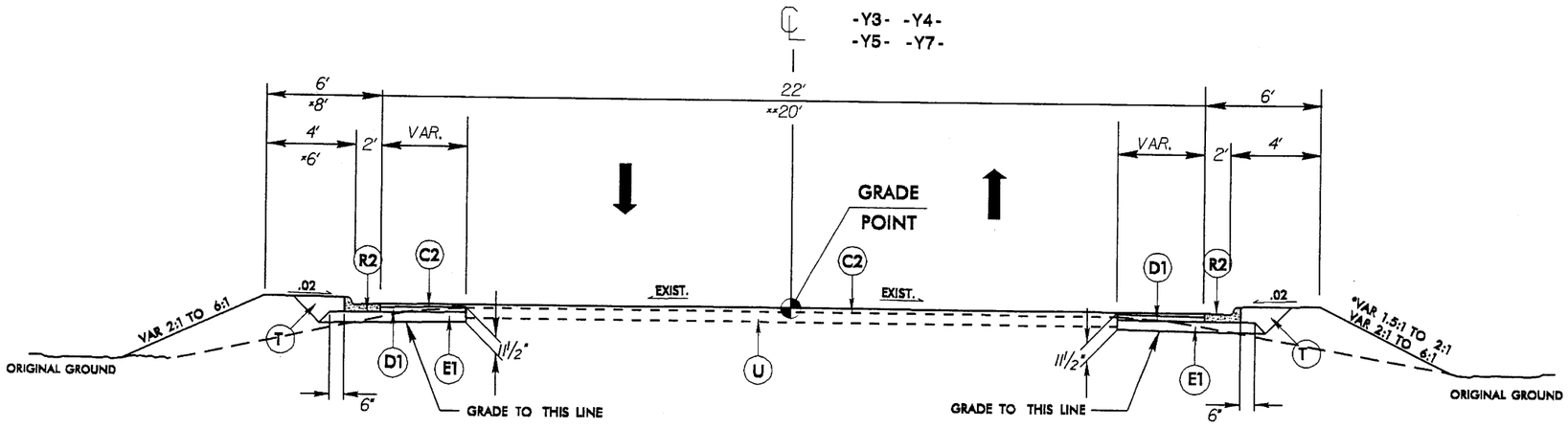



## TYPICAL SECTION NO. 5

NOTE: SEE PLANS FOR TURN LANES AND TAPERS

**USE TYPICAL SECTION NO. 5 FROM:**
-Y2- STA 10+44.66 TO 18+00.00
RESURFACE AND TRANSITION TO EXISTING FROM
-Y2- STA. 18+00.00 TO 18+50.00

| PAVEMENT SCHEDULE | |
|---|---|
| C1 | 2" TYPE S9.5B |
| C2 | 3" TYPE S9.5B |
| C3 | VAR. DEPTH TYPE S9.5B |
| D1 | 4" TYPE I19.0B |
| D2 | 3" TYPE I19.0B |
| D3 | VAR. DEPTH TYPE I19.0B |
| E1 | 4½" TYPE B25.0B |
| E2 | VAR. DEPTH TYPE B25.0B |
| J1 | 10" ABC |
| J2 | 8" ABC |
| P | PRIME COAT |
| R1 | 2'-6" CONC CURB AND GUTTER. |
| R2 | 2'-6" CONC CURB AND GUTTER. |
| R3 | 5" MONO. CONC. ISLAND (Keyed In) |
| T | EARTH MATERIAL. |
| U | EXISTING PAVEMENT. |
| W | VARIABLE DEPTH ASPHALT PAVEMENT |




## TYPICAL SECTION NO. 6

**USE TYPICAL SECTION NO. 6 FROM:**
*-Y3- STA 14+00.00 TO 15+93.91
-Y4- STA 10+50.00 TO 12+00.00
-Y5- STA 10+39.00 TO 11+50.00
**-Y7- STA 13+50.00 TO 14+65.92

RESURFACE AND TRANSITION TO EXISTING FROM
*-Y3- STA 13+50.00 TO 14+00.00
-Y4- STA 10+00.00 TO 10+50.00
**-Y7- STA 13+00.00 TO 13+50.00

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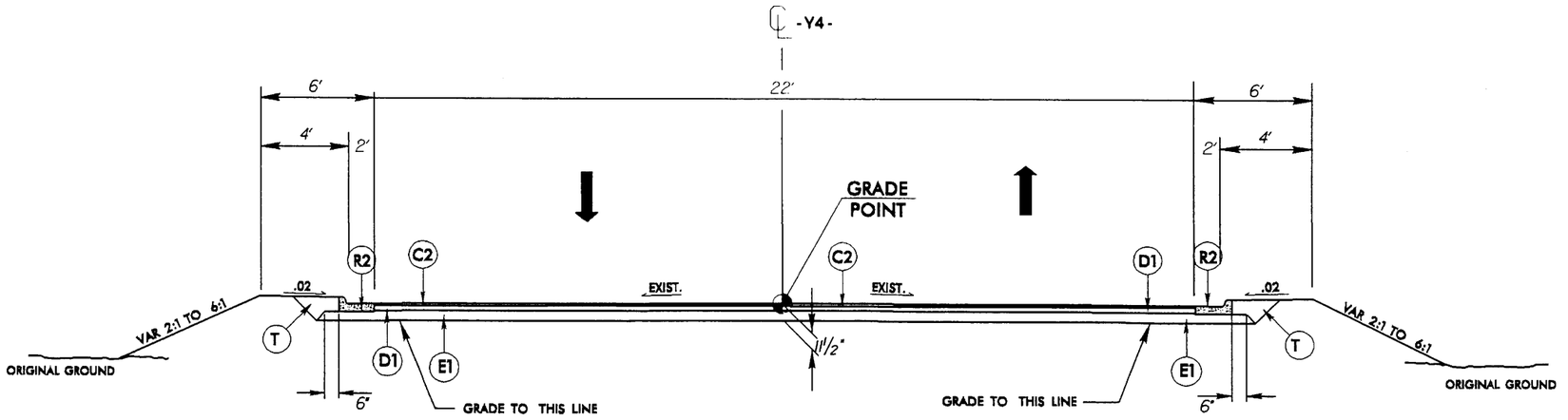
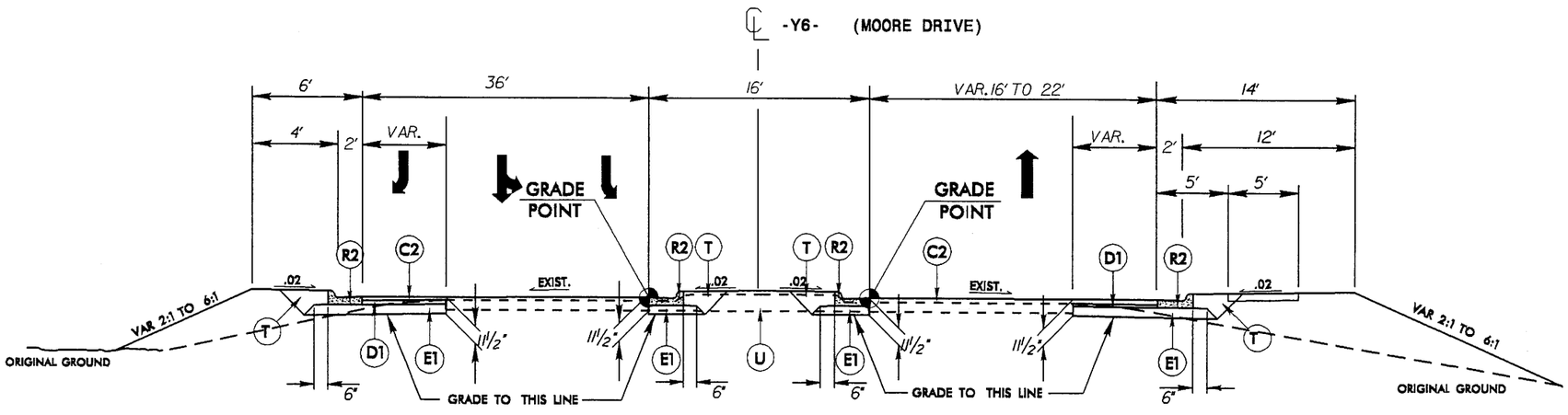



## TYPICAL SECTION NO. 7

**USE TYPICAL SECTION NO. 7 FROM:**

-Y4- STA 12+00.00 TO 12+80.72




## TYPICAL SECTION NO. 8

**USE TYPICAL SECTION NO. 8 FROM:**

-Y6- STA 10+39.00 TO 11+00.00

RESURFACE AND TRANSITION TO EXISTING FROM

-Y6- STA 11+00.00 TO 12+00.00

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 2-D |

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

| PAVEMENT SCHEDULE | |
|---|---|
| C1 | 2" TYPE S9.5B |
| C2 | 3" TYPE S9.5B |
| C3 | VAR. DEPTH TYPE S9.5B |
| D1 | 4" TYPE I19.0B |
| D2 | 3" TYPE I19.0B |
| D3 | VAR. DEPTH TYPE I19.0B |
| E1 | 4½" TYPE B25.0B |
| E2 | VAR. DEPTH TYPE B25.0B |
| J1 | 10" ABC |
| J2 | 6" ABC |
| P | PRIME COAT |
| R1 | 2'-9" CONC CURB AND GUTTER. |
| R2 | 2'-8" CONC CURB AND GUTTER. |
| R3 | 5" MONO. CONC. ISLAND (Keyed In) |
| T | EARTH MATERIAL. |
| U | EXISTING PAVEMENT. |
| W | VARIABLE DEPTH ASPHALT PAVEMENT |

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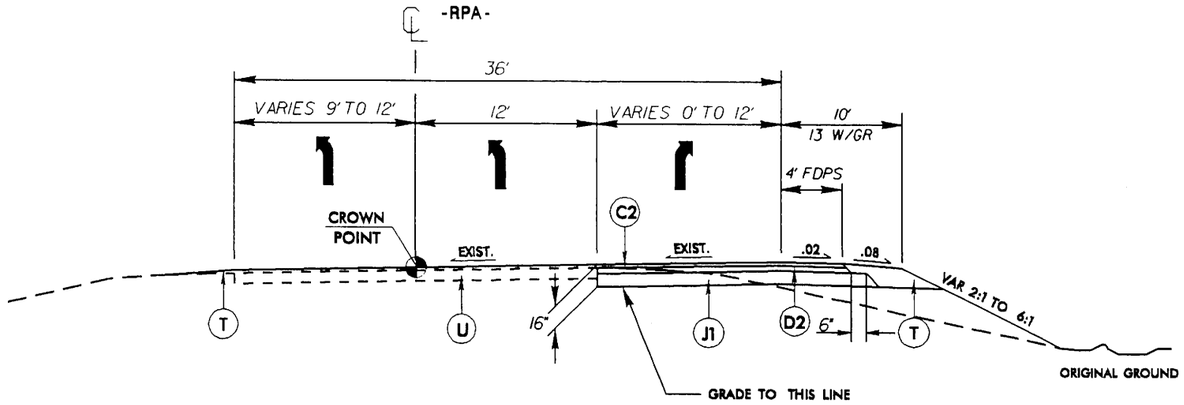
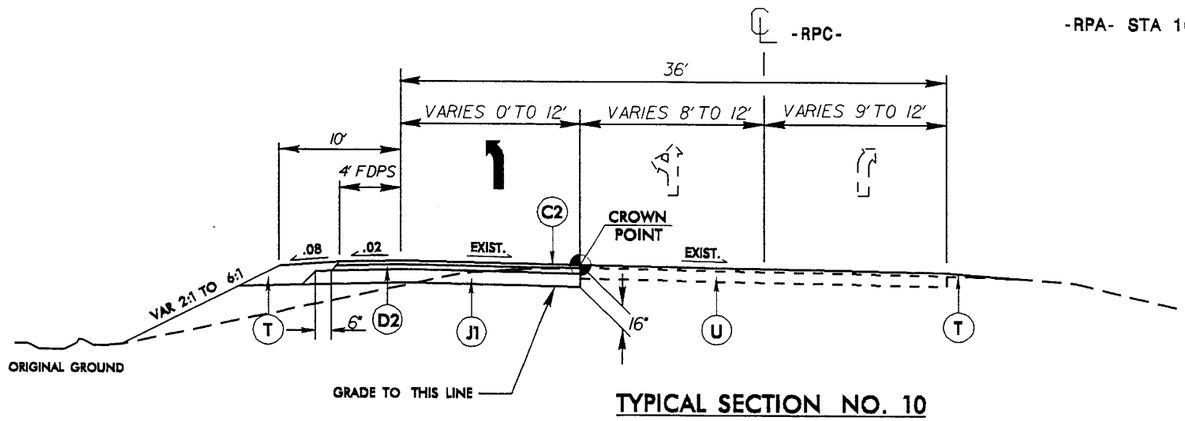



## TYPICAL SECTION NO. 9

**USE TYPICAL SECTION NO. 9 FROM:**

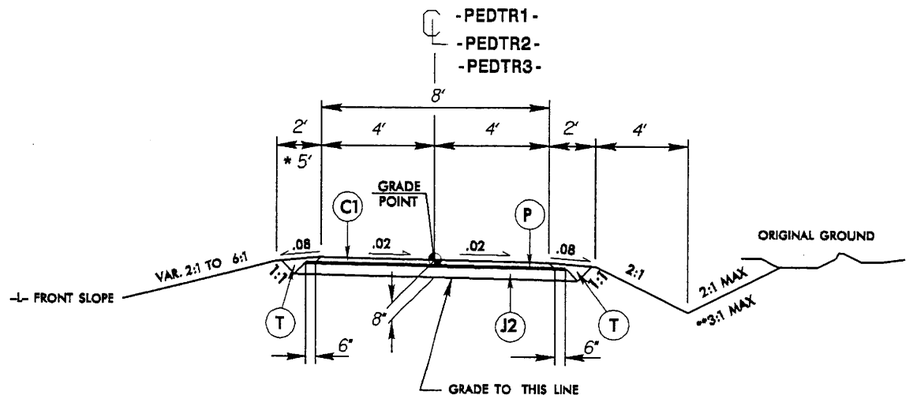
-RPA- STA 10+75.00 TO 20+05.67




## TYPICAL SECTION NO. 10

**USE TYPICAL SECTION NO. 10 FROM:**

-RPC- STA 12+55.00 TO 19+13.79




## TYPICAL SECTION NO. 11

**USE TYPICAL SECTION N1.10 FROM:**

-PEDTR1- STA 10+00 TO 17+37.63
-PEDTR2- STA 10+00 TO 22+41.81
-PEDTR3- STA 10+00 TO 15+13.77

USE * -PEDTR1- STA 13+00.00 TO 14+50.00
USE * -PEDTR2- STA 11+50.00 TO 13+50.00
USE * -PEDTR2- STA 16+00.00 TO 17+50.00 LT.

**-PEDTR2- STA 13+50 TO 22+10 RT.
**-PEDTR3- STA 13+50 TO 15+70 RT.

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 2-E |
| ROADWAY DESIGN ENGINEER | PAVEMENT DESIGN ENGINEER |

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

### PAVEMENT SCHEDULE

| | |
|---|---|
| C1 | 2" TYPE S9.5B |
| C2 | 3" TYPE S9.5B |
| C3 | VAR. DEPTH TYPE S9.5B |
| D1 | 4" TYPE I19.0B |
| D2 | 3" TYPE I19.0B |
| D3 | VAR. DEPTH TYPE I19.0B |
| E1 | 4½" TYPE B25.0B |
| E2 | VAR. DEPTH TYPE B25.0B |
| J1 | 10" ABC |
| J2 | 6" ABC |
| P | PRIME COAT |
| R1 | 2'-0" CONC CURB AND GUTTER. |
| R2 | 2'-6" CONC CURB AND GUTTER. |
| R3 | 5" MONO. CONC. ISLAND (Keyed In) |
| T | EARTH MATERIAL. |
| U | EXISTING PAVEMENT. |
| W | VARIABLE DEPTH ASPHALT PAVEMENT |

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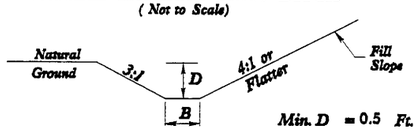
$$$$$INCRADE$$$$$

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 2-F |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

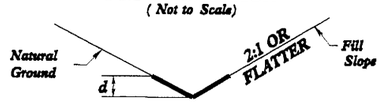
## DETAIL A
### SPECIAL LATERAL BASE DITCH
*( Not to Scale)*




*Min. D = 0.5 Ft.*
*B = 2.0 Ft.*

-L- STA. 22+75 TO STA. 25+00 LT.
-L- STA. 46+50 TO STA. 50+40 RT.
-L- STA. 52+00 TO STA. 53+50 RT.

## DETAIL B
### TOE PROTECTION
*( Not to Scale)*

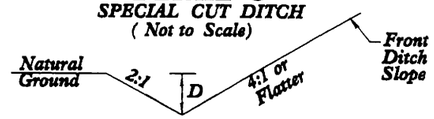



*d = 0.5 Ft. 0.5*

*Type of Liner = PSRM*

-L- STA. 23+00 TO STA. 23+50 RT.
-L- STA. 25+00 TO STA. 25+67 LT.

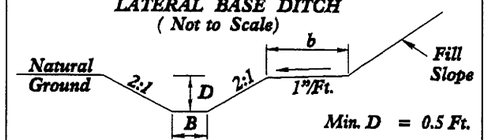
## DETAIL C
### SPECIAL CUT DITCH
*( Not to Scale)*




*Min. D = 0.5 Ft.*

-L- STA. 19+70 TO STA. 21+00 LT.
-L- STA. 37+22 TO STA. 38+00 LT.
-L- STA. 42+00 TO STA. 43+00 RT.
-L- STA. 67+50 TO STA. 70+50 RT.
-Y2- STA. 11+50 TO STA. 13+00 LT.
-Y7- STA. 13+00 TO STA. 14+00 LT.
-PEDTR3- STA. 10+25 TO STA. 11+35 RT.

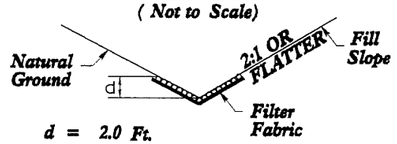
## DETAIL D
### LATERAL BASE DITCH
*( Not to Scale)*




*Min. D = 0.5 Ft.*
*B = 2.0 Ft.*
*b = 5.0 Ft.*

-L- STA. 41+25 TO STA. 42+20 LT.
-PEDTR1- STA. 14+02 TO STA. 15+23 RT.

## DETAIL E
### TOE PROTECTION
*( Not to Scale)*

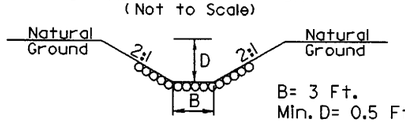



*d = 2.0 Ft.*

*Type of Liner = Class B Riprap*

-L- STA. 36+00 TO STA. 37+00 RT.
-L- STA. 38+00 TO STA. 38+60 LT.

## DETAIL F
### STANDARD BASE DITCH
( Not to Scale)

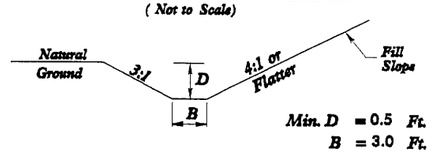



B= 3 Ft.
Min. D= 0.5 Ft.
Max. d= 2.0 Ft

*Type of Liner = Class B Rip Rap*

-PEDTR2- STA. 11+55 LT.
-PEDTR2- STA. 11+75 RT.

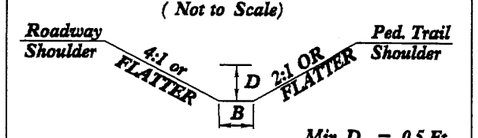
## DETAIL G
### SPECIAL LATERAL BASE DITCH
*( Not to Scale)*




*Min. D = 0.5 Ft.*
*B = 3.0 Ft.*

-L- STA. 50+40 TO STA. 52+00 RT.

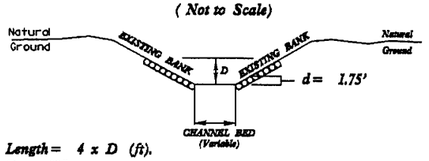
## DETAIL H
### BASE DITCH
*( Not to Scale)*




*Min. D = 0.5 Ft.*
*B = 2.0 Ft.*

-L- STA. 28+71 TO STA. 40+20 RT.

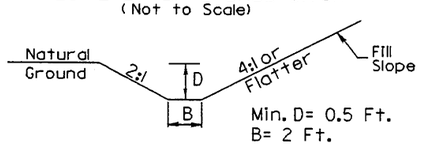
## DETAIL I
### PIPE OUTLET CHANNEL
*( Not to Scale)*




*Length = 4 x D (ft).*
*D= 42"*
*Est.= 1.6 Tons of Class I Rip-Rap*

-L- STA. 38+61 LT.

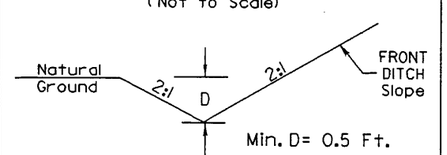
## DETAIL J
### SPECIAL LATERAL BASE DITCH
( Not to Scale)




Min. D= 0.5 Ft.
B= 2 Ft.

-Y1RT- STA. 19+97 TO STA. 22+47 RT.

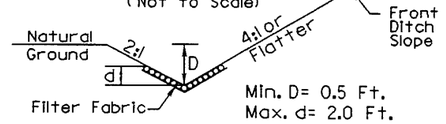
## DETAIL K
### SPECIAL CUT DITCH
( Not to Scale)




Min. D= 0.5 Ft.

-PEDTR1- STA. 15+23 TO STA. 16+95 RT.
-PEDTR2- STA. 11+34 TO STA. 11+75 RT.
-PEDTR3- STA. 12+30 TO STA. 12+75 RT.

## DETAIL L
### SPECIAL CUT DITCH
( Not to Scale)



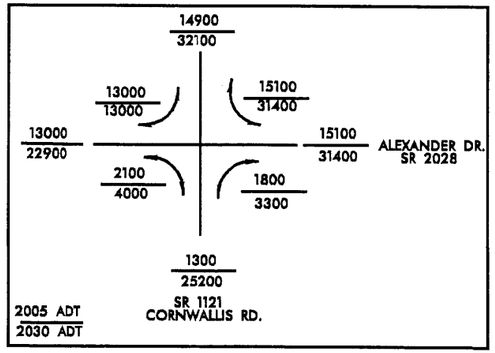

Min. D= 0.5 Ft.
Max. d= 2.0 Ft.

Type of Liner= Class B Rip-Rap

-L- STA. 70+50 TO STA. 71+54 RT.

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 4 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION




NAD 83

SEE SHEET 9
MATCHLINE -Y1- STA 19+00.00

-PEDTR3-
PC Sta. 16+62.73

-PEDTR3-
PT Sta. 17+05.18

END CONST.
-PEDTR3-
POT Sta. 17+29.40

20+00
-Y1- PT Sta. 20+14.83

DATA GENERAL CORP
DB 930 PG 46

TROXLER ASSOCIATES LTD
DB 1599 PG 498-500

BEGIN PROJECT U-3309A
-L- POC STA 18+50.00

-BL-208 PINC 15+53.70
-L- 20+83.59 (-40.80')

360' TRANSITION

BEGIN C/A
+50.00
EX. R/W

200' TAPER

END C&G
+80.78

5' BIKE LANE

TIE TO EXIST. C&G

2'-6" C&G

150' TAPER

BIKE LANE

5' BIKE LANE

N 35° 10' 26.5" E

N 38° 34' 54.2" E

N 38° 24' 33.8" E

N 38° 16' 26.6" E

S 41° 45' 33.6" E

S 40° 33' 31.5" E

S 40° 48' 38.5" E

BEG. C/A
+50.00
EX. R/W

50' TAPER
100' FULL LANE
50' TAPER

200' TAPER

BEG. C&G
+22.49

BEG. C&G
+89.89

BEG. C&G
+90.95

END C&G
+10.43
DO NOT DISTURB TRAIL

END C&G
+49.42

END C&G
+47.34

-L- PT Sta. 20+26.59

-L- PT Sta. 27+17.63

-Y1- POT Sta. 23+29.72

-L- POT Sta. 27+20.30

-Y2- POT Sta. 10+00.00

-Y2- PC Sta. 12+96.11

UNITED THERAPEUTICS CORPORATION
PARCEL 2
DB 5257 PG 563
PB 151 PG 262

ELILILLY & COMPANY
DB 2342 PG 487
PB 138 PG 97

TRIANGLE UNIVERSITIES CTR
FOR ADVANCE STUDIES
DB 992 PG 992

150-50-150
6.0 OS

180-45-180
8.0 OS

MATCHLINE -L- STA. 31+00.00
SEE SHEET 5

MATCHLINE -Y2- STA 14+00.00
SEE SHEET 10

| -L- | -Y1- | -Y2- | -PEDTR3- |
|---|---|---|---|
| PI Sta 15+19.71<br>Δ = 22° 01' 47.0" (RT)<br>D = 2° 08' 45.3"<br>L = 1,026.59'<br>T = 519.71'<br>R = 2,670.00'<br>SE = Exist. | PI Sta 14+92.16<br>Δ = 1° 52' 19.2" (LT)<br>D = 0° 28' 38.9"<br>L = 392.07'<br>T = 196.05'<br>R = 12,000.00'<br>SE = 06<br>$V_D$ = 60 MPH | PI Sta 16+27.28<br>Δ = 11° 33' 15.3" (RT)<br>D = 2° 14' 48.8"<br>L = 781.27'<br>T = 393.72'<br>R = 2,550.00'<br>SE = Exist. | PI Sta 14+68.20<br>Δ = 16° 12' 45.4" (LT)<br>D = 38° 11' 49.9"<br>L = 42.44'<br>T = 21.37'<br>R = 150.00' |

NOTE: RECONNECT ALL PEDESTRIAN TRAILS AND SIDEWALKS BACK TO INTERSECTIONS.

