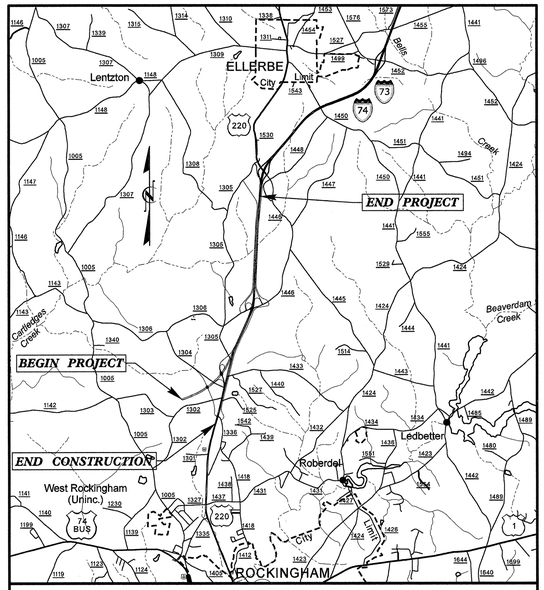
09/08/99

TIP PROJECT: R-3421C

CONTRACT: C202962

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Symbology



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

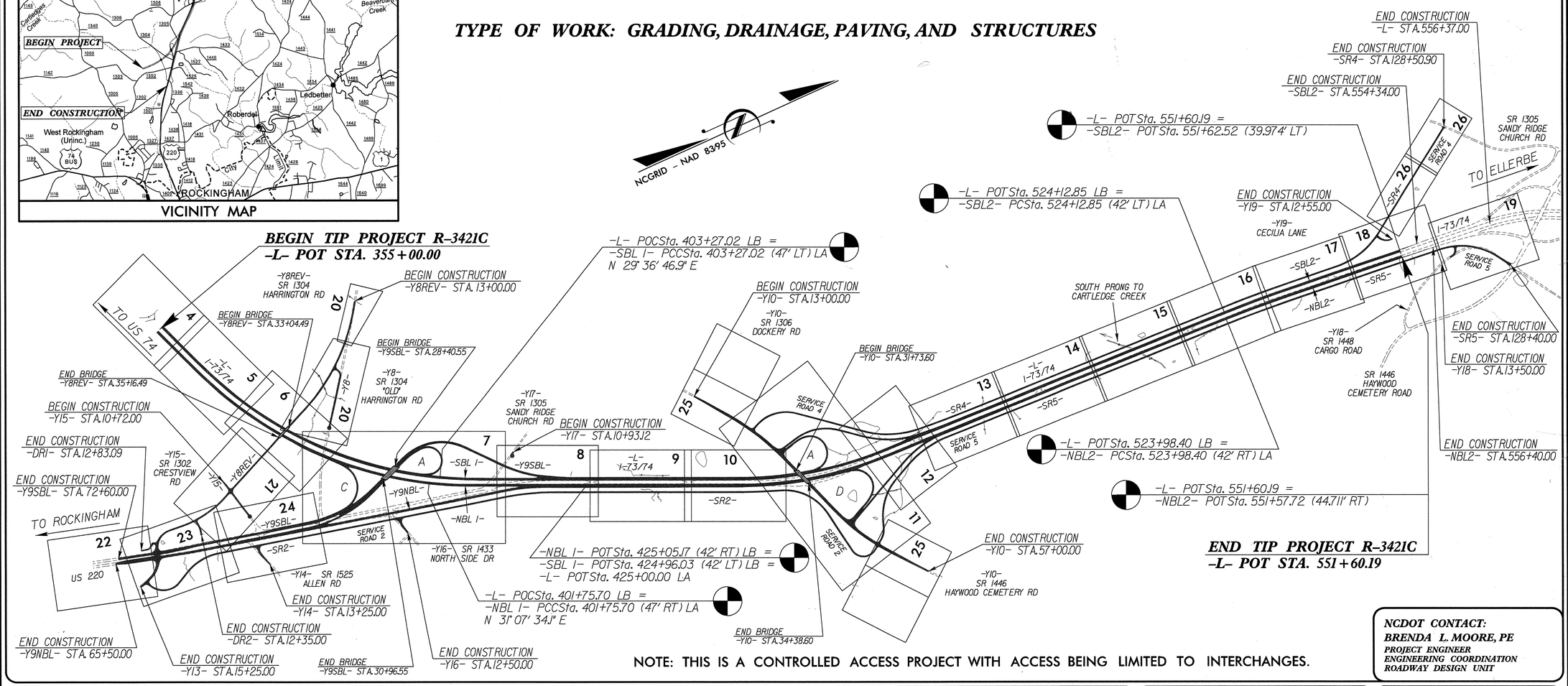
RICHMOND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34542.1.2	NHF-0220(4)	PE
34542.2.5	HPPNHF-0220(56)	R/W & UTILITIES
34542.3.FS5	HPPNHS-0220(65)	CONSTRUCTION

LOCATION: I-73/74 FROM 0.2 MILES SOUTHWEST OF SR 1304 (HARRINGTON RD) TO I-73/74 INTERCHANGE SOUTH OF ELLERBE

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



NOTE: THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

NCDOT CONTACT:
BRENDA L. MOORE, PE
PROJECT ENGINEER
ENGINEERING COORDINATION
ROADWAY DESIGN UNIT

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2012 = 14,270
ADT 2032 = 27,520
DHV = 10 %
D = 60 %
T = 26 % *
V = 70 MPH
* TTST 17 % DUAL 9 %
FUNC. CLASS = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3421C = 3.724 mi
TOTAL LENGTH TIP PROJECT R-3421C = 3.724 mi

-L- LINE USED FOR PROJECT LENGTH

Prepared for:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., NC, 27610
By:
M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 19, 2010
LETTING DATE:
JANUARY 21, 2014

ROBERT W. PORTER, JR PE
PROJECT ENGINEER
KEVIN S. HUTCHENS PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19990 ENGINEER PAUL K. TINSON
SIGNATURE:

ROADWAY DESIGN ENGINEER
10-21-2013
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
P.E.
SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

10/21/2013
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09/08/99

TIP PROJECT: R-3421C

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See Sheet 1-A For Index of Sheets
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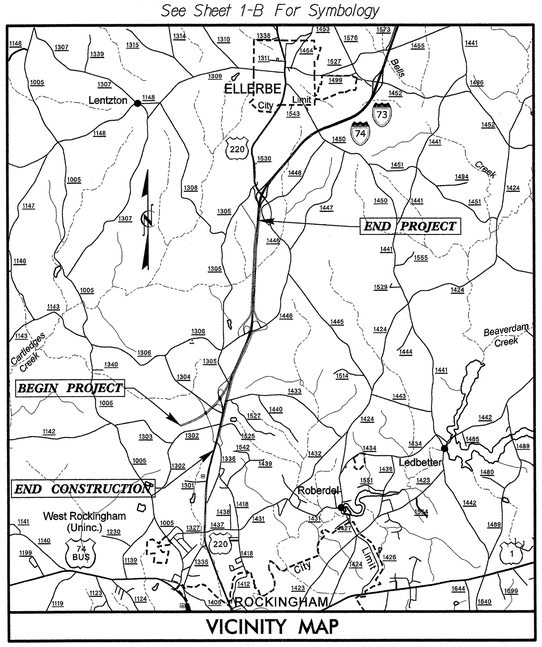

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RICHMOND COUNTY

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N.C.	R-3421C	1	

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Part 1 of 2

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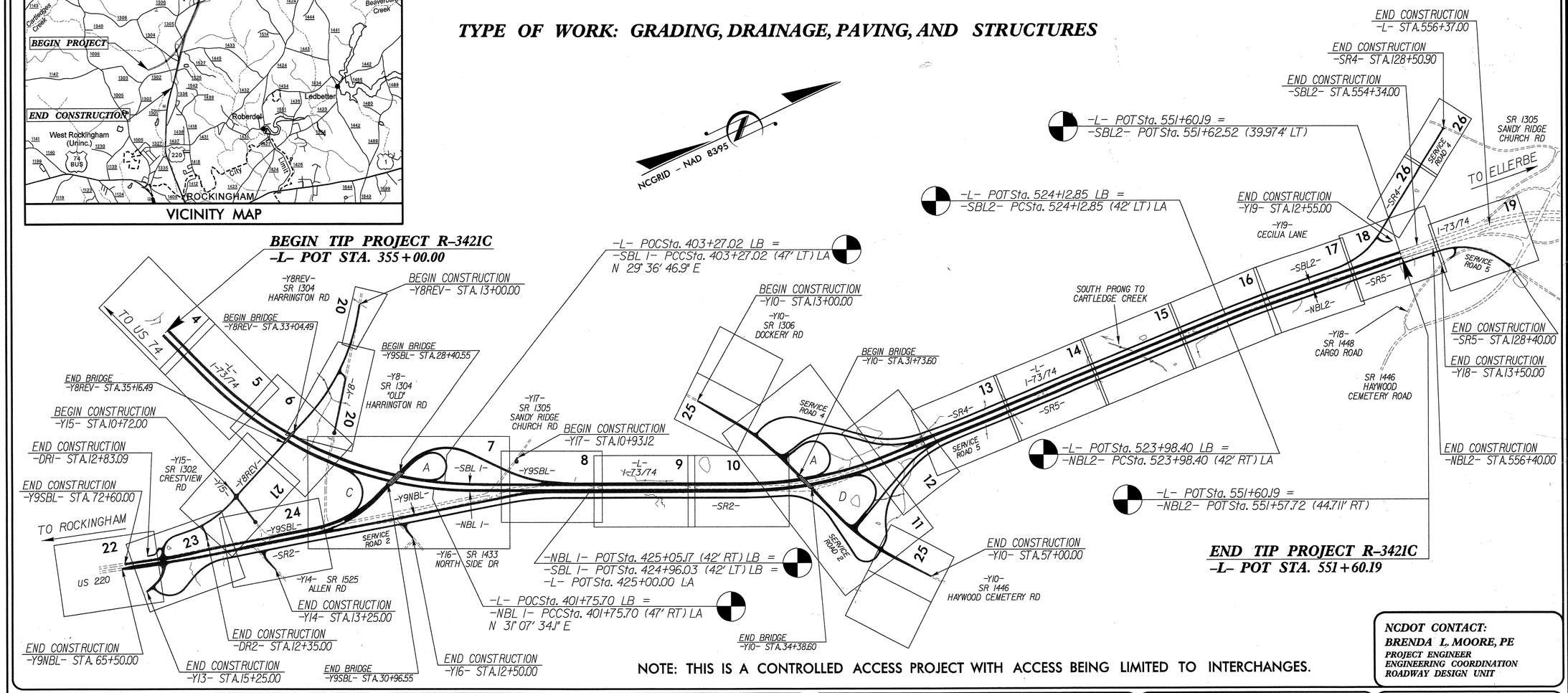

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PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL E. ATKINSON
SIGNATURE:

ROADWAY DESIGN ENGINEER
10-21-2013
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
P.E.
SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

10/21/2013
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GENERAL NOTES: 2012 SPECIFICATIONS
EFFECTIVE: 01-17-2012
REVISED: 07-30-2012

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.

GRADING:

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

CLEARING:

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

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NOS. 225.04 AND 225.05 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. 560.02 (SHEET 3 OF 3) AND THE SPECIAL DETAILS SHOWN ON PLANSHEETS 2-Q THRU 2-S.

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.

SHOULDER DRAINS:

SHOULDER DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 816.02 AND DETAILS IN PLANS AT LOCATIONS DIRECTED BY THE ENGINEER.

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".

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE: RICHMOND COUNTY - WATER
TOWN OF ELLERBE - SEWER
PROGRESS ENERGY, PEE DEE ELECTRIC - POWER
TIME WARNER CABLE - CABLE
ELLERBE TELEPHONE COMPANY, AT&T EAST - TELEPHONE

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS AND BY CONTRACT IN ACCORDANCE WITH DESIGNATED SYMBOLS.

GEOTEXTILE FOR DRAINAGE:

GEOTEXTILE FOR DRAINAGE, AS SHOWN IN THE 2012 ROADWAY STANDARD DRAWINGS AND 2012 STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, IS SHOWN AS FILTER FABRIC AND/OR ABBREVIATED "F.F." OR "FF" IN THE ROADWAY PLANS.

2012 ROADWAY ENGLISH STANDARD DRAWINGS EFF. 01-17-2012
REV. 10-30-2012

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.01	Guide for Grading Subgrade - Interstate and Freeway
225.02	Guide for Grading Subgrade - Secondary and Local
225.03	Deceleration and Acceleration Lanes
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.05	Method of Obtaining Superelevation - Divided Highways
225.06	Method of Grading Sight Distance at Intersections
225.07	Grading for False Cut at Grade Separations
225.08	Earth Berm Median Pier Protection
225.09	Guide for Shoulder and Ditch Transition at Grade Separations
240.01	Guide for Berm Ditch Construction
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.02	Method of Shoulder Construction - High Side of Superelevated Curve - Method II
	Notes for STD. 560.02: Use detail on sheet 2-S in lieu of sheet 1 of 3. Sheet 2 of 3 is no longer applicable.
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
610.02	Guide for Paving Shoulders Under Bridges - Method II
610.03	Guide for Paving Shoulders Under Bridges - Method III
654.01	Pavement Repairs
665.01	Asphalt Shoulders - Milled Rumble Strips
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.03	Pipe Underdrain and Blind Drain
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 - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.21	Reinforced Concrete Endwall - for Single 54" Pipe 90 Skew
838.27	Reinforced Concrete Endwall - for Single 60" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.51	Reinforced Brick Endwall - for Single 54" Pipe 90 Skew
838.57	Reinforced Brick Endwall - for Single 60" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.20	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 or Precast
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
850.10	Guide for Berm Drainage Outlet - 15" and 18" Pipe
850.11	Guide for Berm Drainage Outlet - 24" and 30" Pipe
852.01	Concrete Islands
854.02	Double Faced Concrete Barrier - Types 'T', 'T1' and 'T2'
862.01	Guardrail Placement
862.02	Guardrail Installation
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
865.01	Cable Guiderail
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

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	1-A

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
11-18-2013

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C THRU 1-H	SURVEY CONTROL SHEETS
1-I THRU 1-J	CENTERLINE COORDINATE LIST
2 THRU 2-H	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-I THRU 2-K	DRAINAGE DITCH DETAILS
2-L THRU 2-M	SHEAR POINT/CROSS SECTION LAYOUT DIAGRAMS
2-N THRU 2-O	NOISEWALL ENVELOPE
2-P	DETAIL SHOWING TYPICAL SECTIONS UNDER STRUCTURES
2-Q THRU 2-R	DETAIL SHOWING METHOD OF SHOULDER CONSTRUCTION HIGH SIDE OF SUPERELEVATED CURVE METHOD I (SHOULDERS UP TO 10')
2-S	DETAIL SHOWING METHOD OF SHOULDER CONSTRUCTION HIGH SIDE OF SUPERELEVATED CURVE METHOD II (SHOULDERS 10' AND ABOVE)
2-T	DETAIL SHOWING STRUCTURE ANCHOR UNIT GUARDRAIL ANCHOR UNIT TYPE B-77 FOR F-SHAPE BARRIER
2-U	DETAIL SHOWING CONCRETE BARRIER TRANSITION
2-V	DETAIL OF TEMPOARY 1" STEEL COVER OVER DRAINAGE STRUCTURE
2-W	DETAIL SHOWING SPECIAL TRAFFIC BEARING DROP INLET, DRAINAGE STRUCTURE #1303
2-X	DETAIL OF REINFORCED CONCRETE ENDWALL FOR 84" DIAMETER PIPE - 90° SKEW, DRAINAGE STRUCTURE #2010
2-Y	DETAIL OF REINFORCED CONCRETE ENDWALL SILL, DRAINAGE STRUCTURE #2012
2-Z	DETAIL TO CONVERT EXISTING DROP INLET OR CATCH BASIN TO JUNCTION BOX (MANHOLE OPTIONAL)
2-AA THRU 2-AH	DETOUR PLANS
2-AI THRU 2-AQ	DETOUR PROFILES
2-AR THRU 2-AU	DETAILS SHOWING STANDARD TEMPORARY SHORING AND STANDARD TEMPORARY WALL
2-AV	DETAIL TO CONVERT EXISTING TRAFFIC BEARING DROP INLET OR CATCH BASIN TO TRAFFIC BEARING JUNCTION BOX (MANHOLE OPTIOANL)
~~3~~	~~SUMMARY OF QUANTITIES~~
3-A THRU 3-M	SUMMARY OF DRAINAGE
3-N THRU 3-O	SUMMARY OF GUARDRAIL
3-P	SUMMARIES OF PAVEMENT REMOVAL, PAVEMENT BREAKING, GUIDERAIL, SHOULDER DRAIN, UNDERDRAIN, AND WOVEN WIRE FENCE
3-Q	SUMMARY OF EARTHWORK
3-R	PARCEL INDEX SHEET
4 THRU 26	PLAN SHEETS
27 THRU 70	PROFILE SHEETS
TMP-1 THRU TMP-86	TRAFFIC MANAGEMENT PLANS
SD-1	SPECIAL SIGN DESIGN
PMP-1 THRU PMP-21	PAVEMENT MARKING PLANS
EC-1 THRU EC-70	EROSION CONTROL PLANS
RF-1	REFORESTATION DETAIL
SIGN-1 THRU SIGN-19	SIGNING PLANS
UO-1 THRU UO-22	UTILITIES BY OTHERS PLANS
X-1 INDEX	CROSS SECTION INDEX - PART 1
X-1A THRU X-1J	CROSS SECTION EARTHWORK VOLUME SUMMARY
X-1 THRU X-277	CROSS SECTIONS - PART 1 -L-, -Y- LINES, SERVICE ROADS, AND RAMPS
XD-1 INDEX	CROSS SECTION INDEX - PART 2
XD-1 THRU XD-90	CROSS SECTIONS - PART 2 DETOURS
C-1 THRU C-8	CULVERT PLANS
S-1 THRU S-86	STRUCTURE PLANS
W-1 THRU W-3	NOISEWALL PLANS

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11/18/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

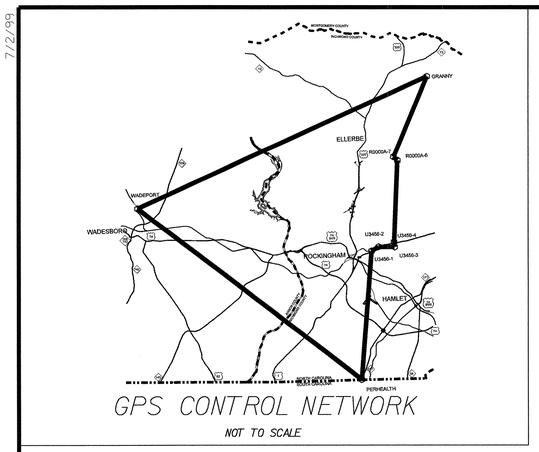
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

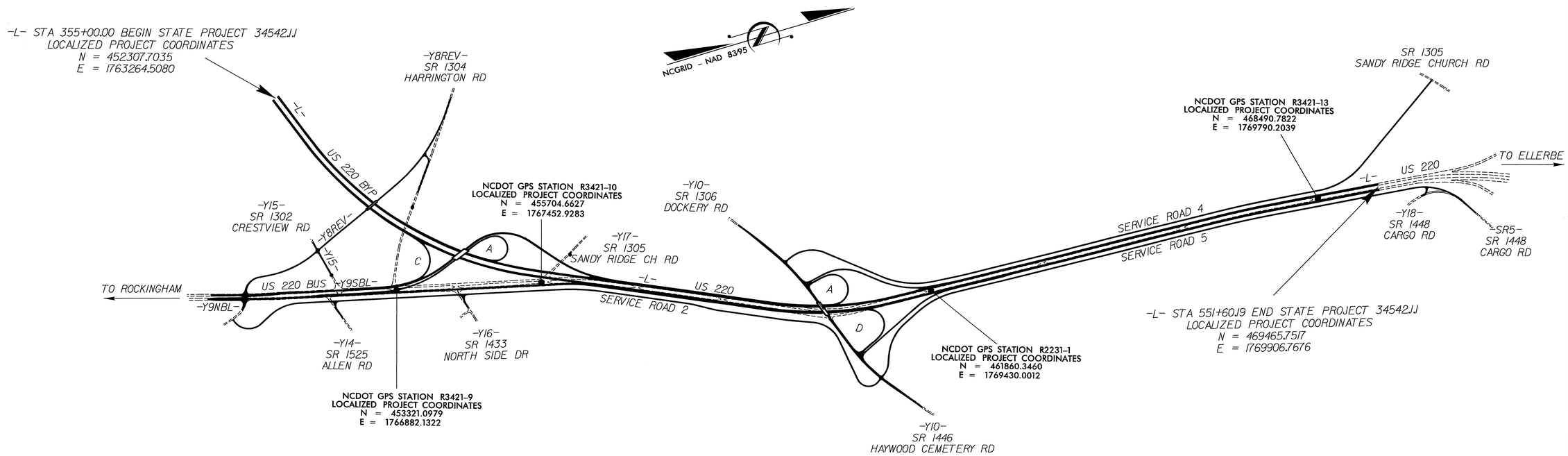
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ZUTL
- 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.

SURVEY CONTROL SHEET

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1C	
LOCATION AND SURVEYS			





DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCDOT FOR MONUMENT "R3421-11"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 438375.9441(ft) EASTING: 1746551.2575(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99987565
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"R3421-11" TO -L- STATION 355+00.00
N 50° 11' 10.4" E 21758.370'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

● ***INDICATES CONTROL MONUMENTS SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.***

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION.

SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

NOTES

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 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 BASE 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:

   R3421A_LS_GPSCALIB_041207.HTML
   R3421A_LS_WGS84_041207.TXT
   R3421A_LS_LOCAL_041207.TXT
   R3421A_LS_CONTROL_041207.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.

7/2/99
3/1/2013
12:19:52 PM
C:\pwworking\proj\r3421c_ls_1c_SCS.dgn

SURVEY CONTROL SHEET R-3421C

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1D	
LOCATION AND SURVEYS			

GPS CALIBRATION REPORT

PROJECT : R3421

TIP NUMBER	R3421C		
USER NAME	SCRANFORD	DATE & TIME	3:13:50 PM 12/16/04
COORDINATE SYSTEM	US STATE PLANE 1983(AT GROUND)	ZONE	NORTH CAROLINA 3200
HORIZONTAL DATUM	NAD 1983 (CONUS)		
VERTICAL DATUM	NAVD88	GEOID MODEL	GEOID99 (CONUS)
COORDINATE UNITS	US SURVEY FEET		
DISTANCE UNITS	US SURVEY FEET		
HEIGHT UNITS	US SURVEY FEET		

LOCAL SITE INFORMATION
LOCALIZED AROUND

LATITUDE	34°57'05.57766"N
LONGITUDE	79°50'45.03914"W
SITE SCALE FACTOR	1.00012436 55
HEIGHT	127.705SFT

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	460127.577SFT
EASTING COORDINATE OF ROTATION CENTER	1767810.855SFT
ROTATION ABOUT THE CENTER POINT	0°00'00"
TRANSLATION NORTH	0.019SFT
TRANSLATION EAST	-0.006SFT
SCALE FACTOR	0.99999983

VERTICAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ORIGIN POINT	472273.834SFT
EASTING COORDINATE OF ORIGIN POINT	1785177.898SFT
VERTICAL SEPARATION AT ORIGIN	0.042SFT
SLOPE NORTH	2.424PPM
SLOPE EAST	-0.100PPM

GEOID MODEL DEFINITION

GEOID99 (CONUS)

RESIDUAL DIFFERENCES BETWEEN GPS (WGS84) AND LOCAL COORDINATES

SUMMARY

	MAXIMUM ERROR	ROOT MEAN SQUARE ERROR	POINT
HORIZONTAL	0.060SFT	0.007	R0000A-7_WGS84
VERTICAL	0.065SFT	0.011	R0000A-7_WGS84
THREE-DIMENSIONAL	0.088SFT	0.013	R0000A-7_WGS84

POINT RESIDUALS

WGS84 COORDINATES			CALCULATED POINT FOR DISPLAY ONLY		LOCAL COORDINATES
POINT	R0000A-7_WGS84	NORTHING	472273.834SFT	POINT	R0000A-7
LATITUDE	35°02'43.84825"N	EASTING	1785177.898SFT	NORTHING	472273.891SFT
LONGITUDE	79°43'03.98201"W	ELEVATION	406.998SFT	EASTING	1785177.880SFT
HEIGHT	304.583SFT	HORZ ERROR	0.060SFT	ELEVATION	407.063SFT
		VERT ERROR	0.065SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.088SFT	QUALITY	SURVEY QUALITY
POINT	GRANNY_WGS84	NORTHING	504943.828SFT	POINT	GRANNY
LATITUDE	35°08'07.61741"N	EASTING	1794500.656SFT	NORTHING	504943.820SFT
LONGITUDE	79°41'14.58408"W	ELEVATION	557.429SFT	EASTING	1794500.668SFT
HEIGHT	455.262SFT	HORZ ERROR	0.014SFT	ELEVATION	557.381SFT
		VERT ERROR	0.048SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.050SFT	QUALITY	SURVEY QUALITY
POINT	U3456-1_WGS84	NORTHING	435832.529SFT	POINT	U3456-1
LATITUDE	34°56'42.56346"N	EASTING	1773381.985SFT	NORTHING	435832.521SFT
LONGITUDE	79°45'22.50410"W	ELEVATION	304.605SFT	EASTING	1773381.965SFT
HEIGHT	202.172SFT	HORZ ERROR	0.021SFT	ELEVATION	304.583SFT
		VERT ERROR	0.022SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.031SFT	QUALITY	SURVEY QUALITY
POINT	R3421-6_WGS84	NORTHING	444453.276SFT	POINT	R3421-6
LATITUDE	34°58'05.65160"N	EASTING	1746163.486SFT	NORTHING	444453.290SFT
LONGITUDE	79°50'50.32033"W	ELEVATION	277.087SFT	EASTING	1746163.498SFT
HEIGHT	175.495SFT	HORZ ERROR	0.018SFT	ELEVATION	277.090SFT
		VERT ERROR	0.003SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.018SFT	QUALITY	SURVEY QUALITY
POINT	R0000A-13_WGS84	NORTHING	454623.600SFT	POINT	R0000A-13
LATITUDE	34°59'46.27678"N	EASTING	1746608.032SFT	NORTHING	454623.589SFT
LONGITUDE	79°50'46.02070"W	ELEVATION	200.776SFT	EASTING	1746608.036SFT
HEIGHT	99.248SFT	HORZ ERROR	0.011SFT	ELEVATION	200.774SFT
		VERT ERROR	0.002SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.011SFT	QUALITY	SURVEY QUALITY
POINT	R3421-8_WGS84	NORTHING	449771.970SFT	POINT	R3421-8
LATITUDE	34°58'59.28923"N	EASTING	1758721.177SFT	NORTHING	449771.958SFT
LONGITUDE	79°48'19.96025"W	ELEVATION	348.615SFT	EASTING	1758721.175SFT
HEIGHT	246.765SFT	HORZ ERROR	0.012SFT	ELEVATION	348.602SFT
		VERT ERROR	0.013SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.018SFT	QUALITY	SURVEY QUALITY
POINT	R2231-1_WGS84	NORTHING	461860.363SFT	POINT	R2231-1
LATITUDE	35°00'59.68816"N	EASTING	1769429.995SFT	NORTHING	461860.347SFT
LONGITUDE	79°46'12.39863"W	ELEVATION	345.886SFT	EASTING	1769430.002SFT
HEIGHT	243.864SFT	HORZ ERROR	0.017SFT	ELEVATION	345.918SFT
		VERT ERROR	0.032SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.036SFT	QUALITY	SURVEY QUALITY
POINT	R3421-13_WGS84	NORTHING	468490.792SFT	POINT	R3421-13
LATITUDE	35°02'05.29295"N	EASTING	1769790.195SFT	NORTHING	468490.784SFT
LONGITUDE	79°46'08.68585"W	ELEVATION	415.734SFT	EASTING	1769790.204SFT
HEIGHT	313.772SFT	HORZ ERROR	0.012SFT	ELEVATION	415.771SFT
		VERT ERROR	0.037SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.039SFT	QUALITY	SURVEY QUALITY
POINT	R3421-9 - WGS84	NORTHING	453321.090SFT	POINT	R3421-9
LATITUDE	34°59'35.03521"N	EASTING	1766882.140SFT	NORTHING	453321.098SFT
LONGITUDE	79°46'42.22392"W	ELEVATION	393.458SFT	EASTING	1766882.132SFT
HEIGHT	291.417SFT	HORZ ERROR	0.011SFT	ELEVATION	393.408SFT
		VERT ERROR	0.050SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.051SFT	QUALITY	SURVEY QUALITY
POINT	R3421-10_WGS84	NORTHING	455704.679SFT	POINT	R3421-10
LATITUDE	34°59'58.65396"N	EASTING	1767452.925SFT	NORTHING	455704.663SFT
LONGITUDE	79°46'35.58803"W	ELEVATION	423.027SFT	EASTING	1767452.929SFT
HEIGHT	320.997SFT	HORZ ERROR	0.016SFT	ELEVATION	423.025SFT
		VERT ERROR	0.002SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.016SFT	QUALITY	SURVEY QUALITY

DATUM DESCRIPTION

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N 50° 11' 10.4" E 2175.8.370'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

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   R3421A_LS_CONTROL_041207.TXT

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1E	
LOCATION AND SURVEYS			

SURVEY CONTROL SHEET R-3421C

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
186	BL-186	452355.5490	1763392.2070	386.61	356+36.37	0.18 LT
187	BL-187	452472.1320	1763699.0050	407.52	359+64.56	2.15 LT
188	BL-188	452642.9680	1764136.4990	435.09	364+34.32	8.10 LT
189	BL-189	452732.6480	1764349.0750	436.95	366+65.40	9.14 LT
190	BL-190	452948.4500	1764826.0330	382.25	371+88.74	9.54 RT
191	BL-191	453129.5200	1765106.2480	368.36	375+21.99	3.27 LT
192	BL-192	453317.7320	1765383.2820	370.13	378+57.17	4.32 LT
193	BL-193	453574.6600	1765734.5770	352.75	382+92.16	8.47 RT
194	BL-194	453747.3300	1765916.0690	370.87	385+42.34	1.51 LT
195	BL-195	454055.0830	1766236.2710	397.73	389+86.36	5.44 RT
196	BL-196	454251.3900	1766403.4570	403.79	392+44.05	0.47 LT
197	BL-197	454632.8720	1766715.5870	385.65	397+36.53	10.81 RT
198	BL-198	454942.4670	1766904.1780	385.51	400+98.59	4.12 LT
199	BL-199	455380.2460	1767159.0650	406.34	406+05.31	3.36 RT
10	R3421-10	455704.6627	1767452.9283	423.02	410+22.52	130.89 RT
217	BL-217	456421.1275	1767628.5108	422.94	417+47.06	7.63 LT
218	BL-218	457218.5340	1768003.1982	381.60	426+28.07	1.21 RT
219	BL-219	458517.1257	1768594.6254	365.23	440+54.99	1.45 LT
220	BL-220	460157.3050	1769388.8532	402.51	458+55.60	146.98 RT
221	R2231-1	461860.3460	1769430.0012	345.92	475+37.48	2.85 RT
222	BL-222	463794.3523	1769515.7671	339.96	494+73.39	0.69 LT
223	BL-223	465295.4238	1769566.2688	310.03	509+75.19	19.49 LT
224	BL-224	466317.9305	1769634.4837	329.98	519+99.76	1.48 RT
13	R3421-13	468490.7822	1769790.2039	415.77	541+78.40	15.73 LT
225	BL-225	469412.6799	1769905.0980	425.33	551+07.23	3.79 RT
226	BL-226	470524.2622	1770077.6004	439.81	OUTSIDE PROJECT LIMITS	

BY8

POINT	DESC.	NORTH	EAST	ELEVATION	Y8REV STATION	OFFSET
227	BY8-227	455339.1176	1763728.6852	336.26	OUTSIDE PROJECT LIMITS	
228	BY8-228	454656.6560	1764696.1819	349.83	19+05.30	38.54 LT

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
194	BL-194	453747.3300	1765916.0690	370.87	385+42.34	1.51 LT
233	BY8-233	453575.9757	1766175.1315	383.41	386+13.62	300.36 RT

POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
9	R3421-9	453321.0979	1766882.1322	393.41	34+10.74	39.06 RT

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
229	BY9-229	450145.5186	1766051.1625	362.98	66+95.87	41.50 RT
230	BY9-230	451030.7331	1766329.6449	371.18	57+67.97	22.62 RT
231	BY9-231	452182.4745	1766612.1877	382.01	45+80.91	33.50 RT
232	BY9-232	452455.0153	1766670.0897	385.64	43+02.40	41.35 RT
9	R3421-9	453321.0979	1766882.1322	393.41	34+10.74	39.06 RT
234	BY9-234	454245.2491	1767104.1954	403.23	24+60.29	40.68 RT
10	R3421-10	455704.6627	1767452.9283	423.02	9+59.79	45.14 RT

BY10

POINT	DESC.	NORTH	EAST	ELEVATION	Y10 STATION	OFFSET
235	BY10-235	459044.4954	1767388.3661	422.22	12+22.11	13.67 LT
236	BY10-236	459767.0448	1768484.0340	419.02	25+34.43	11.21 LT
220	BL-220	460157.3050	1769388.8532	402.51	35+17.62	48.27 LT
237	BY10-237	460286.0106	1769920.2733	404.34	40+61.02	11.45 RT
238	BY10-238	460687.8433	1770681.8879	399.67	49+20.26	21.59 RT
239	BY10-239	461210.5726	1771329.5387	402.88	57+51.82	10.67 RT

BY11

POINT	DESC.	NORTH	EAST	ELEVATION	SR4 STATION	OFFSET
13	R3421-13	468490.7822	1769790.2039	415.77	101+85.51	109.27 RT
247	BY11-247	469165.6690	1769786.1110	428.04	107+84.29	202.44 RT
248	BY11-248	469510.8400	1769431.1940	426.36	112+30.14	70.59 RT
249	BY11-249	470320.3300	1768891.3410	427.82	122+03.13	68.34 RT
250	BY11-250	470892.9490	1768522.5160	417.80	128+84.18	77.63 RT

BY12

POINT	DESC.	NORTH	EAST	ELEVATION	SR5 STATION	OFFSET
226	BL-226	470524.2622	1770077.6004	439.81	121+62.32	176.57 LT
240	BY12-240	470684.6801	1770456.6819	428.60	125+04.84	7.01 RT

BY13

POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
230	BY9-230	451030.7331	1766329.6449	371.18	57+67.97	22.62 RT
241	BY13-241	450405.4660	1766592.4611	380.61	62+94.38	405.03 LT

BY14

POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
231	BY9-231	452182.4745	1766612.1877	382.01	45+80.91	33.50 RT
242	BY14-242	452447.2450	1767364.1895	367.39	41+46.63	635.09 LT

BY15

POINT	DESC.	NORTH	EAST	ELEVATION	Y15 STATION	OFFSET
243	BY14-243	452214.5211	1765741.1732	425.16	10+92.71	12.32 RT
244	BY15-244	452331.9474	1766249.1058	414.19	16+14.04	13.00 RT

POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
232	BY9-232	452455.0153	1766670.0897	385.64	43+02.40	41.35 RT

BY16

POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
234	BY9-234	454245.2491	1767104.1954	403.23	24+60.29	40.68 RT
245	BY16-245	454476.6442	1767686.6049	418.02	20+98.35	470.93 LT

BY17

POINT	DESC.	NORTH	EAST	ELEVATION	Y17 STATION	OFFSET
246	BY17-246	456376.5771	1767037.1503	435.57	10+03.89	14.00 RT

POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
10	R3421-10	455704.6627	1767452.9283	423.02	9+59.79	45.14 RT

****
BM29 ELEVATION = 364.84
N 450070 E 1766141
Y9NBL STATION 67+43 66 LEFT
RR SPIKE IN BASE OF 18" PINE
****
****
BM30 ELEVATION = 364.87
N 452368 E 1767265
Y9NBL STATION 42+47 557 LEFT
RR SPIKE IN BASE OF ABANDONED POWER POLE
****
****
BM31 ELEVATION = 411.00
N 454502 E 1767799
Y9NBL STATION 20+47 574 LEFT
RR SPIKE IN BASE OF POWER POLE (*529 35)
****
****
BM32 ELEVATION = 424.22
N 456464 E 1767961
L STATION 419+24 277 RIGHT
RR SPIKE IN BASE OF POWER POLE (*DH05 AJ)
****
****
BM33 ELEVATION = 373.13
N 458356 E 1768865
L STATION 440+21 311 RIGHT
RR SPIKE IN BASE OF POWER POLE (DH20 AJ)
****
****
BM34 ELEVATION = 420.23
N 459546 E 1767970
Y10 STATION 19+85 79 LEFT
RR SPIKE IN BASE OF POWER POLE (*M04 AJ)
****

****
BM35 ELEVATION = 356.72
N 462387 E 1769705
L STATION 480+76 253 RIGHT
RR SPIKE IN BASE OF 20" WHITE OAK
****
****
BM36 ELEVATION = 387.55
N 464058 E 1770062
L STATION 497+62 533 RIGHT
RR SPIKE IN BASE OF POWER POLE
****
****
BM37 ELEVATION = 320.60
N 466147 E 1770002
L STATION 518+46 376 RIGHT
RR SPIKE IN BASE OF 15" GUM TREE
****
****
BM38 ELEVATION = 416.80
N 468484 E 1769540
L STATION 541+46 264 LEFT
RR SPIKE IN BASE OF POWER POLE
****
****
BM39 ELEVATION = 427.95
N 470673 E 1770462
SR5 STATION 125+02 19 RIGHT
RR SPIKE IN BASE OF POWER POLE(*7N1322)
****
****
BM40 ELEVATION = 349.99
N 454164 E 1765436
Y8REV STATION 26+86 355 LEFT
RR SPIKE IN BASE OF POWER POLE
****

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R3421-11"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 438375.9441(ft) EASTING: 1746551.2575(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987565
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R3421-11" TO -L- STATION 355+00.00
N 50° 11' 10.4" E 21758.370'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES

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   HTTP:\WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/
   THE FILES TO BE FOUND ARE AS FOLLOWS:

   R3421A_LS_GPSCALIB_041207.HTML
   R3421A_LS_WGS84_041207.TXT
   R3421A_LS_LOCAL_041207.TXT
   R3421A_LS_CONTROL_041207.TXT

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7/2/99
3/1/2013
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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1F	
	LOCATION AND SURVEYS		

SURVEY CONTROL SHEET

L

TYPE	STATION	NORTH	EAST
POT	351+00.00	452167.8637	1762889.7484
POT	355+00.00	452307.7034	1763264.5081
TS	362+34.60	452564.5184	1763952.7528
SC	364+34.60	452635.5263	1764139.7202
CS	407+28.99	455492.7226	1767210.6927
ST	409+28.99	455674.8097	1767294.9831
TS	446+52.55	459059.8687	1768844.6356
SC	448+52.55	459242.2043	1768926.8100
CS	468+47.48	461171.2685	1769394.1645
ST	470+47.48	461370.9958	1769404.5526
PC	524+47.33	466765.0924	1769653.6476
PT	533+56.57	467671.6925	1769721.3696
POT	551+60.19	469465.7517	1769906.7676
POT	562+91.56	470591.1307	1770023.0642

NBL1

TYPE	STATION	NORTH	EAST
PC	401+75.70	454981.7366	1766988.2155
CS	406+45.00	455394.9771	1767211.9596
ST	408+45.00	455576.2719	1767296.4025
POT	425+05.17	457085.1088	1767986.9889

NBL2

TYPE	STATION	NORTH	EAST
PC	524+34.34	466750.1788	1769695.0037
PT	533+43.58	467656.7788	1769762.7257
POT	551+57.78	469461.3655	1769949.2116
POT	562+89.16	470586.5463	1770067.4267

SBL1

TYPE	STATION	NORTH	EAST
PC	403+27.02	455159.8019	1766983.6184
CS	408+40.29	455614.9200	1767220.6675
ST	410+40.29	455796.3849	1767304.7667
POT	424+96.03	457120.0674	1767910.6090

SBL2

TYPE	STATION	NORTH	EAST
PC	524+36.72	466756.4386	1769611.2032
PT	533+45.97	467663.0386	1769678.9252
POT	551+62.56	469470.0001	1769865.6565
POT	562+93.93	470595.2983	1769982.7353

SR2

TYPE	STATION	NORTH	EAST
POT	10+71.54	450577.2320	1766562.8747
PC	11+13.12	450590.3927	1766602.3153
PT	16+27.30	451009.5489	1766775.4758
PC	18+27.10	451188.1182	1766685.8437
PT	23+61.18	451707.8861	1766626.4177
PC	66+89.73	455914.9058	1767644.9303
PT	74+22.05	456605.8436	1767884.2070
PC	101+15.77	459055.1981	1769005.2632
PT	105+96.20	459497.5580	1769192.5329
PC	107+96.20	459683.9004	1769265.1724
PT	115+89.96	460158.7973	1769856.1888
PC	122+35.94	460258.3165	1770494.4587
PT	126+39.03	460568.7447	1770628.7911
POT	127+26.94	460641.3347	1770679.2022

SR4

TYPE	STATION	NORTH	EAST
POT	9+61.16	459647.5052	1768281.7047
PC	10+66.35	459743.2964	1768238.2518
PT	17+05.35	460344.4338	1768317.9268
PC	27+33.11	461137.4774	1768971.6615
PT	35+77.47	461907.3322	1769286.1782
PC	38+55.10	462183.9316	1769310.1051
PT	41+96.32	462524.3729	1769332.6814
PC	84+47.33	466770.8587	1769528.7807
PT	93+63.68	467684.5415	1769597.0318
PC	101+93.40	468509.8711	1769682.3213
PT	110+20.00	469296.7182	1769488.5644
POT	128+61.08	470830.7818	1768470.6043

SR5

TYPE	STATION	NORTH	EAST
POT	18+96.16	460641.3347	1770579.2022
PC	19+76.07	460707.3164	1770534.1278
PT	21+60.25	460819.1179	1770391.4110
PC	22+84.51	460862.6898	1770275.0074
PT	29+21.81	461284.4249	1769818.7277
PC	32+01.50	461537.9425	1769700.6046
PT	38+91.81	462207.8572	1769568.3314
PC	84+47.33	466754.3262	1769778.5145
PT	93+49.47	467658.8434	1769845.7075
PC	117+19.44	470016.2624	1770089.3230
PT	126+27.28	470760.7304	1770552.8482
POT	128+93.87	470902.3365	1770778.7186

Y10

TYPE	STATION	NORTH	EAST
POT	10+00.00	458900.3570	1767218.8320
PC	14+33.64	459160.4209	1767565.8349
PT	15+77.62	459245.3105	1767682.1192
PC	19+12.71	459439.4720	1767955.2278
PT	29+49.28	459918.8144	1768870.7269
PC	40+24.09	460283.9806	1769881.6028
PT	50+19.91	460765.6578	1770748.2810
PC	56+71.46	461169.1805	1771259.8399
PT	58+72.10	461303.5907	1771408.6017

Y10LPA

TYPE	STATION	NORTH	EAST
CS	0+00.00	460887.2785	1769163.0900
SC	3+00.00	460881.8822	1769175.9834
CS	8+95.22	460387.4261	1768711.7517
ST	11+95.22	460092.2089	1768714.2048
POT	14+15.45	459876.7124	1768759.6170

Y10LPD

TYPE	STATION	NORTH	EAST
POT	0+00.00	460420.0935	1769351.1873
TS	1+91.34	460607.8397	1769388.0857
SC	4+91.34	460888.5099	1769501.2677
CS	8+19.21	460917.3053	1769803.9172
ST	11+19.21	460679.6983	1769979.1374
POT	14+49.02	460380.7543	1770118.4263

Y10RPA

TYPE	STATION	NORTH	EAST
POT	0+00.00	462125.2843	1769385.3238
TS	1+40.07	461985.6576	1769373.2524
SC	3+40.07	461786.8997	1769351.3892
CS	10+03.97	461177.7969	1769102.5461
ST	12+03.97	461020.5878	1768978.9825
TS	13+73.09	460890.0907	1768871.4090
SC	15+73.09	460730.1538	1768751.6138
CS	20+15.59	460307.2294	1768647.7336
ST	22+15.59	460109.9920	1768679.7984
POT	24+65.59	459865.3648	1768731.3494

Y10RPD

TYPE	STATION	NORTH	EAST
TS	0+00.00	462275.0573	1769500.3589
SC	2+00.00	462075.1529	1769495.7851
CS	6+90.66	461596.1336	1769590.3664
ST	8+90.66	461412.9696	1769670.5763
POT	20+15.51	460393.3705	1770145.6446

Y13

TYPE	STATION	NORTH	EAST
POT	10+00.00	450877.6693	1766308.6058
PC	10+73.63	450842.5125	1766373.2980
PCC	13+16.46	450664.5539	1766531.3113
PT	14+51.30	450537.1263	1766575.2748
POT	15+83.16	450410.5940	1766612.3780

Y14

TYPE	STATION	NORTH	EAST
POT	10+00.00	452294.7536	1766768.4974
PC	10+46.68	452283.7698	1766813.8668
PT	11+59.41	452288.6960	1766925.0016
POT	14+00.00	452365.7745	1767152.9102

Y15

TYPE	STATION	NORTH	EAST
POT	10+00.00	452205.5188	1765648.0028
POT	20+00.00	452432.0379	1766622.0098

Y16

TYPE	STATION	NORTH	EAST
POT	10+00.00	454374.6679	1767272.0413
PC	10+48.09	454363.3513	1767318.7853
PT	11+50.88	454365.3271	1767420.4248
POT	13+75.00	454426.4886	1767636.0374

Y17

TYPE	STATION	NORTH	EAST
POT	10+00.00	456386.6679	1767047.6048
POT	16+00.00	455859.1596	1767333.4984

Y18

TYPE	STATION	NORTH	EAST
POT	10+00.37	470248.8100	1770139.1193
PC	10+49.32	470224.8615	1770185.3953
PT	11+56.81	470146.6429	1770251.4707
PC	12+14.07	470098.1571	1770260.8168
PT	14+55.24	469859.6839	1770329.6567

Y19

TYPE	STATION	NORTH	EAST
POT	10+00.00	469245.9153	1769520.4759
PC	10+52.02	469272.4758	1769565.2050
PT	12+44.79	469438.2368	1769662.5846
POT	19+41.72	470125.4000	1769712.0860

Y2REV

TYPE	STATION	NORTH	EAST
POT	26+57.47	470893.2675	1770261.3985
PC	27+87.20	470221.3046	1770240.5352
PT	33+44.90	470700.8726	1770457.3712
POT	34+31.70	470746.9775	1770530.9114
POT	37+24.18	470902.3365	1770778.7186

Y8

TYPE	STATION	NORTH	EAST
POT	10+00.00	454347.1159	1764927.2867
PC	10+62.17	454382.9673	1764978.0759
PT	11+88.00	454381.2627	1765095.7551
POT	19+25.00	453938.9833	1765685.2980

Y8REV

TYPE	STATION	NORTH	EAST
POT	9+92.81	455194.7025	1763963.0745
PC	14+70.46	454919.8323	1764353.7121
PT	27+87.93	453908.7065	1765171.8160
PC	46+88.87	452159.9887	1765917.1597
PT	54+89.71	451376.6912	1766037.6604
PC	56+68.65	451198.6092	1766020.2208
PT	60+29.94	450913.9185	1766198.4192
POT	60+79.94	450896.5563	1766245.3079

Y9LPA

TYPE	STATION	NORTH	EAST
CS	0+00.00	454868.3243	1766791.8392
SC	3+00.00	455146.3334	1766881.4743
CS	7+76.45	455213.3911	1766516.0603
SC	9+76.45	455020.0874	1766479.8009
CS	11+11.97	454886.2608	1766500.0464
ST	13+11.97	454696.5137	1766562.8132
TS	17+73.21	454265.8698	1766725.9199
SC	19+73.21	454076.8093	1766793.3605
CS	29+17.16	453144.2344	1766851.2134
ST	31+17.16	452949.0820	1766807.5582

Y9NBL

TYPE	STATION	NORTH	EAST
TS	0+00.00	456604.3627	1767793.3484
SC	2+00.00	456421.6012	1767712.1432
CS	5+75.12	456067.3672	1767589.4695
ST	7+75.12	455873.8271	1767540.2549
PC	50+86.69	451683.0148	1766525.7387
PT	58+40.15	450955.1511	1766331.2741
POT	68+85.66	449951.7051	1766037.7034

Y9RPC

TYPE	STATION	NORTH	EAST
POT	0+00.00	453673.9429	1765925.3615
TS	2+49.17	453841.0450	1766110.1880
SC	5+49.17	454007.1984	1766357.0360
CS	10+76.51	453800.2776	1766788.8775
SC	12+76.51	453603.8824	1766821.0762

Y9SBL

TYPE	STATION	NORTH	EAST
POT	0+00.00	456943.2046	1767816.4626
TS	2+75.00	456701.7439	1767684.8506
SC	4+75.00	456527.8545	1767586.0946
CS	9+84.94	456134.2869	1767264.4591
ST	11+84.94	456002.6060	1767113.7839
TS	15+84.94	455744.9119	1766807.8529
SC	17+84.94	455609.8997	1766660.4988
CS	25+70.72	454879.6723	1766470.3971
ST	27+70.72	454689.9432	1766533.2249
TS	31+74.80	454311.9657	1766676.1188
SC	33+74.80	454123.7051	1766743.5593
CS	42+78.75	453230.5207	1766808.3645
ST	45+58.75	452956.9114	1766749.1627
PC	63+36.83	451228.7577	1766330.7776
PT	69+01.93	450682.8599	1766184.9292
POT	76+45.01	449969.6759	1765976.2782

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R3421-11" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 438375.9441(ft) EASTING: 1746551.2575(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987565
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R3421-11" TO -L- STATION 355+00.00
N 50° 11' 10.4" E 21758.370'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

● ***INDICATES CONTROL MONUMENTS SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.***

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION.

SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

NOTES

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7/2/99

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1G	

LOCATION AND SURVEYS

SURVEY CONTROL SHEET

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	357+29.30	-175.00	452551.8253	1763418.1624
L	356+54.89	175.00	452197.6145	1763470.0511
L	362+34.60	265.00	452316.2407	1764045.3982
L	364+34.60	265.00	452388.9826	1764236.6830
L	372+00.00	265.00	452730.7488	1764960.1970
L	374+25.00	175.00	452826.1585	1765116.7070
L	448+52.55	-175.00	459312.2467	1768766.4383
L	446+52.55	-175.00	459132.6993	1768685.5107
L	425+00.00	-175.00	457175.4188	1767785.6742
L	362+34.60	-175.00	452728.4768	1763891.5730
L	381+25.00	-175.00	453612.7849	1765498.9763
L	385+80.00	-175.00	453899.9320	1765825.5955
L	383+67.89	-175.00	453762.7303	1765672.4468
L	384+52.91	-265.00	453884.2963	1765674.6341
L	394+58.00	-175.00	454518.8528	1766397.3830
L	453+25.00	-175.00	459739.8598	1768932.2540
L	357+25.00	175.00	452222.4058	1763536.4983
L	433+00.00	-175.00	457402.8464	1768122.6138
L	364+34.60	-175.00	452798.3910	1764076.6882
L	366+65.21	268.52	452476.4580	1764468.8070
L	368+56.41	307.53	452527.8170	1764659.5140
L	550+00.00	-135.00	469320.2893	1769756.0165
L	551+60.24	-131.33	469479.3070	1769776.1398
L	546+00.00	-135.00	468922.4081	1769714.8996
L	465+41.22	1005.52	460748.8616	1770365.1613
L	385+65.00	175.00	453633.1008	1766852.5886
L	386+10.00	348.00	453544.4765	1766199.4948
L	380+00.00	175.00	453254.4377	1765606.3550
L	377+25.00	175.00	453093.9106	1765376.3540
L	377+75.00	-175.00	453410.3513	1765218.6743

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
SR2	126+33.00	70.00	460601.4391	1770691.8821
SR2	122+35.94	70.00	460189.1523	1770505.2428
SR2	115+89.96	70.00	460089.6330	1769866.9728
SR2	105+96.20	110.00	459457.6064	1769295.8212
SR2	109+90.00	70.00	459812.5373	1769414.3956
SR2	101+15.77	70.00	459026.8658	1769068.9133
SR2	74+22.05	70.00	456576.7114	1767947.8569
SR2	68+89.73	70.00	455998.4348	1767722.9650
SR2	58+30.00	70.00	454285.3027	1767322.4283
SR2	28+84.00	70.00	452199.5568	1766817.4726
SR2	23+61.18	70.00	451691.4150	1766694.4523
SR2	18+27.10	70.00	451219.5285	1766748.4850
SR2	16+27.30	70.00	451040.9513	1766838.8370
SR2	11+50.00	70.00	450541.0010	1766666.6248
SR2	16+27.30	-75.00	450975.9236	1766700.4460
SR2	19+50.00	-70.00	451281.0047	1766573.0121
SR2	12+97.31	-75.00	450741.5422	1766888.5269
SR2	87+00.00	70.00	457738.7313	1768479.7071
SR2	42+00.00	70.00	453478.6070	1767127.1286
SR2	102+20.00	70.00	459121.9091	1769112.8586
SR2	102+20.00	102.00	459108.9558	1769141.3197
SR2	17+00.00	-96.00	451835.9423	1766666.0010
SR2	107+96.20	110.00	459643.9494	1769367.6610
SR2	18+27.10	-70.00	451156.7132	1766623.2839
SR2	38+16.82	70.00	452328.6513	1766848.7260
SR2	51+56.61	70.00	454489.3569	1767352.2198

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
SR4	128+44.90	105.00	470875.3535	1768567.0415
SR4	128+86.41	-145.00	470705.0516	1768380.0150
SR4	110+20.00	-70.00	469258.0143	1769438.2378
SR4	101+93.40	-70.00	468517.0665	1769612.6920
SR4	93+83.68	-70.00	467691.7378	1769527.4825
SR4	84+47.33	-70.00	466774.0878	1769458.8553
SR4	41+96.31	-70.00	462527.6818	1769262.7558
SR4	38+55.10	-70.00	462189.9645	1769240.3657
SR4	35+77.47	-70.00	461913.3650	1769216.4388
SR4	27+33.11	-70.00	461182.0027	1768917.6478
SR4	17+05.35	-70.00	460388.9593	1768263.9130
SR4	10+66.35	-70.00	459714.3793	1768174.5040
SR4	10+57.00	70.00	459797.0015	1768291.5455
SR4	17+05.35	70.00	460299.9882	1768371.9405
SR4	111+00.00	-70.00	469324.6732	1769386.0040
SR4	111+00.00	-60.00	469338.2823	1769394.3373
SR4	108+70.00	80.00	469282.4578	1769635.1388
SR4	10+82.00	70.00	459436.2157	1768494.3037
SR4	127+75.00	60.00	470725.8773	1768468.2073
SR4	128+00.00	60.00	470813.0578	1768554.3730
SR4	55+50.00	-70.00	463879.8457	1769325.2014
SR4	70+00.00	-70.00	465328.3821	1769392.8908
SR4	120+00.00	60.00	470898.1173	1768896.7158
SR4	120+00.00	60.00	470146.4668	1768996.7038
SR4	111+00.00	60.00	469396.5519	1769494.3258
SR4	110+25.00	70.00	469339.5881	1769544.1267

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
SR5	126+27.28	50.00	470718.3673	1770579.4071
SR5	19+91.00	70.00	460761.7394	1770581.1695
SR5	21+60.25	70.00	460884.6985	1770415.9108
SR5	22+84.51	70.00	460928.1823	1770299.5070
SR5	29+21.81	70.00	461313.9888	1769882.1782
SR5	32+01.50	70.00	461567.5065	1769764.8550
SR5	38+91.01	70.00	462204.6280	1769638.2567
SR5	84+47.33	70.00	466756.0972	1769848.4480
SR5	93+49.47	70.00	467651.6480	1769915.3368
SR5	117+19.44	70.00	470009.0626	1770158.9518
SR5	20+24.10	-75.00	460681.7870	1770459.5501
SR5	24+58.00	-60.00	460984.8746	1770095.0185
SR5	22+84.51	-75.00	460792.3535	1770240.7575
SR5	21+60.25	-75.00	460748.8616	1770365.1613
SR5	54+40.00	70.00	463751.9721	1769709.7119
SR5	69+00.00	70.00	465210.4178	1769777.8618
SR5	117+85.00	70.00	470069.4619	1770167.2017
SR5	127+43.48	50.00	470780.8983	1770677.8598
SR5	122+75.00	50.00	470494.8270	1770332.6778
SR5	102+00.00	70.00	468497.6713	1770002.7647
SR5	127+12.79	-50.00	470948.5184	1770598.7450
SR5	126+27.28	-50.00	470883.8934	1770526.2894
SR5	124+80.19	-50.00	470711.7457	1770401.9292
SR5	120+25.00	125.00	470261.0730	1770281.0333
SR5	87+29.75	70.00	467836.8457	1769863.9085
SR5	88+29.75	70.00	467136.1807	1769878.5825
SR5	88+29.75	170.00	467129.1629	1769978.3360
SR5	87+29.75	170.00	467830.4564	1769963.7042

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y10	24+50.00	-100.00	459007.8398	1768367.6050
Y10	24+50.00	100.00	459630.1980	1768459.4928
Y10	24+50.00	60.00	459665.7263	1768441.1153
Y10	13+00.00	-60.00	459128.2860	1767422.9112
Y10	14+33.64	-60.00	459208.4335	1767529.8517
Y10	15+77.62	-60.00	459294.2120	1767647.3538
Y10	19+12.71	-60.00	459488.3735	1767928.4623
Y10	21+50.00	-60.00	459621.8368	1768121.1070
Y10	13+00.00	-29.99	459184.2680	1767448.9120
Y10	13+00.00	30.02	459856.2553	1767476.8953
Y10	13+00.00	60.00	459832.2610	1767494.8778
Y10	14+33.64	60.00	459112.4885	1767601.8183
Y10	15+77.62	60.00	459196.4090	1767716.8848
Y10	19+12.71	60.00	459398.5705	1767989.9933
Y10	56+50.00	-60.00	461202.9977	1771205.8308
Y10	58+19.91	-60.00	460912.7660	1770711.1215
Y10	58+19.91	60.00	460718.5495	1770785.4485
Y10	56+50.00	60.00	461100.7810	1771208.1498
Y10	56+85.00	30.17	461154.8959	1771289.3299
Y10	56+85.00	-29.83	461200.8678	1771251.7468
Y10	26+96.46	-100.00	459417.5368	1768997.7197
Y10	29+49.28	100.00	459824.7630	1768904.7018

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y13	15+28.28	-30.00	450471.6998	1766625.7233
Y13	13+85.95	-52.01	450694.9500	1766574.9870

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y14	13+25.00	-50.00	452389.1107	1767065.8440
Y14	11+59.41	-50.00	452336.0605	1766908.9830
Y14	13+25.00	-30.02	452370.1815	1767072.2461
Y14	13+25.00	29.98	452313.3440	1767091.4688
Y14	13+25.00	50.00	452294.3820	1767097.8820
Y14	11+59.41	50.00	452241.3368	1766941.0187

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y15	16+55.00	-40.00	452392.8498	1766276.9964
Y15	17+00.00	60.00	452305.6418	1766343.4788
Y15	17+00.00	-60.00	452422.5225	1766316.2963
Y15	11+00.00	-30.13	452257.5180	1765738.6583
Y15	14+55.00	-40.00	452347.5453	1766082.1951
Y15	13+05.00	40.00	452235.6467	1765954.2155
Y15	11+77.59	30.06	452216.4635	1765827.8628

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y16	12+60.50	50.00	454347.1388	1767539.5248
Y16	12+60.00	-50.00	454440.4790	1767502.1380
Y16	12+50.00	-29.65	454428.8978	1767507.6923
Y16	11+50.88	-50.00	454413.4295	1767406.7800
Y16	11+50.88	50.00	454317.2258	1767434.8657

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y17	10+75.00	-29.92	456334.9865	1767109.6478
Y17	11+15.00	-70.00	456318.9165	1767163.9438

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y18	12+40.00	28.82	470059.1584	1770237.1067
Y18	13+70.00	-31.76	469949.2807	1770328.7632

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y19	11+75.00	65.00	469336.3749	1769705.0534
Y19	12+75.00	-25.00	469462.1447	1769639.7934
Y19	12+75.00	25.00	469458.5933	1769689.6671

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y8	12+50.00	30.37	454319.7610	1765127.1263
Y8	10+00.00	-29.47	454037.5679	1765602.9914
Y8	10+00.00	30.53	453989.5728	1765566.9850
Y8	10+00.00	50.00	453937.9942	1765603.2979
Y8	10+00.00	-50.00	454005.9841	1765679.3069

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y8REV	39+00.00	80.00	452854.3193	1765534.2545
Y8REV	39+00.00	-80.00	452717.8548	1765681.4426
Y8REV	14+70.46	50.00	454878.9408	1764324.9291
Y8REV	27+87.93	120.00	453861.6555	1765061.4248
Y8REV	27+87.93	-120.00	453955.7575	1765282.2071
Y8REV	32+00.00	120.00	453482.5839	1765222.9931
Y8REV	40+25.00	-60.00	452794.2214	1765712.8555
Y8REV	21+50.00	-135.00	453628.5638	1765437.9896
Y8REV	41+00.00	60.00	452678.1759	1765631.8713
Y8REV	60+03.00	60.00	450870.5339	1766147.4198
Y8REV	56+68.65	60.00	451284.4572	1765968.5065
Y8REV	54+89.71	60.00	451382.5393	1765977.9463
Y8REV	56+68.65	-60.00	451192.7612	1766079.9350
Y8REV	59+00.00	-60.00	451026.2530	1766135.6738
Y8REV	54+89.71	-60.00	451370.8433	1766097.3748
Y8REV	19+60.00	50.00	454564.8614	1764685.7778
Y8REV	46+88.87	-60.00	452183.5062	1765972.3553
Y8REV	46+88.87	60.00	452136.4590	1765961.9827
Y8REV	59+00.00	60.00	450945.0139	1766047.3550
Y8REV	59+38.00	85.00	450900.6928	1766057.8658
Y8REV	23+75.00	120.00	454207.1848	1764877.1957
Y8REV	13+25.00	-29.84	455827.9438	1764251.9189
Y8REV	13+25.00	30.16	454978.8740	1764217.3911
Y8REV	14+70.46	-50.00	454968.7237	1764382.4852
Y8REV	17+80.95	50.00	454761.8827	1764629.1127
Y8REV	36+00.00	-100.00	453200.8736	1765582.2136
Y8REV	36+50.00	100.00	453076.4590	1765417.8330
Y8REV	23+75.00	-95.00	454324.4286	1765057.4147
Y8REV	45+15.00	60.00	452296.4067	1765793.7894
Y8REV	45+35.00	-60.00	452325.0591	1765912.0224

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y9NBL	55+85.94	-50.00	451263.8162	1766470.1195

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y9SBL	52+91.80	294.70	452313.7960	1766290.2479
Y9SBL	50+81.93	100.00	452471.9587	1766528.8655
Y9SBL	52+16.25	100.00	452341.4055	1766497.2590
Y9SBL	9+25.00	125.00	456264.2641	1767219.3282
Y9SBL	45+58.75	100.00	452980.4493	1766651.9705
Y9SBL	42+78.75	100.00	453246.8694	1766789.7100
Y9SBL	63+36.83	60.00	451242.8758	1766272.4623
Y9SBL	65+25.00	60.00	451061.2685	1766226.9833
Y9SBL	2+75.00	125.00	456761.5675	1767575.8958
Y9SBL	4+75.00	125.00	456593.3483	1767479.6218
Y9SBL	11+84.94	125.00	456098.2125	1767033.2588
Y9SBL	15+84.94	125.00	455840.5185	1766727.3270
Y9SBL	17+84.94	125.00	455694.7172	1766568.6685
Y9SBL	68+00.00	50.00	450734.6840	1766164.1775
Y9SBL	25+70.72	160.00	454842.1933	1766314.8485
Y9SBL	24+00.00	125.00	455845.7523	1766323.3850
Y9SBL	27+70.72	140.00	454640.4325	1766402.2718
Y9SBL	0+00.00	125.00	457003.0282	1767786.7878
Y9SBL	52+16.25	60.00	452331.9935	1766536.1367
Y9SBL	40+80.00	455.00	453455.2869	1766376.4289
Y9SBL	42+22.40	106.81	453300.5810	1766710.9170
Y9SBL	10+60.22	125.00	456177.5479	1767126.1782

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y10RPA	19+00.00	120.00	460433.8652	1768529.7137
Y10RPA	22+15.59	120.00	460085.2473	1768562.3778
Y10RPA	20+15.59	120.00	460299.8673	1768528.8118

ROW MARKER CONCRETE OR GRANITE-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y10RPD	19+12.75	-120.00	460537.1925	1770211.8190
Y10RPD	15+58.00	-120.00	460866.8033	1770057.8145

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
L	372+05.00	-175.00	453117.5063	1764750.3382
L	372+85.00	-198.00	453130.6243	1764743.0200
L	372+31.00	-210.00	453160.3247	1764755.1163
L	372+55.00	-210.00	453171.7262	1764775.2299
L	372+55.00	-175.00	453141.3148	1764792.5533
L	426+50.00	-175.00	457311.8114	1767852.1003
L	426+50.00	-195.00	457320.1347	1767833.9150
L	427+75.00	-195.00	457433.7953	1767885.9368
L	427+94.00	-240.00	457469.7997	1767852.9260
L	428+35.00	-240.00	457507.0804	1767869.9891
L	428+35.00	-175.00	457480.0298	1767929.8026
L	428+35.00	-195.00	457488.3524	1767910.9873
L	447+40.00	-175.40	459211.8927	1768721.2060
L	447+40.00	-198.00	459221.2274	1768700.6296
L	448+10.00	-194.00	459282.8953	1768732.3815
L	449+50.00	-175.00	459399.1486	1768803.5130
L	385+52.00	-309.41	453988.3783	1765714.6276
L	425+00.00	-195.00	457183.7424	1767771.4882
L	385+43.00	198.00	453606.6872	1766046.8581
L	385+80.00	-198.00	453923.3561	1765816.9986
L	385+28.00	198.00	453956.2238	1766834.6270
L	385+28.00	175.00	453607.3804	1766824.5130
L	373+72.00	-180.00	453202.7506	1764887.9686
L	374+12.00	-195.00	453235.5517	1764913.3866
L	374+28.00	-175.00	453222.4776	1764930.3867
L	373+72.00	-175.00	453198.4574	1764898.5316
L	433+00.00	-195.00	457911.1699	1768104.4281
L	439+75.00	-195.00	458524.9374	1768385.3461
L	439+75.00	-175.00	458516.6139	1768403.5319
L	393+55.00	-197.00	454461.0007	1766322.5853

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
SR2	17+96.00	70.00	451191.7227	1766762.3578
SR2	17+96.00	80.00	451196.2088	1766771.2951
SR2	18+27.10	80.00	451224.0065	1766757.3422
SR2	75+00.00	70.00	456647.5895	1767980.2979
SR2	79+75.00	180.00	457063.6853	1768212.5333
SR2	80+55.00	100.00	457139.7573	1768238.5533
SR2	88+36.00	70.00	457862.3940	1768536.3065
SR2	89+81.00	70.00	457983.3118	1768555.0347
SR2	89+56.00	70.00	457971.5882	1768586.2478
SR2	90+00.00	70.00	458011.5167	1768604.5595
SR2	66+89.73	90.00	455893.7287	1767732.4835
SR2	74+22.05	90.00	456568.3877	1767966.0430
SR2	69+35.00	90.00	456124.5245	1767796.1867
SR2	71+80.00	90.00	456350.5089	1767874.5533
SR2	59+25.00	90.00	455158.4673	1767552.4613
SR2	44+35.00	90.00	453702.3827	1767201.8631
SR2	88+36.00	90.00	457854.0704	1768554.4929
SR2	88+81.00	90.00	457894.9882	1768573.2207
SR2	89+56.00	90.00	457963.1846	1768604.4338
SR2	90+00.00	90.00	458003.1931	1768622.7455
SR2	101+15.77	90.00	459017.7422	1769087.0991
SR2	102+20.00	122.00	459100.8598	1769159.6082
SR2	95+63.00	90.00	458515.1204	1768857.0518
SR2	105+96.20	130.00	459458.3422	1769313.6558
SR2	107+96.20	130.00	459636.6854	1769386.2956
SR2	115+89.96	90.00	460069.6718	1769870.8543
SR2	114+00.00	90.00	460023.7675	1769789.5109
SR2	112+00.00	90.00	459933.9522	1769558.3791
SR2	109+90.00	90.00	459800.8876	1769430.5952
SR2	122+70.00	94.26	460177.0729	1770957.5948
SR2	123+41.00	95.00	460226.5378	1770649.1316
SR2	124+15.00	95.00	460309.1345	1770719.5305
SR2	124+89.00	95.00	460411.6800	1770755.2973
SR2	125+63.00	95.00	460520.0051	1770751.5985
SR2	126+23.00	92.00	460600.8053	1770717.1717
SR2	75+00.00	90.00	456639.2668	1767998.4836
SR2	75+00.00	189.00	456631.3587	1768015.7600
SR2	81+70.00	70.00	457256.8103	1768259.1349
SR2	88+95.00	90.00	457108.2484	1768248.1075
SR2	38+30.00	90.00	453114.2895	1767859.5060
SR2	38+30.00	70.00	453118.9955	1767840.0675
SR2	37+45.00	90.00	453031.6761	1767839.5854
SR2	37+45.00	70.00	453036.3821	1767820.0669
SR2	50+41.35	90.00	454291.6243	1767344.5366

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R3421-11" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 438375.9441(ft) EASTING: 1746551.2575(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987565
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R3421-11" TO -L- STATION 355+00.00
N 50° 11' 10.4" E 21758.370'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

● ***INDICATES CONTROL MONUMENTS SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.***

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION.

SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

NOTES

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 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 BASE 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:

   R3421A_LS_GPSCALIB_041207.HTML
   R3421A_LS_WGS84_041207.TXT
   R3421A_LS_LOCAL_041207.TXT
   R3421A_LS_CONTROL_041207.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.

7/2/99

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1H	
LOCATION AND SURVEYS			

SURVEY CONTROL SHEET

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
SR4	34+25.00	-106.00	461777.0032	1769160.8134
SR4	34+25.00	-70.00	461770.0207	1769196.1297
SR4	56+15.00	-70.00	463944.7765	1769328.1999
SR4	56+15.00	-90.00	463945.6991	1769308.2215
SR4	56+40.00	-90.00	463970.6725	1769309.3748
SR4	56+40.00	-70.00	463969.7499	1769329.3531
SR4	62+45.00	-90.00	464575.0284	1769337.2835
SR4	62+83.00	-90.00	464612.9880	1769339.8364
SR4	62+83.00	-70.00	464612.8654	1769359.8147
SR4	62+45.00	-70.00	464574.1058	1769357.2618
SR4	109+15.00	-70.00	469173.3424	1769481.2353
SR4	109+48.00	-70.00	469200.4300	1769466.0805
SR4	109+48.00	-105.00	469182.8618	1769435.7375
SR4	109+15.00	-105.00	469156.6132	1769450.4526
SR4	117+64.00	-60.00	469883.4728	1769827.2027
SR4	117+64.00	-75.00	469875.1791	1769814.7841
SR4	118+58.00	-75.00	469953.5835	1768962.7382
SR4	118+58.00	-60.00	469961.7974	1768975.2291
SR4	108+55.00	-90.00	469114.3986	1769488.9667
SR4	111+50.00	-75.00	469363.5786	1769354.1929
SR4	53+28.00	-90.00	463651.8131	1769254.6131
SR4	53+28.00	-70.00	463658.0985	1769314.5918
SR4	86+00.00	-90.73	466928.3772	1769445.9595
SR4	70+00.00	-90.00	465329.2247	1769372.1117
SR4	76+40.00	-70.00	465967.6288	1769421.6132
SR4	76+40.00	-90.00	465968.5434	1769401.6345
SR4	77+40.00	-70.00	466067.5143	1769426.2262
SR4	77+40.00	-90.00	466068.4389	1769406.2475
SR4	78+00.00	-90.00	466128.3747	1769389.8159
SR4	85+85.00	-91.00	467234.4599	1769465.6310
SR4	92+10.00	-90.74	467540.0788	1769491.6232
SR4	101+93.40	-90.00	468519.1223	1769592.7983
SR4	104+15.00	-90.00	468723.7970	1769594.9767
SR4	106+35.00	-90.00	468923.9663	1769659.9242
SR4	30+00.00	-70.00	461391.7890	1769859.3567
SR4	30+88.00	-87.00	461466.7982	1769878.4157
SR4	32+25.00	-118.00	461602.8092	1769100.8286
SR4	94+00.00	-70.00	467727.8664	1769531.1365
SR4	94+00.00	-90.00	467729.9223	1769511.2421
SR4	95+10.00	-90.00	467839.3396	1769522.5493
SR4	95+10.00	-70.00	467837.2837	1769542.4434
SR4	122+50.00	-75.00	470280.1331	1768745.9882
SR4	122+50.00	-60.00	470288.4268	1768758.4868
SR4	109+15.00	-91.00	469163.3047	1769462.7895
SR4	109+48.00	-91.00	469189.8890	1769447.8457
SR4	110+45.19	67.31	469354.9201	1769530.7230

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
SR5	23+30.00	70.00	460943.8184	1770260.9548
SR5	23+65.00	70.00	460957.2899	1770231.9178
SR5	23+30.00	85.00	460957.5573	1770266.9760
SR5	23+65.00	85.00	460970.7590	1770236.5196
SR5	29+45.00	70.00	461335.0068	1769872.3856
SR5	30+30.00	70.00	461412.0539	1769836.4865
SR5	35+30.00	70.00	461863.3012	1769665.6492
SR5	35+70.00	70.00	461900.6485	1769658.3778
SR5	35+70.00	105.00	461906.8491	1769592.8228
SR5	78+30.00	70.00	466139.4278	1769819.9627
SR5	78+30.00	80.00	466138.9865	1769829.9521
SR5	82+50.00	70.00	466558.9807	1769839.3373
SR5	82+50.00	80.00	466558.5194	1769849.3267
SR5	93+98.00	70.00	467694.9196	1769920.3251
SR5	95+58.00	70.00	467859.0721	1769936.7719
SR5	93+98.00	150.00	467891.6962	1769999.9213
SR5	95+58.00	150.00	467850.8487	1770016.3481
SR5	101+90.00	70.00	468487.7243	1770001.7367
SR5	102+93.00	70.00	468598.1787	1770012.3244
SR5	101+90.00	115.00	468483.0986	1770046.4984
SR5	102+93.00	115.00	468595.5530	1770057.0860
SR5	116+77.00	70.00	469966.8474	1770154.5893
SR5	116+77.00	80.00	469965.8194	1770164.5363
SR5	117+00.00	70.00	469989.7255	1770156.9535
SR5	117+00.00	80.00	469988.6976	1770166.9005
SR5	117+63.00	70.00	470049.2557	1770163.9920
SR5	19+86.67	90.00	460769.3187	1770600.4724
SR5	20+30.00	94.00	460814.9256	1770566.7677
SR5	21+16.00	94.00	460882.9011	1770477.0586
SR5	22+84.51	90.00	460946.9171	1770386.0073
SR5	33+80.00	70.00	461725.4562	1769702.1350
SR5	32+01.50	90.00	461575.9535	1769782.1840
SR5	27+63.00	90.00	461200.8459	1769972.0175
SR5	26+83.00	90.00	461014.6131	1770066.5646
SR5	24+44.00	90.00	461004.1948	1770179.1564
SR5	33+80.00	140.00	461746.8902	1769768.7723
SR5	31+80.00	70.00	461548.0194	1769773.1353
SR5	30+30.00	90.00	461420.5087	1769854.6153
SR5	29+45.00	90.00	461343.4536	1769890.5143
SR5	35+30.00	110.00	461871.4950	1769704.8089
SR5	32+80.00	130.00	461658.3294	1769790.0916
SR5	38+30.00	77.00	462146.6053	1769643.8169
SR5	39+50.00	74.00	462263.3737	1769644.9743
SR5	38+30.00	70.00	462146.6297	1769636.8169
SR5	40+85.00	90.00	462397.4919	1769667.1844
SR5	42+00.00	70.00	462513.2921	1769652.5107
SR5	52+42.00	70.00	463554.1828	1769700.5785
SR5	53+10.00	98.00	463620.8188	1769731.6856
SR5	54+55.00	90.00	463766.0335	1769730.3829
SR5	54+90.00	70.00	463801.9188	1769712.0188

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
Y10	24+50.00	120.00	459612.4339	1768468.6818
Y10	27+00.00	120.00	459716.5698	1768687.2441
Y10	29+49.55	120.00	459805.7188	1768918.8271
Y10	15+00.00	60.00	459151.4836	1767654.5903
Y10	15+00.00	100.00	459119.1996	1767678.2069
Y10	15+30.00	100.00	459136.5485	1767702.8427
Y10	15+30.00	60.00	459168.9477	1767678.5995
Y10	50+23.00	80.00	460704.7629	1770800.2558
Y10	56+50.00	80.00	461093.0780	1771292.5364
Y10	57+10.00	30.07	461170.3119	1771389.0121
Y10	21+00.00	60.00	459493.6613	1768142.7992
Y10	21+25.00	80.00	459489.9324	1768174.2379

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
Y14	11+05.27	-50.00	452328.3847	1766869.2396

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
Y16	11+04.72	-50.00	454487.8917	1767372.6847

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
Y18	12+61.00	28.73	470037.9846	1770241.5374

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
Y19	13+10.86	-25.00	469497.9189	1769642.3408

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
Y8	14+25.00	-50.00	454279.8324	1765315.3491
Y8	17+00.00	-50.00	454114.0032	1765535.3212
Y8	17+00.00	-29.50	454097.6021	1765523.8170
Y8	11+50.00	-61.00	454456.7073	1765077.7023
Y8	11+88.00	-55.00	454425.2583	1765128.7689
Y8	14+25.00	-29.50	454262.6963	1765303.8076
Y8	11+20.00	-66.77	454467.9313	1765029.6843
Y8	13+85.00	30.41	454238.7148	1765235.8916
Y8	13+85.00	70.00	454207.0462	1765211.3336
Y8	14+20.00	70.00	454186.8425	1765239.3388
Y8	14+20.00	30.42	454217.7828	1765263.8826

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
Y8REV	16+50.00	-72.00	454886.6533	1764542.2610
Y8REV	14+70.46	-70.00	454977.0820	1764393.9914
Y8REV	13+25.00	-50.00	455044.4321	1764263.5287
Y8REV	38+44.00	-130.61	453724.3536	1765392.3683
Y8REV	38+44.00	-145.00	453729.9964	1765405.6073
Y8REV	38+69.00	-145.00	453706.9982	1765415.4096
Y8REV	38+69.00	-131.64	453701.7615	1765403.1234
Y8REV	41+85.92	-75.00	452725.6580	1765757.5843
Y8REV	18+10.00	50.00	454668.9169	1764582.2014
Y8REV	18+10.00	70.00	454654.3669	1764568.4792
Y8REV	18+20.00	70.00	454647.6932	1764575.5257
Y8REV	18+20.00	50.00	454662.1852	1764589.3091
Y8REV	40+95.89	-60.00	452725.3247	1765741.4288
Y8REV	45+39.18	-75.00	452327.0988	1765927.4587
Y8REV	21+00.00	-131.00	454577.5932	1764915.6438
Y8REV	17+80.00	-70.00	454777.2637	1764641.9332

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
Y9NBL	65+50.00	-79.51	450251.5355	1766208.2649
Y9NBL	65+00.00	-103.00	450292.9288	1766244.8500
Y9NBL	64+00.00	-113.00	450386.0969	1766282.5269
Y9NBL	62+50.00	-100.00	450533.7125	1766312.1687
Y9NBL	61+35.00	-80.11	450649.6702	1766325.3723
Y9NBL	55+45.00	-56.27	451224.3745	1766465.8255
Y9NBL	55+45.00	-125.00	451286.2968	1766532.1311
Y9NBL	55+00.00	-102.27	451255.9839	1766522.0573
Y9NBL	54+80.00	-107.17	451274.1532	1766532.0107
Y9NBL	55+81.00	-83.32	451182.3589	1766482.3573
Y9NBL	56+17.00	-83.02	451147.6573	1766472.4353

PERMANENT EASEMENTS REBAR

ALIGN	STATION	OFFSET	NORTH	EAST
Y9SBL	58+30.00	60.00	451735.4794	1766391.7212
Y9SBL	57+35.00	112.00	451840.8478	1766363.5344
Y9SBL	57+22.00	107.00	451851.5063	1766371.4529
Y9SBL	57+22.00	60.00	451840.4472	1766417.1332
Y9SBL	44+00.00	102.55	453133.2780	1766885.0905
Y9SBL	44+00.00	165.00	453146.5310	1766624.0651
Y9SBL	43+55.00	165.00	453188.1100	1766632.7828
Y9SBL	43+43.00	132.71	453192.8925	1766666.6564
Y9SBL	57+63.19	80.00	451805.1191	1766388.0030
Y9SBL	57+22.00	80.00	451845.1531	1766397.6952
Y9SBL	59+15.00	60.00	451652.8661	1766371.7202
Y9SBL	45+58.75	125.00	452986.3319	1766627.6724
Y9SBL	43+43.00	102.06	453186.9834	1766696.7316
Y9SBL	65+39.36	80.00	451052.4639	1766284.8398
Y9SBL	63+36.83	80.00	451247.5859	1766253.0252
Y9SBL	25+70.00	181.00	454838.1280	1766294.2272
Y9SBL	18+00.00	145.00	455695.1117	1766542.0336
Y9SBL	21+60.00	150.00	455326.8236	1766334.3414
Y9SBL	23+25.00	150.00	455134.1808	1766308.5130
Y9SBL	7+00.00	145.00	456433.5348	1767343.4915
Y9SBL	4+75.00	145.00	456603.8183	1767462.5850
Y9SBL	2+75.00	145.00	456771.1395	1767557.5346
Y9SBL	0+00.00	145.00	457012.6000	1767689.1470
Y9SBL	47+90.00	120.00	452768.3970	1766578.1186
Y9SBL	47+90.00	100.00	452755.6918	1766597.5571
Y9SBL	44+00.00	131.73	453139.4673	1766656.5735
Y9SBL	24+80.00	159.00	454949.3644	1766296.3999
Y9SBL	24+80.00	174.00	454947.5223	1766281.5834
Y9SBL	24+71.00	173.00	454958.5169	1766281.2134
Y9SBL	24+71.00	157.00	454958.3819	1766297.1136
Y9SBL	23+15.00	150.00	455146.8286	1766301.4259
Y9SBL	23+15.00	165.00	455147.2672	1766286.4778
Y9SBL	23+25.00	165.00	455135.2485	1766285.5585
Y9SBL	21+50.00	150.00	455338.2251	1766337.6595
Y9SBL	21+50.00	165.00	455342.5965	1766323.2836
Y9SBL	21+60.00	165.00	455338.9246	1766319.9129
Y9SBL	19+25.00	150.00	455588.2812	1766448.6948
Y9SBL	19+15.00	150.00	455590.2339	1766455.1723
Y9SBL	19+15.00	165.00	455598.4945	1766442.6517
Y9SBL	19+25.00	165.00	455588.3846	1766436.0728
Y9SBL	20+37.50	145.00	455461.8783	1766389.1979
Y9SBL	14+80.00	145.00	455974.9598	1766855.8896
Y9SBL	13+90.00	145.00	455981.4822	1766863.5379
Y9SBL	13+90.00	160.00	455992.8746	1766853.8743
Y9SBL	14+00.00	160.00	455986.4322	1766846.2261
Y9SBL	16+85.00	145.00	455787.5858	1766635.1702
Y9SBL	16+75.00	145.00	455794.8143	1766643.2762
Y9SBL	16+75.00	160.00	455806.0381	1766633.3251
Y9SBL	16+85.00	160.00	455798.7495	1766625.1525
Y9SBL	28+35.00	190.00	454562.6247	1766378.2333
Y9SBL	28+80.00	166.00	454728.3783	1766345.1425
Y9SBL	52+16.25	80.00	452336.7029	1766516.6986
Y9SBL	9+25.18	145.00	456278.3126	1767205.0916
Y9SBL	68+32.00	110.00	450788.3065	1766898.6171
Y9SBL	68+00.00	126.00	450807.5472	1766889.7473
Y9SBL	67+72.00	65.83	450825.5598	1766157.3560
Y9SBL	59+50.00	60.00	451618.8488	1766363.4847
Y9SBL	59+50.00	80.00	451623.5547	1766344.0466
Y9SBL	59+15.00	100.00	451662.2781	1766332.8433
Y9SBL	59+07.00	110.00	451672.4865	1766325.0865
Y9SBL	59+07.00	155.00	451682.9951	1766281.2700
Y9SBL	59+73.00	130.00	451612.9656	1766298.0382
Y9SBL	59+46.00	172.00	451649.8982	1766255.5706
Y9SBL	59+87.00	130.00	451599.3587	1766286.7448
Y9SBL	59+87.00	172.00	451629.2414	1766245.9232
Y9SBL	59+15.00	80.00	451657.5720	1766352.2821
Y9SBL	42+66.00	132.00	453263.8153	1766698.8416
Y9SBL	18+55.61	144.00	456194.7269	1767116.9341
Y9SBL	50+91.99	120.00	452466.8875	1766507.0600
Y9SBL	50+94.50	125.00	452465.6197	1766501.6886

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R3421-11"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 438375.9441(ft) EASTING: 1746551.2575(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987565
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"R3421-11" TO -L- STATION 355+00.00
N 50° 11' 10.4" E 21758.370'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

● ***INDICATES CONTROL MONUMENTS SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.***

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION.

SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

NOTES

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 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 BASE 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:

   R3421A_LS_GPSCALIB_041207.HTML
   R3421A_LS_WGS84_041207.TXT
   R3421A_LS_LOCAL_041207.TXT
   R3421A_LS_CONTROL_041207.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.

