09/08/99

TIP PROJECT: R-5207A

CONTRACT: C203138

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

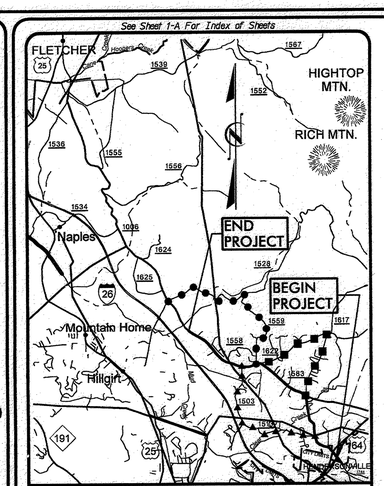
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
45393.2.2		PE, R/W, UTIL.
45393.3.2		CONST.

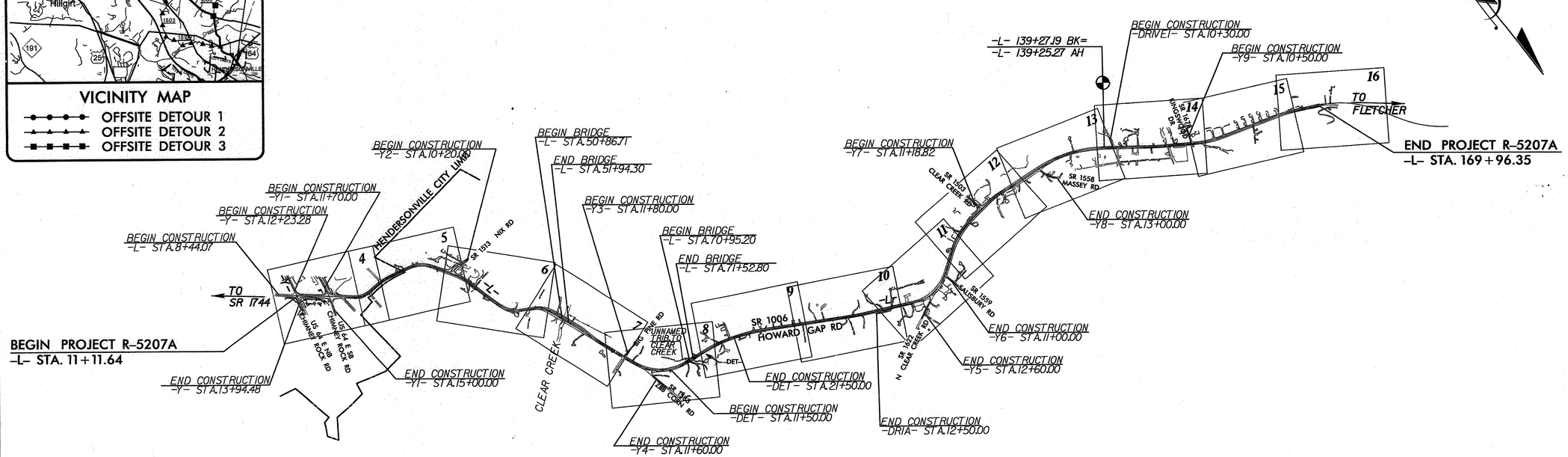
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HENDERSON COUNTY

LOCATION: SR 1006 (HOWARD GAP ROAD.) FROM US 64 TO BRIDGE 20

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES, AND SIGNALS





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 2007 = 8,089
ADT 2027 = 12,549
DHV = 11 %
D = 60 %
T = 5 %
Vd = 50 MPH

REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5207A =	2.978 MILES
LENGTH STRUCTURES TIP PROJECT R-5207A =	0.031 MILES
TOTAL LENGTH TIP PROJECT R-5207A =	3.009 MILES

PLANS PREPARED BY:

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

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 19, 2010

LETTING DATE:
MAY 21, 2013

PLANS PREPARED FOR:

NCDOT DIVISION 14
NCDOT Contact:
RALPH CANNADY
DIVISION PROJECT MANAGER

JIMMY L. TERRY, PE
PROJECT ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY
P.E
SIGNATURE:

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

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

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

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY

10/1/12

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
2 THRU 2-C	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND BRIDGE TYPICAL
2-D	DETOUR DESIGN
2-E	DETAIL OF CONCRETE ENDWALL FOR 75 DEG SKEW 36" PIPE CULVERT
2-F	DETAIL OF CONCRETE ENDWALL FOR 75 DEG SKEW 48" PIPE CULVERT
2-G	DETAIL OF SANDBAG HEADWALL FOR 45 DEG SKEW DOUBLE 54" PIPE CULVERT
2-H	DETAIL OF REINFORCED CONCRETE ENDWALL FOR 60 DEG OR 120 DEG SKEW - DOUBLE 60" PIPE CULVERT
2-I	DETAIL OF TYPE III - SHOP CURVED STRUCTURE ANCHOR UNIT
2-J	STANDARD TEMPORARY SHORING DETAIL
2-K	DETAIL OF PEDESTRIAN SAFETY RAIL
2-L	DETAIL OF ROCK PLATING
2-M	DETAIL OF REINFORCED SOIL SLOPE (RSS)
2-N	DETAIL OF SOIL NAIL SLOPE STABILIZATION
3	SUMMARY OF QUANTITIES
3-A	SUMMARIES OF EARTHWORK, GUARDRAIL, AND ASPHALT PAVEMENT REMOVAL
3-B THRU 3-F	SUMMARY OF DRAINAGE
3-G	PARCEL INDEX SHEET
4 THRU 16	ROADWAY PLAN SHEETS
17 THRU 24	ROADWAY PROFILE SHEET
TMP-1 THRU TMP-13	TRAFFIC MANAGEMENT PLANS
SP-1	DETOUR SIGN LAYOUT
PMP-1 THRU PMP-15	PAVEMENT MARKING PLANS
EC-1 THRU EC-29	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-11	SIGNING PLANS
SIG-1 THRU SIG-15	SIGNALIZATION PLANS
UC-1 THRU UC-8	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-14	UTILITIES BY OTHERS PLANS
X-INDEX	CROSS SECTION INDEX
X-SUM1 AND X-SUM2	CROSS SECTION SUMMARY SHEETS
X-1 THRU X-110	CROSS-SECTIONS
S-1 THRU S-49	STRUCTURE PLANS
W-1 THRU W-2	SOLDIER PILE RETAINING WALL

LIST OF STANDARD DRAWINGS

2012 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 January, 2012 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
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
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	Asphalt Shoulders - Milled Rumble Strips
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right of Way Marker
806.02	Granite Right of Way Marker
815.03	Pipe Underdrain and Blind Drain
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
838.80	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
840.04	Concrete Open Throat Catch Basin - 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin - 12" thru 48" 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
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.19	Concrete Grated Drop INlet Type 'D' - 12" thru 36" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 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
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
840.72	Pipe Collar
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
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure 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:

2012 SPECIFICATIONS
EFFECTIVE: 01-17-12
REVISED: 11/01/11

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.

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS 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

COMMUNCIATIONS, AT&T, PSNC ENERGY, AND CITY OF HENDERSONVILLE.

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 CONTRACT.

8/17/99

10/1/2012
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04/16/11

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

Note: Not to Scale

S.U.E. = Subsurface Utility Engineering

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 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: Area or Site
- Potential Soil Contamination: Area 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 R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — CA
- 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
- 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.

6/2/99

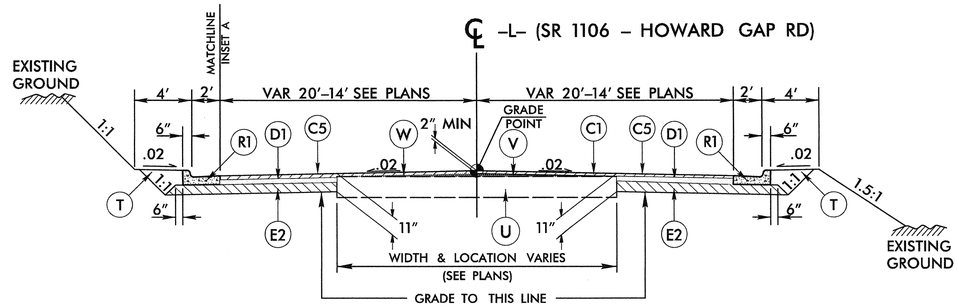
PROJECT REFERENCE NO.	SHEET NO.
R-5207A	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

TGS ENGINEERS
TGS ENGINEERS
975 WALNUT STREET
SUITE 141
CARY, NC 27511
PH (919) 319 8850
CORP. LICENSE NO.: C-0275

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. 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 TO EXCEED 2" IN DEPTH.
C3	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD..
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
C5	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.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTER. COURSE. TYPE I19.0B, AT AN AVERAGE RATE OF 456 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.
D4	PROP. APPROX. 4" ASPHALT CONCRETE INTER. COURSE. TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D5	PROP. VAR. DEPTH ASPHALT CONCRETE INTER. COURSE. TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 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. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH
E4	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E5	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH
P	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YARD.
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	CONCRETE SHOULDER BERM GUTTER
J1	5" AGGREGATE BASE COURSE.
J2	6" AGGREGATE BASE COURSE.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	MILLING EXISTING PAVEMENT
W	WEDGING EXISTING PAVEMENT (SEE DETAILS ON THIS SHEET).

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

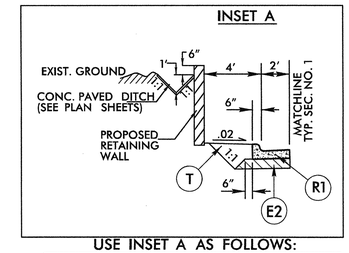


TYPICAL SECTION NO. 1

TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 1 FROM -L- STA. 11+11.64 TO 11+54.83 LT AND TO -L- STA. 11+88.62 RT

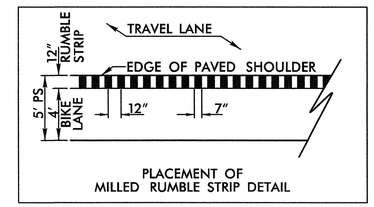
USE TYPICAL SECTION NO. 1 AS FOLLOWS:

-L- STA. 11+54+83 LT TO 22+81.50 LT
-L- STA. 11+88.62 RT TO 20+75.77 RT



USE INSET A AS FOLLOWS:

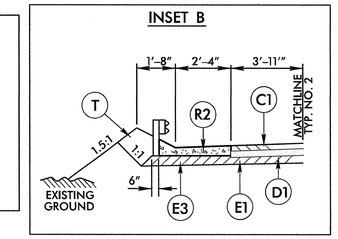
-L- STA. 11+30 LT TO 14+00 LT



USE DETAIL AS FOLLOWS:

-L- STA. 23+56 TO 32+20 LT
-L- STA. 35+04 TO 50+34 LT
-L- STA. 52+15 TO 70+64 LT
-L- STA. 71+70 TO 169+96 LT

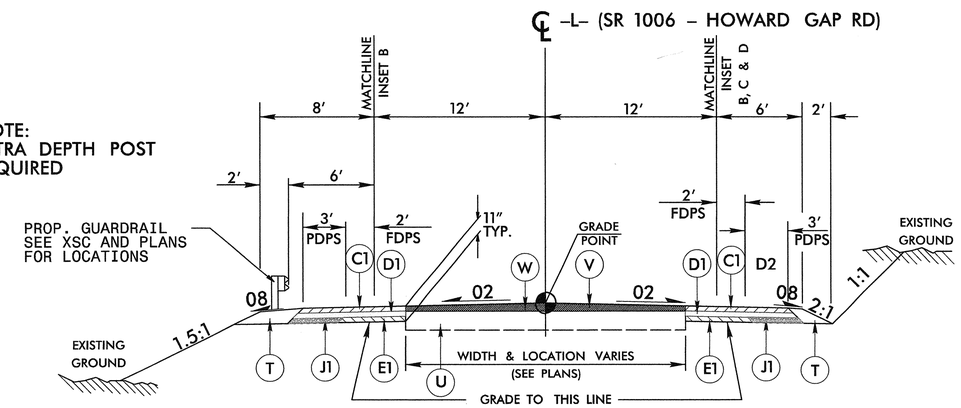
-L- STA. 20+76 TO 36+50 RT
-L- STA. 40+50 TO 50+68 RT
-L- STA. 52+22 TO 70+78 RT
-L- STA. 71+84 TO 168+68 RT



USE INSET B AS FOLLOWS:

-L- STA. 50+35 LT TO 50+58 LT
-L- STA. 50+52 RT TO 50+68 RT
-L- STA. 70+33 LT TO 70+61 LT

NOTE:
EXTRA DEPTH POST REQUIRED



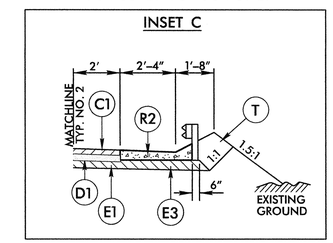
TYPICAL SECTION NO. 2

SEE PLANS FOR AUXILIARY LANE WIDENING

TRANSITION FROM TYPICAL SECTION NO. 1 TO NO. 2 FROM -L- STA. 22+81.50 LT TO -L- STA. 23+56.26 LT AND FROM -L- STA. 20+75.77 RT TO -L- STA. 21+63.22 RT

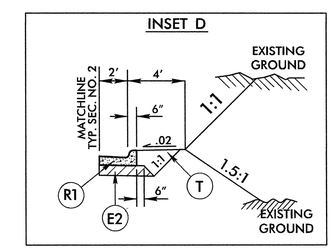
USE TYPICAL SECTION NO. 2 AS FOLLOWS:

-L- STA. 21+63.22 RT TO 50+86.71 (BEG. BRIDGE) RT
-L- STA. 23+56.26 LT TO 50+86.71(BEG. BRIDGE) LT
-L- STA. 51+94.30 (END BRIDGE) TO 70+95.20 (BEG. BRIDGE)
-L- STA. 71+52.80 (END BRIDGE) TO 139+27.19 (BK)
-L- STA. 139+25.27 (AH) TO 169+96.35



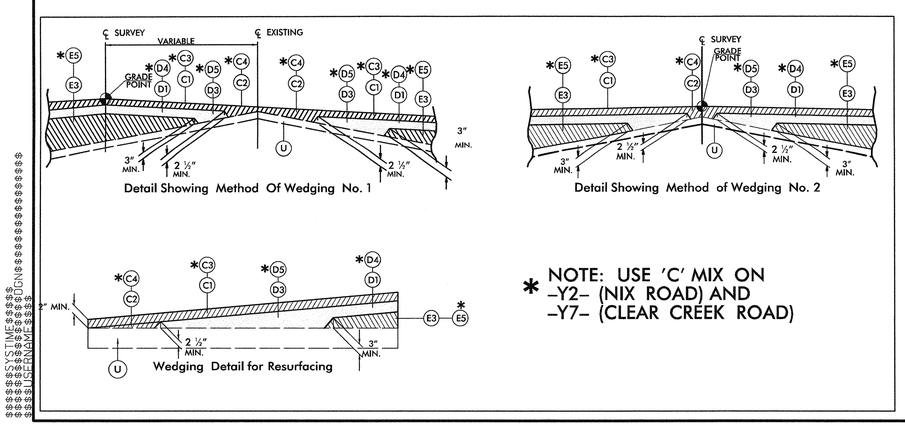
USE INSET C AS FOLLOWS:

-L- STA. 168+68 RT TO 169+96.35 RT

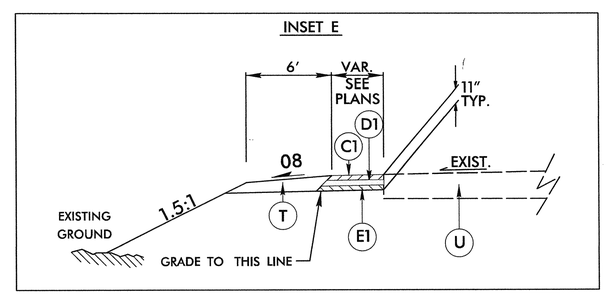


USE INSET D AS FOLLOWS:

-L- STA. 36+50.00 TO 40+50.00 RT



* NOTE: USE 'C' MIX ON
-Y2- (NIX ROAD) AND
-Y7- (CLEAR CREEK ROAD)



USE INSET E AS FOLLOWS:

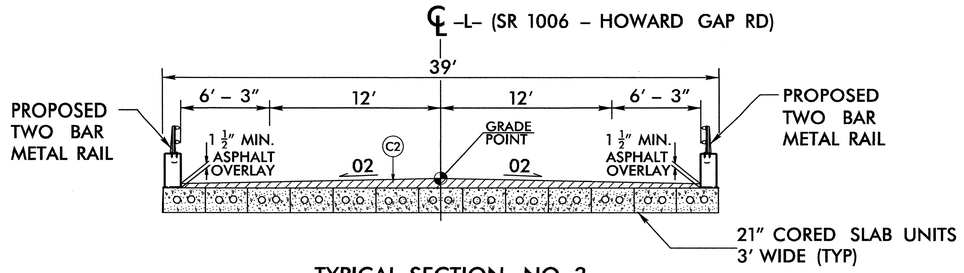
-L- STA. 8+44.07 TO 10+84 LT

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

TGS ENGINEERS
975 WALNUT STREET
SUITE 141
CARY, NC 27511
PH (919) 319 8850
CORP. LICENSE NO.: C-0275

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B
C2	PROP. VAR. DEPTH 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
V	MILLING EXISTING PAVEMENT
W	WEDGING EXISTING PAVEMENT (SEE DETAILS ON SHEET 2)

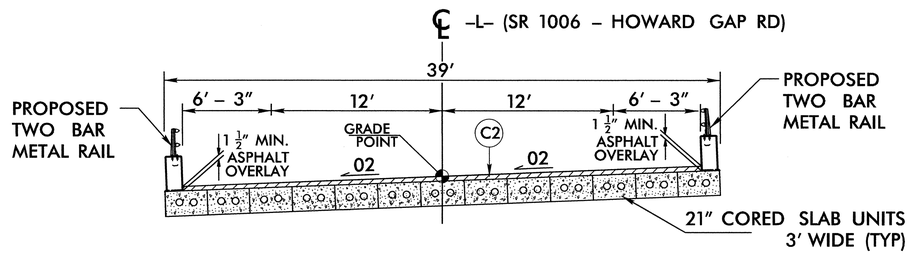
NOTE: PAVEMENT EDGE SLOPES ARE 30 DEGREES UNLESS SHOWN OTHERWISE.



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3 AS FOLLOWS:

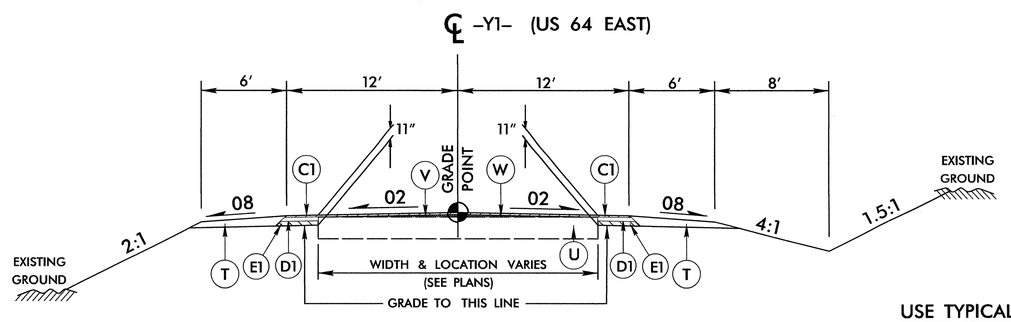
-L- STA 50+86.71 TO 51+94.30



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4 AS FOLLOWS:

-L- STA. 70+95.20 TO 71+52.80



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5 AS FOLLOWS:

-Y1- STA. 11+70.00 TO 15+00.00

6/2/99

$$$$$$DELENTE$$$$$$SYTIME$$$$$$DGN$$$$$$

6/2/99

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

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY 9/25/12

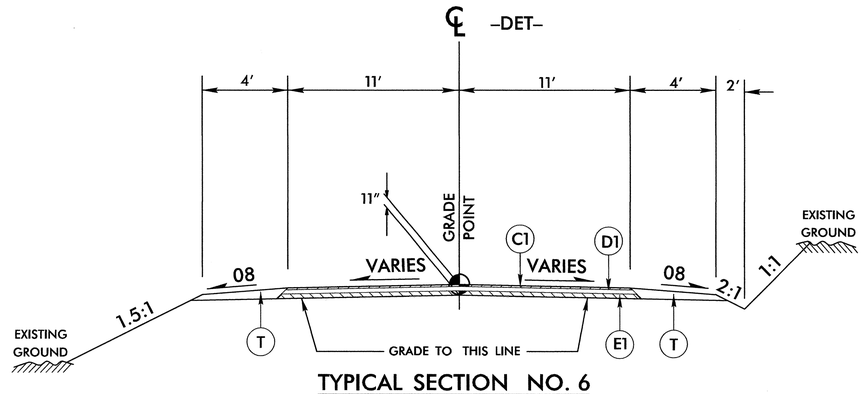
PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029969 ENGINEER STEVEN L. CANNON 9/26/2012

TGS ENGINEERS
TGS ENGINEERS
975 WALNUT STREET
SUITE 141
CARY, NC 27511
PH (919) 319 8850
CORP. LICENSE NO.: C-0275

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
V	MILLING EXISTING PAVEMENT
W	WEDGING EXISTING PAVEMENT (SEE DETAILS ON SHEET 2)

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



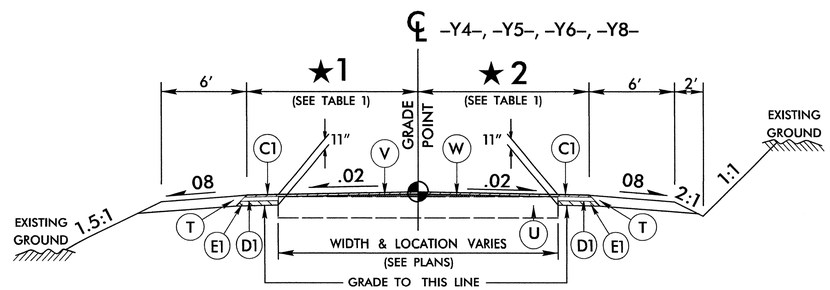
TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6 AS FOLLOWS:
-DET- STA. 13+43 TO 19+81

MINIMUM WIDENING AND RESURFACING FROM:
-DET- STA. 11+50.00 TO -DET- STA. 13+43
-DET- STA. 19+81 TO -DET- STA. 21+50.00

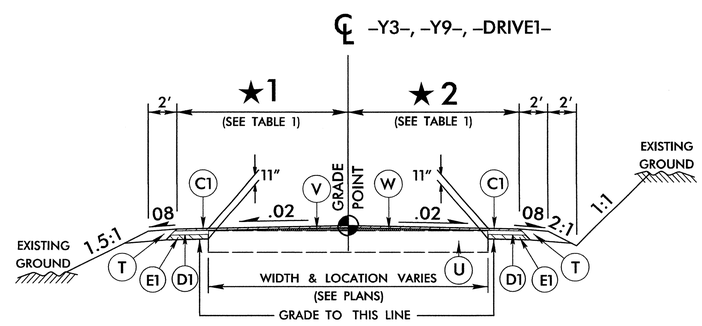
USE TABLE NO. 1 FOR
TYPICAL SECTION NOS. 7 & 8

TABLE 1		
★1 WIDTH	★2 WIDTH	LINE
SEE ROADWAY PLANS 9' TO 9.5'	SEE ROADWAY PLANS 8.2' TO 9'	-Y3-
SEE ROADWAY PLANS 9.3' TO 14.3'	SEE ROADWAY PLANS 9.2' TO 10'	-Y4-
SEE ROADWAY PLANS 9.5' TO 15'	SEE ROADWAY PLANS 9.5' TO 150'	-Y5-
9'	9'	-Y8-, -Y9-
10'	10'	-Y6-
12'	12'	-DRIVE1-



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7 AS FOLLOWS:
-Y4- STA. 10+12.00 TO 11+60.00
-Y5- STA. 10+18.04 TO 12+60.00
-Y6- STA. 10+18.00 TO 11+00.00
-Y8- STA. 10+12.04 TO 13+00.00



TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8 AS FOLLOWS:
-Y3- STA. 11+80.00 TO 12+47.75
-Y9- STA. 10+50.00 TO 11+61.33
-DRIVE1- STA. 10+30.00 TO 11+49.64

$$$$SYSTIME$$$$
$$$$LINE$$$$
$$$$DGN$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	2-C

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY, JR. 9/25/12

PAVEMENT DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029969 STEVEN L. CANNON 9/26/2012

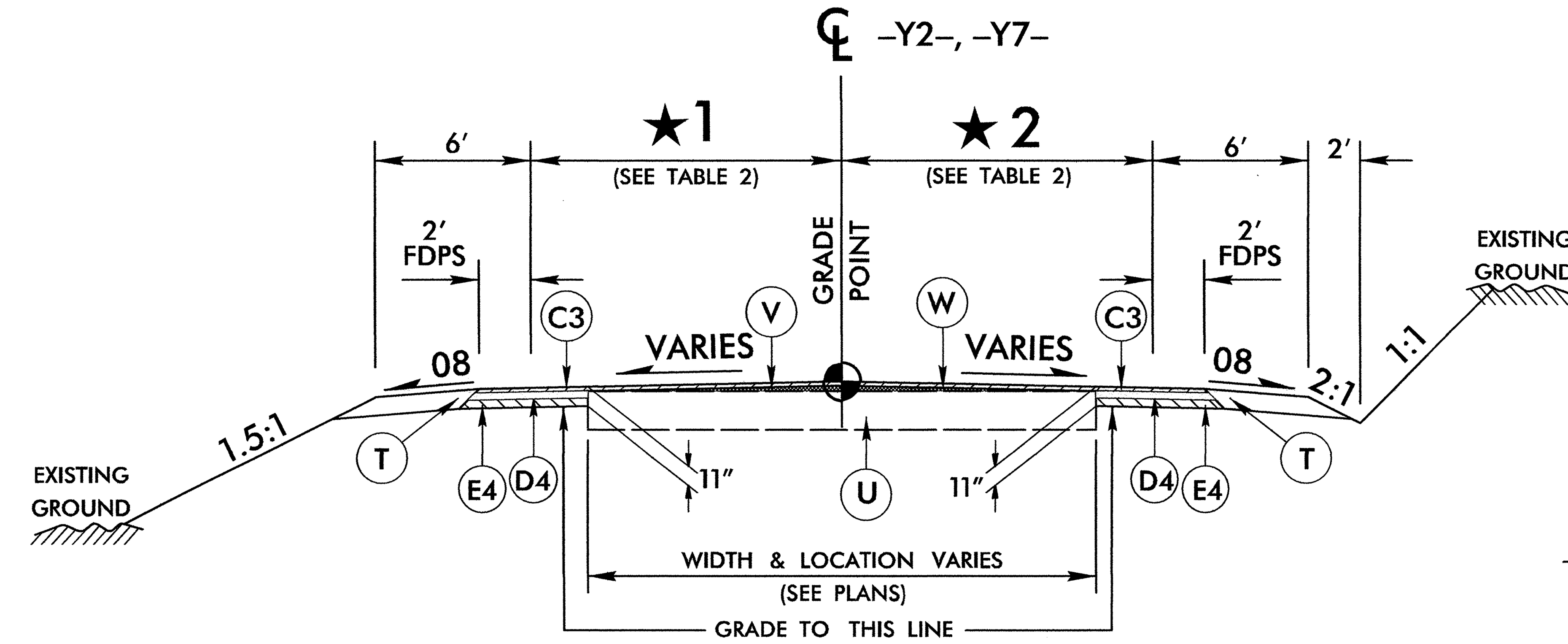
TGS ENGINEERS
975 WALNUT STREET
SUITE 141
CARY, NC 27511
PH (919) 319 8850
CORP. LICENSE NO.: C-0275

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B
C3	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C
D4	PROP. APPROX. 4" ASPHALT CONCRETE INTER. COURSE. TYPE I19.0C
E4	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C
J2	6" AGGREGATE BASE COURSE.
P	PRIME COAT
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING EXISTING PAVEMENT
W	WEDGING EXISTING PAVEMENT (SEE DETAILS ON SHEET 2)

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

USE TABLE NO. 2 FOR TYPICAL SECTION NO. 9

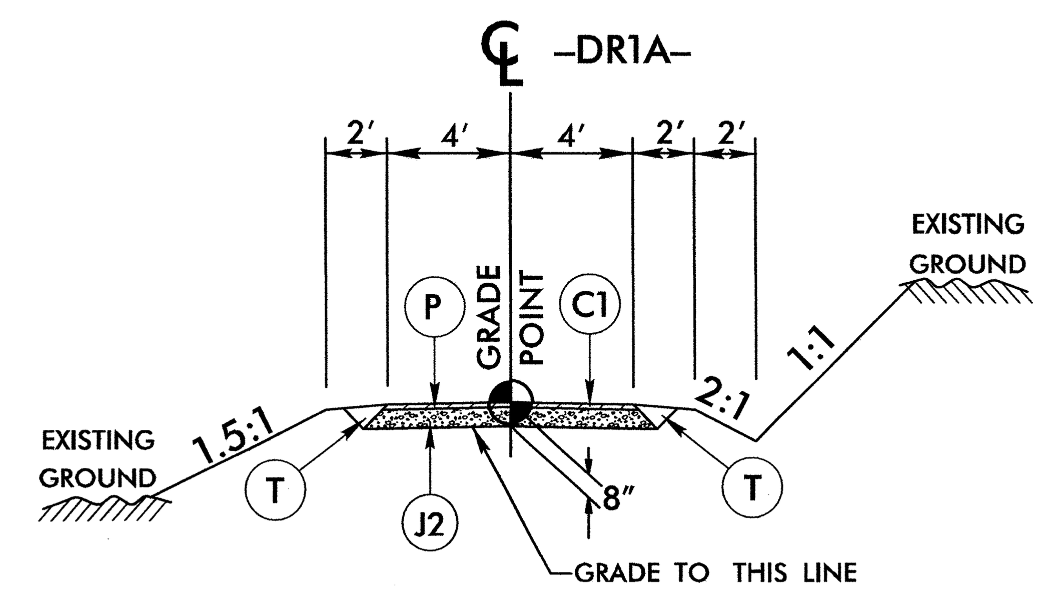
TABLE 2		
★1 WIDTH	★2 WIDTH	LINE
SEE ROADWAY PLANS 9.5' TO 18'	SEE ROADWAY PLANS 9.5' TO 22.8'	-Y2-
SEE ROADWAY PLANS 10.9' TO 15.8'	SEE ROADWAY PLANS 11.2' TO 15.3'	-Y7-



TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9 AS FOLLOWS:

-Y2- STA. 10+20.00 TO 13+13.47
-Y7- STA. 11+18.82 TO 12+46.70



TYPICAL SECTION NO. 10

USE TYPICAL SECTION NO. 10 AS FOLLOWS:

-DR1A- STA. 10+12.00 TO 12+50.00

6/2/99

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

8/17/99

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

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER WILLIAM L. TERRY 11/25/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER WILLIAM L. TERRY 11/25/12

