STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 24, 2004

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

ATTENTION: Mr. John Thomas
NCDOT Coordinator

Dear Sir:

SUBJECT: **Application for a Nationwide Permit 23** for proposed intersection improvements at US 15/501 and SR 1734 (Erwin Road) in Orange County, Fed. Project No. NHF-15 (9), State Project No. 8.1502101, WBS Element 35009.1.1, Division 7, TIP U-4008.

The North Carolina Department of Transportation (NCDOT) proposes improvements at the intersection of US 15/501 and Erwin Road near Chapel Hill. The improvements will be designed according to the new Superstreet Design, which resembles an oblong traffic circle. Pavement at the center of the existing intersection will be removed and grassed. The proposed right of way varies between 150 feet and 300 feet, with four 12-foot lanes divided by grassed medians of varying width. Two 12 to 13-foot turn lanes will be added across the existing grassed median to access northbound lanes from the southbound lanes and vice-versa. Please find enclosed the project site map, permit drawings, roadway design plan sheets, the Categorical Exclusion and the Community Impact Assessment (Appendix C in the CE).

IMPACTS TO WATERS OF THE UNITED STATES

Water resources within the study area are located in the Cape Fear River Drainage Basin (HU 03030002). Two unnamed tributaries (UT) to Booker Creek are the only jurisdictional water resources that fall within the project area. Unnamed tributaries receive the same classification as the streams to which they flow. The classification for Booker Creek (DEM Index No. 16-14-1-15-2-(4), 12/1/83) is C NSW. Booker Creek is classified as a 303(d) Biologically Impaired water from the dam at Eastwood Lake to U.S. Hwy. 15. However, according to the North Carolina 2003 Impaired Waters List, the cause of impairment is not known. Both UT's are within one mile of this impaired section of Booker Creek.

Site 1 (see permit sheet 3 of 6) includes Booker Creek UT2. UT2 is a non-mitigable, intermittent stream that flows from Chapel Hill Memorial Cemetery southeastward along the eastern side of northbound US 15/501 into a 48-inch concrete pipe underneath US 15/501. This pipe drains into UT1. Existing topography and soil series' boundaries do not support the geographical location of

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1548 MAIL SERVICE CENTER
RALEIGH NC 27699-1548

TELEPHONE: 919-733-3141
FAX: 919-733-9794

WEBSITE: WWW. NCDOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

this intermittent channel. Most likely, this was a roadside ditch that was established during construction of US 15/501 to provide drainage for the northbound lanes. UT2 is not regularly maintained and appears to have naturalized, having no aquatic function. There is a short ephemeral segment of this channel flowing northeastward, from the corner of Europa Drive and US 15/501, draining into the same 48-inch concrete pipe.

UT2 has a channel width ranging from 3 to 5 feet and channel depth of 6 inches to 1 foot. Streambed substrate consists of silt and pebble in the lower reach and bedrock on the higher reach (close to the cemetery). Throughout, there is a well-defined bed and bank.

Site 2 (see permit sheet 3 of 6) includes Booker Creek UT1. UT1 drains the Erwin Road/southbound US 15/501intersection. After crossing the intersection, this perennial UT flows southwestward along the northwest side of Dobbins Drive.

UT1 has a channel width of approximately 4 to 6 feet at top of bank and a channel depth of 3 to 4 feet. Water within the channel ranges from 4 to 8 inches deep. Streambed substrate consists of silt, sand and gravel and there is a well-defined bed and bank. There is substantial evidence that storm flows have severely eroded the banks, undercutting the channel with debris and trash in and around the stream

Permanent Impacts: There are two jurisdictional streams with anticipated impacts on this project.

Site 1: Approximately 403 linear feet of stream (0.05 acre of fill in surface water) will be impacted on the right side of -Y2A- from Sta. 26+80 to 30+85 (See permit impact summary sheet 6 of 6). This impact is due to the widening of US 15/501. Due to the hill slope and close proximity to a hotel parking lot there is no potential for natural stream design at this site.

Site 2: The impact at Site 2 occurs on the right side of -Y3- Sta. 21+80 to 22+00 (see summary sheet 6 of 6). At this site a 42" RCP cross-pipe is being replaced with a 66" RCP and there is potential impact of 15 feet of channel (less than 0.01 acre of fill in surface water).

Restoration Plan: Standard Best Management Practices for Erosion and Sediment Control will be adhered to. The impacted areas will be revegetated according to the reforestation plan included in the Erosion Control plans and Standard Specifications.

Schedule: The project schedule calls for a production letting of 12/21/04 with a date of availability of 2/01/05.

Utilities: No utility impacts are associated with this project.

AVOIDANCE, MINIMIZATION AND MITIGATION

All steps will be taken to minimize stream impacts for the two unnamed tributaries to Booker Creek. There are no wetlands in the project area therefore long-term impacts to jurisdictional wetlands will be avoided as a result of the proposed improvements.

Site 1: Despite the minimization strategies employed for the proposed project, the resulting stream impacts of UT2 will be greater than 150 feet. However, the relocated UT2 will be a

grassed swale with filtering capabilities. Although the mitigation threshold was exceeded, UT2 does not require mitigation due to the stream having no aquatic function as explained by Mr. John Thomas of the US Army Corps of Engineers. Mr. Thomas stated, in a May 25, 2004 conversation, that UT2 is jurisdictional requiring no mitigation because it's only function is the conveyance of water.

Site 2: UT 1 does not meet the mitigation threshold amount of 150 feet of impact. Therefore, no mitigation is required at Site 2.

INDIRECT AND CUMULATIVE IMPACTS

A copy of the Indirect Impact Study has been included in this application for your review (see p. 17, Community Impact Assessment, Appendix C of the CE). Indirect impacts are those impacts that may come about because of an event such as the proposed transportation improvements at the intersection of US 15/501 and Erwin Road. As the proposed project primarily entails the reconfiguration of and improvements to an existing intersection to improve traffic flow and safety, the project should have minimal indirect and cumulative impacts in the study area.

As previously mentioned Booker Creek is an impaired stream and on the 303(d) list. According to the North Carolina 2003 Impaired Waters List, the cause of impairment is unknown. Therefore, this project should not affect the downstream water quality standards.

FEDERALLY-PROTECTED SPECIES

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 29, 2003, the United States Fish and Wildlife Service lists a combined total of five federally protected species for Orange County. Biological Conclusions of "No Effect" were found for the red cockaded woodpecker and dwarf wedge mussel species. However, the project area contains habitat suitable for small-whorled pogonia, smooth coneflower, and Michaux's sumac. According to the Natural Heritage database, smooth coneflower was last observed in the project vicinity in 1922, northwest of the intersection of US 15/501 and Summerfield Crossing Road. Surveys for small-whorled pogonia, smooth coneflower, and Michaux's sumac were conducted on May 6, 2003 by NCDOT biologists Logan Williams and Elizabeth Lusk. No plants were observed within the proposed ROW. However, since habitat exists for these plants, a "May Effect, Not Likely to Adversely Affect" conclusion has been issued. Concurrence with this conclusion has been requested from the US Fish and Wildlife Service (see attached letter).

SUMMARY

All aspects of this project are being processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR § 771.115(b). The NCDOT requests that these activities be authorized by a Nationwide Permit 23. Since all general conditions of the corresponding 401 Water Quality Certification (WQC) will be adhered to, written concurrence for a WQC from the N.C. Division of Water Quality (NCDWQ) is not required. The NCDWQ is

provided written notification of the proposed action by a copy of this Section 404 NWP 23 application.

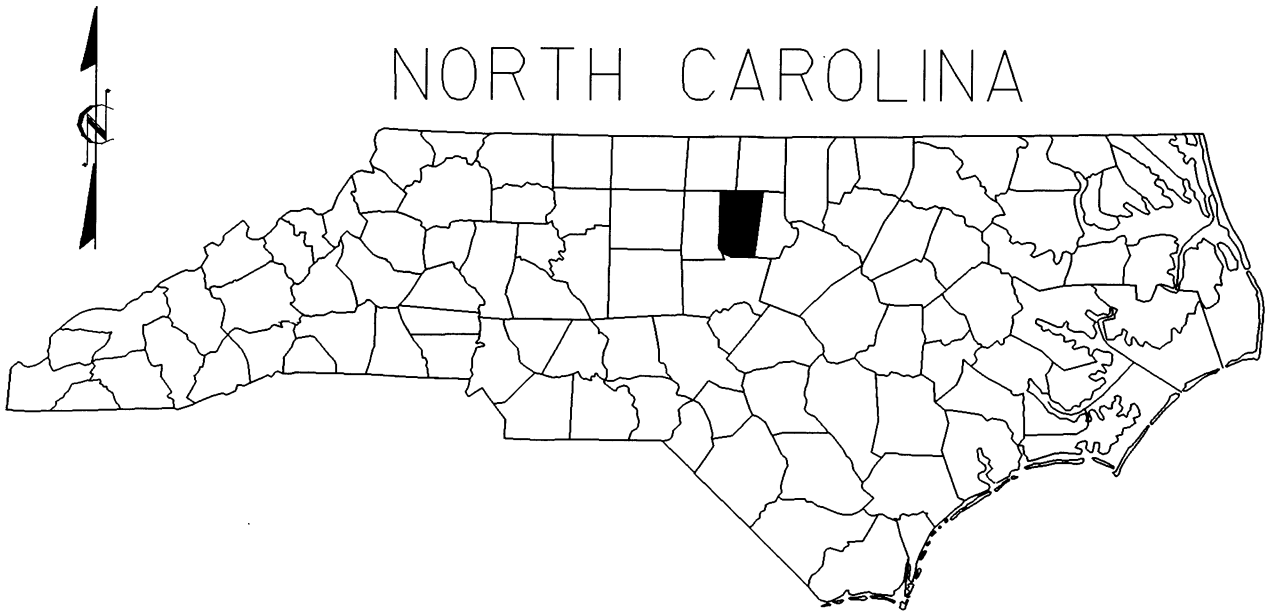
Thank you for your assistance with this project. If you have any questions or need additional information please call Ms. Cheryl Knepp at (919) 715-1489.

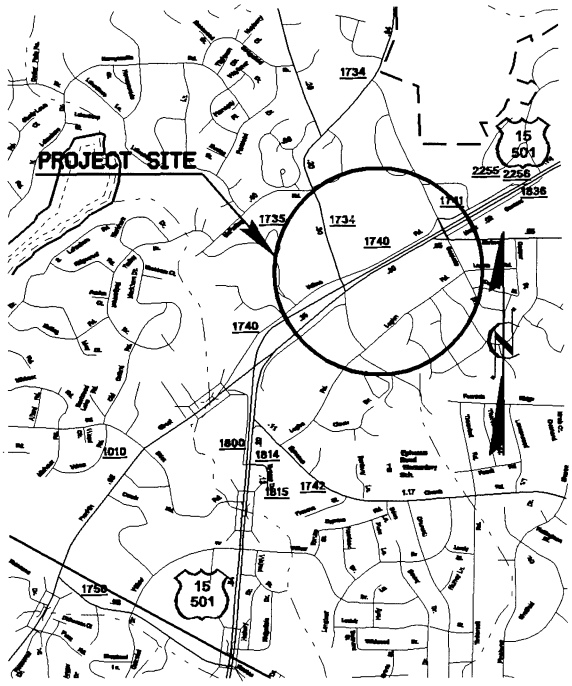
Sincerely,

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

GJT/hwm

cc:
Mr. John Hennessy, DWQ (2 copies)
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Mr. Jay Bennett, P.E., Roadway Design
Mr. Omar Sultan, Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. David Chang, P.E., Hydraulics
Mr. Ron Hancock, P.E., Bridge Construction
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Ms. Cristina Solberg, P.E.
Mr. John F. Sullivan, III, FHWA
Mr. J. M. Mills, P.E.
Mr. Jerry Parker, DEO
Mr. David Franklin, USACE, Wilmington



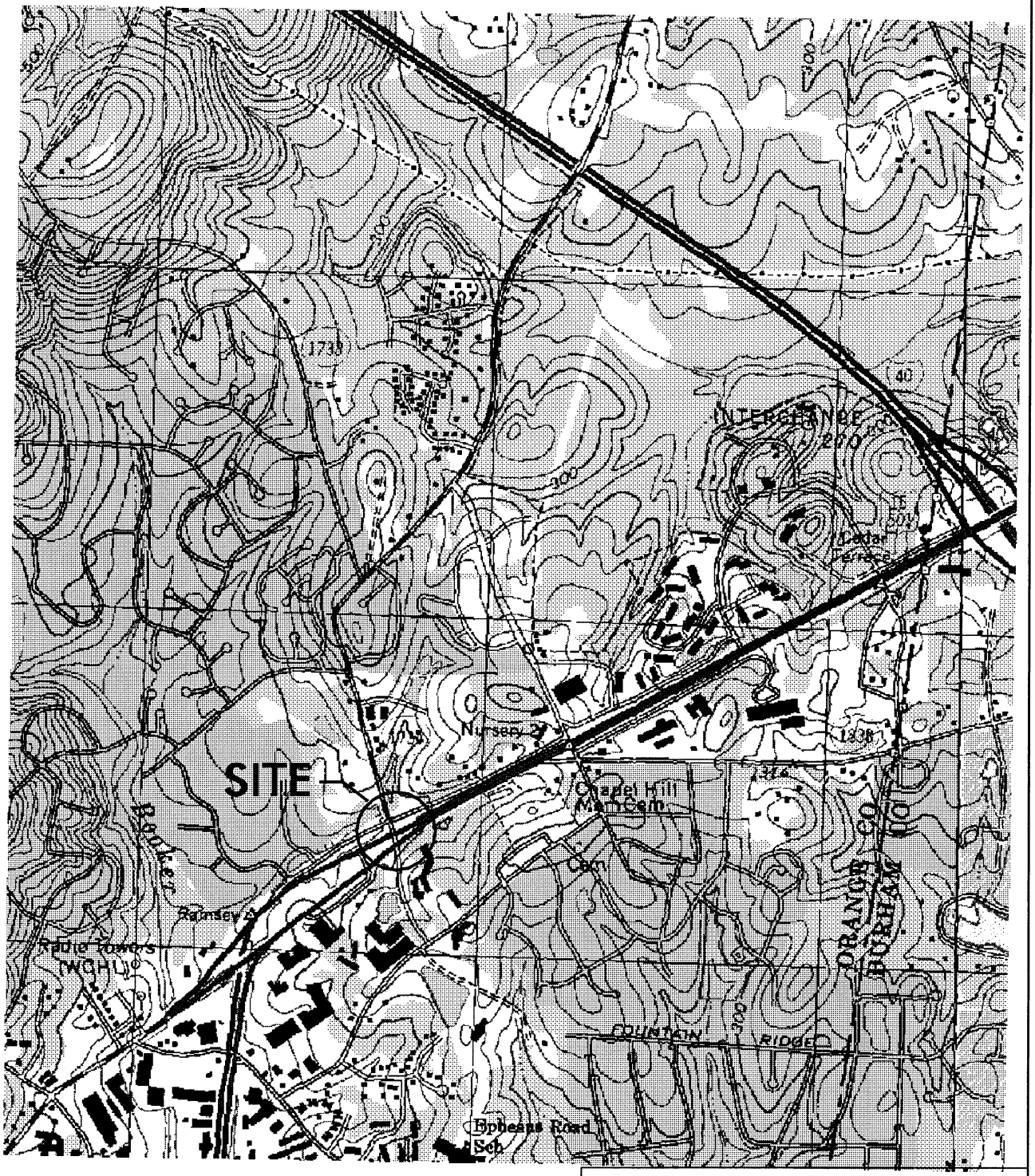


VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS
ORANGE COUNTY
PROJECT: 35009.1.1 (U-4008)
INTERSECTION IMPROVEMENT AT US 15-501 AND ERWIN ROAD IN CHAPEL HILL

SHEET 1 **OF** 6 **3/25/04**



SITE MAP

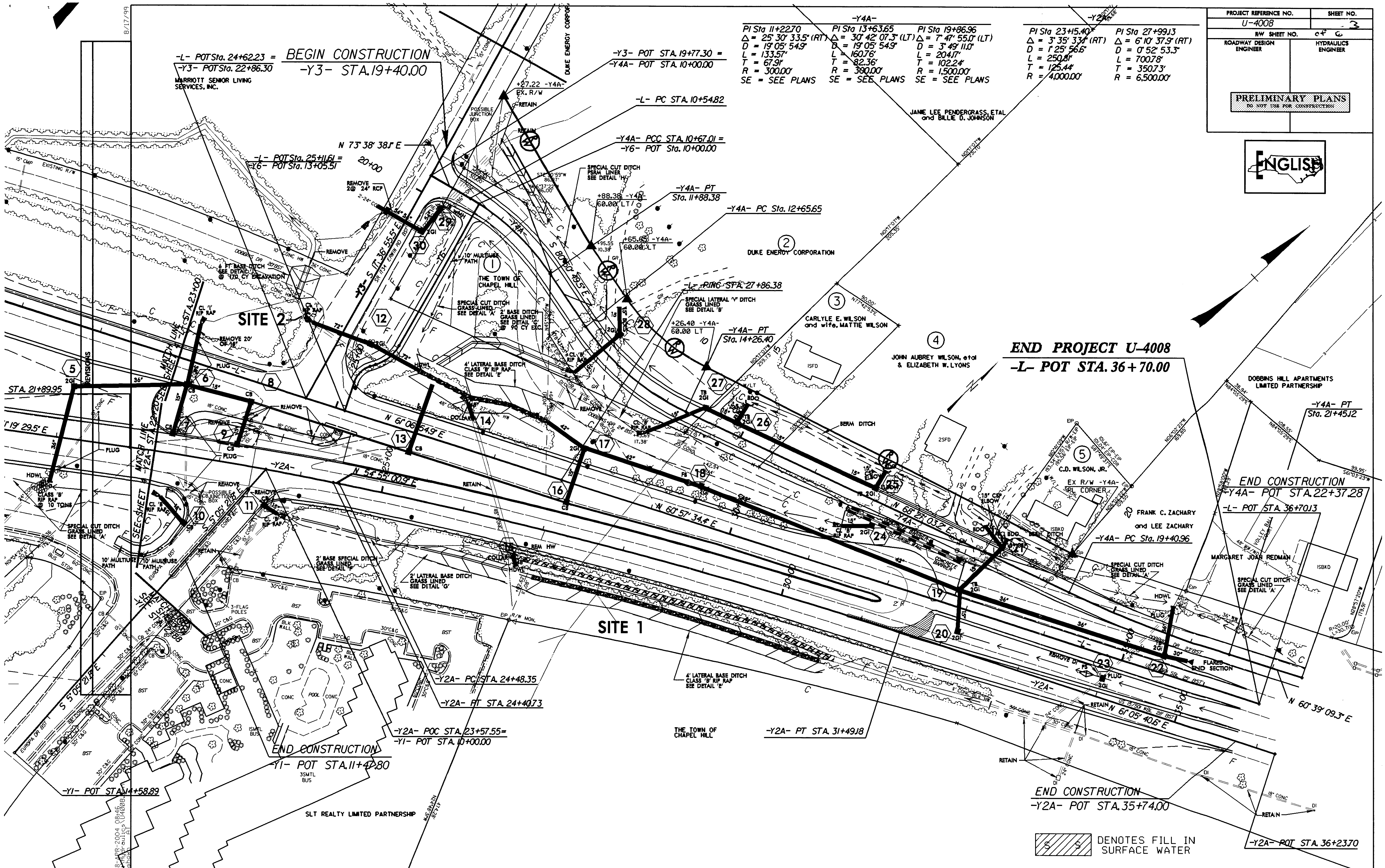
NCDOT

DIVISION OF HIGHWAYS

ORANGE COUNTY

PROJECT: 35009.1.1 (U-4008)

INTERSECTION IMPROVEMENT AT US 15-501 AND ERWIN ROAD IN CHAPEL HILL



PROJECT REFERENCE NO. U-4008
SHEET NO. 3
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
ENGLISH
-Y4A-
PI Sta 11+22.70
Δ = 25° 30' 33.5" (RT)
D = 19° 05' 54.9"
L = 133.57'
T = 67.91'
R = 300.00'
SE = SEE PLANS
PI Sta 13+63.65
Δ = 30° 42' 07.3" (LT)
D = 19° 05' 54.9"
L = 160.76'
T = 82.36'
R = 300.00'
SE = SEE PLANS
PI Sta 19+86.96
Δ = 7° 47' 55.0" (LT)
D = 3° 49' 11.0"
L = 204.17'
T = 102.24'
R = 1,500.00'
SE = SEE PLANS
-Y2A-
PI Sta 23+15.40
Δ = 3° 35' 33.1" (RT)
D = 1° 25' 56.6"
L = 250.81'
T = 125.44'
R = 4,000.00'
PI Sta 27+99.13
Δ = 6° 10' 37.9" (RT)
D = 0° 52' 53.3"
L = 700.78'
T = 350.73'
R = 6,500.00'
-L- POT Sta. 24+62.23 =
-Y3- POT Sta. 22+86.30
BEGIN CONSTRUCTION
-Y3- STA. 19+40.00
MARRIOTT SENIOR LIVING SERVICES, INC.
-Y3- POT STA. 19+77.30 =
-Y4A- POT STA. 10+00.00
-L- PC STA. 10+54.82
-Y4A- PCC STA. 10+67.01 =
-Y6- POT Sta. 10+00.00
-L- POT Sta. 25+11.61 =
-Y6- POT Sta. 13+05.51
N 73° 38' 38.1" E
-Y4A- PT Sta. 11+88.38
-Y4A- PC Sta. 12+65.65
DUKE ENERGY CORPORATION
JANIE LEE PENDERGRASS, ETAL and BILLIE D. JOHNSON
THE TOWN OF CHAPEL HILL
-L- RING STA. 27+86.38
CARLYLE E. WILSON and wife, MATTIE WILSON
-Y4A- PT Sta. 14+26.40
JOHN AUBREY WILSON, etal & ELIZABETH W. LYONS
END PROJECT U-4008
-L- POT STA. 36+70.00
DOBBINS HILL APARTMENTS LIMITED PARTNERSHIP
-Y4A- PT Sta. 21+45.12
C.D. WILSON, JR.
END CONSTRUCTION
-Y4A- POT STA. 22+37.28
-L- POT STA. 36+70.13
FRANK C. ZACHARY and LEE ZACHARY
-Y4A- PC Sta. 19+40.96
MARGARET JOAN REDMAN
SITE 2
SITE 1
STA. 21+89.95
N 61° 06' 54.9" E
N 54° 55' 00.9" E
N 60° 57' 34.4" E
N 68° 27' 03.7" E
N 60° 39' 09.3" E
N 61° 05' 40.6" E
-Y2A- PC STA. 24+48.35
-Y2A- PT STA. 24+40.73
-Y2A- POC STA. 23+57.55 =
-Y1- POT STA. 10+00.00
END CONSTRUCTION
-Y1- POT STA. 11+47.80
-Y1- POT STA. 14+58.89
-Y2A- PT STA. 31+49.18
THE TOWN OF CHAPEL HILL
SLT REALTY LIMITED PARTNERSHIP
END CONSTRUCTION
-Y2A- POT STA. 35+74.00
-Y2A- POT STA. 36+23.70
DENOTES FILL IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
U-4008	4
RW SHEET NO.	Of 6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ENGLISH

-L- POT Sta. 24+62.23 = -Y3- POT Sta. 22+86.30

BEGIN CONSTRUCTION -Y3- STA. 19+40.00

-Y3- POT STA. 19+77.30 = -Y4A- POT STA. 10+00.00

-L- PC STA. 10+54.82

-Y4A- PCC STA. 10+67.01 = -Y6- POT Sta. 10+00.00

-L- POT Sta. 25+11.61 = -Y6- POT Sta. 13+05.51

-Y4A- PT Sta. 11+88.38

-Y4A- PC Sta. 12+65.65

-L- PRC STA. 27+56.38

-Y4A- PT Sta. 14+26.40

-Y4A-

PI Sta 11+22.70	PI Sta 13+63.65	PI Sta 19+86.96
Δ = 25° 30' 33.5" (RT)	Δ = 30° 42' 07.3" (LT)	Δ = 7° 41' 55.0" (LT)
D = 19° 05' 54.9"	D = 19° 05' 54.9"	D = 3° 49' 11.0"
L = 133.57'	L = 160.76'	L = 204.17'
T = 67.91'	T = 82.36'	T = 102.24'
R = 300.00'	R = 300.00'	R = 1,500.00'
SE = SEE PLANS	SE = SEE PLANS	SE = SEE PLANS

-Y2A-

PI Sta 23+15.40	PI Sta 27+99.13
Δ = 3° 35' 33.4" (RT)	Δ = 6° 10' 37.9" (RT)
D = 1° 25' 56.6"	D = 0° 52' 53.3"
L = 250.81'	L = 700.78'
T = 125.44'	T = 350.73'
R = 4,000.00'	R = 6,500.00'

END PROJECT U-4008
-L- POT STA. 36+70.00

-Y4A- PT Sta. 21+45.12

END CONSTRUCTION
-Y4A- POT STA. 22+37.28
-L- POT STA. 36+70.13

-Y4A- PC Sta. 19+40.96

-Y2A- PC STA. 24+48.35

-Y2A- PT STA. 24+40.73

-Y2A- POC STA. 23+57.55 = -Y1- POT STA. 10+00.00

END CONSTRUCTION
-Y1- POT STA. 11+42.80

-Y1- POT STA. 14+58.89

-Y2A- PT STA. 31+49.18

END CONSTRUCTION
-Y2A- POT STA. 35+74.00

-Y2A- POT STA. 36+23.70

SITE 2

SITE 1

JANIE LEE PENDERGRASS, ETAL and BILLIE D. JOHNSON

DUKE ENERGY CORPORATION

THE TOWN OF CHAPEL HILL

CARLYLE E. WILSON and wife, MATTIE WILSON

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MARGARET JOAN REDMAN

DOBBINS HILL APARTMENTS LIMITED PARTNERSHIP

MARRIOTT SENIOR LIVING SERVICES, INC.

SLT REALTY LIMITED PARTNERSHIP

DENOTES FILL IN SURFACE WATER

08-APR-2004 08:41

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
	NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	

NCDOT

DIVISION OF HIGHWAYS
ORANGE COUNTY
PROJECT: 35009.1.1 (U-4008)

INTERSECTION IMPROVEMENT AT
US 15-501 AND ERWIN ROAD
IN CHAPEL HILL

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Mechanized Clearing (Method III) (ac)	Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
1	-Y2A- STA. 26+80						0.05			403 *	
	TO 30+85 RT.										
2	-Y3- STA. 21+80						<0.01			15	
	TO 22+00 RT.										
TOTALS:			0	0	0	0	0.05	0	0	418	0

*Stream is Intermittent and does not require mitigation

Form Revised 3/22/01

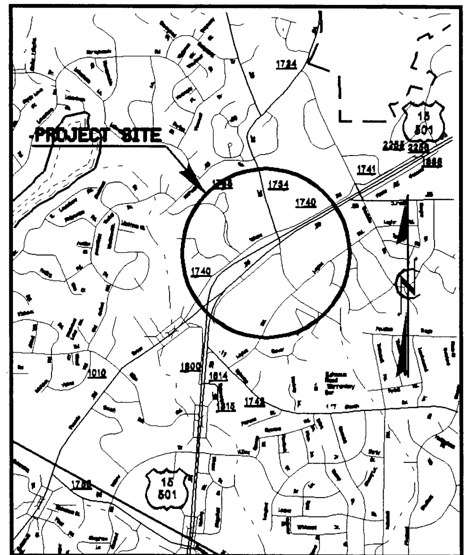
NCDOT

DIVISION OF HIGHWAYS
ORANGE COUNTY
PROJECT 35009.1.1 (U-4008)
INTERSECTION IMPROVEMENT AT
US 15-501 AND ERWIN ROAD
IN CHAPEL HILL

4/8/2004

CONTRACT: C200971 TIP PROJECT: U-4008

See Sheet 1-A For Index of Sheets



VICINITY MAP

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF CHAPEL HILL

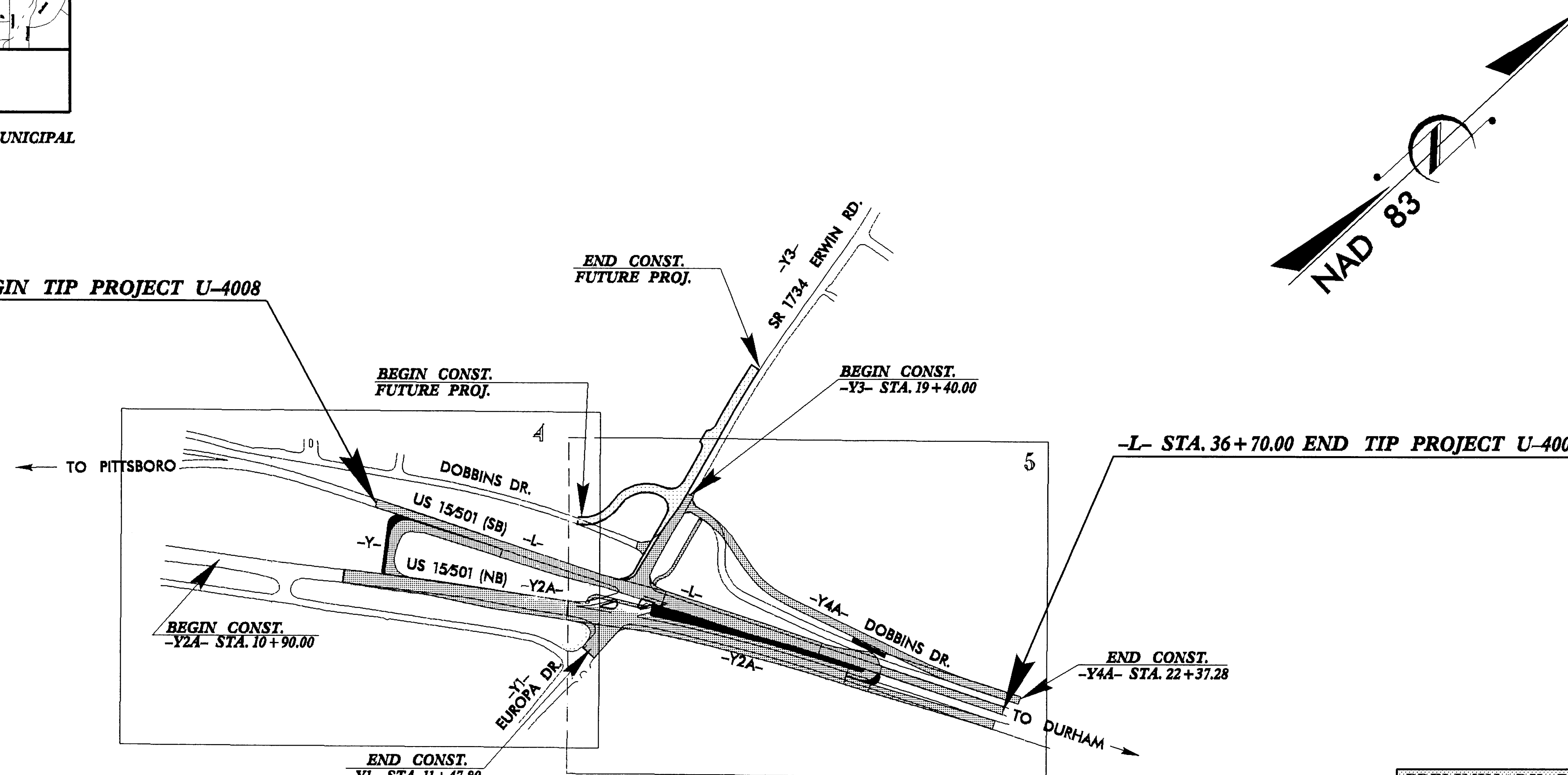
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ORANGE COUNTY

LOCATION: INTERSECTION IMPROVEMENT AT US 15-501 AND ERWIN ROAD IN CHAPEL HILL

TYPE OF WORK: GRADING, WIDENING, DRAINAGE, PAVING, SIGNALS, RETAINING WALL, AND RESURFACING

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4008	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
35009.1.1	NHF-15(9)	P.E.	
35009.2.2	NHS-15(9)	ROW, UTIL.	



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2002 = 48,800
ADT 2025 = 96,400
DHV = 11 %
D = 55 %
T = 3 % *
V = 45 MPH
* TTST 1% DUAL 2%
FUNC CLASS = ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-4008 = 0.392 MILES
TOTAL LENGTH TIP PROJECT U-4008 = 0.392 MILES

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

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 9, 2004

LETTING DATE:
DECEMBER 21, 2004

ROGER D. THOMAS, PE
PROJECT ENGINEER

BRIAN P. ROBINSON
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

5/28/99

*S.U.E = SUBSURFACE UTILITY ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

ROADS & RELATED ITEMS

- Edge of Pavement
- Curb
- Prop. Slope Stakes Cut
- Prop. Slope Stakes Fill
- Prop. Woven Wire Fence
- Prop. Chain Link Fence
- Prop. Barbed Wire Fence
- Prop. Wheelchair Ramp
- Curb Cut for Future Wheelchair Ramp
- Exist. Guardrail
- Prop. Guardrail
- Equality Symbol
- Pavement Removal

RIGHT OF WAY

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

HYDROLOGY

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

STRUCTURES

MAJOR

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

MINOR

- Head & End Wall
- Pipe Culvert
- Footbridge
- Drainage Boxes
- Paved Ditch Gutter

UTILITIES

- Exist. Pole
- Exist. Power Pole
- Prop. Power Pole
- Exist. Telephone Pole
- Prop. Telephone Pole
- Exist. Joint Use Pole
- Prop. Joint Use Pole
- Telephone Pedestal
- U/G Telephone Cable Hand Hold
- Cable TV Pedestal
- U/G TV Cable Hand Hold
- U/G Power Cable Hand Hold
- Hydrant
- Satellite Dish
- Exist. Water Valve
- Sewer Clean Out
- Power Manhole
- Telephone Booth
- Cellular Telephone Tower
- Water Manhole
- Light Pole
- H-Frame Pole
- Power Line Tower
- Pole with Base
- Gas Valve
- Gas Meter
- Telephone Manhole
- Power Transformer
- Sanitary Sewer Manhole
- Storm Sewer Manhole
- Tank; Water, Gas, Oil
- Water Tank With Legs
- Traffic Signal Junction Box
- Fiber Optic Splice Box
- Television or Radio Tower
- Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement
- Recorded Water Line
- Designated Water Line (S.U.E.*)
- Sanitary Sewer
- Recorded Sanitary Sewer Force Main
- Designated Sanitary Sewer Force Main(S.U.E.*)
- Recorded Gas Line
- Designated Gas Line (S.U.E.*)
- Storm Sewer
- Recorded Power Line
- Designated Power Line (S.U.E.*)
- Recorded Telephone Cable
- Designated Telephone Cable (S.U.E.*)
- Recorded U/G Telephone Conduit
- Designated U/G Telephone Conduit (S.U.E.*)
- Unknown Utility (S.U.E.*)
- Recorded Television Cable
- Designated Television Cable (S.U.E.*)
- Recorded Fiber Optics Cable
- Designated Fiber Optics Cable (S.U.E.*)
- Exist. Water Meter
- U/G Test Hole (S.U.E.*)
- Abandoned According to U/G Record — ATTUR
- End of Information — E.O.I.

BOUNDARIES & PROPERTIES

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Property Line Symbol
- Exist. Iron Pin
- Property Corner
- Property Monument
- Property Number
- Parcel Number
- Fence Line
- Existing Wetland Boundaries
- High Quality Wetland Boundary
- Medium Quality Wetland Boundaries
- Low Quality Wetland Boundaries
- Proposed Wetland Boundaries
- Existing Endangered Animal Boundaries
- Existing Endangered Plant Boundaries

BUILDINGS & OTHER CULTURE

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

TOPOGRAPHY

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

VEGETATION

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

RAILROADS

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

revised 02/02/00

17-MAY-2004 16:30 U4008.sum

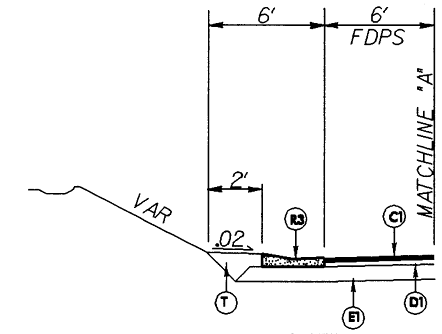
PROJECT REFERENCE NO.	SHEET NO.
U-4008	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

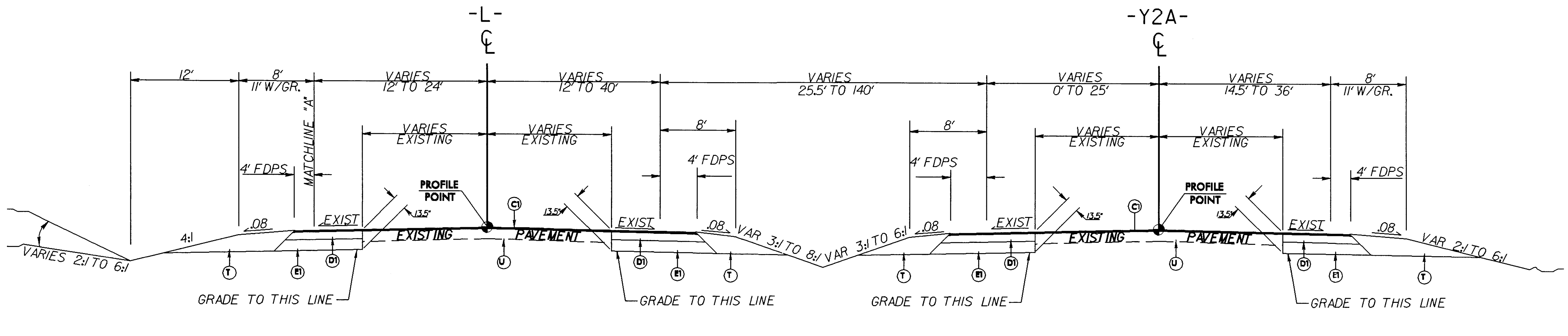
PRELIMINARY PAVEMENT

PAVEMENT SCHEDULE

C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.	R5	3" CONCRETE ISLAND COVER.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.	R1	2'-6" CONCRETE CURB AND GUTTER.	T	EARTH MATERIAL.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	R2	1'-6" CONCRETE CURB AND GUTTER.	U	EXISTING PAVEMENT.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2¼" IN DEPTH OR GREATER THAN 4" IN DEPTH.	R3	4' CONCRETE EXPRESSWAY GUTTER.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL SHEET No. 2)
E1	PROP. APPROX. 6.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0, AT AN AVERAGE RATE OF 370.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	R4	5" MONOLITHIC CONCRETE ISLAND		



INSET "A"

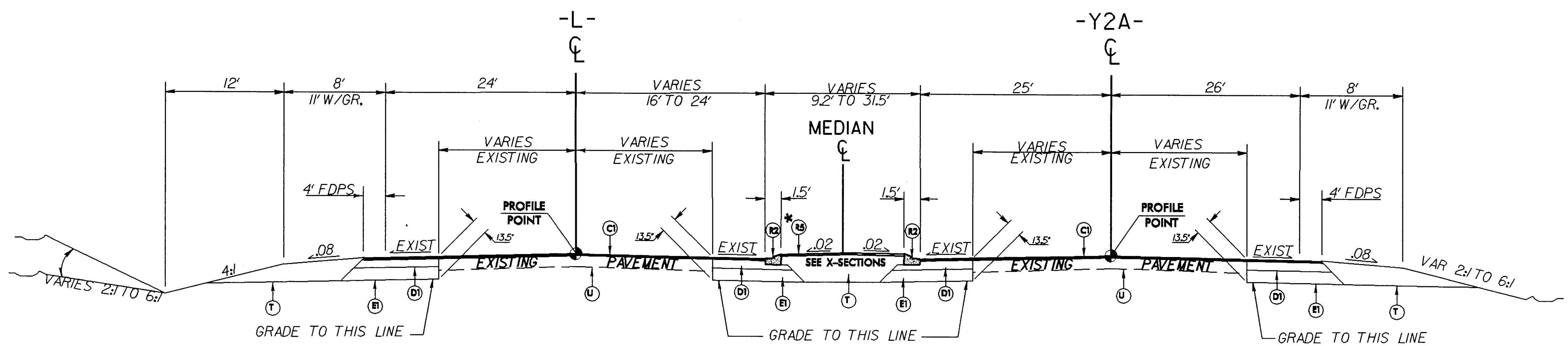


TYPICAL SECTION NO.1

USE TYPICAL SECTION NO.1

-L- STA.16+00.00 TO STA.22+86.00
-L- STA.32+67.00 TO STA.36+50.00

NOTE: USE INSET "A" -L- STA. 32+82.00 TO STA. 35+50.00 LT.



