STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5207B	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38629		PE
45393.2.3		R/W, UTIL.
45393.3.3		CONST.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

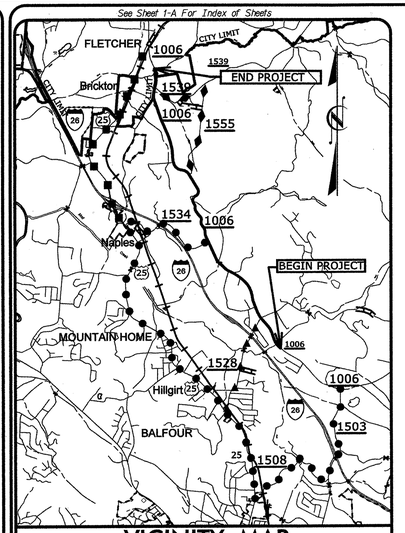
HENDERSON COUNTY

LOCATION: SR 1006 (HOWARD GAP ROAD) FROM BRIDGE 334 TO SR 1539 (JACKSON ROAD)

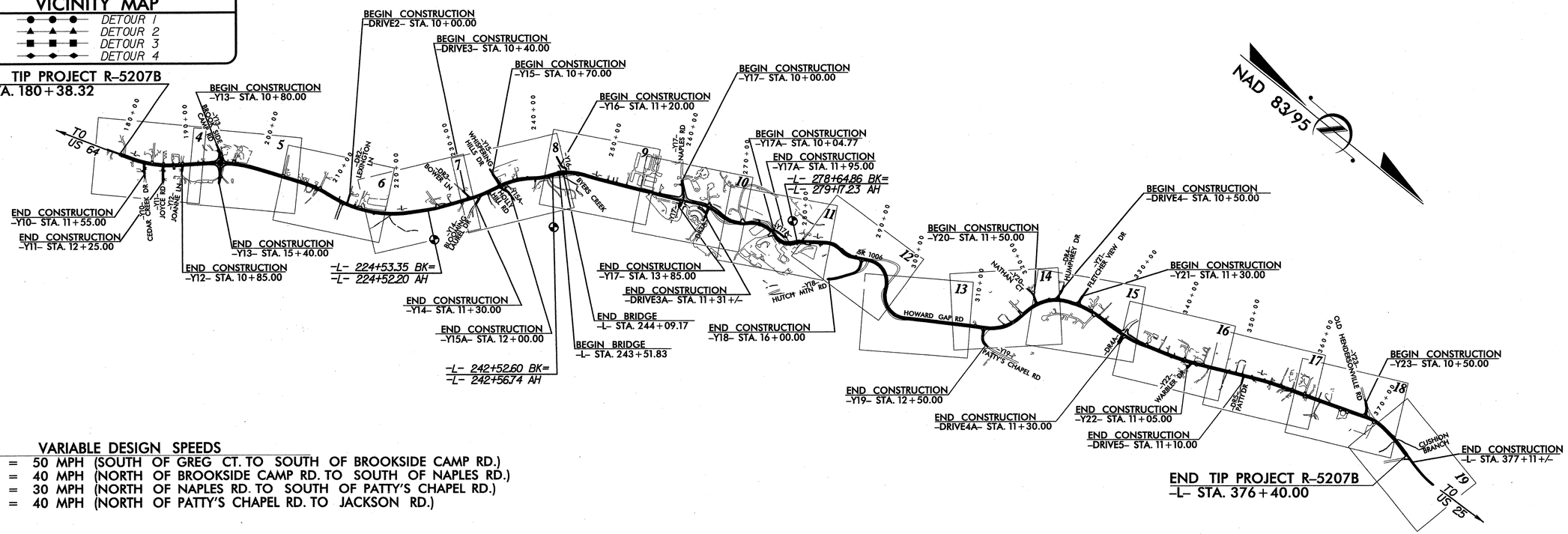
TYPE OF WORK: STRUCTURE, CULVERT, RETAINING WALLS, GRADING, DRAINAGE, PAVING, SIGNALS

PROJECT: R-5207B

CONTRACT: C202743



VICINITY MAP
DETOUR 1
DETOUR 2
DETOUR 3
DETOUR 4



VARIABLE DESIGN SPEEDS

* Vd = 50 MPH (SOUTH OF GREG CT. TO SOUTH OF BROOKSIDE CAMP RD.)
Vd = 40 MPH (NORTH OF BROOKSIDE CAMP RD. TO SOUTH OF NAPLES RD.)
Vd = 30 MPH (NORTH OF NAPLES RD. TO SOUTH OF PATTY'S CHAPEL RD.)
Vd = 40 MPH (NORTH OF PATTY'S CHAPEL RD. TO JACKSON RD.)

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 2008 = 8,758
ADT 2028 = 13,218
DHV = 11 %
D = 60 %
T = 6 %
*Vd = VARIES (SEE ABOVE)
TTST = 2% DUAL 4%
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5207B = 3.691 MILES
LENGTH STRUCTURES TIP PROJECT R-5207B = 0.011 MILES
TOTAL LENGTH TIP PROJECT R-5207B = 3.702 MILES

PLANS PREPARED BY:
TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
OCTOBER 2006

LETTING DATE:
JULY 17, 2012

PLANS PREPARED FOR:
NCDOT DIVISION 14
NCDOT Contact:
RALPH CANNADY
DIVISION CONTRACT OFFICER

JIMMY L. TERRY, PE
PROJECT ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY
SIGNATURE: P.E. 4/20/12

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY
SIGNATURE: P.E. 4/20/12

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

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09/08/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	I-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 25018 ENGINEER JIMMY L. TERRY 9/20/12

INDEX OF SHEETS

SHEET NO.	SHEET
1	Title Sheet
1-A	Index of Sheets, General Notes, and Standard Drawings
1-B	Conventional Symbols
2 thru 2-B	Pavement Schedule, Typical Sections, and Bridge Typical
2-C	Driveway and Parking Lot Grading Plan
2-D	Intersection Detail and Grading Plan
2-E	Anchorage for Frames Details
2-F and 2-G	Method of Pipe Installation Details
2-H and 2-I	Curb Ramp Details
2-J	Proposed Pedestrian Safety Rail
2-K	Soil Nail Stabilization Slope
2-L	Rock Plating Details
2M	STANDARD REINFORCED SOIL SLOPE
2N	DETAIL OF TEMPORARY SHORING
3 (2 SHEETS)	Summary of Quantities
3-A	Summary of Earthwork, Guardrail, and Asphalt Pavement Removal
3-B thru 3-G	Summary of Drainage
3-H	Parcel Index Sheet
4 thru 19	Roadway Plan Sheets
20 thru 29	Roadway Profile Sheets
TCP-1 thru TCP-24	Traffic Control Plans
PM-1 thru PM-4	Pavement Marking Plans
EC-1 thru EC-35	Erosion Control Plans
SIGN-1 thru SIGN-18	Signing Plans
SIG-1 thru SIG-18	Signal Plans
UC-1 thru UC-16	Utility Construction Plans
UO-1 thru UO-17	Utility By Others Plans
X-INDEX	Cross Section Index
X-SUM1 and X-SUM2	Cross Section Summary Sheets
X-1 thru X-106	Cross Sections
S-1 thru S-27	Structure Plans
W-1 thru W-3	Retaining Wall Plans

LIST OF STANDARD DRAWINGS

EFF. 07-18-06
REV. 01-02-07

2006 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
DIVISION 3 - PIPE CULVERTS	
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
665.01	Milled Rumble Strips - Asphalt Pavements
DIVISION 8 - INCIDENTALS	
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.27	Reinforced Concrete Endwall - for Single 60" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.57	Reinforced Brick Endwall - for Single 60" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.13	Concrete Bridge Approach Drop Inlet - 12" thru 24" Pipe
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.41	Spring Box - Concrete or Brick
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.01	Concrete Sidewalk
848.02	Driveway Turnout - Radius Type
848.04	Street Turnout
850.01	Concrete Paved Ditches
852.01	Concrete Islands
852.02	Concrete Mountable Median - for Use with Rigid or Flexible Pavement
857.01	Precast Reinforced Concrete Barrier - 41" Single Faced
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.03	Drainage Ditches with Class 'A' Rip Rap
876.04	Drainage Ditches with Class 'B' Rip Rap

GENERAL NOTES

GENERAL NOTES:

2006 SPECIFICATIONS
EFFECTIVE: 07-18-06
REVISED: 07-19-11

GRADE LINE:
GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3' RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

STREET TURNOUT:

STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE DUKE POWER COMPANY

MEDIA COMMUNICATIONS, AT&T, PSNC ENERGY, FLETCHER ACADEMY,

CANE CREEK WATER AND SEWER AUTHORITY, CITY OF HENDERSONVILLE,

AND FOX GLEN HOME OWNERS ASSOCIATION

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

Curb Ramps:

CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. THE CONSTRUCTION OF ALL CURB RAMPS SHALL BE IN ACCORDANCE WITH THE DETAILS IN THE PLANS.

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PROJECT REFERENCE NO.	SHEET NO.
R-5207B	1-B

04/16/11

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Known Soil Contamination: Boundary or Site
- Potential Soil Contamination: Boundary or Site

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

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PROJECT REFERENCE NO.	SHEET NO.
R-5207B	2
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY — 4/23/12

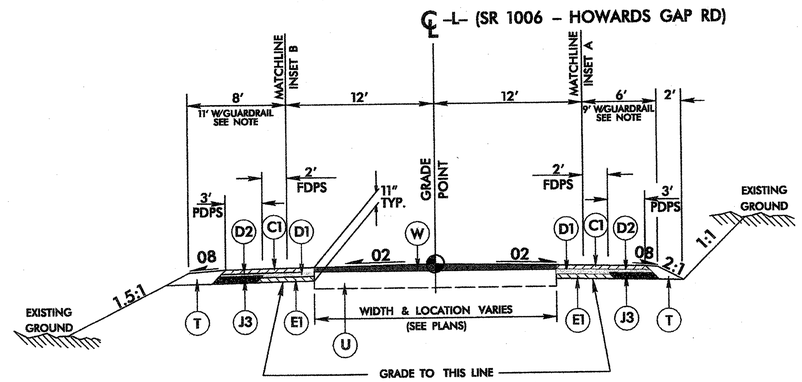
PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 029969 ENGINEER STEVEN L. CANNON — 4/23/2012

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

PAVEMENT SCHEDULE

C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. APPROX. 3¾" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 210 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1½" IN DEPTH OR GREATER THAN 2" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTER. COURSE. TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. APPROX. 2½" ASPHALT CONCRETE INTER. COURSE. TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTER. COURSE. TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E2	PROP. APPROX. 6" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
E3	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E4	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 4" IN DEPTH OR GREATER THAN 5½" IN DEPTH
J1	PROP. 8" AGGREGATE BASE COURSE.
J2	PROP. 4 " AGGREGATE BASE COURSE.
J3	PROP. 6.5" AGGREGATE BASE COURSE.
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	CONCRETE SHOULDER BERM GUTTER
R3	1'-8" CONCRETE CURB AND GUTTER.
R4	7" MONOLITHIC CONCRETE TRUCK APRON.
R5	8"X12" CONCRETE CURB.
S	CONCRETE SIDEWALK
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING EXISTING PAVEMENT (SEE DETAIL ON SHEET 2-A).

NOTE: PAVEMENT EDGE SLOPES ARE 30 DEGREES UNLESS SHOWN OTHERWISE.



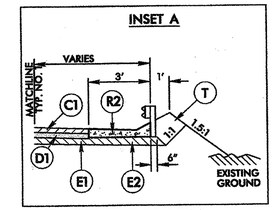
TYPICAL SECTION NO. 1

SEE PLANS FOR TURN LANE WIDENING

USE TYPICAL SECTION NO. 1 AS FOLLOWS:

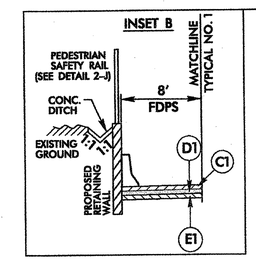
-L- STA. 180+38.32 TO 224+53.35 BK
-L- STA. 224+52.20 AH TO 242+52.60 BK
-L- STA. 242+56.74 AH TO 243+51.83 (BEGIN BRIDGE)
-L- STA. 244+09.17 (END BRIDGE) TO 261+56+/-
-L- STA. 264+50+/- TO 278+64.86 BK
-L- STA. 279+17.23 AH TO 376+40.00

NOTE: NO ADDITIONAL SHOULDER WIDENING IS REQUIRED IN LOCATIONS OF GUARDRAIL, EXCEPT 3' WIDENING IN LOCATIONS OF GRAU 350. (SEE XSC AND PLANS FOR LOCATIONS)



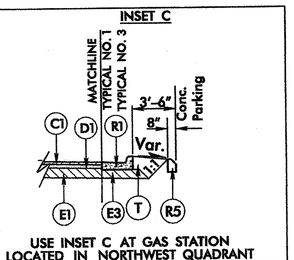
USE INSET A AS FOLLOWS:

-L- STA. 244+37+/- TO 244+90+/- RT
-L- STA. 289+30+/- TO 294+80+/- RT

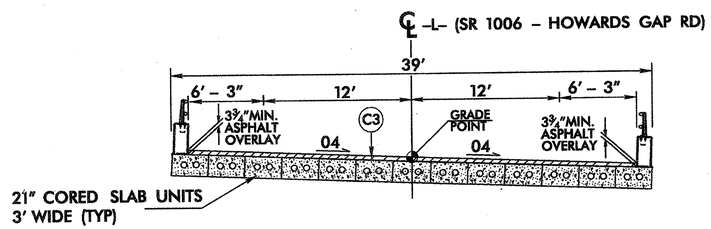


USE INSET B AS FOLLOWS:

-L- STA. 277+30+/- TO 279+50+/- LT
-L- STA. 285+50+/- TO 287+00+/- LT



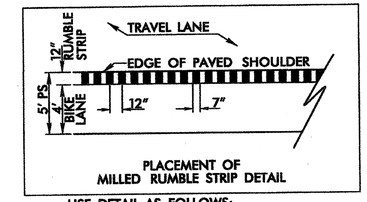
USE INSET C AT GAS STATION LOCATED IN NORTHWEST QUADRANT OF INTERSECTION OF HOWARD GAP RD. AND BROOKSIDE CAMP RD. (SEE PLANS FOR LOCATION)



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 AS FOLLOWS:

-L- STA. 243+51.83 TO 244+09.17

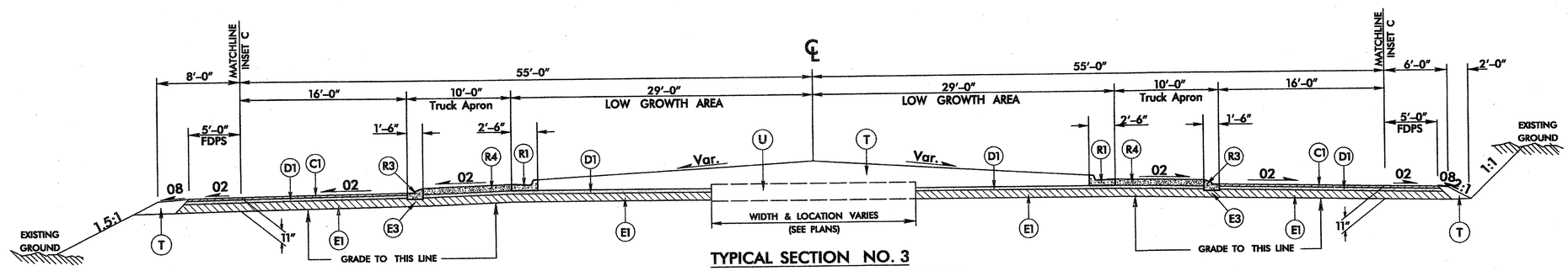


PLACEMENT OF MILLED RUMBLE STRIP DETAIL

USE DETAIL AS FOLLOWS:

-L- STA. 180+38+/- TO 193+27+/- LT
-L- STA. 196+91+/- TO 243+24+/- LT
-L- STA. 244+29+/- TO 259+97+/- LT
-L- STA. 265+30+/- TO 376+40+/- LT

-L- STA. 180+38+/- TO 193+22+/- RT
-L- STA. 195+79+/- TO 243+31+/- RT
-L- STA. 244+39+/- TO 260+30+/- RT
-L- STA. 265+58+/- TO 375+94+/- RT



TYPICAL SECTION NO. 3

USE TYPICAL SECTION FOR ROUNDABOUT

@ INTERSECTION OF HOWARD GAP RD AND BROOKSIDE CAMP RD.

SEE SHEET 2-D FOR GRADING PLAN

NOTE: WEDGE EXISTING PAVEMENT AS NEEDED FOR PROPER TIE-IN DURING CONSTRUCTION (SEE TRAFFIC CONTROL PLANS FOR TEMPORARY PAVEMENT LOCATIONS)

5/14/99

CSYSTIME$$$$ DGN$$$$ USERNAME$$$$

5/14/99

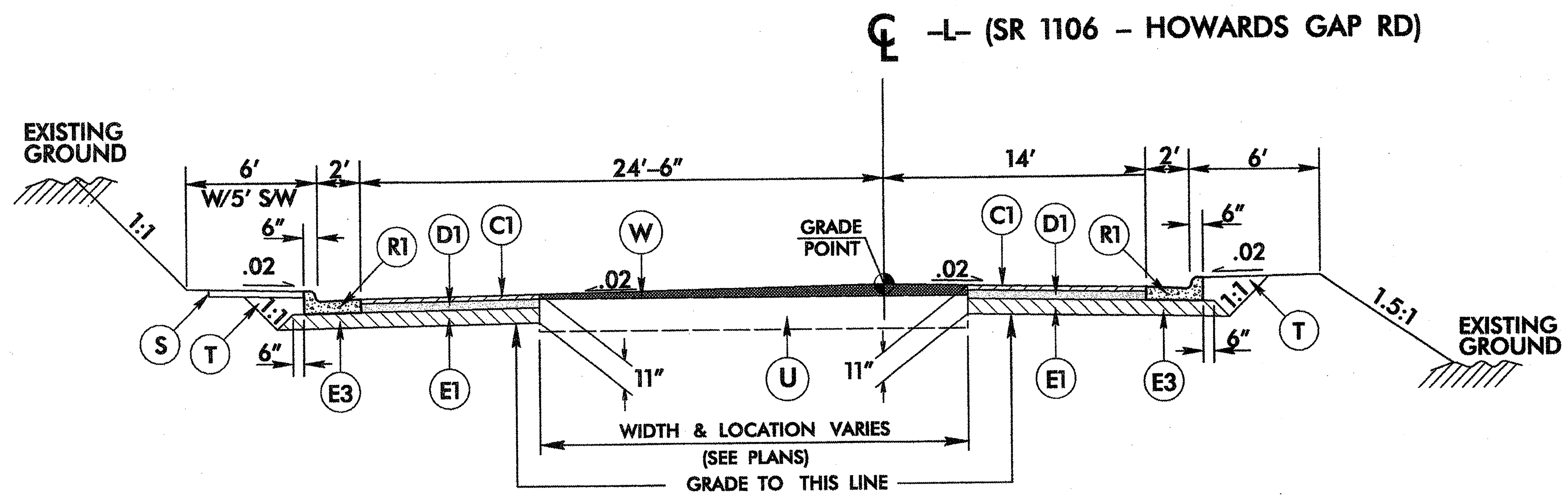
PROJECT REFERENCE NO.	SHEET NO.
R-5207B	2-A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY 4/23/12	NORTH CAROLINA PROFESSIONAL SEAL 029969 ENGINEER STEVEN L. CANNON 4/23/2012

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B
C4	VAR. S9.5B
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTER. COURSE. TYPE I19.0B
D3	VAR. I19.0B
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B
E3	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B
E4	VAR. B25.0B
J1	PROP. 8" AGGREGATE BASE COURSE.
J2	PROP. 4 " AGGREGATE BASE COURSE.
R1	2'-6" CONCRETE CURB AND GUTTER
R3	1'-6" CONCRETE CURB AND GUTTER.
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING EXISTING PAVEMENT (SEE DETAILS ON THIS SHEET)

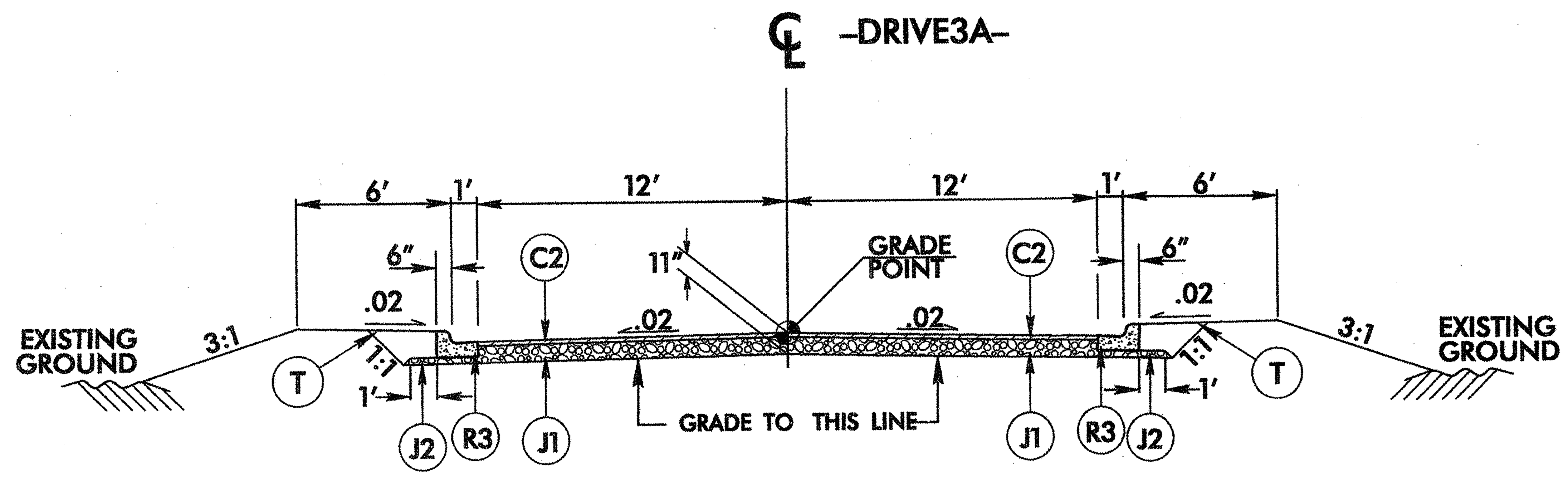
NOTE: PAVEMENT EDGE SLOPES ARE 30 DEGREES UNLESS SHOWN OTHERWISE.



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4 AS FOLLOWS:

-L- STA. 261+56+/- TO 264+50+/-

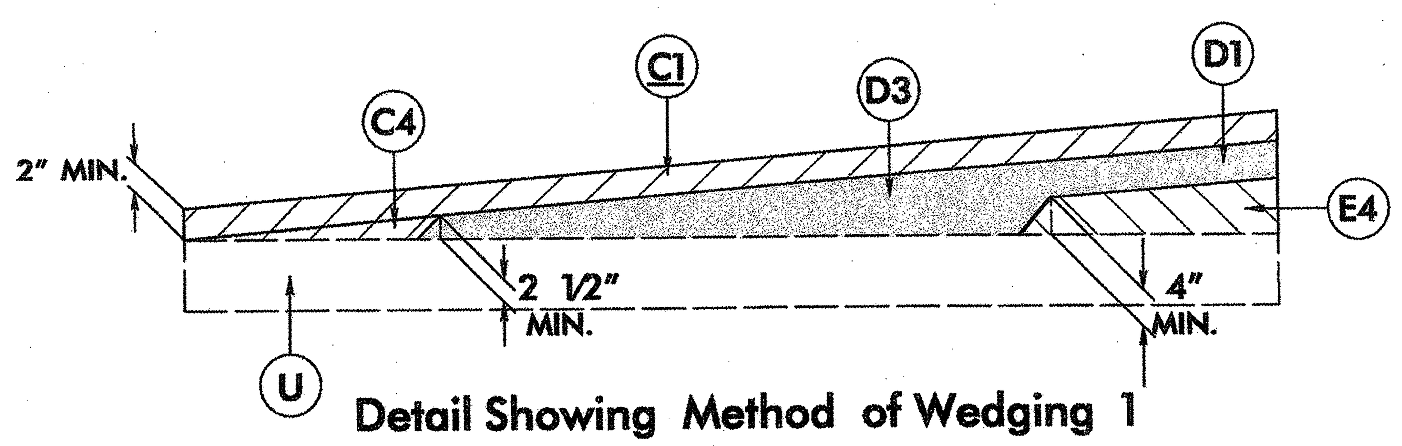


TYPICAL SECTION NO. 5

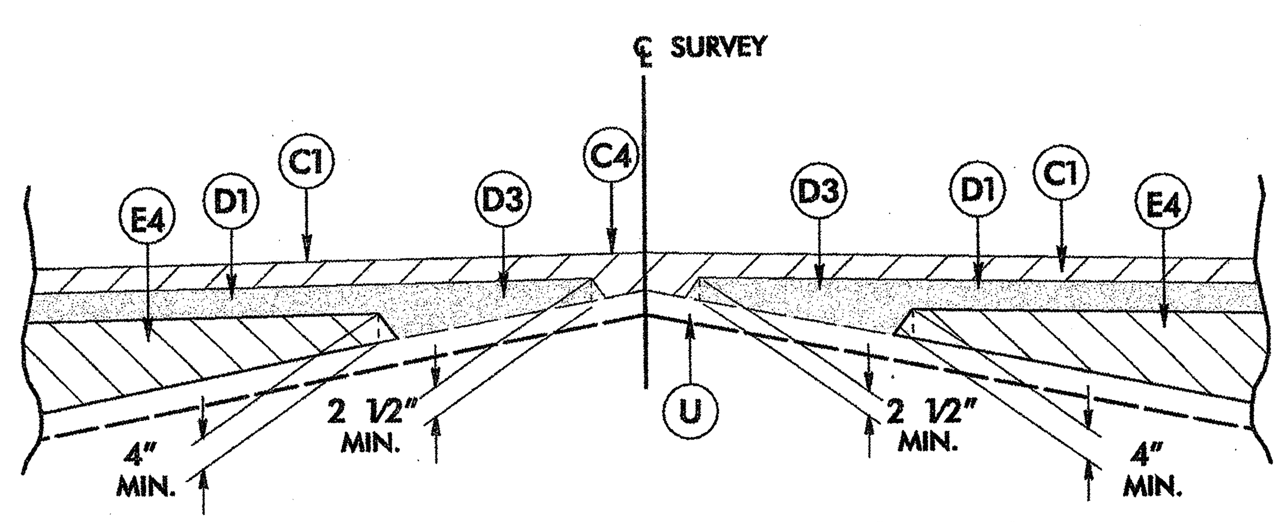
USE TYPICAL SECTION NO. 5 AS FOLLOWS:

-DRIVE4A- STA. 10+12.55 TO 11+31+/-

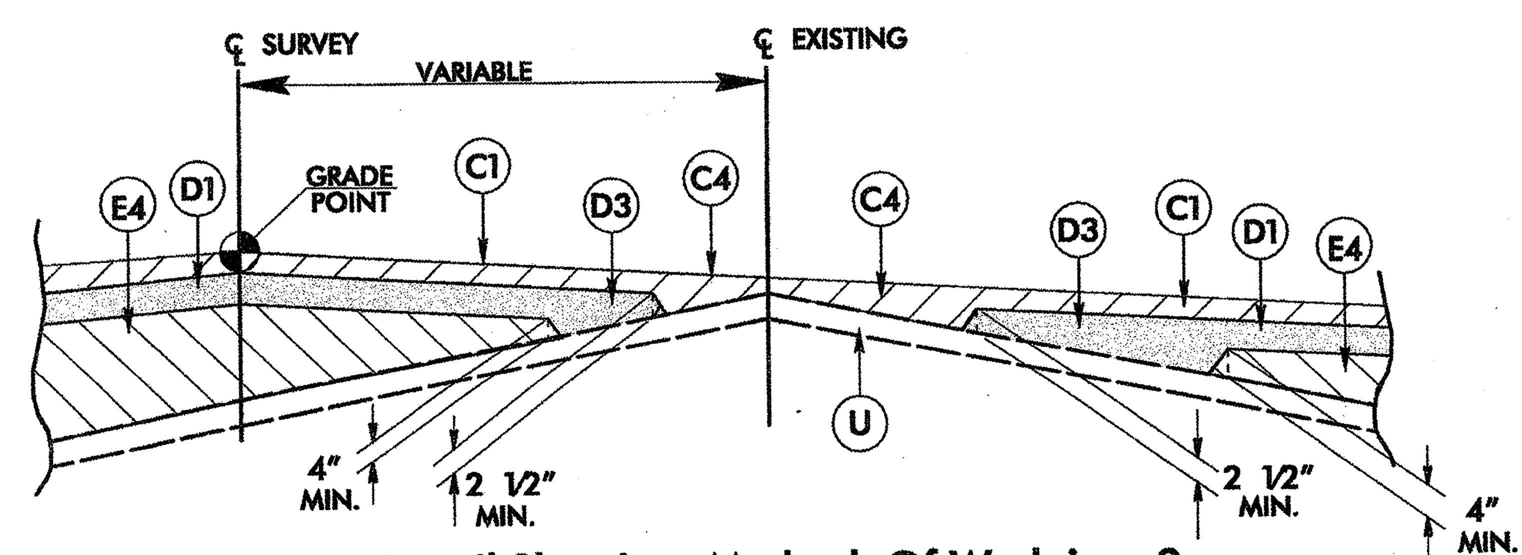
NOTE: SEE DETAIL SHEET 2-C FOR GRADING PLAN



Detail Showing Method of Wedging 1



Detail Showing Method of Wedging 2



Detail Showing Method Of Wedging 3

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

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	2-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY 4/23/12

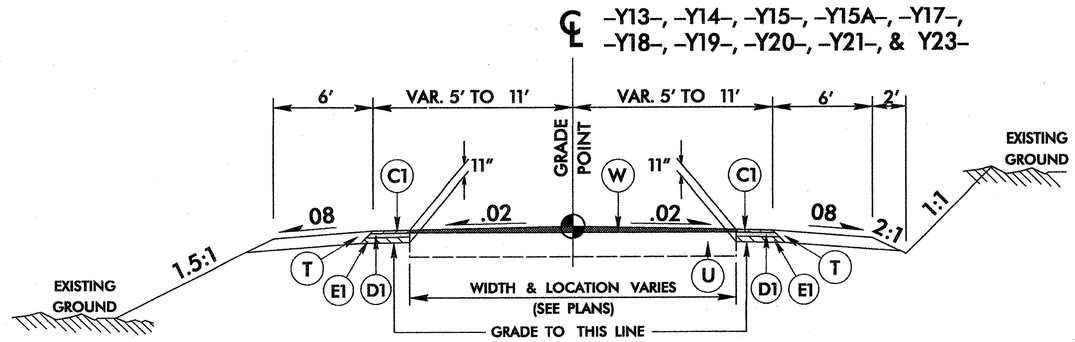
NORTH CAROLINA PROFESSIONAL SEAL 029969 ENGINEER STEVEN L. CAMPBELL 4/23/2012

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

5/14/99

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTER. COURSE. TYPE I19.0B
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING EXISTING PAVEMENT (SEE DETAIL ON SHEET 2-A).

NOTE: PAVEMENT EDGE SLOPES ARE 30 DEGREES UNLESS SHOWN OTHERWISE.



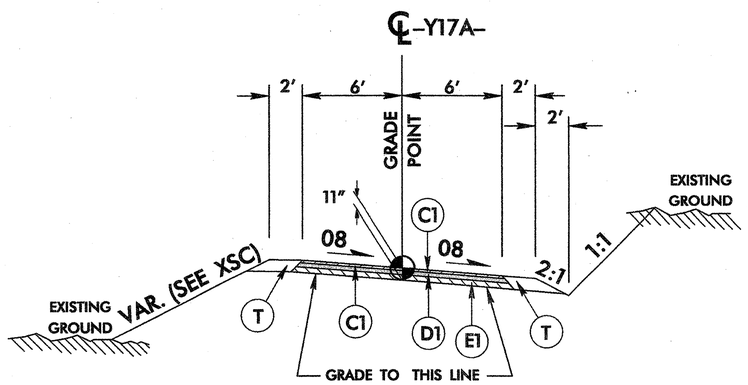
TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6 AS FOLLOWS:

-Y13- STA. 10+80.00 TO 12+15.66
-Y13- STA. 13+25.66 TO 15+40.00
-Y14- STA. 10+12.00 TO 11+30.00
-Y15- STA. 10+70.00 TO 12+56.38
-Y15A- STA. 10+12.07 TO 12+00.00
-Y17- STA. 10+00.00 TO 12+52.11
-Y18- STA. 12+01.47 TO 16+00.00
-Y19- STA. 10+12.00 TO 12+50.00
-Y20- STA. 11+50.00 TO 12+45.93
-Y21- STA. 11+30.00 TO 12+54.59

NOTE: FULL DEPTH PAVEMENT (NO WIDENING OR RESURFACING) FOR THE FOLLOWING:

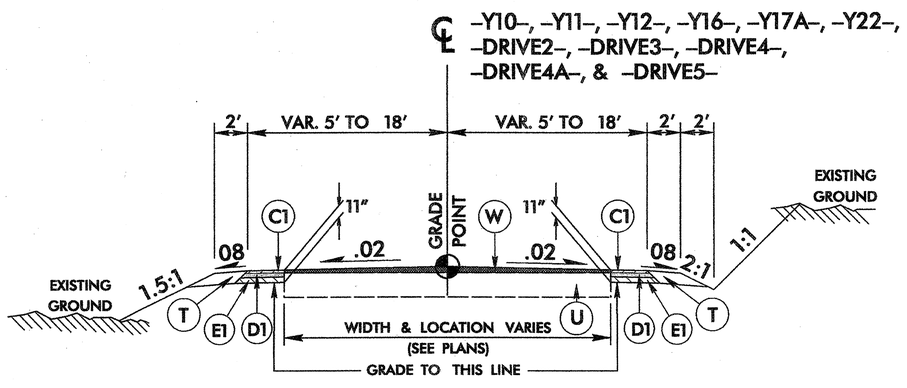
-Y18- STA. 10+12.00 TO 12+01.47
-Y23- STA. 10+50.00 TO 12+31.04



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7 AS FOLLOWS:

-Y17A- STA. 10+04.77 TO 11+95.00



TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8 AS FOLLOWS:

-Y10- STA. 10+12.00 TO 11+55.00
-Y11- STA. 10+12.01 TO 12+25.00
-Y12- STA. 10+12.17 TO 10+85.00
-Y22- STA. 10+13.41 TO 11+05.00
-DRIVE2- STA. 10+00.00 TO 11+26.10
-DRIVE3- STA. 10+40.00 TO 11+33.75
-DRIVE4- STA. 10+40.00 TO 11+33.75
-DRIVE4A- STA. 10+18+/- TO 11+30+/-
-DRIVE5- STA. 10+12.02 TO 11+10.00

NOTE: FULL DEPTH PAVEMENT (NO WIDENING OR RESURFACING) FOR THE FOLLOWING:

-Y16- STA. 11+20.00 TO 12+54.81
-DRIVE4- STA. 10+50.00 TO 12+11.11

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	2-C
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

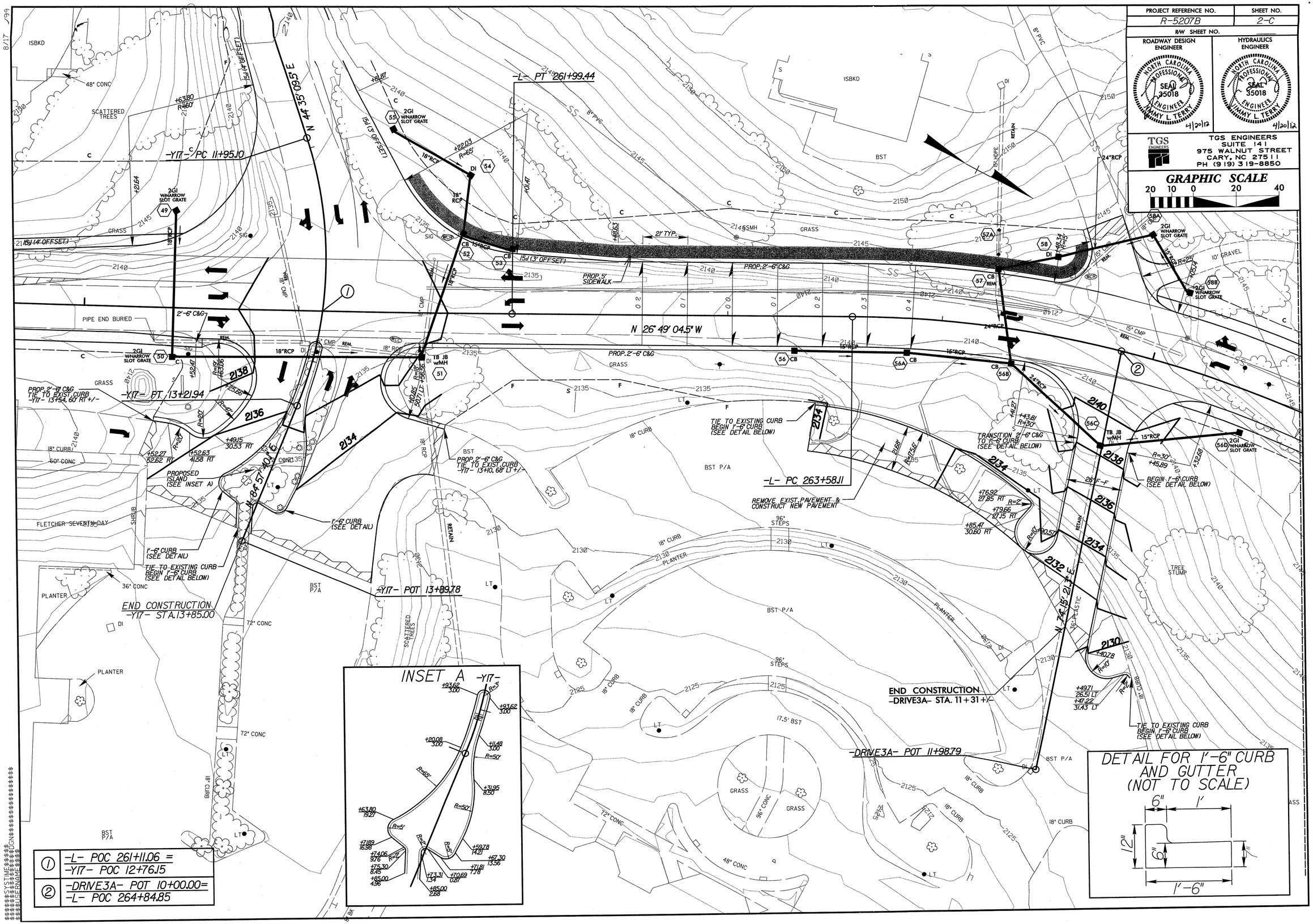
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY 4/20/12

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY 4/20/12

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

GRAPHIC SCALE
20 10 0 20 40



INTERSECTION DETAIL AND GRADING PLAN

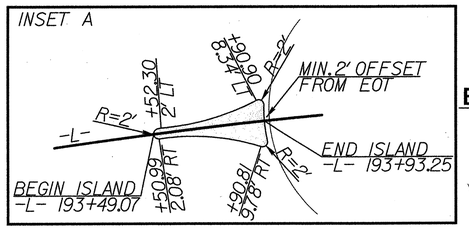
PROJECT REFERENCE NO.	SHEET NO.
R-5207B	2-D
R/W SHEET NO.	