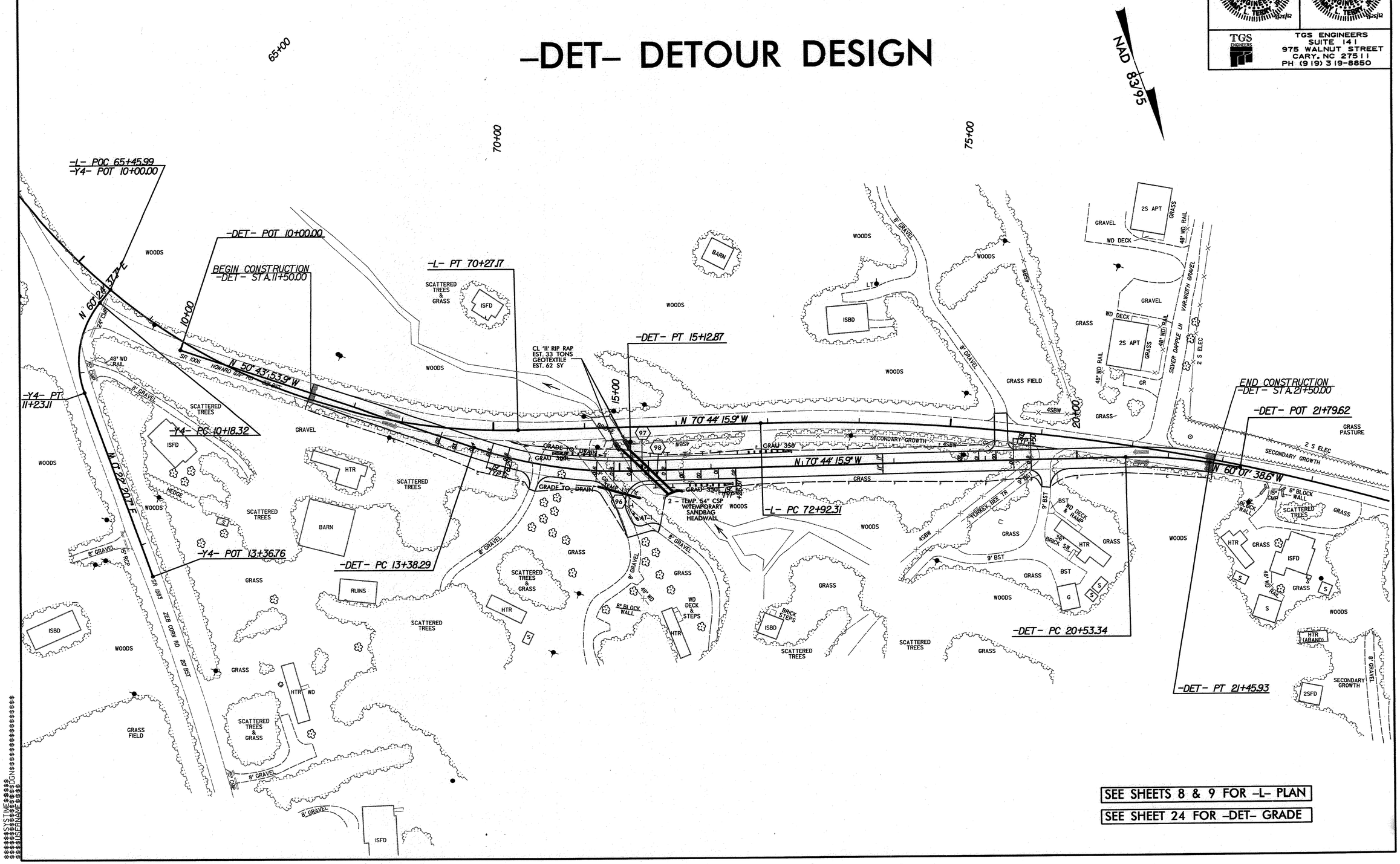
TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

-L-	
PI Sta 67+02.52	PI Sta 77+65.46
Δ = 62° 35' 52.9" (LT)	Δ = 23° 14' 56.9" (RT)
D = 8° 33' 05.8"	D = 2° 29' 28.0"
L = 732.00'	L = 933.28'
T = 407.35'	T = 473.15'
*R = 670.00'	R = 2,300.00'
SE = 0.04	SE = 0.04

-Y4-
PI Sta 10+76.10
Δ = 60° 02' 17.0" (LT)
D = 57° 17' 44.8"
L = 104.79'
T = 57.78'
R = 100.00'
SE = 0.05

-DET-	
PI Sta 14+26.48	PI Sta 20+99.77
Δ = 20° 00' 22.0" (LT)	Δ = 10° 36' 37.3" (RT)
D = 11° 27' 33.0"	D = 11° 27' 33.0"
L = 174.59'	L = 92.59'
T = 88.19'	T = 46.43'
R = 500.00'	R = 500.00'
SE = 0.06	SE = 0.02

-DET- DETOUR DESIGN

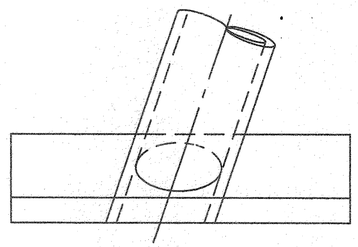


PROJECT REFERENCE NO.	SHEET NO.
R-5207A	2-E

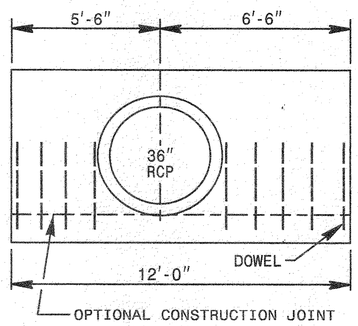
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE ENDWALL FOR
36" PIPE, 75 DEG. SKEW CULVERT

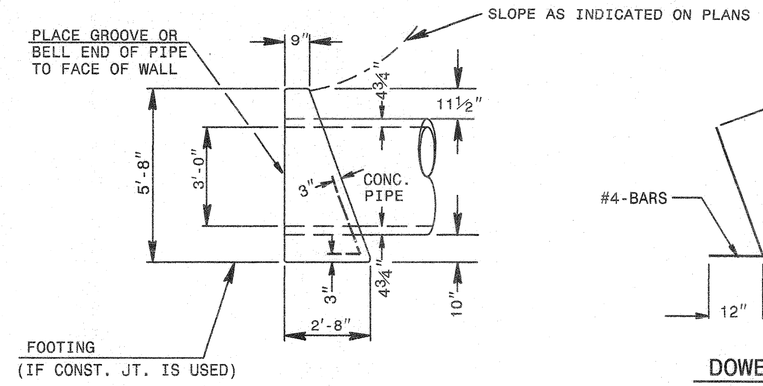
SHEET 1 OF 1
838D01



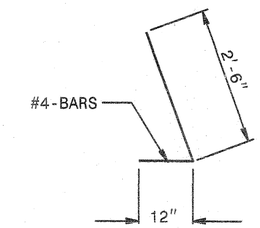
PLAN



ELEVATION



END ELEVATION



DOWEL
BAR-"X"

DOWELS IN ENDWALL WITH REINFORCED CONCRETE PIPE	
LOC.	"X"
LEFT	4
RIGHT	5
TOTAL LBS.	21

GENERAL NOTES:

- -CHAMFER ALL CORNERS 1".
- -PLACE 2 #6 "Y" BARS IN THE TOP OF ENDWALL WITH A MINIMUM OF 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALL LENGTH.
- -USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
- -WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT IS USED IN COMPUTING ENDWALL QUANTITIES.
- -WHEN THE CONTRACTOR ELECTS TO USE A CONSTRUCTION JOINT AT THE BOTTOM OF THE PIPE, PLACE BAR 'X' DOWELS IN THE BASE AS SHOWN ON PLANS. SPACING OF BARS IS TO BE APPROXIMATELY 12" CENTERS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- -WHEN THE CONTRACTOR ELECTS TO USE A CONSTRUCTION JOINT AT THE BOTTOM OF THE PIPE AND POUR THE BASE SEPARATELY THE POUR SHALL BE LEFT ROUGH.
- -USE CLASS "B" CONCRETE.

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

ENGLISH DETAIL DRAWING FOR
CONCRETE ENDWALL FOR
36" PIPE, 75 DEG. SKEW CULVERT

SHEET 1 OF 1
838D01

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOHN S. HOWESTON III
10/1/12

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

SEE PLATE FOR TITLE

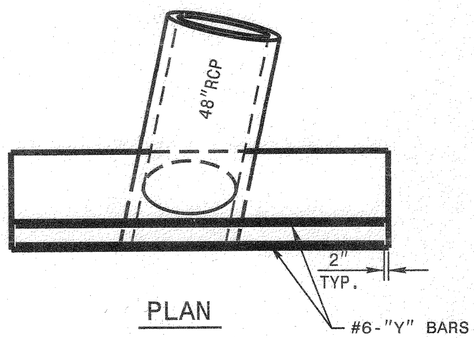
ORIGINAL BY: T.S.Spell DATE: 8-16-00
MODIFIED BY: K.A.KEMPF DATE: 9-2-08
CHECKED BY: DATE:
FILE SPEC.: details/kkempf/english/skew endwall.dgn

5/14/99

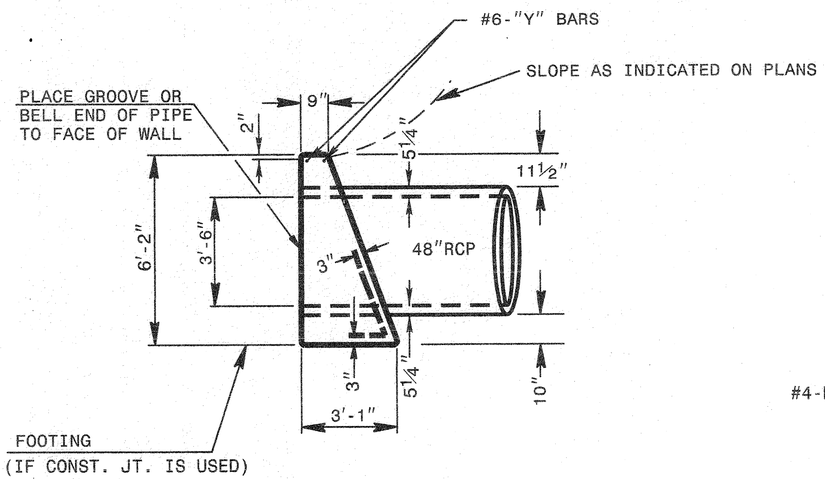
PROJECT REFERENCE NO.	SHEET NO.
R-5207A	2-F

GENERAL NOTES:

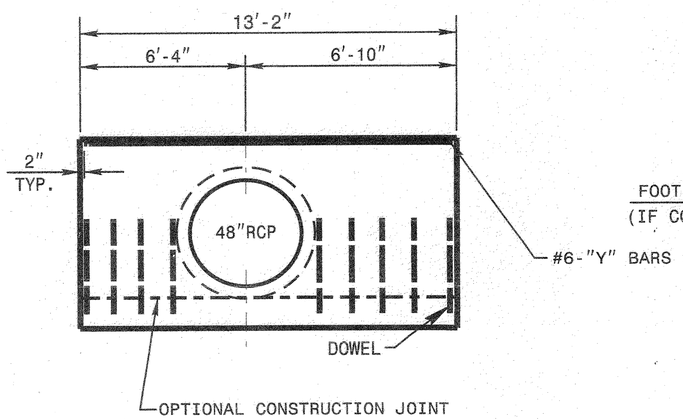
- CHAMFER ALL CORNERS 1".
- PLACE 2 #6 "Y" BARS IN THE TOP OF ENDWALL WITH A MINIMUM OF 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALL LENGTH.
- USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
- WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT IS USED IN COMPUTING ENDWALL QUANTITIES.
- WHEN THE CONTRACTOR ELECTS TO USE A CONSTRUCTION JOINT AT THE BOTTOM OF THE PIPE, PLACE BAR 'X' DOWELS IN THE BASE AS SHOWN ON PLANS. SPACING OF BARS IS TO BE APPROXIMATELY 12" CENTERS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- WHEN THE CONTRACTOR ELECTS TO USE A CONSTRUCTION JOINT AT THE BOTTOM OF THE PIPE AND POUR THE BASE SEPARATELY THE POUR SHALL BE LEFT ROUGH.
- USE CLASS "B" CONCRETE.



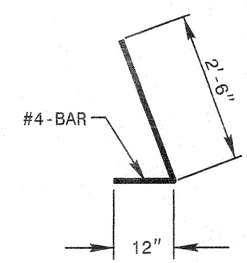
PLAN



END ELEVATION



ELEVATION



DOWEL
BAR-"X"

STEEL IN ENDWALL WITH REINFORCED CONCRETE PIPE		
LOC.	"X"	"Y"
TOP		38
LEFT	4	
RIGHT	5	
TOTAL LBS. 59		

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER
10/1/12

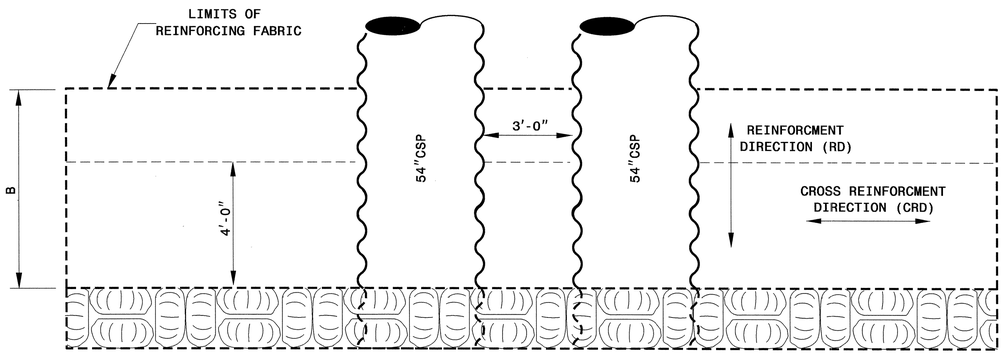
DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

CONCRETE ENDWALL FOR 75 DEG. SKEW 48" PIPE CULVERT

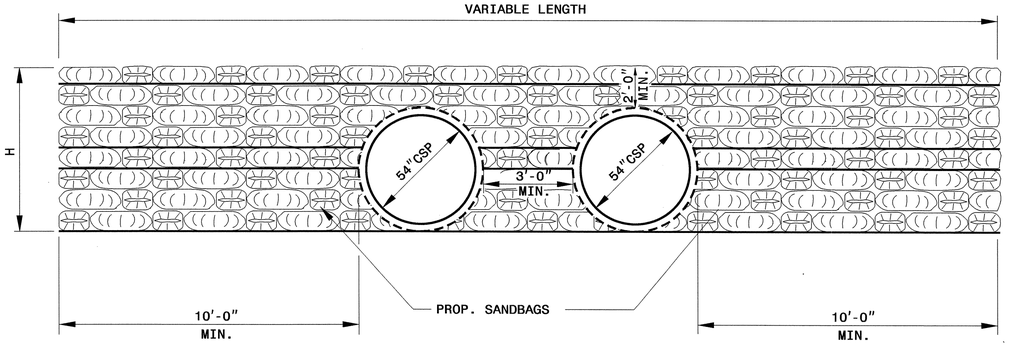
ORIGINAL BY: DATE:
MODIFIED BY: rnbritt DATE: 08-03-12
CHECKED BY: DATE:
FILE SPEC. details/nbritt/english/hydro/endwall.dgn

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	2-6



PLAN



FRONT ELEVATION

NOTES:

1. REINFORCED SANDBAG HEADWALLS ARE BASED ON THE FOLLOWING ASSUMPTIONS:

   1) TRAFFIC SURCHARGE IS 240 PSF OR LESS AND BACKSLOPE IS 2:1 OR FLATTER.
   2) GRADE IN FRONT OF WALL IS 6:1 OR FLATTER
   3) MAXIMUM APPLIED BEARING PRESSURE IS LESS THAN 1 TSF.

2. REINFORCED SANDBAG HEADWALLS ARE BASED ON THE FOLLOWING IN-SITU SOIL PARAMETERS:

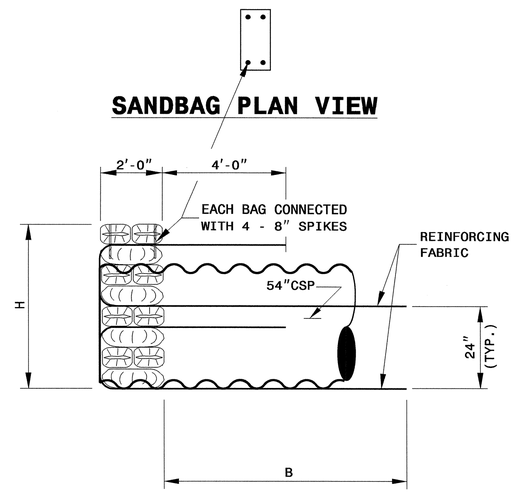
   1) UNIT WEIGHT = 120 PCF
   2) FRICTION ANGLE = 30 DEGREES

   DO NOT USE REINFORCED SANDBAG HEADWALL DETAIL WHEN ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW BOTTOM OF PIPE.

3. PLACE REINFORCEMENT IN SLIGHT TENSION AND FREE OF KINKS, FOLDS, WRINKLES AND CREASES.
4. DO NOT SPLICE REINFORCEMENT IN THE REINFORCEMENT DIRECTION (RD). SEAMS ARE ALLOWED IN THE CROSS-REINFORCEMENT DIRECTION (CRD).
5. BACKFILL IN ACCORDANCE WITH SECTION 235 OF THE STANDARD SPECIFICATIONS.

   DO NOT BACKFILL WITH ROCK, BROKEN PAVEMENT OR SIMILAR MATERIAL.
   DO NOT DAMAGE REINFORCEMENT WHEN PLACING AND COMPACTING BACKFILL.
   DO NOT USE SHEEPSFOOT, GRID ROLLERS OR OTHER TYPES OF COMPACTION EQUIPMENT WITH FEET.
   DO NOT OPERATE HEAVY EQUIPMENT ON REINFORCEMENT UNITL IT IS COVERED WITH AT LEAST 10" OF BACKFILL.
   USE ONLY HAND OPERATED EQUIPMENT TO COMPACT WITHIN 3 ft OF THE HEADWALL FACE.

6. #4 REINFORCING BARS (GRADE 60) 24" LONG MAY BE SUBSTITUTED FOR 8" SPIKES. DRIVE #4 BARS THRU 4 BAGS MAXIMUM.
7. HEADWALL DIMENSIONS MAY BE ADJUSTED FOR SINGLE, DOUBLE OR MORE PIPES AS SHOWN IN PLANS.



SIDE ELEVATION

REINFORCING FABRIC		
WALL HEIGHT H (ft)	REINF. LENGTH B (ft)	ULTIMATE TENSILE STRENGTH (lb/ft)
< 4	6	2400
4 TO 6	6	3000
6 TO 8	= H	3600
8 TO 10	= H	4500

INLET END SANDBAG HEADWALL AREA = 109 S.F.

OUTLET END SANDBAG HEADWALL AREA = 226 S.F.

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER
10/1/12

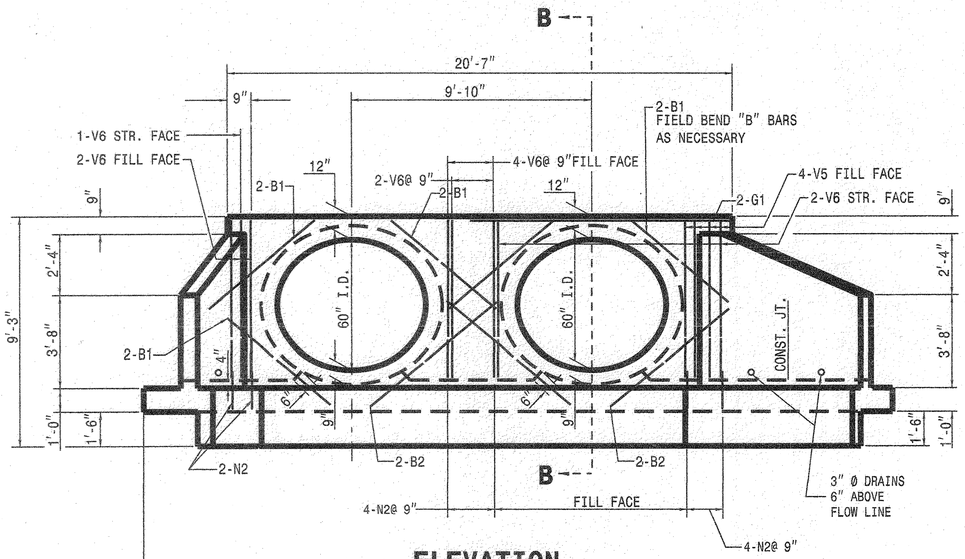
CONTRACT STANDARDS & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

DETAIL OF REINFORCED SANDBAG HEADWALL

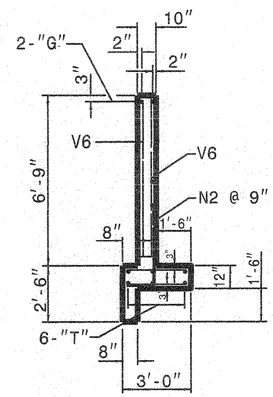
ORIGINAL BY: _____ DATE: _____
MODIFIED BY: nbritt DATE: 09-25-2012
CHECKED BY: _____ DATE: 10/1/12
FILE SPEC.: details/nbritt/english/hydro/enddwalls.dgn

5/14/99

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



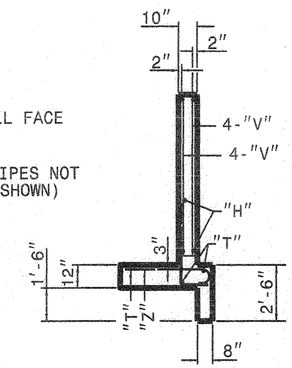
ELEVATION



SECTION B-B

FILL FACE

(PIPES NOT SHOWN)



SECTION A-A

NOTES:

ALL CONCRETE TO BE CLASS "A".

ALL REINFORCING STEEL SHALL BE ASTM615-GRADE 60.

ALL REINFORCING STEEL SHALL BE DEFORMED BARS. WHERE SPLICING OF REINFORCMENT IS NECESSARY, BARS ARE TO BE LAPPED 45 DIAMETERS. ALL DIMENSIONS RELATIVE TO REINFORCEMENT ARE TO CENTERS OF BARS.

THE FOOTING, CURTAIN WALL AND 4" OF WALL ARE TO BE POURED IN ONE OPERATION ALLOWING NO TIME FOR INITIAL SET TO TAKE PLACE BETWEEN THEM. THE REMAINING WALL SHALL THEN BE POURED IN ONE OPERATION.

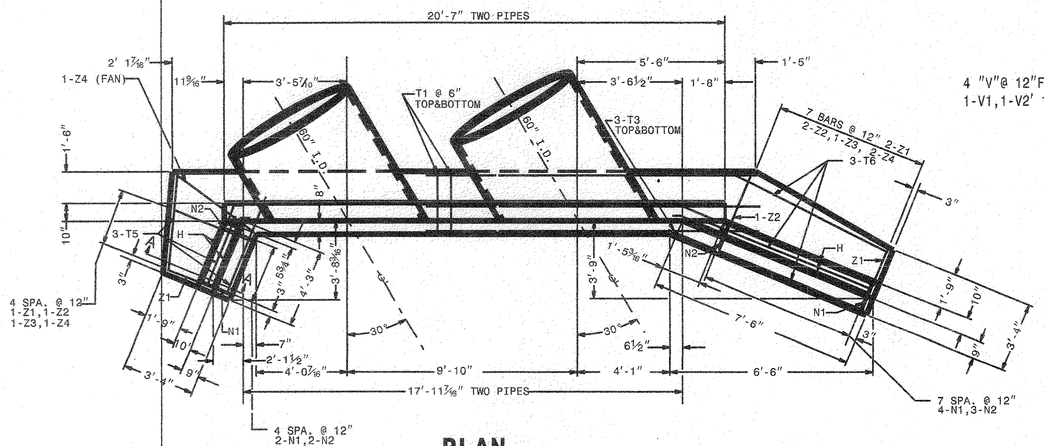
ALL EXPOSED CORNERS ARE TO BE CHAMFERED 1".

3" DIAMETER DRAINS SHALL BE PLACED IN WALL AS SHOWN AND BE 6" ABOVE NORMAL FLOW LINE.

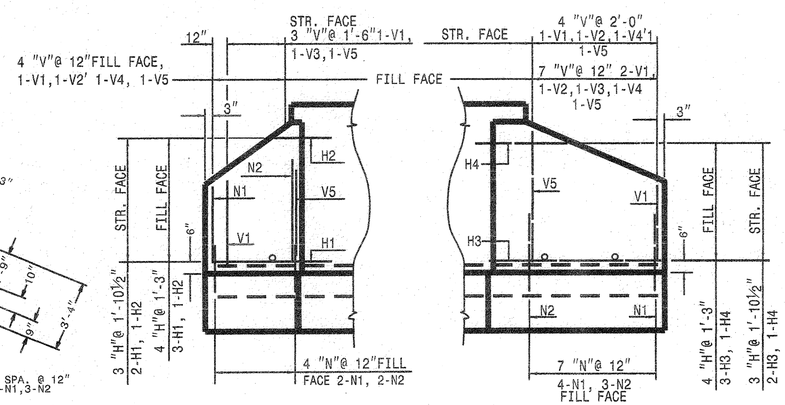
ALL MATERIAL AND WORKMANSHIP AS PER N.C.DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.

THE FOLLOWING EXTRA BARS ARE PROVIDED FOR HOLDING REINFORCING STEEL IN CORRECT POSITION IN WING: 4H-4V-6T

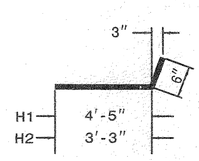
BILL OF MATERIAL FOR ENDWALL				
REINF. STEEL			2 PIPES	
BAR	SIZE	LENGTH	NO.	WEIGHT
B1	#4	5'-0"	10	33
B2	#4	6'-6"	6	26
G2	#7	20'-3"	2	83
H1	#4	4'-11"	5	16
H2	#4	3'-9"	2	5
H3	#4	8'-7"	5	29
H4	#4	6'-7"	2	9
N1	#4	3'-5"	6	14
N2	#5	3'-11"	15	61
T1	#4	2'-6"	82	137
T3	#4	23'-9"	6	95
T5	#4	4'-6"	3	9
T6	#4	7'-0"	3	14
V1	#4	3'-3"	5	11
V2	#4	3'-11"	3	8
V3	#4	4'-3"	2	6
V4	#4	4'-6"	3	9
V5	#4	5'-1"	5	17
V6	#4	6'-3"	15	63
Z1	#4	3'-4"	3	7
Z2	#4	3'-8"	3	7
Z3	#5	4'-1"	2	9
Z4	#5	4'-4"	4	18
REINF. STEEL LBS.				686
CLASS "A" CONCRETE TOTAL CU. YDS				8.9



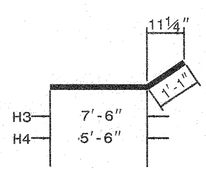
PLAN



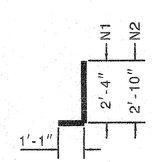
WING ELEVATION



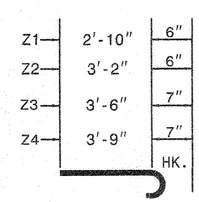
"H" BARS



"H" BARS



"N" BARS



"Z" BARS

"H", "N", & "Z" BAR DIMENSIONS ARE OUT TO OUT.

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER

10/11/12

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

DETAIL OF REINFORCED CONCRETE ENDWALL FOR DOUBLE 60"PIPE 60°OR 120° SKEW

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: rnbritt DATE: 08-09-2012
CHECKED BY: _____ DATE: _____
FILE SPEC.: details/rnbritt/english/60endwall 60sk.dgn

$$$$SYSTIME$$$$
$$$$SYSDIS$$$$
$$$$USERNAME$$$$

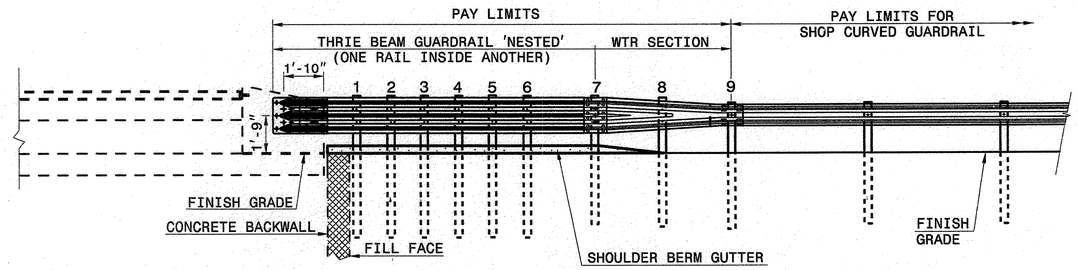
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

TYPE III - SHOP CURVED
STRUCTURE ANCHOR UNIT

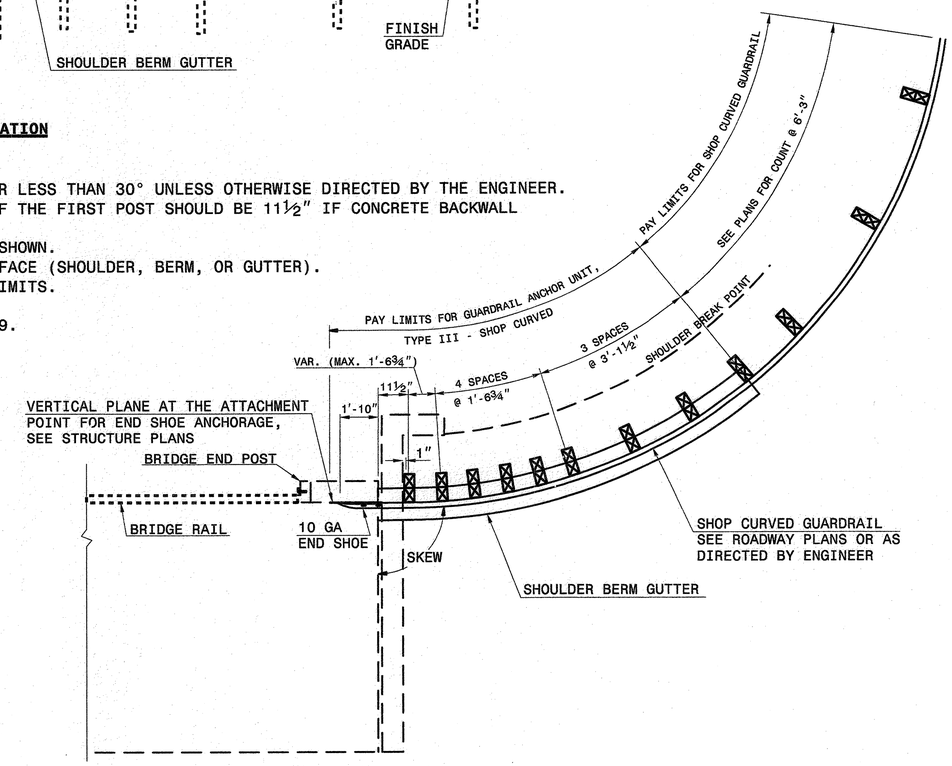
SHEET 1 OF 1

TYPE III SC



ELEVATION

NOTE:
- **POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- *THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
- -SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS SHOWN.
- -MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
- -USE NO STEEL POSTS WITHIN THE GUARDRAIL ANCHOR UNIT LIMITS.
- -LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
- -SEE STANDARD 862.03 SHEET 4 FOR POST SECTIONS 1 THRU 9.



