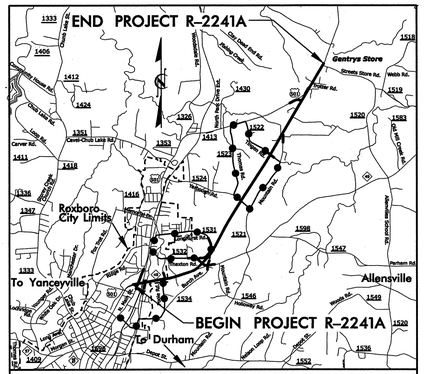
TIP PROJECT: R-2241A

CONTRACT: C202960

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PERSON COUNTY

LOCATION: US 501 FROM NC 49 IN ROXBORO TO SOUTH OF SR 1602

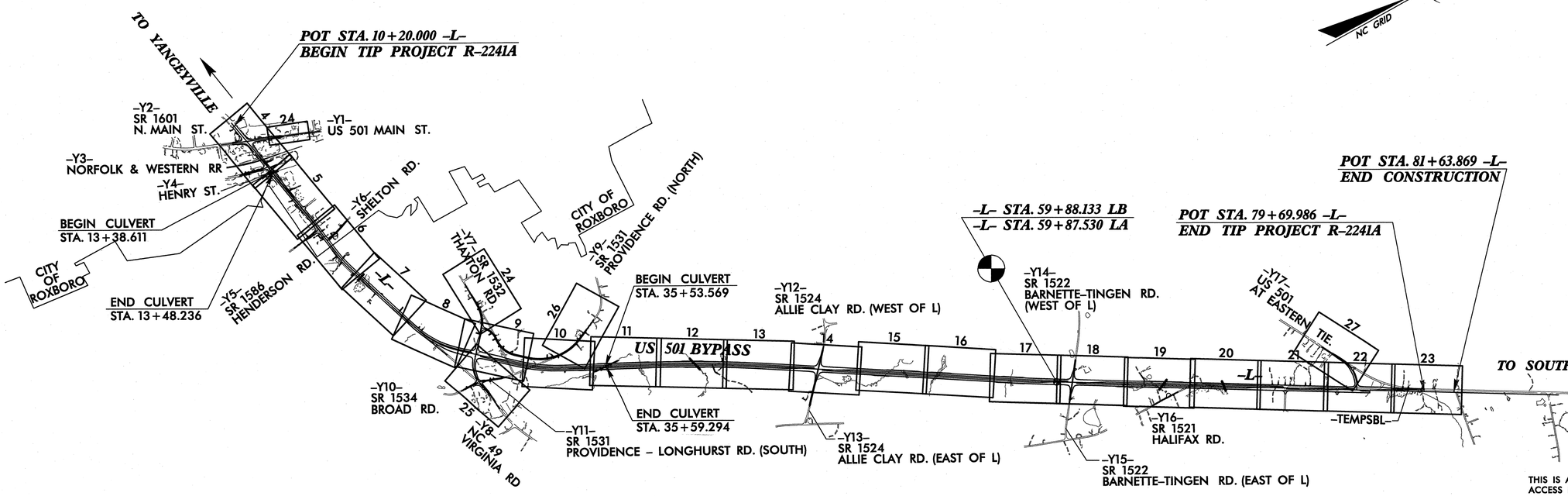
TYPE OF WORK: GRADING, DRAINAGE, PAVING, CURB AND GUTTER, WIDENING, CULVERTS, AND SIGNALS

METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2241A	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34406.1.1	MA-STP-501 (1)	PE
34406.2.3	STP-0501 (11)	R/W & UTILITY
34406.3.2	HPP-0501 (25)	CONST.



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

DESIGN EXCEPTION FOR VERTICAL SIGHT DISTANCE AND SAG VERTICAL "K" FACTOR ON -L-, APPROVED 10-07-05

GRAPHIC SCALE

5 0 10
PLANS
5 0 10
PROFILE (HORIZONTAL)
1 0 2
PROFILE (VERTICAL)

DESIGN DATA

	5 LANE C&G	4 LANE DIVIDED
ADT 2011 =	10,200	2,900
ADT 2027 =	11,500	4,100
DHV =	9 %	9 %
D =	60 %	55 %
T =	10 %*	21 %**
V =	65 km/h	100 km/h

FUNC. CLASSIFICATION: ARTERIAL

* TTST 5% + DUAL 5%

** TTST 10% + DUAL 11%

REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT R-2241A = 6.951 km
(LENGTH BASED ON SOUTHBOUND LANE)

LENGTH OF STRUCTURES TIP PROJECT R-2241A = 0.015 km

TOTAL LENGTH OF TIP PROJECT R-2241A = 6.966 km

NCDOT CONTACT: BRENDA MOORE, PE
Project Engineer, Roadway Design

PLANS PREPARED FOR THE NCDOT BY:
STV/RALPH WHITEHEAD ASSOCIATES, INC.
1000 West Morehead St., Ste. 200, Charlotte NC, 28208
NC License Number F-0991

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
OCTOBER 24, 2006

LETTING DATE:
APRIL 16, 2013

JOHN N. JOHNSON, P.E.
PROJECT ENGINEER

JOSEPH A. FREEMAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR.

SIGNATURE: P.E. 2/21/13

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON

SIGNATURE: P.E. 2-20-13

DEPARTMENT OF TRANSPORTATION • STATE OF NORTH CAROLINA •

2/20/2013
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stephens

TIP PROJECT: R-2241A

CONTRACT: C202960

See Sheet 1-A For Index of Sheets
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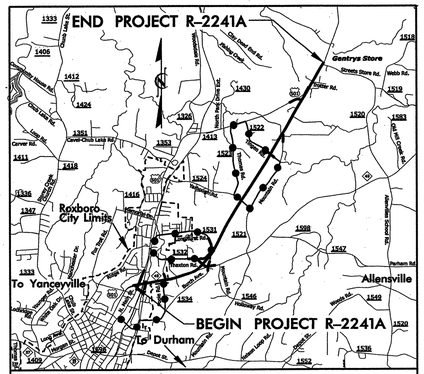

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PERSON COUNTY

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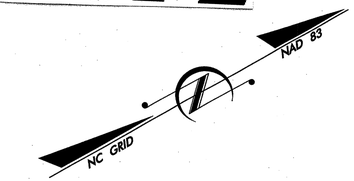
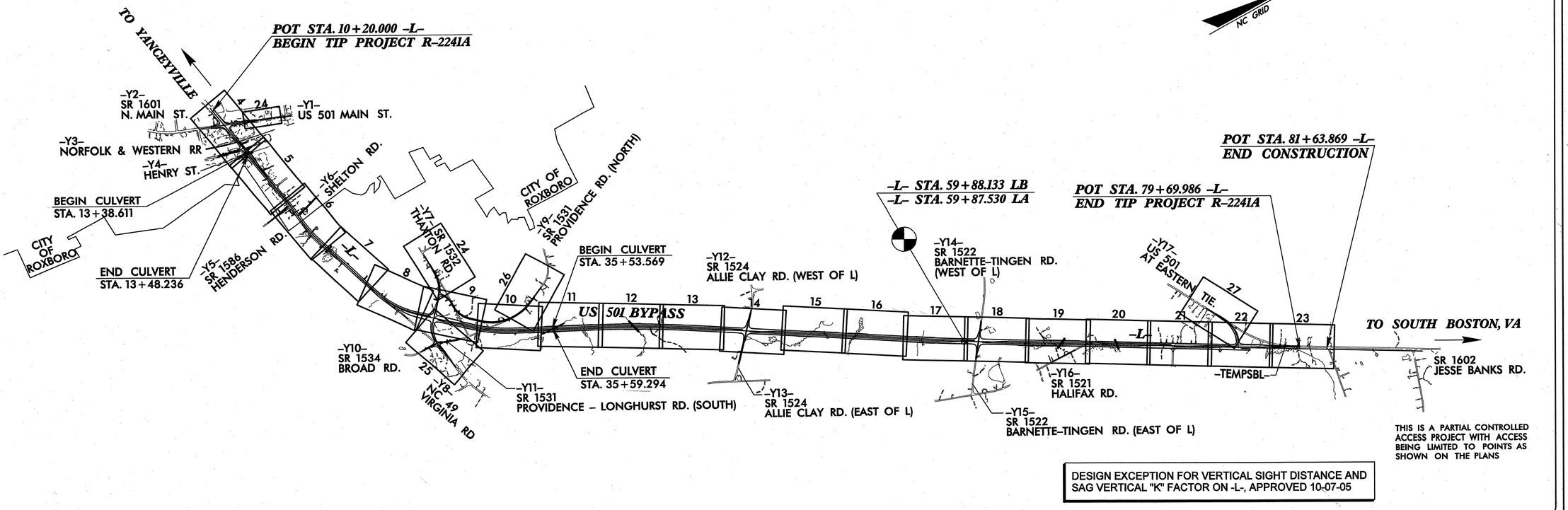
34406.3.2	HPP-0501 (25)	CONST.

Part 1 of 2





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NCDOT CONTACT: BRENDA MOORE, PE
Project Engineer, Roadway Design

PLANS PREPARED FOR THE NCDOT BY:
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PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
2/21/13

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON
2-26-13

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

2/20/2013
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stephens

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	1-A

METRIC

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON

INDEX OF SHEETS

1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C THRU 1-E	SURVEY CONTROL SHEETS
1-F	CENTERLINE COORDINATE LIST
2 THRU 2-H	TYPICAL SECTIONS AND DETAILS
2-I	SHOULDER DRAIN DETAILS
2-J THRU 2-K	DITCH DETAILS
2-L THRU 2-M	INTERSECTION DETAIL SHEETS
2-N THRU 2-O	DETOUR SHEETS
2-P	DETAIL FOR TEMPORARY CONTAINMENT OF CONTAMINATED SOIL
2-Q	CHAIN LINK FENCE (1.8M HEIGHT) DETAIL
2-R	CONCRETE JUNCTION BOX WITH 150MM DIP LINE PASSING THRU (300MM THRU 1650MM PIPE)
2-S THRU 2-AC	TEMPORARY WALL DETAILS
2-AD THRU 2-AE	METHOD OF PIPE INSTALLATION DETAILS
3 (2 SHEETS)	SUMMARY OF QUANTITIES
3-A THRU 3-N	DRAINAGE SUMMARY SHEETS
3-O	EARTHWORK SUMMARY SHEET
3-P	MISCELLANEOUS SUMMARIES
3-Q	ALIGNMENT CURVE DATA SHEET
3-R	PARCEL INDEX SHEET
4 THRU 27	PLAN SHEETS
28 THRU 45	PROFILE SHEETS
TMP-1 THRU TMP-58	TRAFFIC MANAGEMENT PLANS
SD-1 THRU SD-2	SIGN DESIGN PLANS
PM-1 THRU PM-25	PAVEMENT MARKING PLANS
EC-1 THRU EC-59	EROSION CONTROL PLANS
RF-1 THRU RF-3	REFORESTATION PLANS
SIGN-1 THRU SIGN-22	SIGNING PLANS
SIG-1 THRU SIG-30	SIGNAL PLANS
UC-1 THRU UC-23	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-20	UTILITIES BY OTHERS PLANS
X-0A THRU X-0C	CROSS-SECTION SUMMARY SHEETS
X-1 THRU X-138	CROSS-SECTION SHEETS
C-1 THRU C-26	CULVERT PLANS

GENERAL NOTES

GENERAL NOTES: 2006 SPECIFICATIONS EFFECTIVE: 01-17-12
REVISED: 11/01/11

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED 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 III.

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.

BERM DITCHES:

BERM DITCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 240.01 AT LOCATIONS 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.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 900 MM RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

STANDARD DRAWINGS

EFF. 08-01-2008
REV. 07-16-2006

2006 ROADWAY METRIC STANDARD DRAWINGS

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

STD.NO.	TITLE
DIVISION 2 – EARTHWORK	
200.03	Method of Clearing – Method III
225.01	Guide for Grading Subgrade – Interstate and Freeway
225.02	Guide for Grading Subgrade – Secondary and Local
225.04	Method of Obtaining Superelevation – Two Lane Pavement
225.05	Method of Obtaining Superelevation – Divided Highways
240.01	Guide for Berm Ditch Construction
DIVISION 3 – PIPE CULVERTS	
310.02	Parallel Pipe End Section – Precast Concrete Section for 375mm to 600mm Pipe
310.03	Cross Pipe End Section – Precast Concrete Section for 450mm to 750mm Pipe
310.10	Driveway Pipe Construction
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
DIVISION 7 – CONCRETE PAVEMENTS AND SHOULDERS	
700.04	Concrete Pavement Header Board
700.05	Tying Proposed Pavement to Existing
710.01	Concrete Pavement – Station Marking
DIVISION 8 – INCIDENTALS	
806.01	Concrete Right-of-Way Marker
815.03	Pipe Underdrain and Blind Drain
816.01	Concrete Pads – for Shoulder Drain Installation
816.02	Aggregate Shoulder Drain
816.04	Markers for Drainage Structure and Concrete Pad
838.01	Concrete Endwall for Single and Double Pipe Culverts – 375mm thru 1200mm Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts – 375mm thru 1200mm Pipe 90 Skew
838.80	Precast Endwalls – 300mm thru 1800mm Pipe 90 Skew
840.01	Brick Catch Basin – 300mm thru 1350mm Pipe
840.02	Concrete Catch Basin – 300mm thru 1350mm Pipe
840.03	Frame, Grates and Hood – for Use on Standard Catch Basin
840.14	Concrete Drop Inlet – 300mm thru 750mm Pipe
840.15	Brick Drop Inlet – 300mm thru 750mm 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' – 300mm thru 1800mm Pipe
840.18	Concrete Grated Drop Inlet Type 'B' – 300mm thru 900mm Pipe
840.19	Concrete Grated Drop Inlet Type 'D' – 300mm thru 900mm Pipe
840.20	Frames and Wide Slot Flat Grates
840.22	Frames and Wide Slot Sag Grates
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames – Brick or Concrete
840.26	Brick Grated Drop Inlet Type 'A' – 300mm thru 1800mm Pipe
840.27	Brick Grated Drop Inlet Type 'B' – 300mm thru 900mm Pipe
840.28	Brick Grated Drop Inlet Type 'D' – 300mm thru 900mm Pipe
840.31	Concrete Junction Box – 300mm thru 1650mm Pipe
840.32	Brick Junction Box – 300mm thru 1650mm Pipe
840.35	Traffic Bearing Grated Drop Inlet – for Cast Iron Double Frame and Grates
840.41	Spring Box – Concrete or Brick
840.51	Brick Manhole – 300mm thru 900mm Pipe
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
840.72	Pipe Collar
846.02	Drop Inlet Installation in Expressway Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.02	Driveway Turnout – Radius Type
848.04	Street Turnout
848.05	Wheelchair Ramp – Curb Cut
850.10	Guide for Berm Drainage Outlet – 375mm and 450mm Pipe
852.01	Concrete Islands
852.05	Median Curb for Catch Basin – for Use with 450mm Curb and Gutter
852.10	Median Construction – with Curb and Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
866.01	Chain Link Fence – 1200mm, 1500mm and 1800mm High Fence
866.02	Woven Wire Fence – with Wood Post
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap
700.01	CONCRETE PAVEMENT JOINTS
700.02	EXPANSION JOINT LAYOUT
700.03	DOWEL ASSEMBLY

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".

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE Progress Energy-Power (Transmission), PSNC Energy

Progress Energy-Power (Distribution), Charter Communications, Piedmont EMC, Century Link,

Time Warner Cable and Piedmont Natural Gas Company

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.

CURB RAMPS

CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS.

ROCK

ROCK IS ANTICIPATED BETWEEN:

-L- 36+65 TO 36+90
-L- 38+50 TO 39+90
-L- 44+10 TO 44+30
-L- 59+65 TO 59+95

ROCK BLASTING MAY BE REQUIRED FOR EXCAVATION ON THE PROJECT. IF APPLICABLE, SEE ROCK BLASTING PROVISION.

3/4/2013
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PROJ. REFERENCE NO.	SHEET NO.
R-2241A	1-B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

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

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 Marker — RW
- Proposed Control of Access Line with Concrete or Granite 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.

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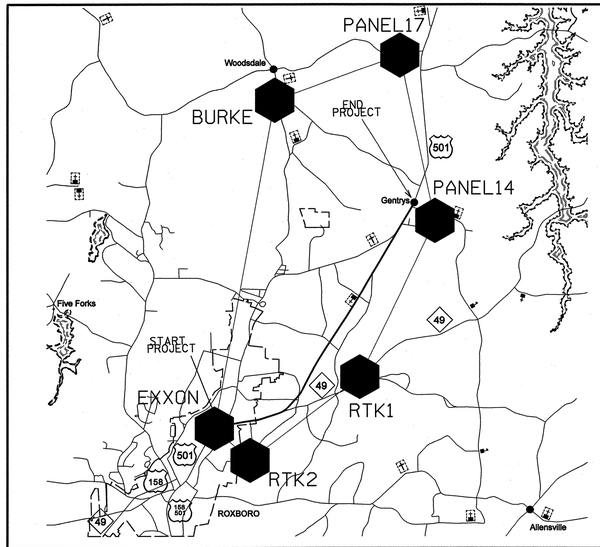
METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2241A	1-C
	Location and Surveys	

SURVEY CONTROL SHEET R-2241A

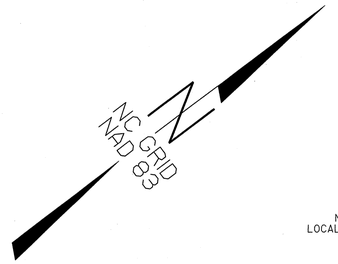


GPS CONTROL NETWORK

NOT TO SCALE

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "JKA PANEL 13" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 300205.115(m) EASTING: 616308.868(m) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000077057 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "JKA PANEL 13" TO -L- STATION 10+20.000 IS S40°03'09.54"W 6,729.835 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29



NCGS STATION NORFOLK
LOCALIZED PROJECT COORDINATES
N = 298847.826
E = 613793.670

NCDOT GPS STATION B3013-1
LOCALIZED PROJECT COORDINATES
N = 298978.838
E = 614322.891

-L- STA 81+28.436 END STATE PROJECT
34406.1.1
LOCALIZED PROJECT COORDINATES
N = 300079.649
E = 616452.441

NCGS STATION EXXON
LOCALIZED PROJECT COORDINATES
N = 294990.388
E = 611799.796

-L- STA 10+20.00 BEGIN STATE PROJECT
34406.1.1
LOCALIZED PROJECT COORDINATES
N = 295053.740
E = 611978.278

NCDOT GPS STATION R2241A-1A
LOCALIZED PROJECT COORDINATES
N = 295496.185
E = 612239.235

-L- STA 59+88.133 LB=
-L- STA 59+87.530 LA
LOCALIZED PROJECT COORDINATES
N = 298239.695
E = 615357.887

NCDOT GPS STATION R2241-15
LOCALIZED PROJECT COORDINATES
N = 299369.440
E = 615489.313

NCDOT GPS STATION R2241-14
LOCALIZED PROJECT COORDINATES
N = 299552.9530
E = 615832.4590

NCDOT GPS STATION JKA PANEL-13
LOCALIZED PROJECT COORDINATES
N = 300205.115
E = 616308.868

NCDOT GPS STATION R2241A-1
LOCALIZED PROJECT COORDINATES
N = 294972.303
E = 612053.320

NCDOT GPS STATION R2241A-3
LOCALIZED PROJECT COORDINATES
N = 295711.282
E = 613622.539

NCDOT GPS STATION R2241A-RTK2
LOCALIZED PROJECT COORDINATES
N = 294199.876
E = 612686.977

NCDOT GPS STATION R2241A-4
LOCALIZED PROJECT COORDINATES
N = 295714.635
E = 613890.990

NCDOT GPS STATION R2241A-5
LOCALIZED PROJECT COORDINATES
N = 298207.115
E = 615547.090

NCDOT GPS STATION R2241A-6
LOCALIZED PROJECT COORDINATES
N = 298310.817
E = 615413.670

NCDOT GPS STATION PANEL-14
LOCALIZED PROJECT COORDINATES
N = 300180.258
E = 617286.026

NCDOT GPS STATION R2241A-RTK1
LOCALIZED PROJECT COORDINATES
N = 296288.412
E = 615418.035

NOTES:

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:

HTTP:\WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT

R2241A_LS_GPSCALIB_050112.HTML
R2241A_LS_WGS84_050112.TXT
R2241A_LS_LOCAL_050112.TXT
R2241A_LS_CONTROL_070420.TXT

IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

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

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

12/11/2012
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stephens

SURVEY CONTROL SHEET 34406.1.1

METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2241A	1-D
	Location and Surveys	

GPS Calibration Report

Project : 34406.1.1 TIP Number: R2241A

User name A.K. ALFORD Date & Time 3:00:41 PM 12/9/04
Coordinate System US State Plane 1983(at ground) Zone North Carolina 3200
Horizontal Datum NAD 1983 (Conus)
Vertical Datum Geoid Model Geoid99 NC Sub Grid
Coordinate Units Meters
Distance Units Meters
Height Units Meters

LOCAL SITE INFORMATION
Localized around
Latitude 36°27'21.65218"N
Longitude 78°55'30.64699"W
Site Scale Factor 0.9999229490
Height

The North Carolina Department of Transportation uses a Localized Coordinate System which is very similar to North Carolina Zone 3200 from which it is derived.
Please take care in utilizing these coordinates to eliminate confusion of the two systems.
This file is to aid in the use of Real Time Kinematic (RTK) GPS during construction layout.

Datum Transformation Parameters

Datum Transformation computation not requested

Updated Default Projection (Transverse Mercator) Definition

Updated default projection not requested

Horizontal Adjustment Parameters

Northing coordinate of rotation center 298012.185m
Easting coordinate of rotation center 614319.267m
Rotation about the center point 0°00'01"
Translation north 0.011m
Translation east -0.014m
Scale factor 1.00000246

Vertical Adjustment Parameters

Northing coordinate of origin point 304242.368m
Easting coordinate of origin point 616411.587m
Vertical separation at origin -0.027m
Slope north 0.974ppm
Slope east 0.981ppm

Geoid Model Definition

Geoid99 NC Sub Grid

Residual Differences Between GPS (WGS84) And Local Coordinates

Summary

	Maximum error	Root Mean Square error	Point
Horizontal	0.047m	0.032	R2241A-1 - WGS84
Vertical	0.057m	0.028	RTK1 - WGS84
Three-dimensional	0.067m	0.042	PANEL17 - WGS84

Point Residuals

WGS84 Coordinates	Calculated point FOR DISPLAY ONLY	Local Coordinates
Point PANEL17 - WGS84 Latitude 36°29'32.62191"N Longitude 78°55'26.39854"W Height 144.794m	Northing 304242.368m Easting 616411.587m Elevation 175.832m Horz error 0.044m Vert error 0.050m 3D error 0.067m	Point PANEL17 - Local Northing 304242.382m Easting 616411.545m Elevation 175.882m Utilized Horz and Vert Quality Survey quality
Point BURKE - WGS84 Latitude 36°28'56.67474"N Longitude 78°57'31.41250"W Height 137.656m	Northing 303132.458m Easting 613300.488m Elevation 168.669m Horz error 0.028m Vert error 0.012m 3D error 0.030m	Point BURKE - Local Northing 303132.431m Easting 613300.481m Elevation 168.681m Utilized Horz and Vert Quality Survey quality
Point PANEL14 - WGS84 Latitude 36°27'20.81927"N Longitude 78°54'51.40479"W Height 142.845m	Northing 300180.234m Easting 617286.059m Elevation 173.849m Horz error 0.041m Vert error 3D error 0.041m	Point PANEL14 - Local Northing 300180.258m Easting 617286.026m Elevation 173.953m Utilized Horizontal Quality Survey quality
Point R2241D-14 - WGS8 Latitude 36°27'00.50625"N Longitude 78°55'49.79893"W Height 144.014m	Northing 299552.958m Easting 615832.420m Elevation 174.998m Horz error 0.039m Vert error 0.040m 3D error 0.056m	Point R2241D-14 - Local Northing 299552.953m Easting 615832.459m Elevation 174.958m Utilized Horz and Vert Quality Survey quality

Point Residuals

WGS84 Coordinates	Calculated point FOR DISPLAY ONLY	Local Coordinates
Point R2241D-15 - WGS8 Latitude 36°26'54.56036"N Longitude 78°56'03.58333"W Height 136.926m	Northing 299369.445m Easting 615489.271m Elevation 167.906m Horz error 0.042m Vert error 0.032m 3D error 0.053m	Point R2241D-15 - Local Northing 299369.440m Easting 615489.313m Elevation 167.874m Utilized Horz and Vert Quality Survey quality
Point R2241A-6 - WGS84 Latitude 36°26'20.21850"N Longitude 78°56'06.64752"W Height 159.109m	Northing 298310.819m Easting 615413.649m Elevation 190.080m Horz error 0.021m Vert error 0.015m 3D error 0.026m	Point R2241A-6 - Local Northing 298310.817m Easting 615413.670m Elevation 190.065m Utilized Horz and Vert Quality Survey quality
Point R2241A-5 - WGS84 Latitude 36°26'16.85095"N Longitude 78°56'01.29273"W Height 161.347m	Northing 298207.103m Easting 615547.085m Elevation 192.318m Horz error 0.013m Vert error 0.008m 3D error 0.015m	Point R2241A-5 - Local Northing 298207.115m Easting 615547.090m Elevation 192.326m Utilized Horz and Vert Quality Survey quality
Point B3013-1 - WGS84 Latitude 36°26'41.91138"N Longitude 78°56'50.42933"W Height 132.694m	Northing 298978.854m Easting 614322.856m Elevation 163.662m Horz error 0.038m Vert error 0.031m 3D error 0.049m	Point B3013-1 - Local Northing 298978.838m Easting 614322.891m Elevation 163.631m Utilized Horz and Vert Quality Survey quality
Point NORFOLK - WGS84 Latitude 36°26'37.66990"N Longitude 78°57'11.68214"W Height 139.708m	Northing 298847.849m Easting 613793.629m Elevation 170.672m Horz error 0.047m Vert error 0.038m 3D error 0.060m	Point NORFOLK - Local Northing 298847.826m Easting 613793.670m Elevation 170.634m Utilized Horz and Vert Quality Survey quality
Point RTK1 - WGS84 Latitude 36°25'14.60765"N Longitude 78°56'06.52324"W Height 187.819m	Northing 296288.403m Easting 615418.056m Elevation 218.771m Horz error 0.023m Vert error 0.057m 3D error 0.061m	Point RTK1 - Local Northing 296288.412m Easting 615418.035m Elevation 218.828m Utilized Horz and Vert Quality Survey quality
Point R2241A-3 - WGS84 Latitude 36°24'55.91670"N Longitude 78°57'18.60876"W Height 177.441m	Northing 295711.284m Easting 613622.525m Elevation 208.369m Horz error 0.014m Vert error 0.013m 3D error 0.019m	Point R2241A-3 - Local Northing 295711.282m Easting 613622.539m Elevation 208.356m Utilized Horz and Vert Quality Survey quality
Point R2241A-4 - WGS84 Latitude 36°24'56.02115"N Longitude 78°57'07.83307"W Height 182.094m	Northing 295714.628m Easting 613890.984m Elevation 213.025m Horz error 0.009m Vert error 0.003m 3D error 0.010m	Point R2241A-4 - Local Northing 295714.635m Easting 613890.990m Elevation 213.028m Utilized Horz and Vert Quality Survey quality
Point R2241A-1A - WGS84 Latitude 36°24'48.955501"N Longitude 78°58'14.13387"W Height 144.020m	Northing 295496.184m Easting 612239.262m Elevation 174.933m Horz error 0.027m Vert error 0.003m 3D error 0.027m	Point R2241A-1A - Local Northing 295496.185m Easting 612239.235m Elevation 174.936m Utilized Horz and Vert Quality Survey quality
Point EXXON - WGS84 Latitude 36°24'32.54982"N Longitude 78°58'31.77764"W Height 156.711m	Northing 294990.391m Easting 611799.805m Elevation 187.613m Horz error 0.010m Vert error 0.001m 3D error 0.010m	Point EXXON - Local Northing 294990.388m Easting 611799.796m Elevation 187.614m Utilized Horz and Vert Quality Survey quality
Point R2241A-1 - WGS84 Latitude 36°24'31.96042"N Longitude 78°58'21.60106"W Height 156.807m	Northing 294972.288m Easting 612053.365m Elevation 187.712m Horz error 0.047m Vert error 0.018m 3D error 0.051m	Point R2241A-1 - Local Northing 294972.303m Easting 612053.320m Elevation 187.730m Utilized Horz and Vert Quality Survey quality
Point RTK2 - WGS84 Latitude 36°24'06.89535"N Longitude 78°57'56.18059"W Height 172.226m	Northing 294199.875m Easting 612686.995m Elevation 203.128m Horz error 0.018m Vert error 0.017m 3D error 0.025m	Point RTK2 - Local Northing 294199.876m Easting 612686.977m Elevation 203.145m Utilized Horz and Vert Quality Survey quality

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "JKA PANEL 13" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 300205.115(m) EASTING: 616308.868(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000077057
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "JKA PANEL 13" TO -L- STATION 10+20.000 IS
S40°03'09.54"W 67.29.835
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NOTES

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

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

   THE FILES TO BE FOUND ARE AS FOLLOWS:

   R2241A_LS_GPSCALIB_050112.HTML
   R2241A_LS_WGS84_050112.TXT
   R2241A_LS_LOCAL_050112.TXT
   R2241A_LS_CONTROL_070420.TXT

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

12/11/2007
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stephesc

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	1-E
Location and Surveys	

SURVEY CONTROL SHEET R-2241A

CONTROL DATA

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
101	R2241-A BL-1	295027.2218	611912.4296	185.659	OUTSIDE PROJECT LIMITS	
102	R2241-A BL-2	295060.2648	612093.3620	184.627	11+34.439	13.809 RT
103	R2241-A BL-3	295089.5978	612243.8971	178.950	12+87.786	11.399 RT
104	R2241-A BL-4	295122.8096	612405.2369	178.646	14+52.452	7.069 RT
105	R2241-A BL-5	295151.3298	612557.2056	185.032	16+07.068	5.711 RT
106	R2241-A BL-6	295173.4547	612705.0044	186.706	17+56.796	6.672 RT
107	R2241-A BL-7	295202.9046	612942.2921	177.798	19+93.610	17.694 RT
108	R2241-A BL-8	295296.3316	613171.0973	186.698	22+39.613	1.103 LT
109	R2241-A BL-9	295337.4862	613326.6968	194.993	24+00.326	7.632 RT
110	R2241-A BL-10	295431.2322	613494.9323	197.394	25+93.857	17.433 LT
111	R2241-A BL-11	295510.5525	613604.6543	206.555	27+33.424	11.790 LT
112	R2241-A BL-12	295565.6544	613654.0884	207.382	28+07.991	13.061 LT
113	R2241-A BL-13	295714.4582	613777.7756	209.765	30+01.328	20.927 LT
114	R2241-A BL-14	295784.4188	613890.0341	212.558	31+27.775	16.681 RT
115	R2241-A BL-15	295826.6986	613949.7535	207.560	31+95.595	38.398 RT
116	R2241-A BL-16	295943.9798	614001.8048	203.610	33+19.061	21.592 RT
117	R2241-A BL-17	296049.0994	614055.6388	199.795	34+36.935	20.659 RT
118	R2241-A BL-18	296139.7099	614108.7771	194.969	35+41.845	25.947 RT
119	R2241-A BL-19	296258.6454	614177.4699	200.579	36+79.061	31.951 RT
120	R2241-A BL-20	296383.3132	614251.0494	200.824	38+23.779	39.584 RT
121	R2241-A BL-21	296469.0177	614303.6803	206.967	39+24.792	45.556 RT
122	R2241-A BL-22	296544.3318	614345.1867	200.614	40+11.349	45.469 RT
123	R2241-A BL-23	296606.8985	614383.9037	195.141	40+85.369	48.261 RT
124	R2241-A BL-24	296665.4499	614420.2446	202.791	41+54.741	50.263 RT
125	R2241-A BL-25	296839.6667	614524.1180	210.421	43+59.016	48.574 RT
126	R2241-A BL-26	296976.8966	614605.7607	210.126	45+19.041	43.621 RT
127	R2241-A BL-27	297131.8453	614698.0460	200.189	46+99.296	37.805 RT
128	R2241-A BL-28	297230.8963	614756.8655	197.788	48+14.431	33.941 RT
129	R2241-A BL-29	297445.5857	614887.1390	189.300	50+65.481	27.910 RT
130	R2241-A BL-30	297574.1622	614959.2263	193.043	52+12.636	19.302 RT
131	R2241-A BL-31	297737.3398	615057.5745	193.063	54+03.090	14.156 RT
132	R2241-A BL-32	297814.8447	615103.9836	195.809	54+93.387	11.456 RT
133	R2241-A BL-33	297971.4728	615197.7027	190.931	56+75.829	5.942 RT
134	R2241-A BL-34	298052.2877	615246.0933	184.939	57+69.977	3.135 RT
135	R2241-A BL-35	298126.9152	615294.0828	192.204	58+58.653	4.022 RT
136	R2241-A BL-36	298217.1965	615357.7820	196.880	59+68.775	11.439 RT
6	GPS R2241A-6	298310.8170	615413.6700	190.065	60+77.173	11.580 RT
137	R2241-A BL-37	298382.9643	615445.3117	190.639	61+55.356	1.888 RT
138	R2241-A BL-38	298431.8083	615478.7966	188.296	62+14.453	5.694 RT
139	R2241-A BL-39	298516.9128	615524.3892	182.787	63+10.904	1.367 RT
140	R2241-A BL-40	298619.0961	615584.1961	175.319	64+29.300	0.525 RT
141	R2241-A BL-41	298748.0950	615666.2124	169.468	65+82.096	5.060 RT
142	R2241-A BL-42	298830.7248	615709.9227	168.953	66+75.458	0.381 RT
143	R2241-A BL-43	299011.8942	615805.0989	166.797	68+79.820	10.446 LT
144	R2241-A BL-44	299288.0772	615975.5485	173.494	72+04.322	5.158 LT
145	R2241-A BL-45	299531.6992	616122.5571	171.855	74+88.857	3.368 LT
146	R2241-A BL-46	299706.4575	616225.6506	170.304	76+91.757	4.113 LT
172	R2241-A BY17-2	299830.4890	616270.7940	171.212	78+21.433	28.727 LT
4000	BL-4 (R2241B)	299948.0810	616353.6110	171.738	79+64.835	17.672 LT
182	R2241-A BY18-2	300090.6100	616438.5380	171.652	81+30.748	17.552 LT
3000	BL-3 (R2241B)	300321.5770	616576.1270	170.010	83+99.591	17.388 LT
191	R2241-A BY19-1	300529.0970	616697.4810	170.502	86+39.983	19.189 LT

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
208	R2241-A BY1-1	295349.0473	612195.7253	175.970	11+00.444	6.198 LT
201	R2241-A BY1-2	295205.4643	612142.7886	180.755	12+53.507	8.729 LT
					Y2 STATION	OFFSET
102	R2241-A BL-2	295060.2648	612093.3620	184.627	14+06.700	14.376 LT
202	R2241-A BY1-3	294938.3536	612038.9173	189.091	OUTSIDE PROJECT LIMITS	
205	R2241-A BY1-4	294789.9469	611963.8065	194.524	OUTSIDE PROJECT LIMITS	

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
384	R2241-A BY2-1	295242.4296	612234.5414	178.233	OUTSIDE PROJECT LIMITS	
380	R2241-A BY2-2	295100.4855	612207.7279	181.143	10+96.447	2.827 RT
385	R2241-A BY2-3	294946.9319	612160.2306	183.026	OUTSIDE PROJECT LIMITS	

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
103	R2241-A BL-3	295089.5978	612243.8971	178.950	10+14.165	12.179 RT
381	R2241-A BY3-1	294937.6018	612213.2083	177.858	OUTSIDE PROJECT LIMITS	

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
106	R2241-A BL-6	295173.4547	612705.0044	186.706	10+09.726	17.643 LT
388	R2241-A BY4-1	295092.7840	612694.8031	190.797	10+87.721	5.044 RT
391	R2241-A BY4-2	295014.0935	612706.2553	193.170	11+67.241	4.986 RT

BY5

POINT	DESC.	NORTH	EAST	ELEVATION	Y6 STATION	OFFSET
395	R2241-A BY5-1	295340.9703	612721.0415	188.804	10+01.811	3.400 LT
393	R2241-A BY5-2	295262.0301	612748.2722	189.144	10+85.088	4.053 LT
389	R2241-A BY5-3	295191.0252	612766.5154	185.006	11+58.309	3.707 LT
106	R2241-A BL-6	295173.4547	612705.0044	186.706	11+59.850	60.246 RT

BY6

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
313	R2241-A BY6-1	295334.0006	613311.0560	194.399	23+84.372	6.134 RT
109	R2241-A BL-9	295337.4862	613326.6968	194.993	24+00.326	7.632 RT
302	R2241-A BY6-2	295423.8871	613557.5869	200.094	26+42.095	22.971 RT
304	R2241-A BY6-3	295468.6278	613691.7541	206.795	27+62.458	80.140 RT
					Y8 STATION	OFFSET
306	R2241-A BY6-4	295517.0847	613826.2920	206.583	15+55.309	12.441 RT
308	R2241-A BY6-5	295542.5770	613929.3724	208.864	16+60.694	4.978 RT
311	R2241-A BY6-6	295568.0034	614112.4937	210.894	OUTSIDE PROJECT LIMITS	

BY7

POINT	DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
327	R2241-A BY7-1	296277.3170	613824.7521	211.189	OUTSIDE PROJECT LIMITS	
325	R2241-A BY7-2	296164.7030	613876.7607	211.732	16+79.532	4.087 RT
323	R2241-A BY7-3	296014.9294	613921.9036	209.912	15+23.635	5.154 RT
316	R2241-A BY7-4	295890.9426	613910.8106	212.052	14+03.779	17.788 RT
					L STATION	OFFSET
114	R2241-A BL-14	295784.4188	613890.0341	212.558	31+27.775	16.681 RT
					Y11 STATION	OFFSET
4	R2241A 4	295714.6340	613890.9890	213.028	OUTSIDE PROJECT LIMITS	
319	R2241-A BY7-5	295629.4373	613868.8619	212.015	10+09.237	4.455 LT
					Y10 STATION	OFFSET
306	R2241-A BY6-4	295517.0847	613826.2920	206.583	10+12.478	0.490 LT

BY8

POINT	DESC.	NORTH	EAST	ELEVATION	Y10 STATION	OFFSET
306	R2241-A BY6-4	295517.0847	613826.2920	206.583	10+12.478	0.490 LT
309	R2241-A BY8-1	295396.2589	613828.1209	202.121	OUTSIDE PROJECT LIMITS	

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	Y7 STATION	OFFSET
334	R2241-A BY9-1	295715.7226	613360.4024	197.893	10+26.990	4.059 RT
332	R2241-A BY9-2	295720.0852	613500.9663	202.302	11+67.982	0.375 RT
					Y9 STATION	OFFSET
3	R2241A 3	295711.2810	613622.5380	208.356	10+50.035	2.823 RT
					L STATION	OFFSET
113	R2241-A BL-13	295714.4582	613777.7756	209.765	30+01.328	20.927 LT

BY10

POINT	DESC.	NORTH	EAST	ELEVATION	Y12 STATION	OFFSET
345	R2241-A BY10-1	297315.1979	614450.9719	206.922	OUTSIDE PROJECT LIMITS	
337	R2241-A BY10-2	297244.3135	614575.6465	207.632	OUTSIDE PROJECT LIMITS	
					Y13 STATION	OFFSET
127	R2241-A BL-27	297131.8453	614698.0460	200.189	11+63.317	4.345 LT
338	R2241-A BY10-3	297038.2923	614799.5555	201.965	13+01.362	4.168 LT
340	R2241-A BY10-4	296950.3055	614896.6015	205.799	OUTSIDE PROJECT LIMITS	

BY11

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
343	R2241-A BY11-1	297091.4500	614970.8134	204.011	48+12.336	289.312 RT
340	R2241-A BY10-4	296950.3055	614896.6015	205.799	46+53.451	302.907 RT
342	R2241-A BY11-2	296817.2632	614831.8933	209.966	45+06.514	320.138 RT

BY12

POINT	DESC.	NORTH	EAST	ELEVATION	Y14 STATION	OFFSET
356	R2241-A BY12-1	298500.3103	615153.5071	180.777	OUTSIDE PROJECT LIMITS	
348	R2241-A BY12-2	298406.7418	615287.9504	184.218	OUTSIDE PROJECT LIMITS	
					Y15 STATION	OFFSET
6	R2241A 6	298310.8170	615413.6700	190.065	11+33.574	5.682 LT
5	R2241A 5	298207.1150	615547.0900	192.326	OUTSIDE PROJECT LIMITS	
351	R2241-A BY12-3	298127.0775	615658.9970	192.600	OUTSIDE PROJECT LIMITS	

BY13

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
354	R2241-A BY13-1	298276.1547	615710.5199	186.132	61+99.150	284.422 RT
351	R2241-A BY12-3	298127.0775	615658.9970	192.600	60+44.688	316.359 RT
353	R2241-A BY13-2	297988.0993	615608.5592	196.946	59+04.193	344.593 RT

BY14

POINT	DESC.	NORTH	EAST	ELEVATION	Y16 STATION	OFFSET
142	R2241-A BL-42	298830.7248	615709.9227	168.953	OUTSIDE PROJECT LIMITS	
361	R2241-A BY14-1	298729.7618	615728.5459	171.624	11+18.134	4.076 RT
363	R2241-A BY14-2	298613.1908	615725.2755	174.903	10+01.518	3.927 RT

BY17

POINT	DESC.	NORTH	EAST	ELEVATION	Y17 STATION	OFFSET
14	R2241-14	299552.9520	615832.4590	174.958	OUTSIDE PROJECT LIMITS	
171	R2241-A BY17-1	299674.5660	616059.4740	173.314	11+88.405	14.957 LT
172	R2241-A BL-172	299830.4890	616270.7940	171.212	12+97.417	215.361 LT

BY18

POINT	DESC.	NORTH	EAST	ELEVATION	Y18 STATION	OFFSET
182	R2241-A BY18-2	300090.610	616438.538	169.107	OUTSIDE PROJECT LIMITS	
181	R2241-A BY18-1	300072.809	616538.617	171.652	10+81.400	4.409RT

****
409 ELEVATION = 206.800
N 296961 E 614684
L STATION 45+48 118 RIGHT
SPIKE SET IN A 380MM PINE
****
410 ELEVATION = 205.102
N 297179 E 614627
L STATION 47+01 47 LEFT
SPIKE SET IN A 355MM PINE
****
411 ELEVATION = 190.875
N 297591 E 614920
L STATION 52+05 23 LEFT
SPIKE SET IN A 305MM GUM
****
412 ELEVATION = 197.374
N 298209 E 615409
L STATION 59+88 59 RIGHT
SPIKE SET IN A 355MM TWIN CHERRY
****
413 ELEVATION = 171.375
N 298765 E 615615
L STATION 65+70 47 LEFT
SPIKE SET IN A 710MM OAK
****
414 ELEVATION = 170.089
N 298814 E 615753
L STATION 66+83 46 RIGHT
SPIKE SET IN A 480MM OAK
****
415 ELEVATION = 172.493
N 299473 E 616116
L STATION 74+35 21 RIGHT
SPIKE SET IN A 355MM OAK
****
416 ELEVATION = 173.944
N 299888 E 616232
L STATION 78+51 92 LEFT
SPIKE SET IN A 810MM OAK
****

****
401 ELEVATION = 185.993
N 295022 E 611904
L STATION 9+98
S 61° 36′ 27.6" W DIST 59.592
NAIL SET IN POWER POLE
****
402 ELEVATION = 180.597
N 295121 E 612224
L STATION 12+73 23 LEFT
NAIL SET IN POWER POLE
****
403 ELEVATION = 187.624
N 295183 E 612647
L STATION 17+00 10 LEFT
NAIL SET IN POWER POLE
****
404 ELEVATION = 197.581
N 295333 E 613339
L STATION 24+10 16 RIGHT
NAIL SET IN A 380MM PINE
****
405 ELEVATION = 204.997
N 295495 E 613807
L STATION 28+58 148 RIGHT
NAIL SET IN A 430MM GUM
****
406 ELEVATION = 214.094
N 295706 E 613899
L STATION 30+76 75 RIGHT
NAIL SET IN A 455MM PINE
****
407 ELEVATION = 207.666
N 295804 E 613983
L STATION 31+96 79 RIGHT
NAIL SET IN A 380MM PINE
****
408 ELEVATION = 204.273
N 296423 E 614232
L STATION 38+50 4 RIGHT
SPIKE SET IN A 510MM OAK
****

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "JKA PANEL 13" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 300205.115(m) EASTING: 616308.868(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000077057
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "JKA PANEL 13" TO -L- STATION 10+20.000 IS S40°03′09.54″W 6,729.835
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NOTES

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

2. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   THE FILES TO BE FOUND ARE AS FOLLOWS:

   R2241A_LS_GPSCALIB_050112.HTML
   R2241A_LS_WGS84_050112.TXT
   R2241A_LS_LOCAL_050112.TXT
   R2241A_LS_CONTROL_070420.TXT

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

12/11/2012
r:\roadway\proj\sheets\r2241a_ls_1E.dgn
stephesc
stephesc

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	1-F
R /W SHEET NO.	

METRIC

NOT TO SCALE

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN

12-12-12

CENTERLINE COORDINATE LIST

Point #	Chain	Station	Northing (Y)	Easting (X)
1	L	10+00.00	295050.2234	611958.5896
2	L	10+20.00	295053.7396	611978.2781
3	L	10+40.00	295057.2558	611997.9666
4	L	10+60.00	295060.7720	612017.6551
5	L	10+80.00	295064.2882	612037.3436
6	L	11+00.00	295067.8043	612057.0321
7	L	11+20.00	295071.3205	612076.7205
8	L	11+40.00	295074.8367	612096.4090
9	L	11+60.00	295078.3529	612116.0975
10	L	11+80.00	295081.8691	612135.7860
11	L	12+00.00	295085.3853	612155.4745
12	L	12+20.00	295088.9015	612175.1630
13	L	12+40.00	295092.4177	612194.8514
14	L	12+60.00	295095.9339	612214.5399
15	L	12+80.00	295099.4501	612234.2284
16	L	13+00.00	295102.9663	612253.9169
17	L	13+20.00	295106.4825	612273.6054
18	L	13+40.00	295109.9987	612293.2939
19	L	13+60.00	295113.5149	612312.9823
20	L	13+80.00	295117.0310	612332.6708
21	L	14+00.00	295120.5472	612352.3593
22	L	14+20.00	295124.0634	612372.0478
23	L	14+40.00	295127.5796	612391.7363
24	L	14+60.00	295131.0958	612411.4248
25	L	14+80.00	295134.6120	612431.1132
26	L	15+00.00	295138.1282	612450.8017
27	L	15+20.00	295141.6444	612470.4902
28	L	15+40.00	295145.1606	612490.1787
29	L	15+60.00	295148.6768	612509.8672
30	L	15+80.00	295152.1930	612529.5557
31	L	16+00.00	295155.7092	612549.2441
32	L	16+20.00	295159.2254	612568.9326
33	L	16+40.00	295162.7406	612588.6213
34	L	16+60.00	295166.1392	612608.3303
35	L	16+80.00	295169.3406	612628.0723
36	L	17+00.00	295172.3444	612647.8454
37	L	17+20.00	295175.1503	612667.6475
38	L	17+40.00	295177.8241	612687.4680
39	L	17+60.00	295180.4945	612707.2889
40	L	17+80.00	295183.1649	612727.1098
41	L	18+00.00	295185.8353	612746.9307
42	L	18+20.00	295188.5057	612766.7517
43	L	18+40.00	295191.1761	612786.5726
44	L	18+60.00	295193.8466	612806.3935
45	L	18+80.00	295196.5324	612826.2123
46	L	19+00.00	295199.4148	612846.0033
47	L	19+20.00	295202.7584	612865.7211
48	L	19+40.00	295206.6625	612885.3357
49	L	19+60.00	295211.1254	612904.8307
50	L	19+80.00	295216.1434	612924.1903
51	L	20+00.00	295221.7089	612943.3996
52	L	20+20.00	295227.6963	612962.4822
53	L	20+40.00	295233.8435	612981.5140
54	L	20+60.00	295239.9992	613000.5431
55	L	20+80.00	295246.1550	613019.5722
56	L	21+00.00	295252.3107	613038.6013
57	L	21+20.00	295258.4665	613057.6304
58	L	21+40.00	295264.6222	613076.6595
59	L	21+60.00	295270.7780	613095.6886
60	L	21+80.00	295276.9337	613114.7177
61	L	22+00.00	295283.0895	613133.7468
62	L	22+20.00	295289.2452	613152.7759
63	L	22+40.00	295295.4010	613171.8050
64	L	22+60.00	295301.5567	613190.8342
65	L	22+80.00	295307.7125	613209.8633
66	L	23+00.00	295313.8682	613228.8924
67	L	23+20.00	295320.0240	613247.9215
68	L	23+40.00	295326.1797	613266.9506
69	L	23+60.00	295332.3355	613285.9797
70	L	23+80.00	295338.4912	613305.0088
71	L	24+00.00	295344.6470	613324.0379
72	L	24+20.00	295350.8027	613343.0670
73	L	24+40.00	295356.9630	613362.0946
74	L	24+60.00	295363.2029	613381.0962
75	L	24+80.00	295369.6527	613400.0275
76	L	25+00.00	295376.4424	613418.8393
77	L	25+20.00	295383.6998	613437.4754
78	L	25+40.00	295391.5484	613455.8699
79	L	25+60.00	295400.0936	613473.9510
80	L	25+80.00	295409.3550	613491.6759
81	L	26+00.00	295419.3178	613509.0163
82	L	26+20.00	295429.9660	613525.9445
83	L	26+40.00	295441.2827	613542.4333
84	L	26+60.00	295453.2497	613558.4563
85	L	26+80.00	295465.8478	613573.9880
86	L	27+00.00	295479.0549	613589.0053
87	L	27+20.00	295492.8001	613603.5324
88	L	27+40.00	295506.9692	613617.6466
89	L	27+60.00	295521.4545	613631.4367
90	L	27+80.00	295536.1542	613644.9981
91	L	28+00.00	295550.9718	613658.4308
92	L	28+20.00	295565.8196	613671.8302
93	L	28+40.00	295580.6676	613685.2293
94	L	28+60.00	295595.5156	613698.6284
95	L	28+80.00	295610.3636	613712.0276
96	L	29+00.00	295625.2116	613725.4267
97	L	29+20.00	295640.0597	613738.8258
98	L	29+40.00	295654.9077	613752.2249
99	L	29+60.00	295669.7557	613765.6240
100	L	29+80.00	295684.6037	613779.0232
101	L	30+00.00	295699.4517	613792.4223
102	L	30+20.00	295714.2997	613805.8214
103	L	30+40.00	295729.1478	613819.2205
104	L	30+60.00	295743.9977	613832.6175
105	L	30+80.00	295758.8890	613845.9685
106	L	31+00.00	295773.8938	613859.1916
107	L	31+20.00	295789.0836	613872.2017
108	L	31+40.00	295804.5243	613884.9127
109	L	31+60.00	295820.2424	613897.2788
110	L	31+80.00	295836.2315	613909.2927
111	L	32+00.00	295852.4836	613920.9483
112	L	32+20.00	295868.9907	613932.2399
113	L	32+40.00	295885.7446	613943.1619
114	L	32+60.00	295902.7371	613953.7089
115	L	32+80.00	295919.9597	613963.8758
116	L	33+00.00	295937.3918	613973.6792
117	L	33+20.00	295954.9796	613983.2010
118	L	33+40.00	295972.6667	613992.5371
119	L	33+60.00	295990.4002	614001.7851
120	L	33+80.00	296008.1398	614011.0213
121	L	34+00.00	296025.8794	614020.2575
122	L	34+20.00	296043.6189	614029.4937
123	L	34+40.00	296061.3585	614038.7298
124	L	34+60.00	296079.0981	614047.9660
125	L	34+80.00	296096.8377	614057.2022
126	L	35+00.00	296114.5773	614066.4384
127	L	35+20.00	296132.3169	614075.6746
128	L	35+40.00	296150.0565	614084.9108
129	L	35+60.00	296167.7960	614094.1469
130	L	35+80.00	296185.5356	614103.3831
131	L	36+00.00	296203.2752	614112.6193
132	L	36+20.00	296221.0148	614121.8555
133	L	36+40.00	296238.7544	614131.0917
134	L	36+60.00	296256.4940	614140.3278
135	L	36+80.00	296274.2336	614149.5640
136	L	37+00.00	296291.9732	614158.8002
137	L	37+20.00	296309.7127	614168.0364
138	L	37+40.00	296327.4523	614177.2726
139	L	37+60.00	296345.1919	614186.5088
140	L	37+80.00	296362.9315	614195.7449
141	L	38+00.00	296380.6704	614204.9825
142	L	38+20.00	296398.3906	614214.2558
143	L	38+40.00	296416.0842	614223.5797
144	L	38+60.00	296433.7511	614232.9541
145	L	38+80.00	296451.3912	614242.3790
146	L	39+00.00	296469.0043	614251.8542
147	L	39+20.00	296486.5902	614261.3797
148	L	39+40.00	296504.1488	614270.9554
149	L	39+60.00	296521.6800	614280.5812
150	L	39+80.00	296539.1837	614290.2571
151	L	40+00.00	296556.6596	614299.9829
152	L	40+20.00	296574.1076	614309.7587
153	L	40+40.00	296591.5277	614319.5842
154	L	40+60.00	296608.9196	614329.4595
155	L	40+80.00	296626.2832	614339.3844
156	L	41+00.00	296643.6184	614349.3589
157	L	41+20.00	296660.9250	614359.3829
158	L	41+40.00	296678.2030	614369.4563
159	L	41+60.00	296695.4520	614379.5790
160	L	41+80.00	296712.6721	614389.7510
161	L	42+00.00	296729.8630	614399.9721
162	L	42+20.00	296747.0247	614410.2423
163	L	42+40.00	296764.1569	614420.5615
164	L	42+60.00	296781.2596	614430.9296
165	L	42+80.00	296798.3326	614441.3465
166	L	43+00.00	296815.3758	614451.8122
167	L	43+20.00	296832.3890	614462.3265
168	L	43+40.00	296849.3721	614472.8894
169	L	43+60.00	296866.3250	614483.5007
170	L	43+80.00	296883.2474	614494.1605
171	L	44+00.00	296900.1393	614504.8685
172	L	44+20.00	296917.0006	614515.6248
173	L	44+40.00	296933.8449	614526.4076
174	L	44+60.00	296950.6892	614537.1905
175	L	44+80.00	296967.5334	614547.9734
176	L	45+00.00	296984.3777	614558.7563
177	L	45+20.00	297001.2220	614569.5392
178	L	45+40.00	297018.0662	614580.3221
179	L	45+60.00	297034.9105	614591.1050
180	L	45+80.00	297051.7547	614601.8879
181	L	46+00.00	297068.5990	614612.6708
182	L	46+20.00	297085.4433	614623.4537
183	L	46+40.00	297102.2875	614634.2366
184	L	46+60.00	297119.1318	614645.0195
185	L	46+80.00	297135.9761	614655.8024
186	L	47+00.00	297152.8203	614666.5853
187	L	47+20.00	297169.6646	614677.3682
188	L	47+40.00	297186.5088	614688.1511
189	L	47+60.00	297203.3531	614698.9340
190	L	47+80.00	297220.1974	614709.7169
191	L	48+00.00	297237.0416	614720.4998
192	L	48+20.00	297253.8859	614731.2827
193	L	48+40.00	297270.7302	614742.0655
194	L	48+60.00	297287.5744	614752.8484
195	L	48+80.00	297304.4187	614763.6313
196	L	49+00.00	297321.2629	614774.4142
197	L	49+20.00	297338.1072	614785.1971
198	L	49+40.00	297354.9515	614795.9800
199	L	49+60.00	297371.7957	614806.7629
200	L	49+80.00	297388.6400	614817.5458
201	L	50+00.00	297405.4842	614828.3287
202	L	50+20.00	297422.3285	614839.1116
203	L	50+40.00	297439.1728	614849.8945
204	L	50+60.00	297456.0170	614860.6774
205	L	50+80.00	297472.8613	614871.4603
206	L	51+00.00	297489.7056	614882.2432
207	L	51+20.00	297506.5498	614893.0261
208	L	51+40.00	297523.3941	614903.8090
209	L	51+60.00	297540.2383	614914.5919
210	L	51+80.00	297557.0826	614925.3748
211	L	52+00.00	297573.9269	614936.1577
212	L	52+20.00	297590.7711	614946.9406
213	L	52+40.00	297607.6154	614957.7235
214	L	52+60.00	297624.4597	614968.5064
215	L	52+80.00	297641.3039	614979.2892
216	L	53+00.00	297658.1482	614990.0721
217	L	53+20.00	297674.9924	615000.8550
218	L	53+40.00	297691.8367	615011.6379
219	L	53+60.00	297708.6810	615022.4208
220	L	53+80.00	297725.5252	615033.2037
221	L	54+00.00	297742.3695	615043.9866
222	L	54+20.00	297759.2138	615054.7695
223	L	54+40.00	297776.0580	615065.5524
224	L	54+60.00	297792.9023	615076.3353
225	L	54+80.00	297809.7465	615087.1182
226	L	55+00.00	297826.5908	615097.9011
227	L	55+20.00	297843.4351	615108.6840
228	L	55+40.00	297860.2793	615119.4669
229	L	55+60.00	297877.1236	615130.2498
230	L	55+80.00	297893.9679	615141.0327
231	L	56+00.00	297910.8121	615151.8156
232	L	56+20.00	297927.6564	615162.5985
233	L	56+40.00	297944.5006	615173.3814
234	L	56+60.00	297961.3449	615184.1643
235	L	56+80.00	297978.1892	615194.9472
236	L	57+00.00	297995.0334	615205.7300
237	L	57+20.00	298011.8777	615216.5129
238	L	57+40.00	298028.7219	615227.2958
239	L	57+60.00	298045.5663	615238.0786
240	L	57+80.00	298062.4279	615248.8344
241	L	58+00.00	298079.3202	615259.5418
242	L	58+20.00	298096.2430	615270.2010
243	L	58+40.00	298113.1962	615280.8118
244	L	58+60.00	298130.1796	615291.3741
245	L	58+80.00	298147.1932	615301.8879
246	L	59+00.00	298164.2367	615312.3530
247	L	59+20.00	298181.3100	615322.7693
248	L	59+40.00	298198.4131	615333.1369
249	L	59+60.00	298215.5457	615343.4555
250	L	59+80.00	298232.7077	615353.7251
251	L	59+99.40	298249.8938	615363.9543
252	L	60+19.40	298267.0824	615374.1795
253	L	60+39.40	298284.2709	615384.4046
254	L	60+59.40	298301.4595	615394.6298
255	L	60+79.40	298318.6480	615404.8549
256	L	60+99.40	298335.8366	615415.0800
257	L	61+19.40	298353.0252	615425.3052
258	L	61+39.40	298370.2137	615435.5303
259	L	61+59.40	298387.4023	615445.7555
260	L	61+79.40	298404.5908	615455.9806
261	L	61+99.40	298421.7794	615466.2058
262	L	62+19.40	298438.9679	615476.4309
263	L	62+39.40	298456.1565	615486.6560
264	L	62+59.40	298473.3450	615496.8812
265	L	62+79.40	298490.5336	615507.1063
266	L	62+99.40	298507.7222	615517.3315
267	L	63+19.40	298524.9107	615527.5566
268	L	63+39.40	298542.0993	615537.7818
269	L	63+59.40	298559.2878	615548.0069
270	L	63+79.40	298576.4764	615558.2320
271	L	63+99.40	298593.6649	615568.4572
272	L	64+19.40	298610.8535	615578.6823
273	L	64+39.40	298628.0420	615588.9075
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276	L	64+99.40	298679.6077	615619.5829
277	L	65+19.40	298696.7963	615629.8080
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279	L	65+59.40	298731.1734	615650.2583
280	L	65+79.40	298748.3619	615660.4835
281	L	65+99.40	298765.5505	615670.7086
282	L	66+19.40	298782.7391	615680.9338
283	L	66+39.40	298799.9276	615691.1589
284	L	66+59.40	298817.1162	615701.3840
285	L	66+79.40	298834.3047	615711.6092
286	L	66+99.40	298851.4933	615721.8343
287	L	67+19.40	298868.6818	615732.0595
288	L	67+39.40	298885.8704	615742.2846
289	L	67+59.40	298903.0589	615752.5098
290	L	67+79.40	298920.2475	615762.7349
291	L	67+99.40	298937.4361	615772.9600
292	L	68+19.40	298954.6246	615783.1852
293	L	68+39.40	298971.8132	615793.4103
294	L	68+59.40	298989.0017	615803.6355
295	L	68+79.40	299006.1903	615813.8606
296	L	68+99.40	299023.3788	615824.0858
297	L	69+19.40	299040.5674	615834.3109
298	L	69+39.40	299057.7559	615844.5360
299	L	69+59.40	299074.9445	615854.7612
300	L	69+79.40	299092.1331	615864.9863
301	L	69+99.40	299109.3216	615875.2115
302	L	70+19.40	299126.5102	615885.4366
303	L	70+39.40	299143.6987	615895.6618
304	L	70+59.40	299160.8873	615905.8869
305	L	70+79.40	299178.0758	615916.1120
306	L	70+99.40	299195.2644	615926.3372
307	L	71+19.40	299212.4529	615936.5623
308	L	71+39.40	299229.6415	615946.7875
309	L	71+59.40	299246.8301	615957.0126
310	L	71+79.40	299264.0186	615967.2378
311	L	71+99.40	299281.2072	615977.4629
312	L	72+19.40	299298.3957	615987.6880
313	L	72+39.40	299315.5843	615997.9132
314	L	72+59.40	299332.7728	616008.1383
315	L	72+79.40	299349.9614	616018.3635
316	L	72+99.40	299367.1499	616028.5886
317	L	73+19.40	299384.3385	616038.8138
318	L	73+39.40	299401.5271	616049.0389
319	L	73+59.40	299418.7156	616059.2640
320	L	73+79.40	299435.9042	616069.4892
321	L	73+99.40	299453.0927	616079.7143
322	L	74+19.40	299470.2813	616089.9395
323	L	74+39.40	299487.4698	616100.1646
324	L	74+59.40	299504.6584	616110.3898
325	L	74+79.40	299521.8470	616120.6149
326	L	74+99.40	299539.0355	616130.8400
327	L	75+19.40	299556.2241	616141.0652
328	L	75+39.40	299573.4126	616151.2903
329	L	75+59.40	299590.6012	616161.5155
330	L	75+79.40	299607.7897	616171.7406
331	L	75+99.40	299624.9783	616181.9658
332	L	76+19.40	299642.1668	616192.1909
333	L	76+39.40	299659.3554	616202.4160
334	L	76+59.40	299676.5440	616212.6412
335	L	76+79.40	299693.7325	616222.8663
336	L	76+99.40	299710.9211	616233.0915
337	L	77+19.40	299728.1096	616243.3166
338	L	77+39.40	299745.2982	616253.5418
339	L	77+59.40	299762.4867	616263.7669
340	L	77+79.40	299779.6753	616273.9920
341	L	77+99.40	299796.8638	616284.2172
342	L	78+19.40	299814.0524	616294.4423
343	L	78+39.40	299831.2410	616304.6675
344	L	78+59.40	299848.4295	616314.8926
345	L	78+79.40	299865.6181	616325.1178
346	L	78+99.40	299882.8066	616335.3429
347	L	79+19.40	299899.9952	616345.5681
348	L	79+39.40	299917.1837	616355.7932
349	L	79+59.40	299934.3723	616366.0183
350	L	79+79.40	299951.5608	616376.2435
351	L	79+99.40	299968.7494	616386.4686
352	L	80+19.40	299985.9380	616396.6938

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stephesc

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NC License Number F-0991

NOTES:

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- SEE PLANS FOR LOCATION OF TURN LANES AT INTERSECTIONS.

METRIC

NOT TO SCALE

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032598 ENGINEER JOSEPH A. FREEMAN

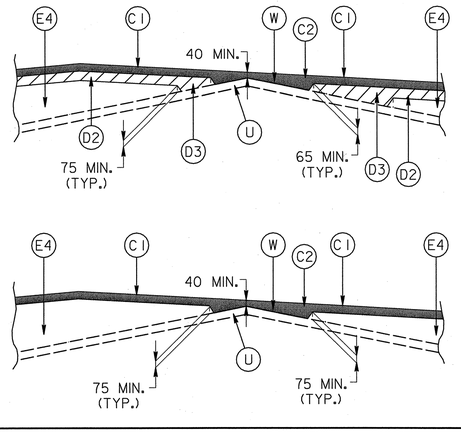
02-11-13

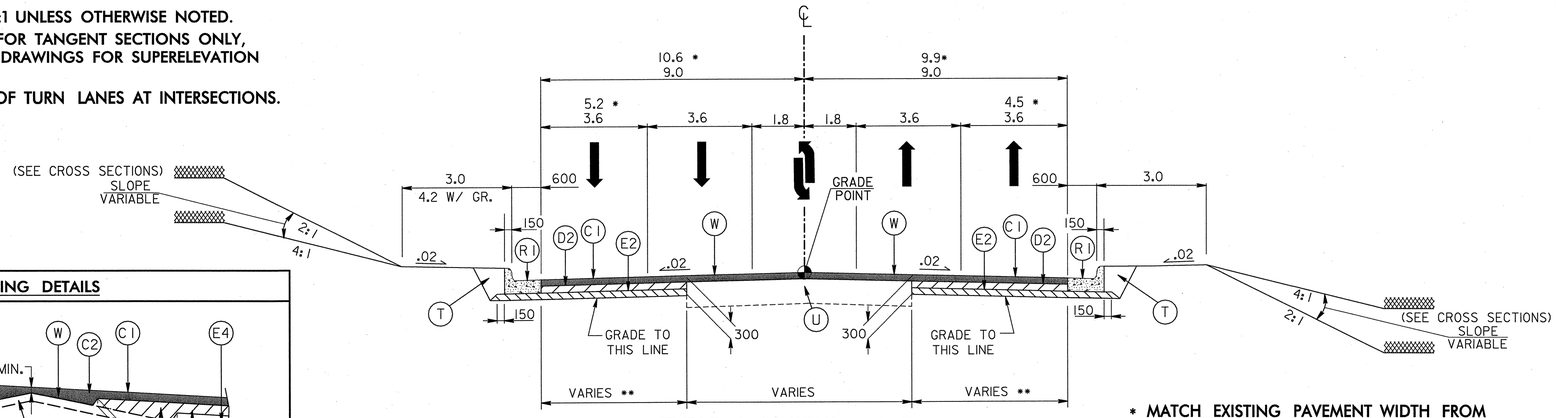
PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON

3/6/13

WEDGING DETAILS



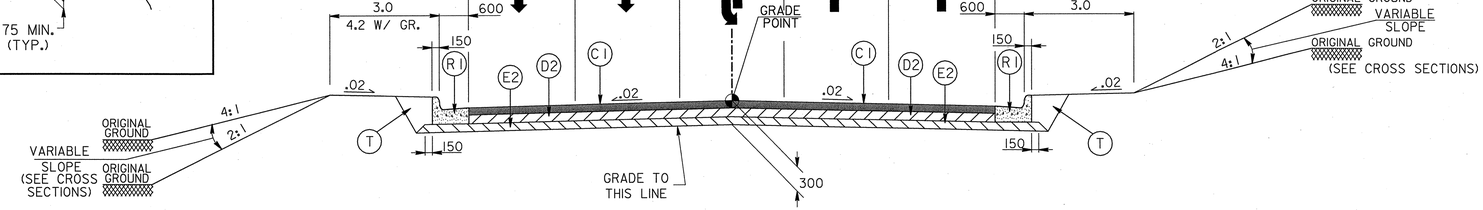


TYPICAL SECTION NO. 1

-L- STA. 10+20.000 TO 12+20.000
-L- STA. 14+60.000 TO 18+40.000
-L- STA. 21+80.000 TO 24+50.000

* MATCH EXISTING PAVEMENT WIDTH FROM -L- STA 10+20.000 TO 11+00.000

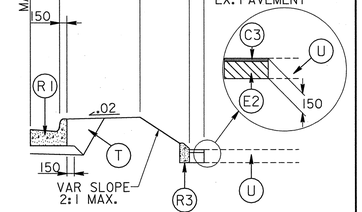
** LOCATION OF EXISTING PAVEMENT VARIES WITHIN THE WIDENING AREAS OF -L-. SEE PLANS AND CROSS SECTIONS FOR LOCATION.