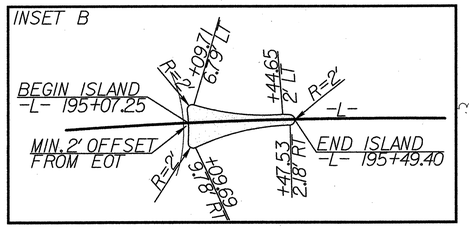
ROADWAY DESIGN ENGINEER

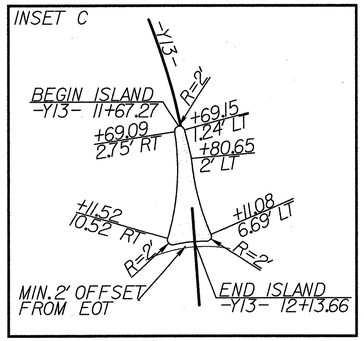
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY 4/20/12

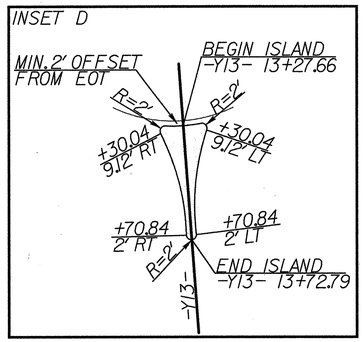
8/17/99

REVISIONS

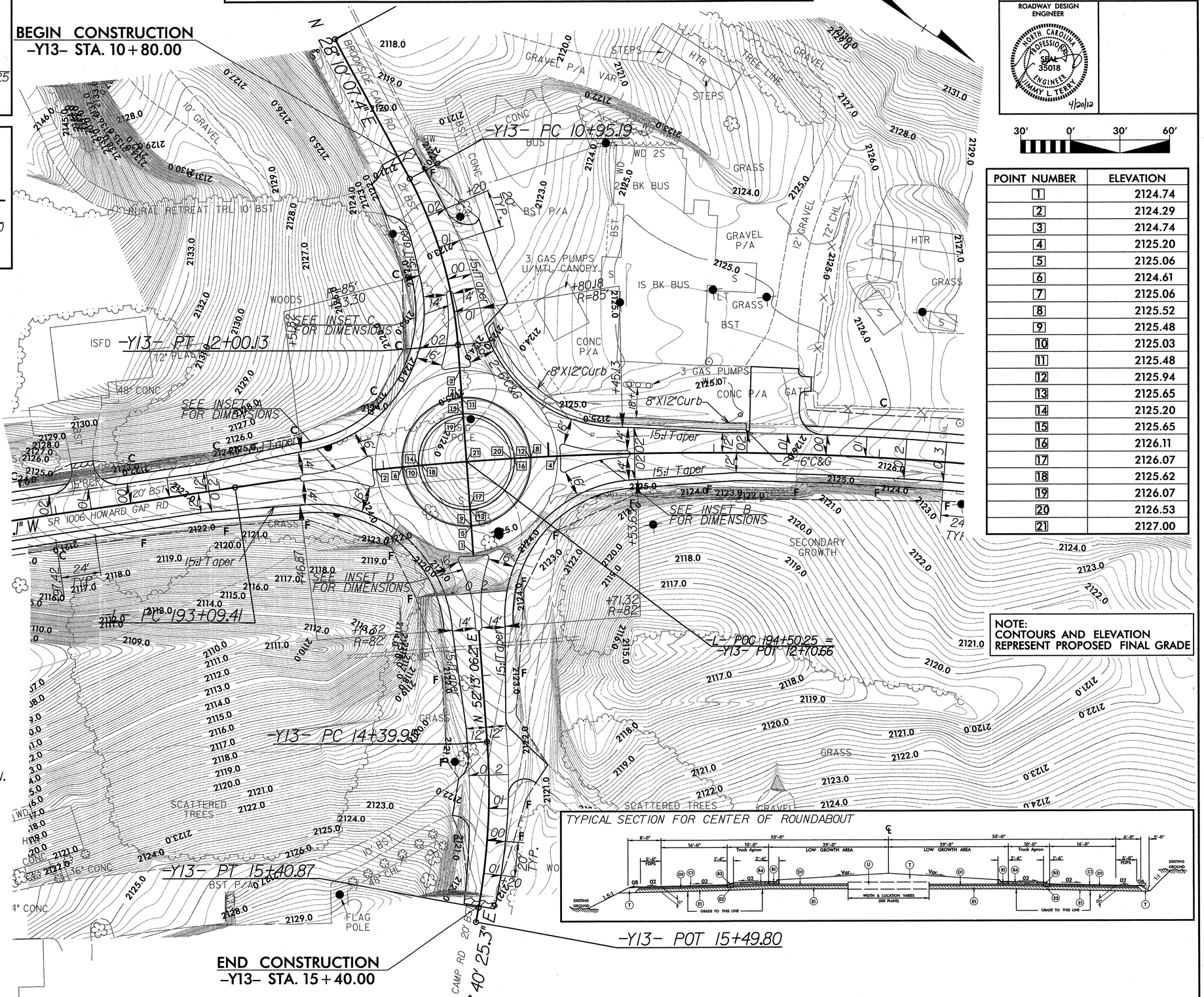








NOTE: CONTRACTOR WILL NEED TO CHANNEL APPROXIMATLY 5" OF TEMPORARY PAVEMENT AND PLACE THE PROPOSED 1'-6" CURB ONCE TRAFFIC IS PLACED IN ROUNDABOUT PATTERN.



NOTE: CONTOURS AND ELEVATION REPRESENT PROPOSED FINAL GRADE

30' 0' 30' 60'

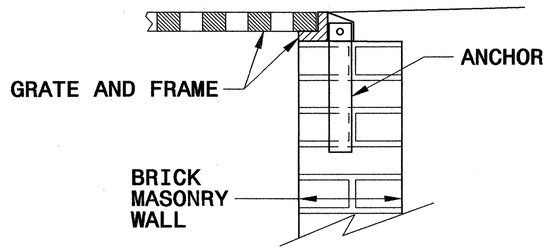
POINT NUMBER	ELEVATION
1	2124.74
2	2124.29
3	2124.74
4	2125.20
5	2125.06
6	2124.61
7	2125.06
8	2125.52
9	2125.48
10	2125.03
11	2125.48
12	2125.94
13	2125.65
14	2125.20
15	2125.65
16	2126.11
17	2126.07
18	2125.62
19	2126.07
20	2126.53
21	2127.00

SYMBOLS

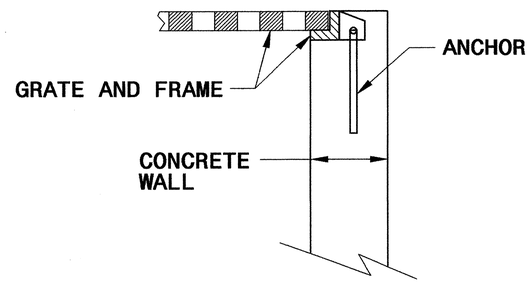
PROJECT REFERENCE NO.	SHEET NO.
R-5207B	2-E

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

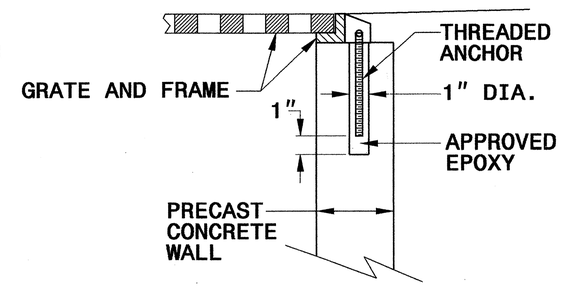
ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE



BRICK MASONRY CONSTRUCTION



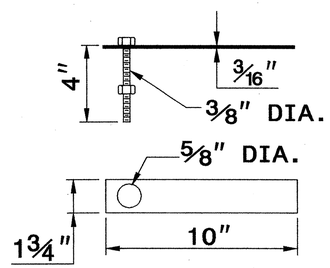
CONCRETE CONSTRUCTION



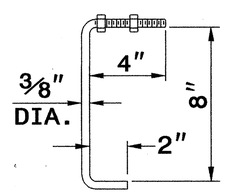
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

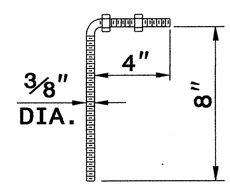
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



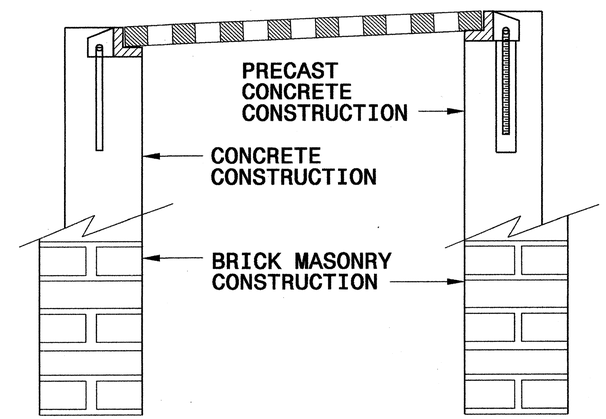
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



PRECAST CONCRETE ANCHOR
3/8" DIA. BENT BAR



FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS

SHEET 1 OF 1
840D25

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1
840D25

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOHN L. HOUPTMAN
5/7/12

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY:	2006 STD 840.25	DATE:	07/18/06
MODIFIED BY:	E.E. WARD	DATE:	9/25/06
CHECKED BY:		DATE:	
FILE SPEC.:			

27-SEP-2006 08:59
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erioward AT PS222293

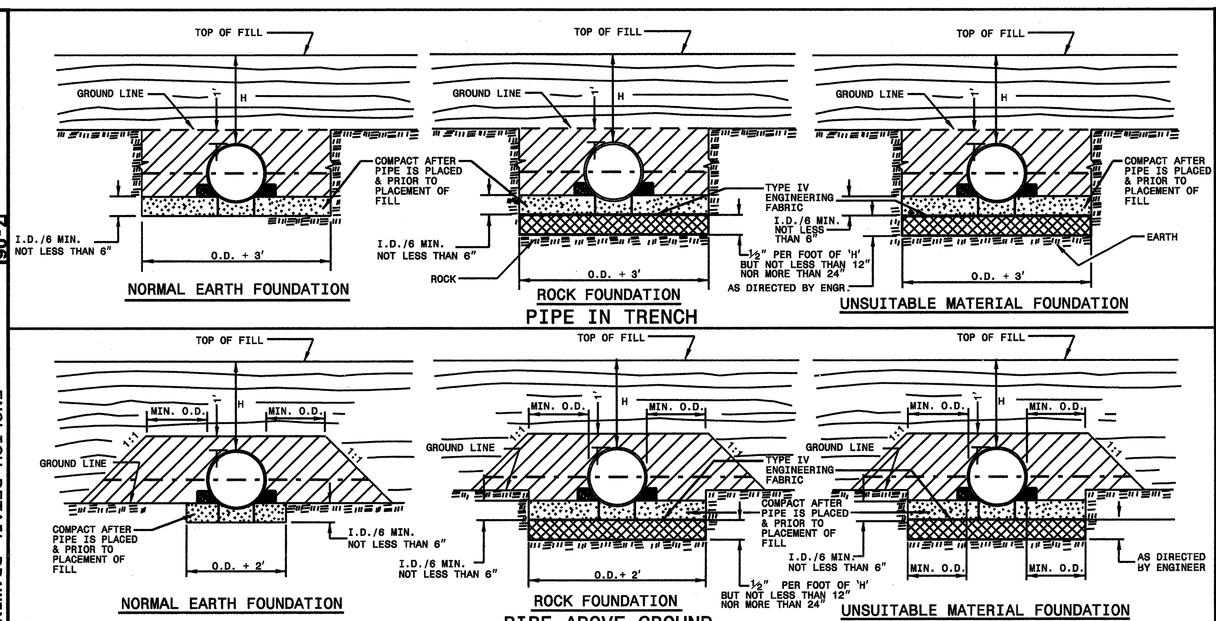
05-NOV-2009 11:35
s:\contracts\contracts\special details\ericward\stds\06' stds to special details\30001\0300d01.dgn
jhowerton AT PS237501

5/14/99

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL.

UNDISTURBED EARTH MATERIAL

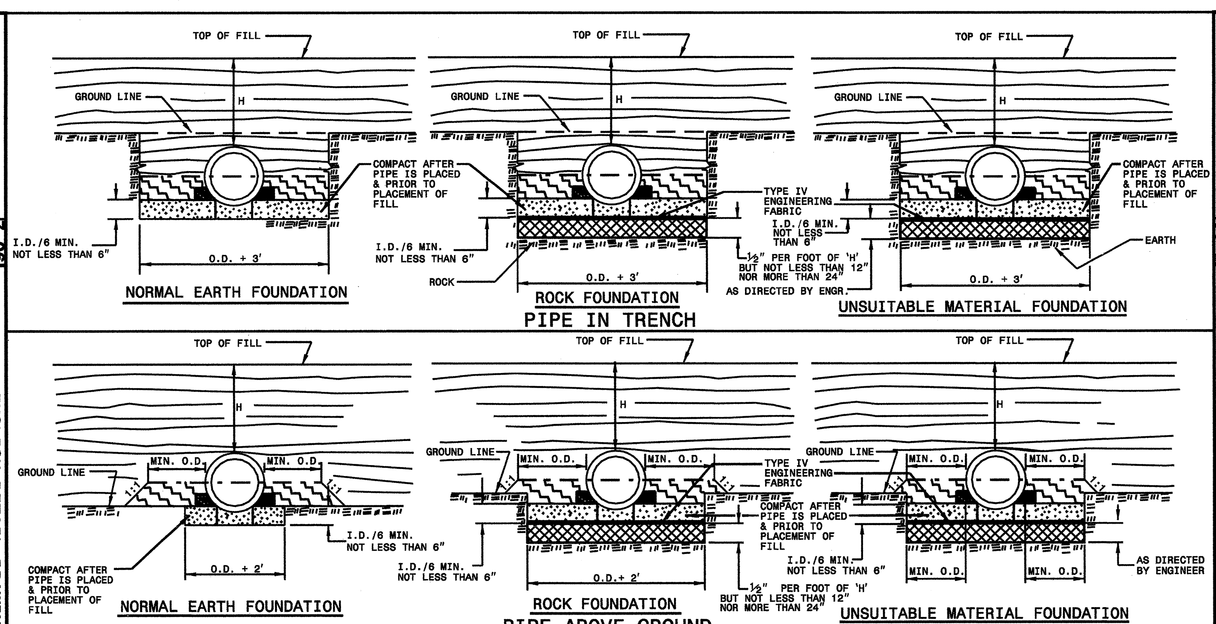
SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

SHEET 1 OF 3
300D01

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

SHEET 2 OF 3
300D01

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

NORTH CAROLINA PROFESSIONAL SEAL 02986 ENGINEER

SEE PLATE FOR TITLE

ORIGINAL BY: Kkempf
MODIFIED BY:
CHECKED BY:
FILE SPEC: s:\ericward\stds\stdspecdetails\30001\0300d01.dgn

DATE: 5-15-09
DATE:
DATE:

PROJECT REFERENCE NO. R-5207B
SHEET NO. 2-F

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

FLEXIBLE PIPE

Round Corrugated Steel Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	204	256			
15	12	162	204			
18	12	135	169	239		
21	12	115	145	204		
24	12	100	126	178		
30	12	79	100	142		
36	12	65	83	117	152	
42	12	55	70	100	130	160
48	12	48	61	87	113	139
54	12		54	77	100	123
60	12			69	90	111
66	12				81	100
72	12				74	91
78	12					81
84	12					69

Round Corrugated Aluminum Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	123	155	218	281	344
15	12	98	123	174	224	275
18	12	81	102	144	187	228
21	12	69	87	123	160	195
24	12	60	76	108	139	171
27	12		67	95	123	151
30	12		60	85	111	136
36	12		50	71	92	113
42	12			60	78	96
48	12			52	68	84
54	12			46	50	74
60	12				50	62
66	12					51
72	12					41

** FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

HDPE - * (Minimum fill) 2′ for pipe diameters ≥ 12″ and ≤ 60″
* (Maximum fill) 20′ for pipe diameters ≤ 24″
17′ for pipe diameters ≥ 30″ and ≤ 60″

PVC - * (Minimum fill) 2′ for pipe diameters ≥ 12″ and ≤ 36″
* (Maximum fill) 30′ for pipe diameters ≥ 12″ and ≤ 36″

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

CSP - AASHTO M36
CAAP - AASHTO M196
HDPE - AASHTO M294
PVC - ASTM F949 or AASHTO M304

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1′ MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

RIGID PIPE

RCP - * (Minimum fill) 1′ for Class IV & CLASS V
2′ for Class III & Class II

* (Maximum fill) 10′ - Class II pipe
20′ - Class III pipe
30′ - Class IV pipe
40′ - Class V pipe

(For fills > 40′ & < 80′ use LRFD Direct Design Method)

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1′ MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

SHEET 3 OF 3
300D01

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC: s:\general\stds\stdsworkshop\300\0300d01.dgn

NORTH CAROLINA PROFESSIONAL SEAL 022986 ENGINEER
5/7/12

PROJECT REFERENCE NO. R-3307B
SHEET NO. 2-G

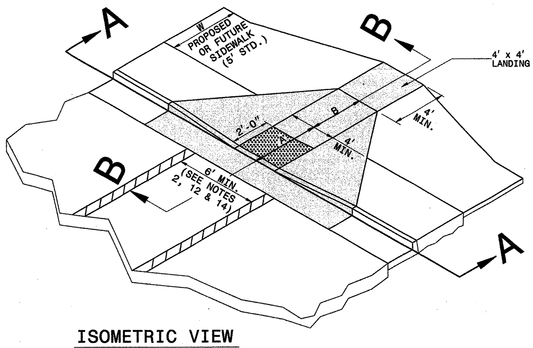
$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

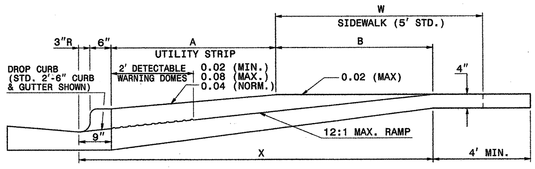
ENGLISH DETAIL DRAWING FOR

CURB RAMP

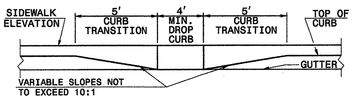
PROPOSED CURB AND GUTTER



ISOMETRIC VIEW



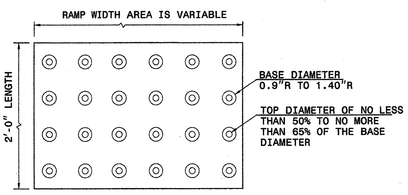
SECTION B-B

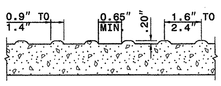


SECTION A-A

PAY LIMITS FOR CURB RAMP

NOTES:
1. DETECTABLE WARNING DOMES WILL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.
2. DETECTABLE WARNING DOMES WILL CONTRAST VISIBILITY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.

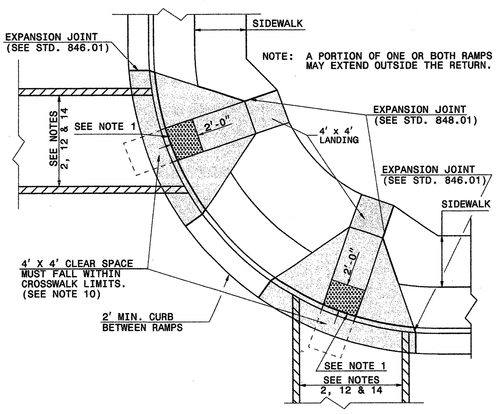




DETECTABLE WARNING DOMES

W	A	W+A+9"	X	B
5'	0.0'	5.8'	5.8'	5.0'*
5'	0.0'	6.8'	6.8'	6.0'**
7'	0.0'	7.8'	7.3'	6.5'**
8'	0.0'	8.8'	7.3'	6.5'**
5'	2.0'	7.8'	7.8'	5.0'
5'	2.5'	8.3'	8.1'	4.8'
5'	3.0'	8.8'	8.3'	4.4'
5'	3.5'	9.3'	8.4'	4.1'
5'	4.0'	9.8'	8.6'	3.8'
5'	4.5'	10.3'	8.7'	3.4'
5'	5.0'	10.8'	8.9'	3.1'

B = X-(A+9")
B = DISTANCE FROM FRONT EDGE OF SIDEWALK TO BACK POINT OF 12:1 (8.33%) SLOPE.
* BACK OF SIDEWALK DROP REQUIRED FOR ALL SIDEWALK SLOPES.
** BACK OF SIDEWALK DROP REQUIRED FOR SIDEWALK SLOPES 0.04.



PLAN VIEW

DUAL RAMPS
ANY RADII
(4' MIN. FLOOR WIDTH)

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

CURB RAMP

PROPOSED CURB AND GUTTER

SHEET 1 OF 3
848D05

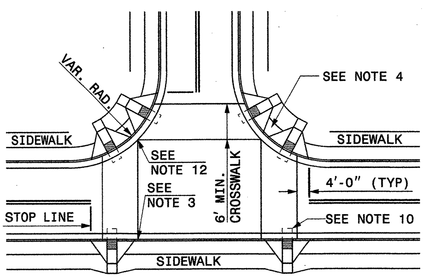
SHEET 1 OF 3
848D05

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

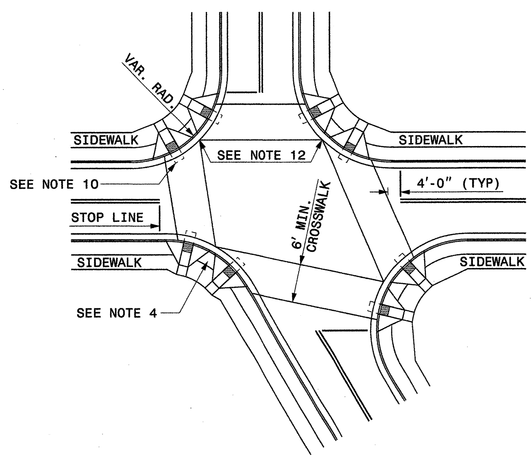
ENGLISH DETAIL DRAWING FOR

CURB RAMP

PROPOSED CURB AND GUTTER



DETAIL SHOWING TYPICAL LOCATION OF CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS



DETAIL SHOWING TYPICAL LOCATION OF CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES

ROADWAY PLAN SYMBOL
CR
FOR PROPOSED CURB RAMP

PROPOSED CURB RAMP W/ LANDING
PROPOSED OR FUTURE SIDEWALK

ALLOWABLE LOCATIONS

DUAL RAMP RADII.....ANY

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

CURB RAMP

PROPOSED CURB AND GUTTER

SHEET 2 OF 3
848D05

SHEET 2 OF 3
848D05

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: STD.NO.848.05 DATE: 4-22-10
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: SpecialDetails/EnlWrd/STDS/848d05.dgn

NORTH CAROLINA PROFESSIONAL SEAL 02586 ENGINEER
DOT STANDARD
5/1/12

PROJECT REFERENCE NO. R-5207B
SHEET NO. 2-H

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

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAILS DRAWING FOR

CURB RAMPS

NOTES

SHEET 3 OF 3

848D05

NOTES:

1. CONSTRUCT THE RAMP SURFACE TO BE STABLE, FIRM, AND SLIP RESISTANT. CONSTRUCT THE CURB RAMP TYPE AS SHOWN IN THE PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER.
2. LOCATE CURB RAMPS AND PLACE PEDESTRIAN CROSSWALK MARKINGS AS SHOWN IN THE PAVEMENT MARKING PLANS. WHEN FIELD ADJUSTMENTS REQUIRE MOVING CURB RAMPS OR MARKINGS AS SHOWN, CONTACT THE SIGNING AND DELINEATION UNIT OR LOCATE AS DIRECTED BY THE ENGINEER.
3. COORDINATE THE CURB RAMP AND THE PEDESTRIAN CROSSWALK MARKINGS SO A 4'x4' CLEAR SPACE AT THE BASE OF THE CURB RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES.
4. SET BACK DISTANCE FROM INSIDE CROSSWALK MARKING TO NEAREST EDGE OF TRAVEL LANE IS 4' MINIMUM.
5. REFER TO THE PAVEMENT MARKING PLANS FOR STOP BAR LOCATIONS AT SIGNALIZED INTERSECTIONS. IF A PAVEMENT MARKING PLAN IS NOT PROVIDED, CONTACT THE SIGNAL DESIGN SECTION FOR THE STOP BAR LOCATIONS OR LOCATE AS DIRECTED BY THE ENGINEER.
6. TERMINATE PARKING A MINIMUM OF 20' BACK OF A PEDESTRIAN CROSSWALK.
7. CONSTRUCT CURB RAMPS A MINIMUM OF 4' WIDE.
8. CONSTRUCT THE RUNNING SLOPE OF THE RAMP 8.33% MAXIMUM.
9. ALLOWABLE CROSS SLOPE ON SIDEWALKS AND CURB RAMPS WILL BE 2% MAXIMUM.
10. CONSTRUCT THE SIDE FLARE SLOPE A MAXIMUM OF 10% MEASURED ALONG THE CURB LINE.
11. CONSTRUCT THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE BASE OF THE CURB RAMP A MAXIMUM OF 5% AND MAINTAIN A SMOOTH TRANSITION.
12. CONSTRUCT LANDINGS FOR SIDEWALK A MINIMUM OF 4'x4' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION. CONSTRUCT LANDINGS FOR MEDIAN ISLANDS A MINIMUM OF 5'x5' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
13. TO USE A MEDIAN ISLAND AS A PEDESTRIAN REFUGE AREA, MEDIAN ISLANDS WILL BE A MINIMUM OF 6' WIDE. CONSTRUCT MEDIAN ISLANDS TO PROVIDE PASSAGE OVER OR THROUGHT THE ISLAND.
14. SMALL CHANNELIZATION ISLANDS THAT CAN NOT PROVIDE A 5'X5' LANDING AT THE TOP OF A RAMPS, WILL BE CUT THROUGH LEVEL WITH THE SURFACE STREET.
15. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP. THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE OR THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.
16. PLACE A ½" EXPANSION JOINT WHERE THE CONCRETE CURB RAMP JOINS THE CURB AS SHOWN IN ROADWAY STANDARD DRAWING 848.01
17. PLACE ALL PEDESTRIAN PUSH BUTTON ACTUATORS AND CROSSING SIGNALS AS SHOWN IN THE PLANS OR AS SHOWN IN THE MUTCD.
18. CURB RAMPS THROUGH MEDIAN ISLANDS, SINGLE RAMPS AT DUAL CROSSWALKS OR LIMITED R/W SITUATIONS, WILL BE HANDLED BY SPECIAL DETAILS. CONTACT THE CONTRACT STANDARDS AND DEVELOPMENT UNIT FOR THE DETAILS OR FOR A SPECIAL DESIGN.

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

CURB RAMPS

NOTES

SHEET 3 OF 3

848D05

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

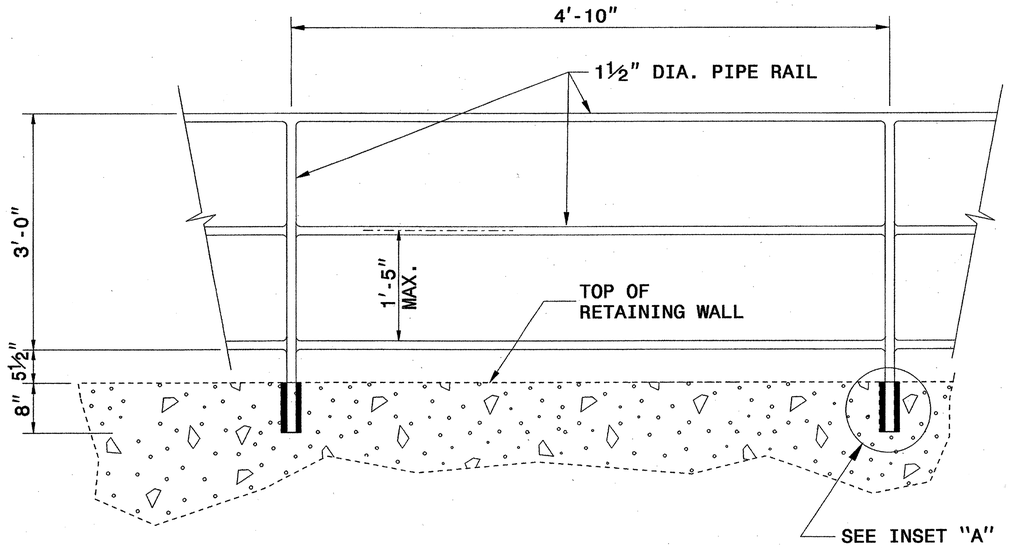
ORIGINAL BY: STD.NO.848.05 DATE: 4-22-10
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: SpecialDetails/English/STDS/848D05.dgn

NORTH CAROLINA PROFESSIONAL SEAL 02806 ENGINEER

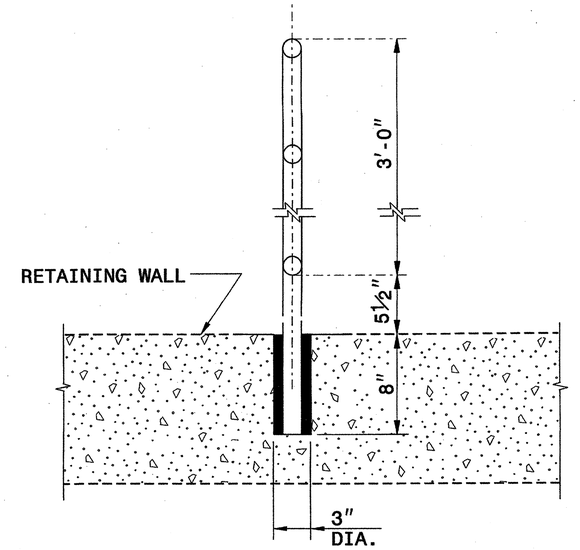
5/7/12

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	2-I

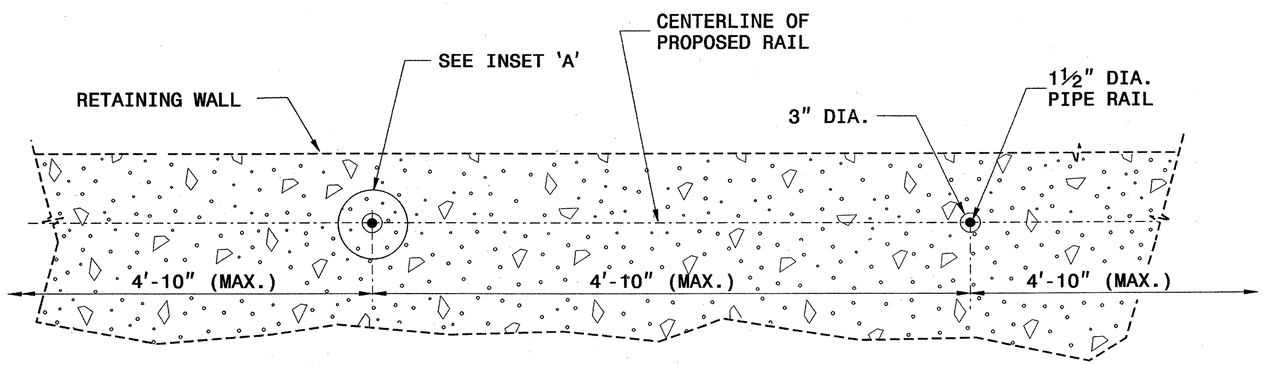
PROJECT REFERENCE NO.	SHEET NO.
R-5207B	2-J



ELEVATION OF PROPOSED PEDESTRIAN HANDRAIL



INSET 'A'



PLAN VIEW

NOTES:

CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1½" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.

REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.

PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.

WELD IN ACCORDANCE WITH ARTICLE 1072-20 OF THE STANDARD SPECIFICATIONS.

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL G. HOCKENBERRY
5/7/12

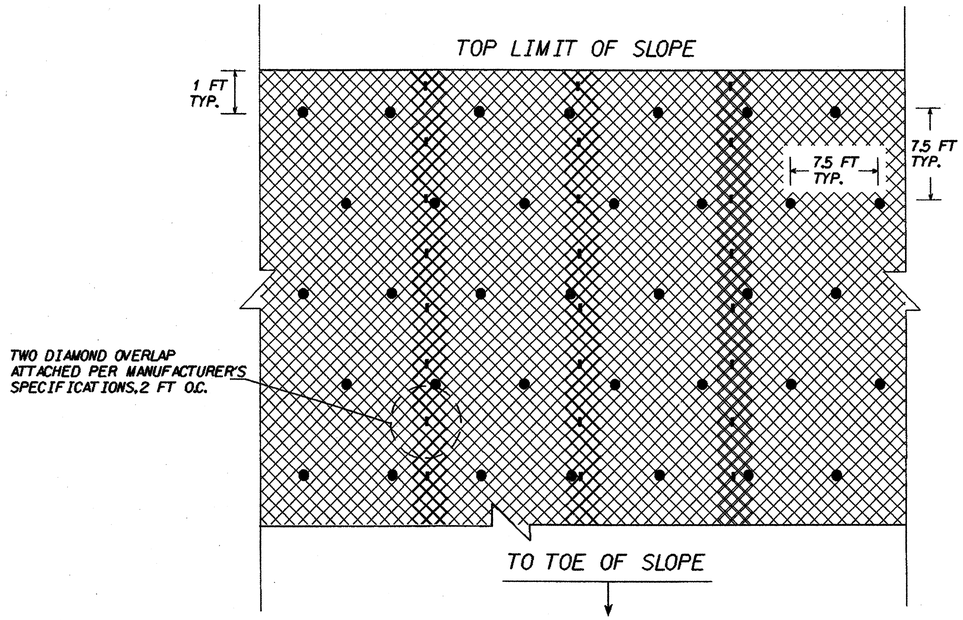
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

PROPOSED PEDESTRIAN SAFETY RAIL

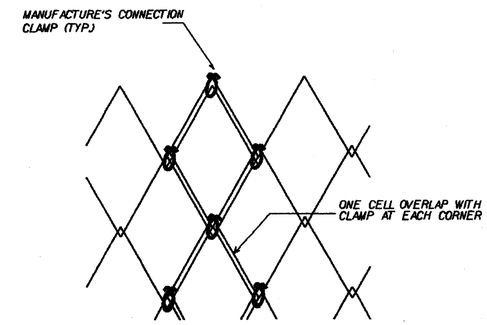
ORIGINAL BY:	E.E.WARD	DATE:	12-99
MODIFIED BY:	T.S.Snell	DATE:	1-4-05
CHECKED BY:	[signature]	DATE:	9/30/11
FILE SPEC.:	w:\details/stand/metric/0842d03.dgn		

30-SEP-2011 2:00
S:\Contracts\Contracts\Special Details\jhowerton\Handrail on Retaining Wall.dgn
$$$$USERNAME$$$$

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK — SCCLark — 4/20/12 (SIGNATURE, DATE)	(SIGNATURE, DATE)



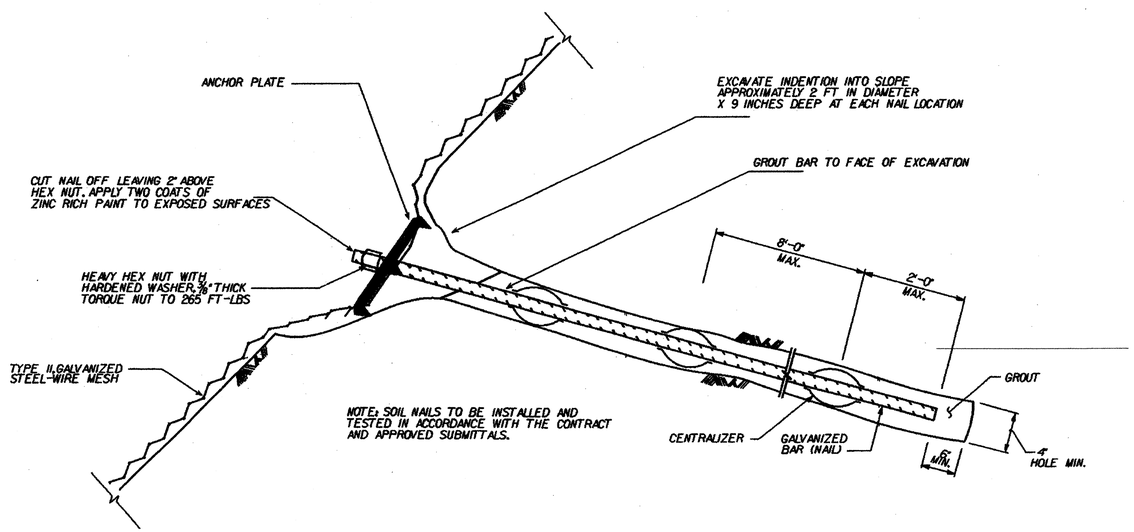
FACE DETAIL



MESH OVERLAP & CONNECTION DETAIL

NOTES:

1) WIRE MESH SHALL BE INSTALLED ON 1:1 (H:V) SOIL CUT SLOPES TALLER THAN 10 FT AS DIRECTED BY THE ENGINEER.
2) SOIL NAIL LENGTH = 20 FT (TYP)
3) DESIGN TEST LOAD (DTL) = 10 KIPS
4) INSTALL NAILS INTO SLOPE WITH AN INCLINATION OF 15 DEGREES (+/- 2) TO THE HORIZONTAL



TYPICAL SECTION

TOTAL BILL OF MATERIAL	
SOIL NAIL SLOPE STABILIZATION	2500 SQ. YDS.