TYPICAL SECTION NO.2

USE TYPICAL SECTION NO.2

* -L- STA. 22+86.00 TO STA. 25+27.00 RAISED GRASS MEDIAN

-L- STA. 25+27.00 TO STA. 32+00.00

6/2/99

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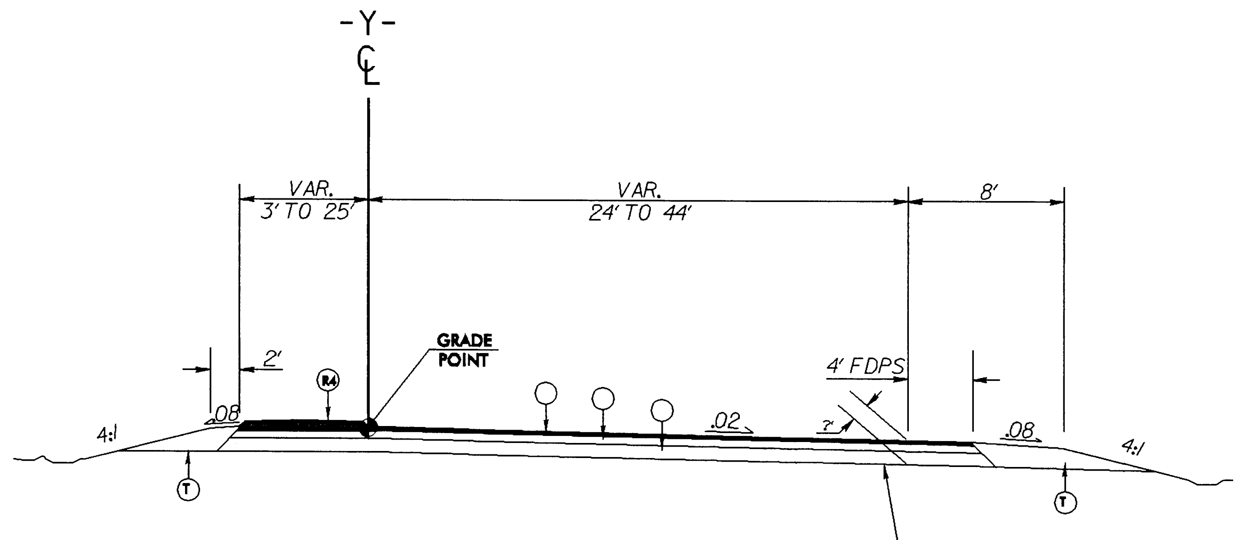
RDPD1290 AT RD196500

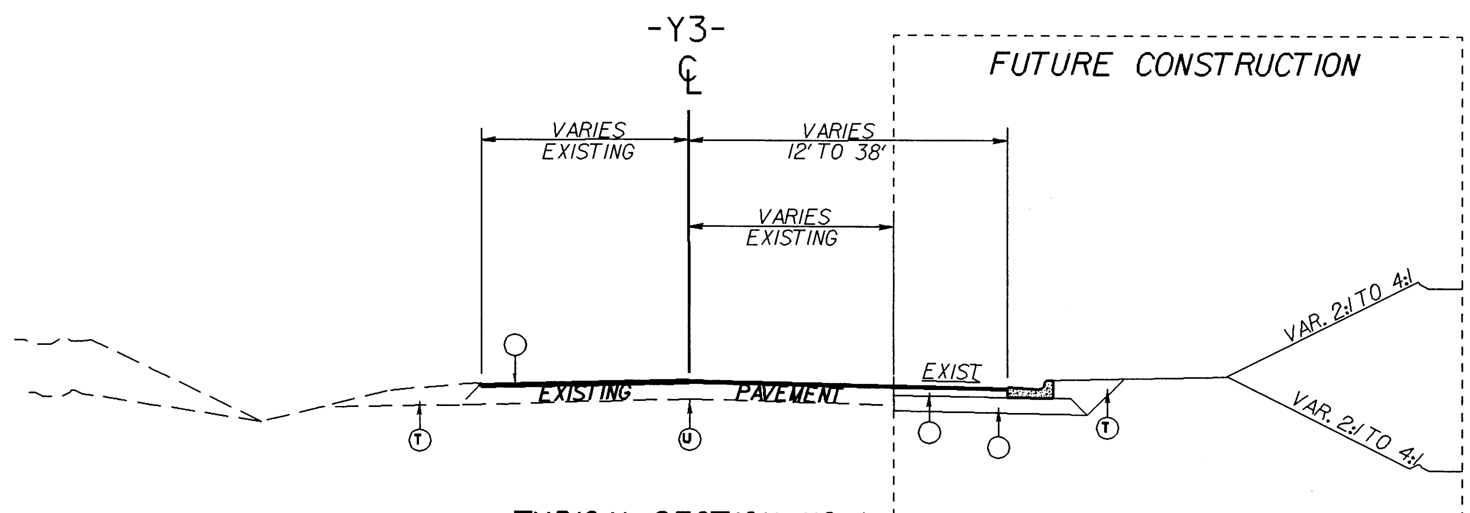
PROJECT REFERENCE NO.	SHEET NO.
U-4008	2A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



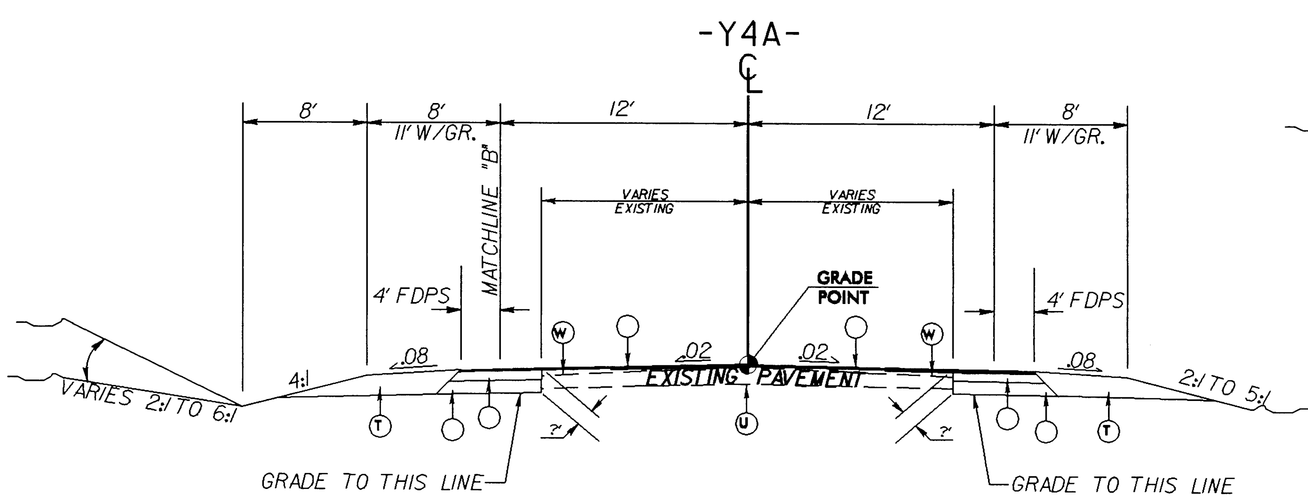
TYPICAL SECTION NO.3

USE TYPICAL SECTION NO.3
-Y- STA. 10+22.00 TO STA. 13+19.00

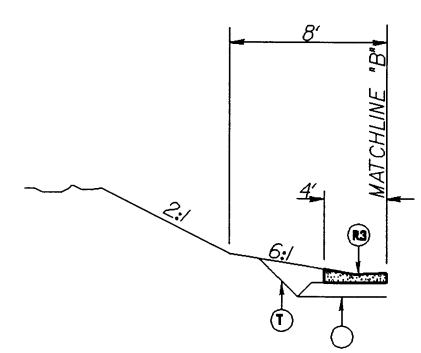


TYPICAL SECTION NO.4

USE TYPICAL SECTION NO.4
-Y3- STA. 19+40.00 TO STA. 22+61.83



TYPICAL SECTION NO.5



INSET "B"

USE TYPICAL SECTION NO.5
-Y4A- STA. 10+12.00 TO STA. 12+00.00
-Y4A- STA. 19+27.03 TO STA. 22+37.28
NOTE: USE INSET "B" -Y4A- STA. 19+27.03 TO STA. 19+30.00 LT.

PRELIMINARY PAVEMENT

PAVEMENT SCHEDULE	
C?	?", TYPE S9.5C
C2	VAR. DEPTH, TYPE S9.5C
D?	?", TYPE I19.0C
D2	VAR. DEPTH, TYPE I19.0C
E?	?", TYPE B25.0
E2	VAR. DEPTH, TYPE B25.0
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	1'-6" CONCRETE CURB AND GUTTER.
R3	4' CONCRETE EXPRESSWAY GUTTER.
R4	8" MONOLITHIC CONCRETE ISLAND
R5	3" CONCRETE ISLAND COVER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING

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

FULL DEPTH WIDENING ALL ASPHALT

6/2/99

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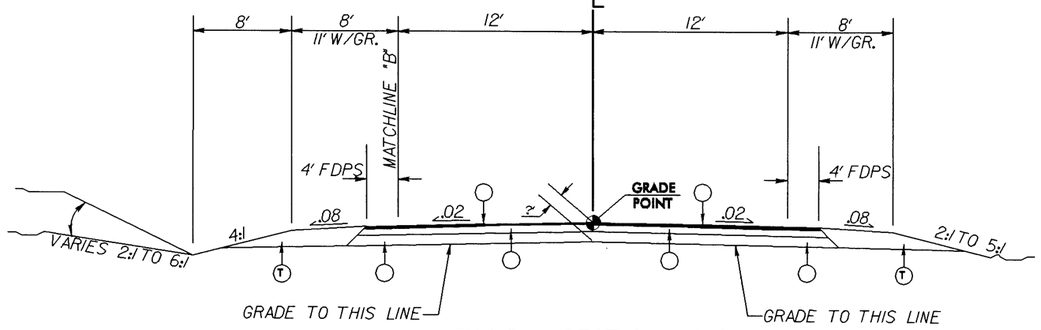
RD196500

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
U-4008	2B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

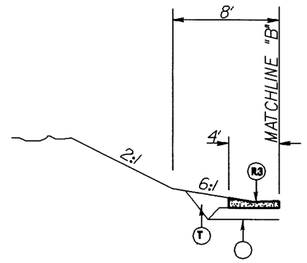
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y4A-



TYPICAL SECTION NO.6

USE TYPICAL SECTION NO.6
-Y4A- STA. 12+00.00 TO STA. 19+27.03
NOTE: USE INSET "B" -Y4A- STA. 14+43.57 TO STA. 19+27.03 LT.



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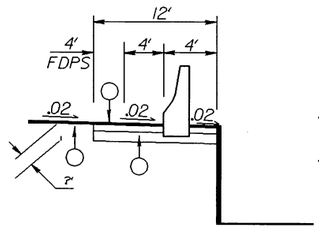


RETAINING WALL DETAIL

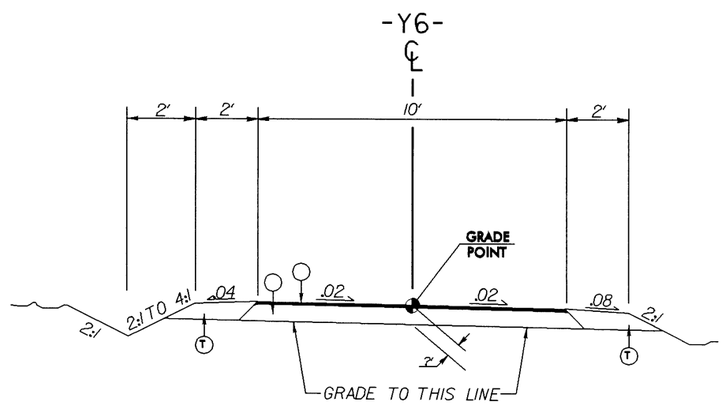
USE DETAIL
-Y4A- STA. 16+53+ TO 18+10+ RT.

PRELIMINARY PAVEMENT

PAVEMENT SCHEDULE	
C?	?", TYPE S9.5C
C2	VAR. DEPTH, TYPE S9.5C
D?	?", TYPE I19.0C
D2	VAR. DEPTH, TYPE I19.0C
E?	?", TYPE B25.0
E2	VAR. DEPTH, TYPE B25.0
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	1'-6" CONCRETE CURB AND GUTTER.
R3	4' CONCRETE EXPRESSWAY GUTTER.
R4	5" MONOLITHIC CONCRETE ISLAND
R5	3" CONCRETE ISLAND COVER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING

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

-Y6-



TYPICAL SECTION NO.7

USE TYPICAL SECTION NO.7
-Y6- STA. 10+17.12 TO STA. 12+70.01
NOTE: A MULTI-USE-PATH

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BPRobinson AT RD16500

PROJECT REFERENCE NO.	SHEET NO.
U-4008	4

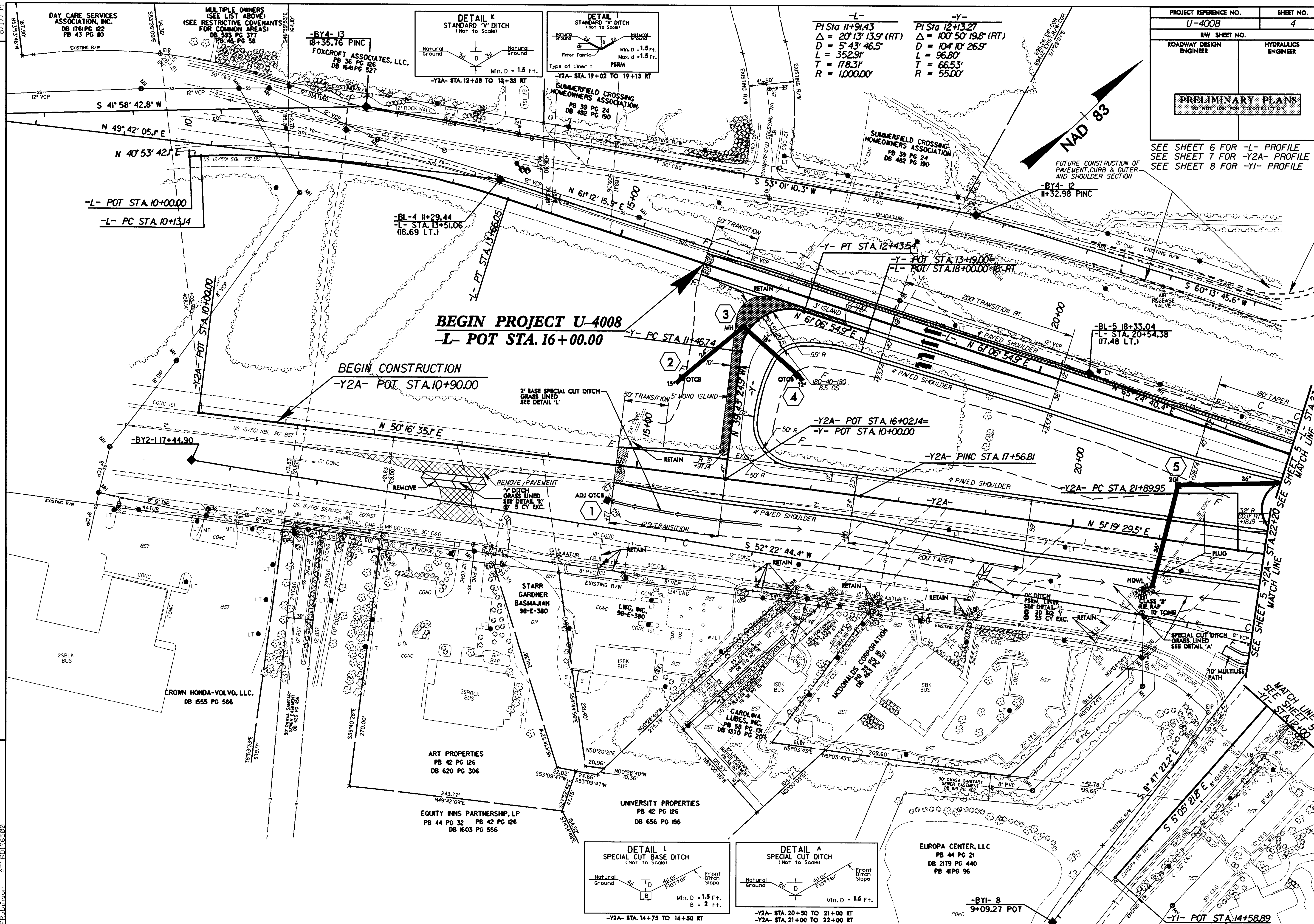
R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SEE SHEET 6 FOR -L- PROFILE
SEE SHEET 7 FOR -Y2A- PROFILE
SEE SHEET 8 FOR -Y1- PROFILE

REVISIONS



-L-
PI Sta 11+91.43
Δ = 20° 13' 13.9" (RT)
D = 5° 43' 46.5"
L = 352.91'
T = 178.31'
R = 1,000.00'
-Y-
PI Sta 12+13.27
Δ = 100° 50' 19.8" (RT)
D = 104° 10' 26.9"
L = 96.80'
T = 66.53'
R = 55.00'
DETAIL K
STANDARD 'V' DITCH
(Not to Scale)
Natural Ground
Min. D = 1.5 Ft.
-Y2A- STA. 12+58 TO 13+33 RT
DETAIL I
STANDARD 'V' DITCH
(Not to Scale)
Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
Filter Fabric
Type of Liner = PSRM
-Y2A- STA. 19+02 TO 19+13 RT
NAD 83
DAY CARE SERVICES ASSOCIATION, INC.
DB 1761 PG 122
PB 43 PG 110
MULTIPLE OWNERS
(SEE LIST ABOVE)
(SEE RESTRICTIVE COVENANTS FOR COMMON AREAS)
DB 593 PG 377
PB 46 PG 58
-BY4- 13
18+35.76 PINC
FOXCROFT ASSOCIATES, LLC.
PB 36 PG 126
DB 1641 PG 527
SUMMERFIELD CROSSING HOMEOWNERS ASSOCIATION
PB 39 PG 24
DB 482 PG 190
S 41° 58' 42.8" W
N 49° 42' 05.1" E
N 40° 53' 42.1" E
-L- POT STA. 10+00.00
-L- PC STA. 10+13.14
-BL-4 11+29.44
-L- STA. 13+51.06
(18.69 LT.)
-L- PT STA. 13+66.05
N 61° 12' 15.9" E
S 53° 01' 10.3" W
FUTURE CONSTRUCTION OF PAVEMENT, CURB & GUTER AND SHOULDER SECTION
-BY4- 12
11+32.98 PINC
S 60° 13' 45.6" W
-Y- PT STA. 12+43.54
-Y- POT STA. 13+19.00=
-L- POT STA. 18+00.00 18' RT
200' TRANSITION RT.
BEGIN PROJECT U-4008
-L- POT STA. 16+00.00
-Y- PC STA. 11+46.74
N 61° 06' 54.9" E
-BL-5 18+33.04
-L- STA. 20+54.38
(17.48 LT.)
N 65° 24' 40.4" E
BEGIN CONSTRUCTION
-Y2A- POT STA. 10+90.00
2' BASE SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'L'
50' TRANSITION
5' MONO ISLAND
N 39° 43' 21.9" W
-Y2A- POT STA. 16+02.14=
-Y- POT STA. 10+00.00
-Y2A- PINC STA. 17+56.81
N 50° 16' 35.1" E
-BY2-1 17+44.90
US 15/501 NBL
US 15/501 SBL
REMOVE
REMOVE PAVEMENT
'V' DITCH GRASS LINED SEE DETAIL 'K'
5 CY EXC.
ADJ CTCB
4' PAVED SHOULDER
125' TRANSITION
-Y2A- PC STA. 21+89.95
N 51° 19' 29.5" E
S 52° 22' 44.4" W
200' TAPER
180' TAPER
SEE SHEET 5 -L- STA. 23+00 MATCH LINE
SEE SHEET 5 -Y2A- STA. 22+20 MATCH LINE
'V' DITCH PSRM LINER SEE DETAIL 'I'
30 SQ Y
25 CY EXC.
CLASS 'B' RIP RAP
10 TONS
SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'A'
10' MULTIUSE PATH
STARR GARDNER BASMAJIAN
98-E-380
LWG, INC.
98-E-380
CROWN HONDA-VOLVO, LLC.
DB 1555 PG 566
ART PROPERTIES
PB 42 PG 126
DB 620 PG 306
EQUITY INNS PARTNERSHIP, LP
PB 44 PG 32
PB 42 PG 126
DB 1603 PG 556
UNIVERSITY PROPERTIES
PB 42 PG 126
DB 656 PG 196
MCDONALDS CORPORATION
CAROLINA LUBES, INC.
EUROPA CENTER, LLC
PB 44 PG 21
DB 2179 PG 440
PB 41 PG 96
-BY1- 8
9+09.27 POT
-Y1- POT STA. 14+58.89
S 8° 47' 22.2" E
S 5° 05' 21.8" E
MATCH LINE -Y1- STA. 12+00 SEE SHEET 5
DETAIL L
SPECIAL CUT BASE DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
Min. D = 1.5 Ft.
B = 2 Ft.
-Y2A- STA. 14+75 TO 16+50 RT
DETAIL A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
Min. D = 1.5 Ft.
-Y2A- STA. 20+50 TO 21+00 RT
-Y2A- STA. 21+00 TO 22+00 RT

8/17/99

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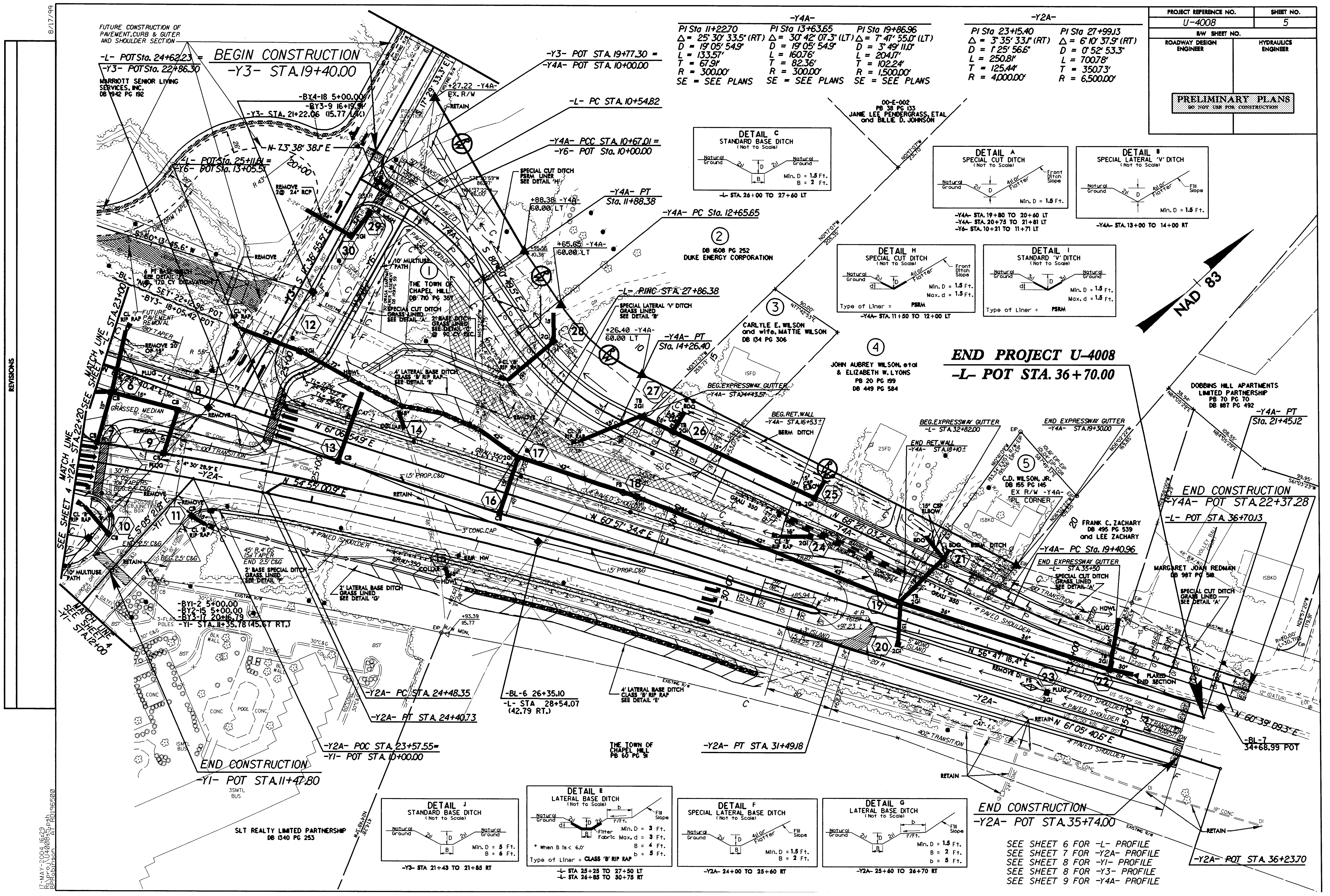
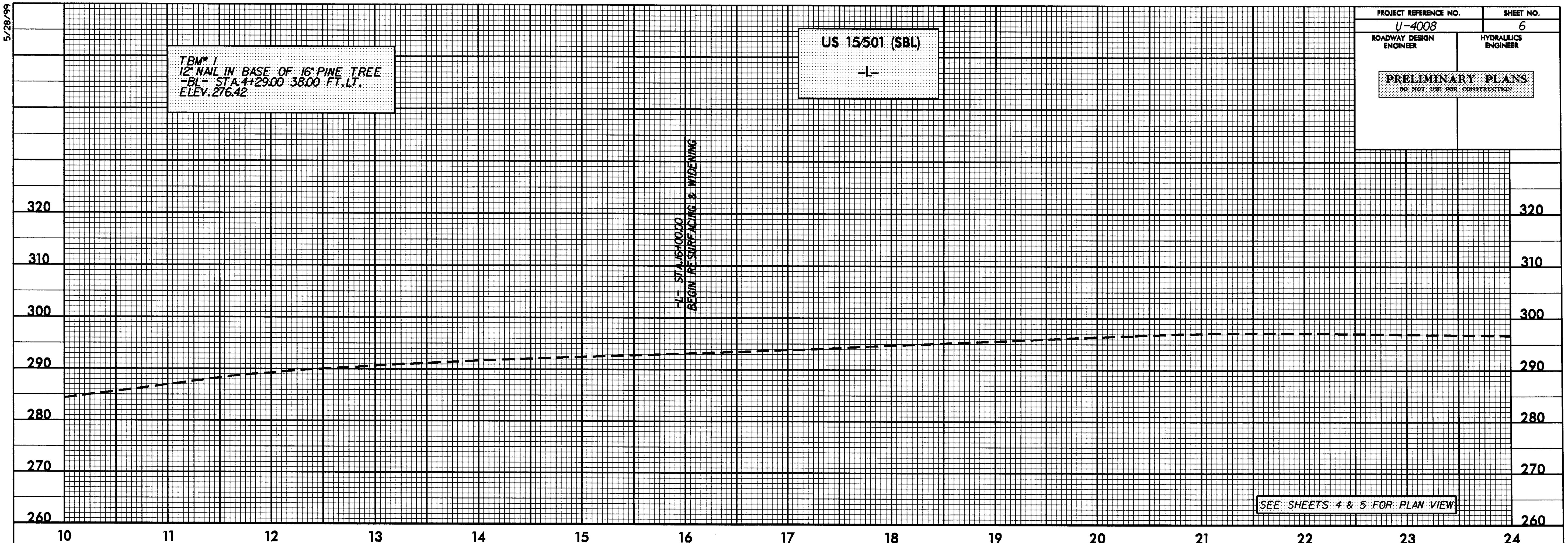
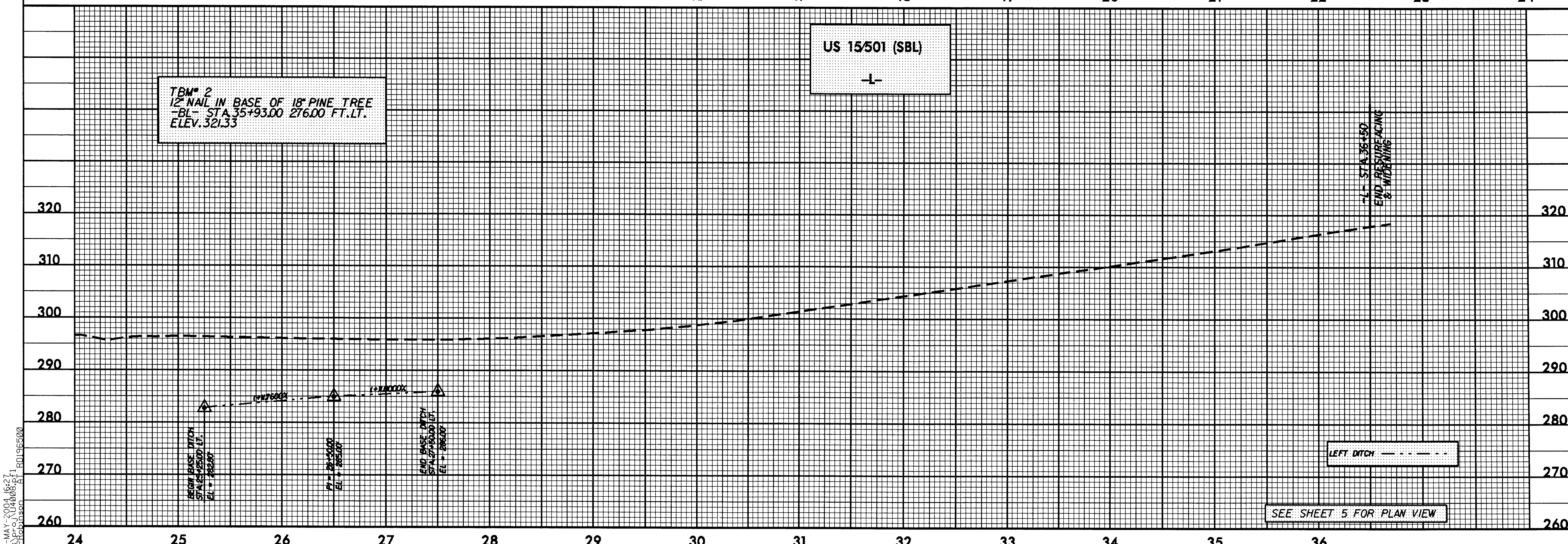

PROJECT REFERENCE NO. U-4008
SHEET NO. 5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
REVISIONS
8/17/99
-Y4A-
PI Sta 11+22.70 Δ = 25° 30' 33.5" (RT) D = 19° 05' 54.9" L = 133.57' T = 67.91' R = 300.00' SE = SEE PLANS
PI Sta 13+63.65 Δ = 30° 42' 07.3" (LT) D = 19° 05' 54.9" L = 160.76' T = 82.36' R = 300.00' SE = SEE PLANS
PI Sta 19+86.96 Δ = 7° 47' 55.0" (LT) D = 3° 49' 11.0" L = 204.17' T = 102.24' R = 1,500.00' SE = SEE PLANS
-Y2A-
PI Sta 23+15.40 Δ = 3° 35' 33.1" (RT) D = 1° 25' 56.6" L = 250.81' T = 125.44' R = 4,000.00'
PI Sta 27+99.13 Δ = 6° 10' 37.9" (RT) D = 0° 52' 53.3" L = 700.78' T = 350.73' R = 6,500.00'
FUTURE CONSTRUCTION OF PAVEMENT, CURB & GUTER AND SHOULDER SECTION
-L- POT Sta. 24+62.23 = -Y3- POT Sta. 22+86.30
BEGIN CONSTRUCTION -Y3- STA. 19+40.00
MARRIOTT SENIOR LIVING SERVICES, INC. DB 1942 PG 192
-Y3- POT STA. 19+77.30 = -Y4A- POT STA. 10+00.00
-L- PC STA. 10+54.82
-Y4A- PCC STA. 10+67.01 = -Y6- POT Sta. 10+00.00
-Y4A- PT Sta. 11+88.38
-Y4A- PC Sta. 12+65.65
-L- PINC STA. 27+86.38
-Y4A- PT Sta. 14+26.40
00-E-002 PB 38 PG 133 JANIE LEE PENDERGRASS, ETAL and BILLIE D. JOHNSON
DB 1608 PG 252 DUKE ENERGY CORPORATION
CARLYLE E. WILSON and wife, MATTIE WILSON DB 134 PG 306
JOHN AUBREY WILSON, etal & ELIZABETH W. LYONS PB 20 PG 199 DB 449 PG 584
THE TOWN OF CHAPEL HILL DB 710 PG 357
C.D. WILSON, JR. DB 155 PG 145
FRANK C. ZACHARY DB 495 PG 539 and LEE ZACHARY
MARGARET JOAN REDMAN DB 987 PG 318
DOBBINS HILL APARTMENTS LIMITED PARTNERSHIP PB 70 PG 70 DB 887 PG 492
THE TOWN OF CHAPEL HILL PB 60 PG 51
SLT REALTY LIMITED PARTNERSHIP DB 1340 PG 253
END PROJECT U-4008 -L- POT STA. 36+70.00
NAD 83
END CONSTRUCTION -Y4A- POT STA. 22+37.28 -L- POT STA. 36+70.13
-Y4A- PT Sta. 21+45.12
-Y4A- PC Sta. 19+40.96
END EXPRESSWAY GUTTER -Y4A- STA. 19+30.00
BEG. EXPRESSWAY GUTTER -L- STA. 32+82.00
END RET. WALL -Y4A- STA. 18+10±
BEG. RET. WALL -Y4A- STA. 16+53±
BEG. EXPRESSWAY GUTTER -Y4A- STA. 14+43.57
-BL-7 34+68.99 POT
-BL-6 26+35.10 -L- STA 28+54.07 (42.79 RT.)
-Y2A- PC STA. 24+48.35
-Y2A- PT STA. 24+40.73
-Y2A- POC STA. 23+57.55 = -Y1- POT STA. 10+00.00
-Y2A- PT STA. 31+49.18
END CONSTRUCTION -Y1- POT STA. 11+47.80
END CONSTRUCTION -Y2A- POT STA. 35+74.00
-Y2A- POT STA. 36+23.70
-BY1-2 5+00.00 -BY2-15 5+00.00 -BY3-17 20+16.79 -Y1- STA. 11+35.78 (45.67 RT.)
-BY4-18 5+00.00 -BY3-9 16+19.91 -Y3- STA. 21+22.06 (15.77 LT.)
-L- POT Sta. 25+11.61 = -Y6- POT Sta. 13+05.51
MATCH LINE -Y2A- STA. 22+20 SEE SHEET 4
MATCH LINE -L- STA. 23+00 SEE SHEET 4
MATCH LINE -Y1- STA. 12+00 SEE SHEET 4
N 61° 08' 54.9" E
N 54° 55' 00.9" E
N 60° 57' 34.4" E
N 68° 27' 03.2" E
N 56° 41' 18.4" E
N 61° 05' 40.6" E
N 60° 39' 09.3" E
N 73° 38' 38.1" E
DETAIL A SPECIAL CUT DITCH (Not to Scale) Min. D = 1.5 Ft. -Y4A- STA. 19+80 TO 20+60 LT -Y4A- STA. 20+75 TO 21+81 LT -Y6- STA. 10+21 TO 11+71 LT
DETAIL B SPECIAL LATERAL 'V' DITCH (Not to Scale) Min. D = 1.5 Ft. -Y4A- STA. 13+00 TO 14+00 RT
DETAIL C STANDARD BASE DITCH (Not to Scale) Min. D = 1.5 Ft. B = 2 Ft. -L- STA. 26+00 TO 27+60 LT
DETAIL H SPECIAL CUT DITCH (Not to Scale) Min. D = 1.5 Ft. Max. d = 1.5 Ft. Type of Liner = PSRM -Y4A- STA. 11+50 TO 12+00 LT
DETAIL I STANDARD 'V' DITCH (Not to Scale) Min. D = 1.5 Ft. Max. d = 1.5 Ft. Type of Liner = PSRM
DETAIL J STANDARD BASE DITCH (Not to Scale) Min. D = 5 Ft. B = 6 Ft. -Y3- STA 21+43 TO 21+85 RT
DETAIL E LATERAL BASE DITCH (Not to Scale) Min. D = 3 Ft. Max. d = 3 Ft. B = 4 Ft. b = 5 Ft. * When B is < 6.0' Type of Liner = CLASS 'B' RIP RAP -L- STA 25+25 TO 27+50 LT -L- STA 26+85 TO 30+75 RT
DETAIL F SPECIAL LATERAL BASE DITCH (Not to Scale) Min. D = 1.5 Ft. B = 2 Ft. -Y2A- 24+00 TO 25+60 RT
DETAIL G LATERAL BASE DITCH (Not to Scale) Min. D = 1.5 Ft. B = 2 Ft. b = 5 Ft. -Y2A- 25+60 TO 26+70 RT
SEE SHEET 6 FOR -L- PROFILE
SEE SHEET 7 FOR -Y2A- PROFILE
SEE SHEET 8 FOR -Y1- PROFILE
SEE SHEET 8 FOR -Y3- PROFILE
SEE SHEET 9 FOR -Y4A- PROFILE
17-MAY-2004 16:29

PROJECT REFERENCE NO.	SHEET NO.
U-4008	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5/28/99