PROJ. REFERENCE NO.	SHEET NO.
R-3421C	1-I

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CENTERLINE COORDINATE LIST

Point #	Chain	Station	Northing (Y)	Easting (X)
1	L	354+00.00	452272.7435	1763170.8182
2	L	355+00.00	452307.7034	1763264.5081
3	L	356+00.00	452342.6633	1763358.1980
4	L	357+00.00	452377.6233	1763451.8880
5	L	358+00.00	452412.5832	1763545.5779
6	L	359+00.00	452447.5431	1763639.2678
7	L	360+00.00	452482.5030	1763732.9578
8	L	361+00.00	452517.4630	1763826.6477
9	L	362+00.00	452552.4229	1763920.3376
10	L	363+00.00	452587.4209	1764014.0133
11	L	364+00.00	452622.9585	1764107.4852
12	L	365+00.00	452659.8034	1764200.4487
13	L	366+00.00	452698.2596	1764292.7573
14	L	367+00.00	452738.3208	1764384.3806
15	L	368+00.00	452779.9751	1764475.2908
16	L	369+00.00	452823.2096	1764565.4603
17	L	370+00.00	452868.0112	1764654.8614
18	L	371+00.00	452914.3662	1764743.4670
19	L	372+00.00	452962.2606	1764831.2501
20	L	373+00.00	453011.6797	1764918.1840
21	L	374+00.00	453062.6084	1765004.2422
22	L	375+00.00	453115.0313	1765089.3984
23	L	376+00.00	453168.9325	1765173.6268
24	L	377+00.00	453224.2954	1765256.9016
25	L	378+00.00	453281.1032	1765339.1975
26	L	379+00.00	453339.3386	1765420.4894
27	L	380+00.00	453398.9839	1765500.7527
28	L	381+00.00	453460.0209	1765579.9627
29	L	382+00.00	453522.4310	1765658.0954
30	L	383+00.00	453586.1952	1765735.1271
31	L	384+00.00	453651.2941	1765811.0341
32	L	385+00.00	453717.7079	1765885.7935
33	L	386+00.00	453785.4162	1765959.3824
34	L	387+00.00	453854.3985	1766031.7784
35	L	388+00.00	453924.6339	1766102.9595
36	L	389+00.00	453996.1008	1766172.9040
37	L	390+00.00	454068.7775	1766241.5905
38	L	391+00.00	454142.6419	1766308.9982
39	L	392+00.00	454217.6714	1766375.1065
40	L	393+00.00	454293.8433	1766439.8953
41	L	394+00.00	454371.1343	1766503.3449
42	L	395+00.00	454449.5209	1766565.4359
43	L	396+00.00	454528.9792	1766626.1494
44	L	397+00.00	454609.4850	1766685.4669
45	L	398+00.00	454691.0137	1766743.3703
46	L	399+00.00	454773.5406	1766799.8421
47	L	400+00.00	454857.0405	1766854.8649
48	L	401+00.00	454941.4879	1766908.4221
49	L	402+00.00	455026.8572	1766960.4974
50	L	403+00.00	455113.1224	1767011.0748
51	L	404+00.00	455200.2570	1767060.1389
52	L	405+00.00	455288.2347	1767107.6749
53	L	406+00.00	455377.0287	1767153.6683
54	L	407+00.00	455466.6117	1767198.1049
55	L	408+00.00	455556.9346	1767241.0185
56	L	409+00.00	455647.7341	1767282.9163
57	L	410+00.00	455738.6610	1767324.5370
58	L	411+00.00	455829.5895	1767366.1545
59	L	412+00.00	455920.5180	1767407.7719
60	L	413+00.00	456011.4465	1767449.3894
61	L	414+00.00	456102.3749	1767491.0068
62	L	415+00.00	456193.3034	1767532.6243
63	L	416+00.00	456284.2319	1767574.2418
64	L	417+00.00	456375.1603	1767615.8592
65	L	418+00.00	456466.0888	1767657.4767
66	L	419+00.00	456557.0173	1767699.0942
67	L	420+00.00	456647.9458	1767740.7116
68	Y8REV	13+00.00	455017.9274	1764214.3022
69	Y8REV	14+00.00	454960.3813	1764296.0851
70	Y8REV	15+00.00	454902.6854	1764377.7617
71	Y8REV	16+00.00	454842.4376	1764457.5660
72	Y8REV	17+00.00	454778.8841	1764534.7636
73	Y8REV	18+00.00	454712.1374	1764609.2177
74	Y8REV	19+00.00	454642.3160	1764680.7962
75	Y8REV	20+00.00	454569.5434	1764749.3722
76	Y8REV	21+00.00	454493.9488	1764814.8243
77	Y8REV	22+00.00	454415.6661	1764877.0364
78	Y8REV	23+00.00	454334.8341	1764935.8983
79	Y8REV	24+00.00	454251.5961	1764991.3055
80	Y8REV	25+00.00	454166.0997	1765043.1599
81	Y8REV	26+00.00	454078.4963	1765091.3695

Point #	Chain	Station	Northing (Y)	Easting (X)
82	Y8REV	27+00.00	453988.9413	1765135.8489
83	Y8REV	28+00.00	453897.6053	1765176.5475
84	Y8REV	29+00.00	453805.6127	1765215.7567
85	Y8REV	30+00.00	453713.6201	1765254.9659
86	Y8REV	31+00.00	453621.6275	1765294.1751
87	Y8REV	32+00.00	453529.6349	1765333.3843
88	Y8REV	33+00.00	453437.6423	1765372.5934
89	Y8REV	34+00.00	453345.6497	1765411.8026
90	Y8REV	35+00.00	453253.6571	1765451.0118
91	Y8REV	36+00.00	453161.6644	1765490.2210
92	Y8REV	37+00.00	453069.6718	1765529.4302
93	Y8REV	38+00.00	452977.6792	1765568.6394
94	Y8REV	39+00.00	452885.6866	1765607.8485
95	Y8REV	40+00.00	452793.6940	1765647.0577
96	Y8REV	41+00.00	452701.7014	1765686.2669
97	Y8REV	42+00.00	452609.7088	1765725.4761
98	Y8REV	43+00.00	452517.7162	1765764.6853
99	Y8REV	44+00.00	452425.7236	1765803.8945
100	Y8REV	45+00.00	452333.7310	1765843.1036
101	Y8REV	46+00.00	452241.7384	1765882.3128
102	Y8REV	47+00.00	452149.7307	1765921.4864
103	Y8REV	48+00.00	452056.3228	1765957.1476
104	Y8REV	49+00.00	451960.8700	1765986.9049
105	Y8REV	50+00.00	451863.7449	1766010.6422
106	Y8REV	51+00.00	451765.3268	1766028.2669
107	Y8REV	52+00.00	451666.0001	1766039.7099
108	Y8REV	53+00.00	451566.1525	1766044.9268
109	Y8REV	54+00.00	451466.1741	1766043.8971
110	Y8REV	55+00.00	451366.4519	1766036.6577
111	Y8REV	56+00.00	451266.9280	1766026.9113
112	Y8REV	57+00.00	451167.2977	1766018.9485
113	Y8REV	58+00.00	451069.7950	1766038.5321
114	Y8REV	59+00.00	450985.6334	1766091.5144
115	Y8REV	60+00.00	450925.8197	1766170.9664
116	Y9SBL	0+00.00	456943.2046	1767816.4626
117	Y9SBL	1+00.00	456855.4007	1767768.6037
118	Y9SBL	2+00.00	456767.5968	1767720.7448
119	Y9SBL	3+00.00	456679.7962	1767672.8799
120	Y9SBL	4+00.00	456592.4015	1767624.2812
121	Y9SBL	5+00.00	456506.6462	1767572.8584
122	Y9SBL	6+00.00	456423.5993	1767517.1724
123	Y9SBL	7+00.00	456343.5806	1767457.2164
124	Y9SBL	8+00.00	456266.8094	1767393.1547
125	Y9SBL	9+00.00	456193.4962	1767325.1629
126	Y9SBL	10+00.00	456123.8408	1767253.4284
127	Y9SBL	11+00.00	456057.5344	1767178.5791
128	Y9SBL	12+00.00	455992.9068	1767102.2692
129	Y9SBL	13+00.00	455928.4833	1767025.7864
130	Y9SBL	14+00.00	455864.0598	1766949.3037
131	Y9SBL	15+00.00	455799.6363	1766872.8209
132	Y9SBL	16+00.00	455735.2101	1766796.3405
133	Y9SBL	17+00.00	455669.5887	1766720.8924
134	Y9SBL	18+00.00	455598.7451	1766650.3779
135	Y9SBL	19+00.00	455520.0711	1766588.7550
136	Y9SBL	20+00.00	455434.3280	1766537.4217
137	Y9SBL	21+00.00	455342.8540	1766497.1788
138	Y9SBL	22+00.00	455247.0764	1766468.6544
139	Y9SBL	23+00.00	455148.4898	1766452.2937
140	Y9SBL	24+00.00	455048.6327	1766448.3518
141	Y9SBL	25+00.00	454949.0632	1766456.8904
142	Y9SBL	26+00.00	454851.3284	1766477.7508
143	Y9SBL	27+00.00	454756.2190	1766508.5632
144	Y9SBL	28+00.00	454662.5515	1766543.5803
145	Y9SBL	29+00.00	454569.0126	1766578.9425
146	Y9SBL	30+00.00	454475.4738	1766614.3047
147	Y9SBL	31+00.00	454381.9350	1766649.6670
148	Y9SBL	32+00.00	454288.3937	1766685.0227
149	Y9SBL	33+00.00	454194.5595	1766719.5886
150	Y9SBL	34+00.00	454099.6517	1766751.0655
151	Y9SBL	35+00.00	454003.2779	1766777.7074
152	Y9SBL	36+00.00	453905.6417	1766799.2689
153	Y9SBL	37+00.00	453807.0110	1766815.6911
154	Y9SBL	38+00.00	453707.6559	1766826.9288
155	Y9SBL	39+00.00	453607.8488	1766832.9513
156	Y9SBL	40+00.00	453507.8634	1766833.7420
157	Y9SBL	41+00.00	453407.9736	1766829.2988
158	Y9SBL	42+00.00	453308.4532	1766819.6338
159	Y9SBL	43+00.00	453209.5745	1766804.7766
160	Y9SBL	44+00.00	453111.4956	1766785.3025
161	Y9SBL	45+00.00	453014.0333	1766762.9249

Point #	Chain	Station	Northing (Y)	Easting (X)
162	Y9LPA	0+00.00	454868.3243	1766791.8392
163	Y9LPA	1+00.00	454953.9218	1766843.4600
164	Y9LPA	2+00.00	455047.0983	1766878.9858
165	Y9LPA	3+00.00	455146.3333	1766881.4743
166	Y9LPA	4+00.00	455235.5216	1766838.5926
167	Y9LPA	5+00.00	455293.2332	1766758.2012
168	Y9LPA	6+00.00	455305.3382	1766659.9828
169	Y9LPA	7+00.00	455268.8728	1766567.9846
170	Y9LPA	8+00.00	455192.7838	1766504.6947
171	Y9LPA	9+00.00	455096.4679	1766479.9203
172	Y9LPA	10+00.00	454996.6167	1766481.6738
173	Y9LPA	11+00.00	454897.9187	1766497.3420
174	Y9LPA	12+00.00	454801.7515	1766524.6031
175	Y9LPA	13+00.00	454707.7087	1766558.5829
176	Y9LPA	14+00.00	454614.1692	1766593.9434
177	Y9LPA	15+00.00	454520.6304	1766629.3056
178	Y9LPA	16+00.00	454427.0915	1766664.6678
179	Y9LPA	17+00.00	454333.5527	1766700.0301
180	Y9LPA	18+00.00	454240.0109	1766735.3844
181	Y9LPA	19+00.00	454146.1658	1766769.9207
182	Y9LPA	20+00.00	454051.2356	1766801.3293
183	Y9LPA	21+00.00	453954.8396	1766827.8911
184	Y9LPA	22+00.00	453857.1856	1766849.3714
185	Y9LPA	23+00.00	453758.5412	1766865.7115
186	Y9LPA	24+00.00	453659.1768	1766876.8665
187	Y9LPA	25+00.00	453559.3648	1766882.8059
188	Y9LPA	26+00.00	453459.3787	1766883.5134
189	Y9LPA	27+00.00	453359.4926	1766878.9871
190	Y9LPA	28+00.00	453259.9803	1766869.2394
191	Y9LPA	29+00.00	453161.1146	1766854.2969
192	Y9LPA	30+00.00	453063.1134	1766834.4430
193	Y9LPA	31+00.00	452965.7603	1766811.5937
194	Y9RPC	0+00.00	453673.9429	1765925.3615
195	Y9RPC	1+00.00	453741.0073	1765999.5394
196	Y9RPC	2+00.00	453808.0718	1766073.7173
197	Y9RPC	3+00.00	453874.9811	1766148.0345
198	Y9RPC	4+00.00	453938.0450	1766225.5918
199	Y9RPC	5+00.00	453989.2982	1766311.2803
200	Y9RPC	6+00.00	454018.9692	1766406.4420
201	Y9RPC	7+00.00	454020.8038	1766506.0853
202	Y9RPC	8+00.00	453994.4804	1766602.2062
203	Y9RPC	9+00.00	453942.1330	1766687.0114
204	Y9RPC	10+00.00	453868.0061	1766753.6248
205	Y9RPC	11+00.00	453778.1176	1766796.6696
206	Y9RPC	12+00.00	453680.2152	1766816.2046
207	Y10RPA	0+00.00	462125.2043	1769385.3238
208	Y10RPA	1+00.00	462025.5764	1769376.7056
209	Y10RPA	2+00.00	461925.9595	1769367.9626
210	Y10RPA	3+00.00	461826.5573	1769357.1012
211	Y10RPA	4+00.00	461727.9085	1769340.8359
212	Y10RPA	5+00.00	461630.6270	1769317.7655
213	Y10RPA	6+00.00	461535.1918	1769287.9653
214	Y10RPA	7+00.00	461442.0677	1769251.5805
215	Y10RPA	8+00.00	461351.7087	1769208.7883
216	Y10RPA	9+00.00	461264.5547	1769159.7971
217	Y10RPA	10+00.00	461181.0305	1769104.8458
218	Y10RPA	11+00.00	461101.2251	1769044.6074
219	Y10RPA	12+00.00	461023.6496	1768981.5064
220	Y10RPA	13+00.00	460946.4871	1768917.8986
221	Y10RPA	14+00.00	460869.3103	1768854.3083
222	Y10RPA	15+00.00	460790.6806	1768792.5433
223	Y10RPA	16+00.00	460706.9486	1768737.9866
224	Y10RPA	17+00.00	460616.6489	1768695.2114
225	Y10RPA	18+00.00	460521.2748	1768665.4198
226	Y10RPA	19+00.00	460422.6826	1768649.1916
227	Y10RPA	20+00.00	460322.7914	1768646.8427
228	Y10RPA	21+00.00	460223.4416	1768657.7269
229	Y10RPA	22+00.00	460125.2458	1768676.5884
230	Y10RPA	23+00.00	460027.3940	1768697.2045
231	Y10RPA	24+00.00	459929.5431	1768717.8249
232	Y10LPA	0+00.00	460087.2785	1769163.8900
233	Y10LPA	1+00.00	460184.6636	1769186.4820
234	Y10LPA	2+00.00	460284.1382	1769194.7456
235	Y10LPA	3+00.00	460381.8822	1769175.9834
236	Y10LPA	4+00.00	460465.5966	1769122.5112
237	Y10LPA	5+00.00	460521.8796	1769040.6601
238	Y10LPA	6+00.00	460541.8454	1768943.3527
239	Y10LPA	7+00.00	460522.3418	1768845.9515
240	Y10LPA	8+00.00	460466.4480	1768763.8342

Point #	Chain	Station	Northing (Y)	Easting (X)
241	Y10LPA	9+00.00	460382.9885	1768709.9649
242	Y10LPA	10+00.00	460285.3936	1768690.3121
243	Y10LPA	11+00.00	460185.7401	1768696.4546
244	Y10LPA	12+00.00	460087.5278	1768715.1912
245	Y10LPA	13+00.00	459989.6769	1768735.8116
246	Y10LPA	14+00.00	459891.8260	1768756.4321
247	Y10RPD	0+00.00	462275.0573	1769500.3589
248	Y10RPD	1+00.00	462175.1399	1769496.3272
249	Y10RPD	2+00.00	462075.1529	1769495.7851
250	Y10RPD	3+00.00	461975.3447	1769501.6379
251	Y10RPD	4+00.00	461876.1878	1769514.4387
252	Y10RPD	5+00.00	461778.1655	1769534.1251
253	Y10RPD	6+00.00	461681.7552	1769560.6013
254	Y10RPD	7+00.00	461587.4264	1769593.7378
255	Y10RPD	8+00.00	461495.3312	1769632.6794
256	Y10RPD	9+00.00	461404.5061	1769674.5198
257	Y10RPD	10+00.00	461313.8624	1769716.7540
258	Y10RPD	11+00.00	461223.2188	1769758.9881
259	Y10RPD	12+00.00	461132.5751	1769801.2223
260	Y10RPD	13+00.00	461041.9314	1769843.4565
261	Y10RPD	14+00.00	460951.2878	1769885.6907
262	Y10RPD	15+00.00	460860.6441	1769927.9248
263	Y10RPD	16+00.00	460770.0004	1769970.1590
264	Y10RPD	17+00.00	460679.3568	1770012.3932
265	Y10RPD	18+00.00	460588.7131	1770054.6274
266	Y10RPD	19+00.00	460498.0694	1770096.8616
267	Y10RPD	20+00.00	460407.4258	1770139.0957
268	Y10LPA	0+00.00	460087.2785	1769163.8900
269	Y10LPA	1+00.00	460184.6636	1769186.4820
270	Y10LPA	2+00.00	460284.1382	1769194.7456
271	Y10LPA	3+00.00	460381.8822	1769175.9834
272	Y10LPA	4+00.00	460465.5966	1769122.5112
273	Y10LPA	5+00.00	460521.8796	1769040.6601
274	Y10LPA	6+00.00	460541.8454	1768943.3527
275	Y10LPA	7+00.00	460522.3418	1768845.9515
276	Y10LPA	8+00.00	460466.4480	1768763.8342
277	Y10LPA	9+00.00	460382.9885	1768709.9649
278	Y10LPA	10+00.00	460285.3936	1768690.3121
279	Y10LPA	11+00.00	460185.7401	1768696.4546
280	Y10LPA	12+00.00	460087.5278	1768715.1912
281	Y10LPA	13+00.00	459989.6769	1768735.8116
282	Y10LPA	14+00.00	459891.8260	1768756.4321
283	SR2	11+00.00	450586.2394	1766589.8685
284	SR2	12+00.00	450629.3593	1766679.6256
285	SR2	13+00.00	450699.2438	1766750.5051
286	SR2	14+00.00	450788.4731	1766794.6173
287	SR2	15+00.00	450887.2242	1766807.1062
288	SR2	16+00.00	450984.6260	1766786.5968
289	SR2	17+00.00	451074.5223	1766742.8627
290	SR2	18+00.00	451163.8953	1766698.0023
291	SR2	19+00.00	451254.7357	1766656.3141
292	SR2	20+00.00	451350.0966	1766626.4497
293	SR2	21+00.00	451448.5514	1766609.3549
294	SR2	22+00.00	451548.3980	1766605.3250
295	SR2	23+00.00	451647.9102	1766614.4298
296	SR2	24+00.00	451745.6173	1766635.5524
297	SR2	25+00.00	451842.8096	1766659.0825
298	SR2	26+00.00	451940.0018	1766682.6126
299	SR2	27+00.00	452037.1941	1766706.1427
300	SR2	28+00.00	452134.3864	1766729.6728
301	SR2	29+00.00	452231.5786	1766753.2028
302	SR2	30+00.00	452328.7709	1766776.7329
303	SR2	31+00.00	452425.9631	1766800.2630
304	SR2	32+00.00	452523.1554	1766823.7931
305	SR2	33+00.00	452620.3477	1766847.3232
306	SR2	34+00.00	452717.5399	1766870.8533
307	SR2	35+00.00	452814.7322	1766894.3834
308	SR2	36+00.00	452911.9244	1766917.9134
309	SR2	37+00.00	453009.1167	1766941.4435
310	SR2	38+00.00	453106.3089	1766964.9736
311	SR2	39+00.00	453203.5012	1766988.5037
312	SR2	40+00.00	453300.6935	1767012.0338
313	SR2	41+00.00	453397.8857	1767035.5639
314	SR2	42+00.00	453495.0780	1767059.0940
315	SR2	43+00.00	453592.2702	1767082.6241
316	SR2	44+00.00	453689.4625	1767106.1541
317	SR2	45+00.00	453786.6548	1767129.6842
318	SR2	46+00.00	453883.8470	1767153.2143
319	SR2	47+00.00	453981.0393	1767176.7444

Point #	Chain	Station	Northing (Y)	Easting (X)
320	SR2	48+00.00	454078.2315	1767200.2745
321	SR2	49+00.00	454175.4238	1767223.8046
322	SR2	50+00.00	454272.6160	1767247.3347
323	SR2	51+00.00	454369.8083	1767270.8647
324	SR2	52+00.00	454467.0006	1767294.3948
325	SR2	53+00.00	454564.1928	1767317.9249
326	SR2	54+00.00	454661.3851	1767341.4550
327	SR2	55+00.00	454758.5773	1767364.9851
328	SR2	56+00.00	454855.7696	1767388.5152
329	SR2	57+00.00	454952.9618	1767412.0453
330	SR2	58+00.00	455050.1541	1767435.5753
331	SR2	59+00.00	455147.3464	1767459.1054
332	SR2	60+00.00	455244.5386	1767482.6355
333	SR2	61+00.00	455341.7309	1767506.1656
334	SR2	62+00.00	455438.9231	1767529.6957
335	SR2	63+00.00	455536.1154	1767553.2258
336	SR2	64+00.00	455633.3077	1767576.7559
337	SR2	65+00.00	455730.4999	1767600.2860
338	SR2	66+00.00	455827.6922	1767623.8160
339	SR2	67+00.00	455924.8812	1767647.3595
340	SR2	68+00.00	456021.6874	1767672.4193
341	SR2	69+00.00	456117.8044	1767700.0044
342	SR2	70+00.00	456213.1665	1767730.0958
343	SR2	71+00.00	456307.7083	1767762.6731
344	SR2	72+00.00	456401.3650	1767797.7139
345	SR2	73+00.00	456494.0724	1767835.1941
346	SR2	74+00.00	456585.7670	1767875.0881
347	SR2	75+00.00	456676.7219	1767916.6476
348	SR2	76+00.00	456767.6503	1767958.2651
349	SR2	77+00.00	456858.5788	1767999.8825
350	SR2	78+00.00	456949.5073	1768041.5000
351	SR2	79+00.00	457040.4357	1768083.1175
352	SR2	80+00.00	457131.3642	1768124.7349
353	SR2	81+00.00	457222.2927	1768166.3524
354	SR2	82+00.00	457313.2212	1768207.9699
355	SR2	83+00.00	457404.1496	1768249.5873
356	SR2	84+00.00	457495.0781	1768291.2048
357	SR2	85+00.00	457586.0066	1768332.8222
358	SR2	86+00.00	457676.9350	1768374.4397
359	SR2	87+00.00	457767.8635	1768416.0572
360	SR2	88+00.00	457858.7920	1768457.6746
361	SR2	89+00.00	457949.7204	1768499.2921
362	SR2	90+00.00	458040.6489	1768540.9096
363	SR2	91+00.00	458131.5774	1768582.5270
364	SR2	92+00.00	458222.5059	1768624.1445
365	SR2	93+00.00	458313.4343	1768665.7620
366	SR2	94+00.00	458404.3628	1768707.3794
367	SR2	95+00.00	458495.2913	1768748.9969
368	SR2	96+00.00	458586.2197	1768790.6143
369	SR2	97+00.00	458677.1482	1768832.2318
370	SR2	98+00.00	458768.0767	1768873.8493
371	SR2	99+00.00	458859.0051	1768915.4667
372	SR2	100+00.00	458949.9336	1768957.0842
373	SR2	101+00.00	459040.8621	1768998.7017
374	SR2	102+00.00	459131.9661	1769039.9322
375	SR2	103+00.00	459223.5513	1769080.0824
376	SR2	104+00.00	459315.6107	1769119.1328
377	SR2	105+00.00	459408.1312	1769157.0780
378	SR2	106+00.00	459501.0992	1769193.9133
379	SR2	107+00.00	459594.2704	1769230.2330
380	SR2	108+00.00	459687.4382	1769266.5616
381	SR2	109+00.00	459777.7419	1769309.3496
382	SR2	110+00.00	459861.6513	1769363.6156
383	SR2	111+00.00	459937.7157	1769428.4214
384	SR2	112+00.00	460004.6201	1769502.6466
385	SR2	113+00.00	460061.2079	1769585.0080
386	SR2	114+00.00	460106.5007	1769674.0818
387	SR2	115+00.00	460139.7155	1769768.3281
388	SR2	116+00.00	460160.3438	1769866.1075
389	SR2	117+00.00	460175.7497	1769964.9137
390	SR2	118+00.00	460191.1556	1770063.7198
391	SR2	119+00.00	460206.5615	1770162.5260
392	SR2	120+00.00	460221.9674	1770261.3322
393	SR2	121+00.00	460237.3733	1770360.1383
394	SR2	122+00.00	460252.7792	1770458.9445
395	SR2	123+00.00	460278.0665	1770555.1072
396	SR2	124+00.00	460343.6884	1770629.1826
397	SR2	125+00.00	460436.7906	1770662.7291
398	SR2	126+00.00	460534.5786	1770647.5333
399	SR2	127+00.00	460619.0880	1770594.3998
400	SR4	10+00.00	459682.8725	1768265.6613

PROJ. REFERENCE NO.	SHEET NO.
R-3421C	1-J

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CENTERLINE COORDINATE LIST

Point #	Chain	Station	Northing (Y)	Easting (X)
401	SR4	11+00.00	459774.3313	1768225.2585
402	SR4	12+00.00	459870.3187	1768197.6711
403	SR4	13+00.00	459969.6383	1768187.1708
404	SR4	14+00.00	460069.2724	1768194.0767
405	SR4	15+00.00	460166.1936	1768218.1790
406	SR4	16+00.00	460257.4570	1768258.7453
407	SR4	17+00.00	460340.2897	1768314.5430
408	SR4	18+00.00	460417.4680	1768378.1315
409	SR4	19+00.00	460494.6305	1768441.7394
410	SR4	20+00.00	460571.7929	1768505.3472
411	SR4	21+00.00	460648.9554	1768568.9550
412	SR4	22+00.00	460726.1178	1768632.5628
413	SR4	23+00.00	460803.2803	1768696.1706
414	SR4	24+00.00	460880.4428	1768759.7785
415	SR4	25+00.00	460957.6052	1768823.3863
416	SR4	26+00.00	461034.7677	1768886.9941
417	SR4	27+00.00	461111.9301	1768950.6019
418	SR4	28+00.00	461190.0892	1769012.9607
419	SR4	29+00.00	461272.2701	1769069.8997
420	SR4	30+00.00	461358.3051	1769120.8285
421	SR4	31+00.00	461447.7553	1769165.4872
422	SR4	32+00.00	461540.1646	1769203.6482
423	SR4	33+00.00	461635.0618	1769235.1169
424	SR4	34+00.00	461731.9629	1769259.7327
425	SR4	35+00.00	461830.3736	1769277.3701
426	SR4	36+00.00	461929.7775	1769288.1198
427	SR4	37+00.00	462029.4054	1769296.7380
428	SR4	38+00.00	462129.0333	1769305.3562
429	SR4	39+00.00	462228.6713	1769313.8563
430	SR4	40+00.00	462328.3887	1769321.3616
431	SR4	41+00.00	462428.1874	1769327.6933
432	SR4	42+00.00	462528.0538	1769332.8514
433	SR4	43+00.00	462627.9473	1769337.4644
434	SR4	44+00.00	462727.8408	1769342.0774
435	SR4	45+00.00	462827.7344	1769346.6904
436	SR4	46+00.00	462927.6279	1769351.3034
437	SR4	47+00.00	463027.5215	1769355.9164
438	SR4	48+00.00	463127.4150	1769360.5294
439	SR4	49+00.00	463227.3086	1769365.1424
440	SR4	50+00.00	463327.2021	1769369.7554
441	SR4	51+00.00	463427.0956	1769374.3684
442	SR4	52+00.00	463526.9892	1769378.9814
443	SR4	53+00.00	463626.8827	1769383.5944
444	SR4	54+00.00	463726.7763	1769388.2074
445	SR4	55+00.00	463826.6698	1769392.8204
446	SR4	56+00.00	463926.5634	1769397.4334
447	SR4	57+00.00	464026.4569	1769402.0464
448	SR4	58+00.00	464126.3505	1769406.6594
449	SR4	59+00.00	464226.2440	1769411.2724
450	SR4	60+00.00	464326.1375	1769415.8854
451	SR4	61+00.00	464426.0311	1769420.4984
452	SR4	62+00.00	464525.9246	1769425.1114
453	SR4	63+00.00	464625.8182	1769429.7244
454	SR4	64+00.00	464725.7117	1769434.3374
455	SR4	65+00.00	464825.6053	1769438.9504
456	SR4	66+00.00	464925.4988	1769443.5634
457	SR4	67+00.00	465025.3924	1769448.1764
458	SR4	68+00.00	465125.2859	1769452.7894
459	SR4	69+00.00	465225.1794	1769457.4024
460	SR4	70+00.00	465325.0730	1769462.0154
461	SR4	71+00.00	465424.9665	1769466.6284
462	SR4	72+00.00	465524.8601	1769471.2415
463	SR4	73+00.00	465624.7536	1769475.8545
464	SR4	74+00.00	465724.6472	1769480.4675
465	SR4	75+00.00	465824.5407	1769485.0805
466	SR4	76+00.00	465924.4343	1769489.6935
467	SR4	77+00.00	466024.3278	1769494.3065
468	SR4	78+00.00	466124.2213	1769498.9195
469	SR4	79+00.00	466224.1149	1769503.5325
470	SR4	80+00.00	466324.0084	1769508.1455
471	SR4	81+00.00	466423.9020	1769512.7585
472	SR4	82+00.00	466523.7955	1769517.3715
473	SR4	83+00.00	466623.6891	1769521.9845
474	SR4	84+00.00	466723.5826	1769526.5975
475	SR4	85+00.00	466823.4721	1769531.2964
476	SR4	86+00.00	466923.3341	1769536.5454
477	SR4	87+00.00	467023.1616	1769542.4135
478	SR4	88+00.00	467122.9508	1769548.9007
479	SR4	89+00.00	467222.6979	1769556.0065
480	SR4	90+00.00	467322.3989	1769563.7308
481	SR4	91+00.00	467422.0502	1769572.0732
482	SR4	92+00.00	467521.6478	1769581.0335
483	SR4	93+00.00	467621.1879	1769590.6112
484	SR4	94+00.00	467720.6709	1769600.7654
485	SR4	95+00.00	467820.1412	1769611.0446
486	SR4	96+00.00	467919.6115	1769621.3239
487	SR4	97+00.00	468019.0818	1769631.6031
488	SR4	98+00.00	468118.5521	1769641.8824
489	SR4	99+00.00	468218.0223	1769652.1616
490	SR4	100+00.00	468317.4926	1769662.4409
491	SR4	101+00.00	468416.9629	1769672.7201
492	SR4	102+00.00	468516.4350	1769682.9814
493	SR4	103+00.00	468616.2504	1769688.5579
494	SR4	104+00.00	468716.1836	1769685.8067
495	SR4	105+00.00	468815.5411	1769674.7470
496	SR4	106+00.00	468913.6331	1769655.4554
497	SR4	107+00.00	469009.7790	1769628.0659
498	SR4	108+00.00	469103.3114	1769592.7685
499	SR4	109+00.00	469193.5812	1769549.8083
500	SR4	110+00.00	469279.9618	1769499.4834
501	SR4	111+00.00	469363.3771	1769444.3314
502	SR4	112+00.00	469446.7010	1769389.0401
503	SR4	113+00.00	469530.0248	1769333.7488
504	SR4	114+00.00	469613.3487	1769278.4574
505	SR4	115+00.00	469696.6726	1769223.1661
506	SR4	116+00.00	469779.9965	1769167.8748
507	SR4	117+00.00	469863.3203	1769112.5834
508	SR4	118+00.00	469946.6442	1769057.2921
509	SR4	119+00.00	470029.9681	1769002.0008
510	SR4	120+00.00	470113.2920	1768946.7094
511	SR4	121+00.00	470196.6158	1768891.4181
512	SR4	122+00.00	470279.9397	1768836.1267
513	SR4	123+00.00	470363.2636	1768780.8354
514	SR4	124+00.00	470446.5875	1768725.5441
515	SR4	125+00.00	470529.9113	1768670.2527
516	SR4	126+00.00	470613.2352	1768614.9614
517	SR4	127+00.00	470696.5591	1768559.6701
518	SR4	128+00.00	470779.8830	1768504.3787
519	SR5	19+00.00	460644.5019	1770577.0387
520	SR5	20+00.00	460726.5151	1770519.8576
521	SR5	21+00.00	460792.5260	1770445.3572
522	SR5	22+00.00	460833.0319	1770354.1708
523	SR5	23+00.00	460868.1685	1770260.5479
524	SR5	24+00.00	460910.5041	1770170.0199
525	SR5	25+00.00	460963.5380	1770085.3144
526	SR5	26+00.00	461026.4823	1770007.6895
527	SR5	27+00.00	461098.4022	1769938.2983
528	SR5	28+00.00	461178.2293	1769878.1714
529	SR5	29+00.00	461264.7779	1769828.2019
530	SR5	30+00.00	461355.2968	1769785.7059
531	SR5	31+00.00	461445.9404	1769743.4717
532	SR5	32+00.00	461536.5841	1769701.2375
533	SR5	33+00.00	461628.5894	1769662.1101
534	SR5	34+00.00	461723.1035	1769629.5063
535	SR5	35+00.00	461819.6647	1769603.5861
536	SR5	36+00.00	461917.8011	1769584.4764
537	SR5	37+00.00	462017.0328	1769572.2704
538	SR5	38+00.00	462116.8749	1769567.0279
539	SR5	39+00.00	462216.8406	1769568.7462
540	SR5	40+00.00	462316.7342	1769573.3592
541	SR5	41+00.00	462416.6277	1769577.9722
542	SR5	42+00.00	462516.5213	1769582.5852
543	SR5	43+00.00	462616.4148	1769587.1982
544	SR5	44+00.00	462716.3084	1769591.8112
545	SR5	45+00.00	462816.2019	1769596.4242
546	SR5	46+00.00	462916.0954	1769601.0372
547	SR5	47+00.00	463015.9890	1769605.6502
548	SR5	48+00.00	463115.8825	1769610.2632
549	SR5	49+00.00	463215.7761	1769614.8762
550	SR5	50+00.00	463315.6696	1769619.4892
551	SR5	51+00.00	463415.5632	1769624.1022
552	SR5	52+00.00	463515.4567	1769628.7152
553	SR5	53+00.00	463615.3503	1769633.3283
554	SR5	54+00.00	463715.2438	1769637.9413
555	SR5	55+00.00	463815.1373	1769642.5543
556	SR5	56+00.00	463915.0309	1769647.1673
557	SR5	57+00.00	464014.9244	1769651.7803
558	SR5	58+00.00	464114.8180	1769656.3933
559	SR5	59+00.00	464214.7115	1769661.0063
560	SR5	60+00.00	464314.6051	1769665.6193
561	SR5	61+00.00	464414.4986	1769670.2323
562	SR5	62+00.00	464514.3922	1769674.8453
563	SR5	63+00.00	464614.2857	1769679.4583
564	SR5	64+00.00	464714.1792	1769684.0713
565	SR5	65+00.00	464814.0728	1769688.6843
566	SR5	66+00.00	464913.9663	1769693.2973
567	SR5	67+00.00	465013.8599	1769697.9103
568	SR5	68+00.00	465113.7534	1769702.5233
569	SR5	69+00.00	465213.6470	1769707.1363
570	SR5	70+00.00	465313.5405	1769711.7493
571	SR5	71+00.00	465413.4341	1769716.3623
572	SR5	72+00.00	465513.3276	1769720.9753
573	SR5	73+00.00	465613.2211	1769725.5883
574	SR5	74+00.00	465713.1147	1769730.2013
575	SR5	75+00.00	465813.0082	1769734.8143
576	SR5	76+00.00	465912.9018	1769739.4273
577	SR5	77+00.00	466012.7953	1769744.0403
578	SR5	78+00.00	466112.6889	1769748.6533
579	SR5	79+00.00	466212.5824	1769753.2663
580	SR5	80+00.00	466312.4760	1769757.8793
581	SR5	81+00.00	466412.3695	1769762.4923
582	SR5	82+00.00	466512.2630	1769767.1053
583	SR5	83+00.00	466612.1566	1769771.7184
584	SR5	84+00.00	466712.0501	1769776.3314
585	SR5	85+00.00	466811.9395	1769781.0316
586	SR5	86+00.00	466911.8010	1769786.2906
587	SR5	87+00.00	467011.6274	1769792.1785
588	SR5	88+00.00	467111.4146	1769798.6951
589	SR5	89+00.00	467211.1589	1769805.8402
590	SR5	90+00.00	467310.8561	1769813.6134
591	SR5	91+00.00	467410.5025	1769822.0145
592	SR5	92+00.00	467510.0939	1769831.0431
593	SR5	93+00.00	467609.6265	1769840.6989
594	SR5	94+00.00	467709.1046	1769850.9015
595	SR5	95+00.00	467808.5749	1769861.1807
596	SR5	96+00.00	467908.0451	1769871.4600
597	SR5	97+00.00	468007.5154	1769881.7392
598	SR5	98+00.00	468106.9857	1769892.0185
599	SR5	99+00.00	468206.4560	1769902.2977
600	SR5	100+00.00	468305.9263	1769912.5770
601	SR5	101+00.00	468405.3965	1769922.8562
602	SR5	102+00.00	468504.8668	1769933.1355
603	SR5	103+00.00	468604.3371	1769943.4147
604	SR5	104+00.00	468703.8074	1769953.6940
605	SR5	105+00.00	468803.2777	1769963.9732
606	SR5	106+00.00	468902.7480	1769974.2525
607	SR5	107+00.00	469002.2182	1769984.5318
608	SR5	108+00.00	469101.6885	1769994.8110
609	SR5	109+00.00	469201.1588	1770005.0903
610	SR5	110+00.00	469300.6291	1770015.3695
611	SR5	111+00.00	469400.0994	1770025.6488
612	SR5	112+00.00	469499.5696	1770035.9280
613	SR5	113+00.00	469599.0399	1770046.2073
614	SR5	114+00.00	469698.5102	1770056.4865
615	SR5	115+00.00	469797.9805	1770066.7658
616	SR5	116+00.00	469897.4508	1770077.0450
617	SR5	117+00.00	469996.9211	1770087.3243
618	SR5	118+00.00	470095.9714	1770100.8203
619	SR5	119+00.00	470193.2164	1770123.9519
620	SR5	120+00.00	470287.6663	1770156.6764
621	SR5	121+00.00	470378.3773	1770198.6666
622	SR5	122+00.00	470464.4432	1770249.5030
623	SR5	123+00.00	470545.0039	1770308.6776
624	SR5	124+00.00	470619.2545	1770375.5994
625	SR5	125+00.00	470686.4531	1770449.5994
626	SR5	126+00.00	470745.9284	1770529.9385
627	SR5	127+00.00	470799.3595	1770614.4641
628	SR5	128+00.00	470852.4773	1770699.1901
629	Y8	10+00.00	454347.1159	1764927.2867
630	Y8	11+00.00	454398.4907	1765012.3293
631	Y8	12+00.00	454374.0602	1765105.3557
632	Y14	10+00.00	452294.7536	1766768.4974
633	Y14	11+00.00	452278.2388	1766866.7405
634	Y14	12+00.00	452301.6998	1766963.4518
635	Y16	10+00.00	454374.6679	1767272.0413
636	Y16	11+00.00	454357.7842	1767370.2451
637	Y16	12+00.00	454378.7317	1767467.6798
638	Y18	10+50.00	470224.6378	1770186.0373
639	Y18	11+00.00	470197.1625	1770227.1889
640	Y18	11+50.00	470153.3215	1770250.1305
641	Y18	12+00.00	470104.0352	1770258.5205
642	Y19	10+00.00	469245.9153	1769520.4759
643	Y19	10+50.00	469271.4441	1769563.4675
644	Y19	11+00.00	469301.6633	1769603.1403
645	Y19	11+50.00	469340.7510	1769634.1105
646	Y19	12+00.00	469386.2857	1769654.4476
647	Y19	12+50.00	469435.4321	1769662.9546
648	Y19	13+00.00	469485.3058	1769666.5060
649	DR1	10+00.00	450952.0696	1766128.5614
650	DR1	10+50.00	450911.9903	1766098.6818
651	DR1	11+00.00	450866.5303	1766109.0094
652	DR1	11+50.00	450824.8217	1766136.5559
653	DR1	12+00.00	450776.1154	1766137.1789
654	DR1	12+50.00	450727.3247	1766126.2488
655	DR1	13+00.00	450679.0272	1766113.3588
656	DR2	10+00.00	451616.1819	1766043.0951
657	DR2	10+50.00	451618.7959	1766093.0267
658	DR2	11+00.00	451621.3835	1766142.9596
659	DR2	11+50.00	451619.1706	1766192.8527
660	DR2	12+00.00	451609.1306	1766241.7982
661	DR2	12+50.00	451597.2185	1766290.3585
662	DR2	13+00.00	451585.3064	1766338.9188

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ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POWER, JR.
12-9-2013

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 031484 ENGINEER VIJAYA G. MITCHELL
12/11/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PAVEMENT SCHEDULE

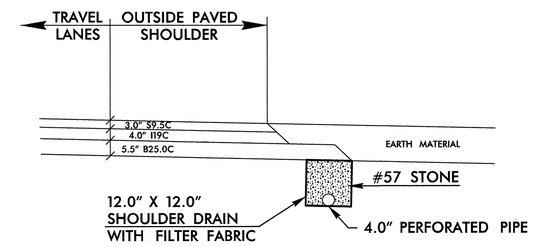
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	E3	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
C3	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E4	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	J1	PROP. 8" AGGREGATE BASE COURSE.
C5	PROP. APPROX. 1.25" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD.	N1	GEOTEXTILE FOR PAVEMENT STABILIZATION (SEE CHART ON THIS SHEET FOR LOCATIONS)
C6	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	P	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YD.
C7	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.	R1	2'-6" CONCRETE CURB & GUTTER
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	R2	6" MONOLITHIC CONCRETE ISLAND (KEYED IN)
D2	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	R3	CONCRETE SHOULDER BERM GUTTER
D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5" IN DEPTH OR GREATER THAN 4" IN DEPTH.	R4	CONCRETE MEDIAN BARRIER (VARIABLE HEIGHT, TYPE T1 OR T2)
D4	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	T	EARTH MATERIAL
D5	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5" IN DEPTH OR GREATER THAN 4" IN DEPTH.	U	EXISTING PAVEMENT
E1	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAILS, THIS SHEET)

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

SHOULDER DRAIN DETAIL

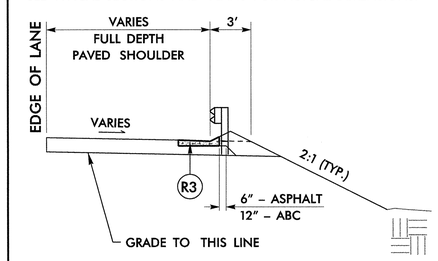
SEE SHOULDER DRAIN SUMMARY ON SHEET 3-P.
NOTE: USE IN CONJUNCTION WITH TYPICAL SECTION NOS. 2, 3, 5, & 7.

ASPHALT PAVEMENT DESIGN



DETAIL FOR SHOULDER BERM GUTTER

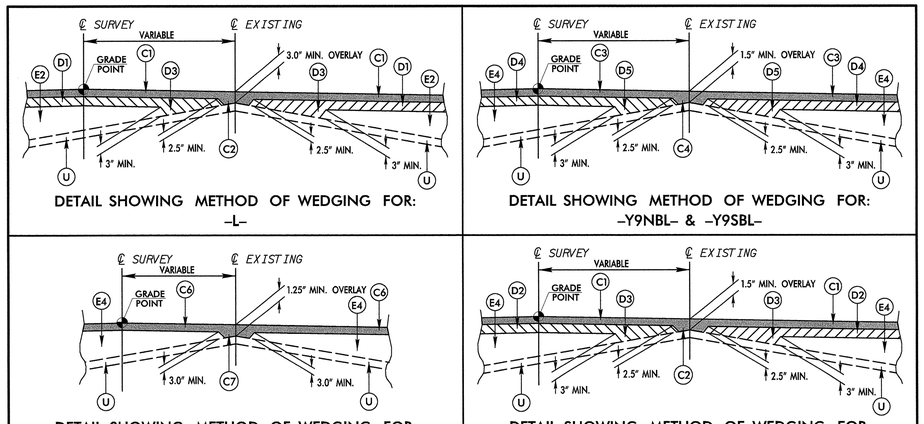
SEE CORRESPONDING TYPICAL SECTION FOR PAVEMENT DESIGN.
SEE TYPICAL SECTIONS AND PLANS FOR ACTUAL DIMENSIONS.



LINE	STATIONS
-L-	431+50.00 to 439+00.00 LT
-SR2-	17+20.00 to 20+05.00 RT
-SR2-	21+55.00 to 24+70.00 RT
-SR2-	103+10.00 to 110+80.00 RT
-Y8REV-	23+45.00 to 32+96.31 RT
-Y8REV-	35+31.59 to 40+00.00 RT
-Y8REV-	30+54.00 to 32+89.39 LT
-Y8REV-	35+24.67 to 40+50.00 LT
-Y9LPA-	16+24.74 to 16+82.00 LT
-Y9SBL-	27+75.00 to 28+30.51 RT
-Y9SBL-	31+34.15 to 32+05.00 RT
-Y9NBL-	11+46.00 to 22+27.50 LT
-Y10-	28+95.00 to 31+44.12 RT
-Y10-	34+33.68 to 35+10.10 RT
-Y10-	34+70.08 to 37+05.00 LT

THE FOLLOWING LOCATIONS OCCUR IN LOCATIONS THAT WILL BE GRADING ONLY, AND ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY. QUANTITIES FOR THESE LOCATIONS ARE NOT INCLUDED IN THE FINAL ESTIMATE.

-L-	355+00.00 to 358+20.00 LT
-L-	355+00.00 to 355+70.00 RT
-L-	372+40.00 to 384+50.00 LT



DETAIL SHOWING METHOD OF WEDGING FOR: -L-

DETAIL SHOWING METHOD OF WEDGING FOR: -Y9NBL- & -Y9SBL-

DETAIL SHOWING METHOD OF WEDGING FOR: -Y8-, -Y8REV-, -Y10-, -Y14-, -Y15-, -Y16-, -Y17-, & -Y18-

DETAIL SHOWING METHOD OF WEDGING FOR: -SR5-, -TA1-, & -TA2-

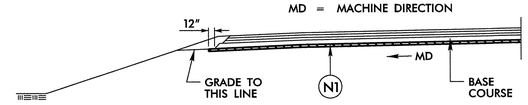
WEDGING DETAILS (W)

GEOTEXTILE FOR PAVEMENT STABILIZATION (LOCATIONS & DETAIL)

(THE FOLLOWING AREAS SHOULD BE INVESTIGATED FOR NEED DURING CONSTRUCTION)

LINE	STATIONS	LINE	STATIONS
-Y8REV-	20+50 to 39+50	-SR2-	13+00 to 20+00
-Y9SBL-	21+75 to 32+50	-SR2-	30+00 to 31+75
-Y9LPA-	7+70 to 18+25	-SR2-	102+50 to 110+00
-Y10-	30+50 to 39+75	-SR5-	60+50 to 63+50
-Y10LPA-	4+00 to 7+75	-SR5-	79+00 to 83+00

MD = MACHINE DIRECTION



USE GEOTEXTILE FOR PAVEMENT STABILIZATION DETAIL IN CONJUNCTION WITH APPROPRIATE TYPICAL SECTIONS AT LOCATIONS NOTED ABOVE.

THE FOLLOWING RECOMMENDED STATIONS OCCUR IN LOCATIONS THAT WILL BE GRADING ONLY, AND ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY. THE QUANTITY OF GEOTEXTILE FOR PAVEMENT STABILIZATION HAS BEEN ADJUSTED TO ACCOUNT FOR LOCATIONS TO BE PAVED ONLY.