PROJECT NO.: R-5207B
HENDERSON COUNTY
STATION: VARIES
SHEET 1 OF 1

GEOTECHNICAL ENGINEERING UNIT
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE
☐ CONTRACTS

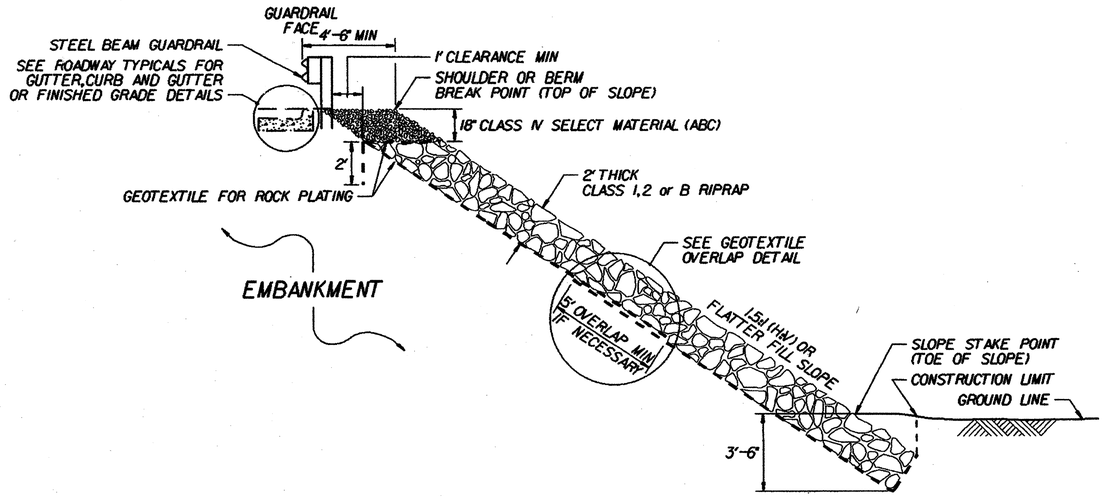
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOIL NAIL SLOPE STABILIZATION

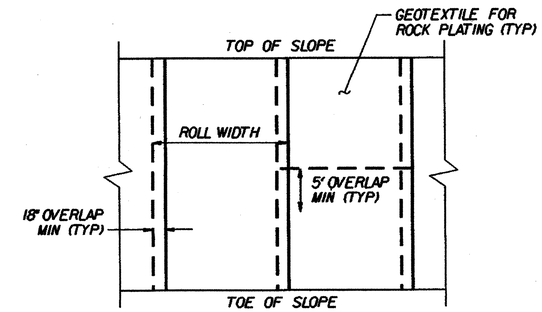
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	2-K
1			3			TOTAL SHEETS
2			4			

PREPARED BY: JTW	DATE: 4/18/12
REVIEWED BY: SCC	DATE: 4/20/12

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK	
SCC 4/20/12 (SIGNATURE / DATE)	(SIGNATURE / DATE)



ROCK PLATING DETAIL NO. 2 – TYPICAL SECTION



GEOTEXTILE OVERLAP DETAIL
(PLAN VIEW)

USE ROCK PLATING DETAIL NO. 2 WHERE FILL SLOPES ARE STEEPER THAN 2:1 AND GREATER THAN 10 FT IN HEIGHT.

EXTEND ROCK PLATING LIMITS TO 2:1 SLOPES, AS DIRECTED.

TOTAL BILL OF MATERIAL	
ROCK PLATING	1500 SQ. YDS.

PROJECT NO.: R-5207B
HENDERSON *COUNTY*
STATION: VARIES
SHEET 1 OF 1

GEOTECHNICAL ENGINEERING UNIT
☐ *EASTERN REGIONAL OFFICE*
☒ *WESTERN REGIONAL OFFICE*
☐ *CONTRACTS*

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

ROCK PLATING

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	2-L
1			3			TOTAL SHEETS
2			4			

PREPARED BY: JTW	DATE: 4/18/12
REVIEWED BY: SCC	DATE: 4/20/12

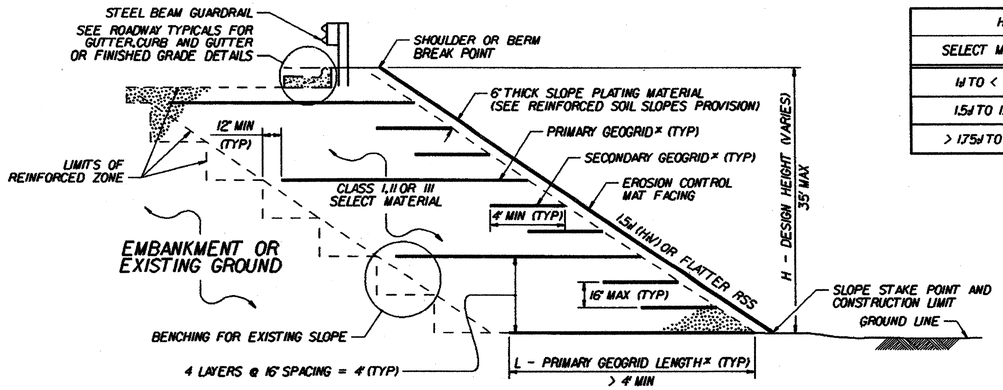
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK

SIGNATURE DATE 4/20/12

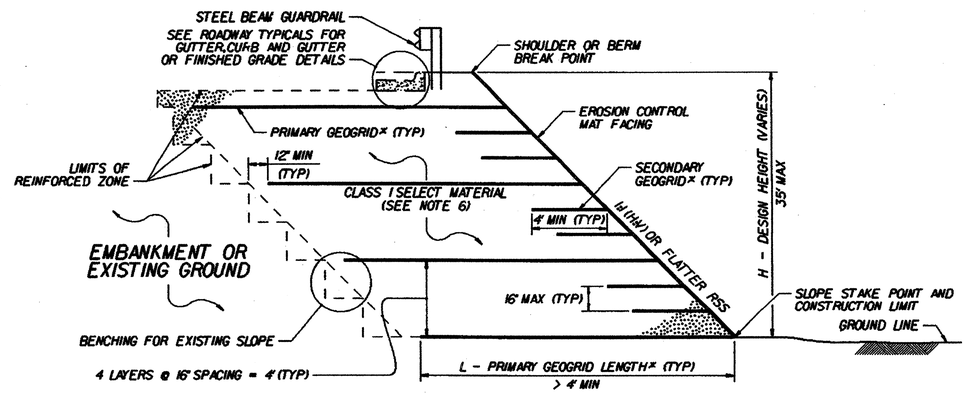
ENGINEER

SIGNATURE DATE



STANDARD RSS WITH SELECT MATERIAL THAT DOES NOT MEET ARTICLE 560-2 OF THE STANDARD SPECIFICATIONS

***SEE TABLES AND GEOGRID LAYOUT DETAILS.**



STANDARD RSS WITH SELECT MATERIAL THAT MEETS ARTICLE 560-2 OF THE STANDARD SPECIFICATIONS

***SEE TABLES AND GEOGRID LAYOUT DETAILS.**

H (FT)	0 - < 10		10 - 20		> 20 - 35	
SELECT MATERIAL CLASS	I	II OR III	I	II OR III	I	II OR III
1:1 TO < 1.5:1 (H:V) RSS	1.20	SEE NOTE 6	1.10	SEE NOTE 6	1.00	SEE NOTE 6
1.5:1 TO 1.75:1 (H:V) RSS	1.15	1.00	1.05	0.95	0.95	0.90
> 1.75:1 TO < 2:1 (H:V) RSS	1.10	0.75	1.00	0.70	0.90	0.65

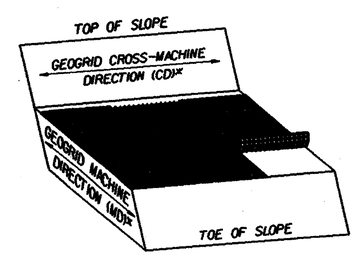
L/H RATIO (L > 4' MIN)

IF L ≤ 4', USE SECONDARY GEOGRID INSTEAD OF PRIMARY GEOGRID.

H (FT)		0 - < 10		10 - 20		> 20 - 35	
SELECT MATERIAL CLASS		I	II OR III	I	II OR III	I	II OR III
PRIMARY GEOGRID *SUBSTITUTE SECONDARY GEOGRID FOR PRIMARY GEOGRID FOR > 2:1 (H:V) RSS)	1:1 TO < 1.5:1 (H:V) RSS	2XT	SEE NOTE 6	3XT	SEE NOTE 6	5XT	SEE NOTE 6
		SG150		SG200		SG350	
		SF20		SF35		SF55	
		UX1100HS		UX1400HS		UX1500HS	
	1.5:1 TO 1.75:1 (H:V) RSS	2XT	2XT	3XT	2XT	3XT	2XT
		SG150	SG150	SG200	SG150	SG200	SG150
		SF20	SF20	SF35	SF20	SF35	SF20
		UX1100HS	UX1100HS	UX1400HS	UX1100HS	UX1400HS	UX1100HS
	> 1.75:1 TO < 2:1 (H:V) RSS	2XT	2XT	2XT	2XT	2XT	2XT
		SG150	SG150	SG150	SG150	SG150	SG150
		SF20	SF20	SF20	SF20	SF20	SF20
		UX1100HS	UX1100HS	UX1100HS	UX1100HS	UX1100HS	UX1100HS
SECONDARY GEOGRID	1:1 (H:V) OR FLATTER RSS	2XT					
		SG150					
		SF11					
		BX1100					

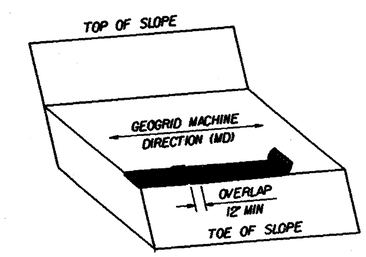
PRIMARY AND SECONDARY GEOGRIDS

#XT REFERS TO MIRAFI SERIES GEOGRID.
SG#### REFERS TO STRATAGRID SERIES GEOGRID.
SF## REFERS TO SYNTEEN SERIES GEOGRID.
UX####HS AND BX#### REFER TO TENSAR SERIES GEOGRID.



PRIMARY GEOGRID LAYOUT

***SEE NOTES 7 AND 8.**



SECONDARY GEOGRID LAYOUT

GEOGRID LAYOUT DETAILS

NOTES:

1. SEE ROADWAY PLANS FOR REINFORCED SOIL SLOPE (RSS) LOCATIONS.
2. FOR STANDARD REINFORCED SOIL SLOPES, SEE REINFORCED SOIL SLOPES PROVISION. FOR EROSION CONTROL MAT FACING, SEE PERMANENT SOIL REINFORCEMENT MAT PROVISION.
3. STANDARD RSS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 PSF
4. DO NOT USE STANDARD RSS IF THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE EXISTING GROUND OR TOE OF SLOPE.
5. DO NOT USE STANDARD RSS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW RSS.
6. FOR 1:1 TO < 1.5:1 (H:V) RSS, USE CLASS I SELECT MATERIAL IN THE REINFORCED ZONE THAT MEETS ARTICLE 560-2 OF THE STANDARD SPECIFICATIONS EXCEPT FOR SELECT MATERIAL THAT MEETS AASHTO M 145 FOR SOIL CLASSIFICATIONS A-4 AND A-5. DO NOT USE A-4 OR A-5 SOIL OR CLASS II OR III SELECT MATERIAL FOR 1:1 TO < 1.5:1 (H:V) RSS.
7. EXCEPT FOR TENSAR UX GEOGRIDS, DO NOT SPLICE OR OVERLAP PRIMARY GEOGRIDS IN THE MACHINE DIRECTION (MD) SO THAT SPLICES OR OVERLAPS ARE PARALLEL TO THE TOE OF SLOPE. TENSAR UX GEOGRIDS MAY BE SPLICED ONCE PER PRIMARY GEOGRID LENGTH IN ACCORDANCE WITH TENSAR'S RECOMMENDED CONNECTION DETAIL. A LENGTH OF AT LEAST 4' IS REQUIRED FOR EACH TENSAR UX GEOGRID PIECE.
8. EXCEPT FOR TENSAR UX GEOGRIDS, PLACE PRIMARY GEOGRIDS SO THAT GEOGRIDS ARE ADJACENT TO EACH OTHER IN THE CROSS-MACHINE DIRECTION (CD). TENSAR UX GEOGRIDS MAY BE PLACED WITH A MAXIMUM SPACING BETWEEN GEOGRIDS OF 1.64' IN THE CD. STAGGER TENSAR UX GEOGRIDS SO THAT GEOGRIDS ARE CENTERED OVER GAPS IN THE PRIMARY GEOGRID LAYER BELOW.
9. DO NOT PLACE FIRST PRIMARY GEOGRID LAYER UNTIL EXCAVATION DIMENSIONS AND IN-SITU MATERIAL ARE APPROVED.

TOTAL BILL OF MATERIAL	
REINFORCED SOIL SLOPES (RSS)	2900 SQ. YDS.

PREPARED BY: JTW	DATE: 4/18/12
REVIEWED BY: SCC	DATE: 4/20/12

PROJECT NO.: R-5207B

HENDERSON COUNTY

STATION: VARIES

SHEET 1 OF 1

GEOTECHNICAL ENGINEERING UNIT

☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE
☐ CONTRACTS

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

REINFORCED SOIL SLOPE (RSS)

REVISIONS							
NO.	BY	DATE	NO.	BY	DATE	SHEET NO. 2-M	
1			3			TOTAL SHEETS	
2			4				

PROJECT REFERENCE NO.	SHEET
R-5207B	2-N

GEOTECHNICAL ENGINEER

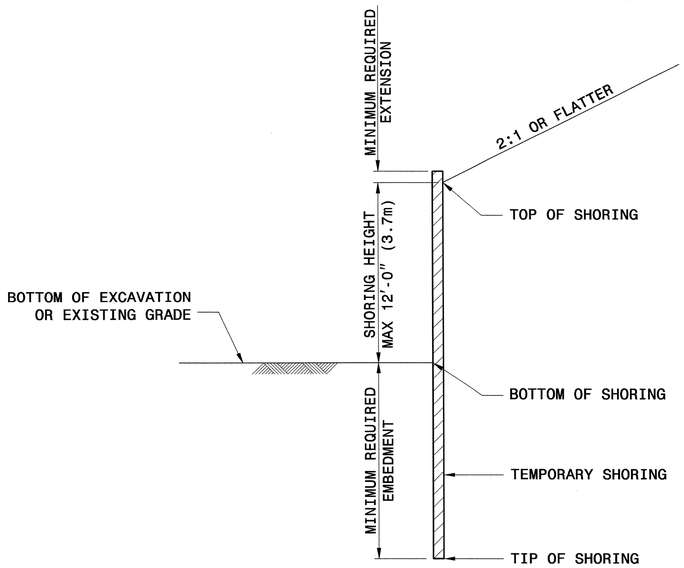
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 6/15/12

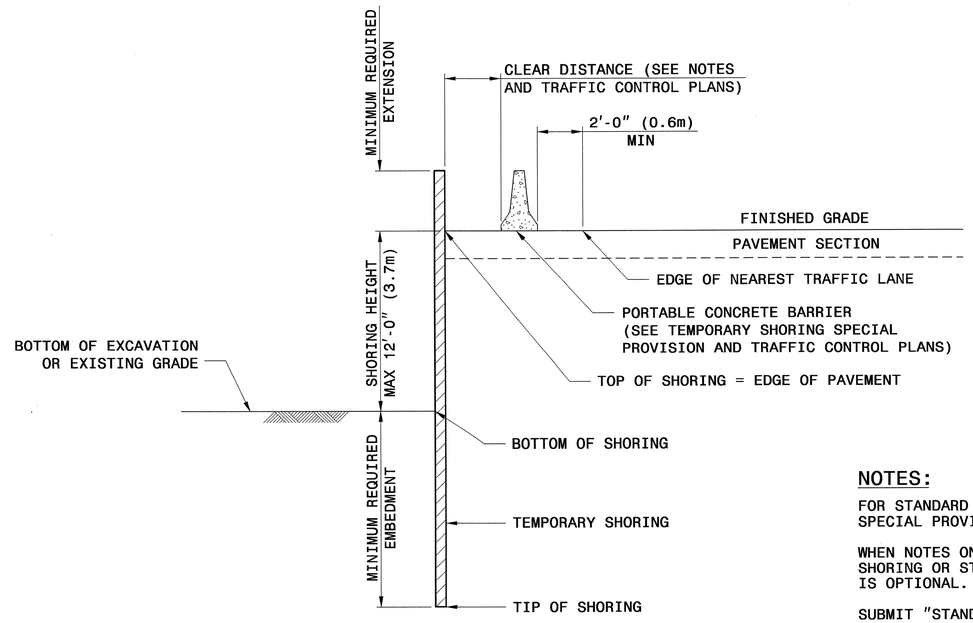
SIGNATURE DATE

ENGINEER

SIGNATURE DATE



SLOPE CASE



SURCHARGE CASE

GROUNDWATER CONDITION	SHORING HEIGHT FT (m)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H PILES WITH TIMBER LAGGING			SHEET PILES		H PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN^3/FT (cm^3/m)	MINIMUM REQUIRED EMBEDMENT FT (m)			MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN^3/FT (cm^3/m)	MINIMUM REQUIRED EMBEDMENT FT (m)		
				HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)			HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)
GROUNDWATER ELEVATION BELOW TIP OF SHORING	< 6 (1.8)	7.5 (2.3)	3.0 (161)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)	11.0 (3.4)	10.0 (538)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)
	7 (2.1)	8.5 (2.6)	4.5 (242)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)	12.0 (3.7)	12.0 (645)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)
	8 (2.4)	10.0 (3.0)	6.5 (349)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)	12.5 (3.8)	14.0 (753)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)
	9 (2.7)	11.0 (3.4)	9.5 (511)	--	12.0 (3.7)	12.0 (3.7)	13.5 (4.1)	16.5 (887)	--	12.5 (3.8)	12.5 (3.8)
	10 (3.0)	12.5 (3.8)	13.0 (699)	--	--	13.5 (4.1)	14.0 (4.3)	19.5 (1048)	--	13.5 (4.1)	13.5 (4.1)
	11 (3.4)	13.5 (4.1)	17.0 (914)	--	--	14.5 (4.4)	15.0 (4.6)	22.5 (1210)	--	--	14.5 (4.4)
	12 (3.7)	15.0 (4.6)	21.5 (1156)	--	--	16.0 (4.9)	16.0 (4.9)	25.5 (1371)	--	--	15.5 (4.7)
GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND TIP OF SHORING	< 6 (1.8)	11.5 (3.5)	4.5 (242)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)	16.0 (4.9)	12.0 (645)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)
	7 (2.1)	13.0 (4.0)	7.0 (376)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)	17.0 (5.2)	14.5 (780)	14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
	8 (2.4)	15.0 (4.6)	10.0 (538)	--	15.0 (4.6)	15.0 (4.6)	18.0 (5.5)	17.0 (914)	--	15.5 (4.7)	15.5 (4.7)
	9 (2.7)	17.0 (5.2)	14.0 (753)	--	17.0 (5.2)	17.0 (5.2)	19.0 (5.8)	20.0 (1075)	--	17.0 (5.2)	17.0 (5.2)
	10 (3.0)	18.5 (5.6)	19.5 (1048)	--	--	18.5 (5.6)	20.0 (6.1)	23.5 (1263)	--	--	18.5 (5.6)
	11 (3.4)	20.5 (6.3)	26.0 (1398)	--	--	--	21.0 (6.4)	28.0 (1505)	--	--	20.0 (6.1)
	12 (3.7)	22.5 (6.9)	33.0 (1774)	--	--	--	22.0 (6.7)	33.0 (1774)	--	--	21.5 (6.6)

NOTE: MINIMUM REQUIRED EXTENSION IS 6" (150mm) FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" (800 mm) FOR "SURCHARGE CASE WITH TRAFFFIC IMPACT".

NOTES:

FOR STANDARD TEMPORARY SHORING, SEE TEMPORARY SHORING SPECIAL PROVISION.

WHEN NOTES ON PLANS DO NOT PROHIBIT STANDARD TEMPORARY SHORING OR STANDARD SHORING, STANDARD TEMPORARY SHORING IS OPTIONAL.

SUBMIT "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 14 DAYS BEFORE BEGINNING SHORING CONSTRUCTION. UP TO THREE LOCATIONS MAY BE INCLUDED ON EACH SELECTION FORM.

STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING CONDITIONS:
1) MAXIMUM SHORING HEIGHT IS 12'-0" (3.7m).
2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
3) BOTTOM OF EXCAVATION OR EXISTING GRADE IN FRONT OF SHORING IS 6:1 (H:V) SLOPE OR FLATTER.
4) H PILE SPACING IS 6'-0" (1.8m).
5) H PILE EMBEDMENT DEPTHS ARE FOR DRIVEN PILES.
6) TIMBER LAGGING IS A MINIMUM OF 3" (75mm) THICK.

STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
TOTAL UNIT WEIGHT = 120 PCF (18.8 KN/M^3)
FRICTION ANGLE = 30 DEGREES
COHESION = 0 PSF (0 KPA)
GROUNDWATER IS ASSUMED TO BE BELOW BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT WITHIN THE EMBEDMENT DEPTH.

VERIFY GROUNDWATER ELEVATION BEFORE BEGINNING SHORING CONSTRUCTION.

IF THE CLEAR DISTANCE AVAILABLE IS LESS THAN THE MINIMUM REQUIRED IN ACCORDANCE WITH THE TRAFFIC CONTROL PLANS, SET THE BARRIER AGAINST THE TRAFFIC SIDE OF THE SHORING AND USE THE "SURCHARGE CASE WITH TRAFFIC IMPACT".

AT THE CONTRACTOR'S OPTION, H PILE EMBEDMENT DEPTHS FOR PILES SET IN DRILLED HOLES MAY BE REDUCED BY 25%. FOR PILE EXCAVATION, SEE TEMPORARY SHORING SPECIAL PROVISION.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF THE SHORING. COLLECT AND DIRECT RUNOFF AWAY FROM SHORING.

CONTACT THE ENGINEER IF MINIMUM REQUIRED EMBEDMENT IS NOT ACHIEVED.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 2-20-07

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202743

SUMMARY OF QUANTITIES - R-5207B

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
0001000000-E	200	Lump Sum		CLEARING & GRUBBING .. ACRE(S)
0008000000-E	200	1	ACR	SUPPLEMENTARY CLEARING & GRUB-BING
0015000000-N	205	2	EA	SEALING ABANDONED WELLS
0022000000-E	225	48,000	CY	UNCLASSIFIED EXCAVATION
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (243+80.50)
0036000000-E	225	325	CY	UNDERCUT EXCAVATION
0038000000-E	SP	140	CY	SHALLOW UNDERCUT
0080000000-E	SP	250	TON	CLASS IV SUBGRADE STABILIZA-TION
0134000000-E	240	390	CY	DRAINAGE DITCH EXCAVATION
0156000000-E	250	16,020	SY	REMOVAL OF EXISTING ASPHALT PAVEMENT
0195000000-E	SP	610	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	200	SY	FABRIC FOR SOIL STABILIZATION
0199000000-E	SP	375	SF	TEMPORARY SHORING
0223000000-E	SP	1,500	SY	ROCK PLATING
0241000000-E	SP	2,900	SY	GENERIC GRADING ITEM REINFORCED SOIL SLOPES
0241000000-E	SP	2,500	SY	GENERIC GRADING ITEM SOIL NAIL SLOPE STABILIZATION
0262000000-N	SP	15	EA	GENERIC GRADING ITEM SOIL NAIL PROOF TESTS
0262000000-N	SP	4	EA	GENERIC GRADING ITEM SOIL NAIL VERIFICATION TESTS
0262000000-N	SP	25	EA	GENERIC GRADING ITEM SUPPLEMENTAL SOIL NAILS
0318000000-E	SP	1,530	TON	FOUNDATION CONDITIONING MATE-RIAL, MINOR STRS
0320000000-E	SP	3,430	SY	FOUNDATION CONDITIONING FABRIC
0335000000-E	SP	96	LF	**" DRAINAGE PIPE (2")
0335100000-E	SP	40	LF	12" DRAINAGE PIPE
0335200000-E	SP	2,112	LF	15" DRAINAGE PIPE
0335300000-E	SP	808	LF	18" DRAINAGE PIPE
0335400000-E	SP	56	LF	24" DRAINAGE PIPE
0335850000-E	SP	2	EA	**" DRAINAGE PIPE ELBOWS (15")
0378000000-E	SP	140	LF	24" RC PIPE CULVERTS, CLASS III
0448200000-E	SP	628	LF	15" RC PIPE CULVERTS, CLASS IV
0448300000-E	SP	716	LF	18" RC PIPE CULVERTS, CLASS IV
0448400000-E	SP	316	LF	24" RC PIPE CULVERTS, CLASS IV
0576000000-E	SP	144	LF	**" CS PIPE CULVERTS, *****" THICK (30", 0.138")
0576000000-E	SP	184	LF	**" CS PIPE CULVERTS, *****" THICK (42", 0.109")
0576000000-E	SP	88	LF	**" CS PIPE CULVERTS, *****" THICK (48", 0.109")
0576000000-E	SP	64	LF	**" CS PIPE CULVERTS, *****" THICK (60", 0.138")
0582000000-E	SP	212	LF	15" CS PIPE CULVERTS, 0.064" THICK
0588000000-E	SP	1,380	LF	18" CS PIPE CULVERTS, 0.064" THICK
0594000000-E	SP	252	LF	24" CS PIPE CULVERTS, 0.064" THICK
0600000000-E	SP	168	LF	30" CS PIPE CULVERTS, 0.079" THICK
0636000000-E	SP	2	EA	**" CS PIPE ELBOWS, *****" THICK (15", 0.064")
0995000000-E	340	5,172	LF	PIPE REMOVAL
1011000000-N	500	Lump Sum		FINE GRADING
1121000000-E	520	6,900	TON	AGGREGATE BASE COURSE
1220000000-E	545	10,000	TON	INCIDENTAL STONE BASE
1231000000-E	560	4,000	CY	SHOULDER BORROW
1297000000-E	607	2,380	SY	MILLING ASPHALT PAVEMENT, ***" DEPTH (2")
1489000000-E	610	16,500	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-E	610	18,700	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-E	610	12,000	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1575000000-E	SP	2,240	TON	ASPHALT BINDER FOR PLANT MIX
1693000000-E	654	400	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
1840000000-E	665	17,800	LF	MILLED RUMBLE STRIPS (ASPHALT CEMENT CONCRETE)
2022000000-E	SP	67.2	CY	SUBDRAIN EXCAVATION
2033000000-E	SP	50.4	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	SP	300	LF	6" PERFORATED SUBDRAIN PIPE
2070000000-N	SP	1	EA	SUBDRAIN PIPE OUTLETS
2077000000-E	SP	6	LF	6" OUTLET PIPE (SUBDRAINS)
2209000000-E	838	18.7	CY	ENDWALLS
2220000000-E	838	5.6	CY	REINFORCED ENDWALLS
2286000000-N	840	37	EA	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	11.81	LF	MASONRY DRAINAGE STRUCTURES
2352000000-N	840	9	EA	FRAME WITH GRATE, STD 840.**** (840.16)
2366000000-N	840	9	EA	FRAME WITH TWO GRATES, STD 840.24
2367000000-N	840	5	EA	FRAME WITH TWO GRATES, STD 840.29
2374000000-N	840	3	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)
2374000000-N	840	1	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)
2374000000-N	840	3	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)
2396000000-N	840	6	EA	FRAME WITH COVER, STD 840.54
2535000000-E	846	190	LF	**"X **" CONCRETE CURB (8" X 12")
2542000000-E	846	800	LF	1'-6" CONCRETE CURB & GUTTER
2549000000-E	846	1,370	LF	2'-6" CONCRETE CURB & GUTTER
2556000000-E	846	603	LF	SHOULDER BERM GUTTER
2591000000-E	848	190	SY	4" CONCRETE SIDEWALK
2612000000-E	848	210	SY	6" CONCRETE DRIVEWAY
2619000000-E	850	90	SY	4" CONCRETE PAVED DITCH
2655000000-E	852	170	SY	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)
2724000000-E	857	300	LF	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED
2738000000-E	SP	220	SY	GENERIC PAVING ITEM 7" CONCRETE MONOLITHIC TRUCK APRON
2752000000-E	SP	300	LF	GENERIC PAVING ITEM PEDESTRIAN SAFETY RAIL
2759000000-N	SP	2	EA	GENERIC PAVING ITEM CONCRETE CURB RAMPS
2830000000-N	858	6	EA	ADJUSTMENT OF MANHOLES
2845000000-N	858	31	EA	ADJUSTMENT OF METER BOXES OR VALVE BOXES
3030000000-E	862	3,500	LF	STEEL BM GUARDRAIL
3045000000-E	862	400	LF	STEEL BM GUARDRAIL, SHOP CURVED
3150000000-N	862	40	EA	ADDITIONAL GUARDRAIL POSTS
3165000000-N	SP	1	EA	GUARDRAIL ANCHOR UNITS, TYPE ********** (350 TL-2)
3195000000-N	862	3	EA	GUARDRAIL ANCHOR UNITS, TYPE AT-1
3215000000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	26	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3317000000-N	862	2	EA	GUARDRAIL ANCHOR UNITS, TYPE B-77
3360000000-E	863	170	LF	REMOVE EXISTING GUARDRAIL
3628000000-E	876	150	TON	RIP RAP, CLASS I
3642000000-E	876	760	TON	RIP RAP, CLASS A
3649000000-E	876	730	TON	RIP RAP, CLASS B
3656000000-E	876	8,525	SY	FILTER FABRIC FOR DRAINAGE
4072000000-E	903	1,995	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4102000000-N	904	124	EA	SIGN ERECTION, TYPE E
4116100000-N	904	2	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (E)
4155000000-N	907	82	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
4400000000-E	1110	1,025	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	192	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	309	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4430000000-N	1130	240	EA	DRUMS
4435000000-N	1135	10	EA	CONES
4445000000-E	1145	168	LF	BARRICADES (TYPE III)
4450000000-N	1150	4,800	HR	FLAGGER
4465000000-N	1160	2	EA	TEMPORARY CRASH CUSHIONS
4650000000-N	1251	233	EA	TEMPORARY RAISED PAVEMENT MARKERS
4685000000-E	1205	50,372	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	49,247	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4697000000-E	1205	267	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS)
4700000000-E	1205	464	LF	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)
4702000000-E	1205	34	LF	THERMOPLASTIC PAVEMENT MARKING LINES (12", 120 MILS)
4710000000-E	1205	546	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
4721000000-E	1205	12	EA	THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS)
4725000000-E	1205	41	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4810000000-E	1205	62,666	LF	PAINT PAVEMENT MARKING LINES (4")
4825000000-E	1205	344	LF	PAINT PAVEMENT MARKING LINES (12")
4835000000-E	1205	370	LF	PAINT PAVEMENT MARKING LINES (24")
4845000000-N	1205	16	EA	PAINT PAVEMENT MARKING SYMBOL
4905000000-N	1253	640	EA	SNOWPLOWABLE PAVEMENT MARKERS
5325800000-E	1510	240	LF	8" WATER LINE
5326200000-E	1510	1,930	LF	12" WATER LINE
5546000000-E	1515	4	EA	8" VALVE
5558000000-E	1515	16	EA	12" VALVE
5648000000-N	1515	15	EA	RELOCATE WATER METER
5672000000-N	1515	14	EA	RELOCATE FIRE HYDRANT
5691200000-E	1520	75	LF	6" SANITARY GRAVITY SEWER
5691300000-E	1520	631	LF	8" SANITARY GRAVITY SEWER
5775000000-E	1525	7	EA	4' DIA UTILITY MANHOLE
5781000000-E	1525	10.3	LF	UTILITY MANHOLE WALL, 4' DIA
5800000000-E	1530	75	LF	ABANDON 6" UTILITY PIPE
5801000000-E	1530	1,128	LF	ABANDON 8" UTILITY PIPE
5804000000-E	1530	620	LF	ABANDON 12" UTILITY PIPE
5816000000-N	1530	1	EA	ABANDON UTILITY MANHOLE
5828000000-N	1530	7	EA	REMOVE UTILITY MANHOLE
5835700000-E	1540	30	LF	16" ENCASEMENT PIPE
5871900000-E	1550	15	LF	TRENCHLESS INSTALLATION OF 16" IN SOIL

SUMMARY OF QUANTITIES - R-5207B

ItemNumber	Sec #	Quantity	Unit	Description
5871910000-E	1550	15	LF	TRENCHLESS INSTALLATION OF 16" NOT IN SOIL
6000000000-E	1605	25,125	LF	TEMPORARY SILT FENCE
6006000000-E	1610	1,680	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	4,955	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	1,280	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	31	ACR	TEMPORARY MULCHING
6018000000-E	1620	750	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	3	TON	FERTILIZER FOR TEMPORARY SEED-ING
6024000000-E	1622	585	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	12	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	1,500	LF	SAFETY FENCE
6030000000-E	1630	4,880	CY	SILT EXCAVATION
6036000000-E	1631	6,675	SY	MATTING FOR EROSION CONTROL
6037000000-E	SP	660	SY	COIR FIBER MAT
6038000000-E	SP	600	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	1,680	LF	1/4" HARDWARE CLOTH
6045000000-E	SP	35	LF	**" TEMPORARY PIPE (18")
6069000000-E	1638	14	CY	STILLING BASINS
6071020000-E	SP	285	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	455	LF	COIR FIBER BAFFLE
6084000000-E	1660	21	ACR	SEEDING & MULCHING
6087000000-E	1660	21	ACR	MOWING
6090000000-E	1661	350	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	1	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	500	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	15	TON	FERTILIZER TOPDRESSING
6111000000-E	SP	50	LF	IMPERVIOUS DIKE
6114500000-N	SP	25	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	100	EA	RESPONSE FOR EROSION CONTROL
6120000000-E	SP	363	CY	CULVERT DIVERSION CHANNEL
7000000000-E	1705	4	EA	PEDESTRIAN SIGNAL HEAD (**", ** SECTION) (16", 1 SECTION W/ COUNTDOWN)
7060000000-E	1705	2,090	LF	SIGNAL CABLE
7120000000-E	1705	19	EA	VEHICLE SIGNAL HEAD (12", 3 SECTION)
7132000000-E	1705	8	EA	VEHICLE SIGNAL HEAD (12", 4 SECTION)
7144000000-E	1705	3	EA	VEHICLE SIGNAL HEAD (12", 5 SECTION)
7264000000-E	1710	1,130	LF	MESSENGER CABLE (3/8")
7300000000-E	1715	1,160	LF	UNPAVED TRENCHING (**********) (1, 2")
7324000000-N	1716	13	EA	JUNCTION BOX (STANDARD SIZE)
7360000000-N	1720	4	EA	WOOD POLE
7372000000-N	1721	8	EA	GUY ASSEMBLY
7408000000-E	1722	1	EA	1" RISER WITH WEATHERHEAD
7420000000-E	1722	4	EA	2" RISER WITH WEATHERHEAD
7444000000-E	1725	2,750	LF	INDUCTIVE LOOP SAWCUT
7456000000-E	1726	6,410	LF	LEAD-IN CABLE (**********) (14-2)
7576000000-N	SP	4	EA	METAL STRAIN SIGNAL POLE
7613000000-N	SP	4	EA	SOIL TEST
7614100000-E	SP	60	CY	DRILLED PIER FOUNDATION
7624000000-N	1743	1	EA	SIGNAL PEDESTAL WITH FOUNDA-TION
7636000000-N	1745	2	EA	SIGN FOR SIGNALS
7684000000-N	1750	2	EA	SIGNAL CABINET FOUNDATION
7756000000-N	1751	2	EA	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)
7780000000-N	1751	13	EA	DETECTOR CARD (TYPE 2070L)
7901000000-N	1753	2	EA	CABINET BASE EXTENDER
7948000000-N	SP	1	EA	TRAFFIC SIGNAL REMOVAL

COMPUTED BY: JLT DATE: April 20, 2012
CHECKED BY: SGM DATE: April 20, 2012

PROJECT NO.	SHEET NO.
R-5207B	3-A

CRAIG

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

Station	Station	Uncl. Excav.	Embank. +%	Borrow	Waste
-L- Sta. 180+38.32	-L- Sta. 194+11.25	1,070	452	0	618
-L- Sta. 194+89.25	-L- Sta. 210+50.00	1,160	302	0	858
-Y10- Sta. 10+12.00	-Y10- Sta. 11+55.00	24	82	58	0
-Y11- Sta. 10+12.01	-Y11- Sta. 12+25.00	4	209	205	0
-Y12- Sta. 10+12.17	-Y12- Sta. 10+85.00	10	2	0	8
-Y13- Sta. 11+00.00	-Y13- Sta. 12+31.66	147	0	0	147
-Y13- Sta. 13+09.66	-Y13- Sta. 15+40.00	21	496	475	0
SUBTOTALS #1:		2,436	1,543	738	1,630
-L- Sta. 210+50.00	-L- Sta. 224+53.35	1,251	307	0	944
-L- Sta. 224+50.00	-L- Sta. 240+50.00	3,446	553	0	2,893
-DRIVE2- Sta. 10+00.00	-DRIVE2- Sta. 11+26.10	12	1	0	11
-DRIVE3- Sta. 10+40.00	-DRIVE3- Sta. 11+33.75	15	1	0	14
-Y14- Sta. 10+12.00	-Y14- Sta. 11+30.00	8	152	144	0
-Y15- Sta. 10+70.00	-Y15- Sta. 12+56.38	17	3	0	14
-Y15A- Sta. 10+12.07	-Y15A- Sta. 12+00.00	720	0	0	720
SUBTOTALS #2:		5,469	1,018	144	4,595
-L- Sta. 240+50.00	-L- Sta. 242+52.60	335	320	0	15
-L- Sta. 242+56.74	-L- Sta. 243+51.83	220	238	18	0
-L- Sta. 244+09.17	-L- Sta. 270+50.00	8,437	803	0	7,634
-Y16- Sta. 11+20.00	-Y16- Sta. 12+54.81	360	25	0	335
-Y17- Sta. 10+00.00	-Y17- Sta. 12+52.11	456	36	0	420
SUBTOTALS #3:		9,808	1,421	18	8,405
-L- Sta. 270+50.00	-L- Sta. 278+64.86	743	505	0	238
-L- Sta. 279+17.23	-L- Sta. 300+50.00	19,030	23,990	4,960	0
-Y17A- Sta. 10+04.77	-Y17A- Sta. 11+95.00	1,437	254	0	1,183
-Y18- Sta. 10+12.00	-Y18- Sta. 16+00.00	97	1,227	1,130	0
SUBTOTALS #4:		21,307	25,976	6,090	1,421
-L- Sta.300+50.00	-L- Sta. 330+50.00	5,270	3,717	0	1,553
-Y19- Sta. 10+12.00	-Y19- Sta. 12+50.00	10	1,262	1,252	0
-Y20- Sta. 11+50.00	-Y20- Sta. 12+45.93	6	13	7	0
-DRIVE4- Sta. 10+50.00	-DRIVE4- Sta. 12+11.11	363	0	0	363
-Y21- Sta. 11+30.00	-Y21- Sta. 12+54.59	19	12	0	8
SUBTOTALS #5:		5,668	5,003	1,258	1,924
-L- Sta. 330+50.00	-L- Sta. 360+50.00	1,699	1,610	0	89
-DRIVE4A- Sta. 10+18.00	-DRIVE4A- Sta. 11+30.00	0	334	334	0
-Y22- Sta. 10+13.41	-Y22- Sta. 11+05.00	3	3	0	0
-DRIVE5- Sta. 10+12.02	-DRIVE5- Sta. 11+10.00	5	13	8	0
SUBTOTALS #6:		1,707	1,960	342	89
-L- Sta. 360+50.00	-L- Sta. 376+40.00	1,346	1,643	297	0
-Y23- Sta. 10+50.00	-Y23- Sta. 12+31.04	352	99	0	253
SUBTOTALS #7:		1,698	1,742	297	253
TOTALS:		48,093	38,663	0	18,317
Waste in Lieu of Borrow				-8,887	-8,887
Loss Due to Clearing and Grubbing		-2,000			2,000
PROJECT TOTALS:		46,093	38,663	0	7,430
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT					
GRAND TOTALS:		46,093	38,663	0	7,430
SAY:		**48,000**		**0**	

Note: Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

EST. DDE = 390 CUBIC YARDS
SHOULDER BORROW = 4,000 CUBIC YARDS
EST. UNDERCUT EXCAVATION = 325 CUBIC YARDS
TOTAL SHALLOW UNDER CUT = 140 CUBIC YARDS
CLASS IV SUBGRADE STABILIZATION = 250 TONS

SUMMARY OF EXISTING ASPHALT PAVEMENT REMOVAL

LINE	Station	Station	LOC LT/RT/CL	YD^2
-Y10-	10+09	10+75	LT/RT	130.11
-L-	193+90	195+33	LT/RT	709.89
-Y13-	13+11	14+42	LT	279.67
-Y13-	14+64	15+13	LT	11.22
-L-	206+75	208+25	LT/RT	336.22
-L-	211+99	215+58	LT	208.44
-L-	218+61	220+26	RT	23.00
-L-	221+06	223+27	LT	46.33
-Y14-	10+10	11+15	LT	263.56
-L-	235+31	237+09	RT	332.33
-L-	235+77	241+03	LT	485.22
-L-	241+27	246+90	LT/RT	1,129.33
-Y17-	13+03	13+39	RT	95.44
-Y17-	12+82	13+11	LT	39.78
-L-	264+50	269+64	RT	1,016.00
-L-	270+38	274+63	LT	1,146.22
-L-	274+66	277+58	LT	1,064.22
-L-	281+04	283+29	RT	169.78
-L-	283+52	285+37	LT	199.33
-L-	285+79	287+07	RT	55.44
-Y18-	10+12	12+58	LT	595.56
-L-	289+48	294+42	LT	1,648.11
-L-	294+44	302+75	RT	1,909.44
-Y19-/-L-	11+52	317+75	LT/RT	1,603.11
-L-	320+06	323+75	LT	699.33
-L-	353+25	355+25	LT/RT	418.78
-Y23-	10+77	12+43	LT	627.78
-L-	372+25	374+75	LT/RT	529.22
-Y11-	10+11	11+25	LT/RT	239.33
			TOTAL:	16,012.22
			SAY:	**16,020**

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.