PLAN VIEW

GUARDRAIL ANCHOR UNIT, TYPE III - SHOP CURVED FOR ATTACHMENT TO RAIL ON BRIDGE

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

ENGLISH DETAIL DRAWING FOR

TYPE III - SHOP CURVED
STRUCTURE ANCHOR UNIT

SHEET 1 OF 1

TYPE III SC

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER
10/1/12

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

SEE PLATE FOR TITLE

ORIGINAL BY: DATE:
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: details/nbritt/english/guardrail/typeiiisc.dgn

5/14/99
$$$$$SYSTIME$$$$$
$$$$$DGN$$$$$
$$$$$USERNAME$$$$$

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

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK

SIGNATURE DATE 7/25/12

ENGINEER

SIGNATURE DATE

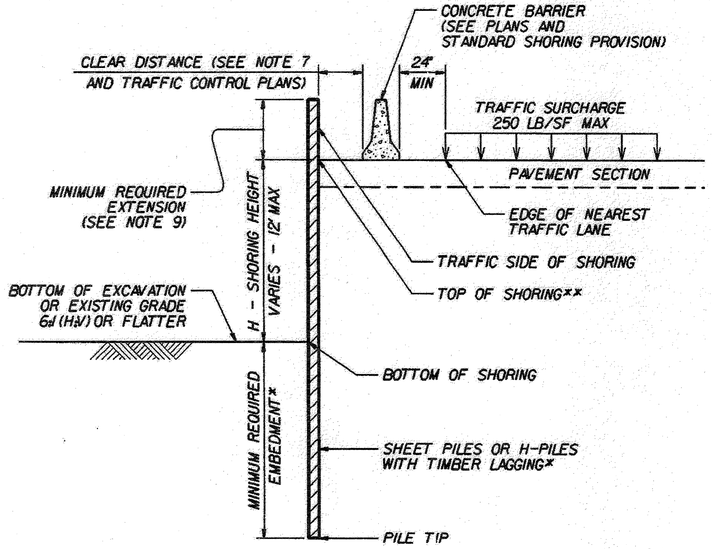
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

***DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".**

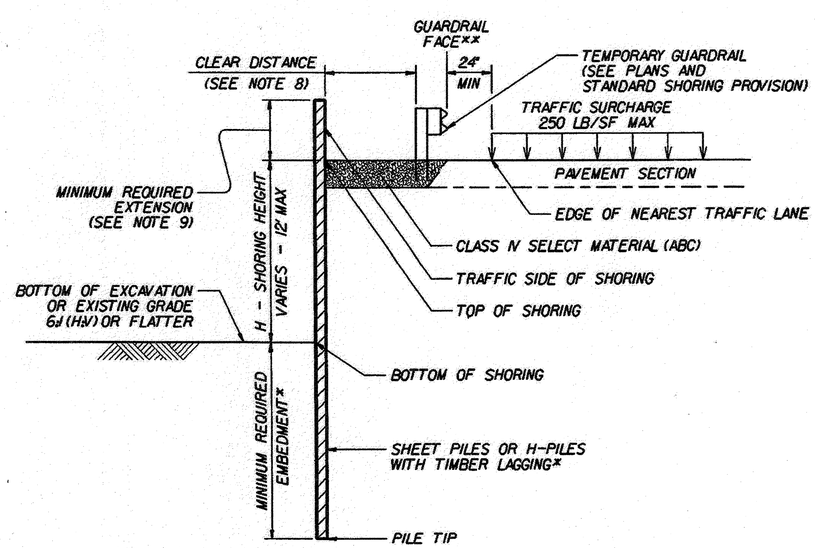
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 LB/CF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 LB/SF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH,
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM.
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



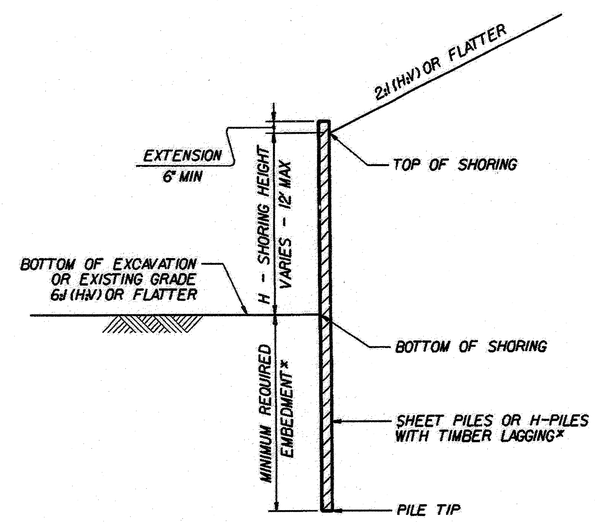
CONCRETE BARRIER

****TOP OF SHORING = EDGE OF PAVEMENT**



TEMPORARY GUARDRAIL

****GUARDRAIL FACE = EDGE OF PAVEMENT**



STANDARD TEMPORARY SHORING

(SLOPE CASE)

***SEE TABLE ABOVE.**

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)

***SEE TABLE ABOVE.**

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

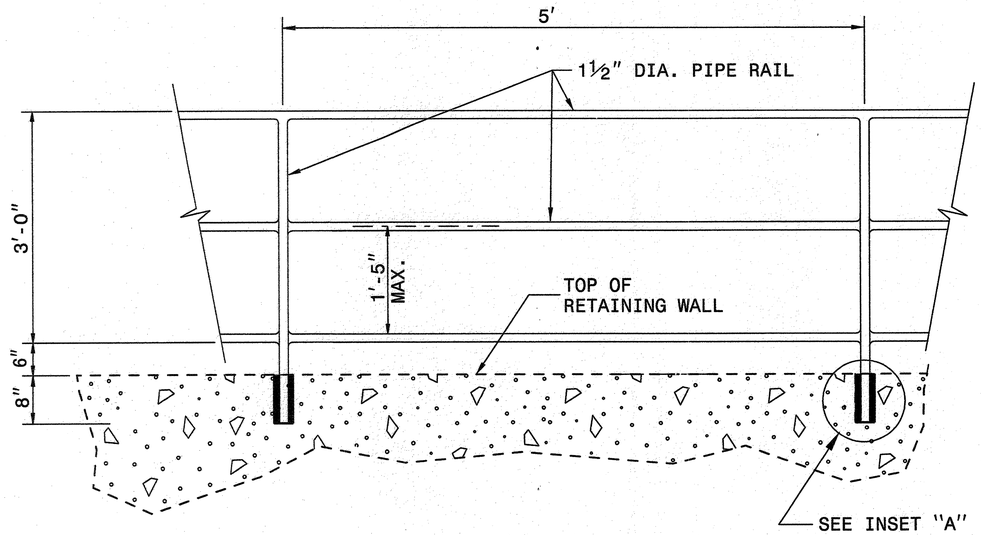
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.01

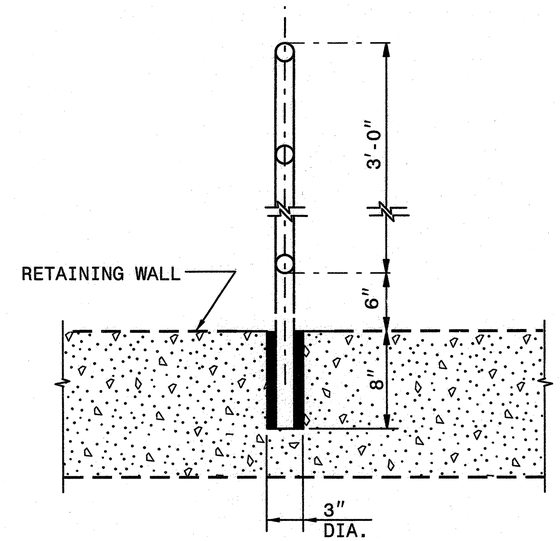
STANDARD TEMPORARY SHORING

DATE: 1-17-12

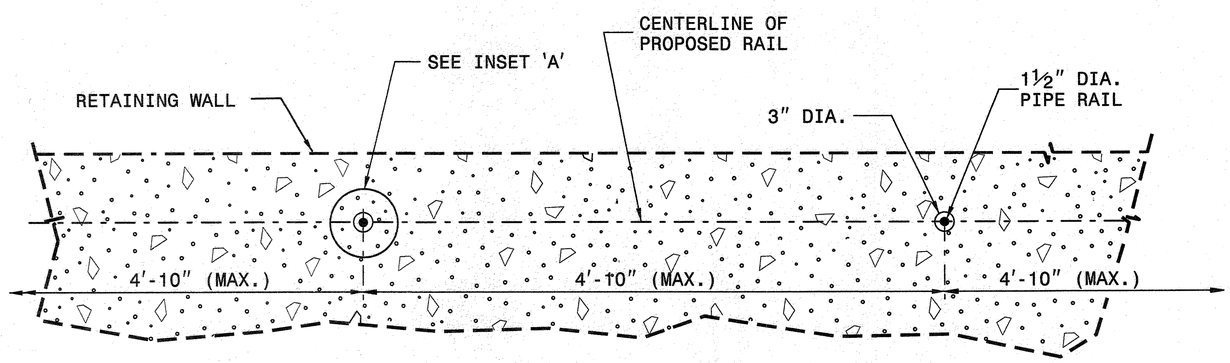
PROJECT REFERENCE NO.	SHEET NO.
R-5207A	2-K



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 1072-18 OF THE STANDARD SPECIFICATIONS.

FILL THE MOUNTING SPACE AROUND THE HANDRAIL WITH AN APPROVED GROUT OR EPOXY.

NORTH CAROLINA PROFESSIONAL SEAL 022968 ENGINEER
JOHN D. HUNEYCUTT
10/1/12

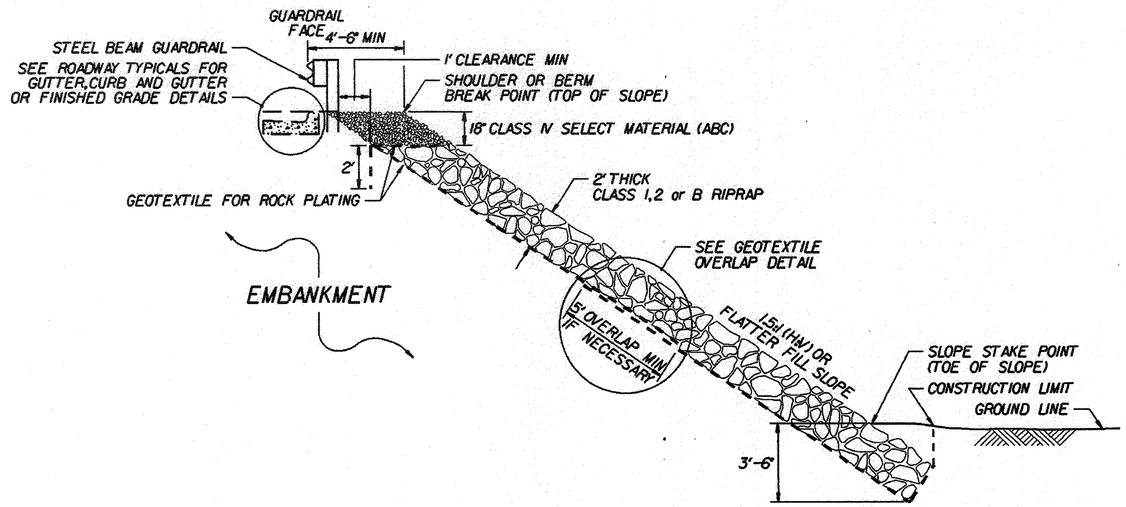
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

PROPOSED PEDESTRIAN SAFETY RAIL

ORIGINAL BY:	E.E.WARD	DATE:	12-99
MODIFIED BY:	T.S.Spell	DATE:	1-4-05
CHECKED BY:		DATE:	
FILE SPEC.:	w:details/stand/metric/0842d03.dgn		

$$$$SYSTIME$$$$
$$$$SYSTIME$$$$
$$$$USERNAME$$$$

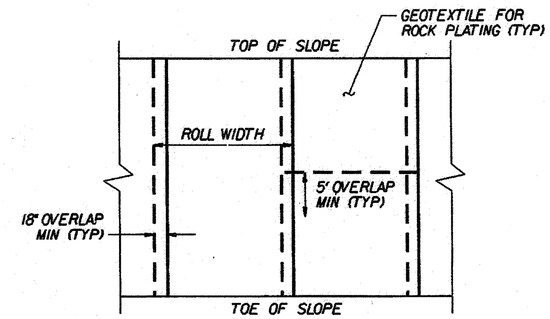
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C. CLARK	
SIGNATURE 8/21/12 DATE	SIGNATURE DATE



ROCK PLATING DETAIL NO. 2 – TYPICAL SECTION

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.



GEOTEXTILE OVERLAP DETAIL
(PLAN VIEW)

TOTAL BILL OF MATERIAL	
ROCK PLATING	500 SQ. YDS.

FOR ROCK PLATING, SEE SECTION 275 OF THE STANDARD SPECIFICATIONS.

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

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

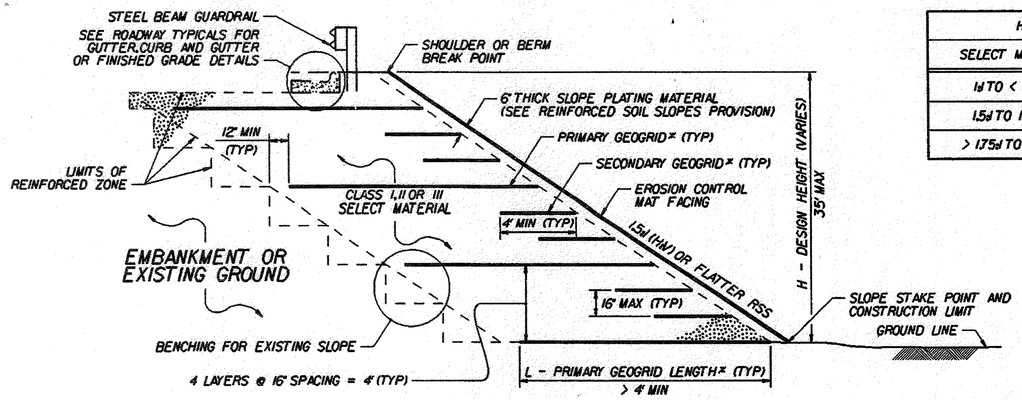
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ROCK PLATING

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

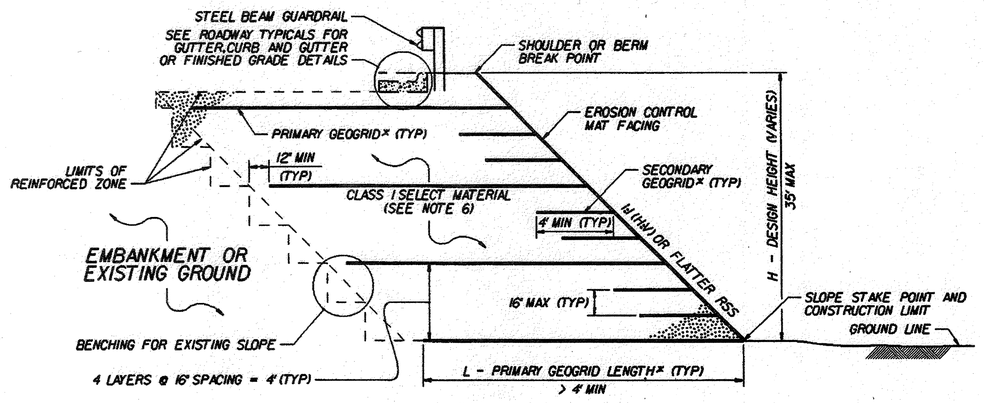
PREPARED BY: JTW	DATE: 8/12
REVIEWED BY: SCC	DATE: 8/12

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK — SIGNATURE: Scc DATE: 8/21/12	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

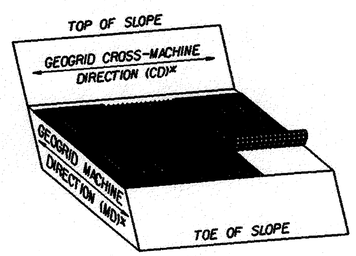
L/H RATIO (L > 4' MIN)

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					

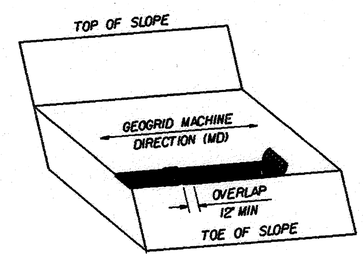
PRIMARY AND SECONDARY GEOGRIDS

#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)	500 SQ. YDS.

PREPARED BY:	JTW	DATE:	8/12
REVIEWED BY:	SCC	DATE:	8/12

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

GEOTECHNICAL ENGINEERING UNIT

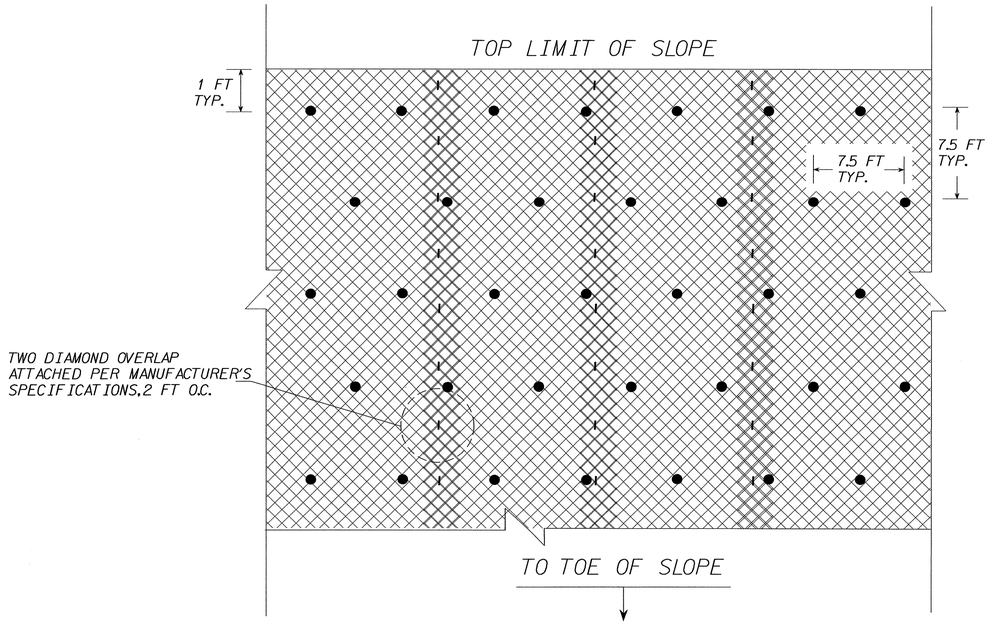
☐ EASTERN REGIONAL OFFICE
☒ WESTERN REGIONAL OFFICE
☐ CONTRACTS

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

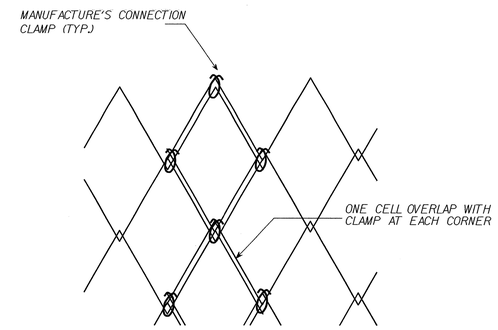
REINFORCED SOIL SLOPE (RSS)

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

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29869 ENGINEER SHANE C CLARK	
SIGNATURE 9/24/12 DATE	SIGNATURE DATE



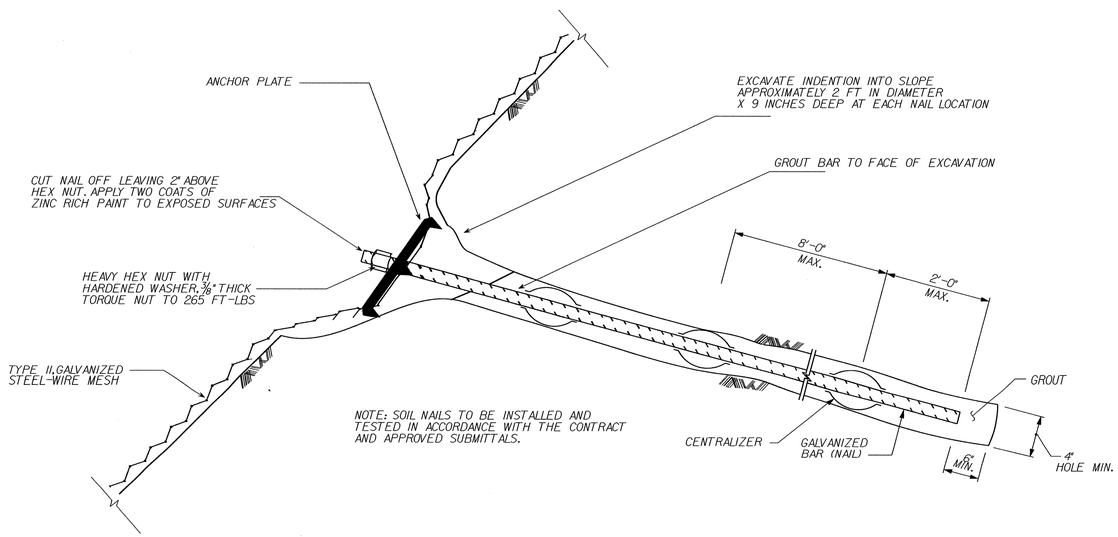
FACE DETAIL



MESH OVERLAP & CONNECTION DETAIL

NOTES:

1) WIRE MESH (TYPE II) 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-5207A
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-N
1			3				TOTAL SHEETS
2			4				

PREPARED BY: JTW	DATE: 4/18/12
REVIEWED BY: SCC	DATE: 8/27/12

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C203138

SUMMARY OF QUANTITIES - R-5207A

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
0000930000-E	SP	270	LF	GENERIC MISCELLANEOUS ITEM PEDESTRIAN SAFETY RAIL
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (51+40.50)
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ********** (71+24.00)
0043000000-N	226	Lump Sum		GRADING
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB-BING
0057000000-E	226	100	CY	UNDERCUT EXCAVATION
0134000000-E	240	70	CY	DRAINAGE DITCH EXCAVATION
0195000000-E	265	200	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	200	SY	GEOTEXTILE FOR SOIL STABILIZA-TION
0199000000-E	SP	598	SF	TEMPORARY SHORING
0223000000-E	275	500	SY	ROCK PLATING
0225000000-E	SP	500	SY	REINFORCED SOIL SLOPES
0241000000-E	SP	2,500	SY	GENERIC GRADING ITEM SOIL NAIL SLOPE STABILIZATION
0262000000-N	SP	12	EA	GENERIC GRADING ITEM SOIL NAIL PROOF TESTS
0262000000-N	SP	3	EA	GENERIC GRADING ITEM SOIL NAIL VERIFICATION TESTS
0262000000-N	SP	15	EA	GENERIC GRADING ITEM SUPPLEMENTAL SOIL NAILS
0318000000-E	300	800	TON	FOUNDATION CONDITIONING MATE-RIAL, MINOR STRUCTURES
0320000000-E	300	2,520	SY	FOUNDATION CONDITIONING GEO-TEXTILE
0335200000-E	305	1,612	LF	15" DRAINAGE PIPE
0335300000-E	305	892	LF	18" DRAINAGE PIPE
0335400000-E	305	348	LF	24" DRAINAGE PIPE
0335500000-E	305	408	LF	30" DRAINAGE PIPE
0335600000-E	305	72	LF	36" DRAINAGE PIPE
0335850000-E	305	1	EA	** DRAINAGE PIPE ELBOWS (24")
0366000000-E	310	272	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-E	310	428	LF	18" RC PIPE CULVERTS, CLASS III
0378000000-E	310	504	LF	24" RC PIPE CULVERTS, CLASS III
0384000000-E	310	48	LF	30" RC PIPE CULVERTS, CLASS III
0576000000-E	310	92	LF	** CS PIPE CULVERTS, ***** THICK (36", 0.079")
0576000000-E	310	60	LF	** CS PIPE CULVERTS, ***** THICK (42", 0.109")
0576000000-E	310	68	LF	** CS PIPE CULVERTS, ***** THICK (48", 0.109")
0576000000-E	310	140	LF	** CS PIPE CULVERTS, ***** THICK (54", 0.138")
0576000000-E	310	120	LF	** CS PIPE CULVERTS, ***** THICK (60", 0.138")
0588000000-E	310	352	LF	18" CS PIPE CULVERTS, 0.064" THICK
0594000000-E	310	404	LF	24" CS PIPE CULVERTS, 0.064" THICK
0600000000-E	310	80	LF	30" CS PIPE CULVERTS, 0.079" THICK
0995000000-E	340	2,929	LF	PIPE REMOVAL
1099500000-E	505	150	CY	SHALLOW UNDERCUT
1099700000-E	505	250	TON	CLASS IV SUBGRADE STABILIZA-TION
1121000000-E	520	2,952	TON	AGGREGATE BASE COURSE
1220000000-E	545	3,100	TON	INCIDENTAL STONE BASE
1275000000-E	600	26	GAL	PRIME COAT
1297000000-E	607	800	SY	MILLING ASPHALT PAVEMENT, *** DEPTH (2")
1330000000-E	607	800	SY	INCIDENTAL MILLING
1489000000-E	610	9,800	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1491000000-E	610	400	TON	ASPHALT CONC BASE COURSE, TYPE B25.0C
1498000000-E	610	14,400	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1503000000-E	610	350	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C
1519000000-E	610	8,700	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1523000000-E	610	210	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5C
1575000000-E	620	1,695	TON	ASPHALT BINDER FOR PLANT MIX
1693000000-E	654	200	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
1840000000-E	665	30,500	LF	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)
2000000000-N	806	156	EA	RIGHT OF WAY MARKERS
2022000000-E	815	67.2	CY	SUBDRAIN EXCAVATION
2033000000-E	815	50.4	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	300	LF	6" PERFORATED SUBDRAIN PIPE
2070000000-N	815	1	EA	SUBDRAIN PIPE OUTLET
2077000000-E	815	6	LF	6" OUTLET PIPE
2209000000-E	838	14.9	CY	ENDWALLS
2220000000-E	838	8.9	CY	REINFORCED ENDWALLS
2275000000-E	SP	43.39	CY	FLOWABLE FILL
2286000000-N	840	29	EA	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	1.36	LF	MASONRY DRAINAGE STRUCTURES
2364000000-N	840	5	EA	FRAME WITH TWO GRATES, STD 840.16
2366000000-N	840	7	EA	FRAME WITH TWO GRATES, STD 840.24
2367000000-N	840	4	EA	FRAME WITH TWO GRATES, STD 840.29
2374000000-N	840	2	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)
2374000000-N	840	6	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)
2374000000-N	840	3	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)
2486000000-E	SP	335	SF	GENERIC DRAINAGE ITEM SANDBAG HEADWALLS
2549000000-E	846	2,030	LF	2'-6" CONCRETE CURB & GUTTER
2556000000-E	846	200	LF	SHOULDER BERM GUTTER
2591000000-E	848	10	SY	4" CONCRETE SIDEWALK
2612000000-E	848	470	SY	6" CONCRETE DRIVEWAY
2619000000-E	850	60	SY	4" CONCRETE PAVED DITCH
2815000000-N	858	1	EA	ADJUSTMENT OF DROP INLETS
2845000000-N	858	12	EA	ADJUSTMENT OF METER BOXES OR VALVE BOXES
3195000000-N	862	7	EA	GUARDRAIL ANCHOR UNITS, TYPE AT-1
3215000000-N	862	7	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	9	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3387000000-N	862	1	EA	TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE ********** (AT-1)
3389100000-N	SP	3	EA	TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE 350
3420000000-E	SP	1,275	LF	GENERIC GUARDRAIL ITEM STEEL BM GUARDRAIL WITH 8' POSTS
3420000000-E	SP	425	LF	GENERIC GUARDRAIL ITEM STEEL BM GUARDRAIL, SHOP CURVED WITH 8' POSTS
3420000000-E	SP	225	LF	GENERIC GUARDRAIL ITEM TEMPORARY STEEL BM GUARDRAIL WITH 8' POSTS
3420000000-E	SP	62.5	LF	GENERIC GUARDRAIL ITEM TEMPORARY STEEL BM GUARDRAIL WITH 8' POSTS (SHOP CURVED)
3435000000-N	SP	20	EA	GENERIC GUARDRAIL ITEM ADDITIONAL GUARDRAIL POSTS (8')
3436000000-N	862	1	EA	GENERIC GUARDRAIL ITEM GUARDRAIL ANCHOR UNITS, TYPE III SHOP CURVED
3628000000-E	876	126	TON	RIP RAP, CLASS I
3635000000-E	876	73	TON	RIP RAP, CLASS II
3642000000-E	876	532	TON	RIP RAP, CLASS A
3649000000-E	876	1,026	TON	RIP RAP, CLASS B
3656000000-E	876	7,693	SY	GEOTEXTILE FOR DRAINAGE
4072000000-E	903	1,266	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4102000000-N	904	70	EA	SIGN ERECTION, TYPE E
4108000000-N	904	1	EA	SIGN ERECTION, TYPE F
4116100000-N	904	4	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (E)
4155000000-N	907	63	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
4400000000-E	1110	288	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	946	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	260	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4415000000-N	1115	2	EA	FLASHING ARROW BOARD
4420000000-N	1120	2	EA	PORTABLE CHANGEABLE MESSAGE SIGN
4430000000-N	1130	872	EA	DRUMS
4435000000-N	1135	60	EA	CONES
4445000000-E	1145	160	LF	BARRICADES (TYPE III)
4450000000-N	1150	10,800	HR	FLAGGER
4480000000-N	1165	2	EA	TMA
4516000000-N	1180	900	EA	SKINNY DRUM
4650000000-N	1251	400	EA	TEMPORARY RAISED PAVEMENT MARKERS
4685000000-E	1205	29,387	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	36,534	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4695000000-E	1205	419	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
4697000000-E	1205	275	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS)
4710000000-E	1205	291	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
4725000000-E	1205	24	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4810000000-E	1205	68,008	LF	PAINT PAVEMENT MARKING LINES (4")
4820000000-E	1205	371	LF	PAINT PAVEMENT MARKING LINES (8")
4835000000-E	1205	263	LF	PAINT PAVEMENT MARKING LINES (24")
4845000000-N	1205	24	EA	PAINT PAVEMENT MARKING SYMBOL
4850000000-E	1205	2,400	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
4905000000-N	1253	493	EA	SNOWPLOWABLE PAVEMENT MARKERS
5319000000-E	1505	1	CY	CLASS B CONCRETE FOR ENCASING UTILITY LINES
5325600000-E	1510	100	LF	6" WATER LINE
5326200000-E	1510	938	LF	12" WATER LINE
5326600000-E	1510	178	LF	16" WATER LINE
5546000000-E	1515	3	EA	8" VALVE
5558000000-E	1515	3	EA	12" VALVE
5558600000-E	1515	3	EA	16" VALVE
5648000000-N	1515	7	EA	RELOCATE WATER METER
5672000000-N	1515	3	EA	RELOCATE FIRE HYDRANT
5709200000-E	1520	415	LF	4" FORCE MAIN SEWER
5768000000-N	1520	2	EA	SANITARY SEWER CLEAN-OUT