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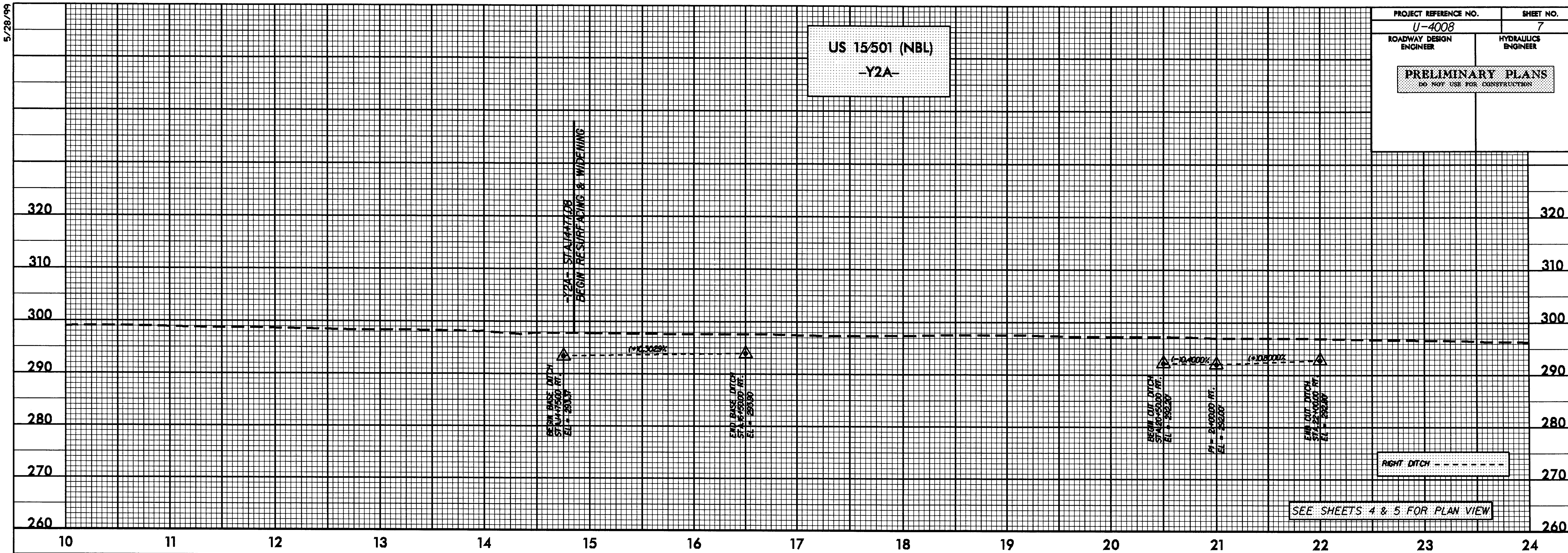
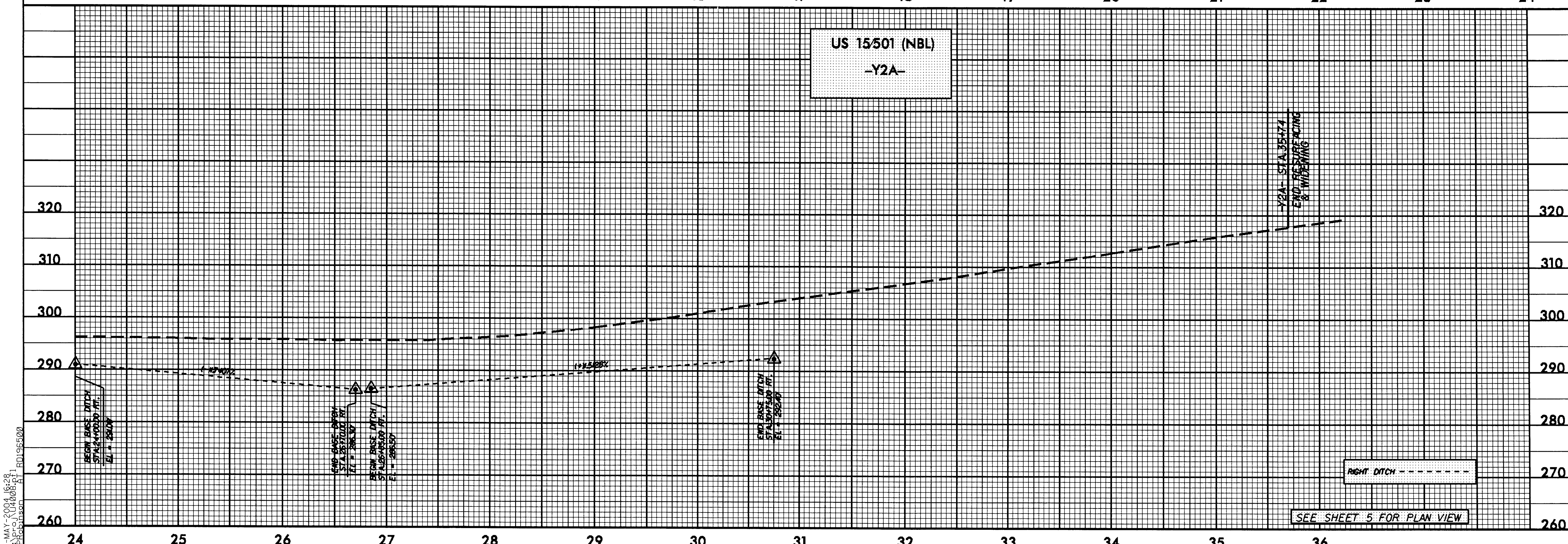
BPRobinson AT RD196500

PROJECT REFERENCE NO.	SHEET NO.
U-4008	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5/28/99





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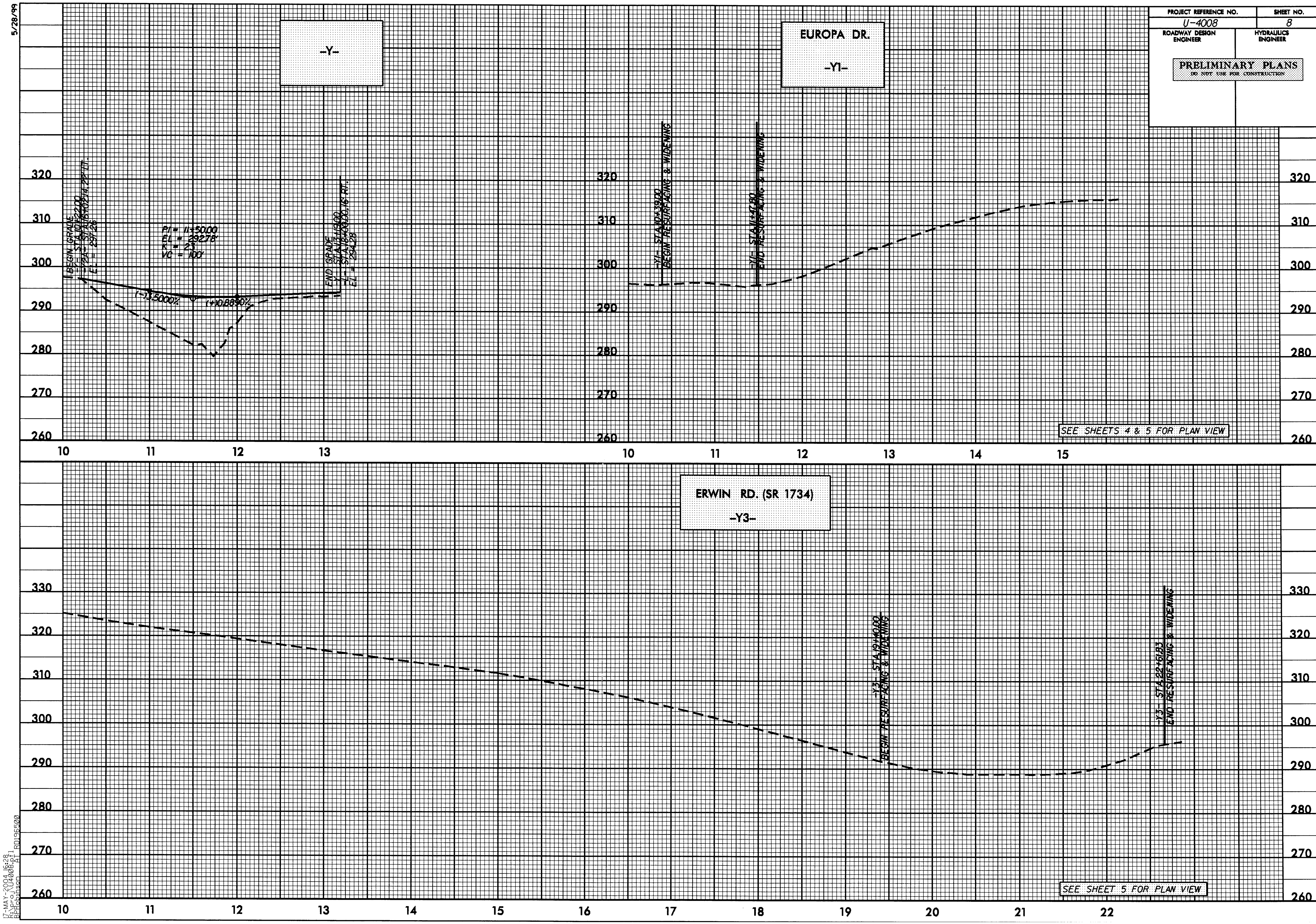
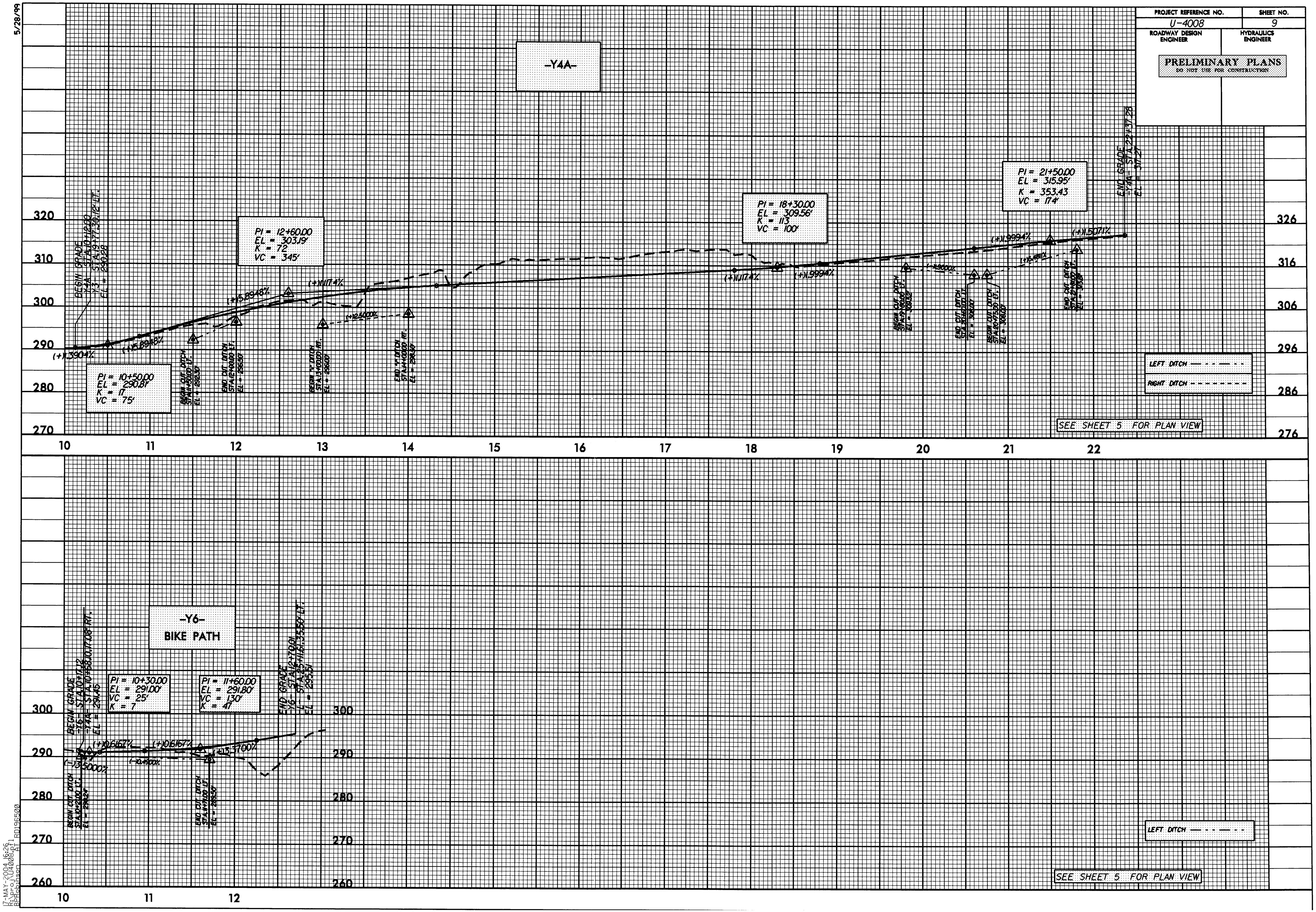
PROJECT REFERENCE NO.	SHEET NO.
U-4008	8

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION




5/28/99
PROJECT REFERENCE NO.
U-4008
SHEET NO.
9
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
-Y4A-
PI = 10+50.00
EL = 290.81'
K = 17
VC = 75'
PI = 12+60.00
EL = 303.19'
K = 72
VC = 345'
PI = 18+30.00
EL = 309.56'
K = 113
VC = 100'
PI = 21+50.00
EL = 315.95'
K = 353.43
VC = 174'
BEGIN GRADE
END GRADE
(+)1.3904%
(+)5.8948%
(+)1.1174%
(+)1.9994%
(+)1.5071%
LEFT DITCH
RIGHT DITCH
SEE SHEET 5 FOR PLAN VIEW
-Y6-
BIKE PATH
PI = 10+30.00
EL = 291.00'
VC = 25'
K = 7
PI = 11+60.00
EL = 291.80'
VC = 130'
K = 47
(-)3.5000%
(+)0.6167%
(+)5.3700%
LEFT DITCH
SEE SHEET 5 FOR PLAN VIEW

Intersection Improvement at US 15-501 and Erwin Road (SR 1734)/Europa Drive
Orange County
F. A. Project No. NHF-15(9)
State Project No. 8.1502101
T. I. P. No. U-4008

CATEGORICAL EXCLUSION

U. S. Department of Transportation

Federal Highway Administration

and

N. C. Department of Transportation

Division of Highways

2/25/03 _____
Date Greg Thorpe, Ph.D., Manager
Project Development and Environmental Analysis Branch, NCDOT

2/26/03 for _____
Date Donald J. Voelker
Acting Division Administrator, FHWA

Intersection Improvement at US 15-501 and Erwin Road (SR 1734)/Europa Drive
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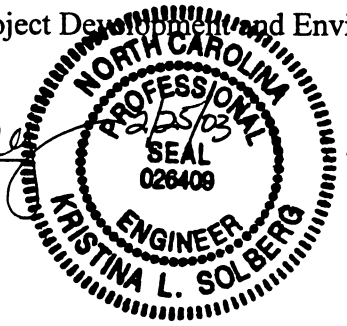
CATEGORICAL EXCLUSION

February 2003

Documentation Prepared in Project Development and Environmental Analysis Branch by:



Kristina L. Solberg, P.E.
Project Development Engineer

2/25/03

Cynthia Sharer, P.E.
Project Development Unit Head

PROJECT COMMITMENTS

Intersection Improvement Project at
US 15-501 and Erwin Road (SR 1734)/ Europa Drive
Orange County
F. A. Project No. NHF-15(9)
State Project No. 8.1502101
TIP Project Number U-4008

Current status, changes, or additions to the project commitments as shown in the environmental document for the project are printed in *italics*.

NCDOT PD&EA, Roadway Design, and Public Involvement

Surveys have not been conducted for small-whorled pogonia (threatened), smooth coneflower (endangered), and Michaux's sumac (endangered), however NCDOT will conduct surveys prior to right of way acquisition during the appropriate survey windows of the 2003 growing season. If any of these species are found, DOT will consult with USFWS to determine how DOT can proceed with the project and remain in compliance with the Section 7 of the Endangered Species Act. In a conversation with Dale Suiter of the USFWS on January 14, 2003 he stated that due to urbanization of the area it is highly unlikely that any populations of these federally protected species will be found, but that it is necessary to conduct surveys since habitat is present in the project area. The last observation of smooth coneflower was more than 50 years ago (1922) in the project area, and there are no records of small-whorled pogonia or Michaux's sumac in the project area.

The Right of Way Branch will be notified by PD&EA when the protected plant surveys are complete. Right of Way acquisition may not begin until it is found that none of the mentioned protected species are found to be in the project area, or proper coordination with USFWS is complete.

NCDOT Roadway Design

NCDOT will conduct the necessary coordination with the U. S. Fish and Wildlife Service and the N. C. Wildlife Resources Commission as required per the Fish and Wildlife Coordination Act, as amended (16 USC 661 et seq.), with regard to stream modifications. Stream modifications will be minor; and they will mimic natural conditions such as channel slope, water velocity, and flow.

This environmental commitment will be implemented during construction of the project.

NCDOT Roadside Environmental Unit

All planning, design and construction procedures and practices will be employed and implemented in such a manner as to avoid and minimize environmental impacts. Impacts will be minimized by the employment of Best Management Practices.

This is a standard NCDOT procedure.

NCDOT Public Involvement

NCDOT will establish a web site to educate the public about the proposed intersection improvement. This web site will be accessible prior to construction of the project. A public hearing will be held in spring/summer of 2003.

This commitment will be implemented prior to construction of the project.

NCDOT Traffic Engineering Branch, Signing Section, Logo Signing

NCDOT will install additional logo trail blazers, at no expense to businesses already participating in the logo sign program, to assist in directing customers to businesses that participate in the Logo sign program and are directly affected by TIP Project U-4008. Businesses will be responsible for annual maintenance fees for the logo trailblazers. Although TIP U-4008 is in Orange County (Division 7), the I-40 exit 270 interchange falls in Durham County, which is Division 5. The Division 5 Logo Program coordinator will be responsible for implementing this project commitment and contacting business owners in the project area who are affected by the project.

This commitment will be implemented during construction of the project.

NCDOT Traffic Engineering Branch, Signing Section

The NCDOT Signing Section will develop clear and concise signing plans to direct drivers through the completed project.

This is a standard NCDOT procedure. This commitment will be implemented during construction of the project.

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Intersection Improvement at US 15-501 and Erwin Road (SR 1734)/Europa Drive
Orange County
F. A. Project No. NHF-15(9)
State Project No. 8.1502101
T. I. P. No. U-4008

I. Need for the Proposed Project

A. General Description of Project

The North Carolina Department of Transportation proposes to improve the intersection of US 15-501 and Erwin Road (SR 1734) near Chapel Hill in Orange County. The purpose of the intersection improvement is to improve the carrying capacity and safety of the intersection. A vicinity map is included as Figure 1. The existing right-of-way varies between 130 feet (40 meters) and 300 feet (91 meters). The existing road is a divided highway with four 11-foot lanes (3 meter) with 10 foot (3 meter) grassed shoulders, divided by a grass median of variable width.

The proposed intersection improvement will require the acquisition of approximately 1.62 acres of additional right of way. It is anticipated that no wetlands and no more than 605 linear feet (184.5 m) of insignificant, intermittent, jurisdictional stream will be impacted by the proposed project. The U.S. Army Corp of Engineers has determined that no mitigation will be required as a result of impacts due to this project.

B. Purpose of the Proposed Project

The North Carolina Department of Transportation's latest approved 2002 – 2008 Transportation Improvement Program (TIP) proposes to improve the intersection of US 15-501 and Erwin Road (SR 1734). The project is intended to increase the traffic carrying capacity of the roadway and enhance safety so that this intersection can serve to better move traffic in a corridor that connects residential, commercial and retail areas along US 15-501, which accesses Interstate 40 near the town of Chapel Hill. Right of way and construction are scheduled in the 2004-2010 Draft TIP for fiscal years 2003 and 2004, respectively.

C. Existing Conditions

US 15-501 is a major north-south thoroughfare through the town of Chapel Hill, located in Orange County and crosses Interstate 40 before it continues north to the City of Durham. In this document US 15-501 will be referred to as a north-south oriented roadway, while Erwin Road will be referred to as laying to the west of US 15-501, and Europa Drive to the east. In reality US

15-501 does not run precisely north-south in the project area, rather it is skewed in a northeast/southwest orientation. However, for the sake of simplicity, US 15-501 will be referred to as a north-south roadway with the two directions being referred to as NBL (northbound lane) and SBL (south bound lane).

At the intersection of US 15-501 and Erwin Road there are high arterial through volumes, which conflict with moderate to low cross street through volumes.

US 15-501 splits approximately 1000 feet (305 m) to the south of the Erwin Road intersection as the major thoroughfare carries traffic toward Chapel Hill. As US 15-501 heads northward toward Interstate 40 and Durham, Sage Road is the next immediate intersection. Both the Erwin Road and Sage Road intersections are extremely congested when peak hourly volumes occur.

The area consists of business and residential development. The northwest and southwest quadrants of the intersection are residential while the northeast and southeast quadrants are commercial. On the northeast quadrant is a hotel, while on the southeast quadrant a service road leads to several businesses. Businesses in the area include: Sheraton, Hampton Inn, McDonald's, Jiffy Lube, Summit Hospitality, Talbert's Tire & Automotive, car dealerships, Prime Only restaurant, and a grocery store.

D. Traffic Data and Capacity Analysis

Figures 4A and 4B show the average daily traffic (in hundreds) in the project area with the U-4008 intersection improvement for the years 2002 and 2025 respectively. Figure 4C shows the average daily traffic of the project vicinity with the U-4008 intersection improvement in the year 2002. Figure 4D shows the average daily traffic of the project vicinity with proposed improvements to Weaver Dairy Road in the year 2025. All figures include truck percentages, directional splits, and design hour volume.

The concept of level of service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream and how these conditions are perceived by motorists and/or passengers. A LOS definition generally describes these conditions in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. Six levels are available. They are given letter designations from A to F, with LOS A representing the best operation conditions and LOS F representing the worst.

The estimated 2002 traffic volume along existing US 15-501 is 48,800 vehicles per day. Projected traffic volumes for the year 2025 along US 15-501 between Erwin Road and Sage Road is expected to be approximately 96,400.

Currently the intersection of US 15-501 and Erwin Road operates at an undesirable level of service, LOS F. Based upon existing constraints, somewhat unconventional intersection treatments were considered to help improve operations, safety, and air quality at this location. A superstreet type intersection design is recommended at this location to help achieve the desired goals. The superstreet design removes left-turns and side street through movements from the intersection in question (a bi-directional crossover location) by relocating them downstream of the intersection (U-turn points). The existing median along US 15-501 in this area lends itself well to the superstreet design in that there is already available space / right-of-way to provide the directional crossovers on either side of the existing intersection. This design also replaces the existing single multi-phase signal with four more efficient two-phase signals, thereby reducing delay and in turn improving air quality in the area.

The original proposed design of providing an additional left-turn lane from northbound US 15-501 onto Erwin Road to improve operations was also analyzed and compared to the recommended superstreet and "No-Build" designs.

Based upon the 2000 version of the *Highway Capacity Manual*, when the operating speed of a principal arterial with a free-flow speed of 45 – 55 miles per hour drops below 16 miles per hour, that facility is operating at LOS F. Using the microscopic simulation tool CORSIM, NCDOT Congestion Management Section determined that the network speeds in the project area will drop below 16 miles per hour in the year 2012 with a superstreet type design. The analyzed volumes were based upon existing and design year, 2025, volumes provided by the NCDOT Statewide Planning Branch. The year 2012 is an improvement over the "No-Build" and original proposed design which both are anticipated to operate at LOS F by the year 2005, which is the approximate time that the project is expected to be complete. The superstreet design, however, is expected to operate at LOS D in the year 2005, resulting in a design life of approximately seven years. This is a short-term type solution but it will result in immediately improved operations. The improved operations are also anticipated to result in the improved emissions of vehicles in the network, thereby improving the air quality in the area.

TABLE 1. LEVELS OF SERVICE FOR INTERSECTION

Intersection US 15-501/ Erwin Road	**2002 Without Improvements**	**2005 With Improvements**	**2005 Without Improvements**	**2012 With Improvements**	**2012 Without Improvements**
Alt. 1 No Build	F	N/A	F	N/A	F
Alt. 2 Original TIP	F	F	F	F	F
Alt. 3 Superstr.	F	D	F	E	F

E. Other Proposed Highway Improvements in the Area

In addition to the subject project, the following projects are included in the current NCDOT Transportation Improvement Program (TIP).

U-2805: CHAPEL HILL - SR 1777 (Homestead Road, SR 1834 (High School Road) to NC 86, Chapel Hill, Orange County. Widen to three-lane shoulder section. Right of way acquisition to begin in Fiscal Year 2003 and construction to begin in Fiscal Year (FY) 2005.

U-2807: US 15-501, SR 1010 (Franklin Street) in Chapel Hill to US 15-501 Bypass in Durham. Major Corridor Upgrade. This is an unfunded project and will be built in post years (after 2010).

U-3306: SR 1733 (Weaver Dairy Road) from NC 86 to SR 1734, Chapel Hill, Orange County. Construct a multi-lane facility, part on new location. Right of way acquisition began in FY 2004 and construction to begin in FY 2006.

I-3306: I-40 from I-85 in Orange County to NC 147 (Buck Dean Freeway) in Durham County. Add additional lanes. A section of this project is under construction from the Orange County line to NC 147. The remaining section is scheduled for post year construction (After Federal FY 2010).

U-9999 STIP: Bike Lanes along Old Durham-Chapel Hill Road. Programmed in FY 2003.

II. Alternatives Considered

A. Alternate 1

The "No build" alternative was considered for this project. Not building the project would eliminate construction impacts. With current traffic congestion and safety problems and the anticipated future traffic, the "No build" alternative is not recommended for this intersection. Currently this intersection operates at a LOS F. US 15-501 southbound traffic often backs up to the Sage Road intersection during peak hours. The Town of Chapel Hill does not support the "No build" alternative.

B. Alternate 2

Please refer to Figure 3A.

Widening along US 15-501 to accommodate an additional left turn lane in the westerly direction onto Erwin Road; and widening along Erwin Road to

accommodate an additional lane in the westbound direction was studied. This alternative would operate at a LOS F almost immediately upon completion of construction.

C. Alternate 3

Please refer to Figure 3B.

The preferred alternative is the "Superstreet" design. With the proposed Superstreet design, access is partially controlled at the intersection of US 15-501 and Erwin Road. With this alternative left turns will not be permitted from the mainline (US 15-501) onto the side streets (Erwin Road and Europa Drive); through moves will not be allowed to cross US 15-501 between the side streets. All turning movements and through movements will be accommodated at dual signalized U-turns approximately 800 feet in either direction from the current intersection along US 15-501.

No additional widening will be required along Erwin Road, a Division 7 project that is slated for construction prior to the construction of this project will provide additional widening on Erwin Road to allow for two right turn lanes onto US 15-501 as well as relocating Dobbins Drive in the SW quadrant further from the US 15-501 intersection. Southbound US 15-501 will be widened to accommodate an additional right turn lane onto Erwin Road. The Dobbins Drive service road relocation in the NW quadrant is required to allow adequate width for the turning path of the U-turn lanes required along US 15-501.

III. Description of Proposed Action

A. Description of Recommended Alternative

The North Carolina Department of Transportation's 2002–2008 Transportation Improvement Program (TIP) proposes to improve the intersection of US 15-501 and Erwin Road. The project is intended to increase the traffic carrying capacity of the roadway and enhance safety so that this intersection can serve to better move traffic in a corridor that connects residential, commercial and retail areas along US 15-501, which accesses Interstate 40 near the town of Chapel Hill. A vicinity map is included as Figure 1.

The recommendation for the subject project is to construct Alternate 3, the "Superstreet" design (Figure 3B). The recommended project design was selected based on design considerations and constraints, minimization of impacts to land use, streams and traffic ingress/egress as it pertains to safety and operation of the US 15-501 and Erwin Road intersection.

By limiting movements, the superstreet reduces the number of conflict points within this road network. (The road network is defined as the road area necessary to make all movements that can currently be made at the existing intersection.) The existing four-leg intersection allowing all turning movements has 32 conflict points (merging, diverging and crossing.) The superstreet road network operates similar to a roundabout, reducing conflict points to eight, including four merging and four diverging conflict points. All crossing conflict points are eliminated. By eliminating the crossing conflict points that have the potential for the highest accident rate and injury rate, the overall accident rate is reduced. Experience in Michigan at their "Michigan Left" intersections indicates that total and injury accidents are reduced in excess of 30%, as compared to "standard" multi-lane facilities with similar traffic volumes. (The Michigan Left is similar in concept to the Superstreet other than the Michigan Left allows the side street through movement. The Superstreet is assumed to have similar operational and safety characteristics to the Michigan Left concept, except that by eliminating the side street through movements, the conflict points in the road network have been reduced further.) (Source: discussion with Civil Engineering professor Dr. Joe Hummer, PE of North Carolina State University.)

In general, U-turn median spacing of approximately 600 feet (183 m) on either side of the existing intersection for a Superstreet intersection appear to be adequate for acceleration and weaving. Specific to this location, the U-turn median points were moved to approximately 800 feet (244 m) on either side of the existing intersection for queuing purposes. Because of the heavy volumes on the main facility (US 15-501), the right turns from the side streets (Erwin and Europa) are signalized, allowing motorists to enter the main facility without conflict, when necessary. The lane changes and acceleration are not dependent on sufficient gaps in the flow of traffic on the main facility and therefore can be made safely and adequately. (In off-peak periods, these motorists will have more frequent gaps in order to turn right on red, and can safely make their merging and/or weaving movements without always needing to wait for the signal give them the right-of-way.)

B. Project Status

The proposed project is included in the North Carolina Department of Transportation's Draft 2004-2010 Transportation Improvement Program (TIP). The Draft TIP includes $1,750,000 for construction. It is estimated that the required right of way for the project will cost $255,000. Right of way acquisition is scheduled to begin in May 2003 with construction to follow in July 2004. The most recent construction cost estimate is $2,600,000. The total cost of the recommended alternative is $2,855,000.

C. Proposed Right of Way and Control of Access

The proposed project will require approximately 1.62 acres of right of way to construct. The additional right of way is required to relocate the service road in the northwest quadrant of the intersection. The widening is required for the turning path of the dual U-turn lanes proposed along US 15-501 at the northern end of the project. No residential or commercial relocations will occur as a result of this project.

With the proposed Superstreet design, access is partially controlled at the intersection of US 15-501 and Erwin Road. Left turns will not be permitted from US 15-501 onto the cross streets, and no through movements will be allowed from the minor arterials across US 15-501. All turning movements and through movements will be accommodated at dual signalized U-turns approximately 800 feet (244 m) in either direction of the intersection.

Due to the uniqueness of this type of design in North Carolina, signing and pavement marking will be instrumental in limiting driver confusion. The NCDOT Signing Section will develop clear and concise signing plans to direct both familiar and unfamiliar drivers through the project. Also for the U-turns, trucks need to be signed to only use the outside U-turn lane at the northern U-turns. Ideally this movement should be designed with appropriate radii to allow design vehicles to easily use both left-turn lanes. Unfortunately, due to existing constraints, this is not possible, therefore care will be taken to ensure this movement is properly signed.

The US 15-501 point of access to the service road on the southeast quadrant of the intersection will be closed for safety reasons. This access point has been the location of numerous accidents. Drivers wishing to access the service road may do so at the Erwin Road intersection, which is located approximately 1000 feet to the north from the existing service road connection.

In an agreement between the Town of Chapel Hill, the Marriott Corporation, and NCDOT Division 7, Dobbins Drive in the southwest quadrant of the intersection will be realigned. The new alignment will line up with the previously relocated Dobbins Drive service road in the northwest quadrant. This is an NCDOT Division 7 project. The purpose of this service road relocation is to improve safety by relocating Dobbins Drive further from the Erwin Road/US 15-501 intersection. Currently Dobbins Drive is 110 feet from US 15-501, the future alignment will relocate the road 290 feet from US 15-501.

In order for the dual U-turn lanes to accommodate large vehicles (trucks and buses) making U-turns at the northern terminus of the Superstreet, US 15-501 will be widened 12 feet to the east. The service road in the northwest quadrant of

the intersection, Dobbins Drive, will be shifted to the west, away from US 15-501, as a result of widening required to allow for the proper turning path for U-turns.

IV. Avoidance, Minimization, and Mitigation

A. Avoidance

Avoidance mitigation examines all appropriate and practicable possibilities of averting impacts to Waters of the United States. According to a 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency (EPA) and the COE, 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.

B. Minimization

Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts to Waters of the United States. Implementation of these steps will be required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction to median widths, right-of-way widths, and/or fill slopes widths.

C. Mitigation

The COE 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 United States, specifically wetlands. Mitigation of wetland impacts has been defined by the CEQ to include: avoiding impacts (to wetlands), 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.

V. Social and Environmental Concerns

A. Social Effects

1. Geographic and Political Location

The study area and demographic area are part of the Raleigh-Durham-Chapel Hill Metropolitan Statistical Area (MSA), which is the third largest MSA in the state of North Carolina. The 2000 Census reported a population for the MSA of over one million people, and the population is growing. The project is located entirely within the Town of Chapel Hill and Orange County. Situated in the central piedmont region of North Carolina, Orange County shares borders with five other North Carolina Counties. Person and Caswell Counties border Orange County to the north, with Durham County to the east, Chatham County to the south, and Alamance County to the west.

The intersection of Erwin Road and US 15-501 is in a heavily congested and pedestrian-unfriendly corridor. Commercial and office uses are concentrated along Europa Drive, the service road to the east of US 15-501, and Dobbins Road to the west of US 15-501. McDonald's, Jiffy Lube, Talbert's Tire, It's Prime Restaurant, Hampton Inn, and a Crown Honda/Volvo dealership are located on the service road. The Sheraton Europa Hotel and the Europa Center LLC (office complex) are located just off of US 15-501 on Europa Drive. Dobbins Hill Apartments, Summerfield Crossing Apartments and Foxcroft Apartments are all located on Dobbins Drive, while another office complex is located at the corner of Dobbins Drive and East Franklin Street. In addition, two large strip malls are located in the southern portion of the study area. Eastgate Shopping Center is located between East Franklin Street and Fordham Boulevard, and Ram's Plaza is situated on the corner of Ephesus Church Road and Fordham Boulevard.

The part of US 15-501 that exists just south of I-40 in Chapel Hill is a four-lane, divided highway and a major route for travelers commuting between Durham and Chapel Hill. Commercial uses are concentrated along US 15-501 and its service roads, while the residential uses are located on side roads. There are some sidewalks along the service road, Dobbins Drive and Europa Drive, but these sidewalks do not always have linkages to other commercial centers or residential areas. There are also a number of bus stops (including a stop at the corner of the service road and Europa Drive). Very few pedestrians and no bicyclists were witnessed during the field visit.

The single-family, middle-income residential uses are concentrated along or just off of Erwin Road and Legion Road. The multi-family uses are primarily located along Dobbins Drive. The roads often have grassed shoulders and few pedestrian or bicycle facilities exist. The study area is almost completely developed, and no agricultural uses were observed.

2. Existing land uses

In *Planning for Chapel Hill's Future: The Comprehensive Plan*, Chapel Hill is described as a "maturing" community with little undeveloped land. Despite the fact that less than 4% of land within the Town limits is privately owned and undeveloped, development pressures should remain strong because of continuous growth in the region. The future land use patterns shown in *The Comprehensive Plan* essentially reflect the land use patterns that currently exist in Chapel Hill. Commercial land uses dominate the Erwin Road and US 15-501 intersection and have been designated to remain commercial in nature with an objective to integrate office and residential development as much as possible.

The Town of Chapel Hill owns a large tract of land east of US 15-501 and north of the Sheraton Hotel on Europa Drive. About half of this land exists as the Chapel Hill Memorial Cemetery, while the other half is wooded.

The Marriott Corporation owns a large tract of land to the west of Dobbins Drive and south of Erwin Road. Summit Hospitality, a division of Marriott, proposes to build a Residence Inn on the site and may dedicate the right-of-way for the Dobbins Drive realignment proposed as a NCDOT Division 7 project.

3. Bus Stops, Pedestrian, Bicycle, and Greenway Considerations

Bus Stops

NCDOT Project Development & Environmental Anaylsis, Roadway Design, and the Town of Chapel Hill met and concluded that there are no impacts expected to bus stops as a result of this proposed intersection improvement project.

Pedestrian and Bicycle Issues

It is NCDOT policy to replace pedestrian walkways disturbed by construction. The Americans with Disabilities Act (ADA) of 1990 extends the protection of the 1964 Civil Rights Act to the disabled, prohibiting discrimination in public accommodations and transportation and other services.

NCDOT policy declares that bicycle transportation is "an integral part of the comprehensive transportation system in North Carolina."

Pedestrian and bicycle crossing of this intersection and the associated signal designs are key elements of the Superstreet design, both of which have been addressed during project planning and are addressed in the project design.

A multi-use off-road path is proposed to connect Dobbins Drive to US 15-501 along Erwin Road in the northwest quadrant of the intersection. The purpose of this path is to direct pedestrians and cyclists to the northwest corner of the intersection where a pedestrian push button signal is proposed. A crosswalk will direct pedestrians/cyclists across US 15-501 to a multi-use path that crosses the median in a reverse "S" pattern as shown in Figure 3. A second pedestrian signal is proposed at the SE quad of the intersection. A crosswalk will connect the multi-use path to a multi-use path at the corner of US 15-501 and Europa Drive.

The proposed design provides a two-phase crossing for pedestrians and cyclists and provides a safer crossing than the existing intersection or the proposed original TIP project. While traffic on the US 15-501 mainline is stopped during a ped/cyclist crossing, the Europa Drive and Erwin Road side street traffic will flow, making a right turn onto US 15-501. The peds/cyclists will cross to the left of the side street traffic thereby avoiding conflicting movements. By limiting the pedestrian and bicycle crossing to the northwest and southeast quadrants of the intersection a safer and more efficient operation of the intersection is achieved than currently exists for pedestrian and cyclists.

Greenways

Greenways and greenway crossings must be considered in the bridge construction and replacement process. Critical corridors which have been adopted by local governments for future greenways are not to be severed by construction.

No greenway exists in the vicinity of TIP project U-4008.

4. Historic and Cultural Resources

a. Historic Architectural Resources

No structures listed in or eligible for the National Register of Historic Places are located in the project area. The State Historic Preservation Officer (SHPO) was consulted during the planning of the project. In a memo dated February 15, 2001 exhibited in Appendix A of this document, the Department of Cultural resources indicated that there is no effect on historical resources as a result of TIP project U-4008.

b. Archaeological Resources

NCDOT Archaeology was consulted during the planning of the project. There are no known archaeological sites within the vicinity of the project area as is stated in a January 18, 2001 memo included in Appendix A of this document.

5. Business, institutional and residential relocations and impacts

Since the intersection improvement will require little right of way with only a small section of service road being shifted, there are no anticipated relocations associated with the intersection improvement project. Land surrounding the site for this intersection improvement is both commercial and residential. Service road access will be eliminated for safety reasons between US 15-501 onto the service road in front of McDonald's, Volvo, and Jiffy Lube. The service road may be accessed from Europa Drive. The Europa Drive intersection is approximately 1000 feet north of the service road access point.

The Superstreet design moves left-turn and side street through traffic approximately 600 feet in each direction from the current intersection configuration. Initially the biggest concern with this design will be driver education that will precede the completion of the project. Clear directional signage will also be an important element of this project and will be provided to assist in directing traffic.

With the elimination of the left-turn movements from the mainline US 15-501 as well as the removal of the through movements from the side streets, Erwin Road and Europa Drive, drivers will proceed to the U-turns to make these net movements. Although the distance traveled is longer than with the current intersection configuration, the new design and signal phasing will reduce travel time and congestion in the project area. Therefore business owners, customers and employees should not experience a negative effect due to the intersection reconfiguration.

6. Visual impacts

The intersection improvement will have some visual impact in the general vicinity of the facility, however the vast majority of the proposed "Superstreet" facility will be built on existing right of way. Overall visual impacts will be positive since pavement will be removed from the existing intersection and will provide a unique landscaping opportunity for the Town of Chapel Hill. Therefore, there will be no adverse visual impacts.

7. Farmland Impacts

The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the impact of land acquisition and construction projects on prime and important farmland soils. 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. Soil Conservation Service (SCS). These soils are determined by the SCS based on criteria such as crop yield and level of input of economic resources. Land which is planned or zoned for urban development is not subject to the same level of preservation afforded other rural, agricultural areas.

The project area is in a location consisting of no agricultural uses and none are expected in the future. There is no farmland within the general vicinity of the intersection improvement project. This project will not disturb or disrupt any farming operations. Therefore, farmland mitigation or avoidance does not appear to be necessary.

8. Scenic rivers, trout streams, wetlands and water supply watersheds

The Wild and Scenic Rivers Act of 1968, as amended, declared it the policy of the United States to preserve certain selected rivers, "which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic cultural, or other similar values." The Act established the Wild and Scenic River System. The Natural and Scenic Rivers Act of 1971 declared it the policy of North Carolina to retain "the natural and scenic conditions in some of the State's valuable rivers by maintaining them in a free-flowing state and to protect their water quality and adjacent lands by retaining these natural and scenic conditions." At present, designated state Natural and Scenic Rivers are identical with designated federal Wild and Scenic Rivers.

No river, stream or creek within the project area has been designated as a Wild and Scenic River. However, stringent "best management practices" must be utilized during construction to minimize erosion that may result in temporary deterioration of the water quality.

9. Air Quality and Traffic Noise Impacts

The project is located in Orange County, which has been determined to be in compliance with the National Ambient Air Quality Standards. 40 CFR part 51 and 93 is not applicable, because the proposed project is located in an attainment

area. This project is not anticipated to create any adverse effects on the air quality of this attainment area.

An air quality intersection analysis was conducted for this project utilizing the MOBILE5B mobile source emissions computer model and "CAL3QHC - A Modeling Methodology For Predicting Pollutant Concentrations Near Roadway Intersections". 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 predicted 1-hour CO concentrations for the evaluation build years of 2005, 2010, and 2025 are 4.70, 4.70, and 5.20 ppm, respectively. Comparison to the NAAQS indicates no violations of these standards. Hence, the project's impact on noise and 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 highway traffic noise of Title 23 of the Code of Federal Regulations, Part 772, and for air quality of the 1990 Clean Air Act Amendments and the NEPA process, and no additional reports are necessary.

10. Secondary impacts

One unintended consequence of roadway improvements can be - depending upon local land development regulations, development demand, water/sewer availability, and other factors - encouragement of additional development and sprawl. Improvements to levels of service, better accommodation of merging and exiting traffic, and reductions in travel times can have land development impacts outside of the project area.

Secondary impacts resulting from the intersection improvement should be minimal as this facility will not induce additional traffic, but merely capture

existing traffic while reducing delays and vehicle emissions. Secondary impacts resulting from the project should be minimal since the area is already developed.