LINE	STATIONS	LINE	STATIONS
-L-	355+00 to 383+75	-Y9LPA-	7+50 to 7+70
-L-	397+00 to 401+50		

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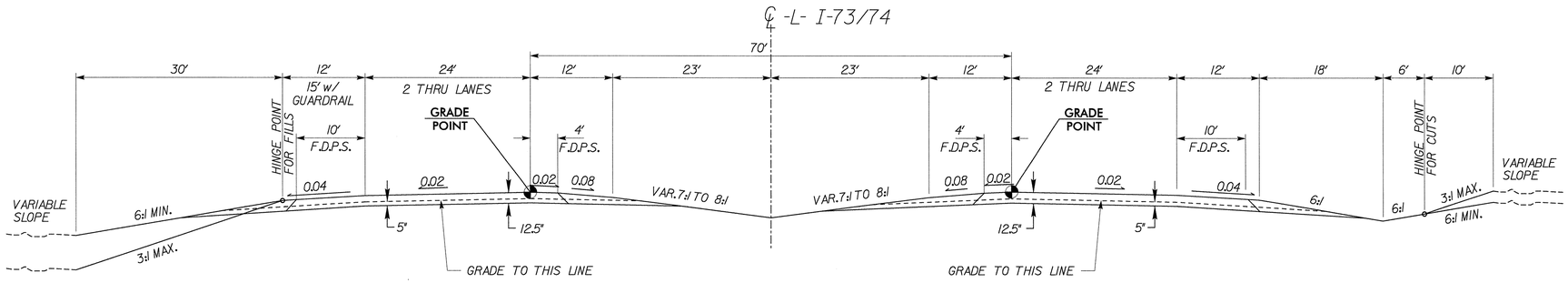
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-A

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. CARTER, JR.
12-9-2013

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 031484 ENGINEER VLADIMIR G. MITCHINEV
12/11/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



TYPICAL SECTION #1

USE TYPICAL SECTION NO. 1:

FROM -L- STA. 355+00.00 LT TO STA. 403+27.02 LT (GRADING ONLY)
FROM -L- STA. 355+00.00 RT TO STA. 401+75.70 RT (GRADING ONLY)

NOTES:

REMOVE ANY PARTIAL DEPTH PAVED SHOULDERS THAT ARE TO BECOME FUTURE TRAVEL LANES EXCEPT IN AREAS REQUIRING AT LEAST 12" WEDGING. THESE AREAS INCLUDE EXISTING US 220 AND Y9NBL BETWEEN STATIONS 13+00 AND 45+00.

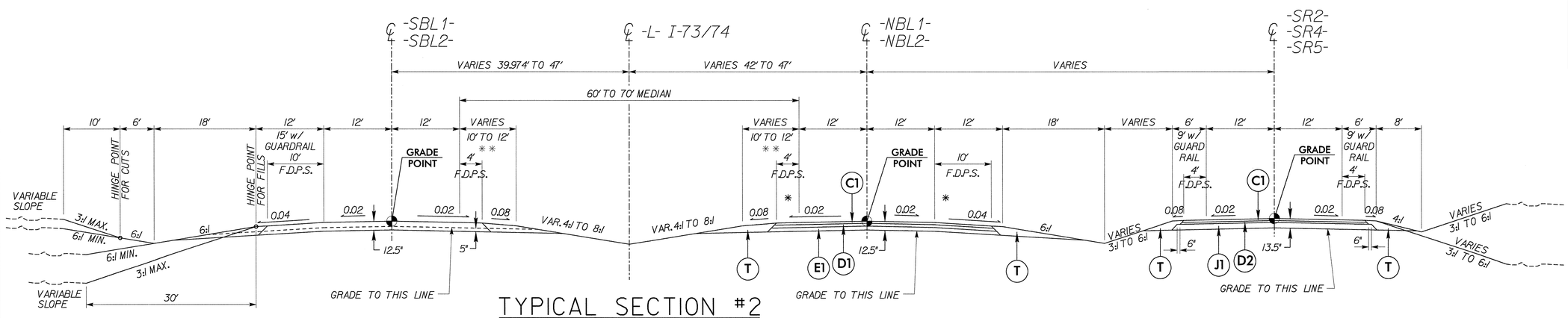
USE SERVICE ROAD TYPICAL ON RIGHT OR LEFT SIDE OF I-73/74 AS NECESSARY.

THE GRADING, NEW PAVEMENT, AND WEDGING / WIDENING PAVEMENT TYPICALS CAN BE USED ON EITHER SIDE OF THE -L- TYPICAL SECTION AS SHOWN IN THE STATION RANGES.

SEE CROSS SECTIONS FOR SLOPE INTERACTIONS BETWEEN MAINLINES AND SERVICE ROADS.

PAVEMENT SCHEDULE	
C1	3.0" S9.5C
C3	3.0" S9.5B
C5	1.25" SF9.5A
C6	2.5" SF9.5A
D1	4.0" I19.0C
D2	2.5" I19.0C
D4	4.0" I19.0B
E1	5.5" B25.0C
E3	4.0" B25.0B
J1	8" ABC
K	STABILIZED SUBGRADE
N1	GEOTEXTILE FOR PAVEMENT STABILIZATION
P	PRIME COAT (0.35 GAL /SY)
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONC. ISLAND (KEYED IN)
R3	CONCRETE SHOULDER BERM GUTTER
R4	CONC. MEDIAN BARRIER (VAR. HEIGHT, T1 OR T2)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

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



TYPICAL SECTION #2

USE TYPICAL SECTION NO. 2
WITH THE GRADING ONLY SECTION ON BOTH SIDES
OF THE -L- TYPICAL SECTION:

FROM -SBL1- STA. 403+27.02 TO STA. 413+96.03 (GRADING ONLY)
FROM -NBL1- STA. 401+75.70 TO STA. 414+05.17 (GRADING ONLY)

USE TYPICAL SECTION NO. 2
WITH THE FULL WIDTH NEW PAVEMENT SECTION ON
BOTH SIDES OF THE -L- TYPICAL SECTION:

FROM -SBL1- STA. 413+96.03 TO STA. 424+96.03

FROM -NBL1- STA. 414+05.17 TO STA. 425+05.17
FROM -SR2- STA. 73+82.89 TO STA. 79+00.61

FROM -SBL2- STA. 524+36.72 TO STA. 551+62.56
FROM -SR4- STA. 84+36.72 TO STA. 104+22.00

FROM -NBL2- STA. 524+34.34 TO STA. 551+57.78
FROM -SR5- STA. 84+34.34 TO STA. 111+53.08

* RUMBLE STRIPS REQUIRED. SEE ROADWAY STD. 665.01

** TRANSITION 12' MEDIAN SHOULDER TO 10' MEDIAN SHOULDER:
FROM -SBL1- STA. 403+27.02 TO STA. 404+27.02
FROM -NBL1- STA. 401+75.70 TO STA. 402+75.70

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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-B

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.

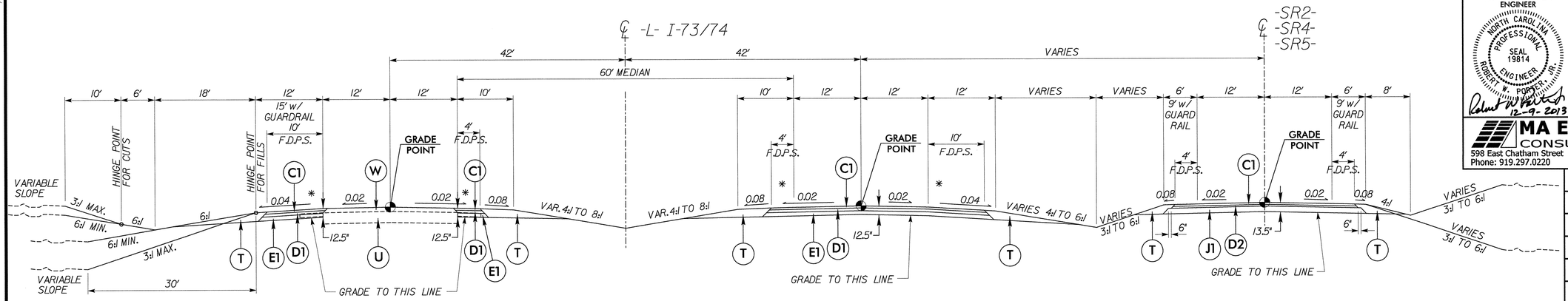
12-9-2013

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 031484 ENGINEER VLADIMIR G. MITCHEV

12/11/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



TYPICAL SECTION #3

USE TYPICAL SECTION NO. 3
WITH THE WEDGING / WIDENING PAVEMENT SECTION ON
THE SPECIFIED SIDE OF THE -L- TYPICAL SECTION:

FROM -L- (LEFT SIDE) STA. 439+00.00 TO STA. 452+79.60

FROM -L- (RIGHT SIDE) STA. 439+00.00 TO STA. 453+80.00
FROM -L- (RIGHT SIDE) STA. 464+60.00 TO STA. 468+00.00

USE TYPICAL SECTION NO. 3
WITH THE FULL WIDTH NEW PAVEMENT SECTION ON
THE SPECIFIED SIDE OF THE -L- TYPICAL SECTION:

FROM -L- (LEFT SIDE) STA. 425+00 TO STA. 439+00.00
FROM -L- (LEFT SIDE) STA. 452+79.60 TO STA. 524+36.72
FROM -SR4- STA. 38+03.08 TO STA. 84+36.72

FROM -L- (RIGHT SIDE) STA. 425+00 TO STA. 439+00.00
FROM -L- (RIGHT SIDE) STA. 453+80.00 TO STA. 464+60.00
FROM -L- (RIGHT SIDE) STA. 468+00.00 TO STA. 524+34.34
FROM -SR2- STA. 79+00.61 TO STA. 110+41.00
FROM -SR5- STA. 39+55.00 TO STA. 84+34.34

* RUMBLE STRIPS REQUIRED. SEE ROADWAY STD. 665.01

NOTES:

REMOVE ANY PARTIAL DEPTH PAVED SHOULDERS THAT ARE TO BECOME FUTURE TRAVEL LANES EXCEPT IN AREAS REQUIRING AT LEAST 12" WEDGING. THESE AREAS INCLUDE EXISTING US 220 AND Y9NBL BETWEEN STATIONS 13+00 AND 45+00.

USE SERVICE ROAD TYPICAL ON RIGHT OR LEFT SIDE OF I-73/74 AS NECESSARY.

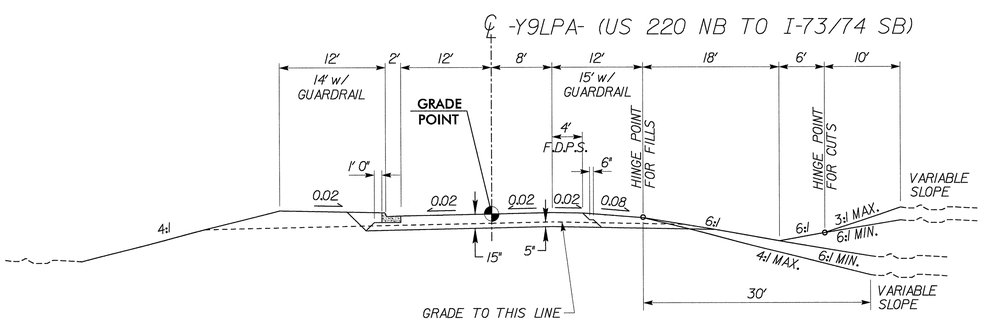
THE GRADING, NEW PAVEMENT, AND WEDGING / WIDENING PAVEMENT TYPICALS CAN BE USED ON EITHER SIDE OF THE -L- TYPICAL SECTION AS SHOWN IN THE STATION RANGES.

SEE CROSS SECTIONS FOR SLOPE INTERACTIONS BETWEEN MAINLINES AND SERVICE ROADS.

PAVEMENT SCHEDULE

C1	3.0" S9.5C
C3	3.0" S9.5B
C5	1.25" SF9.5A
C6	2.5" SF9.5A
D1	4.0" I19.0C
D2	2.5" I19.0C
D4	4.0" I19.0B
E1	5.5" B25.0C
E3	4.0" B25.0B
J1	8" ABC
K	STABILIZED SUBGRADE
N1	GEOTEXTILE FOR PAVEMENT STABILIZATION
P	PRIME COAT (0.35 GAL /SY)
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONC. ISLAND (KEYED IN)
R3	CONCRETE SHOULDER BERM GUTTER
R4	CONC. MEDIAN BARRIER (VAR. HEIGHT, T1 OR T2)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

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



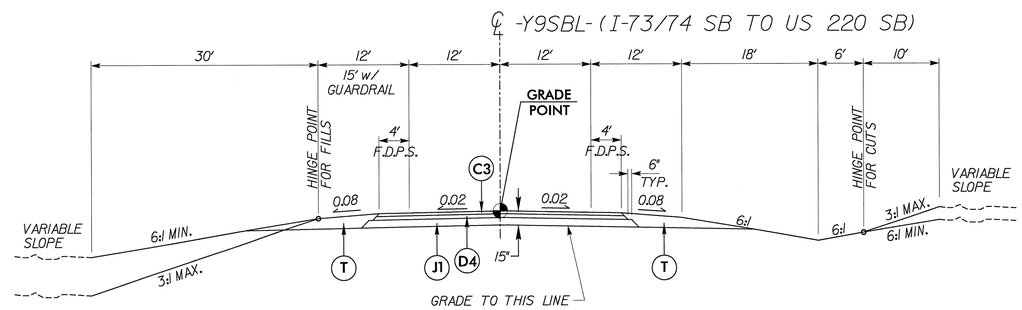
TYPICAL SECTION #4

USE TYPICAL SECTION NO.4:

FROM -Y9LPA- STA. 2+31.65 TO STA. 7+70.00 (GRADING ONLY)

USE TYPICAL SECTION NO. 4 WITH THE RIGHT SIDE SHOULDER, PAVED SHOULDER, DITCH, AND FILL SLOPE DIMENSIONS APPLIED TO THE LEFT SIDE OF THE TYPICAL SECTION:

FROM -Y9LPA- STA. 0+00.00 TO STA. 2+31.65 LT (GRADING ONLY)



TYPICAL SECTION #5

USE TYPICAL SECTION NO. 5:

FROM -Y9SBL- STA. 5+31.17 TO STA. 22+10.00

USE TYPICAL SECTION NO. 5
WITH -L- (-SBL1-) 12.5" PAVEMENT DESIGN (C1, D1, & E1) AS SHOWN IN
TYPICAL SECTION NO. 2 FOR -Y9SBL- AND RAMP GORE AREA:

FROM -Y9SBL- STA. 0+00.00 TO STA. 5+31.17

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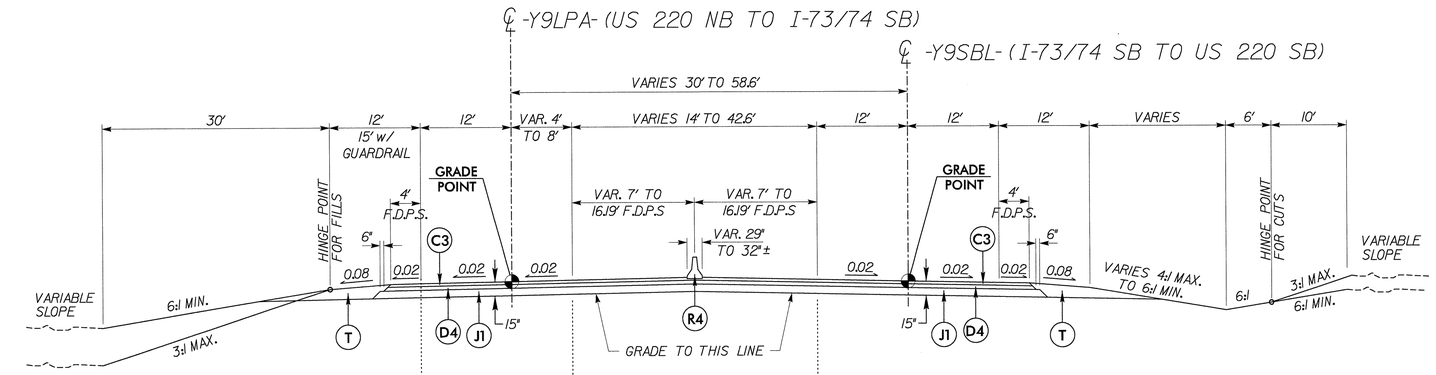
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-C

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter, Jr. 12-9-2013

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 031484 ENGINEER VLADIMIR G. MITCHEV
Vladimir G. Mitchev 12/11/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



TYPICAL SECTION #6

USE TYPICAL SECTION NO. 6:

FROM -Y9SBL- STA. 22+10.00 TO STA. 28+40.55 (BEGIN BRIDGE)
FROM -Y9SBL- STA. 30+96.55 (END BRIDGE) TO STA. 45+52.63

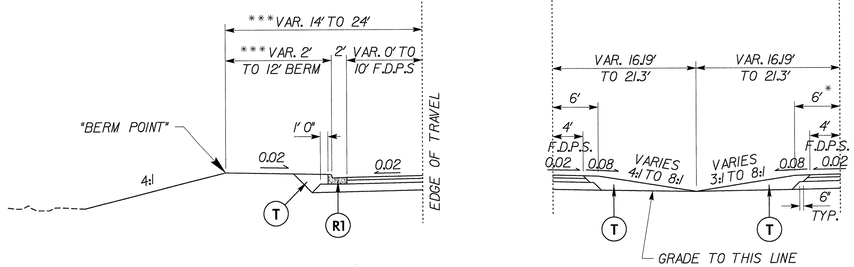
FROM -Y9LPA- STA. 7+70.00 TO STA. 13+58.70 (BEGIN BRIDGE) (SEE TYP. SEC. NO. 6A)
FROM -Y9LPA- STA. 16+14.70 (END BRIDGE) TO STA. 31+17.16

THE CENTERLINE OF BARRIER IS CONTROLLED BY AND LOCATED 7' FROM THE -Y9LPA- EDGE OF TRAVEL LANE FROM:

-Y9LPA- STA. 7+70 TO 17+11.74
-Y9SBL- STA 22+11.31 TO 31+74.80

THE CENTERLINE OF BARRIER IS LOCATED IN THE CENTER OF THE -Y9SBL-/-Y9LPA- MEDIAN FROM:

-Y9LPA- STA. 17+11.74 TO 24+82.14
-Y9SBL- STA. 31+74.80 TO 39+32.00



TYPICAL SECTION #6A

USE TYPICAL SECTION NO. 6A IN CONJUNCTION WITH TYPICAL SECTION NO. 6:

MEDIAN

FROM -Y9SBL- STA. 39+32.00 TO STA. 45+52.63 LT
FROM -Y9LPA- STA. 24+82.14 TO STA. 31+17.16 RT

* IN MEDIAN LOCATIONS WHERE PAVED SHOULDER EXTENDS TO FACE OF GUARDRAIL, INCREASE SHOULDER WIDTH BY 3' IF MEDIAN SLOPE IS STEEPER THAN 8:1.

CURB & GUTTER

FROM -Y9LPA- STA. 7+70.00 TO STA. 13+21.10 LT (APPROACH SLAB)

*** TRANSITION "BERM POINT" FROM 24' TO 14' (SEE CROSS SECTIONS) FROM -Y9LPA- STA. 10+41.50 TO STA. 11+41.50 LT

NOTES:

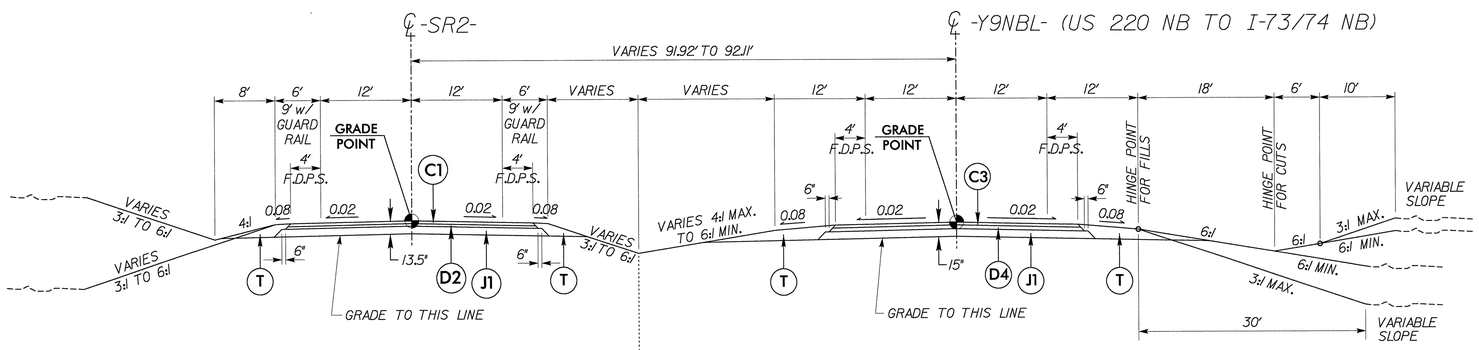
REMOVE ANY PARTIAL DEPTH PAVED SHOULDERS THAT ARE TO BECOME FUTURE TRAVEL LANES EXCEPT IN AREAS REQUIRING AT LEAST 12" WEDGING. THESE AREAS INCLUDE EXISTING US 220 AND Y9NBL BETWEEN STATIONS 13+00 AND 45+00.

SEE CROSS SECTIONS FOR SLOPE INTERACTIONS BETWEEN MAINLINES AND SERVICE ROADS.

PAVEMENT SCHEDULE

C1	3.0" S9.5C
C3	3.0" S9.5B
C5	1.25" SF9.5A
C6	2.5" SF9.5A
D1	4.0" I19.0C
D2	2.5" I19.0C
D4	4.0" I19.0B
E1	5.5" B25.0C
E3	4.0" B25.0B
J1	8" ABC
K	STABILIZED SUBGRADE
N1	GEOTEXTILE FOR PAVEMENT STABILIZATION
P	PRIME COAT (0.35 GAL./SY)
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONC. ISLAND (KEYED IN)
R3	CONCRETE SHOULDER BERM GUTTER
R4	CONC. MEDIAN BARRIER (VAR. HEIGHT, T1 OR T2)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

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



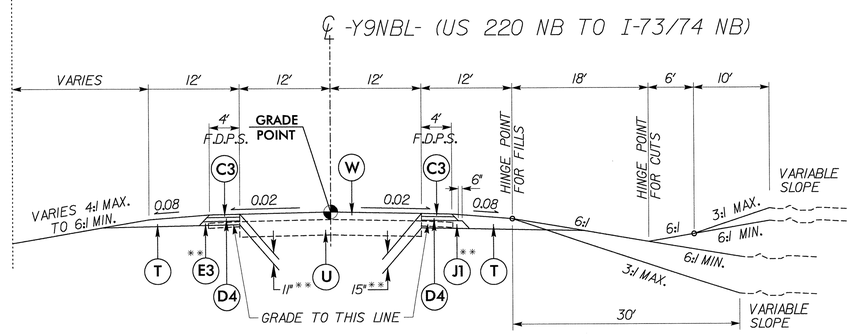
TYPICAL SECTION #7

USE TYPICAL SECTION NO. 7:

FROM -Y9NBL- STA. 4+90.74 TO STA. 12+30.00
FROM -SR2- STA. 36+10.15 TO STA. 73+82.89

USE TYPICAL SECTION NO. 7
WITH -L- (-NBL1-) 12.5" PAVEMENT DESIGN (C1, D1, & E1) AS SHOWN IN TYPICAL SECTION NO. 2 FOR -Y9NBL- AND RAMP GORE AREA:

FROM -Y9NBL- STA. 0+00.00 TO STA. 4+90.74



TYPICAL SECTION #7A

USE TYPICAL SECTION NO. 7A IN CONJUNCTION WITH TYPICAL SECTION NO. 7:

FROM -Y9NBL- STA. 12+30.00 TO STA. 37+89.86

** FOR NARROW WIDENING LESS THAN 6', USE 11" ASPHALT PAVEMENT DESIGN, OTHERWISE USE 15" ASPHALT/ABC PAVEMENT DESIGN.

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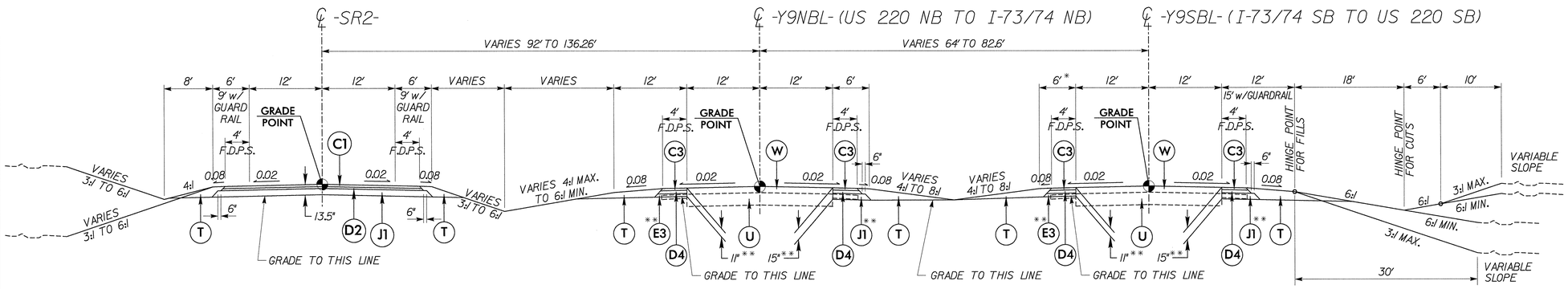
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-D

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter, Jr. 12-9-2013

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 031484 ENGINEER VLADIMIR G. MITCHELL
Vladimir Mitchell 12/11/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



NOTES:

REMOVE ANY PARTIAL DEPTH PAVED SHOULDERS THAT ARE TO BECOME FUTURE TRAVEL LANES EXCEPT IN AREAS REQUIRING AT LEAST 12" WEDGING. THESE AREAS INCLUDE US 220 AND Y9NBL BETWEEN STATIONS 13+00 AND 45+00.

SEE CROSS SECTIONS FOR SLOPE INTERACTIONS BETWEEN MAINLINES AND SERVICE ROADS.

TYPICAL SECTION #8

USE TYPICAL SECTION NO. 8:

FROM -Y9SBL- STA. 45+52.63 TO STA. 72+60.00
FROM -Y9NBL- STA. 37+89.86 TO STA. 65+50.00
FROM -SR2- STA. 21+15.00 TO STA. 36+10.15

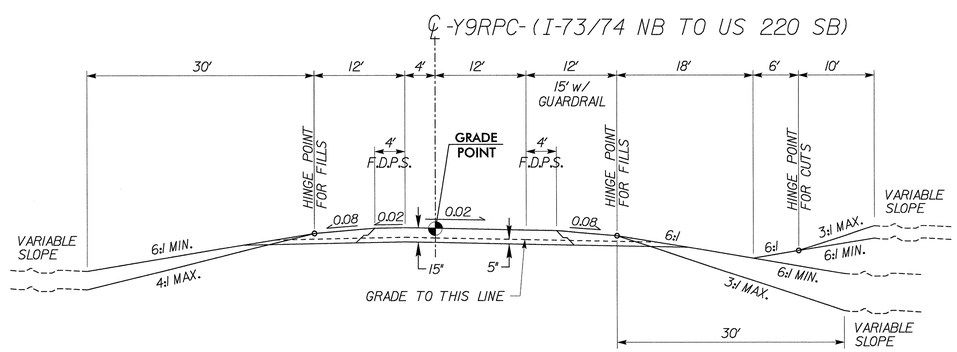
** FOR NARROW WIDENING LESS THAN 6', USE 11" ASPHALT PAVEMENT DESIGN, OTHERWISE USE 15" ASPHALT/ABC PAVEMENT DESIGN.

* IN MEDIAN LOCATIONS WHERE PAVED SHOULDER EXTENDS TO FACE OF GUARDRAIL, INCREASE SHOULDER WIDTH BY 3' IF MEDIAN SLOPE IS STEEPER THAN 8:1.

PAVEMENT SCHEDULE

C1	3.0" S9.5C
C3	3.0" S9.5B
C5	1.25" SF9.5A
C6	2.5" SF9.5A
D1	4.0" I19.0C
D2	2.5" I19.0C
D4	4.0" I19.0B
E1	5.5" B25.0C
E3	4.0" B25.0B
J1	8" ABC
K	STABILIZED SUBGRADE
N1	GEOTEXTILE FOR PAVEMENT STABILIZATION
P	PRIME COAT (0.35 GAL./SY)
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONC. ISLAND (KEYED IN)
R3	CONCRETE SHOULDER BERM GUTTER
R4	CONC. MEDIAN BARRIER (VAR. HEIGHT, T1 OR T2)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

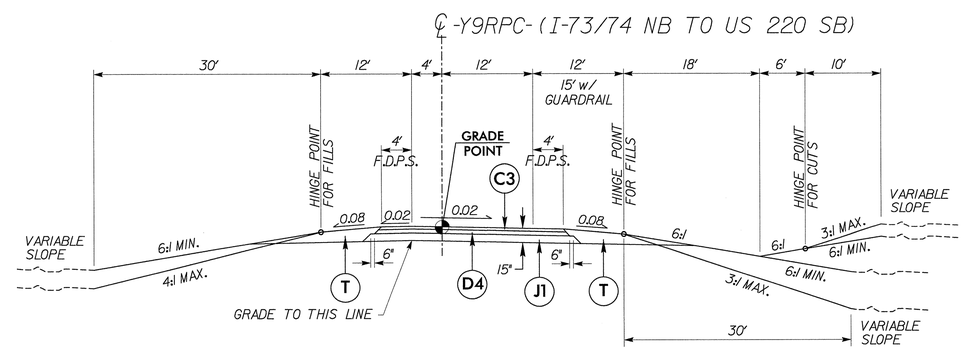
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION #9

USE TYPICAL SECTION NO.9:

FROM -Y9RPC- STA. 0.00.00 TO STA. 10+00.00 (GRADING ONLY)



TYPICAL SECTION #10

USE TYPICAL SECTION NO. 10:

FROM -Y9RPC- STA. 10.00.00 TO STA. 12+76.51

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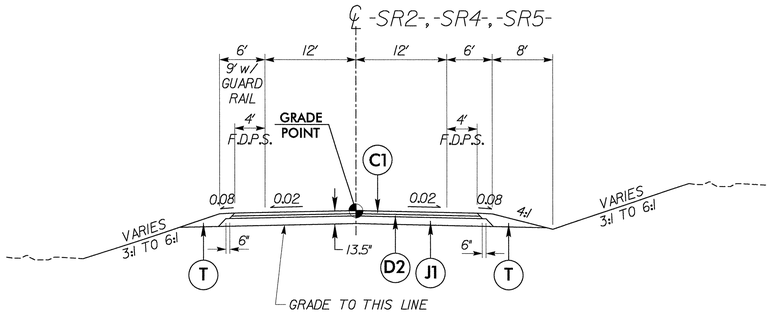
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-E

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
12-9-2013

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 031484 ENGINEER VLADIMIR G. MITCHEV
12/11/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



TYPICAL SECTION #11

USE TYPICAL SECTION NO. 11:

FROM -SR2- STA. 10+81.19 TO STA. 21+15.00
FROM -SR2- STA. 110+41.00 TO STA. 111+83.00
FROM -SR2- STA. 115+26.00 TO STA. 127+06.94

FROM -SR4- STA. 9+81.25 TO STA. 21+84.00
FROM -SR4- STA. 104+22.00 TO STA. 128+50.90

FROM -SR5- STA. 19+16.16 TO STA. 26+40.00
FROM -SR5- STA. 111+53.08 TO STA. 121+51.01

USE IN CONJUNCTION WITH -Y10- (SEE TYPICAL 17):

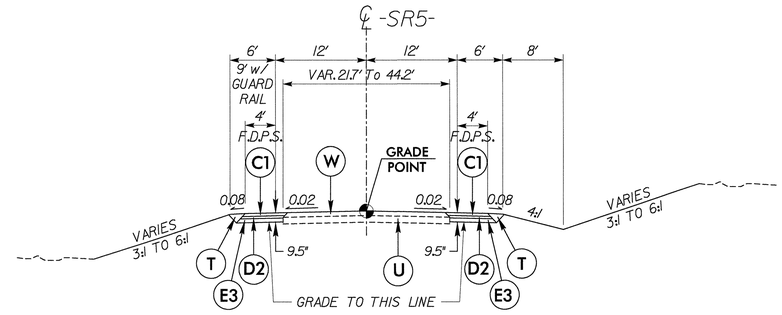
FROM -SR2- STA. 111+83.00 TO STA. 115+26.00

USE IN CONJUNCTION WITH -Y10RPA- (SEE TYPICAL 14):

FROM -SR4- STA. 21+84.00 TO STA. 38+03.08

USE IN CONJUNCTION WITH -Y10RPD- (SEE TYPICAL 14):

FROM -SR5- STA. 26+40.00 TO STA. 39+55.00



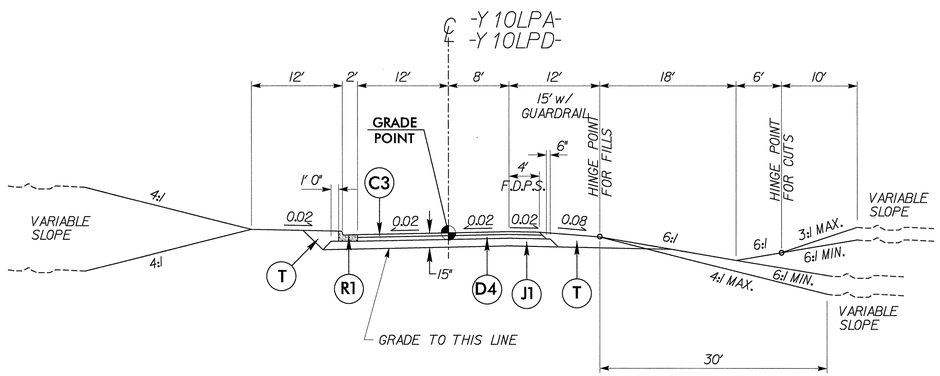
TYPICAL SECTION #12

USE TYPICAL SECTION NO. 12:

FROM -SR5- STA. 121+51.01 TO STA. 128+64.00

PAVEMENT SCHEDULE	
C1	3.0" S9.5C
C3	3.0" S9.5B
C5	1.25" SF9.5A
C6	2.5" SF9.5A
D1	4.0" I19.0C
D2	2.5" I19.0C
D4	4.0" I19.0B
E1	5.5" B25.0C
E3	4.0" B25.0B
J1	8" ABC
K	STABILIZED SUBGRADE
N1	GEOTEXTILE FOR PAVEMENT STABILIZATION
P	PRIME COAT (0.35 GAL /SY)
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONC. ISLAND (KEYED IN)
R3	CONCRETE SHOULDER BERM GUTTER
R4	CONC. MEDIAN BARRIER (VAR. HEIGHT, T1 OR T2)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

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



TYPICAL SECTION #13

USE TYPICAL SECTION NO. 13:

FROM -Y10LPA- STA. 2+50.53.00 TO STA. 12+00.00
FROM -Y10LPD- STA. 3+87.00.00 TO STA. 11+35.00 (MIRRORED TYPICAL)

USE TYPICAL SECTION NO. 13 WITH THE RIGHT SIDE SHOULDER, PAVED SHOULDER, DITCH, AND FILL SLOPE DIMENSIONS APPLIED TO THE LEFT SIDE OF THE TYPICAL SECTION:

FROM -Y10LPA- STA. 0+00.00 TO STA. 2+50.53
FROM -Y10LPD- STA. 0+00.00 TO STA. 3+87.00 (MIRRORED TYPICAL)

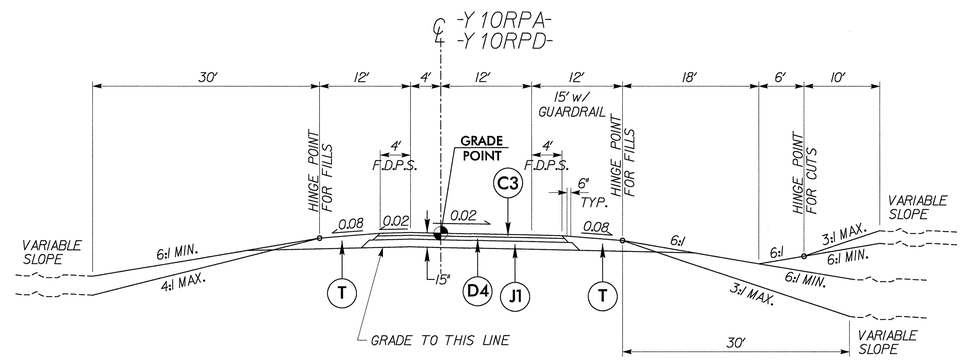
USE TYPICAL SECTION NO. 13
WITH -L- (LT & RT) 12.5' PAVEMENT DESIGN (C1, D1, & E1) AS SHOWN IN TYPICAL SECTION NO. 3 FOR -Y10LPA-, -Y10LPD-, AND LOOP GORE AREAS:

FROM -Y10LPA- STA. 0+00.00 TO STA. 2+50.53
FROM -Y10LPD- STA. 0+00.00 TO STA. 4+27.72 (MIRRORED TYPICAL)

SEE CROSS SECTIONS FOR SLOPE INTERACTIONS BETWEEN TYPICAL SECTION NOS. 13 & 14:

FROM -Y10RPA- STA. 17+75+/- TO STA. 22+47.87 LT
FROM -Y10LPA- STA. 7+80+/- TO STA. 12+00.00 RT

FROM -Y10RPD- STA. 13+50+/- TO STA. 17+01.43 RT
FROM -Y10LPD- STA. 8+00+/- TO STA. 11+35.00 LT



TYPICAL SECTION #14

USE TYPICAL SECTION NO. 14:

FROM -Y10RPA- STA. 4+66.30 TO STA. 22+44.87
FROM -Y10RPD- STA. 3+87.10 TO STA. 17+01.43 (MIRRORED TYPICAL)

USE TYPICAL SECTION NO. 14 IN CONJUNCTION WITH TYPICAL SECTION NO. 11 AND SEE CROSS SECTIONS FOR SLOPE INTERACTION BETWEEN TYPICALS:

FROM -Y10RPA- STA. 0+00.00 TO STA. 16+55.00 (RIGHT OF -SR4-)
FROM -SR4- STA. 38+03.08 TO STA. 21+84.00 (RIGHT OF -Y10RPA-)

FROM -Y10RPD- STA. 0+00.00 TO STA. 13+61.00 (LEFT OF -SR5-) (MIRRORED TYPICAL)
FROM -SR5- STA. 39+55.00 TO STA. 26+40.00 (LEFT OF -Y10RPD-)

USE TYPICAL SECTION NO. 14
WITH -L- (LT & RT) 12.5' PAVEMENT DESIGN (C1, D1, & E1) AS SHOWN IN TYPICAL SECTION NO. 3 FOR -Y10RPA-, -Y10RPD-, AND RAMP GORE AREAS:

FROM -Y10RPA- STA. 0+00.00 TO STA. 4+66.30
FROM -Y10RPD- STA. 0+00.00 TO STA. 3+87.10 (MIRRORED TYPICAL)

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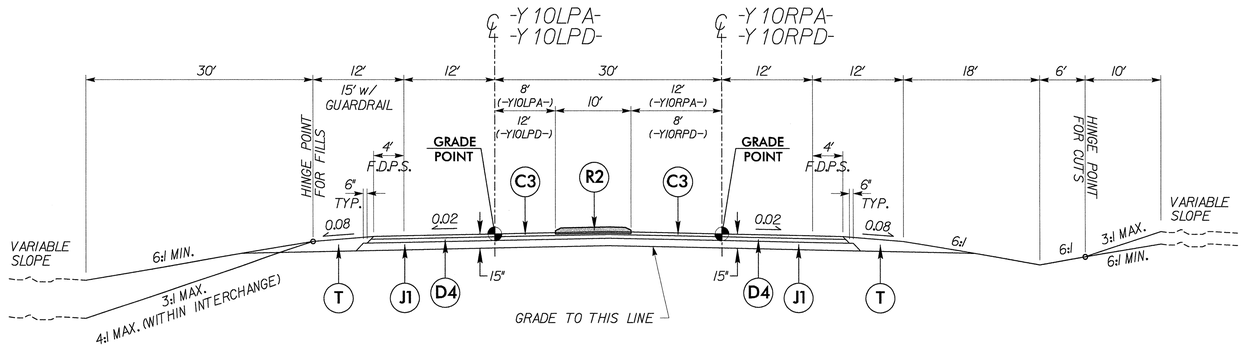
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-F

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
12-9-2013

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 031484 ENGINEER VLADIMIR G. MITCHEV
12/11/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

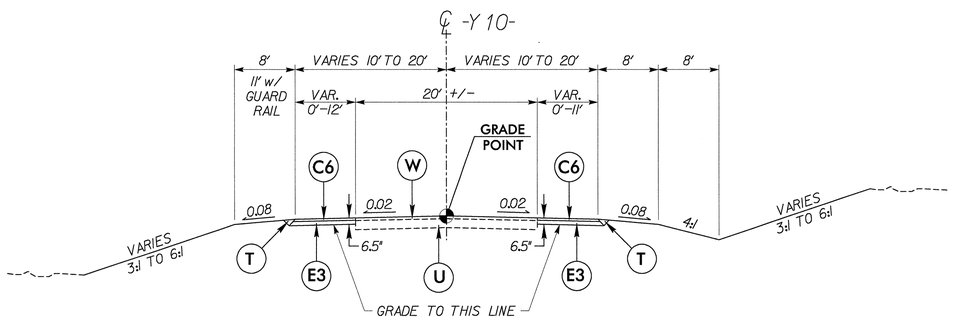


TYPICAL SECTION #15

USE TYPICAL SECTION NO. 15:

FROM -Y10RPA- STA. 22+44.87 TO STA. 24+45.27
FROM -Y10LPA- STA. 12+00.00 TO STA. 13+95.15

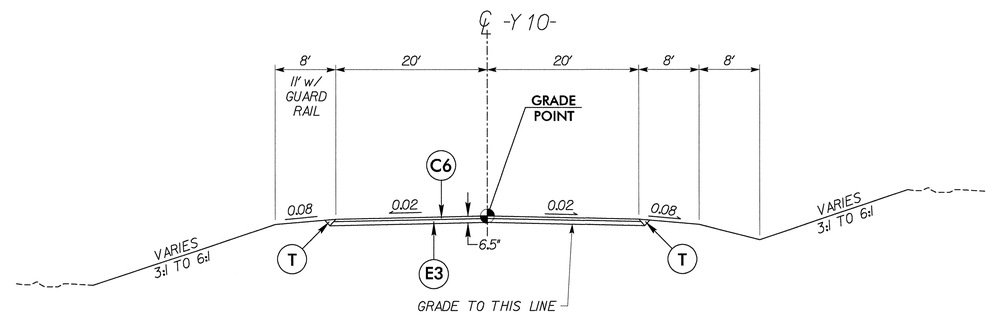
FROM -Y10RPD- STA. 17+01.43 TO STA. 19+95.51 (MIRRORED TYPICAL)
FROM -Y10LPD- STA. 11+35.00 TO STA. 14+29.02 (MIRRORED TYPICAL)



TYPICAL SECTION #16

USE TYPICAL SECTION NO. 16:

FROM -Y10- STA. 13+00.00 TO STA. 20+50.00
FROM -Y10- STA. 44+00.00 TO STA. 56+50.00



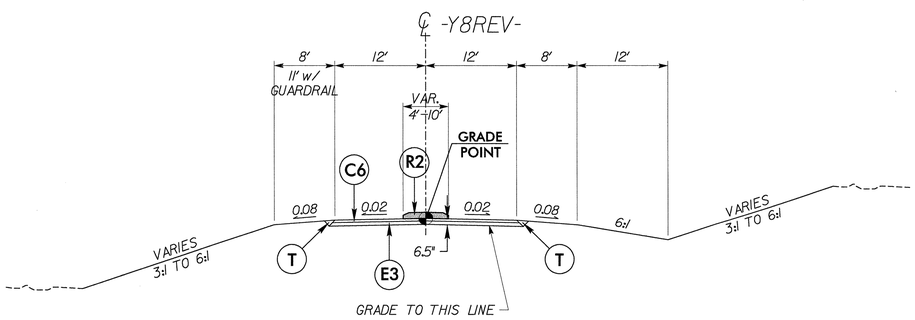
TYPICAL SECTION #17

USE TYPICAL SECTION NO. 17:

FROM -Y10- STA. 20+50.00 TO STA. 31+73.60 (BEGIN BRIDGE)
FROM -Y10- STA. 34+38.60 (END BRIDGE) TO STA. 44+00.00

USE TYPICAL SECTION NO. 17 IN CONJUNCTION WITH TYPICAL SECTION NO. 11 AND SEE CROSS SECTIONS FOR SLOPE INTERACTION BETWEEN TYPICALS:

FROM -Y10- STA. 35+44.00 TO STA. 38+99.00 (LEFT OF -SR2-)
FROM -SR2- STA. 111+83.00 TO STA. 115+26.00 (RIGHT OF -Y10-)

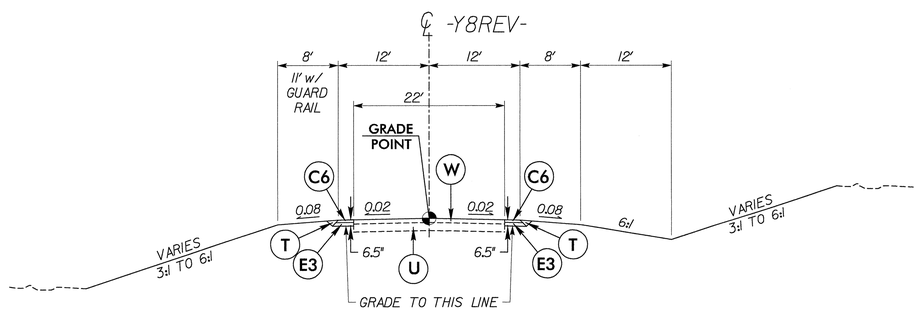


TYPICAL SECTION #18

USE TYPICAL SECTION NO. 18:

FROM -Y8REV- STA. 18+00.00 TO STA. 33+04.49 (BEGIN BRIDGE)
FROM -Y8REV- STA. 35+16.49 (END BRIDGE) TO STA. 60+60.39

SEE PLANS FOR MONOLITHIC CONCRETE ISLAND LOCATION



TYPICAL SECTION #19

USE TYPICAL SECTION NO. 19:

FROM -Y8REV- STA. 13+25.00 TO STA. 18+00.00

PAVEMENT SCHEDULE

C1	3.0" S9.5C
C3	3.0" S9.5B
C5	1.25" SF9.5A
C6	2.5" SF9.5A
D1	4.0" I19.0C
D2	2.5" I19.0C
D4	4.0" I19.0B
E1	5.5" B25.0C
E3	4.0" B25.0B
J1	8" ABC
K	STABILIZED SUBGRADE
N1	GEOTEXTILE FOR PAVEMENT STABILIZATION
P	PRIME COAT (0.35 GAL /SY)
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONC. ISLAND (KEYED IN)
R3	CONCRETE SHOULDER BERM GUTTER
R4	CONC. MEDIAN BARRIER (VAR. HEIGHT, T1 OR T2)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

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

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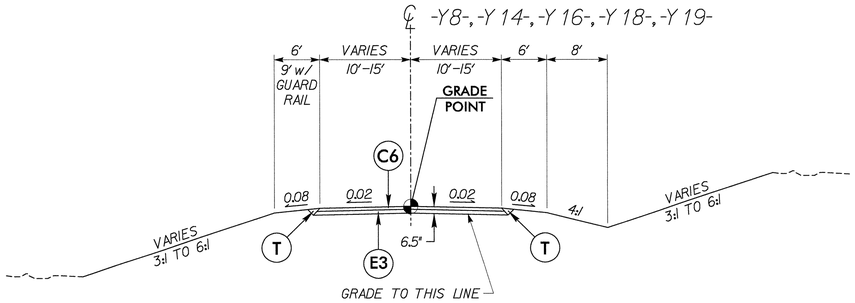
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-G

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPE, JR.
Robert W. Pope, Jr. 12-9-2013

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 031484 ENGINEER VLADIMIR G. MITCHELL
Vladimir G. Mitchell 12/11/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

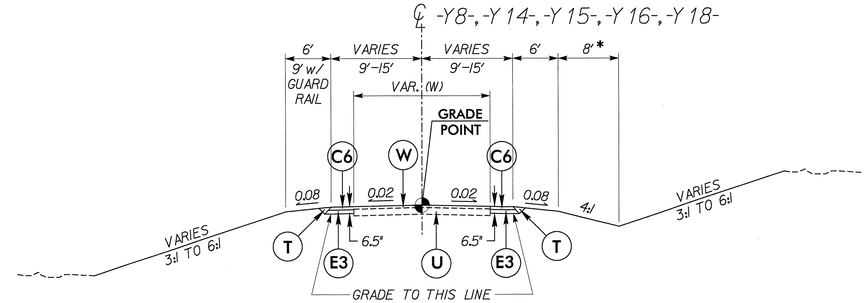


TYPICAL SECTION #20

USE TYPICAL SECTION NO. 20:

FROM -Y8- STA. 10+12.00 TO STA. 16+00.00
FROM -Y14- STA. 10+12.00 TO STA. 12+00.00
FROM -Y16- STA. 10+12.00 TO STA. 11+00.00
FROM -Y18- STA. 10+12.37 TO STA. 10+90.00
FROM -Y19- STA. 10+12.00 TO STA. 12+55.00

SEE PLANS FOR PROPOSED PAVEMENT WIDTHS.