SUMMARY OF QUANTITIES - R-5207A

ItemNumber	Sec #	Quantity	Unit	Description
5798000000-E	1530	436	LF	ABANDON **" UTILITY PIPE (4")
5800000000-E	1530	100	LF	ABANDON 6" UTILITY PIPE
5804000000-E	1530	913	LF	ABANDON 12" UTILITY PIPE
5810000000-E	1530	160	LF	ABANDON 16" UTILITY PIPE
5836400000-E	1540	84	LF	36" ENCASEMENT PIPE
6000000000-E	1605	21,710	LF	TEMPORARY SILT FENCE
6006000000-E	1610	1,800	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	3,150	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	1,010	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	18	ACR	TEMPORARY MULCHING
6018000000-E	1620	450	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	1.75	TON	FERTILIZER FOR TEMPORARY SEED-ING
6024000000-E	1622	200	LF	TEMPORARY SLOPE DRAINS
6029000000-E	SP	900	LF	SAFETY FENCE
6030000000-E	1630	4,510	CY	SILT EXCAVATION
6036000000-E	1631	9,500	SY	MATTING FOR EROSION CONTROL
6038000000-E	SP	500	SY	PERMANENT SOIL REINFORCEMENT MAT
6042000000-E	1632	440	LF	1/4" HARDWARE CLOTH
6071010000-E	SP	60	LF	WATTLE
6071020000-E	SP	85	LB	POLYACRYLAMIDE (PAM)
6071030000-E	1640	180	LF	COIR FIBER BAFFLE
6084000000-E	1660	12	ACR	SEEDING & MULCHING
6087000000-E	1660	12	ACR	MOWING
6090000000-E	1661	200	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	300	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	8.5	TON	FERTILIZER TOPDRESSING
6114500000-N	1667	10	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	100	EA	RESPONSE FOR EROSION CONTROL
7048500000-E	1705	4	EA	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)
7060000000-E	1705	2,520	LF	SIGNAL CABLE
7120000000-E	1705	20	EA	VEHICLE SIGNAL HEAD (12", 3 SECTION)
7132000000-E	1705	2	EA	VEHICLE SIGNAL HEAD (12", 4 SECTION)
7264000000-E	1710	1,250	LF	MESSENGER CABLE (3/8")
7288000000-E	1715	100	LF	PAVED TRENCHING (**********) (1, 2")
7300000000-E	1715	1,530	LF	UNPAVED TRENCHING (*********) (1, 2")
7324000000-N	1716	15	EA	JUNCTION BOX (STANDARD SIZE)
7444000000-E	1725	2,000	LF	INDUCTIVE LOOP SAWCUT
7456000000-E	1726	5,720	LF	LEAD-IN CABLE (**********) (14-2)
7576000000-N	SP	12	EA	METAL STRAIN SIGNAL POLE
7613000000-N	SP	12	EA	SOIL TEST
7614100000-E	SP	180	CY	DRILLED PIER FOUNDATION
7636000000-N	1745	4	EA	SIGN FOR SIGNALS
7642200000-N	1743	1	EA	TYPE II PEDESTAL WITH FOUND-ATION
7684000000-N	1750	3	EA	SIGNAL CABINET FOUNDATION
7756000000-N	1751	3	EA	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)
7780000000-N	1751	15	EA	DETECTOR CARD (TYPE 2070L)
7901000000-N	1753	3	EA	CABINET BASE EXTENDER

COMPUTED BY: SGM	DATE: 8/8/2012
CHECKED BY: JLT	DATE: 8/27/12

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

Line	Station	Station	Uncl. Excav.	Undercut Excav.	Embank. +%	Borrow	Waste
-DET-	11+50.00	21+50.00	693		1,216	523	
	SUB-TOTAL # 1		693		1,216	523	
-L-	8+44.07	10+84.00	39		9		30
-L-	11+64.00	15+28.56	858		21		837
-L-	15+54.98	46+00.00	2,513		1,553		960
-Y1-	11+70.00	15+00.00	197		24		173
-Y2-	10+20.00	12+83.09	224		197		27
	SUB-TOTAL # 2		3,831		1,803		2,027
-L-	46+00.00	50+86.71	111		366	255	
	SUB-TOTAL # 3		111		366	255	
-L-	51+94.30	70+95.20	1,361		1,998	637	
-Y4-	10+48.83	11+60.00	79		25		
	SUB-TOTAL # 4		1,440		2,023	637	
-L-	71+52.80	100+50.00	1,389		1,317		72
	SUB-TOTAL # 5		1,389		1,317		72
-L-	100+50.00	131+00.00	7,505		3,221		4,284
-Y5-	10+18.04	12+60.00	128		17		111
-Y7-	11+18.82	12+46.70	29				29
-Y8-	10+54.26	13+00.00	107		26		81
	SUB-TOTAL # 6		7,769		3,265		4,504
-L-	131+00.00	139+27.19	660		955	295	
	SUB-TOTAL # 7		660		955	295	
-L-	139+25.27	169+96.35	8,202		397		7,805
-DRIVE1-	10+30.00	11+13.43	7				7
-Y9-	10+50.00	11+39.36	14		6		8
	SUB-TOTAL # 8		8,223		403		7,820
Detour Removal							
-L-	71+27.00	75+75.00	1,512				1,512
	SUB-TOTAL # 9		1,512				1,512
	TOTAL		25,628		11,349	1,710	15,989
LOSS DUE TO CLEARING & GRUBBING			-200				-200
WASTE TO REPLACE BORROW						-1,710	-1,710
GRAND TOTAL			25,428		11,349		14,079
SAY			26,700				

EST. DDE = 70 CUBIC YARDS
SHOULDER BORROW = 3,290 CUBIC YARDS
TOTAL SHALLOW UNDERCUT = 150CUBIC YARDS
CLASS IV SUBGRADE STABILIZATION = 250 TONS
PER GEOTECH RECOMMENDATION, ESTIMATED 100 CUBIC YARDS OF UNDERCUT TO BE USED IN THE DISCRETION OF THE RESIDENT ENGINEER.

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.

SUMMARY OF EXISTING ASPHALT PAVEMENT REMOVAL

Line	Station	Station	Loc	SY
-L-	14+04	16+50	LT & RT	1,092.13
-Y2-	10+47	13+21	LT	521.00
-L-	41+95	45+11	RT	401.82
-L-	46+92	51+29	RT	833.64
-L-	51+65	56+91	RT	1,006.01
-L-	63+48	66+89	RT	759.97
-L-	67+20	69+26	LT	90.89
-L-	104+76	108+02	RT	583.93
-L-	109+50	110+00	LT & RT	106.27
-L-	121+50	122+00	LT & RT	219.79
-L-	123+50	129+53	LT & RT	1,360.81
-L-	129+74	1352+50	LT & RT	1,258.83
-L-	135+50	139+83	RT	317.30
-L-	152+72	165+16	LT	962.12
-DET-	13+08	20+60	LT & RT	1,857.67
			COLUMN TOTAL:	11,372.18
			SAY	11,380

Approximate quantities only. Unclassified excavation, shoulder borrow, fine grading, clearing and grubbing, and removal of existing pavement will be paid for at the lump sum price for "Grading".

"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.
G = GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

*For estimating purposes only. See Steel BM Guardrail with 8' Posts Special Provision.

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 CAT-1	ANCHORS AT-1	ANCHORS III	ANCHORS III SHOP CUR.	ANCHORS TEMP GRAU350	ANCHORS TEMP AT-1	IMP. ATTEN. TYPE 350 EA	IMP. ATTEN. TYPE 350 G	IMP. ATTEN. TYPE 350 NG	REMOVE EXISTING GRDRAIL	EXTRA DEPTH POSTS (8')	REMARKS
-L-/-Y2-	30+00	12+58	LT/RT	262.5	118.75			31+00	6'	8'					1		1									61	
-L-	45+62.50	48+00	LT	237.5			47+00		6'	8'					2											38	
-L-	50+15	50+81.82	LT	43.75	56.25			BRIDGE	6'-3"	6'-3"							1	1								16	
-L-	50+55	50+91.60	RT	18.75	56.25		BRIDGE		6'-3"	6'-3"							1	1								12	
-L-	52+89.41	52+36	LT	18.75	56.25		BRIDGE		6'-3"	6'-3"							1	1								12	
-L-	51+99.20	52+92.95	RT	93.75				BRIDGE	6'-3"	8'					1			1								15	
-L-	69+40.91	70+84.66	LT	143.75				BRIDGE	6'-3"	8'					1			1								23	
-L-	70+87	71+65.74	RT		75		BRIDGE		6'-3"	6'-3"							1		1							12	
-L-	71+42.36	71+81	LT	18.75	56.25		BRIDGE		6'-3"	6'-3"							1	1								12	
-L-	71+63.43	72+57.09	RT	93.75				BRIDGE	6'-3"	8'					1			1								15	
-L-	96+20	99+50	RT	312.5	56.25		96+50		6'	8'					1		1									59	
-L-	127+00	133+00	LT	600			13200	128+00	6'	8'					2											96	
		SUB-TOTALS(Permanent):		1,843.75	475.00										9		7	7	1							371	
	LESS ANCHOR DEDUCTIONS																										
	GRAU-350	9@50 ft		450																							
	TYPE III	7@18.75 ft		131.25																							
	TYPE AT-1	7@6.25 ft			43.75																						
	TYPE III SHOP CUR.	1@18.75'			18.75																						
	ANCHOR TOTALS (Permanent)			581.25	62.5																						
	GRAND TOTALS(Permanent)			1262.50	412.50										9		7	7	1							371	
	SAY			1275.00	425.00																						
-DET-	14+25	16+87.50	LT	262.5			15+12	15+00	4'	5'	50'	50'	1'	1'						2						42	Temporary Guardrail
-DET-	15+09+/-	16+23.50	RT	100	56.25		15+50	15+75	4'	5'		50'	1'							1	1					25	Temporary Guardrail
	SUB-TOTALS(Temporary):			362.50	56.25															3	1					67	
	LESS ANCHOR DEDUCTIONS																										
	GRAU-350(Temp.)	3@50 ft		150																							
	TYPE AT-1(Temp.)	9@6.25 ft			6.25																						
	ANCHOR TOTALS (Temporary)			150	6.25																						
	GRAND TOTALS(Temporary)			212.50	50.00															3	1						
	SAY			225.00	62.50																					430 *	

ADDITIONAL GUARDRAIL POSTS = 20 EA

COMPUTED BY: JLT DATE: 3/17/2010

CHECKED BY: ZJR DATE: 7/26/2012

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

JTERRYLAPTOP

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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) 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- 14+48	LT	1		2163.39															
		1	2		2160.39	2157.95			56								X	X	
-Y1- 12+22	RT	2		2160.7															
		2	5		2157.7	2157.24													
-L- 14+75	RT	3		2162.96															
		3	4		2159.96	2158			64										
-L- 15+75	LT	5		2161.7															
		5	6		2157.14	2153.4													
		5	7		2158.7	2159.67				128							X	X	
-L- 17+00	LT	7		2163															
		7	8		2160	2160.05			8								X	X	
		7	9		2159.67	2159.75				16							X	X	
-L- 17+00	LT	8		2162.3															
-L- 17+19	LT	9		2163															
		9	9A		2160	2160.29			52								X	X	
-L- 17+70	LT	9A		2163.29															
		9A	10		2160.39	2162			104								X	X	
-L- 18+75	LT	10		2165															
-L- 21+79	LT	11		2169.12															
		11	12		2166.12	2164.7													
-L- 22+78	LT	12		2167.7															
		12	12A		2162.89	2162.95													
		12	13		2162.89	2162.5													
-L- 22+78	LT	12A		2165.2															
-L- 25+81	LT	14							24										
-L- 26+84	LT	14A							20										
-L-31+83	RT	15							20										
-Y2- 12+64	LT	16		2133.7															
-Y2- 12+64		16	16A		2128.95	2135.1													
		16	16B		2127.59	2125.54						92					X	X	
		16	18		2127.69	2128.21	*				104						X	X	
-L- 35+17	LT	16B		2130.69															
		16B	16C		2125.94	2128.94					8					X	X	X	
		16B	16D		2125.44	2123.3						140					X	X	
-Y2- 11+08	RT	17							28										
-Y2- 11+41	LT	18		2132.96															
		18	18A		2128.31	2131													
-L- 36+20	RT	19	21		2126.2	2118.38													
-L- 37+59	RT	21		2121.53															
		21	22		2118.28	2111.02													
-L- 39+17	RT	22A		2114															
		22A	22		2111.75	2111.27													
-L- 39+17	RT	22		2114.27															
SHEET TOTALS									376	144	112	232							

Station	From	To	C.S. Pipe 12" (.064)	15" (.064)	18" (.064)	24" (.064)	30" (.079)	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- 14+48	1																									
	1	2																								
-Y1- 12+22	2																									
	2	5											92													
-L- 14+75	3																									
	3	4																								
-L- 15+75	5																									
	5	6												120												
	5	7																								
-L- 17+00	7																									
	7	8																								
	7	9																								
-L- 17+00	8																									
-L- 17+19	9																									
	9	9A																								
-L- 17+70	9A																									
	9A	10																								
-L- 18+75	10																									
-L- 21+79	11																									
	11	12										100														
-L- 22+78	12																									
	12	12A										12														
	12	13										72														
-L- 22+78	12A																									
-L- 25+81	14																									
-L- 26+84	14A																									
-L-31+83	15																									
-Y2- 12+64	16																									
-Y2- 12+64	16	16A												120												
	16	16B																								
	16	18																								
-L- 35+17	16B																									
	16B	16C																								
	16B	16D																								
-Y2- 11+08	17																									
-Y2- 11+41	18																									
	18	18A												64												
-L- 36+20	19	21											136													
-L- 37+59	21																									
	21	22											160													
-L- 39+17	22A																									
	22A	22										8														
-L- 39+17	22																									
SHEET TOTALS												192	388	304												

Station	From	To	** " R.C. Pipe (Class V)	***" RC Pipe Culverts, Contractor Design	***" RC Pipe Culverts, Contractor Design	15" Side Drain Pipe	18" Side Drain Pipe	Endwalls Std. 838.01, 838.11 or Std. 838.80 (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
-L- 14+48	1									1			1			1		
	1	2																
-Y1- 12+22	2									1								
	2	5																
-L- 14+75	3									1			1		1			
	3	4																
-L- 15+75	5									1								
	5	6																
	5	7																
-L- 17+00	7									1			1	1				
	7	8																
	7	9																
-L- 17+00	8									1								
-L- 17+19	9									1			1	1				
	9	9A																
-L- 17+70	9A									1			1		1			
	9A	10																
-L- 18+75	10									1			1		1			
-L- 21+79	11									1			1			1		
	11	12																
-L- 22+78	12									1			1			1		
	12	12A																
	12	13																
-L- 22+78	12A									1								
-L- 25+81	14																	
-L- 26+84	14A																	
-L-31+83	15																	
-Y2- 12+64	16									1	1.11							
-Y2- 12+64	16	16A																
	16	16B																
	16	18																
-L- 35+17	16B									1	0.25							
	16B	16C																
	16B	16D																
-Y2- 11+08	17																	
-Y2- 11+41	18									1								
	18	18A																
-L- 36+20	19	21																
-L- 37+59	21									1			1		1			
	21	22																
-L- 39+17	22A									1								
	22A	22																
-L- 39+17	22									1			1		1			
SHEET TOTALS										18	1.36		10	2	5	3		

Station	From	To	D.I. Std. 840.14 or Std. 840.15	D.I. Frame and Grate Std. 840.16	G.D.I. Type "A" Std. 840.17 or 840.26	G.D.I. Type "B" Std. 840.18 or 840.27	G.D.I. Type "D" Std. 840.19 or 840.28				G.D.I. (N.S.) Frame with Two Grates Std. 840.24	G.D.I. (N.S.) Frame with Two Grates Std. 840.29	J.B. Std. 840.31 or 840.32	Traffic Bearing Grated Drop Inlet Std. 840.35	Open Throat Catch Basin Std. 840.04 or 840.05	Adjustment of Drop Inlet (EA)	Drainage Pipe Elbows No. & Size	Flowable Fill, C.Y.	Conc. Collars Cl. "B" C.Y. Std. 840.72	Pipe Removal Lin. Ft.	Remarks
-L- 14+48	1																				
	1	2																			
-Y1- 12+22	2														1						
	2	5																4.05			PLUG & FILL 18" PIPE
-L- 14+75	3																			155.5	
	3	4																			
-L- 15+75	5					1					1										
	5	6																20.52			PLUG AND FILL 24" AND 18" PIPES
	5	7																		105.6	REMOVE 3 DI's
-L- 17+00	7																				
	7	8																			
	7	9																			
-L- 17+00	8		1	1																	
-L- 17+19	9																				
	9	9A																			
-L- 17+70	9A																				
	9A	10																			
-L- 18+75	10																				
-L- 21+79	11																				
	11	12																			
-L- 22+78	12																				
	12	12A																			
	12	13																			
-L- 22+78	12A		1	1																	
-L- 25+81	14																			22.3	
-L- 26+84	14A																			21.3	
-L-31+83	15																			28.5	
-Y2- 12+64	16				1						1										
-Y2- 12+64	16	16A																			
	16	16B																			
	16	18																			
-L- 35+17	16B				1						1										
	16B	16C															1 - 24"			20	HDPE PIPE ON;Y
	16B	16D																			
-Y2- 11+08	17																			23.1	
-Y2- 11+41	18				1						1										
	18	18A																			REMOVE DI
-L- 36+20	19	21																			REMOVE DI
-L- 37+59	21																				
	21	22																		85	REMOVE DI
-L- 39+17	22A		1	1																	
	22A	22																			
-L- 39+17	22																				
SHEET TOTALS			3	3	3	1					4				1		1 - 24"	24.57		461.3	

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:	JTL	DATE:	3/17/2012
CHECKED BY:	ZJR	DATE:	7/26/2012

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

JTERRYLAPTOP

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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
		22	22C		2110.52	2106.5	
-L- 40+15	RT	22D		2109.9			
		22D	22C		2107.65	2107.15	
-L- 40+05	RT	22C		2110.15			
		22C	22E		2106.4	2105.9	
-L- 37+60	LT	20					
-L- 40+44	LT	22B					
-L- 43+99	LT	23					
-L- 50+55	RT	23C		2083.58			
		23C	23D		2080.83	2080.73	
-L- 50+52	LT	23D		2083.58			
		23D	23E		2080.73	2080.7	
-L- 52+29	RT	23F					
-L- 54+76	RT	24					
-L- 58+50	CL	25			2088.9	2087.9	
-L- 59+35	RT	26					
-L- 61+07	RT	27					
-Y4- 10+98	CL	28			2108	2107	
-Y4- 10+96	LT	29					
-L- 65+93	CL	30			2105	2102	
-L- 67+92	RT	31					
-L- 70+40	LT	32		2109.9			
	LT	32	33		2107.13	2104.8	
-L-72+04	LT	33B					
-L- 75+53	LT	34					
-L- 77+30	LT	35					
-L- 78+62	RT	36					
-L- 79+86	RT	36A					
-L- 81+76	LT	37					
-L- 82+44	LT	38					
-L- 83+57	LT	39					
-L- 85+85	CL	40			2141.3	2140.5	
-L- 86+36	LT	41					
-L-87+27	LT	42					
-L- 89+51	LT	42A					
-L- 89+87	CL	43			2140.8	2137.8	
-L- 90+60	LT	44					
-L- 92+63	LT	45					
-L- 94+72	LT	46					
-L- 98+79	LT	47					
-L- 100+28	LT	48					
-L-101+70	RT	48A					
-L- 102+36	LT	49					
SHEET TOTALS							

DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC)

STATION	FROM	TO	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- 37+60	20						16							
-L- 43+99	23							72						
-L- 54+76	24			52										
-L- 59+35	26				32									
-Y4- 10+96	29			24										
-L- 67+92	31			20										
-L-72+04	33B				40									
-L- 75+53	34			36										
-L- 77+30	35			60										
-L- 78+62	36			24										
-L- 79+86	36A			64										
-L- 81+76	37			24										
-L- 82+44	38			16										
-L- 83+57	39			16										
-L- 86+36	41			44										
-L-87+27	42			24										
-L- 89+51	42A			24										
-L- 90+60	44					24								
-L- 92+63	45					20								
-L- 94+72	46					24								
-L- 98+79	47				24									
-L- 100+28	48				24									
-L- 102+36	49				32									
SHEET TOTALS				428	152	68	16	72						

C.S. PIPE / 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. 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"
	22	22C												88												
	22D	22C										8														
	22C	22E												60												
	23C	23D										32														
	23D	23E										16														
-L- 58+50	25					56																				
-L- 61+07	27				84																					
-Y4- 10+98	28				44																					
-L- 65+93	30					64																				
	32	33										16														
-L- 85+85	40				48																					
-L- 89+87	43								60																	
SHEET TOTALS					176	120			60			72		148												

STATION	FROM	TO	** " R.C. PIPE (CLASS V)	*** RC PIPE CULVERTS, CONTRACTOR DESIGN	*** RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	ENDWALLS CU. YARDS 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'	LIN. FT. 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
-L- 40+15	22D									1						
-L- 40+05	22C									1			1		1	
-L- 43+99	23							3.4								
-L- 50+55	23C									1						
-L- 50+52	23D									1						
-L- 70+40	32									1						
-L- 89+87	43								3.8							
SHEET TOTALS								3.4	3.8	5			1		1	

STATION	FROM	TO	CONCRETE TRANSITIONAL SECTION DROP INLET	CONCRETE TRANSITIONAL SECTION CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	TRAFFIC BEARING GRATED DROP INLET STD. 840.35	OPEN THROAT CATCH BASIN STD. 840.04 OR 840.05	ADJUSTMENT OF DROP INLET (EA)	DRAINAGE PIPE ELBOWS NO. & SIZE	FLOWABLE FILL, C.Y.	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L- 40+15	22D				1	1														
-L- 37+60	20																		18.1	
-L- 40+44	22B																		23.6	
-L- 43+99	23																		31.7	
-L- 50+55	23C										1		1							
-L- 50+52	23D										1		1							
-L- 52+29	23F																		19.1	
-L- 54+76	24																		24.1	
-L- 58+50	25																		35.7	
-L- 59+35	26																		26	
-L- 61+07	27																		44.2	
-Y4- 10+98	28																		35.7	
-Y4- 10+96	29																		23.6	
-L- 65+93	30																		45.4	
-L- 67+92	31																		29.8	
-L- 70+40	32										1		1							
-L-72+04	33B																		20.6	
-L- 77+30	35																		32.4	
-L- 85+85	40																		30.3	
-L- 90+60	44																		21.7	
-L- 92+63	45																		19.5	
-L- 94+72	46																		18.3	
-L- 100+28	48																		23.8	
-L-101+70	48A																		22.9	
-L- 102+36	49																		33.1	
SHEET TOTALS					1	1					3		3						579.6	

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

JTERRYLAPTOP

COMPUTED BY:	JTL	DATE:	3/17/2012
CHECKED BY:	ZJR	DATE:	7/26/2012

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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) 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-102+99	RT	49A																	
-Y5- 10+97	LT	50							36										
-Y5- 11+81	RT	51							36										
-Y5- 11+97	LT	52							32										
-L- 107+54	RT	53							144										
-L- 112+99	LT	54							32										
-L- 114+19	LT	55								60									
-L- 115+51	LT	56								32									
-L- 116+81	LT	57								128									
-L- 117+38	RT	58								20									
-Y7- 12+29	CL	59			2154.2	2151.2													
-L- 121+52	LT	60								56									
-L- 122+55	CL	61			2136.7	2134.4													
-L- 123+16	RT	62		2142.6															
	RT	62	63		2138.4	2137.8				68									
	RT	62	64		2138.5	2139				56									
-L- 125+58	RT	65							84										
-L- 126+38	RT	66							64										
-L- 127+21	RT	66A							20										
-L- 129+43	CL	67			2132.98	2127.8													
-Y8- 11+09	RT	67A																	
-Y8- 11+80	RT	67B								32									
-L- 129+83	CL	68			2133.6	2127.6													
-Y8- 11+83	LT	69								68									
-L- 132+67	RT	69A								52									
-L- 140+07	CL	70			2142.2	2141.8													
-L- 143+20	RT	71							40										
-L- 143+91	RT	72							40										
-L- 143+97	LT	73							36										
-L- 145+78	RT	74							24										
-L- 146+15	LT	75							32										
-L- 147+84	LT	76							24										
-L- 147+99	RT	77		2133.3															
	RT	77	78		2130	2131													
	RT	77	79		2130	2130.1													
	RT	77	80		2130	2129.8													
-L- 148+01	RT	79		2132															
-L- 148+28	RT	80		2132															
	RT	80	81		2129.8	2129.3													
-L- 149+12	LT	82							56										
-L- 150+55	RT	83									40								
-Y9- 10+49	RT	84							24										
-Y9- 11+03	RT																		
-L- 151+79	LT	85		2127.4															
	CL	85	86		2126.2	2124													
	LT	85	85A		2123	2113.3						160					X	X	
SHEET TOTALS									724	572	40	160							

STATION	STRUCTURE NO. FROM	TO	C.S. PIPE 12"	15"	18"	24"	30"	36"	42"	48"	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"
THICKNESS OR GAUGE			.064	.064	.064	.064	.079	.079	.109	.109																
-L-102+99	49A																									
-Y5- 10+97	50																									
-Y5- 11+81	51																									
-Y5- 11+97	52																									
-L- 107+54	53																									
-L- 112+99	54																									
-L- 114+19	55																									
-L- 115+51	56																									
-L- 116+81	57																									
-L- 117+38	58																									
-Y7- 12+29	59					148																				
-L- 121+52	60																									
-L- 122+55	61									68																
-L- 123+16	62																									
	62	63																								
	62	64																								
-L- 125+58	65																									
-L- 126+38	66																									
-L- 127+21	66A																									
-L- 129+43	67							92																		
-Y8- 11+09	67A						28																			
-Y8- 11+80	67B																									
-L- 129+83	68					88																				
-Y8- 11+83	69																									
-L- 132+67	69A																									
-L- 140+07	70						52																			
-L- 143+20	71																									
-L- 143+91	72																									
-L- 143+97	73																									
-L- 145+78	74																									
-L- 146+15	75																									
-L- 147+84	76																									
-L- 147+99	77																									
	77	78											12													
	77	79										8														
	77	80											28													
-L- 148+01	79																									
-L- 148+28	80																									
	80	81			68																					
-L- 149+12	82																									
-L- 150+55	83																									
-Y9- 10+49	84																									
-Y9- 11+03																										
-L- 151+79	85																									
	85	86													48											
	85	85A																								
SHEET TOTALS					68	236	80	92		68		8	40		48											

STATION	STRUCTURE NO. FROM	TO	** " R.C. PIPE (CLASS V)	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (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 "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28				G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	TRAFFIC BEARING GRATED DROP INLET STD. 840.35	OPEN THROAT CATCH BASIN STD. 840.04 OR 840.05	ADJUSTMENT OF DROP INLET (EA)	DRAINAGE PIPE ELBOWS NO. & SIZE	FLOWABLE FILL, C.Y.	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L-102+99	49A																																			20.3	
-Y5- 10+97	50																																			29.8	
-Y5- 11+81	51																																				
-Y5- 11+97	52																																				
-L- 107+54	53																																				
-L- 112+99	54																																			17.5	
-L- 114+19	55																																			58.3	
-L- 115+51	56																																			32.1	
-L- 116+81	57																																			81.6	
-L- 117+38	58																																			18.8	
-Y7- 12+29	59																																			59.6	
-L- 121+52	60																																			64.4	
-L- 122+55	61								4.9																											42.4	BURIED INVERTS 0.8', SEE DETAIL SHT 2-F
-L- 123+16	62									1																		1		1							
	62	63																																		127.6	
	62	64																																			REMOVE JB
-L- 125+58	65																																			44.3	
-L- 126+38	66																																				
-L- 127+21	66A																																				
-L- 129+43	67								2.8																									11.01		60.6	INVERTS BURIED 0.6', PLUG&FILL EXIST., SEE DETAIL SHT 2-E
-Y8- 11+09	67A																																				
-Y8- 11+80	67B																																			20.2	
-L- 129+83	68																																	7.05		60.6	INVERTS BURIED 0.4', PLUG&FILL EXIST.
-Y8- 11+83	69																																				
-L- 132+67	69A																																			52	
-L- 140+07	70																																				
-L- 143+20	71																																			21.7	
-L- 143+91	72																																			21.8	
-L- 143+97	73																																			40	
-L- 145+78	74																																				
-L- 146+15	75																																				
-L- 147+84	76																																			34	
-L- 147+99	77									1																			1								
	77	78																																			
	77	79																																			
	77	80																																		95.6	
-L- 148+01	79									1													1				1									42.3	REMOVE DI
-L- 148+28	80									1													1				1										
	80	81																																			
-L- 149+12	82																																			50.5	
-L- 150+55	83																																			51.4	
-Y9- 10+49	84																																			23.3	
-Y9- 11+03																																		0.76		30	REMOVE; PLUG & FILL REMAINING
-L- 151+79	85									1									1	1																	REMOVE DI
	85	86																																			
	85	85A																																			
SHEET TOTALS									7.7	5									1	1			2				2	1	1	1				18.82		1200.7	

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:	JTL	DATE:	3/17/2012
CHECKED BY:	ZJR	DATE:	7/26/2012

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

JTERRYLAPTOP

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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) 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- 151+59	RT	86A								24									
-L- 158+53	LT	87		2110															
	CL	87	89		2106.6	2108.6													
	LT	87	87A		2106.5	EXIST.					128						X	X	
		88																	
-L- 160+28	RT	90							36										
		91																	
-L- 164+25	CL	92			2086.3	2086													
		93																	
-L- 169+21	RT	94		2080.8															
	RT	94	95		2077.8	2080													
-DET- 15+00	RT	96							48										
SHEET 3-E TOTALS									84	24	128								
SHEET 3-B TOTALS									376	144	112	232							
SHEET 3-C TOTALS									428	152	68	16	72						
SHEET 3-D TOTALS									724	572	40	160							
SHEET 3-F TOTALS																			
R-5207A TOTALS									1612	892	348	408	72						