11. Environmental Impacts

A copy of the NCDOT Natural Systems Technical Report for this project may be found in **Appendix B.**

During the environmental surveys for TIP U-4008, wetland delineations were conducted in the vicinity of the subject project. It was determined there are no wetlands in the project area.

Impacts to jurisdictional surface waters are calculated based on the linear feet of the stream that are located within the proposed right-of-way. Under the current design, an unnamed tributary (UT) to Booker Creek will not be impacted. However, a length of up to 605 feet (185 meters) of another unnamed tributary to Booker Creek and 0.01 ac (0.004 ha) of streambed may be impacted by the proposed improvements. This UT was determined by the US Army Corp to be insignificant, intermittent and jurisdictional with no aquatic habitat and requiring no mitigation.

As of February 26, 2001, the USFWS lists five federally protected species for Orange County. Brief descriptions of the characteristics and habitat requirements for these species are included in the Natural Systems Report in Appendix B. Biological Conclusions of "No Effect" were found for the red-cockaded woodpecker and dwarf wedge mussel. Biological Conclusions of "Unresolved" were found for small-whorled pogonia, smooth coneflower, and Michaux's sumac. Surveys for these protected species will be conducted during the summer 2003 survey windows as is stated in the Project Commitments section at the beginning of this document.

The project area contains marginal habitat suitable for small-whorled pogonia, smooth coneflower, and Michaux' sumac. According to the Natural Hertitage database, smooth coneflower has been observed in the project vicinity, northwest of the intersection of US 15-501 and Summerfield Crossing Road (according to USFWS this is a historical population that was last recorded in 1922). Therefore, the project area will be surveyed for small-whorled pogonia, smooth coneflower and Michaux's sumac during the summer 2003 survey windows. Right of way will not commence until all protected species issues are resolved with USFWS adhering to the Section 7 of the Endangered Species Act.

There are 11 Federal Species of Concern (FSC) listed by the USFWS for Orange 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. A 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. A September 13, 2001 review of the NCNHP database of rare species and unique habitats revealed no occurrence of FSC species within one mile (1.6 km) the project study area.

No waters classified as High Quality Waters (HQW), Water Supplies (WS-I or WS-II) or Outstanding Resource Waters (ORW) occur within 1.6 km (1.0 mi) of the project study area.

A Nationwide Permit 33 CFR 330.5(a) (23) is likely to be applicable for all impacts to Waters of the U.S. resulting from the proposed project. This project will also require a 401 Water Quality Certification from the DWQ prior to the issuance of the Nationwide Permit. Section 401 of the Clean Water Act requires that the state issue or deny water certification for any federally permitted or licensed activity that may result in a discharge to Waters of the U.S.. Section 401 Certification allows surface waters to be temporarily impacted for the duration of the construction or other land manipulation. The issuance of a 401 permit from the DWQ is a prerequisite to issuance of a Section 404 permit.

12. Findings and Recommendations

The proposed intersection improvement for the intersection of US 15-501 and Erwin Road would not appear to adversely impact the surrounding area. As drivers will be passing through the intersection along the route, this facility is unlikely to draw additional vehicles to the area.

There are not expected to be any adverse impacts related to noise or air pollution stemming from the intersection improvement, neither should there be any adverse impacts related to lighting. No residential or business relocations will occur as a result of this project. Flow of traffic is expected to improve, thereby lessening congestion and vehicle delays.

The proposed project will provide safer pedestrian and bicycle crossing of US 15-501. The pavement removal and creation of a median in the middle of the existing intersection may provide the Town of Chapel Hill with a unique landscaping opportunity.

A site visit by the USACE, NCDOT Natural Systems Specialist and NCDOT Project Development Engineer to determine if the stream is jurisdictional occurred in February 2002. The stream was determined to be insignificant, intermittent, jurisdictional with no aquatic habitat and requiring no mitigation, and NCDWQ concurred. 1.62 acres of right of way will be disturbed as a result of this project. A protected species survey will be conducted in late spring/summer 2003 to investigate the presence of protected species in the project area. Environmental impacts as a result of this project are expected to be minimal.

VI. Comments and Coordination

A. Comments Received

The project has been coordinated with the appropriate federal, state, and local agencies. Comments were received from the following agencies:

United States Department of the Interior
Fish and Wildlife Service
N. C. Department of Cultural Resources
State Historic Preservation Office
Town of Chapel Hill
North Carolina Department of Transportation
Archaeology Unit
Public Involvement Unit
Traffic Noise/Air Quality Section
Congestion Management Section
Right of Way Branch
Roadway Design Unit
Bicycle and Pedestrian Division
Traffic Forecasting Unit
Natural Systems Unit
Traffic Engineering Accident Analysis System
Hydraulics Section

Copies of the comments received are included in the **Appendix A**.

A copy of the Natural Systems report may be found in **Appendix B**.

A copy of the Community Impact Assessment prepared by the private firm of HNTB North Carolina, PC for NCDOT's Public Involvement & Community Studies Unit, including interviews, may be found in **Appendix C.**

B. Agency Coordination

1. Initial Project Meetings

A series of meetings were held to inform NCDOT Division 7, NCDOT upper management, the Town of Chapel Hill staff and Town Council about the Superstreet design. Support for the Superstreet design was gained at each meeting. The Superstreet is a new design concept for the State of North Carolina and the main concerns were for public education of the new traffic pattern, signage, and for truck turning movements at the U-turns. NCDOT will hold a public hearing for this project upon the completion of the document, and prior to the completion of the project. NCDOT's Public Involvement Unit will assist in publicizing the new traffic pattern using various resources.

2. On Site Agency Meeting

An on site agency meeting between the USACE and NCDOT was held on February 12, 2003 to determine if the stream being impacted by the project is jurisdictional. It was determined that the stream impacted is insignificant, intermittent, jurisdictional with no aquatic habitat and no mitigation required. NCDWQ concurred with this determination.

C. Citizen Involvement

1. Citizens Informational Workshop

NCDOT held a Citizen's Informational Workshop on December 13, 2000 to gather public input and to discuss the proposed alternates. The workshop was held at the Chapel Hill Town Hall in the Council Chambers. A computer generated model was presented by NCDOT Signals & Geometrics and Congestion Management in two separate formal presentations. The computer model illustrated the flow of traffic for the current intersection configuration as well as the proposed alternates and preferred alternate. A question and answer session followed the presentations and written comments were received.

2. Interviews

In order to obtain feedback from the businesses surrounding the immediate project area, a consultant was hired by NCDOT to interview businesses and also was charged with writing a Community Impact Assessment (CIA) document.

Interviews were held on August 8-9, 2002 and telephone interviews were conducted on August 9, 2002. Those interviewed represented the following businesses: Crown Automotive Management Company, Graham Associates Ltd., Hampton Inn, McDonald's, Sheraton Chapel Hill, Prime Only, Summit Hospitality, Talbert Tire & Automotive, Lucor Corporation.

The minutes from the interviews may be found in **Appendix A**.

D. Public Hearing

A public hearing will be held following the completion of this report to provide more detailed information on the proposed project to local citizens and to receive additional comments on the project. It is estimated that the hearing will be held in the Spring/Summer of 2003.

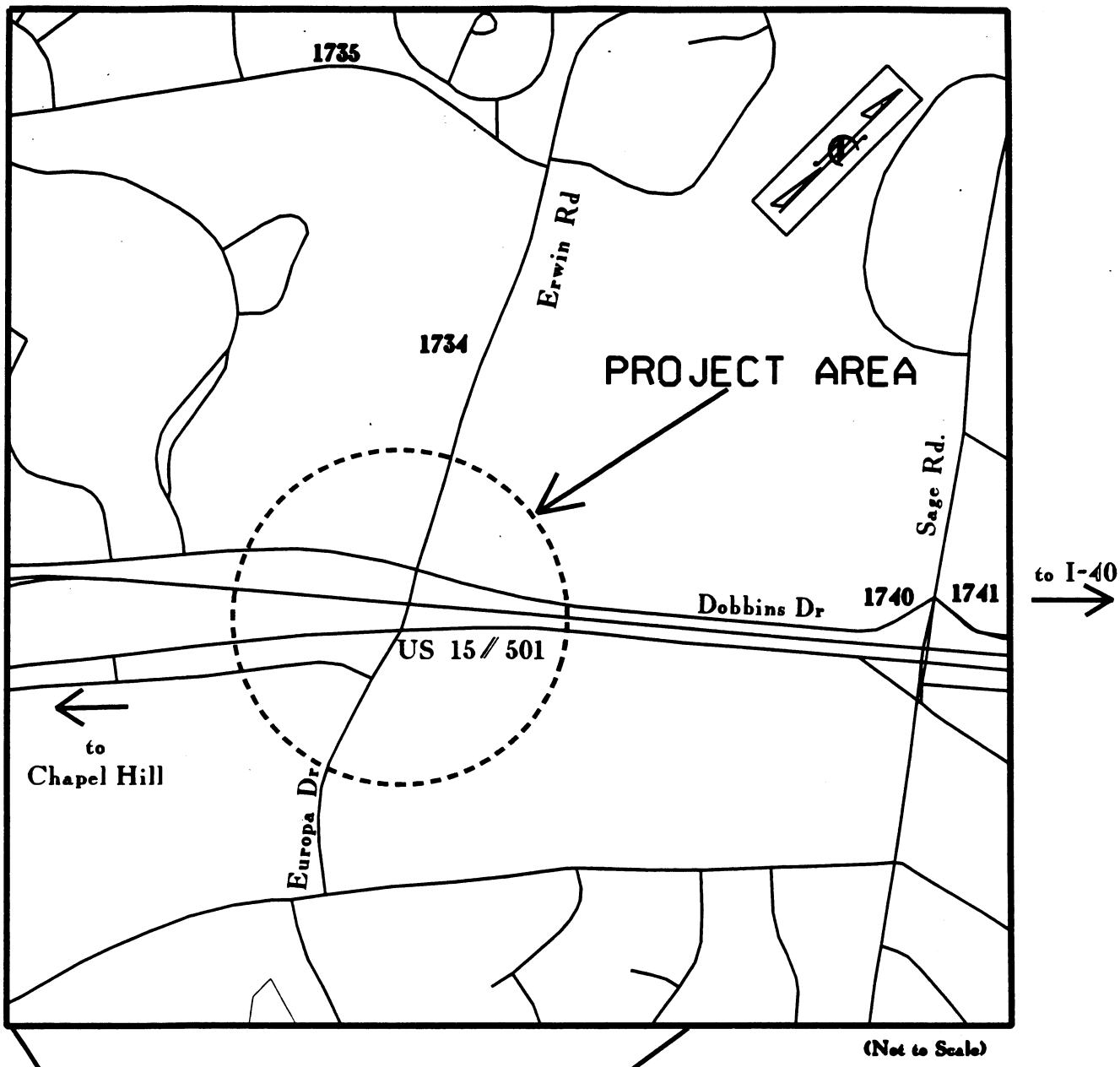
VII. Conclusion

On the basis of the above discussion, it is concluded that no substantial adverse environmental effects will result from implementation of the project. The proposed project is considered to be a "categorical exclusion" as defined by the Federal Highway Administration's environmental guidelines (23 CFR 771.117).

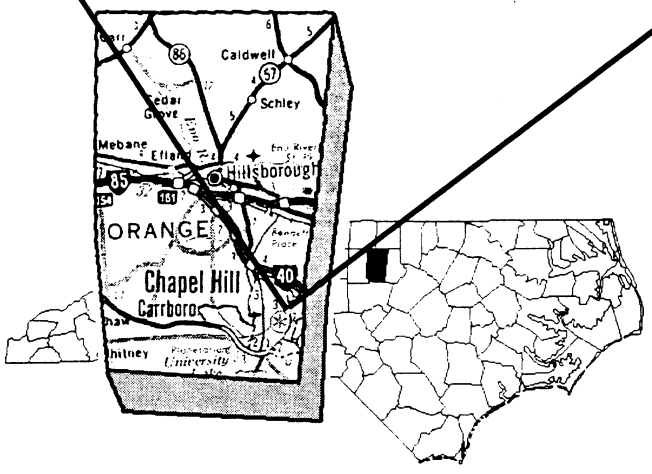
KLS/

FIGURES

U-4008 Vicinity Map



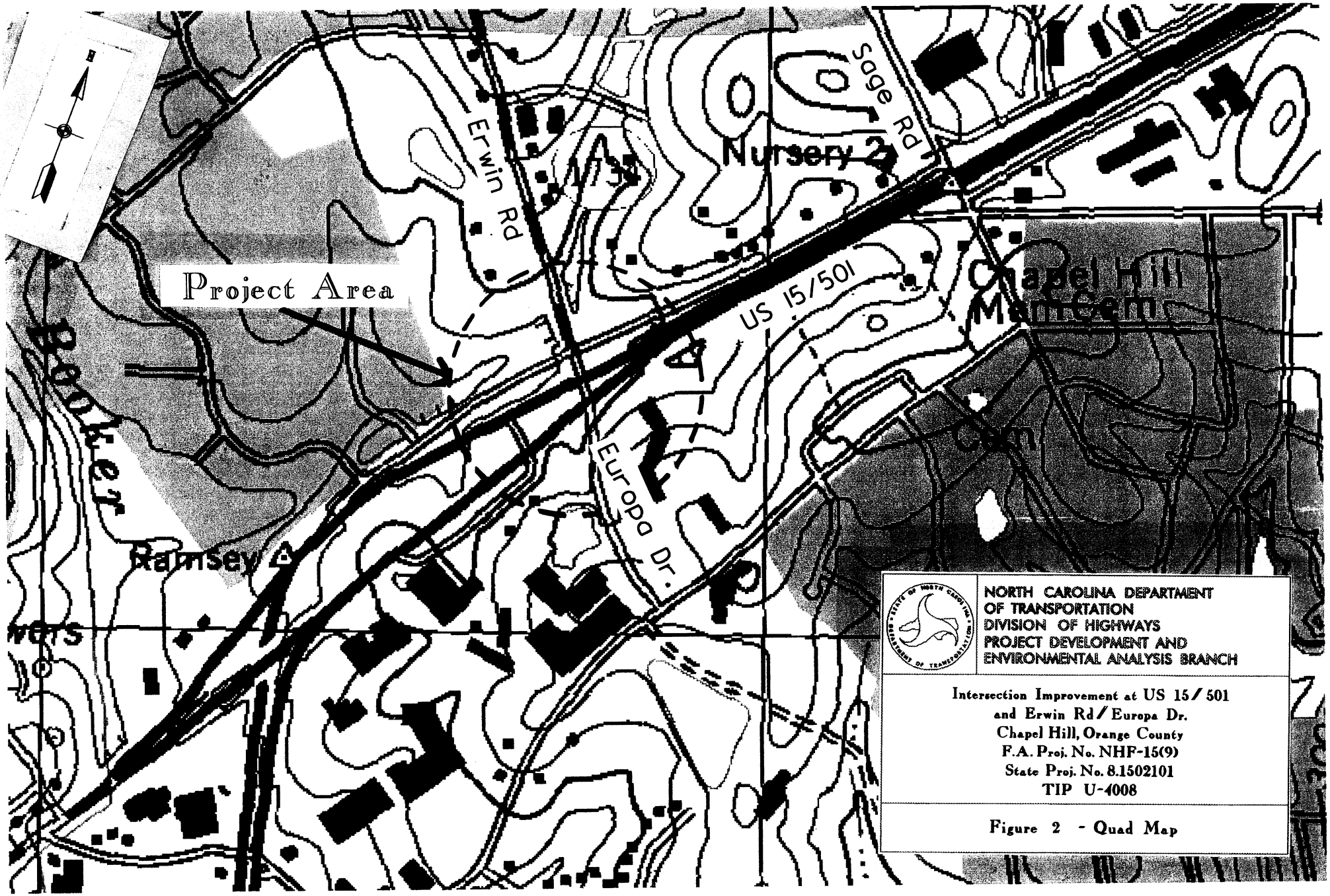
(Not to Scale)



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

Intersection Improvement at US 15 / 501
and Erwin Rd / Europa Dr
Chapel Hill, Orange County
F.A. Proj. No. NHF-15(9)
State Proj. No. 8.1502101
TIP U-4008

Figure 1 - Vicinity Map



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

Intersection Improvement at US 15/501
and Erwin Rd/Europa Dr.
Chapel Hill, Orange County
F.A. Proj. No. NHF-15(9)
State Proj. No. 8.1502101
TIP U-4008

Figure 2 - Quad Map

(not to scale)

Original Proposed Division Project

Dual Left Turn Lanes from Northbound US 15-501 onto Erwin Road

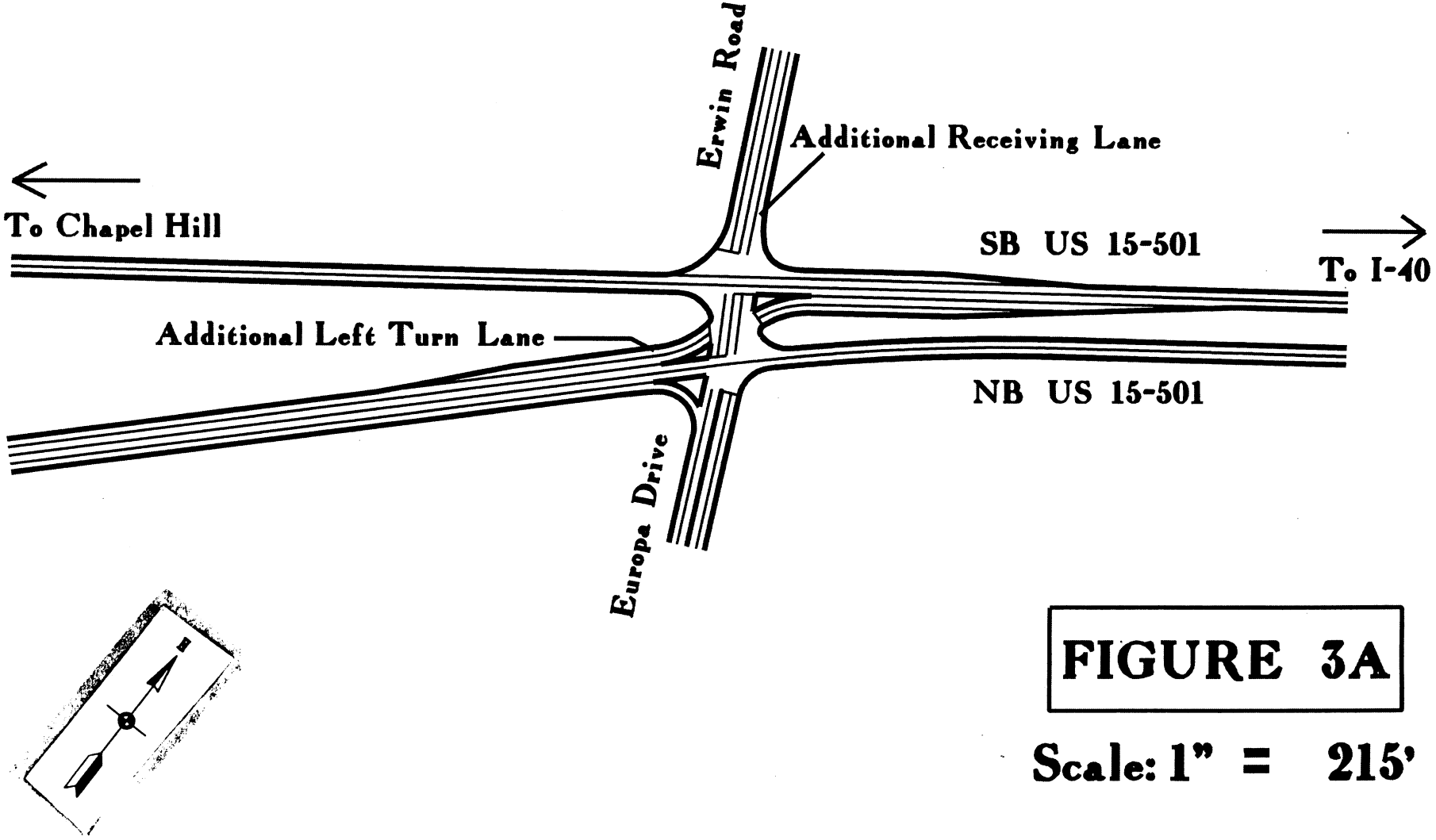
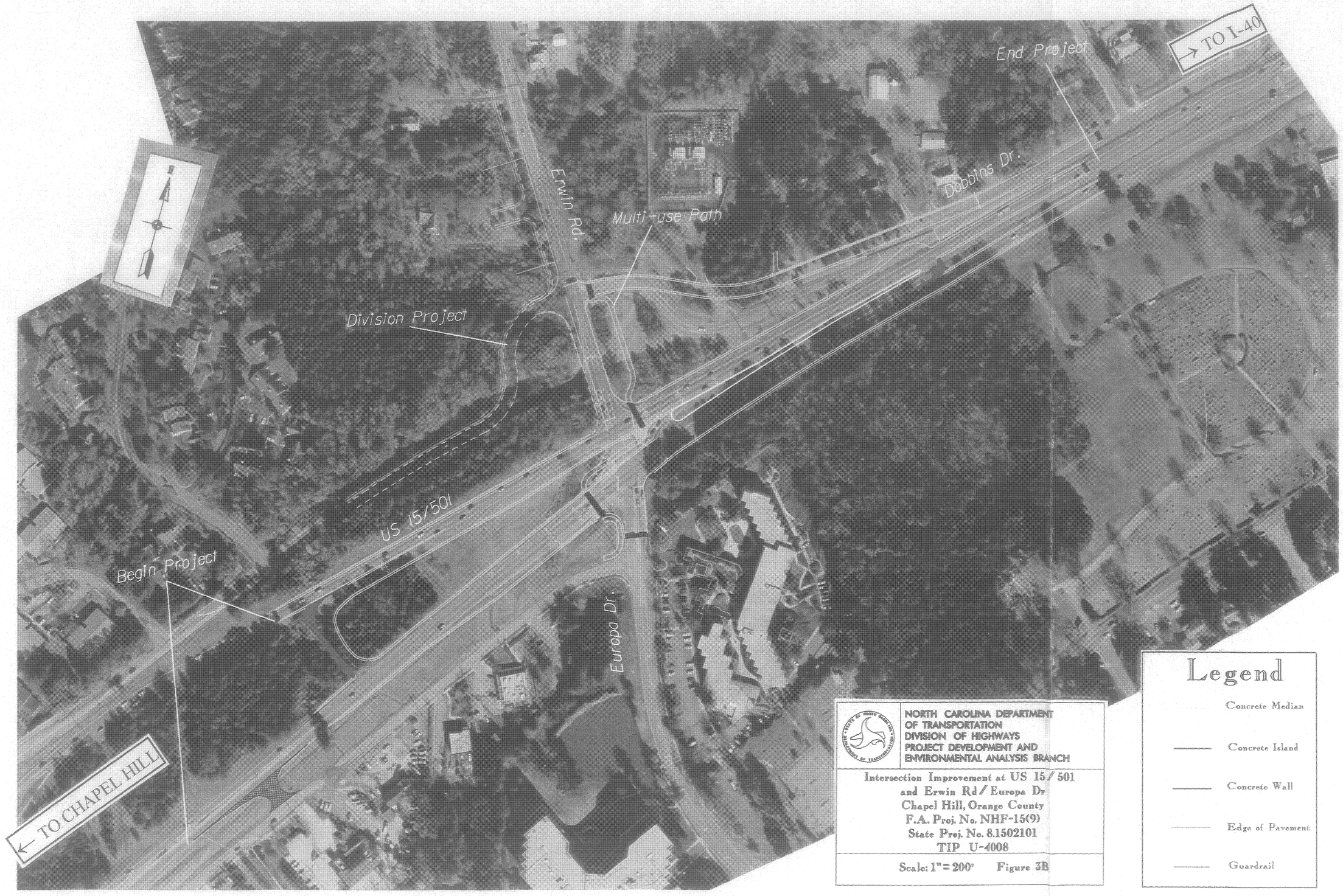


FIGURE 3A

Scale: 1" = 215'



NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
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Intersection Improvement at US 15/501
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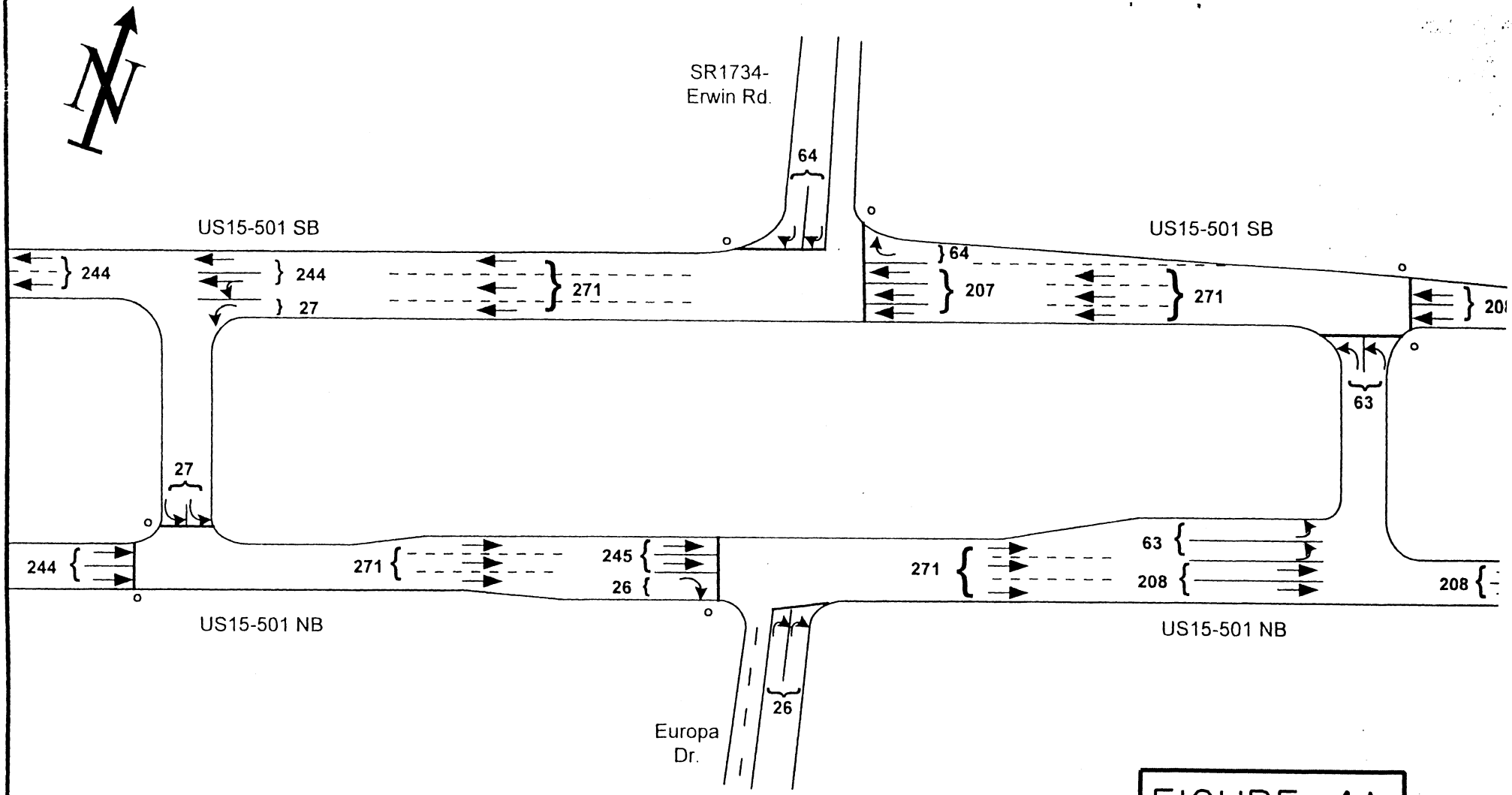
TIP U-4008

Scale: 1" = 200' Figure 3B

Legend

- Concrete Median
- Concrete Island
- Concrete Wall
- Edge of Pavement
- Guardrail



ESTIMATED 2002 ADT
U-4008 Superstreet

FIGURE 4A

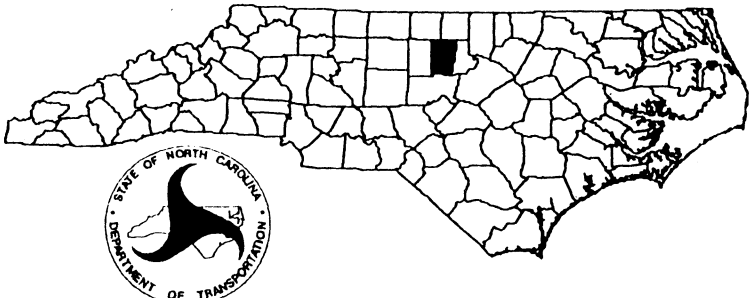
LEGEND

###	VPD----# OF VEHICLES PER DAY IN 100's
### -	MUCH LESS THAN ### VPD
X	MOVEMENT PROHIBITED
⟶	ONE-WAY MOVEMENT

$$DHV \xrightarrow[(d,\,t)]{PM} D$$

DHV	DESIGN HOURLY VOLUME (%) = K30
	K30 = 30'TH HIGHEST HOURLY VOLUME
PM	PM PEAK PERIOD
D	DIRECTIONAL SPLIT (%)
⟶	INDICATES DIRECTION OF D

REVERSE FLOW FOR AM PEAK



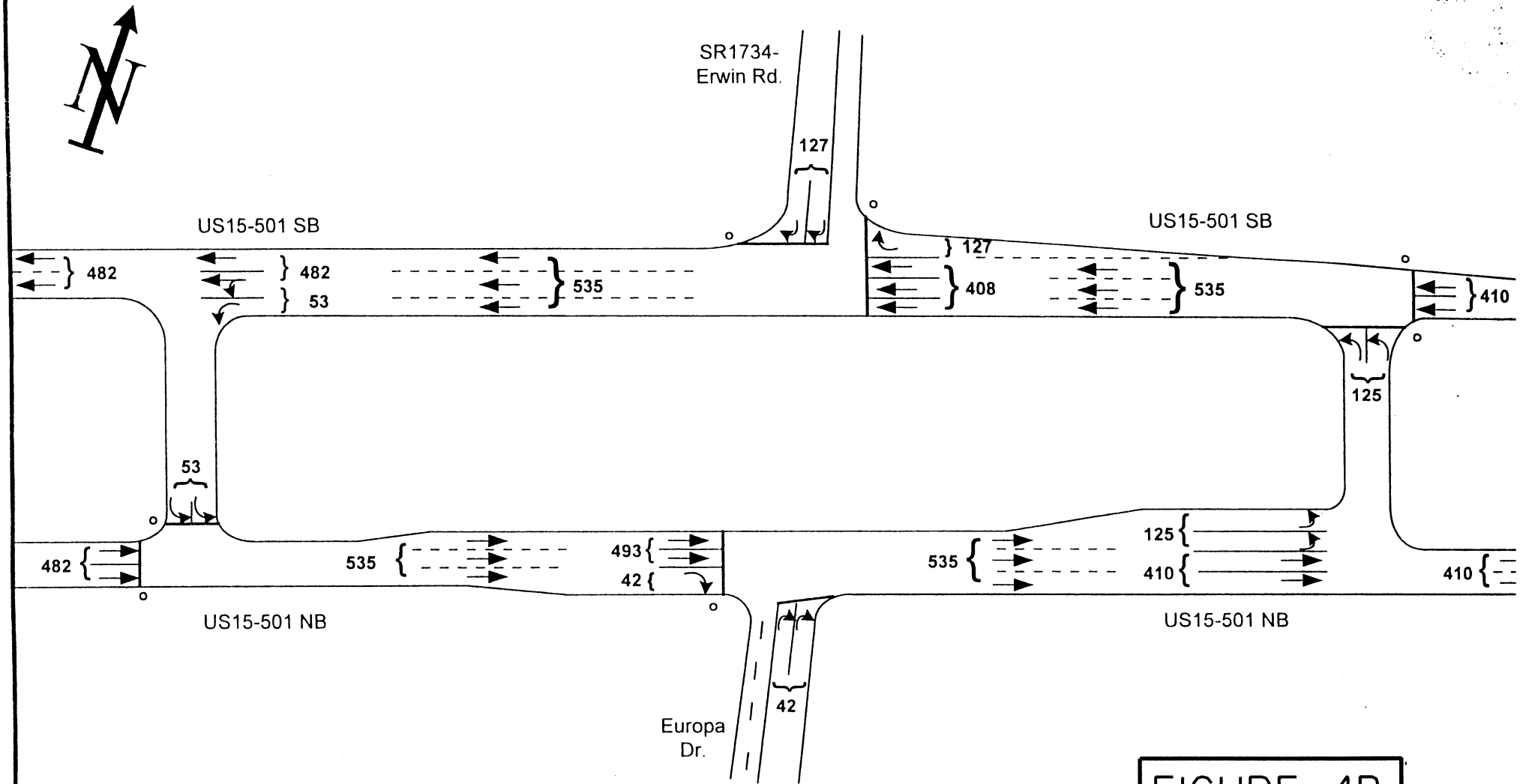
LOCATION:
Intersection of US15-501 and SR1734-Erwin Roa
in Chapel Hill

PROJECT:
Intersection Improvement: Construction of a "Superstreet" intersection design

COUNTY: ORANGE

DIV. : 7 **DATE: March, 2002**

TIP # U-4008 **W.O. # 8.1702101**

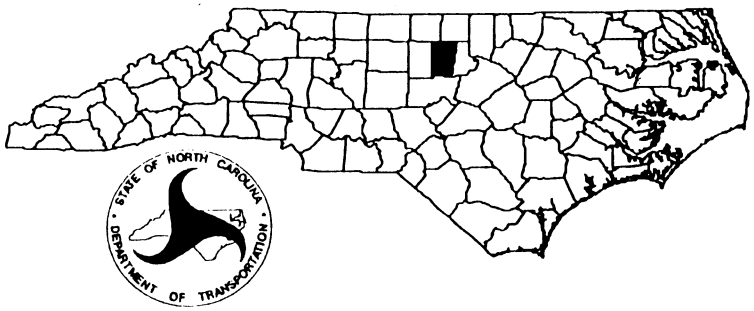


ESTIMATED 2025 ADT
U-4008 Superstreet

FIGURE 4B

LEGEND

###	VPD----# OF VEHICLES PER DAY IN 100's
### -	MUCH LESS THAN ### VPD
X	MOVEMENT PROHIBITED
→	ONE-WAY MOVEMENT
DHV $\frac{PM}{(d,t)}$ → D	
DHV	DESIGN HOURLY VOLUME (%) = K30
	K30 = 30'TH HIGHEST HOURLY VOLUME
PM	PM PEAK PERIOD
D	DIRECTIONAL SPLIT (%)
→	INDICATES DIRECTION OF D
REVERSE FLOW FOR AM PEAK	
(d,t)	DUALS, TT-ST'S (%)



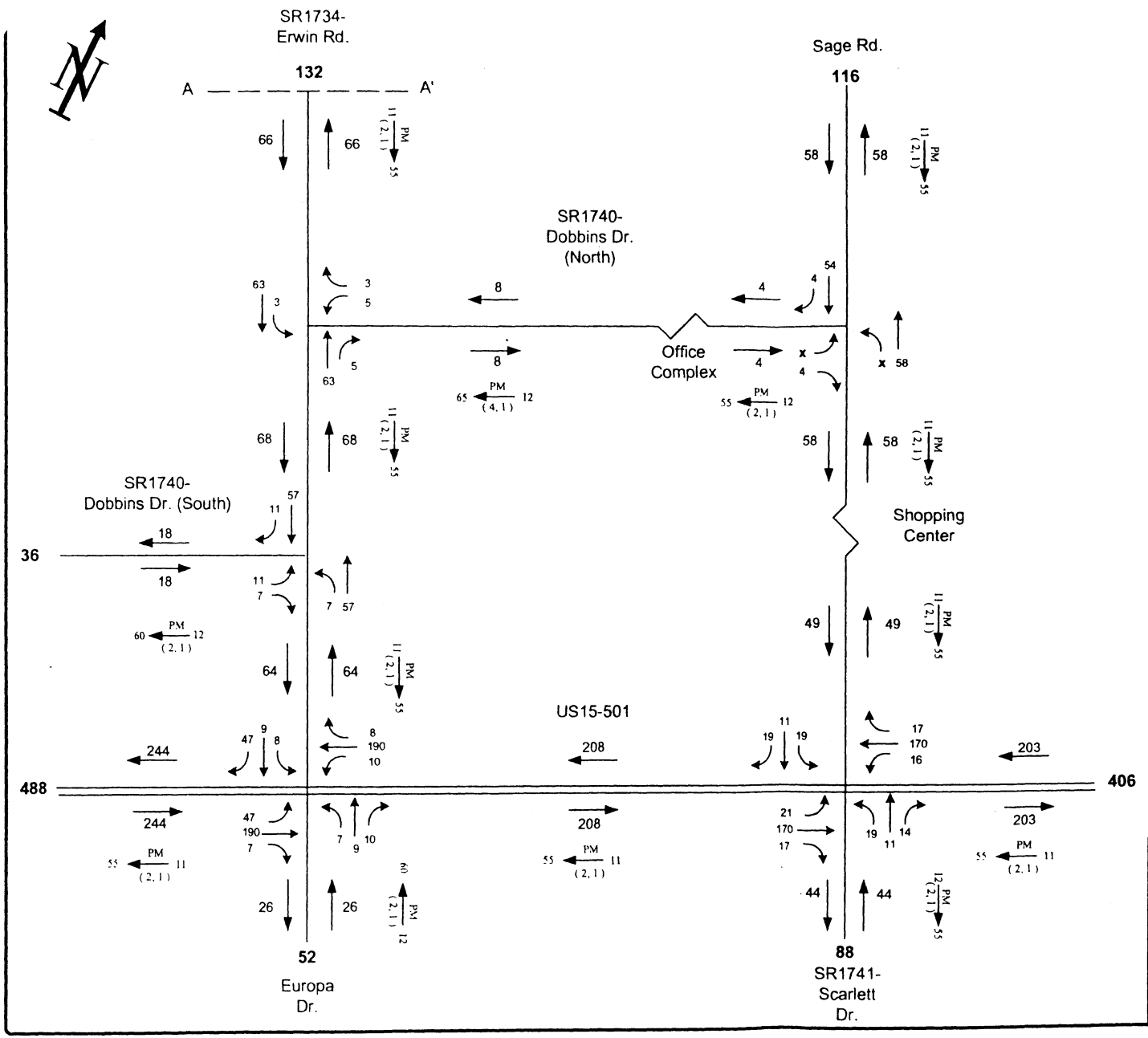
LOCATION:
Intersection of US15-501 and SR1734-Erwin Road in Chapel Hill

PROJECT:
Intersection Improvement: Construction of a "Superstreet" intersection design

COUNTY: ORANGE

DIV. : 7 **DATE: March, 2002**

TIP # U-4008 **W. O. # 8.1502101**



LEGEND

###	VPD—# OF VEHICLES PER DAY IN 100's
###-	MUCH LESS THAN ### VPD
X	MOVEMENT PROHIBITED
→	ONE-WAY MOVEMENT
DHV PM (d, t) D	
DHV	DESIGN HOURLY VOLUME (%) = K30
	K30 = 30'TH HIGHEST HOURLY VOLUME
PM	PM PEAK PERIOD
D	DIRECTIONAL SPLIT (%)
→	INDICATES DIRECTION OF D
REVERSE FLOW FOR AM PEAK	
(d,t)	DUALS, TT-ST'S (%)

FIGURE 4C
SHEET 1

2002 ESTIMATED ADT

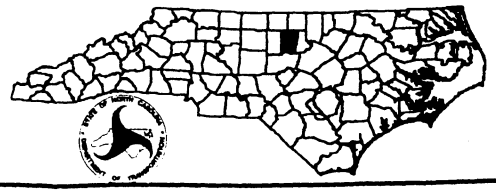
LOCATION:
SR1734-Erwin Rd. from US15-501 to SR1733-Weaver Dairy Rd. and SR1741-Sage Rd. from US15-501 to SR1740-Dobbins Dr. in Chapel Hill