TYPICAL SECTION #21

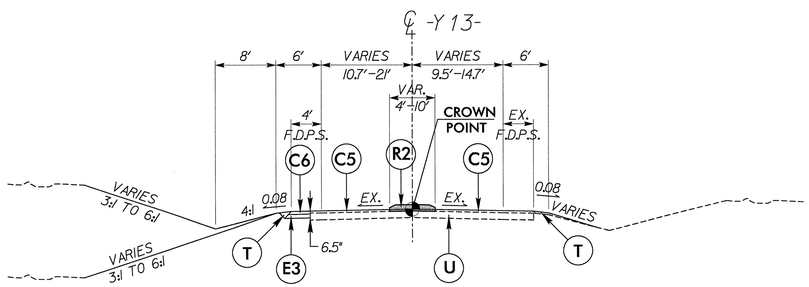
USE TYPICAL SECTION NO. 21:

FROM -Y8- STA. 16+00.00 TO STA. 18+17.15 (W=22')
FROM -Y14- STA. 12+00.00 TO STA. 13+25.00 (W=19')
FROM -Y15- STA. 10+75.00 TO STA. 16+57.15 (W=18')
FROM -Y16- STA. 11+00.00 TO STA. 12+50.00 (W=22')
FROM -Y18- STA. 10+90.00 TO STA. 12+00.00 (W=23')

SEE PLANS FOR PROPOSED PAVEMENT WIDTHS.

* USE 6' DITCH WIDTH TO AVOID CHURCH PROPERTY:

FROM -Y15- STA. 10+72.00 TO STA. 12+00.00 RT



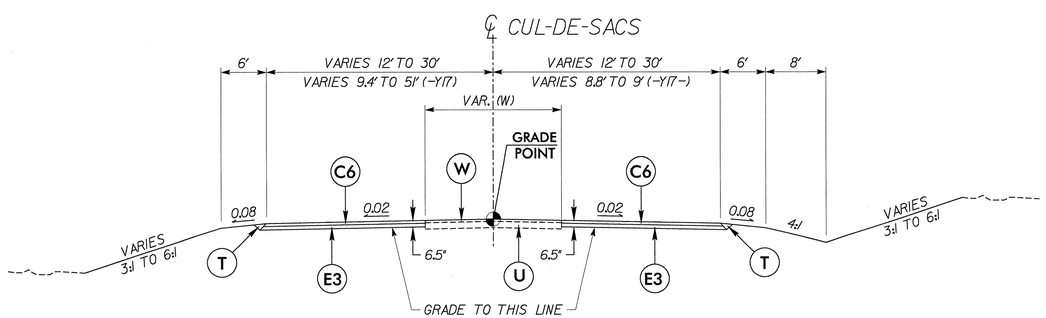
TYPICAL SECTION #22

USE TYPICAL SECTION NO. 22:

FROM -Y13- STA. 10+12.28 TO STA. 15+25.00

RESURFACE EXISTING PAVEMENT WITH 1.25" SF9.5A.
REPLACE EXISTING CONCRETE ISLAND.

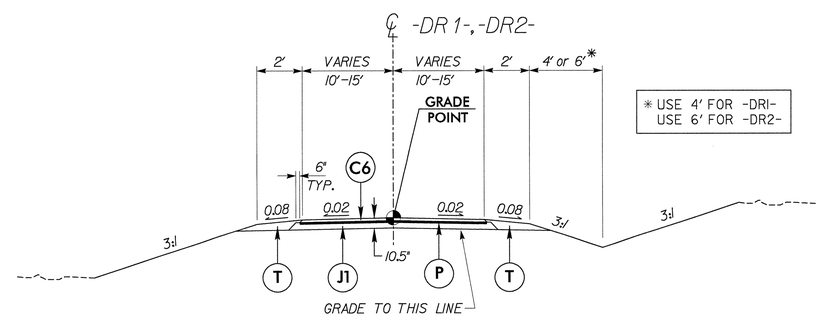
SEE PLANS FOR MONOLITHIC CONCRETE ISLAND LOCATION



TYPICAL SECTION #23

USE TYPICAL SECTION NO. 23:

FROM -Y8- STA. 18+17.15 TO STA. 18+90.00 (W=22')
FROM -Y15- STA. 16+57.15 TO STA. 17+30.00 (W=18')
FROM -Y17- STA. 10+93.12 TO STA. 11+75.00 (W=18.2')



* USE 4' FOR -DR1-
USE 6' FOR -DR2-

TYPICAL SECTION #24

USE TYPICAL SECTION NO. 24:

FROM -DR1- STA. 10+16.78 TO STA. 12+83.09
FROM -DR2- STA. 10+12.00 TO STA. 12+35.00

PAVEMENT SCHEDULE	
C1	3.0" S9.5C
C3	3.0" S9.5B
C5	1.25" SF9.5A
C6	2.5" SF9.5A
D1	4.0" I19.0C
D2	2.5" I19.0C
D4	4.0" I19.0B
E1	5.5" B25.0C
E3	4.0" B25.0B
J1	8" ABC
K	STABILIZED SUBGRADE
N1	GEOTEXTILE FOR PAVEMENT STABILIZATION
P	PRIME COAT (0.35 GAL./SY)
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONC. ISLAND (KEYED IN)
R3	CONCRETE SHOULDER BERM GUTTER
R4	CONC. MEDIAN BARRIER (VAR. HEIGHT, T1 OR T2)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

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

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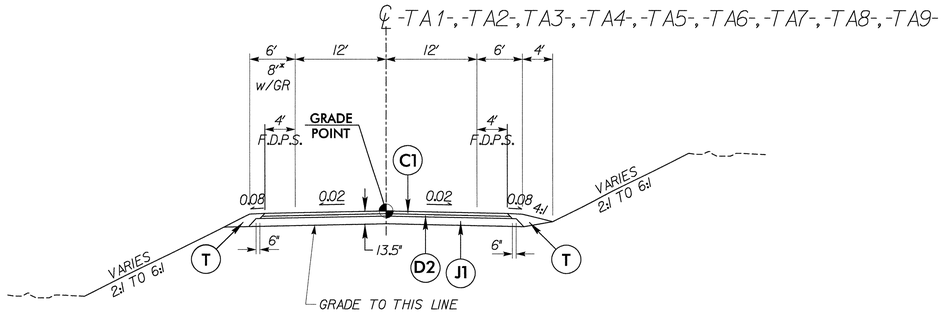
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-H

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter, Jr. 12-9-2013

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 031484 ENGINEER VLADIMIR G. MITCHEV
Vladimir G. Mitchev 12/11/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



TYPICAL SECTION #25

USE TYPICAL SECTION NO. 25:

FROM -TA1- STA. 10+45.83 TO STA. 18+73.21
FROM -TA2- STA. 46+43.88 TO STA. 47+20.00

FROM -TA3- STA. 38+09.38 TO STA. 40+06.00
FROM -TA4- STA. 63+33.44 TO STA. 81+80.08
FROM -TA5- STA. 67+74.18 TO STA. 81+00.00

FROM -TA6- STA. 98+00.00 TO STA. 106+27.78
FROM -TA7- STA. 98+00.00 TO STA. 106+21.92

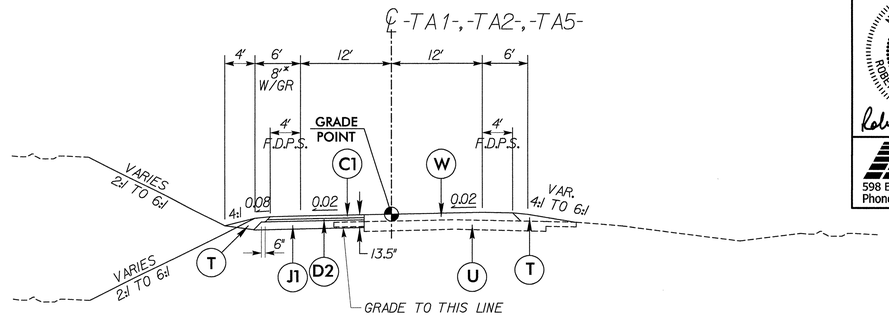
FROM -TA8- STA. 12+50.00 TO STA. 14+82.99
FROM -TA8- STA. 15+07.05 TO STA. 17+32.57
FROM -TA8- STA. 17+56.57 TO STA. 20+50.00

FROM -TA9- STA. 37+74.96 TO STA. 39+40.08

NOTES

TEMPORARY CUT & FILL SLOPES MAY BE PLACED USING 2:1 MAX. SLOPES. HOWEVER, ANY TEMPORARY ALIGNMENT CUT & FILL SLOPES THAT WILL BE USED AS FINAL PROPOSED SLOPES MUST BE PLACED USING 3:1 MAX. SLOPES AS PER THE GEOTECHNICAL SLOPE RECOMMENDATIONS.

* - USE THE 6' GUARDRAIL OFFSET WITH 2' OF SHOULDER WIDENING ON THE OUTSIDE OF ANY GIVEN DETOUR TYPICAL SECTION. IF GUARDRAIL IS REQUIRED ON THE INSIDE OF THE TYPICAL SECTION (ADJACENT TO -L-), THE FACE OF GUARDRAIL WILL BE PLACED AT THE EDGE OF THE PAVED SHOULDER (4' OFFSET) WITH NO SHOULDER WIDENING TO MAXIMIZE WORKING ROOM IN THE MEDIAN AREA. SEE TEMPORARY GUARDRAIL SUMMARY.



TYPICAL SECTION #26

USE TYPICAL SECTION NO. 26:

FROM -TA1- STA. 18+73.21 TO STA. 26+44.50
FROM -TA2- STA. 40+43.83 TO STA. 46+43.88

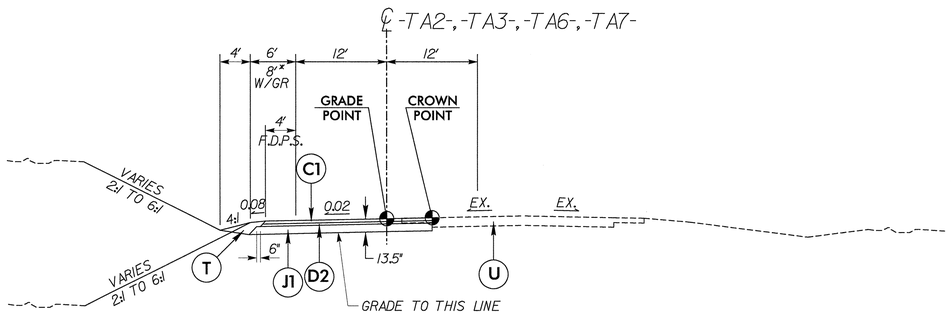
USE EXISTING -L- RT PAVEMENT WITH WEDGING (-L- PVMT. DESIGN) AS REQUIRED IN THIS LOCATION:

FROM -TA5- STA. 64+72.25 TO STA. 65+55.65

NOTE: USE TYPICAL SECTION #26 AND ITS PAVEMENT DESIGN AS NECESSARY, FOR ANY TEMPORARY PAVEMENT WIDENING AREAS SHOWN IN THE WORK ZONE TRAFFIC CONTROL PLANS.

PAVEMENT SCHEDULE	
C1	3.0" S9.5C
C3	3.0" S9.5B
C5	1.25" SF9.5A
C6	2.5" SF9.5A
D1	4.0" I19.0C
D2	2.5" I19.0C
D4	4.0" I19.0B
E1	5.5" B25.0C
E3	4.0" B25.0B
J1	8" ABC
K	STABILIZED SUBGRADE
N1	GEOTEXTILE FOR PAVEMENT STABILIZATION
P	PRIME COAT (0.35 GAL /SY)
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONC. ISLAND (KEYED IN)
R3	CONCRETE SHOULDER BERM GUTTER
R4	CONC. MEDIAN BARRIER (VAR. HEIGHT, T1 OR T2)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

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



TYPICAL SECTION #27

USE TYPICAL SECTION NO. 27 WITH GRADE POINT:

FROM -TA2- STA. 47+20.00 TO STA. 49+66.13

FROM -TA3- STA. 36+31.03 TO STA. 38+09.38

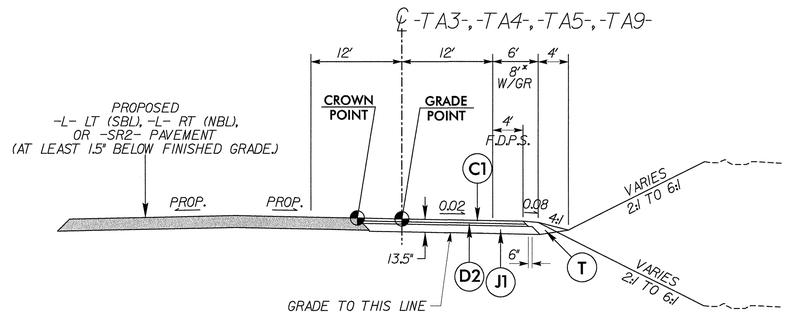
FROM -TA6- STA. 106+27.78 TO STA. 109+20.25
FROM -TA7- STA. 106+21.92 TO STA. 109+22.98

USE TYPICAL SECTION NO. 27 WITH CROWN POINT:

FROM -TA2- STA. 49+66.13 TO STA. 52+90.89 (USE EXIST. -Y9SBL- EOT AS CONTROL)

FROM -TA3- STA. 32+96.54 TO STA. 36+31.03 (USE EXIST. -L- RT (NBL) EOT AS CONTROL)

FROM -TA6- STA. 109+20.25 TO STA. 112+52.98 (USE EXIST. -SBL2- EOT AS CONTROL)
FROM -TA7- STA. 109+22.98 TO STA. 112+51.85 (USE EXIST. -NBL2- EOT AS CONTROL)



TYPICAL SECTION #28

USE TYPICAL SECTION NO. 28 WITH GRADE POINT:

FROM -TA3- STA. 40+06.00 TO STA. 41+64.88
FROM -TA4- STA. 62+18.25 TO STA. 63+33.44 (MIRRORED TYPICAL)

FROM -TA5- STA. 65+55.65 TO STA. 67+74.18
FROM -TA9- STA. 36+15.06 TO STA. 37+74.96 (MIRRORED TYPICAL)
FROM -TA9- STA. 39+40.08 TO STA. 40+98.93

USE PROP. -L- PAVEMENT DESIGN TO REPLACE EXISTING PAVEMENT TO BE UNDERCUT IN THE FOLLOWING LOCATION:

FROM -TA5- STA. 63+21.63 TO STA. 64+72.25

USE TYPICAL SECTION NO. 28 WITH CROWN POINT:

FROM -TA3- STA. 41+64.88 TO STA. 45+03.94 (USE PROP. -L- LT (SBL) EOP AS CONTROL)
FROM -TA4- STA. 60+41.92 TO STA. 62+18.25 (USE PROP. -L- LT (SBL) EOP AS CONTROL) -- (MIRRORED TYPICAL)

FROM -TA9- STA. 31+90.00 TO STA. 36+15.06 (USE PROP. -SR2- EOP AS CONTROL) -- (MIRRORED TYPICAL)
FROM -TA9- STA. 40+98.93 TO STA. 45+57.60 (USE PROP. -L- RT (NBL) EOP AS CONTROL)

7/2/99

12/9/2013
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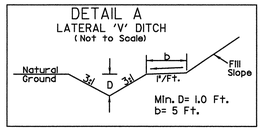
11:59:07 AM

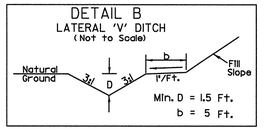
PROJECT REFERENCE NO.	SHEET NO.
R-3421 C	2-1
R/W SHEET NO.	

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
10/15/13

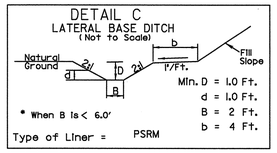
LATERAL DITCH DETAILS



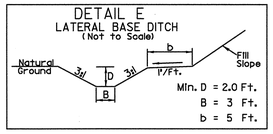
-SR5- STA. 27+00 TO STA. 27+34 (RT)
-SR5- STA. 44+95 TO STA. 47+00 (RT)
-Y8REV- STA. 24+65 TO STA. 26+50 (RT)
-Y8REV- STA. 38+00 TO STA. 40+00 (RT)



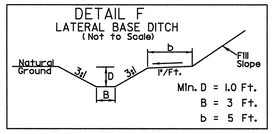
-SR5- STA 70+00 TO STA 71+25 (RT)
-Y8REV- STA 24+00 TO STA 24+50 (RT)

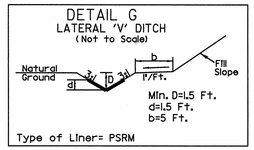


-SR4- STA. 116+50 TO STA. 118+00 (RT)

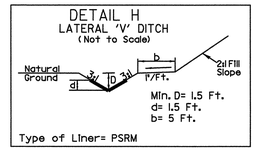


-L- STA. 431+72 TO STA. 433+00 (LT)

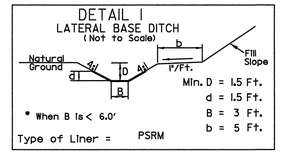




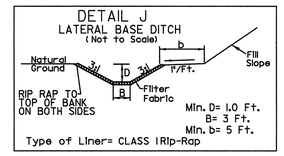
-Y8REV- STA. 36+50 TO STA. 38+00 (RT)
-SR4- STA. 90+04 TO STA. 92+06 (LT)



-SR5- STA 60+00 TO STA 62+47 (RT)

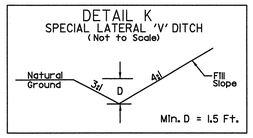


-SR5- STA. 78+50 TO STA. 82+00 (RT)

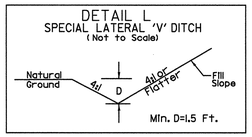


-SR4- STA. 68+20 TO STA. 68+55 (LT)

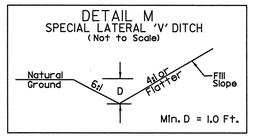
SPECIAL LATERAL DITCH DETAILS



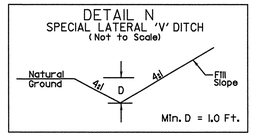
-SR2- STA 13+00 TO STA 17+00 (LT)



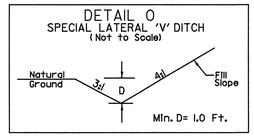
-SR2- STA. 53+50 TO STA. 62+87 (RT)
-NBLI- STA. 405+03 TO STA. 407+04 (RT)



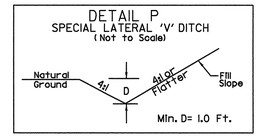
-SR4- STA 10+13 TO 16+50 (RT)
-Y10- STA 23+50 TO STA 27+50 (LT)



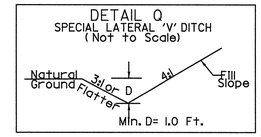
-Y10- STA. 39+50 TO STA. 42+00 (RT)
-Y10LPA- STA. 10+56 TO STA. 11+55 (LT)
-Y15- STA. 12+63 TO STA. 14+50 (LT)
-Y19- STA. 10+50 TO STA. 11+75 (LT)
-SR2- STA. 117+20 TO STA. 122+50 (LT)
-SR4- STA. 108+00 TO STA. 108+92 (RT)
-SR4- STA. 110+14 TO STA. 111+50 (RT)



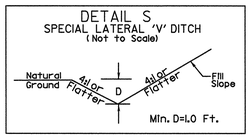
-SR5- STA. 25+50 TO STA. 27+00 (RT)



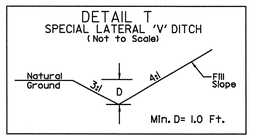
-Y9NBL- STA. 12+30 TO STA. 18+55 (RT)



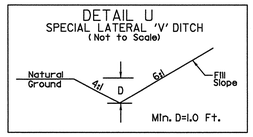
-SR5- STA. 124+30 TO STA. 127+30 (LT)



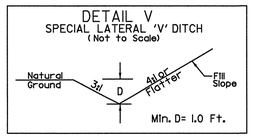
-SR5- STA. 119+97 TO STA. 122+80 (RT)
-Y8REV- STA. 54+50 TO STA. 55+50 (LT)
-Y8REV- STA. 59+00 TO STA. 59+50 (LT)
-Y18- STA. 10+58 TO STA. 12+00 (LT)



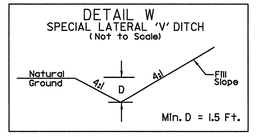
-SR5- STA. 30+20 TO STA. 31+40 (RT)
-Y8REV- STA. 13+50 TO STA. 17+00 (LT)
-Y8REV- STA. 22+50 TO STA. 24+00 (RT)
-Y8REV- STA. 41+00 TO STA. 44+50 (RT)



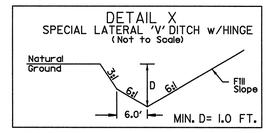
-Y9NBL- STA. 21+00 TO STA. 23+00 (RT)



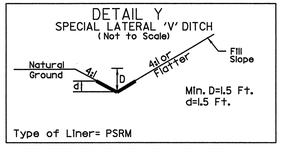
-Y9SBL- STA. 43+08 TO STA. 43+60 (RT)



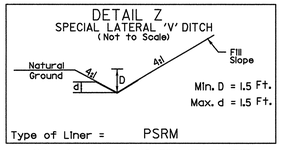
-Y9SBL- STA. 64+60 TO STA. 66+25 (RT)



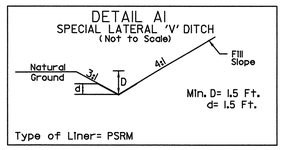
-Y10RPD- STA. 6+00 TO STA. 8+00 (RT)



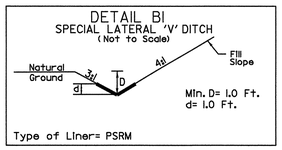
-L- STA. 397+50 TO STA. 399+50 (RT)
-L- STA. 401+20 (RT) TO -NBLI- STA. 405+03 (RT)



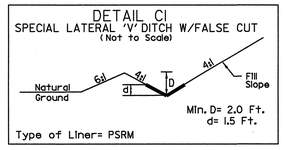
-SR4- STA 114+50 TO STA. 116+50 (RT)



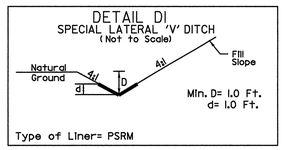
-SR5- STA 82+00 TO STA 90+45 (RT)



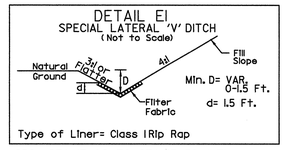
-Y10LPA- STA. 5+16 TO STA. 7+95 (RT)



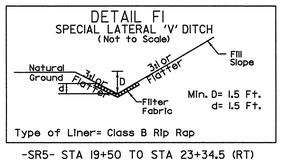
-Y15- STA. 10+72 TO STA. 11+75 (LT)



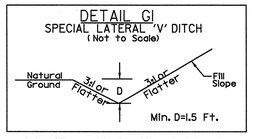
-Y19- STA. 10+60 TO STA. 12+50 (RT)
-Y10LPA- STA. 4+50 TO STA. 5+16 (RT)



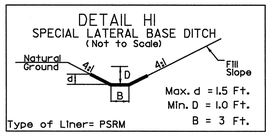
-SR2- STA. 17+00 TO STA. 17+50 (LT)



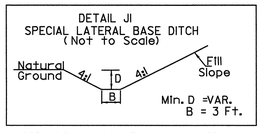
-SR5- STA 19+50 TO STA 23+34.5 (RT)



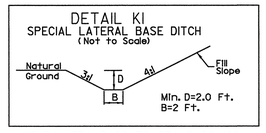
-Y8- STA 11+00 TO STA 14+00 (LT)
-Y8- STA. 14+10 TO STA. 16+00 (LT)



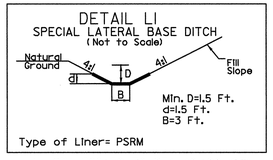
-SR5- STA. 94+36 TO STA. 95+43 (RT)



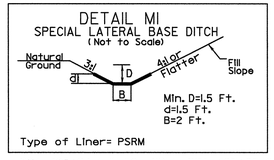
-SR5- STA. 102+09 TO STA. 102+77 (RT)



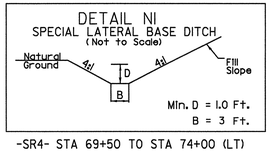
-Y9LPA- STA. 3+26 TO STA. 3+50 (RT)



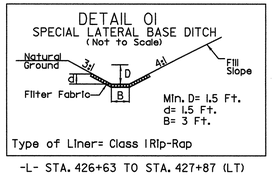
-L- STA. 399+50 TO STA. 401+20 (RT)



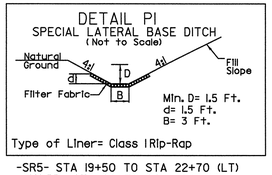
-L- STA. 403+24 (LT) TO -SBLI- STA. 405+65 (LT)



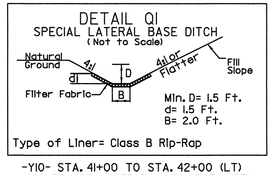
-SR4- STA 69+50 TO STA 74+00 (LT)



-L- STA. 426+63 TO STA. 427+87 (LT)



-SR5- STA 19+50 TO STA 22+70 (LT)
-Y10LPD- STA 9+11 TO STA 11+33 (RT)



-Y10- STA. 41+00 TO STA. 42+00 (LT)
-Y10LPD- STA. 11+33 TO STA. 13+76 (RT)

8/17/99

10/10/2013
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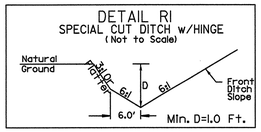
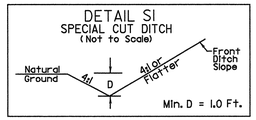
PROJECT REFERENCE NO.	SHEET NO.
R-3421 C	2-J
R/W SHEET NO.	

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19880 ENGINEER PAUL ATKINSON
10/15/13

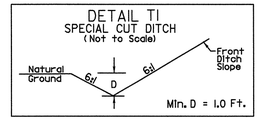
SPECIAL CUT DITCH DETAILS



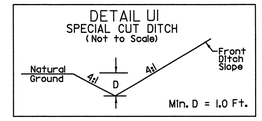
-L- STA. 391+00 TO STA. 394+00 (RT)
-Y9SBL- STA. 14+35 TO STA. 19+50 (RT)



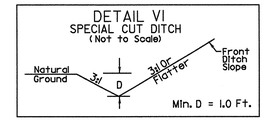
-SR2- STA 52+50 TO STA 53+50 (RT)
-SR2- STA 62+87 TO STA 64+20 (RT)



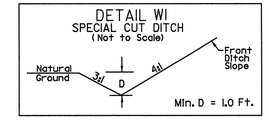
-L- STA. 466+00 TO STA. 473+50 (RT)
-NBLI- STA. 407+55 TO STA. 408+55 (RT)
-Y9SBL- STA. 71+60 TO STA. 72+60 (RT)
-Y9LPA- STA. 3+90 TO STA. 4+50 (RT)



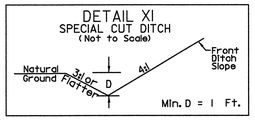
-SR2- STA. 92+12 TO STA. 93+51 (RT)
-SR4- STA. 119+50 TO STA. 120+50 (RT)
-Y8REV- STA. 48+00 TO STA. 52+20 (LT)
-YI0- STA. 15+66 TO STA. 17+00 (LT)
-YI0LPA- STA 11+55 TO STA 13+55 (LT)
-YI5- STA. 12+82 TO STA. 15+80 (RT)
-YI5- STA. 14+50 TO STA. 15+95 (LT)



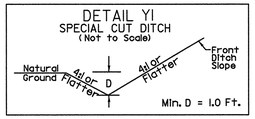
-DR2- STA. 12+00 TO STA. 12+25 (RT)



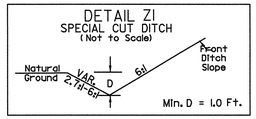
-SR4- STA. 125+00 TO STA. 128+32 (LT)
-SR5- STA. 47+00 TO STA. 47+50 (RT)
-SR5- STA 51+50 TO STA 55+00 (RT)
-SR5- STA 67+00 TO STA 67+81 (RT)
-SR5- STA 68+44 TO STA 70+00 (RT)



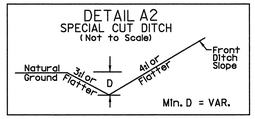
-SR5- STA 55+00 TO STA 58+00 (RT)



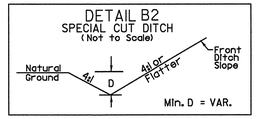
-SR5- STA. 117+93 TO STA. 122+30 (LT)
-YI8- STA. 12+00 TO STA. 12+25 (RT)



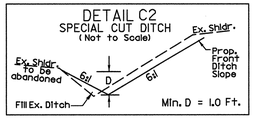
-Y9NBL- STA 8+30 TO STA 9+80 (RT)



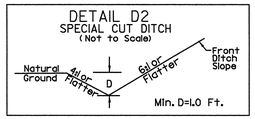
-Y8REV- STA 17+00 TO STA 18+00 (LT)



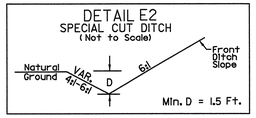
-Y8REV- STA 16+50 TO STA 19+00 (RT)



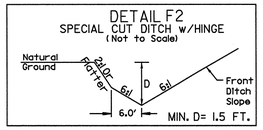
-Y9NBL- STA. 10+30 TO STA. 11+30 (RT)



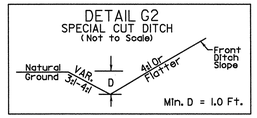
-Y9NBL- STA. 60+16 TO STA. 61+00 (LT)



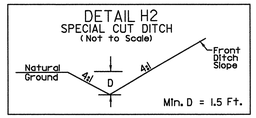
-Y9NBL- STA. 61+65 TO STA. 63+00 (LT)



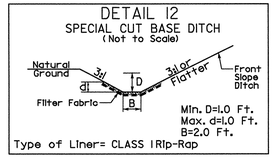
-Y9NBL- STA. 64+50 TO STA. 65+50 (LT)



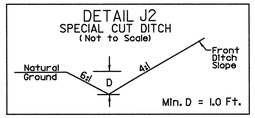
-Y9SBL- STA. 56+13 TO STA. 57+75 (RT)



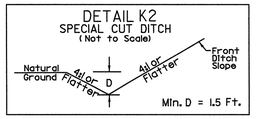
-YI0- STA. 13+50 TO STA. 15+66 (LT)
-YI0- STA 42+00 TO STA 47+83 (RT)
-YI0- STA. 48+38 TO STA. 56+50 (RT)



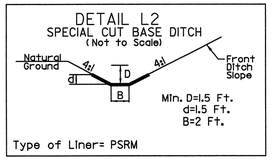
-DR2- STA. 10+46 TO STA. 12+25 (LT)



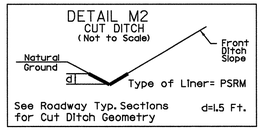
-YI0- STA 20+00 TO STA 22+93 (RT)
-YI0- STA 23+08 TO STA 27+50 (RT)
-YI0- STA. 48+50 TO STA. 57+00 (LT)



-Y8REV- STA. 57+00 TO STA. 59+00 (LT)

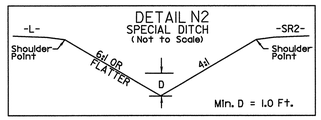


-YI5- STA. 16+30 TO STA. 17+00 (LT)

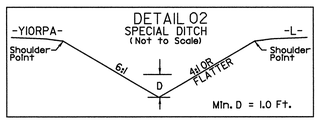


-Y8REV- STA. 48+00 TO STA. 52+50 (RT)

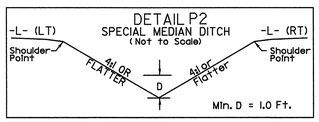
SPECIAL DITCH DETAILS



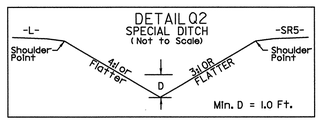
-L- STA. 434+00 TO STA. 438+00 (RT)



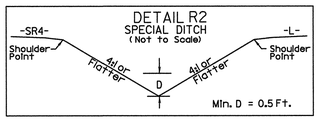
-L- STA. 471+00 TO STA. 472+00 (LT)



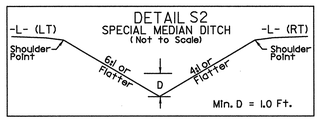
-L- STA. 484+00 TO STA. 487+50 (MED)



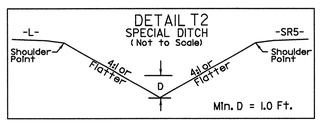
-L- STA. 484+00 TO STA. 490+50 (RT)
-SR5- STA. 112+43 TO STA. 113+43 (LT)



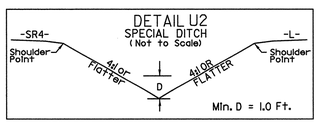
-L- STA. 508+50 TO STA. 511+00 (LT)



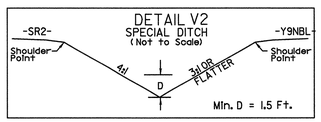
-L- STA. 509+50 TO STA. 511+50 (MED)



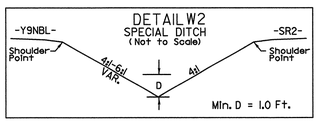
-L- STA. 509+00 TO STA. 512+50 (RT)



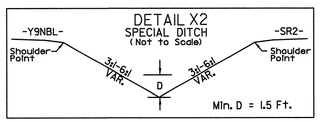
-L- STA. 484+50 TO STA. 489+50 (LT)



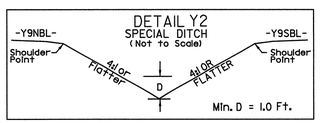
-SR2- STA. 21+60 TO STA. 25+50 (LT)



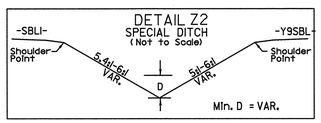
-Y9NBL- STA. 6+30 TO STA. 11+30 (LT)



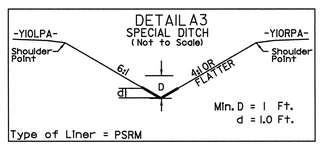
-Y9NBL- STA 16+90 TO STA 24+50 (LT)



-Y9SBL- STA. 61+11 TO STA. 63+11 (LT)



-Y9SBL- STA 5+52 TO STA 8+45 (LT)



-YI0RPA- STA. 18+00 TO STA. 19+00 (LT)

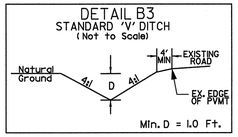
10/10/2013
R:\Roadway\Proj\r3421c_hyd_details.dgn
2:37:10 PM

PROJECT REFERENCE NO.	SHEET NO.
R-3421 C	2-K
R/W SHEET NO.	

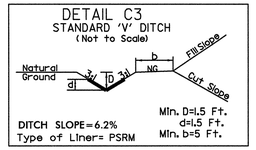
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON 10/9/13

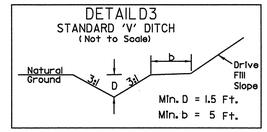
STANDARD DITCH DETAILS



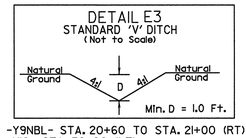
-SR4- STA. 128+36 (LT)
-SR4- STA. 128+36 (RT)
-Y18- STA. 12+00 TO STA. 13+50 (LT)



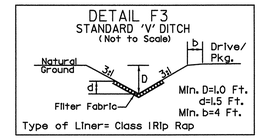
-Y8REV- STA. 36+50 (RT) TO -L- STA. 376+80 (RT)



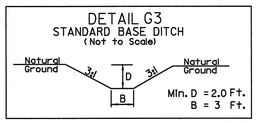
-Y8REV- STA 59+10 (RT)



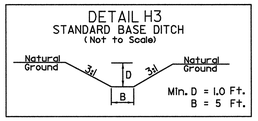
-Y9NBL- STA. 20+60 TO STA. 21+00 (RT)
-Y10- STA. 56+00 (LT)



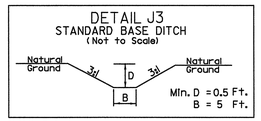
-Y9SBL- STA. 59+25 (RT)



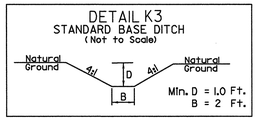
-L- STA. 385+22 (LT)



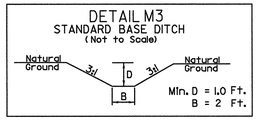
-SR2- STA. 88+60 (RT)



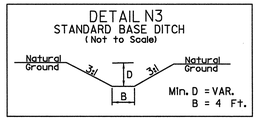
-SR2- STA. 89+84 (RT)



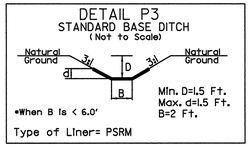
-SR4- STA. 40+40 (LT)



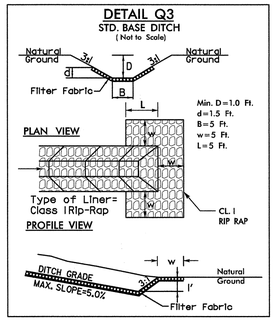
-Y8- STA. 19+70 LT



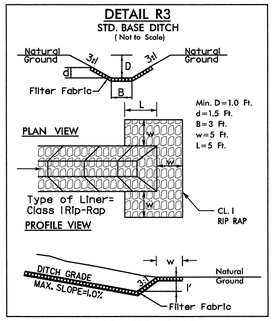
-Y9SBL- STA. 43+60 (RT)



FROM -Y9NBL- STA. 18+55 (RT) TO -L- STA. 401+20 (RT)

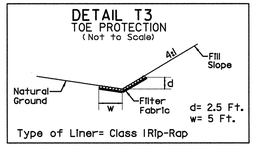


-L- STA. 372+40 LT.
-L- STA. 374+00 LT.
-L- STA. 384+35 LT.