UPGRADE EXISTING TRAFFIC SIGNAL

PROP. 5' MONOLITHIC CONCRETE ISLAND

| |
|---|
| FOR -L- PROFILE, SEE SHEET NO. 13 |
| FOR -Y1- PROFILE, SEE SHEET NO. 16 |
| FOR -Y2- PROFILE, SEE SHEET NO. 17 |

REVISIONS
2/14/08 (RED) ROW REVISION Added Property Lines To Parcel No2 ,Changed Property Owners Name and moved C/A to -L- RT Sta.19+50 on Parcel 2
2/19/08 (BCK) ROW REVISION Moved C/A to -L- RT Sta.16+40

8/17/99

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 5 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

ELI LILLY 300 / 500 — DUPONT 300 / 500

200/300 — 300/400 — 200/300 — 100/200

15100/31400 — SR 2028 ALEXANDER DR. — 15200/31500 — 15200/31500

100/200 — 200/300

2005 ADT 300 / 500
2030 ADT

MATCHLINE SEE SHEET 5-A

MATCHLINE SEE SHEET 5-A

-Y4- POT Sta. 10+00.00

BEG. CONST. -Y4- STA 10+00.00

END 2'6" C&G +50.00

PROP. GUARDRAIL

-Y4- PC Sta. 11+44.76

-Y4- PT Sta. 12+67.84

END C/A +09.00 EXIST. R/W

BEG. 2'6" C&G +29.98

180-60-180 6.0 OS

-L- POC Sta. 40+78.32

-Y4- POT Sta. 13+36.72

BEGIN C/A +40.00 EXIST. R/W

DUPONT DE NEMOURS & COMPANY LLC
DB 3272 PG 166
PB 138 PG 97

530' LEFT-TURN OFFSET

BEG. 2'6" C&G +18.35

200' TAPER

PROP. GUARDRAIL

5' BIKE LANE

N 48° 44' 01.5" E

BEG. C&G +29.05

-L- POC Sta. 40+86.52

-Y5- POT Sta. 10+00.00

150-60-140 4.0 OS

-Y5- PC Sta. 10+89.76

END C&G +50.00

-Y5- PT Sta. 12+38.66

-Y5- PT Sta. 12+75.02

N 72° 01' 13.7" E

END CONST. -Y5- POC STA 12+00.00

MATCHLINE -L- STA. 44+00.00 SEE SHEET 6

NAD 83

-BL-205 PINC 35+04.85

-L- 40+38.04 (-50.77')

-L- PC Sta. 39+48.47

ELI LILLY & COMPANY
DB 3342 PG 487
PB 138 PG 97

TOE PROTECTION SEE DETAIL 8
EST = 18 TONS CLASS B RIPRAP
EST = 47 SY OF FILTER FABRIC

CHANNEL OUTLET PROTECTION SEE DETAIL I CLASS I RIPRAP

2 TONS CLASS B RIPRAP 7 SY FILTER FABRIC

TIE TO EXIST C&G

BEG. C/A +04.00 EXIST. R/W

180-60-180 6.0 OS

END 2'6" C&G +95.26

SPECIAL CUT DITCH SEE DETAIL C

-BL-206 PINC 29+46.68

-L- 34+78.77 (-41.24')

REMOVE & RESET SIGN

END C/A +30.00 EXIST. R/W

BEG. C&G +56.74

180-60-180 6.0 OS

200' TAPER

N 38° 24' 33.9" E

N 39° 38' 39.4" E

N 38° 16' 26.6" E

N 5° 43' 21.8" E

-PEDTRI- PT Sta. 10+68.85

-PEDTRI- PC Sta. 10+09.06

BEG. CONST. -PEDTRI- POT Sta. 10+00.00

TOE PROTECTION SEE DETAIL 8
EST = 61 TONS CLASS B RIPRAP
EST = 164 SY OF FILTER FABRIC

11 TONS CLASS B RIP RAP 28 SY FILTER FABRIC

200' TAPER

530' LEFT-TURN OFFSET

-PEDTRI- PC Sta. 17+04.21

-PEDTRI- PT Sta. 17+37.63

END CONST. -PEDTRI- POT Sta. 17+40.27

N 77° 46' 52.6" E

TRIANGLE UNIVERSITIES CTR FOR ADVANCE STUDIES
DB 992 PG 992

SEE SHEET 4 MATCHLINE -L- STA. 31+00.00

| -L- | -PEDTRI- | | -Y4- | -Y5- |
|---|---|---|---|---|
| PI Sta 48+52.84<br>Δ = 58° 57' 11.0" (RT)<br>D = 3° 34' 51.6"<br>L = 1,646.28'<br>T = 904.37'<br>R = 1,600.00'<br>SE = 06<br>$V_D$ = 60 MPH | PI Sta 10+39.88<br>Δ = 34° 15' 31.9" (RT)<br>D = 57° 17' 44.8"<br>L = 59.79'<br>T = 30.82'<br>R = 100.00' | PI Sta 17+21.57<br>Δ = 38° 17' 59.8" (RT)<br>D = 114° 35' 29.6"<br>L = 33.42'<br>T = 17.36'<br>R = 50.00' | PI Sta 12+06.73<br>Δ = 16° 35' 34.3" (LT)<br>D = 13° 28' 52.9"<br>L = 123.08'<br>T = 61.97'<br>R = 425.00'<br>SE = EXIST. | PI Sta 11+72.12<br>Δ = 60° 56' 19.3" (LT)<br>D = 40° 55' 32.0"<br>L = 148.90'<br>T = 82.37'<br>R = 140.00'<br>SE = EXIST. |

NOTE: RECONNECT ALL PEDESTRIAN TRAILS AND SIDEWALKS BACK TO INTERSECTIONS.

PROP. 5" MONOLITHIC CONCRETE ISLAND

| |
|---|
| FOR -L- PROFILE, SEE SHEET NO. 13 |
| FOR -Y4- PROFILE, SEE SHEET NO. 18 |
| FOR -Y5- PROFILE, SEE SHEET NO. 18 |

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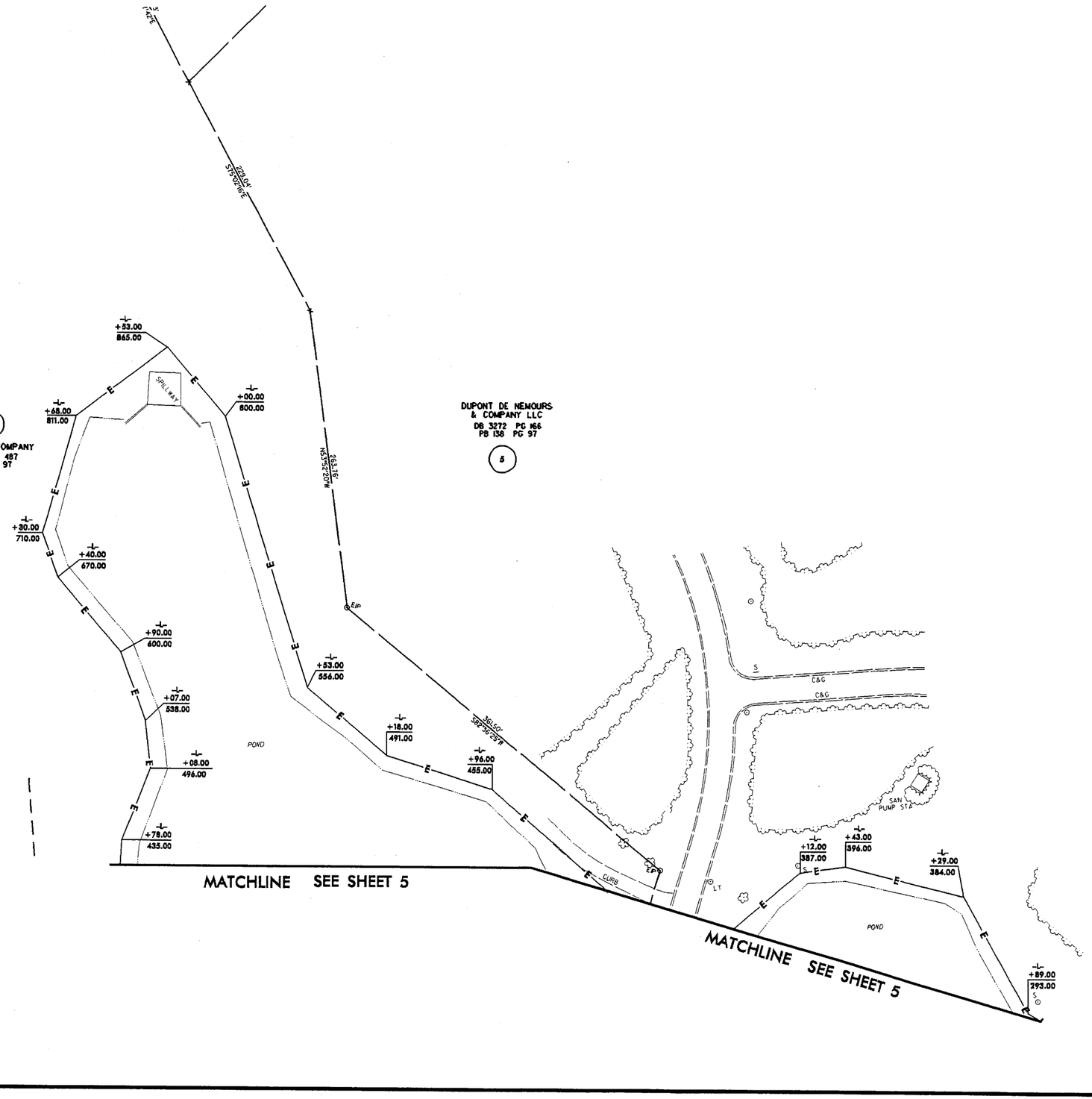
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 5-A |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

REVISIONS

8/1/58

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 6 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

8/17/99

NAD 83

-Y3- PT Sta. 13+88.64

END CONST. -Y3- STA. 13+50.00

END 2'6" C&G +00.00

BEG. 2'6" C&G +76.36

-L- POC Sta. 50+42.23

-Y3- POT Sta. 16+33.10

S 18° 10' 27.6" E

PROP. GUARDRAIL

BEG. C/A +88.48

EXIST. R/W

180-60-180
6.0 OS

DUPONT DE NEMOURS & COMPANY LLC
DB 3272 PG 166
PB 138 PG 97

STATE OF NORTH CAROLINA
DB 407 PG 753
PB 78 PG 72

1 TON CLASS B RIPRAP
5 SY FILTER FABRIC

END C/A +65.80
EXIST. R/W
150-50-150
6.0 OS

BEG. 2'6" C&G +00.18

33 TONS CLASS I RIPRAP
62 SY FILTER FABRIC

PROP. GUARDRAIL

530' LEFT-TURN OFFSET

COLLAR AND EXTEND

-L- PT Sta. 55+94.75

200' TAPER

5' BIKE LANE

MATCHLINE -L- STA. 44+00.00 SEE SHEET 5

MATCHLINE -L- STA. 56+00.00 SEE SHEET 7

530' LEFT-LANE OFFSET

DO NOT DISTURB TRAIL

BEG.CONST. -PEDTR2- POT Sta. 10+00.00
N 84° 56' 41.3" E

TRIANGLE UNIVERSITIES CTR FOR ADVANCE STUDIES
DB 992 PG 992

-PEDTR2- PC Sta. 11+03.00

-PEDTR2- PT Sta. 11+94.63

-PEDTR2- PC Sta. 14+24.74

S 84° 33' 16.7" E

25 TONS CLASS B RIP RAP
63 SY FILTER FABRIC

| -L- | -PEDTR2- | | -Y3- |
|---|---|---|---|
| PI Sta 48+52.84 | PI Sta 11+48.95 | PI Sta 15+17.24 | PI Sta 12+22.66 |
| Δ = 58° 57' 11.0" (RT) | Δ = 10° 30' 02.0" (RT) | Δ = 2° 07' 11.2" (RT) | Δ = 27° 19' 02.0" (RT) |
| D = 3° 34' 51.6" | D = 11° 27' 33.0" | D = 1° 08' 45.3" | D = 8° 04' 11.4" |
| L = 1,846.28' | L = 91.63' | L = 184.99' | L = 338.51' |
| T = 904.37' | T = 45.95' | T = 92.50' | T = 172.54' |
| R = 1,600.00' | R = 500.00' | R = 5,000.00' | R = 710.00' |
| SE = 06 | | | SE = EXIST. |
| $V_D$ = 60 MPH | | | |

| 2005 ADT / 2030 ADT | | NATIONAL DRIVING CENTER | |
|---|---|---|---|
| | | 2900 / 3100 | |
| SR 2028 | 1200 / 1300 | | 1700 / 1800 |
| SR 2028 ALEXANDER DR. | 15200 / 31500 | | 15700 / 32000 |

PROP. 5" MONOLITHIC CONCRETE ISLAND
FOR -L- PROFILE, SEE SHEET NO. 14
FOR -Y3- PROFILE, SEE SHEET NO. 17

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 7 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

MOORE DRIVE
8500
9300

SR 2028 ALEXANDER DR.
15700
32000

3800 / 4200
4600 / 5000
200 / 300
500 / 600
16800
33100
800
1000

2005 ADT
2030 ADT

STATE OF NORTH CAROLINA
DB 407 PG 753
PB 78 PG 72

GUARD HOUSE

GLAXOSMITHKLINE
DB 2986 PG 852
PB 101 PG 74

-Y6- POT Sta. 13+31.95
-Y6- PT Sta. 12+22.45
-L- PC Sta. 58+47.41
-L- POC Sta. 63+12.73
-Y6- POT Sta. 10+00.00
-L- PRC Sta. 62+31.47
-Y6- PC Sta. 11+03.59
-L- PT Sta. 66+51.84
END CONST. -Y6- STA. 12+00.00
TIE TO EX. C&G +25.00
TIE TO EXIST. C&G +25.00
REG. PROP. SIDEWALK +80.00 -L-
REG. C/A +85.00 EXIST. R/W 88.00
END C/A +20.00 EXIST. R/W
BEG. 2'6" C&G +28.42
BEG. C/A +62.00 EX. R/W
END 2'6" C&G +62.34
END C/A +75.00 EX. R/W
BEG. C&G +20.22
BEG. CONST. -Y7- STA. 12+50.00
-Y7- PC Sta. 10+74.78
-Y7- POT Sta. 10+00.00
-Y7- PT Sta. 13+08.17
-PEDTR2- PT Sta. 16+09.72
-PEDTR2- PC Sta. 19+06.67
-PEDTR2- PT Sta. 21+01.20
-PEDTR2- POT Sta. 22+41.81
-L- POC Sta. 63+10.34 RESET EXIST. FENCE
-Y7- POT Sta. 15+04.58
-BL-201 PINC 57+73.03
-L- 63+49.09 (-52.96')

200' TAPER
100' TRANSITION
REMOVE AND RESET EXIST. FENCE
PROP. 5' SIDEWALK
GRADE TO DRAIN AND TIE TO EXISTING DI
3 TONS CLASS B RIPRAP 11 SY FILTER FABRIC
2 TONS CLASS B RIPRAP 7 SY FILTER FABRIC
1 TON CLASS B RIPRAP 5 SY FILTER FABRIC
150-50-150 6.0 OS
180-60-180 6.0 OS
SPECIAL CUT DITCH SEE DETAIL C
5' BIKE LANE
SR 2028 ALEXANDER DR
RETAIN
REMOVE FENCE
TRIANGLE UNIVERSITIES CTR FOR ADVANCE STUDIES DB 992 PG 992

MATCHLINE -L- STA. 56+00.00 SEE SHEET 6
MATCHLINE -L- STA. 69+00.00 SEE SHEET 8

| -L- | | |
|---|---|---|
| PI Sta 48+52.84<br>Δ = 58° 57' 11.0" (RT)<br>D = 3° 34' 51.6"<br>L = 1,646.28'<br>T = 904.37'<br>R = 1,600.00'<br>SE = 06<br>VD = 60 MPH | PI Sta 60+39.48<br>Δ = 0° 53' 43.0" (RT)<br>D = 0° 13' 59.3"<br>L = 384.00'<br>T = 192.00'<br>R = 24,575.16'<br>SE = NC | PI Sta 64+41.66<br>Δ = 0° 58' 48.2" (LT)<br>D = 0° 13' 59.3"<br>L = 420.36'<br>T = 210.19'<br>R = 24,575.16'<br>SE = NC |

| -Y7- | -Y6- | -PEDTR2- | |
|---|---|---|---|
| PI Sta 11+92.44<br>Δ = 18° 01' 18.1" (LT)<br>D = 7° 43' 18.5"<br>L = 233.39'<br>T = 117.67'<br>R = 742.00'<br>SE = EXIST. | PI Sta 11+63.40<br>Δ = 14° 47' 35.4" (RT)<br>D = 12° 27' 20.2"<br>L = 118.77'<br>T = 59.72'<br>R = 460.00'<br>SE = EXIST. | PI Sta 15+17.24<br>Δ = 2° 07' 11.2" (RT)<br>D = 1° 08' 45.3"<br>L = 184.99'<br>T = 92.50'<br>R = 5,000.00' | PI Sta 20+05.18<br>Δ = 22° 17' 28.3" (LT)<br>D = 11° 27' 33.0"<br>L = 194.53'<br>T = 98.51'<br>R = 500.00' |

PROP. 5' MONOLITHIC CONCRETE ISLAND
UPGRADE EXISTING TRAFFIC SIGNAL

NOTE: RECONNECT ALL PEDESTRIAN TRAILS AND SIDEWALKS BACK TO INTERSECTIONS.

FOR -L- PROFILE, SEE SHEET NO. 14
FOR -Y6- PROFILE, SEE SHEET NO. 19
FOR -Y7- PROFILE, SEE SHEET NO. 19

REVISIONS
8/17/99

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ksmith
ss SELECTIONSET

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 8 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

8/17/99

REVISIONS

MATCHLINE -RPA- STA. 16+00.00
SEE SHEET 11

-RPA- PT Sta. 17+21.91

GLAXOSMITHKLINE
DB 2986 PG 852
PB 101 PG 74

70+00

75+00

80+00

APPROX. LOC.

EXISTING R/W

RETAIN

+28.12
EX. R/W

+41.04
EX. R/W

200-75-200
5.5 OS

END PROP. SIDEWALK
+25.61 -RPA-

PROP. 5' SIDEWALK

PROP. GUARDRAIL

CAT-1

-L- POT Sta. 72+89.49
-RPA- POT Sta. 20+09.33

S 38° 45' 12.4" W

R=25

END PAVING
-L- POT STA. 75+10.92

END PROJECT U-3309A
-L- POT STA. 80+00.00

-L- POT Sta. 80+60.59

CONC

BST

SIG

18" C&G

41'

30'

EXIST.

S 82° 43' 20.3" E

S 82° 13' 13.9" E

S 81° 59' 37.1" E

COLLAR AND EXTEND

REMOVE HW

180-60-180
6.0 OS

+40.00
98.00

+64.06
EX. R/W

+79.12
EX. R/W

SPECIAL CUT DITCH
SEE DETAIL L

REMOVE AND RESET EXIST. FENCE

-BL- 70+33.86
-EY- 13+68.36

-L- POT Sta. 79+55.99
-RPC- POT Sta. 19+19.66

-BL-200 PINC 67+55.98
-L- 73+31.78 (-64.45')

36" CONC

18" CONC

S 8° 45' 12.4" W

15+00

4

TRIANGLE UNIVERSITIES CTR
FOR ADVANCE STUDIES

DB 992 PG 992

R=EXIST.

NOTE: VAR. MILLING MAY BE NEEDED TO MAKE TIE

-L- 80+00.36 (-70.31')
-BL-100 -POT 74+25.47 =
U3309B BL-100 POT 5+00.00

24'

12'

4' PS

-RPC-

N 25° 17' 57.4" E

MATCHLINE -RPC- STA. 15+00.00
SEE SHEET 12

| -RPA- | -RPC- |
|---|---|
| PI Sta 14+32.93 | PI Sta 12+20.64 |
| Δ = 17° 34' 04.8" (RT) | Δ = 6° 57' 57.7" (RT) |
| D = 3° 00' 56.0" | D = 1° 54' 35.5" |
| L = 582.58' | L = 364.74' |
| T = 293.59' | T = 182.59' |
| R = 1,900.00' | R = 3,000.00' |
| SE = EXIST. | SE = EXIST. |

NOTE: RECONNECT ALL PEDESTRIAN TRAILS AND SIDEWALKS BACK TO INTERSECTIONS.

★ UPGRADE EXISTING TRAFFIC SIGNAL

| |
|---|
| FOR -L- PROFILE, SEE SHEET NO. 15 |
| FOR -RPA- PROFILE, SEE SHEET NO. 20 |
| FOR -RPC- PROFILE, SEE SHEET NO. 20 |

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 9 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

8/17/99

NAD 83

-Y1- POT Sta. 10+00.00

BEG. CONST.
-Y1- POC STA. 13+00.00

BEG. C/A
+00.00
EX. R/W

-BY1- 214 POT 5+00.00

75' TAPER

ELILILLY & COMPANY
DB 2342 PG 487
PB 138 PG 97

SR 1121 CORNWALLIS RD

S 58°06'46.9" E

S 88°37'58.2" E

S 45°09'20.5" E

S 45°17'36.2" E

-Y1- PC Sta. 12+33.56

BEG.CONST.
-PEDTR3- POT Sta. 10+00.00
-PEDTR3-
PC Sta. 10+15.39

-PEDTR3-
PT Sta. 10+45.21
S 54°27'42.4" E

-PEDTR3-
PC Sta. 11+43.43

-PEDTR3-
PT Sta. 18+71.43

-PEDTR3-
PC Sta. 15+54.49

-PEDTR3-
PT Sta. 16+03.43

TIE TO EX. CURB

360' TRANSITION

200' TAPER

MATCHLINE -Y1- STA 19+00.00
SEE SHEET 4

TROXLER ASSOCIATES LTD
DB 1599 PG 498-500

| -YILT- | |
|---|---|
| PI Sta 14+91.81 | PI Sta 18+46.36 |
| Δ = 8°43'48.2" (RT) | Δ = 7°42'10.9" (RT) |
| D = 2°25'56.4" | D = 2°13'58.4" |
| L = 358.92' | L = 344.98' |
| T = 179.81' | T = 172.75' |
| R = 2,355.59' | R = 2,566.00' |

| -YIRT- | |
|---|---|
| PI Sta 14+93.11 | PI Sta 18+41.78 |
| Δ = 8°05'51.8" (RT) | Δ = 7°42'10.9" (RT) |
| D = 2°14'21.6" | D = 2°15'27.5" |
| L = 361.61' | L = 341.22' |
| T = 181.11' | T = 170.87' |
| R = 2,558.60' | R = 2,538.00' |

| -Y1- |
|---|
| PI Sta 16+27.28 |
| Δ = 17°33'15.3" (RT) |
| D = 2°14'48.8" |
| L = 781.27' |
| T = 393.72' |
| R = 2,550.00' |
| SE = EXIST. |

| -PEDTR3- | | | |
|---|---|---|---|
| PI Sta 10+30.76 | PI Sta 12+07.58 | PI Sta 15+79.18 | PI Sta 16+84.10 |
| Δ = 34°10'15.7" (RT) | Δ = 9°10'06.3" (RT) | Δ = 18°41'34.6" (RT) | Δ = 16°12'45.4" (LT) |
| D = 114°35'29.6" | D = 7°09'43.5" | D = 38°11'49.9" | D = 38°11'49.9" |
| L = 29.82' | L = 128.02' | L = 48.94' | L = 42.44' |
| T = 15.37' | T = 64.14' | T = 24.69' | T = 21.37' |
| R = 50.00' | R = 800.00' | R = 150.00' | R = 150.00' |

PROP. 5' MONOLITHIC CONCRETE ISLAND
FOR -Y1- LT PROFILE, SEE SHEET NO. 16
FOR -Y1- RT PROFILE, SEE SHEET NO. 16

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 10 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

REVISIONS

2/14/08 (REO) ROW REVISION Added Property Lines To Parcel No.2 .Changed Property Owners Name and moved C/A to -Y2- RT Sta.16+10

8/17/99

SEE SHEET 4
MATACHLINE -Y2- STA 14+00

200' TAPER

RETAIN SYSTEM AND TIE PROP ROADWAY TO DRIVE

BEG. C/A +10.00 EX. R/W 90.00

BEG. 2'6" C&G +00.62

R=40'

TIE TO EXIST. C&G +50.00 EX. R/W

R=30'

END 2'6" C&G ℄ +50.90

-Y2- RT Sta. 16+88.18

TRIANGLE UNIVERSITIES CTR FOR ADVANCE STUDIES DB 992 PG 992

END CONST. -Y2- POT STA. 18+50.00

-Y1- 215 POT 24+96.43

-Y2- POT Sta. 22+82.60

S 40° 48' 38.5" E

-Y2-
S 43° 37' 52.7" E

1/2" UNK FUNCTION CABLE

6½" UNK FUNCTION CORRUGATED PIPE

R=4'

REMOVE DI AND COLLAR

BEG. C/A +10.00 EX. R/W

DO NOT DISTURB TRAIL

UNITED THERAPEUTICS CORPORATION
PARCEL 2
DB 5257 PG 663
PB 161 PG 262

2

S 59°35'49" W
220.39'

N/F
JDS UNIPHASE CORPORATION
PARCEL 3
DB 4105 PG 797
PB 161 PG 262

CONC MON

EXISTING R/W

CORNWALLIS RD

-Y2-

PI Sta 14+92.16
Δ = 1° 52' 19.2" (LT)
D = 0° 28' 38.9"
L = 392.07'
T = 196.05'
R = 12,000.00'
SE = Exist.

PROP. 5" MONOLITHIC CONCRETE ISLAND
FOR -Y2- PROFILE, SEE SHEET NO. 17

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8/17/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 11 |
| R/W SHEET NO. | |
| ROADWAY DESIGN | JCS |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RPA-
PI Sta 14+32.93
Δ = 17° 34' 04.8" (RT)
D = 3° 00' 56.0"
L = 582.58'
T = 293.59'
R = 1,900.00'
SE = EXIST.