GUARDRAIL SUMMARY

LINE	BEG. STA.	END STA.	LOC.	LENGTH STRAIGHT	LENGTH SHOP CURVED	LENGTH DOUBLE FACED	WARRANT POINT APPR. END	WARRANT POINT TRAIL. END	"N" DIST FROM E.O.L.	TOTAL SHLDR WIDTH	FLARE LENGTH APPR. END	FLARE LENGTH TRAIL. END	W APPR. END	W TRAIL. END	ANCHORS GRAU 350	ANCHORS GRAU350 TL-2	ANCHORS AT-1	ANCHORS B-77	ANCHORS TYPE III			IMP. ATTEN. TYPE 350 EA	IMP. ATTEN. TYPE 350 G	IMP. ATTEN. TYPE 350 NG	REMOVE EXISTING GRDRAIL	REMARKS
-L-	215+37.50	219+25.00	LT	387.50			218+50	215+50	8'	11'	50'	50'	1'	1'	2											
-L-	231+25.00	233+25.00	LT	200.00			232+00	232+50	8'	11'	50'	50'	1'	1'	2											
-L-	240+54.25	243+48.00	LT	293.75				241+30	6.42'	11'		50'		1'	1				1							
-L-	242+24.75	243+56.00	RT	131.25			BRIDGE		6.42'	11'	50'		1'		1				1							
-L-/-Y16-	244+03.80	11+70.00	LT/RT	18.75	68.75		BRIDGE		6.42'								1		1							
-L-	244+14.80	244+96.05	RT	81.25				BRIDGE	6.42'	10.67'		62.5'		1.25'	1				1							
-L-	269+00.00	271+75.00	RT	275.00			269+50	271+00	8'	11'	50'	50'	1'	1'	2										167	
-L-	279+34.25	279+78.00	LT	43.75			279+34.25		6'	9.5'	25'		0.5'			1		1								ATTACH TO CONCRETE JERSEY BARRIER
-L-	287+00.00	287+68.75	LT	68.75			287+00		6'	10'	50'		1'		1			1								ATTACH TO CONCRETE JERSEY BARRIER
-L-/-Y18-	286+75.00	10+84.00	RT/RT	150.00	93.75		287+50		8'	11'	50'		1'		1		1									
-Y18-/-L-	10+88.00	294+75.00	LT/RT	512.50	93.75			294+00	8'	11'		50'		1'	1		1									
-L-	289+75.00	293+75.00	LT	400.00			293+00	290+50	8'	11'	50'	50'	1'	1'	2											
-L-	302+75.00	306+75.00	LT	400.00			306+00	303+50	8'	11'	50'	50'	1'	1'	2											
-L-/-Y19-	310+25.00	11+75.00	RT/RT	175.00	75.00		311+00	-Y19- 11+00	8'	11'	50'	50'	1'	1'	2											
-L-	314+25.00	317+75.00	RT	350.00			315+00	317+00	8'	11'	50'	50'	1'	1'	2											
-L-	330+12.50	332+62.50	RT	250.00			331+50	332+00	8'	11'	50'	50'	1'	1'	2											
-Y23-/-L-	11+50.00	375+37.50	LT/LT	700.00	50.00		374+16	369+00	8'	11'	50'	50'	1'	1'	2											
-L-	371+75.00	374+75.00	RT	300.00			372+50	374+00	8'	11'	50'	50'	1'	1'	2											
		SUB-TOTALS:		4,737.50	381.25										26	1	3	2	4						167	
	LESS ANCHOR DEDUCTIONS																									
	GRAU-350	26@50 ft		1,300.00																						
	GRAU-350 TL-2	1@25 ft		25.00																						
	TYPE AT-1	3@6.25 ft			18.75																					
	TYPE B-77	2@18.75 ft		37.50																						
	TYPE III	4@18.75 ft		75.00																						
	ANCHOR TOTALS			1,437.50	18.75																					
		GRAND TOTALS		3,300.00	362.50																				167	
		SAY		**3500**	**400**										**26**	**1**	**3**	**2**	**4**						**170**	

Additional Guardrail Posts = 40 Each

COMPUTED BY:	JLT	DATE:	7/13/2011
CHECKED BY:	SGM	DATE:	11/24/2011

PROJECT NO.	SHEET NO.
R-5207B	3-B

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

SANDRA

***ELEVATIONS ARE FOR INFORMATIONAL PURPOSES ONLY.**

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
-L- 182+46	RT	1							28										
-L- 184+01	RT	2							68										
-Y10- 11+14	RT	3							28										
-L- 185+03	LT	4								56									
-L- 186+63	LT	5								48									
-Y11- 10+27	CL	6							68										X
-L- 188+00	LT	7							28										
-L- 188+09	RT	7A							36										
-L- 188+90	LT	8							36										
-L- 189+29	LT	9							36										
-Y12- 10+22	CL	10							60										X
-L- 191+44	LT	11							28										
-L- 192+20	LT	12							36										
-Y13- 11+00	RT	12A						40											
-Y13- 13+82	CL	12B			2111.00	2109.10													
	CL	13	14		2119.50	2120.78													
-L- 195+5	LT	13A		2124.50															
	LT	13A	14		2121.50	2121.03													
-L- 195+32	LT	14		2124.20															
	LT	14	15		2120.88	2124.00													
-L- 197+94	LT	15A																	
-L- 203+38	LT	16																	
-L- 205+95	LT	17							32										
-L- 206+81	LT	18							56										
-L- 206+90	RT	19							44										
-L- 207+87	LT	20							40										
-L- 208+10	LT	20A							20										
-L- 209+06	CL	21			2153.30	2151.00													
-L- 211+77	LT	22							36										
-L- 212+40	RT	22A							40										
-L- 213+91	LT	22B		2155.90															
	LT	22B	23		2153.65	2152.65													
-L- 214+67	LT	23		2156.80															
	CL	23	24		2152.40	2155.00													
-L- 217+00	RT	25							16										
-L-219+00	CL	26			2143.70	2142.50													
-L- 222+40	CL	26A																	
-L- 224+39	CL	26B																	
-L- 225+11	LT	27			2116.80	2109.80													
-L- 225+26	LT	28			2111.70	2109.80													
-L- 225+54	LT	29A								20									
-L- 225+61	CL	29			2126.50	2123.00													
-L- 229+26	RT	30							48										
-L- 231+64	CL	31			2100.80	2097.20													
-L- 233+03	LT	33								28									
-L- 233+39	LT	34								36									
-Y15A- 10+22	CL	35			2104.10	2103.70													
-Y15A- 11+80	RT	35A							16										
-Y15A-	LT	35B							24										
SHEET 3-B TOTALS								40	824	188									

SIZE / THICKNESS OR GAUGE

STATION	FROM	TO	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	30" .079	30" .138	36" .079	42" .109	48" .109	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
-L- 182+46	1																										
-L- 184+01	2																										
-Y10- 11+14	3																										
-L- 185+03	4																										
-L- 186+63	5																										
-Y11- 10+27	6																										
-L- 188+00	7																										
-L- 188+09	7A																										
-L- 188+90	8																										
-L- 189+29	9																										
-Y12- 10+22	10																										
-L- 191+44	11																										
-L- 192+20	12																										
-Y13- 11+00	12A																										
-Y13- 13+82	12B														140												
	13	14																				72					
-L- 195+5	13A																										
	13A	14																			28						
-L- 195+32	14																										
	14	15																				140					
-L- 197+94	15A																										
-L- 203+38	16				68																						
-L- 205+95	17																										
-L- 206+81	18																										
-L- 206+90	19																										
-L- 207+87	20																										
-L- 208+10	20A																										
-L- 209+06	21				60																						
-L- 211+77	22																										
-L- 212+40	22A																										
-L- 213+91	22B																										
	22B	23																			72						
-L- 214+67	23																										
	23	24																				48					
-L- 217+00	25																										
-L-219+00	26					52																					
-L- 222+40	26A																										
-L- 224+39	26B																										
-L- 225+11	27				56																						
-L- 225+26	28									52																	
-L- 225+54	29A																										
-L- 225+61	29				60																						
-L- 229+26	30																										
-L- 231+64	31										88																
-L- 233+03	33																										
-L- 233+39	34																										
-Y15A- 10+22	35				80																						
-Y15A- 11+80	35A																										
-Y15A-	35B																										
SHEET 3-B TOTALS					324	52				52	88				140						100	260					

STATION	FROM	TO	** R.C. PIPE (CLASS V)	*** RC PIPE CULVERTS, CONTRACTOR DESIGN	*** RC PIPE CULVERTS, CONTRACTOR DESIGN	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	FRAMES AND NARROW SLOT FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	TRAFFIC BEARING JB STD. 840.34	TRAFFIC BEARING GRATED DROP INLET STD. 840.35	MANHOLE FRAME AND COVER STD 840.54	SPRING BOX STD 840.41					CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L- 182+46	1																																22.4	
-L- 184+01	2																																31.1	
-Y10- 11+14	3																																	
-L- 185+03	4																																40.5	
-L- 186+63	5																																36.1	
-Y11- 10+27	6																																38.7	
-L- 188+00	7																																59.3	
-L- 188+09	7A																																47	
-L- 188+90	8																																29.7	
-L- 189+29	9																																65.4	
-Y12- 10+22	10																																40.3	
-L- 191+44	11																																25.1	
-L- 192+20	12																																21.2	
-Y13- 11+00	12A																																	
-Y13- 13+82	12B																																140	
	13	14																															47.8	
-L- 195+5	13A							1			1	1																						
	13A	14																																
-L- 195+32	14							1													1			1										REMOVE DI
	14	15																																
-L- 197+94	15A																																27.2	
-L- 203+38	16																																57.8	
-L- 205+95	17																																25.4	
-L- 206+81	18																																26	
-L- 206+90	19																																	
-L- 207+87	20																																	
-L- 208+10	20A																																	
-L- 209+06	21																																29.4	
-L- 211+77	22																																	
-L- 212+40	22A																																	
-L- 213+91	22B							1									1	1																
	22B	23																															53.5	
-L- 214+67	23							1															1		1									REMOVE JB
	23	24																															26.3	
-L- 217+00	25																																14.4	
-L-219+00	26																																36.1	
-L- 222+40	26A																																33.2	
-L- 224+39	26B																																40	
-L- 225+11	27																																38	(Tanager Ln)
-L- 225+26	28						3.8																										50.5	HEADWALL (Tanager Ln)
-L- 225+54	29A																																19.1	(Tanager Ln)
-L- 225+61	29																																73.1	
-L- 229+26	30																																26.6	
-L- 231+64	31						4.9																										74.3	HEADWALL
-L- 233+03	33																																17.8	
-L- 233+39	34																																21.4	
-Y15A- 10+22	35																																	
-Y15A- 11+80	35A																																	
-Y15A-	35B																																	
SHEET 3-B TOTALS							8.7	4			1	1					1	1			1		1	1	1								1334.7	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	(NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

COMPUTED BY:	JLT	DATE:	7/13/2011
CHECKED BY:	SGM	DATE:	11/24/2011

SANDRA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
R-5207B	3-C

*ELEVATIONS ARE FOR INFORMATIONAL PURPOSES ONLY.

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

Table part 1: STATION / SIZE / THICKNESS OR GAUGE, location, structure no., elevations, DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC)

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
-L- 240+12	RT	37								36									
	RT	38	38A		2094.10	2091.45													
-L- 241+84	RT	38A		2093.60															
		38A	38B		2091.35	2091.00													
-L- 243+73	RT	38C																	
-L- 244+35	RT	38D																	
-L- 244+43	RT	39		2090.25															
	RT	39	40		2087.50	2087.40													
-L- 244+62	RT	40		2090.20															
	RT	40	41		2088.40	2087.30													
-Y16- 12+43	CL	42									56								X
-L- 246+10	RT	42A							52										
-L- 250+33	LT	43								28									
-L- 251+10	LT	44								24									
-L- 251+56	LT	45								36									
-L- 253+01	LT	46								36									
-L- 254+64	LT	47																	
-L- 257+74	LT	48							32										
-Y17- 10+55	RT	49A							32										
-L- 260+40	LT	49		2136.80															
	CL	49	50		2133.80	2133.48													
-L- 260+40	RT	50		2138.00															
	RT	50	51		2133.38	2132.80													
-L- 261+58	RT	51		2137.40															
	CL	51	52		2131.70	2132.25													
-L- 261+75	LT	52		2135.50															
	LT	52	53		2132.50	2132.85													
	LT	52	54		2132.35	2132.80													
-L-261+98	LT	53		2135.85															
-L- 261+80	LT	54		2137.00															
	LT	54	55		2132.80	2133.00													
-Y17- 12+04	LT	55		2136.00															
-L- 263+31	RT	56		2139.91															
	RT	56	56A		2136.91	2136.65													
-L- 263+84	RT	56A		2140.15															
	RT	56A	56B		2136.55	2136.31													
-L- 264+35	RT	56B		2140.34															
	RT	56B	56C		2134.20	2133.46													
	RT	56B	57		2134.20	2134.70													
-L- 264+86	RT	56C		2138.40															
	RT	56C	56D		2134.25	2139.25													
-L- 265+50	RT	56D		2142.00															
	LT	57A	57		2141.70	2138.97			16										
-L- 264+23	LT	57		2141.97															
	LT	57	58		2135.56	2135.84													
-L- 264+48	LT	58		2142.00															
SHEET 3-C TOTALS									132	160	56								

Table part 2: C.S. PIPE (gauge .064 .064 .064 .064 .079 .138 .079 .109 .109), R.C. PIPE CLASS III, R.C. PIPE CLASS IV

STATION	FROM	TO	C.S. 12" (.064)	C.S. 15" (.064)	C.S. 18" (.064)	C.S. 24" (.064)	C.S. 30" (.079)	C.S. 30" (.138)	C.S. 36" (.079)	C.S. 42" (.109)	C.S. 48" (.109)	R.C. III 12"	R.C. III 15"	R.C. III 18"	R.C. III 24"	R.C. III 30"	R.C. III 36"	R.C. III 42"	R.C. III 48"	R.C. IV 12"	R.C. IV 15"	R.C. IV 18"	R.C. IV 24"	R.C. IV 30"	R.C. IV 36"	R.C. IV 42"	R.C. IV 48"
	38	38A																			48						
	38A	38B																			56						
	39	40																			32						
	40	41																			12						
	49	50																				64					
	50	51																				116					
	51	52																				56					
	52	53																			20						
	52	54																				28					
	54	55																				40					
	56	56A																				52					
	56A	56B																				48					
	56B	56C																					56				
	56B	57																					40				
	56C	56D																			64						
	57	58																					28				
SHEET 3-C TOTALS																					232	404	124				

Table part 3: ** R.C. PIPE (CLASS V); *** RC PIPE CULVERTS, CONTRACTOR DESIGN; ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS; QUANTITIES FOR DRAINAGE STRUCTURES ("TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B')); FRAME, GRATES, AND HOOD STANDARD 840.03; CONCRETE TRANSITIONAL SECTION

STATION	FROM	TO	** R.C. PIPE (CLASS V)	*** RC PIPE CULVERTS, CONTRACTOR DESIGN	*** RC PIPE CULVERTS, CONTRACTOR DESIGN	ENDWALLS R.C.P.	ENDWALLS C.S.P.	PER EACH (0' THRU 5.0')	LIN. FT. A 5.0' THRU 10.0'	LIN. FT. B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	TYPE OF GRATE E	F	G	DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	FRAMES AND NARROW SLOT FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	TRAFFIC BEARING JB STD. 840.34	TRAFFIC BEARING GRATED DROP INLET STD. 840.35	MANHOLE FRAME AND COVER STD 840.54	SPRING BOX STD 840.41	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L- 240+12	37																												32.1	
	38	38A																											60.9	
-L- 241+84	38A							1									1	1												
	38A	38B																												
-L- 243+73	38C																												26.7	
-L- 244+35	38D																												20.5	
-L- 244+43	39							1													1			1						
	39	40																											278.1	REMOVE DI
-L- 244+62	40							1													1			1						
	40	41																												
-Y16- 12+43	42																													
-L- 246+10	42A																													
-L- 250+33	43																												106.4	
-L- 251+10	44																													REMOVE DI
-L- 251+56	45																												90	REMOVE DI
-L- 253+01	46																												96.1	
-L- 254+64	47																												4	
-L- 257+74	48																													
-Y17- 10+55	49A																												23.3	
-L- 260+40	49							1											1	1										
	49	50																											61.4	
-L- 260+40	50							1											1	1										
	50	51																											120.5	
-L- 261+58	51							1	2.23														1		1					
	51	52																											44	
-L- 261+75	52							1			1	1																		
	52	53																												
	52	54																												
-L-261+98	53							1			1	1																		
-L- 261+80	54							1									1	1												
	54	55																												
-Y17- 12+04	55							1											1	1										
-L- 263+31	56							1			1			1																
	56	56A																												
-L- 263+84	56A							1			1			1																
	56A	56B																												
-L- 264+35	56B							1	1.14		1			1																
	56B	56C																												
	56B	57																												
-L- 264+86	56C							1	4.53														1		1					
	56C	56D																												
-L- 265+50	56D							1											1	1										
	57A	57																									2-Drain. Pipe		30	
-L- 264+23	57							1	2.27		1		1																	
	57	58																												
-L- 264+48	58							1	1.16								1	1												
SHEET 3-C TOTALS								17	11.33		6	2	1	3			3	3	4	4	2		2	2	2		2-Drain. Pipe		994	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	(NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

COMPUTED BY:	JLT	DATE:	7/13/2011
CHECKED BY:	SGM	DATE:	11/24/2011

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
R-5207B	3-D

SANDRA

***ELEVATIONS ARE FOR INFORMATIONAL PURPOSES ONLY.**

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 2"	12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	30" .079	30" .138	36" .079	42" .109	48" .109
	LT	58	58A		2135.94	2136.20																							
-L- 264+90	LT	58A		2141.20																									
		58A	58B		2138.45	2139.35																							
-L- 265+08		58B		2142.10																									
-L- 267+22	CL	59			2147.00	2146.50																84							
-L- 270+12	LT	60									88																		
-L- 271+74	RT	61		2168.30																									
	CL	63	62		2168.40	2168.80																							
	RT	61	63		2164.80	2168.30																							
-L- 272+82	RT	63		2171.80																									
	RT	63	64		2169.15	2171.25																							
-L- 273+41	RT	64		2174.00																									
	RT	64	65		2171.35	2181.15																							
-L- 275+16	RT	65		2184.80																									
		65	66		2181.15	2181.75																							
-L- 275+27	RT	66		2185.80																									
-L- 274+39	LT	67								88																			
-L- 274+30	LT	68									68																		
-L- 277+24	LT	68A																											
-L- 279+69	RT	69A		2188.25																									
	CL	69	69A		2193.20	2184.00																	60						
-L- 279+98	LT	70								64																			
-L- 284+53	CL	71			2195.00	2192.80																52							
-L- 287+87	LT	72								32																			
-L- 288+25	CL	73			2194.25	2188.66																	64						
-L- 289+41	RT	74		2199.04																									
	RT	74	75		2196.29	2195.50															12								
-L- 290+26	CL	76			2188.49	2178.20																		92					
-L- 291+47	CL	77			2189.60	2170.10																132							
-L- 291+38	LT	78		2182.54																									
	CL	78	79		2180.50	2169.60		96																					
-L- 292+04	CL	80			2179.80	2169.60																			144				
-L- 292+79	LT	80A																											
-L- 292+10	RT	81		2212.35																									
	RT	81	82		2209.60	2179.60															60								
-L- 294+12	CL	83			2228.00	2205.90																84							
-L- 304+99	CL	84			2228.36	2220.65																64							
-L- 310+06	CL	85			2191.50	2190.01																48							
-Y19- 11+56	CL	86			2168.90	2166.80																56							
-L- 314+38	LT	87								24																			
-L- 315+40	LT	88								24																			
-L- 316+77	CL	89			2142.00	2134.70																						72	
SHEET 3-D TOTALS								96		232	156										72	520	124	92	144		72	

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"	** " R.C. PIPE (CLASS V)	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	'TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02
	58	58A												52													
-L- 264+90	58A																							1			
	58A	58B										28															
-L- 265+08	58B																							1			
-L- 267+22	59																										
-L- 270+12	60																										
-L- 271+74	61																							1	0.48		
	63	62												44													
	61	63												96													
-L- 272+82	63																							1			
	63	64										56															
-L- 273+41	64																							1			
	64	65										160															
-L- 275+16	65																							1			
	65	66										12															
-L- 275+27	66																							1			
-L- 274+39	67																										
-L- 274+30	68																										
-L- 277+24	68A																										
-L- 279+69	69A																							1			
	69	69A																									
-L- 279+98	70																										
-L- 284+53	71																										
-L- 287+87	72																										
-L- 288+25	73																										
-L- 289+41	74																							1			
	74	75																									
-L- 290+26	76																										
-L- 291+47	77																										
-L- 291+38	78																							1			
	78	79																									
-L- 292+04	80																										
-L- 292+79	80A																										
-L- 292+10	81																							1			
	81	82																									
-L- 294+12	83																										
-L- 304+99	84																										
-L- 310+06	85																										
-Y19- 11+56	86																										
-L- 314+38	87																										
-L- 315+40	88																										
-L- 316+77	89																						5				
SHEET 3-D TOTALS												256		192									5	11	0.48		

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	FRAMES AND NARROW SLOT FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	TRAFFIC BEARING JB STD. 840.34	TRAFFIC BEARING GRATED DROP INLET STD. 840.35	MANHOLE FRAME AND COVER STD 840.54	SPRING BOX STD 840.41					CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
	58	58A																						90.8	
-L- 264+90	58A									1	1														
	58A	58B																							
-L- 265+08	58B									1	1														
-L- 267+22	59																								
-L- 270+12	60																							62.3	
-L- 271+74	61									1	1														
	63	62																						119	REMOVE DI
	61	63																							
-L- 272+82	63									1	1														
	63	64																							
-L- 273+41	64									1	1														
	64	65																						116.9	
-L- 275+16	65												1			1									
	65	66																							
-L- 275+27	66							1	1																
-L- 274+39	67																							138.2	REMOVE DI - 2 EA
-L- 274+30	68																								
-L- 277+24	68A																							69.4	
-L- 279+69	69A												1			1								51.4	REMOVE DI
	69	69A																						91.8	REMOVE DI AND JB
-L- 279+98	70																								
-L- 284+53	71																							34.2	
-L- 287+87	72																								
-L- 288+25	73																							35.5	
-L- 289+41	74											1			1										
	74	75																							
-L- 290+26	76																							47.8	
-L- 291+47	77																								CLASS II SELECT BACKFILL MATERIAL
-L- 291+38	78																1								
	78	79																							CLASS II SELECT BACKFILL MATERIAL
-L- 292+04	80																								CLASS II SELECT BACKFILL MATERIAL
-L- 292+79	80A																							63.7	
-L- 292+10	81											1			1										
	81	82																				2 - 15" CS			ROD & LUG SLEEVE CONNECTION
-L- 294+12	83																							34.4	
-L- 304+99	84																							51.3	
-L- 310+06	85																							85.7	REMOVE JB
-Y19- 11+56	86																							55.8	
-L- 314+38	87																								
-L- 315+40	88																								
-L- 316+77	89																							36.7	HEADWALL
SHEET 3-D TOTALS								1	1	5	5	2	2		2	2	1					2 - 15" CS		1184.9	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	(NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

COMPUTED BY: JLT DATE: 7/13/2011

CHECKED BY: SGM DATE: 11/24/2011

PROJECT NO.	SHEET NO.
R-5207B	3-E

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

SANDRA

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LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 15"	DRAINAGE PIPE 18"	DO NOT USE HDPE	C.S. PIPE 15" .064	C.S. PIPE 18" .064	C.S. PIPE 42" .109	R.C. PIPE CLASS IV 15"	R.C. PIPE CLASS IV 18"	ENDWALLS CU. YARDS C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD 840.54	PIPE REMOVAL LIN. FT.	REMARKS
-L- 317+43	LT	90						88													47.1	
-L- 318+86	CL	91			2145.50	2140.00						60			5						67	
-Y20- 12+09	LT	92		2154.60												1	1	1			37.5	
	LT	92	OUT		2152.35	2152.10							40									
-Y20- 12+34	CL	93			2152.00	2149.92					60										59.2	
-L- 321+62	LT	93A					24															
-Y21- 12+43	CL	94			2146.90	2146.54					72										39.6	
-L- 326+12	CL	94A			2146.10	2145.88					44											
-L- 326+98	CL	95			2145.40	2144.50					48										30.7	
-L- 327+66	LT	96					44														52.7	
-L- 328+95	LT	97					40														19.7	
-L- 330+00	LT	97A					40															
-L- 330+72	CL	98	98A		2150.70	2149.85								52							43.8	
-L- 330+72	RT	98A		2154.15												1			1	1		
-L- 336+68	LT	99					56														27.7	
-L- 337+80	CL	100			2133.20	2132.96					48										21.3	
-L-338+56	LT	101					36														19.9	
-L-339+81	LT	102					20														13.9	
-L- 340+48	RT	102A					28														20.3	
-L- 340+77	LT	103					16														17.1	
-L- 341+51	RT	103A																			17.1	
-L- 342+24	RT	104					36														28.3	
	LT	105	105A		2124.39	2119.75				140											171.8	REMOVE DI
-L- 343+49	LT	105A		2122.00												1	1	1				
	LT	105A	105B		2119.50	2118.80					52											
-L- 344+00	LT	105B		2121.20												1	1	1				REMOVE DI
	LT	105B	105C		2118.70	2118.48					72										88.3	
-L- 344+74	LT	105C		2121.10												1	1	1				REMOVE DI
	LT	105C	OUT		2118.48	2118.35					44										35	
-Y22- 10+27	CL	106					60		X												40.5	
		107																				NOT USED
-L- 344+13	RT	108					36														37.8	
		109																				NOT USED
-L- 346+10	CL	110			2117.54	2117.40					48										31.3	
-L- 348+70	LT	111					20														33.5	
-L- 349+66	LT	112					20														17.2	
-L- 350+15	CL	113			2116.60	2116.00					48										30.3	
-L- 350+56	LT	114					20														12.3	
-L- 351+95	LT	115					32														23	
-L- 352+28	RT	116					24														14.9	
-L- 353+76	LT	117					24															
-L- 354+72	LT	118					40															
-L- 356+10	LT	119					52															
-L- 356+51	RT	120					20															
-L- 357+24	RT	121					36														17.2	
-L- 357+79	LT	122					40														30.5	
-L- 359+55	LT	123						52													29.8	
-L- 360+34	LT	124						32													22.4	
SHEET 3-E TOTALS							764	172		140	536	60	40	52	5	5	4	4	1	1	1198.7	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	(NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

COMPUTED BY:	JLT	DATE:	7/13/2011
CHECKED BY:	SGM	DATE:	11/24/2011

PROJECT NO.	SHEET NO.
R-5207B	3-F

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

SANDRA

*ELEVATIONS ARE FOR INFORMATIONAL PURPOSES ONLY.

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) SIZE 2"	12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
THICKNESS OR GAUGE																				
-L- 361+66	LT	125									28									
-L- 361+90	RT	126								36										
-L- 363+25	LT	127									52									
-L- 364+99	RT	128								56										
-L- 366+03	RT	129								68										
-Y23- 12+16	CL	130			2069.20	2068.82														
-L- 369+98	RT	131									52									
-L- 376+72	RT	132			2067.00	2066.50														X
SHEET 3-F TOTALS										160	132									
SHEET 3-B TOTALS									40	824	188									
SHEET 3-C TOTALS										132	160	56								
SHEET 3-D TOTALS								96		232	156									
SHEET 3-E TOTALS										764	172									
R-5207B TOTALS								96	40	2112	808	56								
SHEET 3-F TOTALS																				

STATION	C.S. PIPE SIZE 12"	15"	18"	24"	30"	30"	36"	42"	48"	R.C. PIPE CLASS III SIZE 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV SIZE 12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE	.064	.064	.064	.064	.079	.138	.079	.109	.109																
-L- 361+66																									
-L- 361+90																									
-L- 363+25																									
-L- 364+99																									
-L- 366+03																									
-Y23- 12+16					76																				
-L- 369+98																									
-L- 376+72					76																				
SHEET 3-F TOTALS					76	76																			
SHEET 3-B TOTALS			324	52				52	88			140						100	260						
SHEET 3-C TOTALS																		232	404	124					
SHEET 3-D TOTALS		72	520	124	92	144		72										256		192					
SHEET 3-E TOTALS		140	536					60										40	52						
R-5207B TOTALS		212	1380	252	168	144		184	88			140						628	716	316					
SHEET 3-F TOTALS																									

STATION	*** R.C. PIPE (CLASS V)	**** RC PIPE CULVERTS, CONTRACTOR DESIGN	***** RC PIPE CULVERTS, CONTRACTOR DESIGN	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	LIN. FT. A 5.0' THRU 10.0'	LIN. FT. B 10.0' AND ABOVE	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B')	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	FRAMES AND NARROW SLOT FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	TRAFFIC BEARING JB STD. 840.34	TRAFFIC BEARING GRATED DROP INLET STD. 840.35	MANHOLE FRAME AND COVER STD 840.54	SPRING BOX STD 840.41	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L- 361+66										1	1					1	1			1		1	1	1				19.3	
-L- 361+90																												40	
-L- 363+25																												27	
-L- 364+99																												54.1	
-L- 366+03																												51.2	
-Y23- 12+16																												79.6	
-L- 369+98																												46.7	
-L- 376+72																												60	
SHEET 3-F TOTALS																												377.9	
SHEET 3-B TOTALS					8.7	4				1	1					1	1			1		1	1	1				1334.7	
SHEET 3-C TOTALS						17	11.33			6	2	1	3			3	3	4	4	2		2	2	2			2-Drain. Pipe	994	
SHEET 3-D TOTALS					5	11	0.48									1	1	5	5	2	2		2	2	1		2 - 15" CS	1184.9	
SHEET 3-E TOTALS					5	5										4	4				1		1					1198.7	
																												41.1	
R-5207B TOTALS					18.7	37	11.81			7	3	1	3			9	9	9	9	5	3	3	5	6	1		2-Drain. Pipe	5131.3	
																											2 - 15" CSP		
SHEET 3-F TOTALS																													

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	(NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

COMPUTED BY: JLT DATE: 7/13/2011

CHECKED BY: SGM DATE: 11/24/2011

PROJECT NO. R-5207B SHEET NO. 3-G

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

SANDRA

*ELEVATIONS ARE FOR INFORMATIONAL PURPOSES ONLY.