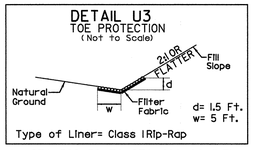


-L- STA. 427+80 (LT)

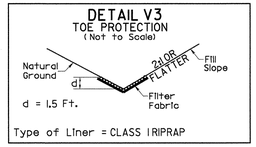
OTHER



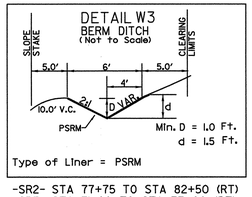
-L- STA 376+25 TO STA 377+00 (RT)
-SR5- STA 29+40 TO STA 29+80 (RT)



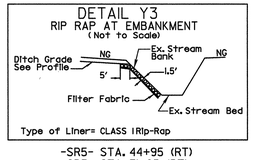
-L- STA. 399+50 TO STA. 400+00 (LT)
-Y9SBL- STA. 26+70 TO STA. 27+50 (RT)
-Y9LPA- STA. 11+00 TO STA. 11+45 (LT)
-SR2- STA. 17+50 TO STA. 21+00 (LT)
-SR2- STA. 102+90 TO STA. 103+50 (RT)
-SR2- STA. 106+00 TO STA. 107+80 (RT)
-SR4- STA. 36+00 TO STA. 37+50 (LT)
-SR4- STA. 62+00 TO STA. 62+50 (LT)
-SR5- STA 113+30 TO STA 113+50 (RT)



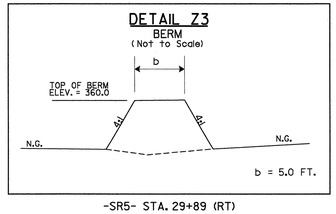
-L- STA. 451+00 TO STA. 453+50 (LT)
-SR2- STA. 85+00 TO STA. 85+70 (RT)
-SR2- STA. 86+10 TO STA. 88+60 (RT)
-Y10LPA- STA. 4+00 TO STA. 7+50 (LT)



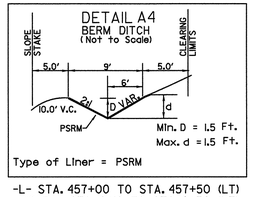
-SR2- STA 77+75 TO STA 82+50 (RT)
-SR5- STA 31+90 TO STA 33+00 (RT)



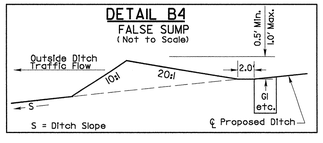
-SR5- STA. 44+95 (RT)
-SR5- STA 71+25 (RT)
-Y8REV- STA. 24+55 (RT)
-Y8REV- STA. 24+65 (RT)

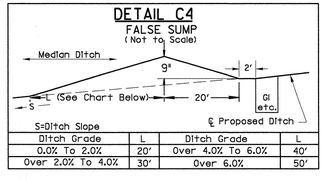


-SR5- STA. 29+89 (RT)

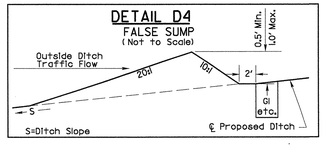


-L- STA. 457+00 TO STA. 457+50 (LT)
-Y10LPA- STA 0+16 TO STA 2+30 (LT)





Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'



8/17/99

10/10/2013
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M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

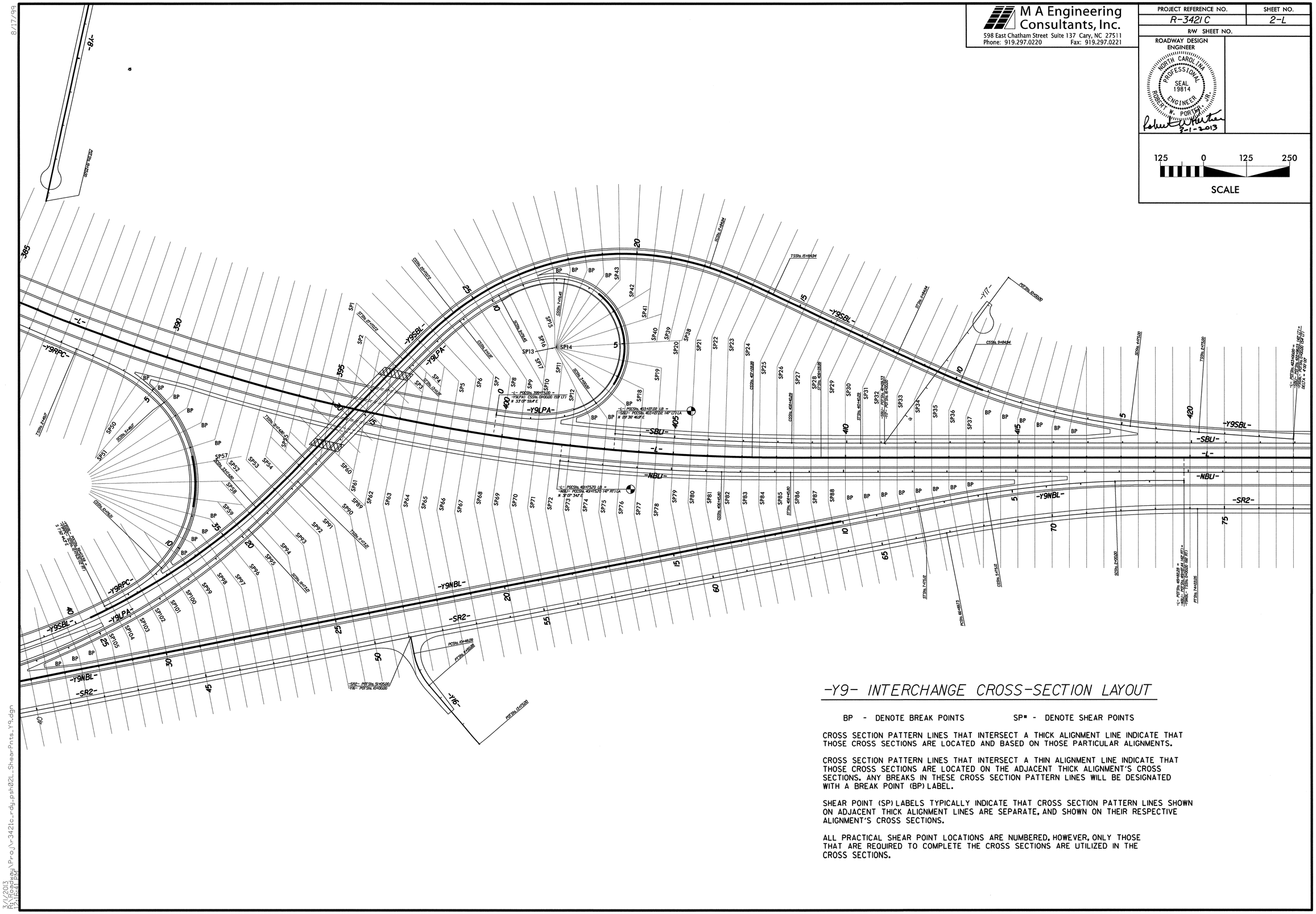
PROJECT REFERENCE NO.	SHEET NO.
R-3421 C	2-L
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.

3-1-2013

125 0 125 250
SCALE



-Y9- INTERCHANGE CROSS-SECTION LAYOUT

BP - DENOTE BREAK POINTS SP# - DENOTE SHEAR POINTS

CROSS SECTION PATTERN LINES THAT INTERSECT A THICK ALIGNMENT LINE INDICATE THAT THOSE CROSS SECTIONS ARE LOCATED AND BASED ON THOSE PARTICULAR ALIGNMENTS.

CROSS SECTION PATTERN LINES THAT INTERSECT A THIN ALIGNMENT LINE INDICATE THAT THOSE CROSS SECTIONS ARE LOCATED ON THE ADJACENT THICK ALIGNMENT'S CROSS SECTIONS. ANY BREAKS IN THESE CROSS SECTION PATTERN LINES WILL BE DESIGNATED WITH A BREAK POINT (BP) LABEL.

SHEAR POINT (SP) LABELS TYPICALLY INDICATE THAT CROSS SECTION PATTERN LINES SHOWN ON ADJACENT THICK ALIGNMENT LINES ARE SEPARATE, AND SHOWN ON THEIR RESPECTIVE ALIGNMENT'S CROSS SECTIONS.

ALL PRACTICAL SHEAR POINT LOCATIONS ARE NUMBERED, HOWEVER, ONLY THOSE THAT ARE REQUIRED TO COMPLETE THE CROSS SECTIONS ARE UTILIZED IN THE CROSS SECTIONS.

8/17/99
3/1/2013
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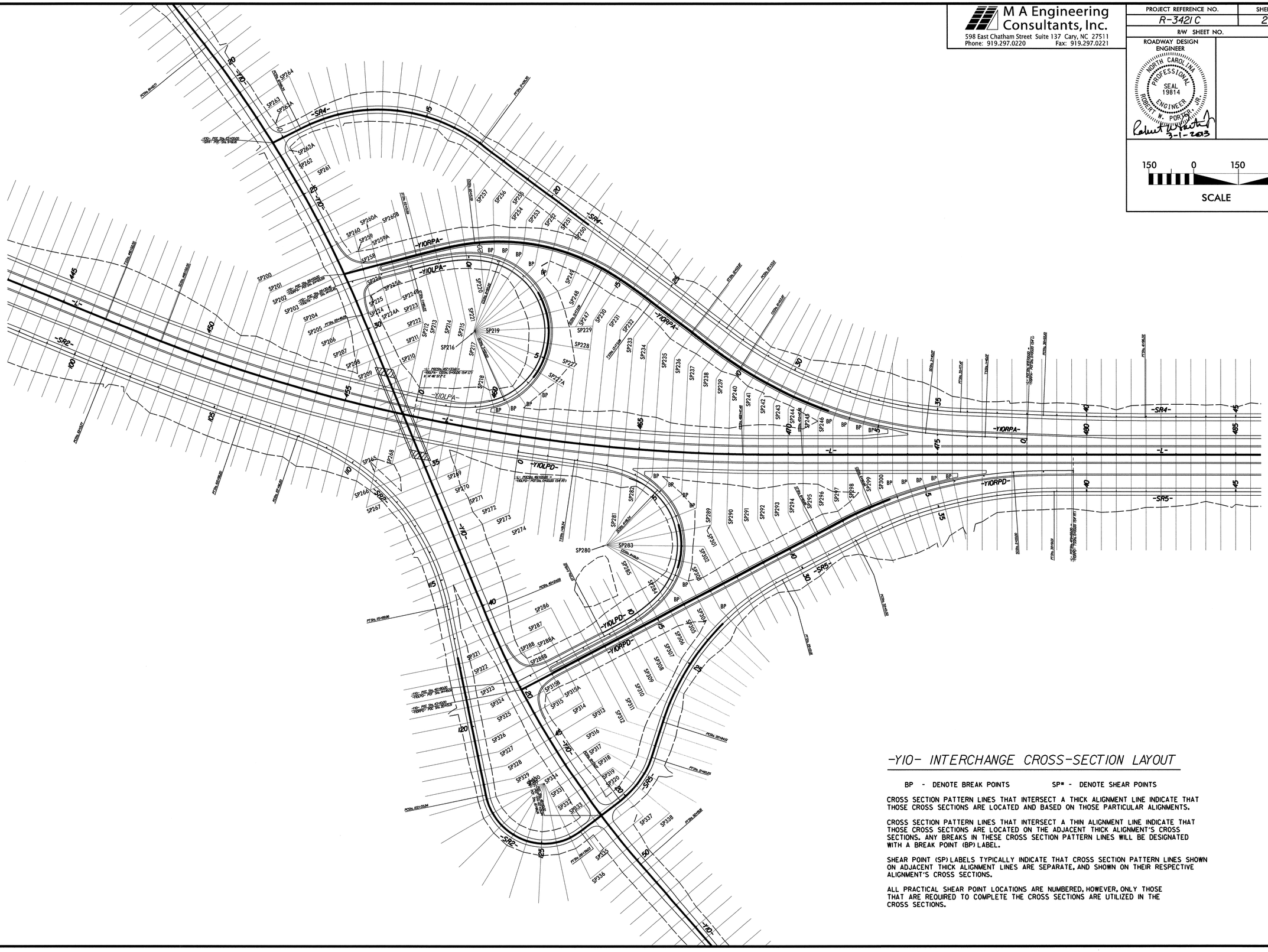
M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
R-3421 C	2-M
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-1-2013

150 0 150 300
SCALE



-YIO- INTERCHANGE CROSS-SECTION LAYOUT

BP - DENOTE BREAK POINTS SP# - DENOTE SHEAR POINTS

CROSS SECTION PATTERN LINES THAT INTERSECT A THICK ALIGNMENT LINE INDICATE THAT THOSE CROSS SECTIONS ARE LOCATED AND BASED ON THOSE PARTICULAR ALIGNMENTS.

CROSS SECTION PATTERN LINES THAT INTERSECT A THIN ALIGNMENT LINE INDICATE THAT THOSE CROSS SECTIONS ARE LOCATED ON THE ADJACENT THICK ALIGNMENT'S CROSS SECTIONS. ANY BREAKS IN THESE CROSS SECTION PATTERN LINES WILL BE DESIGNATED WITH A BREAK POINT (BP) LABEL.

SHEAR POINT (SP) LABELS TYPICALLY INDICATE THAT CROSS SECTION PATTERN LINES SHOWN ON ADJACENT THICK ALIGNMENT LINES ARE SEPARATE, AND SHOWN ON THEIR RESPECTIVE ALIGNMENT'S CROSS SECTIONS.

ALL PRACTICAL SHEAR POINT LOCATIONS ARE NUMBERED, HOWEVER, ONLY THOSE THAT ARE REQUIRED TO COMPLETE THE CROSS SECTIONS ARE UTILIZED IN THE CROSS SECTIONS.

8/17/99

3/1/2013
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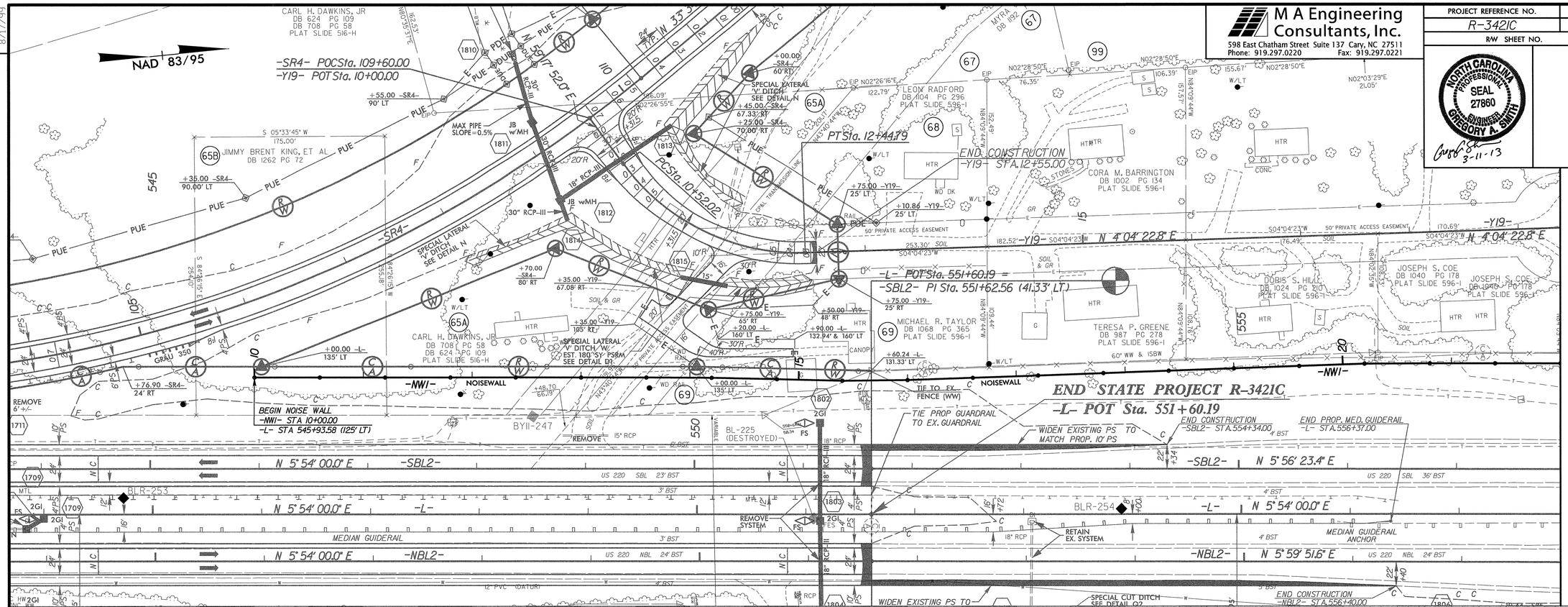
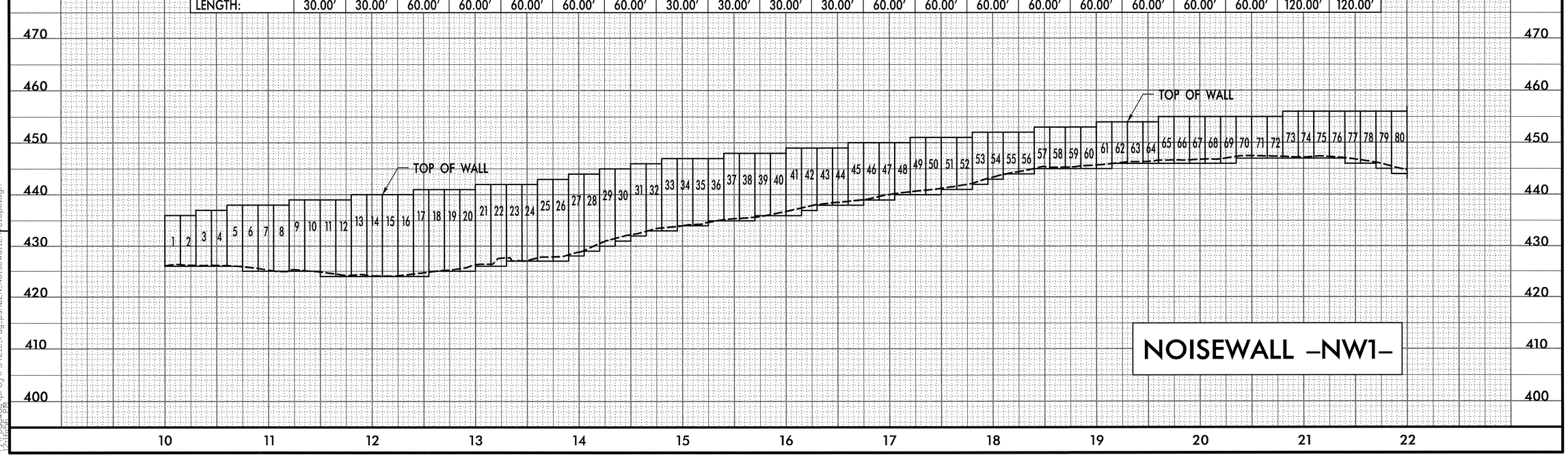
M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-N
R/W SHEET NO.	

NORTH CAROLINA PROFESSIONAL SEAL 27860 ENGINEER GREGORY A. SMITH
3-11-13



-NW1- DESIGN DATA																					
PANEL NUMBER:	1-2	3-4	5-8	9-12	13-16	17-20	21-24	25-26	27-28	29-30	31-32	33-36	37-40	41-44	45-48	49-52	53-56	57-60	61-64	65-72	73-80
TOP ELEVATION:	436.00'	437.00'	438.00'	439.00'	440.00'	441.00'	442.00'	443.00'	444.00'	445.00'	446.00'	447.00'	448.00'	449.00'	450.00'	451.00'	452.00'	453.00'	454.00'	455.00'	456.00'
LENGTH:	30.00'	30.00'	60.00'	60.00'	60.00'	60.00'	60.00'	30.00'	30.00'	30.00'	30.00'	60.00'	60.00'	60.00'	60.00'	60.00'	60.00'	60.00'	60.00'	120.00'	120.00'



NOISEWALL -NW1-

3/1/2013
C:\Projects\proj\r3421c_rdy_psh02N_NoiseWall1Envelope.dgn

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

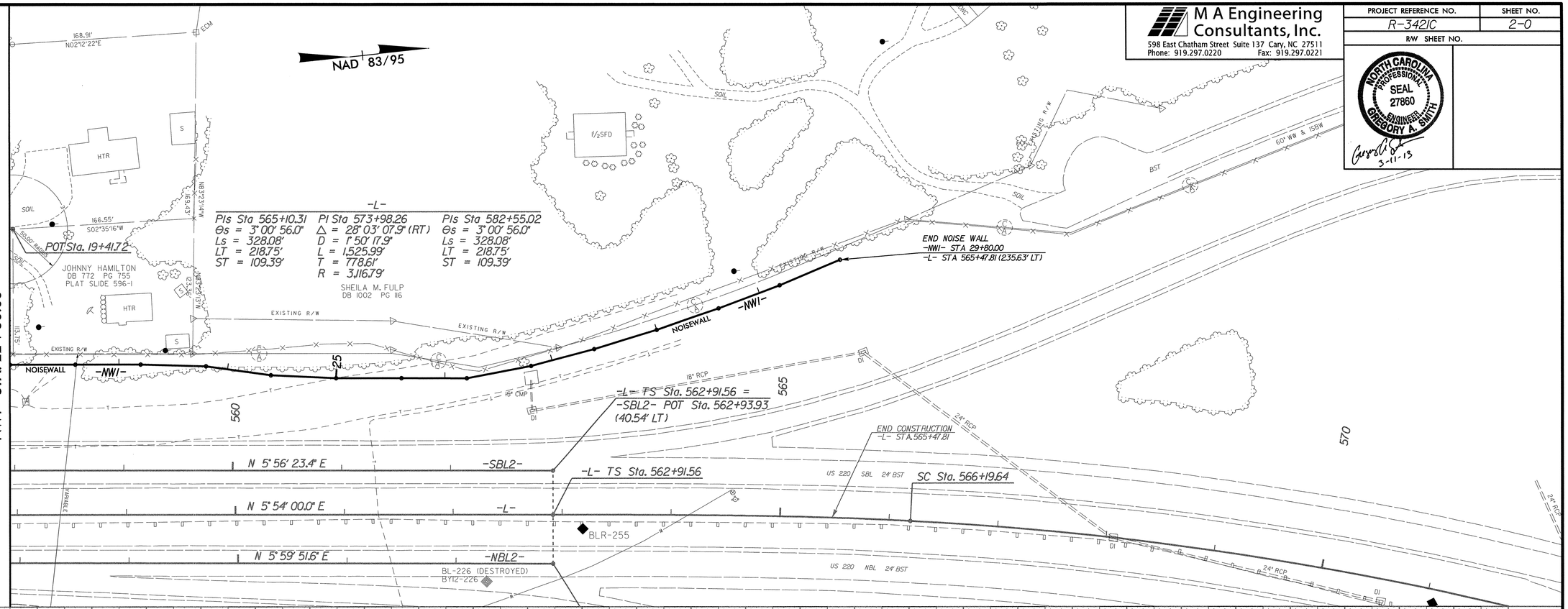
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-0
R/W SHEET NO.	

NORTH CAROLINA PROFESSIONAL SEAL 27860 ENGINEER GREGORY A. SMITH
3-11-13

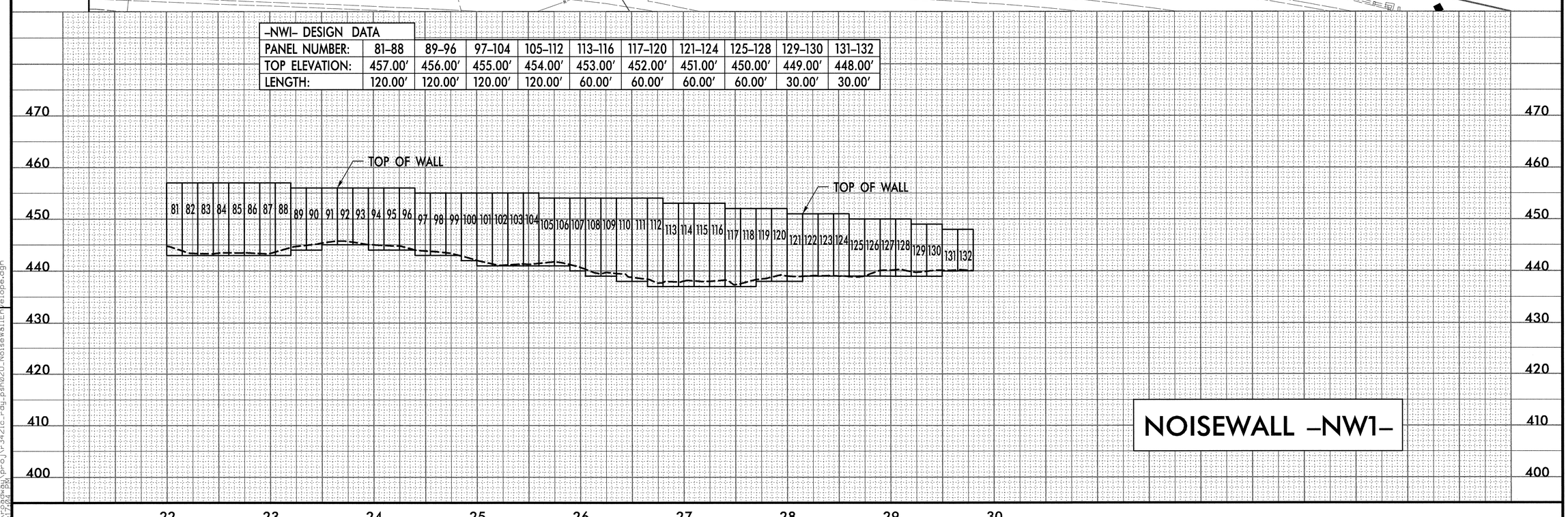
REVISIONS

8/17/99

MATCH LINE SEE SHEET 2-N
-NW1- STA. 22+00.00



-NW1- DESIGN DATA										
PANEL NUMBER:	81–88	89–96	97–104	105–112	113–116	117–120	121–124	125–128	129–130	131–132
TOP ELEVATION:	457.00'	456.00'	455.00'	454.00'	453.00'	452.00'	451.00'	450.00'	449.00'	448.00'
LENGTH:	120.00'	120.00'	120.00'	120.00'	60.00'	60.00'	60.00'	60.00'	30.00'	30.00'



NOISEWALL -NW1-

3/1/2013
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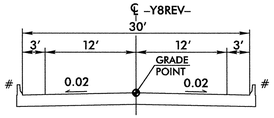
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-P
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

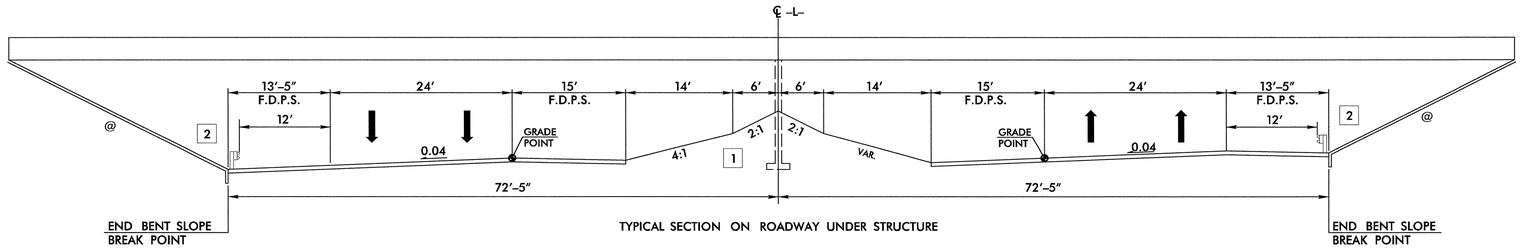
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.

Robert W. Porter Jr. 3-1-2013

-Y8REV- STRUCTURE OVER -L-
SR 1304 (HARRINGTON ROAD) OVER I-73/74

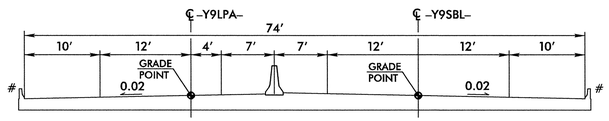


TYPICAL SECTION ON STRUCTURE

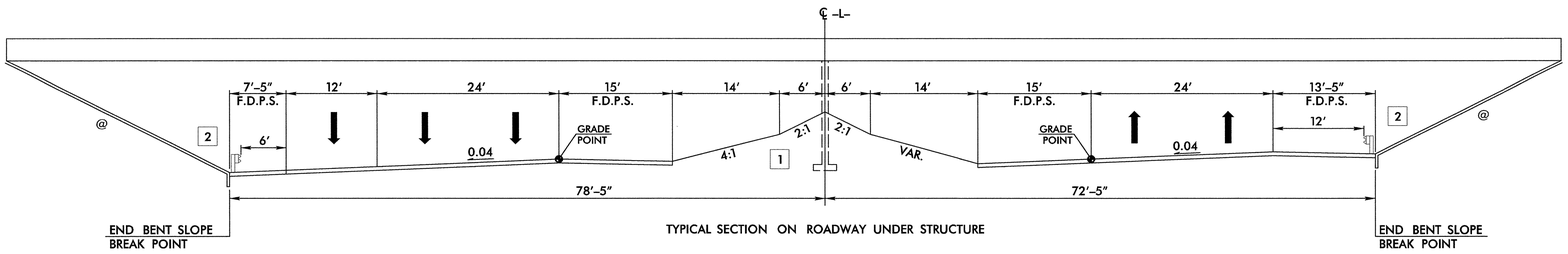


TYPICAL SECTION ON ROADWAY UNDER STRUCTURE

-Y9SBL-/-Y9LPA- STRUCTURE OVER -L-
US 220 RAMPS OVER I-73/74



TYPICAL SECTION ON STRUCTURE



TYPICAL SECTION ON ROADWAY UNDER STRUCTURE

LEGEND

@ - SEE STRUCTURE PLANS FOR END BENT SLOPES

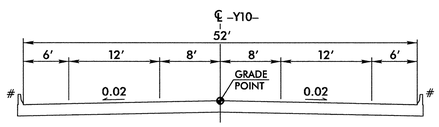
- SEE STRUCTURE PLANS FOR BRIDGE RAIL DETAIL

1 SEE STD. 225.08

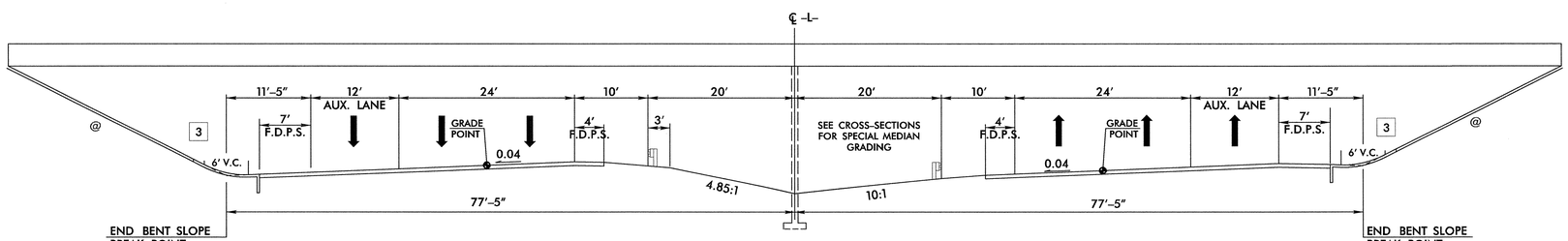
2 SEE STD. 610.02

3 SEE STD. 610.03

-Y10- STRUCTURE OVER -L-
SR 1306 (DOCKERY ROAD) / SR 1416 (HAYWOOD CEMETERY ROAD) OVER I-73/74



TYPICAL SECTION ON STRUCTURE



TYPICAL SECTION ON ROADWAY UNDER STRUCTURE

DETAIL SHOWING TYPICAL SECTIONS ON AND UNDER STRUCTURES

NOT TO SCALE

8/17/99

3/1/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-Q

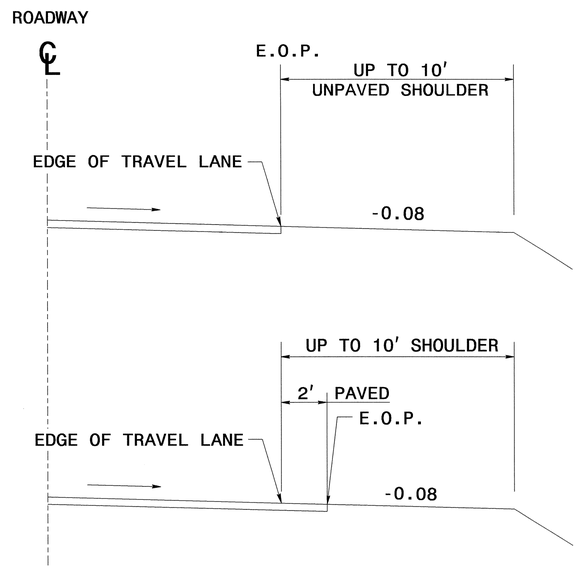
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
METHOD OF SHOULDER CONSTRUCTION
HIGH SIDE OF SUPERELEVATED CURVE
METHOD I (SHOULDERS UP TO 10')

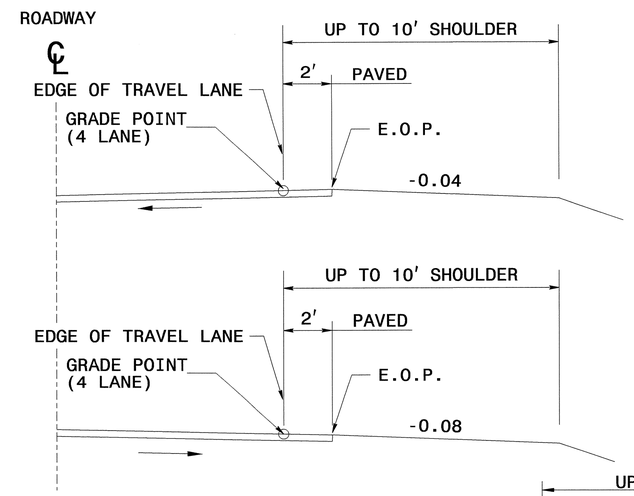
SHEET 1 OF 2

560D01

NORMAL OUTSIDE SHOULDER SLOPES

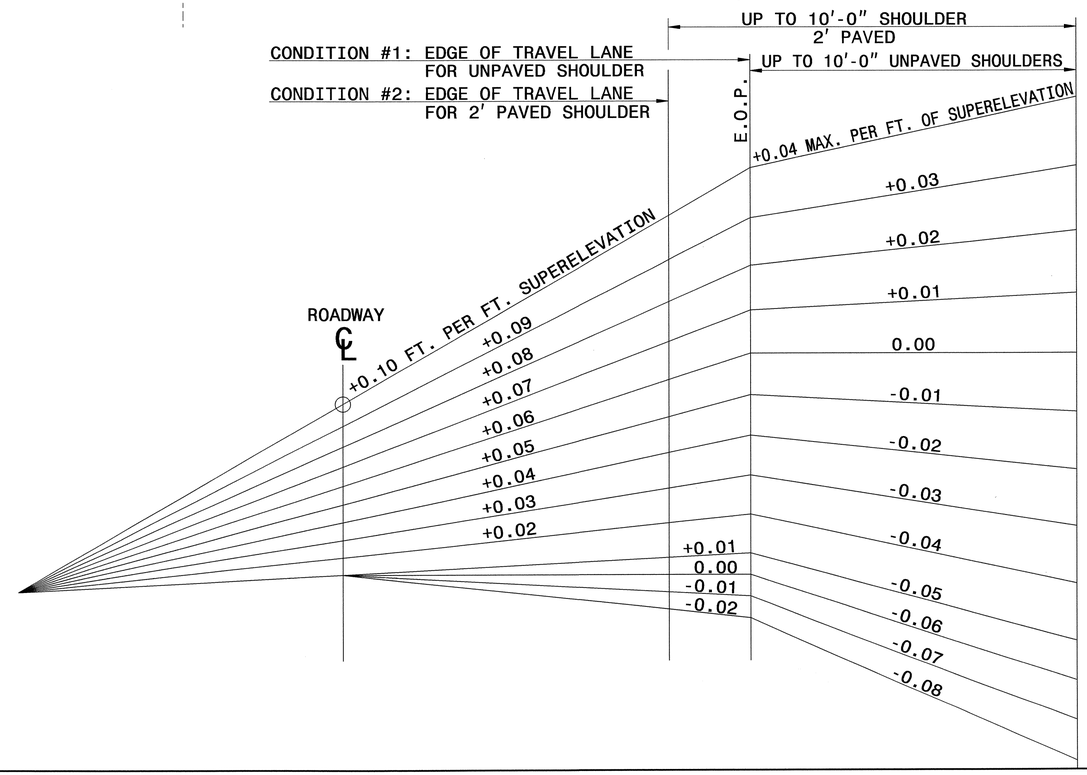


NORMAL MEDIAN SHOULDER SLOPES



NOTE: ON LOW SIDE OF SUPERELEVATED PAVEMENT USE NORMAL SHOULDER SLOPE UNLESS NORMAL SHOULDER SLOPE IS FLATTER THAN SUPERELEVATION, THEN USE SUPER-ELEVATION RATE ON SHOULDER.

NOTE: "ROLL-OVER" ALGEBRAIC DIFFERENCE IN RATES OF CROSS SLOPE NOT TO EXCEED 0.06 AS SHOWN. IF SUPER-ELEVATION IS REVOLVED ABOUT CENTER LINE OF PAVEMENT, SAME APPLIES. ON DIVIDED ROADWAYS, GRADE POINT TO BE AT THE MEDIAN EDGE OF TRAVEL LANE.



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

ENGLISH DETAIL DRAWING FOR
METHOD OF SHOULDER CONSTRUCTION
HIGH SIDE OF SUPERELEVATED CURVE
METHOD I (SHOULDERS UP TO 10')

SHEET 1 OF 2

560D01

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER
JOHN L. HOWARD
3/7/13

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

SEE PLATE FOR TITLE

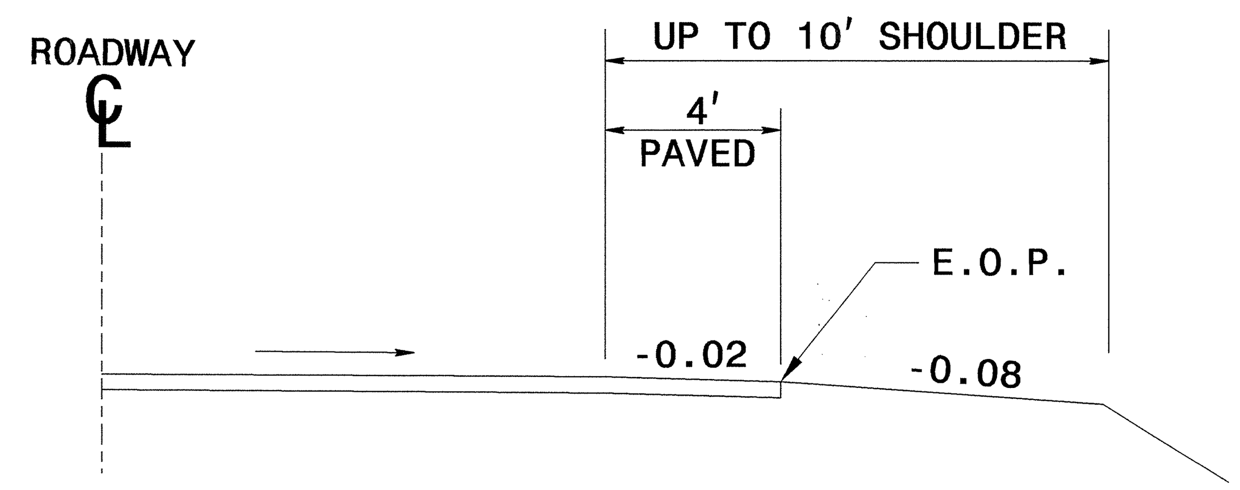
ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE: 2/11/13
FILE SPEC: c:/howard/stds/stdstodetails/30001/0300d01.dgn

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

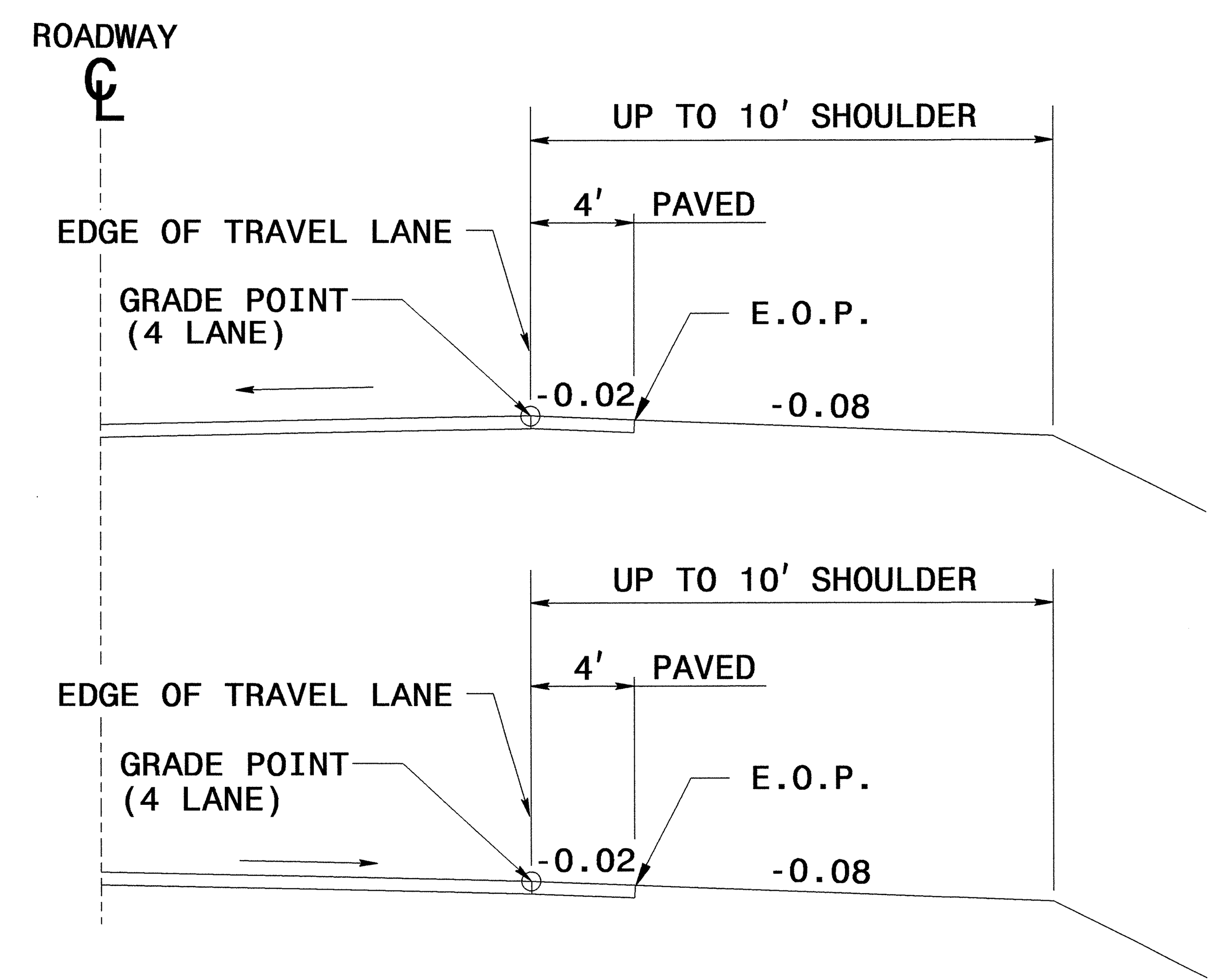
ENGLISH DETAIL DRAWING FOR
METHOD OF SHOULDER CONSTRUCTION
HIGH SIDE OF SUPERELEVATED CURVE
METHOD I (SHOULDERS UP TO 10')

SHEET 2 OF 2
560D01

NORMAL OUTSIDE SHOULDER SLOPES

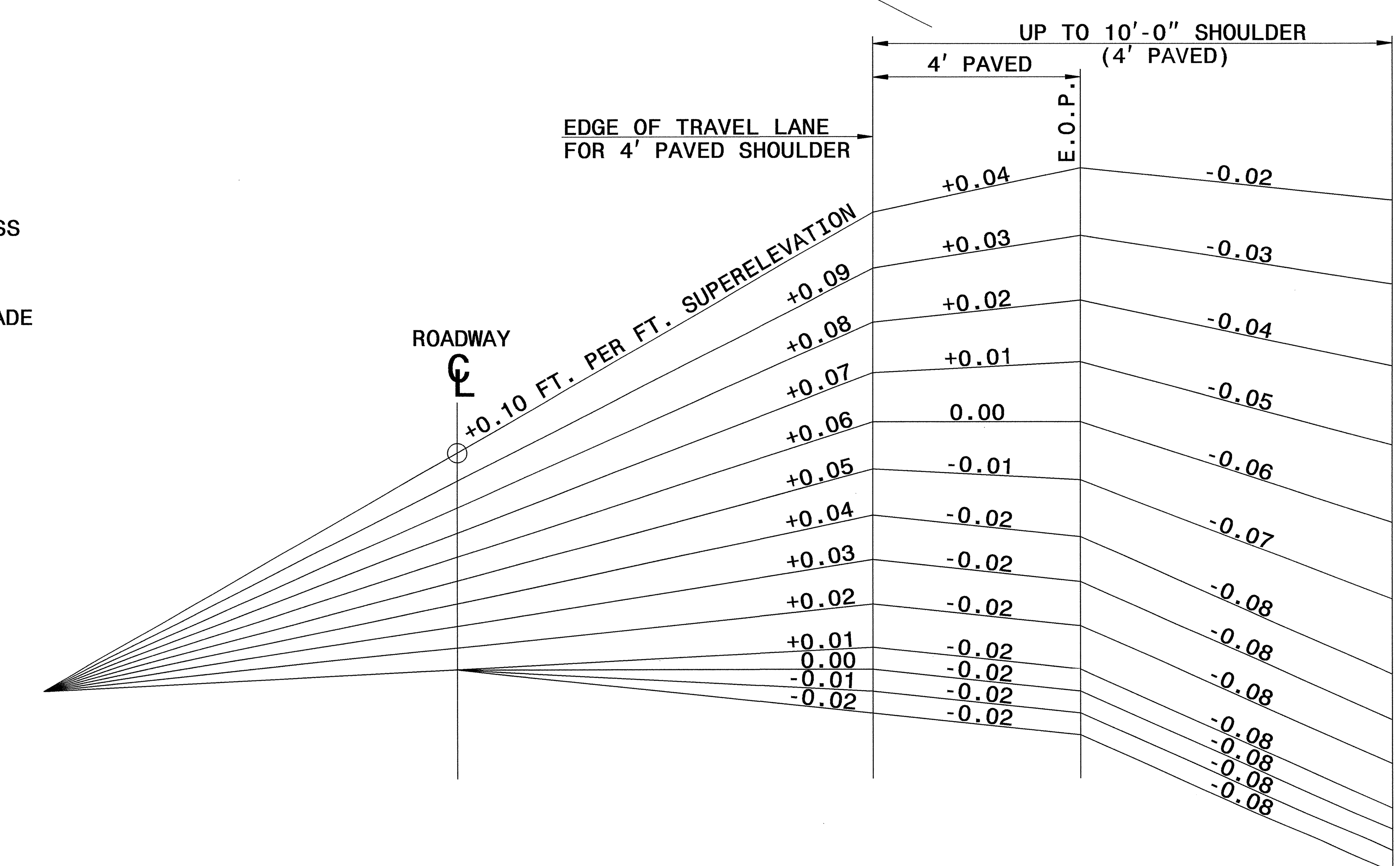


NORMAL MEDIAN SHOULDER SLOPES



NOTE: ON LOW SIDE OF SUPERELEVATED PAVEMENT USE NORMAL SHOULDER SLOPE UNLESS NORMAL SHOULDER SLOPE IS FLATTER THAN SUPERELEVATION, THEN USE SUPER-ELEVATION RATE ON SHOULDER.