NAD 83

CL AXOSMTHKLINE
DB 2986 PG 852
PB 101 PG 74

7

-RPA- PC Sta. 11+39.34

SEE SHEET 8
MATCHLINE -RPA- STA 16+00.00

REMOVE AND REPLACE EXIST. GUARDRAIL

EXISTING R/W

S 13° 52' 29.8" W
-RPA-

NC 147 DURHAM FREEWAY

200' TAPER

S 8° 45' 12.4" W

CABLE
APPROX. LOC.
42"CONC
12" CONC
36"CONC
MTL
C&G
5+00.00 POT
-RPA- POT Sta. 10+00.00
-RPA- POT STA. 10+75.00
BEGIN CONST.
15.00
TIMBS
60"MTL
60"MTL

FOR -RPA- PROFILE, SEE SHEET NO. 20

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 12 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

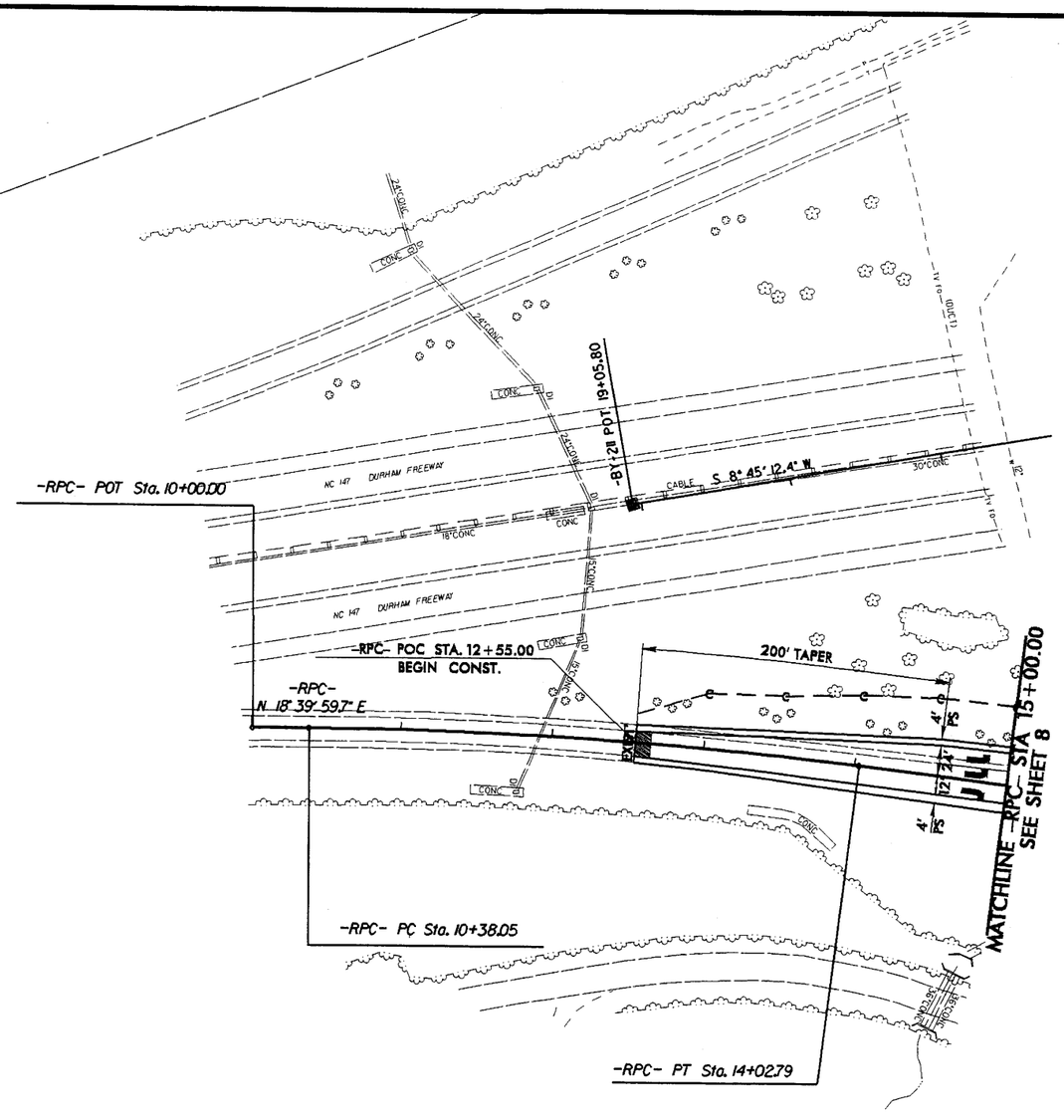
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

TRIANGLE UNIVERSITIES CTR
FOR ADVANCE STUDIES
DB 992 PG 992

NAD 83




-RPC-

PI Sta 12+20.64
Δ = 6° 57' 57.7" (RT)
D = 1° 54' 35.5"
L = 364.74'
T = 182.59'
R = 3,000.00'
SE = EXIST.

FOR -RPC- PROFILE, SEE SHEET NO. 20

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tsmith

5/28/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 13 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BEGIN CONSTRUCTION
BEGIN MIN. RESURFACING
-L- STA. 15+50.00
EL = 306.61'

BEGIN GRADE
-L- STA. 15+50.00
EL = 309.30'

BEG. LT. DITCH GRADE
PI = 19+70.000
EL = 306.62

PI = 20+00.000
EL = 307.25

PI = 20+50.000
EL = 309.05

BEG. LT. DITCH GRADE
PI = 22+75.000
EL = 314.50

END LT. DITCH GRADE
PI = 21+00.000
EL = 310.50

PI = 24+50.000
EL = 319.43

END LT. DITCH GRADE
PI = 25+00.000
EL = 320.10

PI = 26+70.00
EL = 329.70'
K = 114
VC = 670'
V = 55 MPH

-L- POT Sta. 27+17.63
-Y1- POT Sta. 23+29.72

-L- POT Sta. 27+20.30
-Y2- POT Sta. 10+00.00

PI = 29+00.000
EL = 317.50

BEG. RT. DITCH GRADE
PI = 28+77.000
EL = 318.05

LEFT DITCH
RIGHT DITCH
FOR PLAN VIEW, SEE SHEET NO. 4

PI = 33+00.00
EL = 310.63'
K = 332
VC = 180'
V = 60 MPH

PI = 29+00.000
EL = 317.50

PI = 35+00.000
EL = 300.78

PI = 35+50.000
EL = 299.45

PI = 36+00.000
EL = 297.92

PI = 36+50.000
EL = 294.99

BEG. LT. DITCH GRADE
PI = 37+22.000
EL = 295.73

PI = 37+00.000
EL = 294.22

PI = 37+50.000
EL = 292.65

PI = 37+50.000
EL = 293.00

END LT. DITCH GRADE
PI = 38+00.000
EL = 294.00

PI = 38+65.00
EL = 296.60'
K = 145
VC = 269'
V = 60 MPH

PI = 38+00.000
EL = 296.97

PI = 38+50.000
EL = 290.15

PI = 39+00.000
EL = 289.78

PI = 39+50.000
EL = 289.55

PI = 40+00.000
EL = 289.19

-L- POC Sta. 40+78.32
-Y4- ROT Sta. 13+36.72

-L- POC Sta. 40+86.52
-Y5- POT Sta. 10+00.00

BEG. RT. DITCH GRADE
PI = 42+00.000
EL = 288.85

END RT. DITCH GRADE
PI = 43+00.000
EL = 288.34

PI = 42+50.000
EL = 288.00

BEG. LT. DITCH GRADE
PI = 41+25.000
EL = 282.87

PI = 41+50.000
EL = 283.28

PI = 42+00.000
EL = 283.79

END LT. DITCH GRADE
PI = 42+20.000
EL = 284.00

END RT. DITCH GRADE
PI = 40+20.000
EL = 289.00

LEFT DITCH
RIGHT DITCH
FOR PLAN VIEW, SEE SHEET NO. 4 & 5

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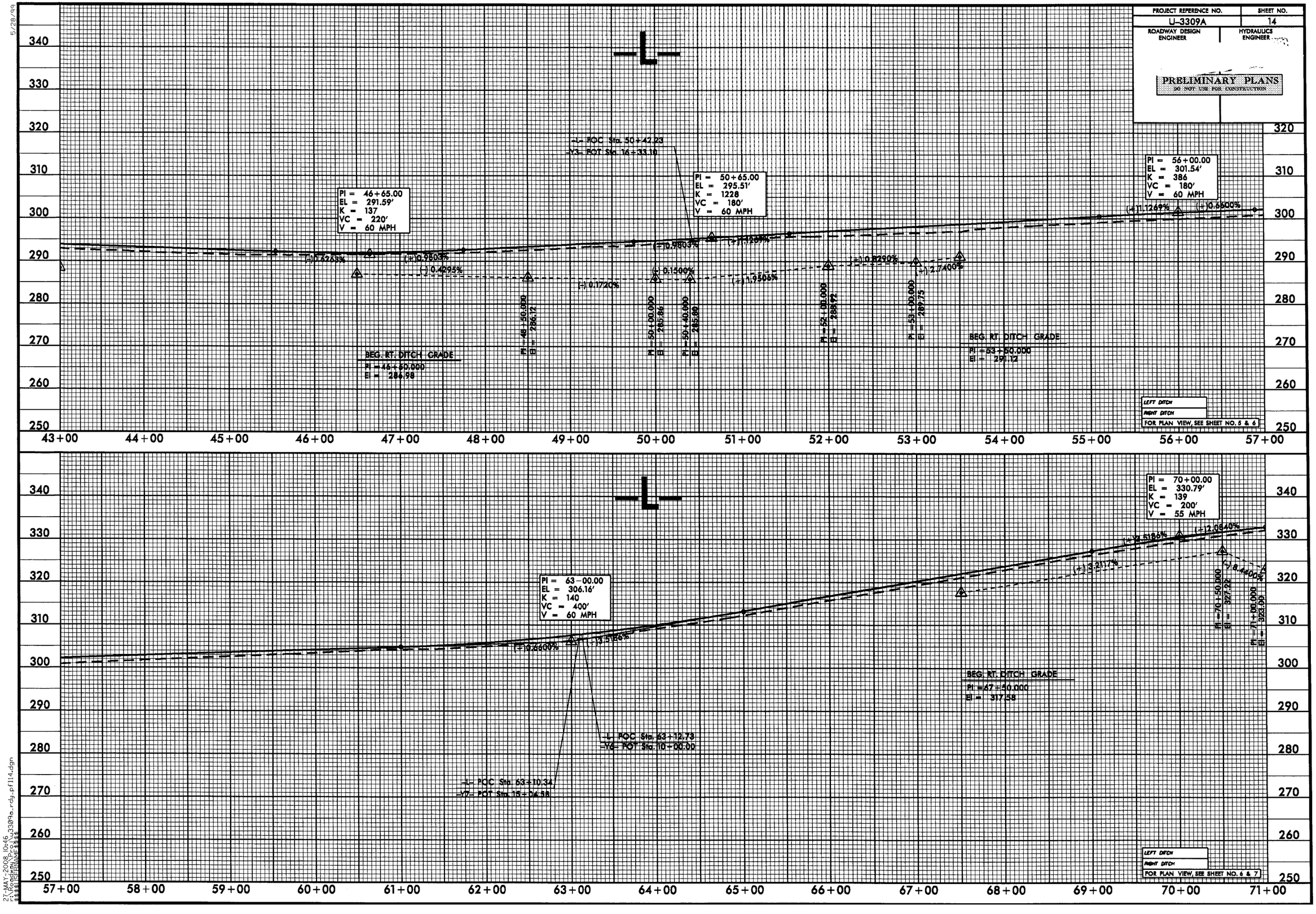
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 14 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 15 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

END GRADE
BEG. MIN. RESURFACING
-L- STA. 72+30.00
PL = 334.00'

(-)12.0840%

(-)4.0560%

PL = 71-100.000
EL = 323.00

PL = 71-50.000
EL = 315.50

END RT. DITCH GRADE
PL = 71 -54.000
EL = 315.50

END MIN. RESURFACING
AND WIDENING
-L- STA. 75+10.92
EL = 338.21'

NC 147 DURHAM FREEWAY

-L- POT Sta. 72+89.49
-RPA- POT Sta. 20+09.35

-L- POT Sta. 79+55.99
-RPC- POT Sta. 19+19.66

LEFT DITCH
RIGHT DITCH
FOR PLAN VIEW, SEE SHEET NO. 7 & 8

350
340
330
320
310
300
290
280
270
260

71+00 72+00 73+00 74+00 75+00 76+00 77+00 78+00 79+00 80+00

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 16 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

# -Y1LT-

BEGIN GRADE
-Y1LT- STA. 13+12.00
EL = 311.20'

PI = 16+50.00
EL = 322.89'
K = 160
VC = 400'
V = 60 MPH

(+)3.4588%
(+)0.9427%
(+)0.9427%
(-)1.0000%

PI = 21+00.00
EL = 327.23'
K = 153
VC = 300'
V = 60 MPH

END GRADE
-Y1LT- STA. 22+85.53
EL = 325.28'

360 350 340 330 320 310 300 290 280 270

14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00

FOR PLAN VIEW, SEE SHEET NO. 4 & 9

# -Y1RT-

BEGIN GRADE
-Y1RT- STA. 13+12.00
EL = 311.03'

PI = 16+15.00
EL = 321.24'
K = 179
VC = 340'
V = 60 MPH

(+)3.3696%
(+)1.4515%
(+)1.4515%
(-)0.6000%
(-)1.0000%

PI = 20+60.00
EL = 327.79'
K = 121
VC = 300'
V = 55 MPH

END GRADE
-Y1RT- STA. 22+84.53
EL = 325.45'

BEG. RT. DITCH GRADE
PI = 19+97.000
EL = 323.50

21+97.000
322.39
EL

END RT. DITCH GRADE
PI = 22+47.000
EL = 321.80

350 340 330 320 310 300 290 280 270 260

14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00

RIGHT DITCH - - - -
FOR PLAN VIEW, SEE SHEET NO. 4 & 9

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 17 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

# -Y2-

BEGIN GRADE
-Y2- STA. 10+44.66
EL = 323.79'

PI = 11+00.00
EL = 323.62'
K = 64
VC = 50'
V = 46 MPH (STOP)

(-)0.3000%
(-)1.0817%
(-)0.3213%

PI = 16+50.00
EL = 317.68'
K = 455
VC = 300'
V = 60 MPH

(-)1.0817%
(-)0.4220%

END GRADE
-Y2- STA. 18+00.00
EL = 317.04'

END CONSTRUCTION
-Y2- STA. 18+50.00
EL = 316.46'

BEG. LT. DITCH GRADE
PI = 11+50.000
El = 318.500

END LT. DITCH GRADE
PI = 13+00.000
El = 316.982

LEFT DITCH
FOR PLAN VIEW, SEE SHEET NO. 4 & 10

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00

360 350 340 330 320 310 300 290 280 270

# -Y3-

BEGIN CONSTRUCTION
-Y3- STA. 13+50.00
EL = 304.37'

BEGIN GRADE
-Y3- STA. 14+00.00
EL = 302.67'

PI = 15+10.00
EL = 298.45'
K = 35
VC = 100'
V = 29 MPH (STOP)

(-)3.6359%
(-)1.0000%

END GRADE
-Y3- STA. 15+93.91
EL = 297.67'

FOR PLAN VIEW, SEE SHEET NO. 6

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00

360 350 340 330 320 310 300 290 280 270

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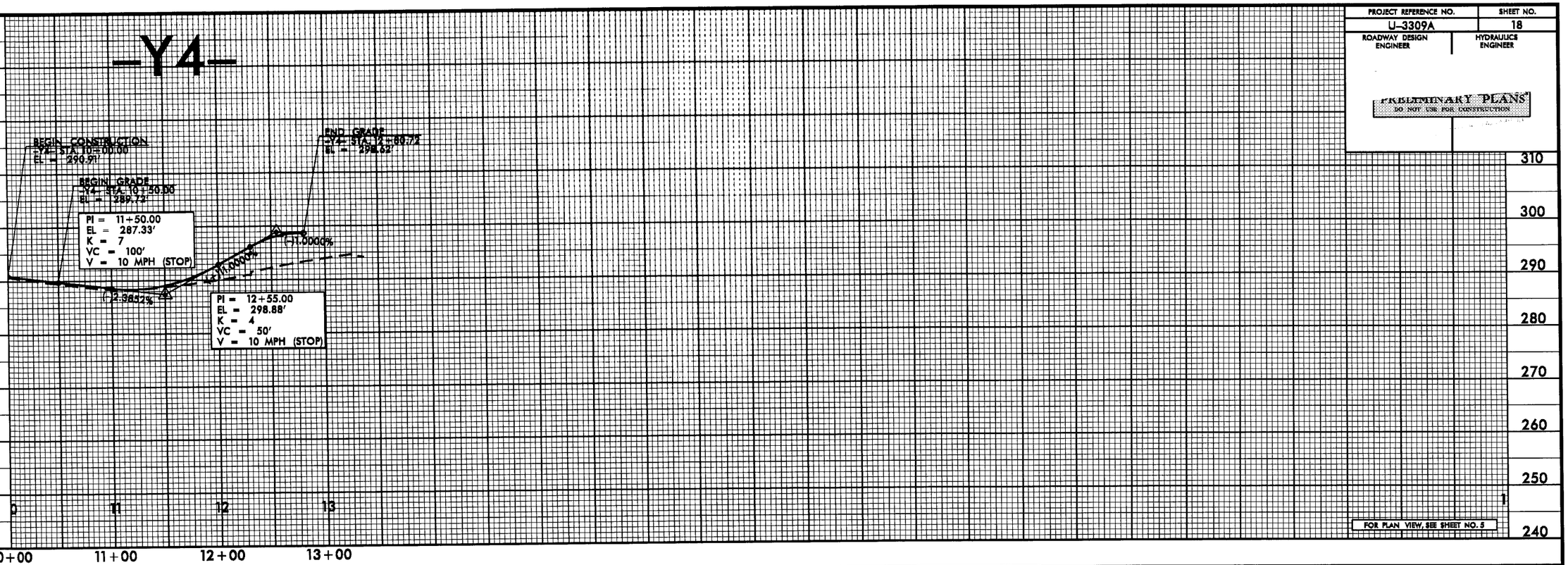
5/28/99

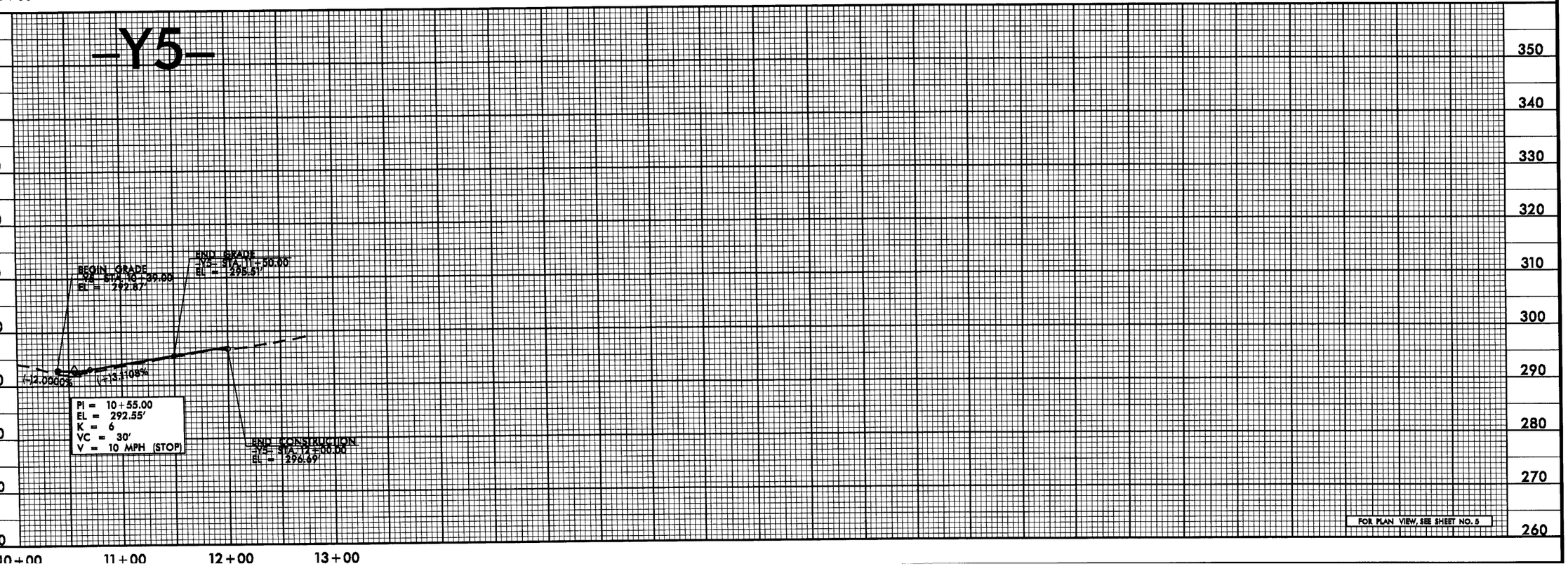
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 18 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

# -Y4-




# -Y5-

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 19 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

# -Y6-

BEGIN GRADE
-Y6- STA. 10+39.00
EL = 306.89'

END GRADE
-Y6- STA. 11+50.00
EL = 305.47'

(-)1.2805%

END CONSTRUCTION
-Y6- STA. 12+00.00
EL = 304.69'

FOR PLAN VIEW, SEE SHEET NO. 7

# -Y7-

BEGIN CONSTRUCTION
-Y7- STA. 12+50.00
EL = 313.81'

BEGIN GRADE
-Y7- STA. 13+00.00
EL = 312.67'

PI = 14+20.00
EL = 306.26'
K = 11
VC = 80'
V = 16 MPH (STOP)

END GRADE
-Y7- STA. 14+65.92
EL = 307.18'

(-)5.7967%

(-)3.7900%

(+)3.0004%

BEG. LT. DITCH GRADE
PI = 13+00.000
EL = 316.290

END LT. DITCH GRADE
PI = 14+00.000
EL = 306.500

LEFT DITCH

FOR PLAN VIEW, SEE SHEET NO. 7

MAY-2008 10:47
Roadway Design
File: U3309a_rdy_pf119.dgn

5/28/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 20 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

# -RPA-

BEGIN MIN RESURFACING AND WIDENING
-RPA- STA. 10+78.00
EL = 327.07'

END MIN RESURFACING AND WIDENING
-RPA- STA. 19+66.38
EL = 335.57'

FOR PLAN VIEW, SEE SHEET NO. 8 & 11

# -RPC-

BEGIN MIN RESURFACING AND WIDENING
-RPC- STA. 12+50.00
EL = 337.27'

END MIN RESURFACING AND WIDENING
-RPC- STA. 18+79.00
EL = 346.00'

FOR PLAN VIEW, SEE SHEET NO. 8 & 12

MAY-2008 10:47
Roadway Proj. u3309a_rdy_prf120.dgn
USERNAME ####

5/28/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 21 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

# -PEDTR1-

BEGIN GRADE
-PEDTR1- STA. 10+00.00
EL = 309.47'

PI = 10+30.00
EL = 308.36'
K = 16
VC = 50'

PI = 12+50.00
EL = 307.14'
K = 29
VC = 150'

PI = 15+50.00
EL = 290.19'
K = 28
VC = 200'

END GRADE
-PEDTR1- STA. 17+00.00
EL = 292.62'

(-)0.5539%
(-)0.5539%
(-)0.5539%
(+)0.1551%
(+)0.2380%
(+)0.3739%
(+)0.5494%
(+)0.8551%
(+)0.5795%

BEG. RT. DITCH GRADE
PI =12+07.000
EL = 286.85

PI =13+47.780
EL = 288.92

PI =14+97.780
EL = 289.19

PI =15+47.300
EL = 291.38

PI =16+47.778
EL = 291.90

END RT. DITCH GRADE
PI =16+95.000
EL = 290.20

RIGHT DITCH
FOR PLAN VIEW, SEE SHEET NO. 5

340 330 320 310 300 290 280 270 260 250

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00

PI = 16+85.00
EL = 327.26'
K = 18
VC = 200'

PI = 11+00.00
EL = 290.48'
K = 41
VC = 200'

PI = 20+96.57
EL = 306.68'
K = 34
VC = 150'

BEGIN GRADE
-PEDTR2- STA. 10+00.00
EL = 289.11'

END GRADE
-PEDTR2- STA. 22+41.81
EL = 305.85'

(+)1.3775%
(+)6.2867%
(+)6.2867%
(-)5.0000%
(-)5.0000%
(-)0.5754%

BEG. RT. DITCH GRADE
PI =11+36.000
EL = 288.75

END RT. DITCH GRADE
PI =11+75.000
EL = 288.50

# -PEDTR2-

RIGHT DITCH
FOR PLAN VIEW, SEE SHEET NO. 6 & 7

340 330 320 310 300 290 280 270 260 250

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00

MAY-2008 10:47
J:\3309a_rdy_pf121.dgn
USER:RAMSEY
$$$$DGNAME

5/28/99

# -PEDTR3-

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| U-3309A | 22 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BEGIN GRADE
-PEDTR3- STA. 10+00.00
EL = 307.71'

END GRADE
-PEDTR3- STA. 11+81.00
EL = 312.83'

BEGIN GRADE
-PEDTR3- STA. 12+13.02
EL = 313.83'

PI = 12+90.00
EL = 315.15'
VC = 100'

PI = 15+35.00
EL = 321.11'
VC = 180'

PI = 16+60.00
EL = 326.67'
VC = 50'

END GRADE
-PEDTR3- STA. 17+21.77
EL = 329.24'

(+)13.3933%
(-)12.2201%
(+)3.2535%
(+)11.7159%
(-)4.2100%
(+)12.4322%
(-)0.5877%

PI =10+78.370
EL = 307.26

END RT. DITCH GRADE
PI =12+75.000
El = 312.699

BEG. RT. DITCH GRADE
PI =12+30.000
El = 310.80

END RT. DITCH GRADE
PI =11+35.000
El = 308.50

BEG. RT. DITCH GRADE
PI =10+25.000
El = 305.50

RIGHT DITCH
FOR PLAN VIEW, SEE SHEET NO. 4 & 9

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

270 280 290 300 310 320 330 340 350 360 370

MAY-2008 10:47
C:\Projects\U-3309a_rdy_pf122.dgn
$$USERNAME$$

Durham County
T.W. Alexander Drive (SR 2028)
From Cornwallis Road (SR 1121) to west of NC 147
Research Triangle Park
Federal Aid Project No. STP-2028(1)
State Project No. 8.2350701
WBS Element No. 34916
T.I.P. No. U-3309 A

ADMINISTRATIVE ACTION

# CATEGORIAL EXCLUSION

**UNITED STATES DEPARTMENT OF TRANSPORTATION**
**FEDERAL HIGHWAY ADMINISTRATION**
**AND**
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**
**submitted pursuant to 42 U.S.C. 4332(2)(C)**

**APPROVED:**

12/22/04 _____
**Date** for **Gregory J. Thorpe, Ph.D., Environmental Management Director**
Project Development and Environmental Analysis Branch, NCDOT

3/30/05 _____
**Date** **John F. Sullivan III, P. E., Division Administrator**
for Federal Highway Administration

Durham County
T.W. Alexander Drive (SR 2028)
From Cornwallis Road (SR 1121) to west of NC 147
Research Triangle Park
Federal Aid Project No. STP-2028(1)
State Project No. 8.2352701
WBS Element No. 34916
T.I.P. No. U-3309 A

# CATEGORICAL EXCLUSION

March, 2005

Documentation Prepared in the Project Development and Environmental Analysis Branch
By:

Marie L. Sutton
Project Development Engineer

Linwood Stone
Linwood Stone, CPM
Project Development Engineer, Unit Head

Robert P. Hanson, P.E.
Project Development Assistant Manager

# PROJECT COMMITMENTS

Durham County
T.W. Alexander Drive (SR 2028)
From Cornwallis Road (SR 1121) to west of NC 147
Research Triangle Park
Federal Aid Project No. STP-2028(1)
State Project No. 8.2352701
WBS Element No. 34916
T.I.P. No. U-3309 A

**Roadway Design / Traffic Control / Signing / Structures / Division / Resident Engineer's Office**

The existing 8-foot pedestrian/jogging path will be retained along the south side of T.W. Alexander Drive. The cost of replacing the existing pedestrian/jogging path will be covered by NCDOT. The proposed 5-foot paved shoulders with pavement marking and signing will accommodate bicycle traffic. Bicycle safe rails (54" high) will be installed on both sides of the NC 147 bridge.