STATION / SIZE / THICKNESS OR GAUGE	C.S. PIPE 12"	15"	18"	24"	30"	36"	42"	48"	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"
	.064	.064	.064	.064	.079	.079	.109	.109																
-L- 151+59																								
-L- 158+53																								
												52												
-L- 160+28																								
-L- 164+25				48																				
-L- 169+21																								
			108																					
-DET- 15+00																								
SHEET 3-E TOTALS			108	48								52												
SHEET 3-B TOTALS									192	388	304													
SHEET 3-C TOTALS			176	120			60		72		148													
SHEET 3-D TOTALS			68	236	80	92		68	8	40		48												
SHEET 3-F TOTALS																								
R-5207A TOTALS			352	404	80	92	60	68	272	428	504	48												

STATION / SIZE / THICKNESS OR GAUGE	** R.C. PIPE (CLASS V)	**** RC PIPE CULVERTS, CONTRACTOR DESIGN	**** RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES (*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') 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	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 "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28				G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	TRAFFIC BEARING GRATED DROP INLET STD. 840.35	OPEN THROAT CATCH BASIN STD. 840.04 OR 840.05	ADJUSTMENT OF DROP INLET (EA)	DRAINAGE PIPE ELBOWS NO. & SIZE	FLOWABLE FILL, C.Y.	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L- 151+59																																				24.3	
-L- 158+53								1												1						1										23.7	
																																				37.4	
																																					STR. NUMBER NOT USED
-L- 160+28																																				35.5	
																																					STR. NUMBER NOT USED
-L- 164+25																																				43.1	
																																					STR. NUMBER NOT USED
-L- 169+21																																1					ADJUST 2-TBGI
																																				94.6	
-DET- 15+00																																				48	TEMPORARY PIPE
SHEET 3-E TOTALS								1												1						1						1				306.6	
SHEET 3-B TOTALS								18	1.36		10	2	5	3			3	3	3	1				4					1		1 - 24"	24.57		461.3	
SHEET 3-C TOTALS						3.4	3.8	5			1		1				1	1							3		3								579.6	
SHEET 3-D TOTALS							7.7	5									1	1		2				2	1	1	1					18.82		1200.7	
SHEET 3-F TOTALS																																				190.4	
R-5207A TOTALS						14.9		29	1.36		11	2	6	3			5	5	3	2	2			7	4	1	4	1	1		1 - 24"	43.39		2738.6	

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:	JTL	DATE:	3/17/2012
CHECKED BY:	ZJR	DATE:	7/26/2012

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

JTERRYLAPTOP

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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

STATION	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" .109	54" .138	54" .168	60" .138	60" .168	66" .138	66" .168	72" .138	72" .168	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" .138	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
-DET- 15+27	CL	97		2103.5	2102.8													72																															72	TEMP PIPE W. HW, SEE DETAIL SHT 2-G
-DET- 15+32	CL	98		2103.5	2102.8													68																															68	TEMP PIPE W. HW, SEE DETAIL SHT 2-G
-L- 46+80	CL	23A		2075.5	2075.2												60																		8.9													50.4	BURY INVERTS 1.2', SEE DETAIL SHT 2-H
-L- 46+90	CL	23B		2075.5	2075.2												60																																BURY INVERTS 1.2', SEE DETAIL SHT 2-H
SHEET TOTALS																		140				120													8.9														190.4	

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

PROJ. REFERENCE NO.	SHEET NO.
R-5207A	3-G

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1A	4	C.LEMUEL OATES AND SANDRA T. OATES
1	4	MOORES GROVE METHODIST CHURCH
2	4	THE MIGRANT COUNCIL OF HENDERSON COUNTY, INC
2A	4	BLUE RIDGE COMMUNITY HEALTH SERVICES, INC. DBA
3	4	EMERICHIP PINE PARK LLC
4,5	4	TRUSTEES OF EBENEZER BAPTIST
		CHURCH OF HENDERSONVILLE, INC.
5	4	JOSEPHINE MATTHEWS
6	4,5	HASAN MANSOUR
4B	4,5	DUKE ENERGY CORPORATION
7	5	LOUISE OR
8	5	LOUISE ORR
9, 9Z	5	WILLIAM PATTERSON AND JANE L. PATTERSON
10	5	CHARLES RONALD STEPP
11	6	PATRICIA ANN PATTERSON
12	5,6	GARY K. KING AND KATHY KING
13	6	MILDRED BANE, WIDOW
14	6	MARGARET P. HALFORD
15	6	ANNE NEWMAN
16	6	MELODY SCHELL AND LUCREDA M. BYRD
17	6,7	GREGORY M. ALBEA AND JULIANNE D. ALBEA
18		NOT USED
19	7	MOUNTAIN BEAN GROWERS, INC.
20	7	KURT P. WHALEY AND EDWARD S. GRAVES
21	7	ERIC FREEMAN AND EMILY FREEMAN
22	7,8	ROBERT R. PACE, JR.
23	7,8	DARLENE NEWMAN GOFORTH
24	8	BRADLEY S. MAST AND AMY N. MAST
25	8	LEONARD C. NEWMAN, JR. AND MARK NEWMAN
26	8	LEON LAMB
27	8	RICHARD L. PACE AND JEWEL E. PACE
28	8	JANET MARIE SHEPHERD
29	8	FREDA McGRAW, PEDEE McGRAW, JUANITA LAUGHTER
30	8,9	ANSEL T. PACE
31		NOT USED
32		NOT USED
33	8,9	JANIESE EARLINE OVERCASH
34	8,9	MICHAEL B. MONDIN AND ROBYN P. MONDIN
35	9	TONG N. TANG AND EANG U. TANG
36	9	RONALD L. YANCEY AND DORIS NIX YANCEY
37	9	THE GLEN MICHAEL MILLARD IRREVOCABLE TRUST
37A	9	UNKNOWN
38	9	RONALD LEDBETTER AND LAURA LEDBETTER
39	9	DOUGLAS EDDIE WATKINS
40	9,10	HENRY E AND HARRIETT F. WORTHY
40A	9	DONALD D. & JOAN H. PRICE
40B	9	ROBBIE & SANDRA WORTHY
41		NOT USED
42	10	WILLIAM WALTER CORN AND CHARMAN PERRY CORN
43	10	JOANN BREVARD OWNBEY AND EDWARD OWNBEY
44	10	GAIL BREVARD MCCARSON
45	10	JOYCE RICE CORN
46	10	MARCEL RIJNDERS AND PAMELA RIJNDERS
47	10	JAMES BRIAN NASH AND ALICIA M. NASH
48	10	DYLAN PATRICK ALLEN AND EMANUELA ALLEN
49	10	CLIFFORD LEE CANTRELL AND HOPE RENEE CANTRELL
50	10	JUDY N. SWEENEY AND CHRIS M. SWEENEY
51	10,11	DARRELL L. EIDEM, SR. AND CAROLYN C. EIDEM
52	10,11	FLAY NEWMAN, JR. AND VIRGINIA NEWMAN
53	11	VIRGINIA NEWMAN MURHPY

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
54	11	MATTIE OWENS
55	11	SUSAN R. RUSSELL
56	11	RICHARD GLASPY SR.
57		NOT USED
58	11	GARY W. NEWMAN AND PAULA H. NEWMAN
59	11	THE DORIS R. GILL LLC
60	11	JENNIFER A. WILSON AND PAUL E. WILSON
61		NOT USED
62	11	CLARA MAE N. SULLIVAN
63	11	JENNIFER ALLMAN WILSON AND HUSBAND, PAUL E. WILSON,
		JAMES RAYFIELD NESBITT, CLARA M. SULLIVAN,
		ELLEN M. WHITE
64	11	JAMES RAYFIELD NESBITT
65	11,12	CHARLES L. NESBITT
66	12	SUSAN E. CALLOWAY
67	11,12	12 RUBY MILLS
68	12	APAC CAROLINA, INC
69	12	JAMES LOWELL CARTER
70	12	JOYCE S. BISHOP REVOCABLE TRUST
71	12	JESUS BAPTIST U.S.A. CONFERENCE
		MISSION ASHEVILLE CHURCH
72	12- 14	G. RAY FUSSELL
73	12,13	THELMA JEAN WATKINS FLETCHER
73A	13	ROBERT A. & BETTY M. LAFONTAI
74	13	ELIAS LOPEZ AND MARIA DIAZ-BARCO
75	13	ROSEMARY RICO
76	13	SUPERIOR TESTING SERVICES, INC.
77	13	MARIA ELENA CASTELEIRO, ISELA MACHADO
		AND OLGA O. PRADO
77A	13	LOUIS JOHN NOA AND HEIDI LEOTA NOA
78	13	JERONIMO GONZALEZ-ESTRADA AND ROSA I. GONZALEZ
79	13	STANLEY LAWSON SCARBOROUGH
80	13, 14	FRED O. BROOKS AND JEWEL C. BROOKS
80A	14	CYNTHIA JOY BROOKS
81	14	PUBLIC SERVICE COMPANY OF NORTH CAROLINA
82	14	FRED DENNIS HOLDEN
83	14	LARRY MONROE COX AND TARA J. COX
85	14	FEDERAL NATIONAL MORTGAGE ASSOCIATION
86	14	DAVID ROBERT COLLINS AND GLENDA JONES COLLINS
87	14	JUDY B. SINYARD
88	14	TRAVIS W. PARK
89	14	KENNETH R. WILKIE
90	14	FELLOWSHIP BAPTIST CHURCH
91	14	JOSEPH MARION ALDERMAN AND PAULA L. ALDERMAN
92	14,15	DIEM GNOC TRAN
93	14,15	THE GARY KEITH KING REVOCABLE TRUST
94	15	D&L REAL ESTATE INVESTMENT LLC
95	15	THE KATHY C. KING REVOCABLE TRUST
96	15	D&L REAL ESTATE

8/17/99

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

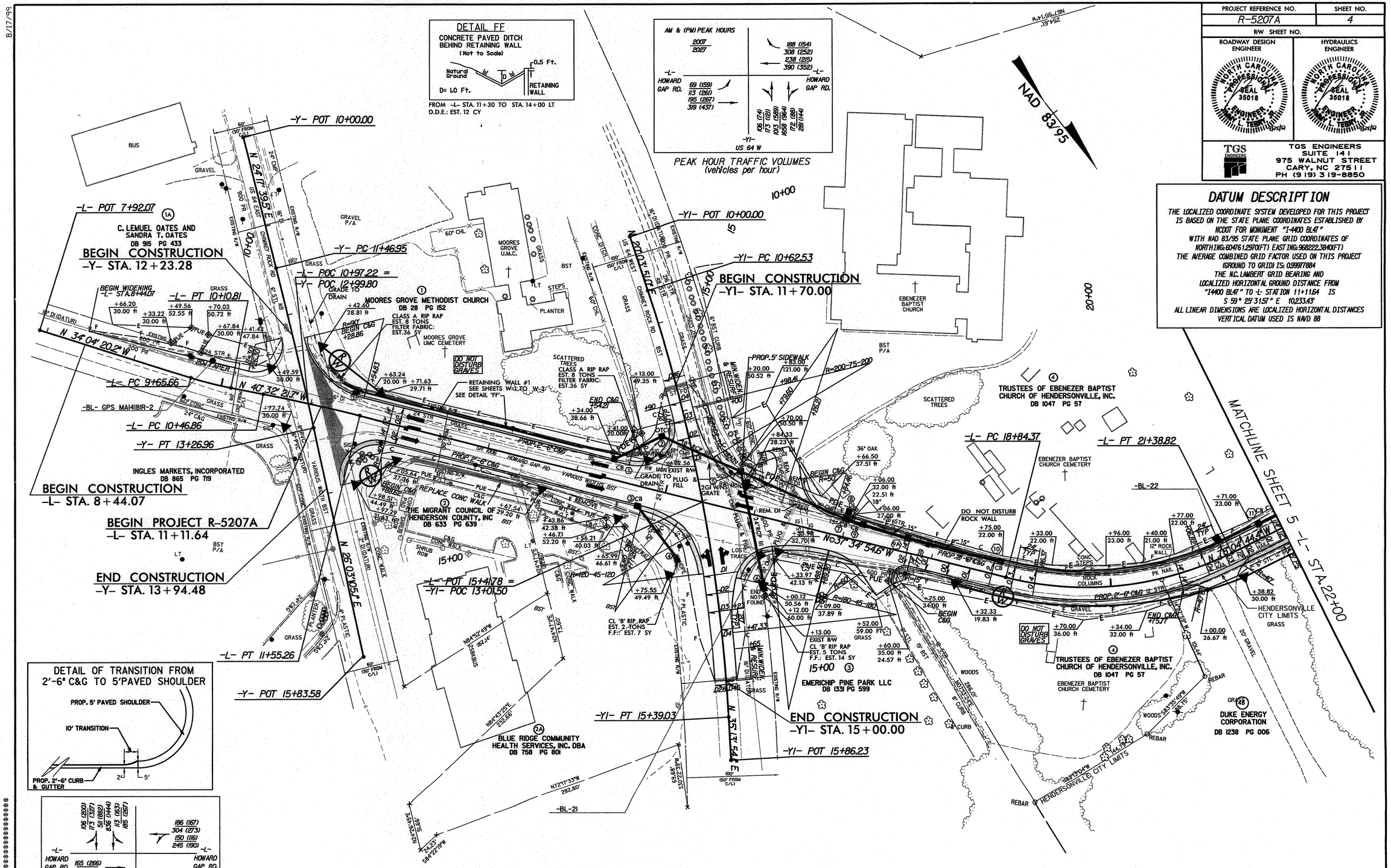
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER MARK L. TERRY 11-5-12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER MARK L. TERRY 11-5-12

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

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: 604761.2590(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 11+11.64 IS S 59° 25' 31.57" E 10,233.43'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88



-L-			-Y-	-Y1-
PI Sta 9+88.26	PI Sta 11+01.07	PI Sta 20+17.17	PI Sta 12+36.96	PI Sta 13+02.18
Δ = 6° 28' 01.5" (LT)	Δ = 2° 57' 27.1" (RT)	Δ = 40° 29' 49.9" (LT)	Δ = 1° 45' 25.6" (RT)	Δ = 15° 10' 03.1" (RT)
D = 14° 19' 26.2"	D = 2° 43' 42.1"	D = 15° 54' 55.8"	D = 0° 58' 33.9"	D = 3° 10' 59.2"
L = 45.15'	L = 108.40'	L = 254.45'	L = 180.02'	L = 476.50'
T = 22.60'	T = 54.21'	T = 132.80'	T = 90.02'	T = 239.65'
R = 400.00'	R = 2,100.00'	*R = 360.00'	R = 5,870.00'	R = 1,800.00'
SE = EXIST.	SE = EXIST.	SE = 0.04	SE = EXIST.	SE = 0.04

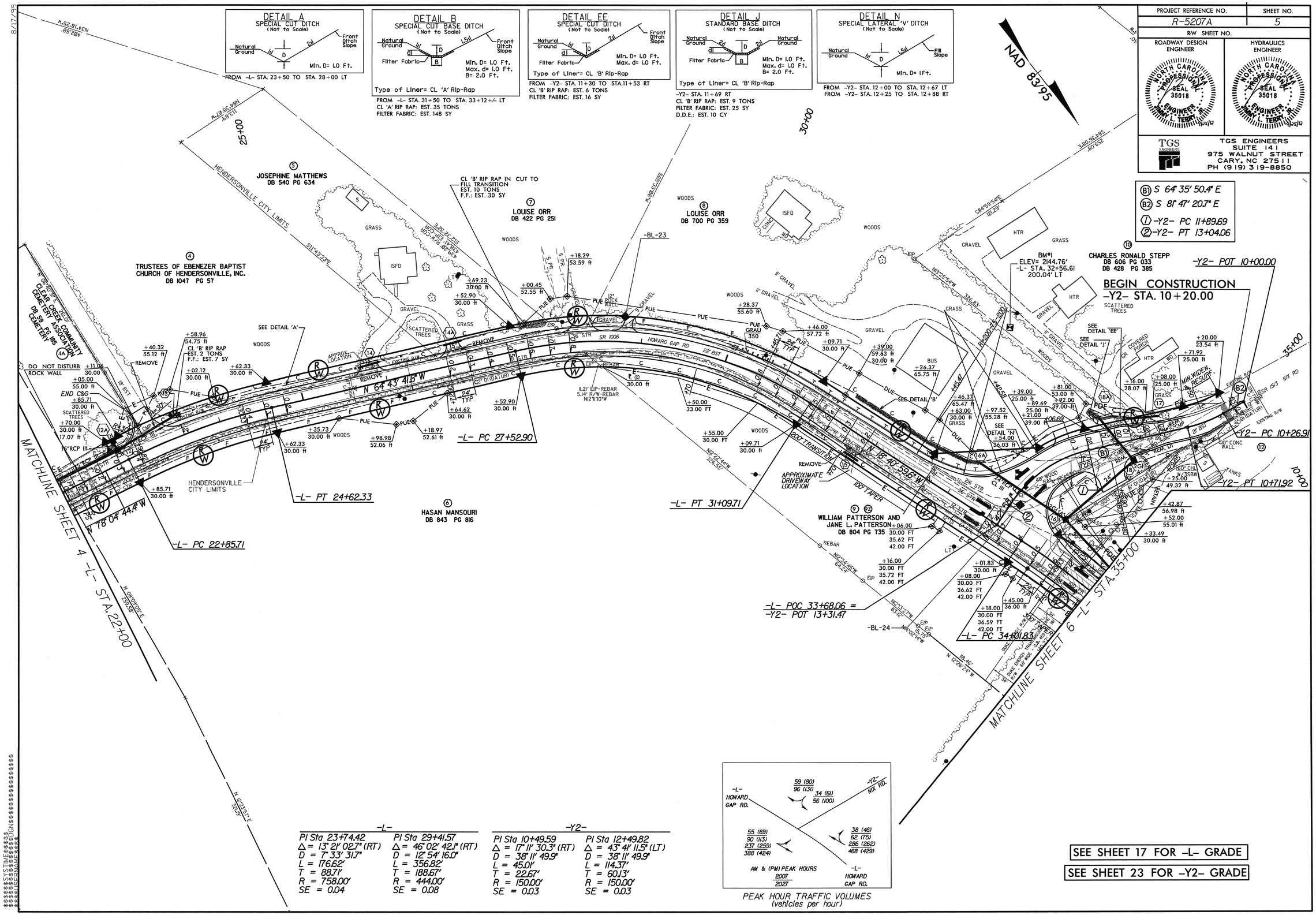
SEE SHEET 17 FOR -L- GRADE
SEE SHEET 23 FOR -Y1- GRADE

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JAMY L. TERRY 10/25/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JAMY L. TERRY 10/25/12

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



SEE SHEET 17 FOR -L- GRADE

SEE SHEET 23 FOR -Y2- GRADE

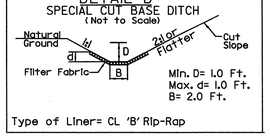
PROJECT REFERENCE NO.	SHEET NO.
R-5207A	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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

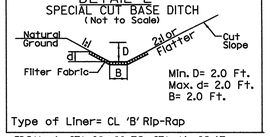
DETAIL D
SPECIAL CUT BASE DITCH
(Not to Scale)



Type of Liner= CL 'B' Rip-Rap

FROM -L- STA. 36+50 TO STA. 38+00 LT
CL 'B' RIP RAP: EST. 55 TONS
FILTER FABRIC: EST. 170 SY

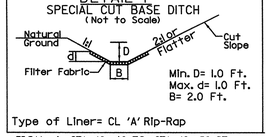
DETAIL E
SPECIAL CUT BASE DITCH
(Not to Scale)



Type of Liner= CL 'B' Rip-Rap

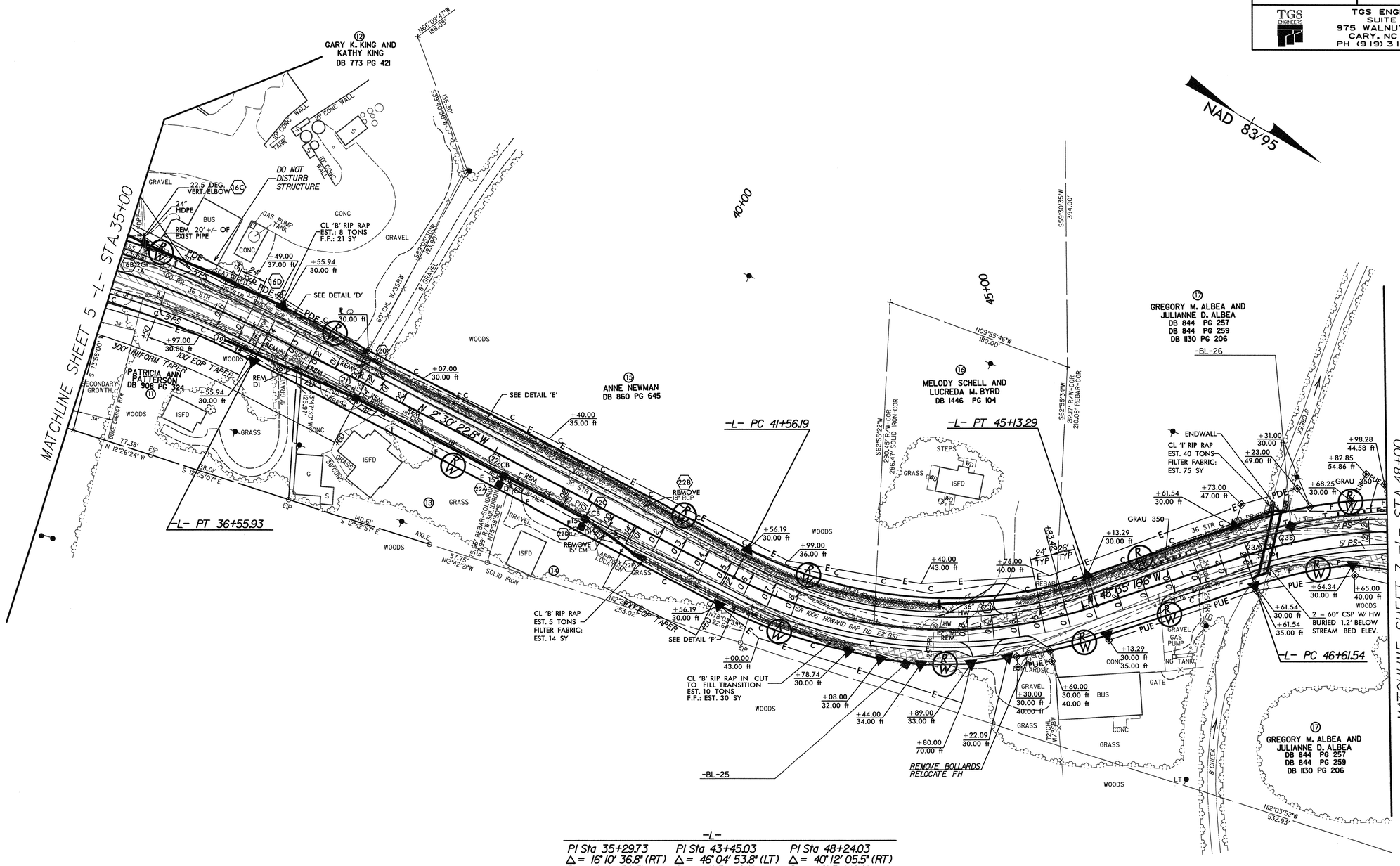
FROM -L- STA. 38+00 TO STA. 46+95 LT
CL 'B' RIP RAP: EST. 450 TONS
FILTER FABRIC: EST. 1400 SY

DETAIL F
SPECIAL CUT BASE DITCH
(Not to Scale)



Type of Liner= CL 'A' Rip-Rap

FROM -L- STA. 40+60 TO STA. 42+50 RT
CL 'A' RIP RAP: EST. 75 TONS
FILTER FABRIC: EST. 200 SY



-L-

PI Sta 35+29.73	PI Sta 43+45.03	PI Sta 48+24.03
Δ = 16° 10' 36.8" (RT)	Δ = 46° 04' 53.8" (LT)	Δ = 40° 12' 05.5" (RT)
D = 6° 21' 58.3"	D = 12° 54' 16.0"	D = 12° 54' 16.0"
L = 254.11'	L = 357.10'	L = 311.53'
T = 127.90'	T = 188.84'	T = 162.49'
R = 900.00'	R = 444.00'	*R = 444.00'
SE = 0.06	SE = 0.08	SE = 0.04

11	PATRICIA ANN PATTERSON	DB 908 PG 324
13	MILDRED BANE, WIDOW	DB 423 PG 149
14	MARGARET P. HALFORD	DB 332 PG 357

SEE SHEET 18 FOR -L- GRADE

SYSTIME = $$$$ SIGN = $$$$ SCALE = $$$$ NAME = $$$$

8/17/99

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

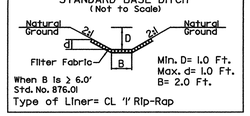
ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY 11/21/12

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

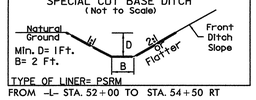
PAVEMENT REMOVAL

DETAIL GG
STANDARD BASE DITCH
(Not to Scale)



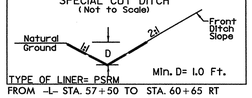
FROM -L- STA. 50+55 TO STA. 50+97 LT
(SEE -L- PROFILE FOR DITCH GRADE)
CL 'I' RIP RAP: EST. 40 TONS
FILTER FABRIC: EST. 65 SY
D.D.E.: EST. 10 CY

DETAIL K
SPECIAL CUT BASE DITCH
(Not to Scale)



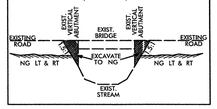
TYPE OF LINER= PSRM
FROM -L- STA. 52+00 TO STA. 54+50 RT
PSRM = 160 SY

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)

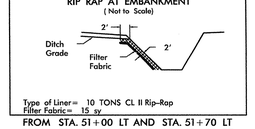


TYPE OF LINER= PSRM
FROM -L- STA. 57+50 TO STA. 60+65 RT
PSRM = 90 SY

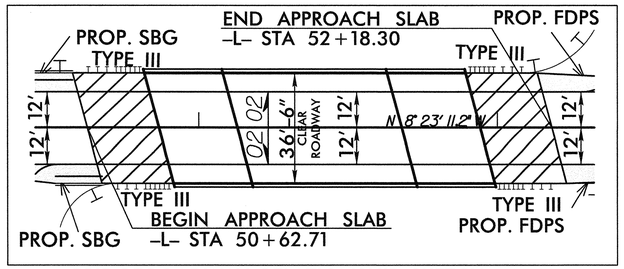
ABUTMENT REMOVAL DETAIL
(Not to Scale)



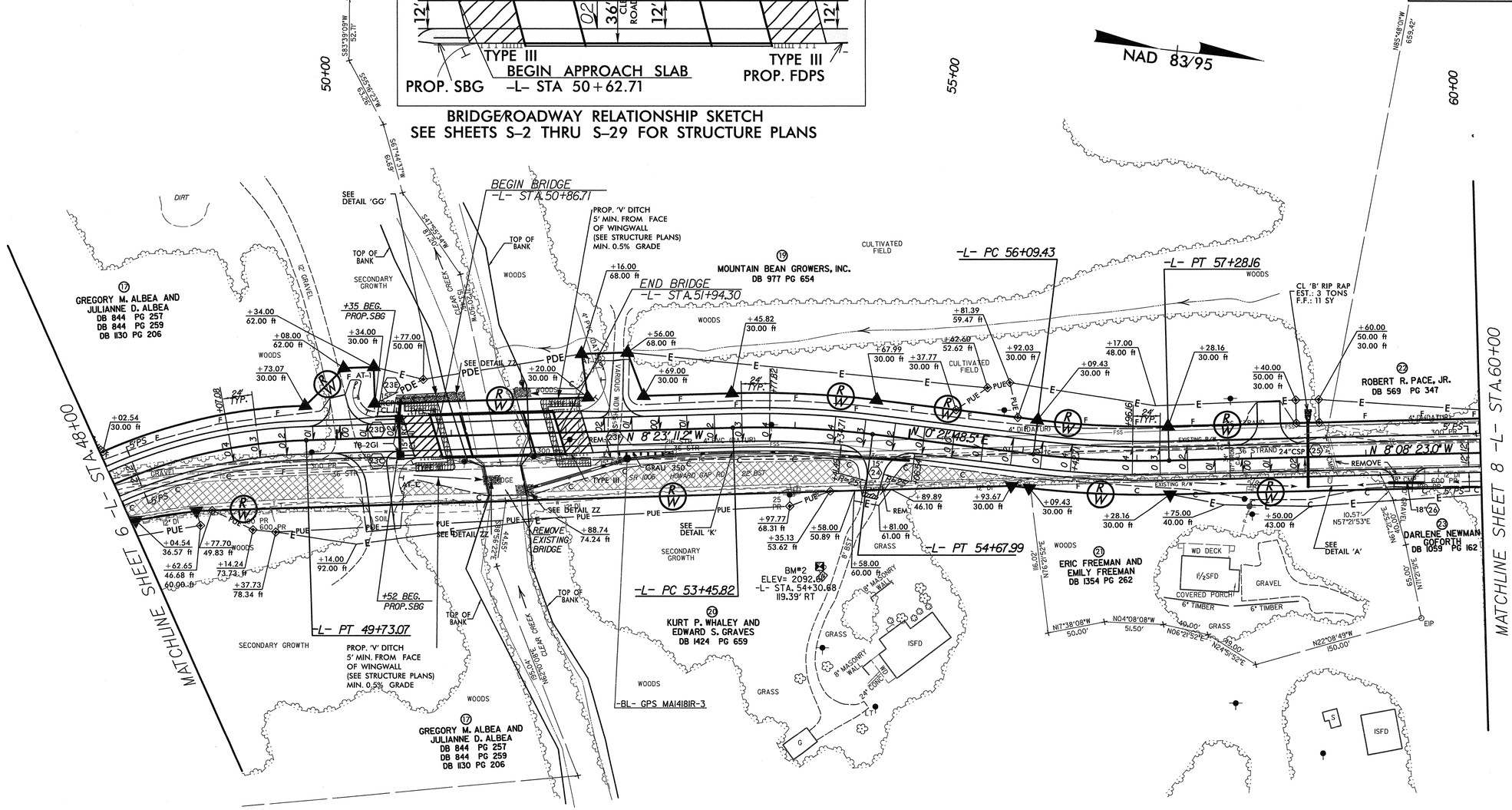
DETAIL ZZ
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 10 TONS CL II Rip-Rap
Filter Fabric= 15 sy
FROM STA. 51+00 LT AND STA. 51+70 LT
FROM STA. 51+30 RT AND STA. 51+60 RT
EST. 20 TONS CLASS II RIP RAP
EST. 30 SY FILTER FABRIC
EACH LOCATION



BRIDGE/ROADWAY RELATIONSHIP SKETCH
SEE SHEETS S-2 THRU S-29 FOR STRUCTURE PLANS



-L-

PI Sta 48+24.03	PI Sta 54+07.03	PI Sta 56+68.91
Δ = 40° 12' 05.5" (RT)	Δ = 8° 44' 59.7" (RT)	Δ = 8° 30' 11.5" (LT)
D = 12° 54' 16.0"	D = 7° 09' 43.1"	D = 7° 09' 43.1"
L = 311.53'	L = 122.17'	L = 118.73'
T = 162.49'	T = 61.20'	T = 59.47'
*R = 444.00'	R = 800.00'	R = 800.00'
SE = 0.04	SE = 0.04	SE = 0.04