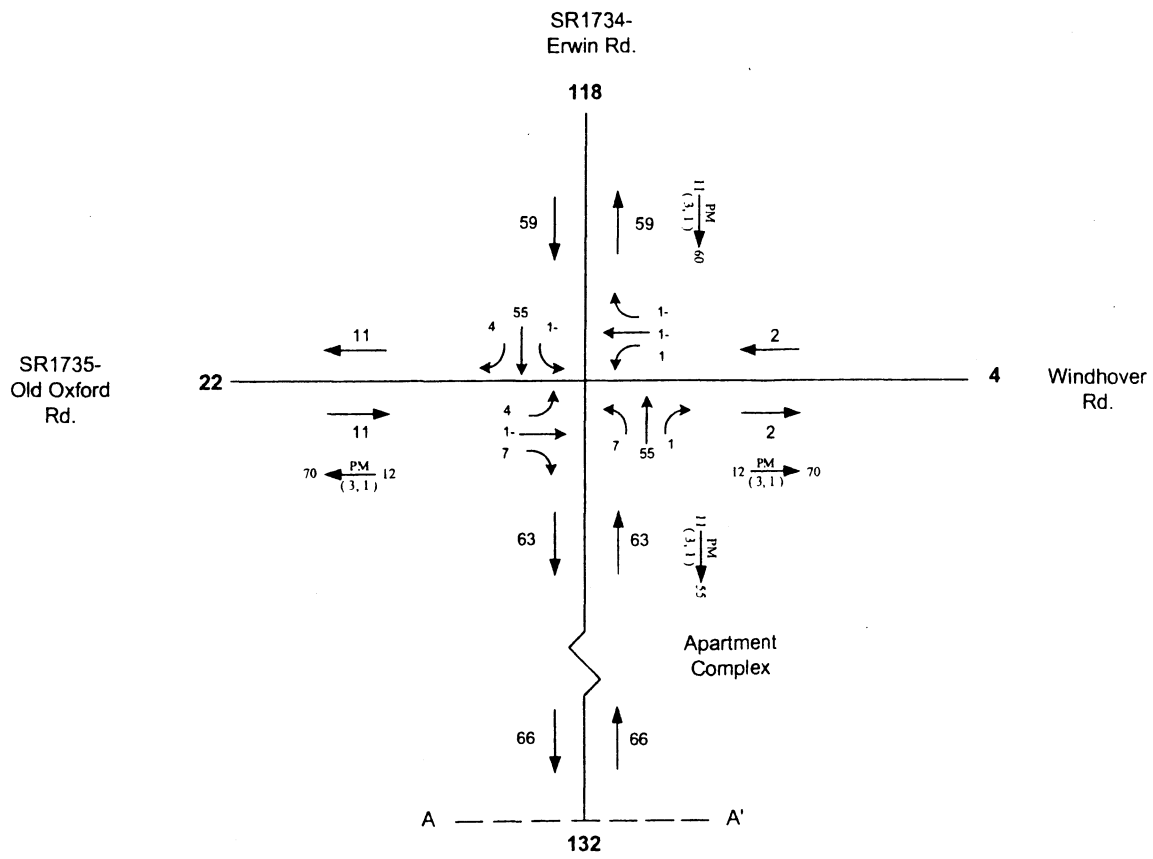
PROJECT:
Implement Superstreet design at US15-501 & SR1734-Erwin Road

COUNTY: Orange

DIV.: 7 **DATE:** March, 2002

TIP # U-4008 **W. O. #** 8.1502101





LEGEND

###	VPD—# OF VEHICLES PER DAY IN 100's
### -	MUCH LESS THAN ### VPD
X	MOVEMENT PROHIBITED
→	ONE-WAY MOVEMENT
DHV PM (d, t) → D	
DHV	DESIGN HOURLY VOLUME (%) = K30
	K30 = 30'TH HIGHEST HOURLY VOLUME
PM	PM PEAK PERIOD
D	DIRECTIONAL SPLIT (%)
→	INDICATES DIRECTION OF D
REVERSE FLOW FOR AM PEAK	
(d,t)	DUALS, TT-ST'S (%)

FIGURE 4C SHEET 2

2002 ESTIMATED ADT

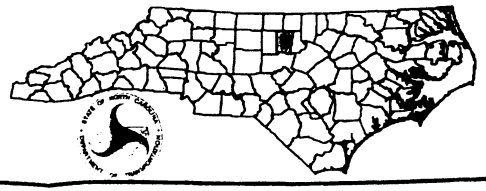
LOCATION:
SR1734-Erwin Rd. from US15-501 to SR1733-Weaver Dairy Rd. and SR1741-Sage Rd. from US15-501 to SR1740-Dobbins Dr. in Chapel Hill

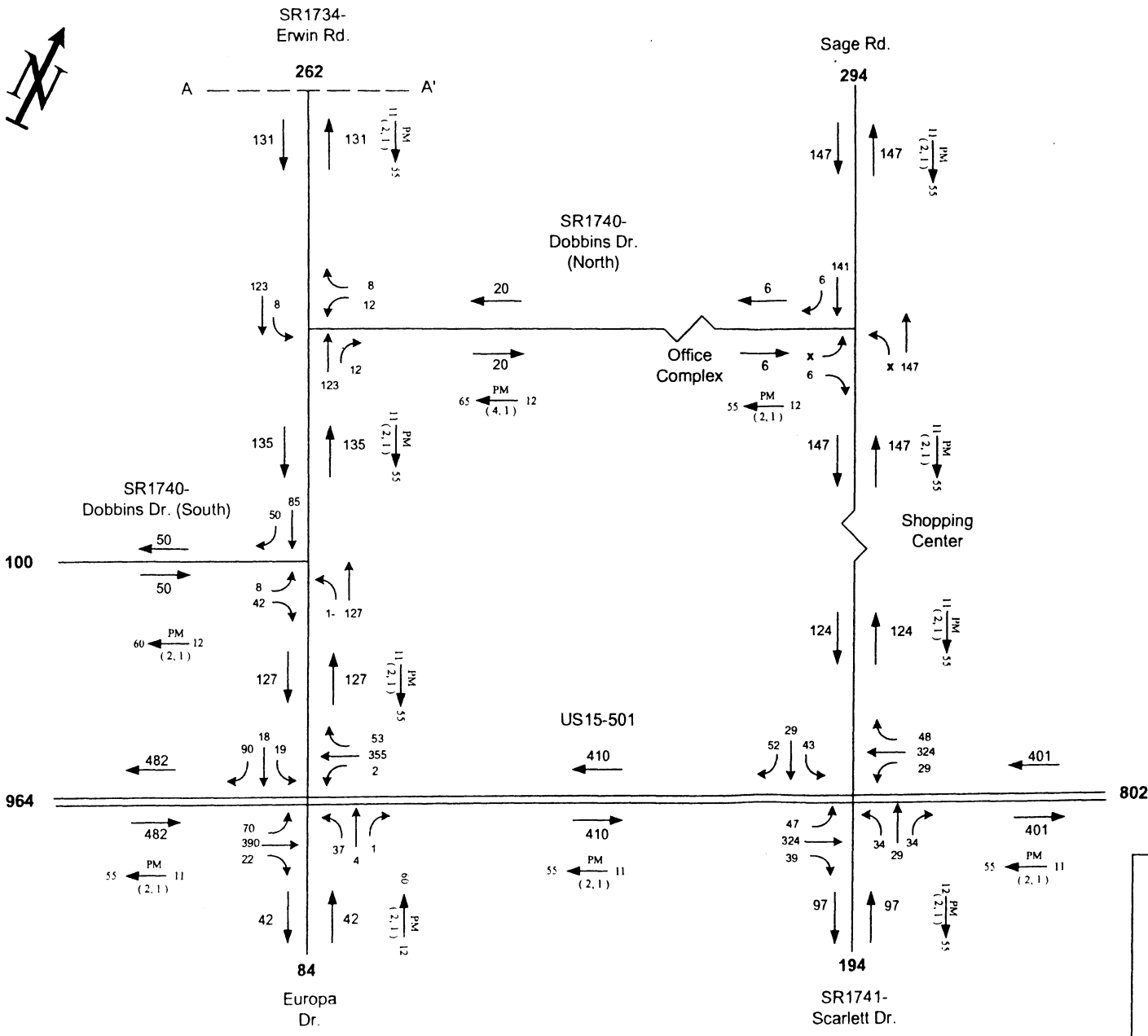
PROJECT:
Implement Superstreet design at US15-501 & SR1734-Erwin Road

COUNTY: Orange

DIV.: 7 **DATE:** March, 2002

TIP # U-4008 **W. O. #** 8.1502101





LEGEND

###	VPD—# OF VEHICLES PER DAY IN 100's
### -	MUCH LESS THAN ### VPD
X	MOVEMENT PROHIBITED
→	ONE-WAY MOVEMENT
DHV PM (d, t) D	
DHV	DESIGN HOURLY VOLUME (%) = K30
	K30 = 30'TH HIGHEST HOURLY VOLUME
PM	PM PEAK PERIOD
D	DIRECTIONAL SPLIT (%)
→	INDICATES DIRECTION OF D
REVERSE FLOW FOR AM PEAK	
(d,t)	DUALS, TT-ST'S (%)

FIGURE 4D
SHEET 1

2025 ESTIMATED ADT
Assumes SR1733-Weaver Dairy Road Extension Open

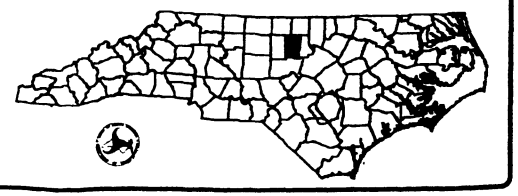
LOCATION:
SR1734-Erwin Rd. from US15-501 to SR1733-Weaver Dairy Rd. and SR1741-Sage Rd. from US15-501 to SR1740-Dobbins Dr. in Chapel Hill

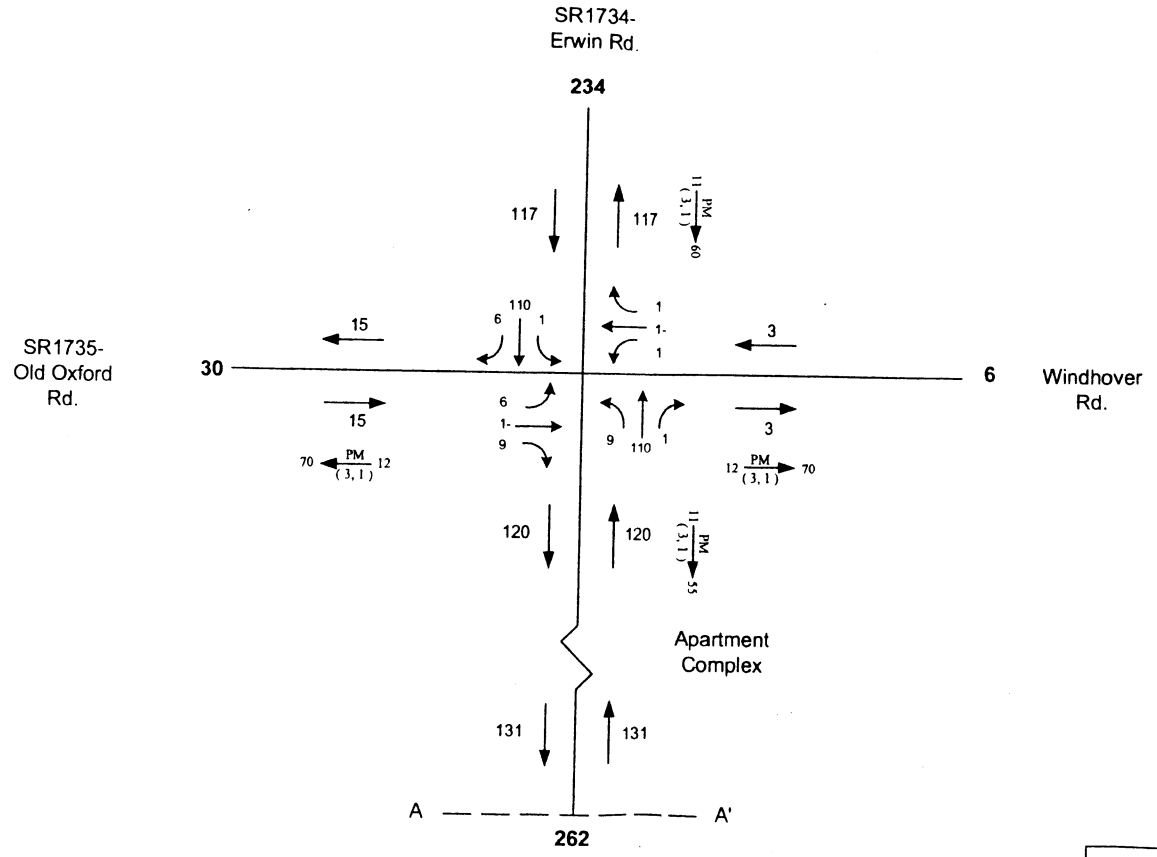
PROJECT:
Implement Superstreet design at US15-501 & SR1734-Erwin Road and

COUNTY: Orange

DIV.: 7 **DATE:** March, 2002

TIP # U-4008 **W. O. #** 8.1502101





LEGEND

###	VPD—# OF VEHICLES PER DAY IN 100's
###-	MUCH LESS THAN ### VPD
X	MOVEMENT PROHIBITED
→	ONE-WAY MOVEMENT
DHV PM (d, t) D	
DHV	DESIGN HOURLY VOLUME (%) = K30
	K30 = 30'TH HIGHEST HOURLY VOLUME
PM	PM PEAK PERIOD
D	DIRECTIONAL SPLIT (%)
→	INDICATES DIRECTION OF D
REVERSE FLOW FOR AM PEAK	
(d,t)	DUALS, TT-ST'S (%)

FIGURE 4D SHEET 2

2025 ESTIMATED ADT
Assumes SR1733-Weaver Dairy Road Extension Open

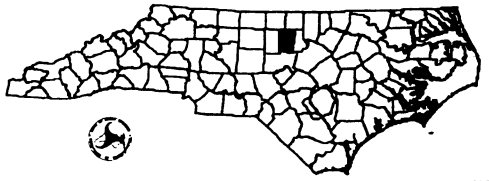
LOCATION:
SR1734-Erwin Rd. from US15-501 to SR1733-Weaver Dairy Rd. and SR1741-Sage Rd. from US15-501 to SR1740-Dobbins Dr. in Chapel Hill

PROJECT:
Implement Superstreet design at US15-501 & SR1734-Erwin Road and

COUNTY: Orange

DIV.: 7 **DATE:** March, 2002

TIP # U-4008 **W. O. #** 8.1502101



APPENDIX A

Comments Received

United States Department of the Interior

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

November 21, 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 intersection improvement at US 15/501 and Erwin Road, Orange County, North Carolina (TIP No. U-4008). 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 shows that the general project area is mostly developed with only minimal amounts of fragmented forest. As a result, wildlife habitat in the project area is limited, and significant aquatic habitat appears to be absent. The National Wetlands Inventory and U.S. Geological Survey topographical quadrangle maps do not indicate any mapped wetlands or streams in the project area.

There are five federally-protected species known to occur in Orange County, the red-cockaded woodpecker (*Picoides borealis*), dwarf wedge mussel (*Alasmidonta heterodon*), Michaux's sumac (*Rhus michauxii*), small-whorled pogonia (*Isotria medeoloides*) and smooth coneflower (*Echinacea laevigata*). With the exception of the smooth coneflower, the North Carolina Natural Heritage Program (NCNHP) database does not indicate any known occurrences of these species near the project vicinity. However, 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 are often found is provided on our web site, **http://endangered.fws.gov.** If suitable habitat exists in the project area for any of these species, biological surveys for those listed species should be conducted. All survey documentation must include survey methodologies and results. Special emphasis should be given to the smooth coneflower. There is an old record (1922) of smooth coneflower from a location approximately 1,150 feet from the project area.

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. 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;

2. A description of the proposed action with an analysis of all alternatives being considered, including 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 of waters of the U.S. that are to be impacted;

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; and,

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

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,

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

cc: John Thomas, 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 4, 2002

MEMORANDUM

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

FROM: David Brook for David Brook

SUBJECT: Improvement at US 15/501 and Erwin Road, U-4008,
Chapel Hill, Orange County, ER02-11554

Thank you for your memorandum of November 4, 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.

cc: Mary Pope Furr, NCDOT
Matt Wilkerson, NCDOT

bc: County

Federal Aid # NHF-15(9) *TIP #* U 4008 *County*: Orange

CONCURRENCE FORM FOR PROPERTIES NOT ELIGIBLE FOR THE NATIONAL REGISTER OF HISTORIC PLACES

Project Description:

On 2/15/2001, representatives of the

- [x] North Carolina Department of Transportation (NCDOT)
- [ ] Federal Highway Administration (FHWA)
- [x] North Carolina State Historic Preservation Office (HPO)
- [ ] Other

Reviewed the subject project at

- [ ] Scoping meeting
- [x] Historic architectural resources photograph review session/consultation
- [ ] Other

All parties present agreed

- [x] There are no properties over fifty years old within the project's area of potential effects.
- [x] There are no properties less than fifty years old which are considered to meet Criteria Consideration G within the project's area of potential effects.
- [ ] There are properties over fifty years old within the project's Area of Potential Effects (APE), but based on the historical information available and the photographs of each property, the property identified as **(List Attached)** is considered not eligible for the National Register and no further evaluation of it is necessary.
- [x] There are no National Register-listed or Study Listed properties within the project's area of potential effects.
- [ ] All properties greater than 50 years of age located in the APE have been considered at this consultation, and based upon the above concurrence, all compliance for historic architecture with Section 106 of the National Historic Preservation Act and GS 121-12(a) has been completed for this project.
- [x] There are no historic properties affected by this project. (*Attach any notes or documents as needed*)

Signed:

Mary Pope Furr — 2/15/2001
Representative, NCDOT — Date

[signature] — 3/1/01
FHWA, for the Division Administrator, or other Federal Agency — Date

April Montgomery — 2/15/01
Representative, HPO — Date

David Brook — 3/9/01
State Historic Preservation Officer — Date

If a survey report is prepared, a final copy of this form and the attached list will be included.

INTEROFFICE MEMORANDUM
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

To: Kristina Solberg, Project Planning Engineer

From: Brian Overton, Archaeologist

Subject: U-4008, Orange Co., Archaeological Consideration

Date: 1/18/01

CC: Tom Padgett
Carl Goode, P.E.

We have reviewed the site files and maps at the Office of State Archaeology for the requested project, U-4008: Intersection Improvement at US 15/501 and Erwin Road (near Chapel Hill) in Orange County. There are no known archaeological sites within the vicinity of the project area. The proposed improvements appear confined to previously disturbed areas that characteristically have poor integrity for archaeological deposits. This disturbed context is unlikely to yield any significant archaeological resources that will be impacted by the project.

I hope that this information helps in the completion of the Programmatic Categorical Exclusion for the project. If you have additional concerns or need further clarification please feel free to contact me.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 4, 2002

MEMORANDUM TO: Kristina Solberg, P.E
Project Development Engineer

FROM: Bobby Dunn
Traffic Noise/Air Quality Section

SUBJECT: US 15/501(Super Street) and Erwin Road near Chapel Hill, Orange County, State Project # 8.1502101, F.A. Project # NHF-15(9), TIP # U-4008

The project is located in Orange County, which has been determined to be in compliance with the National Ambient Air Quality Standards. 40 CFR part 51 and 93 is not applicable, because the proposed project is located in an attainment area. This project is not anticipated to create any adverse effects on the air quality of this attainment area.

An air quality intersection analysis was conducted for this project utilizing the MOBILE5B mobile source emissions computer model and "CAL3QHC - A Modeling Methodology For Predicting Pollutant Concentrations Near Roadway Intersections". 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 predicted 1-hour CO concentrations for the evaluation build years of 2005, 2010, and 2025 are 4.70, 4.70, and 5.20 ppm, respectively.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

March 20, 2002

MEMORANDUM TO: Kristina Solberg, P.E.
Project Development Engineer
Project Planning Unit
Project Development and Environmental Analysis Branch

FROM: Darius D. Sturdivant DDS
Transportation Engineer I
Traffic Forecasting Unit A
Statewide Planning Branch

SUBJECT: Traffic Forecast for TIP# U-4008, Project #8.1502101, implementation of the Superstreet intersection design at US15-501 & SR1734-Erwin Road, along with SR1734-Erwin Road from US15-501 to SR1733-Weaver Dairy Road and SR1741-Sage Road from US15-501 to SR1740-Dobbins Drive in Chapel Hill, Orange County.

Please find attached a copy of the estimated 2002/2025 ADT's for the aforementioned project. Also attached are truck, DHV, and directional percentages for the project.

Project U-4008 is located inside the city limits of Chapel Hill in Orange County. Chapel Hill is part of the Triangle region, which also consists of the Raleigh-Durham metropolitan areas. US15-501 is a heavily traveled road, which primarily serves traffic between Chapel Hill and Durham. This location and its network of adjoining streets are currently experiencing rapid commercial and residential development which has resulted in traffic congestion and delays along US15-501.

Project U-4008 involves the construction of a "Superstreet" or "Michigan U-Turn" at the intersection of US15-501 and SR1734-Erwin Road. The new intersection design attempts to accommodate the heavy left turn demand on each approach of US15-501 as well as movements across the intersection without severely impacting heavy through traffic volumes. As a result, improvements at the intersection should help to reduce traffic congestion and delay along US15-501.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING
1554 MAIL SERVICE CENTER
RALEIGH NC 27699-1554

TELEPHONE: 919-733-4705
FAX: 919-733-2417

WEBSITE: WWW.DOT.STATE.NC.US

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

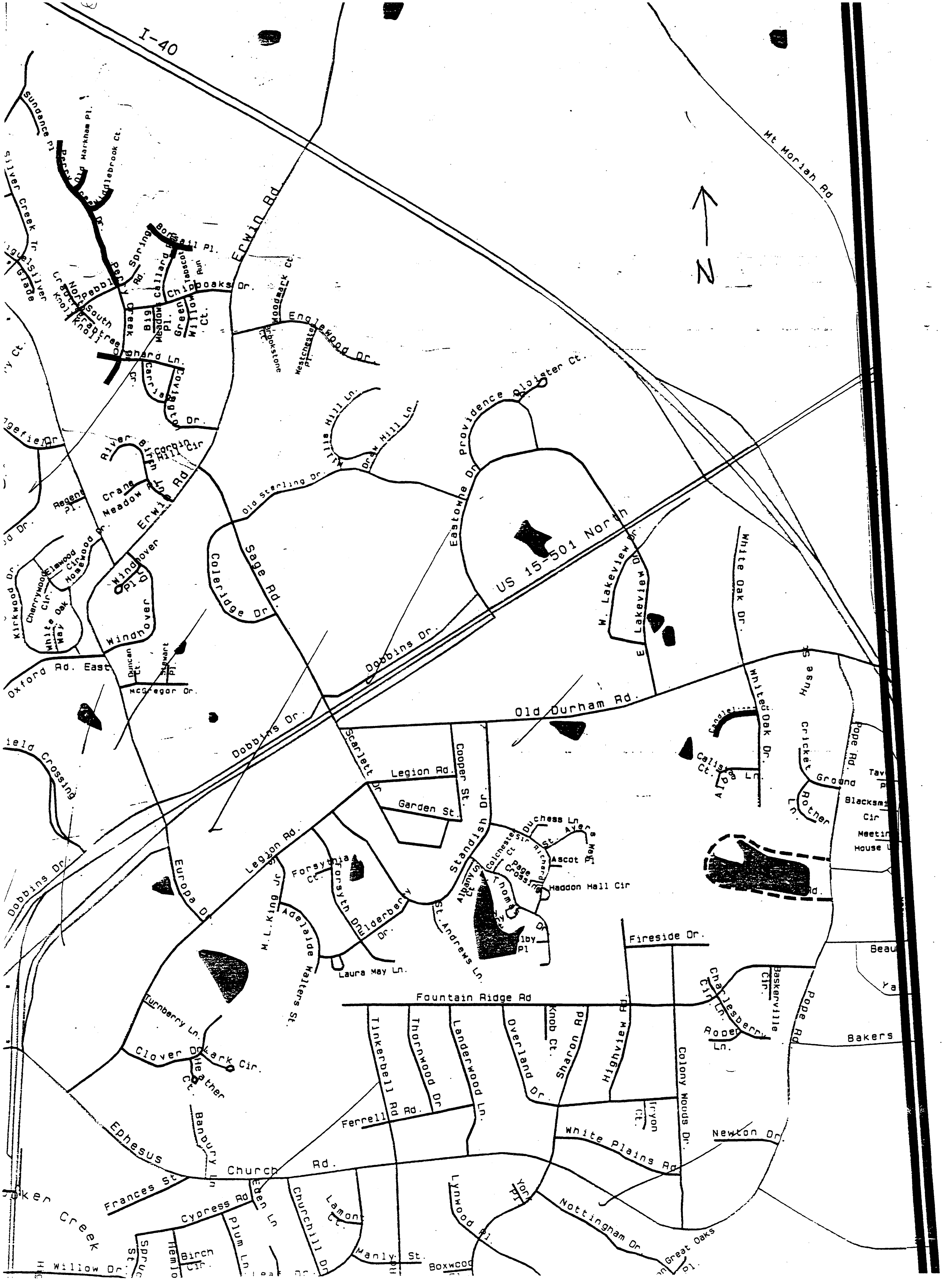
In an attempt to better understand the potential impact of the Superstreet traffic operation, historical ADT count data was collected at five locations along the roadway network located near the intersection of US15-501 and SR1734-Erwin Road. Average annual growth rates were calculated at each location and while traffic volumes increased, the growth rates were not consistent. This may be due to various types of commercial and residential development in the area, which affects the amount of traffic generated at specific locations. Based on historical ADT data recorded between 1983 and 2000, traffic volumes have increased by 3% along US15-501. This region is continuing to grow and many of the current growth trends are expected to continue. The projected 2002 ADT volume on US15-501 between SR1734-Erwin Road and Sage Road is 44,800 vpd.

Proposed TIP Project U-3306 is expected to improve traffic operations between SR1735-Weaver Dairy Road and US15-501. Project U-3306 involves the construction of a new segment of SR1735-Weaver Dairy Road along a new alignment to connect with Sage Road, allowing direct access to US15-501. The 2025 traffic forecast projection includes additional traffic generated by proposed commercial development along US15-501, increased traffic volumes along Sage Road resulting from TIP Project U-3306, and a possible mix of commercial and residential development along the street network near the US15-501 and SR1734-Erwin Road intersection. The estimated 2025 ADT volume along US15-501 between SR1734-Erwin Road and Sage Road is expected to be approximately 82,000 vpd.

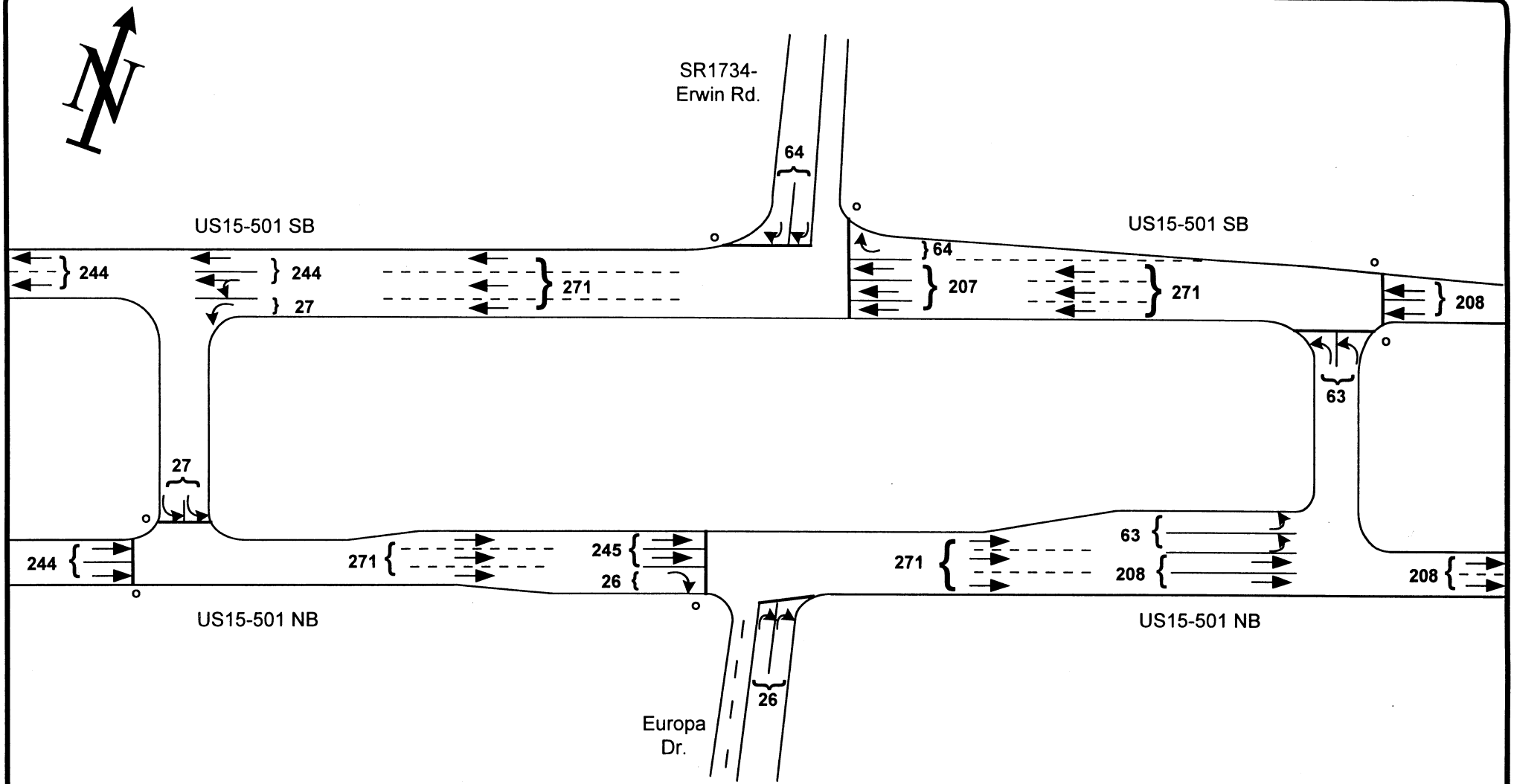
Should you have any questions or need further clarification on any of the information provided, please do not hesitate to contact Darius Sturdivant at (919) 715-5737 ext. 77 or by email at ddsturdivant@dot.state.nc.us.

Attachments

cc: Lori Cove, P.E.
John Alford, P.E.
Joe Springer
Nathan Phillips, P.E.
L.C. Smith



I-40
N
Mt Moriah Rd
Erwin Rd
Sundance Pl
Silver Creek Tr
Chip oaks Dr.
Englewood Dr.
Woodmark Ct.
Brookstone Ct.
Westchester Pl.
Orchard Ln.
Providence
Cloister Ct.
Eastowne Dr.
Old Sterling Dr.
Coleridge Dr.
Sage Rd.
US 15-501 North
W. Lakeview Dr.
E. Lakeview Dr.
White Oak Dr.
Windhover Dr.
Oxford Rd. East
McGregor Dr.
Dobbins Dr.
Old Durham Rd.
Scarlett Dr.
Legion Rd.
Cooper St.
Garden St.
Standish Dr.
Duchess Ln
Ascot
Haddon Hall Cir
Europa Dr.
Forsythia Ct.
Adelaide Walters St.
M.L.King Jr.
St.Andrews Ln.
Laura May Ln.
Fireside Dr.
Fountain Ridge Rd
Tinkerbell Rd
Thornwood Dr.
Landerwood Ln.
Overland Dr.
Sharon Rd
Highview Rd.
Colony Woods Dr.
Turnberry Ln.
Clover Dr.
Lark Cir.
Heather Ct.
Ferrell Rd.
Banbury Ln
Ephesus Church Rd.
White Plains Rd
Newton Dr.
Frances St
Cypress Rd
Churchill Dr
Lynwood Pl.
Nottingham Dr.
Great Oaks
Manly St.
Willow Dr.
Pope Rd.
Cricket Ground
Blacksmith
Bakers
Crane Meadow Pl.
Regent Pl.
Kirkwood Dr.
Cherrywood Cir
Dobbins Dr.



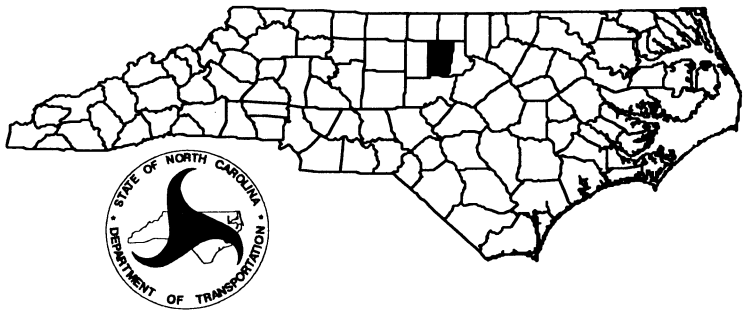
ESTIMATED 2002 ADT
U-4008 Superstreet

LEGEND

###	VPD----# OF VEHICLES PER DAY IN 100's
### -	MUCH LESS THAN ### VPD
X	MOVEMENT PROHIBITED
→	ONE-WAY MOVEMENT

$$DHV \xrightarrow[(d,\,t)]{PM} D$$

DHV	DESIGN HOURLY VOLUME (%) = K30
	K30 = 30'TH HIGHEST HOURLY VOLUME
PM	PM PEAK PERIOD
D	DIRECTIONAL SPLIT (%)
→	INDICATES DIRECTION OF D
REVERSE FLOW FOR AM PEAK	
(d,t)	DUALS, TT-ST'S (%)



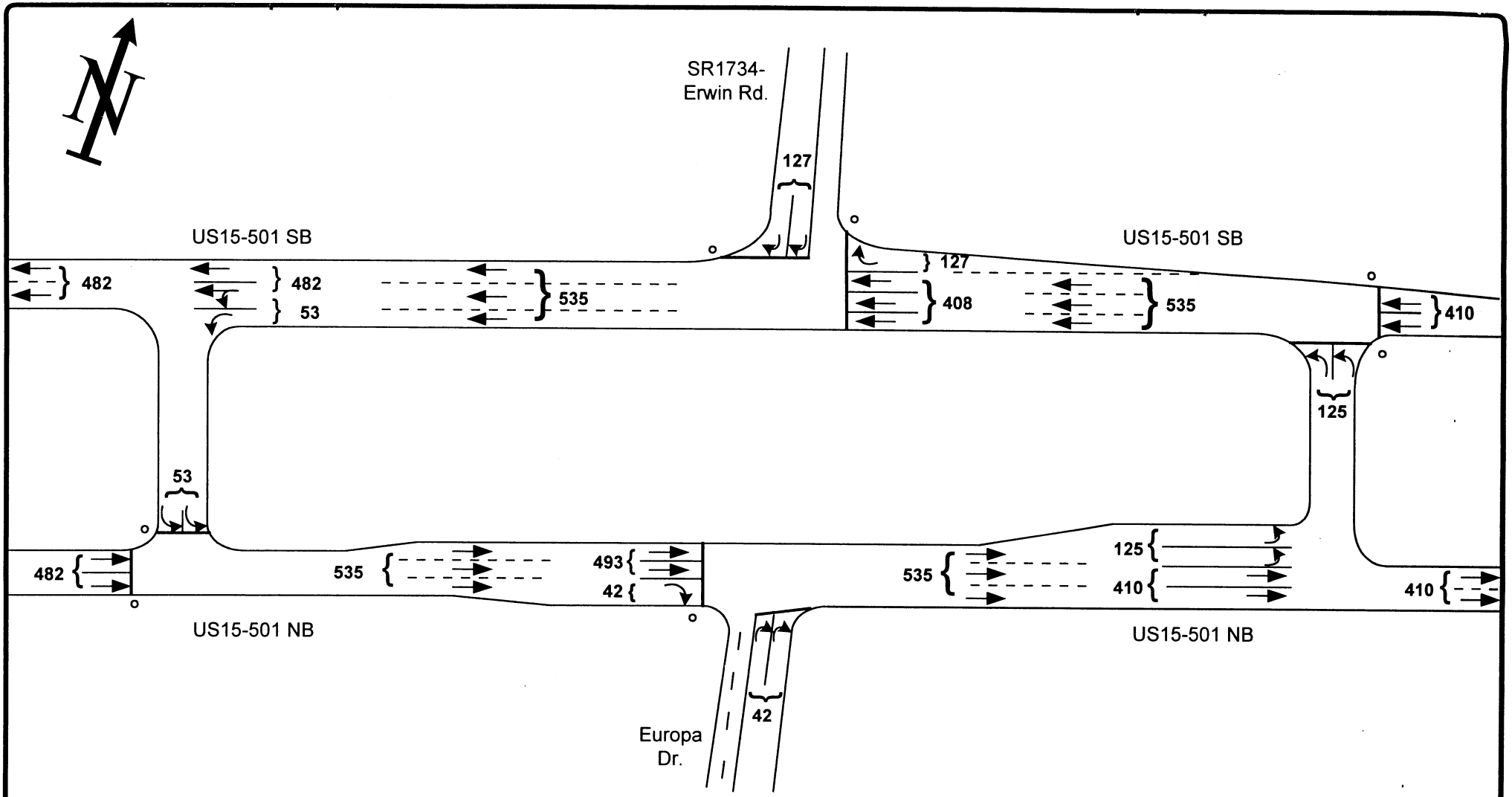
LOCATION:
Intersection of US15-501 and SR1734-Erwin Road in Chapel Hill

PROJECT:
Intersection Improvement: Construction of a "Superstreet" intersection design

COUNTY: ORANGE

DIV. : 7 **DATE: March, 2002**

TIP # U-4008 **W. O. # 8.1502101**



ESTIMATED 2025 ADT
U-4008 Superstreet

LEGEND

###	VPD----# OF VEHICLES PER DAY IN 100's
### -	MUCH LESS THAN ### VPD
X	MOVEMENT PROHIBITED
→	ONE-WAY MOVEMENT

DHV $\xrightarrow[(d,\,t)]{PM}$ D

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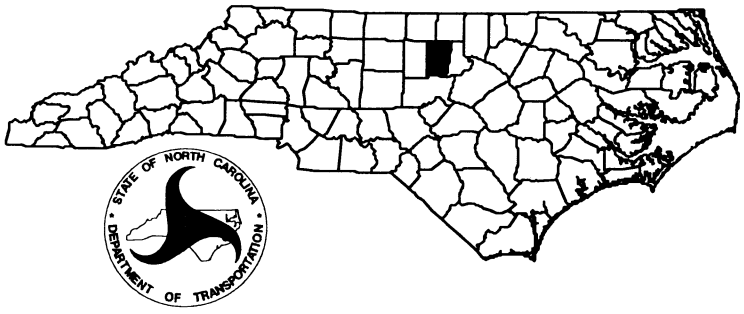