Existing curb and gutter located at the entrances to the businesses will be replaced at the cost of the NCDOT.

**Traffic Engineering**

The NCDOT Traffic Engineering and Safety Systems Branch will review the project before final design to determine if pedestrian phasing is required. If pedestrian phasing is required, the phases will be added to the signals throughout the project.

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Durham County
T.W. Alexander Drive (SR 2028)
From Cornwallis Road (SR 1121) to west of NC 147
Research Triangle Park
Federal Aid Project No. STP-2028(1)
State Project No. 8.2352701
WBS Element No. 34916
T.I.P. No. U-3309 A

## SUMMARY

### 1. Type of Action

This is a Federal Highway Administration (FHWA) Administrative Action, Categorical Exclusion.

### 2. Description of Action

The North Carolina Department of Transportation (NCDOT), Division of Planning and Environment, proposes to widen T.W. Alexander Drive (SR 2028) to multi-lanes from Cornwallis Road (SR 1121) to west of NC 147 in the Research Triangle Park. This project also includes intersection improvements at Cornwallis Road (SR 1121) and the addition of turn lanes at the NC 147 Interchange. (See Figure 1 for project location). The proposed improvements will improve traffic flow along T.W. Alexander Drive.

This project is included in NCDOT's approved 2004-2010 Transportation Improvement Program (T.I.P). The turn lanes at the NC 147 Interchange were added to the scope of the project to improve traffic flow and relieve congestion without requiring the widening of the NC 147 bridge. The cost of the additional work is $400,000. Right of way acquisition is scheduled to begin in Federal Fiscal Year (FFY) 2006 and construction is scheduled to be let in FFY 2008.

### 3. Alternatives Considered

#### A. Recommended Alternative

It is recommended that T.W. Alexander Drive (SR 2028) be widened to a four-lane divided shoulder section with a 30-foot raised median from Cornwallis Road (SR 1121) to just west of NC 147 in the Research Triangle Park in Durham County. The typical section includes 5-foot paved shoulders within 8-foot usable shoulders. The proposed 5-foot paved shoulders will accommodate bicycle traffic.

#### B. Alternative Modes of Transportation

Several alternatives were considered for the proposed action including the Mass Transit Alternative, Transportation System Management Alternative, No-Build Alternative, and Build Alternative. No alternative mode of transportation is considered to be a practical alternative to this highway project. Mass transit, staggering work hours, car-pooling, and vanpooling are possible ways to reduce

highway congestion; however, these congestion management measures are not within the control of NCDOT and will not serve the purpose and need for the project alone.

**C. Transportation System Management Alternative**

The Transportation System Management (TSM) Alternative includes limited construction activities designed to maximize the efficiency of the present transportation system. TSM measures enhance the operations of a facility, while minimizing capital outlay. These measures can include physical improvements to the roadway network as well as operational improvements.

Although TSM measures will improve traffic safety and operations, they will not eliminate the need for additional capacity on the roadway network. Therefore, TSM techniques are eliminated from further consideration as an alternative to new roadway construction to the existing roadway.

**D. "No Build" Alternative**

The "No Build" alternative was considered during project development. The "no build" alternative presents negative impacts to future traffic operations in the area. Enhanced safety, greater traffic carrying capacity, and improved mobility are needed from a facility that connects the existing radials. For these reasons, the "no build" alternative was rejected.

**4. Environmental Impacts**

The proposed project will provide an overall positive benefit to the Research Triangle Park. The project will improve traffic flow and increase safety by reducing travel times and providing more efficient vehicle operation. The provision of a 5-foot paved shoulder with marking and signage will allow bicyclists to travel along the shoulder of the roadway.

No adverse effects on historic structures and properties, archaeological sites, streams, wetlands, federally protected species, hazardous waste sites, or community cohesion are expected as a result of project construction. Impacts on noise levels and air quality in the project will be insignificant. No High Quality Waters, Outstanding Resource Water, or waters classified as WS-I and WS-II are located within the project limits, or within 1.0 mile of the project study area. There are no major stream crossings found along the project corridor.

**5. Coordination**

During this planning study, comments were requested from the following federal, state and local agencies. Written comments were received from agencies noted with an asterisk (*).

U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
*U.S. Department of the Interior, Fish and Wildlife Service

U.S. Advisory Council on Historic Preservation
U.S. Department of Agriculture
U.S. Environmental Protection Agency
U.S. Department of Health and Human Services
N.C. Department of Environment and Natural Resources
N.C. State Clearinghouse, Department of Administration
*N.C. Department of Cultural Resources, Division of Historical Resources
N.C. Department of Human Resources
N.C. Wildlife Resources Commission
N.C. Department of Public Instruction
*Research Triangle Foundation

**6. Basis for Categorical Exclusion**

On the basis of planning and environmental studies conducted for this project, it was determined the proposed action will not have significant adverse effects upon the human or natural environment. The project has been reviewed by appropriate state and local agencies and no objections have been raised. Therefore, a Federal Categorical Exclusion is applicable for this project.

**Table 1**
**Summary of Impacts**

| Category | Units | Build Alternate |
|---|---|---|
| Length | miles | 1.06 |
| Residential Relocations | total | 0 |
| | minority | 0 |
| Business Relocations | total | 0 |
| | minority | 0 |
| Total Relocations | total | 0 |
| Non-Profit Relocations | total | 0 |
| Potential Hazardous Mat. Sites | each | 0 |
| Wetlands | Acres | 0 |
| Stream Impacts | Linear feet | 150 |
| Protected Species Impacted | Species | 0 |

0 in draft

| | | | |
|---|---|---|---|
| Noise | Impacted properties (residence and bus.) | 1 | |
| Historic Architecture | Properties | 0 | |
| Archaeology | Sites | 0 | |
| Air Quality 1-Hour* | carbon monoxide (ppm) 2025 | 7.9 | Draft |
| Construction Cost | Dollars | $7,900,000 | 6.3M |
| Right of Way Cost | Dollars | $ 500,000 | ✓ |
| Total Cost | Dollars | $8,400,000 | 6.8M |

*ppm = parts per million
National Ambient 1-hour Air Quality Standards: 35 ppm

**7. Additional Information**

The following persons can be contacted for additional information:

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Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, North Carolina 27601
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Raleigh, North Carolina 27611
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Durham County
T.W. Alexander Drive (SR 2028)
From Cornwallis Road (SR 1121) to west of NC 147
Research Triangle Park
Federal Aid Project No. STP-2028(1)
State Project No. 8.2352701
T.I.P. No. U-3309 A
WBS Element 34916.1.1

# I. DESCRIPTION OF THE PROPOSED PROJECT

## A. General Description of Project

The North Carolina Department of Transportation (NCDOT) proposes to widen 1.06 miles of T.W. Alexander Drive (SR 2028) to multi-lanes from Cornwallis Road (SR 1121) to just west of NC 147 in the Research Triangle Park. Improvements at the intersections with Cornwallis and the NC 147 Interchange are also included. (See Figures 1 for project location). The proposed improvements will improve traffic flow along T.W. Alexander Drive.

This project is included in NCDOT's approved 2004 to 2010 Transportation Improvement Program (T.I.P). Right of way acquisition is scheduled to begin in Federal Fiscal Year (FFY) 2006 and construction is scheduled to be let in FFY 2008.

T.I.P. Project Number U-3309 B, an adjacent project, widens T.W. Alexander Drive (SR 2028) to a four-lane divided shoulder section with a 30-foot raised grass median from east of NC 147 (Durham Freeway) to Miami Boulevard (SR 1959) in the Research Triangle Park. This project was let to contract in May 2002 and is scheduled for completion in May 2005.

Cornwallis Road has been widened to accommodate bike lanes from NC 55 to SR 1959 (T.I.P. Project Number E-2913B). This project (U-3309A) will tie-in with matching pavement markings and pavement widths at the T.W. Alexander Drive and Cornwallis Road intersection. A "Moving Ahead" project proposes to add a 3" overlay on Cornwallis Road. The pavement at the intersection with T.W. Alexander Drive will be milled and replaced. This work is scheduled to be complete by December 2005.

## B. Proposed Improvements

### 1. Cross Section

The project proposes to widen T. W. Alexander Drive (SR 2028) to a four-lane divided shoulder section with a 30-foot raised grass median. The typical section includes 5-foot paved shoulders within 8-foot usable shoulders. This cross section includes an additional 1-foot of pavement to each shoulder width to accommodate bicycle traffic. (See figure 3).

2. **Proposed Design Speed and Speed Limit**
The proposed project will have a minimum design speed of 60 miles per hour (mph). The posted speed limit is expected to be 55 mph.

3. **Right of Way**
The existing150-foot right of way will be sufficient for this project. Temporary construction easements, permanent drainage easements, and additional right of way will be required in some areas along the project.

4. **Drainage Structures**
There are no major stream crossings found along the project corridor.

5. **Bicycle Provisions**
The proposed 5-foot paved shoulders on both sides of T.W. Alexander Drive will include pavement marking and signing to accommodate bicycle traffic. The width of the NC 147 bridge is sufficient to carry bicycle traffic across. Bicycle safe rail (54" high) will be provided on both sides of the bridge.

6. **Pedestrian/Jogging Path**
The Research Triangle Foundation has requested the existing 8-foot pedestrian/jogging path be retained along the south side of T.W. Alexander Drive. The cost of replacing the existing pedestrian/jogging path will be covered by NCDOT. The NCDOT Traffic Engineering and Safety Systems Branch will review the project before final design to determine if pedestrian phasing is required. If pedestrian phasing is required, the phases will be added to the signals throughout the project.

7. **Access Control**
No control of access is proposed for this project. The median opening recommendations are based on the NCDOT's Median Crossover Guidelines and the traffic operations analysis of the SR 2028 (T.W. Alexander Drive) corridor. Consideration was given to the availability of alternate access points and traffic circulation in the surrounding roadway network. SR 2028 (T.W. Alexander Drive) connects to the Durham Freeway to the east and Cornwallis Road to the west. Cornwallis Road also has an interchange on the Durham Freeway. This allows access to the Durham Freeway whether or not full-movement median openings are provided.

8. **Intersection Treatment and Type of Control**
All intersections along the proposed project will remain at grade.

9. **Special Permits Required**
It is anticipated that a Nationwide #14 Permit will be sufficient since anticipated impacts to Waters of the U.S. (streams) from the proposed project are less than 300 feet.

**10. Changes in the State Highway System**

No changes in the state highway system are currently anticipated.

**11. Cost Estimates**

The proposed improvements are estimated to cost a total of $8,400,000 including $500,000 for right of acquisition and $7,900,000 for construction.

## II. PURPOSE OF AND NEED FOR THE PROPOSED PROJECT

### A. Purpose of Project

The purpose of this project is to improve the capacity and safety of T.W. Alexander Drive (SR 2028). T.W. Alexander Drive is an important connection in the roadway network at Research Triangle Park. The proposed project will eliminate the "bottleneck" which currently exists between NC 147 (Durham Freeway) and Cornwallis Road (SR 1121) by widening T.W. Alexander Drive to a four-lane, median divided facility. The widening will reduce congestion by separating turning movements from through traffic flow, and by restricting the number and areas of left-turn access points. In addition, the proposed project will improve the traffic carrying capacity of the road and reduce the potential for crashes.

### B. Characteristics of the Existing Facility

**1. Existing Cross Section**

The existing cross section of T.W. Alexander Drive (SR 2028) between NC 147 (Durham Freeway) and Cornwallis Road (SR 1121) is a two-lane, 26-foot facility with 8 to 20 foot shoulders.

**2. Existing Right of Way**

The existing right of way width is 150 feet.

**3. Degree of Roadside Interference**

No roadside interference exists except for the business signage that may need to be relocated or replaced. The existing curb and gutter located at the entrances to the businesses will be replaced at the expense of the NCDOT.

**4. Intersecting Roads and Type of Control**

The following streets intersect T.W. Alexander Drive at grade and are controlled as noted:

| Road | Type of Control |
|---|---|
| Cornwallis Road | Signalized |
| Lilly Driveway | Unsignalized |
| DuPont Driveway | Unsignalized |
| National Driving Center Driveway | Unsignalized |
| Moore Drive | Signalized |

| | |
|---|---|
| NC 147 Southbound Ramps | Signalized |
| NC 147 Northbound Ramps | Signalized |

5. **Speed Limit**
   The Regional Traffic Engineer has stated that the speed limit along this project will be posted at 55-mph. This speed limit is not only to allow continuity, but it is considered the appropriate speed limit based on the design speed of the roadway.

6. **Utilities**
   All major utilities (electric, water, sanitary, sewer, telecommunications, and natural gas) are located on the project and will be accommodated during and after construction of the project. According to NCDOT standards, utility impacts are anticipated to be high.

7. **School Bus Data**
   Two school buses travel this section of T.W. Alexander Drive (SR 2028) twice a day for pass-through purposes.

8. **Railroad Crossing**
   There are no existing or planned railroad crossings within the project limits.

9. **Greenways**
   There are no existing or planned greenways in the project area.

10. **Pedestrian/Jogging Path**
    There is an 8-foot wide asphalt pedestrian/jogging path along the south side of T.W. Alexander Drive in the project area.

**C. Projected Traffic Volumes and Capacity Analysis**

Current Average Daily Traffic (ADT) volume along T.W. Alexander Drive is 15,700 to 14,100 vehicles per day. Truck Traffic is three percent of the total daily traffic.

Design Year 2030 volume is projected to be 33,100 to 31,400 vehicles per day. Truck traffic is three percent of the design year total daily traffic volumes. See Figures 4 A & B for Estimated Average Daily Traffic (ADT) Projections.

Levels of service are used to describe the operating conditions on a street or highway. When traffic volumes approach or exceed the capacity of a roadway or intersection, operating levels of service (LOS) are diminished and congestion results. Simply defined, level of service is a qualitative measure which describes operational conditions of traffic along a roadway or at an intersection of two roadways. Six (6) levels of service are defined from A to F, with LOS A the best and LOS F the worst. Each level of service represents a range of operating conditions.

Mainline Analysis - The results of the arterial analysis indicate that it currently operates at Level-of-Service (LOS) D. The 2030 No Build arterial analysis showed that without the project, SR 2028 (T.W. Alexander Drive) will operate at LOS F overall. With the project and the individual intersection improvements outlined below, SR 2028 (T.W. Alexander Drive) is projected to operate at LOS E, and the overall travel speeds will have increased from the No Build condition.

Intersection Analysis- For free-flowing sections of roadway, level of service is a measure of traffic density and speed. For signalized intersections, level of service is defined in terms of stopped delay. Generally, in suburban areas with traffic signals spaced less than 1.0 mile apart, the traffic carrying capacity of a roadway is determined by the ability of the signalized intersections to accommodate the traffic volumes. The studied section of T.W. Alexander Drive has traffic signals at the intersections with Cornwallis Road, Moore Drive, NC 147 Southbound Ramps and NC 147 Northbound Ramps. The traffic carrying capacity is dependent upon the ability of the intersections to accommodate traffic volumes. See Tables 1 – 3 for the existing and future levels of service for the intersections located within the project area. Figures 5 – 8 show the proposed intersection geometry described below.

- **SR 2028 (T.W. Alexander Drive) and Cornwallis Road** – This intersection is currently signalized. With the existing geometry, this intersection is expected to operate at LOS C in 2003 and LOS F with 161.3 seconds of delay in 2030. It is recommended to provide southbound dual left-turn lanes. Exclusive westbound and northbound right-turn lanes are also recommended at this location. With the recommended geometry, the intersection is expected to operate at LOS F with 107.3 seconds of delay in the 2030 design year.

  In order to achieve a LOS D or better, a grade separation or six through lanes (3 in each direction) for both Cornwallis Road and T.W. Alexander Drive would be needed. These additional improvements are beyond the budget and scope of this project.

- **SR 2028 (T.W. Alexander Drive) and Lilly Driveway** – This intersection is currently unsignalized. With the existing geometry, the eastbound left-turn movement is expected to operate at LOS A, the southbound left-turn movement at LOS F with a queue of three vehicles, and the southbound right-turn movement at LOS C in 2003. In 2030, the eastbound left-turn movement is expected to operate at LOS C, the southbound left-turn movement at LOS F with an indeterminate queue, and the southbound right-turn movement at LOS E. It is recommended that the Lilly Driveway have right-in, right-out access to SR 2028 (T.W. Alexander Drive). With the recommended geometry, the southbound right-turn movement is expected to operate at LOS C in the 2030 design year.

- **SR 2028 (T.W. Alexander Drive) and DuPont Driveway / Tucasi Central Campus Driveway** – This intersection is currently unsignalized. With the existing geometry, the eastbound and westbound left-turn movements are expected to operate

at LOS A, the northbound shared left-through and right-turn movement at LOS E, the southbound shared left-turn and through movement at LOS F with a queue of one vehicle, and the southbound right-turn movement at LOS C in 2003. In 2030, the eastbound and westbound left-turn movements are expected to operate at LOS C, the northbound shared left-, through, and right-turn movement at LOS F with a queue of twelve vehicles, the southbound shared left-turn and through movement at LOS F with a queue of six vehicles, and the southbound right-turn movement at LOS E.

It is recommended that the DuPont Driveway have right-in, right-out access to SR 2028 (T.W. Alexander Drive) and the Tucasi Central Campus Driveway have left-in, right-in, right-out access to SR 2028 (T.W. Alexander Drive). With the recommended geometry, the westbound left-turn and southbound right-turn movements are expected to operate at LOS C, and the northbound right-turn movement is expected to operate at LOS D in the 2030 design year.

- **SR 2028 (T.W. Alexander Drive) and National Driving Center Driveway** – This intersection is currently unsignalized. With the existing geometry, the shared eastbound left-through movement is expected to operate at LOS B, the southbound left-turn movement at LOS F with a queue of sixteen vehicles, and the southbound right-turn at LOS C in 2003. In 2030, the shared eastbound left-through movement and the southbound left – and right-turn movements are expected to operate at LOS F with indeterminate queues. It is recommended that National Driving Center Driveway have a full-movement median opening on SR 2028 (T.W. Alexander Drive). With the recommended geometry, the eastbound left-turn movement is expected to operate at LOS C, the southbound left-turn movement at LOS F with a queue of fourteen vehicles, and the southbound right-turn movement is expected to operate at LOS B in the 2030 design year. It is not unusual to have left-turns from the side streets operating at LOS F. The southbound left-turn movement's small que during the peak hour contributes to the LOS F.

- **SR 2028 (T.W. Alexander Drive) and Moore Drive** – This intersection is currently signalized. The intersection is expected to operate at LOS C in 2003 and in 2030. It is recommended to provide an exclusive westbound right-turn lane at this location. With this recommended geometry, the intersection is expected to operate at LOS C in the 2030 design year.

- **SR 2028 (T.W. Alexander Drive) and NC 147 Southbound Ramps** – This intersection is currently signalized. The intersection is expected to operate at LOS C in 2003 and LOS F with 91.0 seconds of delay in 2030. It is recommended to provide dual southbound left-turn lanes and a freeflow right-turn lane at this location. The freeflow right-turn lane will require a third through lane on SR 2028 (T.W. Alexander Drive) to receive it. The third lane can be dropped as a right-turn lane at Moore Drive. With this recommended geometry, the intersection is expected to operate at LOS D in the 2030 design year.

- **SR 2028 (T.W. Alexander Drive) and NC 147 Northbound Ramps** – This intersection is currently signalized. The intersection is expected to operate at LOS B in 2003 and LOS E in 2030. It is recommended to provide dual northbound left-turn lanes and a freeflow northbound right-turn lane at this location. With the recommended geometry, the intersection is expected to operate at LOS C in the 2030 design year.

**Table 1 – Existing Unsignalized Intersections**

| Intersection | Approach/ Movement | 2003 Existing LOS | 2030 No Build LOS |
|---|---|---|---|
| SR 2028 (T.W. Alexander Drive) and Lilly Driveway | EB L | A | C |
| | SB L | F | F |
| | SB R | C | E |
| SR 2028 (T.W. Alexander Drive) and DuPont Driveway / Tucasi Central Campus Driveway | EB L | A | C |
| | WB L | A | C |
| | NB LTR | E | F |
| | SB LT | F | F |
| | SB R | C | E |
| SR 2028 (T.W. Alexander Drive) and National Driving Center Driveway | EB LT | B | F |
| | SB L | F | F |
| | SB R | C | F |

**Table 2 – Improved Unsignalized Intersections**

| Intersection | Approach/ Movement | 2030 Build LOS |
|---|---|---|
| SR 2028 (T.W. Alexander Drive) and Lilly Driveway | SB R | C |
| SR 2028 (T.W. Alexander Drive) and DuPont Driveway/ Tucasi Central Campus Driveway | WB L | C |
| | SB R | C |
| | NB R | D |
| SR 2028 (T.W. Alexander Drive) and National Driving Center Driveway | EB L | C |
| | SB L | F |
| | SB R | B |

**Table 3 – Signalized Intersections**

| Intersection | 2003 Existing LOS | 2030 No Build LOS | 2030 Build LOS |
|---|---|---|---|
| SR 2028 (T.W. Alexander Drive) and Cornwallis Road | C | F | F |
| SR 2028 (T.W. Alexander Drive) and Moore Drive | C | C | C |
| SR 2028 (T.W. Alexander Drive) and NC 147 Southbound Ramps | C | F | D |
| SR 2028 (T.W. Alexander Drive) and NC 147 Northbound Ramps | B | E | C |

**D. Safety**

Existing T.W. Alexander has a greater fatal and non-fatal injury accident rate than the statewide average. The NC 147 ramp intersections account for 57% of the total crashes. 76% of the total crashes occurred at the two main intersections: SR 2028 at NC 147 and SR 2028 at Cornwallis Road. Table 4 provides a summary of the types of accidents in the project area. Table 5 shows the number of accidents in the project area and the corresponding statewide averages for similar roads.

The number of accidents is expected to increase as project area roads become more congested. Left-turns are a safety concern because slow moving or stopped vehicles are vulnerable to rear-end collisions. Left-turn and rear-end accidents are the most common type of accident in the project area.