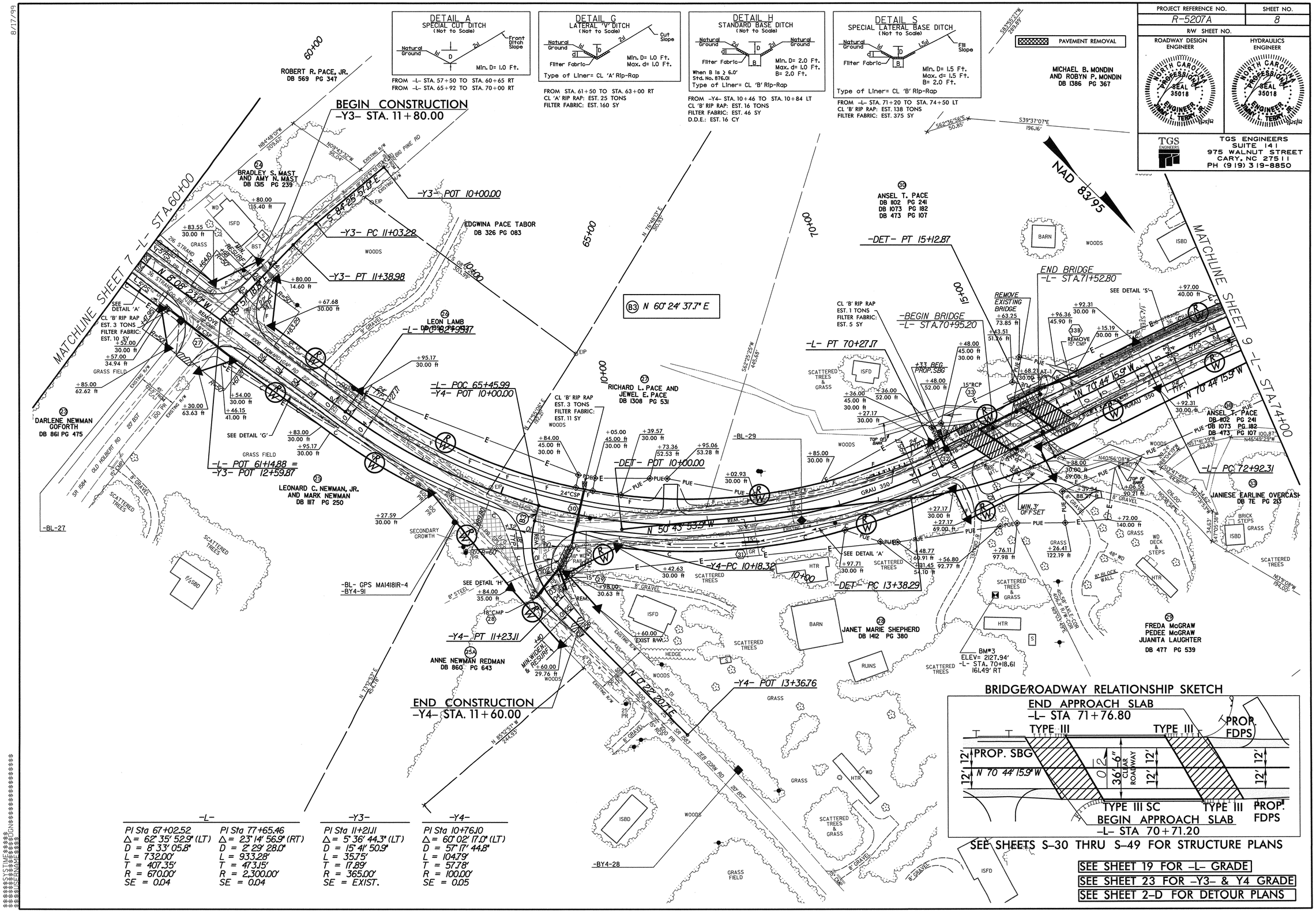
SEE SHEET 18 FOR -L- GRADE

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY, JR. 11/25/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY, JR. 11/25/12

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



-L-		-Y3-	-Y4-
PI Sta 67+02.52	PI Sta 77+65.46	PI Sta 11+21.11	PI Sta 10+76.10
Δ = 62° 35' 52.9" (LT)	Δ = 23° 14' 56.9" (RT)	Δ = 5° 36' 44.3" (LT)	Δ = 60° 02' 17.0" (LT)
D = 8° 33' 05.8"	D = 2° 29' 28.0"	D = 15° 41' 50.9"	D = 57° 17' 44.8"
L = 732.00'	L = 933.28'	L = 35.75'	L = 104.79'
T = 407.35'	T = 473.15'	T = 17.89'	T = 57.78'
R = 670.00'	R = 2,300.00'	R = 365.00'	R = 100.00'
SE = 0.04	SE = 0.04	SE = EXIST.	SE = 0.05

8/17/99

8/17/99

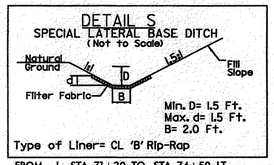
PROJECT REFERENCE NO.	SHEET NO.
R-5207A	9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER GARY L. TERRY 8/25/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER GARY L. TERRY 8/25/12

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

DETAIL S
SPECIAL LATERAL BASE DITCH
(Not to Scale)

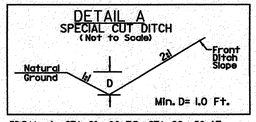


Min. D= 1.5 Ft.
Max. d= 1.5 Ft.
B= 2.0 Ft.

Type of Liner= CL 'B' Rip-Rap

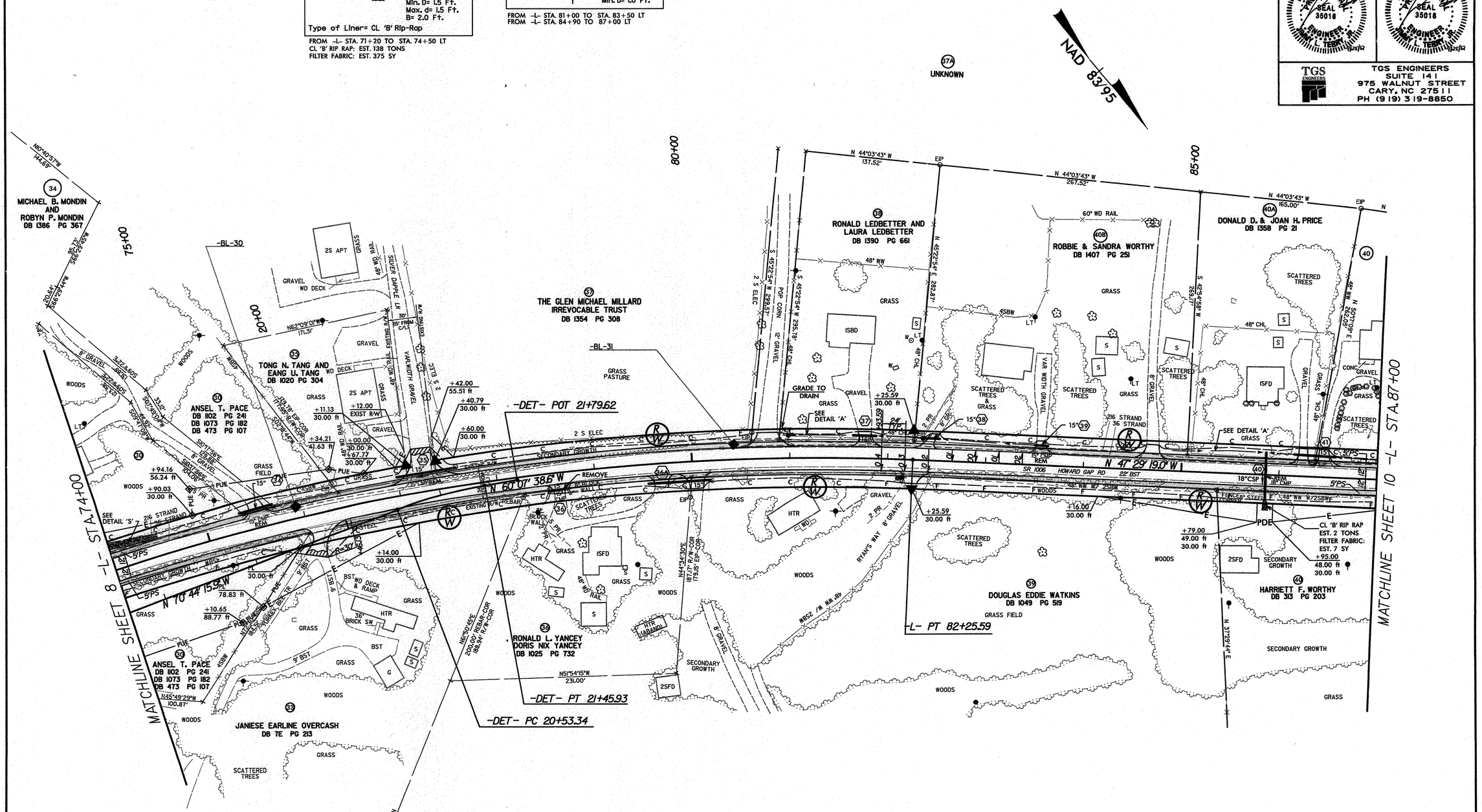
FROM -L- STA. 71+20 TO STA. 74+50 LT
CL 'B' RIP RAP: EST. 138 TONS
FILTER FABRIC: EST. 375 SY

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)



Min. D= 1.0 Ft.

FROM -L- STA. 81+00 TO STA. 83+50 LT
FROM -L- STA. 84+90 TO 87+00 LT



-L-
PI Sta 77+65.46
Δ = 23° 14' 56.9" (RT)
D = 2° 29' 28.0"
L = 933.28'
T = 473.15'
R = 2,300.00'
SE = 0.04

SEE SHEET 19 FOR -L- GRADE

SEE SHEET 2-D FOR DETOUR PLAN

USER: SLTIMES DGN: USTEST1.DGN

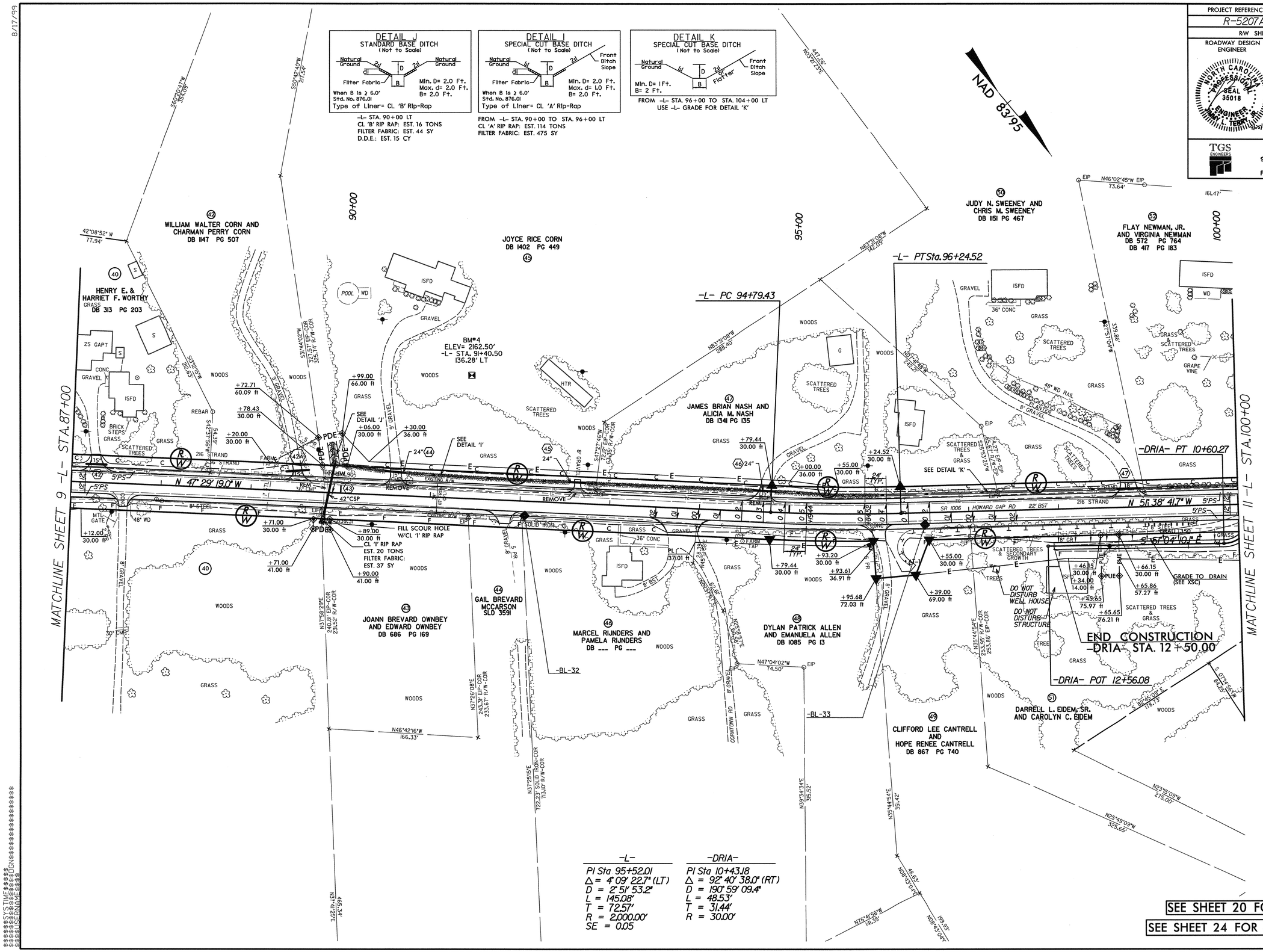
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	10
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY 11/25/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY 11/25/12

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



SEE SHEET 20 FOR -L- GRADE

SEE SHEET 24 FOR -DR1A- GRADE

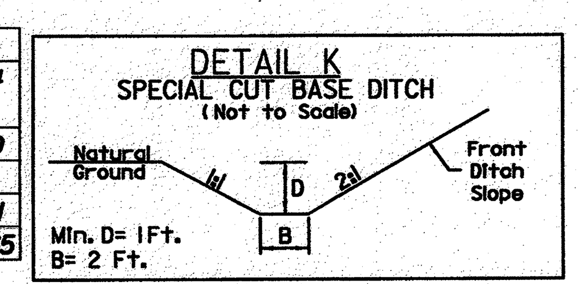
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	11
R/W SHEET NO.	

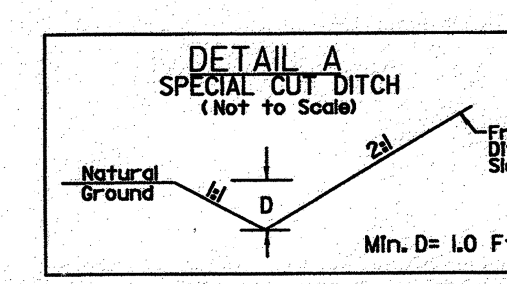
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY, JR. 7/25/12	NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY, JR. 7/25/12

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

51	DARRELL L.EIDEM,SR.AND CAROLYN C.EIDEM	DB 731 PG 433
52	FLAY NEWMAN,JR.AND VIRGINIA NEWMAN	DB 572 PG 764 DB 417 PG 183
53	VIRGINIA NEWMAN MURHPY	DB 820 PG 269
54	MATTIE OWENS	DB 352 PG 49
55	SUSAN R.RUSSELL	DB 1375 PG 431
56	RICHARD GLASPY SR.	DB 1283 PG 565



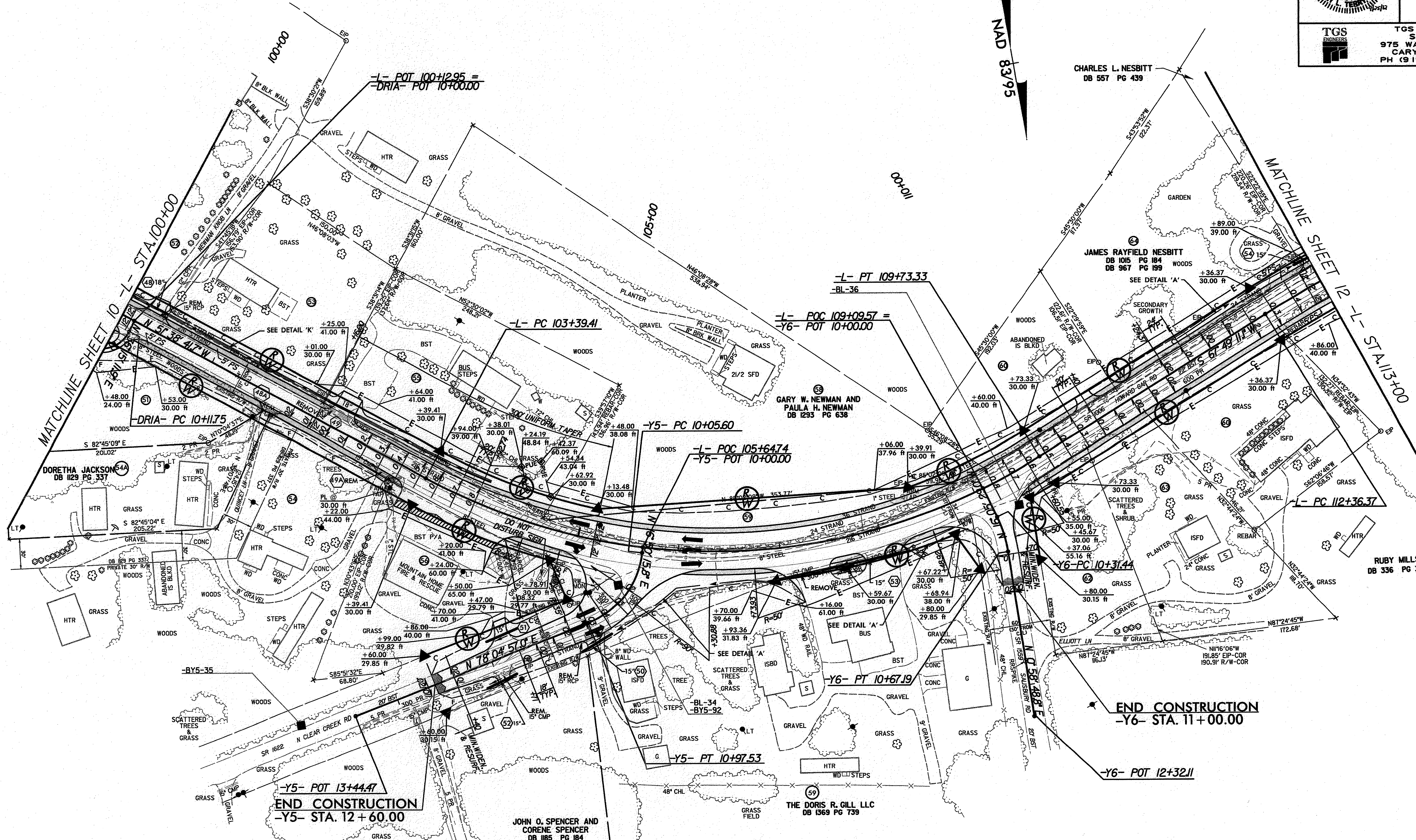
FROM -L- STA. 96+00 TO STA. 104+00 LT
USE -L- GRADE FOR DETAIL 'K'



FROM -Y5- STA. 10+83 LT TO -L- STA. 106+86 RT
FROM -L- STA. 108+20 TO STA. 108+80 RT
FROM -L- STA. 111+50 TO STA. 113+90 LT

60	JENNIFER A.WILSON AND PAUL E.WILSON	DB 967 PG 698 DB 955 PG 307
62	CLARA MAE N.SULLIVAN	DB 909 PG 809
63	JENNIFER ALLMAN WILSON AND HUSBAND PAUL E.WILSON JAMES RAYFIELD NESBITT CLARA M.SULLIVAN ELLEN M.WHITE	DB 965 PG 026

PAVEMENT REMOVAL



-DRIA-	-Y5-	-L-	-L-	-Y6-
PI Sta 10+43.18	PI Sta 10+56.50	PI Sta 106+89.57	PI Sta 115+32.85	PI Sta 10+49.45
Δ = 92° 40' 38.0" (RT)	Δ = 61° 14' 41.2" (RT)	Δ = 60° 32' 07.1" (LT)	Δ = 28° 54' 46.0" (RT)	Δ = 17° 04' 17.8" (RT)
D = 190° 59' 09.4"	D = 66° 37' 22.8"	D = 9° 32' 57.5"	D = 4° 58' 56.1"	D = 47° 44' 47.3"
L = 48.53'	L = 91.93'	L = 633.92'	L = 580.32'	L = 35.75'
T = 31.44'	T = 50.91'	T = 350.16'	T = 296.48'	T = 18.01'
R = 30.00'	R = 86.00'	R = 600.00'	R = 1,150.00'	R = 120.00'
	SE = 0.04	SE = 0.08	SE = 0.04	SE = 0.01

C1	42.00' EIP-EIP 27.52' R/W-R/W N13°32'15"W

SEE SHEET 20 FOR -L- GRADE
SEE SHEET 23 FOR -Y5- & Y6 GRADE
SEE SHEET 24 FOR -DR1A- GRADE

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

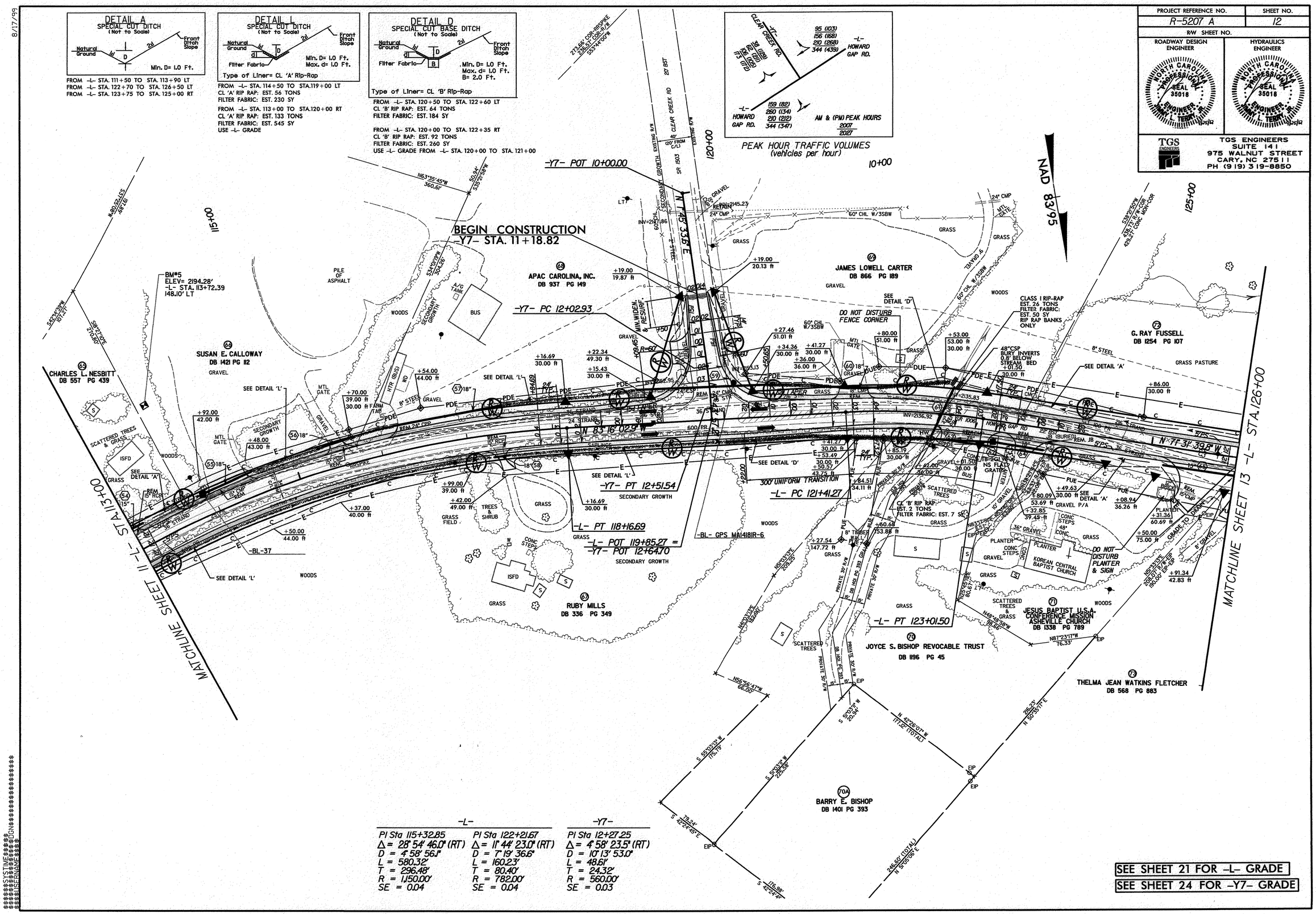
8/17/99

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

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER MARY L. TERRY 12/5/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER MARY L. TERRY 12/5/12

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



-L-	
PI Sta 115+32.85	PI Sta 122+21.67
Δ = 28° 54' 46.0" (RT)	Δ = 11° 44' 23.0" (RT)
D = 4° 58' 56.1"	D = 7° 19' 36.6"
L = 580.32'	L = 160.23'
T = 296.48'	T = 80.40'
R = 1,150.00'	R = 782.00'
SE = 0.04	SE = 0.04

-Y7-
PI Sta 12+27.25
Δ = 4° 58' 23.5" (RT)
D = 10° 13' 53.0"
L = 48.61'
T = 24.32'
R = 560.00'
SE = 0.03

SEE SHEET 21 FOR -L- GRADE
SEE SHEET 24 FOR -Y7- GRADE

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	13
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY, Jr. 11/25/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY, Jr. 11/25/12

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DETAIL M
SPECIAL LAT. BASE DITCH
(Not to Scale)

Natural Ground; 1d; D; 1.5d; Front Ditch Slope; Filter Fabric; B

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

Type of Liner= CL 'B' Rip-Rap

FROM -Y8- STA. 10+45 TO STA. 11+50 LT
CL 'B' RIP RAP: EST. 36 TONS
FILTER FABRIC: EST. 100 SY
FROM -Y8- STA. 10+35 TO STA. 11+67 RT
CL 'B' RIP RAP: EST. 45 TONS
FILTER FABRIC: EST. 125 SY

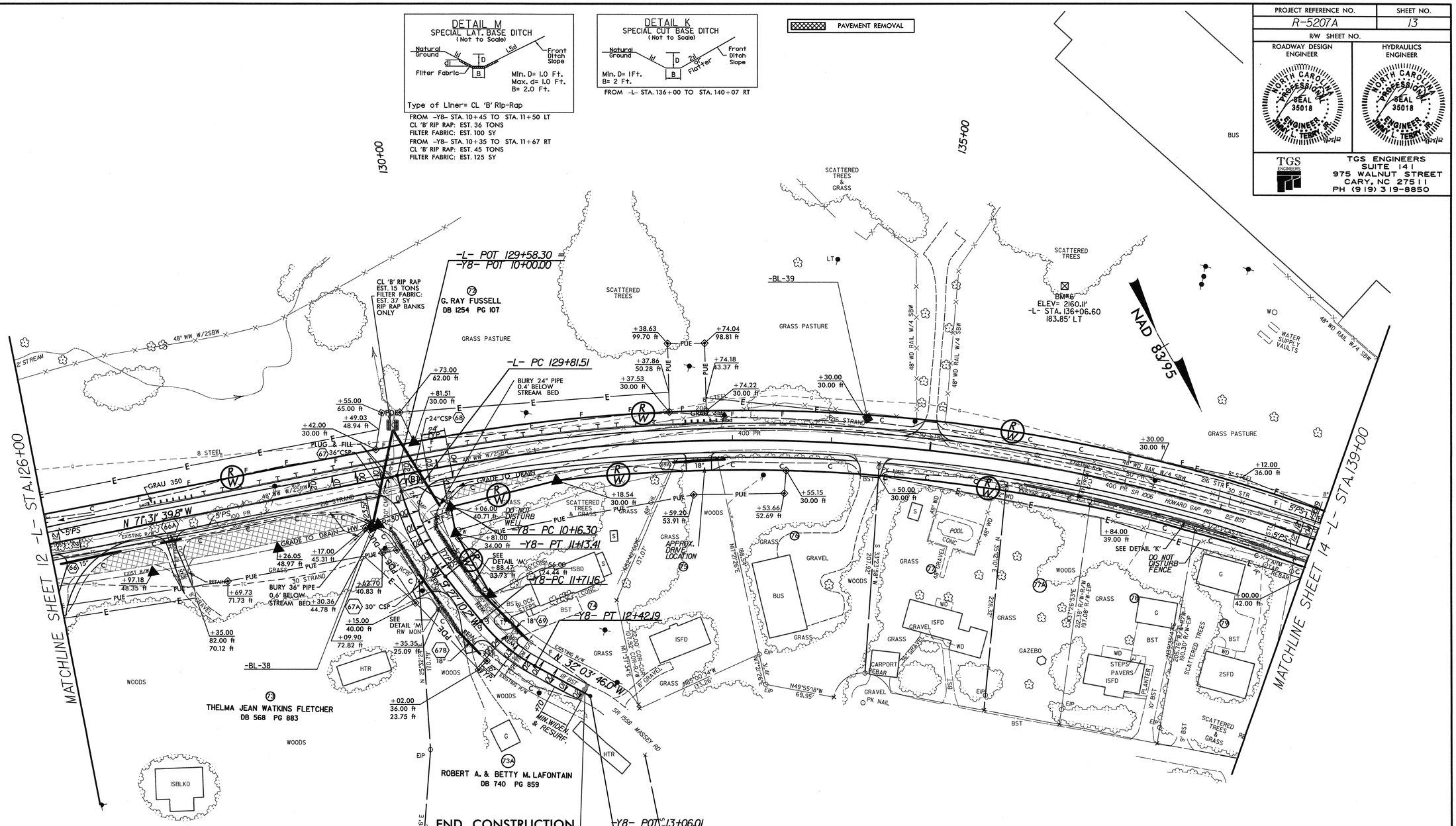
DETAIL K
SPECIAL CUT BASE DITCH
(Not to Scale)

Natural Ground; 1d; D; 2d or Flatter; Front Ditch Slope; B

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

FROM -L- STA. 136+00 TO STA. 140+07 RT

PAVEMENT REMOVAL



74	ELIAS LOPEZ AND MARIA DIAZ-BARCO	DB 1285 PG 251
75	ROSEMARY RICO	DB 1340 PG 198
76	SUPERIOR TESTING SERVICES, INC.	DB 1155 PG 330
77A	MARIA ELENA CASTELEIRO, ISELA MACHADO AND OLGA O. PRADO	DB 1306 PG 359
77	LOUIS JOHN NOA AND HEIDI LEOTA NOA	DB 1412 PG 190
78	JERONIMO GONZALEZ-ESTRADA AND ROSA I. GONZALEZ	DB 1294 PG 296
79	STANLEY LAWSON SCARBOROUGH	DB 710 PG 677