TYPICAL SECTION NO. 2

-L- STA. 12+20.000 TO 14+60.000
-L- STA. 18+40.000 TO 21+80.000
-L- STA. 24+50.000 TO 26+62.078

DETAIL FOR CHANNELIZATION OF EXISTING PAVEMENT



SEE PLANS AND CROSS SECTIONS FOR LOCATION.

PAVEMENT SCHEDULE

A1	200 mm JOINTED CONCRETE PAVEMENT WITH DOWELS	D1	PROP. APPROX. 80 mm ASPH. CONC. INTERMEDIATE COURSE,TYPE I19.0B, AT AN AVERAGE RATE OF 196 kg. PER SQ. M	J1	PROP. 105 mm AGGREGATE BASE COURSE	R1	750 mm CONCRETE CURB AND GUTTER
A2	200 mm JOINTED CONCRETE PAVEMENT WITHOUT DOWELS	D2	PROP. APPROX. 100 mm ASPH. CONC. INTERMEDIATE COURSE,TYPE I19.0B, AT AN AVERAGE RATE OF 245 kg. PER SQ. M	J2	PROP. 150 mm AGGREGATE BASE COURSE	R2	SHOULDER BERM GUTTER
A3	VARIABLE DEPTH CONCRETE	D3	PROP. VAR. DEPTH ASPH. CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 2.45 kg. PER SQ. M. PER 1 mm DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 65 mm OR GREATER THAN 110 mm DEPTH	J3	PROP. 200 mm AGGREGATE BASE COURSE	R3	200 X 450 mm CONCRETE CURB
C1	PROP. APPROX. 80 mm ASPH. CONC. SURFACE COURSE. TYPE S9.5B, AT AN AVERAGE RATE OF 96 kg. PER SQ. M. IN EACH OF TWO LAYERS	E1	PROP. APPROX. 100 mm ASPH. CONC. BASE COURSE TYPE B25.0B AT AN AVERAGE RATE OF 254 kg PER SQ. M	J4	VARIABLE DEPTH AGGREGATE BASE COURSE	T	EARTH MATERIAL
C2	PROP. VAR. DEPTH ASPH. CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 2.4 kg. PER SQ. M. PER 1 mm DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 50 mm IN DEPTH	E2	PROP. APPROX. 120 mm ASPH. CONC. BASE COURSE TYPE B25.0B AT AN AVERAGE RATE OF 294 kg PER SQ. M.	K	BASE TO BE TREATED WITH LIME TO A DEPTH OF 200 mm, AT A RATE OF 10.85 kg. PER SQ. M AS DIRECTED BY THE ENGINEER. OR BASE TO BE TREATED WITH CEMENT TO A DEPTH OF 180 mm, AT A RATE OF 30 kg. PER SQ. M AS DIRECTED BY THE ENGINEER.	U	EXISTING PAVEMENT
C3	PROP. APPROX. 30 mm ASPH. CONC. SURFACE COURSE. TYPE SF9.5A, AT AN AVERAGE RATE OF 71 kg. PER SQ. M. IN EACH LAYER	E3	PROP. APPROX. 130 mm ASPH. CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 319 kg PER SQ. M			W	VARIABLE DEPTH BITUMINOUS PAVEMENT (WEDGING)
C4	PROP. APPROX. 40 mm ASPH. CONC. SURFACE COURSE. TYPE S9.5B, AT AN AVERAGE RATE OF 96 kg. PER SQ. M. IN EACH LAYER	E4	PROP. VAR. DEPTH ASPH. CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 2.45 kg. PER SQ. M. PER 1 mm DEPTH. TO BE PLACED IN LAYERS NOT GREATER THAN 140 mm DEPTH OR LESS THAN 75 mm DEPTH	P	PRIME COAT AT THE RATE OF 1.58 L. PER SQ. M	X	75 mm PADC, TYPE P-57

2/4/2013
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jfreeman

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NC License Number F-0991

NOTES:

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- TYPICAL SECTIONS SHOWN FOR TANGENT SECTIONS ONLY, SEE PLANS AND STANDARD DRAWINGS FOR SUPERELEVATION DETAILS.
- SEE PLANS FOR LOCATION OF TURN LANES AT INTERSECTIONS.

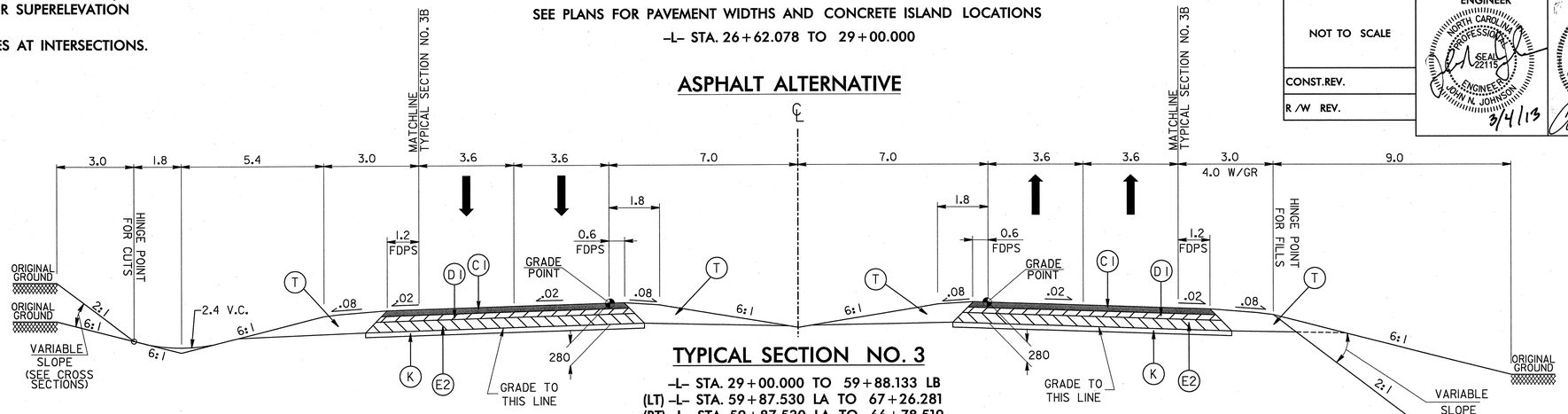
PAVEMENT SCHEDULE

A1	200 mm CONCRETE WITH DOWELS
A2	200 mm CONCRETE WITHOUT DOWELS
A3	VAR. DEPTH CONCRETE
C1	80 mm, TYPE S9.5B
C2	VAR. DEPTH TYPE S9.5B
C3	30 mm, TYPE SF9.5A
C4	40 mm, TYPE S9.5B
D1	80 mm, TYPE I19.0B
D2	100 mm, TYPE I19.0B
D3	VAR. DEPTH TYPE I19.0B
E1	100 mm, TYPE B25.0B
E2	120 mm, TYPE B25.0B
E3	130 mm, TYPE B25.0B
E4	VAR. DEPTH TYPE B25.0B
J1	105 mm ABC
J2	150 mm ABC
J3	200 mm ABC
J4	VAR. DEPTH ABC
K	LIME/CEMENT STABILIZATION
P	PRIME COAT
R1	750 C & G
R2	SHOULDER BERM GUTTER
R3	200 X 450 mm CONCRETE CURB
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAR. DEPTH BITUMINOUS PAVEMENT
X	75 mm PADC

TRANSITION FROM T.S. NO. 2 TO T.S. NO. 3

SEE PLANS FOR PAVEMENT WIDTHS AND CONCRETE ISLAND LOCATIONS
–L– STA. 26+62.078 TO 29+00.000

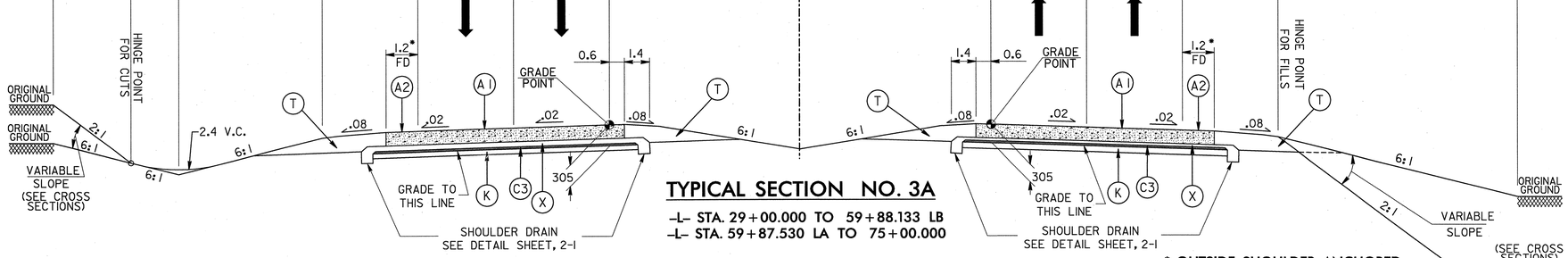
ASPHALT ALTERNATIVE



TYPICAL SECTION NO. 3

–L– STA. 29+00.000 TO 59+88.133 LB
(LT) –L– STA. 59+87.530 LA TO 67+26.281
(RT) –L– STA. 59+87.530 LA TO 66+78.519
(LT) –L– STA. 77+42.569 TO 78+00.000
(RT) –L– STA. 67+10.365 TO 76+77.000

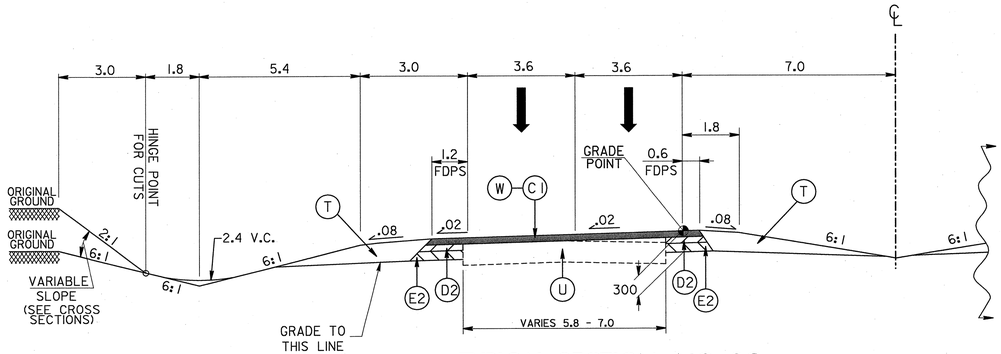
CONCRETE ALTERNATIVE



TYPICAL SECTION NO. 3A

–L– STA. 29+00.000 TO 59+88.133 LB
–L– STA. 59+87.530 LA TO 75+00.000

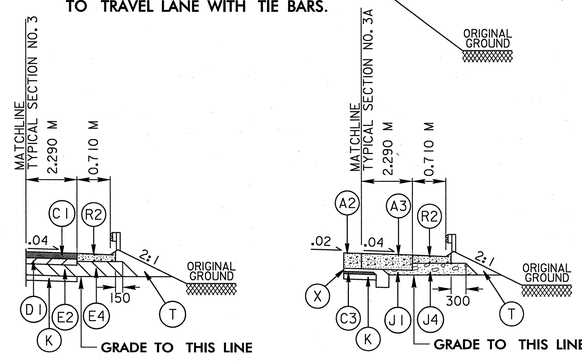
* OUTSIDE SHOULDER ANCHORED TO TRAVEL LANE WITH TIE BARS.



TYPICAL SECTION NO. 3C

ASPHALT ALTERNATIVE

(LT) –L– STA. 67+26.281 TO 77+42.569
(RT) –L– STA. 66+78.519 TO 67+10.365 (MIRROR)



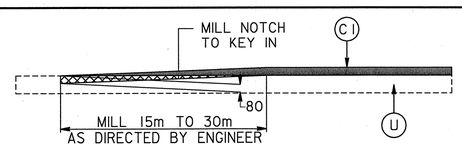
TYPICAL SECTION NO. 3B

ASPHALT ALTERNATIVE

TYPICAL SECTION NO. 3D

CONCRETE ALTERNATIVE

SEE PLANS FOR SHOULDER BERM GUTTER LOCATIONS
(MIRROR FOR LEFT SIDE)



INCIDENTAL MILLING DETAIL

METRIC	PROJECT REFERENCE NO.	SHEET NO.
NOT TO SCALE	R-2241A	2-A
CONST.REV.	R /W SHEET NO.	
R /W REV.	ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON 3/4/13	PAVEMENT DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 22898 ENGINEER CLARK S. MORRISON 3/6/13

3/4/2013
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stephens

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Charlotte, NC 28208
NC License Number: C-0991

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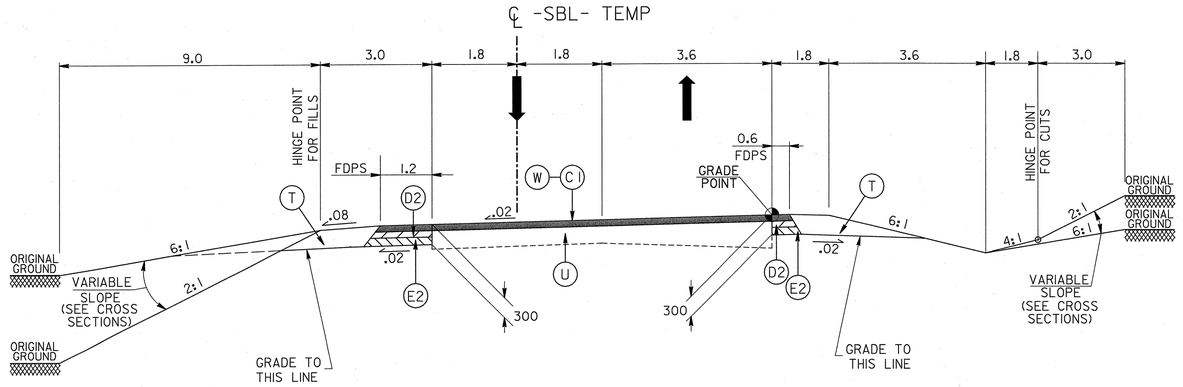
- SEE PLANS FOR LOCATION OF TURN LANES AT INTERSECTIONS.

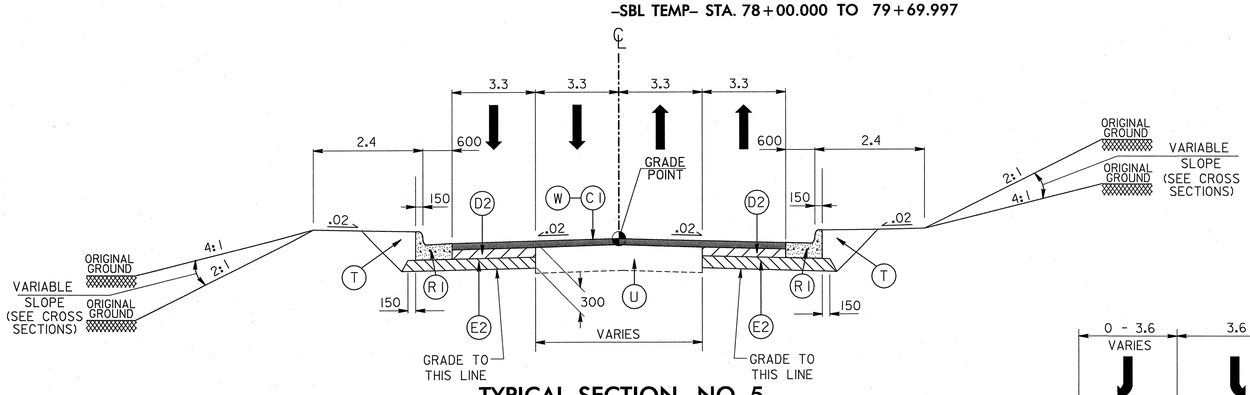
PAVEMENT SCHEDULE

A1	200 mm CONCRETE WITH DOWELS
A2	200 mm CONCRETE WITHOUT DOWELS
A3	VAR. DEPTH CONCRETE
C1	80 mm, TYPE S9.5B
C2	VAR. DEPTH TYPE S9.5B
C3	30 mm, TYPE SF9.5A
C4	40 mm, TYPE S9.5B
D1	80 mm, TYPE I19.0B
D2	100 mm, TYPE I19.0B
D3	VAR. DEPTH TYPE I19.0B
E1	100 mm, TYPE B25.0B
E2	120 mm, TYPE B25.0B
E3	130 mm, TYPE B25.0B
E4	VAR. DEPTH TYPE B25.0B
J1	105 mm ABC
J2	150 mm ABC
J3	200 mm ABC
J4	VAR. DEPTH ABC
K	LIME/CEMENT STABILIZATION
P	PRIME COAT
R1	750 C & G
R2	SHOULDER BERM GUTTER
R3	200 X 450 mm CONCRETE CURB
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAR. DEPTH BITUMINOUS PAVEMENT
X	75 mm PADC



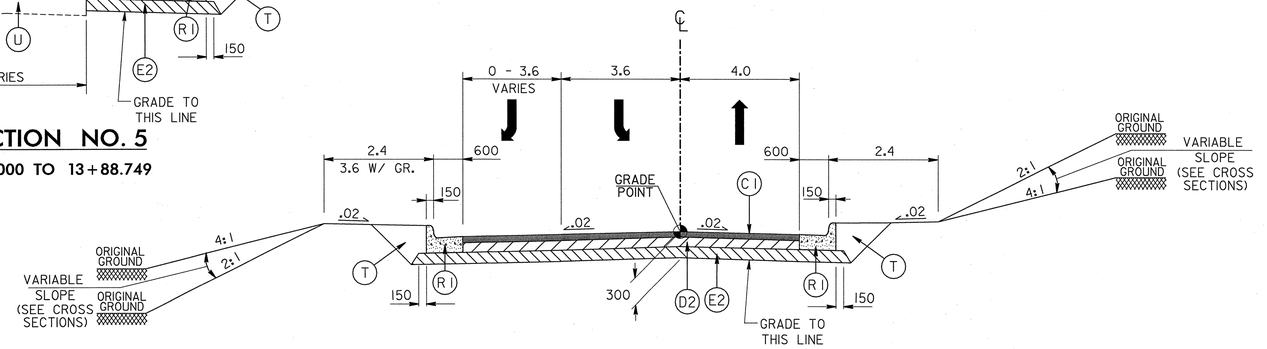
TYPICAL SECTION NO. 4

-SBL TEMP- STA. 78+00.000 TO 79+69.997



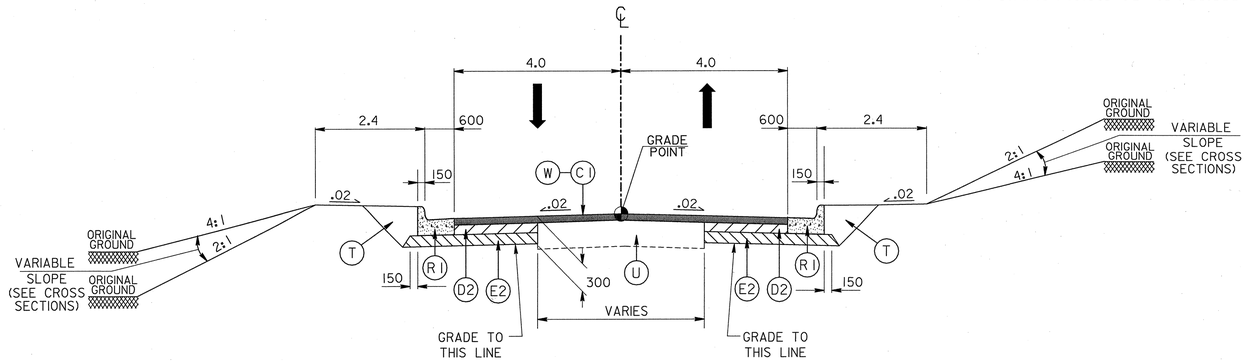
TYPICAL SECTION NO. 5

-Y1- STA. 12+05.000 TO 13+88.749



TYPICAL SECTION NO. 6

-Y4- STA. 10+10.318 TO 10+80.000



TYPICAL SECTION NO. 7

-Y4- STA. 10+80.000 TO 11+30.000

METRIC	PROJECT REFERENCE NO.	SHEET NO.
NOT TO SCALE	R-2241A	2-B
CONST.REV.	R /W SHEET NO.	
R /W REV.	ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 02-11-13	PAVEMENT DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 22886 ENGINEER CLARK S. MORRISON 2/6/13

2/11/2013
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JFreeman

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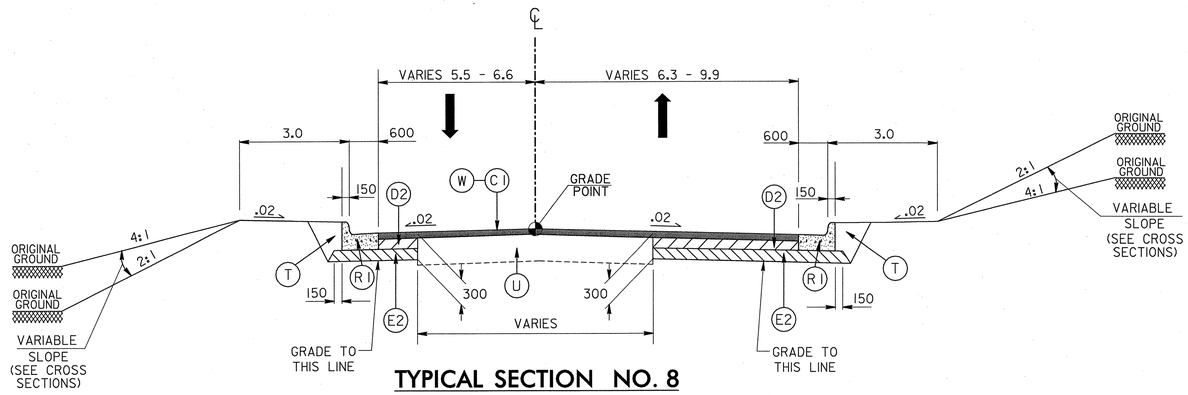
NC License Number F-0991

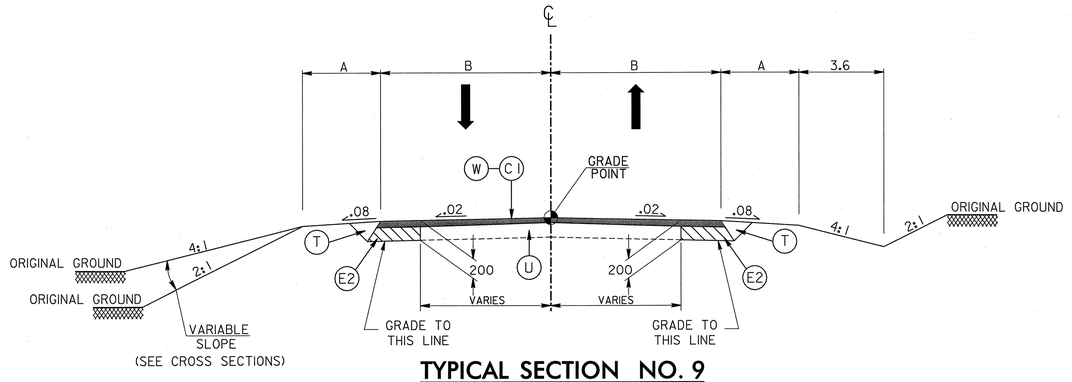
NOTES:
- ALL PAVEMENT SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.
- TYPICAL SECTIONS SHOWN FOR TANGENT SECTIONS ONLY, SEE PLANS AND STANDARD DRAWINGS FOR SUPERELEVATION DETAILS.
- SEE PLANS FOR LOCATION OF TURN LANES AT INTERSECTIONS.

PAVEMENT SCHEDULE	
A1	200 mm CONCRETE WITH DOWELS
A2	200 mm CONCRETE WITHOUT DOWELS
A3	VAR. DEPTH CONCRETE
C1	80 mm, TYPE S9.5B
C2	VAR. DEPTH TYPE S9.5B
C3	30 mm, TYPE SF9.5A
C4	40 mm, TYPE S9.5B
D1	80 mm, TYPE I19.0B
D2	100 mm, TYPE I19.0B
D3	VAR. DEPTH TYPE I19.0B
E1	100 mm, TYPE B25.0B
E2	120 mm, TYPE B25.0B
E3	130 mm, TYPE B25.0B
E4	VAR. DEPTH TYPE B25.0B
J1	105 mm ABC
J2	150 mm ABC
J3	200 mm ABC
J4	VAR. DEPTH ABC
K	LIME/CEMENT STABILIZATION
P	PRIME COAT
R1	750 C & G
R2	SHOULDER BERM GUTTER
R3	200 X 450 mm CONCRETE CURB
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAR. DEPTH BITUMINOUS PAVEMENT
X	75 mm PADC



TYPICAL SECTION NO. 8

–Y2– STA. 14+10.883 TO 14+75.000

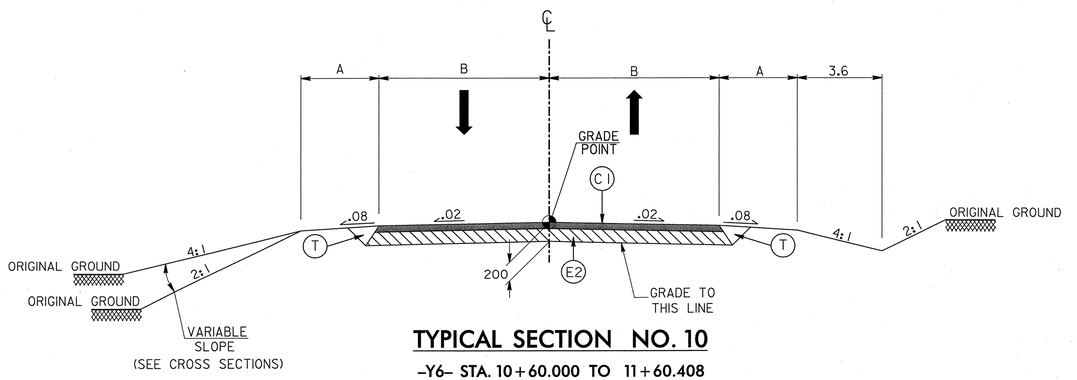


TYPICAL SECTION NO. 9

–Y6– STA. 10+10.000 TO 10+60.000
–Y7– STA. 10+65.000 TO 11+77.350
–Y9– STA. 10+64.153 TO 11+62.148
–Y9– STA. 14+34.923 TO 16+85.000
–Y10– STA. 10+50.000 TO 10+86.000
–Y11– STA. 10+40.000 TO 11+12.950
*OVERLAY EXISTING –Y11– WITH C1 FROM 9+93.905 TO 10+40.000
–Y13– STA. 12+92.603 TO 13+25.000
–Y14– STA. 10+04.000 TO 10+50.000
–Y15– STA. 11+80.000 TO 12+20.000

LINE	A (m)	A (W/GR) (m)	B (m)
-Y6-	1.8	2.8	VARIES 2.6 TO 3.3
-Y7-	1.5	2.5	VARIES 2.8 TO 4.8
-Y9-	1.5	2.5	VARIES 2.9 TO 3.3
-Y10-	1.8	2.8	VARIES 3.0 TO 3.3
-Y11-	1.2	2.2	3.0
-Y13-	1.5	2.5	VARIES 3.0 TO 8.4
-Y14-	1.5	2.5	VARIES 3.0 TO 8.4
-Y15-	1.5	2.5	VARIES 3.0 TO 8.4

(TO BE USED WITH T.S. NO. 9)



TYPICAL SECTION NO. 10

–Y6– STA. 10+60.000 TO 11+60.408
–Y7– STA. 11+77.350 TO 13+85.662
–Y9– STA. 10+04.500 TO 10+64.153
–Y9– STA. 11+62.148 TO 14+34.923
–Y10– STA. 10+03.630 TO 10+50.000

LINE	A (m)	A (W/GR) (m)	B (m)
-Y6-	1.8	2.8	VARIES 2.8 TO 6.1
-Y7-	1.5	2.5	VARIES 3.3 TO 7.8
-Y9-	1.5	2.5	VARIES 3.3 TO 4.5
-Y10-	1.2	2.8	VARIES 3.3 TO 4.9

(TO BE USED WITH T.S. NO. 10)

METRIC

NOT TO SCALE

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-C
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032559 ENGINEER JOSEPH A. FREEMAN
02-11-13

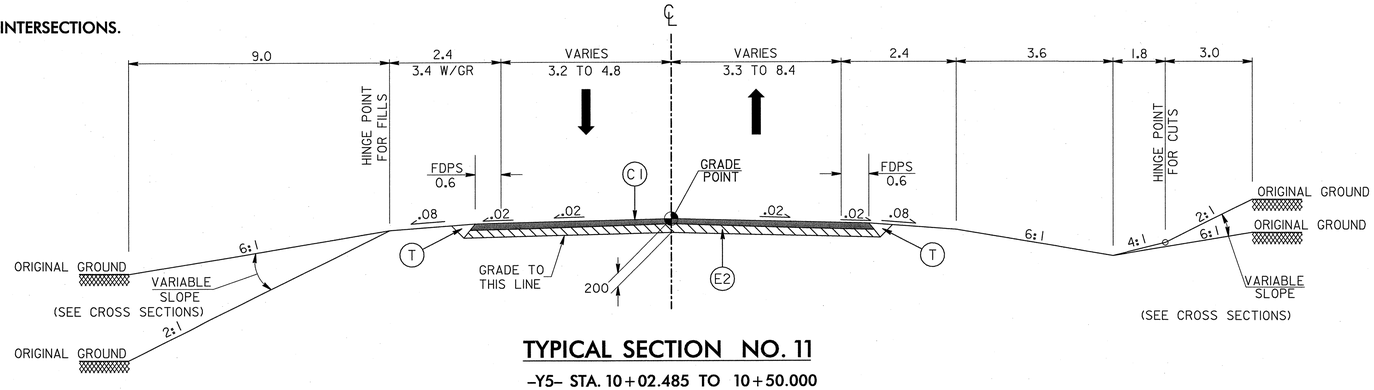
PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
3/6/13

2/1/2013
R:\R2241aProj\Proj\Sheets\R2241A_RDY_TYP.dgn
JFreeman

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

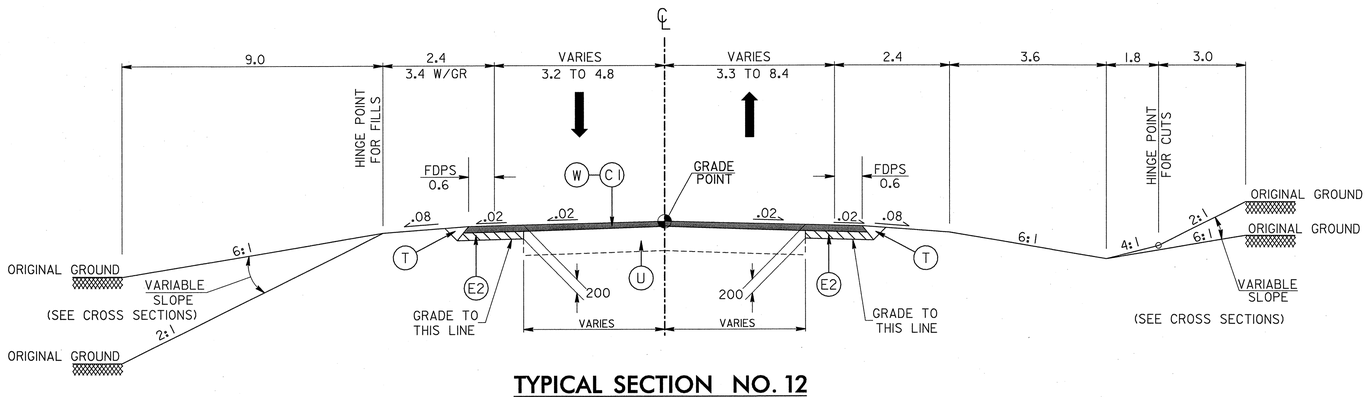
NOTES:
- ALL PAVEMENT SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.
- TYPICAL SECTIONS SHOWN FOR TANGENT SECTIONS ONLY, SEE PLANS AND STANDARD DRAWINGS FOR SUPERELEVATION DETAILS.
- SEE PLANS FOR LOCATION OF TURN LANES AT INTERSECTIONS.

PAVEMENT SCHEDULE	
A1	200 mm CONCRETE WITH DOWELS
A2	200 mm CONCRETE WITHOUT DOWELS
A3	VAR. DEPTH CONCRETE
C1	80 mm, TYPE S9.5B
C2	VAR. DEPTH TYPE S9.5B
C3	30 mm, TYPE SF9.5A
C4	40 mm, TYPE S9.5B
D1	80 mm, TYPE I19.0B
D2	100 mm, TYPE I19.0B
D3	VAR. DEPTH TYPE I19.0B
E1	100 mm, TYPE B25.0B
E2	120 mm, TYPE B25.0B
E3	130 mm, TYPE B25.0B
E4	VAR. DEPTH TYPE B25.0B
J1	105 mm ABC
J2	150 mm ABC
J3	200 mm ABC
J4	VAR. DEPTH ABC
K	LIME/CEMENT STABILIZATION
P	PRIME COAT
R1	750 C & G
R2	SHOULDER BERM GUTTER
R3	200 X 450 mm CONCRETE CURB
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAR. DEPTH BITUMINOUS PAVEMENT
X	75 mm PADC



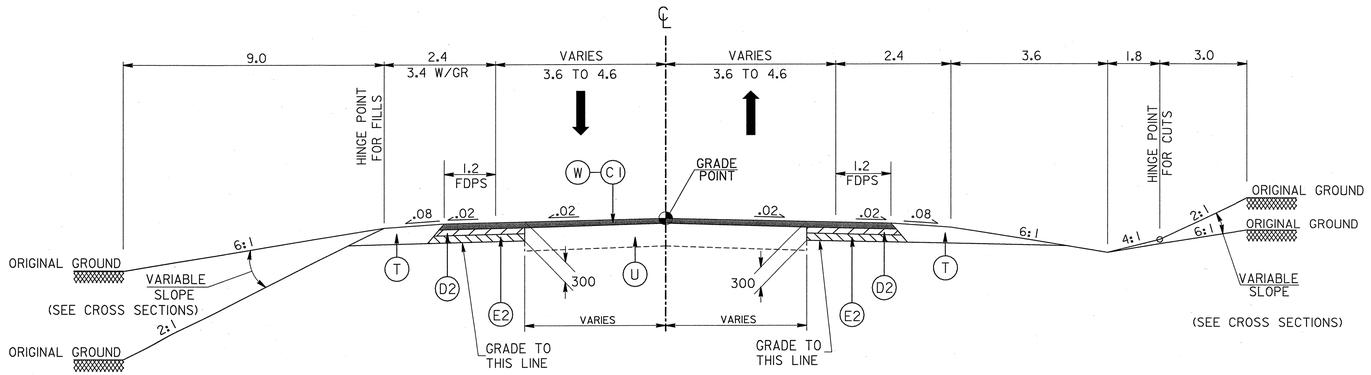
TYPICAL SECTION NO. 11

-Y5- STA. 10+02.485 TO 10+50.000



TYPICAL SECTION NO. 12

-Y5- STA. 10+50.000 TO 11+00.000



TYPICAL SECTION NO. 13

-Y8- STA. 15+70.000 TO 16+50.000

METRIC

NOT TO SCALE

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-D
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
02-11-13

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
3/6/13

2/11/2013
R:\Roadway\Proj\Sheets\R2241A_RDY_TYP.dgn
jfreeman

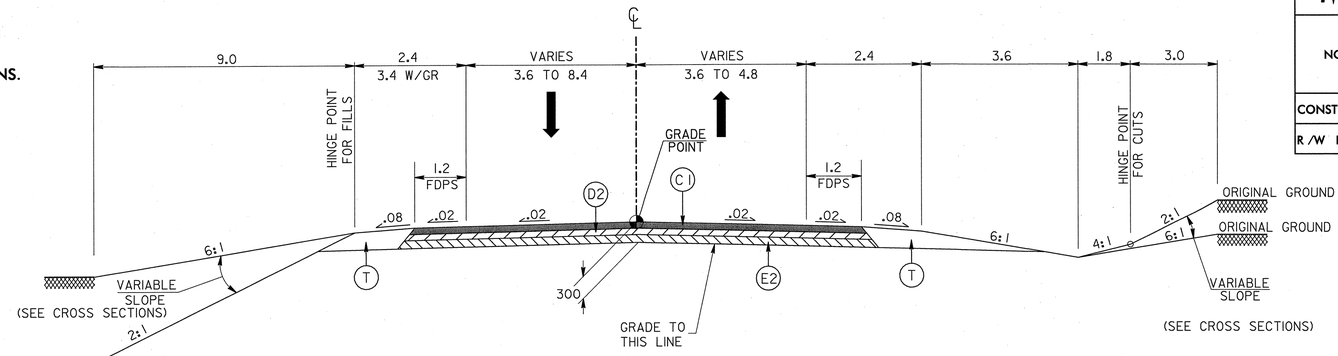
STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

NOTES:

- ALL PAVEMENT SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.
- TYPICAL SECTIONS SHOWN FOR TANGENT SECTIONS ONLY, SEE PLANS AND STANDARD DRAWINGS FOR SUPERELEVATION DETAILS.
- SEE PLANS FOR LOCATION OF TURN LANES AT INTERSECTIONS.

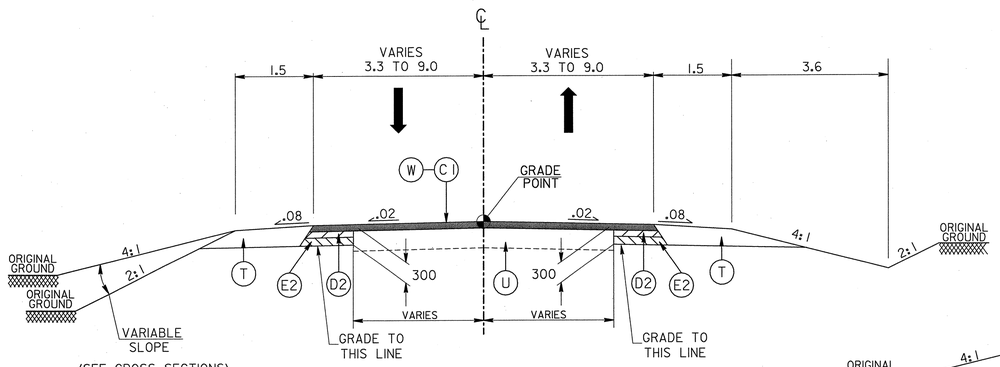
PAVEMENT SCHEDULE

A1	200 mm CONCRETE WITH DOWELS
A2	200 mm CONCRETE WITHOUT DOWELS
A3	VAR. DEPTH CONCRETE
C1	80 mm, TYPE S9.5B
C2	VAR. DEPTH TYPE S9.5B
C3	30 mm, TYPE SF9.5A
C4	40 mm, TYPE S9.5B
D1	80 mm, TYPE I19.0B
D2	100 mm, TYPE I19.0B
D3	VAR. DEPTH TYPE I19.0B
E1	100 mm, TYPE B25.0B
E2	120 mm, TYPE B25.0B
E3	130 mm, TYPE B25.0B
E4	VAR. DEPTH TYPE B25.0B
J1	105 mm ABC
J2	150 mm ABC
J3	200 mm ABC
J4	VAR. DEPTH ABC
K	LIME/CEMENT STABILIZATION
P	PRIME COAT
R1	750 C & G
R2	SHOULDER BERM GUTTER
R3	200 X 450 mm CONCRETE CURB
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAR. DEPTH BITUMINOUS PAVEMENT
X	75 mm PADC



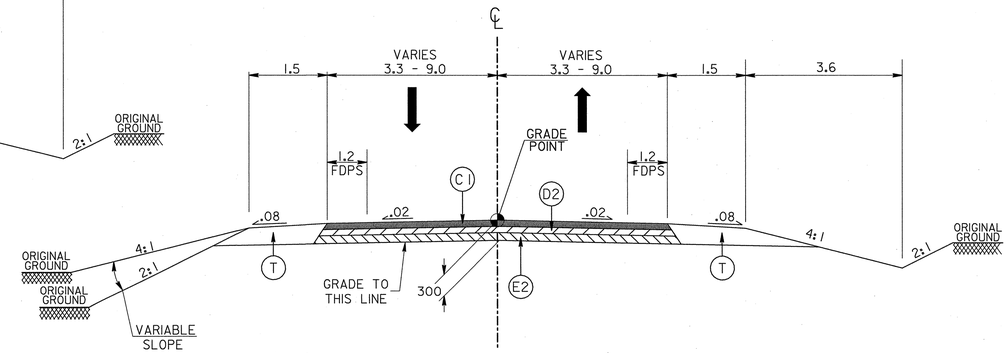
TYPICAL SECTION NO. 14

–Y8– STA. 14+19.662 TO 15+70.000



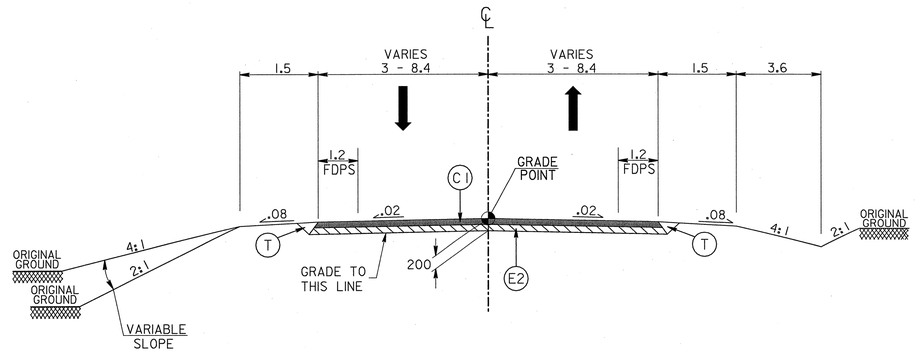
TYPICAL SECTION NO. 15

–Y12– STA. 10+20.000 TO 10+50.000



TYPICAL SECTION NO. 16

–Y12– STA. 10+50.000 TO 11+10.060



TYPICAL SECTION NO. 17

–Y13– STA. 11+41.332 TO 12+92.603
–Y14– STA. 10+50.000 TO 11+22.580
–Y15– STA. 11+22.580 TO 11+80.000

METRIC

NOT TO SCALE

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-E
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
12-11-13

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22886 ENGINEER CLARK S. MORRISON
3/6/13

2/4/2013
R:\Projects\Proj\Sheets\R2241A_RDY_TYP.dgn
J.Freeman

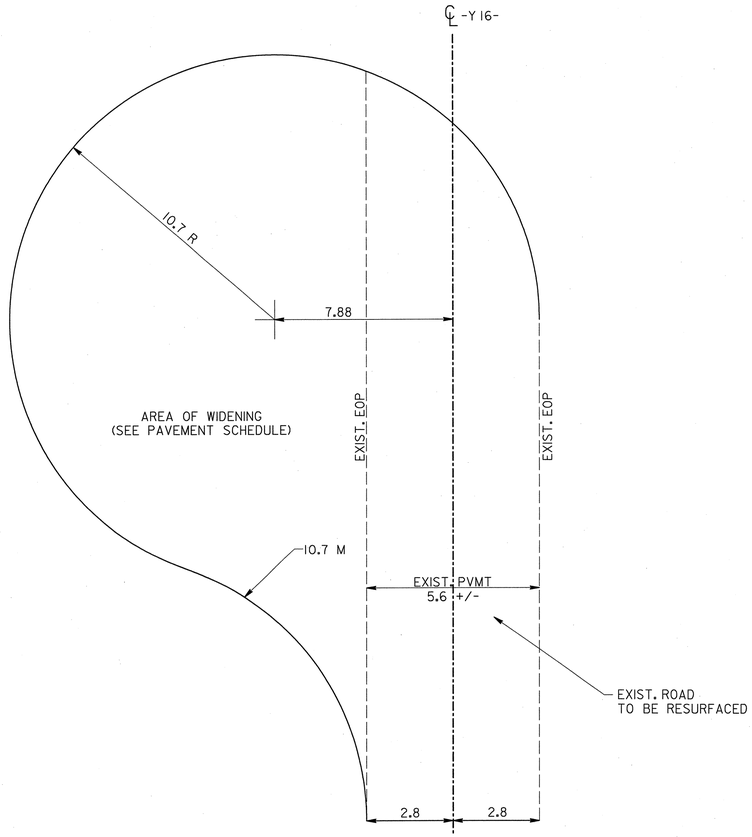
STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

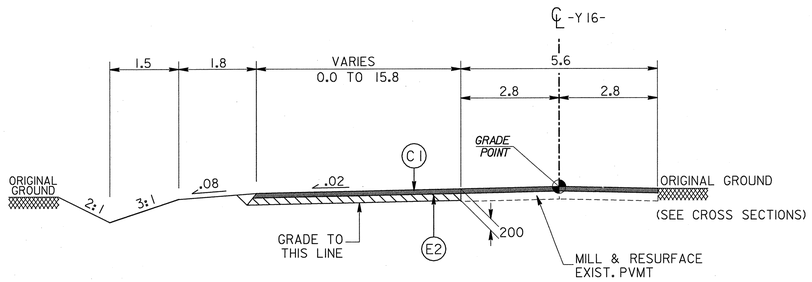
NOTES:

- ALL PAVEMENT SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.
- TYPICAL SECTIONS SHOWN FOR TANGENT SECTIONS ONLY, SEE PLANS AND STANDARD DRAWINGS FOR SUPERELEVATION DETAILS.
- SEE PLANS FOR LOCATION OF TURN LANES AT INTERSECTIONS.

PAVEMENT SCHEDULE	
A1	200 mm CONCRETE WITH DOWELS
A2	200 mm CONCRETE WITHOUT DOWELS
A3	VAR. DEPTH CONCRETE
C1	80 mm, TYPE S9.5B
C2	VAR. DEPTH TYPE S9.5B
C3	30 mm, TYPE SF9.5A
C4	40 mm, TYPE S9.5B
D1	80 mm, TYPE I19.0B
D2	100 mm, TYPE I19.0B
D3	VAR. DEPTH TYPE I19.0B
E1	100 mm, TYPE B25.0B
E2	120 mm, TYPE B25.0B
E3	130 mm, TYPE B25.0B
E4	VAR. DEPTH TYPE B25.0B
J1	105 mm ABC
J2	150 mm ABC
J3	200 mm ABC
J4	VAR. DEPTH ABC
K	LIME/CEMENT STABILIZATION
P	PRIME COAT
R1	750 C & G
R2	SHOULDER BERM GUTTER
R3	200 X 450 mm CONCRETE CURB
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAR. DEPTH BITUMINOUS PAVEMENT
X	75 mm PADC

PLAN VIEW





SECTION A–A

TYPICAL SECTION NO. 18
HALIFAX RD.
CUL–DE–SAC DETAIL
–Y16– STA. 10+80.000 TO 11+00.623

METRIC

NOT TO SCALE

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-F
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
02-11-13

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
3/6/13

2/11/2013
R:\Projects\VProj\Sheets\R2241A_RDY_TYP.dgn
jfreeman

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

NOTES:

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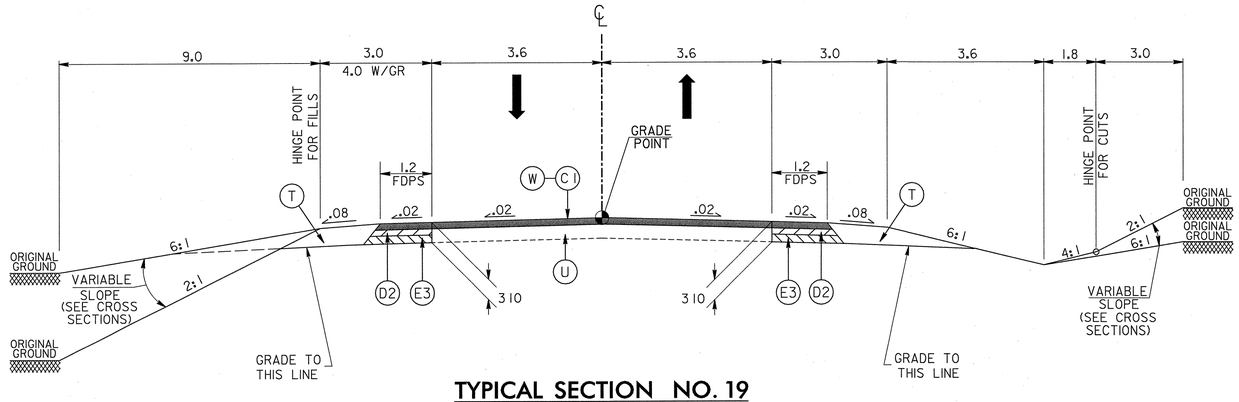
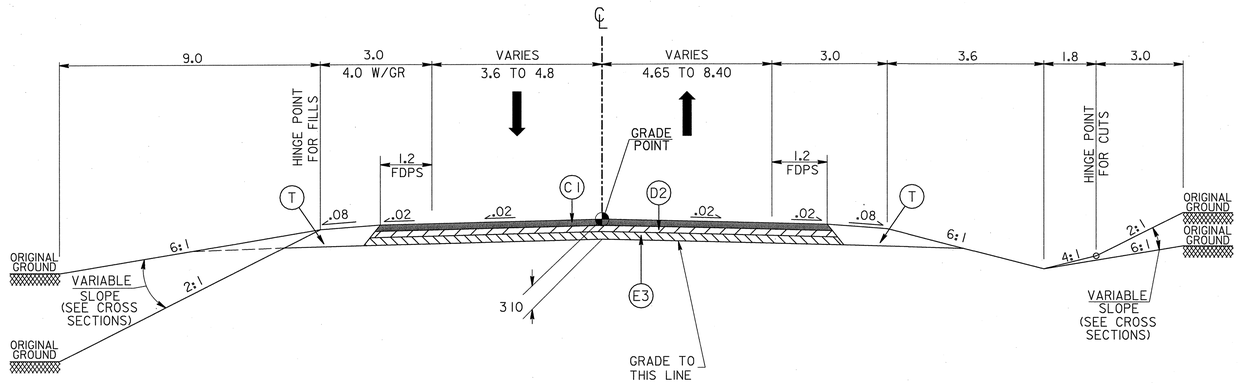
- SEE PLANS FOR LOCATION OF TURN LANES AT INTERSECTIONS.

PAVEMENT SCHEDULE	
A1	200 mm CONCRETE WITH DOWELS
A2	200 mm CONCRETE WITHOUT DOWELS
A3	VAR. DEPTH CONCRETE
C1	80 mm, TYPE S9.5B
C2	VAR. DEPTH TYPE S9.5B
C3	30 mm, TYPE SF9.5A
C4	40 mm, TYPE S9.5B
D1	80 mm, TYPE I19.0B
D2	100 mm, TYPE I19.0B
D3	VAR. DEPTH TYPE I19.0B
E1	100 mm, TYPE B25.0B
E2	120 mm, TYPE B25.0B
E3	130 mm, TYPE B25.0B
E4	VAR. DEPTH TYPE B25.0B
J1	105 mm ABC
J2	150 mm ABC
J3	200 mm ABC
J4	VAR. DEPTH ABC
K	LIME/CEMENT STABILIZATION
P	PRIME COAT
R1	750 C & G
R2	SHOULDER BERM GUTTER
R3	200 X 450 mm CONCRETE CURB
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAR. DEPTH BITUMINOUS PAVEMENT
X	75 mm PADC



TYPICAL SECTION NO. 19

–Y17– STA. 10+70.000 TO 11+82.169



TYPICAL SECTION NO. 20

–Y17– STA. 11+82.169 TO 13+18.495

METRIC

NOT TO SCALE

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-G
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032579 ENGINEER JOSEPH A. FREEMAN
02-11-13

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
2/6/13

2/11/2013
R:\Roadway\Proj\Sheets\R2241A_RDY_TYP.dgn
jfreeman

NOTES:

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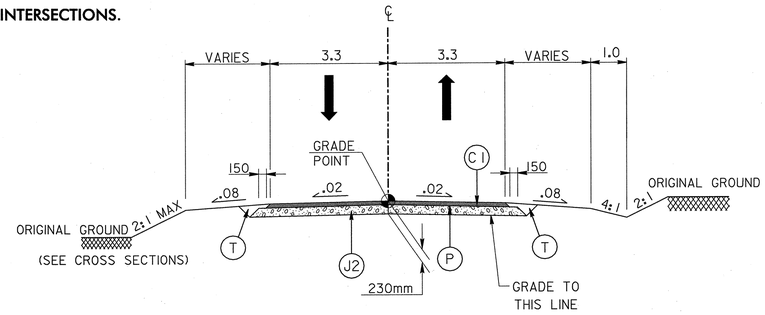
- SEE PLANS FOR LOCATION OF TURN LANES AT INTERSECTIONS.

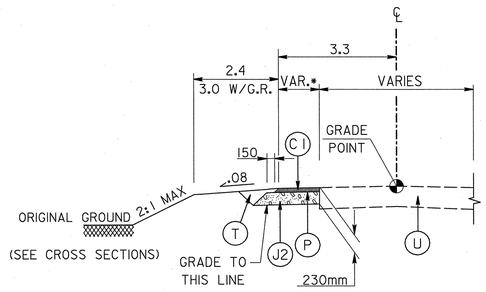
PAVEMENT SCHEDULE

A1	200 mm CONCRETE WITH DOWELS
A2	200 mm CONCRETE WITHOUT DOWELS
A3	VAR. DEPTH CONCRETE
C1	80 mm, TYPE S9.5B
C2	VAR. DEPTH TYPE S9.5B
C3	30 mm, TYPE SF9.5A
C4	40 mm, TYPE S9.5B
D1	80 mm, TYPE I19.0B
D2	100 mm, TYPE I19.0B
D3	VAR. DEPTH TYPE I19.0B
E1	100 mm, TYPE B25.0B
E2	120 mm, TYPE B25.0B
E3	130 mm, TYPE B25.0B
E4	VAR. DEPTH TYPE B25.0B
J1	105 mm ABC
J2	150 mm ABC
J3	200 mm ABC
J4	VAR. DEPTH ABC
K	LIME/CEMENT STABILIZATION
P	PRIME COAT
R1	750 C & G
R2	SHOULDER BERM GUTTER
R3	200 X 450 mm CONCRETE CURB
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAR. DEPTH BITUMINOUS PAVEMENT
X	75 mm PADC



TYPICAL SECTION NO. 21

–DET1– STA. 12+99.745 TO 13+45.520
–DET1– STA. 13+55.260 TO 14+44.101

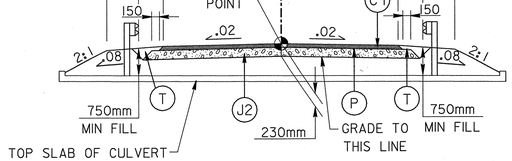


NOTE: -DET1- SHOWN, MIRROR FOR -DET2-

* SEE NARROW WIDENING DETAIL IF LESS THAN 2 M WIDE

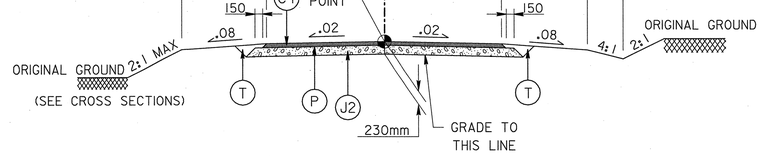
TYPICAL SECTION NO. 22

–DET1– STA. 12+66.000 TO 12+99.745
–DET1– STA. 14+44.101 TO 15+21.386
–DET2– STA. 10+13.253 TO 10+57.907
–DET2– STA. 12+04.291 TO 13+19.977



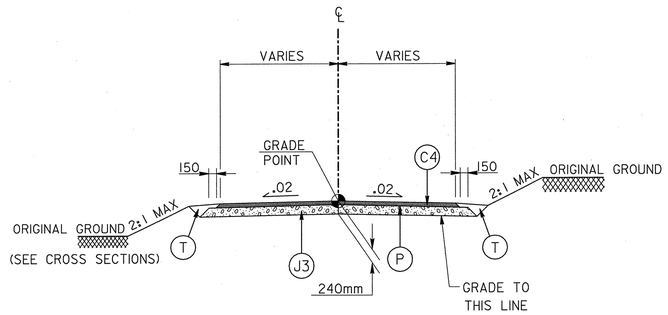
TYPICAL SECTION NO. 23

–DET1– STA. 13+45.520 TO 13+55.260



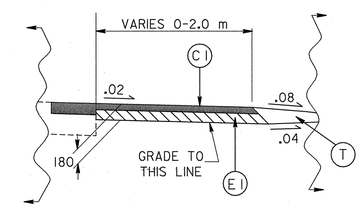
TYPICAL SECTION NO. 24

–DET2– STA. 10+57.907 TO 12+04.291



TYPICAL SECTION NO. 25

–DR1– STA. 10+09.600 TO 10+34.000
–DR2– STA. 10+10.700 TO 10+47.210
–DR3– STA. 10+02.970 TO 10+41.702
–DR4– STA. 10+12.620 TO 10+45.100
–DR5– STA. 10+07.250 TO 10+45.341
–DR6– STA. 10+16.476 TO 10+58.860
–DR7– STA. 10+05.660 TO 10+58.860



NARROW WIDENING DETAIL

SEE PLANS FOR LOCATION(S) OF NARROW WIDENING

METRIC

NOT TO SCALE

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-H
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
02-11-13

PAVEMENT DESIGN ENGINEER

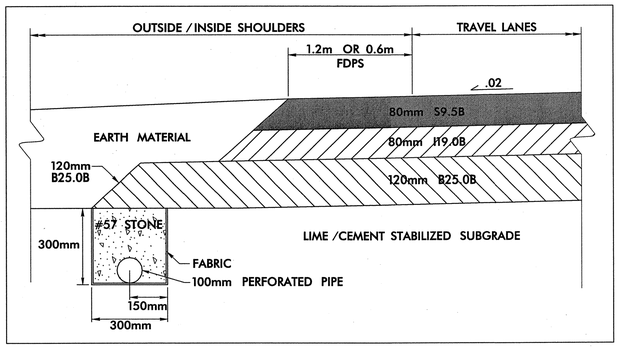
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON
3/6/13

2/11/2013
R:\Roadway\Proj\Sheets\R2241A_RDY_TYP.dgn
jfreeman

SHOULDER DRAIN DETAILS

METRIC	PROJECT REFERENCE NO.	SHEET NO.
NOT TO SCALE	R-2241A	2-I
CONST.REV.	R /W SHEET NO.	
R /W REV.		

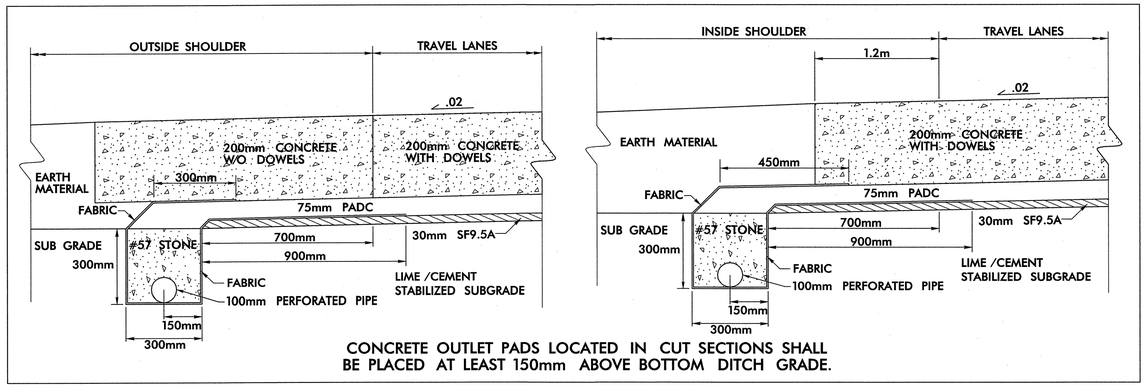
PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CARL S. MORRISON
3/6/13



ASPHALT ALTERNATE

TO BE USED WITH TYPICAL SECTION NO. 3

LINE	SIDE	FROM	TO
-L-	US 501 NB (OUTSIDE)	29+00	30+45
OUTLET:	29+00 (2GI)		
-L-	US 501 NB (OUTSIDE)	36+80	41+50
OUTLET:	37+80 (2GI), 39+00 (2GI), 40+00 (PAD), 41+00 (2GI)		
-L-	US 501 NB (OUTSIDE)	42+40	46+00
OUTLET:	42+60 (2GI), 43+40 (PAD), 45+00 (PAD), 46+00 (2GI)		
-L-	US 501 NB (OUTSIDE)	48+70	53+40
OUTLET:	49+00 (PAD), 50+00 (2GI), 50+60 (PAD), 52+00 (2GI), 53+40 (PAD)		
-L-	US 501 NB (OUTSIDE)	56+50	57+90
OUTLET:	57+10 (2GI)		
-L-	US 501 NB (OUTSIDE)	58+40	60+40
OUTLET:	58+40 (2GI), 60+40 (2GI)		
-L-	US 501 NB (OUTSIDE)	61+20	61+65
OUTLET:	61+65 (PAD)		
-L-	US 501 NB (OUTSIDE)	67+80	69+40
OUTLET:	68+40 (2GI)		
-L-	US 501 NB (OUTSIDE)	71+20	74+90
OUTLET:	71+20 (2GI), 72+00 (PAD), 73+80 (PAD), 74+90 (2GI)		
-L-	US 501 NB (INSIDE)	30+45	32+45
OUTLET:	32+45 (2GI)		
-L-	US 501 SB (OUTSIDE)	29+00	32+45
OUTLET:	29+00 (PAD), 31+40 (PAD), 32+45 (2GI)		
-L-	US 501 SB (OUTSIDE)	36+80	41+50
OUTLET:	37+80 (2GI), 39+00 (2GI), 40+00 (PAD), 40+80 (2GI)		
-L-	US 501 SB (OUTSIDE)	42+40	46+20
OUTLET:	42+40 (2GI), 43+40 (PAD), 45+40 (PAD), 46+40 (2GI)		
-L-	US 501 SB (OUTSIDE)	48+70	53+40
OUTLET:	49+00 (PAD), 50+00 (2GI), 50+60 (PAD), 52+00 (PAD), 53+40 (PAD)		
-L-	US 501 SB (OUTSIDE)	56+50	57+90
OUTLET:	57+10 (2GI)		
-L-	US 501 SB (OUTSIDE)	58+40	60+40
OUTLET:	58+40 (2GI), 60+40 (2GI)		
-L-	US 501 SB (OUTSIDE)	61+20	61+65
OUTLET:	61+65 (PAD)		
-L-	US 501 SB (OUTSIDE)	67+80	69+40
OUTLET:	68+40 (2GI)		
-L-	US 501 SB (OUTSIDE)	71+20	74+90
OUTLET:	71+20 (2GI), 72+00 (PAD), 73+80 (PAD), 74+90 (PAD)		



CONCRETE OUTLET PADS LOCATED IN CUT SECTIONS SHALL BE PLACED AT LEAST 150mm ABOVE BOTTOM DITCH GRADE.

CONCRETE ALTERNATE

TO BE USED WITH TYPICAL SECTION NO. 3A

LINE	SIDE	FROM	TO
-L-	US 501 NB (OUTSIDE)	29+00	30+40
OUTLET:	29+00 (PAD)		
-L-	US 501 NB (INSIDE)	30+40	33+60
OUTLET:	32+45 (2GI), 33+60 (2GI)		
-L-	US 501 NB (OUTSIDE)	33+60	46+40
OUTLET:	34+00 (PAD), 35+10 (2GI), 36+00 (PAD), 37+30 (PAD), 37+80 (2GI), 39+00 (2GI), 40+00 (PAD), 41+00 (2GI), 42+40 (2GI), 43+00 (PAD), 44+00 (PAD), 45+00 (PAD), 46+00 (2GI), 46+40 (PAD)		
-L-	US 501 NB (OUTSIDE)	47+40	60+40
OUTLET:	48+00 (PAD), 49+00 (PAD), 50+00 (2GI), 50+80 (PAD), 52+00 (2GI), 53+00 (PAD), 54+00 (PAD), 54+60 (2GI), 56+20 (2GI), 57+10 (2GI), 58+40 (2GI), 59+00 (PAD), 60+40 (2GI)		
-L-	US 501 NB (OUTSIDE)	61+20	74+90
OUTLET:	62+40 (2GI), 63+20 (2GI), 64+00 (PAD), 65+00 (PAD), 66+00 (PAD), 67+00 (PAD), 68+00 (PAD), 68+40 (2GI), 70+20 (2GI), 71+20 (2GI), 72+00 (PAD), 73+00 (PAD), 74+90 (2GI)		
-L-	US 501 SB (OUTSIDE)	29+00	46+40
OUTLET:	29+00 (PAD), 30+00 (PAD), 31+00 (PAD), 32+00 (PAD), 33+00 (PAD), 34+00 (PAD), 35+00 (2GI), 36+00 (PAD), 37+30 (PAD), 37+80 (2GI), 39+00 (2GI), 40+00 (PAD), 40+80 (2GI), 42+40 (2GI), 43+00 (PAD), 44+00 (PAD), 45+00 (PAD), 46+40 (2GI)		
-L-	US 501 SB (OUTSIDE)	47+40	60+40
OUTLET:	48+30 (2GI), 49+00 (PAD), 50+00 (2GI), 50+60 (PAD), 51+20 (2GI), 52+00 (PAD), 53+00 (PAD), 54+40 (2GI), 55+30 (PAD), 56+20 (2GI), 57+10 (2GI), 58+40 (2GI), 59+00 (PAD), 60+40 (2GI)		
-L-	US 501 SB (OUTSIDE)	61+20	74+90
OUTLET:	62+40 (2GI), 63+00 (PAD), 64+00 (PAD), 65+00 (2GI), 66+00 (PAD), 67+00 (PAD), 68+00 (PAD), 68+40 (2GI), 70+20 (2GI), 71+20 (2GI), 72+00 (PAD), 73+00 (PAD), 74+90 (2GI)		

2/19/2013
R:\Roadway\Proj\Sheets\R2241A_RDY_TYP.dgn
JFreeman

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

METRIC

NOT TO SCALE

CONST.REV.

R /W REV.

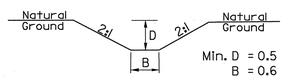
PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-J
R /W SHEET NO.	

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.