NOTE: "ROLL-OVER" ALGEBRAIC DIFFERENCE IN RATES OF CROSS SLOPE NOT TO EXCEED 0.06 AS SHOWN. IF SUPER-ELEVATION IS REVOLVED ABOUT CENTER LINE OF PAVEMENT, SAME APPLIES. ON DIVIDED ROADWAYS, GRADE POINT TO BE AT THE MEDIAN EDGE OF TRAVEL LANE.



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

ENGLISH DETAIL DRAWING FOR
METHOD OF SHOULDER CONSTRUCTION
HIGH SIDE OF SUPERELEVATED CURVE
METHOD I (SHOULDERS UP TO 10')

SHEET 2 OF 2
560D01

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
3/7/13

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: DATE: 2/11/13
FILE SPEC: c:/ericward/stds/stdstodetails/30001/0300d01.dgn

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$$$$$USERNAME$$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-S

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

ENGLISH DETAIL DRAWING FOR

METHOD OF SHOULDER CONSTRUCTION

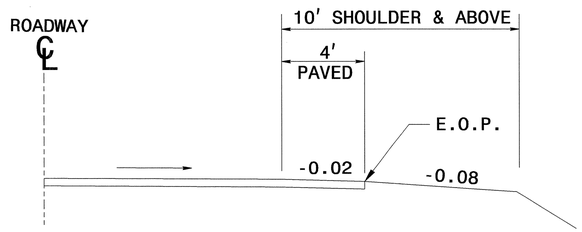
HIGH SIDE OF SUPERELEVATED CURVE

METHOD II (SHOULDERS 10' AND ABOVE)

SHEET 1 OF 1

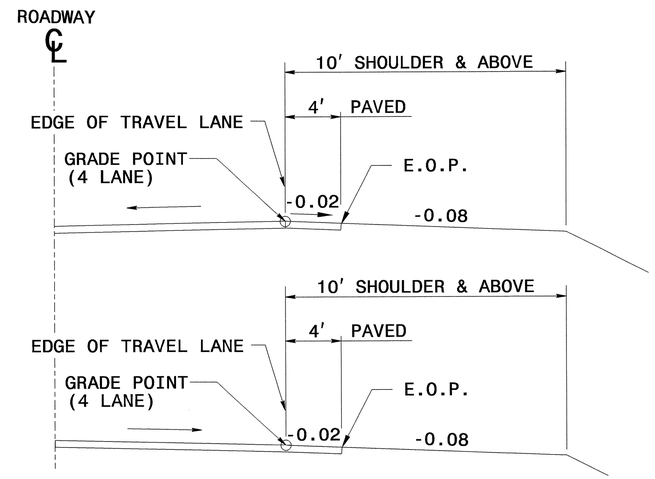
560D02

NORMAL OUTSIDE SHOULDER SLOPES

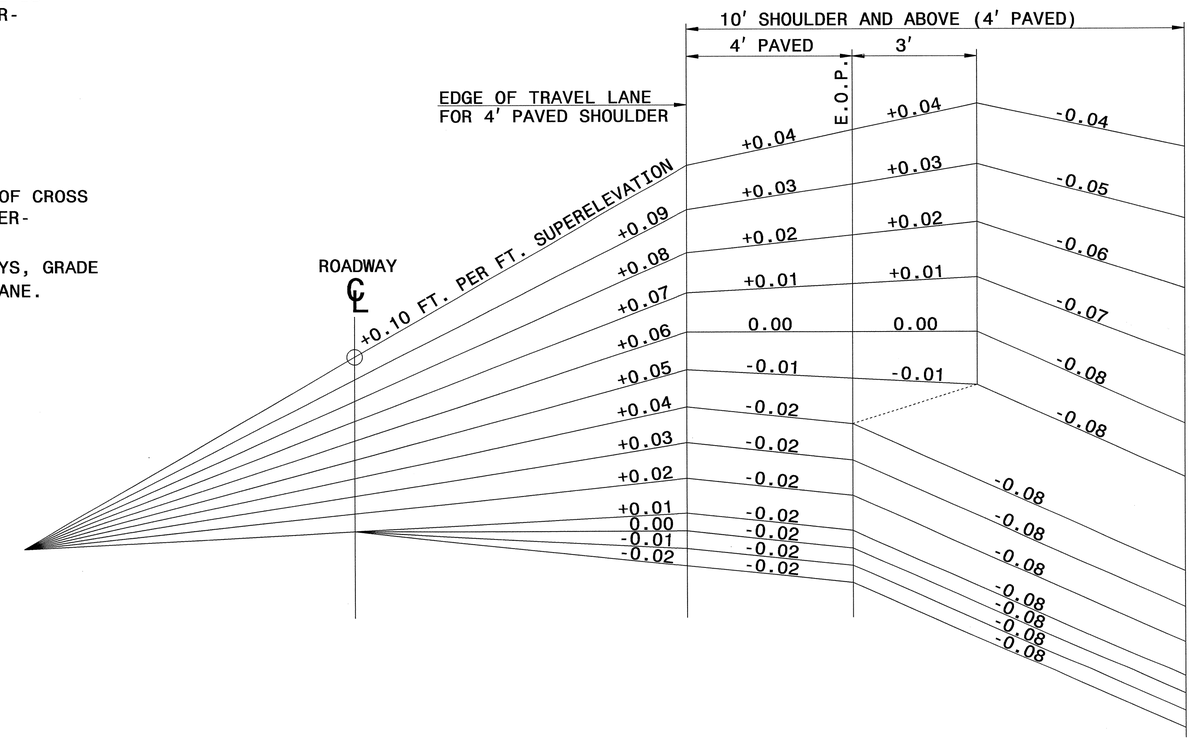


NOTE: ON LOW SIDE OF SUPERELEVATED PAVEMENT USE NORMAL SHOULDER SLOPE UNLESS NORMAL SHOULDER SLOPE IS FLATTER THAN SUPERELEVATION, THEN USE SUPER-ELEVATION RATE ON SHOULDER.

NORMAL MEDIAN SHOULDER SLOPES



NOTE: "ROLL-OVER" ALGEBRAIC DIFFERENCE IN RATES OF CROSS SLOPE NOT TO EXCEED 0.06 AS SHOWN. IF SUPER-ELEVATION IS REVOLVED ABOUT CENTER LINE OF PAVEMENT, SAME APPLIES. ON DIVIDED ROADWAYS, GRADE POINT TO BE AT THE MEDIAN EDGE OF TRAVEL LANE.



STATE OF
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RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

METHOD OF SHOULDER CONSTRUCTION

HIGH SIDE OF SUPERELEVATED CURVE

METHOD II (SHOULDERS 10' AND ABOVE)

SHEET 1 OF 1

560D02

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOHN S. HAMPTON III 3/11/13

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

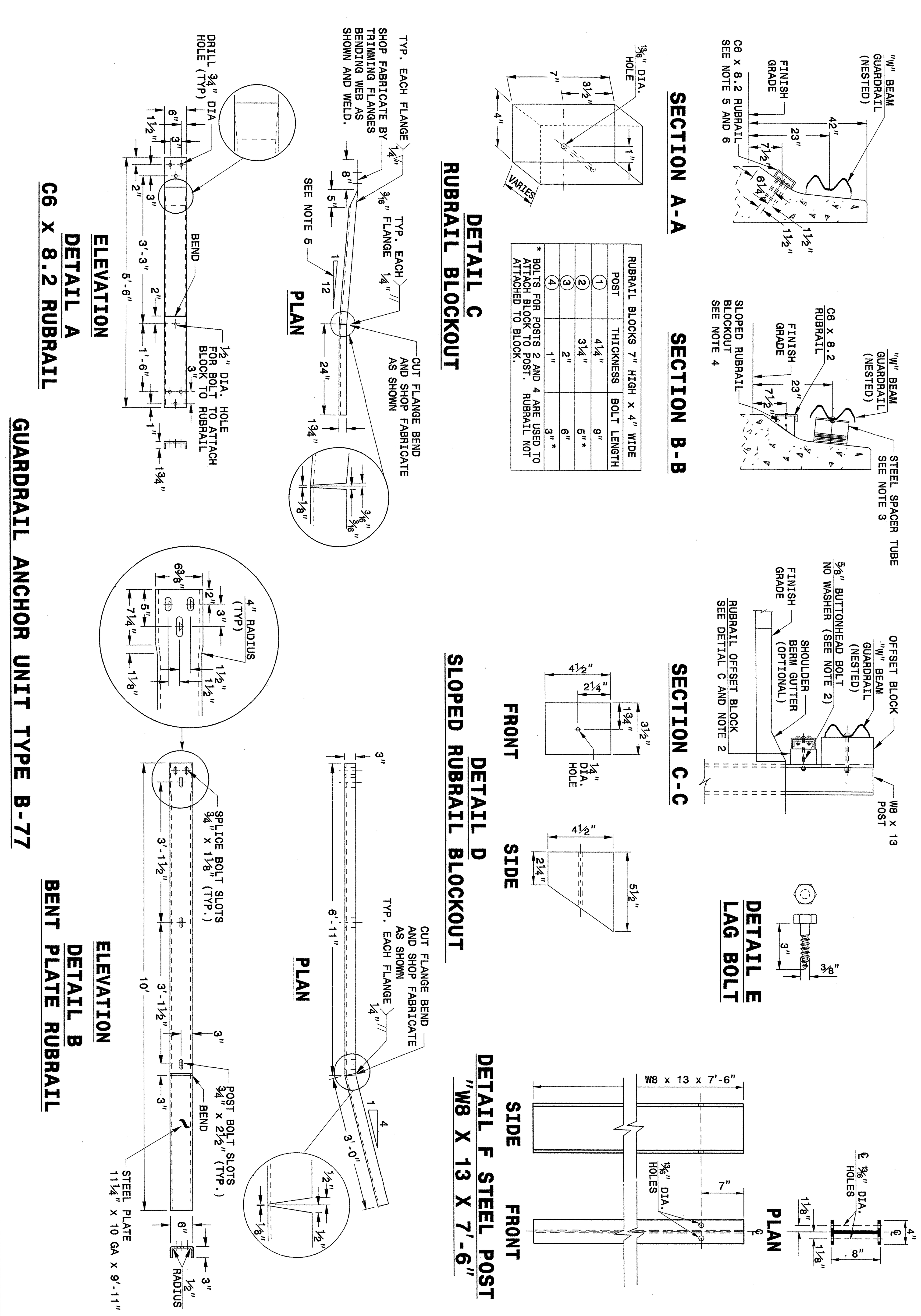
SEE PLATE FOR TITLE

ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE: 2/11/13
FILE SPEC: c:/pwworkdir/pwdrive/pwdrivard/stds/stdstodetails/30001/0300d01.dgn

5/14/99

\$\$\$\$ SYSTEM \$\$\$\$ \$\$\$\$ TIME \$\$\$\$ \$\$\$\$ DGN \$\$\$\$ \$\$\$\$ USERNAME \$\$\$\$

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-T

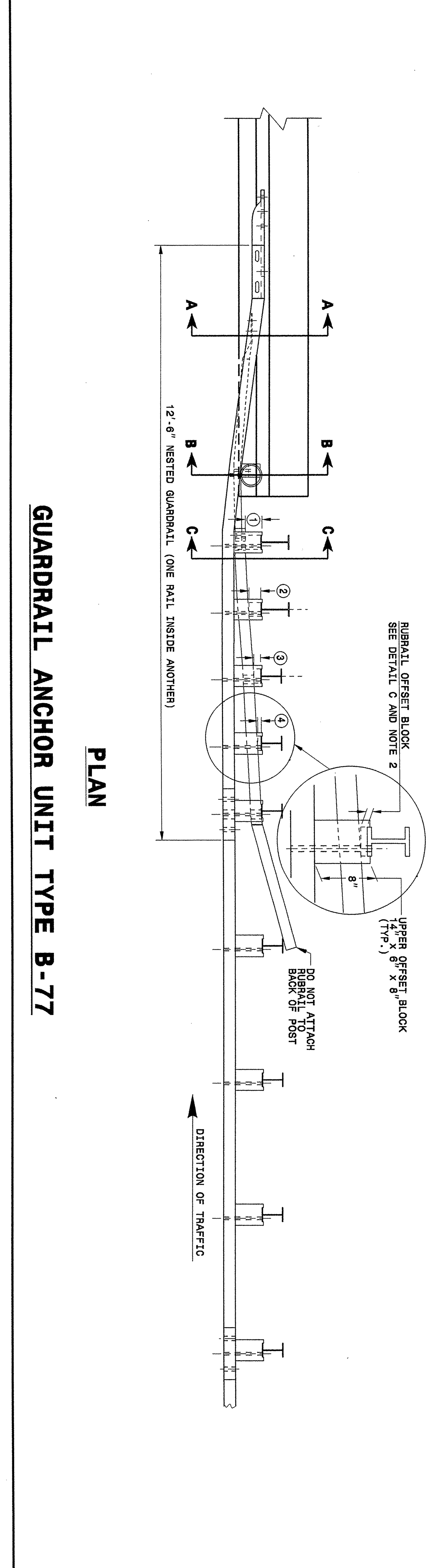


ENGLISH DETAIL DRAWING FOR STRUCTURE ANCHOR UNIT GUARDRAIL ANCHOR UNIT TYPE B-77 FOR F-SHAPE BARRIER — STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — SHEET 5 OF 7 862D03

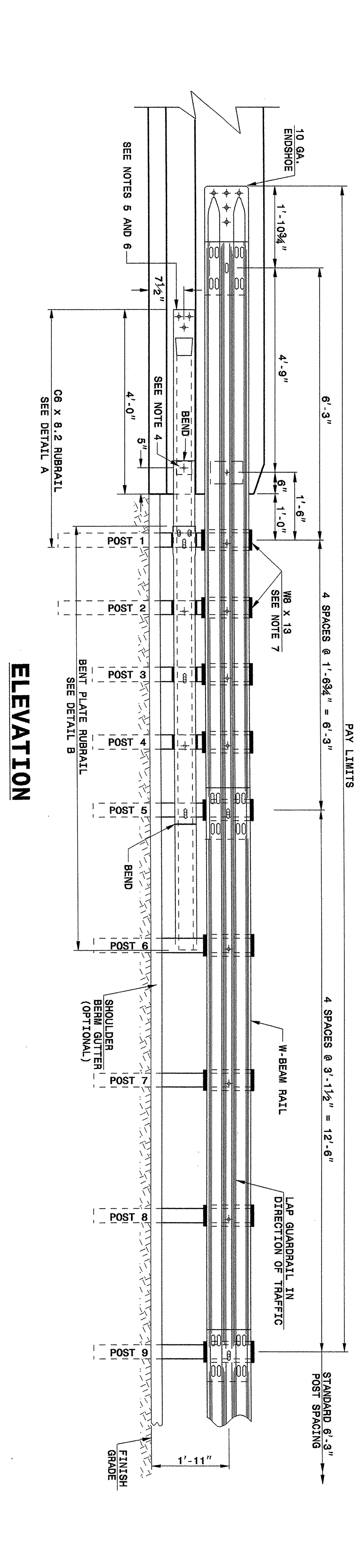
ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

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

SHEET 5 OF 7
862D03



GENERAL NOTES:
1) POSTS 1 THROUGH 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKOUTS AND/OR RUBRAIL.
2) RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH ⅝" BUTTONHEAD BOLTS (SEE CHART FOR BOLT LENGTHS). SECURE BLOCKS ONLY TO POSTS 2 AND 4. SECURE RUBRAIL AND BLOCKOUTS TO POSTS 1 AND 3. RUBRAIL IS SECURED TO POST 5 WITH A ⅝" x 4½" BUTTONHEAD BOLT. RUBRAIL IS FLARED TO BACK OF POST 6 AND NOT SECURED.
3) STEEL SPACER TUBE IS A SCHEDULE 40 GALVANIZED PIPE 6" INSIDE DIAMETER x 9" LONG. ATTACH TUBE TO GUARDRAIL ONLY WITH ⅝" x 1¼" LONG BUTTONHEAD BOLT AND RECTANGULAR PLATE WASHER.
4) SEE DETAIL D FOR SLOPED RUBRAIL BLOCKOUT. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE ⅜" x 3" LAG BOLT WITH FLAT WASHER.
5) SHOP FABRICATE THE C6 x 8.2 RUBRAIL END TO BE CONSISTENT WITH THE SLOPE OF THE F SHAPE AND ATTACH FLUSH WITH THE SLOPED TOE OF THE BARRIER OR BRIDGE RAIL.
6) ANCHORAGE:
(a) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, ANCHOR RUBRAIL USING THREE ⅝" x 6" CHEMICALLY ANCHORED BOLTS WITH WASHERS. MAXIMUM PROJECTION FOR BOLTS IS ½".
(b) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, ANCHOR THE W-BEAM END SHOE USING A 4 BOLT HOLD DOWN PLATE (SEE STD. DWG. 862.04). A 4 BOLT INSERT ASSEMBLY IS ALLOWED ON PRECAST REINFORCED CONCRETE BARRIER (SEE STD. DWG. 857.01). INSTALL THE W-BEAM END SHOE BEHIND THE NESTED W-BEAM ELEMENTS.
(c) AT NEW BRIDGE RAIL, ANCHOR THE W-BEAM END SHOE AND RUBRAIL AS DETAILED ON THE STRUCTURE PLANS.
7) POSTS 1 AND 2 ARE W8 x 13, 7'-6" LONG. ALL OTHER POSTS IN THE ANCHOR UNIT ARE W6 x 8.5.

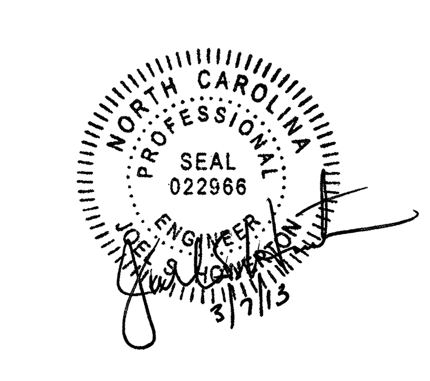


ENGLISH DETAIL DRAWING FOR GUARDRAIL ANCHOR UNIT GUARDRAIL ANCHOR UNIT TYPE B-77 FOR F-SHAPE BARRIER — STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — SHEET 4 OF 7 862D03

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

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

SHEET 4 OF 7
862D03



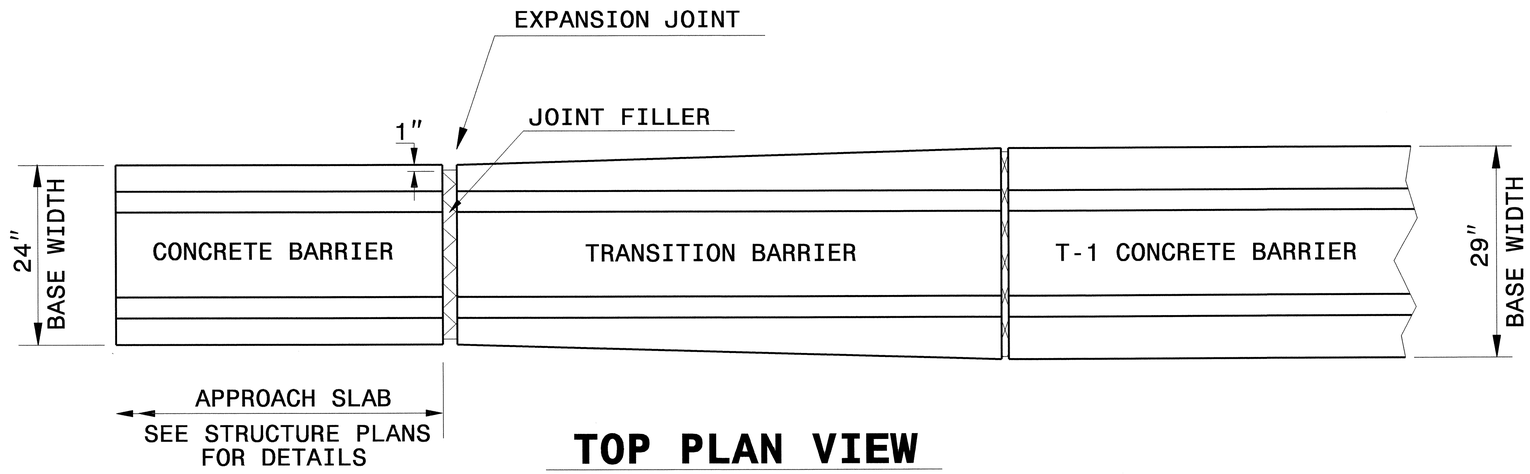
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

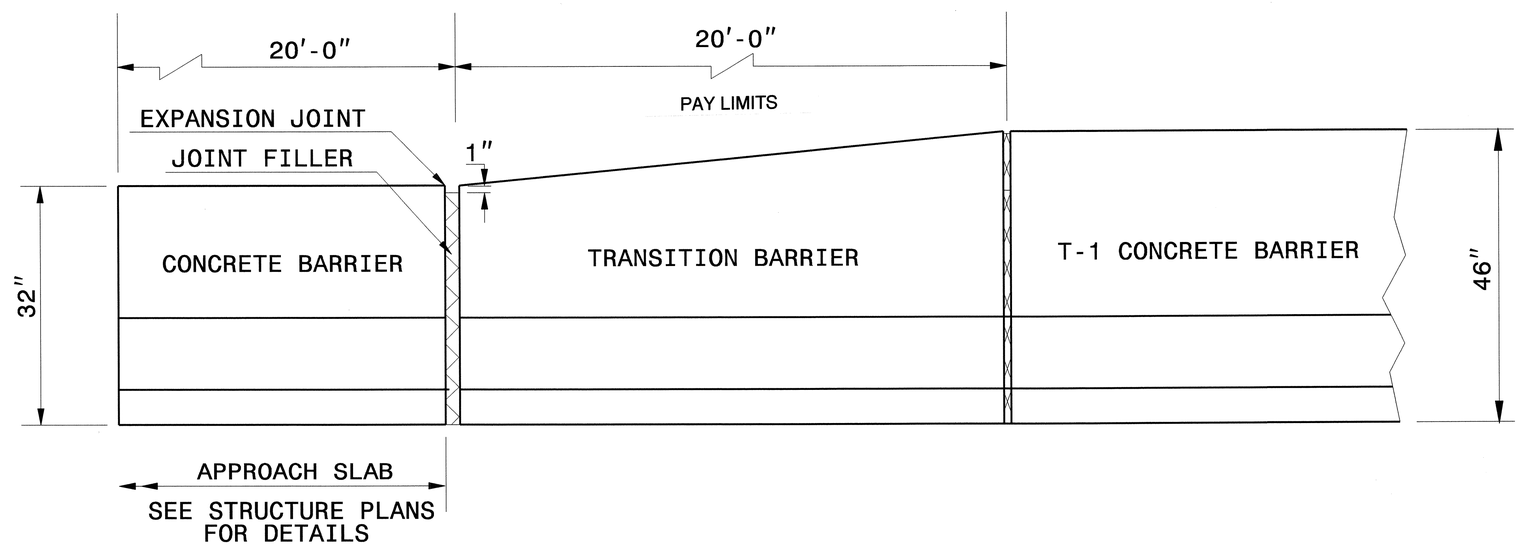
ORIGINAL BY: J HOWERTON DATE: 06-22-12
MODIFIED BY: DATE:
CHECKED BY: DATE: 11/13/12
FILE SPEC.:

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

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-U



TOP PLAN VIEW



FRONT ELEVATION VIEW

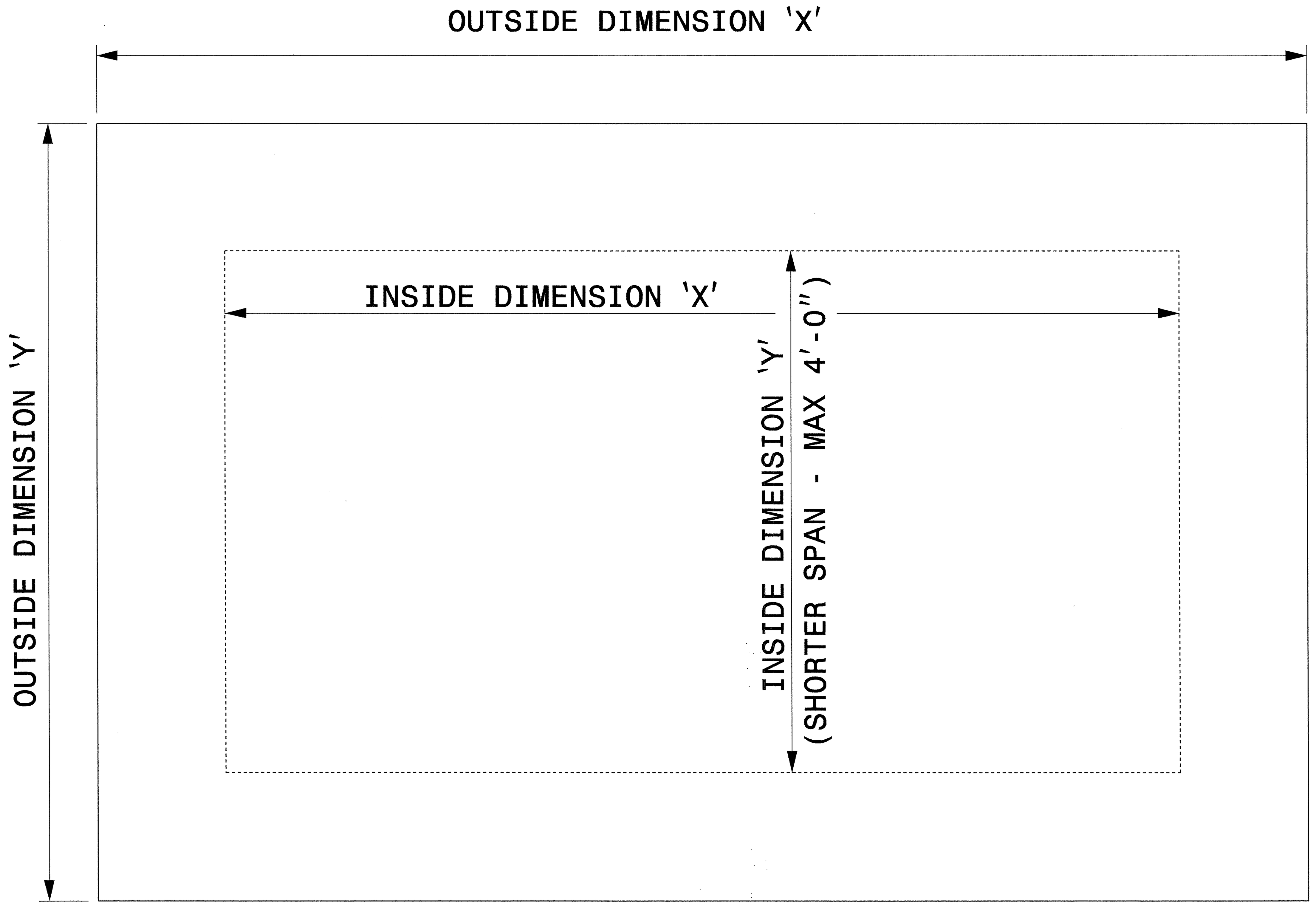
NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER
3/7/13

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

CONCRETE BARRIER TRANSITION DETAIL

ORIGINAL BY: DATE:
MODIFIED BY: nbritt DATE: 02/08/13
CHECKED BY: DATE: 2/14/13
FILE SPEC.: detail/nbritt/english/rural/r3421c barrier tran.dgn

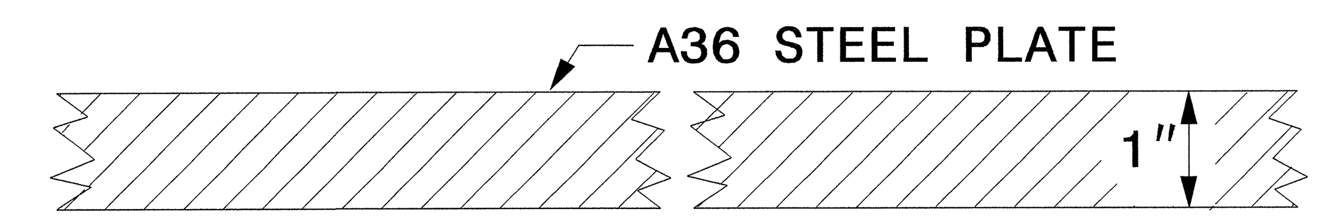
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-V



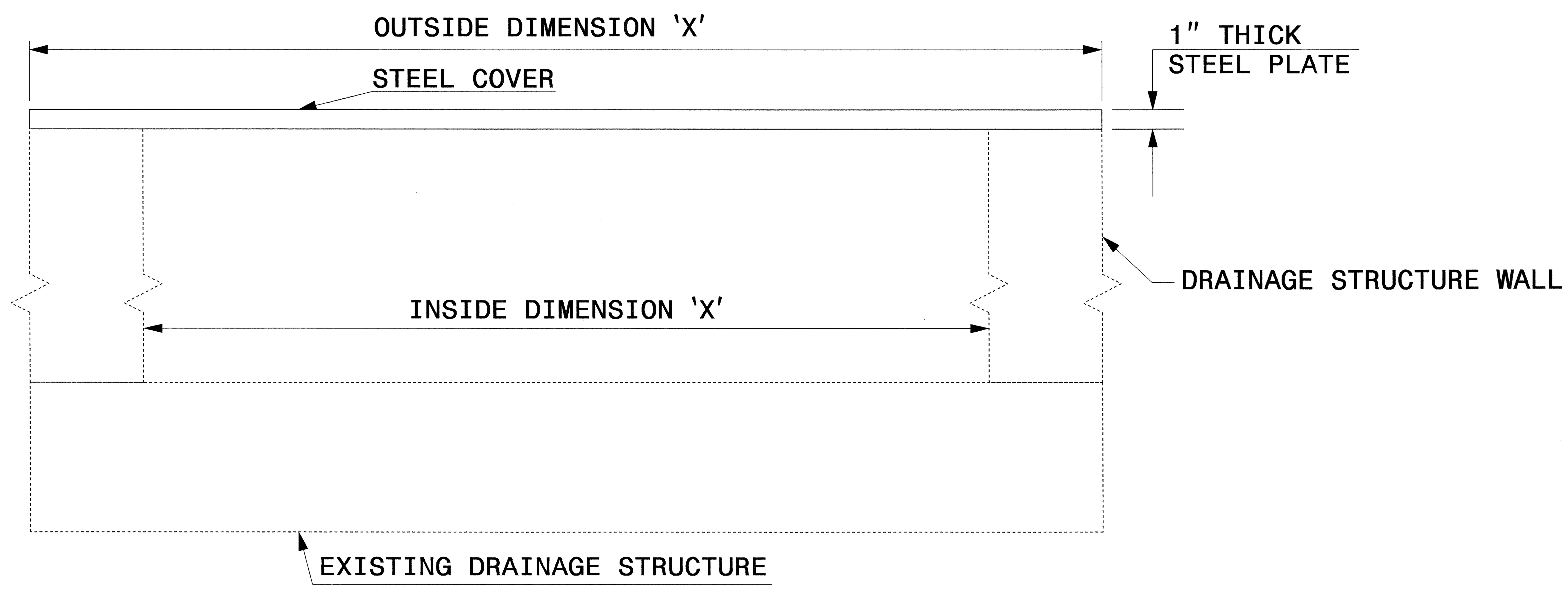
PLAN VIEWS

GENERAL NOTES:

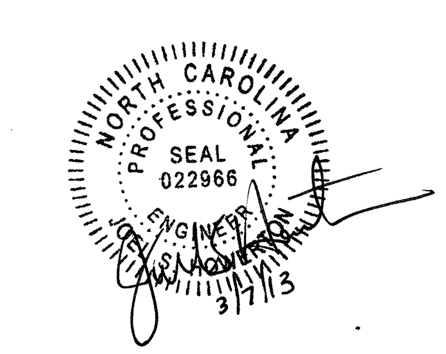
-USE GRADE A36 STEEL
-STEEL COVERS ARE FOR TEMPORARY USE DURING PHASE CONSTRUCTION.
-FILL SHALL BE PLACED DIRECTLY OVER THE STEEL PLATES.
-SEE ROADWAY PLANS AND PROVISIONS FOR LOCATIONS
-QUANTITES TO BE PAID FOR AT THE UNIT PRICE BID PER EACH.



SECTION VIEW OF STEEL TOP PLATE



ELEVATION VIEWS



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

DETAIL OF TEMPORARY 1" STEEL COVER OVER DRAINAGE STRUCTURE

ORIGINAL BY: E.E. WARD DATE: 2-2-98
MODIFIED BY: DATE:
CHECKED BY: [signature] DATE: 2/4/13
FILE SPEC.: eric:/usr/details/metric/stand/stlcvr2.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-W

GENERAL NOTES:

USE CLASS "AA" CONCRETE THROUGHOUT.

PROVIDE ALL JUNCTION BOXES OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

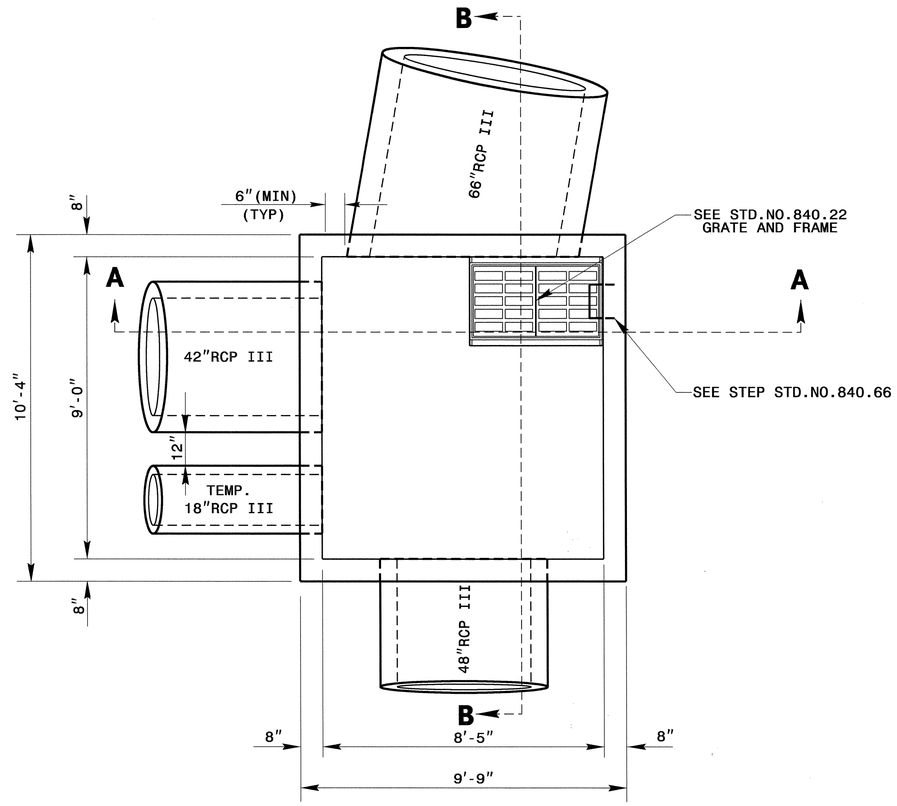
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

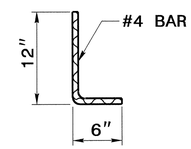
INSTALL MANHOLE IN POSITION AS DIRECTED BY THE ENGINEER. CUT AND BEND ALL REBAR CROSSING THIS OPENING TO ALLOW 2" MINIMUM CONCRETE COVERAGE.

CHAMFER ALL EXPOSED CORNERS 1".

2" MINIMUM CONCRETE COVERAGE ON ALL REBAR.



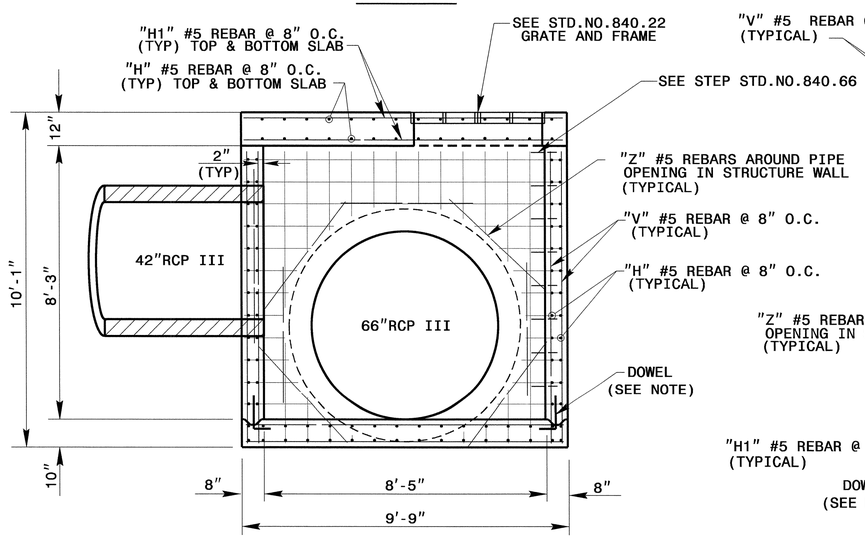
PLAN VIEW



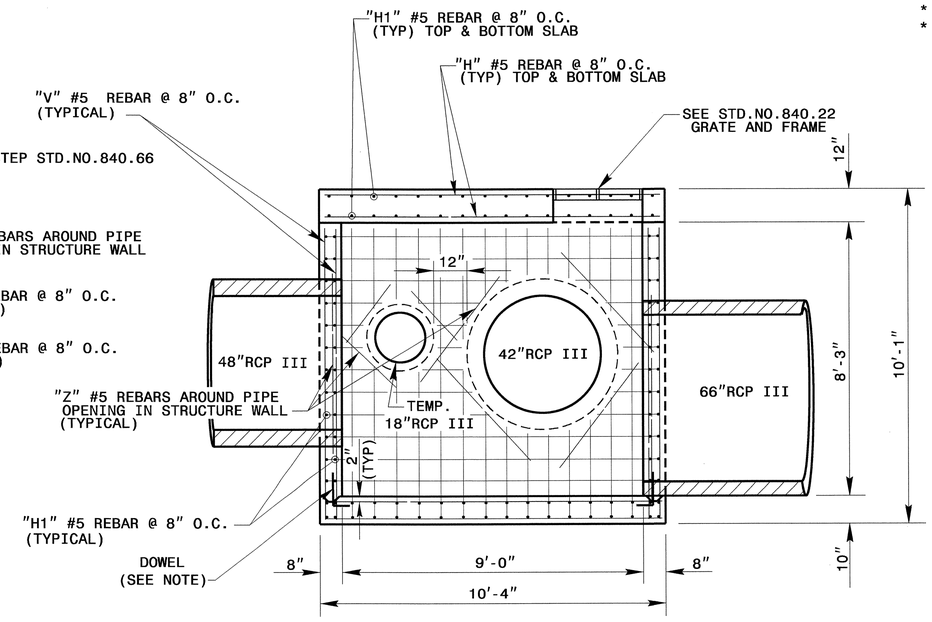
DOWEL

BILL OF MATERIALS				
BAR	NO.	SIZE	LENGTH	WEIGHT
H	108	#5	10'-0"	1127
H1	116	#5	9'-5"	1140
V	136	#5	8'-9"	1242
Z	14	#5	4'-0"	59
TOTAL REINF. STEEL (LBS.)				3568
TOTAL CL."AA" CONC.(CU.YDS.)				14.5

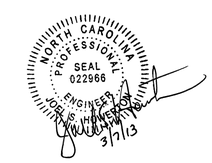
* 0.30 CU. YD. PER FOOT OF RISER HEIGHT
* 0.9 CU. YD. DEDUCTION FOR 1-66" RC PIPE III
* 0.5 CU. YD. DEDUCTION FOR 1-48" RC PIPE III
* 0.4 CU. YD. DEDUCTION FOR 1-42" RC PIPE III
* 0.1 CU. YD. DEDUCTION FOR 1-18" RC PIPE III
* NO DEDUCTION HAS BEEN MADE FOR PIPES



SECTION A-A



SECTION B-B



STRUCTURE #1303

CONTRACT STANDARDS & DEVELOPMENT UNIT
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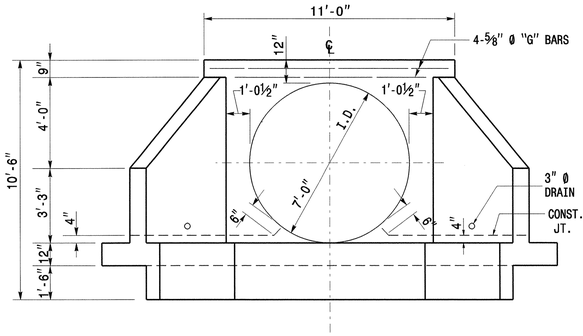
SPECIAL TRAFFIC BEARING DROP INLET

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: nbritt DATE: 02/08/13
CHECKED BY: _____ DATE: 2/11/13
FILE SPEC.: detail/nbritt/english/rural/r3421c 66tbdi.dgn

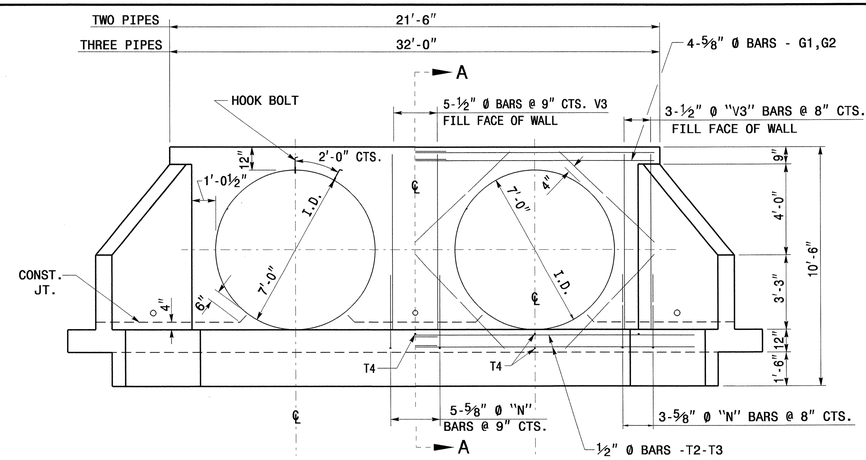
5/14/99

$$$$SYSTIME$$$$ $$$$DGNFILE$$$$ $$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-X



END ELEVATION



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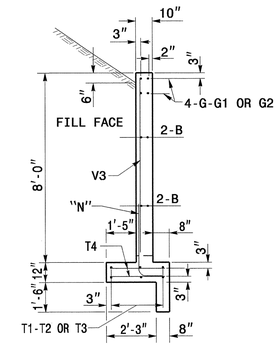


SECTION A-A FOR ALL ENDWALLS

NOTES:

ALL CONCRETE TO BE CLASS "A".

ALL REINFORCING STEEL SHALL BE ASTMA615-GRADE 60.

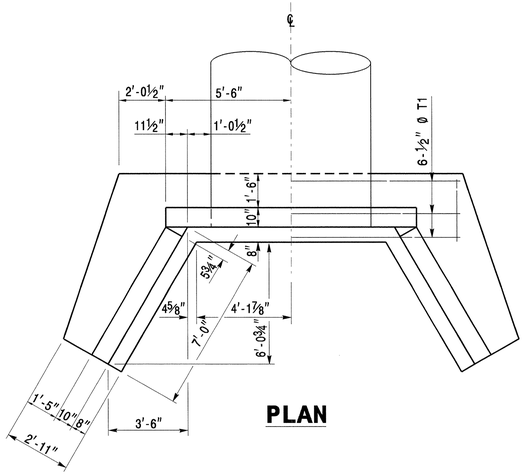
ALL REINFORCING STEEL SHALL BE DEFORMED BARS. WHERE SPLICING OF REINFORCMENT IS NECESSARY, BARS ARE TO BE LAPPED 45 DIAMETERS. ALL DIMENSIONS RELATIVE TO REINFORCEMENT ARE TO CENTERS OF BARS.