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 54" & OVER)

ABBREVIATIONS
C.B. CATCH BASIN
N.D.I. NARROW DROP INLET
D.I. DROP INLET
G.D.I. GRATED DROP INLET
G.D.I.(N.S.) GRATED DROP INLET (NARROW SLOT)
J.B. JUNCTION BOX
M.H. MANHOLE
T.B.D.I. TRAFFIC BEARING DROP INLET
T.B.J.B. TRAFFIC BEARING

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 54"	60"	66"	72"	78"	84"			C.S. PIPE 54" .109	54" .138	54" .168	54" SHOP ELON-GATED .138	54" SHOP ELON-GATED .168	60" .138	60" .168	66" .138	66" .168	72" .139	72" .168		STRUCTURAL PLATE PIPE 60" 12	60" 10		66" 12	66" 10		72" 12	72" 10					REINFORCED ENDWALLS WITH R.C. - C.Y.	REINFORCED ENDWALLS WITH C.S. - C.Y.	MASONRY DRAINAGE STRUCTURES CUBIC YARDS	C.B. STD. 840.01 OR 840.02	FRAMES, GRATES & HOOD STANDARD 840.03 TYPE OF GRATE E	F	G		CONCRETE TRANSITIONAL SECTION DROP INLET	CONCRETE TRANSITIONAL SECTION CATCH BASIN													REINF. CONC. FLARED END SECTIONS NO. & SIZE	CORR. STEEL FLARED END SECTIONS NO. & Size	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD. 840.72		PIPE REMOVAL LIN. FT.	REMARKS
-L- 232+56	CL	32			2098.15	2095.80															64																				5.6																										41.1	HEADWALL
SHEET 3-G TOTALS																					64																				5.6																										41.1	

PROJ. REFERENCE NO.	SHEET NO.
R-5207B	3-H

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
107	4	MICHAEL J. FRANZ AND KERI S. FRANZ
107A	4	DAMIEN S. LUCE AND ELIZABETH L. LUCE
107B	4	NATHAN BENSON BUILDERS, INC.
108	4	JOEY JUSTICE
109	4	KARYN B. SPREEMAN
110	4	NATHAN ALVA BENSON
111	4	FRANKLIN E. BROWN AND PHYLLIS A. BROWN
112	4	TWIN OAKS CONDOMINIUMS HOMEOWNERS ASSOCIATION
113	4	JOHN H. ROSS
114	4	JACK H. CRABTREE AND ROBERT M. CRABTREE
115	4	STANLEY L. YURTH
116	4	DINAH MAE KADUK DINAH MAE KADUK
117	4	ALFRED W. MAYO AND WANDA P. MAYO
118	4 & 5	SHERI H. AYERS
119	4 & 5	MIZPAH PROPERTIES, L.L.C.
120	5	ZUDIE WALKER INC.
121	5	YOUNGBLOOD OIL COMPANY, INC.
122	5	FAKIR B. PATEL
123	5	FAKIR B. PATEL AND KUSUM F. PATEL
124	5	MINNIE MAE NUCKOLLS
125	5	JOYCE ELAINE LAMB
126	5 & 6	FRANCES McWHORTER
127	5 & 6	EDWARD W. NUCKOLLS AND BLANCA M. NUCKOLLS
128	6	THOMAS A. DAVIS AND JUNE S. DAVIS
129	6	BRIAN W. BYRD AND CHARLENE E. BYRD
130	6	PHYLLIS C. HARRIS
131	6	M. HELENA RUDELL
132	6 & 7	WILLIAM D. MOORE AND JANIS K. MOORE
133	6	JEANA W. GREER
134	6	JULIET N. HEATHERLY AND GARLAND S. HEATHERLY
135	6 & 7	HARRY L. SCHENIMANN AND MARILYN G. SCHENIMANN
136	6 & 7	DAVID E. MOORE
137	7	JAMES ARTHUR COLLINS AND MARJORIE H. COLLINS
138	7	ROBERT H. JOHNSON AND NILDA L. JOHNSON
139	7	ROBERT P. POND AND BARBARA L. POND
140	7	JOSEPH H. KELLEY
141	7	JOHN L. REESE, JR.
142	7	RONALD W. KAROLYI AND JOYCE A. DAVIS
143	7 & 8	ELIZABETH L. OLEARY
144	8	PHILIP M. CHAVEZ AND CAROLYN M. CHAVEZ
145	8	LARRY W. FOX AND DEBORAH JEAN FOX
146	8	ROBERT W. SACKETT AND RUTH M. SACKETT
147	8	JAMES THOMPSON AND APRIL THOMPSON
148	8	COLONIAL VILLAGE HOMEOWNER ASSOCIATION
149	8	GARY AND RUTH BIENVENU
150	8	PINE VILLA HOMEOWNERS ASSOCIATION
151	8	RICHARD J. SILTZER AND KELLY M. SILTZER
152	8	AMELIA ANN HOUCK
153	8	JOANN W. FISHER
154	8	MATTHEW BRIAN HYDER AND CAROL G. HYDER
155	8 & 9	PIERCE J. MOORE, JR. AND DORA C. MOORE
155A	8 & 9	ADVENTIST HEALTH SYSTEM SUNBELT HEALTHCARE CORP.
156	8 & 9	DAVID F. BOONE AND LORENA C. BOONE
157	9 THRU 14	ASHEVILLE AGRICULTURAL SCHOOL AND MOUNTAIN SANITARIUM
157A	9	PSNC ENERGY
158	10	THE LAYMAN FOUNDATION OF NC
159	9	LAYMAN FOUNDATION OF NORTH CAROLINA
160	9	ADVENTIST HEALTH SYSTEM SUNBELT HEALTHCARE CORP.
161	9	LAYMAN FOUNDATION OF NORTH CAROLINA
162	9	RONALD E. KRUM AND RUTH M. KRUM

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
163	9 & 10	FLETCHER HOSPITAL, INC.
164		NOT USED
165	11	BELLSOUTH TELECOMMUNICATIONS, INC.
166		NOT USED
167	13 & 14	NATHAN BENSON BUILDERS, INC.
168	14	NATHAN BENSON BUILDERS, INC.
169	14	ROBERT T. BOWLIN
170	14	BERRY BOYS, INC.
171	14 & 15	REBECCA S. CHRISTENSEN
172	15	DYLAN C. AND NATASCHA S. GOTESKY
173	14 & 15	LESLIE L. MILLAR
174	15	ALLEN WALKER AND JAMETTA B. WALKER
175	15	IRENE TURNER
176	15	ANDREW D. AND DAWN M. BOYLE
177	15	JAMES EDWARD BENSON TRUST
178	15	STEVEN M. MCDOWELL AND ANTJE MCDOWELL
179	15	JEFFREY W. KLUTTZ,PAMELA J. KLUTTZ AND MARY E. KLUTTZ
180	15	VANESSA MADDEN
181	15	OTELIA WILSON
182	15	WILLIAM WILSON, JR. AND KATHY S. WILSON
183	15	ALLEN WALKER AND JAMETTA B. WALKER
184	15	PATRICIA DROZE
185	15	JOHN D. DAVIS AND MYRTLE A. DAVIS
186	15 & 16	COUNTY OF HENDERSON, NORTH CAROLINA
187	15 & 16	GLADE LAND FUND, L.L.C.
188	16	DONNA MARIE REILLY
189	16	JOSEPH C. KUYKENDALL AND EDITH KUYKENDALL
190	16	LARRY WAYNE WALKER
191	16	NATHAN A. BENSON
192	16	BRUCE A. JONES AND DARLENE P. JONES
193	16	MARVIN J. FLOREN
193A	16	ROGER C. & JUDY L. FLOREN
194	16	CARRIE M. WALKER
195	16 & 17	ELIZABETH B. DANIEL
196	16 & 17	BLUE RIDGE BIBLE CHURCH
197	17	MARCIA N. MARKO AND JERRY A. BOURNE
198	17	NORMAN RICHARD WILKIE AND PAULINE ELIZABETH WILKIE
199	17	C.B. CUNNINGHAM AND BERTHA CUNNINGHAM
200	17	PATRICIA ANN TURNER
201	17	JAMES T. ROBERTS AND EVELYN MCD. ROBERTS
202	17	EDWIN L. FOX AND CLARA N. FOX
203	17	REAGAN YOUNGBLOOD
204	17	ELDRIDE AND KAREN COATES
205	17	REAGAN D. YOUNGBLOOD
206	17 & 18	MORRIS A. WALKER
207	17 & 18	BRIAN K. WILLIAMS
208	18	TONY L. WILLIAMS AND SHANNON R. WILLIAMS
209	18	BAYLES E. LEWIS AND DIANA J. LEWIS
210	18	BILLY LEE YOUNGBLOOD
211	18 & 19	T D M CORPORATION
212	18 & 19	FLETCHER WAREHOUSING COMPANY LIMITED PARTNERSHIP

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY JR. 4/20/12

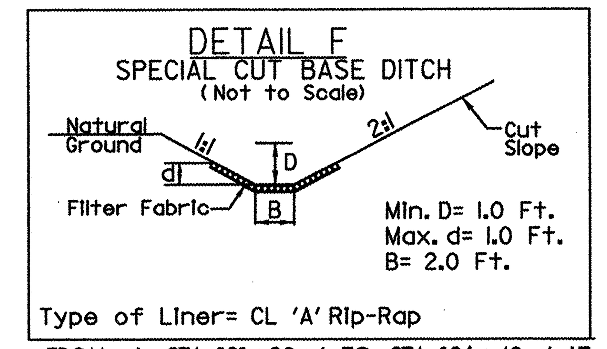
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

8/17/99

DATUM DESCRIPTION

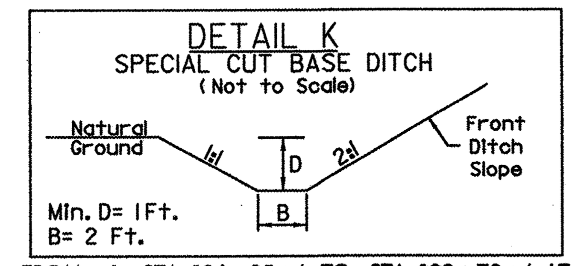
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "I-4400 BL47" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 604761.2970(FT) EASTING: 968222.3840(FT) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99977884 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "I4400 BL47" TO -L- STATION 180+38.32 IS N 27° 38' 50.52" E 5,710.99' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

DETAIL F



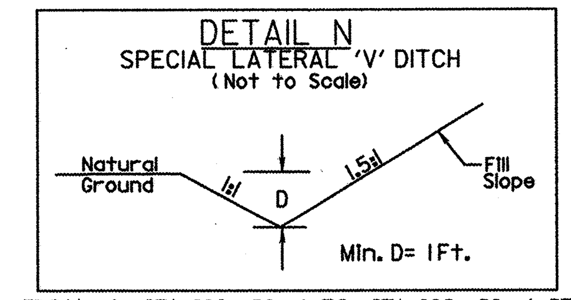
FROM -L- STA. 181+20+/- TO STA. 186+40+/- LT
CL 'A' RIP RAP: EST. 116 TONS
FILTER FABRIC: EST. 460 SY
USE -L- GRADE FOR DETAIL 'F'

DETAIL K



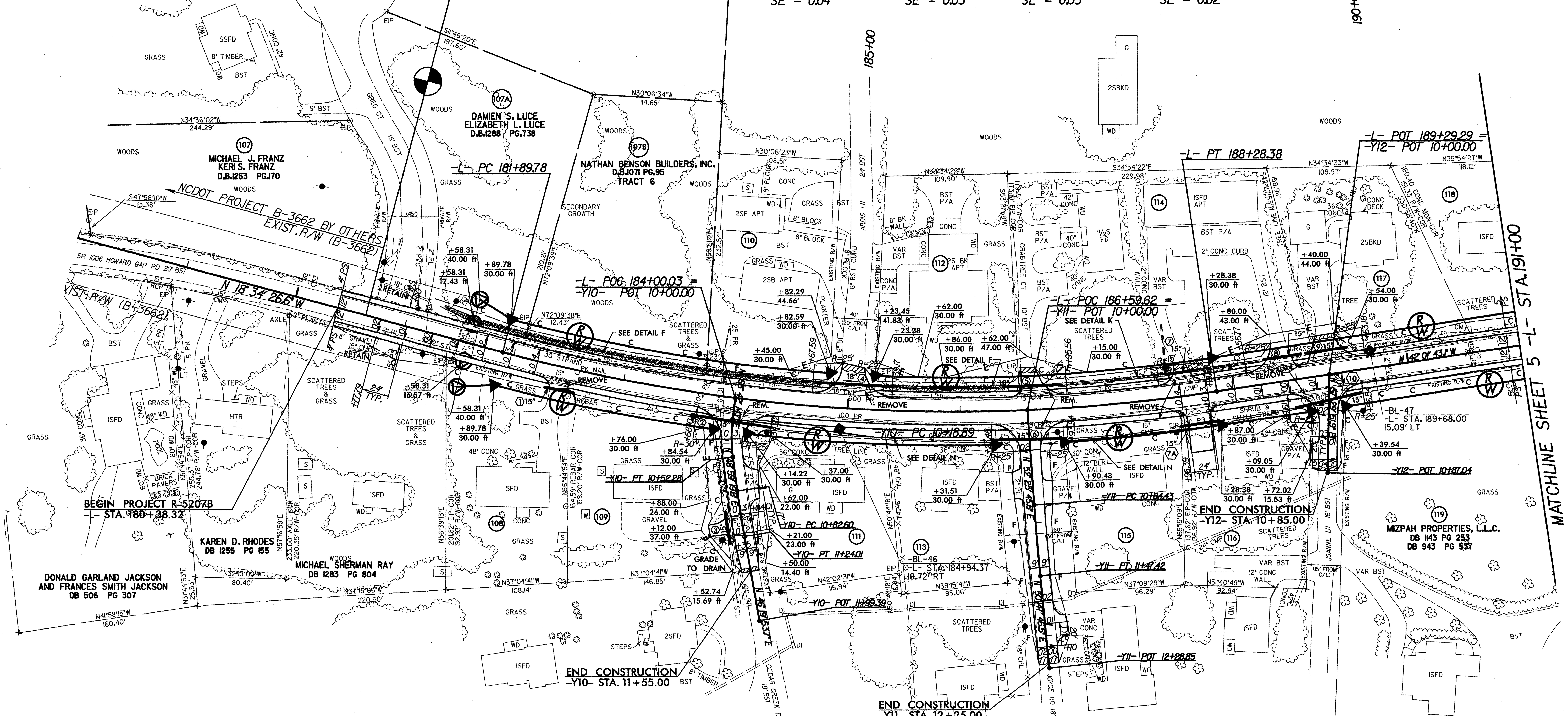
FROM -L- STA. 186+85+/- TO STA. 188+70+/- LT
USE -L- GRADE FOR DETAIL 'K'

DETAIL N



FROM -L- STA. 183+50+/- TO STA. 189+50+/- RT

-L-	-Y10-	-Y10-	-Y11-
PI Sta 185+13.61	PI Sta 10+35.68	PI Sta 11+03.31	PI Sta 11+15.92
Δ = 23° 27' 16.5" (LT)	Δ = 14° 42' 55.1" (LT)	Δ = 2° 39' 25.9" (LT)	Δ = 1° 37' 59.1" (LT)
D = 3° 40' 22.1"	D = 44° 04' 25.2"	D = 6° 24' 58.0"	D = 2° 35' 33.2"
L = 638.60'	L = 33.39'	L = 41.41'	L = 62.99'
T = 323.84'	T = 16.79'	T = 20.71'	T = 31.50'
R = 1,560.00'	R = 130.00'	R = 893.00'	R = 2,210.00'
SE = 0.04	SE = 0.03	SE = 0.03	SE = 0.02



(108)	JOEY JUSTICE DB 1297 PG 672
(109)	KARYN B. SPREEMAN DB 828 PG 397
(110)	NATHAN ALVA BENSON DB N/A PG N/A
(111)	FRANKLIN E. BROWN AND PHYLLIS A. BROWN DB 577 PG 319
(112)	TWIN OAKS CONDOMINIUMS HOMEOWNERS ASSOCIATION DB 656 PG 481
(113)	JOHN H. ROSS DB 1183 PG 463
(114)	JACK H. CRABTREE AND ROBERTA M. CRABTREE DB 769 PG 561; DB 818 PG 795
(115)	STANLEY L. YURTH DB 1017 PG 447
(116)	DINAH MAE KADUK DB 926 PG 696
(117)	ALFRED W. MAYO AND WANDA P. MAYO DB 845 PG 55
(118)	SHERI H. AYERS DB 1256 PG 115

SEE SHEET 20 FOR -L- GRADE

SEE SHEET 28 FOR -Y10- & -Y11- & -Y12- GRADE

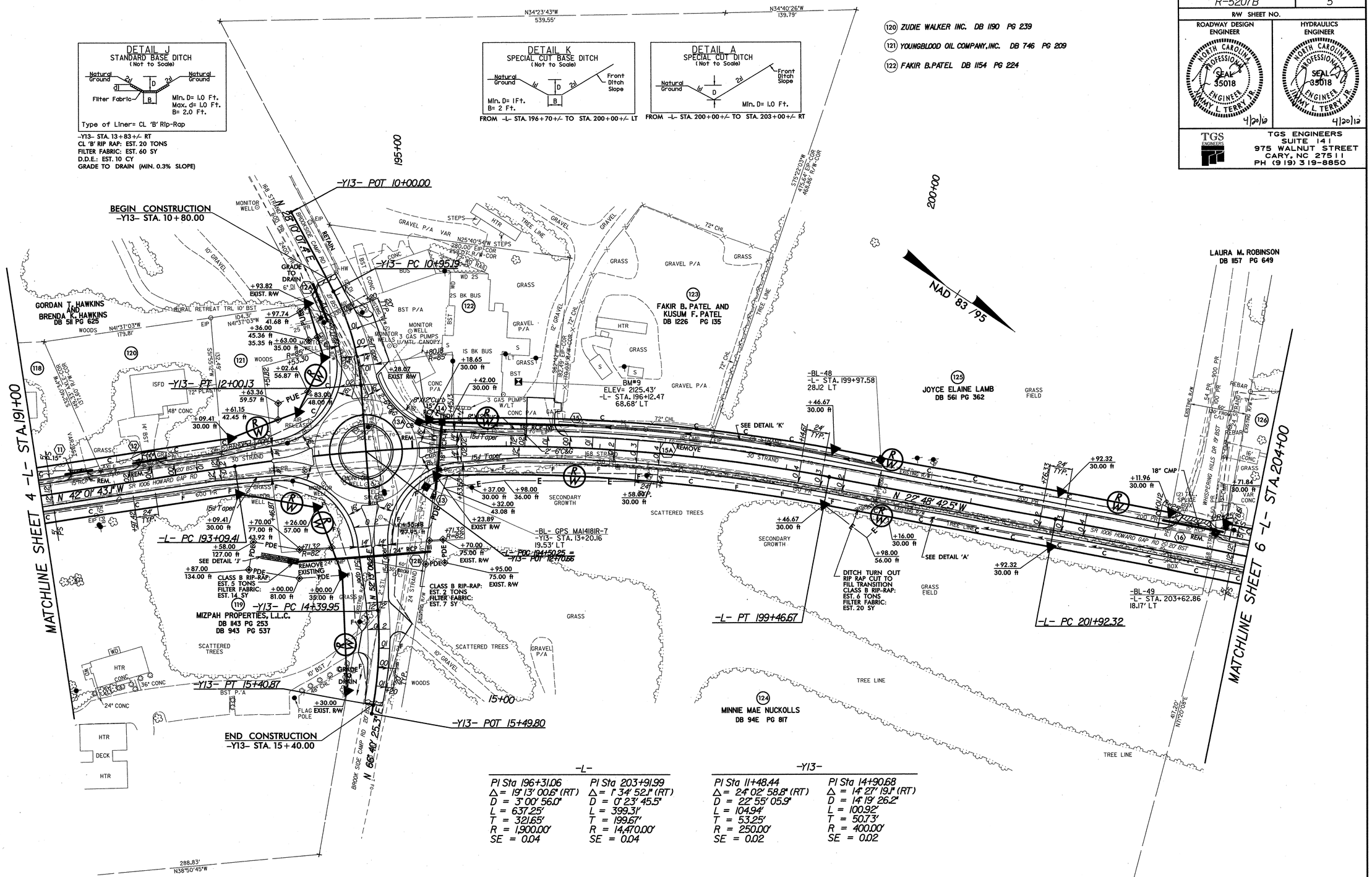
$$$$SYSTIME$$$$ $$$$DGN$$$$ $$$$USERNAME$$$$

207B_rdy_psh04.dgn 4/10/2012 3:36:51 PM

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850



-L-	
PI Sta 196+31.06	PI Sta 203+91.99
Δ = 19° 13' 00.6" (RT)	Δ = 1° 34' 52.1" (RT)
D = 3° 00' 56.0"	D = 0° 23' 45.5"
L = 637.25'	L = 399.31'
T = 321.65'	T = 199.67'
R = 1,900.00'	R = 14,470.00'
SE = 0.04	SE = 0.04

-Y13-	
PI Sta 11+48.44	PI Sta 14+90.68
Δ = 24° 02' 58.8" (RT)	Δ = 14° 27' 19.1" (RT)
D = 22° 55' 05.9"	D = 14° 19' 26.2"
L = 104.94'	L = 100.92'
T = 53.25'	T = 50.73'
R = 250.00'	R = 400.00'
SE = 0.02	SE = 0.02

SEE SHEET 21 FOR -L- GRADE
SEE SHEET 28 FOR -Y13- GRADE

8/17/99
$$$$USERNAME$$$$ $$$$SYSTIME$$$$
2078_rdy_psh05.dgn 4/10/2012 3:37:29 PM

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12	NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

NOTE:
USE EXTRA LONG GUARDRAIL POSTS IN PLACE OF STANDARD LENGTH POSTS FOR ALL GUARDRAIL INSTALLATIONS.

(126) FRANCES McWHORTER DB 1157 PG 649

(129) BRIAN W. BYRD AND CHARLENE E. BYRD DB 1145 PG 80

(130) PHYLLIS C. HARRIS DB 1189 PG 043

(131) M. HELENA RUDELL DB 1082 PG 155

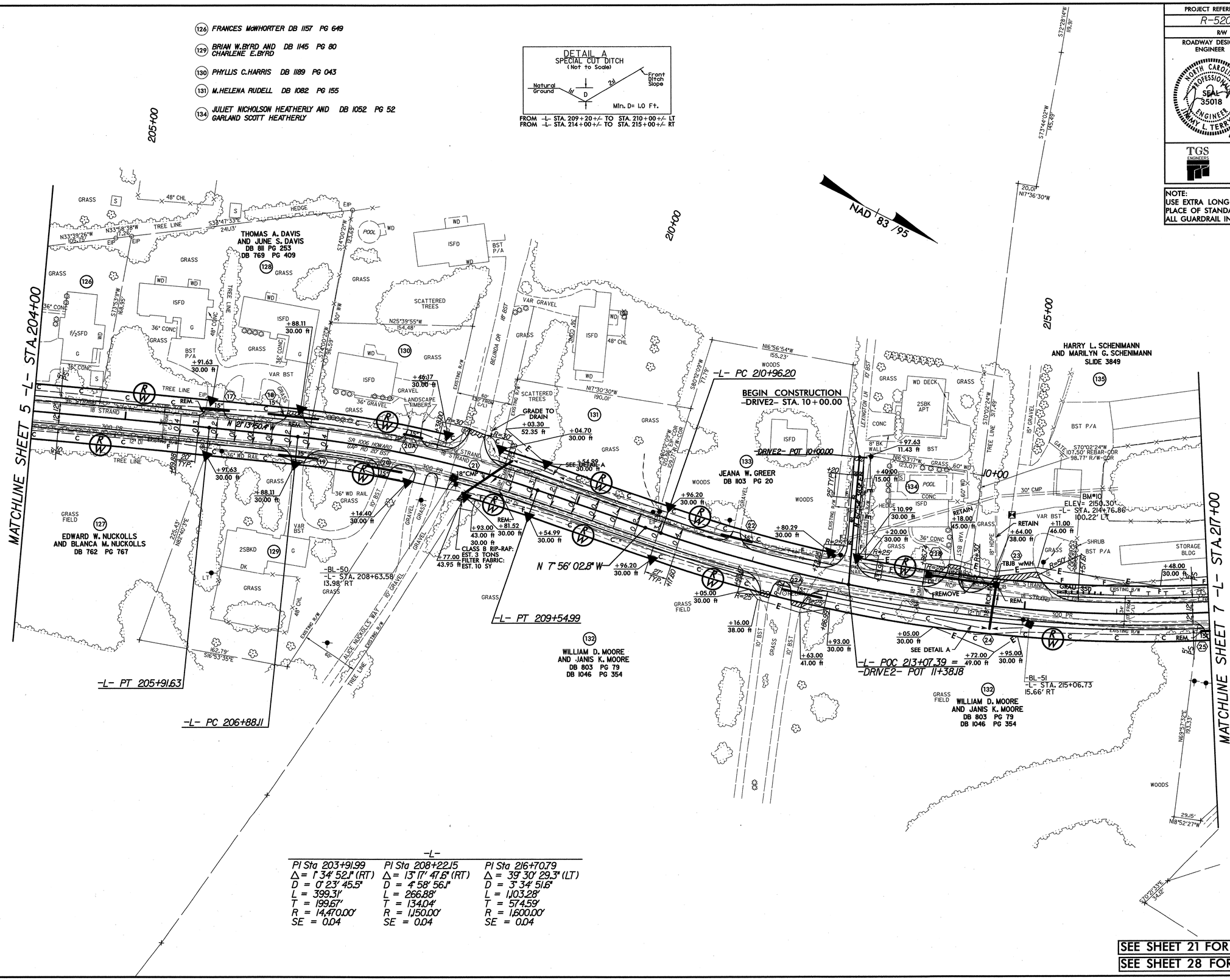
(134) JULIET NICHOLSON HEATHERLY AND GARLAND SCOTT HEATHERLY DB 1052 PG 52

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground — W — D — 2:1 — Front Ditch Slope

Min. D= 1.0 Ft.

FROM -L- STA. 209+20+/- TO STA. 210+00+/- LT
FROM -L- STA. 214+00+/- TO STA. 215+00+/- RT



-L-

PI Sta 203+91.99	PI Sta 208+22.15	PI Sta 216+70.79
Δ = 1° 34' 52.1" (RT)	Δ = 13° 17' 47.6" (RT)	Δ = 39° 30' 29.3" (LT)
D = 0° 23' 45.5"	D = 4° 58' 56.1"	D = 3° 34' 51.6"
L = 399.31'	L = 266.88'	L = 1,103.28'
T = 199.67'	T = 134.04'	T = 574.59'
R = 14,470.00'	R = 1,150.00'	R = 1,600.00'
SE = 0.04	SE = 0.04	SE = 0.04

8/17/99

$SYSTIME$ $$$$ CN $$$$ $FERNAME$ $$$$

r5207B_rdy_psh06.dgn 4/10/2012 3:38:19 PM

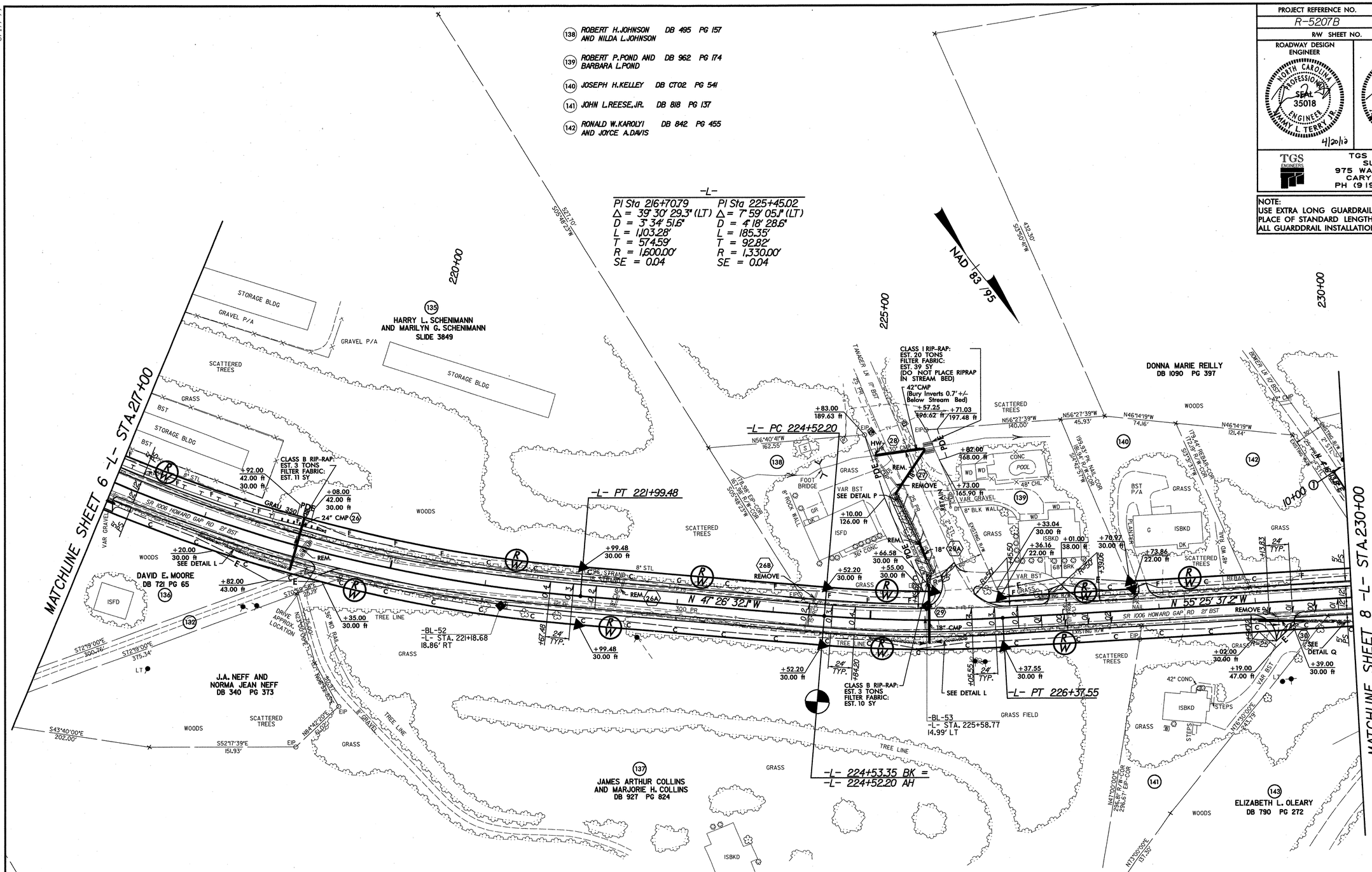
PROJECT REFERENCE NO.	SHEET NO.
R-5207B	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR.
4/20/12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR.
4/20/12

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

NOTE:
USE EXTRA LONG GUARDRAIL POSTS IN PLACE OF STANDARD LENGTH POSTS FOR ALL GUARDDRAIL INSTALLATIONS.



DETAIL L
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
Filter Fabric
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
Type of Liner= CL 'A' Rip-Rap

FROM -L- STA. 218+00+/- TO STA.219+00+/- RT
CL 'A' RIP RAP: EST. 20 TONS
FILTER FABRIC: EST. 78 SY

FROM -L- STA. 225+00+/- TO STA.226+00+/- RT
CL 'A' RIP RAP: EST. 20 TONS
FILTER FABRIC: EST. 78 SY

DETAIL P
SPECIAL CUT BASE DITCH
(Not to Scale)
Existing Road Shoulder
Natural Ground
Filter Fabric
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
Type of Liner= CL 'A' Rip-Rap

TANAGER LANE - RT
CL 'A' RIP RAP: EST. 20 TONS
FILTER FABRIC: EST. 78 SY
D.D.E. : EST. 12CY

DETAIL Q
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
Fill Slope
Filter Fabric
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
Type of Liner= CL 'A' Rip-Rap

FROM STA. 229+50+/- TO STA. 230+00+/- RT
CL 'A' RIP RAP: EST. 9 TONS
FILTER FABRIC: EST. 36 SY

8/17/99

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①	-DRIVE3- POT 10+00.00
②	-DRIVE3- PC 10+94.51
③	-DRIVE3- PT 11+39.99
③to④	N 34° 34' 21.7" E
④	-L- POT 230+48.24 = -DRIVE3- POT 11+45.76
⑤	-L- PC 230+73.82
⑥	-L- POC 231+86.63 = -Y14- POT 10+00.00
⑥to⑦	N 29° 56' 03.2" E
⑦	-Y14- PC 10+08.31
⑧	-Y14- PT 10+46.20
⑨	-Y14- POT 11+30.67
⑩	-Y15- PT 12+31.81

(144) PHILIP M.CHAVEZ AND CAROLYN M.CHAVEZ DB 930 PG 456

(148) COLONIAL VILLAGE HOMEOWNERS ASSOCIATION DB 1A PG 1055

(149) GARY AND RUTH BIENVENU DB 1260 PG 257

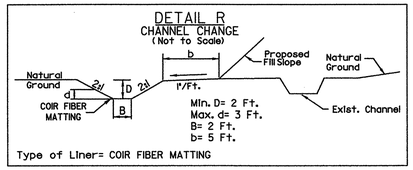
(150) PINE VILLA HOMEOWNERS ASSOCIATION DB 477 PG 575

(151) RICHARD J.SILTZER AND KELLY M.SILTZER DB 1229 PG 762

(152) AMELIA ANN HOUCK DB 1079 PG 665

(156) DAVID F.BOONE AND LORENA C.BOONE DB 950 PG 735

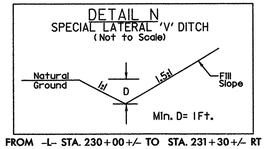
DETAIL R
CHANNEL CHANGE
(Not to Scale)



Type of Liner= COIR FIBER MATTING

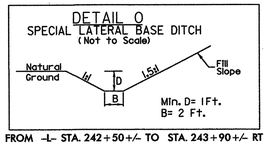
FROM -L- STA. 231+95+/- TO STA. 232+50+/- LT
COIR FIBER MATTING: EST. 150 SY
D.D.E.: EST. 50 CY

DETAIL N
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



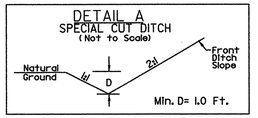
FROM -L- STA. 230+00+/- TO STA. 231+30+/- RT

DETAIL O
SPECIAL LATERAL BASE DITCH
(Not to Scale)



FROM -L- STA. 242+50+/- TO STA. 243+90+/- RT

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)



FROM -L- STA. 232+60+/- TO STA. 237+00+/- RT

(31) 48"CMP - BURY INVERTS 0.8' BELOW STREAM BED

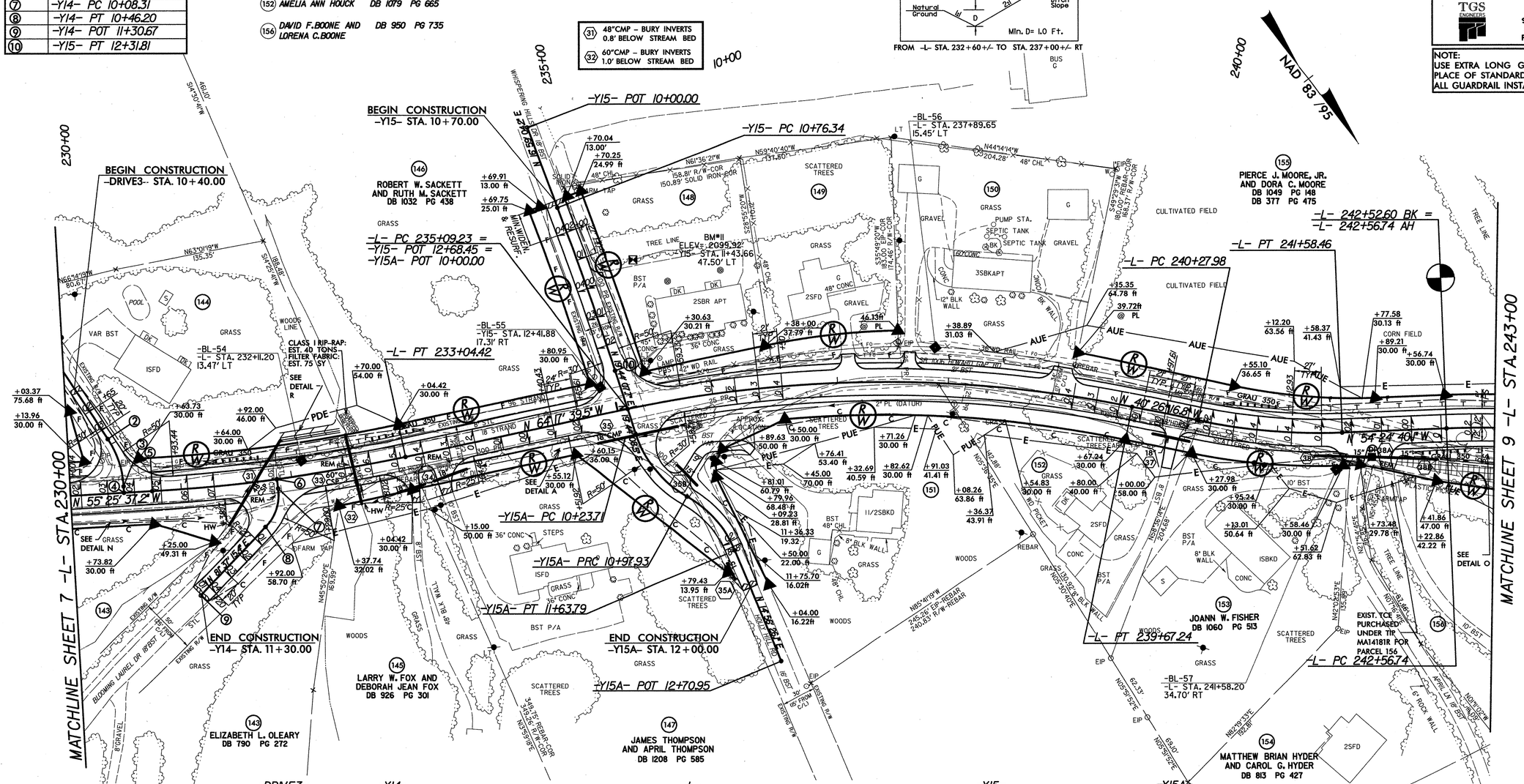
(32) 60"CMP - BURY INVERTS 1.0' BELOW STREAM BED

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

NOTE:
USE EXTRA LONG GUARDRAIL POSTS IN PLACE OF STANDARD LENGTH POSTS FOR ALL GUARDRAIL INSTALLATIONS.



-DRIVE3-	-Y14-	-L-			-Y15-	-Y15A-	
PI Sta 11+17.79	PI Sta 10+28.66	PI Sta 231+89.35	PI Sta 237+41.60	PI Sta 240+93.55	PI Sta 244+82.18	PI Sta 11+54.09	PI Sta 10+62.62	PI Sta 11+32.11
Δ= 30° 18' 07.9" (RT)	Δ= 51° 41' 12.2" (RT)	Δ= 8° 52' 02.3" (LT)	Δ= 23° 51' 22.7" (RT)	Δ= 13° 58' 23.3" (LT)	Δ= 31° 28' 34.0" (RT)	Δ= 2° 45' 03.5" (RT)	Δ= 42° 31' 43.8" (LT)	Δ= 37° 44' 01.5" (RT)
D= 66° 37' 22.8"	D= 136° 25' 06.7"	D= 3° 50' 43.3"	D= 5° 12' 31.3"	D= 10° 42' 34.2"	D= 7° 09' 43.1"	D= 1° 46' 10.1"	D= 57° 17' 44.8"	D= 57° 17' 44.8"
L= 45.48'	L= 37.89'	L= 230.60'	L= 458.01'	L= 130.47'	L= 439.49'	L= 155.47'	L= 74.23'	L= 65.86'
T= 23.29'	T= 20.34'	T= 115.53'	T= 232.37'	T= 65.56'	T= 225.44'	T= 77.75'	T= 38.92'	T= 34.11'
R= 86.00'	R= 42.00'	R= 1,490.00'	R= 1,100.00'	R= 535.00'	R= 800.00'	R= 3,238.00'	R= 100.00'	R= 100.00'
		SE= 0.07	SE= 0.04	SE= 0.04	SE= 0.04			

SEE SHEET 22 FOR -L- GRADE
SEE SHEET 28 FOR -DRIVE3- & -Y14- & -Y15- GRADE
SEE SHEET 29 FOR -Y15A- GRADE

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SYSTIME$$$$ SYSTIME$$$$ USERNAME$$$$ DGN$$$$
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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 25018 ENGINEER JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 25018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

NOTE:
USE EXTRA LONG GUARDRAIL POSTS IN PLACE OF STANDARD LENGTH POSTS FOR ALL GUARDRAIL INSTALLATIONS.

DETAIL GG
STANDARD BASE DITCH
(Not to Scale)

When B is ≥ 6.0'
Std. No. 876.01
Type of Liner= CL 'I' Rip-Rap

Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.

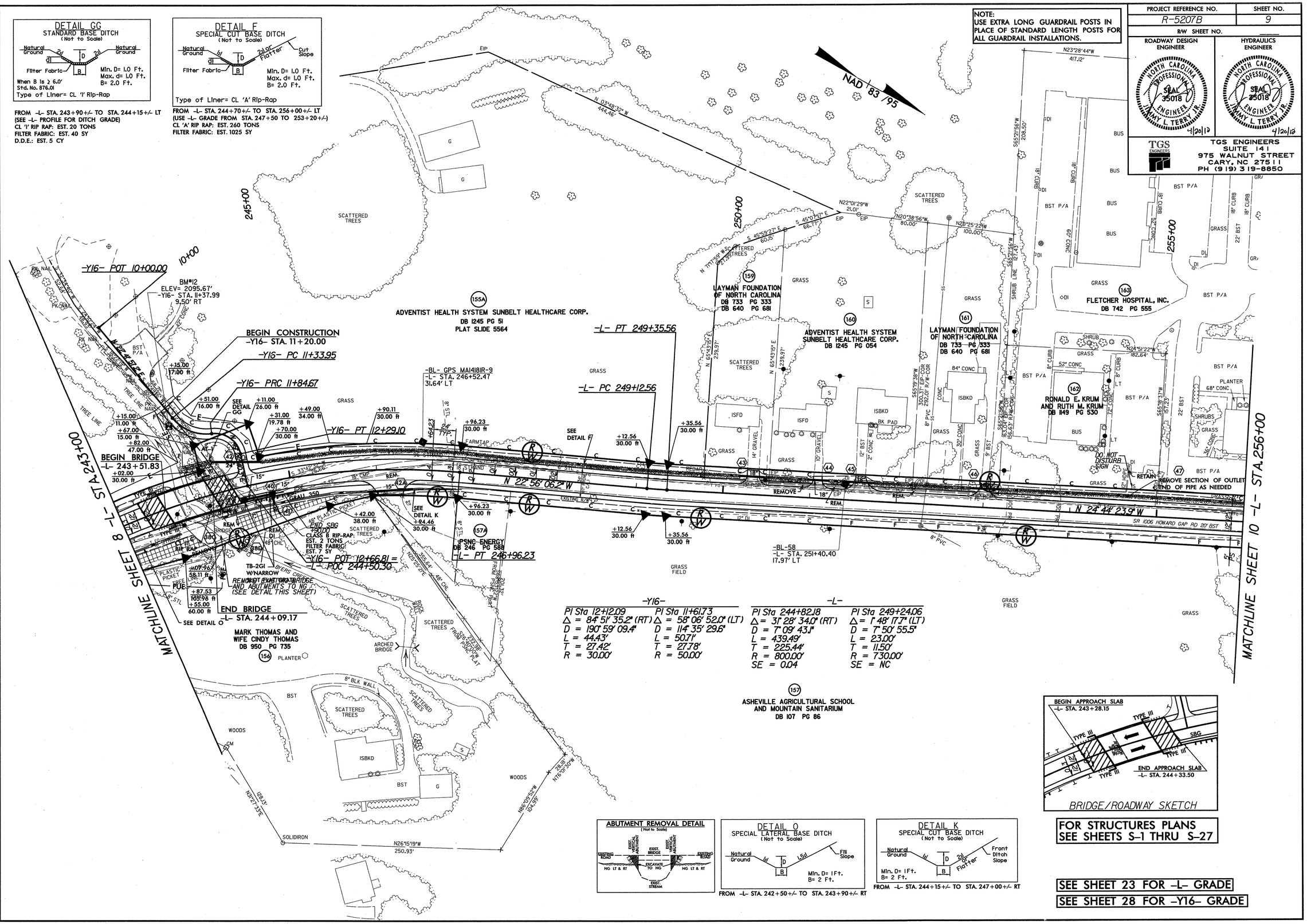
FROM -L- STA. 243+90+/- TO STA. 244+15+/- LT
(SEE -L- PROFILE FOR DITCH GRADE)
CL 'I' RIP RAP: EST. 20 TONS
FILTER FABRIC: EST. 40 SY
D.D.E.: EST. 5 CY

DETAIL F
SPECIAL CUT BASE DITCH
(Not to Scale)

Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.