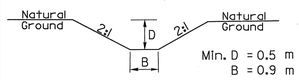
2/11/13

DETAIL 1
STANDARD BASE DITCH
(Not to Scale)



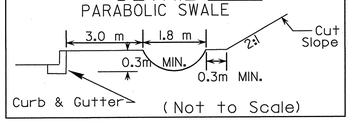
Min. D = 0.5 m
B = 0.6 m

DETAIL 2
STANDARD BASE DITCH
(Not to Scale)



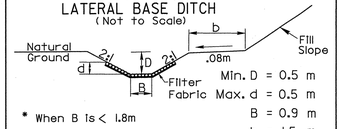
Min. D = 0.5 m
B = 0.9 m

DETAIL 3
PARABOLIC SWALE



(Not to Scale)

DETAIL 4
LATERAL BASE DITCH
(Not to Scale)

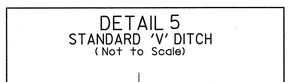


Min. D = 0.5 m
Max. d = 0.5 m
B = 0.9 m
b = 1.5 m

* When B Is < 1.8m

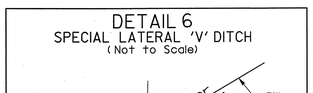
Type of Liner = CLASS 'B' RIP RAP

DETAIL 5
STANDARD 'V' DITCH
(Not to Scale)



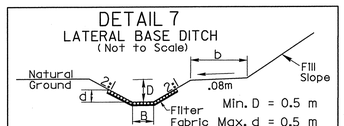
Min. D = 0.5 m

DETAIL 6
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D = 0.5 m

DETAIL 7
LATERAL BASE DITCH
(Not to Scale)

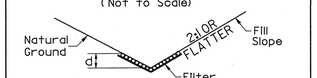


Min. D = 0.5 m
Max. d = 0.5 m
B = 0.6 m
b = 1.5 m

* When B Is < 1.8m

Type of Liner = CLASS 'B' RIP RAP

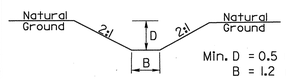
DETAIL 8
TOE PROTECTION
(Not to Scale)



d = 0.5 m

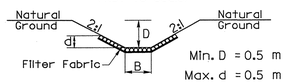
Type of Liner = CLASS 'B' RIP RAP

DETAIL 9
STANDARD BASE DITCH
(Not to Scale)



Min. D = 0.5 m
B = 1.2 m

DETAIL 10
STANDARD BASE DITCH
(Not to Scale)

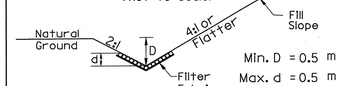


Min. D = 0.5 m
Max. d = 0.5 m
B = 0.9 m

* When B Is < 1.8m

Type of Liner = CLASS 'B' RIP RAP

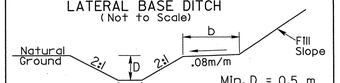
DETAIL 11
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D = 0.5 m
Max. d = 0.5 m

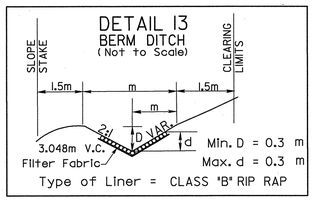
Type of Liner = CLASS "B" RIP RAP

DETAIL 12
LATERAL BASE DITCH
(Not to Scale)



Min. D = 0.5 m
B = 1.5 m
b = 1.2 m

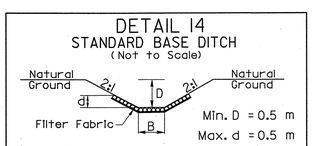
DETAIL 13
BERM DITCH
(Not to Scale)



Min. D = 0.3 m
Max. d = 0.3 m

Type of Liner = CLASS "B" RIP RAP

DETAIL 14
STANDARD BASE DITCH
(Not to Scale)

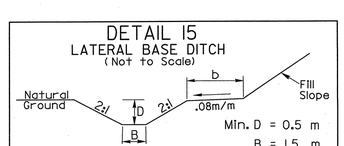


Min. D = 0.5 m
Max. d = 0.5 m
B = 0.6 m

* When B Is < 1.8m

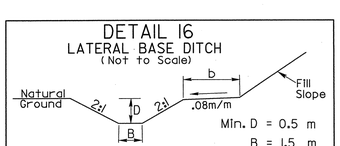
Type of Liner = CLASS "B" RIP RAP

DETAIL 15
LATERAL BASE DITCH
(Not to Scale)



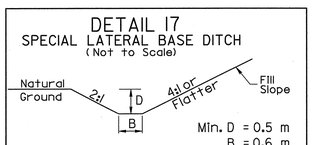
Min. D = 0.5 m
B = 1.5 m
b = 0.9 m

DETAIL 16
LATERAL BASE DITCH
(Not to Scale)



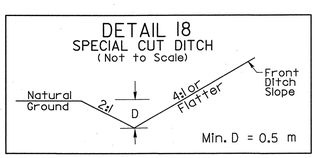
Min. D = 0.5 m
B = 1.5 m
b = 0.6 m

DETAIL 17
SPECIAL LATERAL BASE DITCH
(Not to Scale)



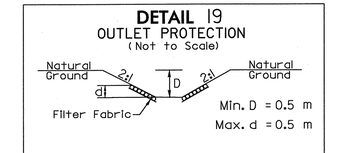
Min. D = 0.5 m
B = 0.6 m

DETAIL 18
SPECIAL CUT DITCH
(Not to Scale)



Min. D = 0.5 m

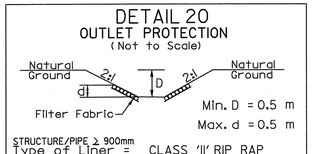
DETAIL 19
OUTLET PROTECTION
(Not to Scale)



Min. D = 0.5 m
Max. d = 0.5 m

Type of Liner = CLASS 'B' RIP RAP

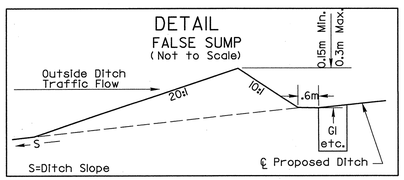
DETAIL 20
OUTLET PROTECTION
(Not to Scale)



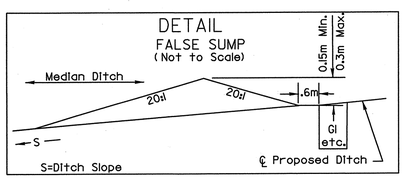
Min. D = 0.5 m
Max. d = 0.5 m

STRUCTURE/PIPE ≥ 900mm
Type of Liner = CLASS 'II' RIP RAP
STRUCTURE/PIPE < 900mm
Type of Liner = CLASS 'I' RIP RAP

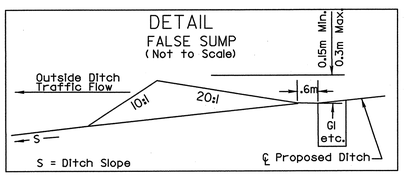
DETAIL
FALSE SUMP
(Not to Scale)



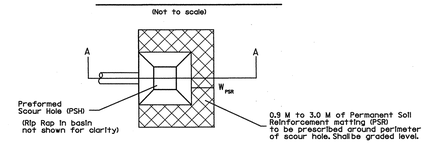
DETAIL
FALSE SUMP
(Not to Scale)



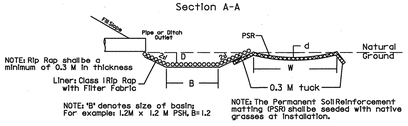
DETAIL
FALSE SUMP
(Not to Scale)



PREFORMED SCOUR HOLE
(Not to scale)

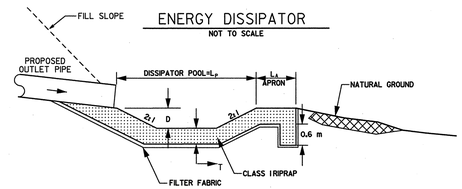


Section A-A

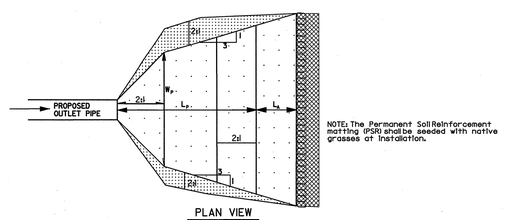


STATION	B M	D M	W_{PSR} M	d M	CLASS I RIP RAP MTONS	DDE (CU M)	FILTER FABRIC (SQ M)
13+80-L-	1.4	.5	1.5	0.15	8.2	11.5	1.2
33+60 -L-	1.4	.5	1.5	0.15	8.2	11.5	1.2
36+60 -L-	1.4	.5	1.5	0.15	8.2	11.5	1.2
48+30 -L-	1.8	.5	1.5	0.15	11.5	15	1.7
50+26 -L-	1.4	.5	1.5	0.15	8.2	11.5	1.2
52+00 -L-	1.2	.5	1.5	0.15	6.5	10.0	1.0
66+60 -L-	1.2	.5	1.5	0.15	6.5	10.0	1.0

ENERGY DISSIPATOR
NOT TO SCALE



PROFILE
NOT TO SCALE



PLAN VIEW
NOT TO SCALE

STATION	L_P M	W_P M	L_A M	T M	D M	CLASS I RIP RAP MTONS	DDE (CU M)	FILTER FABRIC (SQ M)
20+70 -L-	8.0	5.0	1.8	.6	1.0	110	86	75
39+80 -L-	7.0	4.3	2.0	.6	1.0	120	95	85

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

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

METRIC	PROJECT REFERENCE NO.	SHEET NO.
NOT TO SCALE	R-2241A	2-K
CONST.REV.	R /W SHEET NO.	
R /W REV.		

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR.
2/5/13

DETAIL
(NOT TO SCALE)
MULTI–BARREL LOW FLOW CHANNEL,SILLS AND FLOOD PLAIN

*NOTES:

1) BED MATERIAL SHALL BE EXCAVATED AND STOCKPILED DURING INSTALLATION OF THE CULVERTS AND SILLS. THE NATURAL BED MATERIALS SHALL THEN BE PLACED IN THE INLET OF THE CULVERT TO THE SPECIFIED ELEVATION.

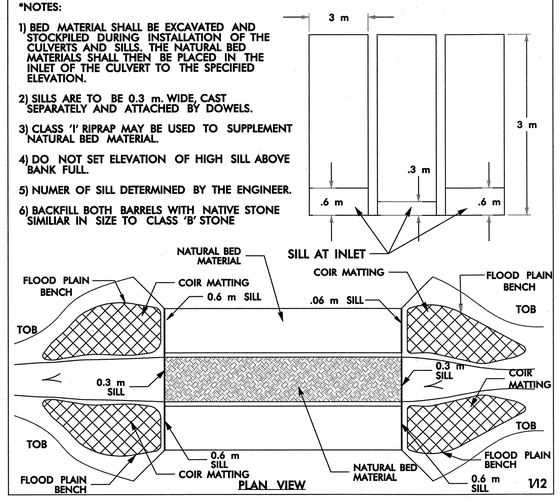
2) SILLS ARE TO BE 0.3 m. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

3) CLASS 'I' RIPRAP MAY BE USED TO SUPPLEMENT NATURAL BED MATERIAL.

4) DO NOT SET ELEVATION OF HIGH SILL ABOVE BANK FULL.

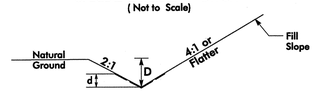
5) NUMER OF SILL DETERMINED BY THE ENGINEER.

6) BACKFILL BOTH BARRELS WITH NATIVE STONE SIMILIAR IN SIZE TO CLASS 'B' STONE



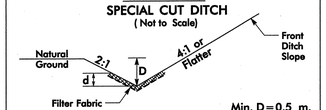
PLAN VIEW 1/12

DETAIL 21
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



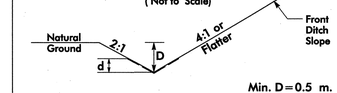
Min. D=0.5 m.
Max. d=0.5 m.
Type of Liner= PSRM

DETAIL 22
SPECIAL CUT DITCH
(Not to Scale)



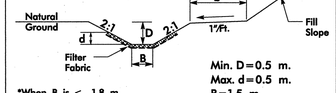
Min. D=0.5 m.
Max. d=0.5 m.
Type of Liner= Class 'II' Rip–Rap

DETAIL 23
SPECIAL CUT DITCH
(Not to Scale)



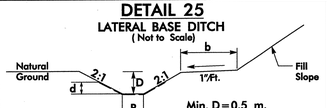
Min. D=0.5 m.
Max d=0.5 m.
Type of Liner= PSRM

DETAIL 24
LATERAL BASE DITCH
(Not to Scale)



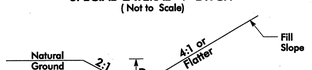
Min. D=0.5 m.
Max. d=0.5 m.
*When B is < 1.8 m
B=1.5 m.
b=1.2 m.
Type of Liner= Class 'II' Rip–Rap

DETAIL 25
LATERAL BASE DITCH
(Not to Scale)



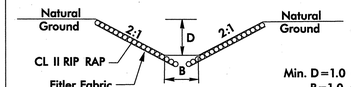
Min. D=0.5 m.
Max. d=0.5 m.
B=1.5 m.
b=0.9 m.
Type of Liner= PSRM

DETAIL 26
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



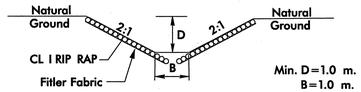
Min. D=0.5 m.
Max. d=0.5 m.
Type of Liner= Class 'II' Rip–Rap

INLET CHANNEL DETAIL
STRUCTURES/PIPES ≥ 900mm



Min. D=1.0 m.
B=1.0 m.

INLET CHANNEL DETAIL
STRUCTURES/PIPES ≤ 900mm



Min. D=1.0 m.
B=1.0 m.

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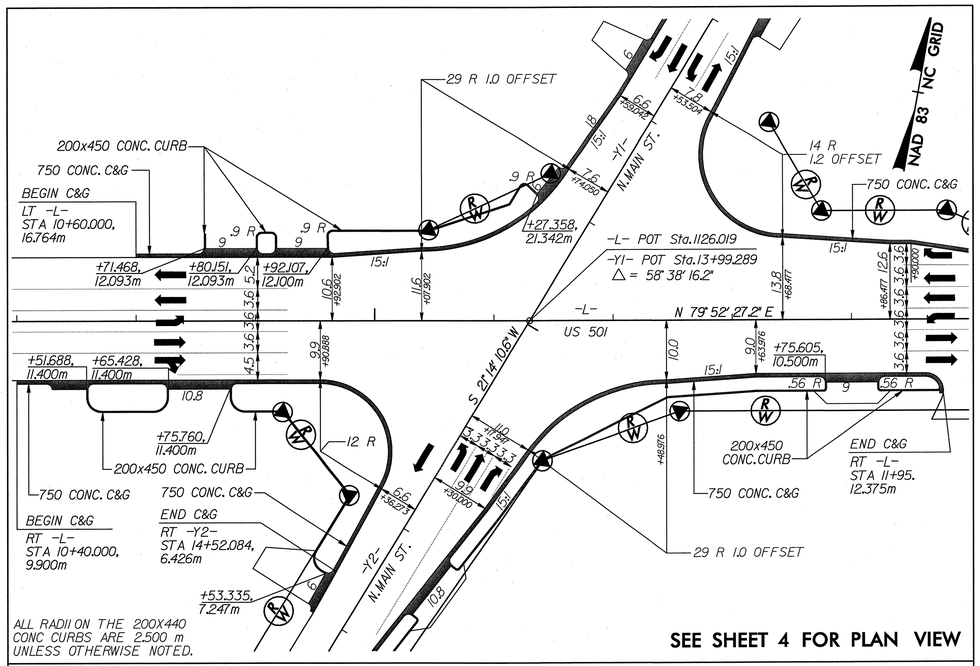
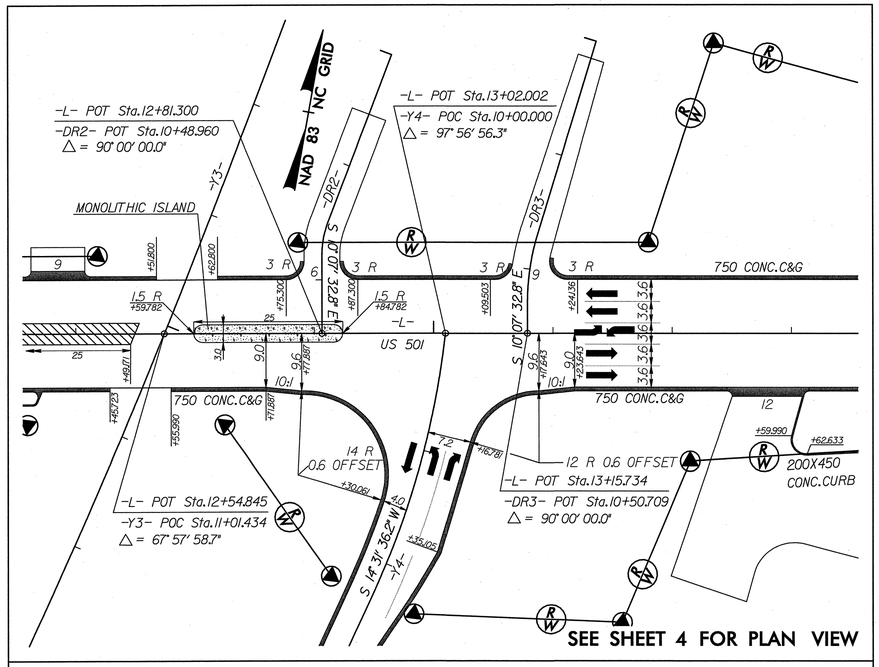
2/4/2013
stephlesc

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-L
R/W SHEET NO.	
METRIC	ROADWAY DESIGN ENGINEER
R/W REV.	
CONST.REV.	

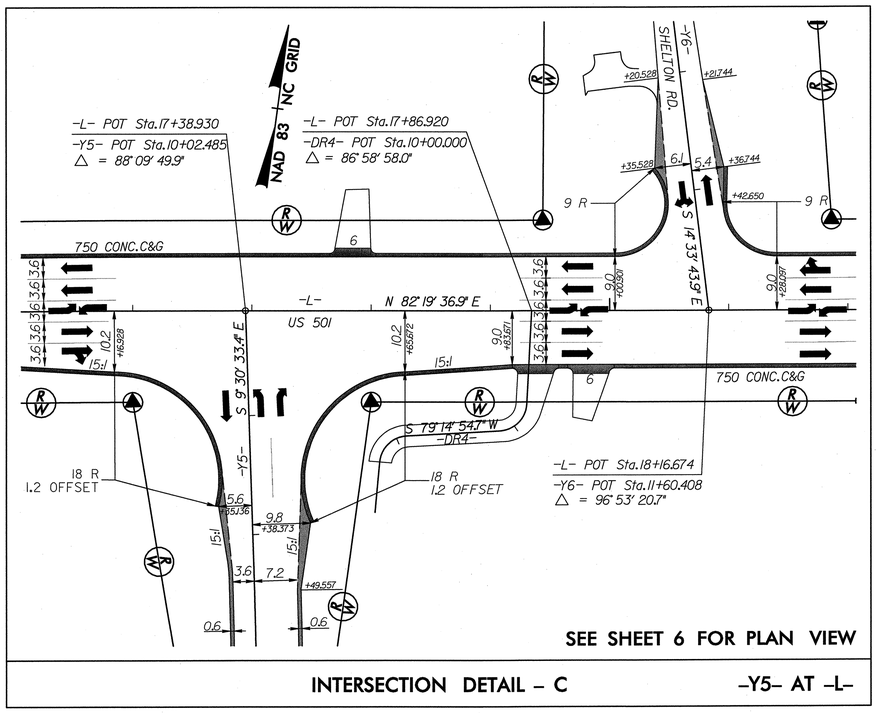


INTERSECTION DETAIL – A -Y2- /-Y1- AT -L-

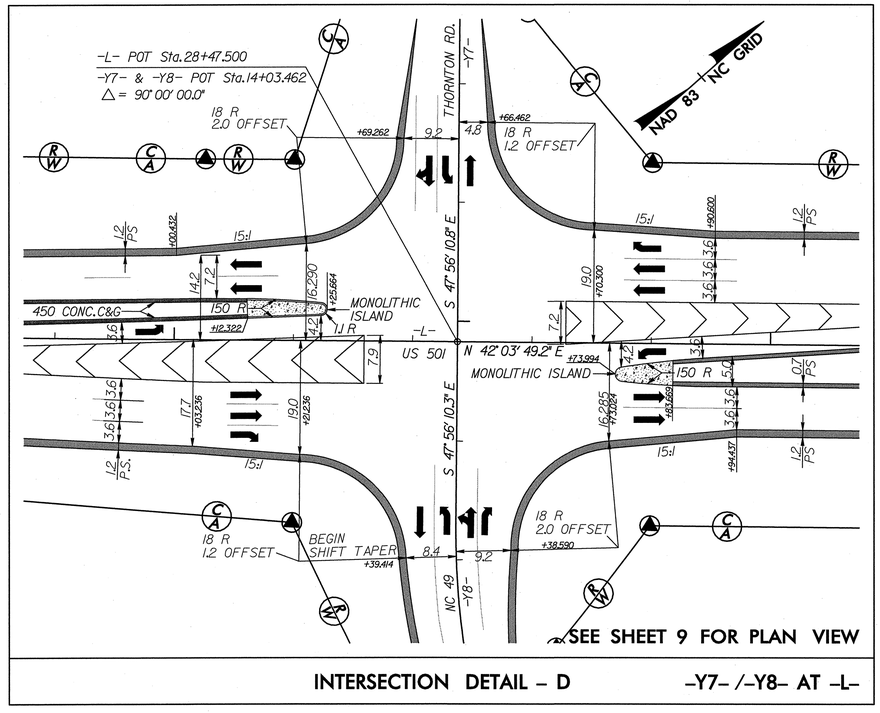


INTERSECTION DETAIL – B -Y4- AT -L-

125mm MONOLITHIC ISLAND
CONCRETE CURB /GUTTER
FULL DEPTH PAVED SHOULDER



INTERSECTION DETAIL – C -Y5- AT -L-



INTERSECTION DETAIL – D -Y7- /-Y8- AT -L-

2/4/2013
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stephesc

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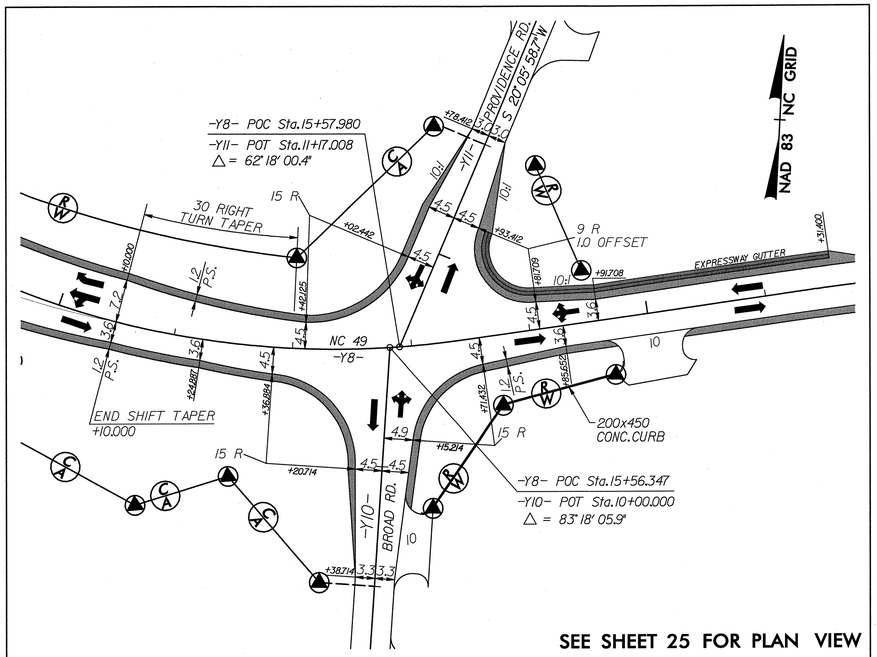
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-M
R /W SHEET NO.	
R /W REV.	
CONST.REV.	

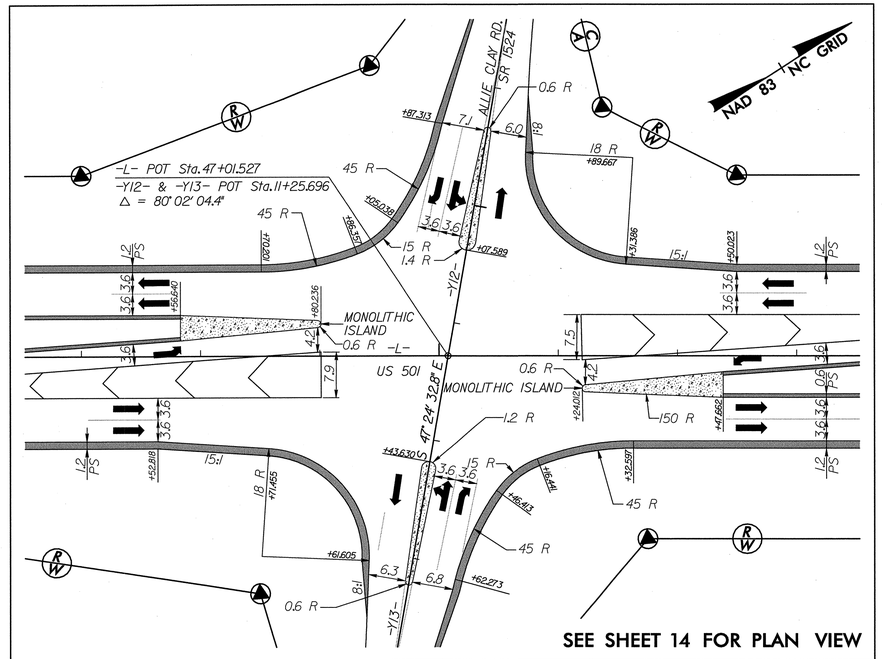
METRIC

5 0 10

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032589 ENGINEER JOSEPH A. FREEMAN
02-07-13

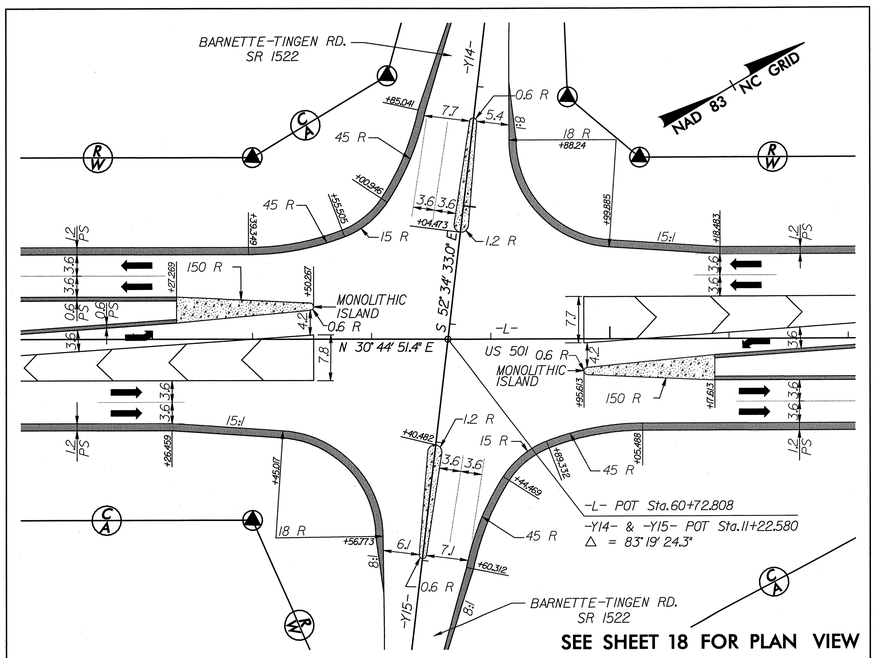


INTERSECTION DETAIL – E –Y10– /–Y11– AT –L–

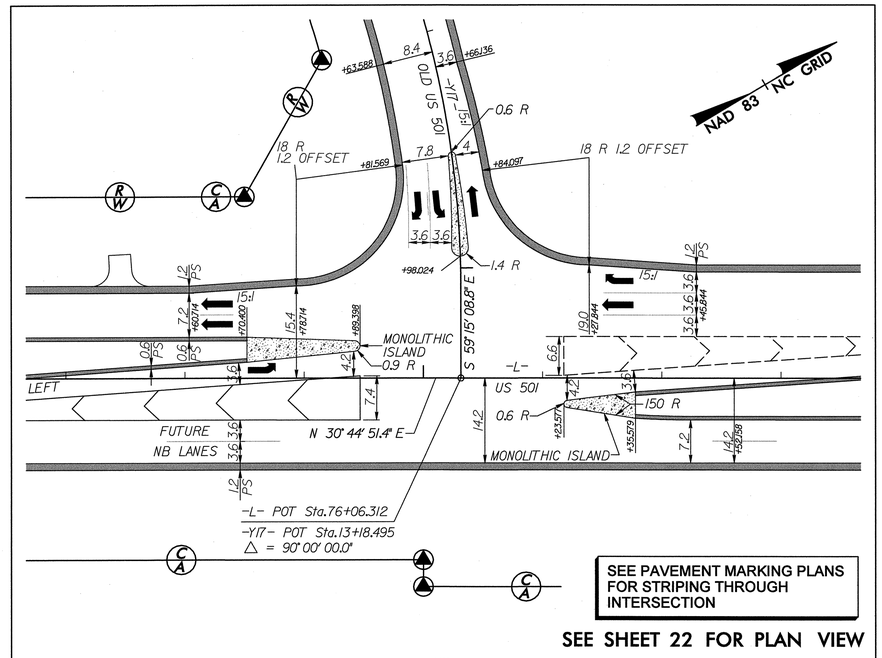


INTERSECTION DETAIL – F –Y12– /–Y13– AT –L–

125mm MONOLITHIC ISLAND
CONCRETE CURB /GUTTER
FULL DEPTH PAVED SHOULDER



INTERSECTION DETAIL – G –Y14– /–Y15– AT –L–



INTERSECTION DETAIL – H –Y17– AT –L–

2/7/2013
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stephesc

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Charlotte, NC 28208
NC License Number F-0991

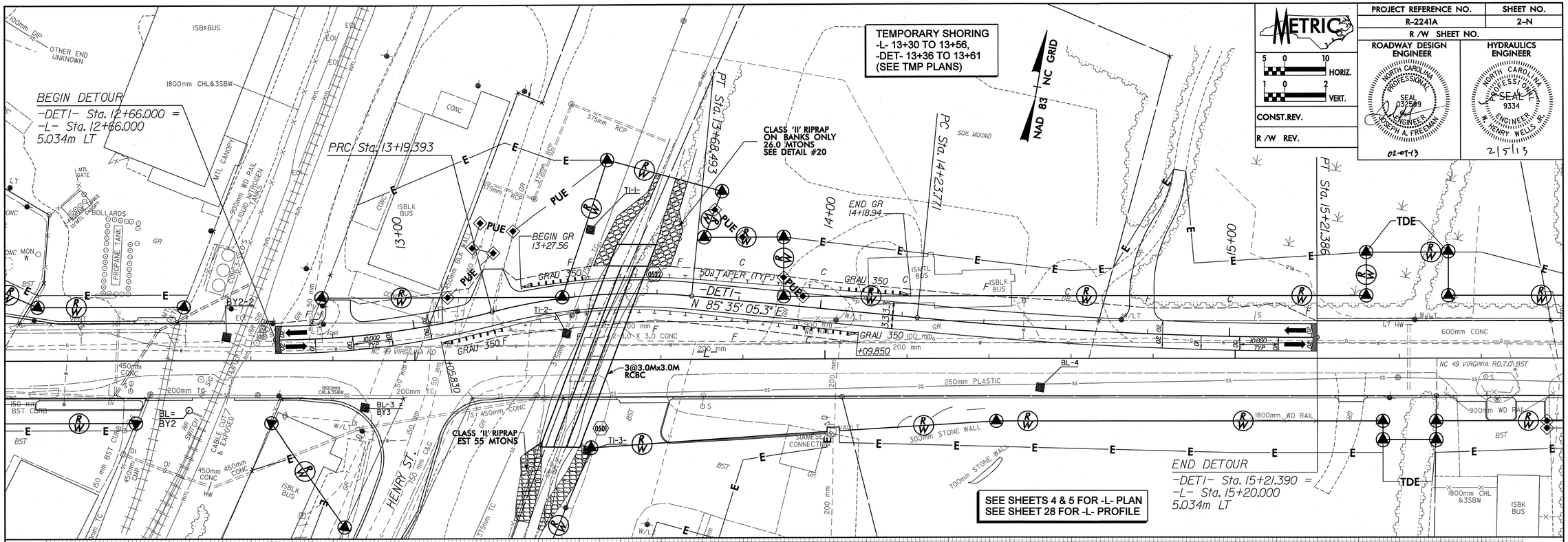
PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-N
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 02-07-13	NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR. 2/5/13

METRIC

5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.

R/W REV.



2/4/2013
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stephesc

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-O
R/W SHEET NO.	

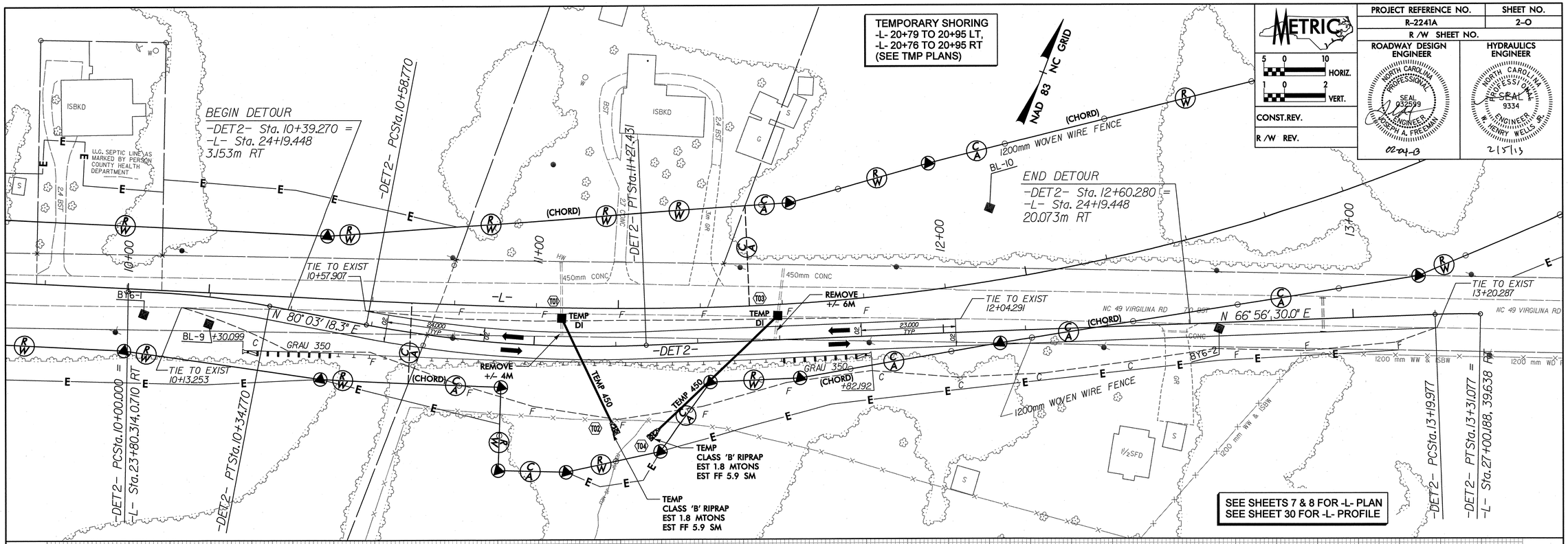
METRIC

5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.
R/W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
02-04-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
2/5/13



2/4/2013
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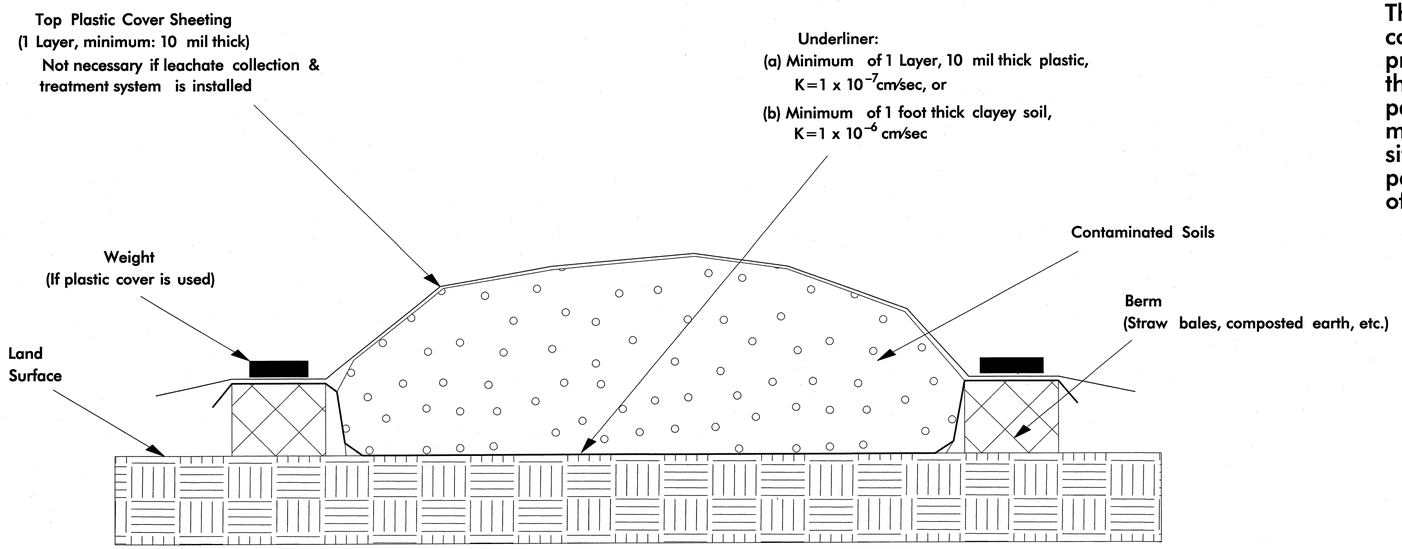
stephesc

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2241A	2-P
	R /W SHEET NO.	
NOT TO SCALE		
CONST.REV.		
R /W REV.		

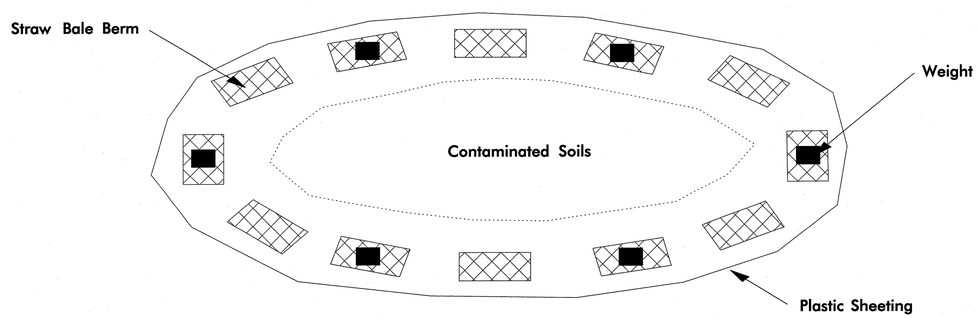
Detail for Temporary Containment of Contaminated Soil

Cross-Section View



NOTE:
The Contractor shall stockpile all contaminated soil excavated from a property in a location within the property boundaries of the source parcel. If the volume of contaminated material exceeds available space on site, the Contractor shall obtain a permit from the NCDENR UST Section for off-site temporary storage.

Map View



1/7/2013
c:\projects\proj\sheets\R2241A_RDY_psh02P.dgn
stephens

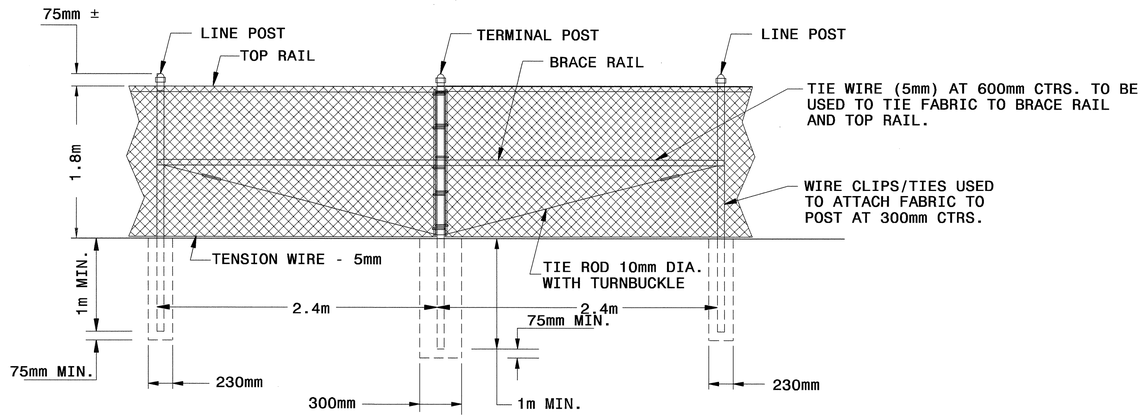
PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-Q

METRIC

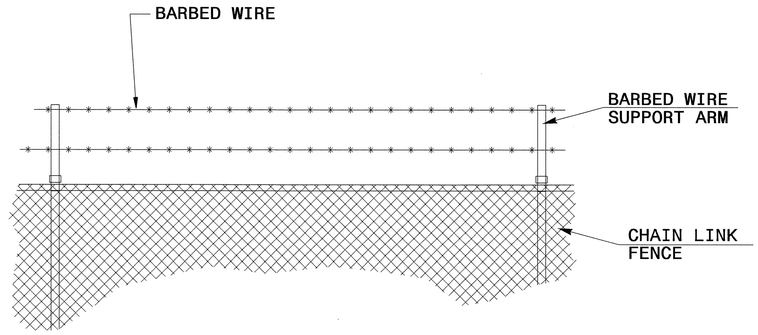
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

METRIC DETAIL DRAWING FOR
CHAIN LINK FENCE
1.8m HEIGHT

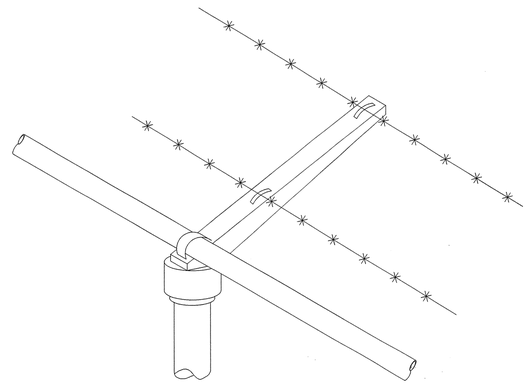
SHEET OF
866D01



LINE BRACE DETAIL



TYPICAL BARBED WIRE ATTACHMENT



BARBED WIRE FENCE SUPPORT ARM

Note:
This drawing is dimensioned in millimeters unless otherwise depicted within the drawing.

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

METRIC DETAIL DRAWING FOR
CHAIN LINK FENCE
1.8m HEIGHT

SHEET OF
866D01

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HUNT 2/25/13

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

SEE PLATE FOR TITLE

ORIGINAL BY: T.S.Spell DATE: 1-99
MODIFIED BY: DATE:
CHECKED BY: DATE: 12/14/12
FILE SPEC.: s:\details\stand\fence1cl_bw.dgn

THE STATE OF NORTH CAROLINA AND ITS AGENTS DO NOT REPRESENT THAT THE ELECTRONIC DATA FILE IS ERROR FREE

PROJECT REFERENCE NO.	SHEET NO.
R-2249-A	2-R

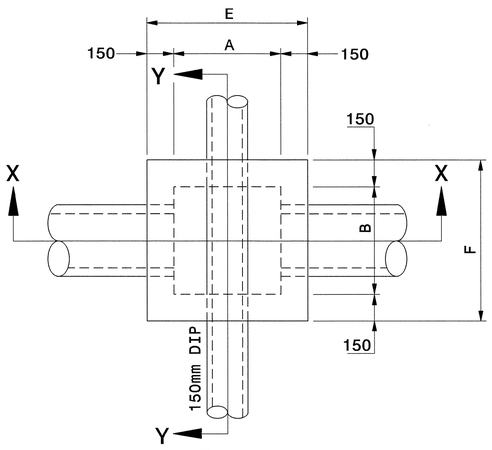
METRIC

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

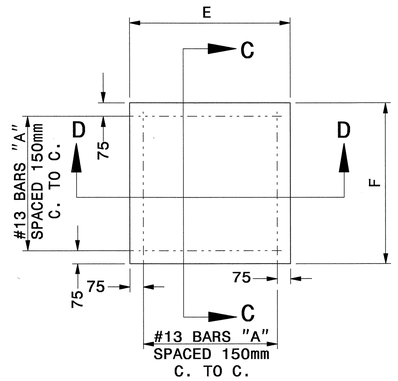
METRIC DETAIL DRAWING FOR

CONCRETE JUNCTION BOX WITH 150mm DIP LINE PASSING THRU

300mm THRU 1650mm PIPE



PLAN



GENERAL NOTES:

ALL EXPOSED CORNERS TO BE CHAMFERED 25mm.

CLASS "B" CONCRETE TO BE USED THROUGHOUT.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 50mm KEYWAY, OR #13 BAR DOWELS AT 300mm CENTERS AS DIRECTED BY THE ENGINEER.

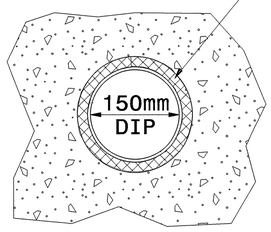
FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STD. DWG. 840.00.

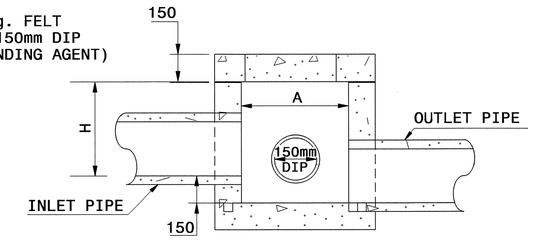
ALL JUNCTION BOXES OVER 1.0m IN DEPTH SHALL BE PROVIDED WITH STEPS 355mm ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. DWG. 840.66.

ADJUST THE STEEL, CONCRETE AND BRICK MASONRY QUANTITIES TO INCLUDE THE ADDITION OF THE MANHOLE (I.E. DIAGONAL BARS SHORTENED AROUND OPENING IN TOP SLAB, ADDITIONAL VARIABLE HEIGHT BRICK MASONRY, OPENING IN TOP SLAB.)

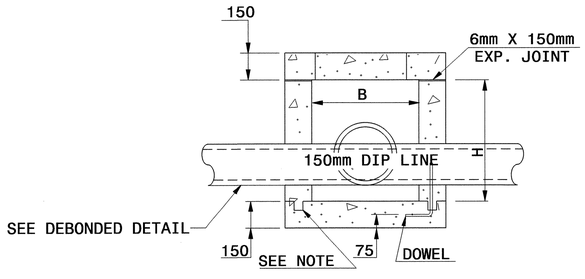
REFER TO R.S.D.N. 840.31 FOR PLACEMENT OF MANHOLE RING AND COVER IN JUNCTION BOX.



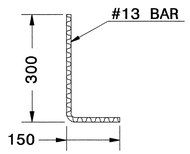
DEBONDED DETAIL



SECTION X-X



SECTION Y-Y



DOWEL

Note:
This drawing is dimensioned in millimeters unless otherwise depicted within the drawing.

DIMENSIONS AND QUANTITIES FOR CONCRETE JUNCTION BOXES

DIMENSIONS OF BOX AND PIPE				REINFORCEMENT BARS "A"		COVER DIMENSIONS		CUBIC METERS IN BOX			TOTAL QUANTITIES BOX AND COVER		DEDUCTIONS FOR ONE PIPE $m.^3$	
PIPE	SPAN	WIDTH	HEIGHT											
D	A	B	H	NO.	LENGTH	E	F	COVER	FLOOR	WALL/ m. OF H.	kg. REINF	m^3. MIN. "H"	C.S.	R.C.
300	610	610	686	12	838	914	914	0.127	0.127	0.464	10	0.573	0.011	0.018
375	686	686	762	12	914	991	991	0.149	0.149	0.512	11	0.689	0.017	0.027
450	762	762	838	14	991	1067	1067	0.173	0.173	0.557	14	0.814	0.025	0.037
600	914	914	991	16	1143	1219	1219	0.226	0.226	0.650	18	1.096	0.045	0.065
750	1067	1067	1143	18	1295	1372	1372	0.286	0.286	0.742	23	1.422	0.070	0.097
900	1219	1219	1295	20	1448	1524	1524	0.354	0.354	0.835	29	1.789	0.100	0.136
1050	1372	1372	1448	22	1600	1676	1676	0.428	0.428	0.928	35	2.200	0.137	0.185
1200	1524	1524	1600	24	1753	1829	1829	0.510	0.510	1.021	42	2.653	0.179	0.242
1350	1676	1676	1753	26	1905	1981	1981	0.597	0.597	1.114	49	3.147	0.227	0.306
1500	1829	1829	1905	28	2057	2134	2134	0.693	0.693	1.207	57	3.685	0.280	0.378
1650	1981	1981	2057	30	2210	2286	2286	0.796	0.796	1.299	66	4.267	0.339	0.450

SHEET 1 OF 1

840D31

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

METRIC DETAIL DRAWING FOR

CONCRETE JUNCTION BOX WITH 150mm DIP LINE PASSING THRU

300mm THRU 1650mm PIPE

SHEET 1 OF 1

840D31

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HUNDLEY 2/25/13

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

SEE PLATE FOR TITLE

ORIGINAL BY: E.E. WARD DATE: 6-6-00
MODIFIED BY: DATE:
CHECKED BY: DATE: 12/14/12
FILE SPEC.: usr/details/stand/conflict box.dgn

5/00/99

$$$$USERNAME$$$$
$$$$SYSTIME$$$$
$$$$ACTIVEDGN$$$$

PROJECT REFERENCE NO.	SHEET
R-2241A	2-S

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

STANDARD TEMPORARY MSE WALL OPTIONS

TEMPORARY MSE WALL OPTION	VENDOR	CONTACT INFORMATION	REINFORCEMENT TYPE	SHEETS
TEMPORARY FABRIC WALL	N/A	N/A	POLYESTER OR POLYPROPYLENE FABRIC	3
HILFIKER TEMPORARY WALL	HILFIKER RETAINING WALLS	1902 HILFIKER LANE, EUREKA, CA 95503-5711 707-443-5093 WWW.HILFIKER.COM	WELDED WIRE MAT	4
SIERRASCAPE TEMPORARY WALL	TENSAR EARTH TECHNOLOGIES, INC	5883 GLENRIDGE DRIVE, SUITE 200 ATLANTA, GA 30328-5363 404-250-1290 WWW.TENSARCORP.COM	GEOGRID	5
RETAINED EARTH TEMPORARY WALL	THE REINFORCED EARTH COMPANY	8614 WESTWOOD CENTER DRIVE, SUITE 1100 VIENNA, VA 22182-2233 703-749-4325 WWW.REINFORCEDEARTH.COM	WELDED WIRE MESH	6-8
TERRATREL TEMPORARY WALL	THE REINFORCED EARTH COMPANY	8614 WESTWOOD CENTER DRIVE, SUITE 1100 VIENNA, VA 22182-2233 703-749-4325 WWW.REINFORCEDEARTH.COM	RIBBED STEEL STRIPS	9-11

FOR STANDARD TEMPORARY MSE WALLS, SEE TEMPORARY SHORING SPECIAL PROVISION.

WHEN NOTES ON PLANS DO NOT PROHIBIT TEMPORARY MSE WALLS OR STANDARD SHORING, STANDARD TEMPORARY MSE WALLS ARE OPTIONAL.

WHEN NOTES ON PLANS REQUIRE TEMPORARY MSE WALLS, USE STANDARD TEMPORARY MSE WALLS OR CONTRACTOR DESIGNED TEMPORARY MSE WALLS.

WHEN THE ALIGNMENT OF STANDARD TEMPORARY MSE WALLS RESULTS IN AN INTERIOR ANGLE LESS THAN 90 DEGREES, SUBMIT AN ACUTE CORNER DETAIL FOR THE SPECIFIC SITUATION IN ACCORDANCE WITH THE WALL VENDOR RECOMMENDATIONS. ALSO, SUBMIT A "STANDARD TEMPORARY MSE WALL SELECTION FORM" FOR EACH TEMPORARY MSE WALL LOCATION. SUBMIT THESE ITEMS AT LEAST 14 DAYS BEFORE BEGINNING WALL CONSTRUCTION.

STANDARD TEMPORARY MSE WALLS ARE BASED ON THE FOLLOWING CONDITIONS:
1) MAXIMUM WALL HEIGHT IS 28′-0″ (8.5m).
2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
3) EXISTING OR FINISHED GRADE IN FRONT OF WALL IS 6:1 (H:V) SLOPE OR FLATTER.
4) THE GRADE OF THE TOP OF WALL IS LESS THAN 4% FOR RETAINED EARTH AND TERRATREL TEMPORARY WALLS.
5) DESIGN SERVICE LIFE IS 3 YEARS.
6) MATERIAL IN REINFORCED ZONE IS SHORING BACKFILL.
7) MAXIMUM APPLIED BEARING PRESSURE IS 1 TSF (100 KPA) FOR WALL HEIGHTS UP TO 8′-0″ (2.4m), 2 TSF (195 KPA) FOR WALL HEIGHTS BETWEEN 8′-0″ AND 18′-0″ (2.4m AND 5.5m) AND 3 TSF (290 KPA) FOR WALL HEIGHTS OVER 18′-0″ (5.5m).

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

DO NOT USE STANDARD TEMPORARY MSE WALLS WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE BOTTOM OF REINFORCED ZONE.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF STANDARD TEMPORARY MSE WALLS. COLLECT AND DIRECT RUNOFF AWAY FROM WALLS AND SHORING BACKFILL.

EXCAVATE AS NECESSARY FOR STANDARD TEMPORARY MSE WALLS IN ACCORDANCE WITH THE FOLLOWING FOR THE WALL OPTION CHOSEN:
1) MINIMUM EMBEDMENT OF 18″ (450mm) UNLESS WALL BEARS ON ROCK, CONCRETE OR PAVEMENT AS DETERMINED BY THE ENGINEER
2) VERTICAL STEPS IN INCREMENTS EQUAL TO THE VERTICAL REINFORCEMENT SPACING
3) WITH THE EXCEPTION OF EITHER THE FIRST OR LAST SECTION OF WALL, HORIZONTAL SECTION LENGTHS IN INCREMENTS EQUAL TO THE FOLLOWING:

STANDARD TEMPORARY MSE WALL OPTION	INCREMENT
TEMPORARY FABRIC WALL	9′-0″ (2.7m) MIN (VARIES)
HILFIKER TEMPORARY WALL	10′-0″ (3.0m) MIN (VARIES)
SIERRASCAPE TEMPORARY WALL	18′-7¼″ (5.7m)
RETAINED EARTH TEMPORARY WALL	24′-0″ (7.3m)
TERRATREL TEMPORARY WALL	19′-8″ (6.0m)

DO NOT PLACE SHORING BACKFILL OR FIRST REINFORCEMENT LAYER UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

IF APPLICABLE, INSTALL FOUNDATIONS LOCATED WITHIN THE REINFORCED ZONE BEFORE BEGINNING WALL CONSTRUCTION UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

ERECT AND MAINTAIN FACINGS AND FORMS AS SHOWN ON THE STANDARD TEMPORARY MSE WALL DETAILS. STAGGER VERTICAL JOINTS OF FACINGS AND FORMS TO CREATE A RUNNING BOND WHEN POSSIBLE UNLESS SHOWN OTHERWISE ON THESE DETAILS.

PLACE FACINGS AND FORMS AS NEAR TO VERTICAL AS POSSIBLE WITH NO NEGATIVE BATTER. CONSTRUCT STANDARD TEMPORARY MSE WALLS WITH A VERTICAL AND HORIZONTAL TOLERANCE OF 3″ (75mm) WHEN MEASURED WITH A 10′-0″ (3m) STRAIGHT EDGE AND AN OVERALL VERTICAL PLUMBNESS (BATTER) AND HORIZONTAL ALIGNMENT OF LESS THAN 6″ (150mm).

PLACE REINFORCEMENT AT LOCATIONS AND ELEVATIONS SHOWN ON THE STANDARD TEMPORARY MSE WALL DETAILS AND IN SLIGHT TENSION FREE OF KINKS, FOLDS, WRINKLES OR CREASES.

DO NOT SPLICE REINFORCEMENT IN THE REINFORCEMENT DIRECTION (RD), i.e., PARALLEL TO THE WALL FACE. SEAMS ARE ALLOWED IN THE CROSS-REINFORCEMENT DIRECTION (CRD).

CONTACT THE ENGINEER WHEN EXISTING OR FUTURE STRUCTURES SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT. TO AVOID STRUCTURES, DELFECT, SKEW AND MODIFY REINFORCEMENT.

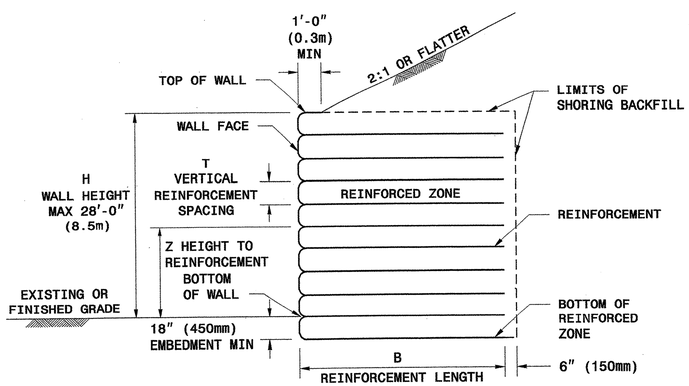
PLACE SHORING BACKFILL IN 8″ TO 10″ (200mm to 250mm) THICK LIFTS AND COMPACT IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. USE ONLY HAND OPERATED COMPACTION EQUIPMENT WITHIN 3′-0″ (1m) OF THE WALL FACE.

DO NOT DAMAGE REINFORCEMENT WHEN PLACING AND COMPACTING SHORING BACKFILL. DO NOT OPERATE HEAVY EQUIPMENT ON REINFORCEMENT UNTIL IT IS COVERED WITH AT LEAST 10″ (250mm) OF SHORING BACKFILL. DO NOT USE SHEEPSFOOT, GRID ROLLERS OR OTHER TYPES OF COMPACTION EQUIPMENT WITH FEET.

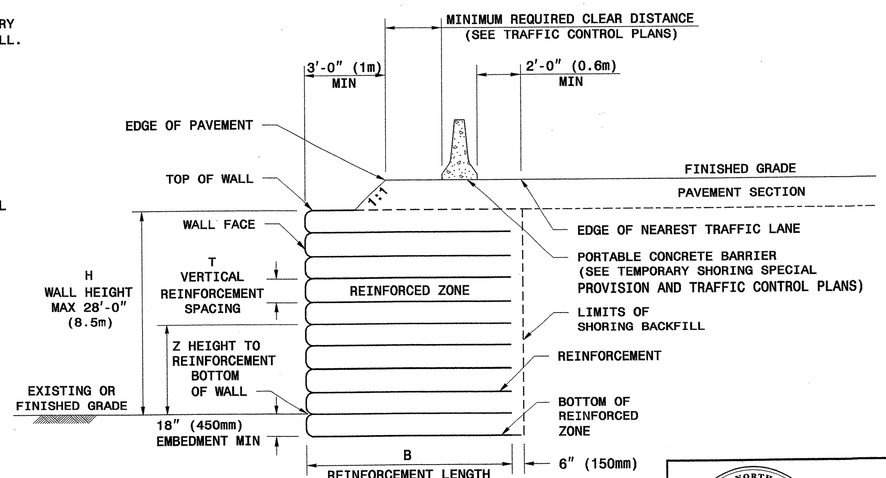
COVER REINFORCING AND RETENTION FABRIC WITH AT LEAST 3″ (75mm) OF SHORING BACKFILL. PLACE TOP REINFORCEMENT LAYER BETWEEN 4″ AND 24″ (100mm and 600mm) BELOW TOP OF WALL DEPENDING ON WALL OPTION.

BENCH STANDARD TEMPORARY MSE WALLS INTO THE SIDES OF EXCAVATIONS WHERE APPLICABLE.

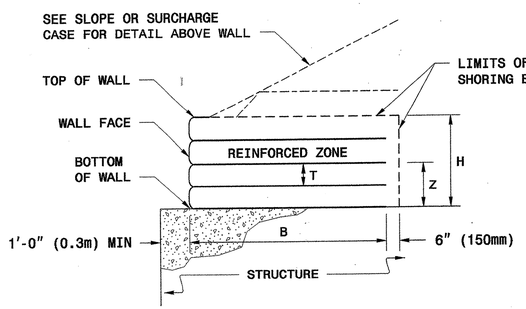
IF THE TOP OF WALL IS WITHIN 5′-0″ (1.5m) OF FINISHED GRADE, REMOVE TOP FORM OR FACING AND INCORPORATE THE TOP REINFORCEMENT LAYER INTO THE FILL WHEN PLACING FILL IN FRONT OF THE WALL. STANDARD TEMPORARY MSE WALLS REMAIN IN PLACE PERMANENTLY UNLESS REQUIRED OTHERWISE.