**Table 4 Accident Type Summary**

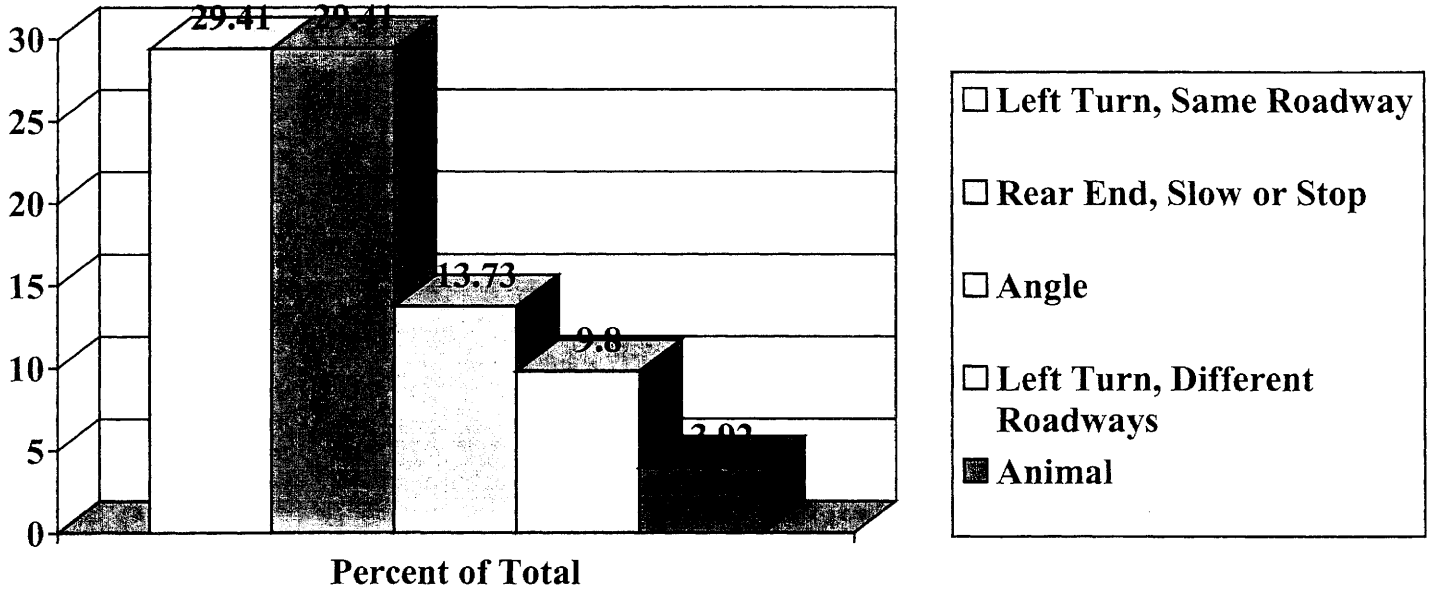



**Table 5**
**Comparison of Accident Rates with Statewide Averages**
**(Per 100 Million Vehicle Miles)**

| Accident Category | T.W. Alexander Drive (SR 2028) | Statewide Rate* |
|---|---|---|
| Total Accident Rate | 384.89 | 407.28 |
| Fatal Accident Rate | 7.55 | 1.17 |
| Non-fatal Injury Accident Rate | 135.84 | 131.79 |
| Night Accident Rate | 90.56 | 91.95 |
| Wet Accident Rate | 45.28 | 71.95 |

** 2001-2003 Statewide Crash rate for 2-Lane Undivided Urban Secondary Route*

**E. Thoroughfare Plan and Route Function**

T.W. Alexander Drive is classified as a collector on the Statewide Functional Classification System and a major thoroughfare on the Durham-Chapel Hill-Carrboro Urban Area Thoroughfare Plan (See Figure 9). This route provides access from both NC 147 and US 70 to industries located in the Research Triangle Park. Inside Research Triangle Park, T.W. Alexander Drive collects traffic from Cornwallis Road (SR 1121), NC 147, and Miami Boulevard (SR 1959). The proposed improvements will improve the level of service (LOS) along this section of T.W. Alexander Drive and is consistent with the thoroughfare plan.

## III. PROJECT ALTERNATIVES

**A. Recommended Alternative**

It is recommended that T.W. Alexander Drive (SR 2028) be widened to a four-lane divided shoulder facility with a thirty-foot raised grass median, from NC 147 (Durham Freeway) to Cornwallis Rd. (SR 1121) in the Research Triangle Park. The typical cross section includes 5-foot paved shoulders within 8-foot useable shoulders. An additional 1-foot of pavement has been added to each shoulder to accommodate bicycle traffic. There were no additional build alternatives considered. U-3309A was designed with the same typical section as U-3309B to provide continuity along T.W. Alexander Drive.

The proposed widening is not symmetrical to the existing roadway, instead it follows the existing right of way. The proposed alignment is much simpler using a single curve where the existing pavement meanders through the right of way.

Improvements to the intersection of Cornwallis Road include adding additional turn lanes and increasing storage length. Additional turn lanes are proposed for northbound and southbound NC 147 interchange off ramps.

In addition to bicycle accommodations, the project proposes to replace the existing off-road, pedestrian/jogging path, which is located on the north side of T.W. Alexander Drive from NC 147 (Durham Freeway) to Moore Dr. and on the south side of T.W. Alexander Drive from Moore Dr. to Cornwallis Rd. (SR 1121). The cost of replacing the existing pedestrian/jogging path will be covered by NCDOT.

The estimated cost of the project is $8,400,000, which includes $500,000 for right of way and $7,900,000 for construction. Right of way acquisition is scheduled to begin in the Federal Fiscal Year (FFY) 2006 and construction is to begin in the Federal Fiscal Year (FFY) 2008.

**B. Alternative Modes of Transportation**

No alternative mode of transportation is considered to be a practical alternative to this highway project. Mass transit, staggering work hours, car-pooling, and van-pooling are possible ways to reduce highway congestion: however, these congestion management

measures will not provide the capacity and safety improvements needed for T.W. Alexander Drive.

**C. Transportation System Management Alternative**

The Transportation System Management (TSM) Alternative includes limited construction activities designed to maximize the efficiency of the present transportation system. TSM measures enhance the operations of a facility, while minimizing capital outlay. These measures can include physical improvements to the roadway network as well as operational improvements.

Potential TSM options within the study area that have not been considered in previously discussed alternatives include optimizing traffic signal phases and coordinating signal operations. Projected traffic volumes for this area exceed the capacity of existing roadways. Generally if traffic volumes exceed the capacity of the roadways, minor improvements to signal phases or optimization of signal timings will not improve the level of service.

Although TSM measures will improve traffic safety and operations, they will not eliminate the need for additional capacity on the roadway network. Therefore, TSM techniques are eliminated from further consideration as an alternative to new roadway construction to the existing roadway.

**D. No-Build Alternative**

The no-build alternative was considered during project development. The no-build alternative would have negative impacts to future traffic operations in the area. Enhanced safety, greater traffic carrying capacity, and improved mobility are needed for this important corridor. For these reasons, the no-build alternative was rejected.

## IV. SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPACTS

**A. Land Use**

**1. Existing Land Use Plans**

Durham County has an approved Durham County Land Use Plan and has planning and zoning jurisdiction along TIP U-3309A.

Land use within the demographic area is predominantly Business Park, with some scattered commercial and residential uses outside of the Research Triangle Park. Most of the area along the corridor is developed although a few vacant spaces are available. The Durham 2020 Comprehensive Plan calls for managing growth by only allowing extension of water and sewer lines within the Urban Growth Area. The Research Triangle Park falls within the Urban Growth Area. According to a representative from the Research Triangle Foundation, built-upon area in RTP is controlled through zoning. TIP U-3309A is consistent with the plans laid out for

Durham County in the 2020 plan as well as the Triangle Township Plan and will provide for an improved flow of traffic within this area. All of the Research Triangle Park is zoned for research applications and those areas to the west of RTP are mainly zoned for industrial and commercial with some multi-family residential facilities.

**2. Future Land Use Changes**

County planners expect no changes in land use or zoning classifications in the project area and no large projects are pending or planned within the demographic area.

## B. Farmland

North Carolina Executive Order Number 96, *Preservation of Prime Agricultural and Forest Lands,* requires all state agencies to consider the impact of land acquisition and construction projects on prime farmland soils, as designated by the U.S. Natural Resources Conservation Service (NRCS). These soils are based on criteria such as crop yield and level of input of economic resources.

The Farmland Protection Policy Act (FPPA) is designed to minimize the degree to which federally sponsored programs contribute to the "unnecessary and irreversible conversion of farmland to non-agricultural uses," and ensure that these programs are consistent with state, local, and private programs to protect farmland.

There are no active farming operations in the TIP project area. Given that the TIP project is located in a fairly developed area, and no agricultural uses exist along the corridor, there are no impacts to prime farmland resulting from TIP U-3309A.

## C. Social Effects

**1. Community/Neighborhood Characteristics**

The project is located within the Research Triangle Park and there are no residences located within the project limits. The widening of T.W. Alexander Drive should not split, disrupt, or isolate the existing Research Triangle Park Community. The project will temporarily disrupt areas around the pedestrian/jogging path south of the road. According to RTP personnel, most business people drive rather than walk to meetings. The pedestrian/jogging trails are mainly used for exercise and recreation.

**2. Public and Private Facilities**

**a. Schools, Libraries, Post Offices, Churches, Etc.**

There are a few public facilities within the demographic area. No public facilities are located along the project corridor, but there is a small cemetery located just southeast of the intersection of T.W. Alexander Drive and Cornwallis Road. There is a daycare center located within the GlaxoSmithKline building just south of So-Hi Drive.

**b. Police, Fire, Emergency Services**

While police, fire and emergency services are available within a two-mile radius of any point on the project, no such facilities are located along this section of T.W. Alexander Drive.

**3. Demographics**

The Research Triangle Park is a large research office park and is a major employment center with over 43,000 employees that work for more than 130 companies. The services and manufacturing industries added the most jobs in Durham County between 1990 and 2000.

**4. Relocation Impacts**

No residential or business relocations will be required.

**5. Environmental Justice**

No businesses or residences are being relocated as a result of the project. Therefore, the project should not have a disproportionately high or adverse effect on minority or low-income populations.

**6. Indirect and Cumulative Impacts**

Completion of the project is not expected to encourage any particular development and most of the area is already developed. The project may, however, indirectly encourage secondary development. By relieving traffic congestion along T.W. Alexander Drive, the project may improve the quality of life for local workers who use the road to reach nearby places of employment. By possibly indirectly encouraging additional office development in the north part of the Research Triangle Park, the project may contribute to the continued economic stability of Durham County. The project should have no impact on neighborhood or community areas.

**7. Cultural Resources**

**a. Architectural / Archaeological Resources**

This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, implemented by the Advisory Council on Historic Preservation's for Compliance with Section 106, codified as CFR Part 800. It is also subject to compliance with Section 4(f) of the Department of Transportation Act of 1966, as amended.

Pursuant to 36 CFR Part 800.4, the North Carolina State Historic Preservation Office (HPO) was consulted prior to the scoping meeting for this project, and they recommended neither an architectural survey nor an archaeological survey be conducted. A copy of HPO's letter is located in the Appendix.

Since there are no properties either listed in or eligible for listing in the National Register of Historic Places in the area of potential effects, no further compliance with Section 106 of the National Register Act of 1966 is required.

**b. Section 4(f) Resources**

Section 4(f) of the Department of Transportation Act of 1966 (49 USC 303) protects the use and function of publicly owned parks, recreation area, wildlife/waterfowl refuges, and historic properties. A transportation project can only

use land from a Section 4(f) resource when there are no other feasible or prudent alternatives and when the project includes all possible planning to minimize harm to the resource.

There are no Section 4(f) resources in the project area; therefore, Section 4(f) of the Department of Transportation Act of 1966 (49 USC 303) as amended does not apply.

## D. Economic Effects

### 1. Incomes

TIP U-3309A should not inhibit development opportunities adjacent to T. W. Alexander Drive or within the demographic area. No new access to land will be created as a result of the project. Development opportunities could potentially be enhanced by less congestion along T. W. Alexander Drive, making the area more attractive to businesses.

Construction will temporarily cause increased congestion along T. W. Alexander Drive until the project is finished. As long as access is maintained to all businesses it should not affect their economic viability. The businesses along T.W. Alexander Drive are not commercial in nature, and, thus, they do not rely on drive-by customer traffic.

There will be no visibility impacts from TIP U-3309A because businesses along the project have limited visibility of the road.

Tax base and property values should not be affected by TIP U-3309A because of the large existing setbacks for the buildings. Property values should not be greatly increased because the project does not provide new access to land, and, therefore, it is just fulfilling a need to relieve existing congestion.

### 2. Development Potential

Because TIP U-3309A is a widening project on existing location, no new access to property will be created. Most of the area along T. W. Alexander Drive is already developed except for two areas to the south that have driveway access off of T. W. Alexander Drive and two privately owned properties to the north. One of the owners, GlaxoSmithKline, already has a building on the site and has no current plans for the remaining portion. The other owner, Craig Davis Properties, also has no current plans for development and their property also has access off Cornwallis Road. Therefore, the potential for induced growth directly along the project is limited. There are more vacant parcels within the demographic area, but the influence of the road widening is much more limited since it is just allowing for reduced traffic congestion and not for new access.

## E. Environmental Effects

### 1. Methodology

Research was conducted prior to field investigations. Information sources used in this pre-field investigation of the study area include: U.S. Geological survey (USGS) quadrangle map (Durham, NC, 1981), Natural Resource Conservation Service soils

information for Durham County (USDA 1977), and NCDOT aerial photography (1:100) of the project area. Water resource information was obtained from publications of the North Carolina Department of Environment and Natural Resources, Division of Water Quality (NCDENR-DWQ 2000a) and from the NC Center for Geographic Systems database (July 2001). Information concerning the occurrence of federal and state protected species in the study area was gathered from the U.S. Fish and Wildlife Service (USFWS) list of protected species and federal species of concern, as well as from the N.C. Natural Heritage Program (NCNHP) database of rare species and unique habitats (Amoroso 2002, LeGrand and Hall 2001).

A study corridor of 150 feet equal to the proposed right of way was chosen for the natural resources investigation. General field surveys were conducted along the proposed study corridor by NCDOT biologists on March 28, 2003. A follow up survey for federally protected plant species was conducted on June 9, 2003. The project site was visited on June 17, 2004 to survey the area that included the improvements to the NC 147 Interchange. Plant communities and their associated wildlife were identified and recorded. Wildlife identification involved using one or more of the following observation techniques: active searching and capture, visual observations (binoculars), and identifying characteristic signs of wildlife (sounds, scat, tracks, nests, and burrows). Impacts to biotic communities, wetland, and stream are based on this 150-foot right of way limit.

Jurisdictional wetland determinations were performed using delineation criteria described in the "Corps of Engineers Wetland Delineation Manual" (Environmental Laboratory, 1987) and rated using the "Guidance for Rating the Values of Wetlands in North Carolina" (Division of Environmental Management 1995). Jurisdictional surface water determinations were performed using guidance provided by the N.C. Division of Water Quality [(DWQ), formerly known as the Division of Environmental Management (DEM)], "Field Location of Streams, Ditches, and Ponding" (NCDENR-DWQ 1997) and DWQ Stream Classification Form (NCDENR-DWQ 1999a).

## 2. Physical Resources

### a. Geogological Resources

#### 1.) Regional Characteristics

The project study area lies within the Piedmont Physiographic Province. The topography in this section of Durham County is characterized by gently rolling hills that are dissected by fairly wide flood plains. The proposed project is approximately 300 feet above mean sea level. The county is drained by tributaries of the Cape Fear River to the southwest and the Neuse River to the northeast. The City of Durham lies immediately to the north of the project area. The study area within the proposed right of way is partially developed; industrial, as well as commercial, with several large forested areas. The physical resources located within the project area directly influence the composition and distribution of a biotic community's flora and fauna.

**2.) Soils**

The southeastern portion of Durham County is underlain primarily with soils in the White Store-Creedmoor Association. This association is comprised of moderately well drained soils that have a subsoil of dominantly firm and very firm clay. There are two soil types located in the project area. Each soil type is arranged in order of representation within the project study area.

- Cartecay and Chewacla (Cc)
- White Store sandy loam 10 to 25 percent slopes (WsE)

**b. Water Resources**

This section contains information concerning those water resources likely to be impacted within the project study area. Water resources information encompasses physical aspects of the resource; its relationship to major water systems, Best Usage Standards and water quality of the resources. Probable impacts to these water bodies are also discussed, as are means to minimize these impacts.

**1.) Waters Impacted and Characteristics**

The project study area is located within subbasin 03-06-05, Hydrologic Unit 03030002 of the Cape Fear River Basin, the largest river basin in the state of North Carolina. This river basin covers 9,149 square miles and 27 counties (NCDENR-DWQ 2000a).

One perennial stream, an Unnamed tributary (UT) to Northeast Creek, is located north of T.W. Alexander Drive and runs parallel to the proposed right of way for approximately 3,000 feet. There are no anticipated impacts to this stream because it is located immediately outside of the proposed right of way. The UT is a perennial stream that begins approximately 1.5 miles northeast of the project area near SR 1945, and flows southwest. This stream flows into two man made ponds near the intersection of T.W. Alexander Drive and Cornwallis Road. The stream then flows into Northeast Creek approximately 1 mile downstream of the project area. The substrate of the stream is composed of sand, clay, bedrock, cobbles and pebbles. The stream was approximately 5 feet wide, varied in depth from 6 inches to 2 feet, had a moderate to slow flow and had good water clarity.

One intermittent channel (IC) is located in the project corridor. The IC crosses under T.W. Alexander Drive approximately 0.25 mile from the intersection T.W. Alexander Drive and Cornwallis Road. After flowing under the road the channel flows into a man made pond. The stream is approximately 1-2 feet wide, had a depth of ½ to 1 foot, had a moderate flow and had moderate clarity.

There are several roadside drainage ditches in the project area and three natural ephemeral channels that cross under the road. At the time of the site visit, standing water was observed in most of these channels.

**2.) Clean Water Act Section 303(d) Streams**

The DWQ has assembled a list of impaired waterbodies according to the Clean Water Act Section 303(d) and 40 CFR 130.7, referred to as the NC 2000 Section 303(d) list. The portion of UT in the project area is not included on the list of 303(d) impaired streams.

**3.) Best Usage Classifications**

Streams have been assigned a best usage classification by the DWQ, which reflects water quality conditions and potential resource usage. Unnamed tributaries receive the same classification as the streams to which they flow. Northeast Creek is classified as **C NSW** at the confluence with the UT. Class **C** refers to waters suitable for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. **NSW** waters are nutrient sensitive waters and receive this supplemental classification because they are in need of additional nutrient management due to excessive growth of microscopic or macroscopic vegetation. In general, management strategies for point and nonpoint source pollution control require there be no increase in nutrients over background levels. No waters classified as Outstanding Resource Waters (ORW), High Quality Waters (HQW) or Water Supplies (WS-I, undeveloped watersheds, or WS-II, predominantly undeveloped watersheds) occur within one mile of the project study area.

**4.) Summary of Anticipated Impacts to Water-Resources**

In order to minimize potential impacts to water resources in the project area, NCDOT's Best Management Practices for the Protection of Surface Waters will be strictly enforced during the construction phase of the project.

**3. Biotic Resources**

Biotic resources located in the project area include terrestrial and aquatic communities. This section describes the communities encountered and the relationships between fauna and flora found within these communities. The composition and distribution of biotic communities throughout the project area are reflective of the topography, hydrologic influences, and the project area's past and present land uses. Descriptions of the terrestrial systems are presented in the context of plant community classifications and follow those presented by Schafale and Weakly (1990) where possible. The dominant flora and fauna observed, or likely to occur, in each community are described and discussed.

Scientific nomenclature and the common names (when applicable) are provided for each described animal and plant species. The plant taxonomy generally follows Radford et al (1968). Animal taxonomy follows Lee et al (1982), Martof et al (1980), Potter et al (1980), and Webster et al (1985). All subsequent references to the same organism will include the common name only. Fauna that is observed during the site visit is denoted with an asterisk (*). Scat evidence or tracks equate to observation of the species. Published range

distributions and habitat analysis are used in estimating fauna expected to be present within the project area.

**a. Terrestrial Communities**

Two terrestrial communities are located in the project study area: Pine Hardwood Forest and maintained/disturbed land. Land use defines community boundaries within the study area.

**Pine Hardwood Forest**

The pine hardwood forest is located on both sides of T.W. Alexander Drive throughout the project corridor. Dominant canopy vegetation observed includes loblolly pine (*Pinus taeda*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), red maple (*Acer rubrum*), white oak (*Quercus alba), and* yellow poplar (*Liriodendron tulipifera*). Shrub/saplings and woody vine species found include those species found in the upper canopy as well as eastern red cedar (*Juniperus virginiana*), American holly (*Ilex opaca*), sourwood (*Oxydendrum arboreum*), giant cane (*Arundinaria gigantia*), and poison ivy (*Toxicodendron radicans*).

**Maintained Roadside**

The maintained/disturbed community consists of three distinct habitats; roadside vegetation, cleared maintained lots, and the landscaped areas along the roadside. All of these communities are maintained via regular mowing and other landscaping activities. Roadside and cleared lot vegetation consists of grass (*Festuca* sp.), dandelion (*Taraxacum officinale*), clover (*Trifolium* sp.), and broomsedge (*Andropogon virginicus*). The landscaped areas includes planted winged elm (*Ulmus alata*) southern magnolia (*Magnolia grandifolia*), redbud (*Cercis canadensis*), and American beech, (*Fagus grandifolia*).

**b.) Wildlife**

Many faunal species are highly adaptive and may populate or exploit the entire range of biotic communities discussed. Generally, the community boundaries are abrupt with little transitional area between them. The forested tracts and drainageways provide habitat for species requiring a forest community, and provide shelter and movement corridors for other wildlife species within the project vicinity.

Mammals that commonly exploit habitats found within the project area consist of the white-tailed deer* (*Odocoileus virginianus*), Virginia opossum (*Didelphis virginiana*), gray squirrel* (*Sciurus carolinensis*), striped skunk (*Mephitis mephitis*), Northern raccoon* (*Procyon lotor*), and eastern cottontail (*Sylvilagus floridanus*).

Forests and forest edge habitats located in the project area also provide opportunities for foraging and shelter for avian species such as the Canada goose* (*Branta canadensis*), mallard* (*Anas platyrhynchos*), Carolina chickadee (*Parus*

*carolinensis*), northern cardinal (*Cardinalis cardinalis*), blue jay (*Cyanocitta cristata*), common crow (*Corvus brachyrhynchos*), white-throated sparrow (*Zonotrichia albicollis*), American goldfinch (*Carduelis tristis*), dark-eyed junco (*Junco hyemalis*), downy woodpecker (*Picoides pubescens*), Carolina wren (*Thryothorus ludovicianus*), tufted titmouse (*Parus bicolor*), northern mockingbird (*Mimus polygottos*), and mourning dove (*Zenaida macroura*).

A variety of reptiles and amphibians may also be expected to utilize the terrestrial communities within the project area. These animals include the northern water snake* (*Nerodia sipedon sipedon*), copperhead (*Agkistrodon contortrix*), black rat snake (*Elaphe constrictor*), eastern garter snake (*Thamnophis sirtalis*), eastern box turtle (*Terrapene carolina*), ground skink (*Scincella lateralis*), and eastern fence lizard (*Sceloporus undulatus*).

**c.) Aquatic Community**

This community is contained within Northeast Creek. Aquatic insects typically found in this type of community include the water strider (*Gerris* sp.), crane fly (*Tipula* sp.), stream mayfly (Ephemeroptera).

**d.) Summary of Anticipated Impacts to Biotic Communities**

Construction related activities in or near the previously described resources have the potential to impact biological functions. This section quantifies and qualifies impacts to the natural resources in terms of area impacted and ecosystems effected. Temporary and permanent impacts are also considered.

Some of the plant communities found along the proposed project area serve as nesting and sheltering habitat for wildlife. Project construction will reduce habitat for faunal species, thereby diminishing faunal numbers. In addition, habitat fragmentation and reduction will concentrate wildlife into smaller areas of refuge, thus causing some species to become more susceptible to stresses; namely, predation, disease, and starvation.

Areas modified by construction (non-paved) will become road shoulders and early successional habitat. Increased traffic noise and reduced habitat will displace some wildlife further from the roadway while attracting other wildlife by creating more early successional habitat. Animals temporarily displaced by construction activities may repopulate areas suitable for the species. This temporary displacement of animals will result in an increase of competition for the remaining resources.

The calculated impacts to biotic resources reflect the relative abundance of each community present within the study area. Project construction will result in clearing and degradation of portions of these communities. Table 6 summarizes potential losses to these biotic communities resulting from project construction. Estimated impacts are derived using the proposed 150-foot right of way on the

proposed alignment. Since the entire right of way will probably not be impacted, actual impacts may be considerably less than indicated.

**Table 6. Anticipated Biotic Community Impacts**

| Community | Impacts (acres) |
|---|---|
| Pine Hardwood Forest | 4 |
| Maintained Roadside | 6.5 |
| **Totals** | **10.5** |

## 4. Jurisdictional Topics

This section provides descriptions, inventories, and impact analyses pertinent to two important issues, Waters of the United States and Rare and Protected Species.

### a. Waters of the United States

Surface waters and wetlands fall under the broad category of "Waters of the United States" (Waters of the U.S.), as defined in Section 33 of the Code of Federal Register (CFR) Part 328.3. Any action that proposes to dredge or place fill material into surface waters or wetlands falls under the jurisdiction of the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (33 U.S.C. 1344). Surface waters include all standing or flowing waters which have commercial or recreational value to the public.

#### 1.) Characteristics of Wetlands and Surface Waters

Potential wetland communities were investigated following the 1987 "Corps of Engineers Wetland Delineation Manual". The three parameter approach is used where hydric soils, hydrophytic vegetation, and hydrology must all be present for an area to be considered a wetland. **There are no wetlands in the project area.**

The unnamed tributary to Northeast Creek is outside of the proposed right of way. There is one intermittent channel that passes under the road. This stream was verified by the USACE on June 9, 2003. Mitigation will not be required for impacts to this stream. There are three ephemeral channels within the proposed right of way.

#### 2.) Summary of Anticipated Jurisdictional Impacts

Impacts to jurisdictional surface waters are calculated based on the linear feet of jurisdictional surface waters that are located within the 150-foot proposed right-of-way. The proposed road will cross one intermittent channel and three ephemeral channels on a tangent within the proposed project. Anticipated impacts to the intermittent channel are estimated to be 150 ft. However since the entire right of way will probably not be used actual impacts may be less.

**3.) Permits**

Factors that determine Clean Water Act Section 404 Nationwide Permit (NWP) applicability include hydrology, juxtaposition with a major resource, whether the impacts occur as part of the widening of an existing facility, or as the result of new location construction. Although an individual site may qualify under NWP authorizations, overall, cumulative impacts from a single and complete project may require authorization under an Individual Permit (IP). Under current USACE regulations, a project that has jurisdictional stream impacts of less than 300 feet at each site and one half of an acre of wetland impacts will qualify for a NWP 14. Otherwise, an IP will be required. A DWQ Clean Water Act Section 401 Water Quality Certification (WQC) is required prior to issuance of a Section 404 permit.