Type of Liner= CL 'A' Rip-Rap

FROM -L- STA. 244+70+/- TO STA. 256+00+/- LT
(USE -L- GRADE FROM STA. 247+50 TO 253+20+/-)
CL 'A' RIP RAP: EST. 260 TONS
FILTER FABRIC: EST. 1025 SY



-Y16-	
PI Sta 12+12.09	PI Sta 11+61.73
Δ = 84° 51' 35.2" (RT)	Δ = 58° 06' 52.0" (LT)
D = 190° 59' 09.4"	D = 114° 35' 29.6"
L = 44.43'	L = 50.71'
T = 27.42'	T = 27.78'
R = 30.00'	R = 50.00'

-L-	
PI Sta 244+82.18	PI Sta 249+24.06
Δ = 31° 28' 34.0" (RT)	Δ = 1° 48' 17.7" (LT)
D = 1° 09' 43.1"	D = 1° 50' 55.5"
L = 439.49'	L = 23.00'
T = 225.44'	T = 11.50'
R = 800.00'	R = 730.00'
SE = 0.04	SE = NC

ABUTMENT REMOVAL DETAIL
(Not to Scale)

DETAIL O
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Min. D= 1Ft.
B= 2 Ft.

FROM -L- STA. 242+50+/- TO STA. 243+90+/- RT

DETAIL K
SPECIAL CUT BASE DITCH
(Not to Scale)

Min. D= 1Ft.
B= 2 Ft.

FROM -L- STA. 244+15+/- TO STA. 247+00+/- RT

BRIDGE/ROADWAY SKETCH

FOR STRUCTURES PLANS
SEE SHEETS S-1 THRU S-27

SEE SHEET 23 FOR -L- GRADE

SEE SHEET 28 FOR -Y16- GRADE

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PROJECT REFERENCE NO.	SHEET NO.
R-5207B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

DETAIL K
SPECIAL CUT BASE DITCH
(Not to Scale)

Natural Ground, 1d, D, 2d, B, Front Ditch Slope
Min. D= 1Ft.
B= 2 Ft.

FROM -L- STA. 256+00+/- TO STA. 257+00+/- LT

DETAIL L
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground, 1d, D, 2d, d, Filter Fabric, Front Ditch Slope
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.

Type of Liner= CL 'A' Rip-Rap

FROM -L- STA. 267+22+/- TO STA.268+50+/- LT
CL 'A' RIP RAP: EST. 24 TONS
FILTER FABRIC: EST. 100 SY

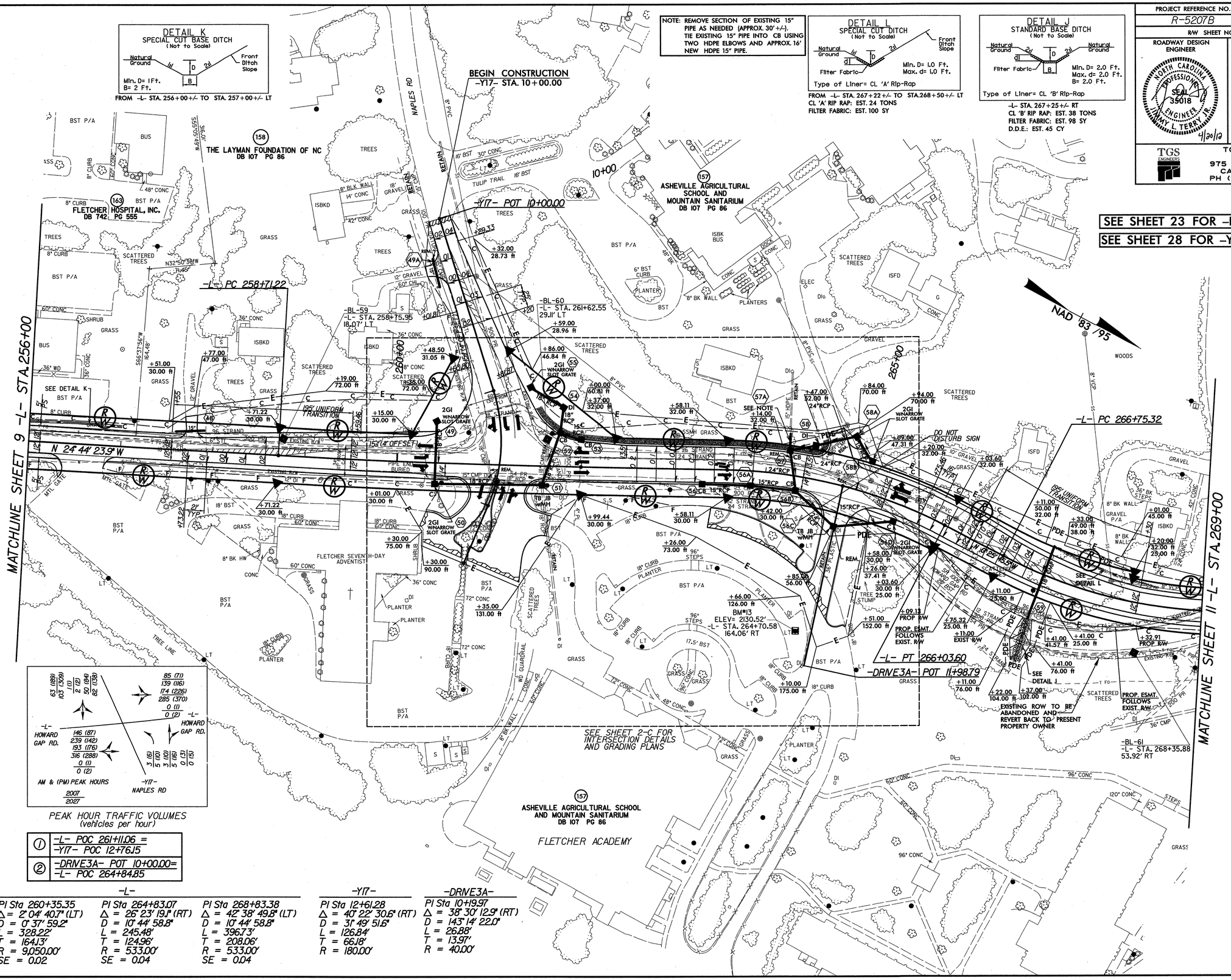
DETAIL J
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2d, d, D, 2d, B, Natural Ground, Filter Fabric
Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B= 2.0 Ft.

Type of Liner= CL 'B' Rip-Rap

-L- STA. 267+25+/- RT
CL 'B' RIP RAP: EST. 38 TONS
FILTER FABRIC: EST. 98 SY
D.D.E.: EST. 45 CY

NOTE: REMOVE SECTION OF EXISTING 15" PIPE AS NEEDED (APPROX. 30'+/-). TIE EXISTING 15" PIPE INTO CB USING TWO HDPE ELBOWS AND APPROX. 16' NEW HDPE 15" PIPE.



①	-L- POC 261+11.06 = -Y17- POC 12+76.15
②	-DRIVE3A- POT 10+00.00= -L- POC 264+84.85

-L-

PI Sta 260+35.35	PI Sta 264+83.07	PI Sta 268+83.38
Δ = 2° 04' 40.7" (LT)	Δ = 26° 23' 19.1" (RT)	Δ = 42° 38' 49.8" (LT)
D = 0° 37' 59.2"	D = 10° 44' 58.8"	D = 10° 44' 58.8"
L = 328.22'	L = 245.48'	L = 396.73'
T = 164.13'	T = 124.96'	T = 208.06'
R = 9,050.00'	R = 533.00'	R = 533.00'
SE = 0.02	SE = 0.04	SE = 0.04

-Y17-

PI Sta 12+61.28
Δ = 40° 22' 30.6" (RT)
D = 31° 49' 51.6"
L = 126.84'
T = 66.18'
R = 180.00'

-DRIVE3A-

PI Sta 10+19.97
Δ = 38° 30' 12.9" (RT)
D = 143° 14' 22.0"
L = 26.88'
T = 13.97'
R = 40.00'

8/17/99

SYCTINE
SIMM
CONN
FERRAME

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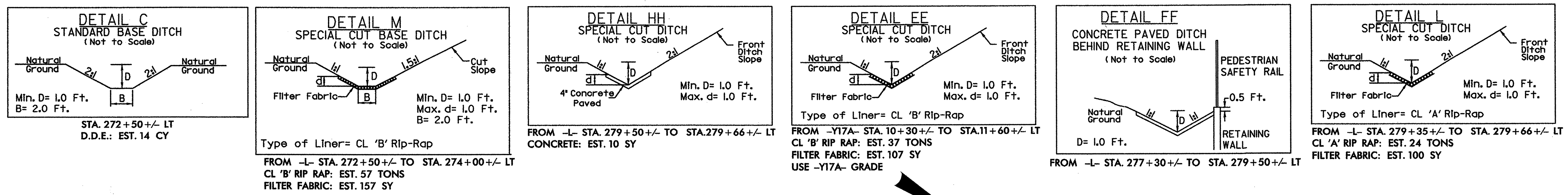
PROJECT REFERENCE NO.	SHEET NO.
R-5207B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12	NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

NOTE:
USE EXTRA LONG GUARDRAIL POSTS IN PLACE OF STANDARD LENGTH POSTS FOR ALL GUARDRAIL INSTALLATIONS.



157
ASHEVILLE AGRICULTURAL SCHOOL AND MOUNTAIN SANITARIUM
DB 107 PG 86

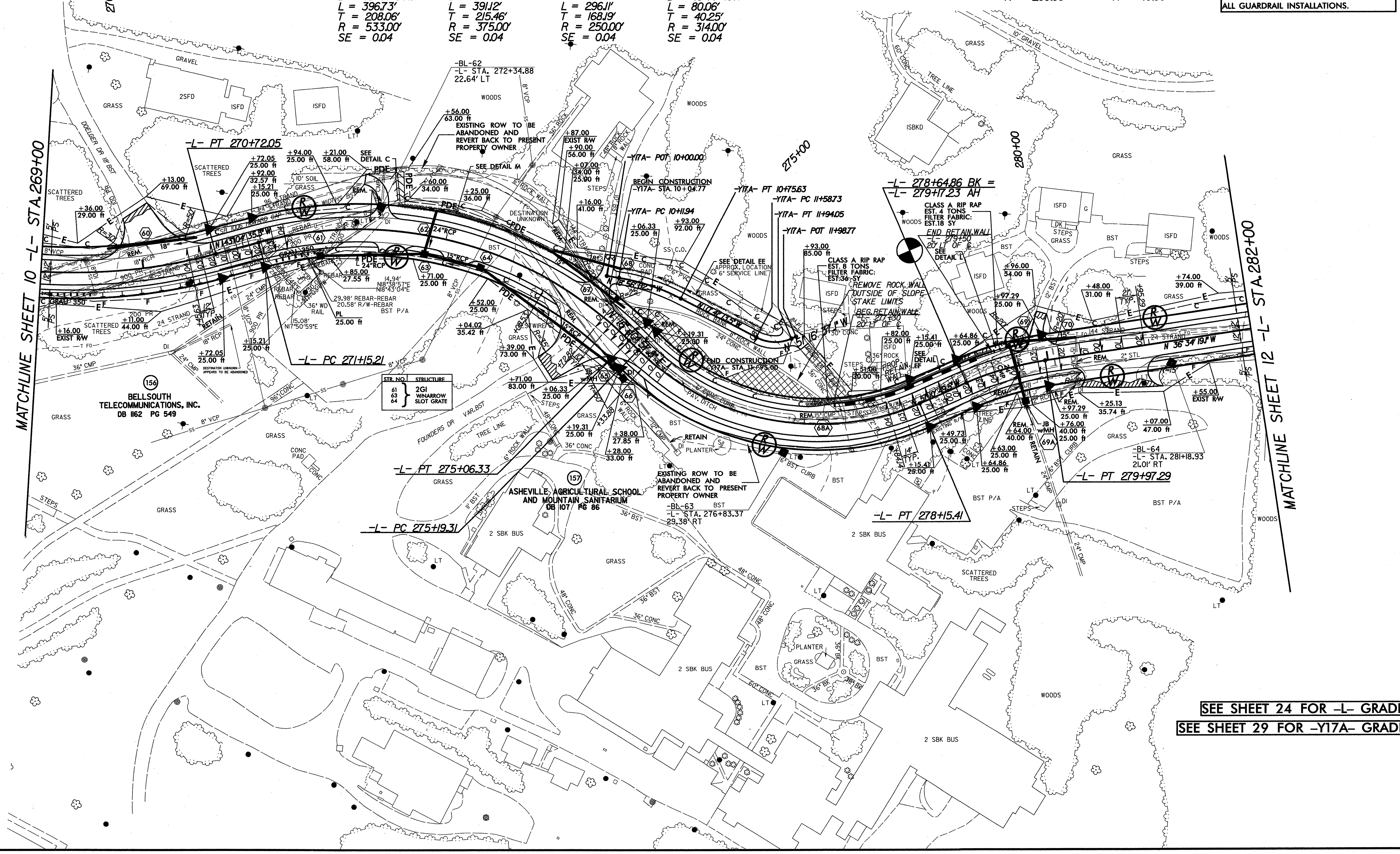
NAD 83/95

-L-

PI Sta 268+83.38	PI Sta 273+30.67	PI Sta 276+87.50	PI Sta 279+57.48
Δ = 42° 38' 49.8" (LT)	Δ = 59° 45' 33.1" (RT)	Δ = 67° 51' 47.4" (LT)	Δ = 14° 36' 30.5" (RT)
D = 10° 44' 58.8"	D = 15° 16' 43.9"	D = 22° 55' 05.9"	D = 18° 14' 49.4"
L = 396.73'	L = 391.12'	L = 296.11'	L = 80.06'
T = 208.06'	T = 215.46'	T = 168.19'	T = 40.25'
R = 533.00'	R = 375.00'	R = 250.00'	R = 314.00'
SE = 0.04	SE = 0.04	SE = 0.04	SE = 0.04

-Y17A

PI Sta 10+44.06	PI Sta 11+77.63
Δ = 18° 14' 48.8" (RT)	Δ = 50° 35' 23.6'
D = 28° 38' 52.4"	D = 143° 14' 22.0"
L = 63.69'	L = 35.32'
T = 32.12'	T = 18.90'
R = 200.00'	R = 40.00'



SEE SHEET 24 FOR -L- GRADE

SEE SHEET 29 FOR -Y17A- GRADE

8/17/99

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

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8/17/99

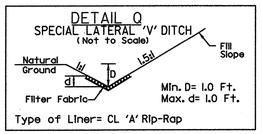
PROJECT REFERENCE NO.	SHEET NO.
R-5207B	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

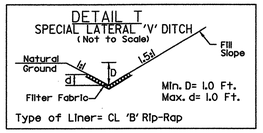
HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

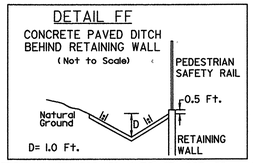
NOTE:
USE EXTRA LONG GUARDRAIL POSTS IN PLACE OF STANDARD LENGTH POSTS FOR ALL GUARDRAIL INSTALLATIONS.



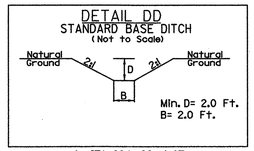
FROM -Y18- STA. 11+30+/- TO STA. 12+20+/- LT
CL 'A' RIP RAP: EST. 15 TONS
FILTER FABRIC: EST. 65 SY



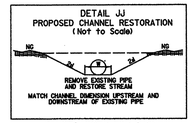
FROM STA. 291+75+/- TO STA. 292+10+/- RT
CL 'B' RIP RAP: EST. 12 TONS
FILTER FABRIC: EST. 34 SY



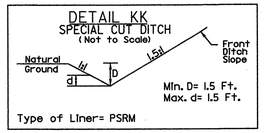
FROM -L- STA. 285+50+/- TO STA. 287+00+/- LT



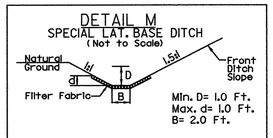
-L- STA. 294+20+/- LT
D.D.E.: EST. 16 CY



-L- STA. 292+78+/- LT



FROM -L- STA. 294+20+/- TO STA. 300+00+/- LT
EST. PSRM = 250 SY



FROM -Y18- STA. 10+43+/- TO STA. 15+50+/- RT
CL 'B' RIP RAP: EST. 194 TONS
FILTER FABRIC: EST. 530 SY

FROM -L- STA. 287+50+/- TO STA. 289+00+/- LT
CL 'A' RIP RAP: EST. 23 TONS
FILTER FABRIC: EST. 117 SY

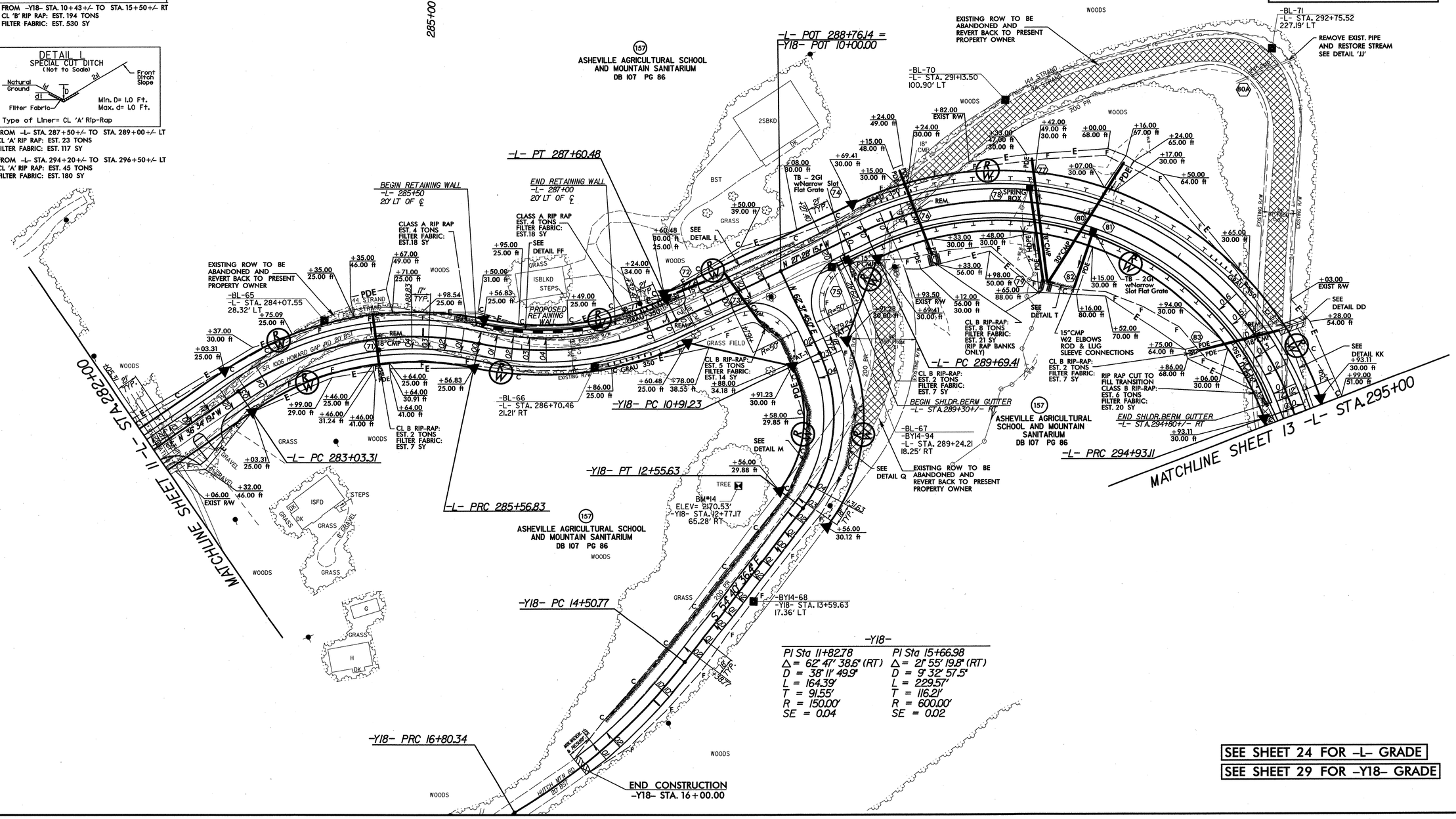
FROM -L- STA. 294+20+/- TO STA. 296+50+/- LT
CL 'A' RIP RAP: EST. 45 TONS
FILTER FABRIC: EST. 180 SY

-L-

PI Sta 284+37.44	PI Sta 286+62.38	PI Sta 293+15.46	PI Sta 298+69.84
Δ = 46° 15' 36.1" (RT)	Δ = 37° 09' 32.1" (LT)	Δ = 95° 33' 38.5" (RT)	Δ = 100° 22' 40.7" (LT)
D = 18° 14' 49.4"	D = 18° 14' 49.4"	D = 18° 14' 49.4"	D = 18° 14' 49.4"
L = 253.52'	L = 203.64'	L = 523.70'	L = 550.10'
T = 134.13'	T = 105.55'	T = 346.06'	T = 376.73'
R = 314.00'	R = 314.00'	R = 314.00'	R = 314.00'
SE = 0.04	SE = 0.04	SE = 0.06	SE = 0.06

76	30"CMP – BURY INVERTS 0.5' BELOW STREAM BED
77	18"CMP – BURY INVERTS 0.3' BELOW STREAM BED 0.064" WALL THICKNESS CLASS III SELECT BACKFILL MATERIAL REQUIRED
80	30"CMP – BURY INVERTS 0.5' BELOW STREAM BED 0.138 WALL THICKNESS CLASS III SELECT BACKFILL MATERIAL REQUIRED

NAD 83 /95



-Y18-

PI Sta 11+82.78	PI Sta 15+66.98
Δ = 62° 47' 38.6" (RT)	Δ = 21° 55' 19.8" (RT)
D = 38° 11' 49.9"	D = 9° 32' 57.5"
L = 164.39'	L = 229.57'
T = 91.55'	T = 116.21'
R = 150.00'	R = 600.00'
SE = 0.04	SE = 0.02

SEE SHEET 24 FOR -L- GRADE

SEE SHEET 29 FOR -Y18- GRADE

SYSTIME
DGN
USERNAME
CHKLE

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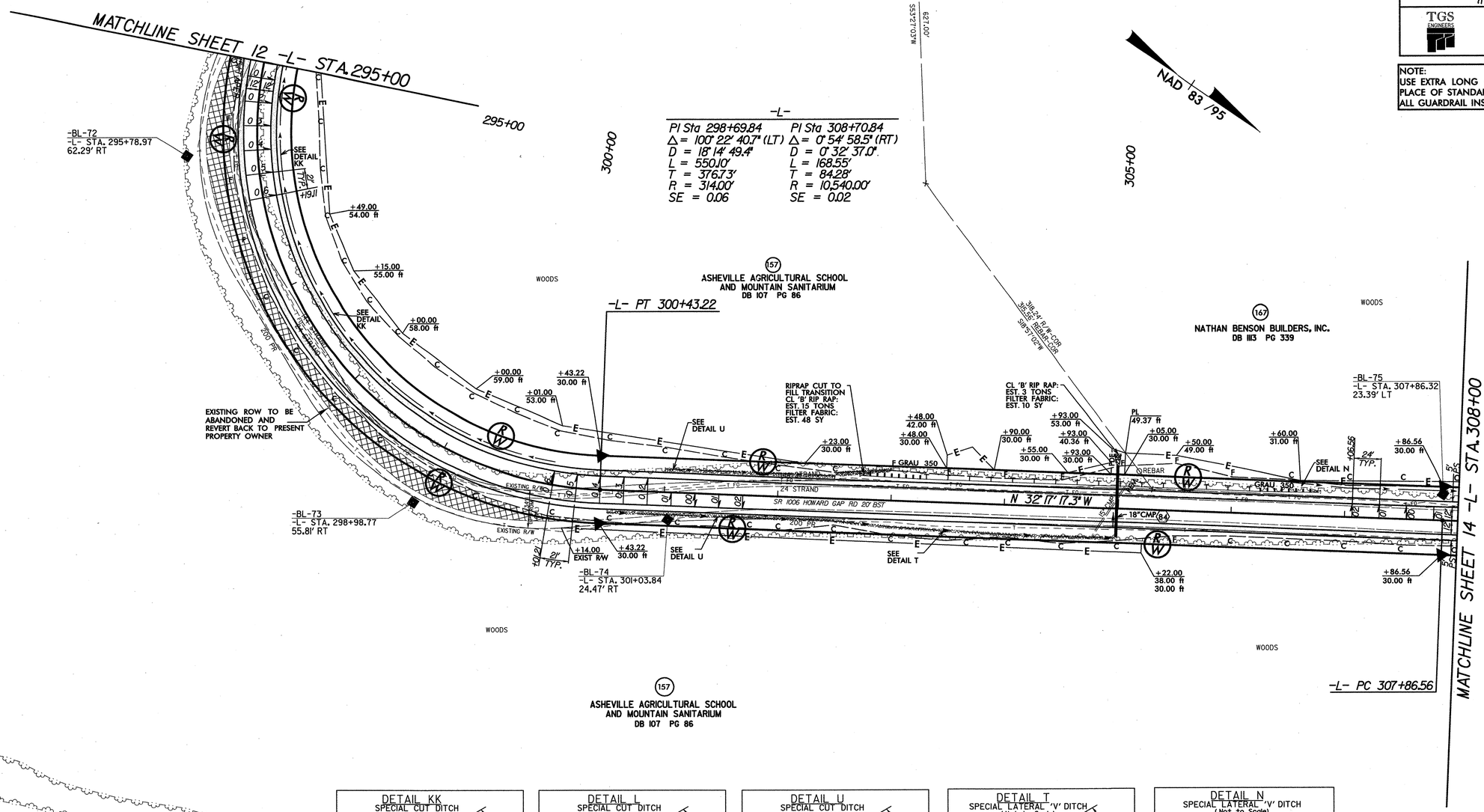
PROJECT REFERENCE NO.	SHEET NO.
R-5207B	13
RW SHEET NO.	

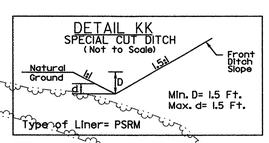
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

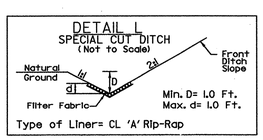
TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

NOTE:
USE EXTRA LONG GUARDRAIL POSTS IN PLACE OF STANDARD LENGTH POSTS FOR ALL GUARDRAIL INSTALLATIONS.



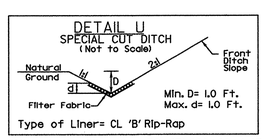


FROM -L- STA. 294+20+/- TO STA. 300+00+/- LT
EST. PSRM = 250 SY



FROM -L- STA. 294+20+/- TO STA.296+50+/- LT
CL 'A' RIP RAP: EST. 45 TONS
FILTER FABRIC: EST. 180 SY

USE -L- GRADE FOR DETAIL 'L'

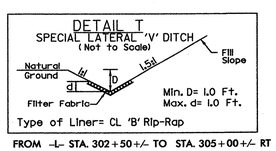


FROM -L- STA. 296+50+/- TO STA.298+00+/- LT
CL 'B' RIP RAP: EST. 71 TONS
FILTER FABRIC: EST. 205 SY

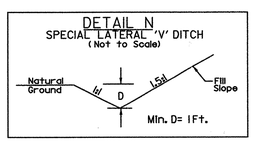
FROM -L- STA. 300+50+/- TO STA.302+50+/- RT
CL 'B' RIP RAP: EST. 57 TONS
FILTER FABRIC: EST. 164 SY

FROM -L- STA. 301+00+/- TO STA.302+50+/- LT
CL 'B' RIP RAP: EST. 43 TONS
FILTER FABRIC: EST. 123 SY

USE -L- GRADE FOR DETAIL 'U'



FROM -L- STA. 302+50+/- TO STA. 305+00+/- RT
CL 'B' RIP RAP: EST. 72 TONS
FILTER FABRIC: EST. 206 SY



FROM -L- STA. 306+50+/- TO STA. 310+00+/- LT

SEE SHEET 25 FOR -L- GRADE

8/17/99

SYSTIME$ SYSNAME$ DGN$ USERNAME$ GRAPHDATE$

i207B_rdy_psh13.dgn 4/11/2012 7:30:40 AM

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	14
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

NOTE:
USE EXTRA LONG GUARDRAIL POSTS IN PLACE OF STANDARD LENGTH POSTS FOR ALL GUARDRAIL INSTALLATIONS.

DETAIL N
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground; 1d; D; 1.5d; Fill Slope; Min. D= 1Ft.

FROM -L- STA. 306+50+/- TO STA. 310+00+/- LT

DETAIL Q
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground; 1d; d1; D; 1.5d; Fill Slope; Filter Fabric; Min. D= 1.0 Ft.; Max. d= 1.0 Ft.

Type of Liner= CL 'A' Rip-Rap

FROM STA. 308+50+/- TO STA. 310+50+/- RT
CL 'A' RIP RAP: EST. 34 TONS
FILTER FABRIC: EST. 144 SY

FROM STA. 314+00+/- TO STA. 315+80+/- LT
CL 'A' RIP RAP: EST. 31 TONS
FILTER FABRIC: EST. 130 SY

FROM STA. 317+85+/- TO STA. 319+50+/- LT
CL 'A' RIP RAP: EST. 30 TONS
FILTER FABRIC: EST. 120 SY

DETAIL T
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground; 1d; d1; D; 1.5d; Fill Slope; Filter Fabric; Min. D= 1.0 Ft.; Max. d= 1.0 Ft.

Type of Liner= CL 'B' Rip-Rap

FROM STA. 316+75+/- TO STA. 318+00+/- LT
CL 'B' RIP RAP: EST. 7 TONS
FILTER FABRIC: EST. 21 SY

DETAIL V
CHANNEL CHANGE
(Not to Scale)

Natural Ground; 2d; d1; D; 2d; b; .04m/m; Proposed Fill Slope; Natural Ground; COIR FIBER MATTING; B; Exist. Channel; Min. D = 1.5 Ft; Max. d = 2.0 Ft; B = 3.0 Ft; b = 5.0 Ft

Type of Liner = COIR FIBER MATTING

FROM STA. 315+80+/- TO STA. 316+75+/- LT
COIR FIBER MATTING: EST. 180 SY
D.D.E. EST. 105 CY

(168) NATHAN BENSON BUILDERS,INC. DB 1113 PG 339 DB 1060 PG 247

(171) REBECCA S.CHRISTENSEN DB 1260 PG 94

(173) LESLIE L.MILLAR DB 1065 PG 430

NAD 83 /95

-L-

PI Sta 308+70.84	PI Sta 314+37.06	PI Sta 321+46.05
Δ= 0° 54' 58.5" (RT)	Δ= 48° 39' 48.2" (LT)	Δ= 56° 42' 33.9" (RT)
D = 0° 32' 37.0"	D = 9° 45' 38.8"	D = 9° 45' 38.8"
L = 168.55'	L = 498.56'	L = 580.99'
T = 84.28'	T = 265.43'	T = 316.79'
R = 10,540.00'	R = 587.00'	R = 587.00'
SE = 0.02	SE = 0.08	SE = 0.04

NOTE #1: CLOSE WELL IN ACCORDANCE WITH HENDERSON COUNTY HEALTH DEPT. REQUIREMENTS.

MATCHLINE SHEET 13 -L- STA. 308+00

MATCHLINE SHEET 15 -L- STA. 321+00

-Y20- POT 10+00.00

-Y20- PC 10+57.10

BEGIN CONSTRUCTION
-Y20- 11+50.00

-Y20- PT 11+52.10

-L- PT 316+70.19

-L- POC 319+76.71 =
-Y20- POT 12+58.05

-L- PC 318+29.27

-L- PC 311+71.63

-L- PT 309+55.11

-L- POT 311+43.77 =
-Y19- POT 10+00.00

-Y19- PC 11+22.48

-Y19- PT 12+39.04

-Y19- POT 12+81.07

END CONSTRUCTION
-Y19- STA. 12+50.00

(167) NATHAN BENSON BUILDERS, INC. DB 1113 PG 339 DB 1060 PG 247

(169) ROBERT T. BOWLIN DB 757 PG 303

(157) ASHEVILLE AGRICULTURAL SCHOOL AND MOUNTAIN SANITARIUM DB 107 PG 86

(170) BERRY BOYS, INC. SLIDE 3293

(89) 42"CMP – BURY INVERTS 0.7' BELOW STREAM BED

(91) 42"CMP – BURY INVERTS 0.7' BELOW STREAM BED

CL 'B' RIP RAP: EST. 3 TONS
FILTER FABRIC: EST. 10 SY

CL 'B' RIP RAP: EST. 2 TONS
FILTER FABRIC: EST. 7 SY

EXISTING ROW TO BE ABANDONED AND REVERT BACK TO PRESENT PROPERTY OWNER

CLASS I RIP-RAP: EST. 20 TONS
FILTER FABRIC: EST. 39 SY
(RIP-RAP BANKS ONLY)

CLASS I RIP-RAP: EST. 20 TONS
FILTER FABRIC: EST. 39 SY
(RIP RAP BANKS ONLY)

-BL-76
BY15-95
-Y19- STA. 10+26.44
7.24' RT

-BL-78
-L- STA. 314+55.35
31.39' RT

-BL-79
-Y20- STA. 12+45.34
11.80' RT

BM#15
ELEV= 2173.30'
-Y19- STA. 11+72.69
47.67' RT

-BY15-77
-Y19- STA. 12+25.88
14.71' RT

-Y19-

PI Sta 11+85.64
Δ= 54° 44' 25.1" (LT)
D = 46° 57' 49.5"
L = 116.56'
T = 63.16'
R = 122.00'
SE = 0.06

-Y20-

PI Sta 11+05.67
Δ= 29° 25' 15.9" (RT)
D = 30° 58' 14.5"
L = 95.00'
T = 48.57'
R = 185.00'
SE = EXIST.

DETAIL L
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground; 1d; d1; D; 2d; Front Ditch Slope; Filter Fabric; Min. D= 1.0 Ft.; Max. d= 1.0 Ft.

Type of Liner= CL 'A' Rip-Rap

FROM -L- STA. 320+10+/- TO STA.321+50+/- LT
CL 'A' RIP RAP: EST. 27 TONS
FILTER FABRIC: EST. 110 SY

DETAIL W
STANDARD BASE DITCH
(Not to Scale)

Natural Ground; 2d; d1; D; 2d; Natural Ground; Filter Fabric; B; Min. D= 4 Ft.; Max. d= 2 Ft.; B= 3 Ft.

When B is > 6.0' Std. No. 876.01

Type of Liner= CL 'B' Rip-Rap

STA. 318+86+/- LT
CL B RIP RAP: EST. 5 TONS
FILTER FABRIC: EST. 130 SY
D.D.E.: EST. 22 CY

SEE SHEET 25 FOR -L- GRADE
SEE SHEET 29 FOR -Y19- & -Y20- GRADE

8/17/99
SYSTIME = $$$$ DGN = $$$$ USER = $$$$ DGNNAME = $$$$
207B_rdy_psh14.dgn 4/11/2012 7:31:27 AM

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	15
RW SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 035018 ENGINEER JIMMY L. TERRY JR. 4/20/12

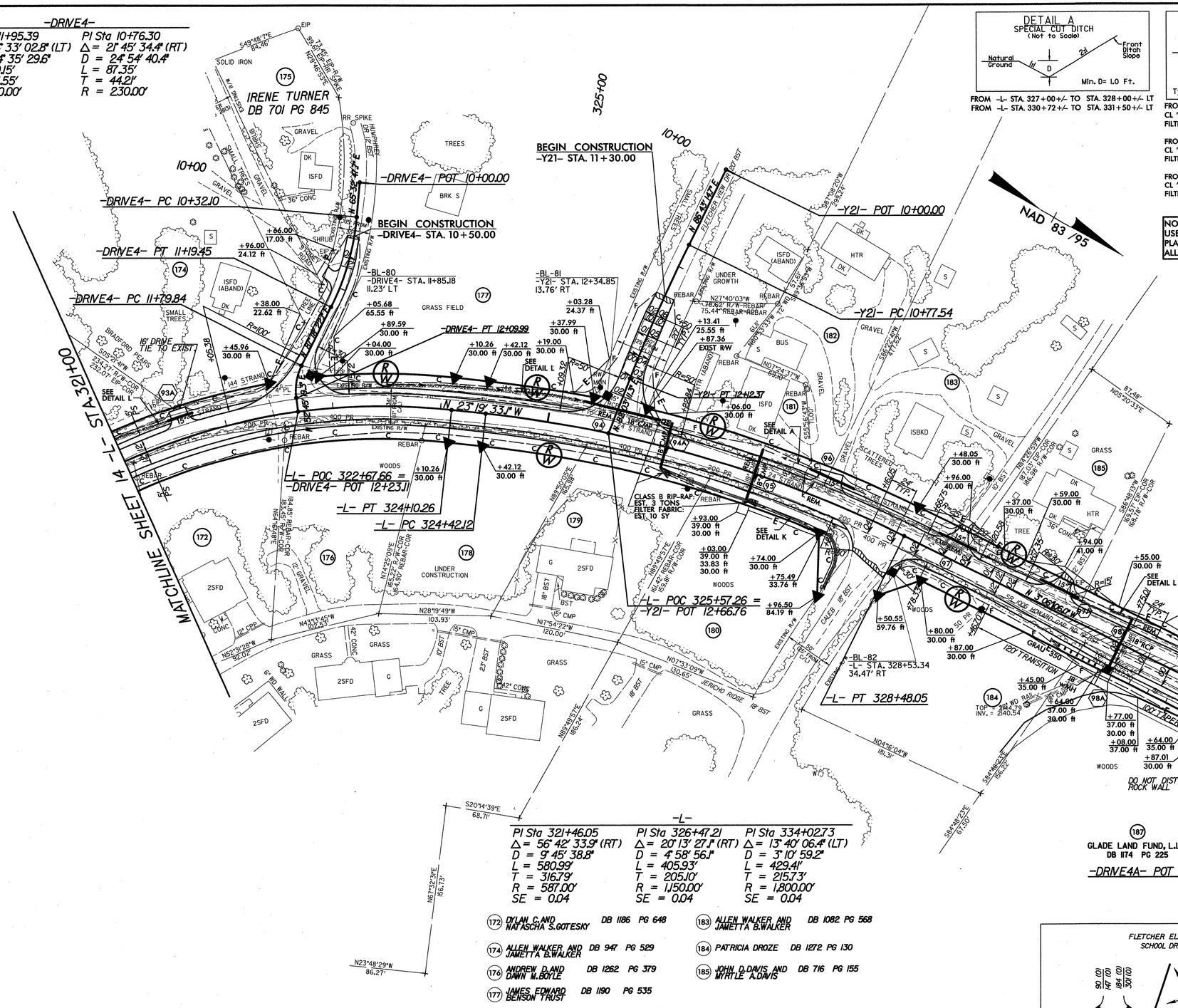
HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 035018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

-DRIVE4-

PI Sta 11+95.39
Δ = 34° 33' 02.8" (LT)
D = 114° 35' 29.6"
L = 30.15'
T = 15.55'
R = 50.00'

PI Sta 10+76.30
Δ = 21° 45' 34.4" (RT)
D = 24° 54' 40.4"
L = 87.35'
T = 44.21'
R = 230.00'



DETAIL A
SPECIAL CUT DITCH (Not to Scale)

Natural Ground, 1:1, D, 2:1, Front Ditch Slope. Min. D= 1.0 Ft.