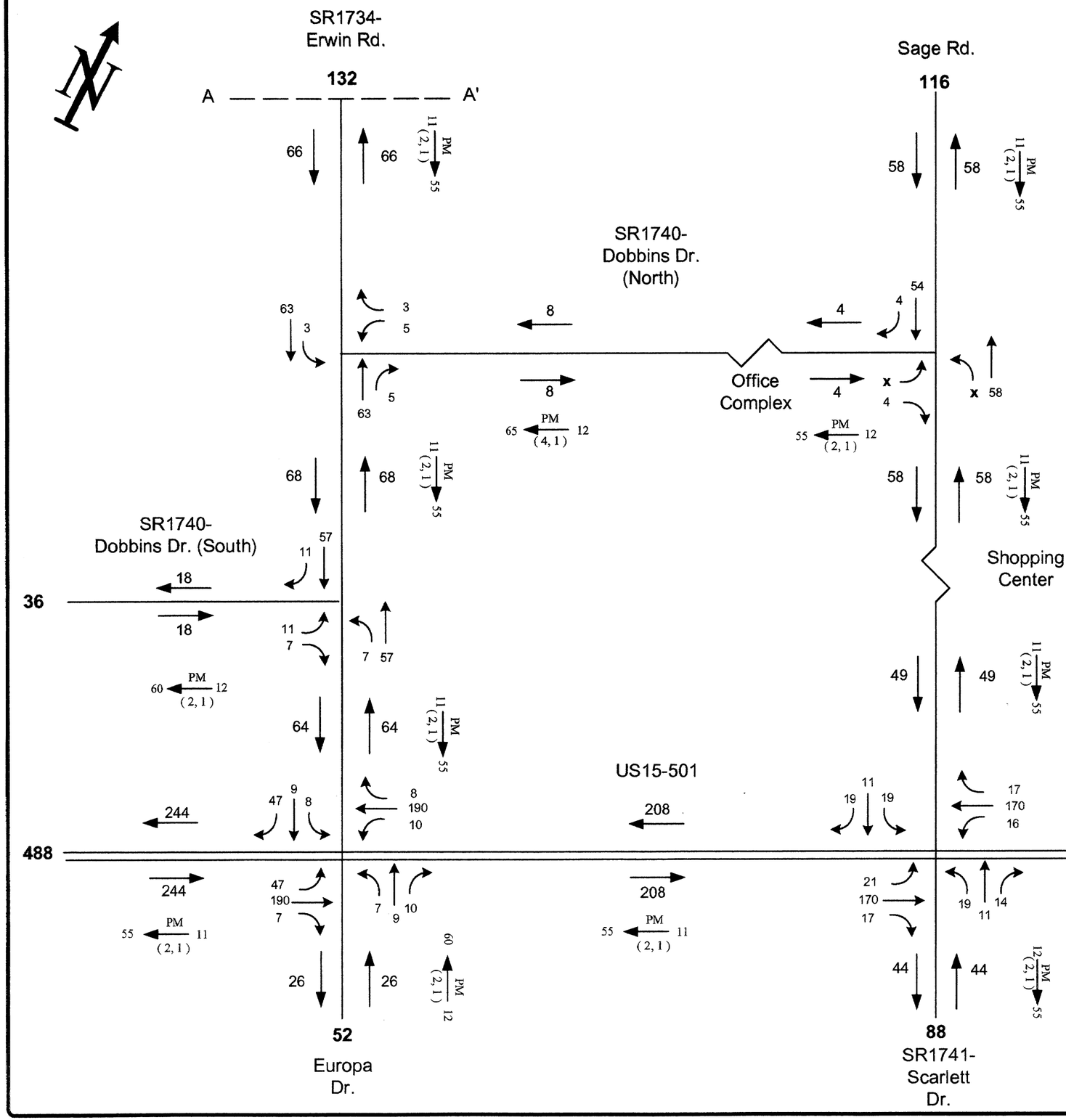
LOCATION:
Intersection of US15-501 and SR1734-Erwin Road in Chapel Hill

PROJECT:
Intersection Improvement: Construction of a "Superstreet" intersection design

COUNTY: ORANGE

DIV. : 7 **DATE: March, 2002**

TIP # U-4008 **W. O. # 8.1502101**



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REVERSE FLOW FOR AM PEAK	
(d,t)	DUALS, TT-ST'S (%)

2002 ESTIMATED ADT

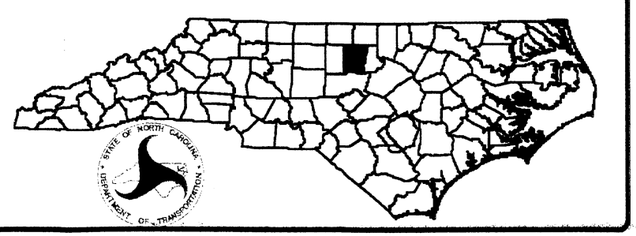
LOCATION:
SR1734-Erwin Rd. from US15-501 to SR1733-Weaver Dairy Rd. and SR1741-Sage Rd. from US15-501 to SR1740-Dobbins Dr. in Chapel Hill

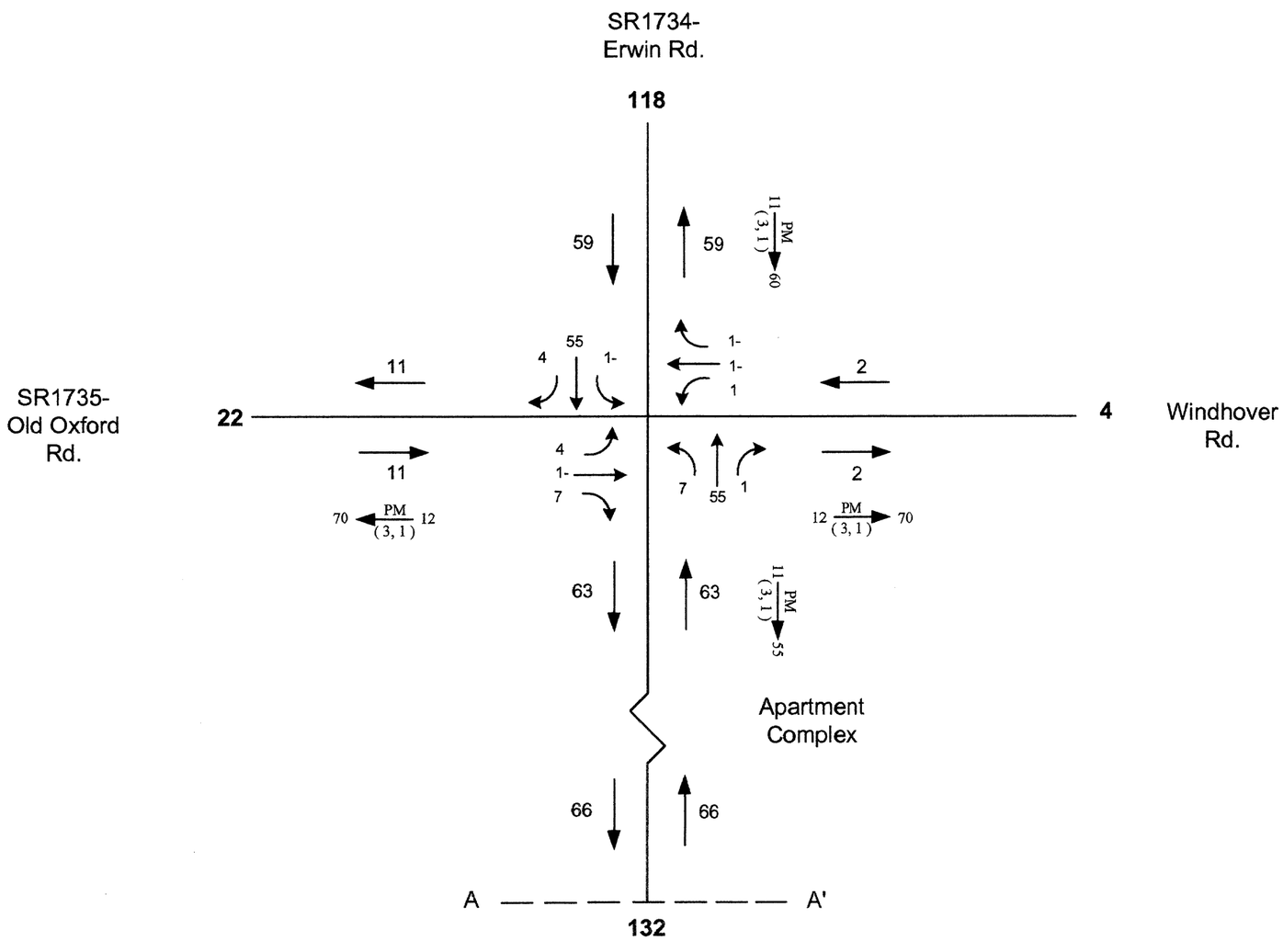
PROJECT:
Implement Superstreet design at US15-501 & SR1734-Erwin Road

COUNTY: Orange

DIV.: 7 **DATE:** March, 2002

TIP # U-4008 **W. O. #** 8.1502101





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2002 ESTIMATED ADT

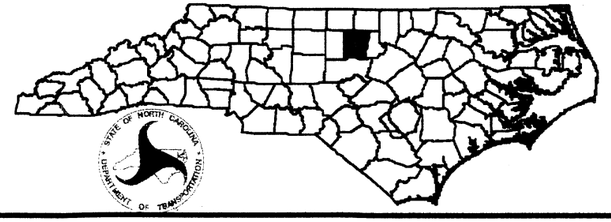
LOCATION:
SR1734-Erwin Rd. from US15-501 to SR1733-Weaver Dairy Rd. and SR1741-Sage Rd. from US15-501 to SR1740-Dobbins Dr. in Chapel Hill

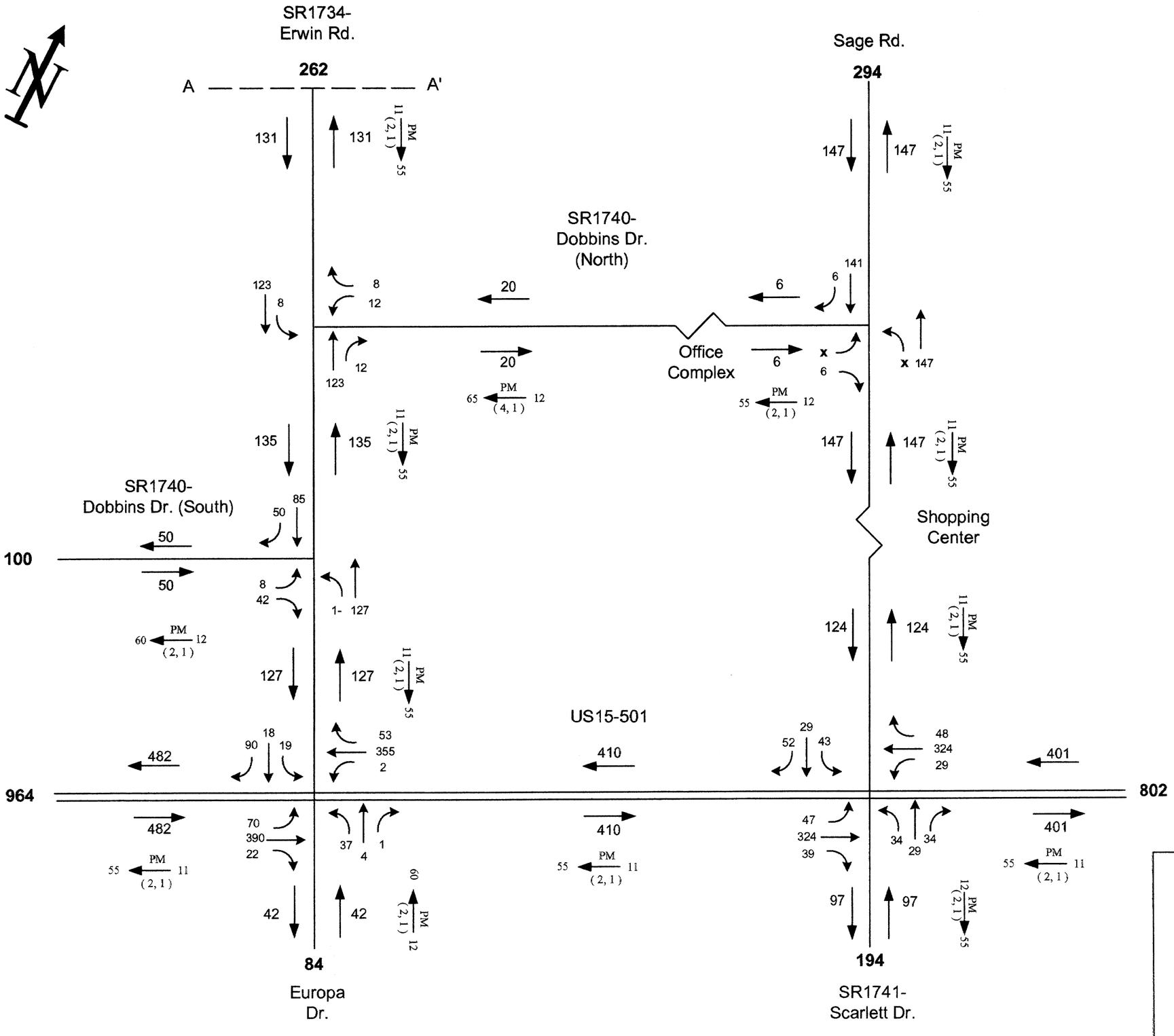
PROJECT:
Implement Superstreet design at US15-501 & SR1734-Erwin Road

COUNTY: Orange

DIV.: 7 **DATE:** March, 2002

TIP # U-4008 **W. O. #** 8.1502101





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REVERSE FLOW FOR AM PEAK	
(d,t)	DUALS, TT-ST'S (%)

2025 ESTIMATED ADT
Assumes SR1733-Weaver Dairy Road Extension Open

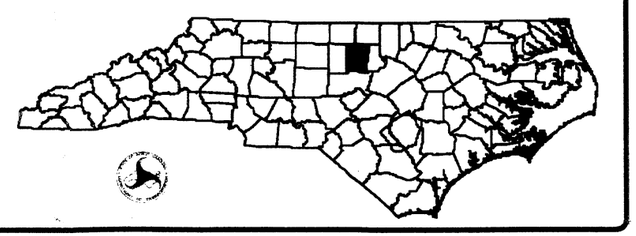
LOCATION:
SR1734-Erwin Rd. from US15-501 to SR1733-Weaver Dairy Rd. and SR1741-Sage Rd. from US15-501 to SR1740-Dobbins Dr. in Chapel Hill

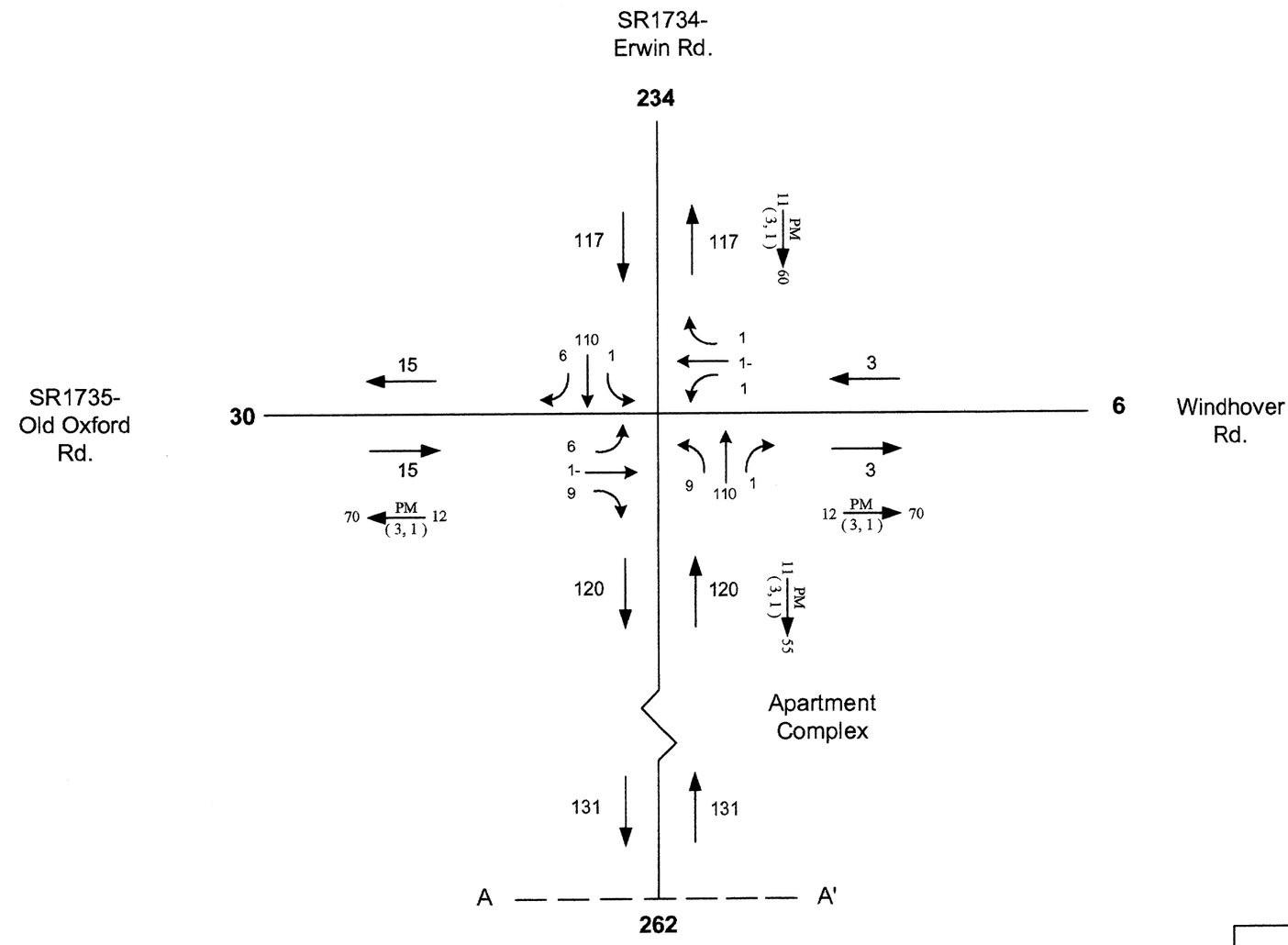
PROJECT:
Implement Superstreet design at US15-501 & SR1734-Erwin Road and

COUNTY: Orange

DIV.: 7 **DATE:** March, 2002

TIP # U-4008 **W. O. #** 8.1502101





LEGEND

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REVERSE FLOW FOR AM PEAK	
(d,t)	DUALS, TT-ST'S (%)

2025 ESTIMATED ADT
Assumes SR1733-Weaver Dairy Road Extension Open

LOCATION:
SR1734-Erwin Rd. from US15-501 to SR1733-Weaver Dairy Rd. and SR1741-Sage Rd. from US15-501 to SR1740-Dobbins Dr. in Chapel Hill

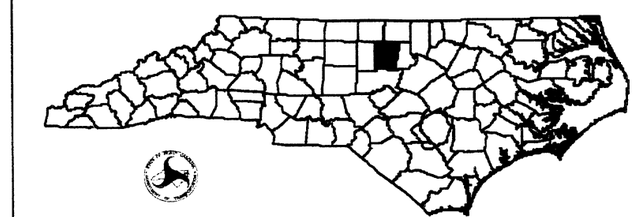
PROJECT:

Implement Superstreet design at US15-501 & SR1734-Erwin Road and

COUNTY: Orange

DIV.: 7 **DATE:** March, 2002

TIP # U-4008 **W. O. #** 8.1502101



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

November 27, 2002

MEMORANDUM TO: Mr. Gregory J. Thorpe, PhD
Environmental Management Director, PDEA

ATTENTION: Ms. Kristina Solberg, PE

FROM: for D. R. Henderson, PE
State Hydraulics Engineer

SUBJECT: Hydraulics Aspects of the Environmental Impacts for the Intersection Improvement at US 15/501 and Erwin Road, Orange County, F. A. Project No. NHF-15(9), State Project No. 8.1502101, T.I.P. No. U-4008.

The proposed project involves improving the intersection at US 15/501 and Erwin Road in Chapel Hill. The Hydraulics Unit staff recently conducted a field investigation and drainage study for the subject project. There are no major stream crossings associated with this project. In consideration of all aspects listed below, the hydraulic recommendations are summarized as follows:

Based on information from the natural systems unit there are two jurisdictional streams with anticipated impacts on this project. Approximately 280 feet of stream will be impacted on the right side of -Y2A- from Sta. 23+60 to 26+20 +/-. This impact is due to the widening of US 15/501. Due to the close proximity to a hotel parking lot there is no potential for natural stream design at this site. The second stream that is to be impacted is located right of –Y3- Sta. 22+00. At this site a 42" RCP cross-pipe is being replaced with a 66" RCP and there is a potential impact of 35 feet. Recommendations made in this report are preliminary and subject to change during the final and more detailed design phase of the project.

The project is located in the Cape Fear River Basin. Durham County is currently participating in the National Flood Insurance Regular Program. This project is not located in a designated flood hazard zone.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
HYDRAULICS UNIT
1590 MAIL SERVICE CENTER
RALEIGH NC 27699-1590

TELEPHONE: 919-250-4100
FAX: 919-250-4108
WEBSITE: WWW.DOH.DOT.STATE.NC.US

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

The project is not within a water supply watershed or any other environmentally sensitive areas. Erosion and sedimentation will be controlled through the specification, installation and maintenance of standard erosion and sedimentation control methods.

It is anticipated that construction of the project can be authorized under a United States Army Corps of Engineers (USACOE) nationwide permit. Existing drainage patterns will be maintained to the extent practicable. The Hydraulics Unit will assist the Project Development and Environmental Analysis Branch, in coordinating with the USACOE and other governmental regulatory agencies to ensure that all environmental concerns are appropriately addressed. Groundwater resources will not be affected by this project, as the roadway is primarily on fill.

cc: Ms. D. M. Barbour, P.E.
Mr. J. A. Bennett, P.E.
Ms. Beth Harmon
Project file

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 30, 2002

TIP Project: U-4008
County: Orange
Description: Intersection Improvement at US 15-501 and Erwin Road in Chapel Hill
Project 8.1502101

MEMORANDUM

TO: [redacted], Environmental Management Director
Project Development and Environmental Analysis Branch
Attention: Kristina Solberg, P.E., Project Development Engineer

FROM: Nathan K. Phillips, P.E., Plan Review Engineer
Congestion Management Section

SUBJECT: Re-issue of Preliminary Review of TIP Project

This memorandum supersedes our previous memorandum issued October 23, 2002. The only differences between this memorandum and our previous one are that this memorandum refers to US 15-501 as a north / south corridor and provides a more detailed description of the superstreet configuration.

The Plan Review Squad of the Traffic Engineering and Safety Systems Branch has completed a preliminary review of this project. As requested, we performed analyses based on the 2001 and 2025 design year traffic projections provided by our Statewide Planning Branch to determine the levels of service (LOS). Based on our analysis, we offer the following comments that should enhance the traffic safety and operation of this facility.

GENERAL

Currently the intersection of US 15-501 and Erwin Road operates at an undesirable level of service, LOS F. Based upon existing constraints, somewhat unconventional intersection treatments were considered to help improve operations, safety, and air quality at this location. A superstreet type intersection design is recommended at this location to help achieve the desired goals. The superstreet design removes left-turns from the intersection in question (a bi-directional crossover location) from both the mainline and side street by relocating them downstream of the intersection (U-turn points). The superstreet also removes side street through movements from the intersection and in the same manner relocates them to the downstream U-turn points. Therefore to make a through movement at a side street, a driver will first turn right onto the mainline, U-turn at the down stream U-turn point, and then perform a right-turn onto the side street to complete their maneuver. The existing median along US 15-501 in this area lends itself well to the superstreet design in that there is already available space / right-of-way to provide the directional crossovers on either side of the existing intersection. This design also replaces the existing single multi-phase

MAILING ADDRESS:
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH
1592 MAIL SERVICE CENTER
RALEIGH, NORTH CAROLINA 27599-1592

TELEPHONE: 919-250-4151
FAX: 919-250-4195
WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
CENTURY CENTER COMPLEX BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH, NORTH CAROLINA 27610

signal with four more efficient two-phase signals, thereby reducing delay and in turn improving air quality in the area.

The original proposed design of providing an additional northbound left-turn lane to improve operations was also analyzed and compared to the recommended superstreet and "No-Build" designs.

ANALYSIS

Based upon the 2000 version of the *Highway Capacity Manual*, when the operating speed of a Type I Urban Street, a principal arterial with a free-flow speed of 45 – 55 miles per hour, drops below 16 miles per hour that facility is operating at LOS F. Using the microscopic simulation tool CORSIM, we determined that the network speeds in the project area will drop below 16 miles per hour in the year 2012 with a superstreet type design. As previously mentioned, the analyzed volumes were based upon existing and design year, 2025, volumes provided by our Statewide Planning Branch. The year 2012 is an improvement over the "No-Build" and proposed design which both are anticipated to operate at LOS F by the year 2005. The superstreet design, however, is expected to operate at LOS D in the year 2005, resulting in a design life of approximately seven years. We realize this is a short-term type solution but it will result in immediate improved operations. The improved operations are also anticipated to result in the improved emissions of vehicles in the network, thereby improving the air quality in the area.

DESIGN

Due to the uniqueness of this type of design in North Carolina, signing and pavement marking will be instrumental in limiting driver confusion. Our Signing Section is working on the development of clear and concise signing plans to direct both familiar and unfamiliar drivers through the project. It will be beneficial to sign the inside right-turn lanes for both Erwin Road and Europa Drive for persons wishing to use the directional crossovers to limit their required weaving maneuver. Also for the northern directional crossover, trucks need to be signed to only use the outside left-turn lane. Ideally this movement should be designed with appropriate radii to allow design vehicles to easily use both left-turn lanes. Unfortunately, due to existing constraints, this is not possible; therefore care should be taken to ensure this movement is properly signed. We recommend that our Traffic Control Section be involved in the associated pavement marking for this design.

Pedestrian crossing of this intersection and the associated signal designs are key elements of the superstreet design, both of which will be addressed in detail under separate cover as this project progresses.

If you have any questions, please contact Jim Dunlop, P.E., Congestion Management Engineer, or me at 250-4151.

NKP/

cc: J. M. Mills, P. E. (Attention: V. E. Barham)
J. H. Grant, P. E. (Attention: K. L. Becker, P.E.)
R. E. Mullinax, P.E.
T. M. Hopkins, P.E. (Attention: J. H. Dunlop, P.E.)
C. L. Evans (Attention: J. W. Dale, P.E.)
J. S. Bourne, P.E.
R. W. King, P.E.
J.A. Bennett, P.E. (Attention: Roger Thomas, P.E.)

APPENDIX B

Environmental Effects

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

September 12, 2001
(Amended February 12, 2003)

MEMORANDUM TO: Cindy Sharer, PE, Unit Head
Project Planning Unit

FROM: Elizabeth L. Lusk, Environmental Biologist
Project Development and Environmental Analysis

SUBJECT: Natural Resources Technical Report for the proposed intersection improvements at US 15/501 and SR 1734 (Erwin Road) in Orange County, Fed. Project No. NHF-15(9), State Project No. 8.1502101, TIP No. U-4008.

ATTENTION: Kristina L. Solberg, P.E.
Project Planning Engineer

The attached Natural Resources Technical Report provides inventories and descriptions of the natural resources within the proposed project area, along with analyses of probable impacts likely to occur to these resources as a result of project construction. Pertinent information on wetlands and federally protected species is also provided, with respect to regulatory concerns that must be considered. Please contact me at 715-1444, if you have any questions, or need this report copied onto disk format.

File: U-4008

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
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RALEIGH NC 27699-1548

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1 SOUTH WILMINGTON STREET
RALEIGH NC

INTERSECTION IMPROVEMENTS
US 15/501 AND SR 1734 (ERWIN ROAD)
ORANGE COUNTY

TIP NO. U-4008
STATE PROJECT NO. 8.1502101
FEDERAL AID PROJECT NO. NHF-15(9)

NATURAL RESOURCES TECHNICAL REPORT

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

ELIZABETH L. LUSK, ENVIRONMENTAL BIOLOGIST

SEPTEMBER 12, 2001
(Amended February 12, 2003)

TABLE OF CONTENTS

1.0 INTRODUCTION

The following Natural Resources Technical Report is submitted to assist in the preparation of a Categorical Exclusion (CE) for the proposed project. The purpose of this report is to inventory and describe the natural resources which occur within the proposed right-of-way boundaries and which are likely to be impacted by the proposed action. Assessments of the nature and severity of probable impacts to these natural resources are provided, along with recommendations for measures that will minimize resource impacts.

This report identifies areas of particular environmental concern that may affect the selection of a preferred alignment or may necessitate changes in design criteria. Such environmental concerns should be addressed during the preliminary planning stages of the proposed project in order to maintain environmental quality in the most efficient and effective manner. The analyses contained in this document are relevant only in the context of the existing preliminary project boundaries and design. If design parameters and criteria change, additional field investigations may be necessary.

1.1 Project Description

The proposed project calls for intersection improvements, in order to relieve traffic congestion at and around the intersection of US 15/501 and Erwin Road (SR 1734) near Chapel Hill in Orange County (Figure 1). The existing right-of-way varies between 130 feet (40 meters) and 300 feet (91 meters). The existing road is a divided highway with four 11-foot lanes (3-meter) with 10-foot (3-foot) grassed shoulders, divided by a grass median of variable width. The improvements will be designed according to the new Superstreet Design, which resembles an oblong traffic circle. Pavement at the center of the existing intersection will be removed and grassed. The proposed right-of-way varies between 150 feet (46 feet) and 300 feet, with four 12-foot (5-meter) lanes divided by grassed medians of varying width. Two 12 to 13-foot turn lanes will be added across the existing grassed median to access northbound lanes from the southbound lanes and vice-versa.

1.2 Methodology

Research was conducted prior to field investigations. Published resource information pertaining to the project area was gathered and reviewed. Resources utilized in this preliminary investigation of the project area include:

- Geological Survey (USGS) quadrangle maps (Southwest Durham).
- NCDOT aerial photographs of the project area (1:100).
- USDA Soil Conservation Service, currently known as Natural Resource Conservation Service, Soil Survey of Orange County, North Carolina (1977).
- NC Center for Geographic Information and Analysis Environmental Sensitivity Base Maps of Orange County (1995).

Water resource information was obtained from publications of the Department of Environment, Health and Natural Resources (NCDEM, 1993). Information concerning the occurrence of federal and state protected species in the study area was obtained from the US Fish and Wildlife Service list of protected and candidate species (February 26, 2001) and from the N.C. Natural Heritage Program (NCNHP) database of rare species and unique habitats. NCNHP files were reviewed for documented occurrences of state or federally listed species and locations of significant natural areas.

NCDOT Environmental Biologists Elizabeth Lusk and Shannon Simpson conducted general field surveys in the proposed project area on March 13, 2001. Water resources were identified and their physical characteristics were recorded. Plant communities and their associated wildlife were also identified and described. Terrestrial community classifications generally follow Schafale and Weakley (1990) where possible, and plant taxonomy follows Radford, *et al.* (1968). Animal taxonomy follows Martof, *et al.* (1980), Menhenick (1991), Potter, *et al.* (1980), and Webster, *et al.* (1985). Vegetative communities were mapped utilizing aerial photography of the project site. Predictions regarding wildlife community composition involved general qualitative habitat assessment based on existing vegetative communities. Wildlife identification involved using a variety of observation techniques: qualitative habitat assessment based on vegetative communities, active searching, identifying characteristic signs of wildlife (sounds, scat, tracks and burrows). Cursory surveys of aquatic organisms were conducted and tactile searches for benthic organisms were administered as well. Organisms captured during these searches were identified and then released.

Jurisdictional wetlands, if present, were identified and evaluated based on criteria established in the "Corps of Engineers Wetland Delineation Manual" (Environment Laboratory, 1987) and "Guidance for Rating the Values of Wetlands in North Carolina" (Division of Environmental Management, 1995). Wetlands were classified based on the classification scheme of Cowardin, *et al.* (1979).

1.3 Terminology and Definitions

For the purposes of this document, the following terms are used concerning the limits of natural resources investigations. **"Project area"** denotes the area bounded by the proposed right-of-way limits along the full length of the project alignment. **"Project vicinity"** is defined as an area extending 0.5 miles (0.8 km) on all sides of the project area, and **"Project region"** denotes an area equivalent in size to the area represented by a 7.5 minute USGS quadrangle map, i.e. [61.8 sq. mi (163.3 sq. km)].

1.4 Qualifications of Principal Investigator

Investigator:	Elizabeth L. Lusk
Education:	Bachelor of Arts, Davidson College
	Master of Forest Management, Duke University
Certification:	Registered Forester, #995
Experience:	Environmental Biologist, NC DOT, Raleigh, NC, August 1999 to present.
	Biologist, CZR Environmental Consultants, Wilmington, NC, 1994 to1999.
	Service Forester, NC Division of Forest Resources, Charlotte, NC, 1992 to 1993.
	Service Forester, MD Forest Service, Baltimore, MD, 1990 to1992.
Expertise:	Bottomland hardwood mitigation, wetland delineation, hydric soil evaluation, biotic community mapping and assessment, technical report writing.

2.0 PHYSICAL RESOURCES

Soil and water resources that occur in the project area are discussed below with respect to possible environmental concerns. Soil properties and site topography significantly influence the potential for soil erosion and compaction, along with other possible construction limitations or management concerns. Water resources within the project area present important management limitations due to the need to regulate water movement and the increased potential for water quality degradation. Excessive soil disturbance resulting from construction activities can potentially alter both the flow and quality of water resources, limiting downstream uses. In addition, soil characteristics and the availability of water

directly influence the composition and distribution of flora and fauna in biotic communities, thus affecting the characteristics of these resources.

2.1 Regional Characteristics

Orange County lies within the piedmont physiographic region of north central North Carolina. The county lies across the divides of three major river basins. The northern edge drains into the Roanoke River Basin; the northeastern portion drains into the Neuse River Basin; and the western and southern portions drain into the Cape Fear River Basin. The proposed project is located in the southeastern corner of the county falling within the Cape Fear River Basin. The Haw River, a tributary of the Cape Fear River, forms approximately 3 miles of the southwestern boundary of the county. Elevation ranges from undulating terrain at 700 to 800 feet above mean sea level, along the major river basin divides in the northern part of the county, to 230 feet on the floodplains of Morgan Creek in the southeastern part on the Cape Fear watershed. The highest point in the county is Occoneechee Mountain at Hillsborough with an elevation of 860 feet.

2.2 Soils

There are two soil types located in the project area. A brief description of each soil type is provided.

- White Store loam, 2 to 6 percent slopes (WsB) is a moderately well-drained soil located on broad upland ridges. In the project area, this soil is found southwest of Erwin Road on both sides of US 15/501. The surface layer is a 5-inch thick yellowish-brown loam, underlain with clay loam and clay layers. Permeability and available water capacity are very slow and the shrink-swell potential is high. Depth to bedrock is 4 to 6 feet. Depth to the seasonal high water table is greater than 3 feet, but a perched water table is 6 to 18 inches below the surface in places during wet periods. Hazards include slow permeability, wetness, and high shrink-swell potential.
- White Store loam, 6 to 15 percent slopes (WtC2) is a moderately well drained soil located on ridges and narrow side slopes on uplands. In the project area, this soil is found northeast of Erwin Road on both sides of US 15/501. The surface layer is a 5-inch thick yellowish-brown loam, underlain with clay loam and clay layers. Permeability and available water capacity is very slow and the shrink-swell potential is high. Depth to bedrock is 4 to 6 feet. Depth to the seasonal high water table is greater than 3 feet, but a perched water table is 6 to 18 inches below the surface in places during wet periods. Hazards include slow permeability, wetness, slope, and high shrink-swell potential.

2.3 Water Resources

This section contains information concerning surface water resources likely to be impacted by the proposed project. Water resource assessments include the physical characteristics, best usage standards, and water quality aspects of the water resources, along with their relationship to major regional drainage systems. Probable impacts to surface water resources are also discussed, as are means to minimize impacts.

Water resources within the study area are located in the Cape Fear River Drainage Basin. Two unnamed tributaries (UT) to Booker Creek are the only jurisdictional water resources that may fall within the project area.

One UT (Booker Creek UT1) drains the Erwin Road/southbound US 15/501intersection. After crossing the intersection, this perennial UT flows southwestward along the northwest side of the Service Road. Under the current preliminary design being proposed by the NCDOT, this resource will not be affected by the intersection improvements, since improvements are south of this UT.

The second UT (Booker Creek UT2) flows from Chapel Hill Memorial Cemetery southeastward along the eastern side of northbound US 15/501 into a 48-inch concrete pipe underneath US 15/501. This pipe drains into UT1. Existing topography and soil series' boundaries do not support the geographical location of this intermittent channel. Most likely, this was roadside ditch that was established during construction of US 15/501 to provide drainage for the northbound lanes. UT2 is not regularly maintained and appears to have naturalized, containing marginal aquatic habitat. There is a short ephemeral segment of this channel flowing northeastward, from the corner of Europa Drive and US 15/501, draining into the same 48-inch concrete pipe. Impacts to this resource can be avoided, if the proposed ROW for the new northbound US 15/501 does not extend much further to the southeast than it's current limits. However, if construction forces relocation of this stream, it would be best to employ Natural Stream Design on the relocated portion, if adequate floodplain width is available between the road and the slope up to the hotel.

2.3.1 Best Usage Classification

Streams have been assigned a best usage classification by the Division of Water Quality (DWQ), formerly Division of Environmental Management (DEM), which reflects water quality conditions and potential resource usage. Unnamed tributaries receive the same classification as the streams to which they flow. The classification for Booker Creek [DEM Index No. 16-41-1-15-2-(4), 12/1/83] is classified as **C NSW. Class C** waters are waters protected for secondary recreation, fishing, wildlife, fish and aquatic life propagation and survival, agriculture and other. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner. There are no restrictions on watershed development activities. **NSW waters** are nutrient sufficient 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 High Quality Waters (HQW), Water Supplies (WS-I or WS-II) or Outstanding Resource Waters (ORW) occur within 1.6 km (1.0 mi) of the project study area.

2.3.2 Physical Characteristics of Surface Waters

Booker Creek UT1 northwest of the service road in the vicinity of the Erwin Road and US 15/501 intersection has a channel width of approximately 4 to 6 feet (1 to 2 meters) at top of bank and a channel depth of 3 to 4 feet (0.9 to 1.2 meters). Water within the channel ranges from 4 to 8 inches (10 to 20 centimeters) deep. Streambed substrate consists of silt, sand, and gravel and there is a well-defined bed and bank. On the day of the site visit, flow was slow and water clarity was fair. There is substantial evidence that storm flows have severely eroded the banks, undercutting the channel. At the time of the field visit, there was debris and trash in and around the stream.

Booker Creek UT2 along the eastern side of northbound US 15/501 has a channel width ranging from 3 feet (0.9 meters) to 5 feet (1.5 meters) and channel depth of 6 inches (0.2 meters) to 1 foot (0.3 meters). The water at the time of the field visit was about 2 to 4 inches (5 to 10 centimeters) deep, slow flowing, with fair to good water clarity. Streambed substrate consists of silt and pebble in the lower reach and bedrock on the higher reach (close to the Cemetery). Throughout, there was a well-defined bed and bank.

2.3.3 Water Quality

This section describes the quality of the water resources within the project area. Potential sediment loads and toxin concentrations of these waters from both point sources and nonpoint sources are evaluated. Water quality assessments are made based on published resource information and existing general watershed characteristics. These data provide insight into the value of water resources within the project area to meet human needs and to provide habitat for aquatic organisms.

Water quality is fair to poor based on the trash and debris found within the streams, as well as water originating from road runoff. Nevertheless, aquatic organisms were observed during the site visit. **Within the project vicinity, there are no registered point source dischargers located upstream or downstream from the project study area on Booker Creek.**

2.3.3.2 Benthic Macroinvertebrate Ambient Network

The Basinwide Monitoring Program, managed by the DWQ, is part of an ongoing ambient water quality-monitoring program that addresses long-term trends in water quality. The program monitors ambient water quality by sampling at fixed sites for selected benthic macroinvertebrates organisms, which are sensitive to water quality conditions. Samples are evaluated on the number of taxa present of intolerant groups [Ephemeroptera, Plecoptera, Trichoptera (EPT)] and a taxa richness value (EPT S) is calculated. A biotic index value is also calculated for the sample that summarizes tolerance data for all species in each collection. The two rankings are given equal weight in final site classification. The biotic index and taxa richness values primarily reflect the influence of chemical pollutants. The major physical pollutant, sediment, is poorly assessed by a taxa richness analysis. Different criteria have been developed for different ecoregions (mountains, piedmont, and coastal plain) within North Carolina. **There are no benthic monitoring stations on Booker Creek in or above the project area.**

2.4 Summary of Anticipated Impacts (general)

Impacts to natural resources in the project area are likely to result from activities associated with project construction. Activities likely to result in impacts are clearing and grubbing of areas currently in woody vegetation. Further negative effects on the natural environment will result from pavement installation and the use of fertilizers and pesticides for revegetation. The following impacts to adjacent surface water resources are likely to result from the above mentioned construction activities.

- Increased sedimentation and siltation downstream of the crossing and increased erosion in the project area.
- Alteration of stream discharge due to silt loading and changes in surface and groundwater drainage patterns.
- Alteration of water levels and flows due to interruptions and/or additions to surface and ground water flow from construction.
- Increased nutrient loading during construction via runoff from exposed areas.
- Increased concentrations of toxic compounds in roadway runoff resulting from creation of greater impervious surface area.
- Increased potential for release of toxic compounds such as fuel and oil from construction equipment and other vehicles.

In order to minimize potential impacts to water resources in the project area, NCDOT's Sedimentation and Erosion Control Guidelines will be strictly enforced during the construction phase of the project. Revegetating cleared land immediately following the completion of grading can further reduce impacts.