It is anticipated that a NWP 14 will be sufficient since anticipated impacts to Waters of the U.S. from the proposed project are less then 300 feet.

**4.) Mitigation**

The USCE has adopted, through the Council on Environmental Quality (CEQ) a wetland mitigation policy which 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 Waters of the U.S., specifically wetlands. Mitigation of wetland 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). Each of these three aspects (avoidance, minimization, and compensatory mitigation) must be considered sequentially.

**a.) Avoidance**

Avoidance examines all appropriate and practicable possibilities of averting impacts to Waters of the U.S. According to a 1990 Memorandum of Agreement between the Environmental Protection Agency (EPA) and the USACE, in determining "appropriate and practicable" measures to offset unavoidable impacts, such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes. Under the current design, the proposed alignment parallels South Buffalo Creek, but does not encroach upon it; successfully avoiding direct impacts to the stream.

**b.) Minimization**

Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts to Waters of the U.S. Implementation of these steps will be required through project modifications and permit conditions. Minimization typically focuses on decreasing the proposed project footprint through the reduction of median widths, right of way widths, fill slopes, and/or road shoulder widths. Other practical minimization mechanisms include: strict enforcement of sedimentation control BMP's for the protection of surface waters during the entire life of the project, reduction of clearing and grubbing activity, reduction/elimination of direct discharge into streams, reduction of runoff

velocity, re-establishment of vegetation on exposed areas, judicious pesticide and herbicide usage, minimization of "in-stream" activity, and litter/debris control.

**c.) Compensatory Mitigation**

Compensatory mitigation is not normally considered until anticipated impacts to Waters of the U.S. have been avoided and minimized to the maximum extend possible. It is recognized that "no net loss of wetlands" functions and values may not be achieved in every permit action. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts that remain after all appropriate and practicable minimization has been required. Compensatory actions often include restoration, creation, and enhancement of Waters of the U.S. Such actions should be undertaken in areas adjacent to or contiguous to the discharge site. No mitigation will be required for impacts to the intermittent channel.

**b. Rare and Protected Species**

Some populations of fauna and flora have been in, or are in, the process of decline due to either natural forces or their inability to coexist with human activities. Federal law (under the provisions of the Endangered Species Act of 1973, as amended) requires that any action, likely to adversely affect a species classified as federally protected, be subject to review by the USFWS. Other species may receive additional protection under separate state laws.

**1) Federally Protected Species**

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under provisions of Sections 7 and 9 of the Endangered Species Act of 1973, as amended. As of January 29, 2003, the FWS lists the following federally-protected species for Durham County (Table 7). A brief description of each species' characteristics and habitat follows.

**Table 7. Federally-Protected Species for Durham County**

| Scientific Name | Common Name | Status |
|---|---|---|
| *Haliaeetus leucocephalus* | bald eagle | Threatened[1] (Proposed for Delisting) |
| *Echinacea laevigata* | smooth coneflower | Endangered[2] |
| *Rhus michauxii* | Michaux's sumac | Endangered |

[1] Threatened species are species that are likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

[2] Endangered is defined as a species that is threatened with extinction throughout all or a significant portion of its range.

Bald Eagle (*Haliaeetus leucocephalus*)**Threatened, proposed for delisting**
Distribution in N.C.: Anson, Beaufort, Brunswick, Carteret, Chatham, Chowan, Craven, Dare, Durham, Granville, Guilford, Hyde, Montgomery, New Hanover, Northhampton, Periquimans, Richmond, Stanley, Vance, Wake, Washington.

Eagle nests are found in close proximity to water (within a half mile) with a clear flight path to the water, in the largest living tree in an area, and having an open view of the surrounding land. Human disturbance can cause an eagle to abandon otherwise suitable habitat.

**BIOLOGICAL CONCLUSION** **NO EFFECT**

No suitable habitat for the bald eagle in the form of open water is within or near the project area. The trees occupying the canopy of the alluvial forest are fairly uniform in height and very dense. Additionally, the NC Natural Heritage Program data base of rare species and unique habitats has no record for the presence of the bald eagle within the project vicinity. Therefore, project construction will not affect the bald eagle.

Smooth coneflower *(Echinacea laevigata)* **Endangered**
Distribution in N.C.: Durham and Granville Counties
Flowers Present: June - early July

Smooth coneflower is a perennial herb that grows from simple or branched rhizomes. This herb has a smooth stem and few leaves. The basal leaves are the largest, and these leaves are smooth to slightly rough, tapered to the base and elliptical to broadly lanceolate. Mid-stem leaves have short or no petioles and are smaller than the basal leaves. Flowers are light pink to purplish in color and solitary. The petal-like rays usually droop. Fruits are gray-brown, oblong-prismatic and four-angled.

Habitat for the smooth coneflower is found in areas of meadows, open woodlands, glades, cedar barrens, roadsides, power line rights-of-way, clearcuts, and dry limestone bluffs. Plants usually grow in soil derived from calcareous parent material. North Carolina populations are found in soils derived from Diabase, a circumneutral igneous rock. Optimal sites are in areas with abundant sunlight and little competition from other herbaceous plants.

**BIOLOGICAL CONCLUSION** **NO EFFECT**

The maintained grassed road sides offers potential habitat for smooth coneflower within the project area. A survey for smooth coneflower was conducted on June 9, 2003 and no specimens of coneflower were observed. The NC Natural Heritage Program data base of rare species and unique habitats contains no record for the presence of smooth coneflower within the project vicinity.

Michaux's sumac (*Rhus michauxii*) **Endangered**
Family: Anacardiaceae
Federally Listed: 9/28/89
Distribution in N.C.: Richmond, Hoke, Moore, Scotland, Franklin, Davie, Robeson, and Wake Counties.
Flowers Present: June

Michaux's sumac is a densely pubescent rhizomatous shrub. The bases of the leaves are rounded and their edges are simply or doubly serrate. The flowers of Michaux's sumac are greenish to white in color. Fruits, which develop from August to September on female plants, are a red densely short-pubescent drupe.

This plant occurs in rocky or sandy open woods. Michaux's sumac is dependent on some sort of disturbance to maintain the openness of its habitat. It usually grows in association with basic soils and occurs on sand or sandy loams. Michaux's sumac grows only in open habitat where it can get full sunlight. Michaux's sumac does not compete well with other species, such as Japanese honeysuckle, with which it is often associated.

**BIOLOGICAL CONCLUSION** **NO EFFECT**

Potential habitat for Michaux's sumac is present within the roadsides of the project area. A survey for Michaux's sumac was conducted on June 9, 2003. Specimens of winged sumac (*Rhus copallina*) were observed throughout the corridor, however no specimens of Michaux's Sumac were observed. The NC Natural Heritage Program database of rare species and unique habitats contains no record for the presence of Michaux's sumac within the project vicinity.

**2) Federal Species of Concern**

There are eleven Federal Species of Concern (FSC) listed by the USFWS for Durham County. Federal species of concern are not afforded federal protection under the Endangered Species Act of 1973, as amended, and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. However, the status of these species is subject to change, and so should be included for consideration. An FSC is defined as a species that is under consideration for listing for which there is insufficient information to support listing. In addition, organisms which are listed as Endangered (E), Threatened (T), or Special Concern (SC) by the NCNHP list of Rare Plant and Animal Species are afforded state protection under the NC State Endangered Species Act and the NC Plant Protection and Conservation Act of 1979, as amended.

Table 8 lists Federal Candidate and State listed species, the species state status (if afforded state protection) and the existence of suitable habitat for each

species in the study area. This species list is provided for information purposes as the status of these species may be upgraded in the future.

**Table 8. Federal Species of Concern for Durham County**

| Scientific Name | Common Name | State Status | Habitat |
|---|---|---|---|
| *Etheostoma collis lepidinion* | Carolina darter | SC | Yes |
| *Lythrurus matutinus* | Pinewoods shiner | SR | Yes |
| *Norturus furiosis* population 1 | Atlantic pigtoe (mussel)* | T | Yes |
| *Fusconaia masoni* | "Neuse" madtom | SC | Yes |
| *Lampsilis cariosa* | Yellow lampmussel | T | Yes |
| *Lasmigona subviridus* | Green floater | E | Yes |
| *Somotogyrus virginicus* | Panhandle pebblesnail | SR | No |
| *Gomphus septima* | Septima's clubtail dragonfly | SR | Yes |
| *Delphinium exaltatum* | Tall larkspur | E-SC | No |
| *Juglans cinerea* | Butternut | W-5[1] | No |
| *Montropsis odorata* | Sweet pinesap | C | No |
| *Plagiochila columbiana* | A liverwort | C | No |

"*" No specimen found in Durham County in twenty years.
[1] Watch List.

Surveys for these species were not conducted during the site visit, nor were any of these species observed. A review of the N.C. Natural Heritage Program database of rare species and unique habitats revealed no records of North Carolina rare and/or protected species in or near the project study area.

**Conclusions**

Within the study area for this project, there are no wetlands and one jurisdictional stream. Impacts to the UT may occur if the proposed right of way is changed. If design changes to the proposed project, such that the UT will incur impacts, this project may be subject to an Indirect and Cumulative Impacts Study. There are three species that are listed as federally protected for Durham County. A Biological Conclusion of "No Effect" has been issued for the Bald Eagle, the smooth coneflower and Michaux's sumac.

**5. Hazardous Materials**

A GeoEnvironmental Impact Evaluation was conducted to identify properties within the project study area that may contain hazardous materials and result in future environmental liability if acquired. These hazards may include, but are not limited to UST's, hazardous waste sites, regulated landfills, and unregulated dumpsites.

A field reconnaissance survey was conducted in the vicinity of the project. In addition to the field survey, a file search of appropriate environmental agencies was conducted to identify any know problem sites along the proposed project alignment. The identified sites are discussed below.

- **Underground Storage Tank (UST) Facilities**
  The Geotechnical Unit performed a field reconnaissance survey and found no anticipated UST sites within the project area.

- **Landfills and Other Potentially Contaminated Properties**
  The Geographical Information Service (GIS) was consulted for the project corridor. The research shows that no apparent regulated or unregulated landfills or dumpsites occur within the project limits.

- **RCRA/CERCLA**
  Based on the GIS search and the field reconnaissance, no potential RCRA or CERCLA sites were identified within the project limits.

**6. Noise**

Only one commercial property is expected to be impacted by highway noise. The transmission loss characteristics of nearby natural elements and man-made structures are believed to moderate the effects of any intrusive traffic noise. Therefore, no noise abatement measures are proposed for this project. This evaluation completes the assessment requirements for highway traffic noise of Title 23 of the Code of Federal Regulations, Part 772 and the NEPA process, and no additional reports are necessary.

**7. Air Quality**

The project is located in Durham County, which is within the Raleigh-Durham non-attainment area for ozone ($O_3$) and carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as "moderate" non-attainment areas for $O_3$ and CO. However, due to improved monitoring data, these areas were redesignated as "maintenance" for $O_3$ on June 17, 1994 and for CO on September 18, 1995. Section 176(c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Durham County. The Durham-Chapel Hill-Carrboro 2025 Long Range Transportation Plan (LRTP) and the 2004-2010 Metropolitan Transportation Improvement Program (MTIP) have been determined to conform to the intent of the SIP. The USDOT air quality conformity approval of the LRTP was June 30, 2003 and the USDOT air conformity approval of the MTIP was October 1, 2003. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There have been no significant changes in the project's design concept or scope, as used in the conformity analyses.

An air quality intersection analysis was conducted in October 2003 for this project utilizing the MOBILE5B mobile source emissions computer model and "CAL3QHC - A Modeling Methodology For Predicting Pollutant Concentrations Near Roadway Intersections". It was acceptable to use Mobile5B for this analysis since it was conducted prior to January 29, 2004. Microscale Analysis performed on or after January 29, 2004 must use Mobile6.

In order to determine the ambient CO concentration at a receptor near a highway, two concentration components must be used: local and background. The local concentration is defined as the CO emissions from cars operating on highways in the near vicinity (i.e., distances within 100 meters) of the receptor location. The background concentration is defined as "the concentration of a pollutant at a point that is the result of emissions outside the local vicinity; that is, the concentration at the upwind edge of the local sources." In this study, the local concentration was determined by the NCDOT Traffic Noise/Air Quality Staff using line source computer modeling, and the background component of 1.8 ppm was obtained from the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Air Quality. Once the two concentration components were ascertained, they were added together to determine the ambient CO concentration for the area in question and to compare to the National Ambient Air Quality Standards (NAAQS). The T.W Alexander (SR 2028) and Cornwallis Road (SR 1121) intersection was selected to analyze air quality impacts of the proposed project. The "worst-case" predicted 1-hour CO concentrations for the evaluation build years of 2005, 2010, and 2025 are 7.00, 7.40, and 7.90 ppm, respectively. Comparison to the NAAQS indicates no violations of these standards. Hence, the project's impact on air quality will not be significant.

If vegetation is disposed of by burning, all burning shall be done in accordance with applicable local laws and regulations of the North Carolina SIP for air quality in compliance with 15 NCAC 2D.0520. This evaluation completes the assessment requirements for air quality of the 1990 Clean Air Act Amendments and the NEPA process, and no additional reports are necessary.

## V. COMMENTS AND COORDINATION

### A. Interagency Coordination

For this planning study, comments were requested from the following federal, state, and local agencies. Written comments received from agencies noted with an asterisk (*). Copies of the comments received are included in the Appendix.

U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
U.S. Department of Interior, Fish and Wildlife Service
U.S. Advisory Council on Historic Preservation
U.S. Department of Agriculture
U.S. Environmental Protection Agency
U.S. Department of Health and Human Services
N.C. Department of Environment and Natural Resources
N.C. State Clearinghouse, Department of Administration
*N.C. Department of Cultural Resources, Division of Archives and History
N.C. Department of Human Resources
N.C. Wildlife Resources Commission

N.C. Department of Public Instruction
*Research Triangle Foundation

**B. NEPA/404 Merger Process**

There are no wetlands in the project area and one jurisdictional stream. It is anticipated that a Nationwide Permit 14 will be sufficient since anticipated impacts to Waters of the U.S. from the proposed project are less than 300 feet. A meeting was held on February 12, 2004 with DWQ, ACOE and FHWA representatives, who all concurred that based on the minimal impacts, this project should not be placed in the NEPA/404 Merger Process.

**C. Local Business Coordination**

Since there are no residences along this section of T.W. Alexander Drive (SR 2028), a citizens informational workshop was not held for this project. Instead, meetings were held with the Research Triangle Foundation and business partners at the park. A meeting was held on January 16, 2003 to preview the proposed improvements and receive comments and concerns from the businesses located along the corridor. There was strong support for the overall improvements; however, there were concerns about the location of median openings. Each business along the project corridor wanted existing entrances to be fully accessible.

Another meeting was held on May 20, 2004 to present the preliminary plans to the RTP businesses. It was explained that the existing drives are not in conformance with the NCDOT's Median Crossover Guidelines. Exceptions plan to be made for accommodating median openings while maintaining the safety of the facility. It was noted that some businesses had more than one entrance and that was taken into consideration when deciding which entrances to restrict. It was also pointed out that there are alternate access points and traffic circulation in the surrounding roadway network. T.W. Alexander Drive (SR 2028) connects to the Durham Freeway to the east and Cornwallis Road to the west. Cornwallis Road also has an interchange on the Durham Freeway. This allows for access to the Durham Freeway whether or not full-movement openings are provided.

There was also concern about the 55-mph speed limit designated for this area. The Research Triangle Foundation and local businesses thought a 45-mph speed limit would be more appropriate. Right turn tapers at each business entrance have been incorporated into the design to remove slower turning traffic from the main through lanes. Written comments received from Eli Lilly and Company and Triangle Universities Center for Advanced Studies Incorporated are included in the Appendix.

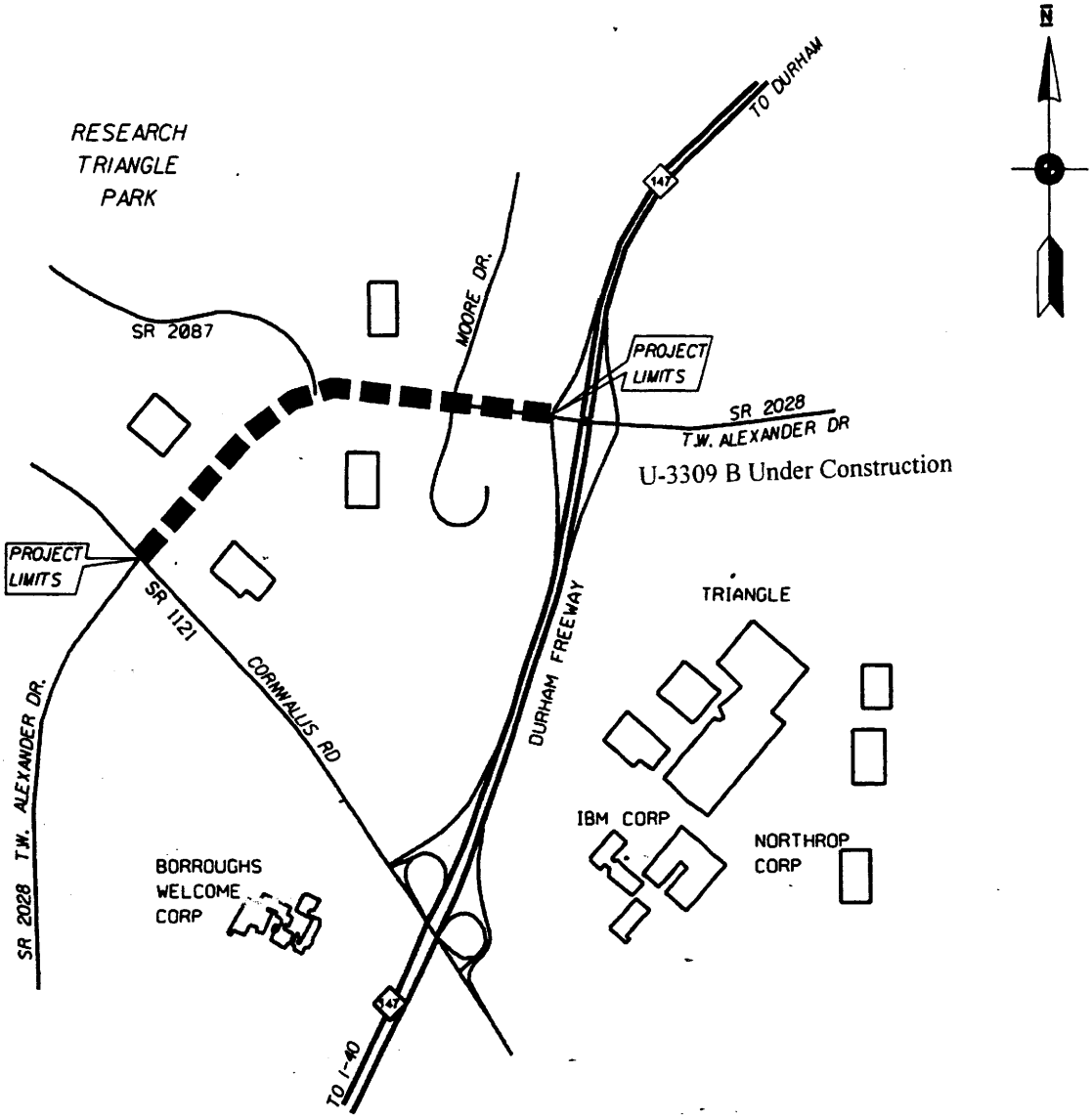
**D. Public Hearing**

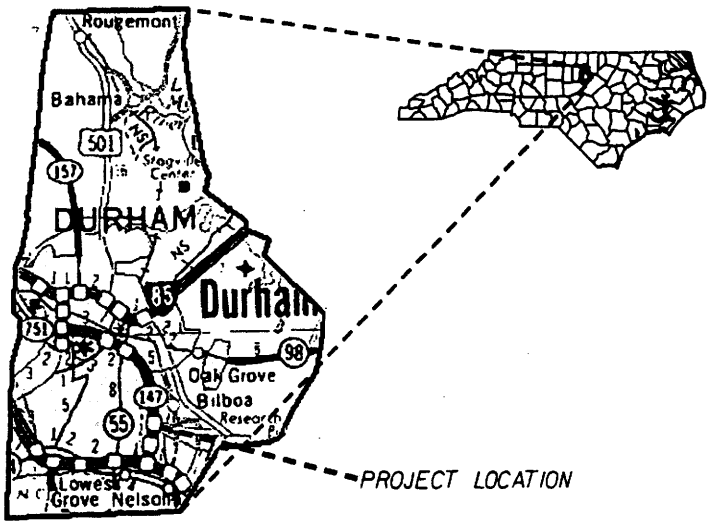
In lieu of a public hearing, the Research Triangle Foundation requested that the Department of Transportation hold another meeting with the local businesses following circulation of this document. Since design changes were made after the May 20, 2004

meeting, another meeting was held on December 8, 2004. The design changes included adding several exclusive right and left turn lanes. Improvements were also made to both legs of SR 1121 (Cornwallis Road) and both NC 147 off ramps. See Figures 5 and 8 for recommended improvements to Cornwallis Road and NC 147.

Improvements to Cornwallis Road changed the access to Troxler Electronic Laboratories, Inc. Based on the comments and concerns expressed during the meeting, the median on Cornwallis Road has been shortened to allow left turns into the Troxler property.

The businesses continued to be very concerned over the proposed 55-mph speed limit in the project area and asked the Department to consider reducing it to 45 mph. The Regional Traffic Engineer has stated that the speed limit along this project will be posted at 55-mph. This speed limit is not only to allow continuity, but it is considered the appropriate speed limit based on the design speed of the roadway.




0 0.75 1.5
MILES

NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

DURHAM COUNTY
SR 2028 (T.W. ALEXANDER DR.), SR 1121
(CORNWALLIS RD) TO NC 147
(DURHAM FREEWAY)

FIGURE-1 VICINITY MAP

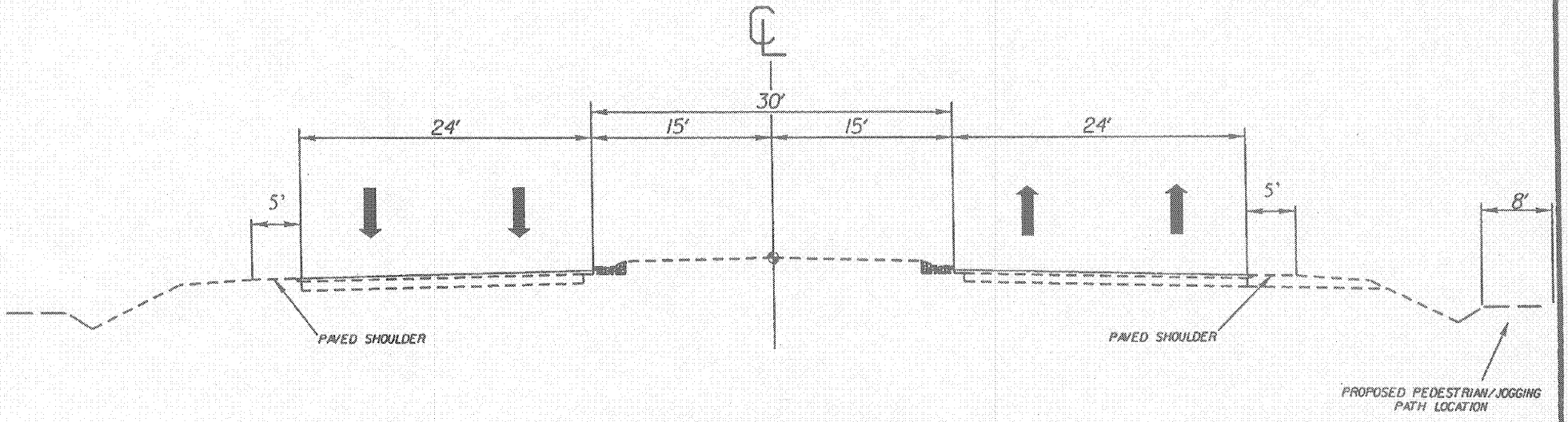
To Duke
Lilly Sphynx Laboratories
Dupont Technologies
UNC TV
Bekaert
Glaxo Smith Kline
To Durham
7.5' Pedestrian Trail
T.W. Alexander Drive
Moore Drive
Tucaal Central Campus
Burroughs Welcome Fund
NC Biotechnology Center
Tucaal East Campus
National Institute of Statistical Services
National Humanities Center
NC 147
Cornwallis Rd.
PROJECT LIMITS
PROJECT LIMITS
U-3309B Under Construction
N
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF PLANNING AND ENVIRONMENT
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH
(SR 2028) T. W. ALEXANDER DRIVE
FROM CORNWALLIS ROAD
TO NC 147 RESEARCH TRIANGLE PARK, NC
TIP NO. U-3309 A
WBS 34916
FIGURE 1

| PROJECT REFERENCE NO. | SHEET NO. |
| --- | --- |
| U-3098 | 2 |
| ROADWAY DESIGN ENGINEER | BRIDGE DESIGN ENGINEER |

PRELIMINARY PLANS
NOT FOR CONSTRUCTION PURPOSES

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

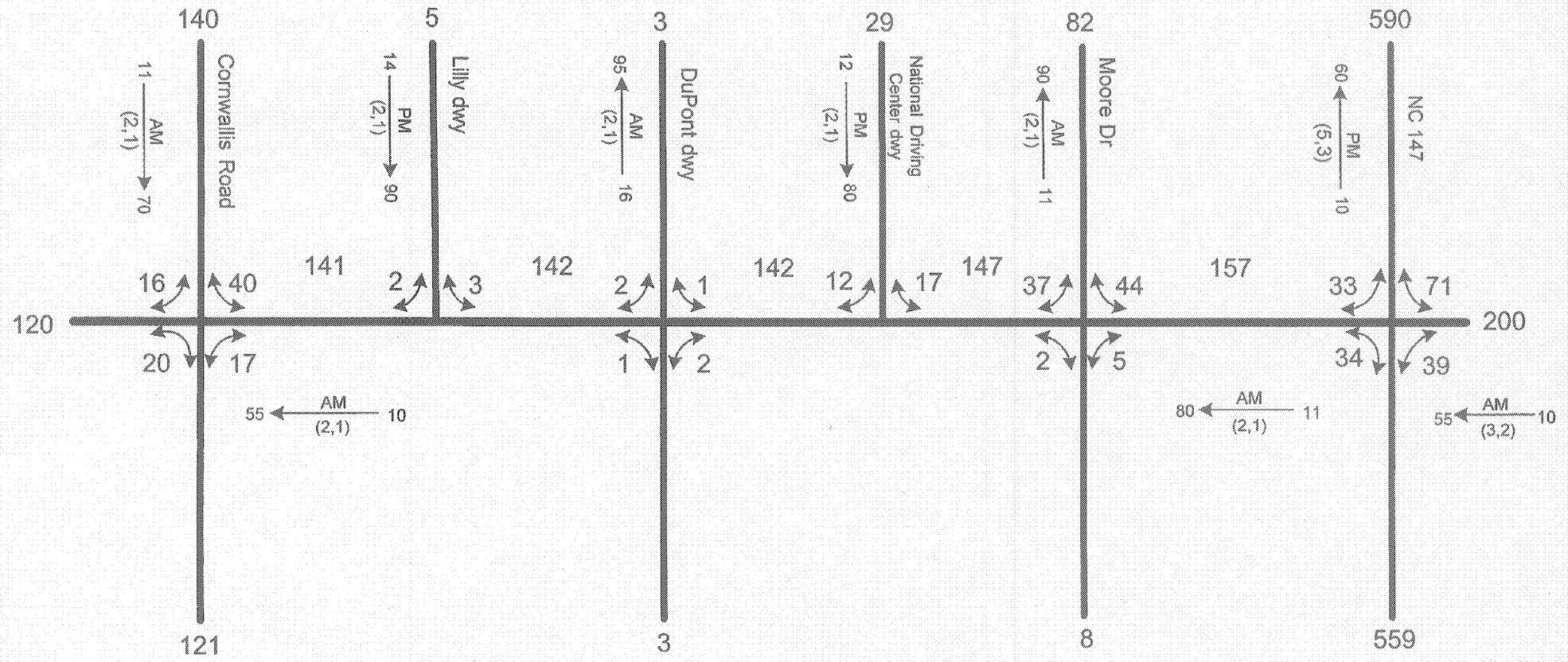
# T.W. ALEXANDER DRIVE




## TYPICAL SECTION

FIGURE 3

# 2003 Estimated Average Annual Daily Traffic (x100)



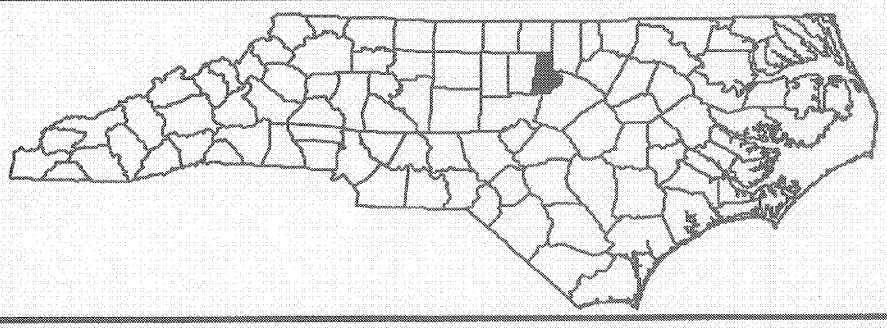

Drawing Not to Scale

N

*LEGEND*

| | |
|---|---|
| *XXX* | *VPD--VEHICLES PER DAY* |
| *DHV* | *DESIGN HOURLY VOLUME (%)* |
| *D* | *DIRECTIONAL FLOW (%)* |
| *PM* | *PM PEAK PERIOD* |
| *(X,X)* | *DUALS, TTST (%)* |