FROM -L- STA. 327+00+/- TO STA. 328+00+/- LT
FROM -L- STA. 330+72+/- TO STA. 331+50+/- LT

DETAIL L
SPECIAL CUT DITCH (Not to Scale)

Natural Ground, 1:1, D, d1, 2:1, Front Ditch Slope. Filter Fabric. Min. D= 1.0 Ft. Max. d= 1.0 Ft.

Type of Liner= CL 'A' Rip-Rap

FROM -L- STA. 320+10+/- TO STA.321+50+/- LT
CL 'A' RIP RAP: EST. 27 TONS
FILTER FABRIC: EST. 110 SY

FROM -L- STA. 323+50+/- TO STA. 325+30+/- LT
CL 'A' RIP RAP: EST. 34 TONS
FILTER FABRIC: EST. 140 SY

FROM -L- STA. 330+50+/- TO STA. 330+72+/- LT
CL 'A' RIP RAP: EST. 4 TONS
FILTER FABRIC: EST. 17 SY

NOTE:
USE EXTRA LONG GUARDRAIL POSTS IN PLACE OF STANDARD LENGTH POSTS FOR ALL GUARDRAIL INSTALLATIONS.

DETAIL K
SPECIAL CUT BASE DITCH (Not to Scale)

Natural Ground, 1:1, D, 2:1, Front Ditch Slope, B. Min. D= 1Ft. B= 2 Ft.

FROM -L- STA. 326+12+/- TO STA. 328+00+/- RT

-Y21-

PI Sta 11+44.99
Δ = 4° 40' 03.4" (LT)
D = 3° 27' 43.1"
L = 134.83'
T = 67.45'
R = 1,655.00'
SE = EXIST.

-L-

PI Sta 321+46.05	PI Sta 326+47.21	PI Sta 334+02.73
Δ = 56° 42' 33.9" (RT)	Δ = 20° 13' 27.1" (RT)	Δ = 13° 40' 06.4" (LT)
D = 9° 45' 38.8"	D = 4° 58' 56.1"	D = 3° 10' 59.2"
L = 580.99'	L = 405.93'	L = 429.41'
T = 316.79'	T = 205.10'	T = 215.73'
R = 587.00'	R = 1,150.00'	R = 1,800.00'
SE = 0.04	SE = 0.04	SE = 0.04

(172) DYLAN C. AND NATASCHA S. GOTESKY DB 1186 PG 648
(174) ALLEN WALKER AND JAMETTA B. WALKER DB 947 PG 529
(176) ANDREW D. AND DAWN M. BOYLE DB 1262 PG 379
(177) JAMES EDWARD BENSON TRUST DB 1190 PG 535
(178) STEVEN M. MCDOWELL AND ANTIJE MCDOWELL DB 1221 PG 530
(179) JEFFREY W. KLUTTZ, PAMELA J. KLUTTZ AND MARY E. KLUTTZ DB 1142 PG 85
(180) VANESSA MADDEN DB 1017 PG 161
(181) OTELIA WILSON DB 806 PG 157
(182) WILLIAM WILSON, JR. AND KATHY S. WILSON DB 806 PG 175
(183) ALLEN WALKER AND JAMETTA B. WALKER DB 1082 PG 568
(184) PATRICIA DROZE DB 1272 PG 130
(185) JOHN D. DAVIS AND MYRTLE A. DAVIS DB 716 PG 155

SEE SHEET 26 FOR -L- GRADE
SEE SHEET 29 FOR -DRIVE4-, -DRIVE4A- & -Y21- GRADE

SYSTEMNAME=$$$$ CONFIG=$$$$ USER=$$$$ FORMNAME=$$$$
r5207b_rdy_psh15.dgn 4/11/2012 7:32:52 AM

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	16
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 25018 ENGINEER JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
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SUITE 141
975 WALNUT STREET
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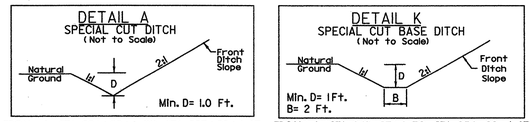
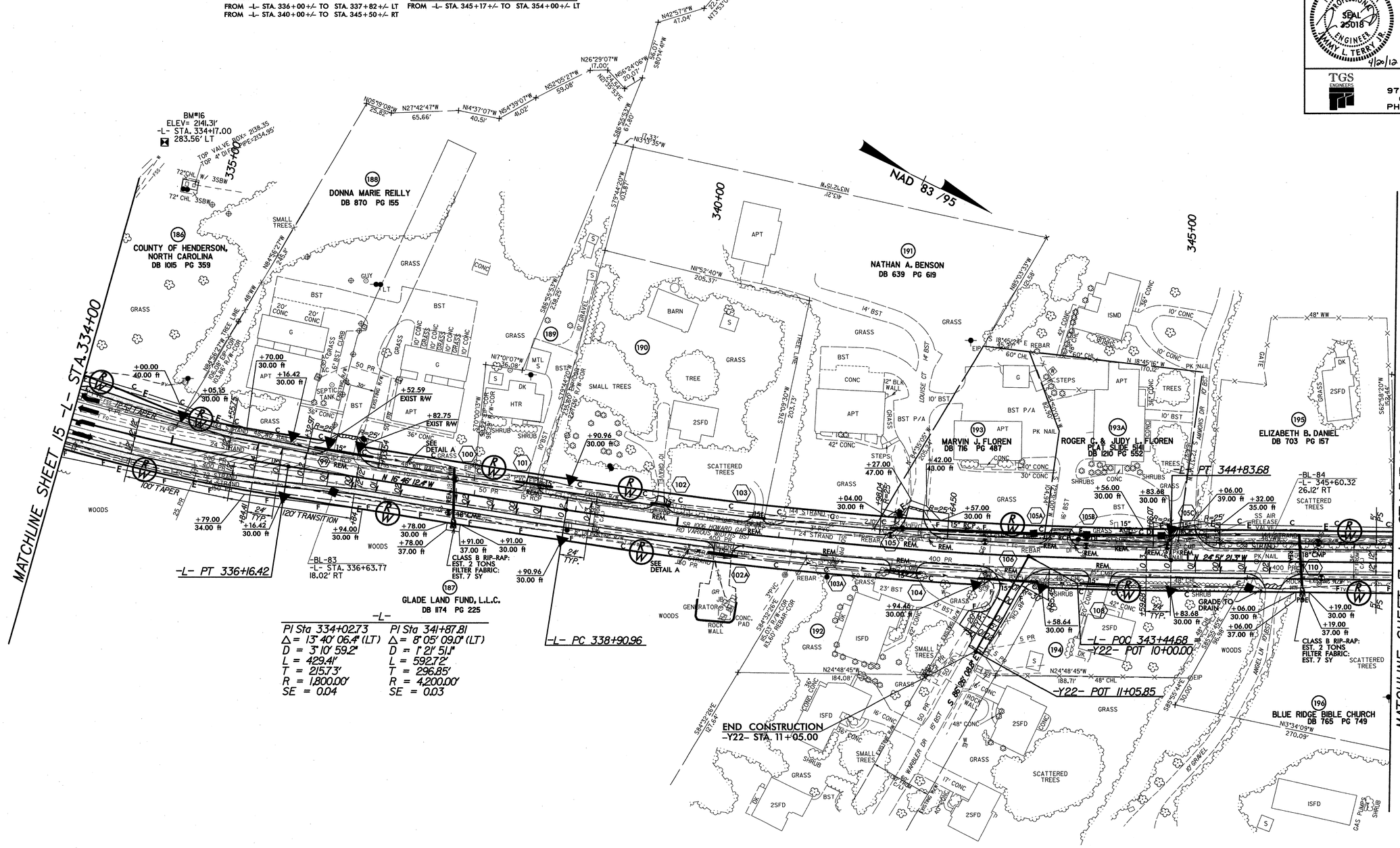


FROM -L- STA. 336+00+/- TO STA. 337+82+/- LT
FROM -L- STA. 340+00+/- TO STA. 345+50+/- RT

FROM -L- STA. 345+17+/- TO STA. 354+00+/- LT



(189) JOSEPH C.KUYKENDALL DB 597 PG 511 AND EDITH KUYKENDALL

(190) LARRY WAYNE WALKER DB 533 PG 245

(192) BRUCE A.JONES AND DARLENE P.JONES DB 1034 PG 297

(194) CARRIE M.WALKER DB 1180 PG 625

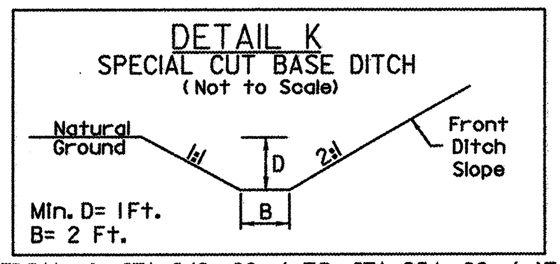
SEE SHEET 26 FOR -L- GRADE
SEE SHEET 29 FOR -Y22- GRADE

8/17/99
SYSTIME$ DGN $FILENAME$
207B_rdy_psh16.dgn 4/11/2012 7:33:35 AM

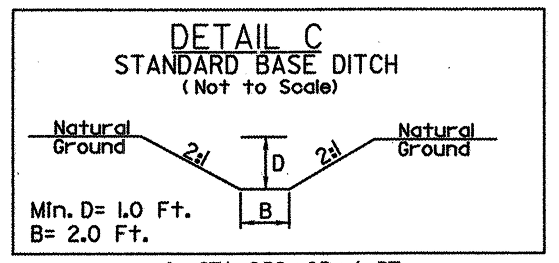
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12	NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

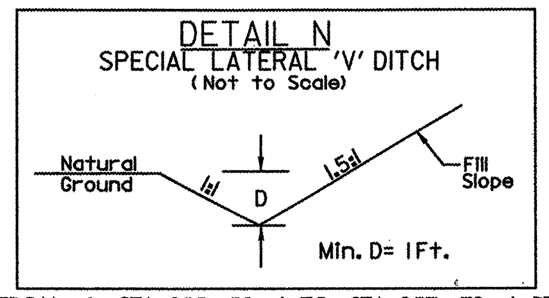
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850



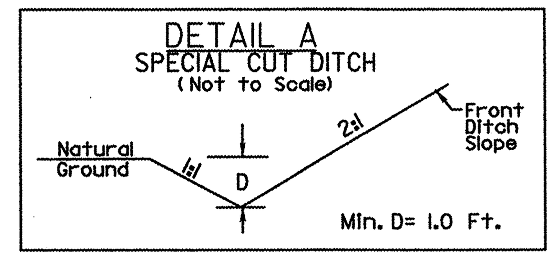
FROM -L- STA. 342+00+/- TO STA. 354+00+/- LT



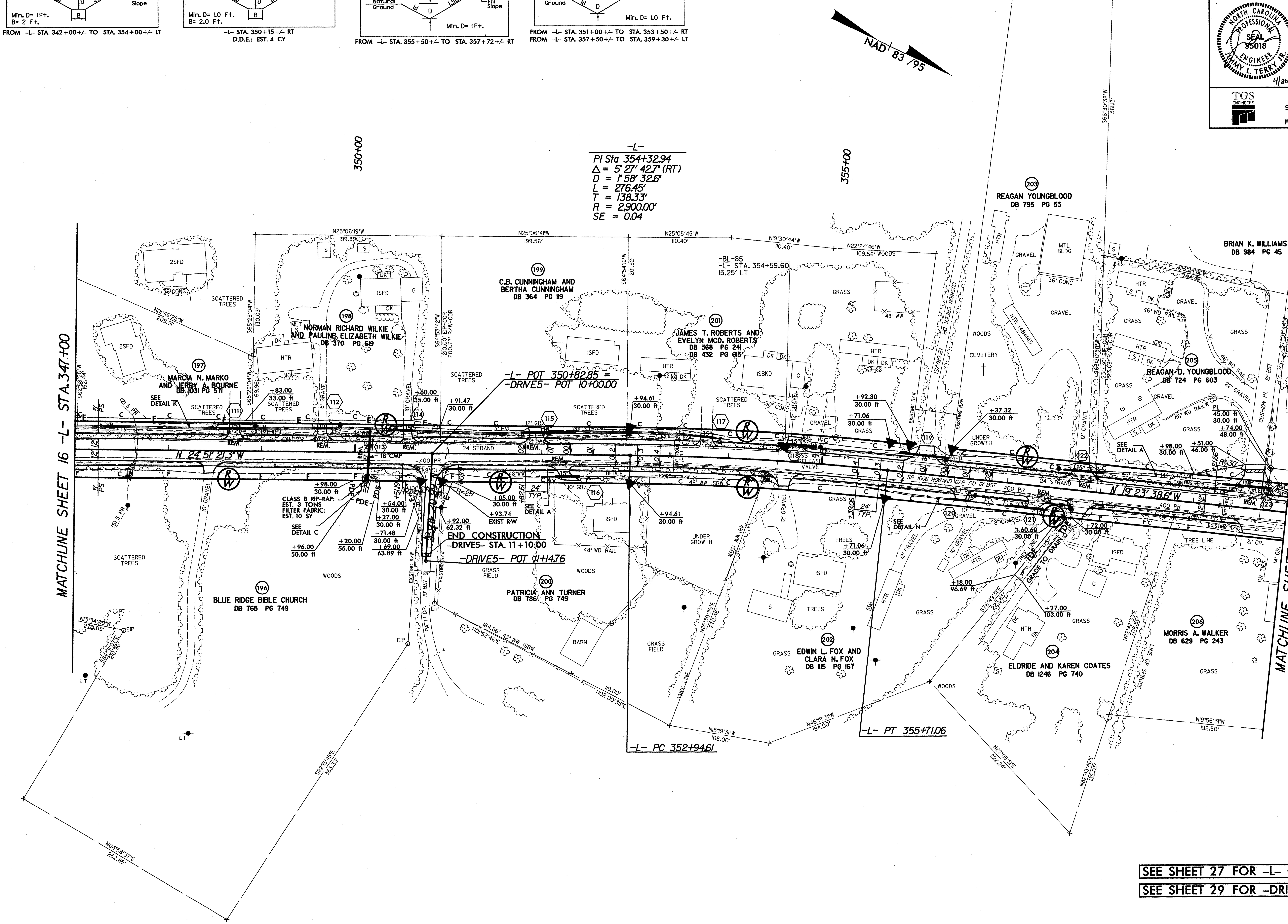
-L- STA. 350+15+/- RT
D.D.E.: EST. 4 CY



FROM -L- STA. 355+50+/- TO STA. 357+72+/- RT



FROM -L- STA. 351+00+/- TO STA. 353+50+/- RT
FROM -L- STA. 357+50+/- TO STA. 359+30+/- LT



SEE SHEET 27 FOR -L- GRADE

SEE SHEET 29 FOR -DRIVE5- GRADE

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

207B_rdy_psh17.dgn 4/11/2012 7:34:29 AM

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	18
R/W SHEET NO.	

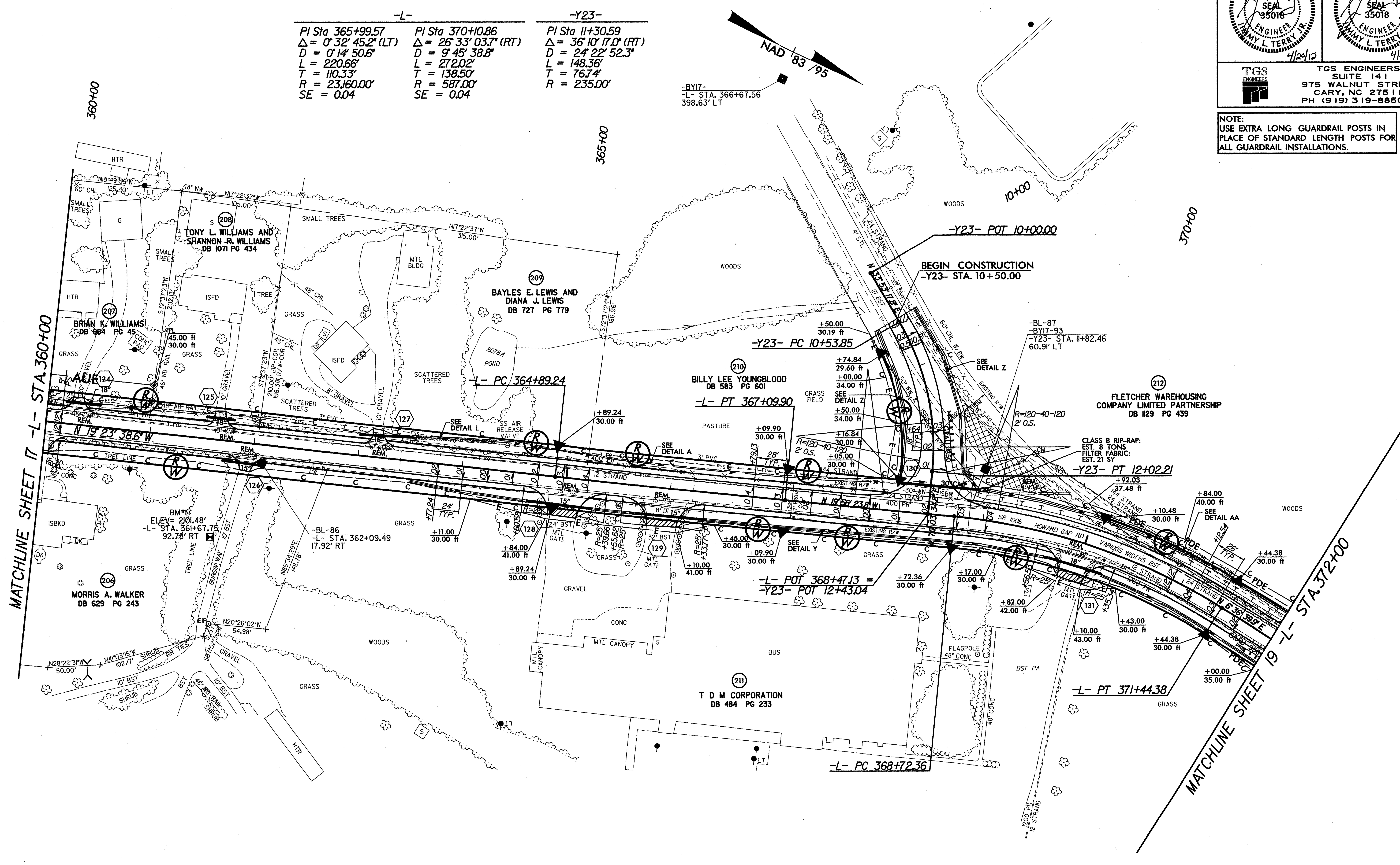
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY JR. 4/20/12

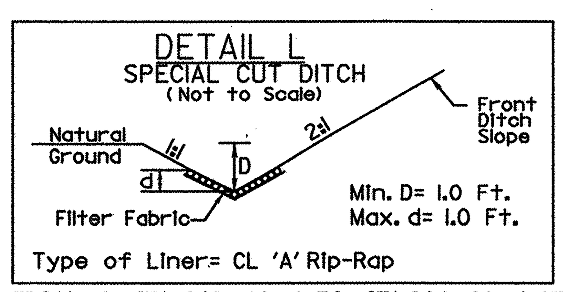
HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

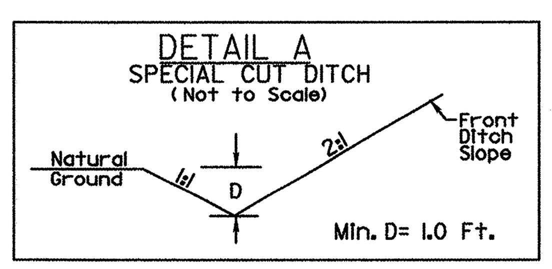
NOTE:
USE EXTRA LONG GUARDRAIL POSTS IN PLACE OF STANDARD LENGTH POSTS FOR ALL GUARDRAIL INSTALLATIONS.

-L-	-L-	-Y23-
PI Sta 365+99.57	PI Sta 370+10.86	PI Sta 11+30.59
△ = 0°32′45.2″ (LT)	△ = 26°33′03.7″ (RT)	△ = 36°10′17.0″ (RT)
D = 0°14′50.6″	D = 9°45′38.8″	D = 24°22′52.3″
L = 220.66′	L = 272.02′	L = 148.36′
T = 110.33′	T = 138.50′	T = 76.74′
R = 23,160.00′	R = 587.00′	R = 235.00′
SE = 0.04	SE = 0.04	

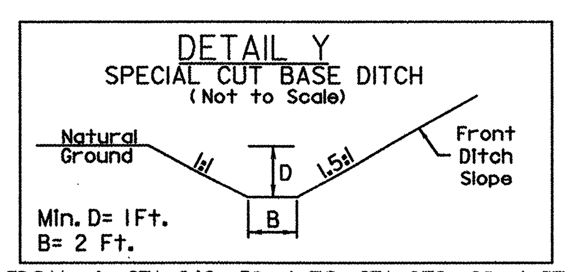




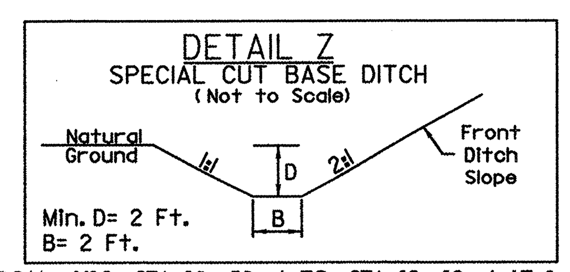
FROM -L- STA. 363+00+/- TO STA.364+30+/- LT
CL 'A' RIP RAP: EST. 25 TONS
FILTER FABRIC: EST. 101 SY



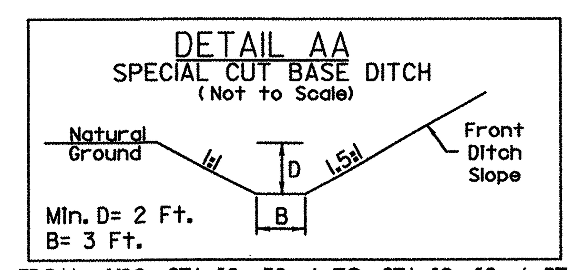
FROM -L- STA. 364+30+/- TO STA. 368+12+/- LT



FROM -L- STA. 363+50+/- TO STA. 373+90+/- RT



FROM -Y23- STA. 10+50+/- TO STA. 12+13+/- LT & RT



FROM -Y23- STA. 10+50+/- TO STA. 12+13+/- RT
FROM -L- STA. 368+90+/- TO STA. 374+04+/- LT

SEE SHEET 27 FOR -L- GRADE
SEE SHEET 29 FOR -Y23- GRADE

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

NOTE:
USE EXTRA LONG GUARDRAIL POSTS IN PLACE OF STANDARD LENGTH POSTS FOR ALL GUARDRAIL INSTALLATIONS.

PROJECT REFERENCE NO.	SHEET NO.
R-5207B	19
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L TERRY, JR. 4/20/12

TGS ENGINEERS
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CARY, NC 27511
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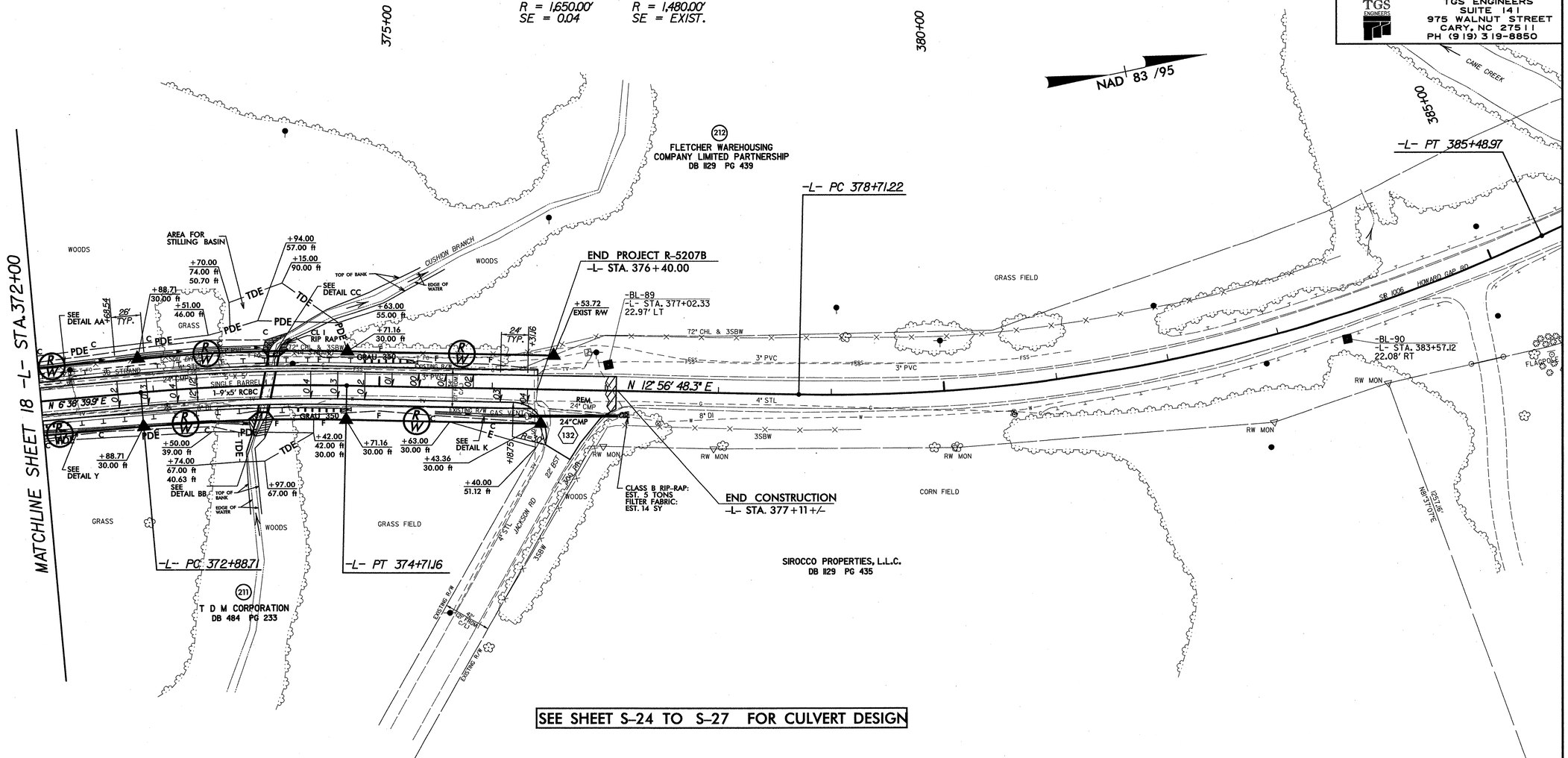
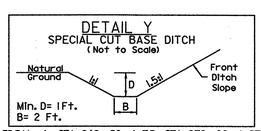
-L-

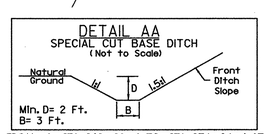
PI Sta 373+80.03	PI Sta 382+16.14
Δ = 6° 20' 08.4" (RT)	Δ = 26° 14' 17.0" (LT)
D = 3° 28' 20.9"	D = 3° 52' 16.8"
L = 182.45'	L = 677.75'
T = 91.32'	T = 344.93'
R = 1,650.00'	R = 1,480.00'
SE = 0.04	SE = EXIST.



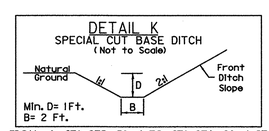
SEE SHEET S-24 TO S-27 FOR CULVERT DESIGN



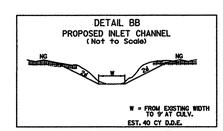
FROM -L- STA. 363+50+/- TO STA. 373+90+/- RT



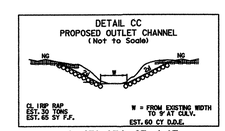
FROM -L- STA. 368+90+/- TO STA. 374+04+/- LT



FROM -L- STA. 375+50+/- TO STA. 376+30+/- RT



-L- STA. 373+96+/- RT



-L- STA. 374+07+/- LT

SEE SHEET 28 FOR -L- GRADE

8/17/99
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$$$$USERNAME$$$$
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PROJECT REFERENCE NO.	SHEET NO.
R-5207B	20

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY, JR.

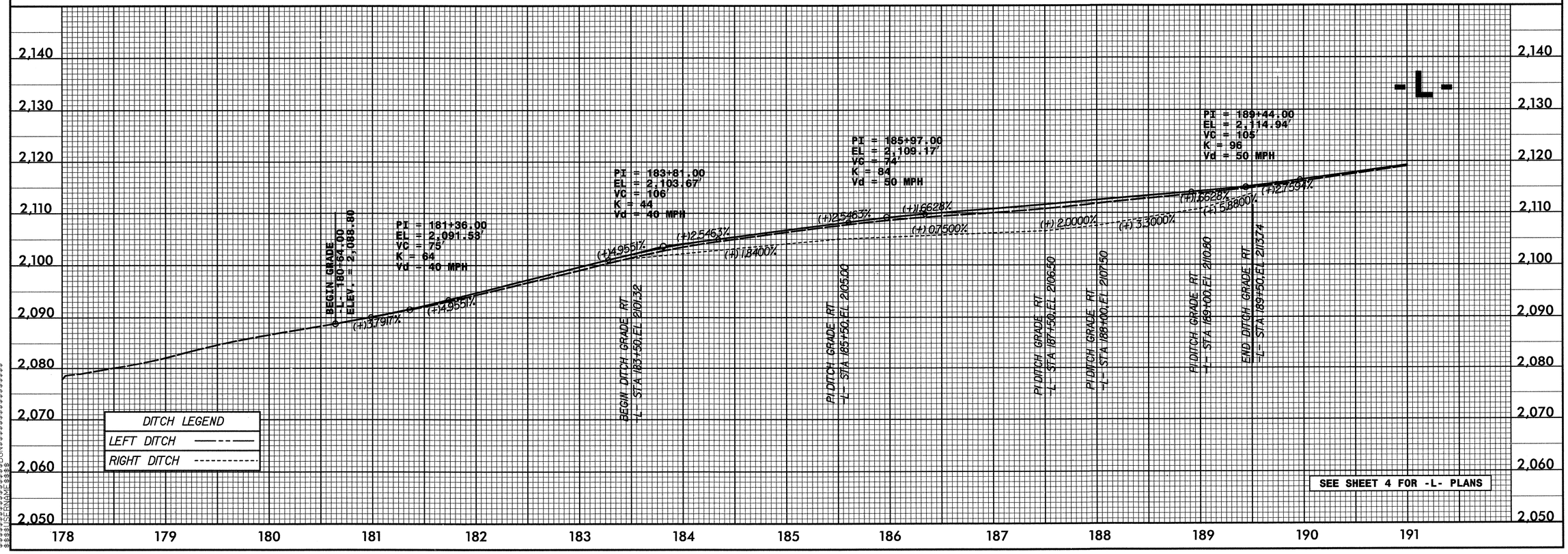
4/20/12

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY, JR.