3.0 BIOTIC RESOURCES

Biotic resources include terrestrial and aquatic communities. This section describes the biotic communities encountered in the project area, as well as the relationships between fauna and flora within these communities. The composition and distribution of biotic communities throughout the project area are reflective of topography, soils, hydrology, and past and present land uses. Descriptions of the terrestrial systems are presented in the context of plant community classifications. These classifications follow Schafale and Weakley (1990) where possible. Representative animal species that are likely to occur in these habitats (based on published range distributions) are also cited.

Scientific nomenclature and common names (when applicable) are provided for each animal and plant species described. Subsequent references to the same organism refer to the common name only. Fauna observed during the site visit are denoted in the text with an asterisk (*).

3.1 Biotic Communities

Biotic communities include terrestrial and aquatic elements. Much of the flora and fauna described from biotic communities utilize resources from different communities, making boundaries between contiguous communities difficult to define. There are two terrestrial communities located in the project area.

3.1.1 Maintained Roadside Community

This community is located on both sides of NC 15/501 and Erwin Road and will be impacted by the intersection improvements. Because of mowing and the use of herbicides this community is kept in a constant state of early succession. The dominant species in this community are fescue (*Festuca* sp.), English plantain (*Plantago lanceolata*), red clover (*Trifolium pratense*), wild onion (*Allium canadense*), and Japanese honeysuckle (*Lonicera japonica*).

3.1.2 Pine-Hardwood Forest Community

The pine-hardwood forest community is located in two areas of the project. A small patch of woods between the north and southbound lanes of US 15/501 south of Erwin Road and also along the naturalized portion of Booker Creek UT2, east of northbound US 15/501 north of Erwin Road. Plant species in this community consist of as loblolly pine (*Pinus taeda*), red maple (*Acer rubrum*), yellow poplar (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), flowering dogwood (*Cornus florida*), Chinese privett (*Ligustrum* sp.), Japanese honeysuckle, poison ivy (*Rhus radicans*), and muscadine vine (*Vitus rotundifolia)*).

3.1.3 Aquatic Community

This community is contained within both Booker Creek UTs. Aquatic insects found in this type of community include the water strider (*Gerris* spp.), crane fly (*Tipula* spp.), stream mayfly* (*Ephemeroptera*), netmaking cattisfly (Hydropsychae*)* and black-winged damselfly (*Calopteryx maculata*). Aquatic habitat in UT2 was marginal, with no evidence of aquatic organisms.

3.1.3 Wildlife

Maintained/disturbed communities adjacent to forested tracts provide rich ecotones for foraging, while the forests provide forage and cover. Common mammals and birds associated with this type of habitat are woodchuck (*Marmota monax*), least shrew (*Crypototis parva*), southern short-tailed shrew (*Blarina carolinensis*), hispid cottonrat (*Sigmodon hispidus*), eastern cottontail rabbit (*Sylvilagus*

floridanus), raccoon* (*Procyon lotor*), opposum (*Didelphis virginiana*), ruby-crowned kinglet (*Regulus calendula*), Carolina chickadee* (*Parus carolinensis*), downy woodpecker (*Picoides pubescens*), cardinal* (*Cardinalis cardinalis*), common grackle (*Quiscalus quiscula)* and white-breasted nuthatch (*Sitta carolinensis*).

3.2 Summary of Anticipated Impacts (quantified)

Construction of the proposed project will have various impacts on the biotic resources described. Any construction related activities in or near these resources have the potential to impact biological functions. This section quantifies and qualifies potential impacts to the natural communities within the project area in terms of the area impacted and the organisms affected. Temporary and permanent impacts are considered here as well, along with recommendations to minimize or eliminate impacts.

3.2.1 Terrestrial Impacts

Impacts to terrestrial communities will result from project construction due to the right of way widening, which necessitates additional clearing of portions of the project area, and the loss of community area. Table 1 summarizes potential losses to these communities, resulting from project construction. Calculated impacts to terrestrial communities reflect the relative abundance of each community present in the study area. Estimated impacts are derived based on the project lengths described in Section 1.1, and the entire proposed right-of-way width of 130 to 300 feet. However, project construction often does not require the entire right-of-way; therefore, actual impacts may be considerably less.

Table 1. Estimated Area Impacts to Terrestrial Communities.

Community	Impacts ac (ha)
Maintained Roadside	1.44 (0.58)
Pine/hardwood Forest	0.12 (0.05)
Total Impacts	**1.56 (0.63)**

3.2.2 Aquatic Impacts

Impacts to the aquatic communities of Booker Creek UT2 may result from the proposed project. Final design will reveal actual impacts; however, up to 605 linear feet of insignificant, intermittent, jurisdictional stream with no substantial aquatic habitat may be impacted. Impacts are likely to result from the physical disturbance of marginal aquatic habitats (i.e. substrate and water quality). Disturbance of aquatic habitats has a detrimental effect on aquatic community composition by reducing species diversity and the overall quality of aquatic habitats. Physical alterations to aquatic habitats can result in the following impacts to aquatic communities.

- Inhibition of plant growth.
- Algal blooms resulting from increased nutrient concentrations.
- Loss of benthic macroinvertebrates through scouring resulting from an increased sediment load.

Strict adherence to BMP's can minimize impacts to aquatic communities.

4.0 JURISDICTIONAL TOPICS

This section provides inventories and impact analyses pertinent to two significant regulatory issues: Waters of the United States and rare and protected species. These issues retain particular significance because of federal and state mandates that regulate their protection. This section deals specifically with the impact analyses required to satisfy regulatory authority prior to project construction.

4.1 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 (CRF) 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 (COE) 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. Wetlands are identified based on the presence of hydric soils, hydrophytic vegetation, and saturated or flooded conditions during all or part of the growing season. On February 12, 2003, jurisdictional determinations and verifications were conducted by Mr. John Thomas, USACE, with Mr. John Hennessy, NCDWQ, deferring to Mr. Thomas' determination.

4.1.1 Characteristics of Wetlands and Surface Waters

Criteria to delineate jurisdictional wetlands include evidence of hydric soils, hydrophytic vegetation, and hydrology. **There are no wetlands in the project area.**

UT1 was determined to be a perennial stream, requiring mitigation if impacts are incurred. UT2 from Europa Drive to the 48-inch concrete pipe at Station –L- 26+75 R is a non-jurisdictional stormwater channel. UT2 from its beginning at the cemetery (easternmost end of the project) to the same 48-inch concrete pipe is an intermittent channel with no aquatic habitat. Mitigation is not required for UT2. Impacts to jurisdictional surface waters are calculated based on the linear feet of the stream that are located within the proposed right-of-way. Under the current preliminary design, Booker Creek UT1 will not be impacted. However, a length of 605 feet of the intermittent Booker Creek UT2 may be impacted by the proposed improvements. In order to avoid or minimize impacts to jurisdictional surface waters, minimizing ROW expansion eastward is recommended. If avoidance is not practicable, use of stream design that mimics the existing channel and Natural Stream Design as closely as possible is recommended. Physical aspects of surface waters are described in Section 2.3.2.

4.1.2 Permits

Impacts to jurisdictional surface waters are anticipated from the proposed project. However, no mitigation requirement is anticipated as a result of the February 12, 2003 insignificant, intermittent, jurisdictional determination. As a result, construction activities will require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers

A Nationwide Permit 23 CFR 771.115(b) is likely to be applicable for all impacts to Waters of the U.S. resulting from the proposed project. This permit authorizes activities undertaken, assisted, authorized, regulated, funded or financed in whole, or part, by another Federal agency or department where that agency or department has determined, (pursuant to the council on environmental quality regulation for implementing the procedural provisions of the National Environmental Policy Act), that:

(1) The activity, work, or discharge is categorically excluded from environmental documentation because it is included within a category of actions which neither individually nor cumulatively have a significant effect on the human environment, and;

(2) The office of the Chief of Engineers has been furnished notice of the agency' or department's application for the Categorical Exclusion and concurs with that determination.

Section 401 of the Clean Water Act requires that the state issue or deny a Water Quality Certification (WQC) for any federally permitted or licensed activity that may result in a discharge to Waters of the U.S. WQC No. 3361 is the corresponding WQC for the 404 CWA NWP 23. However, written concurrence from DWQ is not required unless any standard conditions of this WQC cannot be met. Nevertheless, the NCDOT should notify the DWQ of project construction concurrent with the NW 23 application.

4.1.3 Avoidance, Minimization, Mitigation

The COE 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 (to wetlands), 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.

Avoidance mitigation examines all appropriate and practicable possibilities of averting impacts to Waters of the U.S.. According to a 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency (EPA) and the COE, 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.

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 footprint of the proposed project through the reduction to median widths, right-of-way widths, fill slopes and/or road shoulder widths.

Compensatory mitigation in not normally considered until anticipated impacts to Waters of the U.S. have been avoided and minimized to the maximum extent possible. It is recognized that "no net loss of wetlands" functions and values may not be achieved in each and 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., specifically wetlands. Such actions should be undertaken in areas adjacent to or contiguous to the discharge site.

Projects authorized under Nationwide Permits that result in the fill or alteration of:

- More than 0.1 acre (0.04 ha) may require compensatory mitigation,
- At least 1.0 acre (0.40 ha) of wetlands will require compensatory mitigation, and/or
- At least 150 linear feet (45.7 meters) of significant jurisdictional streams will require compensatory mitigation.

If perennial stream impacts are at least 150 linear feet, then mitigation will be required. Onsite mitigation is preferable via stream relocation at a 1:1 mitigation ratio. This may require additional right-of-

way acquisition. If onsite stream relocation is not practicable, off site mitigation may be available at a 2:1 ratio.

4.2 Rare and Protected Species

Some populations of fauna and flora have been in, or are in, the process of decline either due to natural forces or their inability to coexist with human development. 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 United States Fish and Wildlife Service (USFWS). Other species may receive additional protection under separate state laws.

4.2.1 Federally-Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under the provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of February 26, 2001, the USFWS lists five federally protected species for Orange County.

Table 2. Federally Protected Species for Orange County

Scientific Name	Common Name	Status	Biological Conclusion
Picoides borealis	red-cockaded woodpecker	E**	No Effect
Alasmidonta heterodon	dwarf wedgemussel	E	No Effect
Isotria medeoloides	small-whorled pogonia	T**	Unresolved
Echinacea laevigata	smooth coneflower	E*	Unresolved
Rhus michauxii	Michaux's sumac	E*	Unresolved

E - denotes Endangered (a species that is in danger of extinction throughout all or a significant portion of its range).

T - denotes Threatened (a species that is likely to become an endangered species within the forseeable future throughout all or a significant portion of its range).

* - denotes an Historic Record, the species was last observed in Orange County more than 50 years ago.

** - denotes an Obscure Record, the date and/or location of observation is uncertain.

Brief descriptions of the characteristics and habitat requirements for these species are included as Appendix A. Biological Conclusions of "No Effect" were found for the woodpecker and mussel species. However, the project area contains habitat suitable for small-whorled pogonia, smooth coneflower, and Michaux' sumac. According to the Natural Heritage database, a historical population of smooth coneflower was observed in 1922 in the project vicinity, northwest of the intersection of US 15/501 and Summerfield Crossing Road. Survey windows for these plants are from May to July. **NCDOT biologists will revisit this project during the summer of 2003 during these survey windows to resolve the biological conclusions for small-whorled pogonia, smooth coneflower, and Michaux' sumac.**

4.2.2 Federal Species of Concern and State Listed Species

There are 11 Federal Species of Concern (FSC) listed by the USFWS for Orange 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. A 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 3 lists the FSC, the state status of these species (if afforded state protection), and the potential for suitable habitat in the project area for each species. This species list is provided for information purposes as the protection status of these species may be upgraded in the future. A September 13, 2001 review of the NCNHP database of rare species and unique habitats revealed no occurrence of FSC species within one mile (1.6 km) the project study area.

Table 3. Federal Species of Concern for Orange County

Scientific Name	Common Name	NC Status	Habitat Present
Etheostoma collis lepidinion	Carolina darter	SC	No
Moxostoma sp.	Carolina redhorse	SR	Yes
Alasmidonta varicosa	Brook floater	T/PE	No
Diacyclops jeanneli putei	Carolina well diacyclops	SR/PSC*	No
Fusconaia masoni	Atlantic pigtoe	T/PE	No
Lampsilis cariosa	Yellow lampmussel	T/PE	No
Lasmigona subviridis	Green floater	E	No
Toxolasma pullus	Savanna lilliput	T/PE	No
Juglans cinerea	Butternut	W5	No
Monotropsis odorata	Sweet pinesap	C	No
Plagiochila columbiana	A liverwort	W2	No

"E"--An Endangered species is one whose continued existence as a viable component of the State's flora is determined to be in jeopardy.

"T"--A Threatened species is one which is likely to become endangered species within the foreseeable future throughout all or a significant portion of its range.

"SC"--A Special Concern species is one which requires monitoring but may be taken or collected and sold under regulations adopted under the provisions of Article 25 of Chapter 113 of the General Statutes (animals) and the Plant Protection and Conservation Act (plants). Only propagated material may be sold of Special Concern plants that are also listed as Threatened or Endangered.

"C"--A Candidate species is one which is very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction, direct exploitation or disease. The species is also either rare throughout its range or disjunct in North Carolina from a main range in a different part of the country or the world.

"SR"--A Significantly Rare species is one which is very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction, direct exploitation or disease. The species is generally more common elsewhere in its range, occurring peripherally in North Carolina.

"W2"--A Watch Category 2 species is a rare to uncommon species in North Carolina, but is not necessarily declining or in trouble.

"W5"--A Watch Category 5 species is a species with increasing amounts of threats to its habitat; populations may or may not be known to be declining.

"/P_"--denotes a species which has been formally proposed for listing as Endangered, Threatened, or Special Concern, but has not yet completed the listing process.

* -- Historic record - the species was last observed in the county more than 50 years ago.

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APPENDIX A

Descriptions of Federally Protected Species found in Orange County, NC

Picoides borealis (red-cockaded woodpecker) **Endangered**

Animal Family: Picidae
Date Listed: 10/13/70
Distribution in N.C.: Anson, Beaufort, Bertie, Bladen, Brunswick, Camden, Carteret, Chatham, Columbus, Craven, Cumberland, Dare, Duplin, Forsyth, Gates, Halifax, Harnett, Hertford, Hoke, Hyde, Johnston, Jones, Lee, Lenoir, Montgomery, Moore, Nash, New Hanover, Northhampton, Onslow, Orange, Pamlico, Pender, Perquimans, Pitt, Richmond, Robeson, Sampson, Scotland, Tyrrell, Wake, Wayne, Wilson.

The adult red-cockaded woodpecker (RCW) has a plumage that is entirely black and white except for small red streaks on the sides of the nape in the male. The back of the RCW is black and white with horizontal stripes. The breast and underside of this woodpecker are white with streaked flanks. The RCW has a large white cheek patch surrounded by the black cap, nape, and throat.

The RCW uses open old growth stands of southern pines, particularly longleaf pine (Pinus palustris), for foraging and nesting habitat. A forested stand must contain at least 50% pine, lack a thick understory, and be contiguous with other stands to be appropriate habitat for the RCW. These birds nest exclusively in trees that are $\geq$ 60 years old and are contiguous with pine stands at least 30 years of age. The foraging range of the RCW is up to 200.0 hectares (500.0 acres). This acreage must be contiguous with suitable nesting sites.

These woodpeckers nest exclusively in living pine trees and usually in trees that are infected with the fungus that causes red-heart disease. Cavities are located in colonies from 3.6-30.3 m (12-100 ft) above the ground and average 9.1- 15.7 m (30-50 ft) high. They can be identified by a large incrustation of running sap that surrounds the tree. The RCW lays its eggs in April, May, and June; the eggs hatch approximately 10 to 12 days later.

BIOLOGICAL CONCLUSION **NO EFFECT**
There is no suitable habitat in or near the project area for red-cockaded woodpecker.

Alasmidonta heterodon (dwarf wedge mussel) **Endangered**

Animal Family: Unionidae
Date Listed: 3/14/90
Distribution in N.C.: Franklin, Granville, Halifax, Johnston, Nash, Vance, Wake, Warren, Wilson.

The dwarf wedge mussel is a small mussel having a distinguishable shell noted by two lateral teeth on the right half and one on the left half. The periostracum (outer shell) is olive green to dark brown in color and the nacre (inner shell) is bluish to silvery white.

Known populations of the dwarf wedge mussel in North Carolina are found in Middle Creek and the Little River of the Neuse River Basin and in the upper Tar River and Cedar, Crooked, and Stony Creeks of the Tar River system. This mussel is sensitive to agricultural, domestic, and industrial pollutants and requires a stable silt free streambed with well oxygenated water to survive.

BIOLOGICAL CONCLUSION **NO EFFECT**
There is no suitable habitat in the project area for dwarf wedge mussel.

Isotria medeoloides (small whorled pogonia) **Threatened**
Plant Family: Orchidaceae
Federally Listed: September 10, 1982
Flowers Present: mid May-mid June
Distribution in N.C.: Burke, Haywood, Henderson, Jackson, Macon, Surry.

Small whorled pogonia is a perennial orchid having long pubescent roots and a hollow stem. Stems terminate in a whorl of five or six light green, elliptical leaves that are somewhat pointed. One or two light green flowers are produced at the end of the stem. Flowers of small-whorled pogonia have short sepals.

The small whorled pogonia grows in "second growth deciduous" or deciduous-coniferous forests, with an open canopy, open shrub layer, and sparse herb layer. It prefers acidic soils. Flowering is inhibited in areas where there is relatively high shrub coverage or high sapling density.

BIOLOGICAL CONCLUSION **UNRESOLVED**
There is suitable habitat in the project area for small whorled pagonia. However, no individuals of this species were observed during the site visit. **A survey will be conducted during the 2003 survey window.**

Echinacea laevigata (smooth coneflower) **Endangered**
Plant Family: Asteraceae
Federally Listed: December 9, 1991 PE
Flowers Present: June - early July
Distribution in N.C.: Durham, Granville, Orange, Rockingham.

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 **UNRESOLVED**
There is suitable habitat in the project area for smooth coneflower. However, no individuals of this species were observed during the site visit. **A survey will be conducted during the 2003 survey window.**

Rhus michauxii (Michaux's sumac) **Endangered**
Plant Family: Anacardiaceae
Federally Listed: September 28, 1989
Flowers Present: June
Distribution in N.C.: Davie, Durham, Franklin, Hoke, Lincoln, Moore, Orange, Richmond, Robeson, Scotland, Wake, Wilson.

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 **UNRESOLVED**

There is suitable habitat in the project area for Michaux' sumac. However, no individuals of this species were observed during the site visit. **A survey will be conducted during the 2003 survey window.**

APPENDIX C

Community Impact Assessment

COMMUNITY IMPACT ASSESSMENT

US 15/501 and Erwin Road

TIP U-4008

Orange County, North Carolina

Prepared for

North Carolina Department of Transportation

Office of Human Environment

Prepared by:

HNTB North Carolina, PC

2108 South Boulevard

Suite 108

Charlotte, North Carolina 28203

September 13, 2002

Displacements

It is the policy of the NCDOT to provide assistance and counseling to those affected by transportation improvements as required under the Federal Uniform Relocation Assistance and Real Properties Acquisition Policies Act. Furthermore, the North Carolina Board of Transportation offers programs that address relocation assistance, moving payments and replacement housing payments or rent subsidies for residents and businesses that are impacted by transportation improvements.

Regardless of the alternative chosen, no displacement or relocation of residences or businesses will occur. If the "Superstreet" alternative is chosen, the NCDOT may acquire part of a parcel (single-family residential) on Dobbins Drive in order to construct the U-turn facility in the northern part of the project area.

Indirect and Cumulative Impacts

Indirect impacts are those impacts that may come about because of an event such as the proposed transportation improvements at the intersection of US 15/501 and Erwin Road. Indirect impacts tend to occur over a longer period of time and can take place away from the immediate project area. A change in air quality due to proposed improvements could be considered an indirect effect. Closely related is the concept of cumulative impacts, which are the collective effects of events such as this project.

A checklist of existing conditions often helps to determine the magnitude of potential indirect and cumulative impacts (related to development) that could occur as a result of the TIP project. *Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina* suggests using these factors as determinants:

- Distance to major urban area or regional center
- Traffic volume on intersecting roadways
- Presence of frontage road
- Availability of water and sewer
- Land availability and price
- State of the regional economy
- Location attractiveness
- Land use controls

An assessment of the following factors reveals a slight potential for development as a result of TIP U-4008. As the proposed project primarily entails the reconfiguration of and improvements to an existing intersection to improve traffic flow and safety, the project should have minimal indirect and cumulative impacts in the study area. The project will not provide new access to undeveloped lands or greatly increase roadway capacity, therefore the prospect of additional development due to this particular project is not expected.

Two development proposals will be influenced by the TIP project. The Chapel Hill Town Council has approved a 38,000 square foot office complex proposed on the Sheraton property with the contingency that the "Superstreet" alternative be constructed. Also, any new development on the tract of land to the west of Dobbins Drive and south of Erwin Road may impact plans for the Dobbins Drive realignment proposed as part of each alternative.

Environmental Justice Impacts

Federal programs, under the statutes of Title VI of the Civil Rights Act of 1964, have requirements to protect individuals from discrimination on the basis of race, color, national origin, age, sex, disability, and religion. Furthermore, Executive Order 12898 "directs that programs, policies, and activities not have a disproportionately high and adverse human health and environmental effect on minority and low-income populations"[5].

The 2000 Census information does not indicate any sizeable populations of minorities or low-income persons in the demographic area. However, there is a predominantly African American public housing development (Colony Woods West) located just off of Legion Road and within the study area. While the transportation improvements proposed under TIP U-4008 should not cause substantial adverse impacts on these groups, the lack of a continuous pedestrian system in the area is detrimental to this community. Neither alternative fully addresses the need for a continuous pedestrian/bike network. The "Superstreet" alternative would at least provide crosswalks and signals for pedestrians/bicyclists, while the TIP alternative does not include any additional pedestrian facilities.

Farmland Impacts

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[6].

Soils in the TIP project area are completely within urbanized areas and farming uses do not exist. The proposed improvements for both alternatives in this study would be constructed almost entirely within controlled right-of-way along US 15/501 or Erwin Road and Europa Drive. Any improvements requiring additional right-of-way would be minor in terms of acreage and would not negatively impact any commercial agricultural operations.

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[5] US Department of Transportation, Federal Highway Administration, Community Impact Assessment: A Quick Reference for Transportation) Washington D.C., 1996), Publication NO. FHWA-PD-96-036.
[6] US Department of Agriculture, "Farmland Protection Policy Act", US Department of Agriculture on-line; Available from http://www.info.usda.gov/nrcs/fpcp/fppa.htm; Internet; accessed 2 October 2001.

Scenic Rivers

The United States government regulates certain selected rivers and their immediate environments because they possess "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values". Legislation dictates that these rivers "shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations"[7]. This TIP project will not encroach on any wild and scenic rivers as designated by the United States government.

Water Supply/Watersheds

TIP U-4008 does not appear to be located in any critical watershed districts. The southern portion of the demographic area falls into the Cape Fear River Basin. This is a Class IV NSW Watershed. These types of watersheds are typically located in moderately to highly developed areas. It does not appear that this watershed will be substantially impacted by the proposed transportation improvements.

[7] National Park Service, "Wild and Scenic River's Act", National Park Service on-line; Available from http://www.npc.gov/rivers/wsract.html; Internet; accessed 2 October 2001.

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APPENDIX

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North Carolina Department of Transportation
Office of Human Environment

Community Impact Assessment

Attention:	Kristina Solberg, PDEA Engineer, NCDOT
From:	Susan Fisher, Planner, HNTB and Denese Lavender, Community Planner, NCDOT
Through:	Carl Goode, Office of Human Environment, NCDOT
Contract:	A303954
RE:	TIP U-4008, Intersection Improvement, US 15/501 and Erwin Road, Orange County

I. EXECUTIVE SUMMARY

The North Carolina Department of Transportation (NCDOT) plans to improve the intersection at US 15/501 and Erwin Road in Chapel Hill, North Carolina. These improvements are designed to relieve congestion and improve safety at this busy intersection. US 15/501 is currently a four-lane divided highway with 11-foot lanes and 10-foot grass shoulders. Erwin Road and Europa Drive are two-lane roads with grass shoulders.

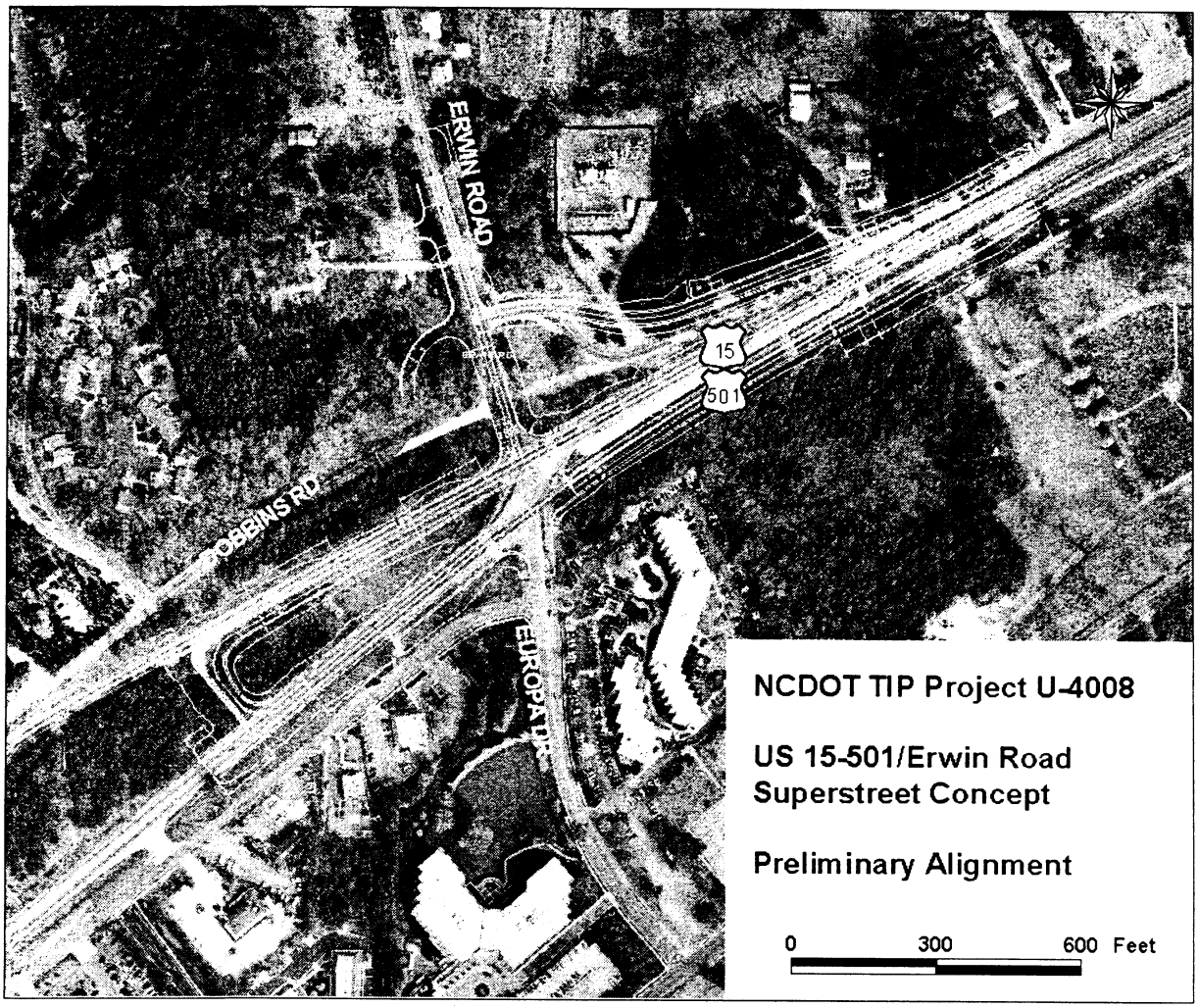
Other than the "no build" option, two improvement alternatives are currently proposed and listed below. Another alternative was originally proposed at a Citizen's Informational Workshop on December 13, 2000 and the meetings between HNTB and business owners/managers in August 2002; however, this "Superstreet with Main Street Left" alternative is not currently under consideration by the NCDOT. It was presented at the business owner/manager meetings to be consistent with information given at the Informational Workshop in 2000.

1. **TIP alternative:** Widening of US 15/501 to accommodate two left turn lanes in each direction, and a widening of Erwin Road to accommodate an additional lane in the westbound direction. The short connector road that links the service road to northbound US 15/501 will also be closed.
2. **"Superstreet" alternative:** Widening of US 15/501 to accommodate an additional right turn lane in the southbound direction. No left turns to be permitted from US 15/501 to Erwin Road or Europa Drive. No through moves to be permitted from Erwin Road and Europa Drive. All traffic to be directed to U-turns. No additional widening of Erwin Road necessary. The service road in the northwest quadrant of the intersection to be relocated westward. The short connector road that links the service road to northbound US 15/501 will also be closed.

The second alternative would be the first signalized "Superstreet" in the state of North Carolina. An unsignalized "Superstreet" exists in western North Carolina, but the

average daily traffic counts are much lower than those on US 15/501 are. For clarification, an aerial photograph illustrating the preliminary alignment of the "Superstreet" is located on the next page.

Figure I. "Superstreet" Design Concept



Prepared using NCDOT data

Community Profile

- The project site is located in a congested, urban corridor with primarily commercial and office uses.
- Residents of the demographic area and the Town of Chapel Hill tend to be relatively affluent and educated, with median household incomes that are higher than the North Carolina average and a large population of college graduates entering the workforce.
- The percentages of Whites (77.4%) and Asians (7.9%) in the demographic area are higher than State averages (70.2% and 1.4% respectively). The percentages of African Americans (8.6%), American Indians (0.3%) and Hispanics (3.8%) are lower than the North Carolina averages of 21.4%, 1.2% and 4.7% respectively.

- The study area is situated between two highly respected Universities, and in close proximity to the Research Triangle Park (RTP). These Universities or hi-tech companies employ many residents of the study area.

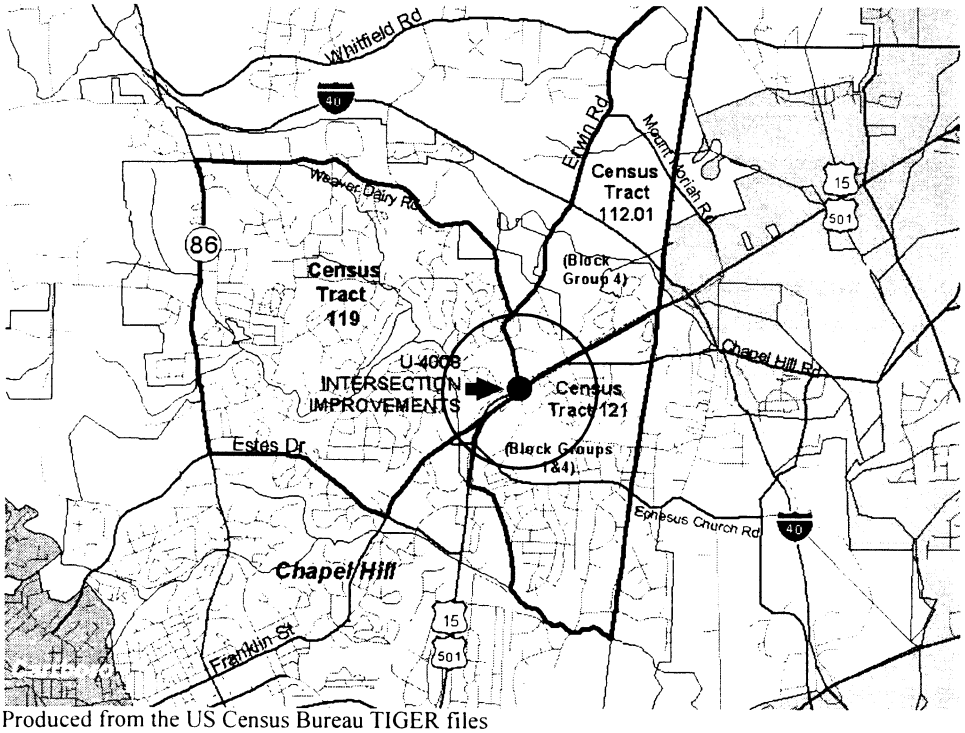
Project Impacts

- Neither alternative would improve the intersection aesthetically. It is recommended that some sort of plantings or landscaping is included in the plan following construction of either alternative. This vegetation should be low to the ground so as not to obstruct visibility of businesses in the area.
- Businesses located on the service road to the east of the project site could be negatively affected by the elimination of the connector road (proposed under both alternatives) that links northbound lanes of US 15/501 to the service road at a location just south of Europa Drive.
- Although access may be reduced with the elimination of through traffic and/or left turn lanes and the elimination of the connector road that links US 15/501 with the service road, vehicular mobility will be improved along the US 15/501 corridor if the "Superstreet" alternative is constructed. NCDOT Congestion Management expects the TIP alternative to fail (level of service F) almost immediately upon completion of the project.
- Pedestrian and bicycle access will be negatively impacted under the TIP proposal as sidewalks and bicycle lanes are not included in the existing plans. It is recommended that sidewalks and bicycle lanes be added to the TIP proposal. The "Superstreet" alternative would improve pedestrian and bicycle access at the intersection with the addition of a multi-use path, crosswalks and push-button signals.
- Construction of the TIP alternative would take place within the existing right-of-way, and construction of the "Superstreet" alternative would take place almost entirely within existing right-of-way. No displacements will occur as a result of either proposed alternative, but the "Superstreet" alternative may result in partial acquisition of a private property.
- If the "Superstreet" alternative were constructed, directional signage would be included to assist drivers in navigating the new type of intersection and to indicate nearby businesses.

II. STUDY AREA DESCRIPTION

The study area encompasses those communities and populations that are most directly affected by the intersection improvements proposed under TIP U-4008. It is identified as a thin black circle in Figure II, and represents the area within ½-mile of the intersection at Erwin Road and US 15/501.

Figure II. Study Area and Demographic Area



Produced from the US Census Bureau TIGER files

The larger area, outlined in blue, includes Census Tract 112.01 (Block Group 4), Census Tract 119 (Block Groups 1-4) and Census Tract 121 (Block Groups 1 and 4). These Census Tracts and Block Groups make up the demographic area and serve to illustrate the demographic characteristics of the local population.

The boundaries of the demographic area are approximately formed by Weaver Dairy Road and Erwin Road in the north; the County Line in the east; Little Creek, East Franklin Street and Estes Drive in the south; and Airport Road (NC 86) in the west.

III. METHODOLOGY

The community profile is shaped by information gathered in a personal visit to the site and interviews with NCDOT staff and Town of Chapel Hill staff. Demographic data was collected initially from the US Census Bureau (www.census.gov), and supplemented by information in *Planning for Chapel Hill's Future: The Comprehensive Plan (2000)* and the *Town of Chapel Hill 2001 Data Book*. Income, poverty and housing figures were also obtained from the Census Bureau, and employment/unemployment data from the Employment Security Commission of North Carolina (www.esc.state.nc.us) and the Orange County website (www.co.orange.nc.us). Information about public facilities and services was obtained from *The Comprehensive Plan*, the *Data Book* and the Chapel Hill Chamber of Commerce (www.chapelhillcarrboro.org). Information regarding land use was primarily acquired from *The Comprehensive Plan*, the field visit and the aerial photo from the Department of Transportation.

In assessing project impacts, it was necessary to use data gathered for the community profile as a basis for evaluating the direct effects of the project on the community in terms of social impacts, physical and visual impacts, land use, economic conditions, mobility, access and safety, public services and displacements. In addition, any indirect or cumulative impacts were addressed. ECONorthwest and Portland State University's report entitled *A Guidebook for Evaluating the Indirect Land Use and Growth Impacts of Highway Improvements*, the Louis Berger Group's *Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina (Volumes I & II)*, and *Community Impact Assessment: A Quick Reference for Transportation*, published by the US Department of Transportation, were helpful guides in assessing indirect and cumulative impacts. Meetings were also conducted with local business owners and managers in order to determine impacts to the business community.

IV. COMMUNITY PROFILE

Field Visit

The intersection of Erwin Road and US 15/501 is in a heavily congested and pedestrian-unfriendly corridor. Commercial and office uses are concentrated along Europa Drive, the service road to the east of US 15/501, and Dobbins Road to the west of US 15/501. McDonald's, Jiffy Lube, Talbert's Tire, It's Prime Restaurant, Hampton Inn, and a Crown Honda/Volvo dealership are located on the service road. The Sheraton Europa Hotel and the Europa Center LLC (office complex) are located just off of US 15/501 on Europa Drive. Dobbins Hill Apartments, Summerfield Crossing Apartments and Foxcroft Apartments are all located on Dobbins Drive, while another office complex is located at the corner of Dobbins Drive and East Franklin Street. In addition, two large strip malls are located in the southern portion of the study area. Eastgate Shopping Center is located between East Franklin Street and Fordham Boulevard, and Ram's Plaza is situated on the corner of Ephesus Church Road and Fordham Boulevard.

The part of US 15/501 that exists just south of I-40 in Chapel Hill is a four-lane, divided highway and a major route for travelers commuting between Durham and Chapel Hill. Commercial uses are concentrated along US 15/501 and its service roads, while the residential uses are located on side roads. There are some sidewalks along the service road, Dobbins Drive and Europa Drive, but these sidewalks do not always have linkages to other commercial centers or residential areas. There are also a number of bus stops (including a stop at the corner of the service road and Europa Drive). Very few pedestrians and no bicyclists were witnessed during the field visit.

The single-family, middle-income residential uses are concentrated along or just off of Erwin Road and Legion Road. The multi-family uses are primarily located along Dobbins Drive. The roads often have grassed shoulders and few pedestrian or bicycle facilities exist. The study area is almost completely developed, and no agricultural uses were observed.

Geographic and Political Description

The study area and demographic area are part of the Raleigh-Durham-Chapel Hill Metropolitan Statistical Area (MSA), which is the third largest MSA in the state of North Carolina. The 2000 Census reported a population for the MSA of over one million people, and the population is growing. The project is located entirely within the Town of Chapel Hill (population 48,715) and Orange County. Situated in the central piedmont region of North Carolina, Orange County shares borders with five other North Carolina Counties. Person and Caswell Counties border Orange County to the north, with Durham County to the east, Chatham County to the south, and Alamance County to the west.

Community Description

The demographic area and study area are part of an extremely dynamic community. *Employment Review* and *Best Jobs USA.com* called the Raleigh-Durham area the "#4 Best Place to Live and Work" in 2000[1]. Approximately 23,000 college graduates enter the local workforce each year, and the government, education and health industries dominate the local economy.

Population Growth and Demographics

North Carolina experienced a 21.4% rate of growth from 1990-2000. This was higher than the average rate of growth that occurred in the United States (13.1%). Furthermore, Chapel Hill and Orange County experienced rates of 25.8% and 26.0% respectively. The demographic area grew less substantially than the Town of Chapel Hill, Orange County and North Carolina, with a growth rate of 13.9%

Table 1. Population Growth, 1990-2000

Area	Population		Growth, 1990-2000	
	1990	2000	Amount	Percentage
Demographic Area	11,938	13,595	1,657	13.9%
Chapel Hill	38,719	48,715	9,996	25.8%
Orange County	93,851	118,227	24,376	26.0%
North Carolina	6,628,637	8,049,313	1,420,676	21.4%

Source: US Census Bureau, 1990 & 2000
Note: 2000 study area includes Census Tract 112.01 (Block Group 4), Tract 119 (Block Groups 1-4) and Tract 121 (Block Groups 1 and 4). 1990 study area includes Census Tract 119 (Block Groups 1-2), Tract 120 (Block Group 1) and Tract 121 (Block Group 1).

Historically, Chapel Hill and Orange County have been home to fewer minorities than the state of North Carolina as a whole. According to the 2000 Census, 76.1% of the Town's population and 75.8% of the County's population was White compared to 70.2% for the State. The demographic area had an even higher percentage of Whites (77.4%) than Chapel Hill and Orange County. The largest groups of minorities in the demographic area were Black or African American (8.6%), Asian (7.9%) and Hispanic or Latino (3.8%).

[1] The Greater Raleigh Chamber of Commerce on-line; Available from http://www.introraleigh.com; Internet; accessed 20 May 2002.