*NOTE: DHV ⟶ D INDICATES THE DIRECTION D. REVERSE FLOW FOR AM PEAK.*



STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

**T.W. Alexander Drive**

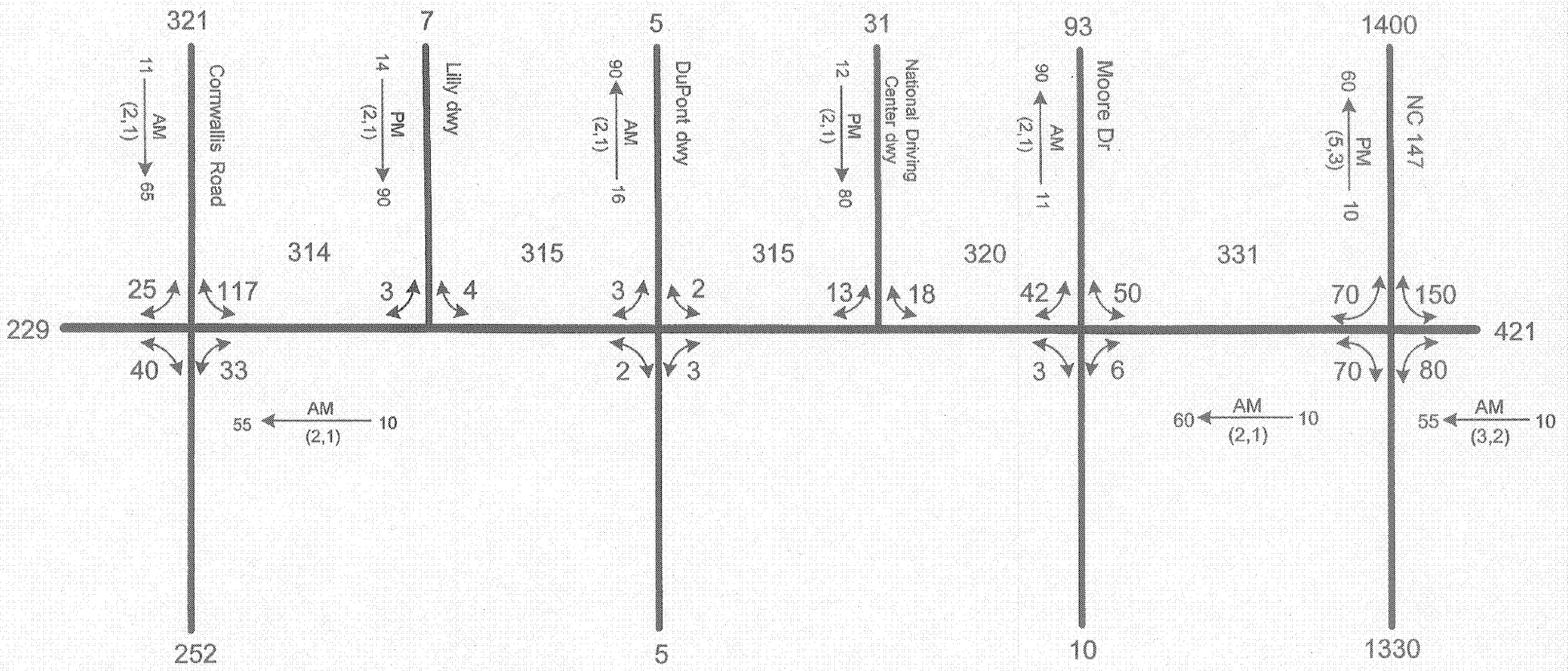
Figure 4A

**Durham County** **Division 5**

**TIP # U-3309A**

***WBS# 34916.1.1*** **prepared by M. Orr**

# 2030 Estimated Average Annual Daily Traffic (x100)



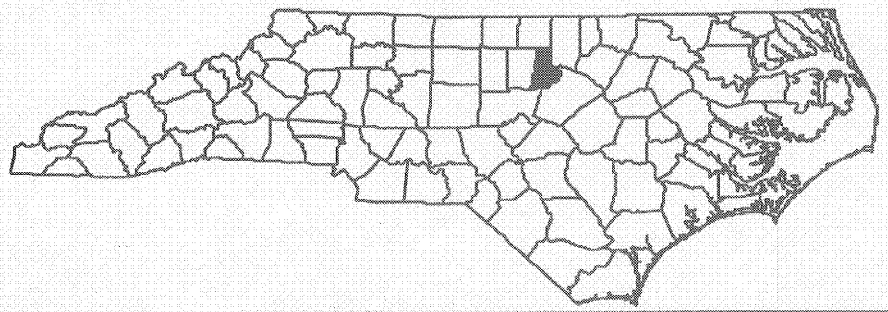

Drawing Not to Scale

N

## LEGEND

| | |
|---|---|
| XXX | VPD--VEHICLES PER DAY |
| DHV | DESIGN HOURLY VOLUME (%) |
| D | DIRECTIONAL FLOW (%) |
| PM | PM PEAK PERIOD |
| (X,X) | DUALS, TTST (%) |

NOTE: DHV ——▶ D INDICATES THE DIRECTION D. REVERSE FLOW FOR AM PEAK.



**T.W. Alexander Drive**

Figure 4B

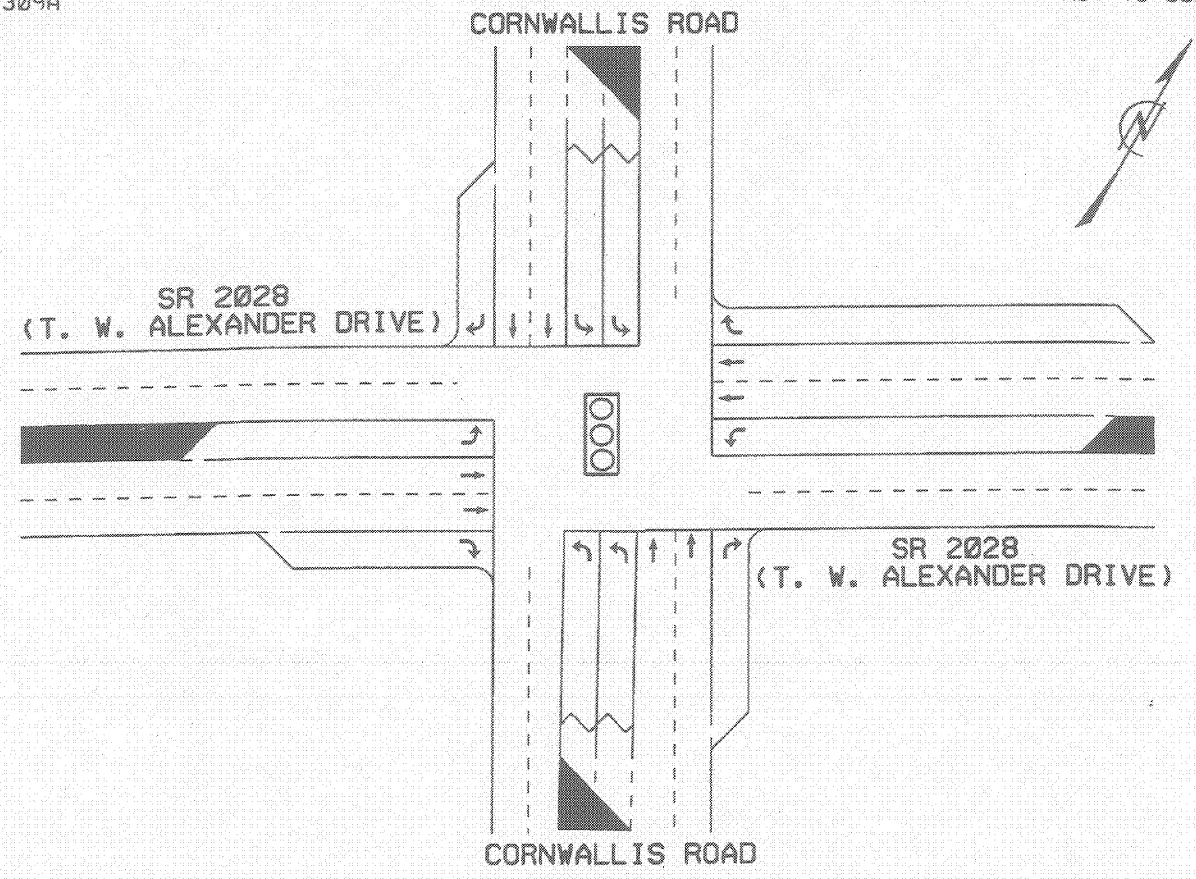
**Durham County** **Division 5**

**TIP # U-3309A**

*WBS# 34916.1.1* **prepared by M. Orr**

U-3309A

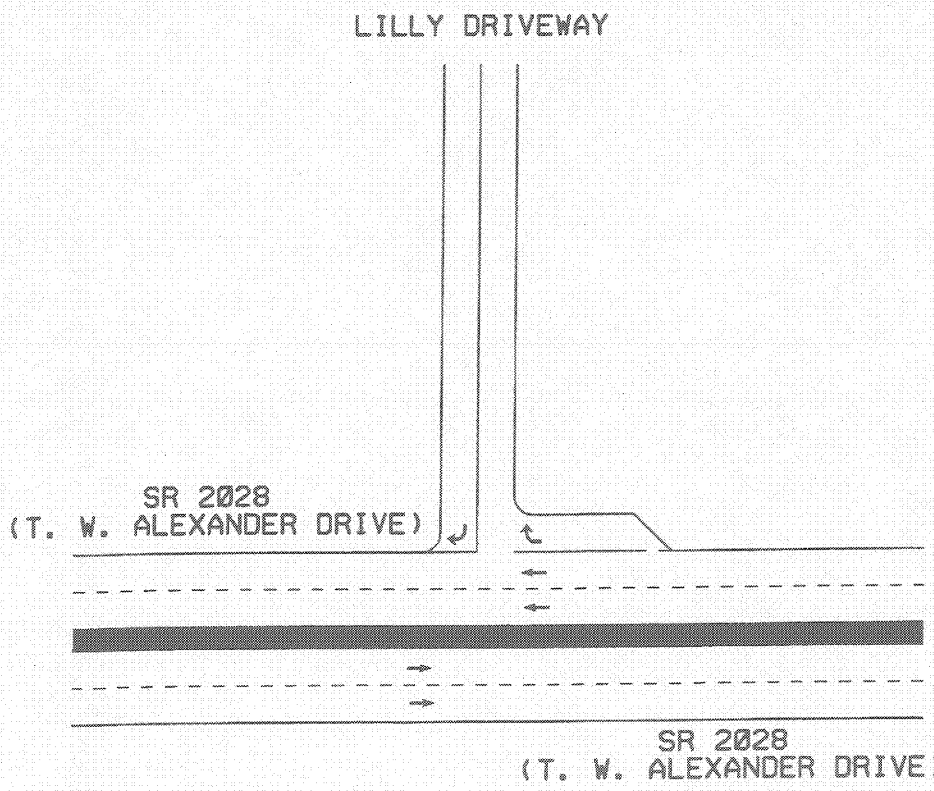
NOT TO SCALE



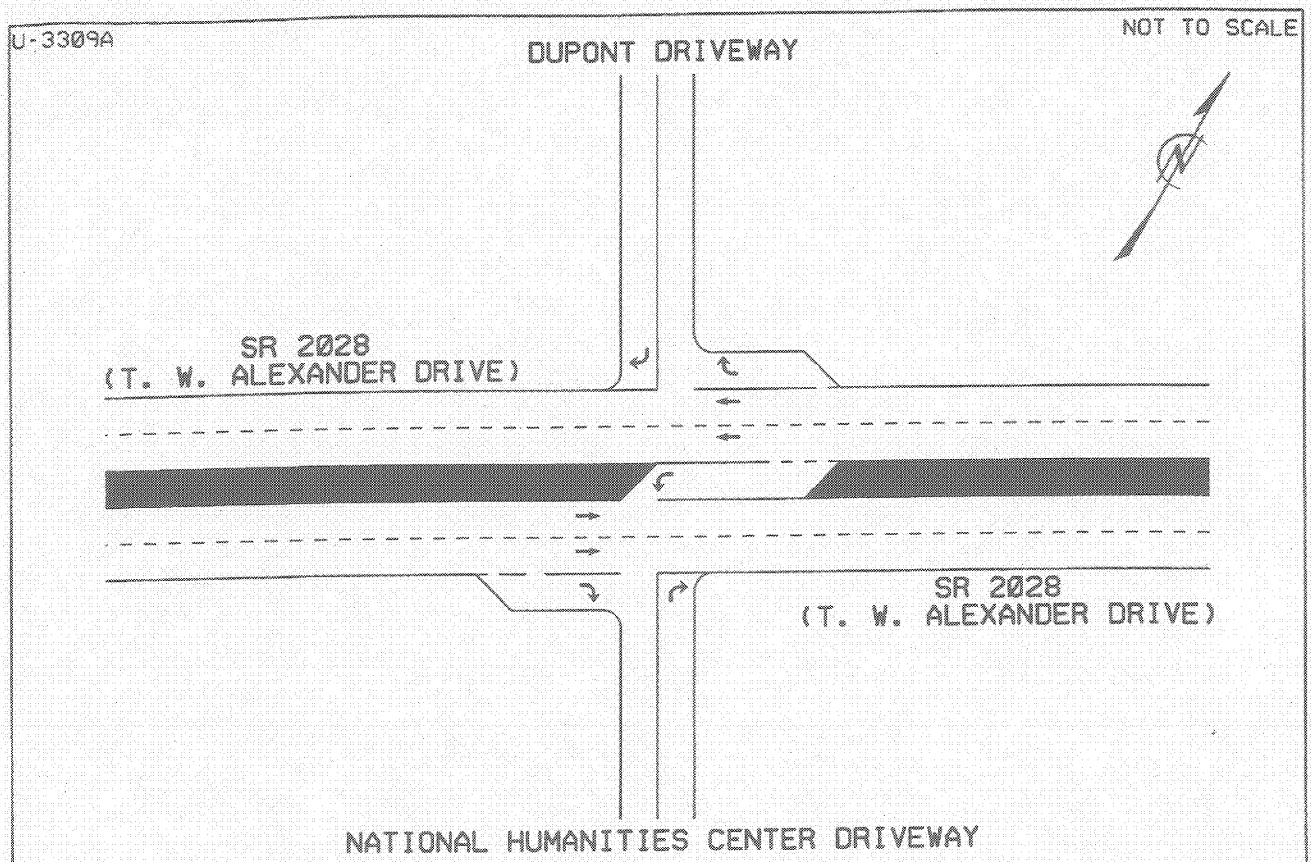

Recommended Laneage
SR 2028 (T.W. Alexander Drive) and Cornwallis Road

U-3309A

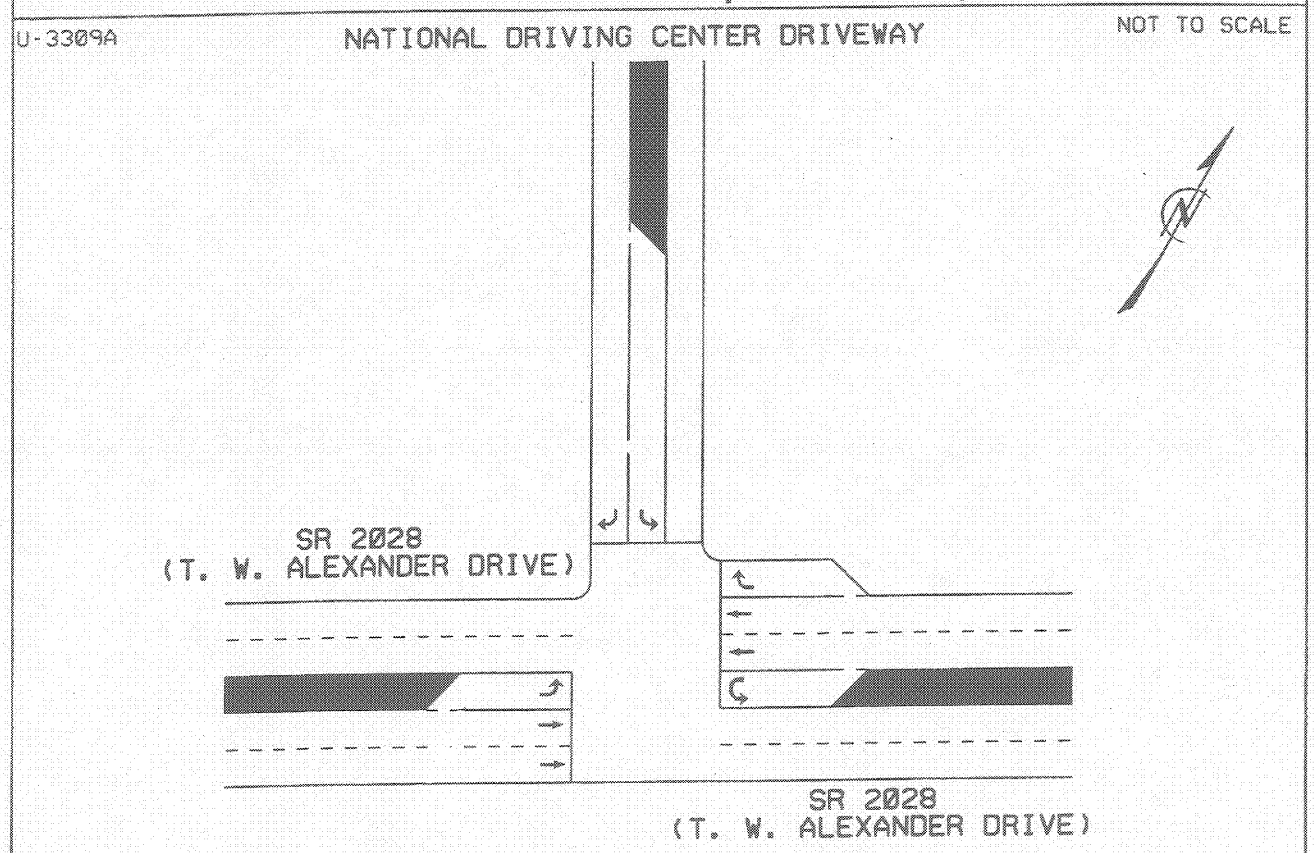
NOT TO SCALE




Recommended Laneage
SR 2028 (T.W. Alexander Drive) and Lilly Driveway




Recommended Laneage
SR 2028 (T.W. Alexander Drive) and DuPont Driveway / Tucasi Central Campus Driveway

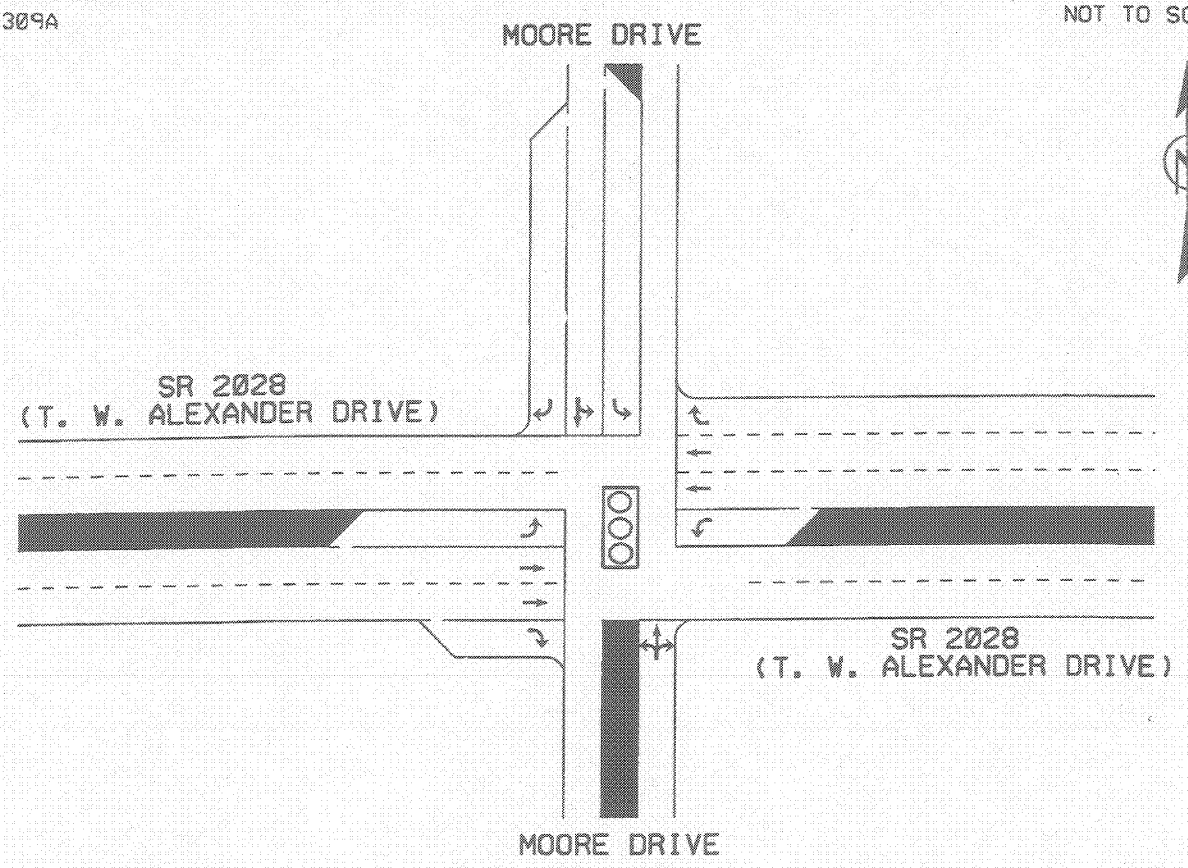



Recommended Laneage
SR 2028 (T.W. Alexander Drive) and National Driving Center Driveway