4/20/12

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850



5/28/99

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PROJECT REFERENCE NO.	SHEET NO.
R-5207B	21

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
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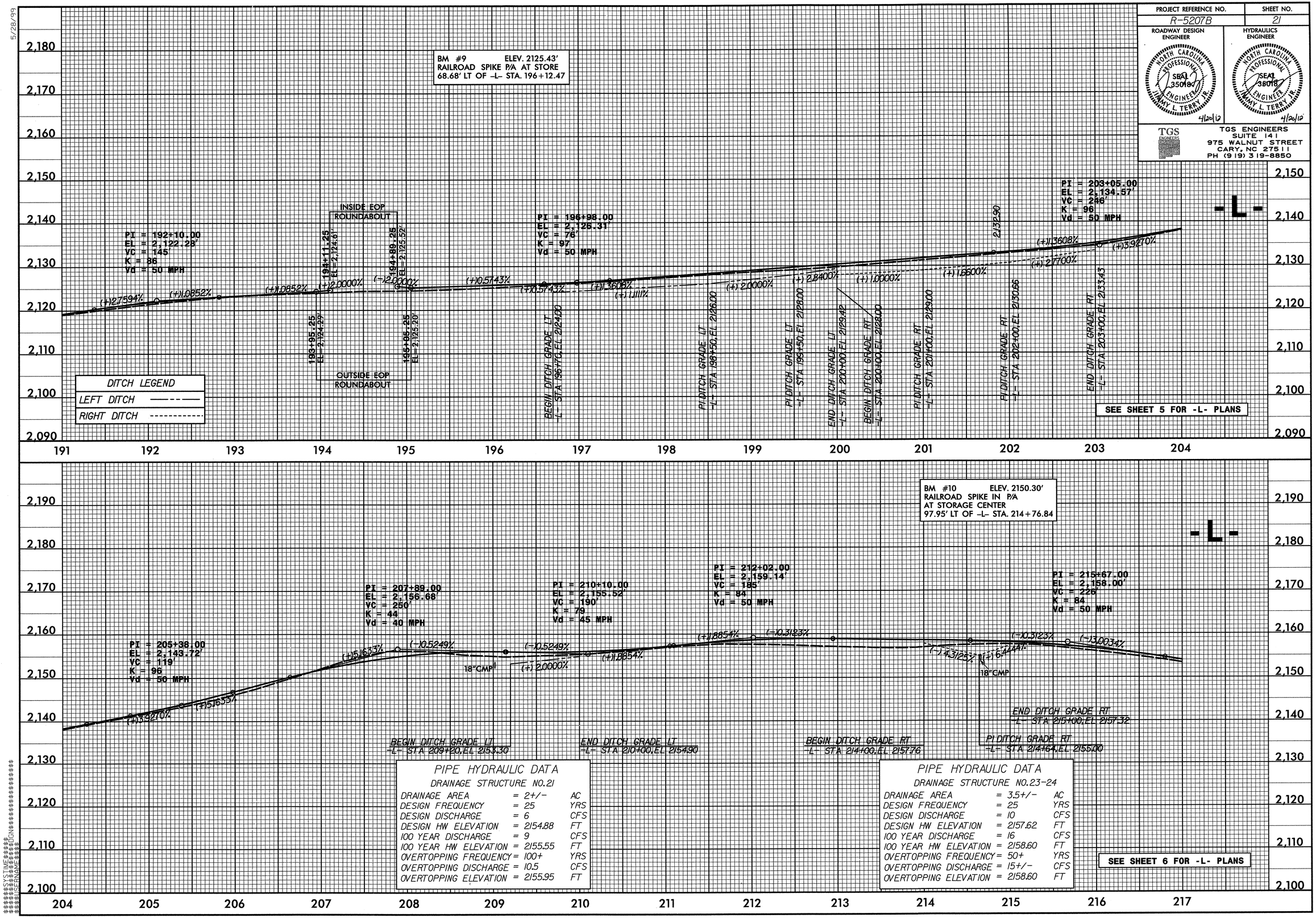

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.21

DRAINAGE AREA	= 2+/-	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 6	CFS
DESIGN HW ELEVATION	= 2154.88	FT
100 YEAR DISCHARGE	= 9	CFS
100 YEAR HW ELEVATION	= 2155.55	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 10.5	CFS
OVERTOPPING ELEVATION	= 2155.95	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.23-24

DRAINAGE AREA	= 3.5+/-	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 10	CFS
DESIGN HW ELEVATION	= 2157.62	FT
100 YEAR DISCHARGE	= 16	CFS
100 YEAR HW ELEVATION	= 2158.60	FT
OVERTOPPING FREQUENCY	= 50+	YRS
OVERTOPPING DISCHARGE	= 15+/-	CFS
OVERTOPPING ELEVATION	= 2158.60	FT

5/28/99
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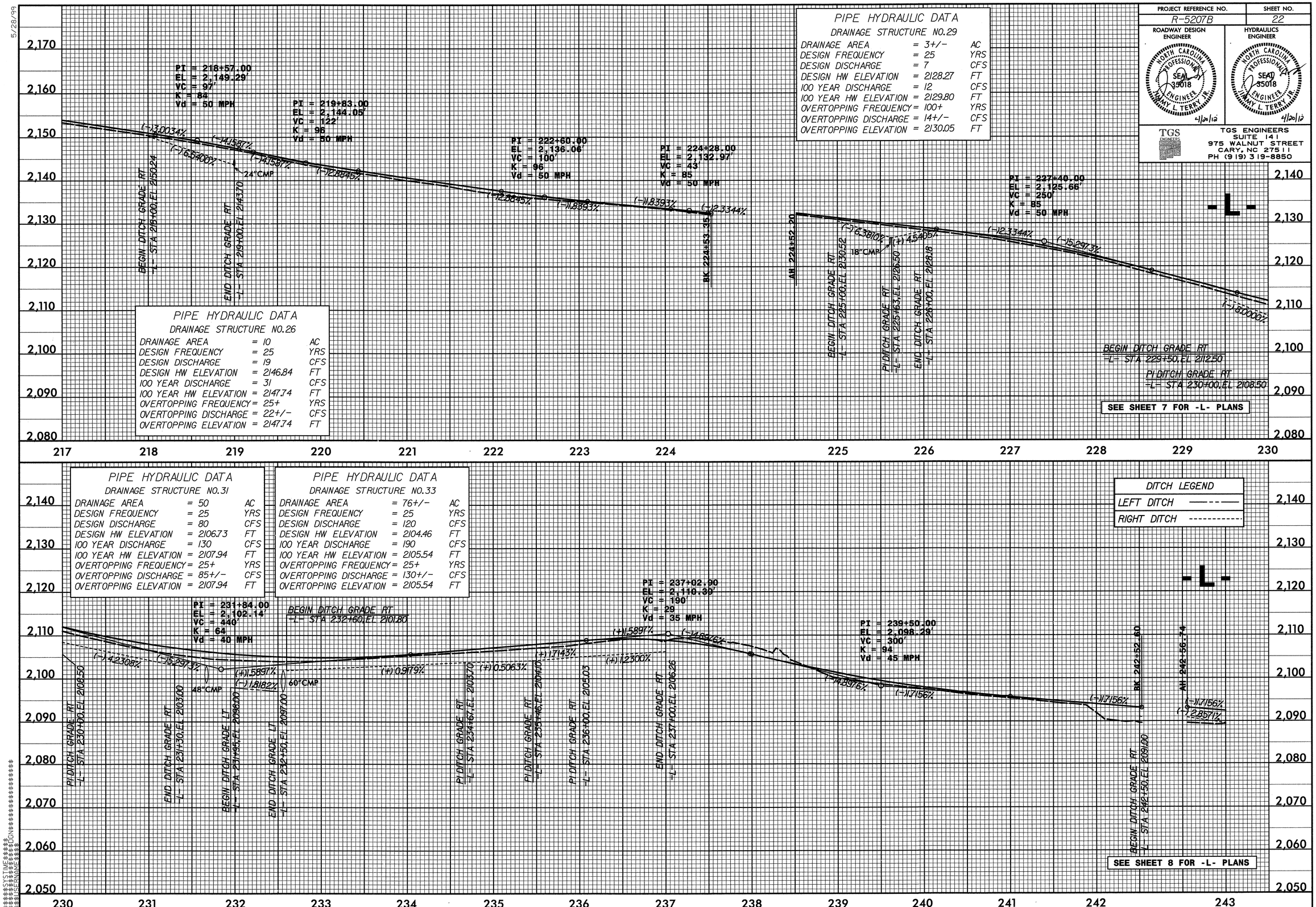
PROJECT REFERENCE NO.	SHEET NO.
R-5207B	22

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850



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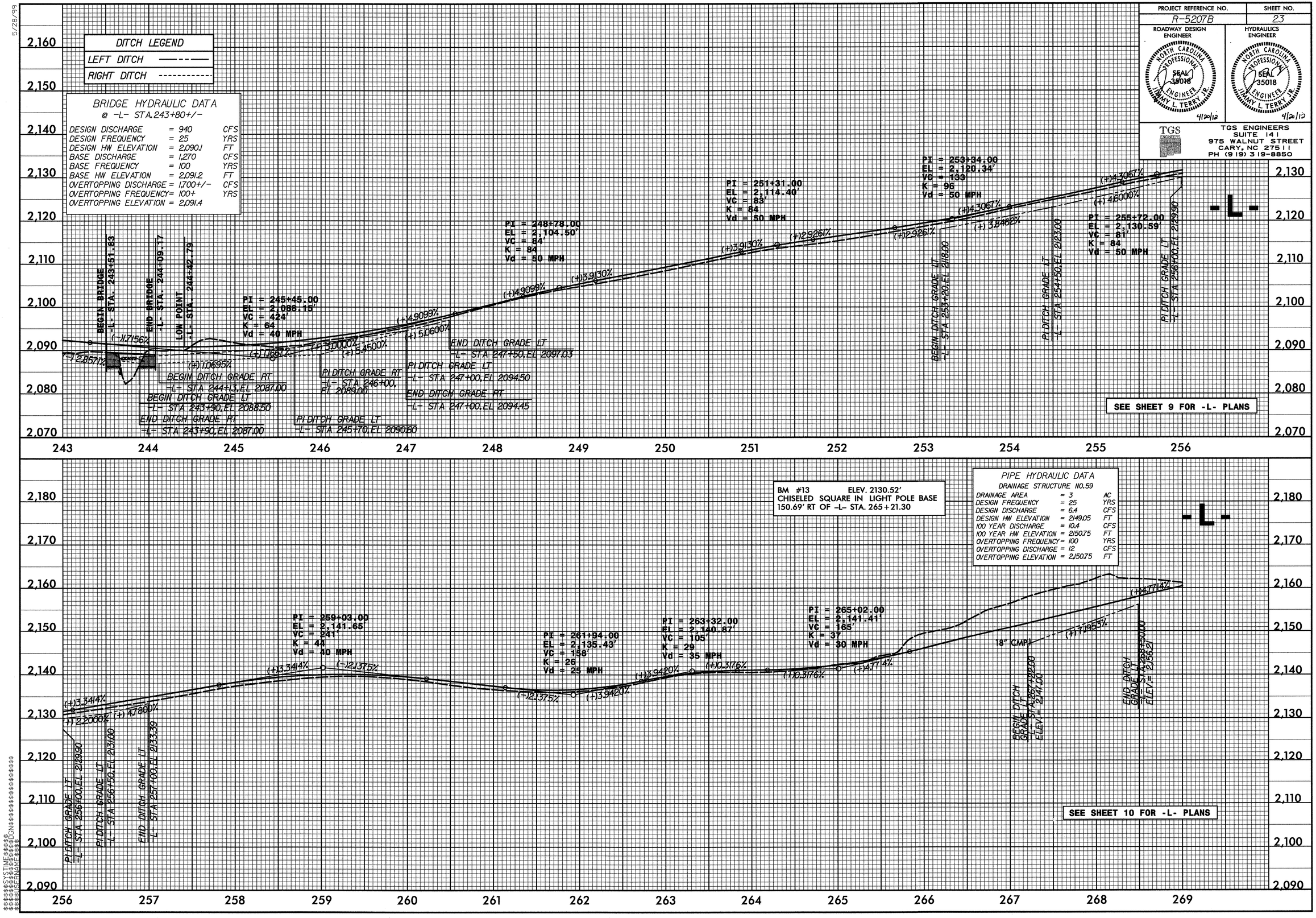
PROJECT REFERENCE NO.	SHEET NO.
R-5207B	23

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850



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PROJECT REFERENCE NO.	SHEET NO.
R-5207B	24

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
SUITE 141
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CARY, NC 27511
PH (919) 319-8850

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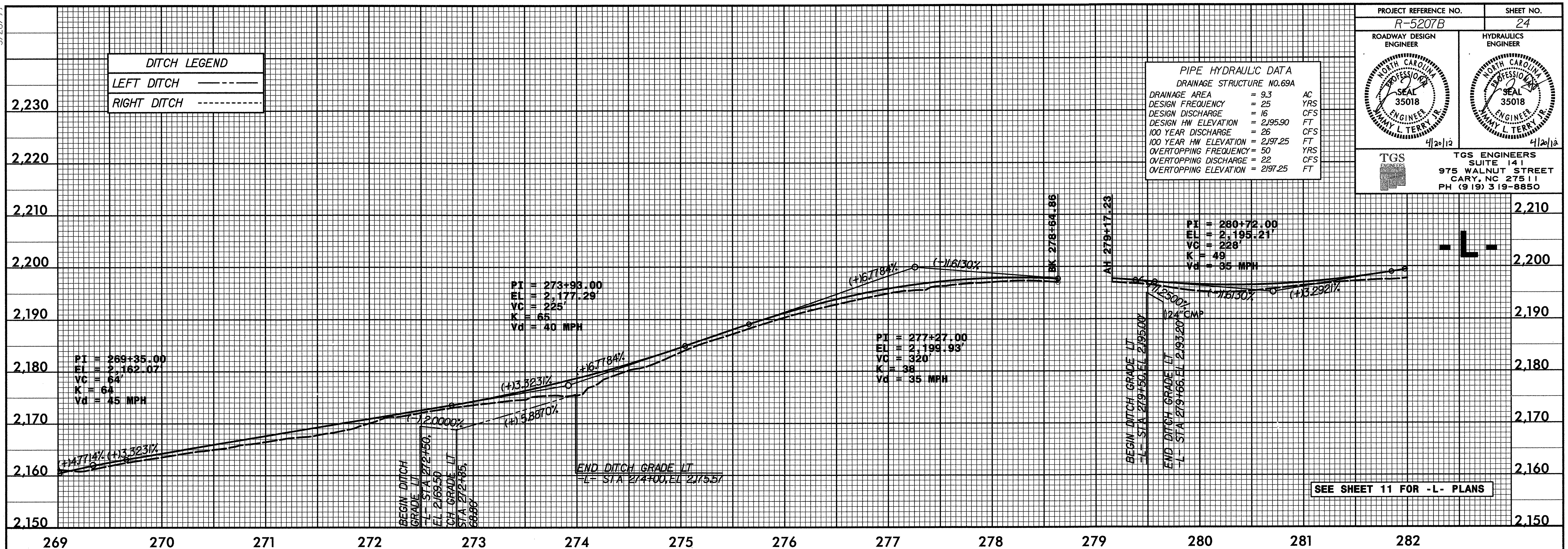
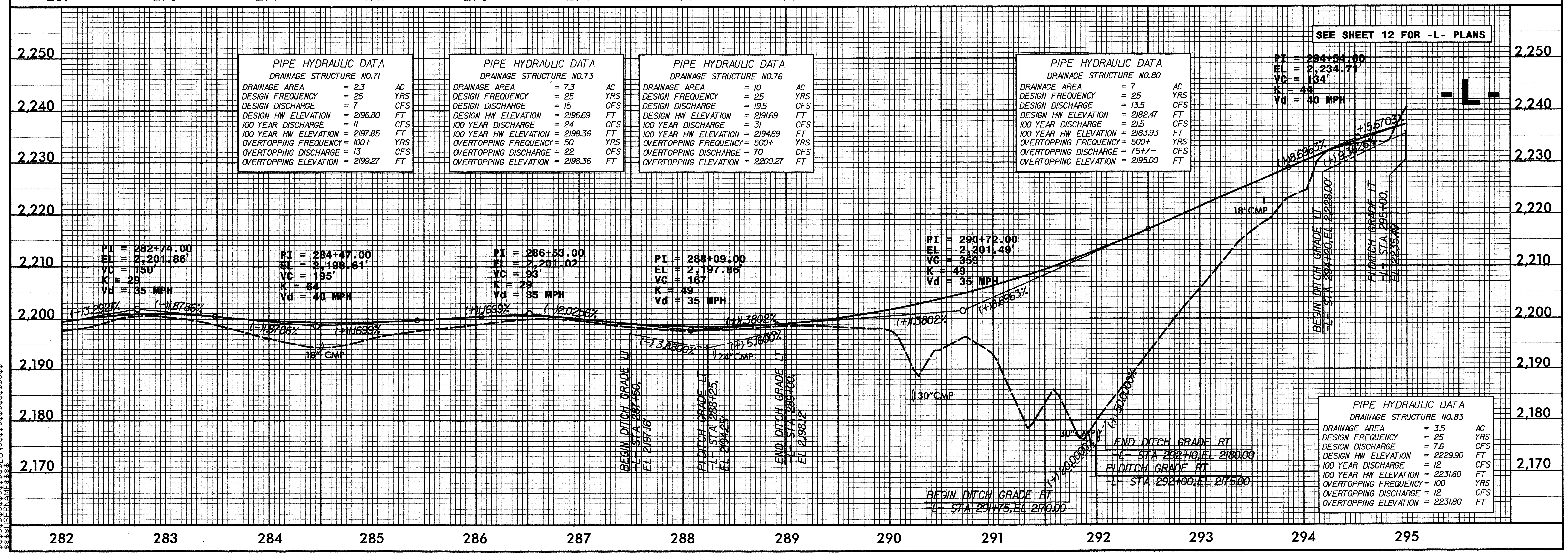


PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.69A

DRAINAGE AREA	= 9.3	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 16	CFS
DESIGN HW ELEVATION	= 2,195.90	FT
100 YEAR DISCHARGE	= 26	CFS
100 YEAR HW ELEVATION	= 2,197.25	FT
OVERTOPPING FREQUENCY	= 50	YRS
OVERTOPPING DISCHARGE	= 22	CFS
OVERTOPPING ELEVATION	= 2197.25	FT



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.71

DRAINAGE AREA	= 2.3	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 7	CFS
DESIGN HW ELEVATION	= 2196.80	FT
100 YEAR DISCHARGE	= 11	CFS
100 YEAR HW ELEVATION	= 2197.85	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 13	CFS
OVERTOPPING ELEVATION	= 2199.27	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.73

DRAINAGE AREA	= 7.3	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 15	CFS
DESIGN HW ELEVATION	= 2196.69	FT
100 YEAR DISCHARGE	= 24	CFS
100 YEAR HW ELEVATION	= 2198.36	FT
OVERTOPPING FREQUENCY	= 50	YRS
OVERTOPPING DISCHARGE	= 22	CFS
OVERTOPPING ELEVATION	= 2198.36	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.76

DRAINAGE AREA	= 10	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 19.5	CFS
DESIGN HW ELEVATION	= 2191.69	FT
100 YEAR DISCHARGE	= 31	CFS
100 YEAR HW ELEVATION	= 2194.69	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 70	CFS
OVERTOPPING ELEVATION	= 2200.27	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.80

DRAINAGE AREA	= 7	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 13.5	CFS
DESIGN HW ELEVATION	= 2182.47	FT
100 YEAR DISCHARGE	= 21.5	CFS
100 YEAR HW ELEVATION	= 2183.93	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 75+/-	CFS
OVERTOPPING ELEVATION	= 2195.00	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.83

DRAINAGE AREA	= 3.5	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 7.6	CFS
DESIGN HW ELEVATION	= 2229.90	FT
100 YEAR DISCHARGE	= 12	CFS
100 YEAR HW ELEVATION	= 2231.60	FT
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 12	CFS
OVERTOPPING ELEVATION	= 2231.80	FT

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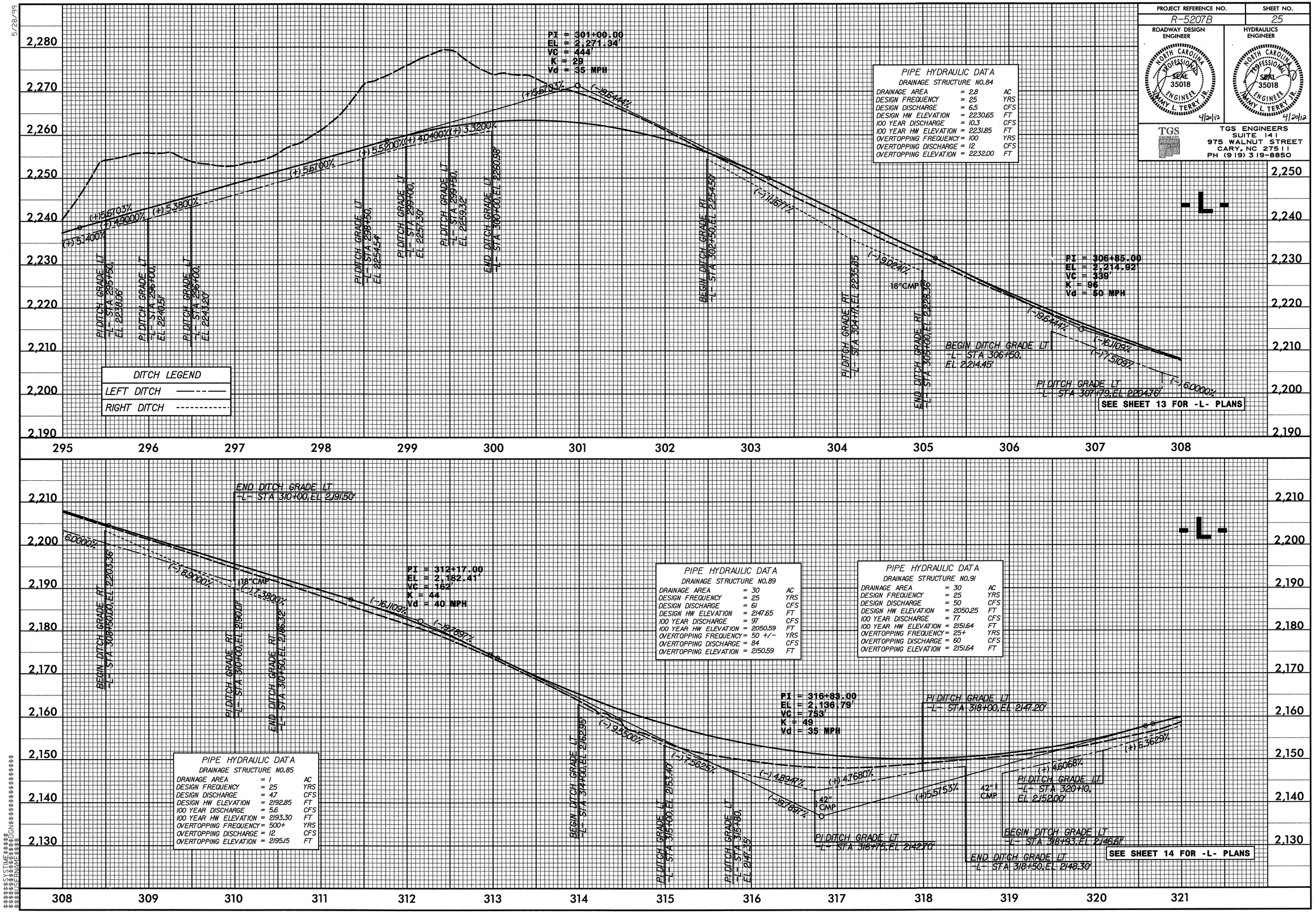
PROJECT REFERENCE NO.	SHEET NO.
R-5207B	25

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER MANY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER MANY L. TERRY JR. 4/20/12

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850



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PROJECT REFERENCE NO.	SHEET NO.
R-5207B	26

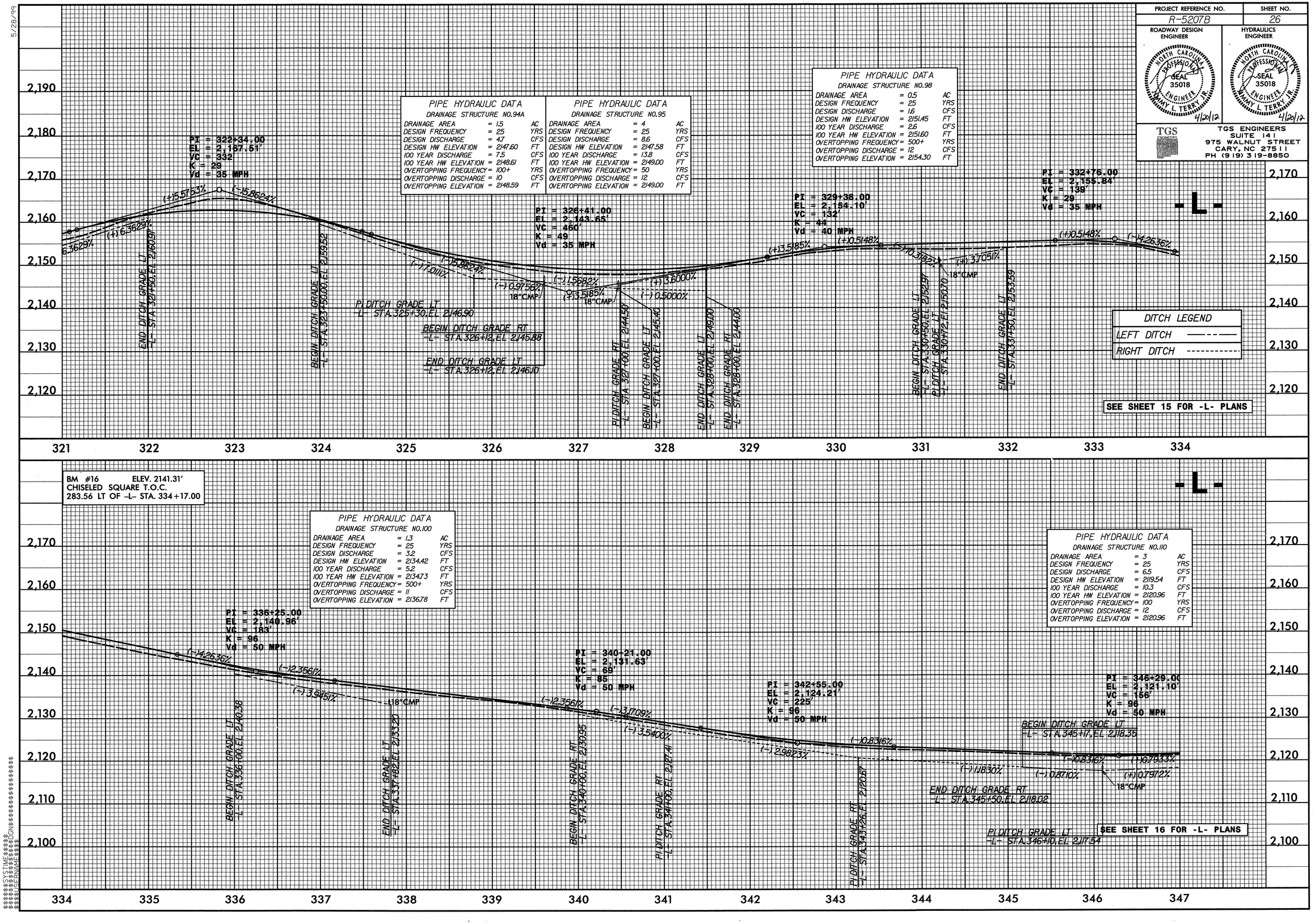
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850



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PROJECT REFERENCE NO.	SHEET NO.
R-5207B	27

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
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CARY, NC 27511
PH (919) 319-8850

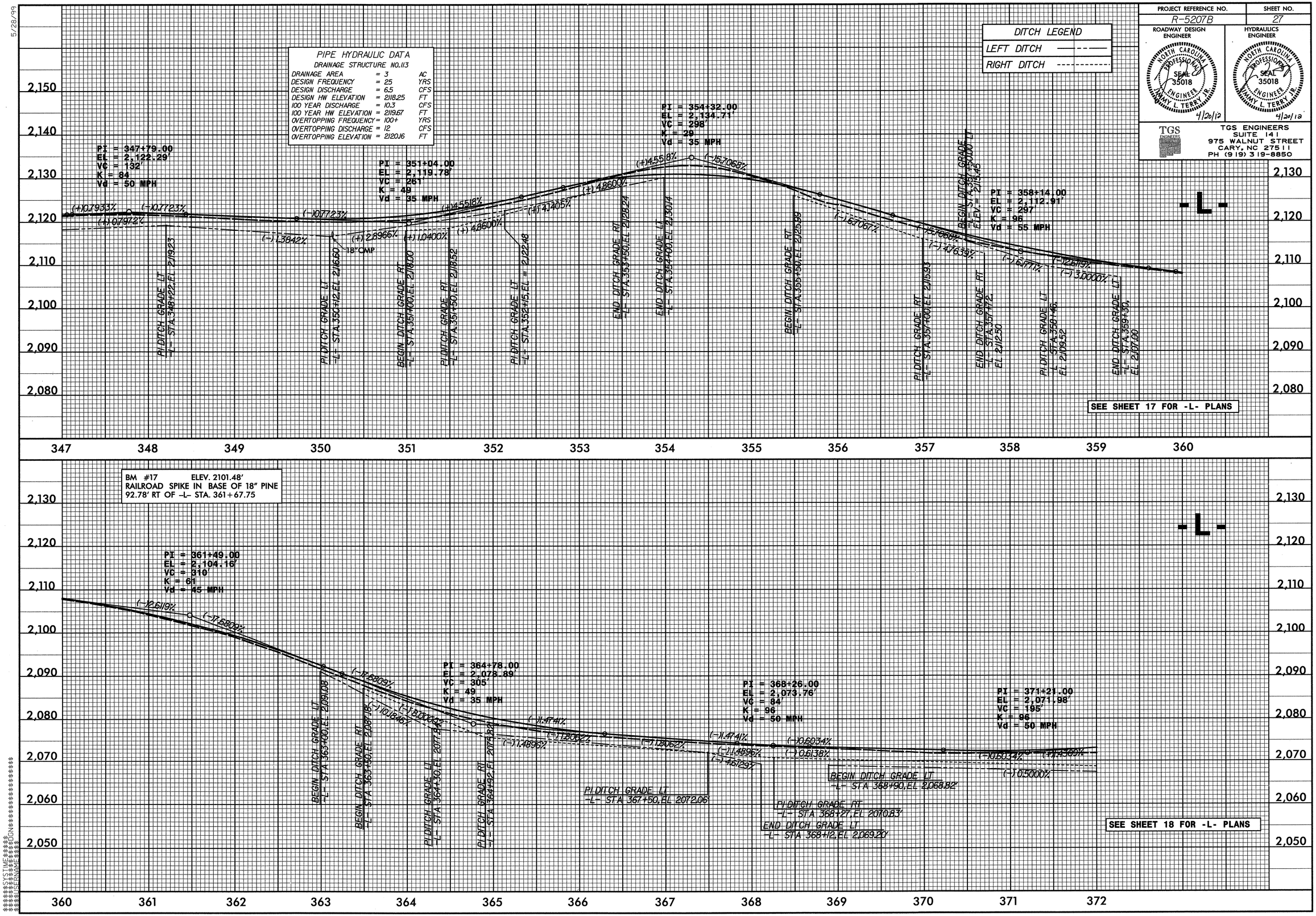
DITCH LEGEND

LEFT DITCH

RIGHT DITCH

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.113

DRAINAGE AREA	= 3	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 6.5	CFS
DESIGN HW ELEVATION	= 2118.25	FT
100 YEAR DISCHARGE	= 10.3	CFS
100 YEAR HW ELEVATION	= 2119.67	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 12	CFS
OVERTOPPING ELEVATION	= 2120.16	FT



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PROJECT REFERENCE NO.	SHEET NO.
R-5207B	28

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

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SUITE 141
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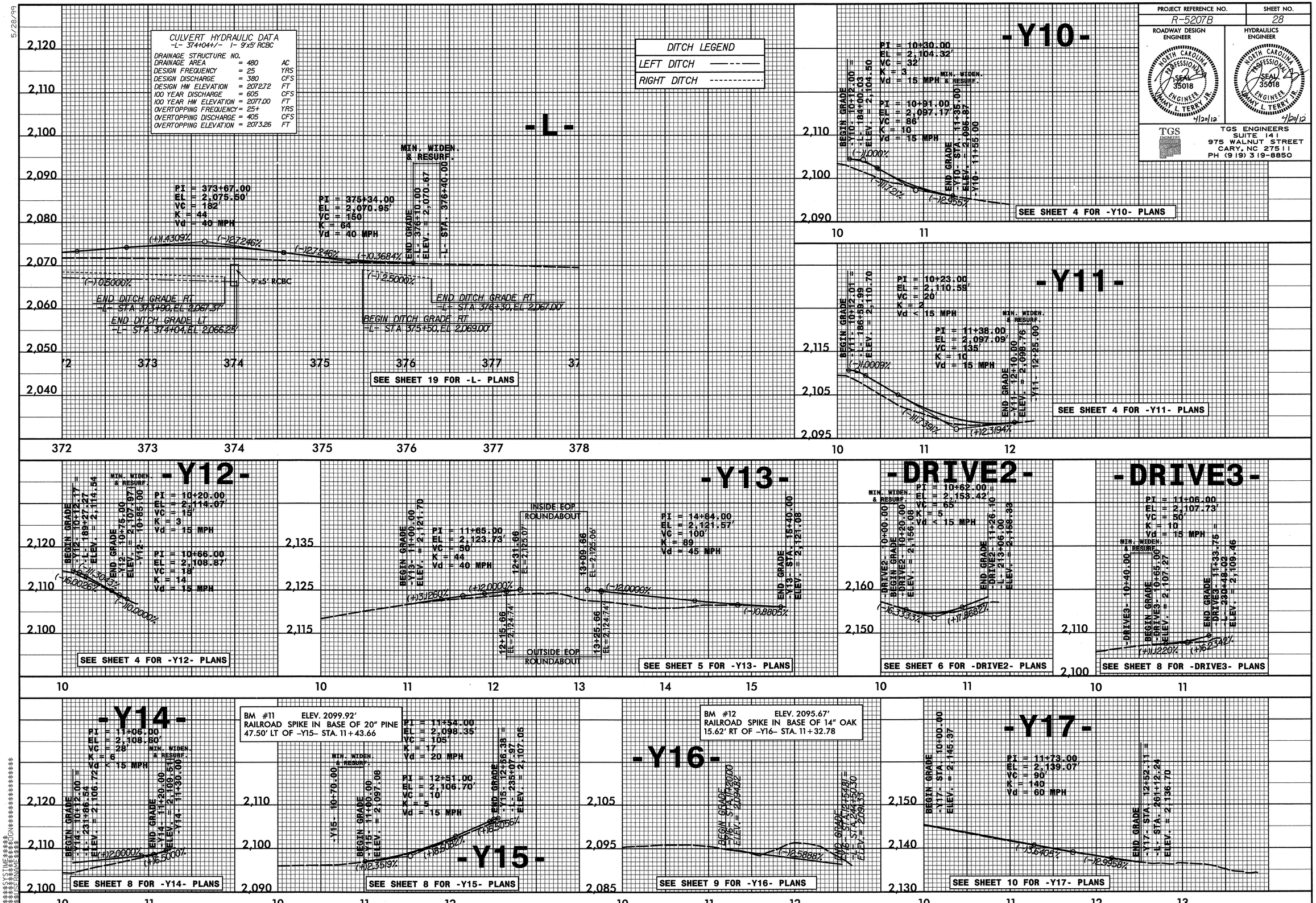

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PROJECT REFERENCE NO.	SHEET NO.
R-5207B	29

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY JR. 4/20/12

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

-Y18-

SEE SHEET 12 FOR -Y18- PLANS

DITCH LEGEND
LEFT DITCH
RIGHT DITCH

BM #14 ELEV. 2170.53'
RAILROAD SPIKE IN BASE OF 36" MAPLE
65.28' RT OF -Y18- STA. 12+77.17

BEGIN GRADE -Y18- 10+12.00 = -L- 288+76.14 ELEV = 2,198.57

PI = 10+22.00
EL = 2,198.13'
VC = 20'
K = 3
Vd = 15 MPH

PI = 12+47.00
EL = 2,171.18'
VC = 235'
K = 37
Vd = 30 MPH

PI = 15+54.00
EL = 2,153.83'
VC = 40'
K = 36
Vd = 35 MPH

BEGIN DITCH GRADE RT -Y18- STA 10+50, EL 2,198.66

P.I. DITCH GRADE RT -Y18- STA 11+00, EL 2,180.04

BEGIN DITCH GRADE LT -Y18- STA 11+30, EL 2,182.00

P.I. DITCH GRADE LT -Y18- STA 11+50, EL 2,179.00

P.I. DITCH GRADE RT -Y18- STA 12+00, EL 2,167.00

END DITCH GRADE LT -Y18- STA 12+20, EL 2,174.00

P.I. DITCH GRADE RT -Y18- STA 13+50, EL 2,161.94

P.I. DITCH GRADE RT -Y18- STA 15+00, EL 2,153.30

END DITCH GRADE RT -Y18- STA 15+50, EL 2,151.70

MIN. WIDEN. & RESURF.

END GRADE -Y18- 15+75.00 = -L- 16+00.00 ELEV. = 2,152.41

-Y19-

BM #15 ELEV. 2173.30'
RAILROAD SPIKE IN BASE OF 30" DOUBLE OAK
47.67' RT OF -Y19- STA. 11+72.69

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.86

DRAINAGE AREA	= 3.5	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 7.6	CFS
DESIGN HW ELEVATION	= 2170.75	FT
100 YEAR DISCHARGE	= 12	CFS
100 YEAR HW ELEVATION	= 2172.47	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 16	CFS
OVERTOPPING ELEVATION	= 2174.80	FT

BEGIN GRADE -Y19- 10+12.00 = -L- 311+43.77 ELEV. = 2,187.06

PI = 10+32.00
EL = 2,187.12'
VC = 36'
K = 3
Vd = 10 MPH

PI = 11+60.00
EL = 2,171.93'
VC = 122
K = 10
Vd = 10 MPH

MIN. WIDEN. & RESURF.

END GRADE -Y19- 12+30.00 = -L- 312+72.14 ELEV. = 2,172.14

18" CMP

SEE SHEET 14 FOR -Y19- PLANS

-DRIVE5-

PI = 10+20.00
EL = 2,120.44'
VC = 15'
K = 3
Vd = 15 MPH

PI = 10+60.00
EL = 2,115.76'
VC = 60
K = 10
Vd = 15 MPH

BEGIN GRADE -DRIVE5- 10+12.02 = -L- 350+82.24 ELEV. = 2,120.91

MIN. WIDEN. & RESURF.

END GRADE -DRIVE5- 10+90.00 = -DRIVE5- 11+10.00 ELEV. = 2,114.02

SEE SHEET 17 FOR -DRIVE5- PLANS

-Y20-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.93

DRAINAGE AREA	= 2	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 6.3	CFS
DESIGN HW ELEVATION	= 2153.65	FT
100 YEAR DISCHARGE	= 10.1	CFS
100 YEAR HW ELEVATION	= 2154.80	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 12	CFS
OVERTOPPING ELEVATION	= 2155.60	FT

PI = 11+95.00
EL = 2,155.04'
VC = 45'
K = 17
Vd = 20 MPH

MIN. WIDEN. & RESURF.

BEGIN GRADE -Y20- 11+50.00 = -Y20- 11+70.00 ELEV. = 2,156.01

END GRADE -Y20- 12+45.93 = -L- 319+78.36 ELEV. = 2,154.41

8" CMP

SEE SHEET 14 FOR -Y20- PLANS

-DRIVE4-

MIN. WIDEN. & RESURF.

BEGIN GRADE -DRIVE4- 10+50.00 = -DRIVE4- 10+70.00 ELEV. = 2,172.47

PI = 11+10.00
EL = 2,170.94'
VC = 80'
K = 20
Vd = 30 MPH

END GRADE -DRIVE4- 12+11.11 = -L- 322+67.87 ELEV. = 2,163.00

SEE SHEET 15 FOR -DRIVE4- PLANS

-Y21-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.94

DRAINAGE AREA	= 1.5	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 4.7	CFS
DESIGN HW ELEVATION	= 2148.26	FT
100 YEAR DISCHARGE	= 7.5	CFS
100 YEAR HW ELEVATION	= 2149.27	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 12	CFS
OVERTOPPING ELEVATION	= 2150.54	FT

PI = 12+00.00
EL = 2,150.79'
VC = 80'
K = 18
Vd = 20 MPH

MIN. WIDEN. & RESURF.

-Y21- 11+30.00

BEGIN GRADE -Y21- 11+50.00 ELEV. = 2,152.69

END GRADE -Y21- 12+54.59 = -L- 325+59.27 ELEV. = 2,151.16

18" CMP

SEE SHEET 15 FOR -Y21- PLANS

-Y22-

PI = 10+28.00
EL = 2,124.19'
VC = 28'
K = 7
Vd = 20 MPH

MIN. WIDEN. & RESURF.

BEGIN GRADE -Y22- 10+13.41 = -L- 343+38.71 ELEV. = 2,123.92

END GRADE -Y22- 10+90.00 = -Y22- 11+05.00 ELEV. = 2,122.95

SEE SHEET 16 FOR -Y22- PLANS

-Y23-

SEE SHEET 18 FOR -Y23- PLANS

MIN. WIDEN. & RESURF.

PI = 11+38.00
EL = 2,073.60'
VC = 100'
K = 182
Vd > 60 MPH

BEGIN DITCH GRADE -Y23- STA 10+50.00 EL 2,070.00

BEGIN GRADE -Y23- 10+70.00 = ELEV. = 2,073.80

END GRADE -Y23- 12+31.04 = -L- 388+47.13 ELEV. = 2,073.90

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.130

DRAINAGE AREA	= 17	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 30	CFS
DESIGN HW ELEVATION	= 2073.14	FT
100 YEAR DISCHARGE	= 48	CFS
100 YEAR HW ELEVATION	= 2073.75	FT
OVERTOPPING FREQUENCY	= 25+	YRS
OVERTOPPING DISCHARGE	= 35	CFS
OVERTOPPING ELEVATION	= 2073.75	FT

30" CMP

END DITCH GRADE -Y23- STA. 12+13+/- EL 2,069.20 (RT) EL 2,068.82 (LT)

-Y15A-

BEGIN GRADE -Y15A- 10+12.07 = -L- 235+09.23 ELEV. = 2,107.09

PI = 11+29.00
EL = 2,121.02'
VC = 60'
K = 13
Vd = 25 MPH

18" CMP

PI = 10+29.00
EL = 2,107.01'
VC = 25'
K = 2
Vd < 15 MPH

END GRADE -Y15A- 11+60.00 = ELEV. = 2,129.88

-Y15A- 12+00.00

MIN. WIDEN. & RESURF.

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.35

DRAINAGE AREA	= 1.5	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 4	CFS
DESIGN HW ELEVATION	= 2105.35	FT
100 YEAR DISCHARGE	= 6	CFS
100 YEAR HW ELEVATION	= 2106.04	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 11	CFS
OVERTOPPING ELEVATION	= 2107.40	FT

SEE SHEET 8 FOR -Y15A- PLANS

-Y17A-

PI = 10+13.00
EL = 2,183.72'
VC = 15'
K = 3.7
Vd < 15 MPH

BEGIN GRADE -Y17A- 10+04.77 = ELEV. = 2,182.90

END GRADE -Y17A- 11+95.80 = ELEV. = 2,208.80

PI = 11+89.00
EL = 2,208.34'
VC = 10'
K = 1.6
Vd < 15 MPH

SEE SHEET 11 FOR -Y17A- PLANS

-DRIVE 4A-

END GRADE -DRIVE4A- 10+15.00 = -DRIVE4A- 10+30.00 ELEV. = 2,154.46

PI = 10+30.00
EL = 2,154.36'
VC = 24'
K = 3

END GRADE -DRIVE4A- 11+30.00 ELEV. = 2,145.71 END ELEV. ASSUMED FILE TO EXIST.

SEE SHEET 15 FOR -DRIVE4A- PLANS

5/28/99

SYSTIME$$$$
USERNAME$$$$
DGNSIZE$$$$
DGNNAME$$$$

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