SLOPE CASE



SURCHARGE CASE



TEMPORARY MSE WALL ON STRUCTURE

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY MECHANICALLY STABILIZED EARTH (MSE) WALLS

SHEET 1 OF 11 DATE: 2-20-07

3EC221427 12/21/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2241A	2-T

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott a. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

HOW TO USE THIS SHEET:

- FOR ALL WALL OPTIONS, DETERMINE MINIMUM REQUIRED REINFORCEMENT LENGTH (B) FROM TABLE AT RIGHT BASED ON WALL HEIGHT (H) AND SLOPE OR SURCHARGE CASE
- FOR STANDARD TEMPORARY FABRIC WALL, SEE SHEET 3 FOR FABRIC STRENGTH REQUIREMENTS BASED ON WALL HEIGHT (H)
- FOR ALL OTHER WALL OPTIONS, DETERMINE REINFORCEMENT TYPE FROM TABLES BELOW FOR EACH HEIGHT TO REINFORCEMENT (Z) BASED ON WALL HEIGHT (H) AND SLOPE OR SURCHARGE CASE

MINIMUM REQUIRED REINFORCEMENT LENGTH B (M)

(FOR ALL WALL OPTIONS)

WALL HEIGHT H (M)	<2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5
SLOPE CASE	2.4	3.4	4.0	4.3	4.9	5.5	6.1	6.7	7.3	7.6	8.2
SURCHARGE CASE	2.4	2.7	3.4	3.7	4.3	4.6	4.9	5.5	5.8	6.4	6.7

TERRATREL TEMPORARY WALL (STRIPS PER LEVEL PER PANEL)

H (M) < 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												3	8.4
											3	3	8.2
											3	3	7.7
										3	3	3	7.2
									3	3	3	3	6.7
								4	3	3	3	3	6.1
							4	4	3	3	3	3	5.6
						4	4	4	3	3	3	3	5.1
						4	4	4	3	3	3	3	4.6
					5	4	4	4	3	3	3	3	4.1
				5	5	4	4	4	3	3	3	3	3.6
			5	5	5	4	4	4	3	3	3	3	3.1
		5	5	5	5	4	4	4	3	3	3	3	2.6
	5	5	5	5	5	4	4	4	3	3	3	3	2.1
	5	5	5	5	5	4	4	4	3	3	3	3	1.6
5	5	5	5	5	5	4	4	4	3	3	3	3	1.1
5	5	5	5	5	5	4	4	4	3	3	3	3	0.6
5	5	5	5	5	5	4	4	4	3	3	3	3	0.1
5	5	5	5	5	5	4	4	4	3	3	3	3	-0.2

SLOPE AND SURCHARGE CASES

SIERRASCAPE TEMPORARY WALL (GEOGRID TYPE)

11 = UX1100MSE
14 = UX1400MSE
15 = UX1500MSE
16 = UX1600MSE
17 = UX1700MSE

H (M) < 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												11	8.1
											11	11	7.8
											11	11	7.3
										11	11	11	6.9
									11	11	11	15	6.4
								11	11	11	14	15	5.9
								11	11	11	14	15	5.5
							11	11	11	14	15	15	5.0
						11	11	11	11	14	15	15	4.6
					11	11	11	11	15	15	15	15	4.1
					11	11	11	15	15	15	15	15	3.7
				11	11	11	11	15	15	15	15	16	3.2
			11	11	11	11	15	15	15	15	15	16	2.7
		11	11	11	11	14	15	15	15	15	16	16	2.3
		11	11	11	11	14	15	15	15	16	16	16	1.8
	11	11	11	11	15	15	15	15	15	16	16	17	1.4
11	11	11	11	14	15	15	15	15	16	16	16	17	0.9
11	11	11	11	14	15	15	15	16	16	16	17	17	0.5
11	11	11	14	15	15	15	15	16	16	17	17	17	0.0
11	11	11	14	15	15	15	15	16	16	17	17	17	-0.5

SLOPE CASE

H (M) < 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												11	8.1
												11	7.8
											11	11	7.3
										11	11	11	6.9
									11	11	11	11	6.4
								11	11	11	11	11	5.9
								11	11	11	11	15	5.5
							11	11	11	11	15	15	5.0
						11	11	11	11	15	15	15	4.6
						11	11	11	11	15	15	15	4.1
					11	11	11	11	15	15	15	15	3.7
				11	11	11	11	15	15	15	15	15	3.2
			11	11	11	11	11	15	15	15	15	15	2.7
		11	11	11	11	11	15	15	15	15	15	16	2.3
	11	11	11	11	11	14	15	15	15	15	15	16	1.8
11	11	11	11	11	14	14	15	15	15	15	16	16	1.4
11	11	11	11	11	14	15	15	15	15	16	16	16	0.9
11	11	11	11	15	15	15	15	15	16	16	16	17	0.5
11	11	11	14	15	15	15	15	15	16	16	17	17	0.0
11	11	11	14	15	15	15	15	15	16	16	17	17	-0.5

SURCHARGE CASE

HILFIKER TEMPORARY WALL (WELDED WIRE MAT TYPE)

29 = MW29 x MW23
45 = MW45 x MW23
61 = MW61 x MW26

H (M) < 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												29	7.9
											29	45	7.3
										29	45	45	6.7
									29	45	45	45	6.1
								29	45	45	45	45	5.5
							29	45	45	45	45	45	4.9
						29	45	45	45	45	45	61	4.3
					29	45	45	45	45	45	61	61	3.7
				29	45	45	45	45	45	61	61	61	3.0
			29	45	45	45	45	45	61	61	61	61	2.4
		29	45	45	45	45	45	61	61	61	61	61	1.8
	29	45	45	45	45	45	61	61	61	61	61	61	1.2
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	45	0.9
29	45	45	45	45	45	61	61	61	61	61	61	45	0.6
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	45	45	0.3
45	45	45	45	45	61	61	61	61	61	61	45	45	0.0
45	45	45	45	45	61	61	61	61	61	61	61	61	-0.5

SLOPE CASE

H (M) < 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												29	7.9
											29	45	7.3
										29	45	45	6.7
									29	45	45	45	6.1
								29	45	45	45	45	5.5
							29	45	45	45	45	45	4.9
						29	45	45	45	45	45	45	4.3
					29	45	45	45	45	45	45	61	3.7
				29	45	45	45	45	45	45	61	61	3.0
			29	45	45	45	45	45	45	61	61	61	2.4
		29	45	45	45	45	45	45	61	61	61	61	1.8
	29	45	45	45	45	45	45	61	61	61	61	61	1.2
29	45	45	45	45	45	45	61	61	61	61	61	61	0.6
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	45	0.3
45	45	45	45	45	45	45	61	61	61	61	61	45	0.0
45	45	45	45	45	45	45	61	61	61	61	61	61	-0.5

SURCHARGE CASE

RETAINED EARTH TEMPORARY WALL (WELDED WIRE MESH TYPE)

3X1 = 3MW52 x MW52 x 305mm
3X2 = 3MW52 x MW52 x 610mm

H (M) < 1.2	1.2 TO 1.8	1.8 TO 2.4	2.4 TO 3.0	3.0 TO 3.7	3.7 TO 4.3	4.3 TO 4.9	4.9 TO 5.5	5.5 TO 6.1	6.1 TO 6.7	6.7 TO 7.3	7.3 TO 7.9	7.9 TO 8.5	Z (M)
												3X1	8.4
												3X1	8.2
											3X1	3X2	7.7
										3X1	3X1	3X2	7.2
									3X1	3X1	3X2	3X2	6.7
								3X1	3X1	3X2	3X2	3X2	6.1
							3X1	3X1	3X2	3X2	3X2	3X2	5.6
							3X1	3X2	3X2	3X2	3X2	3X2	5.1
						3X1	3X2	3X2	3X2	3X2	3X2	3X2	4.6
					3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	4.1
				3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3.6
			3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3.1
		3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	2.6
		3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	2.1
	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	1.6
3X1	3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	1.1
3X1	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	0.6
3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	0.1
3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	3X2	-0.5

SLOPE AND SURCHARGE CASES

NOTES FOR HILFIKER TEMPORARY WALL

1) CAP MAT AT TOP OF WALL IS NOT INCLUDED IN TABLES.
2) REINFORCEMENT IS NOT REQUIRED AT 0.3m LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 7.3m.
3) REINFORCEMENT IS NOT REQUIRED AT 0.9m LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 7.9m.
4) REINFORCEMENT IS NOT REQUIRED AT 0.3m LEVEL FOR SURCHARGE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 7.9m.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

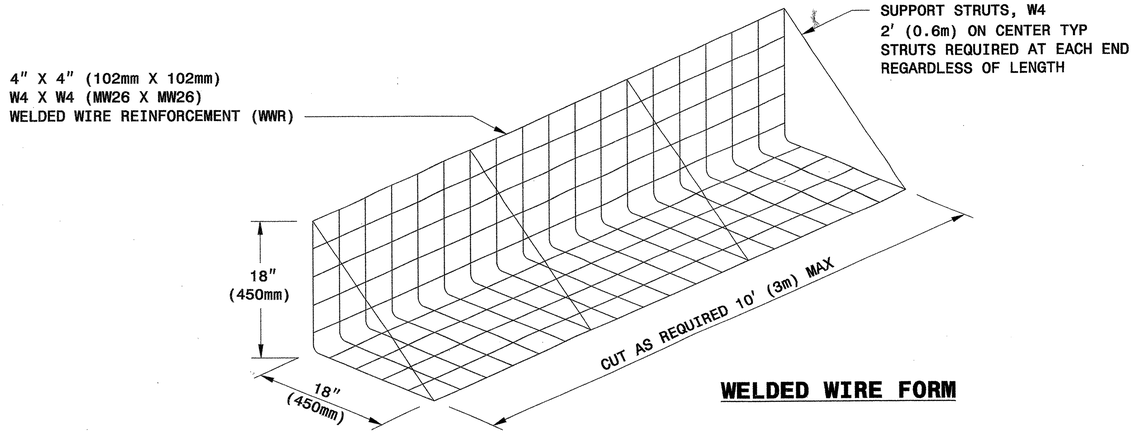
STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY MSE WALL REINFORCEMENT TABLES - METRIC UNITS

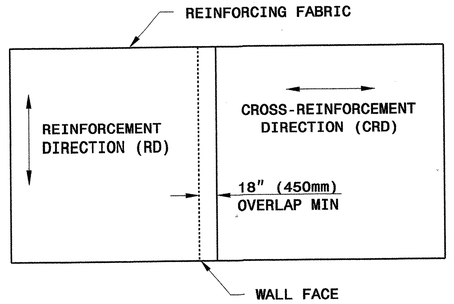
SHEET 2 OF 11 DATE: 2-20-07

PROJECT REFERENCE NO.	SHEET
R-2241A	2-U

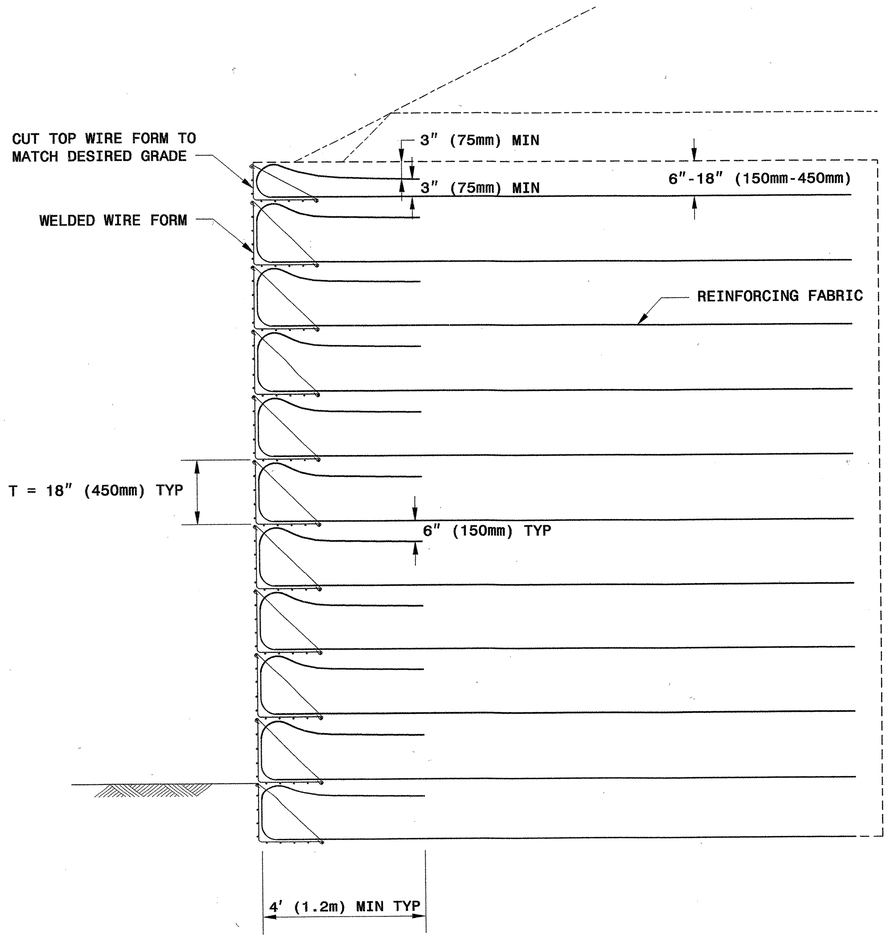
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN	
Scott A. Hidden 3/29/07	
SIGNATURE DATE	SIGNATURE DATE



WELDED WIRE FORM



PLAN VIEW OF FABRIC OVERLAP



TYPICAL SECTION

MINIMUM REQUIRED REINFORCING FABRIC STRENGTH FOR RD*
(SLOPE AND SURCHARGE CASES)

WALL HEIGHT H FEET (M)	POLYESTER WIDE WIDTH TENSILE STRENGTH @ ULTIMATE LB/INCH (KN/M)	POLYPROPYLENE WIDE WIDTH TENSILE STRENGTH @ ULTIMATE LB/INCH (KN/M)
4 (1.2)	200 (35)	200 (35)
6 (1.8)	200 (35)	200 (35)
8 (2.4)	200 (35)	200 (35)
10 (3.0)	200 (35)	230 (40)
12 (3.7)	220 (39)	264 (46)
14 (4.3)	248 (43)	297 (52)
16 (4.9)	276 (48)	330 (58)
18 (5.5)	304 (53)	364 (64)
20 (6.1)	332 (58)	397 (70)
22 (6.7)	359 (63)	431 (76)
24 (7.3)	387 (68)	464 (81)
26 (7.9)	415 (73)	497 (87)
28 (8.5)	443 (78)	531 (93)

*RD = REINFORCEMENT DIRECTION

GEOTECHNICAL ENGINEERING UNIT
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

TEMPORARY
FABRIC WALL

SHEET 3 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2241A	2-V

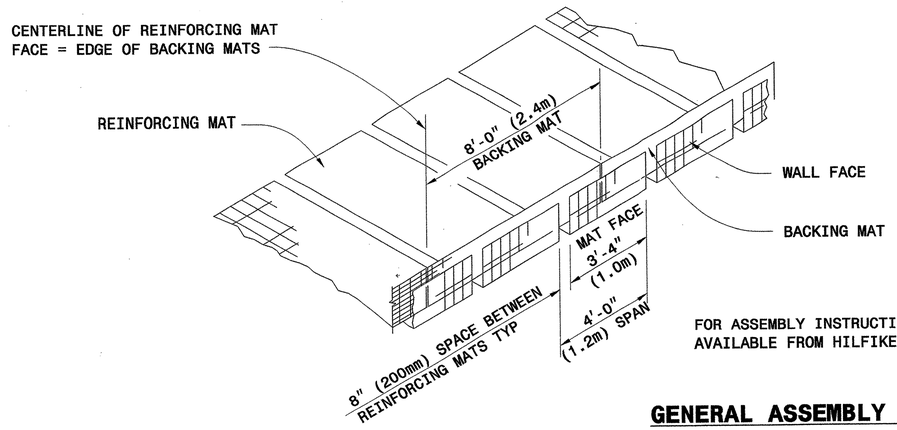
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
SIGNATURE DATE

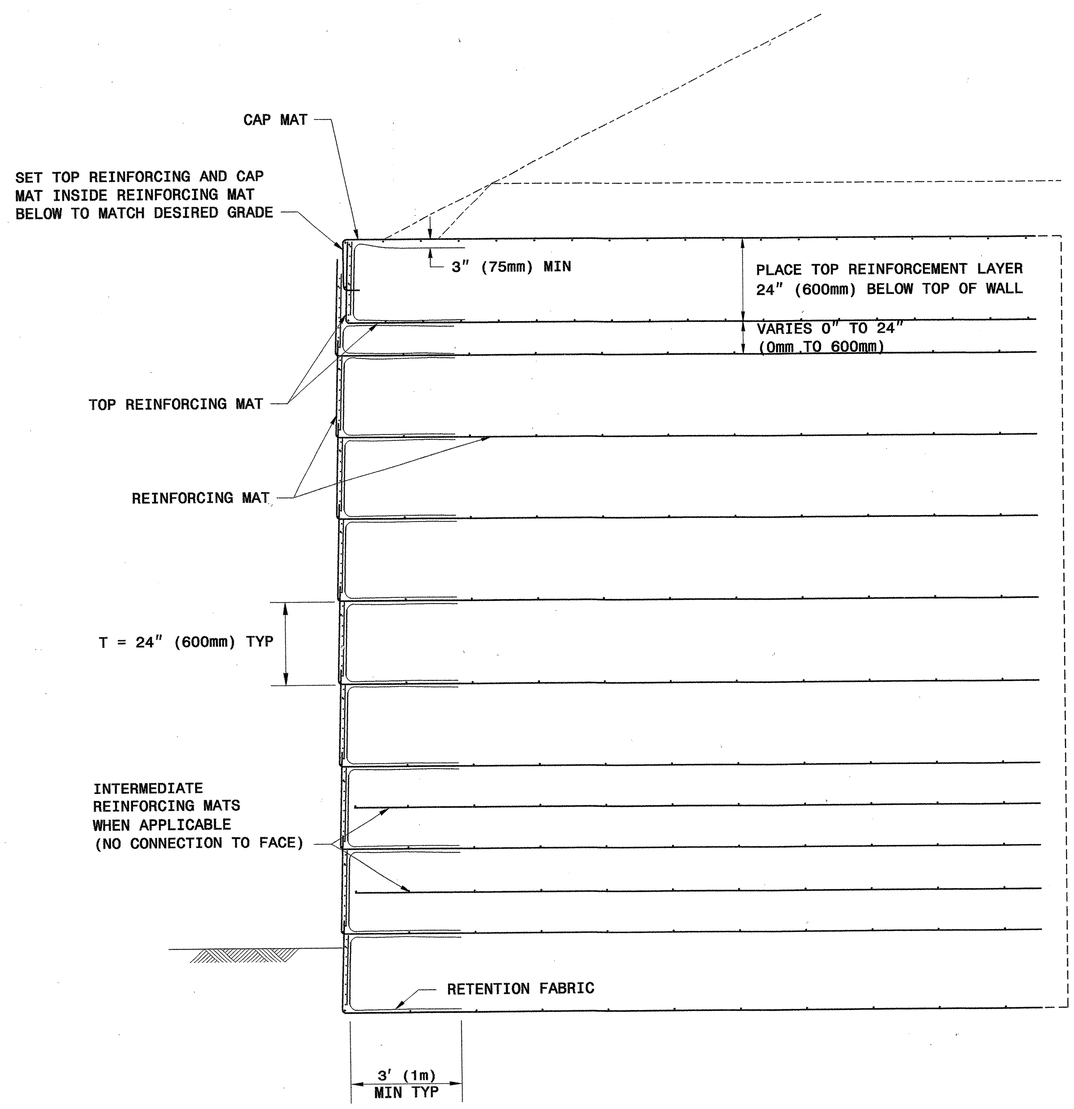
ENGINEER

SIGNATURE DATE

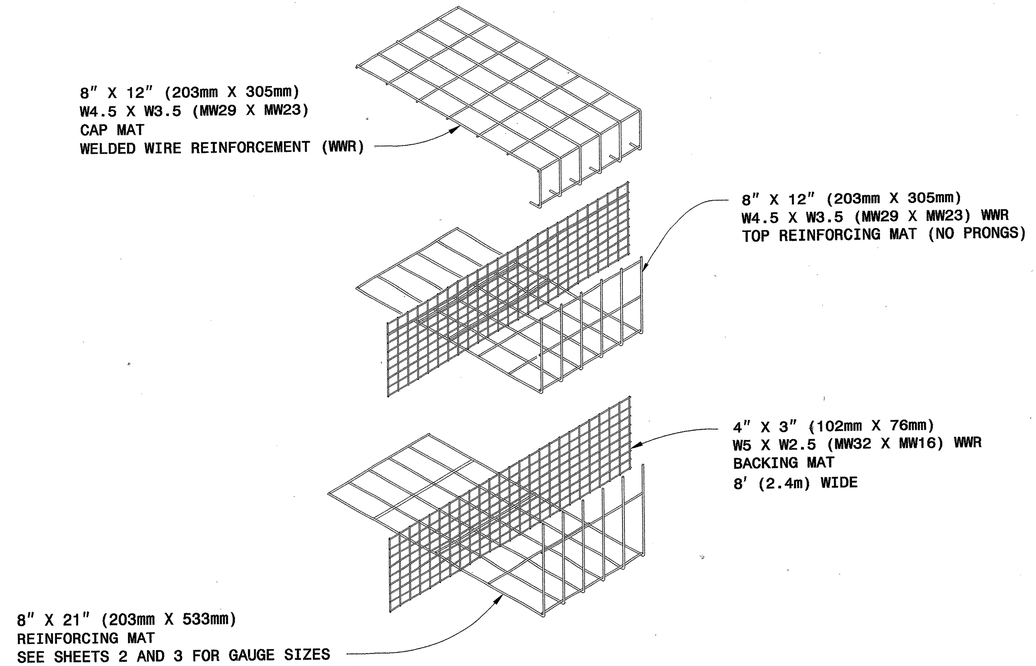


FOR ASSEMBLY INSTRUCTIONS, SEE WELDED WIRE WALL CONSTRUCTION GUIDE AVAILABLE FROM HILFIKER WEBSITE AT WWW.HILFIKER.COM/WWW

GENERAL ASSEMBLY DETAIL



TYPICAL SECTION



WALL COMPONENTS

HILFIKER RETAINING WALLS

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

HILFIKER TEMPORARY WALL

SHEET 4 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2241A	2-W

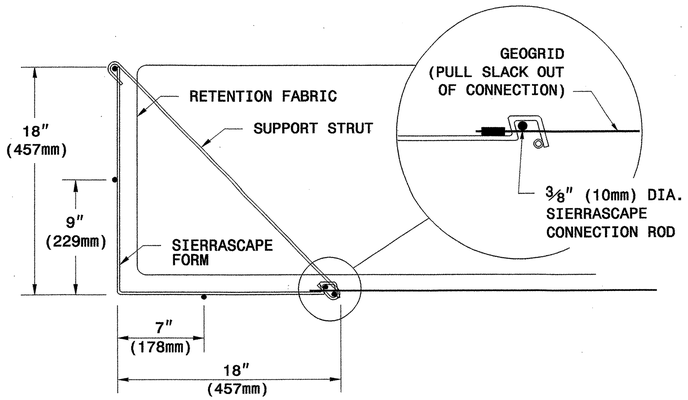
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

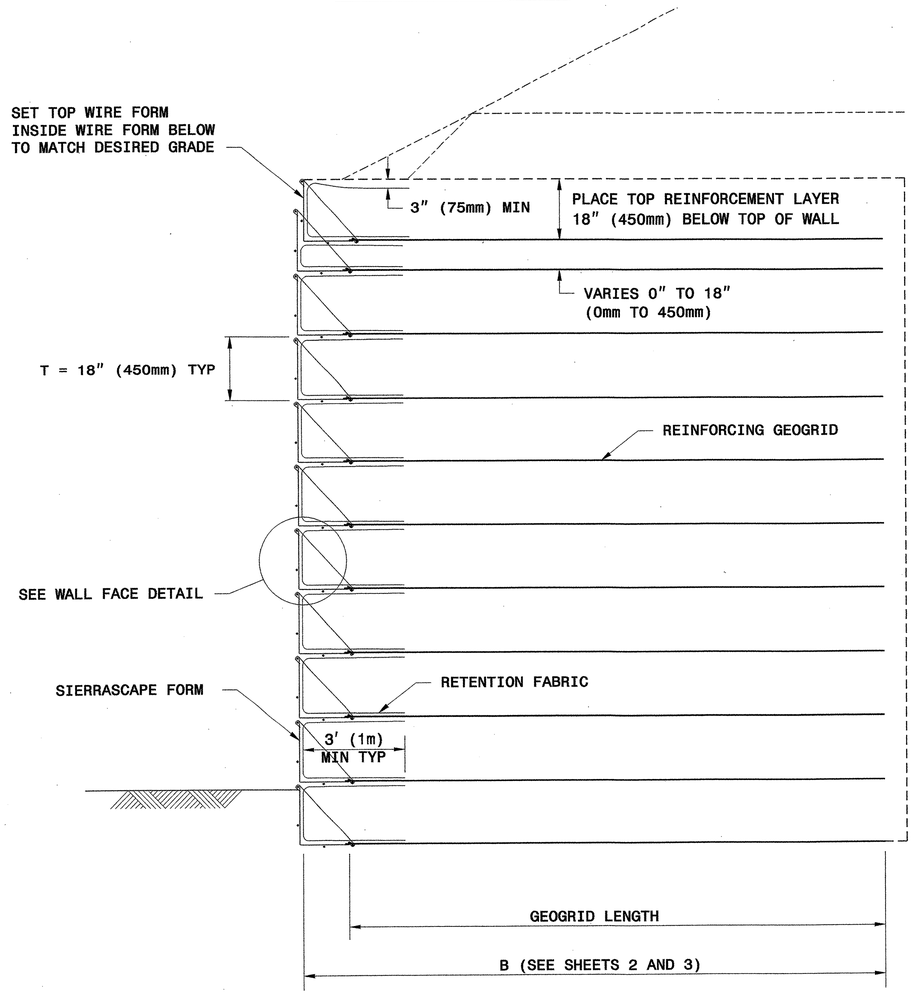
Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

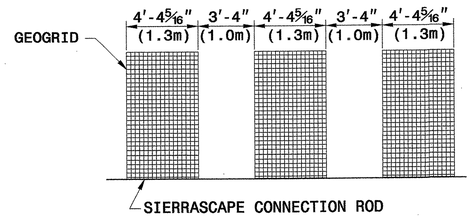
SIGNATURE DATE



WALL FACE DETAIL

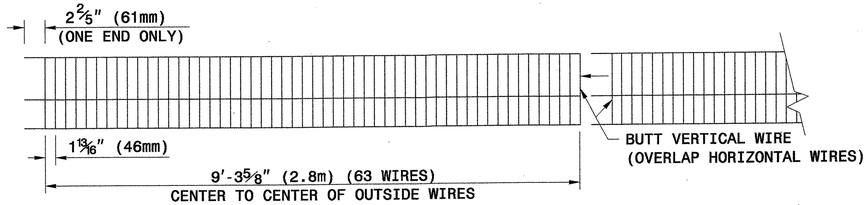


TYPICAL SECTION

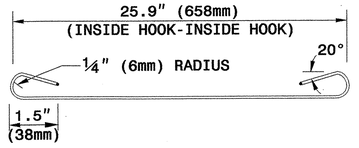


PLACE ALTERNATE LAYERS OF GEOGRID IN STAGGERED PATTERN SUCH THAT THE LAYER ABOVE IS CENTERED OVER SPACE BELOW

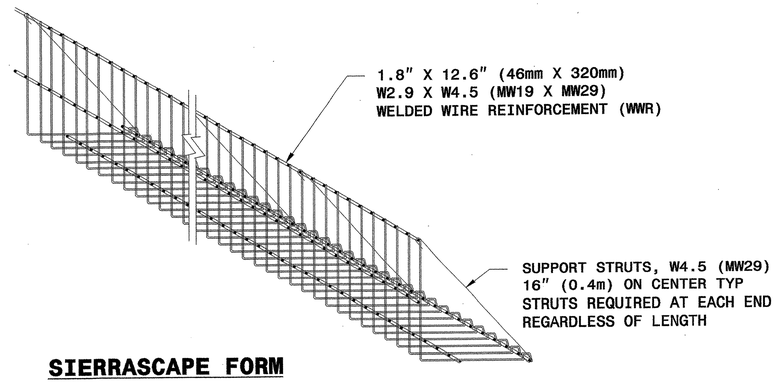
TYPICAL GEOGRID COVERAGE



ELEVATION VIEW



SUPPORT STRUT



SIERRASCAPE FORM

WALL COMPONENTS

TENSAR®
TENSAR EARTH TECHNOLOGIES, INC.

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

SIERRASCAPE
TEMPORARY WALL

SHEET 5 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
TR-2241A	2-X

GEOTECHNICAL ENGINEER

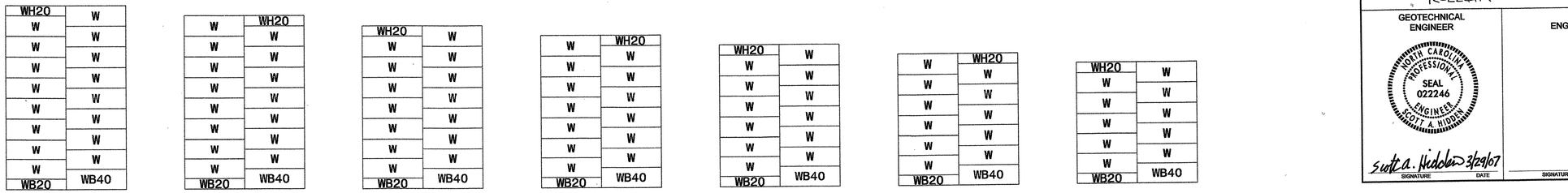
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

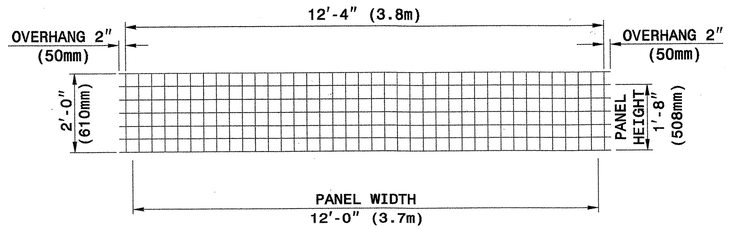
scott a. hidden 3/29/07
SIGNATURE DATE

ENGINEER

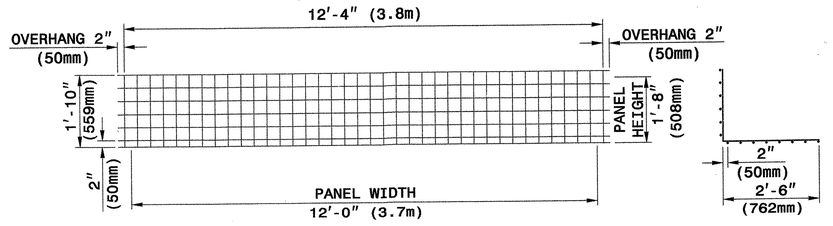
SIGNATURE DATE

PANEL LAYOUTS

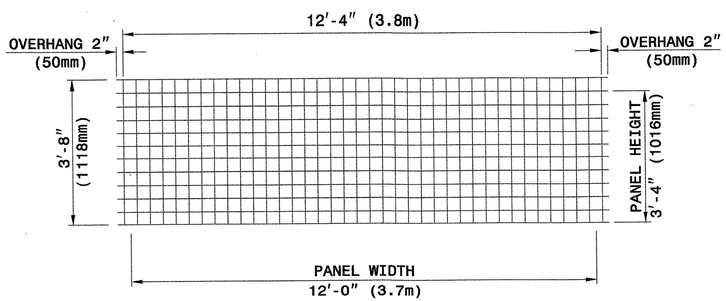




TYPE WH20

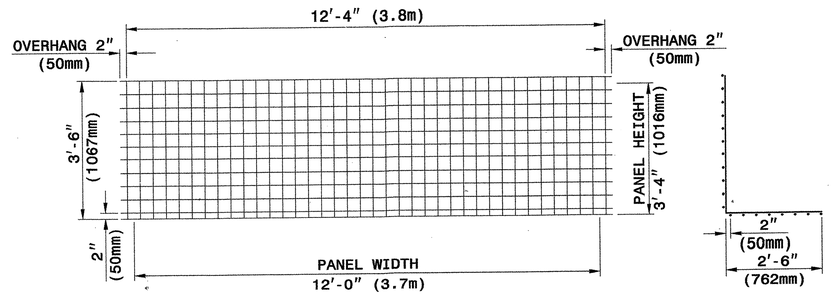


TYPE WB20 **SECTION**



TYPE W

WELDED WIRE FACINGS



TYPE WB40 **SECTION**

WELDED WIRE FORMS

PANEL TYPES (WELDED WIRE FACINGS AND FORMS)

4" X 4" (100mm X 100mm), W8 X W8 (MW52 X MW52) WELDED WIRE REINFORCEMENT (WWR)

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH TEMPORARY WALL

SHEET 6 OF 11 DATE: 12-19-06

GEC221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2241A	2-Y

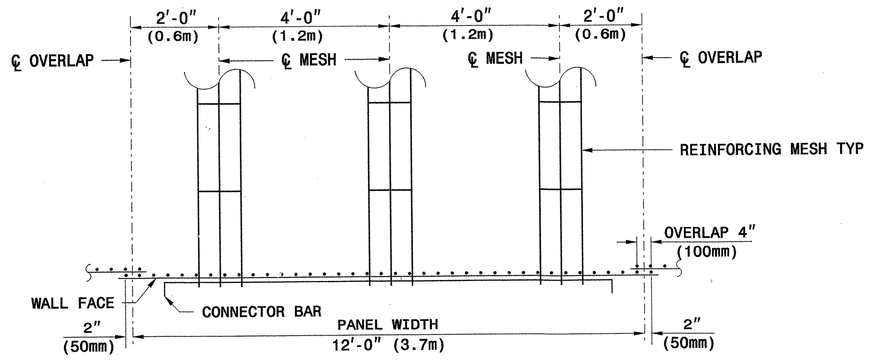
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07
SIGNATURE DATE

ENGINEER

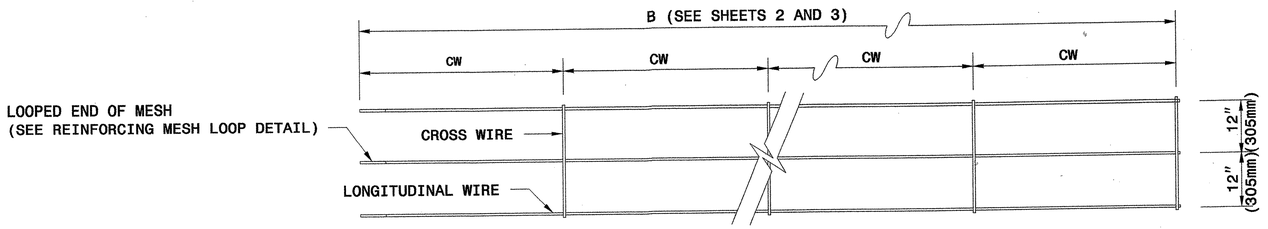
SIGNATURE DATE



REINFORCING MESH PLACEMENT DETAIL
(PLAN VIEW)

½" (13mm) DIA. BAR

CONNECTOR BAR



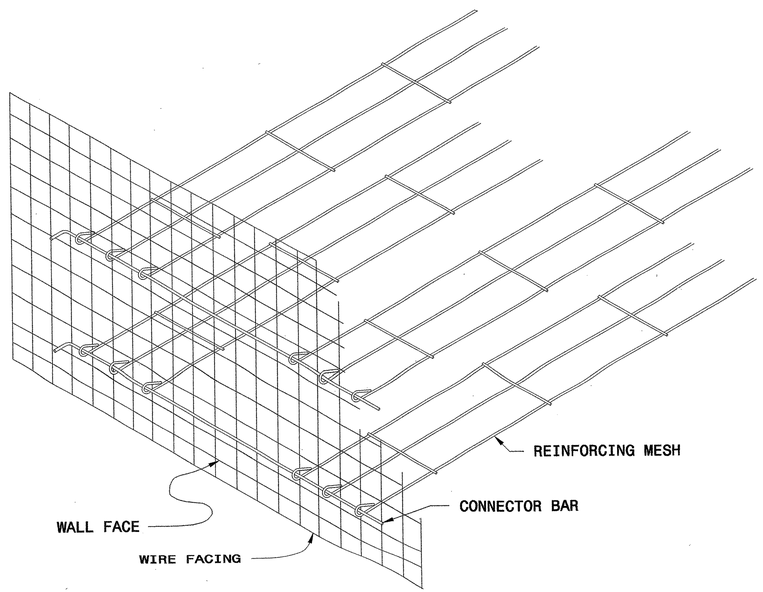
IF REINFORCEMENT LENGTH IS NOT AN INCREMENT OF 2'-0" (610mm) MAKE CW EQUAL TO 12" (305mm) AT THE END OF THE REINFORCING MESH OPPOSITE THE LOOPED END

3W8 X W8 x 2.0' (3MW52 X MW52 X 610mm)

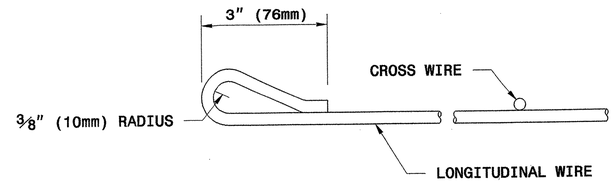
- NO. OF LONGITUDINAL WIRES
- GAUGE OF LONGITUDINAL WIRES
- GAUGE OF CROSS WIRES
- SPACING OF CROSS WIRES IN FT (mm), CW

REINFORCING MESH DESIGNATION

REINFORCING MESH



GENERAL ASSEMBLY DETAIL



REINFORCING MESH LOOP DETAIL

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

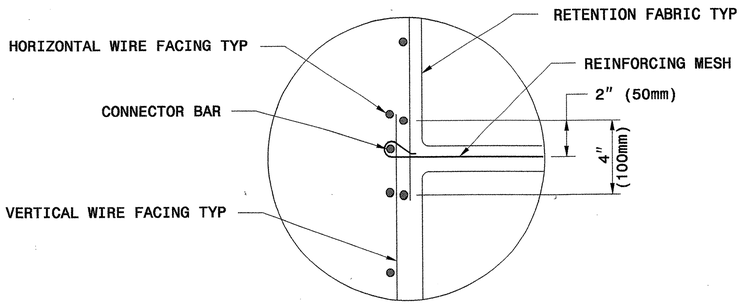
RETAINED EARTH TEMPORARY WALL

SHEET 7 OF 11 DATE: 12-19-06

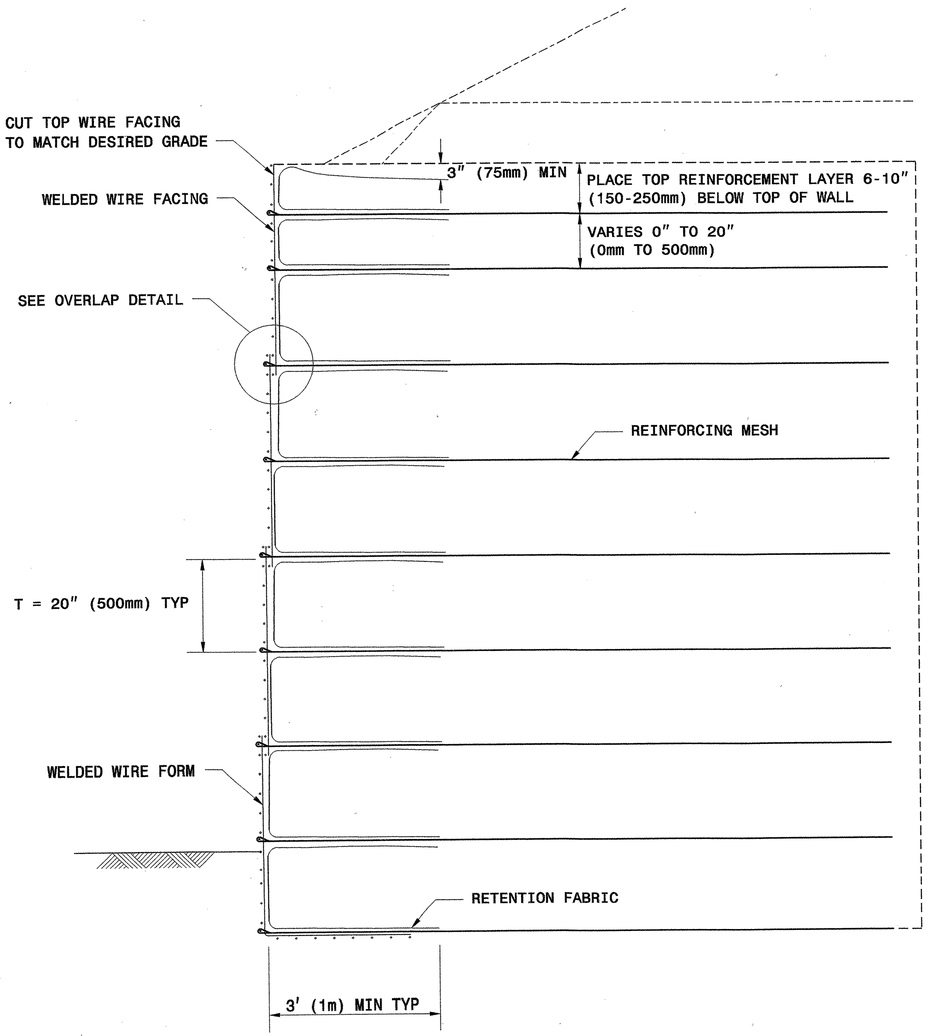
GEC221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2401A	2-2

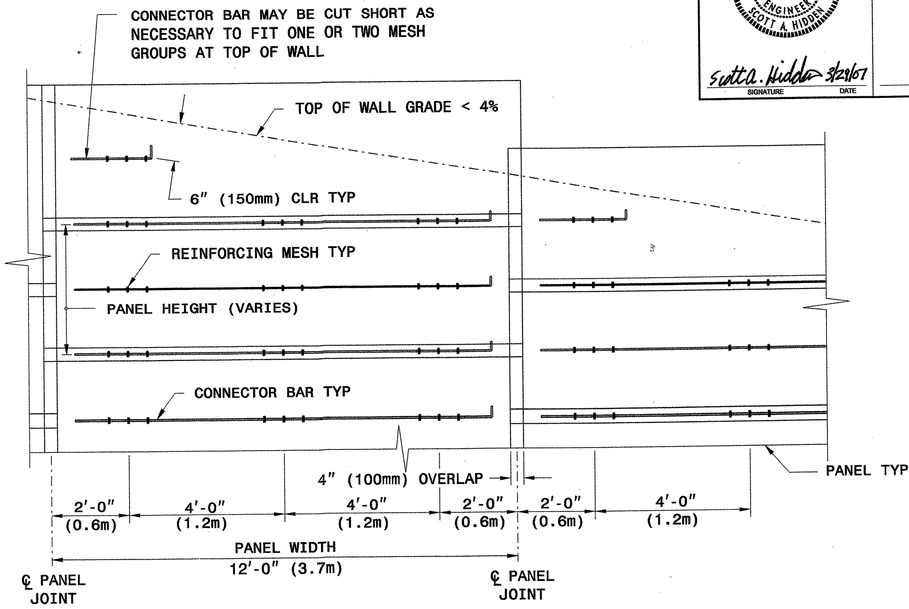
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN	
Scott A. Hidden 3/29/07 SIGNATURE DATE	SIGNATURE DATE



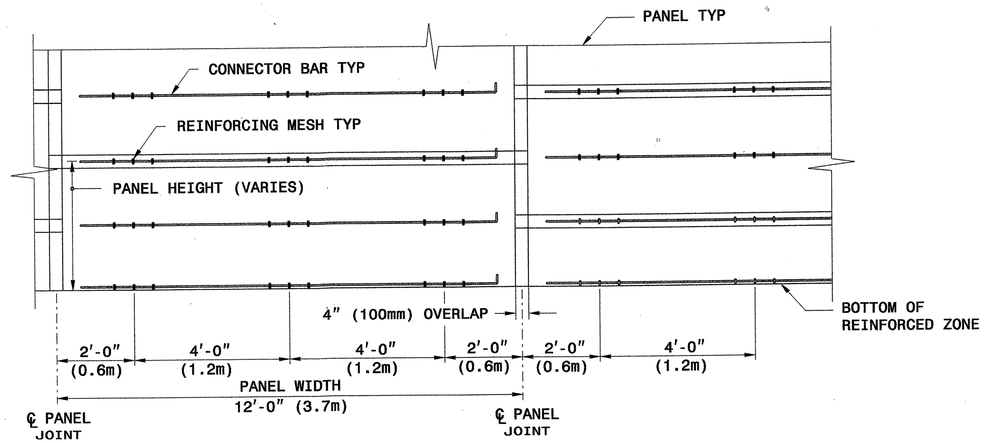
OVERLAP DETAIL



TYPICAL SECTION



TYPICAL ELEVATION @ TOP OF WALL
(WIRES NOT SHOWN FOR CLARITY)



TYPICAL ELEVATION @ BOTTOM OF WALL
(WIRES NOT SHOWN FOR CLARITY)

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

RETAINED EARTH
TEMPORARY WALL

SHEET 8 OF 11 DATE: 12-19-06

GEC221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2248A	2-AA

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

scott a. hidden 3/29/07
SIGNATURE DATE

ENGINEER

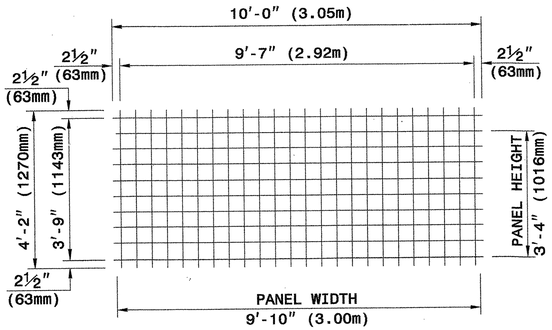
SIGNATURE DATE

PANEL LAYOUTS

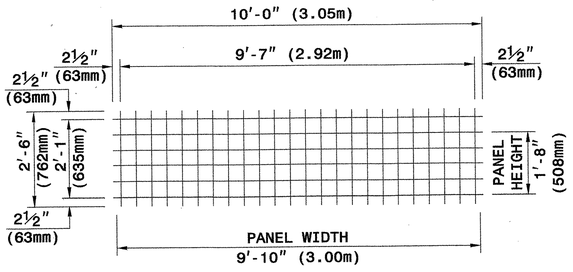
H - WALL HEIGHT

(FEET-INCHES)	< 28 - 0	< 27 - 8	< 26 - 0	< 24 - 4	< 22 - 8	< 21 - 0	< 19 - 4
(METER)	< 8.5	< 8.4	< 7.9	< 7.4	< 6.9	< 6.4	< 5.9

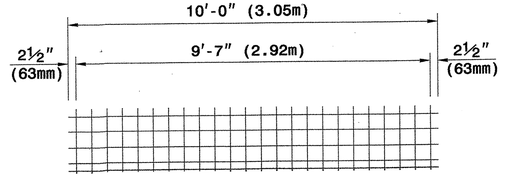
(FEET-INCHES)	< 17 - 8	< 16 - 0	< 14 - 4	< 12 - 8	< 11 - 0	< 9 - 4	< 7 - 8	< 6 - 0	< 4 - 4
(METER)	< 5.4	< 4.9	< 4.4	< 3.9	< 3.4	< 2.8	< 2.3	< 1.8	< 1.3



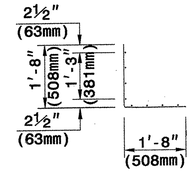
TYPE A



TYPE B



WELDED WIRE FORM



SECTION

WELDED WIRE FACINGS

PANEL TYPES (WELDED WIRE FACINGS AND FORM

5" X 5" (125mm X 125mm), W5 X W5 (MW32 X MW32) WELDED WIRE REINFORCEMENT (WWR)

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL TEMPORARY WALL

SHEET 9 OF 11 DATE: 12-19-06

GEC221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET
R-2241A	2-AB

GEOTECHNICAL ENGINEER

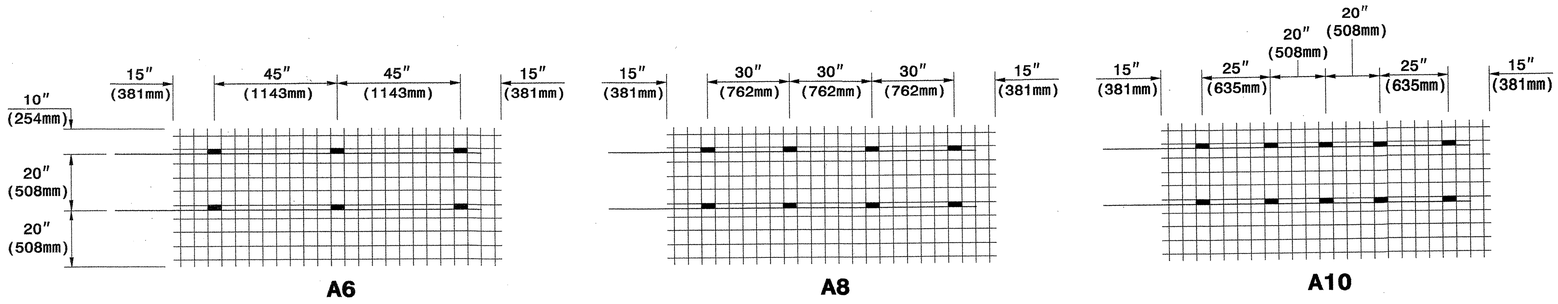
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

SIGNATURE DATE

ENGINEER

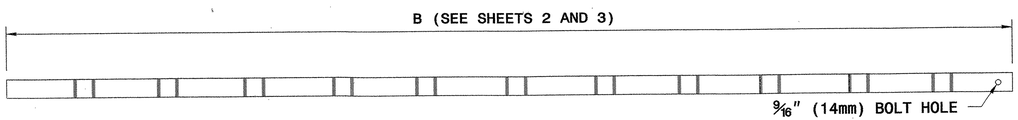
SIGNATURE DATE



KEY: A8

NUMBER OF REINFORCING STRIPS
PANEL TYPE

CONNECTOR ROD AND REINFORCING STRIP PLACEMENT DIAGRAMS



REINFORCING STRIP - 2" X 5/32" (50mm X 4mm)

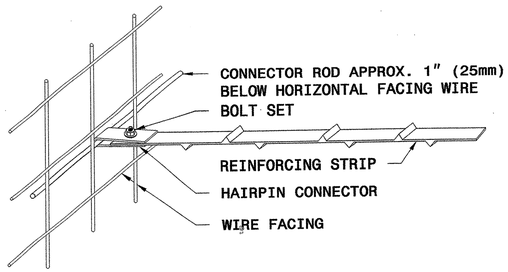
½" (13mm) DIA. ROD

CONNECTOR ROD

½" (13mm) BOLT WITH NUT AND WASHER

BOLT SET

HAIRPIN CONNECTOR



STRIP TO FACING CONNECTION

WALL COMPONENTS

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL
TEMPORARY WALL

SHEET 10 OF 11 DATE: 12-19-06

PROJECT REFERENCE NO.	SHEET
R-2241A	2-AC

GEOTECHNICAL ENGINEER

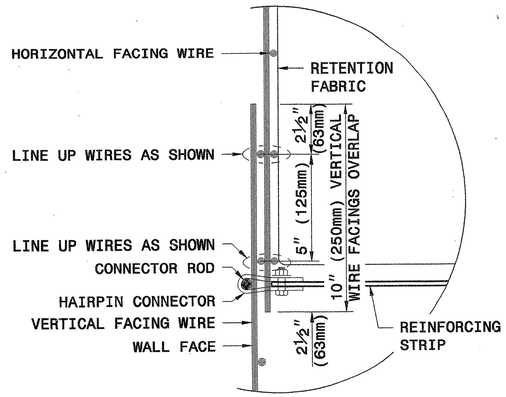
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/29/07

SIGNATURE DATE

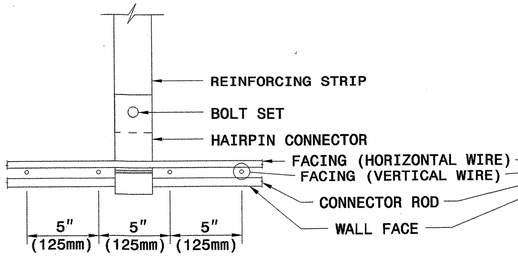
ENGINEER

SIGNATURE DATE



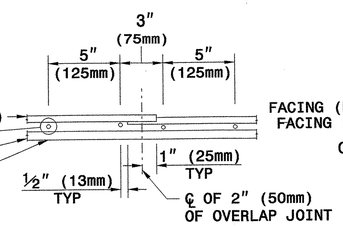
OVERLAP FACINGS VERTICALLY ONE FULL 5" (125mm) WIRE SQUARE DISREGARDING HALF SQUARES AT EDGES

VERTICAL OVERLAP DETAIL



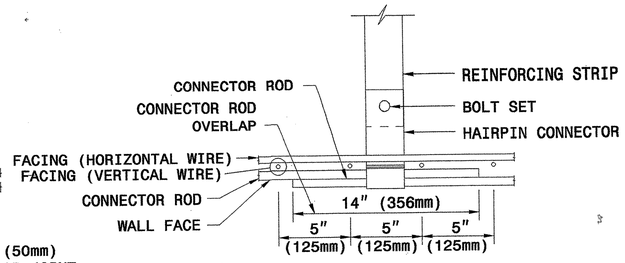
PLAN DETAIL 'A'

STRIP CONNECTION



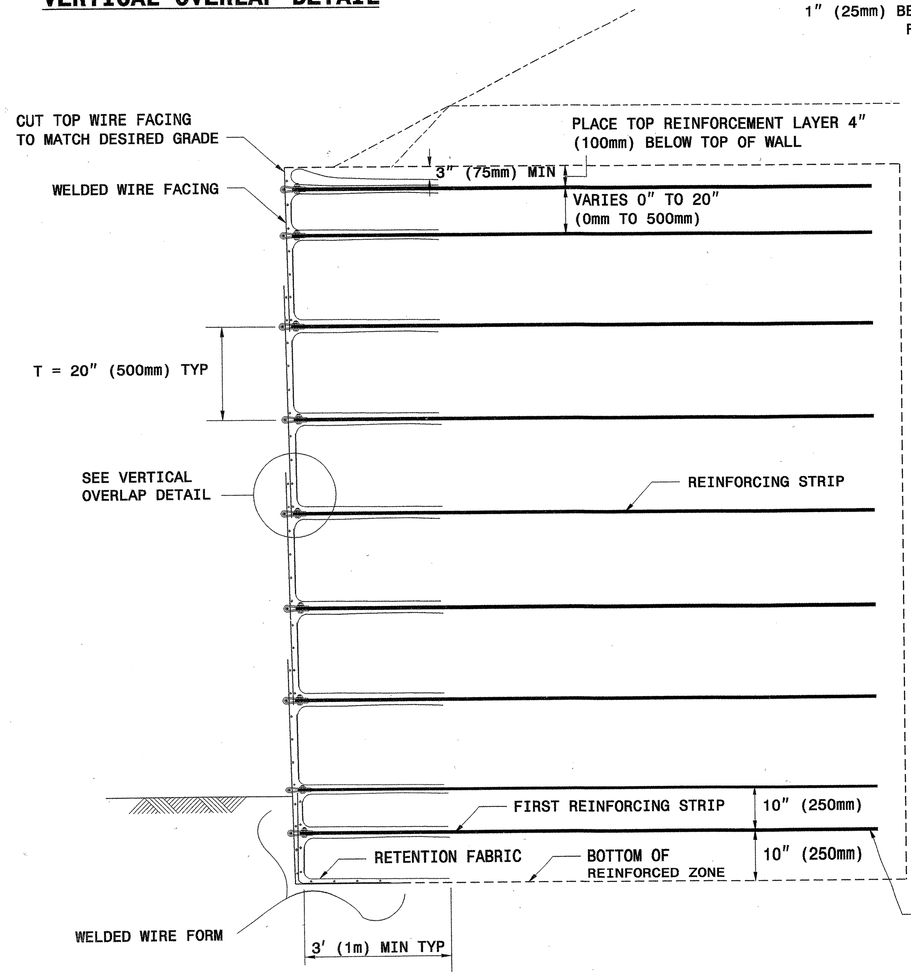
PLAN DETAIL 'B'

HORIZONTAL OVERLAP DETAIL

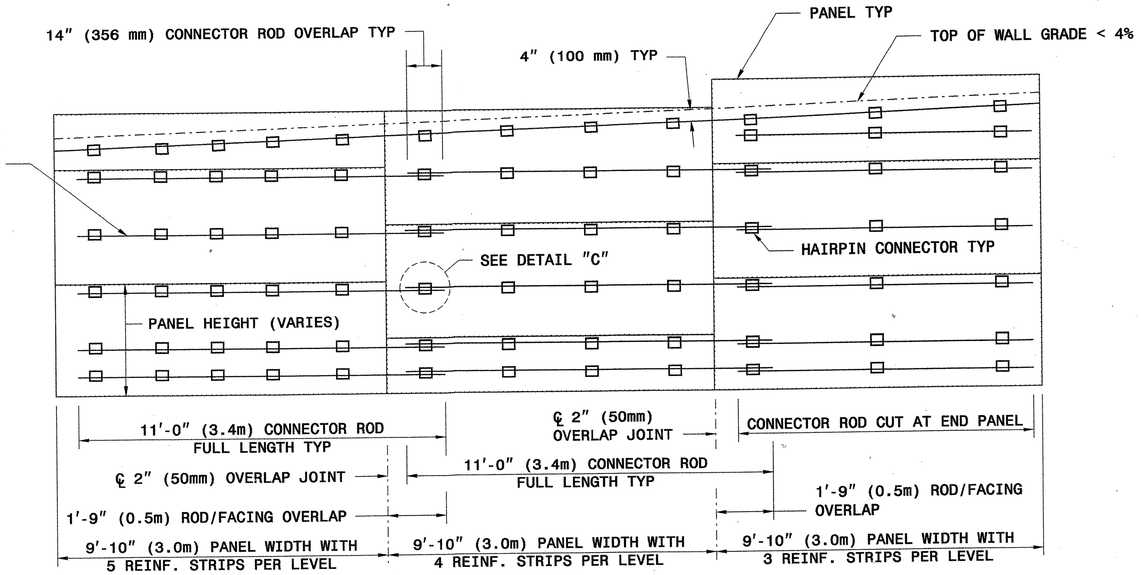


PLAN DETAIL 'C'

STRIP CONNECTION WITH HORIZONTAL OVERLAP DETAIL

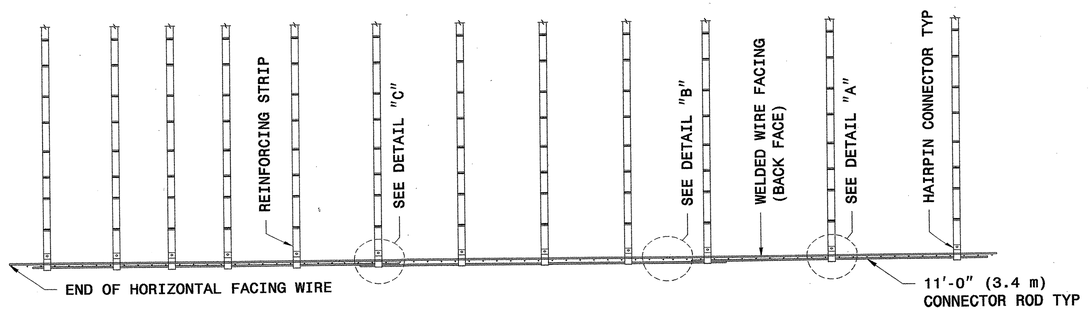


TYPICAL SECTION



TYPICAL ELEVATION

(WIRES NOT SHOWN FOR CLARITY)



TYPICAL PLAN

The Reinforced Earth Company

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL TEMPORARY WALL

SHEET 11 OF 11 DATE: 12-19-06

GEC221427 3/29/2007 std no 1801 shidden GE-Oce34bond

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	2-AD

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 7-06
ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION FLEXIBLE PIPE
SHEET 1 OF 3 300D01

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

- SPRINGLINE OF PIPE
- SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.
- APPROVED SUITABLE LOCAL MATERIAL.
- UNDISTURBED EARTH MATERIAL
- SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

GENERAL NOTES:

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

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

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

- TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
- LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE

SHEET 1 OF 3
300D01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 7-06
ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION RIGID PIPE
SHEET 2 OF 3 300D01

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

- SPRINGLINE OF PIPE
- SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.
- APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.
- UNDISTURBED EARTH MATERIAL
- SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

GENERAL NOTES:

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

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

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

- TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.
- LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE

SHEET 2 OF 3
300D01

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON 2/25/13

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

SEE PLATE FOR TITLE

ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: [signature] DATE: 1/29/13
FILE SPEC.: /ericward/stds/stdstodetails/30001/0300d01.dgn

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

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

5/14/99

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

7-06

ENGLISH DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FILL HEIGHT TABLES

SHEET 3 OF 3

300D01

FLEXIBLE PIPE

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

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

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

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

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

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

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

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

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

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

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

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

RIGID PIPE

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

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

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

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

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

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

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

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

7-06

ENGLISH DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FILL HEIGHT TABLES

SHEET 3 OF 3

300D01

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

SEE PLATE FOR TITLE

ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE: 11/21/13
FILE SPEC: /projects/rdprd/stddtl/stddtldetails/300D/d60d01.dgn

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022566 4/1/13

PROJECT REFERENCE NO. R-2241A

SHEET NO. 2-AE

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

SUMMARY OF QUANTITIES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202960

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
0001000000-M	200	Lump Sum		CLEARING & GRUBBING .. HECTARE(S)
0008000000-M	200	1.2	HA	SUPPLEMENTARY CLEARING & GRUBBING
0015000000-N	205	4	EA	SEALING ABANDONED WELLS
0036000000-M	225	22,000	M3	UNDERCUT EXCAVATION
0038000000-M	SP	300	M3	SHALLOW UNDERCUT
0080000000-M	SP	700	MTN	CLASS IV SUBGRADE STABILIZATION
0134000000-M	240	2,240	M3	DRAINAGE DITCH EXCAVATION
0141000000-M	240	750	M	BERM DITCH CONSTRUCTION
0156000000-M	250	6,380	M2	REMOVAL OF EXISTING ASPHALT PAVEMENT
0192000000-N	260	40	HR	PROOF ROLLING
0195000000-M	SP	29,500	M3	SELECT GRANULAR MATERIAL
0196000000-M	270	31,000	M2	FABRIC FOR SOIL STABILIZATION
0199000000-M	SP	233.2	M2	TEMPORARY SHORING
0241000000-M	SP	16,500	M2	GENERIC GRADING ITEM GEOTEXTILE FOR PAVEMENT STABILIZATION
0255000000-M	SP	2,500	MTN	GENERIC GRADING ITEM EXCAVATION, HAULING & DISPOSAL OF CONTAMINATED SOIL
0318000000-M	SP	2,250	MTN	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0320000000-M	SP	6,770	M2	FOUNDATION CONDITIONING FABRIC
0335000000-M	SP	31.2	M	***MM DRAINAGE PIPE (200MM)
0335200000-M	SP	2,202	M	375MM DRAINAGE PIPE
0335300000-M	SP	676.8	M	450MM DRAINAGE PIPE
0335400000-M	SP	685.2	M	600MM DRAINAGE PIPE
0335500000-M	SP	373.2	M	750MM DRAINAGE PIPE
0335600000-M	SP	229.2	M	900MM DRAINAGE PIPE
0335700000-M	SP	54	M	1050MM DRAINAGE PIPE
0335800000-M	SP	132	M	1200MM DRAINAGE PIPE
0335850000-M	SP	7	EA	****MM DRAINAGE PIPE ELBOWS (375MM)
0335850000-M	SP	6	EA	****MM DRAINAGE PIPE ELBOWS (450MM)
0343000000-M	SP	268.8	M	375MM SIDE DRAIN PIPE
0344000000-M	SP	14.4	M	450MM SIDE DRAIN PIPE
0345000000-M	SP	8.4	M	600MM SIDE DRAIN PIPE
0354000000-M	SP	20.4	M	****MM RC PIPE CULVERTS, CLASS ***** (375MM, CLASS V)
0366000000-M	SP	115.2	M	375MM RC PIPE CULVERTS, CLASS III
0384000000-M	SP	36	M	750MM RC PIPE CULVERTS, CLASS III
0408000000-M	SP	121.2	M	1350MM RC PIPE CULVERTS, CLASS III
0448000000-M	SP	79.2	M	****MM RC PIPE CULVERTS, CLASS IV (1500MM)
0448200000-M	SP	1,027.2	M	375MM RC PIPE CULVERTS, CLASS IV
0448300000-M	SP	462	M	450MM RC PIPE CULVERTS, CLASS IV
0448400000-M	SP	260.4	M	600MM RC PIPE CULVERTS, CLASS IV
0448500000-M	SP	45.6	M	750MM RC PIPE CULVERTS, CLASS IV
0448600000-M	SP	126	M	900MM RC PIPE CULVERTS, CLASS IV
0974000000-M	SP	13.2	M	****MM WELDED STEEL PIPE, ****MM THICK, GRADE B (UNDER RR) (600MM, 12MM)
0986000000-M	SP	135.6	M	GENERIC PIPE ITEM 375MM DUCTILE IRON PIPE
0992000000-M	SP	2	EA	GENERIC PIPE ITEM ENERGY DISSIPATOR BASIN
0995000000-M	340	869.6	M	PIPE REMOVAL
1011000000-N	500	Lump Sum		FINE GRADING
1077000000-M	SP	60	MTN	#57 STONE
1110000000-M	510	500	MTN	STABILIZER AGGREGATE
1220000000-M	545	2,000	MTN	INCIDENTAL STONE BASE
1231000000-M	560	9,230	M3	SHOULDER BORROW
1275000000-M	600	15,531	L	PRIME COAT
1330000000-M	607	980	M2	INCIDENTAL MILLING
1693000000-M	654	100	MTN	ASPHALT PLANT MIX, PAVEMENT REPAIR
2000000000-N	806	225	EA	RIGHT OF WAY MARKERS
2022000000-M	SP	2,070	M3	SUBDRAIN EXCAVATION
2033000000-M	SP	1,035	M3	SUBDRAIN FINE AGGREGATE
2044000000-M	SP	2,500	M	150MM PERFORATED SUBDRAIN PIPE
2070000000-N	SP	17	EA	SUBDRAIN PIPE OUTLETS
2077000000-M	SP	34	M	150MM OUTLET PIPE (SUBDRAINS)
2143000000-M	818	10	MTN	BLOTTING SAND
2209000000-M	838	40.6	M3	ENDWALLS
2220000000-M	838	26.7	M3	REINFORCED ENDWALLS
2253000000-M	840	0.29	M3	PIPE COLLARS
2264000000-M	840	0.22	M3	PIPE PLUGS
2275000000-M	SP	23	M3	FLOWABLE FILL
2286000000-N	840	195	EA	MASONRY DRAINAGE STRUCTURES
2297000000-M	840	3.1	M3	MASONRY DRAINAGE STRUCTURES
2308000000-M	840	15.97	M	MASONRY DRAINAGE STRUCTURES
2354200000-N	840	1	EA	FRAME WITH GRATE, STD 840.24
2364000000-N	840	10	EA	FRAME WITH TWO GRATES, STD 840.16
2364200000-N	840	10	EA	FRAME WITH TWO GRATES, STD 840.20
2365000000-N	840	81	EA	FRAME WITH TWO GRATES, STD 840.22
2366000000-N	840	16	EA	FRAME WITH TWO GRATES, STD 840.24
2367000000-N	840	10	EA	FRAME WITH TWO GRATES, STD 840.29
2374000000-N	840	6	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)
2374000000-N	840	32	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)
2374000000-N	840	25	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)
2396000000-N	840	3	EA	FRAME WITH COVER, STD 840.54
2440000000-N	852	3	EA	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN
2535000000-M	846	350	M	*** X ***MM CONCRETE CURB (200MM X 450MM)
2549000000-M	846	3,860	M	750MM CONCRETE CURB & GUTTER
2556000000-M	846	521	M	SHOULDER BERM GUTTER
2577000000-M	846	70	M	CONCRETE EXPRESSWAY GUTTER
2612000000-M	848	1,000	M2	150MM CONCRETE DRIVEWAY
2619000000-M	850	50	M2	100MM CONCRETE PAVED DITCH
2647000000-M	852	1,760	M2	125MM MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)
3030000000-M	862	1,824.99	M	STEEL BM GUARDRAIL
3045000000-M	862	19.05	M	STEEL BM GUARDRAIL, SHOP CURVED
3150000000-N	862	10	EA	ADDITIONAL GUARDRAIL POSTS
3210000000-N	862	13	EA	GUARDRAIL ANCHOR UNITS, TYPE CAT-1
3270000000-N	SP	19	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3380000000-M	862	140.97	M	TEMPORARY STEEL BM GUARDRAIL
3503000000-M	866	11,330	M	WOVEN WIRE FENCE, 1200MM FABRIC
3509000000-M	866	2,310	EA	100MM TIMBER FENCE POSTS, 2.30M LONG
3515000000-M	866	650	EA	125MM TIMBER FENCE POSTS, 2.50M LONG
3533000000-M	866	49	M	CHAIN LINK FENCE, ****MM FABRIC (1800MM)
3539000000-M	866	14	EA	METAL LINE POSTS FOR ****MM CHAIN LINK FENCE (1800MM)
3557000000-M	866	175	M	ADDITIONAL BARBED WIRE
3628000000-M	876	38	MTN	RIP RAP, CLASS I
3635000000-M	876	425	MTN	RIP RAP, CLASS II
3649000000-M	876	1,454	MTN	RIP RAP, CLASS B
3656000000-M	876	13,385	M2	FILTER FABRIC FOR DRAINAGE
3659000000-N	SP	7	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON
4054000000-M	902	1	M3	PLAIN CONCRETE SIGN FOUNDATIONS
4060000000-M	903	250	KG	SUPPORTS, BREAKAWAY STEEL BEAM
4072000000-M	903	919	M	SUPPORTS, 4.5-KG STEEL U-CHANNEL
4096000000-N	904	8	EA	SIGN ERECTION, TYPE D
4102000000-N	904	117	EA	SIGN ERECTION, TYPE E
4108000000-N	904	37	EA	SIGN ERECTION, TYPE F
4110000000-N	904	2	EA	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)
4116100000-N	904	3	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (D)
4116100000-N	904	9	EA	SIGN ERECTION, RELOCATE, TYPE **** (GROUND MOUNTED) (E)
4155000000-N	907	101	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
4192000000-N	907	7	EA	DISPOSAL OF SUPPORT, U-CHANNEL
4400000000-M	1110	314	M2	WORK ZONE SIGNS (STATIONARY)
4405000000-M	1110	122	M2	WORK ZONE SIGNS (PORTABLE)
4410000000-M	1110	91	M2	WORK ZONE SIGNS (BARRICADE MOUNTED)
4415000000-N	1115	3	EA	FLASHING ARROW PANELS, TYPE C
4420000000-N	1120	2	EA	CHANGEABLE MESSAGE SIGN
4422000000-N	1120	150	DAY	CHANGEABLE MESSAGE SIGN (SHORT TERM)
4430000000-N	1130	469	EA	DRUMS
4445000000-M	1145	264	M	BARRICADES (TYPE III)
4450000000-N	1150	4,800	HR	FLAGGER
4465000000-N	1160	9	EA	TEMPORARY CRASH CUSHIONS
4470000000-N	1160	3	EA	RESET TEMPORARY CRASH CUSHIONS
4480000000-N	1165	3	EA	TMIA
4485000000-M	1170	143	M	PORTABLE CONCRETE BARRIER
4490000000-M	1170	594	M	PORTABLE CONCRETE BARRIER (ANCHORED)
4505000000-M	1170	110	M	RESET PORTABLE CONCRETE BARRIER (ANCHORED)
4516000000-N	1180	100	EA	SKINNY DRUM
4650000000-N	1251	881	EA	TEMPORARY RAISED PAVEMENT MARKERS
4685000000-M	1205	25,786	M	THERMOPLASTIC PAVEMENT MARKING LINES (100MM, 2.3MM)
4686000000-M	1205	14,060	M	THERMOPLASTIC PAVEMENT MARKING LINES (100MM, 3.1MM)
4695000000-M	1205	2,209	M	THERMOPLASTIC PAVEMENT MARKING LINES (200MM, 2.3MM)
4700000000-M	1205	703	M	THERMOPLASTIC PAVEMENT MARKING LINES (300MM, 2.3MM)
4705000000-M	1205	79	M	THERMOPLASTIC PAVEMENT MARKING LINES (400MM, 3.1MM)
4710000000-M	1205	328	M	THERMOPLASTIC PAVEMENT MARKING LINES (600MM, 3.1MM)
4721000000-M	1205	12	EA	THERMOPLASTIC PAVEMENT MARKING CHARACTER (3.1MM)
4725000000-E	1205	162	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)

12/19/2012
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stephens

STATE OF NORTH CAROLINA
SUMMARY OF QUANTITIES

PROJECT REFERENCE No.	SHEET No.
R-2241A	3 (20 of 27)