-Y8-

PI Sta 10+65.53
Δ = 23° 11' 00.8" (LT)
D = 23° 52' 23.7"
L = 97.11'
T = 49.23'
R = 240.00'
SE = 0.04

PI Sta 12+07.14
Δ = 22° 36' 35.8" (LT)
D = 31° 49' 51.6"
L = 71.03'
T = 35.98'
R = 180.00'
SE = 0.04

-L-

PI Sta 134+66.49
Δ = 31° 19' 11.4" (RT)
D = 3° 18' 42.8"
L = 945.68'
T = 484.98'
R = 1,730.00'
SE = 0.04

SEE SHEET 21 FOR -L- GRADE
SEE SHEET 24 FOR -Y8- GRADE

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

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TGS ENGINEERS
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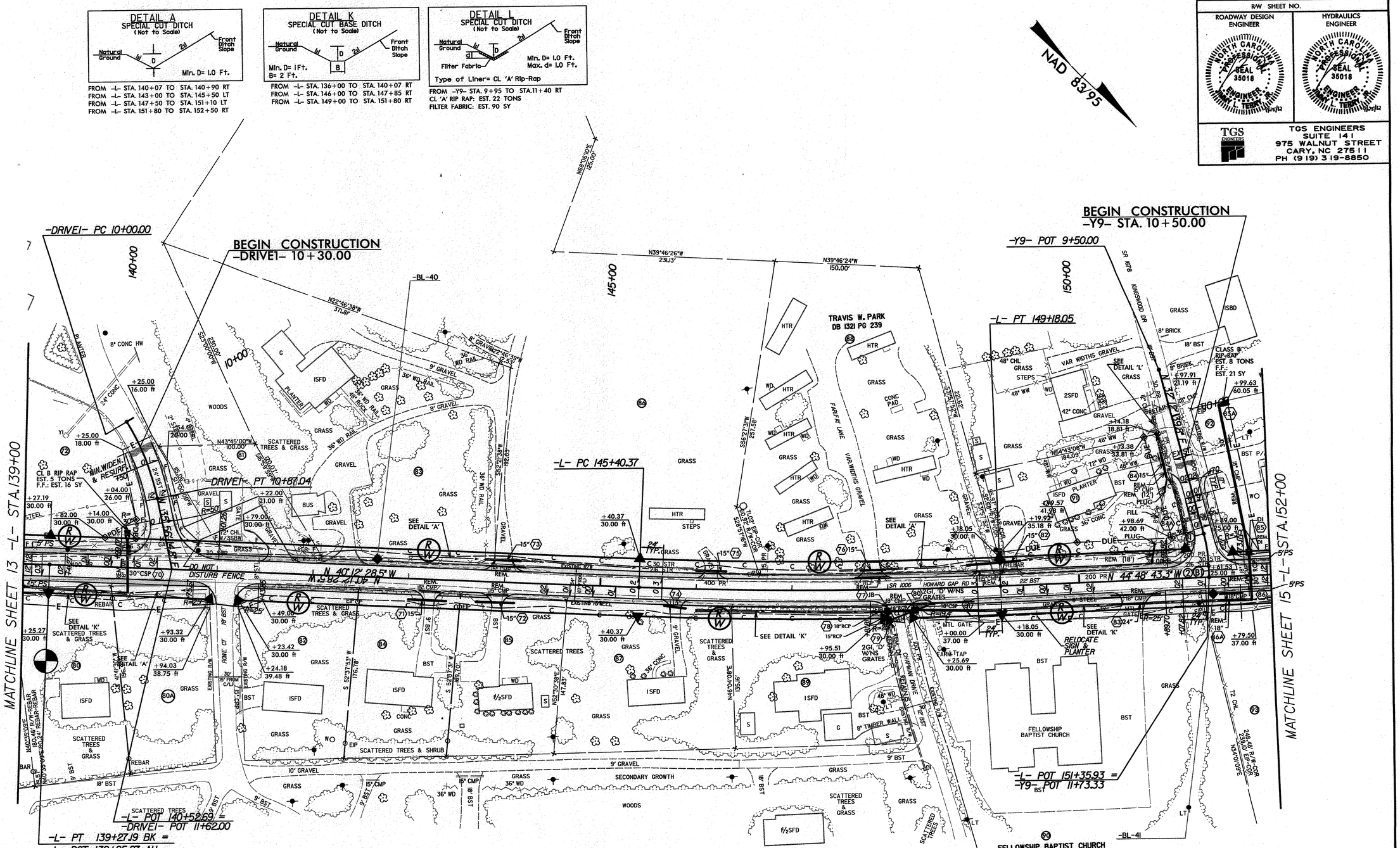
8/17/99



(72)	G.RAY FUSSELL	DB 1254 PG 107
(80)	FRED O.BROOKS AND JEWEL C.BROOKS	DB 753 PG 25
(80A)	CYNTHIA JOY BROOKS	DB 1190 PG 390
(81)	PUBLIC SERVICE COMPANY OF NORTH CAROLINA	DB 331 PG 215
(82)	FRED DENNIS HOLDEN	DB 1216 PG 502
(83)	LARRY MONROE COX AND TARA J.COX	DB 961 PG 742
(84)	GENE GILLIAM	DB 1208 PG 165
(85)	FEDERAL NATIONAL MORTGAGE ASSOCIATION	DB 1442 PG 688
(86)	DAVID ROBERT COLLINS AND GLENDA JONES COLLINS	DB 948 PG 460
(87)	JUDY B.SINYARD	DB 615 PG 923
(89)	KENNETH R.WILKIE	DB 600 PG 879
(91)	JOSEPH MARION ALDERMAN AND PAULA L.ALDERMAN	DB 1116 PG 51
(93)	THE GARY KEITH KING REVOCABLE TRUST	DB 1087 PG 405

-DRIVE1-

PI Sta 10+43.96
Δ = 19° 56' 51.9" (RT)
D = 22° 55' 05.9"
L = 87.04'
T = 43.96'
R = 250.00'
SE = 0.01

-L-

PI Sta 134+66.49
Δ = 31° 19' 11.4" (RT)
D = 3° 18' 42.8"
L = 945.68'
T = 484.98'
R = 1,730.00'
SE = 0.04

PI Sta 147+29.31
Δ = 4° 36' 14.8" (LT)
D = 1° 13' 08.6"
L = 377.68'
T = 188.94'
R = 4,700.00'
SE = 0.03

PI Sta 153+38.49
Δ = 14° 24' 30.4" (LT)
D = 4° 07' 19.2"
L = 349.55'
T = 175.70'
R = 1,390.00'
SE = 0.04

-Y9-

PI Sta 11+44.85
Δ = 12° 58' 34.5" (RT)
D = 38° 11' 49.9"
L = 33.97'
T = 17.06'
R = 150.00'
SE = 0.01

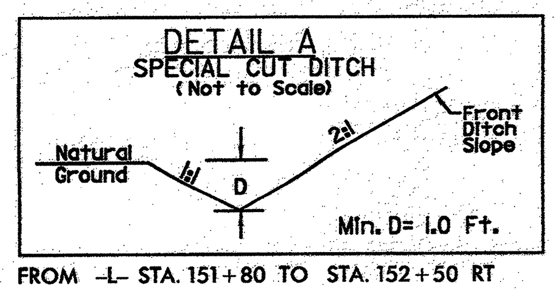
(1)	-Y9- PC 11+27.79
(2)	-Y9- PT 11+61.76
(3)	-L- PC 151+62.79

8/17/99

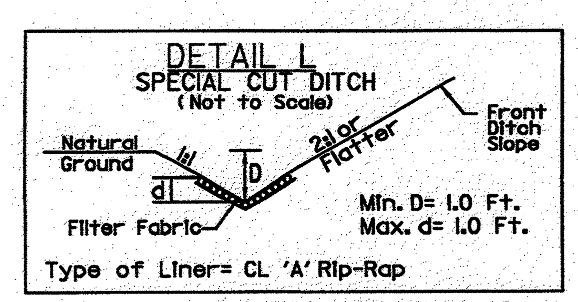
PROJECT REFERENCE NO.	SHEET NO.
R-5207A	15
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY, JR. 9/25/12	NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY, JR. 9/25/12

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

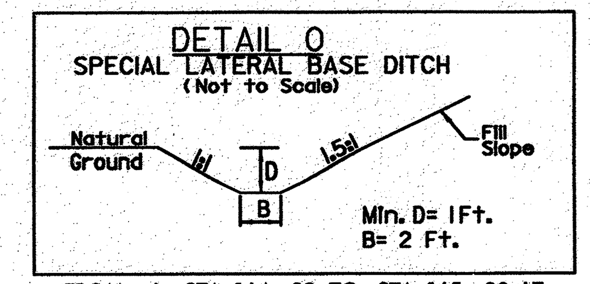


FROM -L- STA. 151+80 TO STA. 152+50 RT



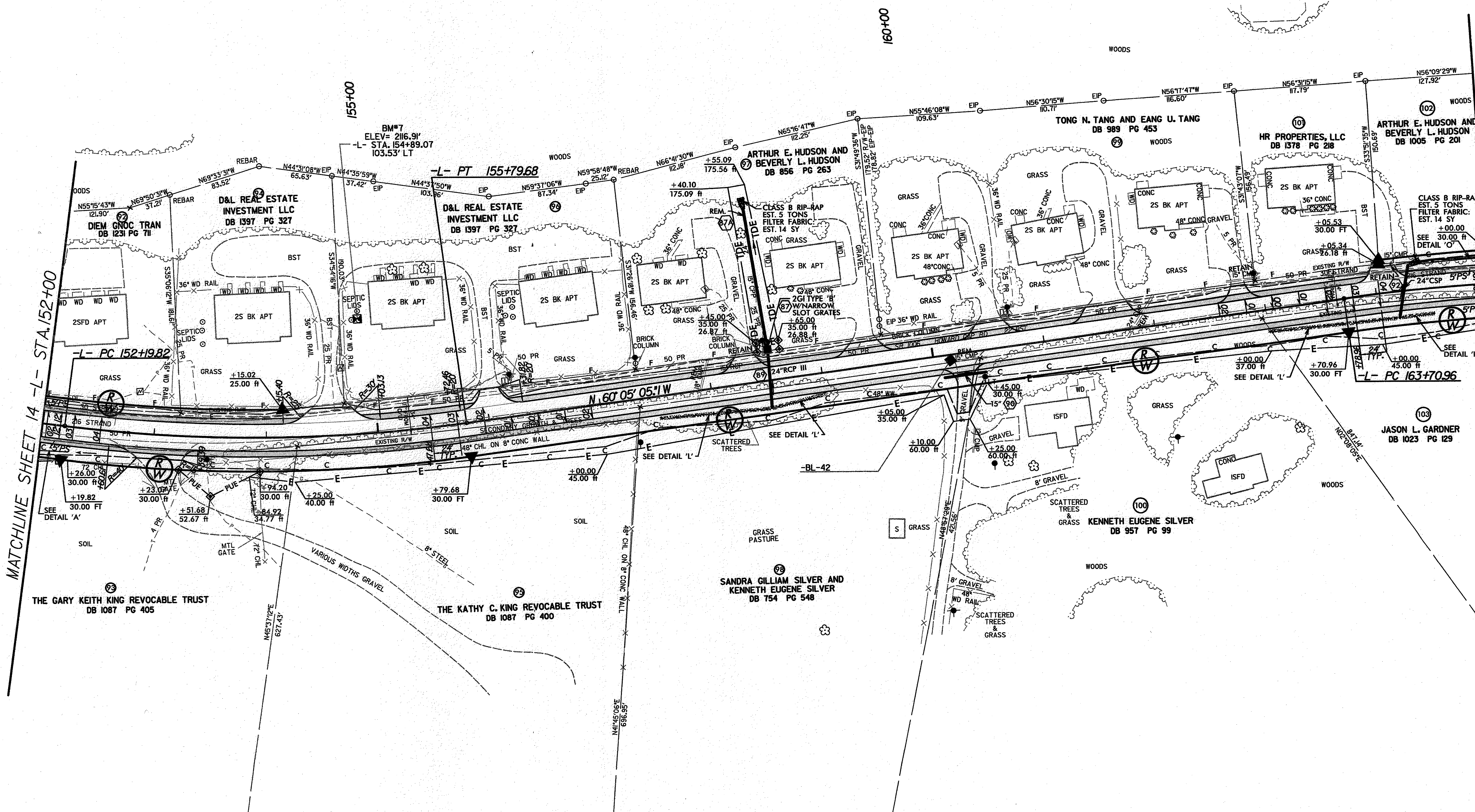
FROM -L- STA. 157+50 TO STA. 159+00 RT
CL 'A' RIP RAP: EST. 28 TONS
FILTER FABRIC: EST. 116 SY

FROM -L- STA. 163+00 TO STA. 164+50 RT
CL 'A' RIP RAP: EST. 28 TONS
FILTER FABRIC: EST. 116 SY



FROM -L- STA. 164+32 TO STA. 165+00 LT

NAD 83/95



-L-

PI Sta 154+00.82	PI Sta 165+03.15
Δ = 15° 16' 21.8" (LT)	Δ = 8° 24' 00.9" (LT)
D = 4° 14' 38.9"	D = 3° 10' 59.2"
L = 359.85'	L = 263.90'
T = 181.00'	T = 132.19'
R = 1,350.00'	R = 1,800.00'
SE = 0.04	SE = 0.04

SEE SHEET 22 FOR -L- GRADE

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

8/17/99

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

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER MARY L. TERRY 12/5/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER MARY L. TERRY 12/5/12

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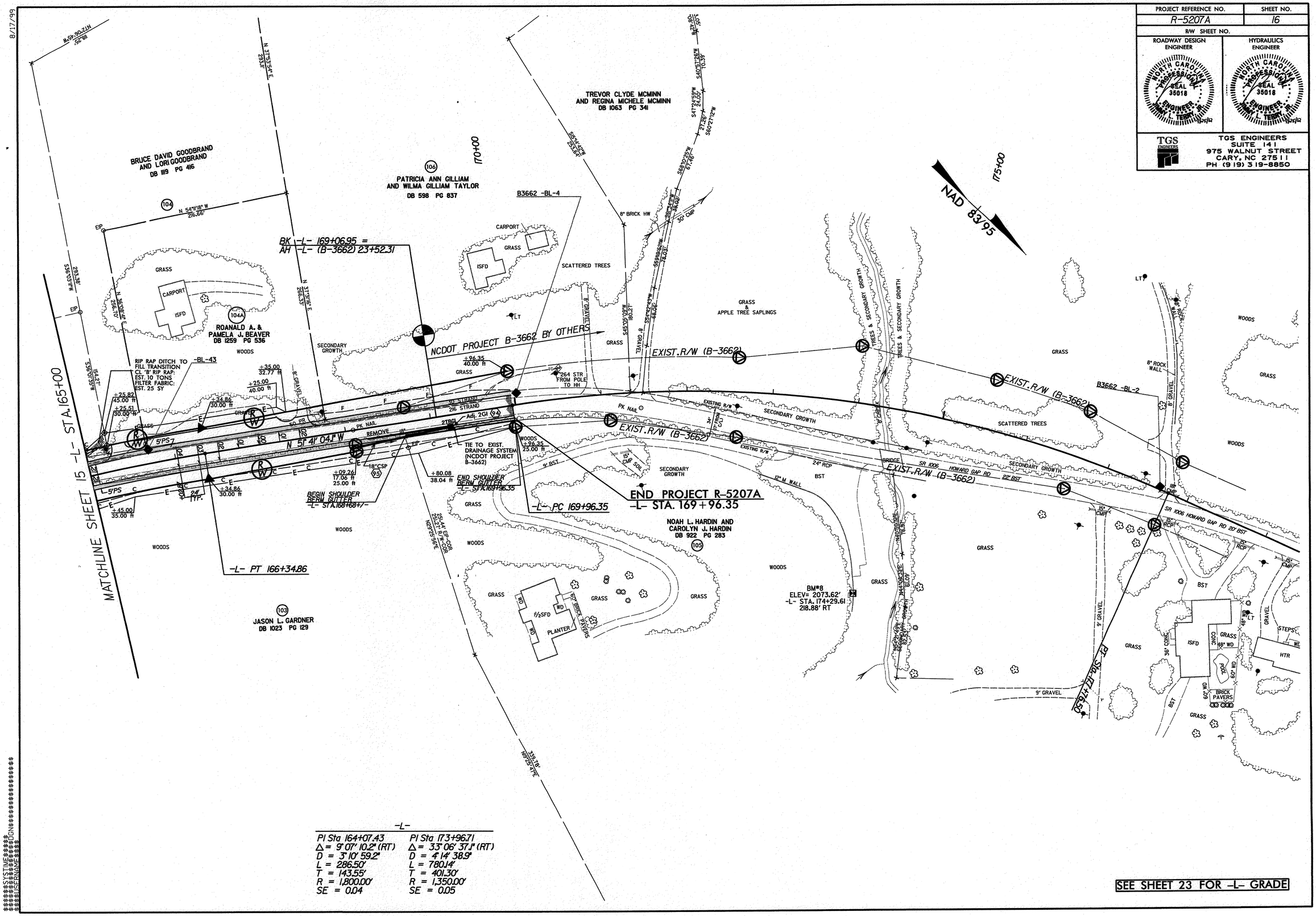
CARY, NC 27511
PH (919) 319-8850



-L-

PI Sta 164+07.43	PI Sta 173+96.71
Δ = 9°07' 10.2" (RT)	Δ = 33°06' 37.1" (RT)
D = 3°10' 59.2"	D = 4°14' 38.9"
L = 286.50'	L = 780.14'
T = 143.55'	T = 401.30'
R = 1,800.00'	R = 1,350.00'
SE = 0.04	SE = 0.05

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

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	17

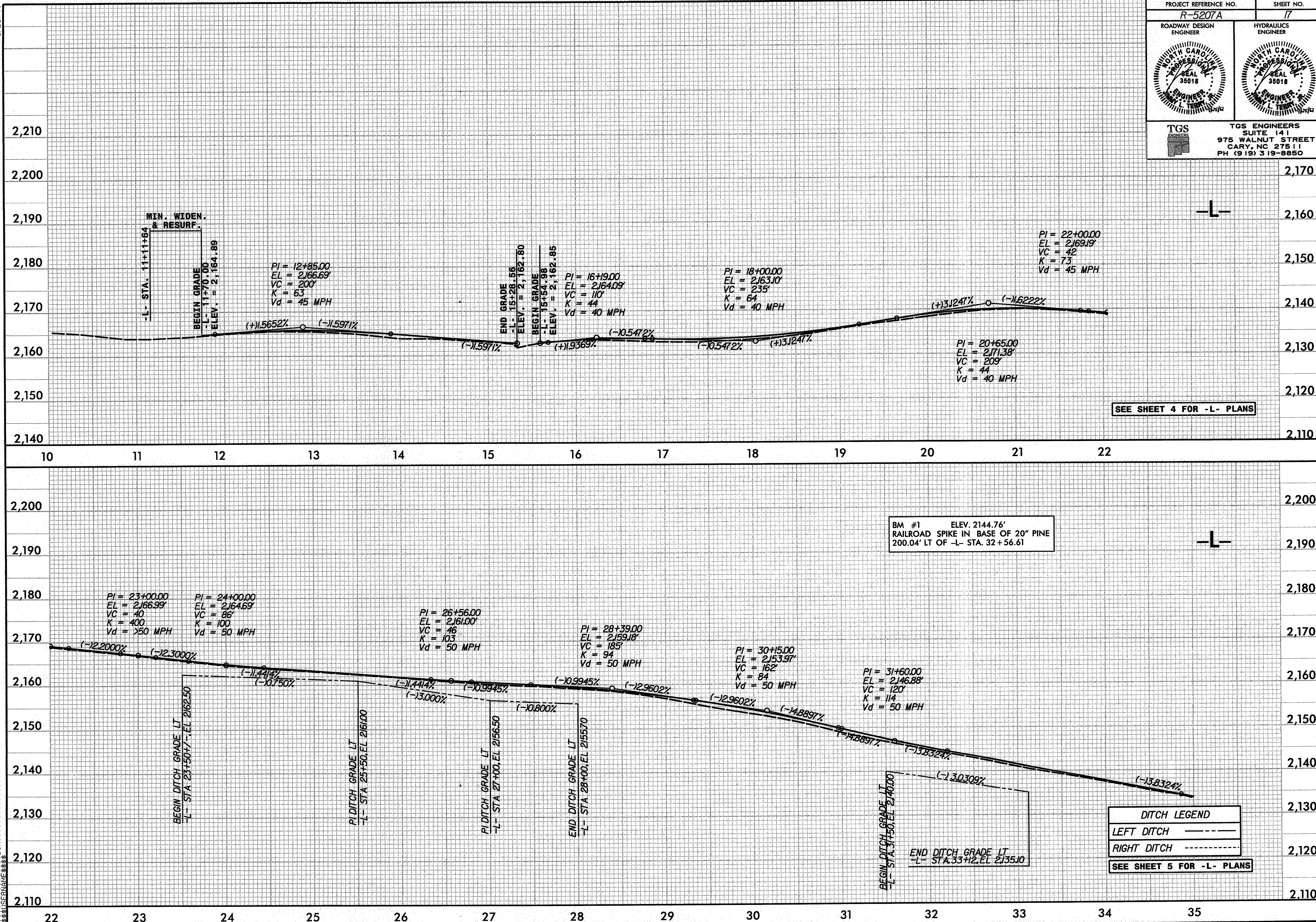
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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

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

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



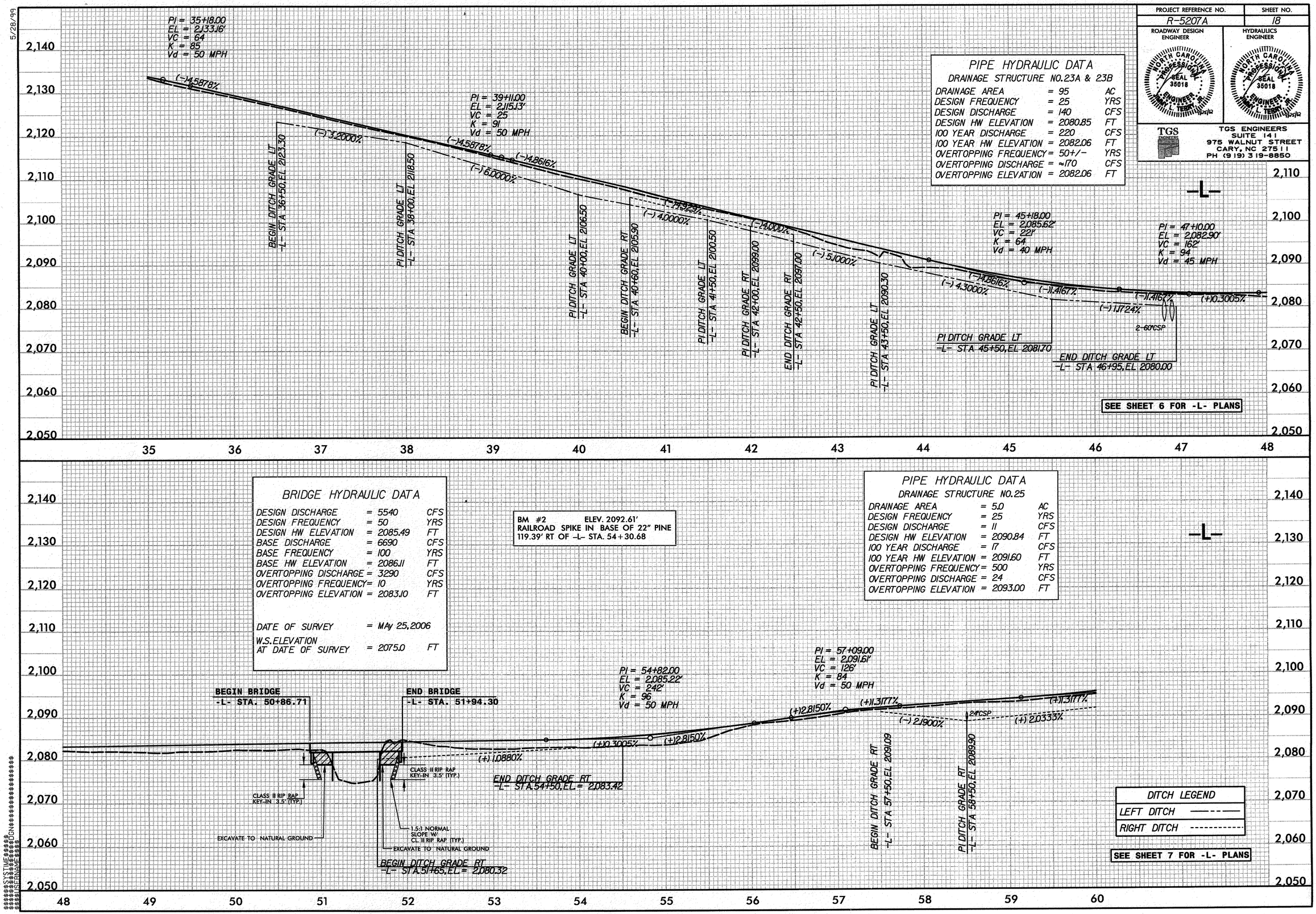
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	18

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.23A & 23B

DRAINAGE AREA	= 95	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 140	CFS
DESIGN HW ELEVATION	= 2080.85	FT
100 YEAR DISCHARGE	= 220	CFS
100 YEAR HW ELEVATION	= 2082.06	FT
OVERTOPPING FREQUENCY	= 50+/-	YRS
OVERTOPPING DISCHARGE	= ≈170	CFS
OVERTOPPING ELEVATION	= 2082.06	FT

SEE SHEET 6 FOR -L- PLANS

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 5540	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 2085.49	FT
BASE DISCHARGE	= 6690	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2086.11	FT
OVERTOPPING DISCHARGE	= 3290	CFS
OVERTOPPING FREQUENCY	= 10	YRS
OVERTOPPING ELEVATION	= 2083.10	FT
DATE OF SURVEY	= MAY 25, 2006	
W.S. ELEVATION AT DATE OF SURVEY	= 2075.0	FT

BM #2 ELEV. 2092.61'
RAILROAD SPIKE IN BASE OF 22" PINE
119.39' RT OF -L- STA. 54+30.68

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.25

DRAINAGE AREA	= 5.0	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 11	CFS
DESIGN HW ELEVATION	= 2090.84	FT
100 YEAR DISCHARGE	= 17	CFS
100 YEAR HW ELEVATION	= 2091.60	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 24	CFS
OVERTOPPING ELEVATION	= 2093.00	FT

DITCH LEGEND	
LEFT DITCH	——— - - ———
RIGHT DITCH	- - - - - - - - - -

SEE SHEET 7 FOR -L- PLANS

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

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	19

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER MARK L. TERRY 5/5/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER MARK L. TERRY 5/5/12

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CARY, NC 27511
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PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.27

DRAINAGE AREA	= 3.2	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 8	CFS
DESIGN HW ELEVATION	= 2097.07	FT
100 YEAR DISCHARGE	= 12	CFS
100 YEAR HW ELEVATION	= 2098.82	FT
OVERTOPPING FREQUENCY	= ≈100	YRS
OVERTOPPING DISCHARGE	= 11.0+/-	CFS
OVERTOPPING ELEVATION	= 2099.60	FT

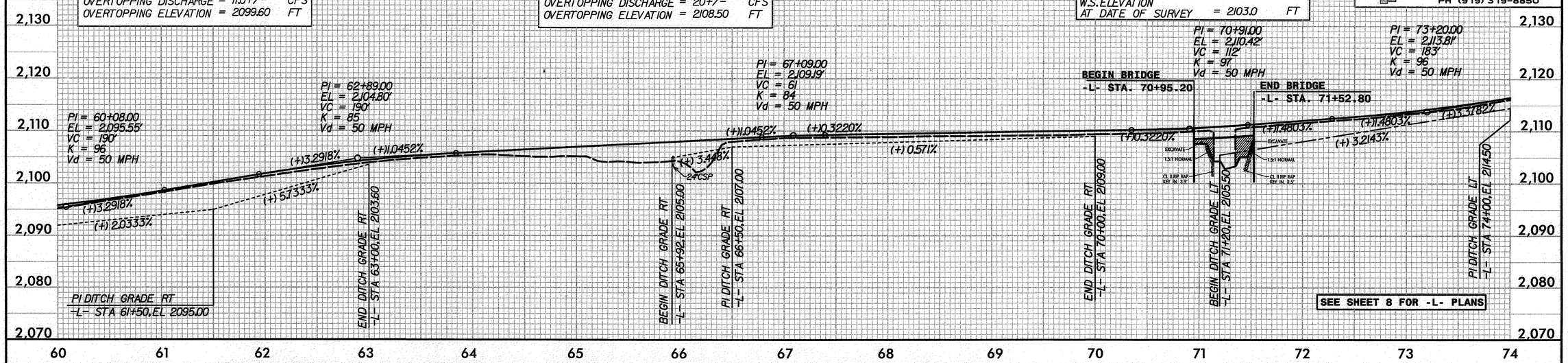
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.30

DRAINAGE AREA	= 7	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 14	CFS
DESIGN HW ELEVATION	= 2107.32	FT
100 YEAR DISCHARGE	= 22	CFS
100 YEAR HW ELEVATION	= 2108.50	FT
OVERTOPPING FREQUENCY	= 50+	YRS
OVERTOPPING DISCHARGE	= 20+/-	CFS
OVERTOPPING ELEVATION	= 2108.50	FT

BM #3 ELEV. 2127.94'
RAILROAD SPIKE IN BASE OF 36" OAK
161.49' RT OF -L- STA. 70+18.61

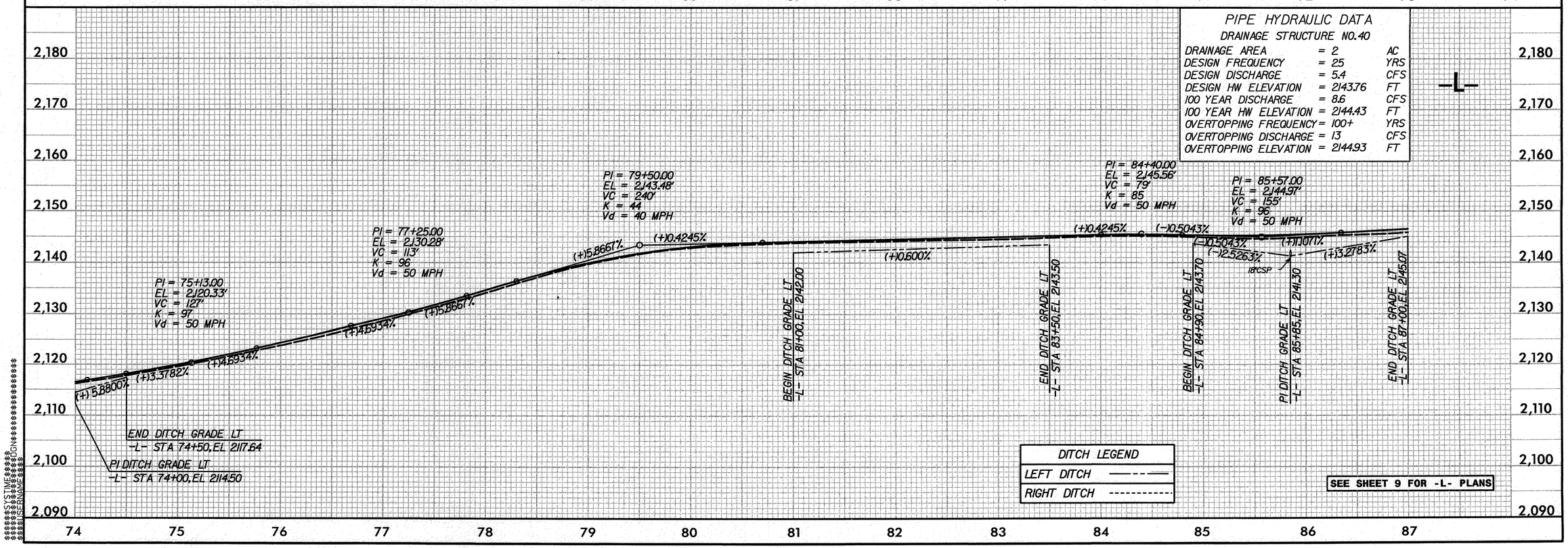
BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 430	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 2108.1	FT
BASE DISCHARGE	= 600	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2108.7	FT
OVERTOPPING DISCHARGE	= 930+	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 2110.5	FT
DATE OF SURVEY	= May 25, 2006	
W.S. ELEVATION AT DATE OF SURVEY	= 2103.0	FT