Table 2. Population by Race, 2000

Race	Demographic Area		Chapel Hill		Orange County		North Carolina	
	Population	Pct.	Population	Pct.	Population	Pct.	Population	Pct.
White	10,521	77.4%	37,073	76.1%	89,656	75.8%	5,647,155	70.2%
Black or African American	1,175	8.6%	5,517	11.3%	16,175	13.7%	1,723,301	21.4%
American Indian or Alaska Native	34	0.3%	181	0.4%	388	0.3%	95,333	1.2%
Asian	1,068	7.9%	3,496	7.2%	4,840	4.1%	112,416	1.4%
Native Hawaiian and Pacific Islander	4	0.0%	12	0.0%	20	0.0%	3,165	0.0%
Hispanic or Latino	514	3.8%	1,564	3.2%	5,273	4.5%	378,963	4.7%
Other Races	41	0.3%	92	0.2%	169	0.1%	9,015	0.1%
Two or More Races	238	1.8%	780	1.6%	1,706	1.4%	79,965	1.0%
Total	**13,595**	**100.0%**	**48,715**	**100.0%**	**118,227**	**100.0%**	**8,049,313**	**100.0%**

Source: US Census Bureau, 2000
Note: Study area includes Census Tract 112.01 (Block Group 4), Tract 119 (Block Groups 1-4) and Tract 121 (Block Groups 1 and 4).

The percentage of the population age 19 or under was highest in Chapel Hill (28.6%) and lowest in the demographic area (25.0%). While 39.2% of the demographic area's population and 38.2% of the State's population was between the ages of 20 and 44, the corresponding percentages in Chapel Hill (48.0%) and Orange County (44.2%) were relatively high.

The reverse was true for the 45 to 64 age group, as the demographic area (25.1%) and State (22.5%) had relatively high percentages as compared to Chapel Hill (15.3%) and Orange County (20.4%). It is also constructive to note that the percentage of the population over the age of 65 living in the demographic area (10.5%) was higher than in Orange County (8.4%) and Chapel Hill (8.0%). The corresponding percentage in the State was 12.0%.

Table 3. Population by Age, 2000

Age	Demographic Area		Chapel Hill		Orange County		North Carolina	
	Population	Pct.	Population	Pct.	Population	Pct.	Population	Pct.
19 years and under	3,395	25.0%	13,933	28.6%	31,952	27.0%	2,193,360	27.2%
20-44 years	5,362	39.4%	23,395	48.0%	52,240	44.2%	3,078,043	38.2%
45-64 years	3,413	25.1%	7,466	15.3%	24,104	20.4%	1,808,862	22.5%
65 or more years	1,425	10.5%	3,921	8.0%	9,931	8.4%	969,048	12.0%
Total	**13,595**	**100.0%**	**48,715**	**100.0%**	**118,227**	**100.0%**	**8,049,313**	**100.0%**

Source: US Census Bureau, 2000
Note: Study area includes Census Tract 112.01 (Block Group 4), Tract 119 (Block Groups 1-4) and Tract 121 (Block Groups 1 and 4).

Income, Poverty Status and Unemployment

The median household income for Orange County is typically higher than the average median household income for North Carolina. The most recent Census data (1997) showed that Orange County had a median household income of $39,410, while North Carolina's median household income was approximately $4,000 less. Income grew at a similar rate for both the County and the State with growth of 31.5-32.5% respectively. According to limited data gathered from 1990 from the Missouri Census Data Center, the median household income in Chapel Hill was $30,489, while median household income in the demographic area was $34,877.

Table 4. Median Household Income, 1990-1997

Area	Median Household Income		Change, 1990-1997	
	1990	1997	Amount	Percentage
Demographic Area	$34,877	N/A	N/A	N/A
Chapel Hill	$30,489	N/A	N/A	N/A
Orange County	$29,968	$39,410	$9,442	31.5%
North Carolina	$26,647	$35,320	$8,673	32.5%

Source: University of Missouri Census Data Center and US Census Bureau, 1990 & 2000
Notes: 1997 incomes are a model-based estimate

The percentage of the population that lived below the poverty level in 1997 was approximately 10-13% for both Orange County and North Carolina. From 1990-1997, the percentage of County residents in this category decreased from 13.9% to 10.5%, while the percentage decreased only 0.4% in the State. Though the Town of Chapel Hill had a relatively large percentage of people living below the poverty level (16.1%) in 1990, the demographic area had a relatively small percentage (11.3%)

Table 5. Percentage of Population below Poverty Level, 1990-1997

Area	Percentage Below Poverty		Change, 1990-1997
	1990	1997	
Demographic Area	11.3%	N/A	N/A
Chapel Hill	16.1%	N/A	N/A
Orange County	13.9%	10.5%	-3.4%
North Carolina	13.0%	12.6%	-0.4%

Source: University of Missouri Census Data Center and US Census Bureau, 1990 & 2000
Notes: 1997 incomes are a model-based estimate

The US Census Bureau employs a set of income thresholds that vary by the size and composition of a family to determine poverty status. These thresholds are not based on geographic boundaries but are adjusted for inflation. The thresholds are also based on income before taxes, and do not include any capital gains or non-cash benefits such as public assistance. In addition, those people living in military barracks or institutional group homes are not included in the poverty statistics[2].

[2] US Census Bureau, "Current Population Reports, Series P60-210", US Census Bureau on-line; Available from http://www.census.gov; Internet; accessed 16 October 2001.

The unemployment rates for both Orange County and North Carolina decreased between 1990 and 2000 while the unemployment rate for Orange County remained consistently lower than the rate for North Carolina. The unemployment rate for Orange County in 2000 was 1.3% compared to 3.6% for the State. In 1990, the unemployment rate in the demographic area was 3.8% and the unemployment rate in the Town of Chapel Hill was 4.4%.

Table 6. Unemployment Rate, 1990-2000

Area	Unemployment Rate		Change, 1990-2000
	1990	2000	
Demographic Area	3.8%	N/A	N/A
Chapel Hill	4.4%	N/A	N/A
Orange County	2.5%	1.3%	-1.2%
North Carolina	4.2%	3.6%	-0.6%

Source: Employment Security Commission of North Carolina, 2001

Tables 4, 5 and 6 include 2000 data only for Orange County and North Carolina. Information for the Town of Chapel Hill and the demographic area is provided by the University of Missouri Census Data Center for 1990. 2000 Census data for the Town of Chapel Hill and the demographic area were not completed at the time of this study.

Housing Characteristics

TIP project U-4008 is in an urban area with predominantly commercial and office uses. There are several multi-family apartment complexes on Dobbins Drive (service road) just north and south of Erwin Road. Additionally, low-density, single-family homes are concentrated off of Erwin Road, Legion Road and Ephesus Church Road. There are five single-family homes along Dobbins Drive, north of Erwin Road.

As seen in Table 7, the demographic area, Chapel Hill and Orange County had home ownership rates below the state average of 69.4% in 2000. Although the rates are relatively low, the residential communities appear to be fairly stable and well established. The low rates are due in part to the fact that Chapel Hill is a university town with a considerably large population of renters.

Table 7. Homeownership Rate, 1990-2000

Area	Homeownership Rate		Change, 1990-2000	
	1990	2000	Amount	Percentage
Demographic Area	55.0%	55.8%	0.8%	1.5%
Chapel Hill	40.5%	42.9%	2.4%	5.9%
Orange County	55.3%	57.6%	2.3%	4.2%
North Carolina	68.0%	69.4%	1.4%	2.1%

Source: US Census Bureau, 1990 & 2000

Business Activity and Employment Centers

Research Triangle Park is located roughly 10-12 miles east of the project site, and is the country's largest planned research park at nearly 7,000 total acres. Almost 50,000 people work in the Park at over 130 different businesses. While the Park is primarily located in Durham County, many Chapel Hill and Orange County residents commute to jobs in RTP.

The Sheraton Hotel and the Europa Center on Europa Drive (Europa Center LLC), the Crown dealership on the service road, and the Blue Cross/Blue Shield headquarters about one mile north of the project site provide the majority of employment in the area. Other employment in the study area is associated with commercial uses along US 15/501 and its service roads.

Public Facilities and Services

Public Facilities

Three public schools are located within the demographic area (Ephesus and Estes Hill Elementary Schools and Phillips Middle School). East Chapel Hill High School is located just outside of the demographic area on Weaver Dairy Road. Other community facilities include the Chapel Hill Public Library, the Chapel Hill Memorial Cemetery on US 15/501, Ephesus Park (12 acres) near Ephesus Elementary School and Cedar Falls Park (64 acres) near East Chapel Hill High School. Colony Woods West (a public housing community), a nursing home and the American Legion Post are all located on Legion Road within the study area.

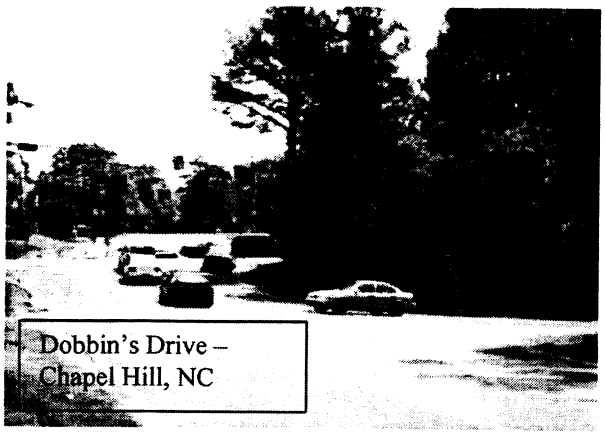
Public Services

The Orange Water and Sewer Authority (OWASA) provides water and sewer service to Orange County and the study area. The Town of Chapel Hill and Orange County have a joint responder program for fire and police services. The nearest fire station is located at the corner of Elliot Road and East Franklin Street, while the Police Headquarters (for the Town of Chapel Hill) is located on Airport Road near the Umstead Road intersection.

Chapel Hill Transit and the Triangle Transit Authority provide transportation service within the study area. These services are discussed in more detail later in the report.

Land Use and Development Plans

In *Planning for Chapel Hill's Future: The Comprehensive Plan*, Chapel Hill is described as a "maturing" community with little undeveloped land. Despite the fact that less than 4% of land within the Town limits is privately owned and undeveloped, development pressures should remain strong because of continuous growth in the region. The future land use patterns shown in *The Comprehensive Plan* essentially reflect the land use patterns that currently exist in Chapel Hill. Commercial land uses dominate the Erwin Road and US 15/501 intersection and have been designated to remain commercial in nature with an objective to integrate office and residential development as much as possible[3].


Dobbin's Drive – Chapel Hill, NC

The Town of Chapel Hill owns a large tract of land east of US 15/501 and north of the Sheraton Hotel on Europa Drive. About half of this land exists as the Chapel Hill Memorial Cemetery, while the other half is wooded.

A 38,000 square foot office complex is proposed for a two-acre property adjacent to the Sheraton Hotel and the Chapel Hill Memorial Cemetery on the northeast corner of Europa Drive and Legion Road. The Chapel Hill Town Council has approved these plans with the contingency that the "Superstreet" alternative be constructed.

The Marriott Corporation owns a large tract of land to the west of Dobbins Drive and south of Erwin Road. They are in the process of selling the land to a division of Marriott called Summit Hospitality. Summit Hospitality proposes to build a Residence Inn on the site and may dedicate the right-of-way for the Dobbins Drive realignment proposed as part of each alternative. The hearing for this proposal is scheduled for November 2002.

V. PROJECT IMPACT ASSESSMENT

Social and Psychological Impacts

The proposed improvements at this intersection should not impact the population growth rate as it does not provide any new access to undeveloped lands. However, the addition of left turn lanes as proposed under the TIP alternative, or the removal of turn lanes and through-lanes at the intersection of US 15-501 and Erwin Road as proposed under the "Superstreet" alternative, may create some social and psychological impacts on the local population. Adding turn lanes as proposed in the TIP alternative could present a psychological barrier for pedestrians and bicyclists traveling on Erwin Road and Europa Drive, as a wider road is more difficult to cross. The removal of lanes as proposed in the "Superstreet" alternative may impact the cohesion and

[3] Town of Chapel Hill, Planning for Chapel Hill's Future: The Comprehensive Plan (Chapel Hill, 2000).

interaction of neighborhoods and businesses on Erwin Road and Europa Drive because of the reduction of direct access and through-traffic.

Any new intersection designs such as the "Superstreet" design may initially cause confusion for drivers and therefore impact the community psychologically. Directional signage is included as part of the "Superstreet" proposal in an effort to minimize driver and pedestrian confusion.

Physical and Visual Impacts

The intersection improvements proposed by NCDOT will be constructed almost totally within the existing right-of-way. The "Superstreet" alternative would require additional right-of-way to provide for the U-turn facility north of the intersection at Erwin Road. A retaining wall has been included as part of this alternative and would serve as a partition between the public road and a single-family property on Dobbins Drive. The retaining wall will minimize the amount of additional right-of-way needed to complete the project but will intrude on personal property and may produce a negative visual impact for the residents of Dobbins Drive.

Construction activities may generate more noise, vibration, and odor but the long-term effects will be minimal. Upon completion of the project, noise and vibration from idling engines should improve slightly and emissions odors should be reduced as well. While US 15/501 will remain primarily commercial in nature, the appearance of the road may change slightly. The widening of US 15/501 and Erwin Road proposed as part of the TIP alternative would most likely result in the removal of mature trees and vegetation. Trees and vegetation may also be removed during construction of the "Superstreet" alternative, however the elimination of turn lanes and through-lanes allows for a median. Although it's not included in NCDOT plans at present, construction of the "Superstreet" affords an opportunity to enhance the intersection aesthetically by reducing visual clutter, installing mast arm signals, and providing plantings in the median.

Land Use Patterns and Compatibility

TIP U-4008 will not create new access to undeveloped lands and should not markedly impact or change the type of land uses along US 15/501. The land uses in the project area are primarily commercial, with some office uses and limited residential uses. *The Comprehensive Plan* (Future Land Use) shows a similar pattern of land uses, with an increasing percentage of mixed-use and office uses replacing strictly commercial uses. The Town of Chapel Hill recognizes the area around this intersection is susceptible to change, however the probable impacts of TIP U-4008 are not inconsistent with the comprehensive plan as it relates to land use.

Although the proposed project is part of the NCDOT TIP, it is a local intersection improvement and is not delineated specifically within the *Durham-Chapel Hill-Carrboro (DCHC) MPO Thoroughfare Plan.* In existing thoroughfare plans, both US 15/501 and Erwin Road are shown as major arterials. No future grade separation or other major improvement for this intersection is indicated in any of the plans. The DCHC MPO list

of Planned Road Projects, produced in January 2000 proposes an eventual widening of US 15/501 from 4 to 6 lanes within the study area (NCDOT TIP Project U-2807). The Road Project list also includes NCDOT TIP Project U-3306, which includes the extension of Weaver Dairy Road to connect with US 15/501 just north of Erwin Road. Both of these improvements are tentatively scheduled for completion between 2005 and 2015.

Economic Impacts

The NCDOT proposes (under both alternatives) to close the existing connection between northbound US 15/501 and the service road on the east side of US 15/501. This will result in reduced direct access to businesses, particularly along the service road. This reduced access could lead to reduced trade. Most businesses will be minimally impacted, but businesses along the service road (in particular those businesses closest to the connector road and most dependent on drive-by traffic) will be the most impacted. The "Superstreet" alternative may aggravate this issue, since through traffic from Erwin Road to Europa Drive and left turns from US 15/501 will be prohibited.

During the Citizen's Informational Workshop in Chapel Hill in December 2000, and the meetings with business owners/managers in August 2002, some citizens expressed concern with the "Superstreet" design in terms of confusion for drivers and reduction of visibility. Initially, drivers may experience some confusion with the new design, which could be a detriment to business. Adequate signage should curtail this potential impact. The "Logo Sign Program," provided by the NCDOT, could be a possible way to avoid this confusion by placing commercial logos on NCDOT signs on the highways. The lack of visibility is an existing problem as well. The tree coverage along both sides of US 15/501 and in the median make it difficult for drivers to see businesses in this stretch of the US 15/501 corridor. In the meetings with business owners and managers, several requests were made to selectively reduce tree coverage along US 15/501.

Mobility and Access

Change in Commuting Patterns

The reconfiguration of the intersection for either alternative should improve the capacity of the intersection and not prevent access to any of the existing roads (other than the connector road). Travelers are expected to experience a decrease in delay and congestion at all approaches at this intersection. Although the TIP alternative decreases the congestion at this intersection, the intersection would be over-capacity as soon as it is constructed. On the other hand, the "Superstreet" alternative should allow for operation below capacity until approximately 2012[4].

US 15/501 is a major commuting route between Durham and Chapel Hill. Neither alternative would impact commuting patterns for regional through traffic. According to local business owners, travelers use Legion Road and the Rams Plaza parking lot to

[4] Project Development and Environmental Analysis Branch. North Carolina Department of Transportation. September 2002.

Ephesus Church Road to avoid the study intersection. Improvements to the intersection may have an impact on local commuting patterns.

Neighborhood Access

Neighborhood access would not be impacted by the reconfiguration of the intersection for either alternative. Potential driver confusion associated with the "Superstreet" is not a major issue for neighborhood access as those motorists living in the area should learn rather quickly how to use the intersection. Additionally, direct access to the neighborhoods/apartment complexes of Summerfield Crossing, Foxcroft and Dobbins Hill should not be affected. Minor impacts, such as the relocation of existing driveways may occur for a few residential properties off of Erwin Road and Dobbins Drive if the "Superstreet" alternative is chosen. Nevertheless, both alternatives should improve the capacity of the intersection, allowing better traffic flow from neighborhood streets onto Erwin Road (particularly from Dobbins Drive).

Commercial Access

Existing commercial development is primarily located on the eastern side of US 15/501 and includes a car dealership, fast food restaurant, oil change business, two hotels and other office complexes. These businesses rely on Europa Drive and a local service road for access to and from US 15/501. The local service road also has a connection to US 15/501 south of the study intersection near Ephesus Church Road that provides access to northbound traffic and Ram's Plaza. Furthermore, the local service road has an existing access drive (connector) to US 15/501 North in front of "It's Prime" restaurant. Preliminary design concepts for both alternatives include closing this connection between the US 15/501 northbound lanes and the adjacent service road, forcing traffic to use Europa Drive.

The TIP alternative improves access to Europa Drive, and thus, access to the businesses from Europa Drive. However, closing the connector to the service road may force traffic that would normally use the connector to use Europa Drive. This would increase traffic at the Europa Drive intersection. Furthermore, some of the businesses along the service road rely on drive-by traffic to attract customers. Eliminating the connector would make access somewhat more difficult and may have a negative impact on these businesses.

The "Superstreet" alternative would impact commercial access to the businesses along Europa Drive and the service road. The reconfigured intersection would increase travel distance for travelers who have to use the turn around to access Europa Drive. Furthermore, driver confusion could influence drivers to avoid the businesses altogether. However, these impacts would be minimized by the improved capacity of the intersection, which should reduce travel time through the intersection. Additionally, appropriate signage and education would reduce driver confusion. Neither alternative impacts visibility of these businesses. According to local business owners interviewed during this study, ease of access and visibility are as important to their business as the volume of traffic.

The "Superstreet" alternative also includes closing the connector road between US 15/501 North and the service road, and would have similar impacts as the TIP alternative.

Commercial access may also be impacted by the construction of either alternative. Construction impacts include temporary rerouting of traffic, closing of lanes, and reduced number of trips to business destinations due to driver confusion and frustration. Business owners indicated concern about loss of business resulting from construction impacts during construction as well as after construction. According to several business owners, potential and existing customers will bypass their establishments because of confusion and frustration associated with the intersection improvements.

In addition to commercial development east of the study intersection, large retail developments exist at Eastgate Shopping Center and Ram's Plaza to the south, and off of Sage Road immediately to the north. Office development is prevalent to the north at Eastowne Office Park and the large Blue Cross/Blue Shield complex. No direct access impacts will occur in these areas as a result of the proposed project, other than to improve overall corridor mobility.

Effects on Parking Availability
The proposed improvements will not impact parking availability. On-street parking is not available on US 15/501, Europa Drive, Erwin Road, or the surrounding service roads. Neither alternative should negatively impact any existing public or private parking lots.

Pedestrian and Bicycle Access
Field inspection shows that there are few existing public pedestrian facilities. The US 15/501 service road and Europa Drive have fragmented sidewalks. Neighborhood streets and other collector and arterial roadways in the study area offer sidewalks, but the proposed improvements will not impact these facilities. Pedestrians are often forced to walk along the service roads to travel to and from the residential and commercial developments on either side of the roadway, and there are no designated pedestrian crossings at the existing intersection.

US 15/501 has 4-foot paved shoulders that now serve as bike lanes. These exist in both directions of US 15/501. Beyond the paved shoulder is a grass shoulder extending to right-of-way limits. The *1992 Urban Bicycle Route Plan for Durham and Orange Counties* designates US 15/501 and Erwin Road for bicycle route improvements. Additionally, Chapel Hill's *Comprehensive Plan* recommends continuous bicycle lanes on US 15/501 by December 2004 or by the next repaving project. Bicyclists, pedestrians and other transit-dependent visitors and employees of the Sheraton, Hampton Inn, McDonalds, and other businesses adjacent to the intersection and service roads would benefit from a continuous pedestrian and/or bicycle network.

The TIP alternative does not include provisions for bicycle or pedestrian facility improvements, as the project is geared toward improving traffic flow at this specific intersection. Furthermore, this alternative increases the overall width of the intersection by adding turn lanes. The proposed "Superstreet" concept provides a 10-foot wide multi-use path along Erwin Road and a crossing of US 15/501 from the northwest quadrant

onto the median and then to the southeast corner of US 15/501 and Europa Drive. It should be noted that the "Superstreet" design is an unfamiliar traffic control concept to most motorists, pedestrian, and cyclists. It will likely cause some confusion for all modes of transportation and require conspicuous pavement delineation and signage.

Public Transportation

Currently, several public transportation services are available in the study area. Chapel Hill Transit (CHT) and the Triangle Transit Authority (TTA) provide fixed route transit services. In addition, CHT offers a demand-responsive transit service that serves individuals with mobility limitations. There is also a Shared Ride Feeder Service that serves sections of Chapel Hill that do not receive regular bus service. A Shared Ride Feeder zone exists in the Erwin Road/Weaver Dairy Road area. Two bus shelters are located on the frontage roads adjacent to the US 15/501 and Erwin Road intersection. Continuous sidewalks are not available, and transit users are forced to walk along the side of the access road and cross the roads without any designated crosswalks. Neither shelter should be impacted positively or negatively by the planned intersection improvements.

After construction, public transportation services should not experience any negative operational effects due to the proposed alternatives. A decrease in congestion and delay in the study area will help buses retain schedule adherence and operational efficiency.

Impacts to Public Facilities and Services

TIP U-4008 should not impact population growth in the study area, and there will be limited impacts on public facilities such as schools, parks and community centers. On the other hand, the management company of the Europa Center has expressed concern about delays in emergency services. Many of offices in the Europa Center provide medical services, and ambulances must be able to quickly and directly access the building. The "Superstreet" concept may lengthen the distance emergency vehicles have to travel to businesses along Europa Drive and the service road.

Safety

The existing intersection does not have pedestrian facilities such as sidewalks, crosswalks, or pedestrian lighting. The TIP alternative proposes to add left turn lanes but does not propose to add any pedestrian facilities. Thus, it will have a negative impact on pedestrian safety. On the other hand, the proposed "Superstreet" concept provides a 10-foot wide multi-use path along Erwin Road and a crossing of US 15/501 from the northwest quadrant of the intersection onto the median and then to the southeast corner of US 15/501 and Europa drive. This would improve safety at the intersection by providing designated facilities for pedestrians and bicyclists to cross the intersection.

HNTB
The HNTB Companies

Memorandum

To: Meeting Minutes
File

Date: August 8, 2002

From: Susan Fisher

HNTB Job Number 34780

Subject: Chapel Hill Business Owner/Manager Meetings
U-4008 Community Impact Assessment

Attendees:

Ron Hodges	Director of Sales, Crown Automotive Management Company
Rob Ingle	Accounting, Crown Automotive Management Company
Maureen Mack	Chief Administrative Officer, Crown Automotive Management Company
Susan Fisher	HNTB, Charlotte
Anne Lenart-Redmond	HNTB, Raleigh

The HNTB representatives identified themselves as consultants for the North Carolina Department of Transportation, and explained that they are in the process of preparing a Community Impact Assessment for transportation improvements proposed at the intersection of Erwin Road/Europa Drive and US 15-501 in Chapel Hill, NC. HNTB representatives gave a brief overview of three alternatives: Alternative #1 (TIP), Alternative #2 and Alternative #3 (Superstreet), and solicited reactions to the proposed alternatives. This information will be included as a supplement to the Community Impact Assessment.

- Mr. Ingle has never observed any of the 100 employees at Crown Honda/Volvo dealership use public transportation or walk/bike to work. However, Mr. Ingle has observed a number of students living in the Foxcroft Apartments who cross US 15-501 on foot and by bicycle.
- Employees appear to commute primarily from Durham, and use southbound US 15-501 and Europa Drive to access the dealership. Customers generally come from Durham (north), and the repeat customers (services) tend use Europa Drive and the service road to access the dealership.
- According to Mr. Hodges, 75% of their sales are new customers visiting the site.
- Mr. Ingle and Mr. Hodges agreed that improvements should be made not only to the proposed intersection at Erwin Road/Europa Drive and US 15-501, but also at Ephesus Church Road and Fordham Boulevard. Left turns movements are difficult and traffic is heavy on Erwin Road. Shuttle busses bottleneck on Europa Drive during special events at UNC. In addition, the Rams Plaza parking lot serves at a cut-through to Ephesus Church Road and Fordham Boulevard.
- They feel that impacts from Alternative #1 would be somewhat positive if the access road between northbound US 15-501and the service road off of Europa Drive remains open.
- Alternative #3, according to the Crown representatives, would have "tremendous" (negative) impacts to business, as it would be inconvenient to service customers. Mr. Ingle says this concept would "punish" customers, and views it as a closing of two entrances into the dealership. Mr. Ingle perceives that with the implementation of Alternative #3, more people will us Legion Road to avoid this problematic intersection.
- Alternative #3 would be acceptable if the loop is reconfigured to align with the access road (proposed now to be closed) near the Hampton Inn, and if left hand turns are allowed from the access road to southbound US 15-501.
- The dealership was denied access to Legion Road despite the fact that it's property abuts Legion Road.

Action Items:

- *HNTB to provide contact information to NCDOT in order to add Crown to the project mailing list.*
- *Follow up question (8/16/02): Rob Ingle – The service department usually test drives vehicles by turning right out of the dealership onto the service road, then a right on Europa Drive, right on Legion*

Road, right of Ephesus Church Road and back through Rams Plaza. "Demo" drives by customers are usually longer, and customers again use the service road to access Europa Drive.

HNTB
The HNTB Companies

Memorandum

To: Meeting Minutes
File
From: Susan Fisher

Date: August 9, 2002

HNTB Job Number 34780

Subject: Chapel Hill Business Owner/Manager Meetings
U-4008 Community Impact Assessment

Phone Interview:

Gene Singleton	Vice President, Summit Hospitality
Susan Fisher	HNTB, Charlotte

Ms. Fisher identified herself as a consultant for the North Carolina Department of Transportation, and explained that she is in the process of preparing a Community Impact Assessment for transportation improvements proposed at the intersection of Erwin Road/Europa Drive and US 15-501 in Chapel Hill, NC. Ms. Fisher gave a brief overview (by phone) of three alternatives: Alternative #1 (TIP), Alternative #2 and Alternative #3 (Superstreet), and solicited reactions to the proposed alternatives. This information will be included as a supplement to the Community Impact Assessment.

- Summit Hospitality is in the process of purchasing (from Marriott) property at the southwest quadrant of the Erwin Road/US 15-501 intersection in Chapel Hill. If and when the site plan is approved by Town Council (on the agenda for Nov 2002), Summit plans to build a Residence Inn. Mr. Singleton attempted to answer the questions as well as possible, given that no business is located on the site at this time.
- He would anticipate that over half of potential employees at the future Residence Inn would use public transportation. He would expect few to walk/bike to work.
- Mr. Singleton feels that most customers would access the Residence Inn from I-40 (north of the project site), but that some would be commuting to and from Chapel Hill as well.
- Mr. Singleton thinks that Alternative #1 would provide some improvement, but the initial and lasting impacts may not be as beneficial as Alternative #3.
- Alternative #3 is the best alternative according to Mr. Singleton. It would provide longer-lasting benefits and would move traffic better during congested peak hours.
- Mr. Singleton has an engineering degree, and is interested in attending public involvement sessions if it would help to have him discuss the issues from a businessman's point of view. He is very supportive of the "Superstreet" alternative and hopes that improvements get underway soon.

Action Items:

- *HNTB to provide contact information to NCDOT in order to add Summit Hospitality to the project mailing list.*
- *HNTB to mail a copy of the revised Community Workshop Handout to Mr. Gene Singleton at 2200 Summit Park Lane, Suite 2000, Raleigh, NC 27612.*

HNTB
The HNTB Companies

Memorandum

To: Meeting Minutes
File

Date: August 8, 2002

From: Susan Fisher

HNTB Job Number 34780

Subject: Chapel Hill Business Owner/Manager Meetings
U-4008 Community Impact Assessment

Attendees:

Rodney Roberson	Manager, McDonald's
Susan Fisher	HNTB, Charlotte
Anne Lenart-Redmond	HNTB, Raleigh

The HNTB representatives identified themselves as consultants for the North Carolina Department of Transportation, and explained that they are in the process of preparing a Community Impact Assessment for transportation improvements proposed at the intersection of Erwin Road/Europa Drive and US 15-501 in Chapel Hill, NC. HNTB representatives gave a brief overview of three alternatives: Alternative #1 (TIP), Alternative #2 and Alternative #3 (Superstreet), and solicited reactions to the proposed alternatives. This information will be included as a supplement to the Community Impact Assessment. Numerous attempts to contact the owner were unsuccessful, but Mr. Roberson (manager) was available for an interview.

- The previous owner of the franchise made Mr. Roberson aware of planned improvements.
- Approximately 20% of the McDonald's employees use public transportation to get to work, and one or two employees may walk or bike to work.
- About half of the staff commutes from Durham and travels on US 15-501 north of Europa Drive. The other half commutes from Carrboro and travels on US 15-501 south of Europa Drive.
- Mr. Roberson feels that this intersection is a problem and improvements should be made. He thinks Alternative #1 would have a positive impact on business, while Alternative #3 would negatively impact his business by eliminating direct access to the McDonald's. He is also concerned with the proposed closure of the access road between northbound US 15-501 and the service road.

Action Items:

- *HNTB to provide contact information to NCDOT in order to add McDonalds to the project mailing list.*
- *HNTB left revised handout from Community Workshop held in December 2000 (August 2002) and a questionnaire for Paul Willouby, Owner.*

HNTB
The HNTB Companies

Memorandum

To: Meeting Minutes
File

Date: August 13, 2002

From: Susan Fisher

HNTB Job Number 34780

Subject: Chapel Hill Business Owner/Manager Meetings
U-4008 Community Impact Assessment

Attendees:

Doug Roan	Vice President, Development & Purchasing, Lucor Corporation
Greg Gallagher	HNTB, Charlotte
Anne Lenart-Redmond	HNTB, Raleigh

The HNTB representatives identified themselves as consultants for the North Carolina Department of Transportation, and explained that they are in the process of preparing a Community Impact Assessment for transportation improvements proposed at the intersection of Erwin Road/Europa Drive and US 15-501 in Chapel Hill, NC. HNTB representatives gave a brief overview of three alternatives: Alternative #1 (TIP), Alternative #2 and Alternative #3 (Superstreet), and solicited reactions to the proposed alternatives. This information will be included as a supplement to the Community Impact Assessment.

- Lucor is the parent company for Jiffy Lube.
- It does not appear that any employees at the Jiffy Lube on the US 15-501 service road use public transportation or walk/bike to work.
- Employees and some customers appear to commute primarily from Durham, and use southbound US 15-501 and Europa Drive to access the store. A significant number of customers also use the access road that connects northbound US 15-501 and the service road.
- Mr. Roan feels that traffic on Europa backs up because the light cycle is too short, and it appears that the light cycle is set to accommodate peak traffic at all times. He thinks that the realignment of Dobbins Drive is a good idea, but that no other improvements are necessary at the intersection.
- Alternative #1 (TIP) could be positive if the access road between northbound US 15-501and the service road off of Europa Drive remains open.
- Alternative #3 (Superstreet), according to Mr. Roan, will hurt business because it is confusing and will cause drivers to avoid the intersection. He feels that no mitigation is possible, as customers will be driven away by the confusing and intimidating arrangement.
- NCDOT and Town officials assured him that the access drive would never be closed.
- A majority of customers are drive-bys. Access and visibility are very important to business.
- Construction impacts are a concern for store sales.

Action Items:

- *HNTB to provide contact information to NCDOT in order to add Lucor to the project mailing list.*

HNTB
The HNTB Companies

Memorandum

To: Meeting Minutes File
From: Susan Fisher
Date: August 8, 2002
HNTB Job Number 34780
Subject: Chapel Hill Business Owner/Manager Meetings
U-4008 Community Impact Assessment

Attendees:

Gary Sabbagh	General Manager, Hampton Inn
Charles Thompson	Assistant General Manager, Hampton Inn
Susan Fisher	HNTB, Charlotte
Anne Lenart-Redmond	HNTB, Raleigh

The HNTB representatives identified themselves as consultants for the North Carolina Department of Transportation, and explained that they are in the process of preparing a Community Impact Assessment for transportation improvements proposed at the intersection of Erwin Road/Europa Drive and US 15-501 in Chapel Hill, NC. HNTB representatives gave a brief overview of three alternatives: Alternative #1 (TIP), Alternative #2 and Alternative #3 (Superstreet), and solicited reactions to the proposed alternatives. This information will be included as a supplement to the Community Impact Assessment.

- Approximately 35% of the 30 employees at the Hampton Inn use public transportation to get to work. There is one bicyclist that commutes from Durham (north of the project site). Most employees live in Chapel Hill and within a one-mile radius of the Hampton Inn. Customers appear to access the hotel from I-40 (southbound on US 15-501 to Europa Drive).
- Both Mr. Sabbagh and Mr. Thompson agree that US 15-501 congestion is a problem, but that something needs to be done to the entire corridor from Europa Drive to Ephesus Church Road. They would prefer that trees be removed in order to increase visibility of the hotel.
- Both disliked the proposed closure of the access road between northbound US 15-501 and the service road off of Europa Drive.
- Alternative #1 is favored, but Gary suggests looking at Big Beaver Road in Troy, Michigan as an alternative.
- They feel that Alternative #3 would inconvenience customers (particularly those going toward Chapel Hill and UNC) and create an indirect route.
- Mr. Sabbagh requested that a larger NCDOT sign be posted along US 15-501. The NCDOT Logo program was discussed and they were referred to Kristina Solberg at the NCDOT.

Action Items:

- *HNTB to provide contact information to NCDOT in order to add Hampton Inn to the project mailing list.*

HNTB
The HNTB Companies

Memorandum

To: Meeting Minutes
File

Date: August 8, 2002

From: Susan Fisher

HNTB Job Number 34780

Subject: Chapel Hill Business Owner/Manager Meetings
U-4008 Community Impact Assessment

Attendees:

John (Jack) Graham	President, Graham Associates Ltd.
Jamie Lee	Title Unknown, Graham Associates Ltd.
Lucy Staincliffe	Senior Property Manager, Graham Associates Ltd.
Susan Fisher	HNTB, Charlotte
Anne Lenart-Redmond	HNTB, Raleigh

The HNTB representatives identified themselves as consultants for the North Carolina Department of Transportation, and explained that they are in the process of preparing a Community Impact Assessment for transportation improvements proposed at the intersection of Erwin Road/Europa Drive and US 15-501 in Chapel Hill, NC. HNTB representatives gave a brief overview of three alternatives: Alternative #1 (TIP), Alternative #2 and Alternative #3 (Superstreet), and solicited reactions to the proposed alternatives. This information will be included as a supplement to the Community Impact Assessment.

- Very few of the approximately 700 employees at the Europa Center use public transportation or walk/bike to work. A larger percentage of the visitors to the Europa Center (particularly those coming for health services) use public transportation. Vendors use the service entrance on Legion Road.
- Employees appear to access the site from Erwin Road and the Durham Area (north of project site). Some of those travelling from Durham use the "back way" (Legion Road), while others travel south on US 15-501 and make left turns onto Europa Drive. They have witnessed cars driving on the grassed median of US 15-501 to get into the left turn lane.
- This intersection is a problem Monday through Friday during peak commuting times. Back-ups occur primarily in the southbound lanes of US 15-501 in the mornings, northbound from Europa Drive in the evenings and at the merging of Franklin Street and Fordham Blvd (US 15-501). The service road off of Europa also has congestion, and when school is in session, traffic backs up on Erwin Road.
- Ms. Staincliffe expressed surprise that more accidents have not occurred at this intersection, particularly because cars get stranded in the middle of the intersection due to short traffic signal cycles.
- Ms. Staincliffe favors Alternative #1 because it would increase the traffic on Europa Drive and provide better accessibility to the Europa Center. However, dual left turn lanes on southbound US 15-501 may cause difficulty for vehicles in the inside lane coming from US 15-501 and turning right onto the service road off of Europa Drive.
- Alternative #3 is the least favorable alternative and would hurt business in Ms. Staincliffe's and Mr. Graham's opinion. There are concerns about the accessibility of emergency vehicles to medical tenants and the ability of vendors to navigate the turnarounds with 18-wheeled vehicles. Lack of through-movement on Europa will reduce accessibility and convenience for tenants and visitors. Also, driver confusion is a concern. Mr. Graham feels that grade separation or fly-over improvements are a better solution at this intersection. "Go for the ultimate fix, not an interim solution."
- Both Ms. Staincliffe and Mr. Graham agree that signal timing may be the problem and a possible solution.
- Easy access for Europa Center tenants is a must, and a long construction period would be detrimental. Closure of the access road would not be a problem.
- Mr. Graham, Ms. Lee and Ms. Staincliffe have concerns about the cumulative effects of congestion at nearby intersections such as Ephesus Church Road and US 15-501.

Action Items:

- *HNTB to provide contact information to NCDOT in order to add Graham Assoc. to the project mailing list.*

HNTB
The HNTB Companies

Memorandum

To: Meeting Minutes
File

Date: August 9, 2002

From: Susan Fisher

HNTB Job Number 34780

Subject: Chapel Hill Business Owner/Manager Meetings
U-4008 Community Impact Assessment

Attendees:

Britt Talbert	Manager, Talbert's Tire & Automotive
Susan Fisher	HNTB, Charlotte
Anne Lenart-Redmond	HNTB, Raleigh

The HNTB representatives identified themselves as consultants for the North Carolina Department of Transportation, and explained that they are in the process of preparing a Community Impact Assessment for transportation improvements proposed at the intersection of Erwin Road/Europa Drive and US 15-501 in Chapel Hill, NC. HNTB representatives gave a brief overview of three alternatives: Alternative #1 (TIP), Alternative #2 and Alternative #3 (Superstreet), and solicited reactions to the proposed alternatives. This information will be included as a supplement to the Community Impact Assessment. Numerous attempts to contact the owner were unsuccessful; however, Manager Britt Talbert was available for an interview.

- Talbert's Tire is in a month-month leasing situation and may move in the near future.
- It does not appear that any employees use public transportation to get to work, nor do they walk/bike to work.
- According to Mr. Talbert, most employees commute from I-40 and use southbound US 15-501 and Europa Drive/service road to get to work. Most customers access the business from Europa Drive and the service road, however some use the Hampton Inn to cut through to Legion Road. He has witness very few people using the access road. As this business has been operating on this site for over 30 years, most customers are familiar with its location. No gasoline is sold at this facility.
- Mr. Talbert thinks the problem areas are the service road (due to congestion on Europa Drive), and northbound traffic on US 15-501 making left turns onto Erwin Road. Weekdays from 4:00-6:00pm are the worst times.
- Alternative #1 would impact Talbert's Tire only minimally, as customers know the location and would not be affected by the addition of turn lanes.
- Mr. Talbert has a slight preference for Alternative #3, although he doesn't feel that he fully understands the Superstreet concept.
- He would like to see the light cycle (signal time) increased for Erwin Road and Europa Drive to allow more vehicles to access US 15-501.

Action Items:

- *HNTB to provide contact information to NCDOT in order to add Talbert's Tire to the project mailing list.*
- *HNTB left revised handout from Community Workshop held in December 2000 (August 2002) and a questionnaire for Star Gardner, owner of the building.*