ItemNumber	Sec #	Quantity	Unit	Description
4770000000-M	1205	644	M	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (100MM) (IV)
4810000000-M	1205	74,089	M	PAINT PAVEMENT MARKING LINES (100MM)
4830000000-M	1205	62	M	PAINT PAVEMENT MARKING LINES (400MM)
4835000000-M	1205	392	M	PAINT PAVEMENT MARKING LINES (600MM)
4840000000-N	1205	10	EA	PAINT PAVEMENT MARKING CHARACTER
4845000000-N	1205	82	EA	PAINT PAVEMENT MARKING SYMBOL
4875000000-N	1205	5	EA	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS
4905000000-N	1253	1,491	EA	SNOWPLOWABLE PAVEMENT MARKERS
4915000000-M	1264	8	EA	2.1M U-CHANNEL POSTS
4955000000-N	1264	8	EA	OBJECT MARKERS (END OF ROAD)
5325600000-M	1510	163	M	150MM WATER LINE
5325800000-M	1510	465	M	200MM WATER LINE
5326200000-M	1510	275	M	300MM WATER LINE
5540000000-M	1515	7	EA	150MM VALVE
5546000000-M	1515	11	EA	200MM VALVE
5558000000-M	1515	3	EA	300MM VALVE
5572200000-M	1515	1	EA	300MM TAPPING VALVE
5648000000-N	1515	23	EA	RELOCATE WATER METER
5649000000-N	1515	1	EA	RECONNECT WATER METER
5672000000-N	1515	4	EA	RELOCATE FIRE HYDRANT
5691200000-M	1520	12	M	150MM SANITARY GRAVITY SEWER
5691300000-M	1520	333	M	200MM SANITARY GRAVITY SEWER
5691400000-M	1520	67	M	250MM SANITARY GRAVITY SEWER
5691600000-M	1520	75.8	M	400MM SANITARY GRAVITY SEWER
5768000000-N	1520	6	EA	SANITARY SEWER CLEAN-OUT
5775000000-M	1525	5	EA	1200MM DIA UTILITY MANHOLE
5776000000-M	1525	5	EA	1500MM DIA UTILITY MANHOLE
5781000000-M	1525	7.6	M	UTILITY MANHOLE WALL, 1200MM DIA
5782000000-M	1525	18.6	M	UTILITY MANHOLE WALL, 1500MM DIA
5798000000-M	1530	71	M	ABANDON ***MM UTILITY PIPE (375MM)
5801000000-M	1530	406	M	ABANDON 200MM UTILITY PIPE
5802000000-M	1530	29	M	ABANDON 250MM UTILITY PIPE
5804000000-M	1530	146	M	ABANDON 300MM UTILITY PIPE
5816000000-N	1530	2	EA	ABANDON UTILITY MANHOLE
5836000000-M	1540	12	M	600MM ENCASEMENT PIPE
5836200000-M	1540	16	M	750MM ENCASEMENT PIPE
5872200000-M	1550	6	M	TRENCHLESS INSTALLATION OF 600MM IN SOIL
5872210000-M	1550	6	M	TRENCHLESS INSTALLATION OF 600MM NOT IN SOIL
5872300000-M	1550	8	M	TRENCHLESS INSTALLATION OF 750MM IN SOIL
5872310000-M	1550	8	M	TRENCHLESS INSTALLATION OF 750MM NOT IN SOIL
6000000000-M	1605	14,000	M	TEMPORARY SILT FENCE
6006000000-M	1610	12,500	MTN	STONE FOR EROSION CONTROL, CLASS A
6009000000-M	1610	7,500	MTN	STONE FOR EROSION CONTROL, CLASS B
6012000000-M	1610	6,250	MTN	SEDIMENT CONTROL STONE
6015000000-M	1615	60	HA	TEMPORARY MULCHING
6018000000-M	1620	2,425	KG	SEED FOR TEMPORARY SEEDING
6021000000-M	1620	20.25	MTN	FERTILIZER FOR TEMPORARY SEEDING
6024000000-M	1622	1,500	M	TEMPORARY SLOPE DRAINS
6027000000-N	1622	67	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-M	SP	50	M	SAFETY FENCE
6030000000-M	1630	42,500	M3	SILT EXCAVATION
6036000000-M	1631	180,000	M2	MATTING FOR EROSION CONTROL
6037000000-M	SP	1,100	M2	COIR FIBER MAT
6038000000-M	SP	3,500	M2	PERMANENT SOIL REINFORCEMENT MAT
6042000000-M	1632	3,250	M	6.4MM HARDWARE CLOTH
6046000000-M	SP	50	M	TEMPORARY PIPE FOR STREAM CROSSING
6069000000-M	1638	40	M3	STILLING BASINS
6071012000-M	SP	2,100	M	COIR FIBER WATTLE
6071020000-M	SP	2,200	KG	POLYACRYLAMIDE (PAM)
6071030000-M	SP	4,000	M	COIR FIBER BAFFLE
6071050000-M	SP	86	EA	***MM SKIMMER (38MM)
6084000000-M	1660	40	HA	SEEDING & MULCHING
6087000000-M	1660	20	HA	MOWING
6090000000-M	1661	1,200	KG	SEED FOR REPAIR SEEDING
6093000000-M	1661	4	MTN	FERTILIZER FOR REPAIR SEEDING
6096000000-M	1662	1,000	KG	SEED FOR SUPPLEMENTAL SEEDING
6108000000-M	1665	59	MTN	FERTILIZER TOPDRESSING
6111000000-M	SP	275	M	IMPERVIOUS DIKE
6114500000-N	SP	55	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	150	EA	RESPONSE FOR EROSION CONTROL
6120000000-M	SP	140	M3	CULVERT DIVERSION CHANNEL
6123000000-M	1670	4	HA	REFORESTATION
6126000000-M	SP	0.1	HA	STREAMBANK REFORESTATION
7060000000-M	1705	1,750	M	SIGNAL CABLE
7120000000-M	1705	30	EA	VEHICLE SIGNAL HEAD (300MM, 3 SECTION)
7132000000-M	1705	7	EA	VEHICLE SIGNAL HEAD (300MM, 4 SECTION)
7144000000-M	1705	6	EA	VEHICLE SIGNAL HEAD (300MM, 5 SECTION)
7264000000-M	1710	550	M	MESSENGER CABLE (9.52MM)
7288000000-M	1715	20	M	PAVED TRENCHING (**********) (1, 50MM)
7300000000-M	1715	550	M	UNPAVED TRENCHING (**********) (1, 50MM)
7324000000-N	1716	12	EA	JUNCTION BOX (STANDARD SIZE)
7360000000-N	1720	4	EA	WOOD POLE
7372000000-N	1721	8	EA	GUY ASSEMBLY
7408000000-M	1722	3	EA	25MM RISER WITH WEATHERHEAD
7420000000-M	1722	14	EA	50MM RISER WITH WEATHERHEAD
7444000000-M	1725	1,540	M	INDUCTIVE LOOP SAWCUT
7456000000-M	1726	4,330	M	LEAD-IN CABLE (**********) (14-2_
7576000000-N	SP	8	EA	METAL STRAIN SIGNAL POLE
7613000000-N	SP	8	EA	SOIL TEST
7614100000-M	SP	50	M3	DRILLED PIER FOUNDATION
7636000000-N	1745	2	EA	SIGN FOR SIGNALS
7684000000-N	1750	2	EA	SIGNAL CABINET FOUNDATION
7756000000-N	1751	2	EA	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)
7780000000-N	1751	15	EA	DETECTOR CARD (TYPE 2070L)
7990000000-M	SP	150	M	GENERIC SIGNAL ITEM UNPAVED TRENCHING FOR TEMPORARY LEAD IN

******* BEGIN SCHEDULE AA *******
******* (2 ALTERNATES) *******

0022000000-M AA1	225	405,000	M3	UNCLASSIFIED EXCAVATION
1044000000-M AA1	501	39,670	M2	LIME TREATED SOIL (SLURRY METHOD)
1066000000-M AA1	501	440	MTN	LIME FOR LIME TREATED SOIL
1121000000-M AA1	520	4,545	MTN	AGGREGATE BASE COURSE
1176000000-M AA1	542	39,670	M2	SOIL CEMENT BASE
1187000000-M AA1	542	1,191	MTN	PORTLAND CEMENT FOR SOIL CEMENT BASE
1198000000-M AA1	SP	600	MTN	AGGREGATE FOR SOIL CEMENT BASE
1209000000-M AA1	543	53,960	L	ASPHALT CURING SEAL
1489000000-M AA1	610	47,510	MTN	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-M AA1	610	31,580	MTN	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-M AA1	610	32,000	MTN	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1575000000-M AA1	SP	5,530	MTN	ASPHALT BINDER FOR PLANT MIX
2099000000-M AA1	816	5,120	M	SHOULDER DRAIN
2110000000-M AA1	816	5,120	M	100MM SHOULDER DRAIN PIPE
2121000000-M AA1	816	210	M	100MM OUTLET PIPE (SHOULDER DRAINS)
2132000000-N AA1	816	30	EA	CONCRETE PAD FOR SHOULDER DRAIN PIPE OUTLET
		*** OR ***		
0022000000-M AA2	225	400,000	M3	UNCLASSIFIED EXCAVATION
1044000000-M AA2	501	48,120	M2	LIME TREATED SOIL (SLURRY METHOD)
1066000000-M AA2	501	530	MTN	LIME FOR LIME TREATED SOIL
1121000000-M AA2	520	5,017	MTN	AGGREGATE BASE COURSE
1176000000-M AA2	542	48,120	M2	SOIL CEMENT BASE
1187000000-M AA2	542	1,444	MTN	PORTLAND CEMENT FOR SOIL CEMENT BASE
1198000000-M AA2	SP	730	MTN	AGGREGATE FOR SOIL CEMENT BASE
1209000000-M AA2	543	65,450	L	ASPHALT CURING SEAL
1489000000-M AA2	610	17,700	MTN	ASPHALT CONC BASE COURSE, TYPE B25.0B
1498000000-M AA2	610	11,800	MTN	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B
1519000000-M AA2	610	13,670	MTN	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1525000000-M AA2	610	6,790	MTN	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A
1575000000-M AA2	SP	2,980	MTN	ASPHALT BINDER FOR PLANT MIX
1682000000-M AA2	652	14,030	MTN	PERMEABLE ASPHALT DRAINAGE COURSE, TYPE P-57
1847000000-M AA2	710	80,945	M2	****MM PORT CEM CONC PAVEMENT, THROUGH LANES (WITH DOWELS) (200MM)
1902000000-N AA2	710	Lump Sum		SURFACE TESTING CONCRETE PAVEMENT
1913000000-M AA2	720	14,615	M2	CONCRETE SHOULDERS ADJACENT TO *****MM PAVEMENT (200MM)
1914000000-M AA2	SP	5,570	M2	CONCRETE SHOULDERS ADJACENT TO *****MM PAVEMENT (WITH DOWELS) (200MM)
1924000000-N AA2	725	Lump Sum		FIELD LABORATORY RENTAL, PORT CEM CONC PAVEMENT
2099000000-M AA2	816	8,820	M	SHOULDER DRAIN
2110000000-M AA2	816	8,820	M	100MM SHOULDER DRAIN PIPE
2121000000-M AA2	816	300	M	100MM OUTLET PIPE (SHOULDER DRAINS)
2132000000-N AA2	816	50	EA	CONCRETE PAD FOR SHOULDER DRAIN PIPE OUTLET

******* END SCHEDULE AA *******

COMPUTED BY: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	3-A

CSD265813

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 1200mm & 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
14+37.00 -Y2-	RT	401		185.5			
		401	402		184.58	183.3	
10+90.97 -L-	RT	402		185.01			
11+00.00 -L-	LT	403		184.54			
		403	404		183.62	183.57	
11+08.50 -L-	LT	404		184.49			
		404	405		183.57	183.29	
13+79.00 -Y1-	RT	405		184.15			
		405	406		183.23	180.12	
13+10.03 -Y1-	RT	406		182.1			
		407	429		180.31	180.26	
13+10.00 -Y1-	LT	407		182.1			
		408	407		180.39	180.31	
13+10.00 -Y1-	LT	408		182			
11+25.09 -L-	RT	409		184.92			
		409	410		184.01	183.29	
11+50.42 -L-	RT	410		184.2			
		410	411		183.29	182.42	
11+73.54 -L-	RT	411		183.36			
		411	416		182.42	180.72	
11+73.54 -L-	RT	412		183.4			
		412	411		182.43	182.42	
11+91.39 -L-	RT	426		181.63			
		426	416		180.66	180.64	
11+91.57 -L-	RT	416		182.63			
		416	428		180.64	180.22	
12+26.86 -L-	RT	427		181.2			
		427	428		180.23	180.22	
12+26.88 -L-	RT	428		181.57			
		428	415		180.15	180.09	
11+91.32 -L-	LT	414		182.29			
		414	415		181.38	180.17	
12+27.78	LT	415		181.26			
		415	417		179.94	179.89	
12+43.98 -L-	LT	417		181.04			
		417	418		179.89	179.88	
12+46.53 -L-	LT	418		181.04			
		418	419		179.88	178.5	
12+52.54 -L-	LT	419		181.1			
		419	420		178.5	178.38	
13+04.30 -L-	LT	421		180.65			
		421	420		179.74	178.38	
12+64.82 -L-	LT	420		181.13			
		420	422		177.4	176.94	
12+73.50 -L-	RT	422		177.85			
		422	423		177.78	176.72	
12+91.78 -L-	RT	423		180.42			
		423	424		176.72	176.68	
13+04.05 -L-	RT	424		180.46			
		424	425		176.68	176.65	
10+24.49 -L-	LT	425					
13+42.46 -L-	RT	501					
		502	501		175.64	175.5	
13+76.28 -L-	RT	502		176.61			
SHEET TOTALS							

FROM	TO	DRAINAGE PIPE (RCP, CSP, CAAP) No HDPE or PVC Pipe 200	375	450	600	750	900	1050	1200	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 300 (1.63)	375 (1.63)	450 (1.63)	600 (1.63)	750 (2.01)	900 (2.01)	1000 (2.01)	1200 (2.01)
401																					
401	402																				
402																					
403																					
403	404																				
404																					
404	405																				
405																					
405	406																				
406																					
407	429																				
407																					
408	407																				
408																					
409																					
409	410																				
410																					
410	411																				
411																					
411	416																				
412																					
412	411																				
426																					
426	416																				
416																					
416	428																				
427																					
427	428																				
428																					
428	415																				
414																					
414	415																				
415																					
415	417																				
417																					
417	418																				
418																					
418	419																				
419																					
419	420																				
421																					
421	420																				
420																					
420	422																				
422																					
422	423					19.2							X								
423																					
423	424																				
424																					
424	425					13.2							X								
425																					
501																					
502	501																				
502																					
SHEET TOTALS						32.4															

FROM	TO	R.C. PIPE CLASS III 300	375	450	600	750	900	1050	1200	R.C. PIPE CLASS IV 300	375	450	600	750	900	1050	1200
401																	
401	402																
402																	
403																	
403	404																
404																	
404	405																
405																	
405	406										69.6						
406																	
407	429										3.4						
407																	
408	407		6.0														
408																	
409																	
409	410																
410																	
410	411																
411																	
411	416																
412																	
412	411																
426																	
426	416																
416																	
416	428										36.0						
427																	
427	428		3.6														
428																	
428	415											19.2					
414																	
414	415		37.2														
415																	
415	417												16.8				
417																	
417	418												3.6				
418																	
418	419												6.0				
419																	
419	420																
421																	
421	420										39.6						
420																	
420	422												32.4				
422																	
422	423																
423																	
423	424					36.0											
424																	
424	425																
425																	
501																	
502	501										34.8						
502																	
SHEET TOTALS			46.8			36.0					183.4	19.2	58.8				

FROM	TO	600 mm WELDED STEEL, TRENCHLESS INSTALLATION	375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. METERS	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.0'	B 3.0 AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G
401									1			1			1
401	402			21.6											
402									1			1		1	
403									1			1			1
403	404			9.6											
404									1			1			1
404	405			24.0											
405									1			1			1
405	406														
406									1			1			1
407	429														
407									1			1		1	
408	407														
408									1						
409									1			1		1	
409	410			28.8											
410									1			1		1	
410	411			24.0											
411									1			1		1	
411	416			18.0											
412									1						
412	411			4.8											
426									1						
426	416			4.8											
416									1	0.41		1		1	
416	428														
427									1						
427	428														
428									1			1		1	
428	415														
414									1			1			1
414	415														
415									1			1			1
415	417														
417									1			1			1
417	418														
418									1			1			1
418	419														
419									1			1			1
419	420	13.2													
421									1			1		1	
421	420														
420									1	1.50	0.73	1	1		
420	422														
422									1						
422	423														
423									1	1.50	0.70	1		1	
423	424														
424									1	1.50	0.78	1		1	
424	425														
425															
501															
502	501														
502									1						
SHEET TOTALS		13.2		135.6					27	4.91	2.21	21	1	10	10

FROM	TO	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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLE	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32	DRAINAGE PIPE ELBOWS NO. & SIZE
401																						
401	402																					
402																						
403																						
403	404																					
404																						
404	405																					
405																						
405	406																					
406																						
407	429																			1		
407																						
408	407																					
408				1	1																	
409																						
409	410																					
410																						
410	411																					
411																						
411	416																					
412																	1	1				
412	411																					
426																	1	1				
426	416																					
416																						
416	428																					
427																	1	1				
427	428																					
428																						
428	415																					
414																						
414	415																					
415																						
415	417																					
417																						
417	418																					
418																						
418	419																					
419																						
419	420																					
421																						
421	420																					
420																						
420	422																					
422				1	1																	
422	423																					
423																						
423	424																					
424																						
424	425																					
425																						
501																						
502	501																					
502																	1	1				
SHEET TOTALS				2	2												4	4		1		

FROM	TO	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
401					
401	402				SEALED DRAINAGE SYSTEM
402					
403					
403	404				SEALED DRAINAGE SYSTEM
404					
404	405				SEALED DRAINAGE SYSTEM
405					
405	406				
406					
407	429				UTILITY INTERFERENCE STRUCTURE
407					
408	407				
408					
409					
409	410				SEALED DRAINAGE SYSTEM
410					
410	411				SEALED DRAINAGE SYSTEM
411					
411	416				SEALED DRAINAGE SYSTEM
412					
412	411				SEALED DRAINAGE SYSTEM
426					
426	416				SEALED DRAINAGE SYSTEM
416					
416	428				
427					
427	428				
428					
428	415				
414					
414	415				
415					
415	417				
417					
417	418				
418					
418	419				
419					
419	420				
421					
421	420				
420					
420	422				
422					
422	423				
423					
423	424				
424					
424	425				
425					OUTLET
501					OUTLET
502	501				
502					
SHEET TOTALS					

ABBREVIATIONS

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

COMPUTED BY: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

LKCXRFA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	3-B

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 1200mm & 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) No HDPE or PVC Pipe 200	375	450	600	750	900	1050	1200	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
		503	502		175.77	175.64													
13+95.11 -L-	RT	503		176.74															
13+80.00 -L-	LT	504																	
		505	504		177.33	176.3				12.0							X	X	X
13+80.00 -L-	LT	505		178.58															
		506	505		177.41	177.33	X												
13+80.00 -L-	RT	506		178.58															
		507	506		177.49	177.41	X												
14+06.00 -L-	RT	507		178.41															
		508	507		177.63	177.49													
14+30.31 -L-	RT	508		178.55															
		509	508		178.17	177.63													
14+60.00 -L-	RT	509		179.09															
		510	505		177.49	177.33	X												
14+06.00 -L-	LT	510		178.41															
		511	510		177.63	177.49													
14+30.31 -L-	LT	511		178.55															
		512	511		178.17	177.63													
14+60.00 -L-	LT	512		179.09															
15+42.00 -L-	RT	513																	
		514	513		180.8	180.9						8.4					X	X	X
15+42.00 -L-	RT	514		182.26															
		515	514		180.7	180.8													
15+42.00 -L-	LT	515		182.26															
		516	515		178.1	180.7						14.4				X			X
		517	514		182.77	181.22													
15+78.50 -L-	RT	517		183.77															
		518	517		182.85	182.77													
15+78.50 -L-	RT	518		183.9															
		519	518		184.33	182.93													
16+10.50 -L-	RT	519		185.3															
		520	515		183.04	181.26													
15+84.18 -L-	LT	520		184.03															
		521	520		184.9	183.04													
16+08.01 -L-	LT	521																	
10+68.00 -Y5-	LT	601																	
		601	602		188.4	188.2													
10+59.90 -Y5-	RT	602																	
17+29.07 -L-	RT	603		186.92															
		603	604		186	185.88													
17+55.18 -L-	RT	604		186.89															
		604	605		185.88	185.01													
17+92.00 -L-	RT	605		185.93															
		606	605		184.13	184.1	X		8.4								X	X	X
17+92.00 -L-	RT	606		185.1															
		605	607		184.1	184.04	X												
17+92.00 -L-	LT	607		185.93															
		608	607		184.49	184.4	X		25.2								X	X	X
11+30.00 -Y6-	RT	608		185.93															
SHEET TOTALS									33.6	12.0		22.8							

STATION	FROM	TO	C.S. PIPE 300 (1.63)	375 (1.63)	450 (1.63)	600 (1.63)	750 (2.01)	900 (2.01)	1000 (2.01)	1200 (2.01)	R.C. PIPE CLASS III 300	375	450	600	750	900	1050	1200	R.C. PIPE CLASS IV 300	375	450	600	750	900	1050	1200
	503	502																		19.2						
13+95.11 -L-	503																									
13+80.00 -L-	504																									
	505	504																								
13+80.00 -L-	505																									
	506	505																			18.0					
13+80.00 -L-	506																									
	507	506																		26.4						
14+06.00 -L-	507																									
	508	507																		25.2						
14+30.31 -L-	508																									
	509	508																		30.0						
14+60.00 -L-	509																									
	510	505																		26.4						
14+06.00 -L-	510																									
	511	510																		25.2						
14+30.31 -L-	511																									
	512	511																		30.0						
14+60.00 -L-	512																									
15+42.00 -L-	513																									
	514	513																								
15+42.00 -L-	514																									
	515	514																					18.0			
15+42.00 -L-	515																									
	516	515																								
	517	514																			37.2					
15+78.50 -L-	517																									
	518	517																			7.2					
15+78.50 -L-	518																									
	519	518																		32.4						
16+10.50 -L-	519																									
	520	515																			43.2					
15+84.18 -L-	520																									
	521	520																			25.2					
16+08.01 -L-	521																									
10+68.00 -Y5-	601																									
	601	602																				24.0				
10+59.90 -Y5-	602																									
17+29.07 -L-	603																									
	603	604																		26.4						
17+55.18 -L-	604																									
	604	605										37.2														
17+92.00 -L-	605																									
	606	605																								
17+92.00 -L-	606																									
	605	607																		18.0						
17+92.00 -L-	607																									
	608	607																								
11+30.00 -Y6-	608																									
SHEET TOTALS												37.2								259.2	130.8	24.0	18.0			

STATION	FROM	TO	375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. METERS	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.0'	B 3.0 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
	503	502															
13+95.11 -L-	503								1								
13+80.00 -L-	504																
	505	504															
13+80.00 -L-	505								1			1			1		
	506	505															
13+80.00 -L-	506								1			1		1			
	507	506															
14+06.00 -L-	507								1			1	1				
	508	507															
14+30.31 -L-	508								1			1			1		
	509	508															
14+60.00 -L-	509								1			1			1		
	510	505															
14+06.00 -L-	510								1			1	1				
	511	510															
14+30.31 -L-	511								1			1		1			
	512	511															
14+60.00 -L-	512								1			1		1			
15+42.00 -L-	513																
	514	513															
15+42.00 -L-	514								1			1			1		
	515	514															
15+42.00 -L-	515								1	0.06		1		1			
	516	515															
	517	514															
15+78.50 -L-	517								1			1			1		
	518	517															
15+78.50 -L-	518								1								
	519	518															
16+10.50 -L-	519								1								
	520	515															
15+84.18 -L-	520								1			1		1			
	521	520															
16+08.01 -L-	521																
10+68.00 -Y5-	601																
	601	602															
10+59.90 -Y5-	602																
17+29.07 -L-	603								1			1			1		
	603	604															
17+55.18 -L-	604								1			1		1			
	604	605															
17+92.00 -L-	605								1	0.33		1		1			
	606	605															
17+92.00 -L-	606								1								
	605	607															
17+92.00 -L-	607								1	0.39		1			1		
	608	607															
11+30.00 -Y6-	608								1								
SHEET TOTALS									21	0.78		16	2	7	7		

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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLE	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
	503	502																							
13+95.11 -L-	503															1	1								
13+80.00 -L-	504																	1							OUTLET
	505	504																							
13+80.00 -L-	505																								
	506	505																							
13+80.00 -L-	506																								
	507	506																							
14+06.00 -L-	507																								
	508	507																							
14+30.31 -L-	508																								
	509	508																							
14+60.00 -L-	509																								
	510	505																							
14+06.00 -L-	510																								
	511	510																							
14+30.31 -L-	511																								
	512	511																							
14+60.00 -L-	512																								
15+42.00 -L-	513																								OPEN ENDED PIPE (IN)
	514	513																							
15+42.00 -L-	514																								
	515	514																							
15+42.00 -L-	515																								
	516	515																							
	517	514																							OUTLET
15+78.50 -L-	517																								
	518	517																							
15+78.50 -L-	518		1	1																					
	519	518																							
16+10.50 -L-	519		1	1																					
	520	515																							
15+84.18 -L-	520																								
	521	520																							
16+08.01 -L-	521																								OPEN ENED PIPE (IN)
10+68.00 -Y5-	601																								OPEN ENED PIPE (IN) & FALSE SUMP
	601	602																							
10+59.90 -Y5-	602																								OUTLET
17+29.07 -L-	603																								
	603	604																							
17+55.18 -L-	604																								
	604	605																							
17+92.00 -L-	605																								
	606	605																							
17+92.00 -L-	606		1	1																					
	605	607																							
17+92.00 -L-	607																								
	608	607																							
11+30.00 -Y6-	608					1					1														FALSE SUMP
SHEET TOTALS			3	3		1					1					1	1	1							

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: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

LKCXRFA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	3-C

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 1200mm & 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) No HDPE or PVC Pipe 200	375	450	600	750	900	1050	1200	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
		609	608		184.54	184.49	X												
11+30.00 -Y6-	LT	609		185.38															
11+17.35 -Y6-	RT	610																	
11+07.19 -Y6-	RT	611																	
10+98.34 -Y6-	LT	612																	
		607	613		184.04	182.89													
18+53.50 -L-	LT	613		183.89															
		615	613		181.73	181.63	X												
18+46.00 -L-	RT	614		184.16															
		614	615		183.32	183.17													
18+53.50 -L-	RT	615		184.01															
		616	615		181.8	181.73	X			9.6							X	X	X
18+53.50 -L-	RT	616																	
		613	617		181.63	180.07													
19+37.50 -L-	LT	617		181.07															
		618	617		180.06	180.04	X		4.8								X	X	X
19+37.49 -L-	LT	618		180.9															
		617	619		179.92	177.31													
20+20.03 -L-	LT	619		178.46															
		620	619		177.46	177.31			4.8								X	X	X
20+20.00 -L-	LT	620		178.3															
		619	621		177.31	177.1													
20+40.00 -L-	LT	621		178.25															
		621	622		176.95	176.88													
20+54.00 -L-	LT	622		178.18															
		622	623		176.88	176.86	X												
20+58.50 -L-	LT	623		178.19															
		624	623		177.35	177.28													
20+58.50 -L-	RT	624		178.19															
19+55.05 -L-	RT	625																	
		625	626										7.2						X
19+61.41 -L-	RT	626																	
20+36.02 -L-	RT	627																	
		627											24.0						X
		623	701		177.28	176.79													
20+67.00 -L-	LT	701		178.25															
		701	702		176.79	175.5						12.0				X			X
20+67.00 -L-	LT	702																	
		703	701		177.81	177.1													
21+05.00 -L-	LT	703		178.82															
		704	703		177.96	177.81													
21+05.00 -L-	RT	704		178.82															
		705	703		183.2	177.91													
22+10.00 -L-	LT	705		184.1															
		706	705		183.26	183.2													
22+10.00 -L-	RT	706		184.1															
		707	705		189.79	183.18													
23+00.00 -L-	LT	707		190.77															
		708	707		189.85	189.79													
23+00.00 -L-	RT	708		190.77															
SHEET TOTALS									9.6	9.6		12.0	31.2						

SIZE / THICKNESS OR GAUGE (C.S. PIPE): 300 – 1.63; 375 – 1.63; 450 – 1.63; 600 – 1.63; 750 – 2.01; 900 – 2.01; 1000 – 2.01; 1200 – 2.01

STATION	FROM	TO	C.S. PIPE 300	375	450	600	750	900	1000	1200	R.C. PIPE CLASS III 300	375	450	600	750	900	1050	1200	R.C. PIPE CLASS IV 300	375	450	600	750	900	1050	1200	375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. METERS
	609	608										15.6																				
11+30.00 -Y6-	609																															
11+17.35 -Y6-	610																												6.0			
11+07.19 -Y6-	611																												9.6			
10+98.34 -Y6-	612																												6.0			
	607	613																			62.4											
18+53.50 -L-	613																															
	615	613																			18.0											
18+46.00 -L-	614																															
	614	615																		8.4												
18+53.50 -L-	615																															
	616	615																														
18+53.50 -L-	616																															
	613	617																			84.0											
19+37.50 -L-	617																															
	618	617																														
19+37.49 -L-	618																															
	617	619																				81.6										
20+20.03 -L-	619																															
	620	619																														
20+20.00 -L-	620																															
	619	621																				20.4										
20+40.00 -L-	621																															
	621	622																					14.4									
20+54.00 -L-	622																															
	622	623																					4.8									
20+58.50 -L-	623																															
	624	623																		18.0												
20+58.50 -L-	624																															
19+55.05 -L-	625																															2.6
	625	626																														
19+61.41 -L-	626																															2.6
20+36.02 -L-	627																															2.6
	627																															
	623	701																					8.4									
20+67.00 -L-	701																															
	701	702																														
20+67.00 -L-	702																															
	703	701																			38.4											
21+05.00 -L-	703																															
	704	703																		18.0												
21+05.00 -L-	704																															
	705	703																		105.6												
22+10.00 -L-	705																															
	706	705																		18.0												
22+10.00 -L-	706																															
	707	705																		90.0												
23+00.00 -L-	707																															
	708	707																		18.0												
23+00.00 -L-	708																															
SHEET TOTALS												15.6								276.0	202.8	102.0	27.6						21.6			7.8

STATION	FROM	TO	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.0'	METERS B 3.0 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
	609	608									
11+30.00 -Y6-	609		1								
11+17.35 -Y6-	610										
11+07.19 -Y6-	611										
10+98.34 -Y6-	612										
	607	613									
18+53.50 -L-	613		1	0.76		1			1		
	615	613									
18+46.00 -L-	614		1			1		1			
	614	615									
18+53.50 -L-	615		1	0.78		1		1			
	616	615									
18+53.50 -L-	616										
	613	617									
19+37.50 -L-	617		1			1			1		
	618	617									
19+37.49 -L-	618		1								
	617	619									
20+20.03 -L-	619		1			1			1		
	620	619									
20+20.00 -L-	620		1								
	619	621									
20+40.00 -L-	621		1			1			1		
	621	622									
20+54.00 -L-	622		1			1	1				
	622	623									
20+58.50 -L-	623		1			1	1				
	624	623									
20+58.50 -L-	624		1			1	1				
19+55.05 -L-	625										
	625	626									
19+61.41 -L-	626										
20+36.02 -L-	627										
	627										
	623	701									
20+67.00 -L-	701		1			1		1			
	701	702									
20+67.00 -L-	702										
	703	701									
21+05.00 -L-	703		1			1		1			
	704	703									
21+05.00 -L-	704		1			1			1		
	705	703									
22+10.00 -L-	705		1			1		1			
	706	705									
22+10.00 -L-	706		1			1			1		
	707	705									
23+00.00 -L-	707		1			1		1			
	708	707									
23+00.00 -L-	708		1			1			1		
SHEET TOTALS			19	1.54		16	3	6	7		

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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLE	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
	609	608																							
11+30.00 -Y6-	609					1					1														FALSE SUMP
11+17.35 -Y6-	610																								
11+07.19 -Y6-	611																								
10+98.34 -Y6-	612																								
	607	613																							
18+53.50 -L-	613																								
	615	613																							
18+46.00 -L-	614																								
	614	615																							
18+53.50 -L-	615																								
	616	615																							
18+53.50 -L-	616																								OPEN ENDED PIPE (IN)
	613	617																							
19+37.50 -L-	617																								
	618	617																							
19+37.49 -L-	618					1											1								
	617	619																							
20+20.03 -L-	619																								
	620	619																							
20+20.00 -L-	620					1											1								
	619	621																							
20+40.00 -L-	621																								
	621	622																							
20+54.00 -L-	622																								
	622	623																							
20+58.50 -L-	623																								
	624	623																							
20+58.50 -L-	624																								
19+55.05 -L-	625																								
	625	626																							
19+61.41 -L-	626																								
20+36.02 -L-	627																								
	627																								
	623	701																							
20+67.00 -L-	701																								
	701	702																							
20+67.00 -L-	702																								OUTLET-ENERGY DISSIPATOR
	703	701																							
21+05.00 -L-	703																								
	704	703																							
21+05.00 -L-	704																								
	705	703																							
22+10.00 -L-	705																								
	706	705																							
22+10.00 -L-	706																								
	707	705																							
23+00.00 -L-	707																								
	708	707																							
23+00.00 -L-	708																								
SHEET TOTALS						3					1						2								

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: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

LKCXRFA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	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 1200mm & UNDER)

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

STATION (SIZE / THICKNESS OR GAUGE)	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL
24+00.00 -L-	LT	709		195.22			
		709	801		194.3	194.06	
24+80.00 -L-	LT	801		195.97			
		802	801		193.9	193.87	
24+80.00 -L-	LT	802		195.1			
		801	803		193.87	190.52	
24+79.98 -L-	RT	803		192.5			
		803	804		189.92	189.9	
24+80.00 -L-	RT	804					
		805	802		194.1	194	
25+10.60 -L-	LT	805		195.1			
		806	805		195.04	194.13	
25+14.06 -L-	LT	806		195.96			
		807	806		195.7	195.04	
25+20.00 -L-	RT	807		196.62			
25+49.50 -L-	LT	808					
		808	809		192.82	187.07	
25+04.59 -L-	RT	809					
25+80.00 -L-	LT	810					
		811	810		196.46	195.1	
25+80.00 -L-	LT	811		197.45			
		812	811		197.3	196.6	
25+80.00 -L-	RT	812		198.22			
		813	811		197.98	196.46	
26+40.00 -L-	LT	813		198.98			
		814	813		199.34	197.98	
26+80.00 -L-	LT	814		200.26			
		815	814		200.9	199.42	
26+80.00 -L-	RT	815		202.2			
		816	815		200.96	200.9	
26+80.00 -L-	RT	816		201.8			
13+37.00 -Y7-	LT	901			204.6	203.8	
10+82.91 -Y9-	LT	902					
11+11.73 -Y9-	LT	903					
11+46.64 -Y9-	RT	904					
11+66.51 -Y9-	LT	905			208	207.3	
12+12.03 -Y9-	LT	906					
29+00.00 -L-	RT	907		208.9			
		907	908		208.06	207.92	
28+99.98 -L-	RT	908		209.9			
		908	909		207.92	207.75	
29+00.00 -L-	LT	909					
		910	908		209.81	209.06	
29+60.09 -L-	RT	910		210.65			
14+15.24 -Y9-	LT	1001					
14+43.64 -Y9-	LT	1002					
14+43.23 -Y9-	RT	1003					
14+72.59 -Y9-	RT	1004					
		426	406	182.24	180.26	180.12	
SHEET TOTALS							

DRAINAGE PIPE (RCP, CSP, CAAP) No HDPE or PVC Pipe

STATION	FROM	TO	200	375	450	600	750	900	1050	1200	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
24+00.00 -L-	709													
	709	801												
24+80.00 -L-	801													
	802	801				8.4						X	X	X
24+80.00 -L-	802													
	801	803												
24+79.98 -L-	803													
	803	804					4.8					X	X	X
24+80.00 -L-	804													
	805	802			30.0							X	X	X
25+10.60 -L-	805													
	806	805			9.6							X	X	X
25+14.06 -L-	806													
	807	806												
25+20.00 -L-	807													
25+49.50 -L-	808													
	808	809												
25+04.59 -L-	809													
25+80.00 -L-	810													
	811	810			12.0						X			X
25+80.00 -L-	811													
	812	811												
25+80.00 -L-	812													
	813	811												
26+40.00 -L-	813													
	814	813			40.8							X	X	X
26+80.00 -L-	814													
	815	814												
26+80.00 -L-	815													
	816	815												
26+80.00 -L-	816													
13+37.00 -Y7-	901						25.2							X
10+82.91 -Y9-	902													
11+11.73 -Y9-	903													
11+46.64 -Y9-	904													
11+66.51 -Y9-	905				21.6									X
12+12.03 -Y9-	906													
29+00.00 -L-	907													
	907	908		19.2								X	X	X
28+99.98 -L-	908													
	908	909				34.8						X	X	X
29+00.00 -L-	909													
	910	908		61.2								X	X	X
29+60.09 -L-	910													
14+15.24 -Y9-	1001													
14+43.64 -Y9-	1002													
14+43.23 -Y9-	1003													
14+72.59 -Y9-	1004													
	426	406												
SHEET TOTALS				80.4	114.0	43.2	30.0							

C.S. PIPE / R.C. PIPE CLASS III

STATION	FROM	TO	C.S. 300	C.S. 375	C.S. 450	C.S. 600	C.S. 750	C.S. 900	C.S. 1000	C.S. 1200	R.C. III 300	R.C. III 375	R.C. III 450	R.C. III 600	R.C. III 750	R.C. III 900	R.C. III 1050	R.C. III 1200
THICKNESS OR GAUGE			1.63	1.63	1.63	1.63	2.01	2.01	2.01	2.01								
24+00.00 -L-	709																	
	709	801																
24+80.00 -L-	801																	
	802	801																
24+80.00 -L-	802																	
	801	803																
24+79.98 -L-	803																	
	803	804																
24+80.00 -L-	804																	
	805	802																
25+10.60 -L-	805																	
	806	805																
25+14.06 -L-	806																	
	807	806																
25+20.00 -L-	807																	
25+49.50 -L-	808																	
	808	809																
25+04.59 -L-	809																	
25+80.00 -L-	810																	
	811	810																
25+80.00 -L-	811																	
	812	811																
25+80.00 -L-	812																	
	813	811																
26+40.00 -L-	813																	
	814	813																
26+80.00 -L-	814																	
	815	814																
26+80.00 -L-	815																	
	816	815																
26+80.00 -L-	816																	
13+37.00 -Y7-	901																	
10+82.91 -Y9-	902																	
11+11.73 -Y9-	903																	
11+46.64 -Y9-	904																	
11+66.51 -Y9-	905																	
12+12.03 -Y9-	906																	
29+00.00 -L-	907																	
	907	908																
28+99.98 -L-	908																	
	908	909																
29+00.00 -L-	909																	
	910	908																
29+60.09 -L-	910																	
14+15.24 -Y9-	1001																	
14+43.64 -Y9-	1002																	
14+43.23 -Y9-	1003																	
14+72.59 -Y9-	1004																	
	426	406																
SHEET TOTALS																		

R.C. PIPE CLASS IV and other pipe

STATION	FROM	TO	R.C. IV 300	R.C. IV 375	R.C. IV 450	R.C. IV 600	R.C. IV 750	R.C. IV 900	R.C. IV 1050	R.C. IV 1200	375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE
24+00.00 -L-	709														
	709	801		80.4											
24+80.00 -L-	801														
	802	801													
24+80.00 -L-	802														
	801	803				32.4									
24+79.98 -L-	803														
	803	804													
24+80.00 -L-	804														
	805	802													
25+10.60 -L-	805														
	806	805													
25+14.06 -L-	806														
	807	806		13.2											
25+20.00 -L-	807														
25+49.50 -L-	808														
	808	809						70.8							
25+04.59 -L-	809														
25+80.00 -L-	810														
	811	810													
25+80.00 -L-	811														
	812	811		12.0											
25+80.00 -L-	812														
	813	811			70.8										
26+40.00 -L-	813														
	814	813													
26+80.00 -L-	814														
	815	814		21.6											
26+80.00 -L-	815														
	816	815		20.4											
26+80.00 -L-	816														
13+37.00 -Y7-	901														
10+82.91 -Y9-	902												6.0		
11+11.73 -Y9-	903												8.4		
11+46.64 -Y9-	904												8.4		
11+66.51 -Y9-	905														
12+12.03 -Y9-	906												10.8		
29+00.00 -L-	907														
	907	908													
28+99.98 -L-	908														
	908	909													
29+00.00 -L-	909														
	910	908													
29+60.09 -L-	910														
14+15.24 -Y9-	1001												7.2		
14+43.64 -Y9-	1002												8.4		
14+43.23 -Y9-	1003												6.0		
14+72.59 -Y9-	1004												7.2		
				10.8											
	426	406													
SHEET TOTALS				158.4	70.8	32.4		70.8					62.4		

ENDWALLS (STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE)); QUANTITIES FOR DRAINAGE STRUCTURES (*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B')); FRAME, GRATES, AND HOOD STANDARD 840.03; CONCRETE TRANSITIONAL SECTION

STATION	FROM	TO	ENDWALLS CU. METERS	PER EACH (0 THRU 1.50)	METERS A: 1.5 THRU 3.0'	METERS B: 3.0 AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	TYPE OF GRATE E	TYPE OF GRATE F	TYPE OF GRATE G	DROP INLET	CATCH BASIN
24+00.00 -L-	709			1			1		1			
	709	801										
24+80.00 -L-	801			1			1		1			
	802	801										
24+80.00 -L-	802			1								
	801	803										
24+79.98 -L-	803			1								
	803	804										
24+80.00 -L-	804											
	805	802										
25+10.60 -L-	805			1								
	806	805										
25+14.06 -L-	806			1			1		1			
	807	806										
25+20.00 -L-	807			1			1		1			1
25+49.50 -L-	808		2.6									
	808	809										
25+04.59 -L-	809		2.6									
25+80.00 -L-	810											
	811	810										
25+80.00 -L-	811			1			1		1			
	812	811										
25+80.00 -L-	812			1			1		1			1
	813	811										
26+40.00 -L-	813			1			1		1			
	814	813										
26+80.00 -L-	814			1								
	815	814										
26+80.00 -L-	815			1			1		1			1
	816	815										
26+80.00 -L-	816			1								
13+37.00 -Y7-	901											
10+82.91 -Y9-	902											
11+11.73 -Y9-	903											
11+46.64 -Y9-	904											
11+66.51 -Y9-	905											
12+12.03 -Y9-	906											
29+00.00 -L-	907			1								
	907	908										
28+99.98 -L-	908			1	0.48							
	908	909										
29+00.00 -L-	909											
	910	908										
29+60.09 -L-	910			1								
14+15.24 -Y9-	1001											
14+43.64 -Y9-	1002											
14+43.23 -Y9-	1003											
14+72.59 -Y9-	1004											
	426	406										
SHEET TOTALS			5.2	16	0.48		8		8			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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLE	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
24+00.00 -L-	709																								
	709	801																							
24+80.00 -L-	801																								
	802	801																							
24+80.00 -L-	802		1	1																					
	801	803																							
24+79.98 -L-	803											1	1												
	803	804																							
24+80.00 -L-	804																								OUTLET
	805	802																							
25+10.60 -L-	805		1	1																					
	806	805																							
25+14.06 -L-	806																								
	807	806																							
25+20.00 -L-	807																								
25+49.50 -L-	808																								
	808	809																							
25+04.59 -L-	809																								
25+80.00 -L-	810																								OUTLET
	811	810																			2-450				
25+80.00 -L-	811																								
	812	811																							
25+80.00 -L-	812																								
	813	811																							
26+40.00 -L-	813																								
	814	813																							
26+80.00 -L-	814					1			1																FALSE SUMP
	815	814																							
26+80.00 -L-	815																								
	816	815																							
26+80.00 -L-	816					1			1																FALSE SUMP
13+37.00 -Y7-	901																								
10+82.91 -Y9-	902																								
11+11.73 -Y9-	903																								
11+46.64 -Y9-	904																								
11+66.51 -Y9-	905																								FALSE SUMP
12+12.03 -Y9-	906																								
29+00.00 -L-	907					1					1														FALSE SUMP
	907	908																							
28+99.98 -L-	908					1			1																
	908	909																							
29+00.00 -L-	909																								OUTLET
	910	908																							
29+60.09 -L-	910					1			1																FALSE SUMP
14+15.24 -Y9-	1001																								
14+43.64 -Y9-	1002																								
14+43.23 -Y9-	1003																								
14+72.59 -Y9-	1004																								
	426	406																							
SHEET TOTALS			2	2		5			4		1	1	1								2(450)				

COMPUTED BY: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

LKCXRFA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	3-E

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 1200mm & 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) No HDPE or PVC Pipe 375	DRAINAGE PIPE 450	DRAINAGE PIPE 1050	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	R.C. PIPE CLASS IV 375	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. METERS	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	METERS A 1.5 THRU 3.0'	G.D.I. TYPE "B" STD. 840.18 OR 840.27	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH TWO GRATES STD. 840.24	100mm CONCRETE PAVED DITCH (M2)	PREFORMED SCOUR HOLE	DRAINAGE PIPE ELBOWS NO. & SIZE	REMARKS
32+51.00 -L-	LT	1005																					8.4			
		1005	1006		209.6	205.91		10.8			X			X											2(375)	
32+51.00 -L-	LT	1006		206.75													1		1			1				FALSE SUMP
		1006	1007		205.91	205.36		22.8				X	X	X												
32+51.00 -L-	LT	1007		206.2													1		1		1					FALSE SUMP
		1007	1008		205.36	201.51		109.2				X	X	X												
33+60.00 -L-	LT	1008		202.5													1		1		1					FALSE SUMP
		1008	1009		201.21	200.2			26.4			X	X	X												
33+60.00 -L-	RT	1009																						1		OUTLET
		1010	1008		201.28	201.21			22.8			X	X	X												
33+60.00 -L-	LT	1010		202.2													1		1		1					FALSE SUMP
		1011	1010		205.8	201.36		10.8			X			X											2(375)	
33+60.00 -L-	LT	1011																					8.4			
35+20.00 -L-	LT	1101																								OUTLET
		1102	1101		197.47	195.95		21.6				X	X	X												
35+00.00 -L-	LT	1102		198.98													1		1		1					FALSE SUMP
		1103	1102	197.55	197.47			24.0				X	X	X												
35+06.43 -L-	CL	1103		199.18													1		1		1					
		1104	1103	197.61	197.55										16.8											
35+11.00 -L-	RT	1104		199.8													1	0.69	1	1						
		1105	1104		197.82	197.61		69.6				X	X	X												
35+80.00 -L-	RT	1105		198.66													1		1	1						
36+40.00 -L-	RT	1106																					8.4		1(375)	
		1106	1107		199.2	195.76		8.4			X			X												
36+40.00 -L-	RT	1107		196.6													1		1		1					FALSE SUMP
		1107	1108		195.76	195.67	X	31.2				X	X	X												
36+60.00 -L-	LT	1108		196.6													1		1		1					FALSE SUMP
		1108	1109		195.67	195.62	X		16.8			X	X	X												
36+60.00 -L-	LT	1109		197.25													1	0.13	1	1						
		1110	1109		197.06	196.41		40.8				X	X	X												
36+20.00 -L-		1110		197.9													1		1	1						
		1109	1111		195.62	194.85			8.4			X	X	X												
36+59.94 -L-	LT	1111																						1		OUTLET
37+44.63 -L-	RT	1112														3.4										
		1112	1113		193.34	190.79				54.0				X												
37+37.44 -L-	LT	1113																								OUTLET
37+80.00 -L-	RT	1114		195.43													1		1		1					FALSE SUMP
		1114	1115		194.59	194.52	X	22.8				X	X	X												
37+80.00 -L-	LT	1115		195.74													1		1		1					FALSE SUMP
		1115	1116		194.52	194.46	X		21.6			X	X	X												
37+80.00 -L-	LT	1116		195.43													1		1		1					FALSE SUMP
		1116	1117		194.46	193			22.8			X	X	X												
37+60.20 -L-	LT	1117																								OUTLET
39+00.00 -L-	LT	1201		196													1		1		1					FASLE SUMP
		1201	1202		195.16	195.09		22.8				X	X	X												
39+00.00 -L-	RT	1202		196.3													1		1		1					FALSE SUMP
		1203	1202		195.16	195.09		21.6				X	X	X												
39+00.00 -L-		1203		196													1		1		1					FALSE SUMP
		1202	1204		195.09	194.85	X		80.4			X	X	X												
SHEET TOTALS								416.4	199.2	54.0					16.8	3.4	18	0.82	18	4	13	1	25	2	5(375)	

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

LKCXRFA

COMPUTED BY: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	3-F

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 1200mm & 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) No HDPE or PVC Pipe 200	375	450	600	750	900	1050	1200	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
39+80.00 -L-	RT	1204		196.7															
		1204	1205		195.1	193						27.6					X	X	X
39+80.00 -L-	LT	1205																	
		1207	1204		196.1	195.1						100.8					X	X	X
40+79.71 -L-	LT	1206		197.4															
		1206	1207		196.56	196.5	X		21.6								X	X	X
40+80.00 -L-	LT	1207		197.7															
41+00.00 -L-	RT	1208		197.9															
		1208	1207		197.06	196.86			31.2								X	X	X
41+33.07 -L-	RT	1209																	
41+78.95 -L-	LT	1212																	
42+40.05 -L-	LT	1301		202.6															
		1301	1302		201.76	201.61	X		24.0								X	X	X
42+40.00 -L-	LT	1302		202.9															
		1302	1207		201.45	196.25					160.8						X	X	X
42+39.95 -L-	RT	1303		202.6															
		1303	1302		201.68	201.61	X				24.0						X	X	X
42+39.94 -L-	RT	1304																	
		1304	1303		204.6	201.68				6.0						X			X
46+00.00 -L-	LT	1401		205.3															
		1401	1402		204.46	203.76			25.2								X	X	X
46+00.00 -L-	RT	1402		204.6															
		1402	1403		203.76	201.5			40.8								X	X	X
46+40.11 -L-	RT	1403																	
46+40.00 -L-	LT	1404		204.35															
		1404	1405		203.57	202.51			19.2								X	X	X
46+40.00 -L-	LT	1405		203.35															
		1405	1406		202.51	201.8			21.6								X	X	X
46+60.00 -L-	LT	1406																	
46+79.16 -L-	LT	1407																	
		1407	1408		201.35	199.75													
46+76.00 -L-	RT	1408																	
46+81.00 -L-	RT	1409																	
		1409	1410		199.65	193.3							37.2			X			X
47+17.82 -L-	RT	1410																	
11+91.62 -Y13-	RT	1411																	
		1411	1412		198.1	194.2							33.6			X			X
11+75.15 -Y13-	LT	1412																	
48+29.45 -L-	LT	1413																	
		1413	1414		197.7	195.68				8.4						X			X
48+30.04 -L-	LT	1414		196.6															
		1414	1415		195.53	195.46	X				22.8						X	X	X
48+29.45 -L-	RT	1415		197.15															
		1415	1416		195.4	195.3					22.8						X	X	X
48+29.45 -L-	RT	1416																	
12+59.81 -Y13-	RT	1417																	
		1417	1418		199.3	198.55					19.2								X
SHEET TOTALS									183.6	14.4	249.6	128.4	70.8						

STATION	FROM	TO	C.S. PIPE 300 (1.63)	C.S. PIPE 375 (1.63)	C.S. PIPE 450 (1.63)	C.S. PIPE 600 (1.63)	C.S. PIPE 750 (2.01)	C.S. PIPE 900 (2.01)	C.S. PIPE 1000 (2.01)	C.S. PIPE 1200 (2.01)	R.C. PIPE CLASS III 300	375	450	600	750	900	1050	1200	R.C. PIPE CLASS IV 300	375	450	600	750	900	1050	1200	375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. METERS
39+80.00 -L-	1204																															
	1204	1205																														
39+80.00 -L-	1205																															
	1207	1204																														
40+79.71 -L-	1206																															
	1206	1207																														
40+80.00 -L-	1207																															
41+00.00 -L-	1208																															
	1208	1207																														
41+33.07 -L-	1209																												10.8			
41+78.95 -L-	1212																												9.6			
42+40.05 -L-	1301																															
	1301	1302																														
42+40.00 -L-	1302																															
	1302	1207																														
42+39.95 -L-	1303																															
	1303	1302																														
42+39.94 -L-	1304																															
	1304	1303																														
46+00.00 -L-	1401																															
	1401	1402																														
46+00.00 -L-	1402																															
	1402	1403																														
46+40.11 -L-	1403																															
46+40.00 -L-	1404																															
	1404	1405																														
46+40.00 -L-	1405																															
	1405	1406																														
46+60.00 -L-	1406																															
46+79.16 -L-	1407																															2.6
	1407	1408																						55.2								
46+76.00 -L-	1408																															
46+81.00 -L-	1409																															2.6
	1409	1410																														
47+17.82 -L-	1410																															
11+91.62 -Y13-	1411																															2.6
	1411	1412																														
11+75.15 -Y13-	1412																															
48+29.45 -L-	1413																															
	1413	1414																														
48+30.04 -L-	1414																															
	1414	1415																														
48+29.45 -L-	1415																															
	1415	1416																														
48+29.45 -L-	1416																															
12+59.81 -Y13-	1417																															
	1417	1418																														
SHEET TOTALS																								55.2					20.4			7.8

STATION	FROM	TO	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.0'	METERS B 3.0 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	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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLE	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
39+80.00 -L-	1204		1	0.35										1				1																FALSE SUMP
	1204	1205																																
39+80.00 -L-	1205																																	OUTLET-ENERGY DISSIPATOR
	1207	1204																																
40+79.71 -L-	1206		1												1			1																FALSE SUMP
	1206	1207																																
40+80.00 -L-	1207		1	0.10										1				1																FALSE SUMP
41+00.00 -L-	1208		1												1			1																FALSE SUMP
	1208	1207																																
41+33.07 -L-	1209																																	
41+78.95 -L-	1212																																	
42+40.05 -L-	1301		1												1			1																FASLE SUMP
	1301	1302																																
42+40.00 -L-	1302		1											1				1																FALSE SUMP
	1302	1207																																
42+39.95 -L-	1303		1												1			1																FALSE SUMP
	1303	1302																																
42+39.94 -L-	1304																						8.4											
	1304	1303																												1(450)				
46+00.00 -L-	1401		1												1			1																FALSE SUMP
	1401	1402																																
46+00.00 -L-	1402		1												1			1																FALSE SUMP
	1402	1403																																
46+40.11 -L-	1403																																	OUTLET
46+40.00 -L-	1404		1												1			1																
	1404	1405																																
46+40.00 -L-	1405		1												1			1																FALSE SUMP
	1405	1406																																
46+60.00 -L-	1406																																	OUTLET
46+79.16 -L-	1407																																	
	1407	1408																																
46+76.00 -L-	1408																																	OUTLET
46+81.00 -L-	1409																																	
	1409	1410																																
47+17.82 -L-	1410																																	OUTLET
11+91.62 -Y13-	1411																																	
	1411	1412																																
11+75.15 -Y13-	1412																																	OUTLET
48+29.45 -L-	1413																						8.4											
	1413	1414																												2(450)				
48+30.04 -L-	1414		1												1			1																FALSE SUMP
	1414	1415																																
48+29.45 -L-	1415		1	0.25											1			1																FALSE SUMP
	1415	1416																																
48+29.45 -L-	1416																										1							OUTLET
12+59.81 -Y13-	1417																																	OPEN ENDED PIPE (IN)
	1417	1418																																
SHEET TOTALS			13	0.70										3	10			13					17				1			3(450)				

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: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

LKCXRFA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	3-G

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 1200mm & 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) No HDPE or PVC Pipe								DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE								R.C. PIPE CLASS III								R.C. PIPE CLASS IV								375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. METERS	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.0'	METERS B 3.0 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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLES	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
SIZE								200	375	450	600	750	900	1050	1200					300	375	450	600	750	900	1000	1200	300	375	450	600	750	900	1050	1200	300	375	450	600	750	900	1050	1200																																							
THICKNESS OR GAUGE																				1.63	1.63	1.63	1.63	2.01	2.01	2.01	2.01																																																					
12+59.81 -Y13-	LT	1418																																																																															OUTLET
50+00.00 -L-	LT	1501		191.6																																														1												1					1														FALSE SUMP
		1501	1502		190.76	190.69	X		21.6								X	X	X																																																													
50+00.00 -L-	LT	1502		191.9																																														1												1			1																FALSE SUMP
		1502	1503		190.69	190.06			27.6								X	X	X																																																													
50+00.00 -L-	RT	1503		190.9																																														1												1			1																FALSE SUMP
		1503	1504		189.98	189.85	X			25.2							X	X	X																																																													
50+25.12 -L-	RT	1504																																																																									1							OUTLET
50+58.50 -L-	LT	1505		191.5																																														1												1			1																
		1505	1506		190.66	190.57	X		28.8								X	X	X																																																													
50+81.48 -L-	LT	1506		192.2																																														1	0.13											1		1																	
		1506	1507		190.57	189.3			8.4							X			X																																																											2(375)				
50+81.51 -L-	LT	1507																																																																															OUTLET
		1508	1506		191.61	191.36			39.6								X	X	X																																																													
51+19.98 -L-	LT	1508		192.45																																														1												1		1																	
51+06.57 -L-	LT	1509																																																	4.6																																OUTLET
		1510	1509		187.16	186.06									70.8				X																																																													
50+58.49 -L-	RT	1510																																																	4.6																																
51+77.48 -L-	RT	1511																																																																															OPEN ENDED PIPE (IN)
		1511	1512		191	188.3						64.8							X																																																													
51+40.00 -L-	LT	1512																																																																															OUTLET
52+00.00 -L-	RT	1513		192.1																																														1												1			1																FALSE SUMP
		1513	1515		191.26	191.19			22.8								X	X	X																																																													
52+00.00 -L-	LT	1514																																																																									1							OUTLET
		1515	1514		191.19	190			24.0								X	X	X																																																													
52+00.00 -L-	RT	1515		192.4																																														1												1			1																FALSE SUMP
53+21.99 -L-	RT	1601																																																	2.6																																
		1601	1602		191.27	187.97							68.4						X																																																													
53+64.52 -L-	LT	1602																																																																															OUTLET
54+60.00 -L-	RT	1603		190.91																																														1												1			1																FALSE SUMP
		1603	1604		190.07	189.76			22.8								X	X	X																																																													
54+60.00 -L-	RT	1604		190.6																																														1												1			1																FALSE SUMP
		1604	1605		189.68	189.47	X			31.2							X	X	X																																																													
54+40.00 -L-	LT	1605		190.6																																														1												1			1																FALSE SUMP
		1605	1606		189.47	189.3				15.6							X	X	X																																																													
54+25.19 -L-	LT	1606																																																																															OUTLET
56+20.00 -L-	RT	1607																																																																					8.4											
		1607	1608		193.6	187.38				13.2						X			X																																																											1(450)				
56+20.00 -L-	RT	1608		188.3																																														1												1			1																FALSE SUMP
		1608	1609		187.38	187.31	X				22.8						X	X	X																																																													
56+20.00 -L-	RT	1609		188.6																																														1											1				1																FALSE SUMP
		1610	1609		187.46	187.39			22.8								X	X	X																																																													
56+20.00 -L-	LT	1610		188.3																																														1												1			1																FALSE SUMP
56+80.00 -L-	LT	1701		187.6																																														1												1			1																FALSE SUMP
		1701	1702		186.76	186.69			22.8								X	X	X																																																													
56+80.00 -L-	RT	1702		187.9																																														1											1				1																FALSE SUMP
		1609	1702		187.15	186.45					60.0						X	X	X																																																													
56+80.00 -L-	RT	1703		187.6																																														1											1				1																FALSE SUMP
		1702	1703		186.45	186.15					21.6						X	X	X																																																													
SHEET TOTALS									241.2	85.2	104.4	64.8	68.4		70.8																																		11.8	17	0.13										3	14		2	14		1			8.4				2			1(450) 2(375)				

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: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

LKCXRFA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	3-H

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 1200mm & UNDER)

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO.		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP) No HDPE or PVC Pipe												C.S. PIPE								R.C. PIPE CLASS III								R.C. PIPE CLASS IV								375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE)	QUANTITIES FOR DRAINAGE STRUCTURES	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B')		C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03			CONCRETE TRANSITIONAL SECTION		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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLES	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
SIZE		FROM	TO					200	375	450	600	750	900	1050	1200	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	300	375	450	600	750	900	1000	1200	300	375	450	600	750	900	1050	1200	300	375	450	600	750	900	1050	1200						CU. METERS	PER EACH (0 THRU 1.50)	METERS A: 1.5 THRU 3.0'	METERS B: 3.0 AND ABOVE		TYPE OF GRATE E	F	G	DROP INLET	CATCH BASIN																							
THICKNESS OR GAUGE																				1.63	1.63	1.63	1.63	2.01	2.01	2.01	2.01																																																						
56+99.83 -L-	RT	1704																																																																															OUTLET
		1703	1704		186.15	185					21.6						X	X	X																																																														
57+08.04 -L-	RT	1705																																																																																OUTLET
		1706	1705		186.91	184.6			12.0							X			X																																																														
57+08.00 -L-	RT	1706		188.45																																														1	0.04											1		1																	
		1707	1706		187.76	187.61			31.2								X	X	X																																																														
57+39.00 -L-	RT	1707		188.6																																														1												1		1																	
		1708	1706		186.96	186.91	X		16.8								X	X	X																																																														
57+08.00 -L-	LT	1708		187.8																																														1												1			1																
		1709	1708		187.61	186.96																															16.8																																															
57+08.00 -L-	LT	1709		188.45																																														1												1		1																	
		1710	1709		187.76	187.61			31.2								X	X	X																																																													
57+38.64 -L-	LT	1710		188.6																																														1												1		1																	
57+45.93 -L-	RT	1711																																															4.6																																
		1711	1712		182.96	181.26									61.2				X																																																														
57+45.53 -L-	LT	1712																																																																																	OUTLET
58+39.90 -L-	LT	1713		189.2																																														1												1			1																FALSE SUMP
		1713	1714		188.36	188.29			25.2								X	X	X																																																												
58+40.00 -L-	LT	1714		189.5																																														1												1			1																FASLE SUMP
		1714	1715		188.29	187.96			25.2								X	X	X																																																												
58+40.10 -L-	RT	1715		188.8																																														1												1			1																FASLE SUMP
		1715	1716		187.96	186.6			20.4								X	X	X																																																												
58+20.31 -L-	RT	1716																																																																																OUTLET
60+13.00 -L-	LT	1801		191.4																																														1												1			1																
		1801	1802		190.56	189.66																															19.2																																															
60+13.00 -L-	LT	1802		190.5																																														1												1			1																FALSE SUMP
		1802	1803		189.66	189.16			40.8								X	X	X																																																												
60+53.34 -L-	LT	1803		190																																														1												1			1																
		1804	1803		188.96	188.39	X		57.6								X	X	X																																																														
60+51.80 -L-	RT	1804		189.8																																														1												1			1																
		1803	1805		188.39	188				21.6							X	X	X																																																													
60+65.35 -L-	LT	1805																																																																																OUTLET
10+45.06 -Y14-	LT	1806																																													14.4																																		
10+78.68 -Y14-	LT	1807																																																																															OUTLET
		1808	1807		187.98	187.93	X		15.6								X	X	X																																																													
60+93.97 -L-	LT	1808		189																																														1												1			1																
		1809	1808		188.16	187.98	X		60.0								X	X	X																																																													
60+89.97 -L-	RT	1809		189																																														1												1			1																
62+40.00 -L-	RT	1810		184.5																																														1												1			1																FALSE SUMP
		1810	1811		183.66	183.59	X		22.8								X	X	X																																																													
62+40.00 -L-	RT	1811		184.9																																														1												1			1																FALSE SUMP
		1812	1811		183.66	183.59	X		21.6								X	X	X																																																												
62+40.00 -L-	LT	1812		184.5																																														1												1			1																FALSE SUMP
63+20.00 -L-	RT	1813		181.65																																														1												1			1																FALSE SUMP
		1813	1814		180.81	180.41			31.2								X	X	X																																																												
63+40.00 -L-	LT	1814		181.25																																														1												1			1																FALSE SUMP
		1811	1814		183.59	180.41			100.8								X	X	X																																																												
63+60.00 -L-	LT	1815		180.25																																														1												1			1																FALSE SUMP
		1814	1815		180.53	179.33				31.2							X	X	X																																																												
SHEET TOTALS									512.4	52.8	21.6				61.2																						36.0										14.4		4.6	20	0.04											20		4	16																

COMPUTED BY: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

LKCXRFA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
R-2241A	3-I

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 1200mm & 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) No HDPE or PVC Pipe 200	375	450	600	750	900	1050	1200	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
63+80.49 -L-	LT	1901																	
		1815	1901		179.33	179.1	X			21.6							X	X	X
64+50.00 -L-	RT	1902																	
		1902	1903					19.2								X	X	X	X
64+50.00 -L-	RT	1903																	
64+52.44 -L-	LT	1904																	
65+00.00 -L-	LT	1905		175.5															
		1905	1906		174.66	171.4			28.8							X			X
65+67.50 -L-	RT	1909																	
		1909	1910					12.0								X	X	X	X
66+60.00 -L-	RT	1911		169.8															
		1911	1912		168.96	168.2			27.6								X	X	X
66+60.00 -L-	LT	1912																	
67+60.01 -L-	RT	2001		166.8															
		2001	2002		165.96	165.89			22.8								X	X	X
67+60.00 -L-	RT	2002		167.1															
		2003	2002		165.96	165.89			22.8								X	X	X
67+59.99 -L-	LT	2003		166.8															
		2002	2004		165.89	165.46			84.0								X	X	X
68+43.00 -L-	RT	2004		166.3															
		2005	2004		165.11	165.04			21.6								X	X	X
68+43.01 -L-	RT	2005		165.95															
		2004	2006		164.96	164.85	X			22.8							X	X	X
68+42.99 -L-	LT	2006		165.95															
		2006	2007		164.85	164.65	X			27.6							X	X	X
68+69.53 -L-	LT	2007																	
69+30.00 -L-	LT	2010		167.2															
		2010	2011		166.36	166.05			22.8								X	X	X
69+30.01 -L-	RT	2011		166.89															
		2011	2012		166.05	165.5			21.6								X	X	X
69+10.01 -L-	RT	2012																	
68+99.53 -L-	LT	2013																	
		2014	2013		165.25	164.8					22.8						X	X	X
69+19.99 -L-	LT	2014		166.7															
		2015	2014		166.38	165.25					100.8						X	X	X
70+19.99 -L-	LT	2015		168.55															
		2016	2015		166.6	166.53				22.8							X	X	X
70+20.00 -L-	RT	2016		168.9															
		2017	2016		167.71	167.64			22.8								X	X	X
70+20.01 -L-	RT	2017		168.55															
		2101	2015		170.12	166.61			100.8								X	X	X
71+19.99 -L-	LT	2101		171.1															
		2102	2101		170.19	170.12			22.8								X	X	X
71+20.00 -L-	RT	2102		172.0															
		2103	2102		170.26	170.19			22.8								X	X	X
SHEET TOTALS								31.2	421.2	94.8	123.6								

STATION	C.S. PIPE 300 (1.63)	375 (1.63)	450 (1.63)	600 (1.63)	750 (2.01)	900 (2.01)	1000 (2.01)	1200 (2.01)	R.C. PIPE CLASS III 300	375	450	600	750	900	1050	1200	R.C. PIPE CLASS IV 300	375	450	600	750	900	1050	1200
SHEET TOTALS																								

ABBREVIATIONS

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

STATION	STRUCTURE NO. FROM	TO	375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. METERS	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.0'	B 3.0 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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLES	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
63+80.49 -L-	1901																																							OUTLET
	1815	1901																																						
64+50.00 -L-	1902								1																					1										
	1902	1903																																						PVC PIPE
64+50.00 -L-	1903																																							OUTLET
64+52.44 -L-	1904						8.4																																	
65+00.00 -L-	1905								1												1			1																FALSE SUMP
	1905	1906																																						
65+67.50 -L-	1909								1																					1										SPRING BOX
	1909	1910																																						PVC PIPE
66+60.00 -L-	1911								1												1			1																FALSE SUMP
	1911	1912																																						
66+60.00 -L-	1912																																1							OUTLET
67+60.01 -L-	2001								1												1			1																FALSE SUMP
	2001	2002																																						
67+60.00 -L-	2002								1												1			1																FALSE SUMP
	2003	2002																																						
67+59.99 -L-	2003								1												1			1																FALSE SUMP
	2002	2004																																						
68+43.00 -L-	2004								1												1			1																FALSE SUMP
	2005	2004																																						
68+43.01 -L-	2005								1												1			1																FALSE SUMP
	2004	2006																																						
68+42.99 -L-	2006								1												1			1																
	2006	2007																																						
68+69.53 -L-	2007																																							OUTLET
69+30.00 -L-	2010								1												1			1																FALSE SUMP
	2010	2011																																						
69+30.01 -L-	2011								1												1			1																FALSE SUMP
	2011	2012																																						
69+10.01 -L-	2012																																							OUTLET
68+99.53 -L-	2013																																							OUTLET
	2014	2013																																						
69+19.99 -L-	2014								1											1				1																FALSE SUMP
	2015	2014																																						
70+19.99 -L-	2015								1	0.67										1				1																FALSE SUMP
	2016	2015																																						
70+20.00 -L-	2016								1	0.80											1			1																FALSE SUMP
	2017	2016																																						
70+20.01 -L-	2017								1												1			1																FALSE SUMP
	2101	2015																																						
71+19.99 -L-	2101								1												1			1																FALSE SUMP
	2102	2101																																						
71+20.00 -L-	2102								1	0.31											1			1																FALSE SUMP
	2103	2102																																						
SHEET TOTALS							8.4		18	1.78										2	14			16						2			1							

COMPUTED BY: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

LKCXRFA

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".