Figure 6

U-3309A

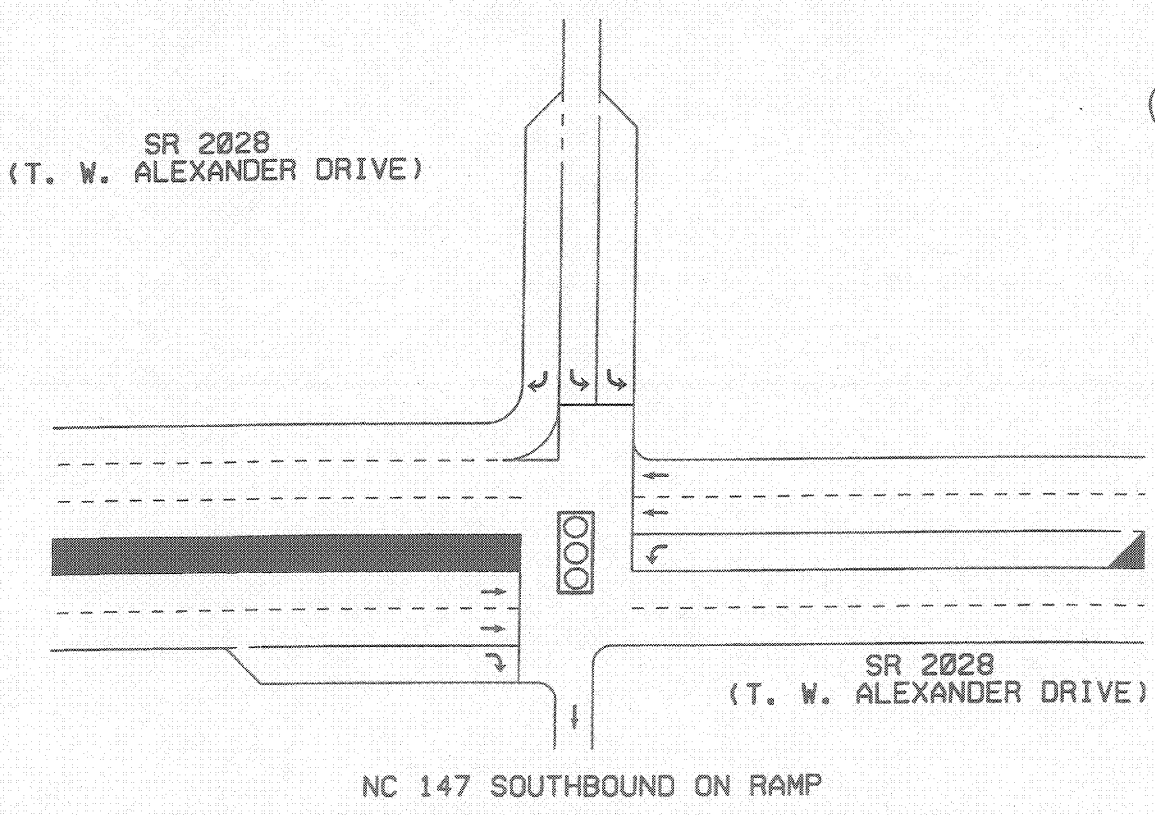
NOT TO SCALE




Recommended Laneage
SR 2028 (T.W. Alexander Drive) and Moore Drive

U-3309A

NOT TO SCALE




Recommended Laneage
SR 2028 (T.W. Alexander Drive) and
NC 147 Southbound Ramps

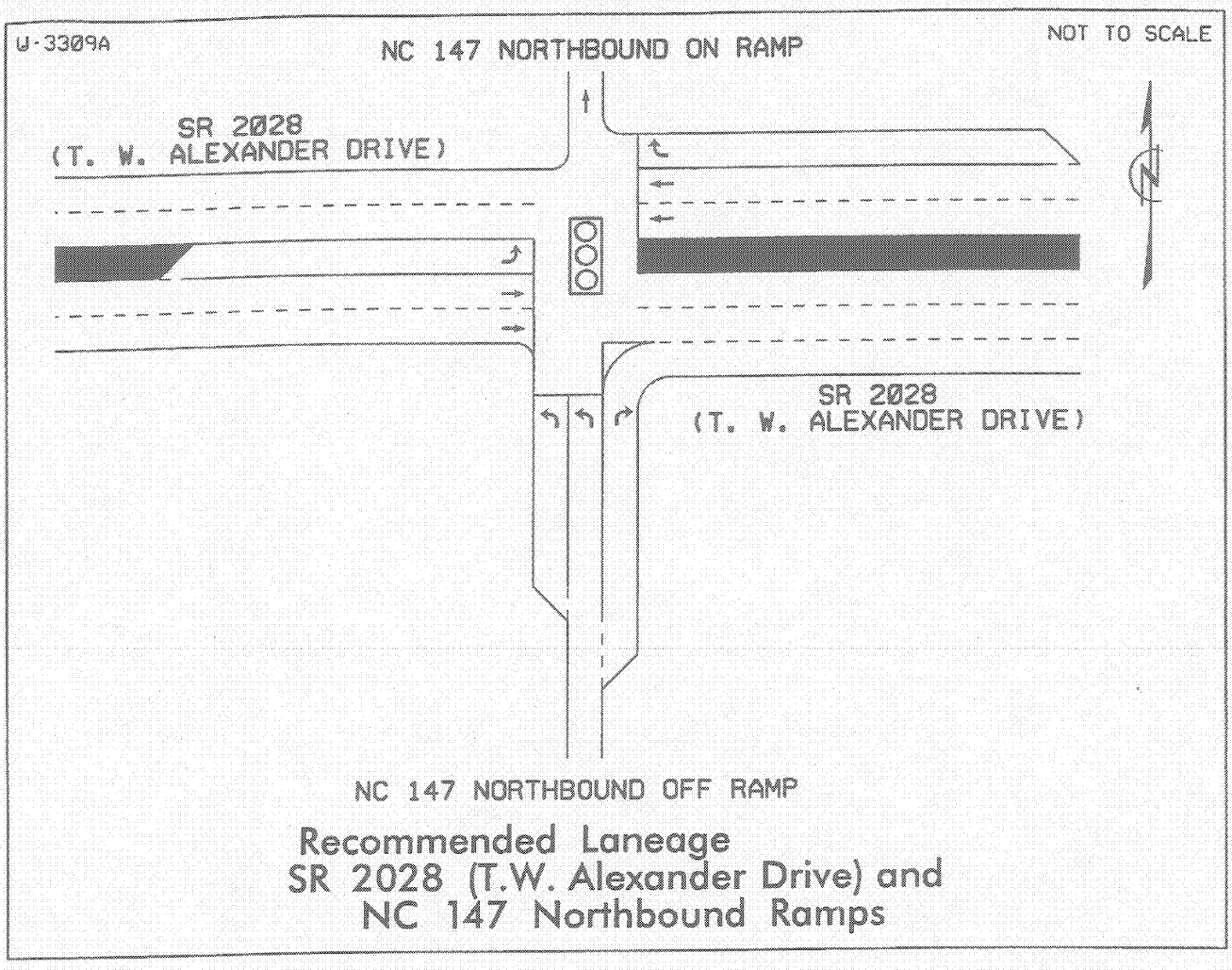
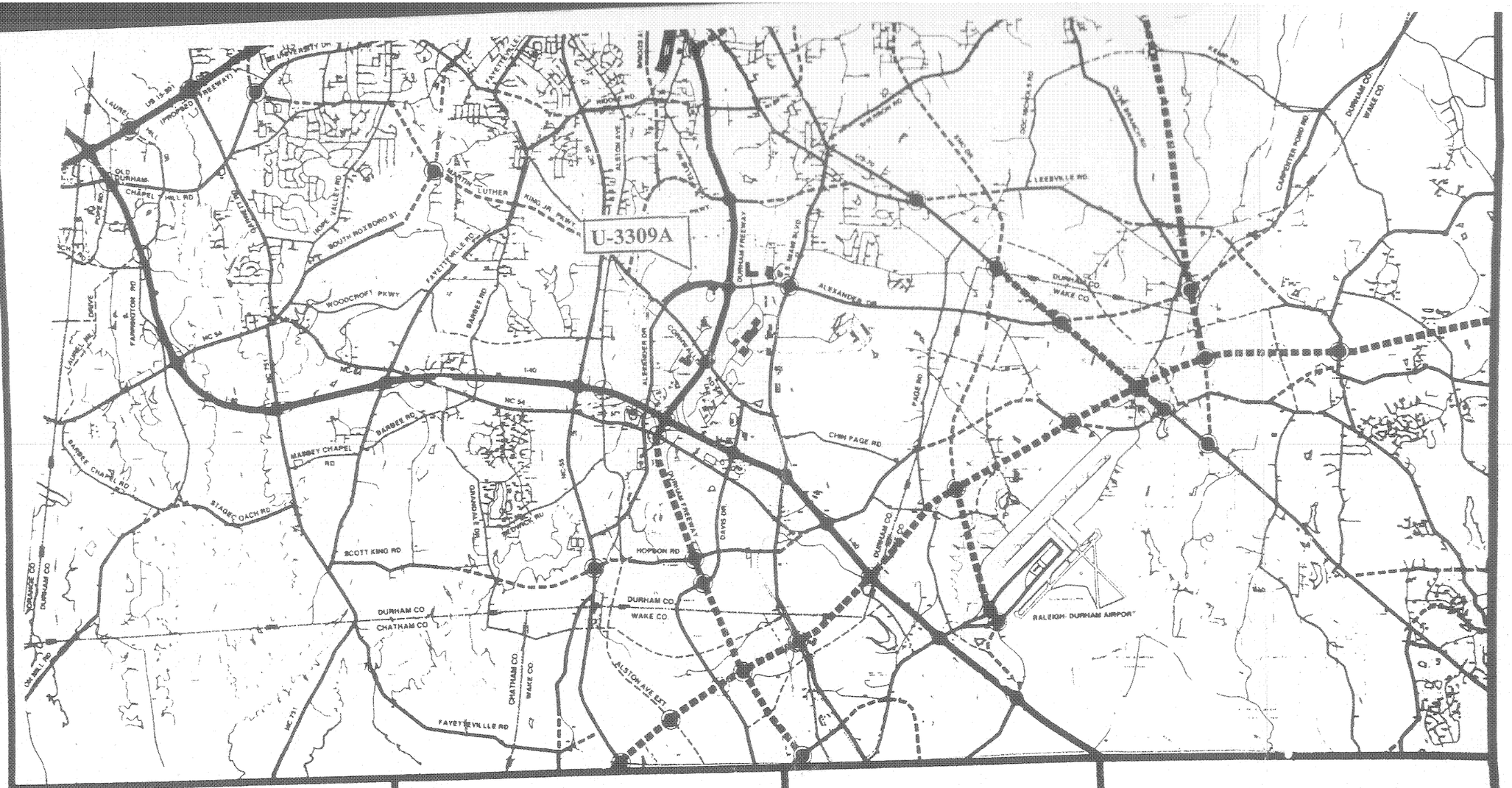

U-3309A
NC 147 NORTHBOUND ON RAMP
NOT TO SCALE
SR 2028
(T. W. ALEXANDER DRIVE)
SR 2028
(T. W. ALEXANDER DRIVE)
NC 147 NORTHBOUND OFF RAMP
Recommended Laneage
SR 2028 (T.W. Alexander Drive) and
NC 147 Northbound Ramps

Figure 8




REVISIONS ADOPTED BY:

| CITY OF DURHAM | STATEWIDE PLANNING BRANCH | NCDOT |
|---|---|---|
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THOROUGHFARE APPROVAL DATES:

PUBLIC HEARING DATES: 11/1/90 3/21/90

| | |
|---|---|
| CITY OF DURHAM | 11/19/91 |
| STATEWIDE PLANNING BRANCH | 12-12-91 M.R. Poole |
| NCDOT | 1/10/92 |

LEGEND

| THOROUGHFARES | EXISTING | PROPOSED |
|---|---|---|
| FREEWAYS | | |
| MAJOR | | |
| MINOR | | |
| INTERCHANGE | | |
| GRADE SEPARATION | | |

NOTE: THE FINAL ALIGNMENT OF END DRIVE AT ROXBORO ROAD WILL BE DETERMINED BY THE ENVIRONMENTAL IMPACT STATEMENT UNDERWAY AS OF JUNE 1991

Figure 9

DURHAM COUNTY PORTION OF

# DURHAM - CHAPEL HILL - CARRBORO URBAN AREA THOROUGHFARE PLAN

NORTH CAROLINA

OCTOBER 2, 1991

0 2500 5000 7500 10000

SCALE IN FEET

# APPENDIX

# United States Department of the Interior

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

RECEIVED
DEC 9 2002
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

December 3, 2002

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

Dear Dr. Thorpe:

This letter is in response to your request for comments from the U.S. Fish and Wildlife Service (Service) on the potential environmental impacts of the proposed widening of SR 2028 to a four-lane divided facility from Cornwallis Road to east of NC 147 in Durham County, North Carolina (TIP No. U-3309A). These comments provide scoping information in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661-667d) and section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

Recent aerial photography of the land along SR 2028 in the project area shows a highly-dissected, semi-forested environment with much commercial development. The areas immediately adjacent to the existing roadsides consist of forest fragments. An unnamed tributary to Northeast Creek runs roughly parallel to a portion of SR 2028 on the north side. It is unclear as to whether this tributary would be impacted by the project, although it appears no crossings will be required. The National Wetlands Inventory map for the Southeast Durham U.S. Geological Survey Quadrangle indicates palustrine shrub/scrub and forested wetlands along this tributary immediately adjacent to the north side of the existing road. However, while NWI maps are useful for providing an overview of a given area, they should not be relied upon in lieu of a detailed determination and delineation by trained personnel.

The Service recommends the following general conservation measures to avoid or minimize environmental impacts to fish and wildlife resources:

1. The road widening should be designed in such a way as to avoid and minimize impacts to the unnamed tributary of Northeast Creek and its associated wetlands. Highway shoulder and median widths should be reduced through wetland areas;

2. If unavoidable wetland or stream impacts are proposed, every effort should be made to identify compensatory mitigation sites in advance. Project planning should include a detailed compensatory mitigation plan for offsetting unavoidable wetland and stream impacts. Opportunities to protect mitigation areas in perpetuity via conservation

easements, land trusts or by other means should be explored at the outset;

3. Wherever appropriate, construction in sensitive areas should occur outside fish spawning and migratory bird nesting seasons. In waterways that may serve as travel corridors for fish, in-water work should be avoided during moratorium periods associated with migration, spawning and sensitive pre-adult life stages;

4. Best Management Practices (BMP) for Protection of Surface Waters should be implemented;

5. Impacts to upland forest should be avoided and minimized to the maximum extent possible; and,

6. Activities within designated riparian buffers should be avoided or minimized.

There are three federally protected species in Durham County: the bald eagle (*Haliaeetus leucocephalus*), Michaux's sumac (*Rhus michauxii*) and smooth coneflower (*Echinacea laevigata*). Although the North Carolina Natural Heritage Program (NCNHP) database does not indicate any known occurrences of these species near the project vicinity, use of the NCNHP data should not be substituted for actual field surveys if suitable habitat occurs near the project site. Information about the habitats in which these species is often found is provided on our web site, **http://endangered.fws.gov.** All survey documentation must include survey methodologies and results.

We reserve the right to review any federal permits that may be required for this project, at the public notice stage. Therefore, it is important that resource agency coordination occur early in the planning process in order to resolve any conflicts that may arise and minimize delays in project implementation. In addition to the above guidance, we recommend that the environmental documentation for this project include the following in sufficient detail to facilitate a thorough review of the action:

1. A clearly defined and detailed purpose and need for the proposed project, supported by tabular data, if available, and including a discussion of the project's independent utility;

2. A description of the proposed action with an analysis of all alternatives being considered, including the upgrading of existing roads and a "no action" alternative;

3. A description of the fish and wildlife resources, and their habitats, within the project impact area that may be directly or indirectly affected;

4. The extent and acreage of waters of the U.S., including wetlands, that are to be impacted by filling, dredging, clearing, ditching, or draining. Acres of wetland impact should be differentiated by habitat type based on the wetland classification scheme of the National Wetlands Inventory (NWI). Wetland boundaries should be determined by using the 1987 Corps of Engineers Wetlands Delineation Manual and verified by the U.S.

Army Corps of Engineers;

5. The anticipated environmental impacts, both temporary and permanent, that would be likely to occur as a direct result of the proposed project. The assessment should also include the extent to which the proposed project would result in secondary impacts to natural resources, and how this and similar projects contribute to cumulative adverse effects;

6. Design features and construction techniques which would be employed to avoid or minimize the fragmentation or direct loss of wildlife habitat;

7. Design features, construction techniques, or any other mitigation measures which would be employed at wetland crossings and stream channel relocations to avoid or minimize impacts to waters of the United States; and,

8. If unavoidable wetland or stream impacts are proposed, project planning should include a detailed compensatory mitigation plan for offsetting the unavoidable impacts.

The Service appreciates the opportunity to comment on this project. Please continue to advise us during the progression of the planning process, including your official determination of the impacts of this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520 (Ext. 32).

Sincerely,

Tom Augspurger

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

cc: Eric Alsmeyer, USACE, Raleigh, NC
John Hennessy, NCDWQ, Raleigh, NC
David Cox, NCWRC, Northside, NC
Chris Militscher, USEPA, Raleigh, NC

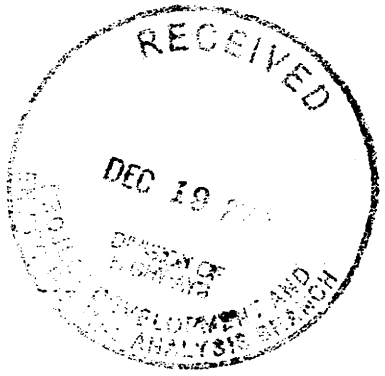
# North Carolina Department of Cultural Resources

## State Historic Preservation Office

David L. S. Brook, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Division of Historical Resources
David J. Olson, Director




December 17, 2002

**MEMORANDUM**

TO: Greg Thorpe, Manager
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: David Brook David Brook

SUBJECT: Improvements SR 2028 (T.W. Alexander Drive) from Cornwallis Road to East of NC 147 in Research Triangle Park, U-3309A, Durham County
ER99-7688, ER02-10285

Thank you for your memorandum of November 19, 2002, concerning the above project.

We have conducted a review of the proposed undertaking and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the undertaking as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please cite the above-referenced tracking number.

DB:doc

cc: Mary Pope Furr


| | Location | Mailing Address | Telephone/Fax |
|---|---|---|---|
| Administration | 507 N. Blount St, Raleigh, NC | 4617 Mail Service Center, Raleigh 27699-4617 | (919) 733-4763 •733-8653 |
| Restoration | 515 N. Blount St, Raleigh , NC | 4613 Mail Service Center, Raleigh 27699-4613 | (919) 733-6547 •715-4801 |
| | [illegible] | 4618 Mail Service Center, Raleigh 27699-4618 | (919) 733-4763 •715-4801 |

**Research Triangle Foundation of North Carolina**

2 Hanes Drive
Post Office Box 12255
Research Triangle Park, North Carolina 27709
Telephone: (919) 549-8181 FAX: (919) 549-8246

**James O. Roberson,** President

June 28, 2004

Ms. Marie L. Sutton
Project Development Engineer
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

RE: U-3309A – T.W. Alexander

Dear Ms. Sutton:

On behalf of the Research Triangle Foundation, which is the developer of the Research Triangle Park, I would like to express some concerns about the preliminary design of U-3309A – T. W. Alexander Drive widening between NC 147 and Cornwallis Road.

My first concern is with respect to the proposed speed limit for T.W. Alexander Drive once the construction is completed. While I recognize that T.W. Alexander Drive is a major thoroughfare, it is a thoroughfare which primarily serves to provide access to RTP companies. As such, I believe a safer speed limit would be 45 mph and would urge NCDOT to establish the final speed limit as 45 mph.

My second concern is with the proposed design of the driveways along the widened section of T.W. Alexander Drive. Currently the driveways along T.W. Alexander Drive have curb and gutter along the turning radius. This was done as part of a comprehensive project in the late 1980s. Most of the companies in RTP participated to have the curb and gutter installed at their drives in order to improve the appearance of RTP because, without the curb and gutter, trucks were cutting the corners and creating ruts at the entrance drives. The driveway project was part of a larger NCDOT project for intersection improvements in RTP and has solved the problem. I have heard no complaints from existing companies along T.W. Alexander Drive about the adequacy of their drives for accommodating trucks and would urge that NCDOT replace the drives with the same design as currently exists to maintain the consistency and appearance of RTP.

Also, I would ask that NCDOT reconsider the design of the median cut that would serve the driveway shared by the Burroughs Wellcome Fund and the National Institute of Statistical Sciences. Under the preliminary design, this median cut would provide a left turn into the site but would not allow a left turn out of the site, nor would it allow a left turn into the drive on the north side of T.W. Alexander which is the primary entrance to DuPont. There are currently only 4 driveways along the entire section of T.W. Alexander

Drive from NC 147 to Cornwallis Road and no prospect of any future driveways being added. I understand that the Eli Lilly Driveway is too close to the Cornwallis intersection to allow a full median cut safely. However, the driveway, which serves the Burroughs Wellcome Fund and DuPont, is over 1400 feet from the Cornwallis intersection and approximately 970 feet from the driveway shared by DuPont and the Center of Public television. Providing a full median cut at this location would lessen the hardship on Eli Lilly since their employees and customers would not have to go as far to reach a median cut in order to make a u-turn to get to their main drive. Given the overall limited number of driveways along this section of T.W. Alexander Drive, I would respectfully request that NCDOT waive its standard separation requirements and allow a full median cut at this location.

Finally, I would like to thank NCDOT for including the turn lanes at the Cornwallis/T.W. Alexander Drive intersection in this project. These turn lanes had been identified as needed by our traffic consultant and I appreciate NCDOT accommodating them in this project.

Please feel free to contact Liz Rooks or me if you have any questions about our comments.

Sincerely,

James O. Roberson

www.lilly.com

Eli Lilly and Company
Sphinx Laboratories
P.O. Box 13951
20 T.W. Alexander
Research Triangle Park, North Carolina 2
U.S.A.

Phone 919 314 4000

January 20, 2003

Mr. Robert P. Hanson, PE., Assistant Manager
ATTN: Ms. Marie Sutton, Project Development Engineer
Project Development & Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Re: TIP Project U-3309A

Mr. Hanson and Ms. Sutton,

This letter is to inform you about the concerns of Eli Lilly and Company, Sphinx Laboratories, regarding the proposed widening of SR 2028 (T. W. Alexander Drive) from SR 1121(Cornwallis Road) to NC147, Federal Project No. STP-2028 (1), State Project No. 8.2352701, TIP Project U-3309A. During the meeting held at the Research Triangle Foundation offices on Thursday, January 16, 2003, the representatives of the businesses located on Alexander Drive were informed about the NCDOT regulation of 1000 feet minimum spacing of the traffic breaks in the center median.

Eli Lilly and Company, Sphinx Laboratories, has its main entrance on T. W. Alexander Drive, and this entrance is used by all of our site visitors and most of our employees. Greater than 90% of our employees reside in Wake, Southern Durham, and Orange counties, and most use the I-40 corridor as their main thoroughfare into Research Triangle Park, and ultimately onto Alexander Drive. Having a median break at the entrance to our facility on Alexander Drive is necessary for efficient traffic flow into our facility.

We are asking that you seriously consider installing a median break at the entrance to our facility on T. W. Alexander Drive as you are planning the project. For any concerns or questions, please do not hesitate to contact me at the email or phone number listed below.

Sincerely,

Kiyomi Carter

Kiyomi Carter, PMP
Team Leader, Project Management, Business Operations
Email: carter_kiyomi@lilly.com
Phone: 919 314-4220

Triangle Universities
Center
For
Advanced
Studies
Incorporated
Research Triangle Park
Box 12074
North Carolina 27709

June 25, 2004

Ms. Marie L. Sutton
Project Development Engineer
Project Development & Environmental Analysis Branch
NCDOT
1548 Mail Service Center
Raleigh, NC 27699-1548

RE: U-3309A – T.W. Alexander Drive Widening

Dear Ms. Sutton:

We are writing on behalf of the Triangle Universities Center for Advanced Studies, Inc. (TUCASI) to express concern about several aspects of the plans for the widening of T.W. Alexander Drive between NC 147 and Cornwallis Road. TUCASI owns a 120 acre campus on the southeast side of T.W. Alexander Drive. This campus houses a number of organizations including the Burroughs Wellcome Fund, the National Institute of Statistical Sciences (NISS), the North Carolina Biotechnology Center, the National Humanities Center and MCNC. TUCASI's concern about the widening project are as follows:

1. **Proposed speed limit.** It is our understanding that the road widening is being designed for a speed limit of 55 mph. T. W. Alexander Drive functions primarily as a road which provides access to research and development sites in RTP. We do not believe that the speed limit should be 55 mph for an access road and that encouraging high speeds will reduce the safety of the roadway. We would urge that the speed limit be no higher than 45 mph.

2. **Widened curb radii at Burroughs Wellcome/NISS driveway.** The current plans indicate that the curb radii at the driveway shared by the Burroughs Wellcome Fund and NISS will be substantially widened and that because of the widened radii, the large TUCASI sign may need to be relocated. The current plans remove the existing curb and gutter and replaces it with a shoulder. In 1988 the Research Triangle Foundation and most of the RTP companies joined in a NCDOT road project to add curb and gutter to the driveways in RTP. We do not want to see a deviation from the standard set by that construction project. The current configuration of this driveway functions well and we do not see the need to widen the curb radii and certainly no reason to use a shoulder section rather than curb and gutter. The TUCASI

sign cost approximately $80,000 and we would strongly urge that moving it be avoided if possible.

3. **Access limitation at Burroughs Wellcome/NISS driveway.** The current plans for the widening indicate that the access to NISS and Burroughs Wellcome will be designed to allow left turns into the site but not to allow left turns out. Nor will left turns be allowed into or out of the DuPont property across the street. Since the separation between the Burroughs Wellcome/NISS drive and the Center for Public Television/Dupont service drive is approximately 970 feet, we would respectfully request that NCDOT waive its standard requirement for driveway separation and allow a full median cut at the Burroughs Wellcome/NISS driveway. We believe that a full median cut would be safer than requiring people to go to the Center for Public Television/DuPont Drive and make a U-turn.

We would be happy to discuss these concerns with you or other representatives of NCDOT if appropriate.

Sincerely,

Sherwood H. Smith Jr.
Chairman of the Board

Tony G. Waldrop
President