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.40

DRAINAGE AREA	= 2	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 5.4	CFS
DESIGN HW ELEVATION	= 2143.76	FT
100 YEAR DISCHARGE	= 8.6	CFS
100 YEAR HW ELEVATION	= 2144.43	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 13	CFS
OVERTOPPING ELEVATION	= 2144.93	FT



SYSTIME$ LEVEL$ ENGINE$ DGN$

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	20

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY, JR. 9/25/12

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY, JR. 9/25/12

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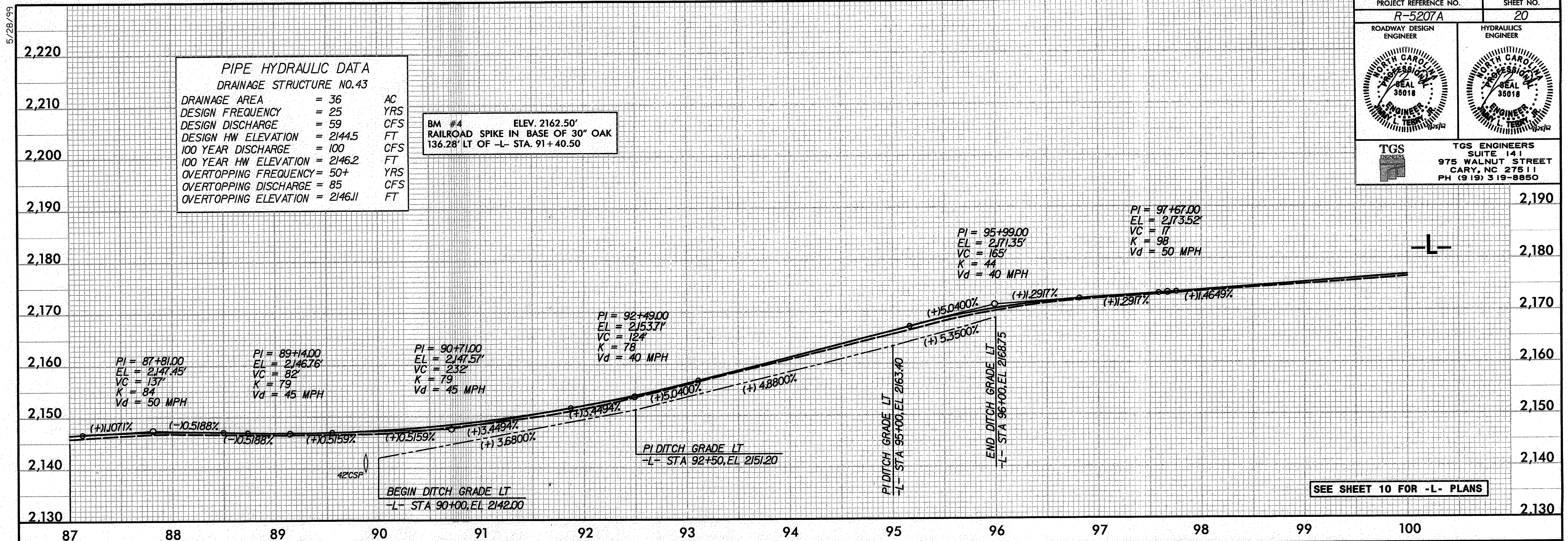
5/28/99

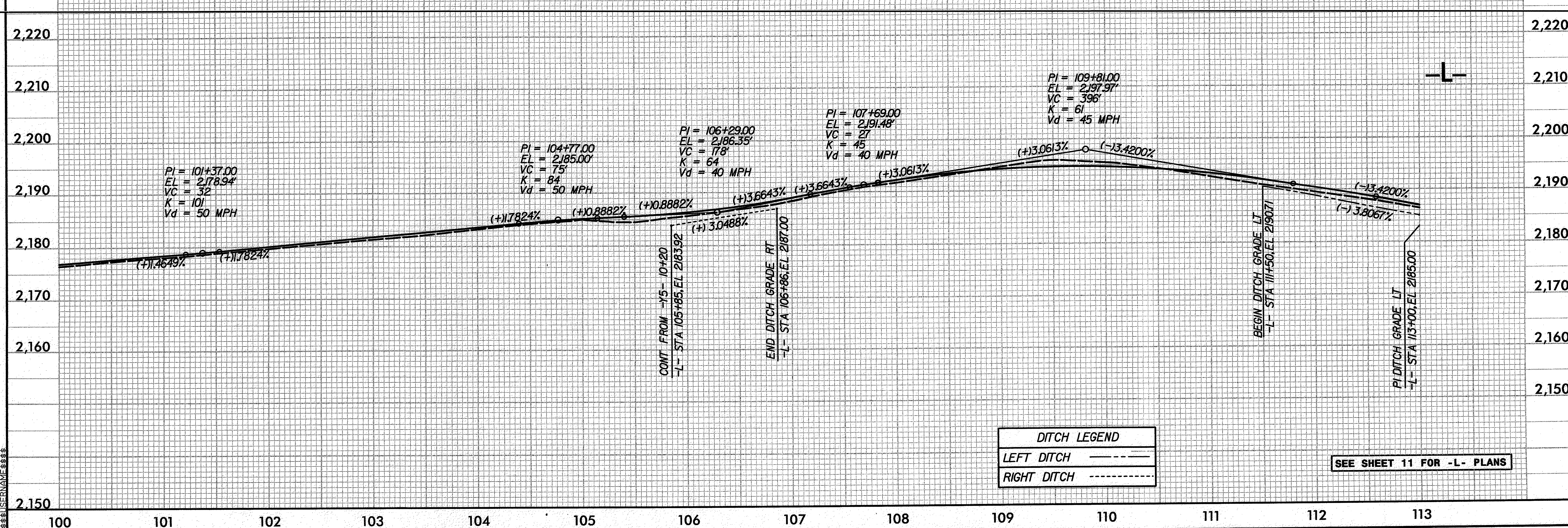
PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.43

DRAINAGE AREA	= 36	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 59	CFS
DESIGN HW ELEVATION	= 2144.5	FT
100 YEAR DISCHARGE	= 100	CFS
100 YEAR HW ELEVATION	= 2146.2	FT
OVERTOPPING FREQUENCY	= 50+	YRS
OVERTOPPING DISCHARGE	= 85	CFS
OVERTOPPING ELEVATION	= 2146.11	FT

BM #4 ELEV. 2162.50'
RAILROAD SPIKE IN BASE OF 30" OAK
136.28' LT OF -L- STA. 91+40.50





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

5/28/99

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

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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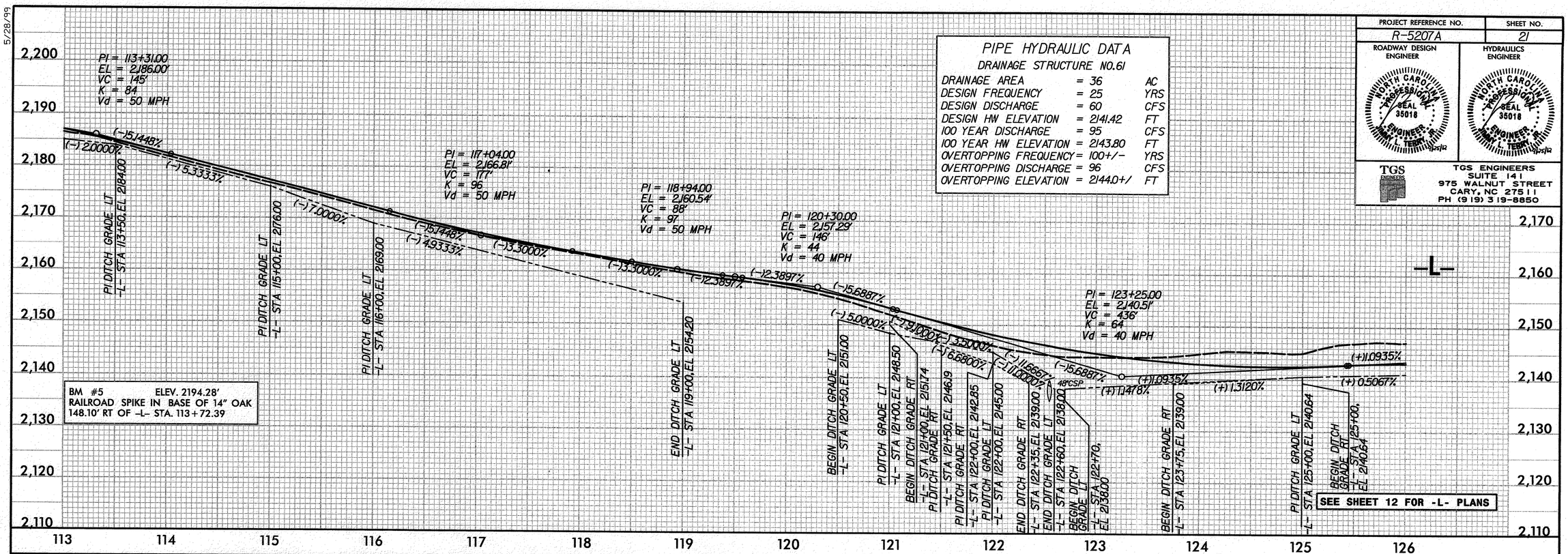


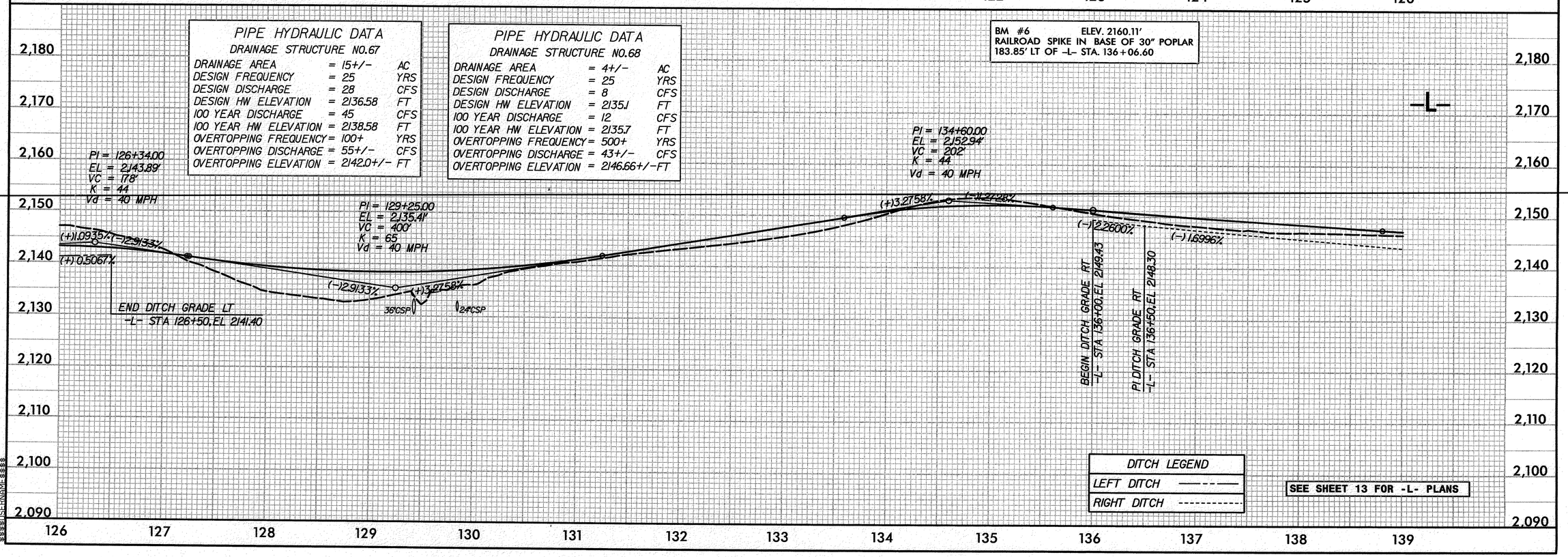
PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.61

DRAINAGE AREA	= 36	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 60	CFS
DESIGN HW ELEVATION	= 2141.42	FT
100 YEAR DISCHARGE	= 95	CFS
100 YEAR HW ELEVATION	= 2143.80	FT
OVERTOPPING FREQUENCY	= 100+/-	YRS
OVERTOPPING DISCHARGE	= 96	CFS
OVERTOPPING ELEVATION	= 2144.0+/	FT

BM #5 ELEV. 2194.28'
RAILROAD SPIKE IN BASE OF 14" OAK
148.10' RT OF -L- STA. 113+72.39

SEE SHEET 12 FOR -L- PLANS



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.67

DRAINAGE AREA	= 15+/-	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 28	CFS
DESIGN HW ELEVATION	= 2136.58	FT
100 YEAR DISCHARGE	= 45	CFS
100 YEAR HW ELEVATION	= 2138.58	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 55+/-	CFS
OVERTOPPING ELEVATION	= 2142.0+/-	FT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.68

DRAINAGE AREA	= 4+/-	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 8	CFS
DESIGN HW ELEVATION	= 2135.1	FT
100 YEAR DISCHARGE	= 12	CFS
100 YEAR HW ELEVATION	= 2135.7	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 43+/-	CFS
OVERTOPPING ELEVATION	= 2146.66+/-	FT

BM #6 ELEV. 2160.11'
RAILROAD SPIKE IN BASE OF 30" POPLAR
183.85' LT OF -L- STA. 136+06.60

DITCH LEGEND	
LEFT DITCH	——— - - - ———
RIGHT DITCH	- - - - - - - - - -

SEE SHEET 13 FOR -L- PLANS

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

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-5207A	22

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

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

TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
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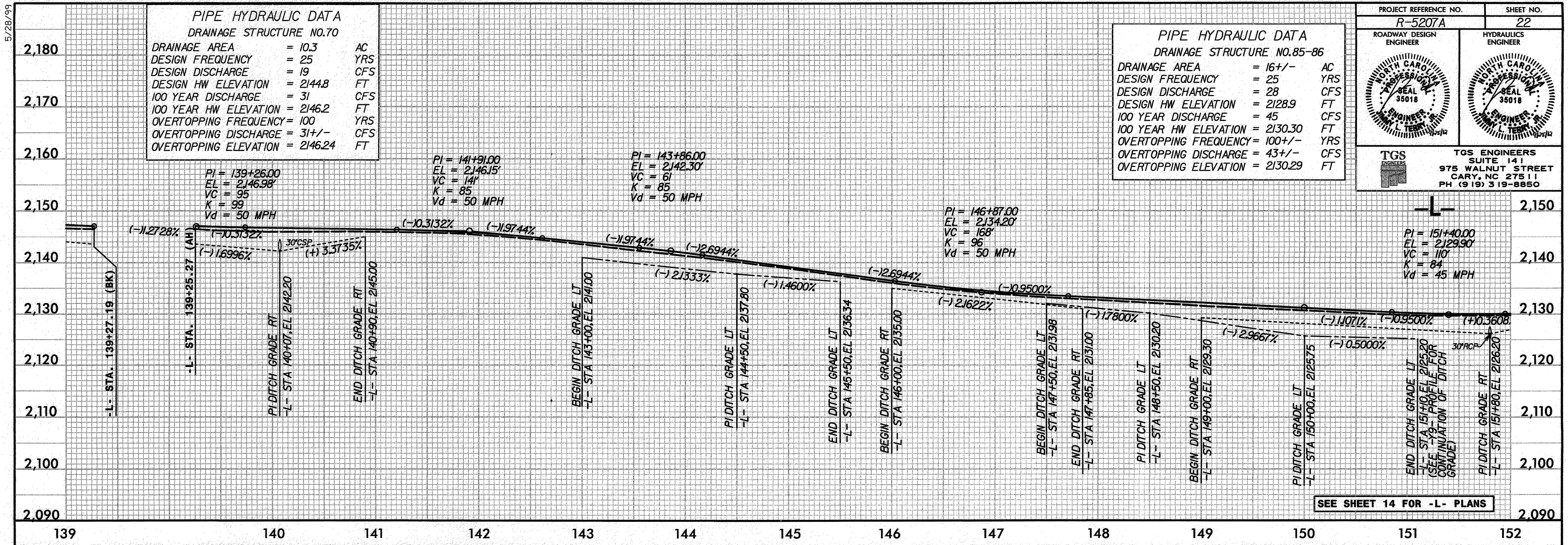
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.70

DRAINAGE AREA	= 10.3	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 19	CFS
DESIGN HW ELEVATION	= 2144.8	FT
100 YEAR DISCHARGE	= 31	CFS
100 YEAR HW ELEVATION	= 2146.2	FT
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 31+/-	CFS
OVERTOPPING ELEVATION	= 2146.24	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.85-86

DRAINAGE AREA	= 16+/-	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 28	CFS
DESIGN HW ELEVATION	= 2128.9	FT
100 YEAR DISCHARGE	= 45	CFS
100 YEAR HW ELEVATION	= 2130.30	FT
OVERTOPPING FREQUENCY	= 100+/-	YRS
OVERTOPPING DISCHARGE	= 43+/-	CFS
OVERTOPPING ELEVATION	= 2130.29	FT



SEE SHEET 14 FOR -L- PLANS

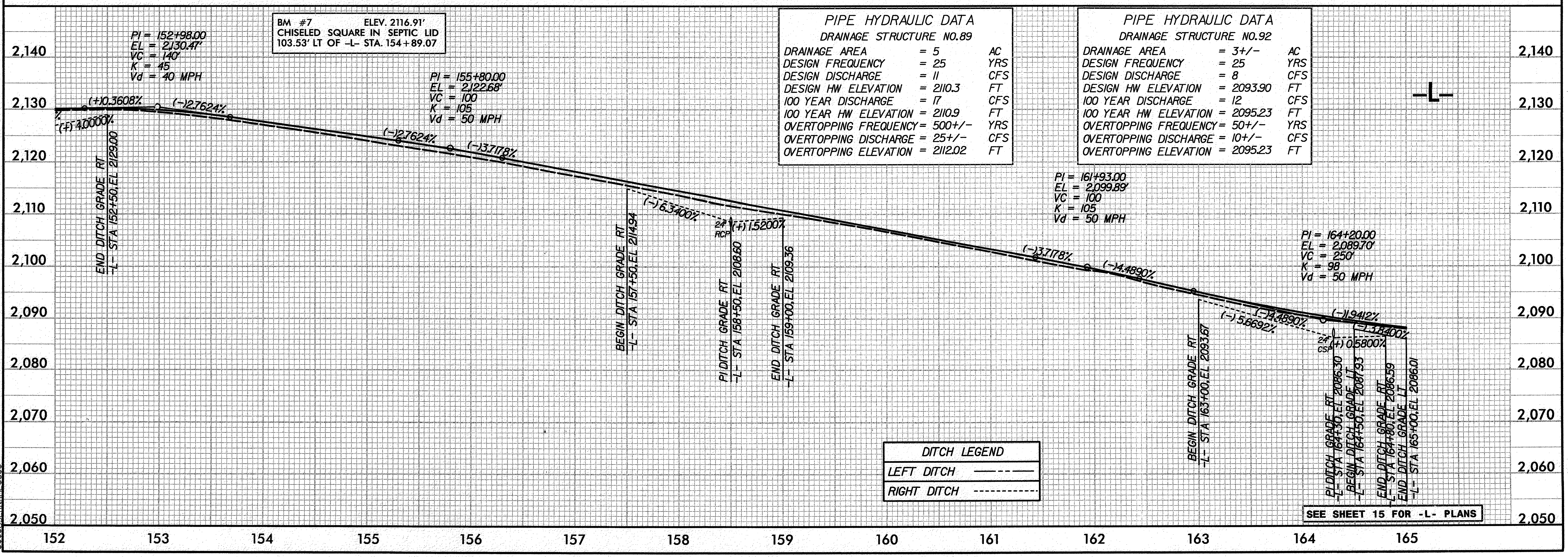
BM #7 ELEV. 2116.91'
CHISELED SQUARE IN SEPTIC LID
103.53' LT OF -L- STA. 154+89.07

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.89

DRAINAGE AREA	= 5	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 11	CFS
DESIGN HW ELEVATION	= 2110.3	FT
100 YEAR DISCHARGE	= 17	CFS
100 YEAR HW ELEVATION	= 2110.9	FT
OVERTOPPING FREQUENCY	= 500+/-	YRS
OVERTOPPING DISCHARGE	= 25+/-	CFS
OVERTOPPING ELEVATION	= 2112.02	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.92

DRAINAGE AREA	= 3+/-	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 8	CFS
DESIGN HW ELEVATION	= 2093.90	FT
100 YEAR DISCHARGE	= 12	CFS
100 YEAR HW ELEVATION	= 2095.23	FT
OVERTOPPING FREQUENCY	= 50+/-	YRS
OVERTOPPING DISCHARGE	= 10+/-	CFS
OVERTOPPING ELEVATION	= 2095.23	FT



DITCH LEGEND	
LEFT DITCH	—— - - ——
RIGHT DITCH	- - - - - - - -

SEE SHEET 15 FOR -L- PLANS

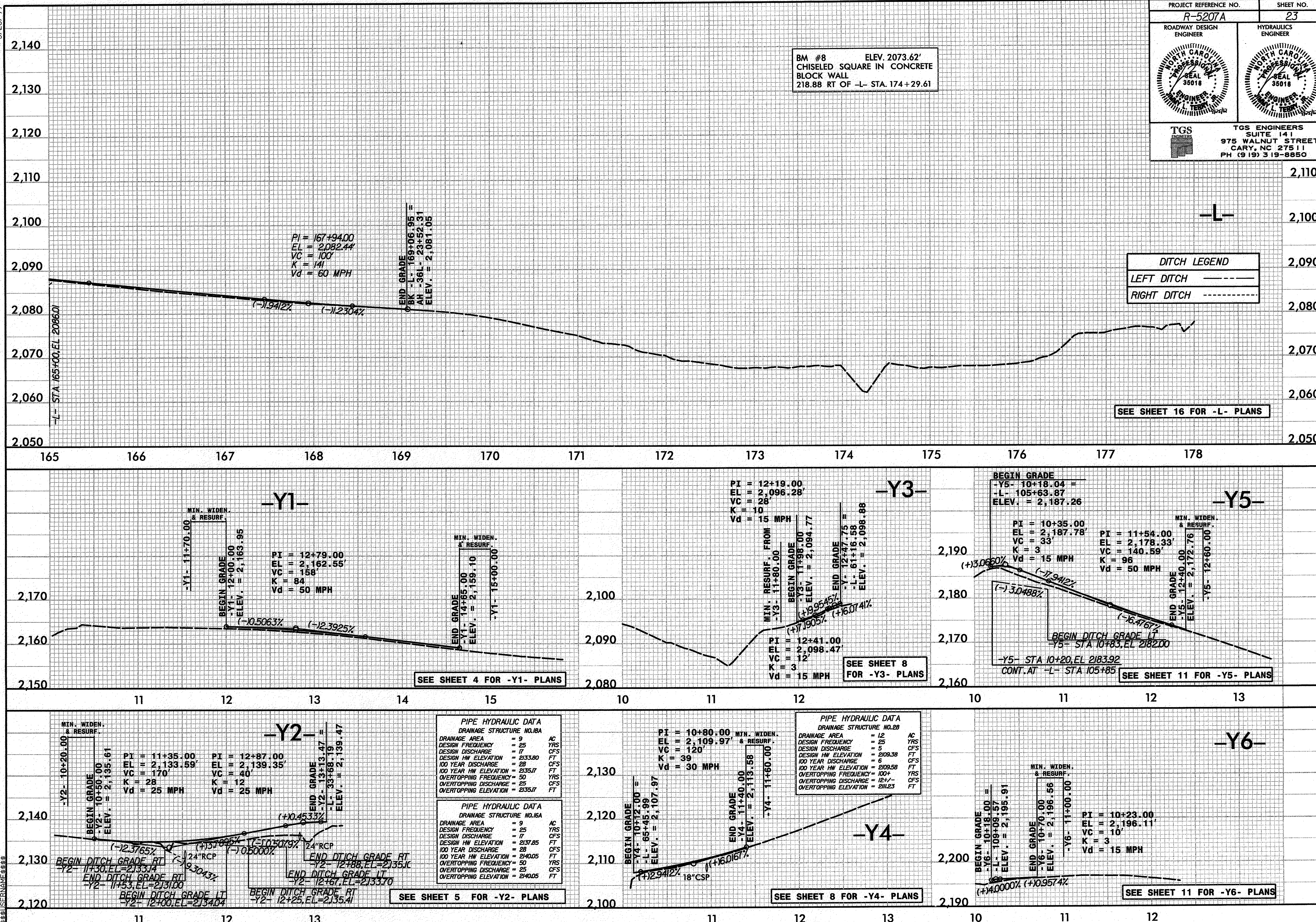
$$$$$$SYSTIME$$$$$ $$$$$$$$$$DGN$$$$$$$$$$$$$$$$ $$$USERNAME$$$$

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

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY, JR. 9/25/12

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



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.18A

DRAINAGE AREA	= 9	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 17	CFS
DESIGN HW ELEVATION	= 2133.80	FT
100 YEAR DISCHARGE	= 28	CFS
100 YEAR HW ELEVATION	= 2135.17	FT
OVERTOPPING FREQUENCY	= 50	YRS
OVERTOPPING DISCHARGE	= 25	CFS
OVERTOPPING ELEVATION	= 2135.17	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.16A

DRAINAGE AREA	= 9	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 17	CFS
DESIGN HW ELEVATION	= 2137.85	FT
100 YEAR DISCHARGE	= 28	CFS
100 YEAR HW ELEVATION	= 2140.05	FT
OVERTOPPING FREQUENCY	= 50	YRS
OVERTOPPING DISCHARGE	= 25	CFS
OVERTOPPING ELEVATION	= 2140.05	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.28

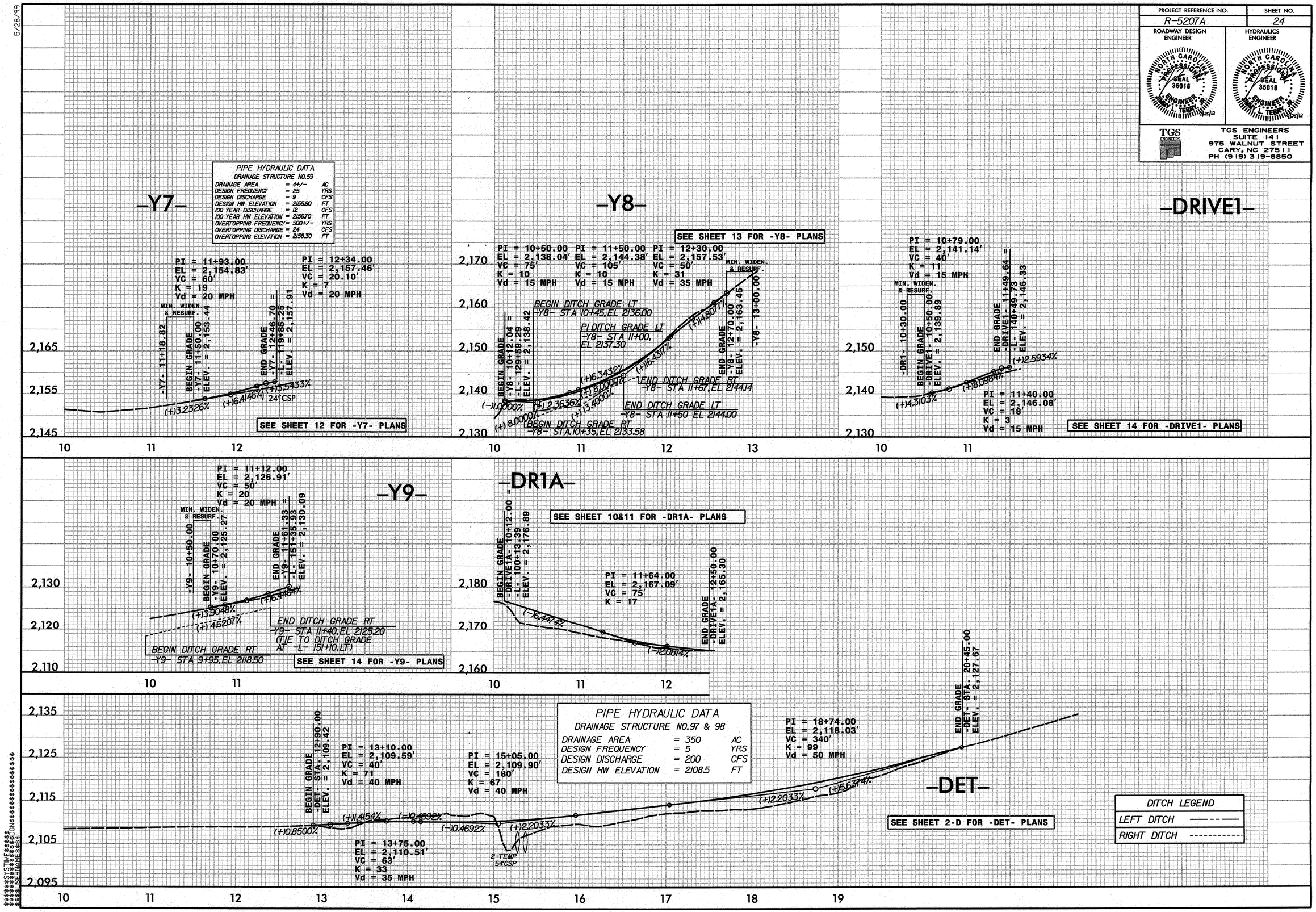
DRAINAGE AREA	= 1.2	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 5	CFS
DESIGN HW ELEVATION	= 2109.38	FT
100 YEAR DISCHARGE	= 6	CFS
100 YEAR HW ELEVATION	= 2109.58	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 12+/-	CFS
OVERTOPPING ELEVATION	= 2111.23	FT

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

5/28/99

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

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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