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	3-J

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 1200mm & 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) No HDPE or PVC Pipe 200	375	450	600	750	900	1050	1200	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
71+20.01 -L-	RT	2103		171.1															
71+46.13 -L-	LT	2104																	
71+77.99 -L-	LT	2105																	
72+14.93 -L-	LT	2106																	
72+11.84 -L-	RT	2107																	
72+42.88 -L-	LT	2108																	
73+25.09 -L-	LT	2109																	
73+48.99 -L-	LT	2110		172.65															
		2110	2111		171.81	171.2	X		24.8								X	X	X
73+49.00 -L-	RT	2111		173.5															
74+48.83 -L-	LT	2201																	
74+86.99 -L-	LT	2202		171.2															
		2202	2203		170.36	170.16	X		20.6								X	X	X
74+87.00 -L-	RT	2203		171.8															
		2111	2203		171.7	170.86			115.0								X	X	X
74+87.01 -L-	RT	2204		171.2															
		2204	2203		170.36	170.16			24.4								X	X	X
75+66.35 -L-	LT	2205		171.2															
		2203	2205		170.16	169.75					80.4						X	X	X
75+45.33 -L-	LT	2206																	
76+00.00 -L-	RT	2207		170															
		2205	2207		169.75	168.55													
76+20.93 -L-	RT	2208																	
		2207	2208		168.55	168.4	X				24.0						X	X	X
75+81.35 -L-	LT	2209																	
		2209	2210		170.5	168.63					8.4								X
75+87.60 -L-	LT	2210		169.7															
		2211	2210		169.41	168.86			48.0								X	X	X
12+40.00 -Y17-	RT	2211		170.25															
		2212	2211		170.61	169.41			25.2								X	X	X
12+40.00 -Y17-	LT	2212		171.45															
		2210	2213		168.48	168.18						75.6					X	X	X
76+44.85 -L-	RT	2213																	
76+88.61 -L-	LT	2214																	
		2214	2215		169.9	168.38						7.2							X
76+86.39 -L-	LT	2215		169.6															
		2215	2216		168.22	168.12							32.4				X	X	X
76+74.50 -L-	RT	2216		170.6															
		2216	2217		168.12	168.04							26.4				X	X	X
76+65.46 -L-	RT	2217																	
80+25.28 -L-	LT	2301																	
12+78.01 -Y1-	LT	2401		181.1															
		2401	2402		180.43	180.29													
12+78.01 -Y1-	LT	2402		181.21															
		2403	2402		178.79	178.95													
12+69.00 -Y1-	RT	2403		180.98															
		406	2403		180.12	178.79													
10+89.00 -Y7-	LT	2404			198.85	198.73													
11+15.98 -Y7-	LT	2405																	
SHEET TOTALS									258.0		112.8	82.8	58.8						

STATION	FROM	TO	C.S. PIPE 300 (1.63)	C.S. 375 (1.63)	C.S. 450 (1.63)	C.S. 600 (1.63)	C.S. 750 (2.01)	C.S. 900 (2.01)	C.S. 1000 (2.01)	C.S. 1200 (2.01)	R.C. PIPE CLASS III 300	III 375	III 450	III 600	III 750	III 900	III 1050	III 1200	R.C. PIPE CLASS IV 300	IV 375	IV 450	IV 600	IV 750	IV 900	IV 1050	IV 1200	375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. METERS
71+20.01 -L-	2103																															
71+46.13 -L-	2104																												9.6			
71+77.99 -L-	2105																												9.6			
72+14.93 -L-	2106																												9.6			
72+11.84 -L-	2107																										20.4					
72+42.88 -L-	2108																												9.6			
73+25.09 -L-	2109																												9.6			
73+48.99 -L-	2110																															
	2110	2111																														
73+49.00 -L-	2111																															
74+48.83 -L-	2201																												7.2			
74+86.99 -L-	2202																															
	2202	2203																														
74+87.00 -L-	2203																															
	2111	2203																														
74+87.01 -L-	2204																															
	2204	2203																														
75+66.35 -L-	2205																															
	2203	2205																														
75+45.33 -L-	2206																												7.2			
76+00.00 -L-	2207																															
	2205	2207																			43.2										
76+20.93 -L-	2208																															
	2207	2208																														
75+81.35 -L-	2209																															
	2209	2210																														
75+87.60 -L-	2210																															
	2211	2210																														
12+40.00 -Y17-	2211																															
	2212	2211																														
12+40.00 -Y17-	2212																															
	2210	2213																														
76+44.85 -L-	2213																															
76+88.61 -L-	2214																															
	2214	2215																														
76+86.39 -L-	2215																															
	2215	2216																														
76+74.50 -L-	2216																															
	2216	2217																														
76+65.46 -L-	2217																															
80+25.28 -L-	2301											3.6																				
12+78.01 -Y1-	2401																															
	2401	2402										4.8																				
12+78.01 -Y1-	2402																															
	2403	2402																		16.8												
12+69.00 -Y1-	2403																															
	406	2403																		42.0												
10+89.00 -Y7-	2404																				18.0											
11+15.98 -Y7-	2405																												6.0			
SHEET TOTALS												8.4								58.8	18.0	43.2					20.4		68.4			

STATION	FROM	TO	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.0'	B 3.0 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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLES	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
71+20.01 -L-	2103		1												1					1														FALSE SUMP
71+46.13 -L-	2104																																	
71+77.99 -L-	2105																																	
72+14.93 -L-	2106																																	
72+11.84 -L-	2107																																	
72+42.88 -L-	2108																																	
73+25.09 -L-	2109																																	
73+48.99 -L-	2110		1											1						1														
	2110	2111																																
73+49.00 -L-	2111		1	0.8											1			1																FALSE SUMP
74+48.83 -L-	2201																																	
74+86.99 -L-	2202		1												1					1														FALSE SUMP
	2202	2203																																
74+87.00 -L-	2203		1	0.14											1			1																FALSE SUMP
	2111	2203																																
74+87.01 -L-	2204		1												1					1														
	2204	2203																																
75+66.35 -L-	2205		1											1				1																
	2203	2205																																
75+45.33 -L-	2206																																	
76+00.00 -L-	2207		1											1				1																FALSE SUMP
	2205	2207																																
76+20.93 -L-	2208																																	OUTLET
	2207	2208																																
75+81.35 -L-	2209																																	OPEN ENDED PIPE (IN)
	2209	2210																																
75+87.60 -L-	2210		1											1					1	1														3-GI
	2211	2210																																
12+40.00 -Y17-	2211		1												1					1														FALSE SUMP
	2212	2211																																
12+40.00 -Y17-	2212		1												1					1														FALSE SUMP
	2210	2213																																
76+44.85 -L-	2213																																	OUTLET
76+88.61 -L-	2214																																	OPEN ENDED PIPE (IN)
	2214	2215																																
76+86.39 -L-	2215		1												1			1																
	2215	2216																																
76+74.50 -L-	2216		1	0.98											1					1														
	2216	2217																																
76+65.46 -L-	2217																																	OUTLET
80+25.28 -L-	2301																															0.29		
12+78.01 -Y1-	2401		1									1	1																					
	2401	2402																																
12+78.01 -Y1-	2402		1			1		1																										
	2403	2402																																
12+69.00 -Y1-	2403		1			1			1																									
	406	2403																																
10+89.00 -Y7-	2404																																	
11+15.98 -Y7-	2405																																	
SHEET TOTALS			16	1.92		2		1	1			1	1	4	9			5	1	8												0.29		

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

LKCXRFA

COMPUTED BY: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	3-K

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 1200mm & 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) No HDPE or PVC Pipe 200	375	450	600	750	900	1050	1200	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
11+26.16 -Y7-	LT	2406																	
11+45.57 -Y7-	LT	2407																	
11+56.84 -Y7-	RT	2408																	
11+80.00 -Y7-	LT	2409			202.20	201.00													
15+20.00 -Y8-	RT	2501																	
		2502	2501		204.50	203.00					30.0						X	X	X
15+20.00 -Y8-	LT	2502		205.57															
		2511	2502		204.77	204.65				25.2							X	X	X
15+47.60 -Y8-	LT	2511		205.69															
		2503	2511		206.96	204.85											X	X	X
15+76.36 -Y8-	LT	2503		207.80															
		2504	2503		207.16	206.96			25.2								X	X	X
10+75.77 -Y11-	LT	2504		208.00															
		2505	2504		209.20	207.16			20.4										X
10+55.52 -Y11-	LT	2505																	
10+58.61 -Y11-	RT	2506																	
10+21.80 -Y10-	LT	2507		206.75															
		2507	2508		205.91	205.82													
10+28.47 -Y10-	LT	2508		207.00															
		2508	2509		205.82	205.36													
10+38.62 -Y10-	LT	2509																	
10+55.74 -Y10-	LT	2510																	
10+55.00 -Y11-	RT	2512																	
15+94.07 -Y9-	RT	2601																	
16+72.55 -Y9-	RT	2602																	
16+38.32 -Y9-	LT	2604																	
16+60.52 -Y9-	LT	2605																	
16+63.68 -Y9-	LT	2603																	
12+02.42 -Y17-	LT	2701																	
SHEET TOTALS									45.6	25.2	30.0								

STATION	FROM	TO	C.S. PIPE 300 (1.63)	375 (1.63)	450 (1.63)	600 (1.63)	750 (2.01)	900 (2.01)	1000 (2.01)	1200 (2.01)	R.C. PIPE CLASS III 300	375	450	600	750	900	1050	1200	R.C. PIPE CLASS IV 300	375	450	600	750	900	1050	1200
11+26.16 -Y7-	2406																									
11+45.57 -Y7-	2407																									
11+56.84 -Y7-	2408																									
11+80.00 -Y7-	2409																				20.4					
15+20.00 -Y8-	2501																									
	2502	2501																								
15+20.00 -Y8-	2502																									
	2511	2502																								
15+47.60 -Y8-	2511																									
	2503	2511																		27.6						
15+76.36 -Y8-	2503																									
	2504	2503																								
10+75.77 -Y11-	2504																									
	2505	2504																								
10+55.52 -Y11-	2505																									
10+58.61 -Y11-	2506																									
10+21.80 -Y10-	2507																									
	2507	2508										7.2														
10+28.47 -Y10-	2508																									
	2508	2509																		10.8						
10+38.62 -Y10-	2509																									
10+55.74 -Y10-	2510																									
10+55.00 -Y11-	2512																									
15+94.07 -Y9-	2601																									
16+72.55 -Y9-	2602																									
16+38.32 -Y9-	2604																									
16+60.52 -Y9-	2605																									
16+63.68 -Y9-	2603																									
12+02.42 -Y17-	2701																									
SHEET TOTALS												7.2								38.4	20.4					

STATION	FROM	TO	375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. METERS	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.0'	B 3.0 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
11+26.16 -Y7-	2406				6.0												
11+45.57 -Y7-	2407				7.2												
11+56.84 -Y7-	2408				7.2												
11+80.00 -Y7-	2409																
15+20.00 -Y8-	2501																
	2502	2501															
15+20.00 -Y8-	2502								1								
	2511	2502															
15+47.60 -Y8-	2511								1								
	2503	2511															
15+76.36 -Y8-	2503								1								
	2504	2503															
10+75.77 -Y11-	2504								1								
	2505	2504															
10+55.52 -Y11-	2505																
10+58.61 -Y11-	2506				7.2												
10+21.80 -Y10-	2507								1								
	2507	2508															
10+28.47 -Y10-	2508								1								
	2508	2509															
10+38.62 -Y10-	2509																
10+55.74 -Y10-	2510				6.0												
10+55.00 -Y11-	2512				8.4												
15+94.07 -Y9-	2601				7.2												
16+72.55 -Y9-	2602				10.8												
16+38.32 -Y9-	2604				8.4												
16+60.52 -Y9-	2605				8.4												
16+63.68 -Y9-	2603				7.2												
12+02.42 -Y17-	2701				12.0												
SHEET TOTALS					96.0				6								

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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLES	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32	DRAINAGE PIPE ELBOWS NO. & SIZE
11+26.16 -Y7-	2406																				
11+45.57 -Y7-	2407																				
11+56.84 -Y7-	2408																				
11+80.00 -Y7-	2409																				
15+20.00 -Y8-	2501																				
	2502	2501																			
15+20.00 -Y8-	2502					1					1										
	2511	2502																			
15+47.60 -Y8-	2511					1											1				
	2503	2511																			
15+76.36 -Y8-	2503					1					1										
	2504	2503																			
10+75.77 -Y11-	2504					1					1										
	2505	2504																			
10+55.52 -Y11-	2505																				
10+58.61 -Y11-	2506																				
10+21.80 -Y10-	2507						1										1				
	2507	2508																			
10+28.47 -Y10-	2508															1	1				
	2508	2509																			
10+38.62 -Y10-	2509																				
10+55.74 -Y10-	2510																				
10+55.00 -Y11-	2512																				
15+94.07 -Y9-	2601																				
16+72.55 -Y9-	2602																				
16+38.32 -Y9-	2604																				
16+60.52 -Y9-	2605																				
16+63.68 -Y9-	2603																				
12+02.42 -Y17-	2701																				
SHEET TOTALS						4	1				3					1	3				

STATION	LOCATION	FROM	TO	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
11+26.16 -Y7-	LT	2406					
11+45.57 -Y7-	LT	2407					
11+56.84 -Y7-	RT	2408					
11+80.00 -Y7-	LT	2409					
15+20.00 -Y8-	RT	2501					OUTLET
		2502	2501				
15+20.00 -Y8-	LT	2502					
		2511	2502				
15+47.60 -Y8-	LT	2511					
		2503	2511				
15+76.36 -Y8-	LT	2503					
		2504	2503				
10+75.77 -Y11-	LT	2504					
		2505	2504				
10+55.52 -Y11-	LT	2505					OPEN ENDED PIPE (IN)
10+58.61 -Y11-	RT	2506					
10+21.80 -Y10-	LT	2507					
		2507	2508				
10+28.47 -Y10-	LT	2508					TRAFFIC BEARING
		2508	2509				
10+38.62 -Y10-	LT	2509					OUTLET
10+55.74 -Y10-	LT	2510					
10+55.00 -Y11-	RT	2512					
15+94.07 -Y9-	RT	2601					
16+72.55 -Y9-	RT	2602					
16+38.32 -Y9-	LT	2604					
16+60.52 -Y9-	LT	2605					
16+63.68 -Y9-	LT	2603					
12+02.42 -Y17-	LT	2701					
11+01.78 -L-	RT					13	REMOVE 375MM PIPE
13+24.36 -Y1-	LT					16	REMOVE 375MM PIPE
13+10.83 -Y1-	LT					31	REMOVE 450MM PIPE
12+07.31 -L-	RT					38	REMOVE 375MM PIPE
12+27.39 -L-	LT					20	REMOVE 450MM PIPE
12+83.29 -L-	RT					6	REMOVE 375MM PIPE
13+09.84 -L-	RT					48	REMOVE 450MM PIPE
15+98.91 -L-	LT					15	REMOVE 450MM PIPE
16+66.24 -L-	LT					15	REMOVE 450MM PIPE
17+38.61 -L-	RT					26	REMOVE 450MM PIPE
19+56.07 -L-	RT					11	REMOVE 900MM PIPE
20+49.25 -L-	RT					24	REMOVE 600MM PIPE
25+39.24 -L-	LT					18	REMOVE 450MM PIPE
26+31.90 -L-	RT					7	REMOVE UNKNOWN SIZE
26+66.19 -L-	RT					8	REMOVE 450MM PIPE
29+77.45 -L-	LT					7	REMOVE UNKNOWN SIZE
29+94.54 -L-	LT					13	REMOVE UNKNOWN SIZE
11+43.13 -Y9-	RT					8	REMOVE 375MM PIPE
11+65.43 -Y9-	RT					7	REMOVE 375MM PIPE
11+64.33 -Y9-	RT					14	REMOVE 450MM PIPE
11+96.47 -Y9-	RT					6	REMOVE UNKNOWN SIZE
31+75.88 -L-	LT					8	REMOVE 300MM PIPE
31+91.36 -L-	LT					6	REMOVE 300MM PIPE
SHEET TOTALS						365	

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: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	3-L

LKCXRFA

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 1200mm & UNDER)

STATION / SIZE	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP) No HDPE or PVC Pipe 200	375	450	600	750	900	1050	1200	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 300	375	450	600	750	900	1000	1200	R.C. PIPE CLASS III 300	375	450	600	750	900	1050	1200	R.C. PIPE CLASS IV 300	375	450	600	750	900	1050	1200	375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. METERS	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.0'	METERS B 3.0 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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLES	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
THICKNESS OR GAUGE																				1.63	1.63	1.63	1.63	2.01	2.01	2.01	2.01																																																							
32+10.75 -L-	LT																																																																															6	REMOVE 300MM PIPE
14+18.59 -Y9-	RT																																																																														12	REMOVE 375MM PIPE
46+96.78 -L-	RT																																																																														15	REMOVE 600MM PIPE
10+53.29 -Y14-	LT																																																																														10	REMOVE 375MM PIPE
65+05.53 -L-	LT																																																																														7	REMOVE 600MM PIPE
67+09.86 R 2 -L-	LT																																																																													7	REMOVE 375MM PIPE
67+68.40 R 2 -L-	LT																																																																													6	REMOVE 375MM PIPE
68+81.41 R 2 -L-	LT																																																																													13	REMOVE 1200MM PIPE
71+51.55 R 2 -L-	LT																																																																													5	REMOVE 300MM PIPE
71+82.10 R 2 -L-	LT																																																																													6	REMOVE 300MM PIPE
72+19.08 R 2 -L-	LT																																																																													5	REMOVE 375MM PIPE
72+47.57 R 2 -L-	LT																																																																													7	REMOVE 375MM PIPE
72+67.12 R 2 -L-	LT																																																																													7	REMOVE 375MM PIPE
73+30.20 R 2 -L-	LT																																																																													6	REMOVE 375MM PIPE
73+54.30 R 2 -L-	LT																																																																													11	REMOVE 375MM PIPE
74+45.29 R 2 -L-	LT																																																																													6	REMOVE 375MM PIPE
75+00.99 R 2 -L-	LT																																																																													23	REMOVE 375MM PIPE
75+49.11 R 2 -L-	LT																																																																													11	REMOVE 375MM PIPE
76+00.16 R 2 -L-	LT																																																																													13	REMOVE 600MM PIPE
76+82.72 R 2 -L-	LT																																																																													12	REMOVE 450MM PIPE
76+98.78 R 2 -L-	LT																																																																													23	REMOVE 450MM PIPE
76+43.23 R 2 -L-	LT																																																																													7	REMOVE 375MM PIPE
79+36.18 R 2 -L-	RT																																																																													7	REMOVE 450MM PIPE
11+92.21 -Y1-	LT																																																																													26	REMOVE 450MM PIPE
12+69.64 -Y1-	LT																																																																													11	REMOVE 450MM PIPE
10+84.92 -Y7-	LT																																																																													8	REMOVE 450MM PIPE
11+19.32 -Y7-	LT																																																																													6	REMOVE 300MM PIPE
11+28.31 -Y7-	LT																																																																														6	REMOVE 300MM PIPE
11+49.70 -Y7-	LT																																																																														9	REMOVE 450MM PIPE
11+52.92 -Y7-	RT																																																																														6	REMOVE 375MM PIPE
11+78.70 -Y7-	LT																																																																														15	REMOVE 450MM PIPE
12+08.74 -Y7-	LT																																																																														6	REMOVE 375MM PIPE
15+19.29 -Y8-	RT																																																																														14	REMOVE 450MM PIPE
10+52.87 -Y10-	LT																																																																														6	REMOVE UNKOWN SIZE PIPE
10+32.65 -Y10-	LT																																																																														11	REMOVE UNKOWN SIZE PIPE
11+08.20 -Y11-	RT																																																																														14	REMOVE 375MM PIPE
10+64.11 -Y11-	LT																																																																														17	REMOVE UNKOWN SIZE PIPE
15+90.62 -Y9-	RT																																																																														7	REMOVE 300MM PIPE
15+95.94 -Y9-	RT																																																																														8	REMOVE 300MM PIPE
16+18.85 -Y9-	LT																																																																														7	REMOVE 375MM PIPE
16+41.63 -Y9-	LT																																																																														8	REMOVE 375MM PIPE
16+64.94 -Y9-	LT																																																																														8	REMOVE 400MM PIPE
16+71.93 -Y9-	RT																																																																														7	REMOVE 375MM PIPE
19+01.98 -L-	RT																																																																												0.06			
19+19.96 -L-	RT																																																																												0.06			1.37 CU. M OF FLOWABLE FILL
24+86.09 -L-	LT																																																																												0.10			2.83 CU. M OF FLOWABLE FILL
SHEET TOTALS																																																																														0.22		425	

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: SCS DATE 1/6/2013

CHECKED BY: JAF DATE 2/20/2013

RD266181

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
R-2241A	3-M

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 1200mm & 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) No HDPE or PVC Pipe 200	375	450	600	750	900	1050	1200	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
Temporary Drainage																			
11+06.59 -DET2-	LT	T01																	
		T01	T02							28.8							X	X	X
11+18.66 -DET2-	RT	T02																	
11+59.75 -DET2-	LT	T03																	
		T03	T04							40.8							X	X	X
11+29.74 -DET2-	RT	T04																	
11+06.76 -DET2-	LT																		
11+58.79 -DET2-	LT																		
SHEET 3-A TOTALS												32.4							
SHEET 3-B TOTALS									33.6	12.0		22.8							
SHEET 3-C TOTALS									9.6	9.6		12.0	31.2						
SHEET 3-D TOTALS									80.4	114.0	43.2	30.0							
SHEET 3-E TOTALS									416.4	199.2				54.0					
SHEET 3-F TOTALS									183.6	14.4	249.6	128.4	70.8						
SHEET 3-G TOTALS									241.2	85.2	104.4	64.8	68.4		70.8				
SHEET 3-H TOTALS									512.4	52.8	21.6				61.2				
SHEET 3-I TOTALS								31.2	421.2	94.8	123.6								
SHEET 3-J TOTALS									258.0		112.8	82.8	58.8						
SHEET 3-K TOTALS									45.6	25.2	30.0								
SHEET 3-L TOTALS																			
SHEET 3-M TOTALS										69.6									
PROJECT TOTALS								31.2	2202.0	676.8	685.2	373.2	229.2	54.0	132.0				

STATION	FROM	TO	C.S. PIPE 300 (1.63)	375 (1.63)	450 (1.63)	600 (1.63)	750 (2.01)	900 (2.01)	1000 (2.01)	1200 (2.01)	R.C. PIPE CLASS III 300	375	450	600	750	900	1050	1200	R.C. PIPE CLASS IV 300	375	450	600	750	900	1050	1200
Temporary Drainage																										
11+06.59 -DET2-	T01																									
	T01	T02																								
11+18.66 -DET2-	T02																									
11+59.75 -DET2-	T03																									
	T03	T04																								
11+29.74 -DET2-	T04																									
11+06.76 -DET2-																										
11+58.79 -DET2-																										
SHEET 3-A TOTALS												46.8			36.0					183.4	19.2	58.8				
SHEET 3-B TOTALS												37.2								259.2	130.8	24.0	18.0			
SHEET 3-C TOTALS												15.6								276.0	202.8	102.0	27.6			
SHEET 3-D TOTALS																				158.4	70.8	32.4		70.8		
SHEET 3-E TOTALS																				16.8						
SHEET 3-F TOTALS																								55.2		
SHEET 3-G TOTALS																										
SHEET 3-H TOTALS																				36.0						
SHEET 3-I TOTALS																										
SHEET 3-J TOTALS												8.4								58.8	18.0	43.2				
SHEET 3-K TOTALS												7.2								38.4	20.4					
SHEET 3-L TOTALS																										
SHEET 3-M TOTALS																										
PROJECT TOTALS												115.2			36.0					1027.0	462.0	260.4	45.6	126.0		

STATION	FROM	TO	600 mm WELDED STEEL, TRENCHLESS INSTALLATION	375 mm R.C. PIPE (CLASS V)	375 mm DUCTILE IRON PIPE	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. METERS	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	METERS A 1.5 THRU 3.0'	METERS B 3.0 AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G
Temporary Drainage																
11+06.59 -DET2-	T01									1						
	T01	T02														
11+18.66 -DET2-	T02															
11+59.75 -DET2-	T03															
	T03	T04								1						
11+29.74 -DET2-	T04															
11+06.76 -DET2-																
11+58.79 -DET2-																
SHEET 3-A TOTALS			13.2		135.6					27	4.91	2.21	21	1	10	10
SHEET 3-B TOTALS										21	0.78		16	2	7	7
SHEET 3-C TOTALS						21.6			7.8	19	1.54		16	3	6	7
SHEET 3-D TOTALS						62.4			5.2	16	0.48		8		8	
SHEET 3-E TOTALS									3.4	18	0.82					
SHEET 3-F TOTALS						20.4			7.8	13	0.70					
SHEET 3-G TOTALS									11.8	17	0.13					
SHEET 3-H TOTALS							14.4		4.6	20	0.04					
SHEET 3-I TOTALS								8.4		18	1.78					
SHEET 3-J TOTALS				20.4		68.4				16	1.92		2		1	1
SHEET 3-K TOTALS						96.0				6						
SHEET 3-L TOTALS																
SHEET 3-M TOTALS										2						
PROJECT TOTALS			13.2	20.4	135.6	268.8	14.4	8.4	40.6	193	13.10	2.21	63	6	32	25
											15.97					

*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B')

STATION	FROM	TO	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	FRAME WITH TWO GRATES STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	M.H. STD. 840.51	M.H. FRAME AND COVER STD. 840.54	100mm CONCRETE PAVED DITCH (M2)	SPRING BOX STD. 840.41	T.B.D.I. STD. 840.35	FRAME WITH TWO GRATES, STD. 840.29	PREFORMED SCOUR HOLE	UTILITY INTERFERENCE STRUCTURE	J.B. STD 840.31 OR 840.32
Temporary Drainage																						
11+06.59 -DET2-	T01				1	1																
	T01	T02																				
11+18.66 -DET2-	T02																					
11+59.75 -DET2-	T03																					
	T03	T04			1	1																
11+29.74 -DET2-	T04																					
11+06.76 -DET2-																						
11+58.79 -DET2-																						
SHEET 3-A TOTALS					2	2												4	4		1	
SHEET 3-B TOTALS					3	3		1					1					1	1	1		
SHEET 3-C TOTALS								3					1						2			
SHEET 3-D TOTALS				3	2	2		5			4		1	1	1							
SHEET 3-E TOTALS								18		4	13		1			25				2		
SHEET 3-F TOTALS							3	10			13					17				1		
SHEET 3-G TOTALS							3	14		2	14		1			8.4				2		
SHEET 3-H TOTALS								20		4	16											
SHEET 3-I TOTALS							2	14			16						2			1		
SHEET 3-J TOTALS					1	1	4	9			5	1	8									
SHEET 3-K TOTALS								4	1				3					1	3			
SHEET 3-L TOTALS																						
SHEET 3-M TOTALS					2	2																
PROJECT TOTALS				3	10	10	12	98	1	10	81	1	16	1	1	50	2	6	10	7	1	

STATION	FROM	TO	DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	CONC. COLLARS CL. "B" M^3 STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
Temporary Drainage							
11+06.59 -DET2-	T01						
	T01	T02				28.8	
11+18.66 -DET2-	T02						OUTLET
11+59.75 -DET2-	T03						
	T03	T04				40.8	
11+29.74 -DET2-	T04						OUTLET
11+06.76 -DET2-						4	REMOVE 450 MM PIPE
11+58.79 -DET2-						6	REMOVE 450 MM PIPE
SHEET 3-A TOTALS							
SHEET 3-B TOTALS							
SHEET 3-C TOTALS							
SHEET 3-D TOTALS			2(450)				
SHEET 3-E TOTALS			5(375)				B
SHEET 3-F TOTALS			3(450)				
SHEET 3-G TOTALS			1(450) 2(375)				
SHEET 3-H TOTALS							
SHEET 3-I TOTALS							
SHEET 3-J TOTALS					0.29		
SHEET 3-K TOTALS						365	
SHEET 3-L TOTALS						425	
SHEET 3-M TOTALS						79.6	
PROJECT TOTALS			6(450) 7(375)		0.29	869.6	

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: SCS DATE: 1/6/2013

CHECKED BY: JAF DATE: 2/20/2013

PROJECT NO.	SHEET NO.
R-2241A	3-N

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 1350mm & OVER)

STATION	SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)*	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 1350	1500	1650	1800	1950	2100	CLASS IV R.C. PIPE 1400	1500	1650	1800	SHOP ELONGATED	STRUCTURAL PLATE PIPE 1500 2.77	1500 3.51	1500 4.27	1650 2.77	1650 3.51	1650 4.27	1800 2.77	1800 3.51	1800 4.27	REINFORCED ENDWALLS CLASS 'A' CONC. WITH R.C. - C.M.	MASONRY DRAINAGE STRUCTURES CUBIC METERS	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	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. 840.19 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	FRAME WITH GRATE STD. 840.20	FRAME WITH TWO GRATES STD. 840.22	FRAME WITH GRATE STD. 840.24	FRAME WITH TWO GRATES STD. 840.24	J.B. STD 840.31 OR 840.32	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" M³ STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
40+63.27 -L-		RT	1210																										4.3																			
			1210	1211		192.3	188									79.2																														CLASS IV RCP
40+09.78 -L-		LT	1211																										4.3																			
65+43.00 R 2 -L-		RT	1907	1910		169.43	168.55		34																				3.8																			
65+62.29 R 2 -L-		LT	1910																											3.147																1			OUTLET
			1910	1908		168.55	167.73		32																																						
65+80.25 R 2 -L-		LT	1908																										3.8																			
69+00.86 R 2 -L-		RT	2008																										3.8																			
			2008	2009		164.35	164.05		55.2																																						
68+79.30 R 2 -L-		LT	2009																										3.8																			
SHEET TOTALS									121.2							79.2														26.7	3.147															1			

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 JUNCTION BOX

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St. Ste. 200
Charlotte, NC 28208
NC License Number F-0991

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	3-O
R /W SHEET NO.	

SUMMARY OF EARTHWORK

IN CUBIC METERS

CHAIN	FROM STATION	TO STATION	SIDE	UNCLASSIFIED EXCAVATION	ROCK	UNDERCUT	EMBANKMENT +%	BORROW	WASTE
-L-	10+40.000	19+40.000	LT	3,315			7,950	4,635	
-DET1-	12+66.000	15+21.390	LT & RT	131			1,416	1,285	
-Y6-	10+20.000	11+60.408	LT & RT	1,817			3	0	1,814
SUBTOTAL SUMMARY No. 1				5,263			9,369	5,920	1,814
-L-	19+40.000	23+60.000	LT	5,291		367	10,114	5,348	892
-Y7-	10+75.000	13+85.662	LT & RT	1,273			2,904	1,631	
-Y8-	14+19.662	16+40.000	LT & RT	6,901			1,282		5,619
-Y9-	10+04.500	11+40.000	LT & RT	10,489			584		9,905
-DET2-	10+39.270	12+60.280	LT & RT	943			5,159	4,216	
SUBTOTAL SUMMARY No. 2				24,897		367	20,043	11,195	16,416
-L-	23+60.000	32+60.000	LT & RT	46,406	163		18,003		28,403
SUBTOTAL SUMMARY No. 3				46,406	163		18,003		28,403
-L-	32+60.000	41+60.000	LT & RT	115,932	8,056	1,058	54,538		62,452
-Y12-	10+20.000	11+10.060	LT & RT	1,361			13		1,348
-Y13-	11+41.332	13+25.000	LT & RT	36			3,995	3,959	
SUBTOTAL SUMMARY No. 4				117,329	8,056	1,058	58,547	3,959	63,799
-L-	41+60.000	50+60.000	LT & RT	76,864	33	2,263	15,463		63,664
SUBTOTAL SUMMARY No. 5				76.864		2,263	15,463		63,664
-L-	50+60.000	64+40.000	LT & RT	129,388	297	5,818	80,493		54,713
SUBTOTAL SUMMARY No. 6				129,388	297	5,818	80,493		54,713
-L-	64+40.000	73+40.000	LT & RT	6,163		575	48,316	42,974	1,396
SUBTOTAL SUMMARY No. 7				6,163		575	48,316	42,974	1,396
-L-	73+40.000	78+00.00	LT & RT	4,059		3,162	7,802	6,077	5,496
-TEMPSBL-	78+00.000	79+69.997	LT & RT	178		440	780	640	478
SUBTOTAL SUMMARY No. 8				4,237		3,602	8,582	6,717	5,974

SUMMARY OF EARTHWORK (CONT..)

CHAIN	FROM STATION	TO STATION	SIDE	UNCLASSIFIED EXCAVATION	ROCK	UNDERCUT	EMBANKMENT +%	BORROW	WASTE
-L-	10+40.000	19+40.000	RT	1,067			11,181	10,113	
-Y1-	12+15.000	13+88.749	LT & RT	167			221	54	
-Y2-	14+10.883	14+60.000	LT & RT	46			59	13	
-Y4-	10+10.318	11+20.000	LT & RT	15			2,834	2,818	
-Y5-	10+02.485	10+85.000	LT & RT	242			576	334	
SUBTOTAL SUMMARY No. 9				1,537			14,871	13,334	
-L-	19+40.000	23+60.000	RT	1,583		367	7,864	6,806	892
-Y10-	10+00.000	10+76.000	LT & RT	41			653	612	
-Y11-	10+40.000	11+12.948	LT & RT	645			2		644
-Y14-	10+14.000	11+22.580	LT & RT	236			1,258	1,224	202
-Y15-	11+22.580	12+10.000	LT & RT	954			18		936
-Y17-	10+80.000	13+18.495	LT & RT	3,866		701	1,035		3,532
SUBTOTAL SUMMARY No. 10				7,325		1,068	10,830	8,642	6,205
SUBTOTAL SUMMARIES 1-10				419,409	8,549	14,751	284,517	92,741	242,384
ESTIMATE LOSS DUE TO CLEARING AND GRUBBING				-16,000					-16,000
ADDITIONAL UNDERCUT						6,100	7,320	7,320	6,100
SELECT MATERIAL TO REPLACE BORROW							-35,400	-35,400	
WASTE IN LIEU OF BORROW								-64,661	-64,661
GRAND TOTAL ALTERNATE #1				403,409	8,549	20,851	256,437		167,823
SAY				405,000		22,000			
SHALLOW UNDERCUT EXCAVATION				300					
DRAINAGE DITCH EXCAVATION				2,240					
EXCAVATION, HAULING, DISPOSAL OF CONTAMINATED SOIL				2,500					
CLASS IV SUBGRADE STABILIZATION				700					
SHOULDER BORROW MATERIAL				9,230					
PAVEMENT STRUCTURE VOLUME= m3				27,600					
GRAND TOTAL ALTERNATE #2				398,524	8,549	20,851	262,454		166,818
SAY				400,000		22,000			
SHALLOW UNDERCUT EXCAVATION				300					
DRAINAGE DITCH EXCAVATION				2,240					
EXCAVATION, HAULING, DISPOSAL OF CONTAMINATED SOIL				2,500					
CLASS IV SUBGRADE STABILIZATION				700					
SHOULDER BORROW MATERIAL				9,230					
PAVEMENT STRUCTURE VOLUME= m3				22,715					

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.

2/28/2013
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METRIC

NOT TO SCALE

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	3-P
R /W SHEET NO.	

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	BEGIN STA.	END STA.	LOCATION	M^2
-L-	26+35.00	28+68.00	RT	1,846
-L-	29+78.00	30+05.00	LT	142
-L-	30+41.00	30+63.00	RT	146
-L-	31+04.00	31+23.00	RT	92
-L-	32+19.00	32+56.00	LT	98
-L-	65+61.00	65+80.00	RT	355
-L-	66+09.00	66+69.00	RT	60
-L-	76+44.00	78+52.00	LT	1,541
-Y7-	11+80.00	12+68.00	LT	559
-Y17-	11+84.00	12+07.00	LT	48
-DET1-	12+89.00	14+70.00	LT	749
-DET2-	10+62.00	13+14.00	RT	744
			TOTAL:	6,380
			SAY:	6,380

TEMPORARY GUARDRAIL SUMMARY

SURVEY LINE	BEGIN STA.	END STA.	LOCATION	LENGTH (M)
-DET1-	13+05.85	14+09.85	RT	102.87
-DET1-	13+27.56	14+21.60	LT	98.25
	ANCHOR GRAU-350	DEDUCTIONS 4 @ 15.24		
			LESS ANCHORS:	60.96
			TOTAL GUARDRAIL LENGTH:	140.16
			SAY:	140.97

GUARDRAIL SUMMARY

SURVEY LINE	BEGIN STA.	END STA.	LOCATION	LENGTH: STRAIGHT	LENGTH: SHOP CURVED	LENGTH: DOUBLE FACED	WARRANT POINT: APPROACH END	WARRANT POINT: TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH: APPROACH END	FLARE LENGTH: TRAILING END	W: APPROACH END	W: TRAILING END	ANCHORS: XI MOD	ANCHORS: B-77	ANCHORS: GRAU 350	ANCHORS: M-350	ANCHORS: TYPE III	ANCHORS: CAT-1	ANCHORS: VI MOD	ANCHORS: BIC	ANCHORS: AT-1	IMPACT ATTENUATOR TYPE 350: EA	IMPACT ATTENUATOR TYPE 350: G	IMPACT ATTENUATOR TYPE 350: NG	CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
-L-	13+04.16	13+46.09	RT	45.72	19.05		RCBC		3.66	3.66	15.24		0.30				1			1										
-L-	13+24.06	13+85.26	LT	57.15			RCBC		3.66	3.66	15.24		0.30				1			1										
-L-	20+47.10	21+90.32	RT	137.16			RCBC	2:1 SLOPE	3.66	3.66	15.24	15.24	0.30	0.30			2													
-L-	20+75.30	22+10.90	LT	129.54			RCBC	2:1 SLOPE	3.66	3.66	15.24	15.24	0.30	0.30			2													
-L-	24+08.90	25+60.41	RT	140.97			2:1 SLOPE	2:1 SLOPE	3.66	3.66	15.24	15.24	0.30	0.30			2													
-L-	34+19.10	35+94.60	RT	171.45			RCBC	2:1 SLOPE	3.66	3.66	15.24		0.30				1			1										
-L-	35+16.34	37+84.84	LT	270.51			2:1 SLOPE	RCBC	3.66	3.66	15.24		0.30				1			1										
-L-	39+71.99	40+71.05	LT	95.25			2:1 SLOPE	2:1 SLOPE	3.66	3.66	15.24		0.30				1			1										
-L-	39+89.04	40+80.76	RT	87.63			2:1 SLOPE	2:1 SLOPE	3.66	3.66	15.24		0.30				1			1										
-L-	50+10.08	50+78.88	RT	64.77			2:1 SLOPE	2:1 SLOPE	3.66	3.66	15.24		0.30				1			1										
-L-	50+75.93	52+39.80	LT	160.02			2:1 SLOPE	2:1 SLOPE	3.66	3.66	15.24		0.30				1			1										
-L-	53+10.68	54+10.00	LT	95.25			2:1 SLOPE	2:1 SLOPE	3.66	3.66	15.24		0.30				1			1										
-L-	56+68.90	58+09.98	RT	137.16			2:1 SLOPE	2:1 SLOPE	3.66	3.66	15.24		0.30				1			1										
-L-	57+02.14	58+01.56	LT	95.25			2:1 SLOPE	2:1 SLOPE	3.66	3.66	15.24		0.30				1			1										
-L-	63+19.10	65+78.43	RT	255.27			2:1 SLOPE	2:1 SLOPE	3.66	3.66	15.24		0.30				1			1										
-L-	64+70.15	66+60.90	LT	186.69			2:1 SLOPE	2:1 SLOPE	3.66	3.66	15.24		0.30				1			1										
-Y17-	12+46.23	12+50.16	LT	7.62																										END OF ROAD PROTECTION
			TOTAL:	2,137.41	19.05		ANCHOR	DEDUCTIONS		TOTAL																				
							GRAU-350	19 @ 15.24		289.56																				
							CAT-1	13 @ 1.905		24.77																				
			LESS ANCHORS:	1,823.08	19.05												19			13										
			TOTAL GUARDRAIL LENGTH:	1,823.08	19.05		TOTAL DEDUCTIONS =			314.33																				
			SAY:	1,824.99																										
			ADDITIONAL GUARDRAIL POST 10 EACH																											

"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
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

1/7/2013
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METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	3-Q
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN

12-12-12

ALIGNMENT CURVE DATA

CURVE & SPIRAL DATA –L–

PI Sta 16+80.878
△ = 2° 27' 09.7" (RT)
L = 85.615
T = 42.814
R = 2,000.000
e = NC

PIs Sta 18+92.880
Θs = 1° 38' 13.3"
Ls = 40.000
LT = 26.668
ST = 13.334

PI Sta 19+48.896
△ = 6° 58' 43.7" (LT)
L = 85.262
T = 42.684
R = 700.000
e = 0.03
Runoff = 40

PIs Sta 20+04.808
Θs = 1° 38' 13.3"
Ls = 40.000
LT = 26.668
ST = 13.334

PIs Sta 25+04.908
Θs = 6° 35' 20.5"
Ls = 115.000
LT = 76.720
ST = 38.382

PI Sta 26+17.167
△ = 16° 49' 56.5" (LT)
L = 146.890
T = 73.978
R = 500.000
e = 0.06
Runoff = 115

PIs Sta 27+28.460
Θs = 6° 35' 20.5"
Ls = 115.000
LT = 76.720
ST = 38.382

PIs Sta 31+02.548
Θs = 2° 32' 47.3"
Ls = 80.000
LT = 53.339
ST = 26.672

PI Sta 32+03.731
△ = 9° 28' 00.5" (LT)
L = 148.704
T = 74.522
R = 900.000
e = 0.06
Runoff = 80

PIs Sta 33+04.585
Θs = 2° 32' 47.3"
Ls = 80.000
LT = 53.339
ST = 26.672

PI Sta 41+08.408
△ = 5° 07' 17.5" (RT)
L = 625.713
T = 313.065
R = 7,000.000
e = NC

PI Sta 58+73.433
△ = 1° 52' 40.2" (LT)
L = 229.421
T = 114.721
R = 7,000.000
e = NC

CURVE DATA –Y1–

PI Sta 12+54.878
△ = 0° 45' 01.5" (LT)
L = 88.170
T = 44.086
R = 6,731.947
e = NC

PI Sta 13+32.037
△ = 0° 45' 01.8" (RT)
L = 66.148
T = 33.075
R = 5,050.000

CURVE DATA –Y4–

PI Sta 10+23.043
△ = 18° 03' 33.4" (RT)
L = 45.703
T = 23.043
R = 145.000

CURVE DATA –Y5–

PI Sta 10+56.064
△ = 1° 16' 15.5" (RT)
L = 22.183
T = 11.092
R = 1,000.000
e = NC

CURVE DATA –Y6–

PI Sta 10+73.319
△ = 4° 48' 26.4" (RT)
L = 50.342
T = 25.186
R = 600.000
e = 0.04
Runoff = 40

CURVE DATA –Y7–

PI Sta 12+02.627
△ = 43° 57' 59.3" (RT)
L = 138.125
T = 72.663
R = 180.000
e = 0.08
Runoff = 50

CURVE DATA –Y8–

PI Sta 15+05.866
△ = 52° 57' 05.4" (LT)
L = 134.006
T = 72.218
R = 145.000
e = 0.08
Runoff = 50

PI Sta 16+44.448
△ = 4° 38' 53.0" (RT)
L = 42.590
T = 21.307
R = 525.000
e = 0.08
Runoff = 50

CURVE DATA –Y9–

PI Sta 10+52.624
△ = 53° 42' 01.2" (RT)
L = 84.352
T = 45.561
R = 90.000
e = 0.06
Runoff = 37.50

PI Sta 11+80.285
△ = 50° 51' 57.5" (LT)
L = 128.728
T = 68.953
R = 145.000
e = 0.08
Runoff = 50

PI Sta 14+93.398
△ = 66° 20' 23.7" (LT)
L = 318.409
T = 179.749
R = 275.000
e = 0.07
Runoff = 43.75

CURVE DATA –Y17–

PI Sta 12+26.836
△ = 58° 53' 09.1" (RT)
L = 169.579
T = 93.136
R = 165.000
e = 0.08
Runoff = 50

CURVE DATA –DET1–

PI Sta 12+92.837
△ = 14° 23' 02.5" (LT)
L = 53.393
T = 26.837
R = 212.678
e = 0.02
Runoff = 9.40

PI Sta 13+44.198
△ = 20° 05' 40.6" (RT)
L = 49.101
T = 24.805
R = 140.001
e = 0.02
Runoff = 9.40

PI Sta 14+72.619
△ = 5° 42' 38.1" (LT)
L = 97.615
T = 48.848
R = 979.398
e = 0.02
Runoff = 9.40

CURVE DATA –DET2–

PI Sta 10+17.429
△ = 9° 57' 38.6" (RT)
L = 34.770
T = 17.429
R = 200.000

PI Sta 10+93.251
△ = 13° 06' 48.3" (LT)
L = 68.662
T = 34.481
R = 300.000

PI Sta 13+25.528
△ = 3° 10' 46.8" (RT)
L = 11.099
T = 5.551
R = 200.000

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PROJ. REFERENCE NO.	SHEET NO.
R-2241A	3-R

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	NO CLAIM
2Z	4	KING II INVESTMENTS, LLC
4	4	W.O. HUMPHRIES, JR.
6	4	ANGELA SNOW TUCK
7	4	LINDA STRICKLAND CARVER
8	4	MARGARET YARBORO
8A	4	MARGARET DAVIS
8B	4	NEW TOP INVESTMENTS, INC.
8C	24	KELLY PROPERTIES OF ROXBORO, LLC
8D	24	JODY LONG AND STEVEN WILSON
9	4	JAI UCK KIM AND HEE RAN KIM
10	4	SOUTHERN STATES COOPERATIVE, INC
11	4	NEB KING PROPERTIES, LLC
11A	4	KING II INVESTMENTS, LLC
12	4	C & G SUPPLY CENTER INC.
13	4	TOM'S AUTO SUPPLY OF ROXBORO, INC.
13A	4	ROXBORO PROPERTIES, LLC
14	4	JIMMY LEWIS CONTRACTING INC.
15	4, 5	ROXBORO INVESTMENT PROPERTIES, LLC
16	4	ROSALIE P. GATES
16A	4,5	J.E. GATES TRUST
16B	5	J.E. GATES ESTATE
17	5	CHARLES E. PERKINS
18	5	CHARLES E. PERKINS
19Z	5, 6	JESSE ANDERSON & SON CONTRACTORS, INC (AKA JESSE ANDERSON & SON, INC.)
20Z	5	PERSON COUNTY
20A	5, 6	PERSON COUNTY BOARD OF EDUCATION
21	5, 6	JUDY & JAMES LEE
22	6	JOYCE B. WADE, WIDOW
23	6	BONNIE GILLIS RIMMER
24	6	KAREN WHITFIELD ETAL
25	6	EDNA P. ELLIOTT
26	6	FELTON E. CARVER, ET AL
27	6	FRANCES S. CARVER, ET AL
28	6	ROBERT L CLAYTON
29	6	WOODY & ANDERSON PROPERTIES
30	6	RITA W. ALLEN, ET AL
31	6	EDNA P. ELLIOTT
32	6	VENNIE LOU CLAYTON AND DOROTHY C. WATSON
33Z	6	ESTELLE P. WADE
34	6	JOYCE B. WADE, WIDOW
35	6, 7, 8	WOODY & ANDERSON PROPERTIES
36	6, 7	MAXINE D. CALL
37	7	TIMOTHY HARRIS AND CHERYL CAVALIER
38	7	RONALD R. SHELTON
39	7	ROBERT W. WALKER
40	8	TODD N. WILBOURNE AND TONYA H. WILBOURNE
41	8, 9, 25	ODELIA P. GENTRY HEIRS
42	9, 25	GEORGE E. DICKERSON
43	8,9, 24, 25	BOBBY HICKS AND DELORES C. HICKS (TRACKS A-I)
44	9, 25	RACHEL P. ROYSTER, ET AL
45	9, 25	BRIAN C. HICKS AND JENNY HICKS
47	25	BONNIE SOLOMON
48	25	BONNIE LUNSFORD DUNEVANAT
49	25	TIMOTHY HARRIS AND CHERYL CAVALIER
50	25	BRIAN C. HICKS AND JENNY HICKS
51	25	BURLEY W. DUNN

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
53	9, 10	MARIAN CLAYTON WHITT
54	9, 10, 26	BURLEY W. DUNN
54A	26	JERRY F & ANGELA BARBAR
55	10	TROY L. CAMPBELL AND ERNESTINE H. CAMPBELL
56	10	STEPHEN D. GARRETT
57	9, 24	CHRISTINE P WHITT
58	24	ROBERT BEAM WILBORN AND MICHAEL BEAM WILBORN
59	24	BERNARD LOWERY, JR., RAMONA HOLT LOWERY
60	24	ELEANOR HAMLIN DUNN
61	24	ROBERT E. WINSTEAD, SHARON L. WINSTEAD
62	10, 11	ALMEADE G. GARRETT, ET AL
63	11	NELLIE R. PENTECOST
64	11, 26	HOWARD T. SMITH
65	26	SHELBY O. CASTLE
66	11, 26	MARY P. SMITH
67	11	SYBIL P. WOOTEN
68	11, 12	MARY P. SMITH
69	11, 12, 13	CHARLES E. PERKINS
70Z	12, 13	MIRIAM J. LAVELLE AND HUSBAND, CHARLES F. SAMS, JR.
71	12, 13	NADINE IRENE DIXON, ET AL
72	12, 13	CHARLES E. PERKINS
73	13, 14	BERTHA HAYES CLAY
74	14	BERTHA CLAY
75	14	GEORGE LEON CLAY
76	14, 15	CHARLIE V. JEFFERS & BEVERLY W. JEFFERS
76A	14	CHARLIE V. & BEVERLY W. JEFFERS
77	14, 15	AUSTIN B. CLAY HEIRS
78Z	15, 16	RONALD E. THOMAS, JR. & WIFE, JODI R. THOMAS
79	15	WILLIE M. DIXON AND CLYDE C. DIXON
80	16, 17	JAMES F. SHOTWELL, JR.
81	17	PAUL S. BARNETT ESTATE
82	17, 18, 19	KEITH L. BARNETTE
83	18	THOMAS A. PENTECOST
84	18	NORMA JEAN BOWES ESTATE
84A	18	ROBERT MERRITT BOWES
85	18, 19	CHARLES F. BROOKS
86	19	MONTWOOD BAPTIST CHURCH
87Y	19	MARTHA B. POWELL
88	19	GEORGE RAYMOND CARTER
89Z	19, 20, 21	ROBIN E. WRENN, ET AL
90	19, 20, 21, 22, 23	FORCE PROTECTION INDUSTRIES, INC.
91	19, 20	ROBIN EVANS WRENN
92	21	KILLIS LOFTIS, ET AL
93	21	ALISSA K. CHAPMAN
94	21	FITZGERALD T. BOWES LIFE ESTATE
95	21	FRIENDSHIP FREEWILL BAPTIST CHURCH
96	21	MARTHA B. POWELL
97	21, 27	RICKY D. WILSON AND TONYA R. WILSON
98	21, 22	STEVEN BRIGGS
99	22	WINFRED CARLTON CLAYTON
100	22, 27	ANNE SHOTWELL LIFE ESTATE
101	23	ANNIE RUTH KENDRICK LIFE ESTATE
102	23	LOUISE S. THOMAS
103	23	DAVID N. ALLEN
104	23	ANDREW L. HOLEMAN
105	23	MICHAEL E. VICKERS
106	23	CHARLOTTE MELTON, ET AL
107	23	BESSIE JANE WALKER "HEIRS"
108	23	BLAKE E. THORNBURG

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208-5991
NC License Number C-0991

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	4
R /W SHEET NO.	

METRIC

5 0 10

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON
3/4/13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR.
3/4/13

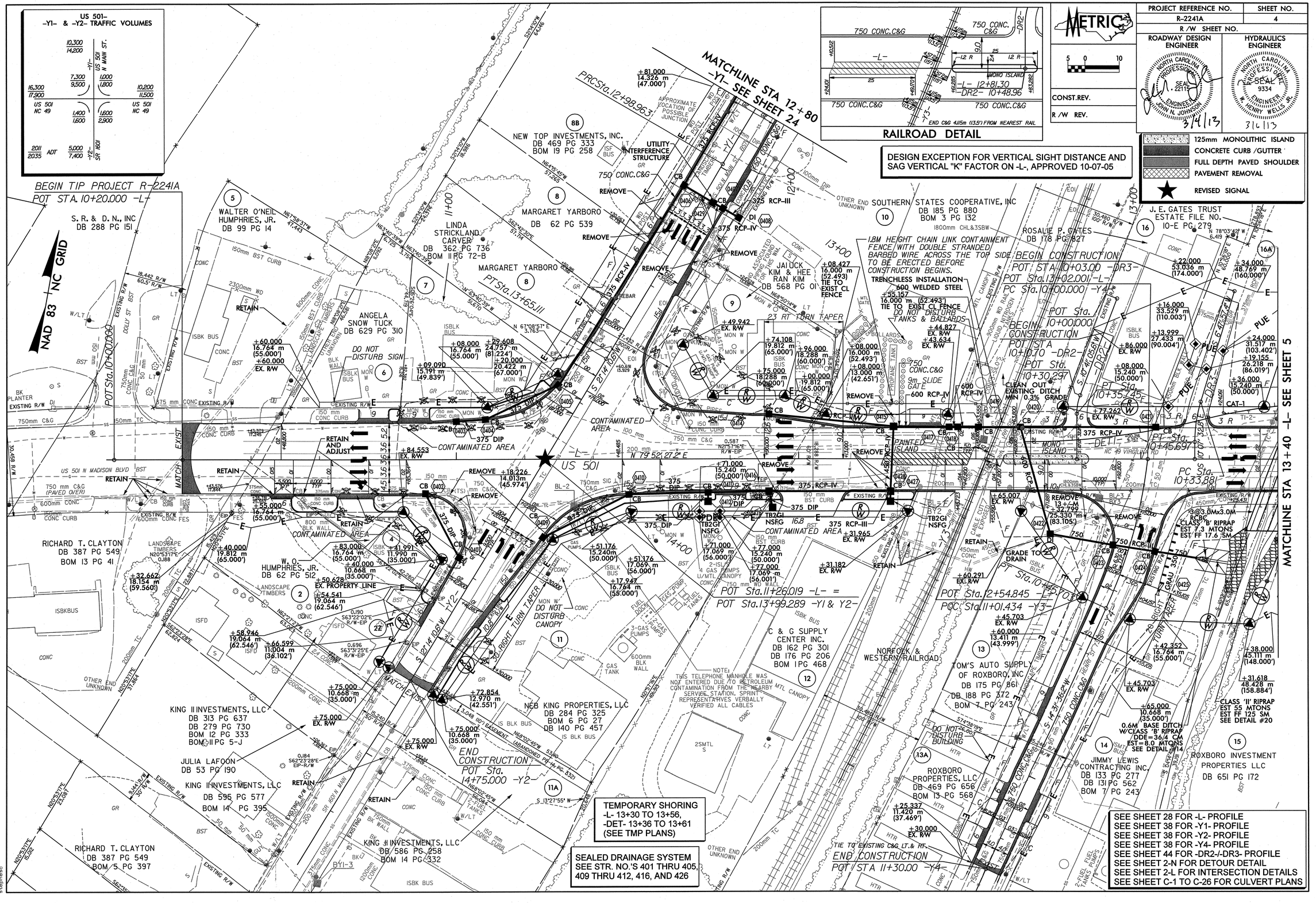
125mm MONOLITHIC ISLAND
CONCRETE CURB /GUTTER
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL
REVISED SIGNAL

DESIGN EXCEPTION FOR VERTICAL SIGHT DISTANCE AND SAG VERTICAL "K" FACTOR ON -L-, APPROVED 10-07-05

US 501 –Y1– & –Y2– TRAFFIC VOLUMES

	10,300 / 14,200	
16,300 / 17,900	7,300 / 9,500 (–Y1– US 501 N MAIN ST.) 1,000 / 1,800	10,200 / 11,500
US 501 NC 49	1,400 / 1,600	1,600 / 2,900 US 501 NC 49
2011 / 2035 ADT	5,000 / 7,400 –Y2– SR 1601	

RAILROAD DETAIL



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1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

METRIC
5 0 10

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	5
R /W SHEET NO.	

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
02-04-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER M. HENRY WELLS, JR.
2/5/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

MATCHLINE STA. 13+40 -L- SEE SHEET 4

MATCHLINE STA. 17+00 -L- SEE SHEET 6

BEGIN CONSTRUCTION
POT STA 10+07.25 -DR5-

POT Sta. 10+00.000
S 0°16'04.0"E
PRC Sta. 10+20.009
PC Sta. 10+10.325
PT Sta. 10+39.589
-DR5- Sta. 10+39.589=
-L- Sta. 14+77.270

US 501
NC 49 VIRGINIA RD.T.D.\BST

J. E. GATES TRUST ESTATE FILE NO. 10-E PG 279 (16A)

CHARLES E. PERKINS DB 581 PG 828 BOM 3A PG 41 (17)

CHARLES E. PERKINS DB 307 PG 778 BOM 9 PG 32-6 (18)

ROXBORO INVESTMENT PROPERTIES LLC DB 651 PG 172 (15)

PERSON COUNTY DB 626 PG 716 DB 15 PG 273 (20)

PERSON COUNTY BOARD OF EDUCATION DB 708 PG 645 PB 6 PG 16 (20A)

JESSE ANDERSON & SON CONTRACTORS, INC (AKA JESSE ANDERSON & SON, INC.) DB 191 PG 278 BOM 4 PG 390 (19)

JESSE ANDERSON & SON CONTRACTORS, INC (AKA JESSE ANDERSON & SON, INC.) DB 191 PG 278

JUDY AND JAMES LEE DB 223 PG 289 BOM 10 PG 4 (21)

EDWARD ANDERSON DB 642 PG 110

CITY OF ROXBORO

FILL W/ SELECT MATERIAL EST 25 CM

CLASS 'II' RIPRAP ON BANKS ONLY EST 26.0 MTONS EST FF 147 SM SEE DETAIL #20

PREFORMED SCOUR HOLE BASE=1.4M SEE DETAIL SHEET # 21

CLASS 'B' RIPRAP EST 0.9 MTONS EST FF 4.2 SM

0.9M BASE DITCH EST DDE=35.3 CM SEE DETAIL #2

CLASS 'B' RIPRAP EST 7.3 MTONS EST FF 17.6 SM

0.9M HEAD DITCH EST DDE=8.1 CM SEE DETAIL #2

TOE PROTECTION STA 15+18 LT TO STA 15+80 LT -L- SEE DETAIL #8

CONTAMINATED AREA

DO NOT DISTURB VAULT, WATER LINE, VALVE

DO NOT DISTURB SIDEWALK WITH STEPS & RAILINGS

DO NOT DISTURB UTILITY POLE WITH LIGHT

200x450 CONC. CURB (TYP.)

TEMPORARY SHORING
-L- 13+30 TO 13+56,
-DET- 13+36 TO 13+61
(SEE TMP PLANS)

SEE SHEET 28 FOR -L- PROFILE
SEE SHEET 45 FOR -DR5- PROFILE
SEE SHEET 2-N FOR DETOUR DETAIL
SEE SHEET C-1 TO C-26 FOR CULVERT PLANS

2/4/2013
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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	6
R /W SHEET NO.	

METRIC

5 0 10

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22113 ENGINEER JOHN N. JOHNSON — 2-20-13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR. — 2/21/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

US 501 -Y5- TRAFFIC VOLUMES

US 501 NC 49 -L-			US 501 NC 49 -L-
8,200 / 9,200	900 / 1,000	100 / 100	7,400 / 8,300

-Y5- HENDERSON ROAD: 1,000 / 1,100

2011 / 2035 ADT

BEGIN CONSTRUCTION
POC 10+10.000 -Y6-

RICHARD T. CLAYTON
DB 249 PG 282
BOM 9 PG 65-4

WOODY & ANDERSON PROPERTIES, INC
DB 241PG 713

THE MICHAEL S. TURNER ALASKA TRUST
DB 528 PG 736
BOM 3A PG 44

ROBERT L CLAYTON
DB 264 PG 170

RITA W. ALLEN, et al
DB 212 PG 614
BOM 3A PG 44

FELTON E. CARVER, ET AL
DB 174 PG 842

PERSON COUNTY BOARD OF EDUCATION
DB 708 PG 645
PB 6 PG 16
ISBLK BUS V.F.W.

KAREN WHITFIELD, ET AL
BOM 1 PG 41

EDNA P. ELLIOTT
DB 219 PG 328
BOM 1 PG 41

FRANCES S. CARVER, ET AL
DB 180 PG 790

EDNA P. ELLIOTT
DB 91PG 356

CITY OF ROXBORO

PC Sta.10+48.133
PT Sta.10+98.476
POT Sta.17+38.929 -L- =
POT Sta.10+02.485 -Y5-
RT Sta.17+23.679
PC Sta.10+44.972
PT Sta.10+67.155
PC Sta.10+38.260
PT Sta.10+22.606
PC Sta.10+15.577
BEGIN CONSTRUCT. PT Sta.10+45.090
POT Sta.10+53.631
POT Sta.18+16.673 -L- =
POT Sta.11+60.408 -Y6-
END CONSTRUCTION 11+00
POC 11+00.000 -Y5-

PERSON COUNTY HEALTH DEPARTMENT

JESSE ANDERSON & SON CONTRACTORS, INC (AKA JESSE ANDERSON & SON, INC.)
DB 191PG 278
BOM 4 PG 390

BONNIE GILLIS RIMMER
DB 292 PG 726
PB 15 PG 338

VENNIE LOU CLAYTON AND DOROTHY C. WATSON
DB 212 PG 559
BOM 6 PG 44
BOM 7 PG 266

ESTELLE P. WADE
DB 99 PG 486

JOYCE B. WADE, WIDOW
DB 432 PG 836
BOM 12 PG 111

JOYCE B. WADE, WIDOW
DB 195 PG 29
BOM 5 PG 118

JOYCE B. WADE, WIDOW
DB 432 PG 836
DB 111 PG 616
BOM 12 PG 111

LOYD MOORE MITCHELL & RED HEN TRUST
DB 615 PG 167
BOM 4 PG 63

MAXINE D. CALL
DB 169 PG 267

JUDY AND JAMES LEE
DB 223 PG 289
BOM 10 PG 4

EDWARD ANDERSON
DB 642 PG 110

PARABOLIC SWALE
STA 18+30 LT TO STA 19+37 LT -L-
SEE DETAIL #3

PARABOLIC SWALE
STA 19+48 LT TO STA 20+20 LT -L-
SEE DETAIL #3

N 72°04' 26.6" E
ST Sta. 20+31.474

SCSta.19+06.212
TSSta.18+66.212
CSSta.19+91.474

MATCHLINE STA. 17+00 -L- SEE SHEET 5

MATCHLINE STA. 20+60 -L- SEE SHEET 7

LAT 0.9M BASE DITCH W/1.5M BERM LINED W/CLASS 'B' RIPRAP
EST 182.4 MTONS
EST FF 554.6 SM
STA 19+60 RT TO STA 20+80 RT -L-
EST DDE = 236.85 CM
SEE DETAIL #4

CLASS 'B' RIPRAP
EST 2.7 MTONS
EST EF 9.2 SM

SPECIAL DITCH GRADE W/CL 'B' RIPRAP
SEE PROFILE FOR GRADE
STA 10+80 LT TO STA 10+68 LT -Y5-
SEE DETAIL #22

SEE SHEET 29 FOR -L- PROFILE
SEE SHEET 39 FOR -Y5- PROFILE
SEE SHEET 39 FOR -Y6- PROFILE
SEE SHEET 44 FOR -DR4- PROFILE
SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 2-L FOR INTERSECTION DETAILS

2/20/2013
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STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

METRIC
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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	7
R /W SHEET NO.	

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
02-04-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR.
2/5/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

21+00 22+00 23+00 24+00

MATCHLINE STA. 20+60 -L- SEE SHEET 6

MATCHLINE STA. 24+20 -L- SEE SHEET 8

ENERGY DISSIPATOR SEE DETAIL SHEET # 2J

CLASS 'II' RIPRAP ON BANKS ONLY EST 52 MTONS EST FF 53 SM SEE DETAIL #20

+96.000 38.100 m (125.000')

+96.000 27.432 m (90.000')

+96.000 15.240 m (50.000')

TOE PROTECTION FF= SM STA 19+91 LT TO STA 21+26 LT -L- SEE DETAIL #8

+80.000 27.432 m (90.000')

RONALD R. SHELTON DB 308 PG 167 BOM 8 PG 115

N71°29'07"E 30.209

600mm STONE WALL

N8°50'55"W 61.003

S18°35'53"E 60.285

1½SBKD

+20.000 17.069 m (56.000')

900mm CONC

PROPOSED ASPHALT DRIVE

+40.000 17.069 m (56.000')

+60.000 21.031 m (69.000')

+00.000 24.994 m (82.000')

WOODY & ANDERSON PROPERTIES, INC DB 241 PG 713

END CONSTRUCTION POT STA 10+34.38 -DRI-

ROBERT W. WALKER DB 74 PG 114

EIP N70°12'06"E 30.560 EIP

N69°47'54"W 30.440

S19°44'54"E 30.560

POT Sta. 10+36.457

PT Sta. 10+34.155

DO NOT DISTURB EXISTING SEPTIC LINES

+58.000 35.052 m (115.000')

+58.000 26.822 m (88.000')

+68.000 35.052 m (115.000')

ISBKD

U.G. SEPTIC LINE AS MARKED BY PERSON COUNTY HEALTH DEPARTMENT

+87.592 26.858 m (88.116')

+20.000 25.908 m (85.000')

+68.00 24.431 m (80.153')

+87.682 23.854 m (78.261')

PC Sta. 10+25.718

750 RCP-IV

GRAU 350

450 RCP-IV

750 CONC. C&G

375 RCP-IV

CB

0.043 N18°30'53"W R/W-EIP

0.675 S18°30'53"E R/W-EIP

BL-8

EXISTING R/W

-L- US 501

N 72°04'26.6"E

N 71°59'34.0"W 340.00' -DRI-

30.48m (100.00')

BY6

DET2

BL-9

T2-1

T2-2

T2-3

NC 49 VIRGINIA RD.7.0 BST

2-1.8 X 1.8 CONC

60' R/W

+74.000 28.346 m (93.000')

PDE

+74.000 38.100 m (125.000')

+96.000 25.908 m (85.000')

+96.000 38.100 m (125.000')

CLASS 'II' RIPRAP EST 60 TONS EST FF 85 SM SEE DETAIL #20

2@2.4Mx2.4M RCBC

+96.000 EX. R/W

TOE PROTECTION FF= SM STA 19+91 RT TO STA 21+40 RT -L- SEE DETAIL #8

+80.000 25.908 m (85.000')

+00.000 19.812 m (65.000')

+40.000 15.240

+40.000 19.812 m (65.000')

+00.000 24.994 m (82.000')

+80.001 15.240 m (50.000')

+00.000 22.555 m (74.000')

POT Sta.23+62.719 -L- =

POT Sta.10+02.485 -DRI-

1½SFD

U.G. SEPTIC LINE AS MARKED BY PERSON COUNTY REALTH DEPARTMENT

DO NOT DISTURB EXISTING SEPTIC LINES

TIMOTHY HARRIS CHERYL CAVALIER DB 305 PG 780

S70°30'59"W 30.480

MAXINE D. CALL DB 109 PG 267

PROPERTY LINE IS CENTER LINE OF CREEK

LAT .09M BASE DITCH W/1.5M BERM LINED W/CLASS 'B' RIPRAP STA 19+60 RT TO STA 20+80 RT -L- EST DDE = 236.85 CM SEE DETAIL #4

WOODY & ANDERSON PROPERTIES, INC DB 241 PG 713

TEMPORARY SHORING -L- 20+79 TO 20+95 LT, -L- 20+76 TO 20+95 RT (SEE TMP PLANS)

SEE SHEET 29 FOR -L- PROFILE
SEE SHEET 44 FOR -DR1- PROFILE
SEE SHEET 2-O FOR DETOUR DETAIL
SEE SHEET C-1 TO C-26 FOR CULVERT PLANS

2/4/2013
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STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

METRIC

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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	8
R /W SHEET NO.	

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 32115 ENGINEER JOHN N. JOHNSON
2-20-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
2/21/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

WOODY & ANDERSON PROPERTIES, INC
DB 241PG 713

TODD N. WILBOURNE
TONYA H. WILBOURNE
DB 360 PG 350

(TRACT H)
BOBBY J, HICKS
DELORES C, HICKS
09-E-428, HARNETT COUNTY

ODELIA P. GENTRY HEIRS
09-E-428, HARNETT COUNTY

MATCHLINE STA. 24+20 -L- SEE SHEET 7

MATCHLINE STA. 27+60 -L- SEE SHEET 9

TS Sta.24+28.188

BEGIN C/A & WW FENCE Sta. 24+49.57

BEGIN CA & FENCE -L- STA. 25+31.98

SC Sta. 25+43.188

BEGIN C/A & WW FENCE Sta. 26+31.694

BEGIN C/A & WW FENCE Sta. 26+53.594

END C/A & WW FENCE Sta. 26+24.173

CS Sta.26+90.078

ST Sta. 27+42.461

N 72° 04' 26.6" E

S73°46'25"W 64.008

S85°59'04"E 85.163

286 TAPER (LANE SHIFT)

45 LEFT TURN TAPER MED RT

45 RIGHT TURN TAPER RT

END C&G +62.078 12.81 LT

CLASS 'B' RIPRAP EST 7.3 MTONS EST FF 17.6 SM

CLASS B RIR RAP EST 1.8 MTONS EST FF 5.9 SM

CLASS II RIPRAP ON BANKS ONLY 9.0 MTONS FF=20 SM SEE DETAIL #20

LAT 0.6M BASE DITCH LINED W/CL 'B' RIPRAP EST 28.9 MTONS EST FF 98.41 SM STA 24+80 TO STA. 25+01 -L- RT EST DDE =14.61 CM SEE DETAIL #7

'V' DITCH DDE=30CM SEE DETAIL #5

GRADE TO DRAIN

ACCESS POINT

REMOVE

1200mm WOVEN WIRE FENCE

1200 mm WW & ISBW

1200mm WD RAIL

EXISTING R/W

SEE SHEET 30 FOR -L- PROFILE
SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 2-O FOR DETOUR DETAIL

2/20/2013
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kwpreese

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	9
R /W SHEET NO.	

METRIC

5 0 10

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON
2-20-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS IV
2/21/13

US 501– –Y7 & Y8– TRAFFIC VOLUMES

1,000 / 1,300 –Y7– SR 1532
7,400 / 8,300 –L– 700 / 1,000 100 / 300 –L– 2,900 / 4,100
4,300 / 4,600 400 / 1,100
2011 / 2035 ADT 4,900 / 5,700 –Y8– NC 49

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL
REVISED SIGNAL

MATCHLINE STA. 12+40 –Y7– SEE SHEET 24

MATCHLINE STA. 27+60 –L– SEE SHEET 8

MATCHLINE STA. 31+20 –L– SEE SHEET 10

MATCHLINE STA. 14+80 –Y8– SEE SHEET 25

SEE SHEET 30 FOR -L- PROFILE
SEE SHEET 39 FOR -Y7- PROFILE
SEE SHEET 40 FOR -Y9- PROFILE
SEE SHEET 41 FOR -Y8- PROFILE
SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 2-L FOR INTERSECTION DETAILS

NAD 83 NC GRID

GPS R-2241A-3

GPS R-2241A-4

POC Sta.12+59.18 –Y7– =
POT Sta.10+00.000 –Y9–

PT Sta.12+68.088

PC Sta.10+07.063

PT Sta.10+91.415

PC Sta.11+11.332

PT Sta.12+40.060

TS Sta.30+49.209

POT Sta.28+47.500 –L– =
POT Sta.14+03.462 –Y7 & Y8–

PC Sta.14+33.648

ST Sta.28+05.078

BOBBY J. HICKS &DELORES C. HICKS DB 625 PG 211 PB 23, PG 113 PB 11, PG 1E

BOBBY J. HICKS &DELORES C. HICKS DB 625 PG 215 PB 23, PG 113 PB 11, PG 1E

BOBBY J. HICKS DELORES C. HICKS DB 625 PG 199 PB 23, PG 113 PB 11, PG 1E

BOBBY J. HICKS &DELORES C. HICKS DB 625 PG 201 PB 23, PG 113 PB 11, PG 1E

BOBBY J. HICKS &DELORES C. HICKS DB 625 PG 205 PB 23, PG 113 PB 11, PG 1E

BOBBY J. HICKS &DELORES C. HICKS DB 625 PG 217 PB 23, PG 113 PB 11, PG 1E

BURLEY W. DUNN DB 188 PG 749 DB 107 PG 74

MARIAN CLAYTON WHITT DB 411 PG 607 PB 14 PG 99 PB 14 PG 100

BOBBY J. HICKS &DELORES C. HICKS DB 528 PG 745 PB 14, PG 31

ODELIA P. GENTRY HEIRS 09-E-428, HARNETT COUNTY

GEORGE E. DICKERSON DB 197 PG 72

US 501

THORNTON RD. SR 1532

NC 87

END C/A & WW FENCE STA. 13+22.062

CLASS 'B' RIPRAP EST 4.5 MTONS EST FF 13.4 SM

SPECIAL DITCH GRADE STA 12+80 LT TO 13+20 LT –Y7– SEE PROFILE FOR GRADE SEE DETAIL #22 BEGIN C/A & WW FENCE STA. 13+22.062

SPECIAL LAT 'V' DITCH STA 13+20 LT TO STA 13+60 LT –Y7– SEE DETAIL #6

'V' TAIL DITCH SEE DETAIL #5 DDE=26 CM

CLASS 'B' RIPRAP EST 4.5 MTONS EST FF 11.7 SM

BOBBY J. HICKS/ 0.6M BASE HEAD DITCH DDE=18 CM SEE DETAIL #1

0.6M BASE TAIL DITCH DDE=30 CM SEE DETAIL #1

SPECIAL DITCH W/PSRM SEE PROFILE FOR GRADE STA 11+66 LT TO 11+90 LT –Y9– SEE DETAIL #23

SPECIAL DITCH W/PSRM SEE PROFILE FOR GRADE STA 11+66 RT TO 11+90 RT –Y9– SEE DETAIL #23

286 TAPER (LANE SHIFT)

450 TAPER

50 TAPER

45 RIGHT TURN TAPER

BEGIN LEFT TURN TAPER

450 CONC.C&G

1200mm WOVEN WIRE FENCE

50' ACCESS EASEMENT

U.G. SEPTIC LINE AS MARKED BY PERSON COUNTY HEALTH DEPARTMENT

SEPTIC REPAIR AREA

SEPTIC RISERS

REMOVE

GRADE TO DRAIN

EX. R/W @ 11.430 m (37.500') EX. R/W @ 15.240 m (50.000') EX. R/W @ 35.052 m (115.000') EX. R/W @ 30.480 m (100.000') END ROW BEGIN ROW

BL-12 BL-13=BY9 BY6-3

(TRACT A) (TRACT B) (TRACT C) (TRACT D) (TRACT E) (TRACT F) (TRACT G) (TRACT H) (TRACT I)

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METRIC

5 0 10

CONST.REV.
R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	10
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22113 ENGINEER JOHN N. JOHNSON
2-20-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.
2/21/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

MATCHLINE STA. 31+20 -L- SEE SHEET 9

MATCHLINE STA. 15+20 -Y9- SEE SHEET 26

MATCHLINE STA. 34+80 -L- SEE SHEET 11

PCSta.13+13.649

-L- SCSta.31+29.209

-L- CSSta.32+77.914

-L- STSta.33+57.914

-Y9-

US 501

SR 1531/PROVIDENCE RD 6.3 BST

MARIAN CLAYTON WHITT
DB 411 PG 607
PB 14 PG 99
PB 14 PG 100

BURLEY W. DUNN
DB 188 PG 749
DB 36 PG 557
DB 107 PG 74

NELLIE R PENTECOST
DB 176 PG 86
DB 80 PG 469
DB 198 PG 594
DB 58 PG 464
BOM 7 PG 335
BOM 5 PG 141
BOM 1PG 143

TROY L. CAMPBELL & ERNESTINE H. CAMPBELL
DB 141 PG 187-188
DB 121 PG 151-152

STEPHEN D. GARRETT
DB 278 PG 896
BOM 11 PG 13-B

ALMEADE G. GARRETT et al
DB 311 PG 448
BOM 21 PG 143

TRANSITION STONE CLASS 'B' RIPRAP EST=4.0 MTONS EST FF 26.7 SM

PREFORMED SCOUR HOLE BASE=1.4M SEE DETAIL SHEET # 2J

STD. BERM DITCH STA. 32+30 LT TO 34+10 LT -L-

BEGIN SHOULDER BERM GUTTER 34+60.000 -RT-

ACCESS POINT

END C/A & WW FENCE Sta. 33+25.000

BEGIN C/A & WW FENCE Sta. 33+43.288

1200mm WOVEN WIRE FENCE

SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 31 FOR -L- PROFILE
SEE SHEET 40 FOR -Y9- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	11
R/W SHEET NO.	

METRIC

5 0 10

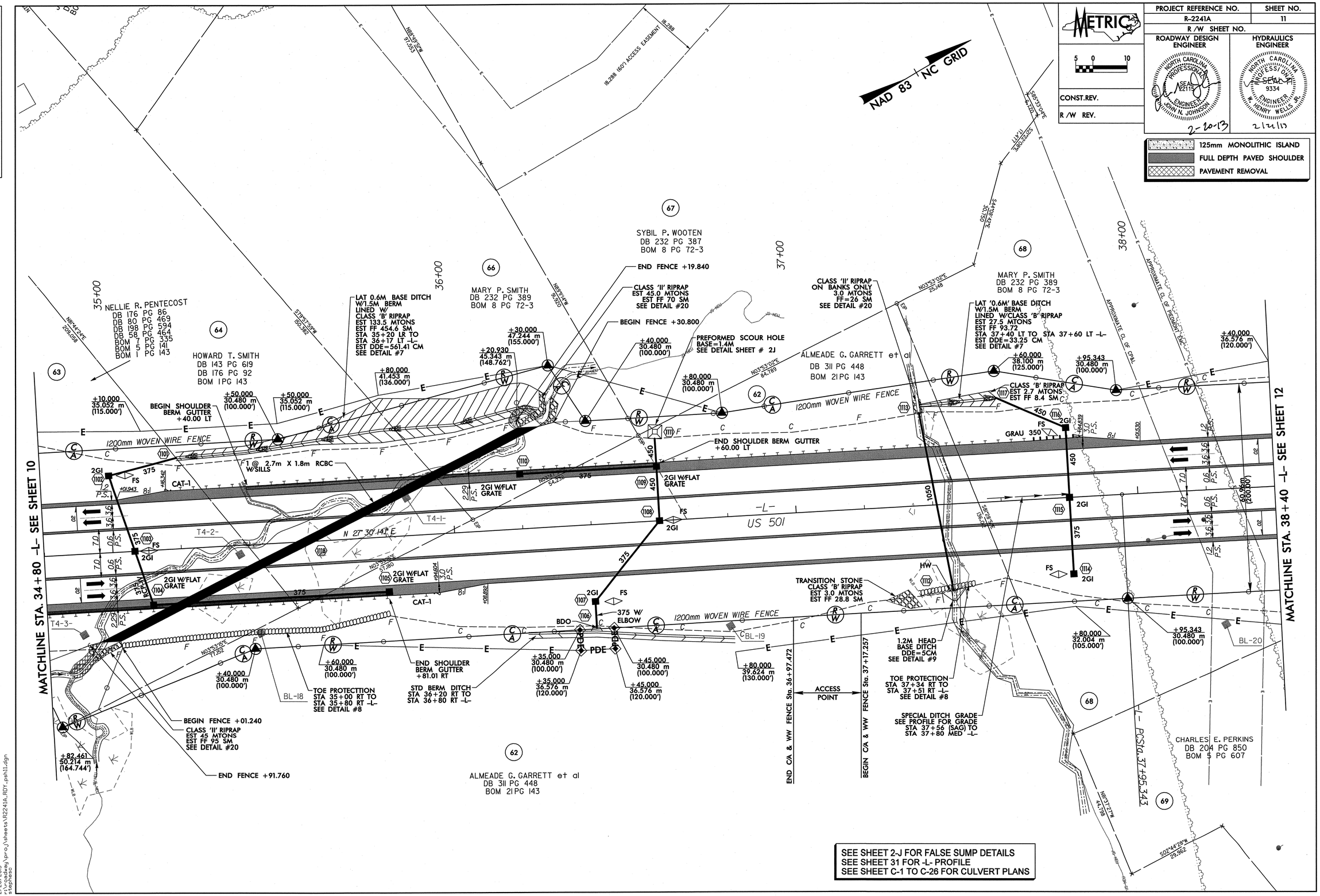
CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON — 2-20-13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR. — 2/21/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL



SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 31 FOR -L- PROFILE
SEE SHEET C-1 TO C-26 FOR CULVERT PLANS

2/20/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	12
R /W SHEET NO.	

METRIC

5 0 10

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 022115 ENGINEER JOHN N. JOHNSON — 2-20-13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR. — 2/21/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

MATCHLINE STA. 38+40 -L- SEE SHEET 11

MATCHLINE STA. 42+00 -L- SEE SHEET 13

MARY P. SMITH
DB 232 PG 389
BOM 8 PG 72-3

MIRIAM J. LAVELLE
AND HUSBAND
CHARLES F. SAMS, JR.
DB 215 PG 757
BOM 4 PG 597

NADINE IRENE DIXON ET AL
DB 266 PG 148
PB 6 PG 81-I
DB 680 PG 810

CHARLES E. PERKINS
DB 204 PG 850
BOM 5 PG 607

CHARLES E. PERKINS
DB 337 PG 519
BOM 8 PG 22-5

END C/A & WW FENCE Sta. 40+90.000

BEGIN C/A & WW FENCE Sta. 41+08.000

END C/A & WW FENCE Sta. 41+72.950

BEGIN C/A & WW FENCE Sta. 41+91.238

END C/A & WW FENCE Sta. 41+52.000

BEGIN C/A & WW FENCE Sta. 42+10.714

ACCESS POINT

1200mm WOVEN WIRE FENCE

END FENCE +08.490

ENERGY DISSIPATOR
SEE DETAIL SHEET # 2J

BEGIN FENCE +10.040

CLASS 'II' RIPRAP
ON BANKS ONLY
+/-4.0 MTONS
FF= +/-36 SM
SEE DETAIL #20

CL 'II' RIPRAP
(BANKS ONLY)
+/- 1.7 MTONS
FF +/- 2.1 SM
SEE DETAIL #20

END FENCE +62.500

BEGIN FENCE +64.060

POT Sta.41+29.428 -L- =
POT Sta.10+00.000 -DR6-

PG Sta.
10+36.752

PT Sta.
10+51.088

POT Sta.-
10+64.941

END CONSTRUCTION
POT STA 10+58.864 -DR6-

US 501

-L-

-DR6-

1500 RCP-IV

GRAU 350

CAT-1

2GI

2GI TYPE 'A'

FS

BL-21

BL-22

BL-23

BL-24

T3-1-

T3-2-

T3-3-

@ PROP. LINE
30.48m
(100')

@ PROPERTY CORNER
Approx. 39.950m (131.068')

SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 32 FOR -L- PROFILE
SEE SHEET 45 FOR -DR6- PROFILE

2/20/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	13
R /W SHEET NO.	

METRIC

5 0 10

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON
2-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS IV
2/21/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

MATCHLINE STA. 42+00 -L- SEE SHEET 12

MATCHLINE STA. 45+60 -L- SEE SHEET 14

NADINE IRENE DIXON ET AL
DB 266 PG 148
PB 6 PG 81-1
DB 680 PG 810

CHARLES E. PERKINS
DB 204 PG 850
BOM 5 PG 607

BERTHA HAYES CLAY
DB 154 PG 464

CHARLES E. PERKINS
DB 337 PG 519
BOM 8 PG 22-5

CHARLES E. PERKINS
DB 204 PG 850
BOM 5 PG 607

BERTHA HAYES CLAY
DB 154 PG 464

S85°52'21"E 91.038

N85°31'06"E 18.288

S83°31'06"W 9.659

N16°30'45"W 70.188

S87°50'09"E 559.426

N 32° 37' 31.6" E

-L- PTSta. 44+21.056

-L- US 501

ACCESS POINT

END C/A & WW FENCE Sta. 43+40

BEGIN C/A & WW FENCE Sta. 43+58

1200mm WOVEN WIRE FENCE

STD BERM DITCH
STA 42+10 RT TO
STA 44+40 RT -L-

BEGIN LEFT TURN TAPER
+18.697

18.288 (60') ACCESS EASEMENT

30 SOIL

BL-25

BL-26

BDO

FS 506.26 56.26

2GI

FS 2GI TYPE 'A'

FS 2GI 450 W/ ELBOW

+40.000 33.528 m (110.000')

+40.000 30.480 m (100.000')

+00.000 30.480 m (100.000')

+00.000 33.528 m (110.000')

+21.056 30.480 m (100.000')

+60.000 35.052 m (115.000')

+40.000 35.052 m (115.000')

+40.000 38.100 m (125.000')

+21.056 30.480 m (100.000')

+40.000 39.624 m (130.000')

+60.000 36.576 m (120.000')

+00.000 36.576 m (120.000')

SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 32 FOR -L- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	14
R /W SHEET NO.	

METRIC 5 0 10

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON — 2-20-13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR. — 2/21/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 / NC GRID

US 501– -Y12- & -Y13- TRAFFIC VOLUMES

	900 / 1,300 -Y12- SR 1524	
2,900 / 4,100 US 501	500 / 700 — 400 / 600	2,700 / 3,900 US 501
	200 / 300 — 100 / 200	
2011 / 2035 ADT	300 / 500 -Y13- SR 1524	

END C/A & WW FENCE STA. 10+20.00

BEGIN CONST. POT Sta.10+20.000 -Y12-

BEGIN C/A & WW FENCE STA. 10+20.00

ALLIE CLAY RD. SR 1524

BY10-2

+20.000 @ EX. R/W

+30.000 15.850 m (52.000')

+57.933 @ EX. R/W

+80.000 21.336 m (70.000')

+40.000 30.480 m (100.000')

+80.000 18.288 m (60.000')

+50.000 39.624 m (130.000')

+50.000 30.480 m (100.000')

+40.000 35.052 m (115.000')

+80.000 39.624 m (130.000')

+00.000 39.624 m (130.000')

10 TAPER

35 RIGHT TURN TAPER

S 47° 24' 32.8" E

N 32° 37' 31.6" E

POT Sta. 47+01.527 -L- = POT Sta. 11+25.696 -Y12- & -Y13-

46+00 47+00 48+00 49+00 11+00

SPECIAL LAT 'V' DITCH LINED W/CLASS 'B' RIPRAP EST 48.6 MTONS EST FF 129.17 STA 46+60 LT TO STA 46+92 LT -L- SEE DETAIL #11

STD BERM DITCH LINED W/ CLASS 'B' RIPRAP EST 89.6 MTONS EST FF 429.2 SM STA 47+40 LT TO 48+80 LT -L- SEE DETAIL #13

CLASS 'B' RIPRAP EST 1.8 MTONS EST FF 5.9 SM

73 BERTHA HAYES CLAY DB 154 PG 464

76 CHARLIE V. JEFFERS & BEVERLY W. JEFFERS DB 197 PG 435 BOM 5 PG 40

77 AUSTIN B. CLAY HEIRS DB 180 PG 829

1200mm WOVEN WIRE FENCE

BEGIN LEFT TURN TAPER +85.560

BDO

450 W/ ELBOW

-L- US 501

MATCHLINE STA. 45+60 -L- SEE SHEET 13

MATCHLINE STA. 49+20 -L- SEE SHEET 15

900 RCP-IV

REMOVE

CLASS 'B' RIPRAP EST 1.8 MTONS EST FF 5.9 SM

CLASS 'I' RIPRAP ONLY ON BANKS 9.0 MTONS FF=20 SM SEE DETAIL #20

+10.000 30.480 m (100.000') SPECIAL LAT 'V' DITCH LINED W/CLASS 'B' RIPRAP EST 85.1 MTONS EST FF 226.0 SM STA 46+20 RT TO STA 46+76 RT -L- SEE DETAIL #11

0.9M HEAD DITCH LINED W/CLASS 'B' RIPRAP 10 MTONS DDE=12CM SEE DETAIL #10

+70.000 -L- 39.624 m (130.000')

BL-27=BY10

+35.000 -L- 30.480 m (100.000')

BL-28

PREFORMED SCOUR HOLE BASE = 1.8M SEE DETAIL SHEET # 2J

CHARLIE V. & BEVERLY W. JEFFERS DB 197 PG 435 BOM 5 PG 40

+90.000 14.272 m (46.824')

+00.000 EX. R/W

+20.000 13.716 m (45.000')

+85.000 17.775 m (58.316')

+00.000 EX. R/W

+20.000 13.716 m (45.000')

75 GEORGE LEON CLAY DB 115 PG 626

BEGIN C/A & WW FENCE Sta. 12+02.245

END C/A & WW FENCE Sta. 12+22.744

ACCESS POINT

12+00

MATCHLINE STA. 12+30 -Y13- SEE INSET THIS SHEET

SEE SHEET 33 FOR -L- PROFILE
SEE SHEET 42 FOR -Y12- PROFILE
SEE SHEET 42 FOR -Y13- PROFILE
SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 2-M FOR INTERSECTION DETAILS

INSET

BEGIN C/A & WW FENCE STA. 12+40.000 9.104 m (29.869')

+55.000 17.374 m (57.000')

+63.000 17.374 m (57.000')

+25.000 EX. R/W

CLASS 'B' RIPRAP

PDE

BY10-3

-Y13- ALLIE CLAY RD 5.8 BST

EXISTING R/W

4,844 N38°30'58"E EIP-R/W

2,724 N38°30'58"E EIP-R/W

+00.000 14.021 m (46.000')

END C/A & WW FENCE STA. 12+40.000 9.184 m (30.131')

MATCHLINE STA. 12+30 -Y13-

CHARLIE V. & BEVERLY W. JEFFERS DB 197 PG 435 BOM 5 PG 40

END CONST. -Y13- POT Sta.13+25.000

NAD 83 / NC GRID

BERTHA CLAY DB 116 PG 71 BOM 14, PG 185

BERTHA HAYES CLAY DB 154 PG 464

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METRIC
5 0 10

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	15
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON
2-20-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
2/21/13

CONST.REV.

R /W REV.

NAD 83 NC GRID

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

MATCHLINE STA. 49+20 -L- SEE SHEET 14

MATCHLINE STA. 52+80 -L- SEE SHEET 16

50+00 51+00 52+00

AUSTIN B. CLAY HEIRS
DB 180 PG 829

RONALD E. THOMAS, JR AND WIFE, JODI R. THOMAS
DB 775 PG 607

END C/A & WW FENCE Sta. 49+66.888

ACCESS POINT

BEGIN C/A & WW FENCE Sta. 49+85.176

LAT 0.6M BASE DITCH W/CLASS 'B' RIPRAP EST 31.7 MTONS EST FF 107.8 SM STA 50+81 TO STA 51+04 -L- LT DDE = 72.23 SEE DETAIL #7

CL 'B' RIPRAP EST 1.8 MTONS EST FF 5.9 SM

BEGIN SHOULDER BERM GUTTER +80.000 LT

TOE PROTECTION STA 50+55 LT TO STA 50+81 LT -L- SEE DETAIL #8

TRANSITION STONE CLASS 'B' RIPRAP EST 5.0 MTONS EST FF 20.3 SM

CLASS 'II' RIPRAP ON BANKS ONLY 3.5 MTONS FF=36 SM

END SHOULDER BERM GUTTER 80.000 LT

POND

1200mm WOVEN WIRE FENCE

PREFORMED SCOUR HOLE BASE=1.2M SEE DETAIL SHEET # 2J GRAU 350

CLASS 'B' RIPRAP EST 4.5 MTONS EST FF 13.4 SM

2GI W/FLAT GRATE

375 W/ ELBOWS

CAT-1

GRAU 350

HW

-L-
US 501
N 32° 37' 31.6" E

TOE PROTECTION STA 50+50 RT TO STA 51+20 RT -L- SEE DETAIL #8

TOE PROTECTION STA 51+70 RT TO STA 51+90 RT -L- SEE DETAIL #8

SPECIAL DITCH GRADE W/CLASS 'B' RIPRAP EST 30.4 MTONS EST FF 93.7 SM SEE PROFILE FOR GRADE STA 49+80 RT TO STA 50+00 RT -L- SEE DETAIL #22

PREFORMED SCOUR HOLE BASE=1.4M SEE DETAIL SHEET # 2J

CLASS 'II' RIPRAP FF=9.4 SM SEE DETAIL #20

BL-29

BL-30

PROP. LINE @ 30.48m (100')

+36.92 PROP. LINE

+49.78 PROPERTY CORNER

0.6M BASE HEAD DITCH LINED W/CLASS 'B' RIPRAP DDE=20 CM EST=8.0 MTONS SEE DETAIL #14

ACCESS POINT

WILLIE M. DIXON
CLYDE C. DIXON
DB 154 PG 437
BOM 21PG 272

LONZY C. DIXOND
B 154 PG 439
BOM 21PG 272

END C/A & WW FENCE Sta. 52+26.430

BEGIN C/A & WW FENCE Sta. 52+44.918

RONALD E. THOMAS, JR AND WIFE, JODI R. THOMAS
DB 775 PG 607

CHARLIE V. JEFFERS & BEVERLY W. JEFFERS
DB 180 PG 829
BOM 5 PG 40

AUSTIN B. CLAY HEIRS
DB 180 PG 829

SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 33 FOR -L- PROFILE

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METRIC

5 0 10

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	16
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON
2-20-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
2/21/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

MATCHLINE STA. 52+80 -L- SEE SHEET 15

MATCHLINE STA. 56+40 -L- SEE SHEET 17

53+00 54+00 55+00 56+00

-L-
US 501
N 32° 37' 31.6" E

RONALD E. THOMAS, JR AND WIFE, JODI R. THOMAS
DB 775 PG 607
78

JAMES F. SHOTWELL, JR.
DB 136 PG 469
80

0.9M BASE TAIL DITCH
DDE=9 CM
SEE DETAIL #2

+60.000
39.624m
(130.000')

TOE PROTECTION
STA 53+51 LT TO
STA 53+67 LT -L-
SEE DETAIL #8

CLASS 'II' RIPRAP
ON BANKS ONLY
6.5 MTONS
FF=15 SM
SEE DETAIL #20

TRANSITION STONE
CLASS 'B' RIPRAP
EST 5.0 MTONS
EST FF 16.9 SM

+40.000
30.480m
(100.000')

+80.000
30.480 m
(100.000')

0.6M BASE TAIL DITCH
DDE=10 CM
SEE DETAIL #1

+40.000
39.624 m
(130.000')

+80.000
36.576 m
(120.000')

CLASS 'B' RIPRAP
EST 2.7 MTONS
EST FF 8.4 SM

GRAU 350

CAT-1

1200mm WOVEN WIRE FENCE

END C/A & WW FENCE Sta. 55+61.088

ACCESS POINT

BEGIN C/A & WW FENCE Sta. 55+80.841

TRANSITION STONE
CLASS 'B' RIPRAP
EST 5.0 MTONS
EST FF 22.8 SM

HW

+60.000
30.480m
(100.000')

DITCH BLOCK – CONSTRUCT
TO ELEVATION 192.25

BL-31

BL-32

CLASS 'II' RIPRAP
(ON BANKS ONLY)
+/-1.7 MTONS
FF +/-2.1 SM
SEE DETAIL #20

TOE PROTECTION
STA 53+12 RT TO
STA 53+20 RT -L-
SEE DETAIL #8

+80.000
35.052 m
(115.000')

+60.000
35.052m
(115.000')

+80.000
30.480 m
(100.000')

+40.000
38.100 m
(125.000')

+80.000
42.672 m
(140.000')

+00.000
48.769 m
(160.003')

+40.000
45.720 m
(150.000')

STD BERM DITCH
STA 55+00 RT TO
STA 56+40 RT -L-

+80.000
47.244 m
(155.000')

+15.000
30.480 m
(100.000')

+25.000
30.480 m
(100.000')

+15.000
41.148 m
(135.000')

+20.000
45.110 m
(148.000')

+25.000
41.148 m
(135.000')

450 W ELBOW

BDO

PDE

SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 34 FOR -L- PROFILE

2/20/2013
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stephens

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Charlotte, NC 28208
NC License Number F-1091

METRIC

5 0 10

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	17
R /W SHEET NO.	

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON
2-20-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
2/21/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

JAMES F. SHOTWELL, JR.
DB 136 PG 469

PAUL S. BARNETT ESTATE
ADMINISTRATIVE BOOK 4 PG 33
DB 37 PG 393
DB 181 PG 706
PB 2 PG 35

KEITH L. BARNETTE
DB 210 PG 97
BOM 1PG 157

-L- PC Sta.57+58.712

-L- POC Sta.59+88.133 LB =
-L- PT Sta.59+87.530 LA

57+00 58+00 59+00

ACCESS POINT

END C/A & WW FENCE Sta. 58+43.717

BEGIN C/A & WW FENCE Sta. 58+63.561

S87°43'02"E 19.160

N 32° 37' 31.6" E

-L- US 501

MATCHLINE STA. 56+40 -L- SEE SHEET 16

MATCHLINE STA. 60+00 -L- SEE SHEET 18

+40.000 36.576 m (120.000')
+80.000 30.480 m (100.000')
+42.000 40.843 m (134.000')
+50.000 42.062 m (138.000')
+42.000 30.480 m (100.000')
+50.000 30.480 m (100.000')
+58.712 30.480 m (100.000')
+20.000 35.052 m (115.00')
+00.000 33.528 m (110.00')
+80.000 39.014 m (128.00')
+88.133 30.480 m (100.000')

CLASS 'I' RIPRAP ON BANKS ONLY 3 MTONS FF=30 SM SEE DETAIL #21

TRANSITION STONE CLASS 'B' RIPRAP EST 6.0 MTONS EST FF 32.9 SM

1200mm WOVEN WIRE FENCE

BEGIN SHOULDER BERM GUTTER +00.000 LT

END SHOULDER BERM GUTTER +80.000 LT

2GI W/FLAT GRATE

CAT-1

GRAU 350

RCP-IV

BL-33 BL-34 BL-35 BL-36

BEGIN LEFT TURN TAPER +97.784

CLASS 'B' RIPRAP 1.8 MTONS EST FF 5.9 SM

END SHOULDER BERM GUTTER +00.000 RT

CAT-1

HW 171

BEGIN SHOULDER BERM GUTTER +00.000 RT

CLASS 'B' RIPRAP EST 4.5 MTONS EST FF 11.7 SM

+00.000 36.576 m (120.000')

+05.000 30.480 m (100.00')

+40.000 47.244 m (155.000')

CLASS 'B' RIPRAP 1 MTON FF 2 SY PLACE AT INTERSECTION W/JS

+40.000 34.138 m (112.00')

+40.000 38.100 m (125.000')

LAT 0.6M BASE DITCH W/1.5M BERM LINED W/CLASS 'B' RIPRAP EST 165.1 MTONS EST FF 562.5 SM STA 57+00 RT TO STA 58+20 RT -L- EST DDE = 227.73 CM SEE DETAIL #7

JAMES F. SHOTWELL, JR. DB 136 PG 469

CLASS 'B' RIPRAP EST 1.8 MTONS EST FF 5.9 SM

+29.000 30.480 m (100.00')

+40.000 33.528 m (110.000')

+20.000 35.052 m (115.000')

SPECIAL DITCH GRADE W/PSRM SEE PROFILE FOR GRADE STA 58+40 RT TO STA 58+60 RT -L- SEE DETAIL #23

+80.000 33.528 m (110.000')

+60.000 42.672 m (140.000')

KEITH L. BARNETTE DB 210 PG 97 BOM 1PG 157

N 47° 53' 38" W 148.394'

SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 34 FOR -L- PROFILE

2/20/2013
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NC License Number F-0991

METRIC

5 0 10

CONST.REV.	
R /W REV.	

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	18
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22113 ENGINEER JOHN N. JOHNSON
2-20-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER H. HENRY WELLS, JR.
2/21/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

BEGIN CONSTRUCTION
POT Sta. 10+04.000 -Y14-

BARNETTE-TINGEN RD. SR 1522

U.G. SEPTIC LINE AS MARKED BY PERSON COUNTY HEALTH DEPARTMENT

10+00

11+00

12+00

60+00

61+00

62+00

63+00

MATCHLINE STA. 60+00 -L- SEE SHEET 17

MATCHLINE STA. 63+60 -L- SEE SHEET 19

CLASS 'B' RIPRAP EST 27.5 MTONS
'V' TAIL DITCH DDE=12 CM SEE DETAIL #5
+30.000 18.288 m (60.000')
+10.000 @ EX. R/W
+00.000 @ EX. R/W
+00.000 13.716 m (45.000')
'V' TAIL DITCH DDE=18 CM SEE DETAIL #5
10 TAPER
+40.000 @ EX. R/W
+40.000 12.192 m (40.000')
+40.000 16.764 m (55.000')
+40.000 35.052 m (115.000')

BEGIN C/A Sta. 10+40.000 -L-
N37°15'13"E 51.636
ACCESS POINT
+40.000 9.335 m (30.628')
BEGIN WW FENCE Sta. 10+52.000
S37°12'28"W 51.563
THOMAS A. PENTECOST DB 162 PG 672

REMOVE PIPE

BEGIN C/A & WW FENCE STA. 10+60.000 -Y14-

CLASS 'B' RIPRAP EST 1.8 MTONS EST FF 5.9 SM
30' RIGHT TURN TAPER
+80.000 15.240 m (50.000')
+82.901 18.999 m (62.331')
+00.000 39.624 m (130.000')
KEITH L. BARNETTE DB 210 PG 97 BOM 1PG 157
+40.000 30.480 m (100.000')

CLASS 'B' RIPRAP EST 0.9 MTONS EST FF 4.2 SM
+80.00 15.2400 m (50.000')
POT Sta. 11+22.580 -Y14 & Y15-
POT Sta. 60+75.808 -L-

KEITH L. BARNETTE DB 210 PG 97 BOM 1PG 157 BOM 4 PG 36

1200mm WOVEN WIRE FENCE

BEGIN LEFT TURN TAPER +57.203

+05.000 30.480 m (100.000')

S 52° 34' 33.0" E 406.263

N 30° 44' 51.4" E

BL-37 BL-38 BL-39

US 501

GPS R-2241A-6=

+38.390

+56.773

+62.573

+60.310

+87.221 15.692 m (51.482')
30' RIGHT TURN TAPER
S02°31'01"W 62.081
BEGIN C/A & WW FENCE STA. 12+00.000
END WW FENCE Sta. 11+97.156
ACCESS POINT
END C/A Sta. 12+05.924
+05.924 9.238 m (30.308')
S44°35'02"E 13.075

RETAIN +20.000 EX. R/W

END CONSTRUCTION
POT Sta. 12+20.00 -Y15-

ROBERT MERRITT BOWES DB 223 PG 138 BOM 3 PG 131 HTR

S02°31'01"W 84.096
+38.572 35.052 m (115.000')
+47.087 30.480 m (100.000')

NORMA JEAN BOWES LIFE ESTATE DB 267 PG 465

CHARLES F. BROOKS DB 204 PG 396 BOM 5 PG 566

S24°45'21"W 47.158
S33°14'29"W 50.041
S33°19'56"W 53.512
S55°54'43"E 154.184

+10.432
+19.099

SOIL

US 501 -Y14- & -Y15- TRAFFIC VOLUMES

2700 / 3900 -L-	100/200 -Y14- SR 1522 100/100 -100*/-100*	2,400 / 4,000 -L-
	-100*/200 200/-100*	
2011 / 2035 ADT	200/300 -Y15- SR 1522	

SEE SHEET 35 FOR -L- PROFILE
SEE SHEET 42 FOR -Y14- PROFILE
SEE SHEET 43 FOR -Y15- PROFILE
SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 2-M FOR INTERSECTION DETAIL

2/20/2013
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NC License Number F-1091

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	19
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 022115 ENGINEER JOHN A. JOHNSON — 2-20-13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR — 2/21/13

METRIC 5 0 10

CONST.REV.

R /W REV.

NAD 83 / NC GRID

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

MATCHLINE STA. 63+60 -L- SEE SHEET 18

MATCHLINE STA. 67+20 -L- SEE SHEET 20

KEITH L. BARNETTE
DB 210 PG 97
BOM 1PG 157

ROBIN E. WRENN, et al
87-E-20

ROBIN EVANS WRENN
DB 205 PG 98
BOM 5 PG 615

ACCESS POINT

END C/A & WW FENCE Sta. 64+46.086

BEGIN C/A & WW FENCE Sta. 64+64.374

END C/A & WW FENCE Sta. 66+99.362

BEGIN C/A & WW FENCE Sta. 67+17.650

+45.000 50.597m (166.000')

+39.000 45.996m (150.906')

+44.000 35.877m (117.707')

+69.000 52.426m (172.000')

+69.000 36.576 m (120.000')

+69.000 30.480m (100.000')

+59.000 36.296m (119.083')

LAT 0.6M BASE DITCH W/1.5M BERM LINED W/CLASS 'B' RIPRAP
EST 165.1 MTONS
EST FF 562.5 SM
STA 64+50 LT TO STA 65+70 LT -L-
EST DDE = 380.50 CM
SEE DETAIL #7

SPECIAL LAT 'V' DITCH LINED W/CLASS 'B' RIPRAP
EST 106.4 MTONS
EST FF 282.6 SM
STA 63+80 LT TO
STA 64+50 LT -L-
SEE DETAIL #11

CLASS 'B' RIPRAP

+60.000 33.528 m (110.000')

REMOVE POND

CLASS 'B' RIPRAP
EST 1.8 MTONS
EST FF 5.9 SM

+10.000 36.576 m (120.000')

+10.000 52.426m (172.000')

1200mm WOVEN WIRE FENCE

+80.000 36.576 m (120.000')

CLASS 'II' RIPRAP ON BANKS ONLY
6.2 MTONS
FF=50 SM
SEE DETAIL #20

PREFORMED SCOUR HOLE
BASE=1.2M
SEE DETAIL SHEET # 2J

LAT 1.2M BASE DITCH
W/1.5M BERM
W/CL 'B' RIPRAP
EST 66.9 MTONS
EST FF 206.2 SM
STA 65+70 LT TO
STA 66+14 LT -L-
EST DDE = 94.99 CM
SEE DETAIL #24

+00.000 33.528 m (110.00')

+70.000 36.576 m (120.000')

+00.000 33.528 m (110.00')

+70.000 30.480 m (100.000')

+00.000 30.480 m (100.000')

CLASS 'I' RIPRAP ON BANKS ONLY
4.5 MTONS FF=36 SM
SEE DETAIL #20

GRADE TO DRAIN

PI Sta. 10+36.030

PC Sta. CAT-10+29.325

REMOVE 600 mm CONC

1350 RCP-III

200 PVC

REMOVE 450 PIPE

SPRING BOX

JB w/Slab Lid

N 30° 44' 51.4" E

BL-40

BL-41

BL-42

-L- US 501

2GI

FS

450

375

GRAU 350

+60.901

7.92%

+76.599

S38°38'47"W 23.83

S38°26'39"W 20.548

S35°20'24"W 26.386

S35°14'50"W 15.209

S35°05'19"W 12.658

S35°37'36"W 8.870

S32°30'07"W 76.647

N85°58'46"W 184.734

S88°48'47"W 154.520

N80°29'46"W 184.734

S57°59'58"E 458.158

DRT

ISFD

GR

S

EIP

EIP

WLB

CLASS 'I' RIPRAP ON BANKS ONLY
8.5 MTONS FF=45.0 SM
SEE DETAIL #20

HW

CAT-478.406

N80°12'25"W 52.151

+92.203

SPECIAL LAT 'V' DITCH
STA 65+80 RT TO
STA 66+00 RT -L-
SEE DETAIL #6

EARTH BERM
ELEV=171.2

GEORGE RAYMOND CARTER
C DB 153 PG 163

EX. R/W @ 30.480 m (100.000')

TOE PROTECTION
STA 64+00 RT TO
STA 64+50 RT -L-
SEE DETAIL #8

+60.000 32.004 m (105.000')

+40.000 36.576 m (120.000')

CLASS 'I' RIPRAP ON BANKS ONLY
3.5 MTONS
FF=30 SM
SEE DETAIL #20

LAT 0.9M BASE DITCH
W/1.5M BERM W/PSRM
STA 64+45 RT TO
STA 65+60 RT -L-
EST DDE = 251.46 CM
SEE DETAIL #25

MONTWOOD BAPTIST CHURCH
DB 307 PG 663
BOM 12 PG 79

MARTHA B. POWELL
DB 221PG 707
DB 221PG 707
BOM 7 PG 61-3

LAT 0.6M BASE DITCH
W/1.5M BERM
STA 65+80 RT TO
STA 65+80 RT -L-
EST DDE = 29.71 CM
SEE DETAIL #16

+44.750 36.576 m (120.000')

+93.000 @ EX. R/W

CHARLES F. BROOKS
DB 204 PG 396
BOM 5 PG 566

FORCE PROTECTION INDUSTRIES, INC.
DB 641 PG 814

BEGIN CONSTRUCTION
POT STA.10+80+00.000 -Y16-

END CONSTRUCTION
POT STA.11+11.323 -Y16-

POT Sta.11+54.361

POT Sta.10+00.00

-Y16-1

N 1°34' 45.9" E

107 R

30 R

RETAIN

TIE CUL-DE-SAC DITCHES TO EXISTING 'V' DITCH

ELMER MERRITT BOWES
DB 202 PG 570

POT STA.11+00.623 -Y16-,7.88 LT
CENTER OF CUL-DE-SAC

SR 1521 HALIFAX RD 57' BSTL

EXISTING R/W

375 mm CONC

450 mm CONC

SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 35 FOR -L- PROFILE
SEE SHEET 45 FOR -DR7- PROFILE

2/20/2013
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stcjones

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METRIC
5 0 10

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	20
R /W SHEET NO.	

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL L22115 ENGINEER JOHN N. JOHNSON
2-20-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.
2/21/13

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

MATCHLINE STA. 67+20 -L- SEE SHEET 19

MATCHLINE STA. 70+80 -L- SEE SHEET 21

ROBIN EVANS WRENN
DB 205 PG 98
BOM 5 PG 615

91

2SFD

N07°39'02"E
85.344

16"CPI
3.9%/ASS

68+00

69+00

70+00

OTHER END UNKNOWN

T5-1-

CLASS 'II' RIPRAP ON BANKS ONLY EST 37.8 MTONS EST FF 59 SM SEE DETAIL #20

END WW FENCE +78.326

SPECIAL LAT 'V' DITCH STA 68+70 LT TO STA 68+77 LT -L- SEE DETAIL #6

CLASS 'B' RIPRAP EST 2.7 MTONS EST FF 8.4

+80.000 32.004 m (105.000')

+00.000 30.480 m (100.000')

+50.000 30.480 m (100.000')

+20.000 32.004 m (105.000')

1200mm WOVEN WIRE FENCE

300mm PLASTIC

89

ROBIN E. WRENN, et al
87-E-20

BEGIN WW FENCE +80.312

+80.000 39.625 m (130.003')

+00.000 42.062 m (138.000')

SPECIAL LAT 0.6M BASE DITCH STA 68+80 LT TO 69+00 LT -L- SEE DETAIL #17

+20.000 30.480 m (100.000')

+80.000 30.480 m (100.000')

PDE

2GI FS

2GI TYPE 'A' EXISTING R/W

2GI TYPE 'A'

CLASS 'B' RIPRAP EST 4.5 MTONS EST FF 11.7 SM

REMOVE

SR 1591 HALIFAX RD 58 RST

CULVERT CHANGES TO 1200 mm CONC UNDER ROAD (CHANGEOVER POINT NOT VISIBLE)

1-L2 X L2 CONC

BL-43

1350 RCP-III

300mm PLASTIC

-L-

N 30° 44' 51.4" E

US 501

BEGIN WW FENCE +01.803

BEGIN 45 LEFT TURN TAPER +07.666

CLASS 'B' RIP RAP EST 0.9 MTONS EST FF 4.2 SM

SPEC LAT V-DITCH STA 69+06 TO 69+10 -L- RT SEE DETAIL #26

END WW FENCE 99.924

CLASS 'II' RIPRAP (ON BANKS ONLY) EST 27.8 MTONS EST FF 43 SM

+00.000 36.576 m (120.000')

+06.500 39.624 m (130.000')

+40.000 32.004 m (105.000')

T5-2-

T5-3-

90

FORCE PROTECTION INDUSTRIES, INC.
DB 641 PG 814

SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 36 FOR -L- PROFILE

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	21
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON — 2-20-13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS IV — 2/21/13

METRIC 5 0 10

CONST.REV.

R/W REV.

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

EMILY BOHANNON
DB 138 PG 399
BOM II PG 34

LILLIS LOFTIS et al
DB 340 PG 113

ALISSA K. CHAPMAN
DB 119 PG 313
BOM II PG 34

FITZGERALD T. BOWES
LIFE ESTATE
DB 661 PG 440
BOM II PG 34

FRIENDSHIP FREEWILL BAPTIST CHURCH
DB 145 PG 69
BOM II PG 34

MARTHA B. POWELL
DB 123 PG 462
BOM II PG 34

D & J UPHOLSTERY
DB 255 PG 164

RICKY D. WILSON
TONYA R. WILSON
DB 668 PG 634
BOM II PG 34

STEVEN BRIGGS
DB 150 PG 38
BOM 10 PG 70
WILL BOOK 07-E-265

ROBIN E. WRENN, et al
87-E-20

U.G. SEPTIC LINE AS MARKED BY PERSON COUNTY HEALTH DEPARTMENT

MATCHLINE STA. 70+80 –L– SEE SHEET 20

MATCHLINE STA. 74+40 –L– SEE SHEET 22

SR 1521 HALIFAX RD · T.O BST

US 501

45 LEFT TURN TAPER

161 LEFT TURN STORAGE

MONOLITHIC ISLAND

GRADE TO DRAIN

1200mm WOVEN WIRE FENCE

300 mm PLASTIC

NOTE: DO NOT DISTURB TREE

ACCESS POINT

REMOVE

FORCE PROTECTION INDUSTRIES, INC.
DB 641 PG 814

SEE PAVEMENT MARKING PLANS FOR PROPOSED INTERIM STRIPING OF NORTHBOUND LANES

SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 36 FOR -L- PROFILE

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Charlotte, NC 28208
NC License Number F-0991

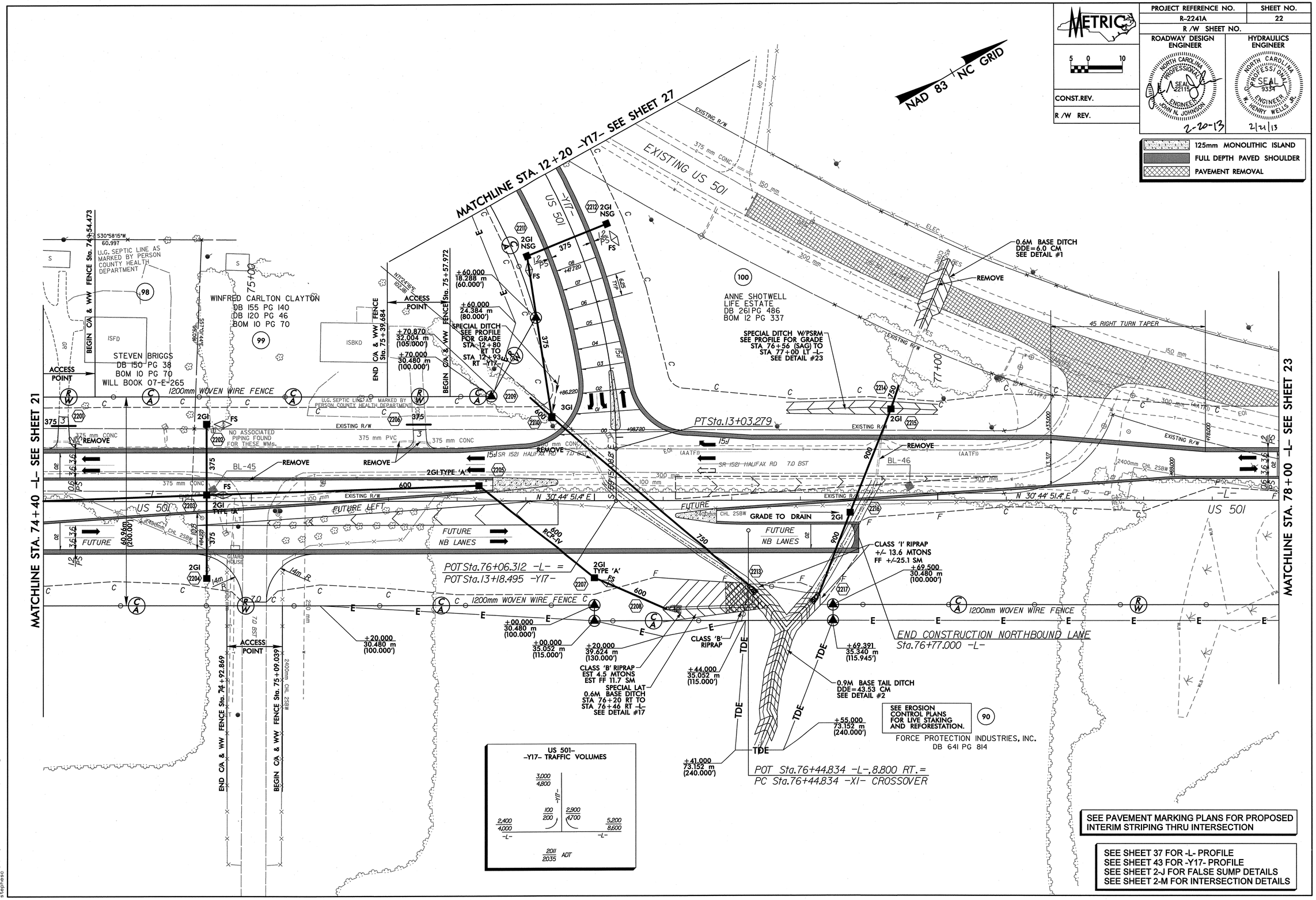
PROJECT REFERENCE NO.	SHEET NO.
R-2241A	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 22115 ENGINEER JOHN N. JOHNSON 2-20-13	NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR. 2/21/13

METRIC

CONST.REV.

R/W REV.

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL



SEE PAVEMENT MARKING PLANS FOR PROPOSED INTERIM STRIPING THRU INTERSECTION

SEE SHEET 37 FOR -L- PROFILE
SEE SHEET 43 FOR -Y17- PROFILE
SEE SHEET 2-J FOR FALSE SUMP DETAILS
SEE SHEET 2-M FOR INTERSECTION DETAILS

2/20/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	23
R /W SHEET NO.	

METRIC

5 0 10

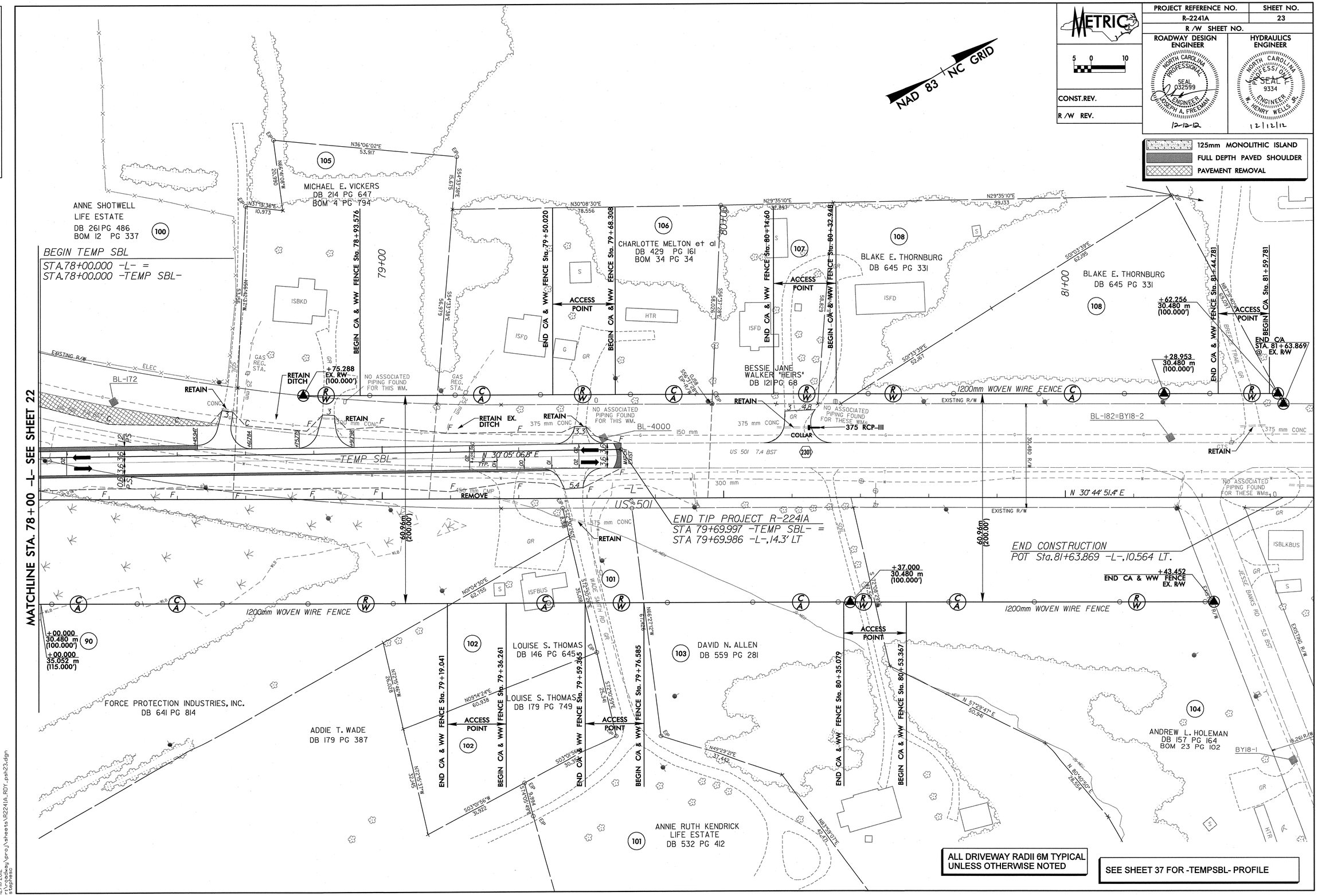
CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
12-12-12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
12/12/12

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL



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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	24
R/W SHEET NO.	

METRIC

5 0 10

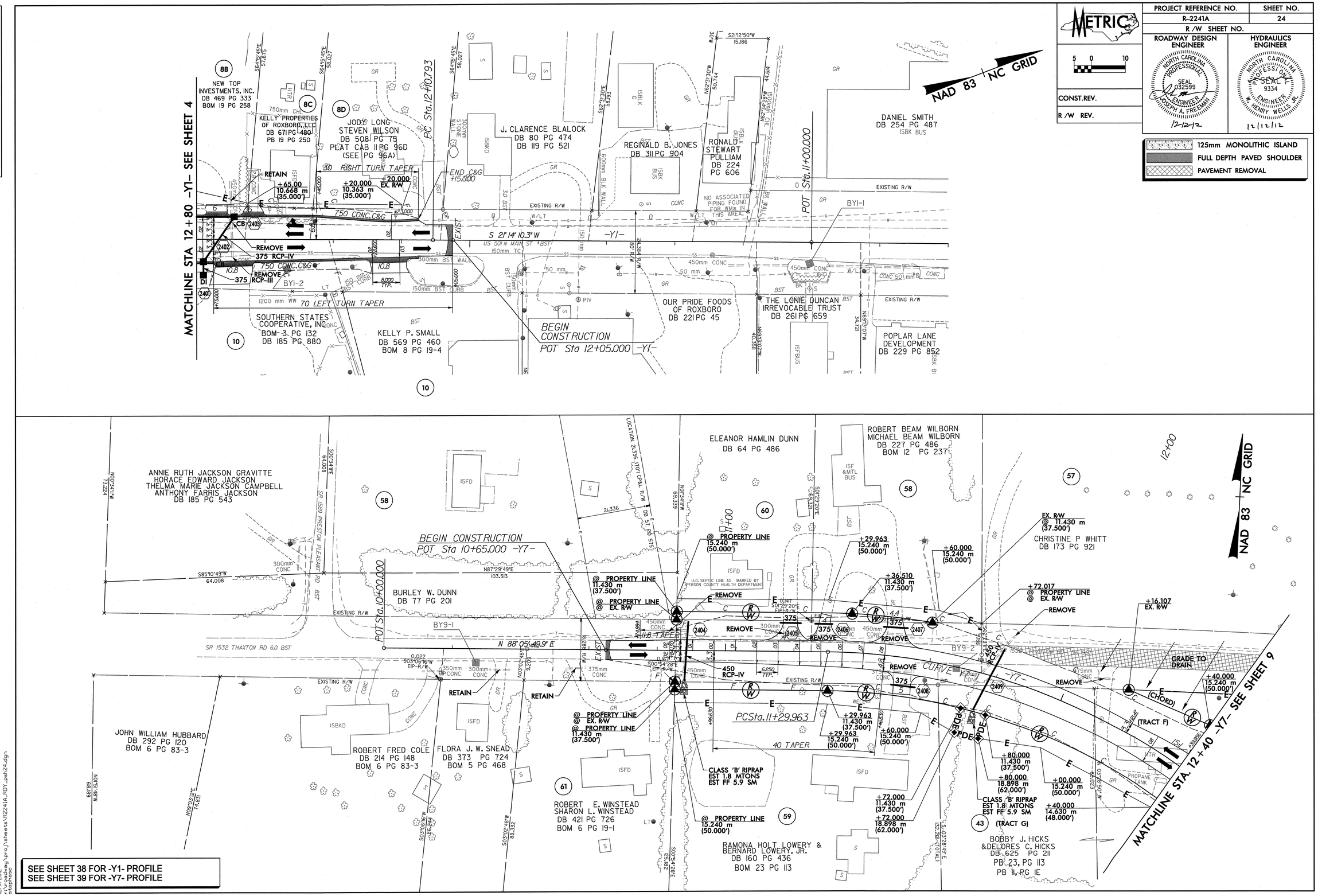
CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
12-12-12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR.
12/12/12

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL



SEE SHEET 38 FOR -Y1- PROFILE
SEE SHEET 39 FOR -Y7- PROFILE

12/11/2012
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NC License Number F-0991

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	25
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 02-04-13

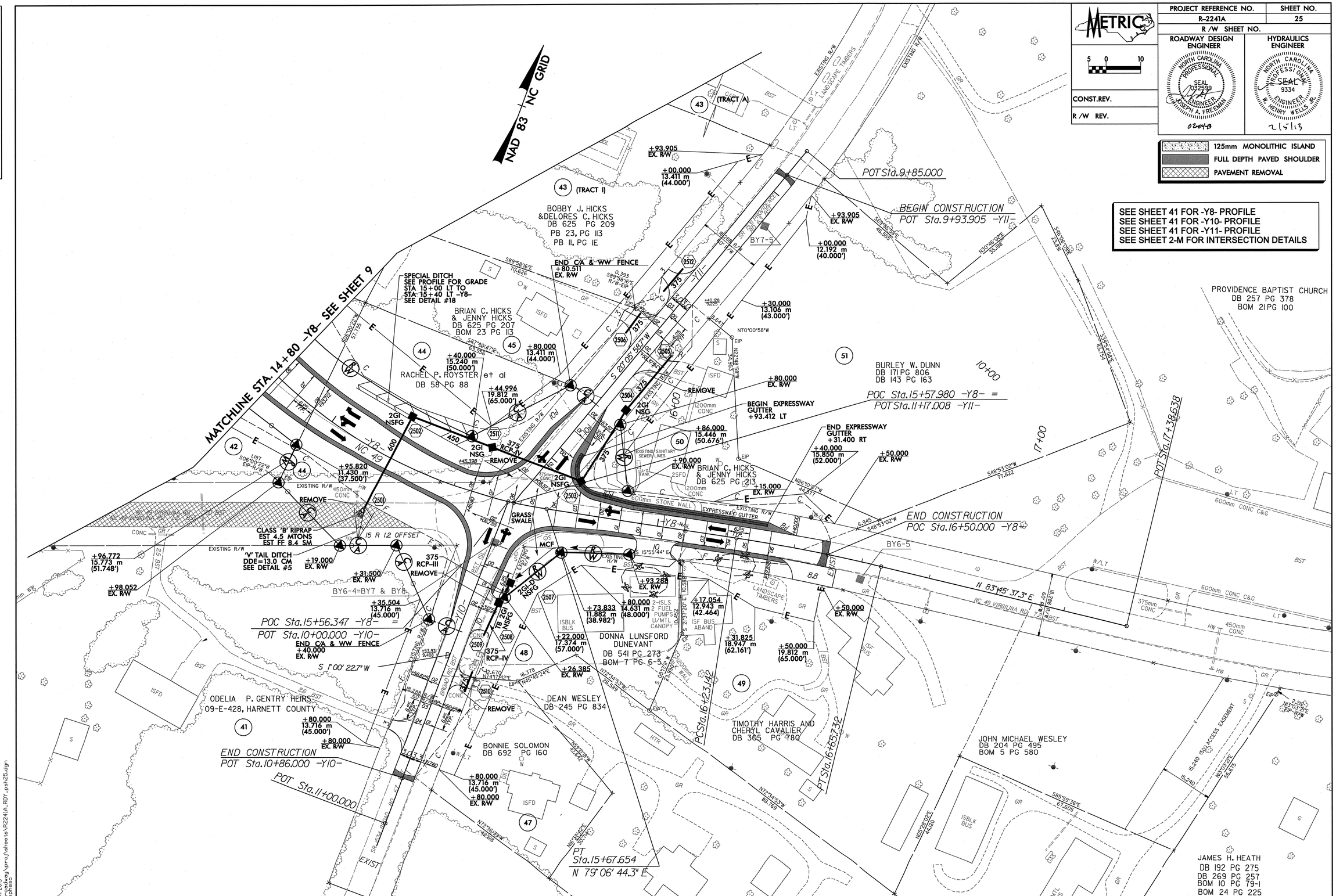
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR. 2/5/13

CONST.REV.

R/W REV.

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

SEE SHEET 41 FOR -Y8- PROFILE
SEE SHEET 41 FOR -Y10- PROFILE
SEE SHEET 41 FOR -Y11- PROFILE
SEE SHEET 2-M FOR INTERSECTION DETAILS



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NC License Number C-0991

METRIC

5 0 10

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	27
R /W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032598 ENGINEER JOSEPH A. FREEMAN
12/12/12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
12/12/12

125mm MONOLITHIC ISLAND
FULL DEPTH PAVED SHOULDER
PAVEMENT REMOVAL

NAD 83 NC GRID

RANDALL M. THOMPSON
DB 199 PG 718

N88°10'25"E
53.85

S74°28'35"E
73.762

EIP

N28°03'28"W
118.448

ISBK CHURCH
KINGDOM HALL

BST
JEHOVAH'S WITNESS TRUTEES
DB 205 PG 263
BOM 5 PG 639

BEGIN CONSTRUCTION
POT Sta.10+70.00 -Y17-

POT Sta.10+00.000

4.3 BST

BK S

EXISTING R/W

300 mm CONC

450 mm CONC

BY17-14

150 mm

US 501 7.4 BST

100 R/W

30.480 R/W

GTS

N 61° 51' 42.1" E

300 mm

0.91
N28°23'04"W
R/W-EIP

0.329
N28°20'44"W
R/W-REBAR

REBAR

NO ASSOCIATED PIPING FOUND FOR THIS WM.

HUBERT A. DAVIS
DB 143 PG 96
DB 125 PG 308
BOM 11 PG 34

SHERRY P. BRANN
DB 321 PG 79

ISBKD

STOWS

GR

N28°23'04"W
69.130

N28°20'44"W
80.520

HUGH A. BLANKS
DB 254 PG 127
BOM 13 PG 4

ISFD

S

B

N61°39'16"E
15.240

N28°20'44"W
21.642

0.620
N28°23'34"W
EIP-R/W COR

0.06
N44°42'18"E
EIP-R/W

18.306 R/W
60.06' R/W

EXISTING R/W

18.288 R/W
60' R/W

RICKY D. WILSON AND WIFE
TONYA R. WILSON
DB 688 PG 634

11+00

ANNE SHOTWELL
LIFE ESTATE
DB 261 PG 486
BOM 12 PG 337

2SFD

12+00

W/LT

100

PC Sta.11+33.700

BY17-14

-Y17-

+69.000
+69.620
+69.375
+68.875
+68.250
+68.875
+68.875
+69.037
+69.375
+69.875

150 mm
6.25 TYP.

300 mm

4.8

12 PS

+33.700
@ EX. R/W

50 TAPER

45 RIGHT TURN TAPER

BEGIN C/A & WW FENCE
±00.000 RT

±00.000
18.288 m
(60.000')

±20.000
24.384 m
(80.000')

ANNE SHOTWELL
LIFE ESTATE
DB 261 PG 486
BOM 12 PG 337

N71°25'16"E
24.079

S59°01'44"E
16.017

S30°58'17"W
30.336

270

375

7.3

6.0 R

US 501 7.4 BST

MATCHLINE STA. 12+20 -Y17- SEE SHEET 22

SEE SHEET 43 FOR -Y17- PROFILE

12/11/2012
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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	28

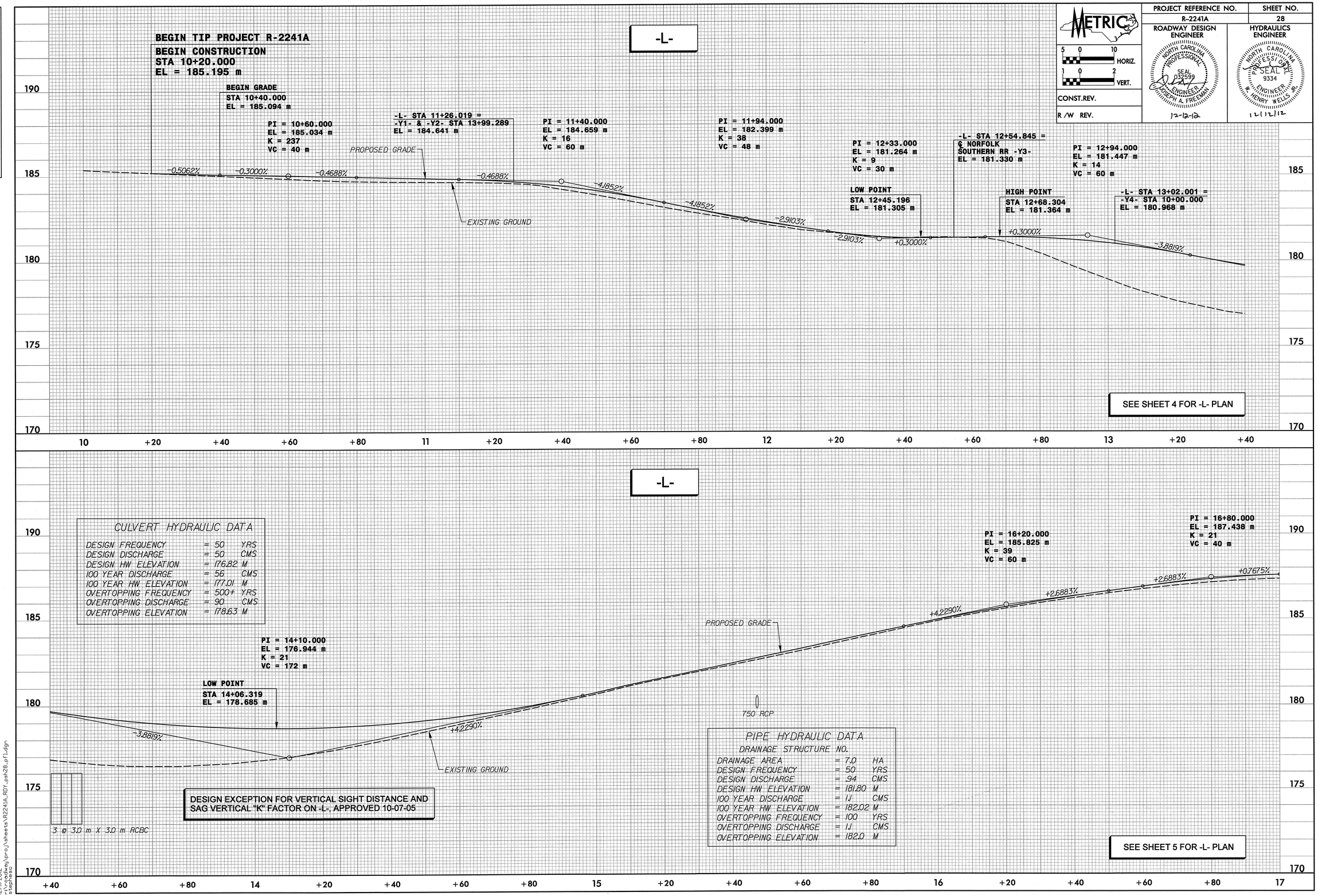
METRIC

5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.
R /W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
12-12-12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
12/12/12



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METRIC
5 0 10 HORIZ.
1 0 2 VERT.
CONST.REV.
R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	29

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
02-04-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR.
2/5/13

-L-

-L- STA 17+38.929 =
-Y5- STA 10+02.485
EL = 187.470 m

PI = 17+20.000
EL = 187.745 m
K = 18
VC = 40 m

PI = 17+60.000
EL = 187.165 m
K = 20
VC = 40 m

-L- STA 18+16.673 =
-Y6- STA 11+60.408
EL = 185.252 m

PI = 18+20.000
EL = 185.098 m
K = 91
VC = 60 m

PI = 19+10.000
EL = 182.594 m
K = 78
VC = 100 m

HIGH POINT
STA 17+13.844
EL = 187.645 m

LOW POINT
STA 20+53.852
EL = 178.452 m

+0.7675% -1.4500% -1.4500% -3.4450% -3.4450% -2.7822% -2.7822% -4.0639% -4.0639%

PROPOSED GRADE
EXISTING GROUND

PROPOSED UNDERCUT

BEGIN LAT. BASE DITCH -L- STA.19+60.00 RT EL.177.85
PI =19+80.000 ET = 176.850
PI =20+00.000 ET = 176.300
PI =20+40.000 ET = 176.100
PI =20+60.000 ET = 175.900
(-) 5.0000% (-) 2.7500% (-) 0.5000% (-) 5.0000%

SEE SHEET 6 FOR -L- PLAN

17 +20 +40 +60 +80 18 +20 +40 +60 +80 19 +20 +40 +60 +80 20 +20 +40 +60

-L-

CULVERT HYDRAULIC DATA

DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 24.3	CMS
DESIGN HW ELEVATION	= 175.59	M
100 YEAR DISCHARGE	= 28.0	CMS
100 YEAR HW ELEVATION	= 175.90	M
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 43.0+	CMS
OVERTOPPING ELEVATION	= 178.45	M

END LAT. BASE DITCH -L- STA.20+80.00 RT EL.177.70

PI = 20+90.000
EL = 175.279 m
K = 21
VC = 240 m

PI = 23+60.000
EL = 195.712 m
K = 24
VC = 170 m

+0.4928% +1.5678% +1.5678% -4.0639% (-) 17.0000%

PROPOSED GRADE
EXISTING GROUND

2 @ 2.4 m X 2.4 m RCBC

SEE SHEET 7 FOR -L- PLAN

+60 +80 21 +20 +40 +60 +80 22 +20 +40 +60 +80 23 +20 +40 +60 +80 24 +20

2/4/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	30

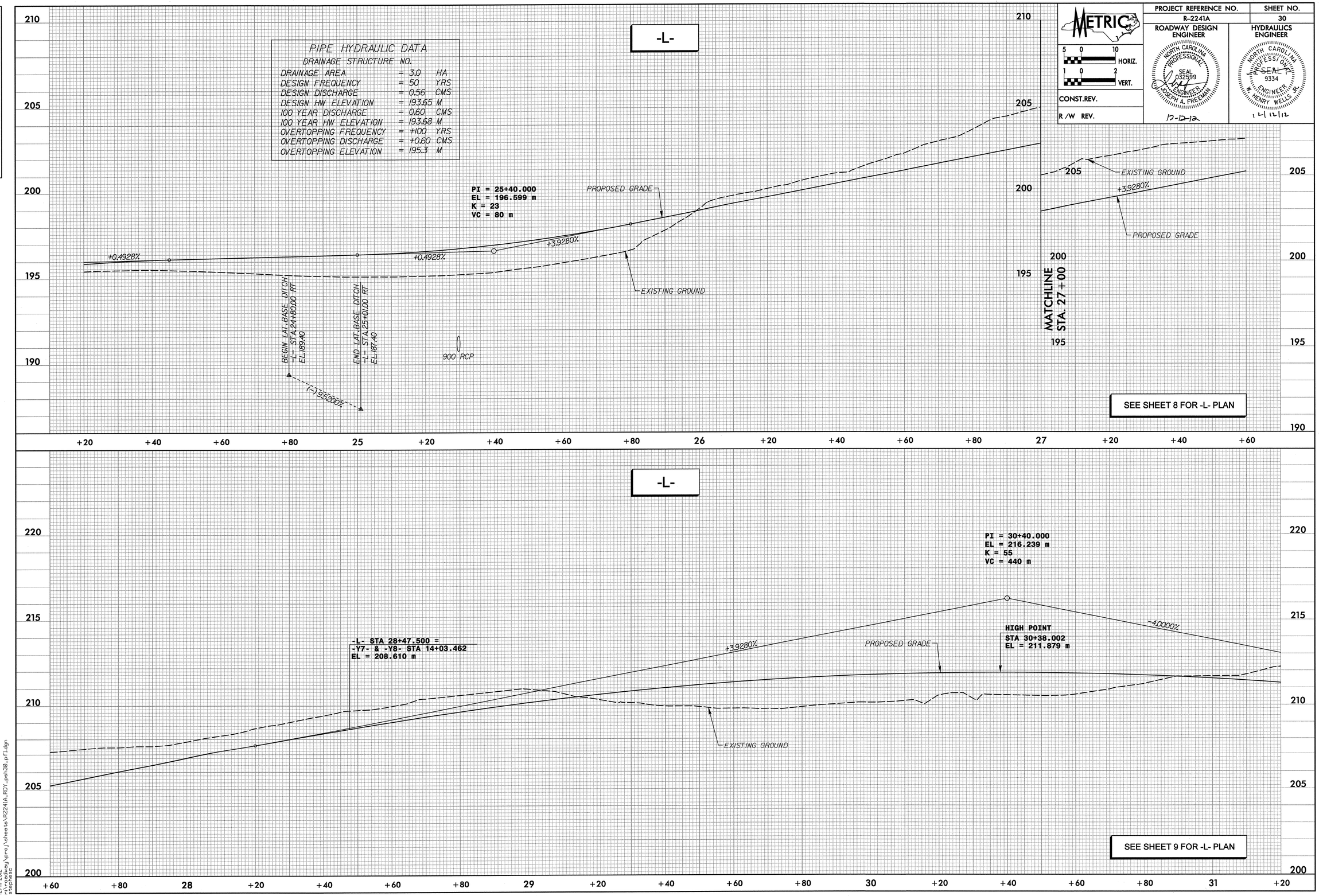
METRIC

5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.
R/W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
12-12-12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
12/12/12



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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	31

METRIC

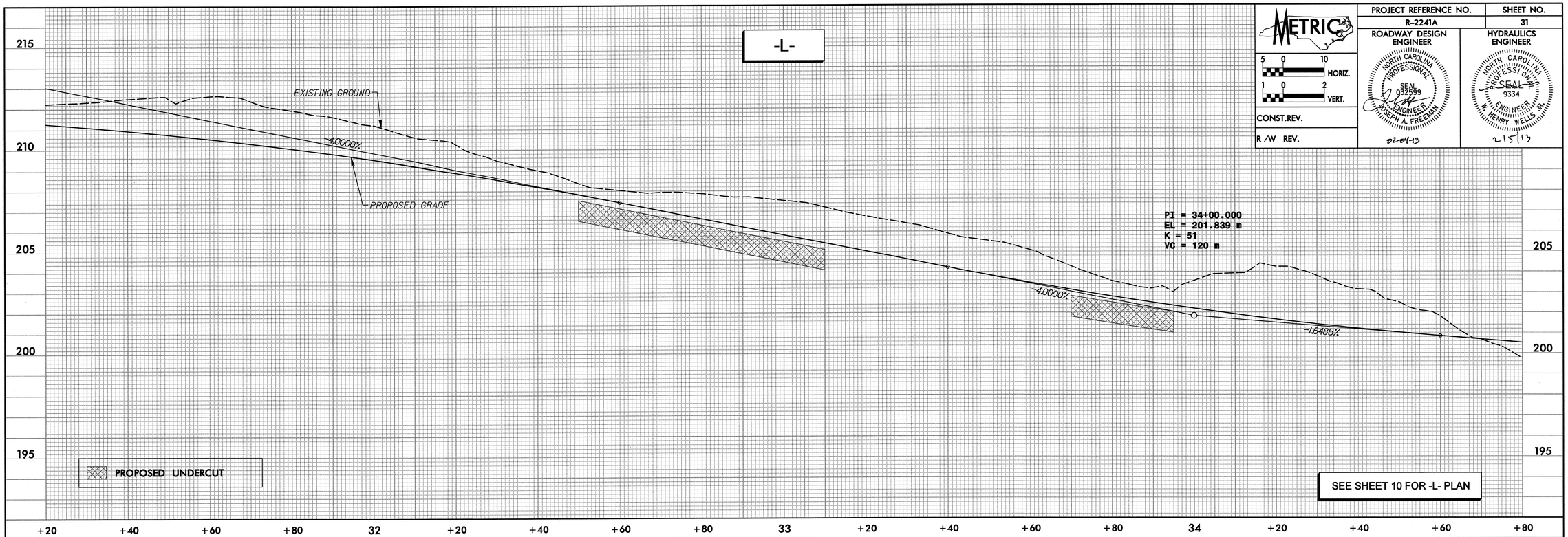
5 0 10 HORIZ.
1 0 2 VERT.

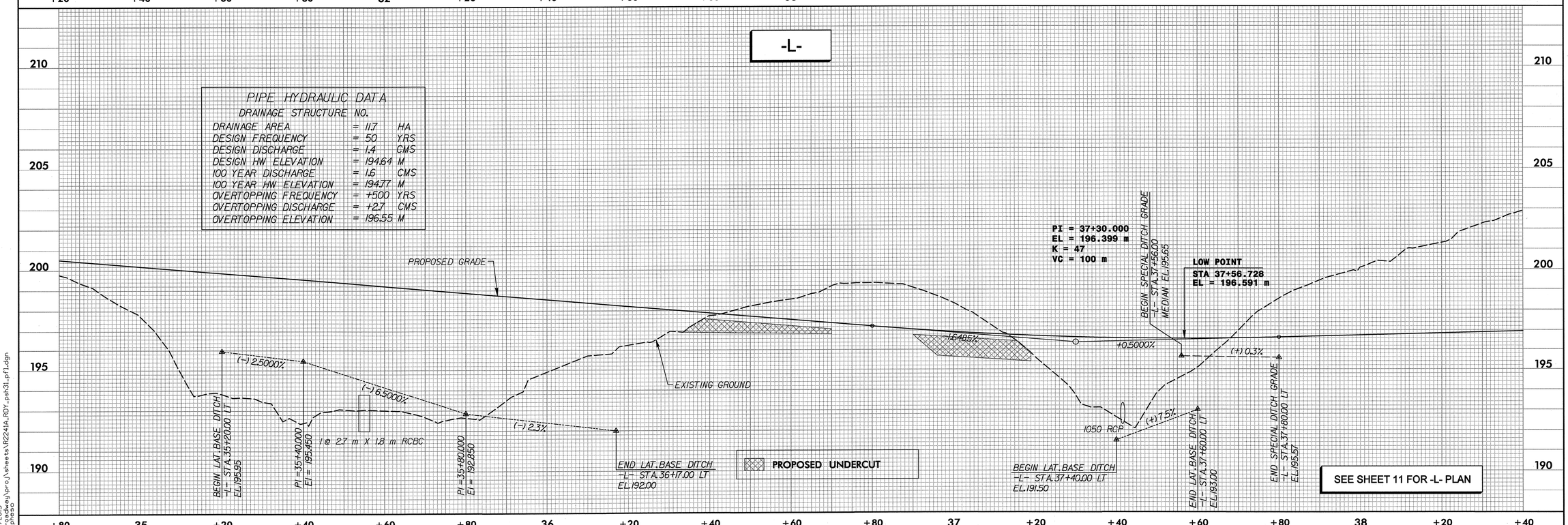
CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
02-04-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
2/5/13





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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	32

METRIC

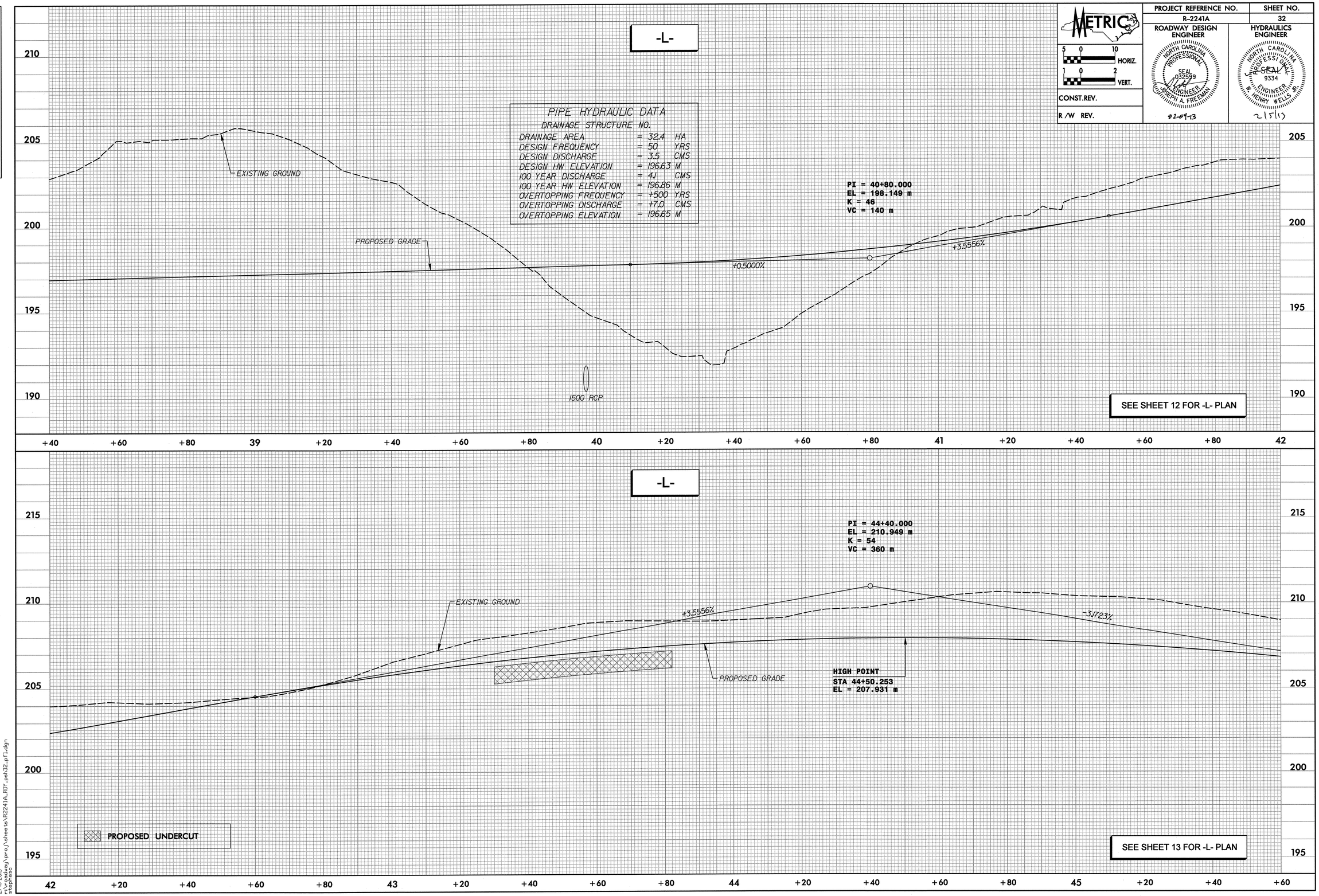
5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
02-04-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
2/5/13



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NC License Number F-0991

METRIC	PROJECT REFERENCE NO.	SHEET NO.
5 0 10 HORIZ.	R-2241A	33
1 0 2 VERT.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 2/4/13	NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR. 2/5/13
R /W REV.		

-L-

-3.17123%

PROPOSED GRADE

BEGIN SPECIAL LAT. 'V' DITCH
-L- STA 46+60.000 LT
EL 201.80

PI = 46+80.000
EL = 201.400

END SPECIAL LAT. 'V' DITCH
-L- STA 46+92.000 LT
EL 201.45

-L- STA 47+01.527 =
-Y12- & -Y13- STA 11+25.696
EL = 202.653 m

PI = 47+40.000
EL = 201.432 m
K = 72
VC = 60 m

-3.17123%

-4.00000%

(-) 2.00%

(+) 0.42%
900 RCP

(-) 5.25%

(-) 4.06%

EXISTING GROUND

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 6.0	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1.02	CMS
DESIGN HW ELEVATION	= 202.21	M
100 YEAR DISCHARGE	= 1.18	CMS
100 YEAR HW ELEVATION	= 202.30	M
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 1.18	CMS
OVERTOPPING ELEVATION	= 202.38	M

BEGIN SPECIAL LAT. 'V' DITCH
-L- STA 46+40.000 RT
EL 201.50

PI = 46+60.000
EL = 200.450

END SPECIAL LAT. 'V' DITCH
-L- STA 46+76.000 RT
EL 199.80

PROPOSED UNDERCUT

SEE SHEET 14 FOR -L- PLAN

-L-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 14.2	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1.96	CMS
DESIGN HW ELEVATION	= 188.61	M
100 YEAR DISCHARGE	= 2.28	CMS
100 YEAR HW ELEVATION	= 188.82	M
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= +3.89	CMS
OVERTOPPING ELEVATION	= 192.47	M

PI = 49+80.000
EL = 191.832 m
K = 47
VC = 220 m

LOW POINT
STA 50+58.128
EL = 192.469 m

BEGIN LAT. BASE DITCH
-L- STA 50+81.00 LT
EL 188.8

PROPOSED GRADE

+0.67777%

4.00000%

(-) 4.79%

BEGIN SPECIAL DITCH GRADE
-L- STA 49+80.00 RT
EL 191.91

END SPECIAL DITCH GRADE
-L- STA 50+00.00 RT
EL 190.95

1200 RCP

(-) 9.57%

EXISTING GROUND

END LAT. BASE DITCH
-L- STA 51+04.00 LT
EL 186.60

750 RCP

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 4.2	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.79	CMS
DESIGN HW ELEVATION	= 191.83	M
100 YEAR DISCHARGE	= .91	CMS
100 YEAR HW ELEVATION	= 191.95	M
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 0.91	CMS
OVERTOPPING ELEVATION	= 191.97	M

PI = 52+80.000
EL = 193.865 m
K = 62
VC = 120 m

HIGH POINT
STA 52+61.694
EL = 193.600 m

PROPOSED UNDERCUT

SEE SHEET 15 FOR -L- PLAN

2/4/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	34

METRIC

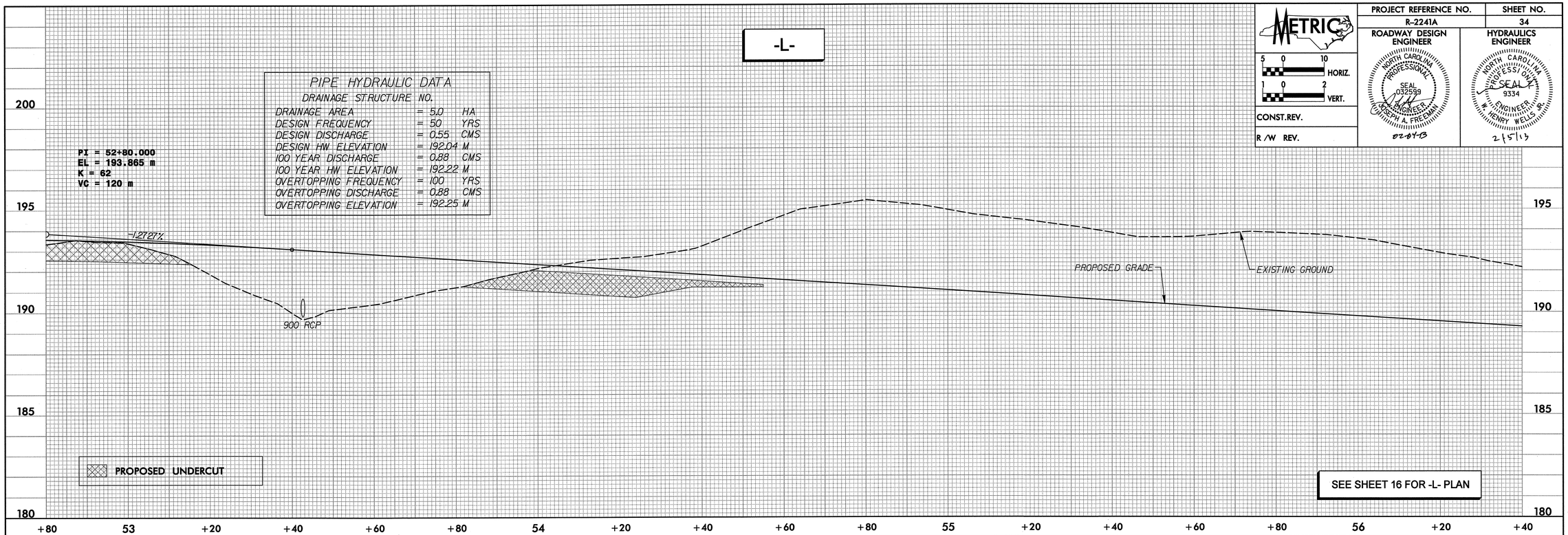
5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
02-04-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
2/5/13



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NC License Number: C-2991

METRIC

5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	35

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN

02-01-13

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.

2/5/13

PI = 60+20.000
EL = 193.641 m
K = 54
VC = 290 m

-L- STA 60+75.808 =
-Y14- & -Y15- STA 11+22.580
EL = 190.908 m

-L-

+1.7884%

-3.5772%

EXISTING GROUND

PROPOSED GRADE

PROPOSED UNDERCUT

SEE SHEET 18 FOR -L- PLAN

195 190 185 180 175

60 +20 +40 +60 +80 61 +20 +40 +60 +80 62 +20 +40 +60 +80 63 +20 +40 +60

-L-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 18.3	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 2.52	CMS
DESIGN HW ELEVATION	= 171.08	M
100 YEAR DISCHARGE	= 2.92	CMS
100 YEAR HW ELEVATION	= 171.20	M
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 2.92	CMS
OVERTOPPING ELEVATION	= 171.2	M

PI = 67+00.000
EL = 169.316 m
K = 45
VC = 60 m

(-) 5.75%

(-) 3.50%

(-) 11.50%

(-) 3.00%

(-) 2.47%

(+) 0.3509%

(-) 3.38%

(-) 3.57%

3.5772%

-2.2325%

EXISTING GROUND

PROPOSED GRADE

BEGIN SPECIAL LAT. 'V' DITCH -L- STA.63+80.00 LT EL.179.15

PI =64+00.000 EI = 178.000

PI =64+40.000 EI = 176.600

BEGIN LAT. BASE DITCH -L- STA.64+45.00 RT EL.172.42

BEGIN LAT. BASE DITCH -L- STA.64+50.00 LT EL.175.45

PI =64+80.000 EI = 172.000

PI =65+20.000 EI = 170.800

1350 RCP

PI =65+43.000 EI = 170.000

BEGIN LAT. BASE DITCH -L- STA.65+70.00 LT EL.169.11

END LAT. BASE DITCH -L- STA.66+00.00 RT EL.170.20

PI =66+00.000 EI = 168.100

END LAT. BASE DITCH -L- STA.66+14.00 LT EL.167.16

SEE SHEET 19 FOR -L- PLAN

185 180 175 170 165

60 +80 64 +20 +40 +60 +80 65 +20 +40 +60 +80 66 +20 +40 +60 +80 67 +20

2/4/2013
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METRIC

5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.

R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	36

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032698 ENGINEER JOSEPH A. FREEMAN

2/04/13

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR.

2/5/13

-L-

PI = 67+80.000
EL = 167.530 m
K = 47
VC = 80 m

LOW POINT
STA 68+43.380
EL = 167.261 m

PI = 68+80.000
EL = 167.010 m
K = 45
VC = 120 m

PI = 69+80.000
EL = 169.159 m
K = 112
VC = 60 m

PI = 70+60.000
EL = 170.448 m
K = 49
VC = 80 m

-2.2325%
-0.5200%
+2.1490%
+1.6113%
+3.2333%
PROPOSED GRADE
EXISTING GROUND
1350 RCP
(-) 0.71%
(+) 1.50%
(+) 5.0%

BEGIN SPECIAL LAT. 'V' DITCH -L- STA 68+70.00 LT EL 164.65
END SPECIAL LAT. 'V' DITCH -L- STA 68+77.00 LT EL 164.6
BEGIN LAT. BASE DITCH -L- STA 68+80.00 LT EL 164.45
END LAT. BASE DITCH -L- STA 69+00.00 LT EL 164.80
BEGIN SPECIAL LAT. 'V' DITCH -L- STA 69+06.00 RT EL 165.30
END SPECIAL LAT. 'V' DITCH -L- STA 69+10.00 RT EL 165.50

PROPOSED UNDERCUT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 22.7	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 2.83	CMS
DESIGN HW ELEVATION	= 166.06	M
100 YEAR DISCHARGE	= 3.26	CMS
100 YEAR HW ELEVATION	= 166.30	M
OVERTOPPING FREQUENCY	= +200	YRS
OVERTOPPING DISCHARGE	= +4.28	CMS
OVERTOPPING ELEVATION	= 167.26	M

SEE SHEET 20 FOR -L- PLAN

-L-

PI = 72+10.000
EL = 175.298 m
K = 52
VC = 220 m

HIGH POINT
STA 72+68.765
EL = 174.470 m

+3.2333%
-0.9816%
PROPOSED GRADE
EXISTING GROUND

PROPOSED UNDERCUT

SEE SHEET 21 FOR -L- PLAN

2/4/2013
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METRIC
5 0 10 HORIZ.
1 0 2 VERT.
CONST.REV.
R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	37

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
02-04-13

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR.
2/5/13

-L-

PI = 74+60.000
EL = 172.844 m
K = 294
VC = 80 m

PI = 75+80.000
EL = 171.340 m
K = 88
VC = 60 m

-L- STA 76+06.312 =
-Y17- STA 13+18.495
EL = 171.190 m

PI = 76+60.000
EL = 170.880 m
K = 54
VC = 70 m

LOW POINT
STA 76+56.202
EL = 170.992 m

END CONSTRUCTION NORTHBOUND LANE
-L- STA. 76+77.000
EL = 171.029 m

END CONSTRUCTION PERM. SOUTHBOUND LANE
-L- STA. 78+00.000
EL = 171.881 m

PROPOSED GRADE
EXISTING GROUND
-0.9816%
-1.2533%
-1.2533%
-0.5750%
-0.5750%
+0.7150%
(-) 0.33%
(+) 2.00%
3:1 TIE TO EXIST ROAD
0.00%

BEGIN LAT. BASE DITCH
-L- STA 76+20.00 RT
EL 168.45

END LAT. BASE DITCH
-L- STA 76+46.00 RT
EL 168.45

BEGIN SPECIAL DITCH GRADE
-L- STA 76+56.00 LT
EL 169.70

PI =76+86.000
EL = 169.600

END SPECIAL DITCH GRADE
-L- STA 77+00.00 LT
EL 169.88

PROPOSED UNDERCUT

SEE SHEET 22 FOR -L- PLAN

-TEMPSBL-

BEGIN GRADE
-TEMPSBL- STA 78+00.000 =
-L- STA 78+00.00 OFF 12.400 EOP
EL = 171.773 m

PI = 78+40.000
EL = 172.059 m
K = 61
VC = 80 m

HIGH POINT
STA 78+43.617
EL = 171.929 m

PI = 79+10.000
EL = 171.641 m
K = 48
VC = 60 m

LOW POINT
STA 79+08.596
EL = 171.735 m

END GRADE
-TEMSBL- STA. 79+69.997
EL = 172.034 m

PROPOSED GRADE
EXISTING GROUND
+0.7150%
-0.5964%
-0.5964%
+0.6550%

SEE SHEET 23 FOR -TEMPSBL- PLAN

2/4/2013
11:24:44
stephens
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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	38

METRIC

5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER NORTH A. FREEMAN
12-12-12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
12/12/12

-Y1-

BEGIN CONSTRUCTION
-Y1- STA 12+05.000
EL = 179.179 m

BEGIN GRADE
-Y1- STA 12+15.000
EL = 179.527 m

PI = 12+40.000
EL = 180.390 m
K = 72
VC = 50 m

PI = 13+60.000
EL = 183.700 m
K = 123
VC = 50 m

END GRADE
-Y1- STA 13+88.749 =
-L- STA 11+31.504 OFF 9.000 EOP
EL = 184.376 m

+3.4520%
+2.7583%
+2.7583%
+2.3514%
PROPOSED GRADE
EXISTING GROUND

SEE SHEETS 4 & 24 FOR -Y1- PLAN

-Y2-

-L- STA 11+26.019 ℄ -L-
EL = 184.646 m

BEGIN GRADE
-Y2- STA. 14+10.883 =
-L- STA. 11+19.985 OFF 9.900 EOP
EL = 184.923 m

END GRADE
-Y2- STA. 14+60.000
EL = 186.433 m

END CONSTRUCTION
-Y2- STA. 14+75.000
EL = 186.800 m

+2.3892%
+3.0743%
PROPOSED GRADE
EXISTING GROUND

SEE SHEET 4 FOR -Y2- PLAN

-Y4-

BEGIN GRADE
-Y4- STA. 10+10.318 =
-L- STA. 13+00.453 OFF 10.200 EOP
EL = 181.046 m

PI = 10+26.000
EL = 180.732 m
K = 11
VC = 28 m

PI = 10+80.000
EL = 178.277 m
K = 22
VC = 80 m

END GRADE
-Y4- STA. 11+20.000
EL = 177.937 m

END CONSTRUCTION
-Y4- STA. 11+30.000
EL = 177.838 m

-2.0023%
-4.5463%
-4.5463%
-0.8500%
PROPOSED GRADE
EXISTING GROUND

SEE SHEET 4 FOR -Y4- PLAN

12/11/2012
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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	39

METRIC

5 0 10 HORIZ.
1 0 2 VERT.

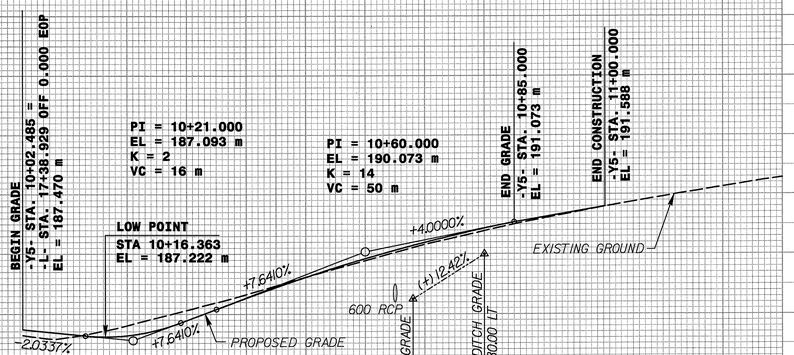
CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
12/12/12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
12/12/12

-Y5-

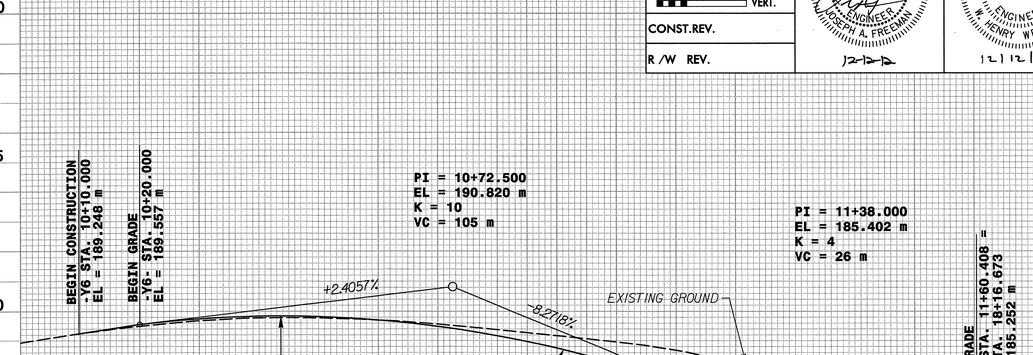


PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 2.4	HA
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 0.54	CMS
DESIGN HW ELEVATION	= 189.14	M
100 YEAR DISCHARGE	= 0.64	CMS
100 YEAR HW ELEVATION	= 189.34	M
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 0.64	CMS
OVERTOPPING ELEVATION	= 189.30	M

SEE SHEET 6 FOR -Y5- PLAN

-Y6-



SEE SHEET 6 FOR -Y6- PLAN

-Y7-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

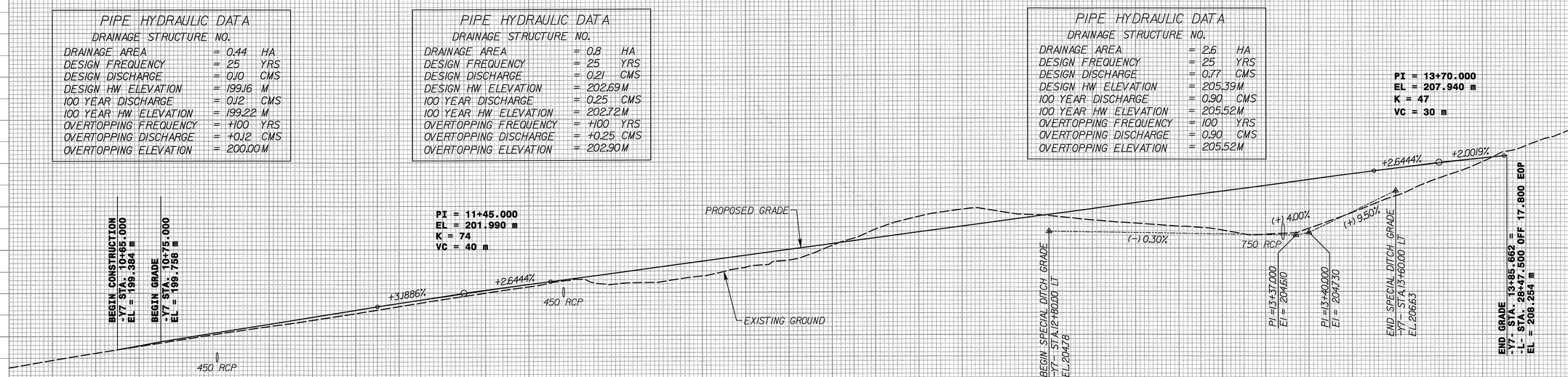
DRAINAGE AREA	= 0.44	HA
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 0.10	CMS
DESIGN HW ELEVATION	= 199.16	M
100 YEAR DISCHARGE	= 0.12	CMS
100 YEAR HW ELEVATION	= 199.22	M
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 0.12	CMS
OVERTOPPING ELEVATION	= 200.00	M

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 0.8	HA
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 0.21	CMS
DESIGN HW ELEVATION	= 202.69	M
100 YEAR DISCHARGE	= 0.25	CMS
100 YEAR HW ELEVATION	= 202.72	M
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 0.25	CMS
OVERTOPPING ELEVATION	= 202.90	M

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 2.6	HA
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 0.77	CMS
DESIGN HW ELEVATION	= 205.39	M
100 YEAR DISCHARGE	= 0.90	CMS
100 YEAR HW ELEVATION	= 205.52	M
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 0.90	CMS
OVERTOPPING ELEVATION	= 205.52	M



SEE SHEETS 9 & 24 FOR -Y7- PLAN

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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	40

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NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
12-12-12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.
12/12/12

METRIC
5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.

R/W REV.

-Y9-

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 0.70	HA
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 0.21	CMS
DESIGN HW ELEVATION	= 208.49	M
100 YEAR DISCHARGE	= 0.24	CMS
100 YEAR HW ELEVATION	= 208.52	M
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 0.24	CMS
OVERTOPPING ELEVATION	= 208.5	M

BEGIN GRADE
-Y9- STA 10+04.500 =
-Y7- STA 12+59.184 OFF 4.500 EOP
EL = 205.314

PI = 10+25.000
EL = 206.339 m
K = 10
VC = 40 m

PI = 10+80.000
EL = 206.779 m
K = 20
VC = 52 m

PI = 11+46.000
EL = 209.032 m
K = 28
VC = 80 m

PI = 12+30.000
EL = 209.452 m
K = 37
VC = 40 m

+5.0000%
+0.8000%
+0.8000%
+3.4129%
+3.4129%
+0.5000%
+0.5000%
+1.5697%
(+) 2.69%
(+) 2.28%
450 RCP
PROPOSED GRADE
EXISTING GROUND

BEGIN SPECIAL DITCH GRADE -Y9- STA/I+66.00 RT EL 208.00

BEGIN SPECIAL DITCH GRADE -Y9- STA/I+66.00 LT EL 207.30

END SPECIAL DITCH GRADE -Y9- STA/I+90.00 LT EL 207.85

END SPECIAL DITCH GRADE -Y9- STA/I+90.00 RT EL 208.65

SEE SHEETS 9 &10 FOR -Y9- PLAN

10 +20 +40 +60 +80 11 +20 +40 +60 +80 12 +20 +40 +60 +80 13 +20 +40 +60

220 215 210 205 200

-Y9-

PI = 14+30.000
EL = 212.591 m
K = 27
VC = 118 m

HIGH POINT
STA 14+13.062
EL = 211.995 m

PI = 15+80.000
EL = 208.340 m
K = 18
VC = 120 m

LOW POINT
STA 15+71.670
EL = 209.308 m

END GRADE
-Y9- STA 16+70.000
EL = 211.713 m

END CONSTRUCTION
-Y9- STA 16+85.000
EL = 212.188 m

+1.5697%
-2.8340%
-2.8340%
PROPOSED GRADE
EXISTING GROUND
(+) 2.00%
+3.7478%
(+) 2.50%
(+) 3.80%

BEGIN SPECIAL DITCH GRADE -Y9- STA/J+90.00 RT EL 208.30

PI =6+100.000 EL = 208.500

PI =6+120.000 EL = 209.000

END SPECIAL DITCH GRADE -Y9- STA/I6+40.00 RT EL 209.76

SEE SHEETS 10 & 26 FOR -Y9- PLAN

+60 +80 14 +20 +40 +60 +80 15 +20 +40 +60 +80 16 +20 +40 +60 +80 17 +20

220 215 210 205 200

12/11/202
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METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	41

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
12-12-12

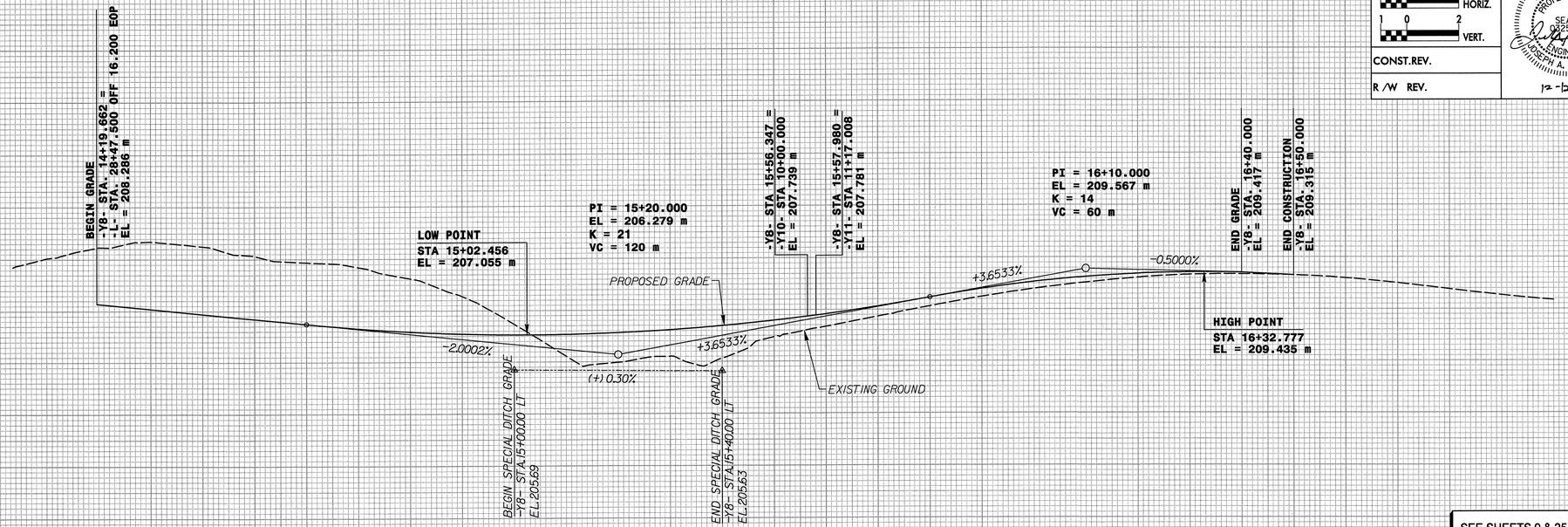
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
12/12/12

5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.

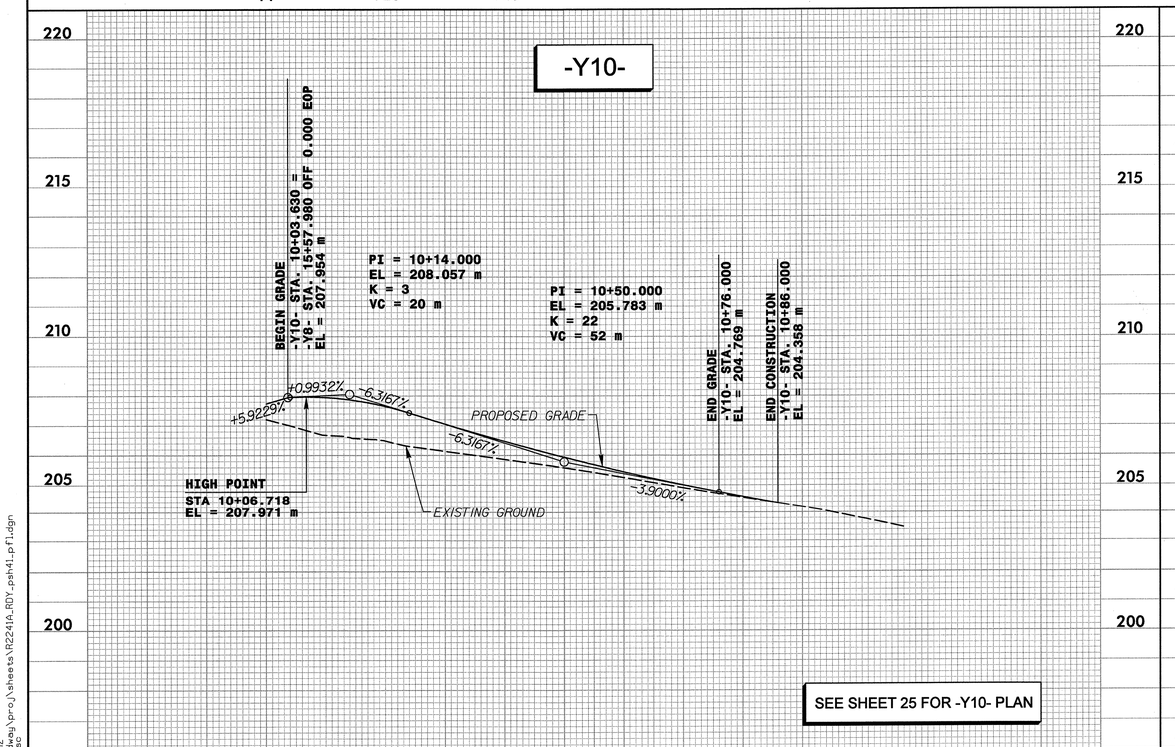
R/W REV.

-Y8-



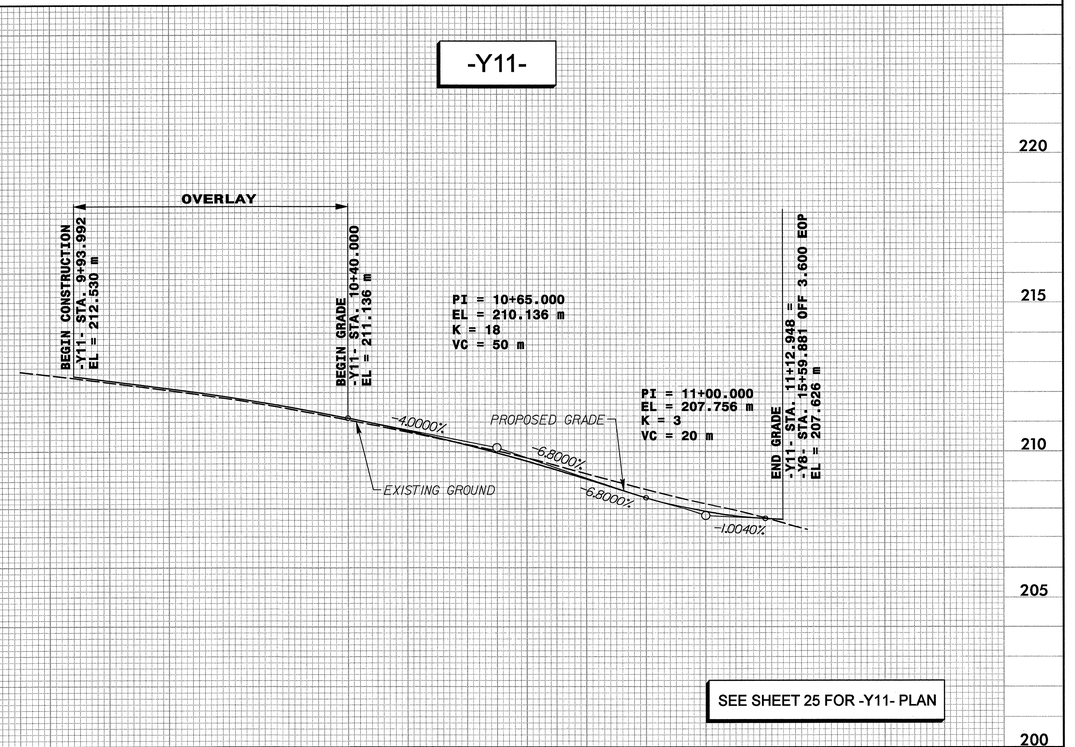
SEE SHEETS 9 & 25 FOR -Y8- PLAN

-Y10-



SEE SHEET 25 FOR -Y10- PLAN

-Y11-



SEE SHEET 25 FOR -Y11- PLAN

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METRIC	PROJECT REFERENCE NO.	SHEET NO.
5 0 10 HORIZ. 1 0 2 VERT.	R-2241A	42
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R /W REV.	NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 12/12/12	NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR. 12/12/12

-Y13-

BEGIN GRADE
-Y13- STA. 11+41.332 =
-L- STA. 46+98.820 OFF 15.400 EOP
EL = 202.571 m

PI = 11+60.000
EL = 202.310 m
K = 27
VC = 30 m

LOW POINT
STA 12+29.521
EL = 201.241 m

PI = 12+45.000
EL = 200.160 m
K = 22
VC = 140 m

END GRADE
-Y13- STA. 13+25.000
EL = 203.283 m

-1.3981%
-2.5294%
-2.5294%
+3.9657%
+3.9657%
+3.4700%
PROPOSED GRADE
EXISTING GROUND
900 RCP
900 RCP
600 RCP

SEE SHEET 14 FOR -Y13- PLAN

-Y12-

BEGIN CONSTRUCTION
-Y12- STA. 10+20.000
EL = 206.818 m

BEGIN GRADE
-Y12- STA. 10+30.000
EL = 206.439 m

PI = 10+50.000
EL = 205.555 m
K = 17
VC = 40 m

PI = 11+00.000
EL = 202.143 m
K = 2
VC = 20 m

END CONSTRUCTION
-Y12- STA. 11+10.060 =
-L- STA. 47+04.233 OFF 15.400 EOP
EL = 202.399 m

LOW POINT
STA 11+04.476
EL = 202.325 m

-3.7900%
-4.4200%
-6.8240%
-6.8240%
+2.5447%
EXISTING GROUND
PROPOSED GRADE

SEE SHEET 14 FOR -Y12- PLAN

-Y14-

BEGIN CONSTRUCTION
-Y14- STA. 10+04.000
EL = 185.622 M

BEGIN GRADE
-Y14- STA. 10+14.000
EL = 186.047 M

PI = 10+50.000
EL = 187.412 m
K = 24
VC = 72 m

PI = 10+96.000
EL = 190.518 m
K = 4
VC = 20 m

END GRADE
-Y14- STA. 11+22.580 =
-L- STA. 60+75.800 OFF 0.000 EOP
EL = 191.105 m

+3.7917%
+6.7522%
+6.7522%
+2.2122%
+2.2112%
+2.1992%
PROPOSED GRADE
EXISTING GROUND

PROPOSED UNDERCUT

SEE SHEET 18 FOR -Y14- PLAN

12/11/2012
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METRIC

5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	43

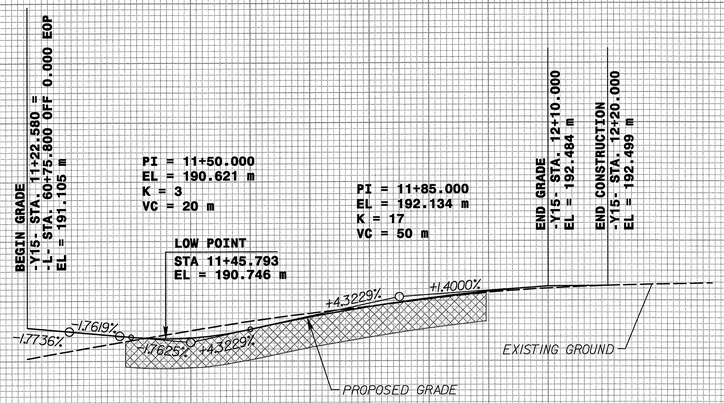
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
12-12-12

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
12/12/12

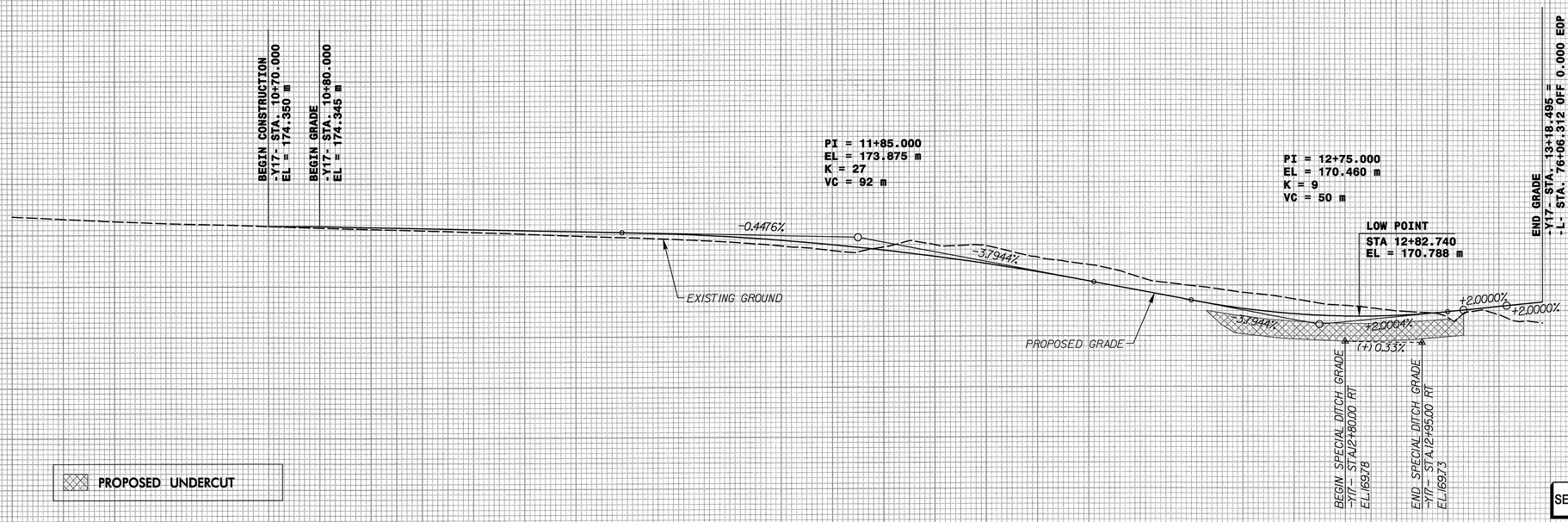
-Y15-



PROPOSED UNDERCUT

SEE SHEET 18 FOR -Y15- PLAN

-Y17-



PROPOSED UNDERCUT

SEE SHEETS 22 & 27 FOR -Y17- PLAN

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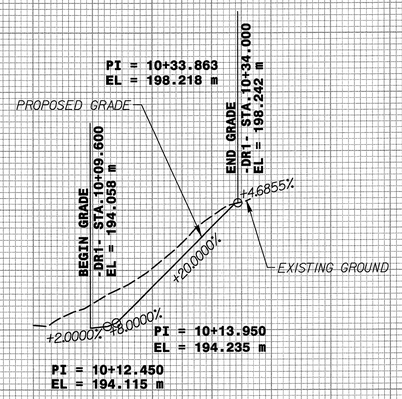
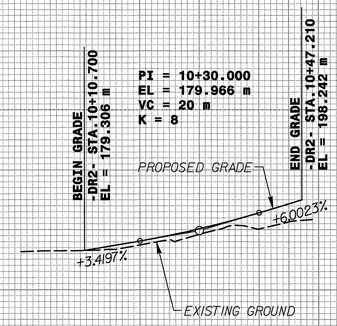
-DR1-



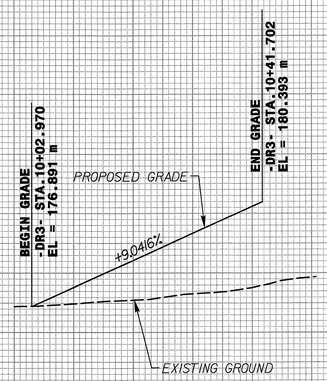
SEE SHEET 7 FOR -DR1- PLAN

-DR2-



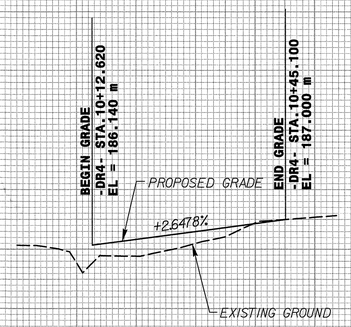
SEE SHEET 4 FOR -DR2- PLAN

-DR3-



SEE SHEET 4 FOR -DR3- PLAN

-DR4-



SEE SHEET 6 FOR -DR4- PLAN

METRIC

5 0 10 HORIZ.
1 0 2 VERT.

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2241A	44

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032589 ENGINEER JOSEPH A. FREEMAN
12-12-12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR.
12/12/12

12/11/2012
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PROJECT REFERENCE NO.	SHEET NO.
R-2241A	45

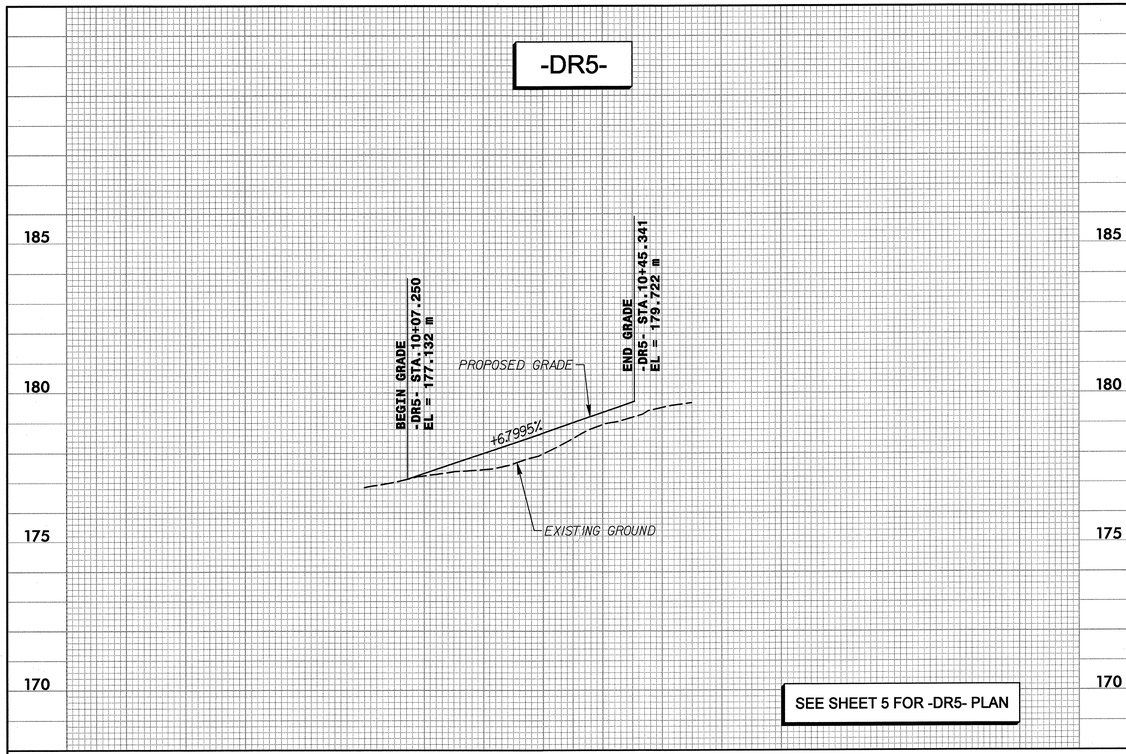
METRIC

5 0 10 HORIZ.
1 0 2 VERT.

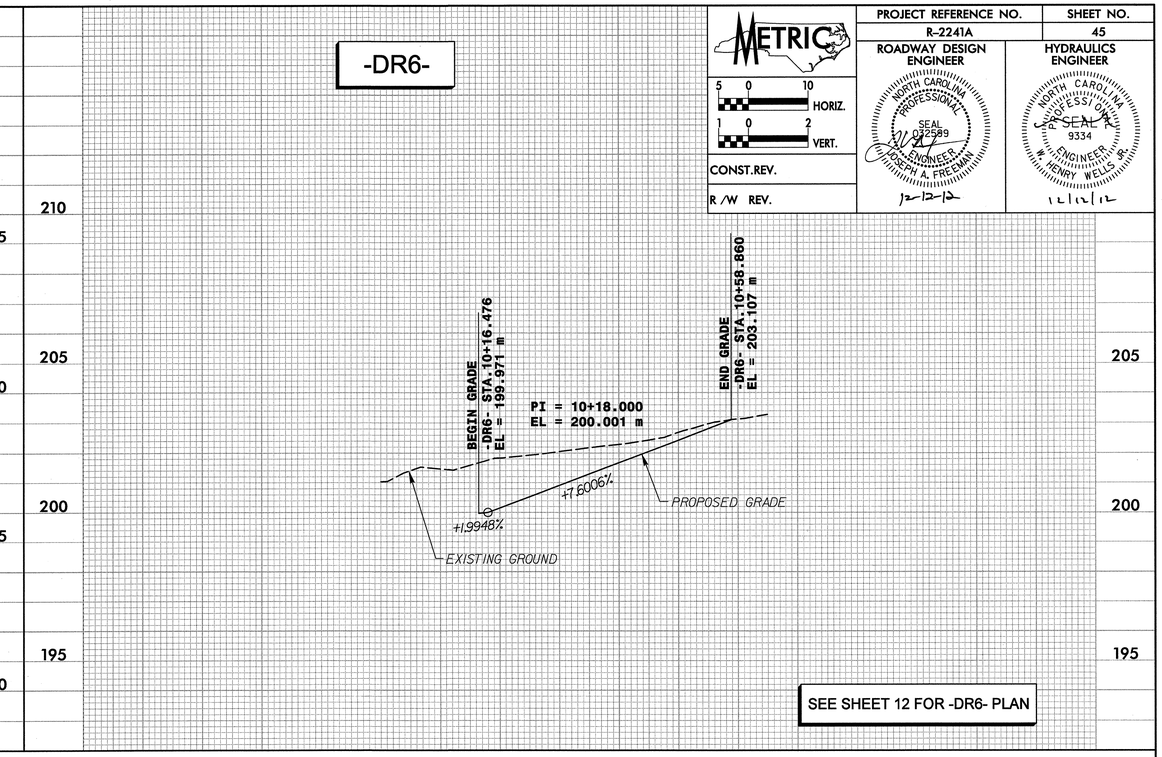
CONST.REV.
R/W REV.

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032589 ENGINEER JOSEPH A. FREEMAN
12-12-12

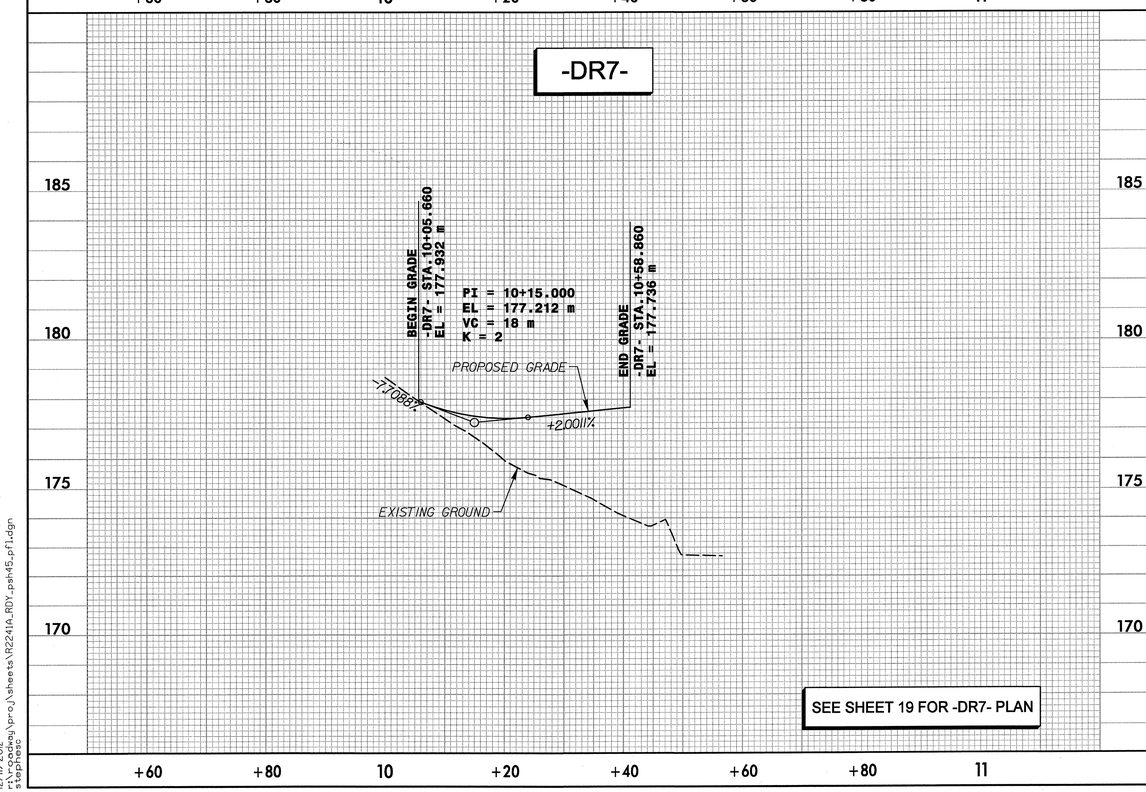
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.
12/12/12



SEE SHEET 5 FOR -DR5- PLAN



SEE SHEET 12 FOR -DR6- PLAN



SEE SHEET 19 FOR -DR7- PLAN

12/11/2012
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