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

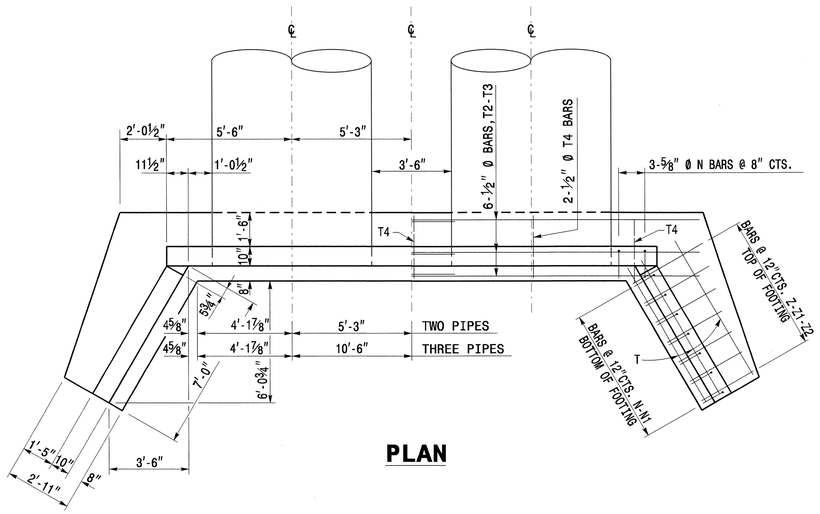
ALL EXPOSED CORNERS ARE TO BE CHAMFERED 1".

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

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



PLAN



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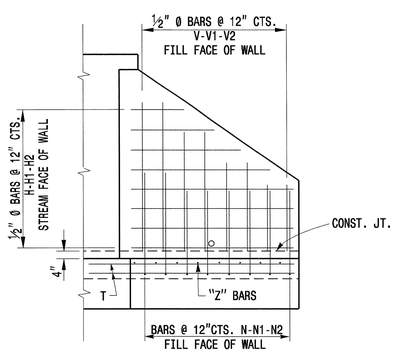
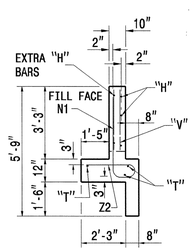
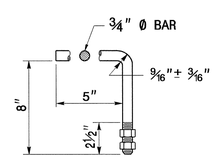


ELEVATION OF WING SHOWING REINFORCEMENT

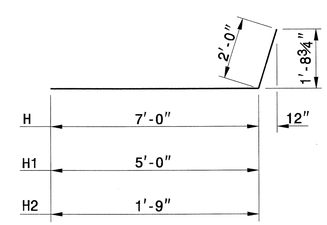


END OF WING

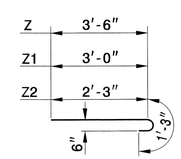


HOOK BOLT

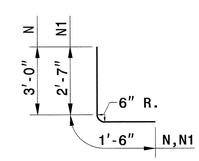
HOOK BOLTS (ANCHORS SHALL BE CONSTRUCTED AT 2'-0" CTS. ALONG THE CIRCUMFERENCE OF THE 7'-0" CSPA. THE HOOK BOLTS SHALL BE EMBEDDED IN THE CONCRETE ENDWALL 8" IN DEPTH. THE GALVANIZED¾" DIA. HOOK BOLTS MUST MEET ASTM A-307 OR ASTM A-836. BOTH BOLTS AND NUTS MUST BE IN ACCORDANCE WITH ASTM A-153 FOR GALVANIZING.



BARS H-H1-H2



BARS Z-Z1-Z2



BARS N-N1

BILL OF MATERIAL FOR ONE ENDWALL

REINFORCING STEEL			1 PIPE		2 PIPES		3 PIPES	
BAR	SIZE	LENGTH	NO.	WEIGHT	NO.	WEIGHT	NO.	WEIGHT
B	#4	6'-0"	8	32	16	64	24	96
G	#5	10'-9"	4	45	-	-	-	-
G1	#5	11'-9"	-	-	8	98	-	-
G2	#5	17'-0"	-	-	-	-	8	142
H	#4	9'-0"	10	60	10	60	10	60
H1	#4	7'-0"	6	28	6	28	6	28
H2	#4	3'-9"	4	10	4	10	4	10
N	#5	4'-6"	10	47	15	70	20	94
N1	#4	4'-1"	10	27	10	27	10	27
T	#4	6'-6"	6	26	6	26	6	26
T1	#4	15'-0"	6	60	-	-	-	-
T2	#4	13'-9"	-	-	12	110	-	-
T3	#4	19'-0"	-	-	-	-	12	152
T4	#4	2'-9"	4	7	7	13	10	18
V	#4	5'-9"	6	23	6	23	6	23
V1	#4	4'-6"	6	18	6	18	6	18
V2	#4	2'-9"	8	15	8	15	8	15
V3	#4	7'-6"	6	30	11	55	16	80
Z	#5	4'-9"	4	20	4	20	4	20
Z1	#4	4'-3"	4	11	4	11	4	11
Z2	#4	3'-6"	6	14	6	14	6	14
TOTAL REINF. STEEL (lbs.)				473		662		834
CLASS "A" CONC. (cu. yds.)				7.9		10.8		13.8

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER R. SHAWN WICKER 3/7/13

STRUCTURE # 2010

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

DETAIL OF REINFORCED CONCRETE ENDWALL FOR 84" DIAMETER PIPE - 90° SKEW

ORIGINAL BY: R.S.WICKER DATE: 6-46
MODIFIED BY: R.E.D. & T.S.S. DATE: 6-96, & 5-00
CHECKED BY: [signature] DATE: 2/4/13
FILE SPEC.: details/nbritt/english/hydro/endwall90sk.dgn

FILE NAME = pw:\\pwdgn01\Proj\Projdata\Projects\Active\R3421C\Design\Structures\Endwall90sk.dgn
USER NAME = nbritt

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-Y

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

1-02

ENGLISH STANDARD DRAWING FOR

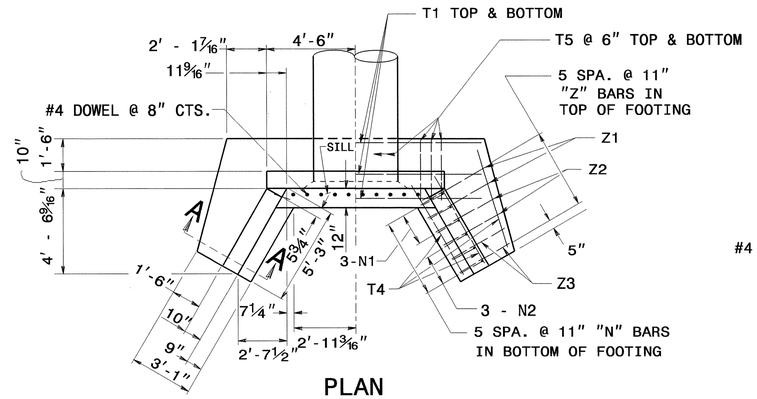
REINFORCED CONCRETE ENDWALL SILL

FOR SINGLE 60" PIPE - 90° SKEW

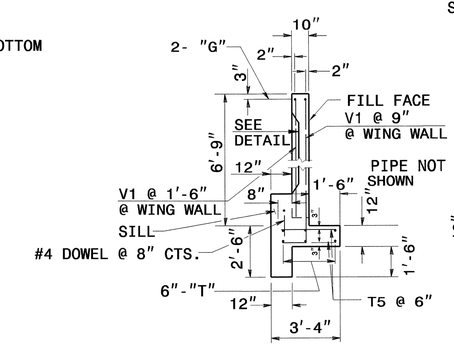
SHEET 1 OF 1

838D27

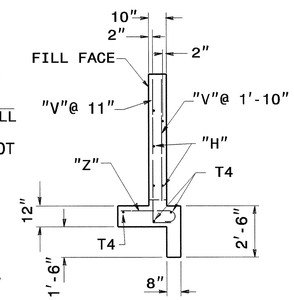
SEE STD. # 838.45 FOR GENERAL NOTES.



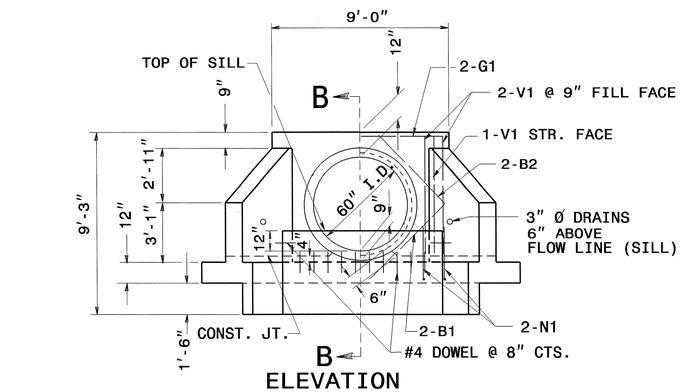
PLAN



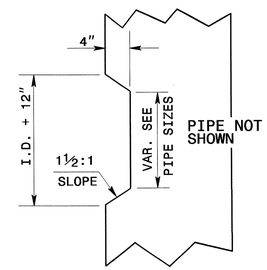
SECTION - BB



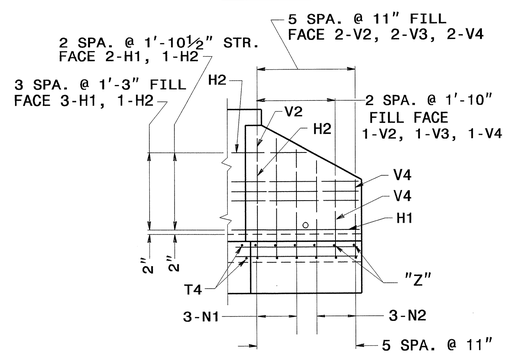
SECTION - AA



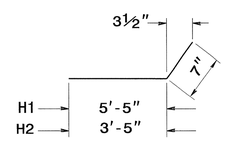
ELEVATION



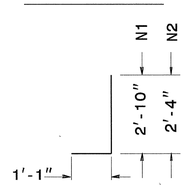
TAPER DETAIL



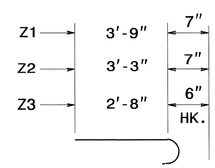
WING ELEVATION



"H" BARS



"N" BARS



"Z" BARS

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

BILL OF MATERIAL FOR ENDWALL

REINF. STEEL			1 PIPE	
BAR	SIZE	LENGTH	NO.	WEIGHT
B1	#4	5'-6"	4	15
B2	#4	4'-6"	4	12
G1	#7	8'-8"	2	35
H1	#4	6'-0"	10	40
H2	#4	4'-0"	4	11
N1	#5	3'-11"	10	41
N2	#4	3'-5"	6	14
T1	#4	12'-8"	6	51
T4	#4	5'-6"	6	22
T5	#4	2'-6"	36	60
V1	#4	6'-3"	6	25
V2	#4	5'-1"	6	20
V3	#4	3'-11"	6	16
V4	#4	2'-9"	6	11
Z1	#5	4'-4"	4	18
Z2	#4	3'-10"	4	10
Z3	#4	3'-2"	4	8
DOWEL	#4	1'-0"	12	8
REINF. STEEL LBS.				417
CON./C.S. CU. YDS			6.5	

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

1-02

ENGLISH STANDARD DRAWING FOR

REINFORCED CONCRETE ENDWALL SILL

FOR SINGLE 60" PIPE - 90° SKEW

SHEET 1 OF 1

838D27

STRUCTURE # 2012

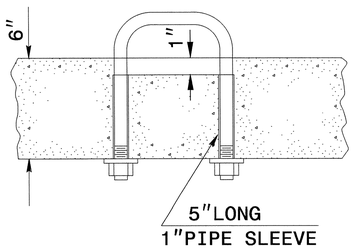
NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOHN S. HONEYCUTT III 3/7/13

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

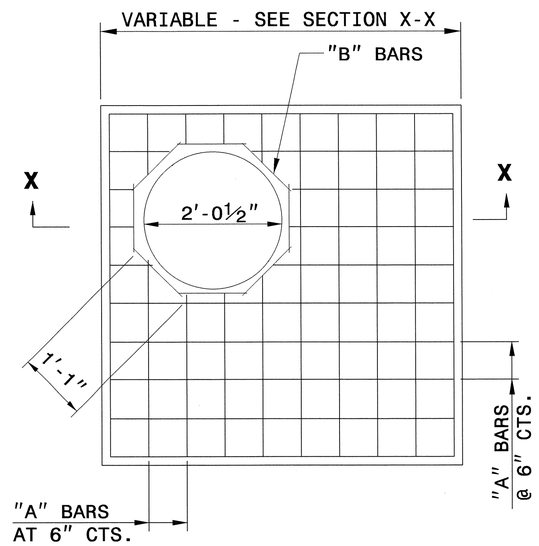
DETAIL OF REINFORCED CONCRETE ENDWALL SILL

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: nbritt DATE: 08-25-05
CHECKED BY: JWS DATE: 2/4/13
FILE SPEC.: details/nbritt/english/rural/r3421cconcendwallsill.dgn

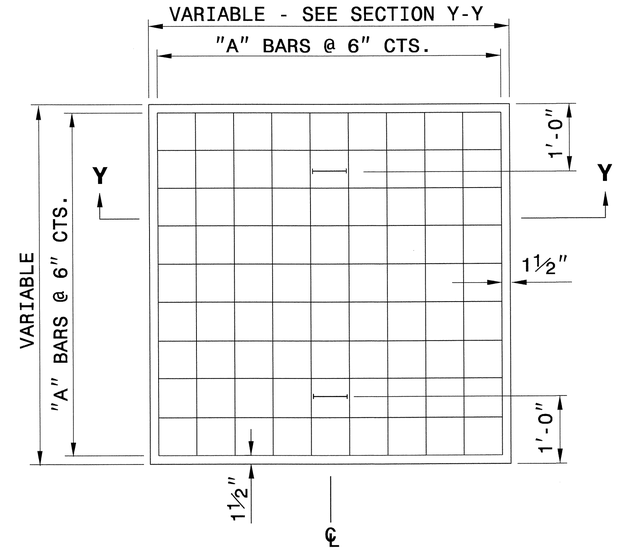
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2Z



PARTIAL SECTION



PLAN



PLAN

GENERAL NOTES:

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

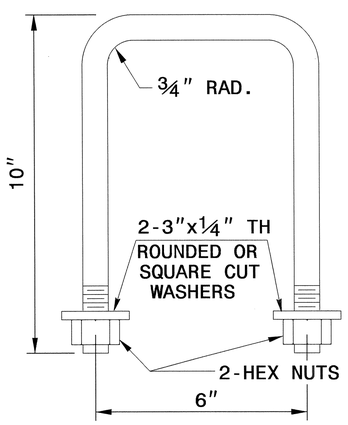
THE DIMENSIONS FOR THE EXISTING BOXES ARE APPROXIMATE AND MAY VARY SLIGHTLY.

DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.

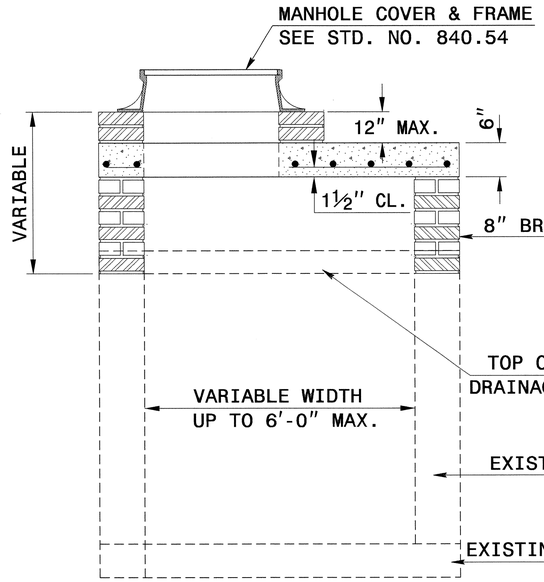
BILL OF MATERIALS

REINFORCING STEEL				
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4'-6"	60.12
B	#4	8	1'-1"	5.79
TOTAL				65.91 *
MASONRY				CU YDS
TOP SLAB CONCRETE CLASS "B"				.4326 *
BRICK MASONRY PER FT HT (MIN)				.4111

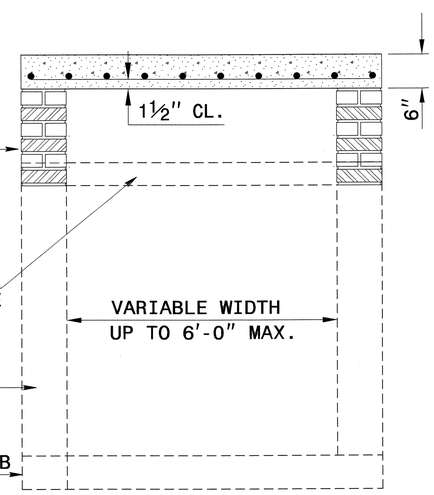
* NOTE:
QUANTITIES BASED ON 3'-6" X 3'-6" DRAINAGE STRUCTURE. ADJUST QUANTITIES FOR LARGER STRUCTURES AND MANHOLE CONSTRUCTION.



DETAIL OF HANDLE



SECTION X-X



SECTION Y-Y

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOE S. HOWERTON 2/20/13

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

DETAIL TO CONVERT EXISTING DROP INLET OR CATCH BASIN TO JUNCTION BOX (MANHOLE OPTIONAL)

ORIGINAL BY: T.S.S. DATE: NOV.1997
MODIFIED BY: T.S.S. DATE: FEB.2000
CHECKED BY: [signature] DATE: 2/20/13
FILE SPEC.: ds174:/usr/details/stand/boxtojbe.dgn

USER NAME = USERNAME
USER TIME = TIME

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AA
R/W SHEET NO.	

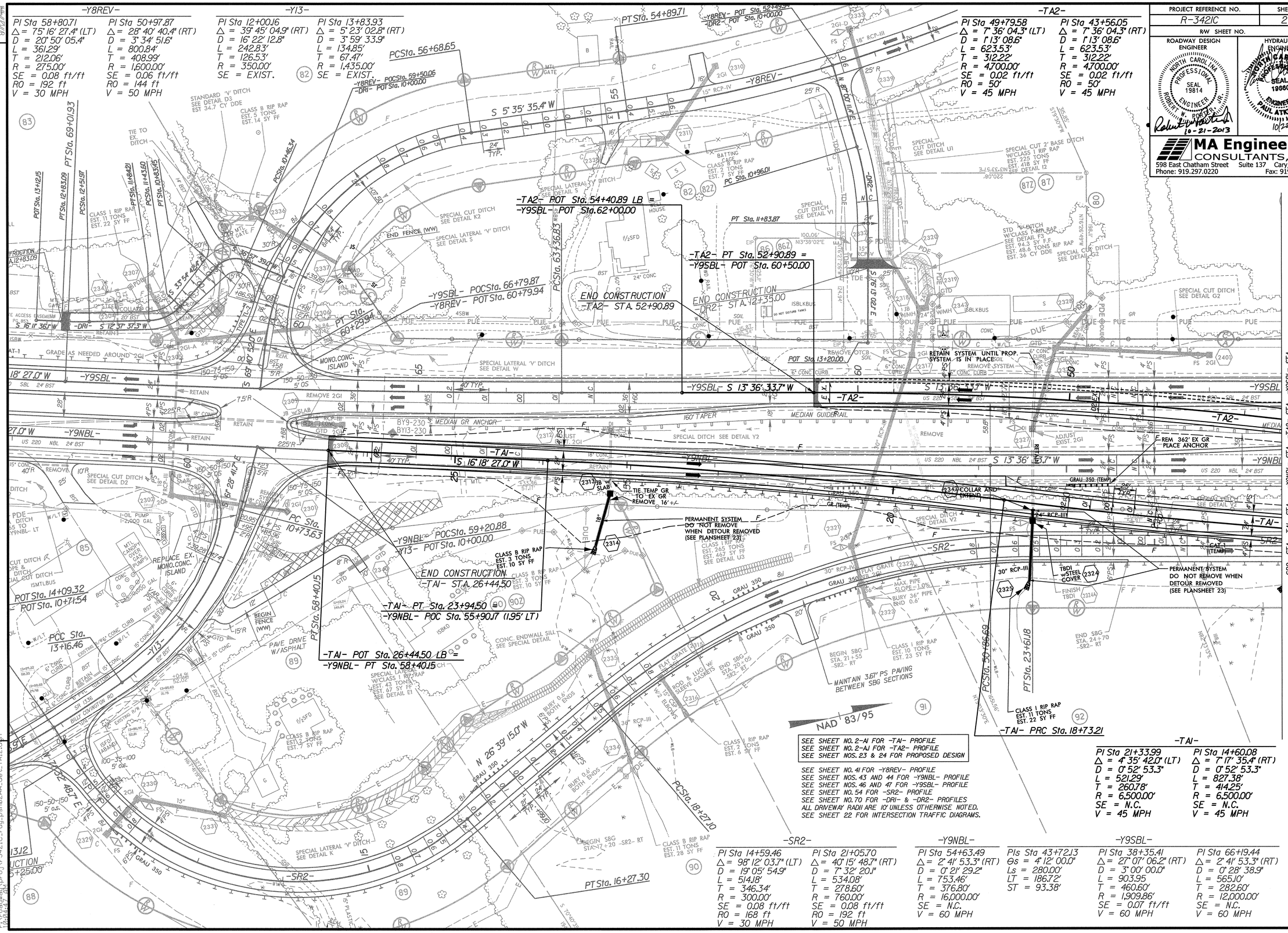
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. ROGERS, JR.
10-21-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19860 ENGINEER PAUL ATKINSON
10/22/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS

07/17/2013



10/21/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AB
R/W SHEET NO.	

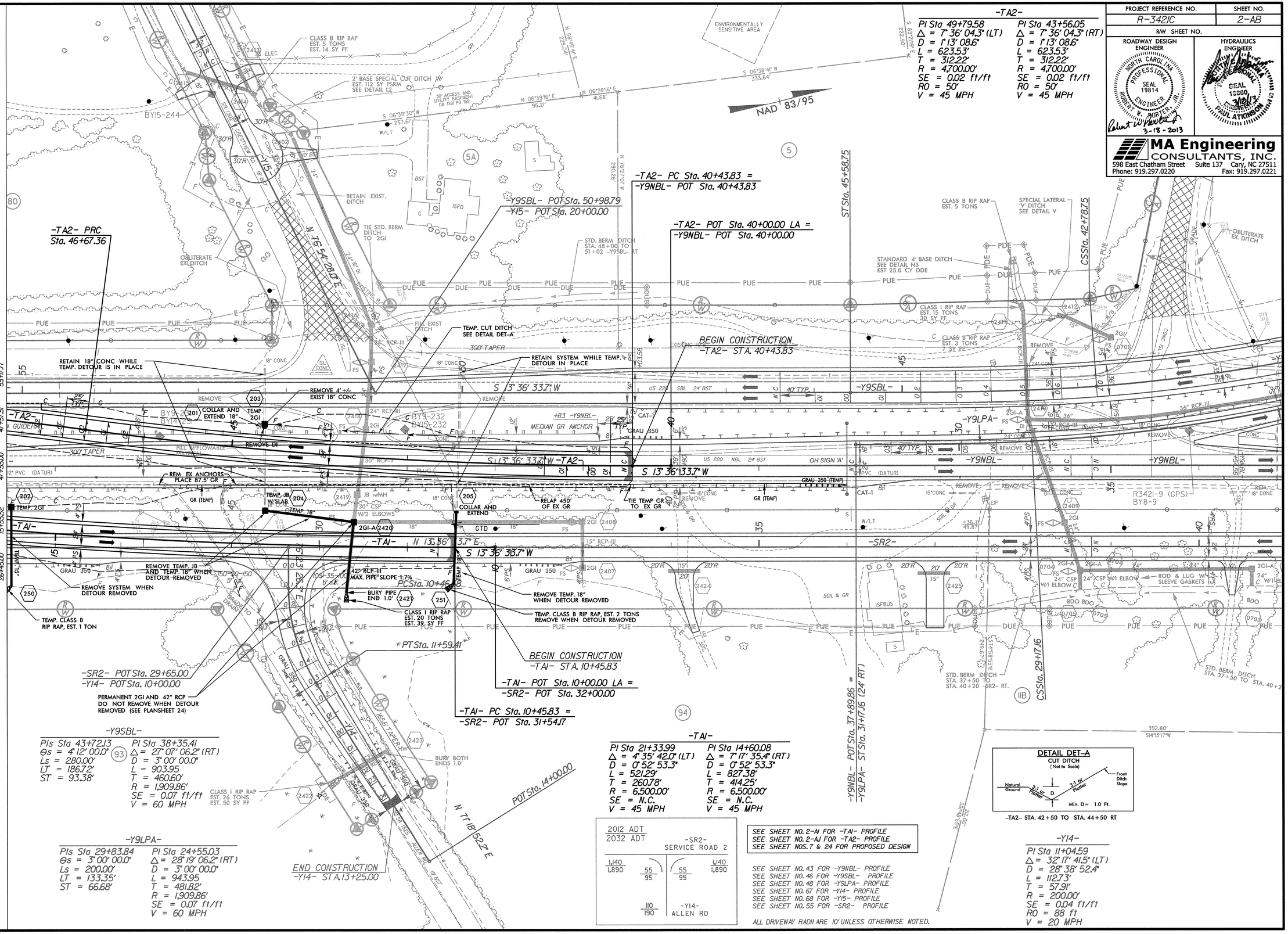
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W Porter Jr
3-18-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19860 ENGINEER PAUL ATKINSON
3/18/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS

3/18/2013



PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AC
RW SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-18-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19880 ENGINEER PAUL ATKINSON
3/18/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS

DETAIL DET-A
CUT DITCH
(Not to Scale)
Natural Ground; 3:1 or Flatter; D; 3:1 or Flatter; Front Ditch Slope
Min. D = 1.0 Ft.

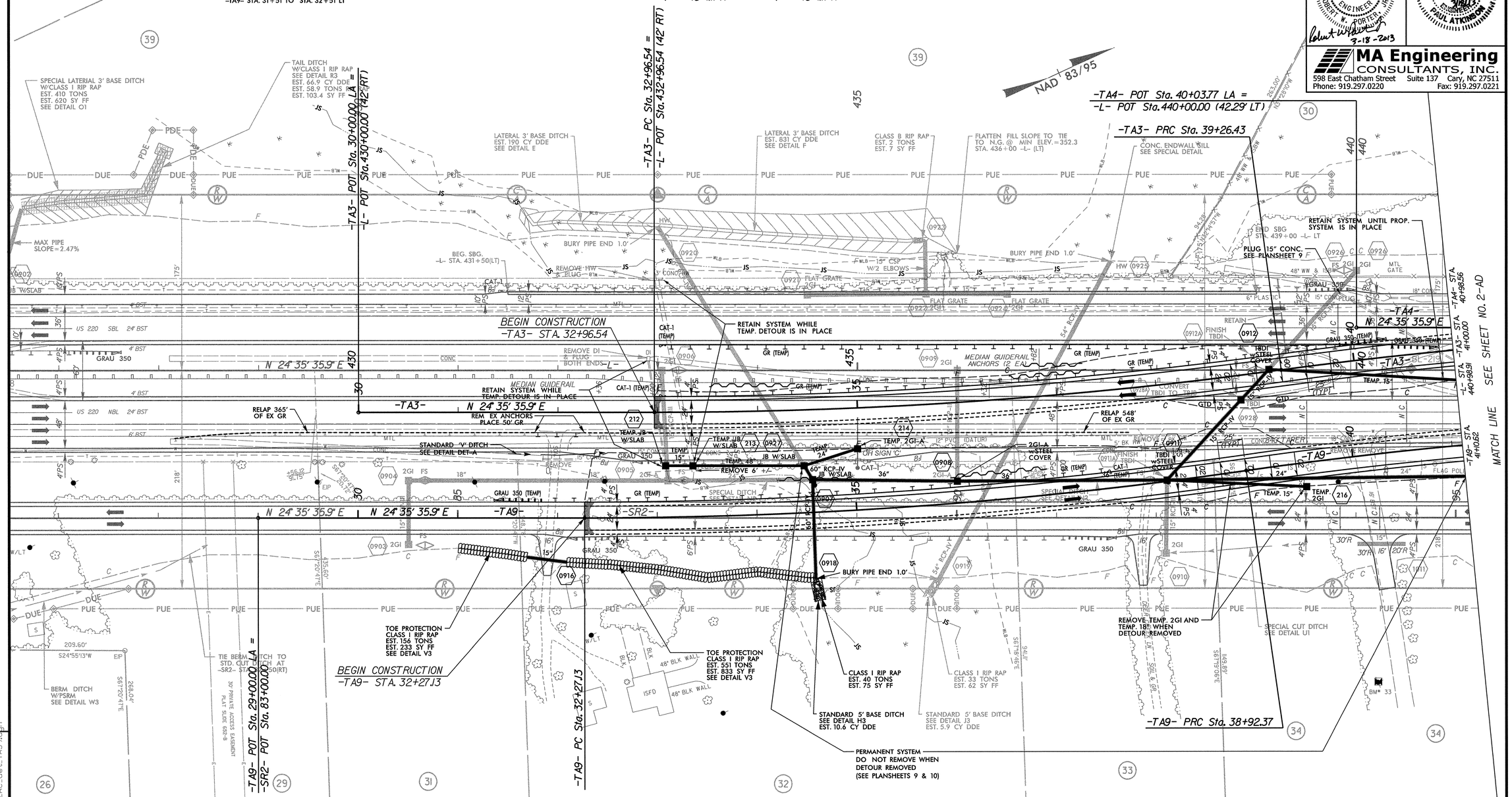
-TA9- STA. 31+51 TO STA. 32+51 LT

-TA3-

PI Sta 36+11.96	PI Sta 42+41.85
Δ = 7° 40' 43.4" (LT)	Δ = 7° 40' 43.4" (RT)
D = 1° 13' 08.6"	D = 1° 13' 08.6"
L = 629.89'	L = 629.89'
T = 315.42'	T = 315.42'
R = 4,700.00'	R = 4,700.00'
SE = 0.02 ft/ft	SE = 0.02 ft/ft
RO = 50'	RO = 50'
V = 45 MPH	V = 45 MPH

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NOS. 30 AND 31 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO.57 FOR -SR2- PROFILE



SEE SHEET NO. 2-AK FOR -TA3- PROFILE
SEE SHEET NO. 2-AO FOR -TA9- PROFILE
SEE SHEET NOS. 9 & 10 FOR PROPOSED DESIGN

-TA9-

PI Sta 35+60.31	PI Sta 42+25.54
Δ = 8° 06' 34.6" (LT)	Δ = 8° 06' 34.6" (RT)
D = 1° 13' 08.6"	D = 1° 13' 08.6"
L = 665.24'	L = 665.24'
T = 333.17'	T = 333.17'
R = 4,700.00'	R = 4,700.00'
SE = 0.02 ft/ft	SE = 0.02 ft/ft
RO = 50'	RO = 50'
V = 45 MPH	V = 45 MPH

TEMPORARY SHORING - SEE WORK ZONE TRAFFIC CONTROL PLANS

3/18/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AD
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-18-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON, JR.
3/18/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS

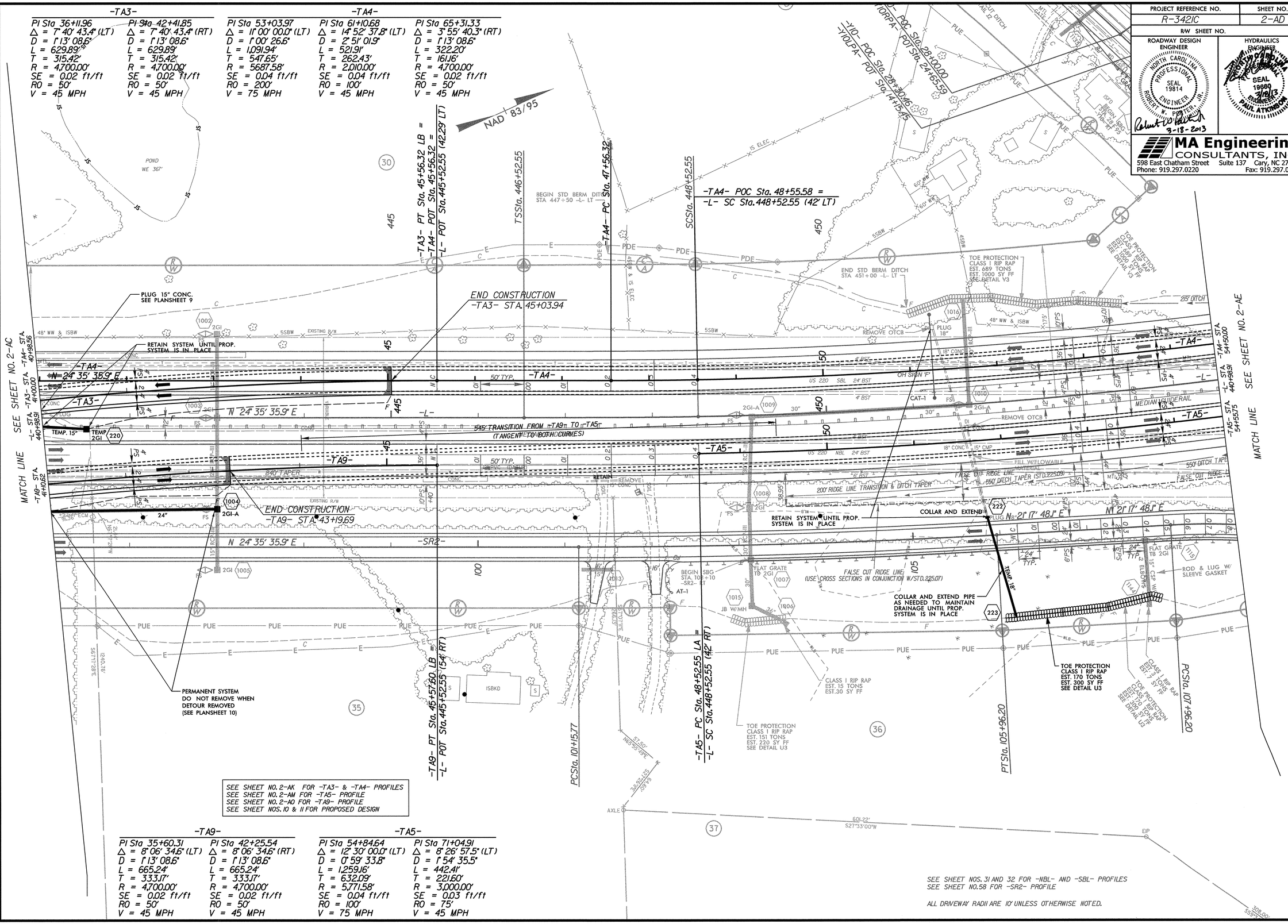
3/18/2013
r:\hydraulics\proj\r-3421c_rdy_psh02AD_dets_TA39.dgn

-TA3-

PI Sta 36+11.96	PI Sta 42+41.85
Δ = 7° 40' 43.4" (LT)	Δ = 7° 40' 43.4" (RT)
D = 1° 13' 08.6"	D = 1° 13' 08.6"
L = 629.89'	L = 629.89'
T = 315.42'	T = 315.42'
R = 4,700.00'	R = 4,700.00'
SE = 0.02 ft/ft	SE = 0.02 ft/ft
RO = 50'	RO = 50'
V = 45 MPH	V = 45 MPH

-TA4-

PI Sta 53+03.97	PI Sta 61+10.68	PI Sta 65+31.33
Δ = 11° 00' 00.0" (LT)	Δ = 14° 52' 37.8" (LT)	Δ = 3° 55' 40.3" (RT)
D = 1° 00' 26.6"	D = 2° 51' 01.9"	D = 1° 13' 08.6"
L = 1,091.94'	L = 521.91'	L = 322.20'
T = 547.65'	T = 262.43'	T = 161.16'
R = 5687.58'	R = 2,010.00'	R = 4,700.00'
SE = 0.04 ft/ft	SE = 0.04 ft/ft	SE = 0.02 ft/ft
RO = 200'	RO = 100'	RO = 50'
V = 75 MPH	V = 45 MPH	V = 45 MPH



SEE SHEET NO. 2-AK FOR -TA3- & -TA4- PROFILES
SEE SHEET NO. 2-AM FOR -TA5- PROFILE
SEE SHEET NO. 2-AO FOR -TA9- PROFILE
SEE SHEET NOS. 10 & 11 FOR PROPOSED DESIGN

-TA9-

PI Sta 35+60.31	PI Sta 42+25.54
Δ = 8° 06' 34.6" (LT)	Δ = 8° 06' 34.6" (RT)
D = 1° 13' 08.6"	D = 1° 13' 08.6"
L = 665.24'	L = 665.24'
T = 333.17'	T = 333.17'
R = 4,700.00'	R = 4,700.00'
SE = 0.02 ft/ft	SE = 0.02 ft/ft
RO = 50'	RO = 50'
V = 45 MPH	V = 45 MPH

-TA5-

PI Sta 54+84.64	PI Sta 71+04.91
Δ = 12° 30' 00.0" (LT)	Δ = 8° 26' 57.5" (LT)
D = 0° 59' 33.8"	D = 1° 54' 35.5"
L = 1,259.16'	L = 442.41'
T = 632.09'	T = 221.60'
R = 5,771.58'	R = 3,000.00'
SE = 0.04 ft/ft	SE = 0.03 ft/ft
RO = 100'	RO = 75'
V = 45 MPH	V = 45 MPH

SEE SHEET NOS. 31 AND 32 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 58 FOR -SR2- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AE
R/W SHEET NO.	

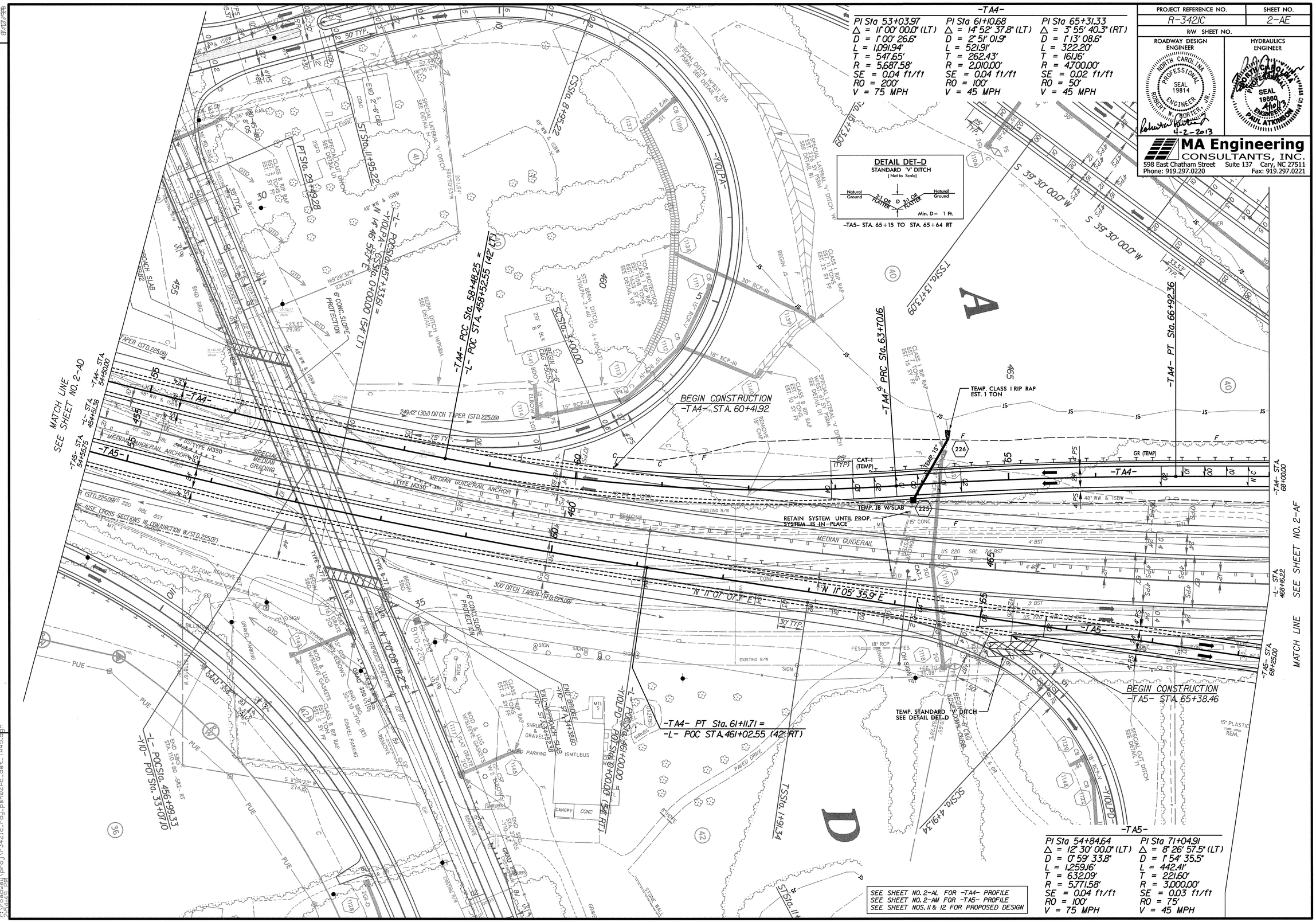
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 4-2-2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19860 ENGINEER PAUL ATKINSON

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

-TA4-

PI Sta 53+03.97	PI Sta 61+10.68	PI Sta 65+31.33
Δ = 11° 00' 00.0" (LT)	Δ = 14° 52' 37.8" (LT)	Δ = 3° 55' 40.3" (RT)
D = 1° 00' 26.6"	D = 2° 51' 01.9"	D = 1° 13' 08.6"
L = 1,091.94'	L = 521.91'	L = 322.20'
T = 547.65'	T = 262.43'	T = 161.16'
R = 5,687.58'	R = 2,010.00'	R = 4,700.00'
SE = 0.04 ft/ft	SE = 0.04 ft/ft	SE = 0.02 ft/ft
RO = 200'	RO = 100'	RO = 50'
V = 75 MPH	V = 45 MPH	V = 45 MPH



REVISIONS

4/1/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AF
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 3-18-2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON — 3/18/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS

MATCH LINE SEE SHEET NO. 2-AE

-TA8- PC Sta. 10+00.00 LA = -SR4- POC Sta. 28+00.00

PERMANENT SYSTEM DO NOT REMOVE WHEN DETOUR REMOVED (SEE PLANSHEETS 12 & 13)

BEGIN CONSTRUCTION -TA8- STA. 12+50.00

-TA4- POC Sta. 72+33.72 = -TA8- POT Sta. 14+95.05

-TA8- PC Sta. 13+73.74 = -SR4- POC Sta. 31+73.74

-TA8- PT Sta. 14+97.96

DETAIL DET-B
STANDARD 'V' DITCH
(Not to Scale)
-TA4- STA. 75+84 TO STA. 76+84 (RT)

-TA8-

PI Sta 11+87.99	PI Sta 14+45.30	PI Sta 18+96.52
Δ = 15° 17' 43.2" (LT)	Δ = 71° 10' 36.9" (RT)	Δ = 62° 22' 24.5" (RT)
D = 4° 05' 33.2"	D = 57° 17' 44.8"	D = 38° 11' 49.9"
L = 373.74'	L = 124.23'	L = 163.29'
T = 187.99'	T = 71.56'	T = 90.80'
R = 1,400.00'	R = 100.00'	R = 150.00'
SE = 0.065 ft/ft	SE = 0.02 ft/ft (ADVERSE)	SE = 0.02 ft/ft
RO = 104'	RO = NA (16' INC.)	RO = 32'
V = STOP COND.	V = STOP COND.	V = STOP COND.

END CONSTRUCTION -TA4- POT Sta. 81+80.08 = -SR4- PT Sta. 41+96.32

END CONSTRUCTION -TA5- POT Sta. 81+00.00 = -SR5- PT Sta. 40+77.75

END CONSTRUCTION -TA8- STA. 20+50.00

-TA8- POT Sta. 21+82.84 LB = -SR5- PT Sta. 29+21.81

-TA5- POC Sta. 72+72.25 = -TA8- POT Sta. 17+44.57

-TA8- PC Sta. 18+05.12

-TA8- PT Sta. 19+69.02 = -SR5- POT Sta. 31+35.64

-TA5- PC Sta. 68+83.30

-L- POT Sta. 478+00.00 = -YIORPA- POT Sta. 0+00.00 (54' LT)

-L- POT Sta. 479+55.00 = -YIORPD- TS Sta. 0+00.00 (54' RT)

CLASS I RIP RAP EST. 32 TONS EST. 67 SY FF

TOE PROTECTION CLASS I RIP RAP EST. 89 TONS EST. 300 SY FF SEE DETAIL U3

CLASS I RIP RAP EST. 7 TONS EST. 14 SY FF

TIE TO EXISTING SWALE

STD. 2' BASE DITCH SEE DETAIL K3 EST. 5.0 CY DDE

BURY PIPE END 1.0'

REMOVE HEADWALL

REMOVE TEMP. SYSTEM (2 JB, TEMP. 15", TEMP. 42") WHEN DETOUR REMOVED

RETAIN SYSTEM WHILE TEMP. DETOUR IS IN PLACE

RETAIN SYSTEM UNTIL PROP. SYSTEM IS CONSTRUCTED

RETAIN PIPE WHILE TEMP. DETOUR IS IN PLACE

TEMP. CLASS B RIP RAP EST. 7 TONS

GRADE TO DRAIN

REMOVE TEMP. SYSTEM WHEN PROP. SYSTEM IS IN PLACE

PERMANENT SYSTEM, DO NOT REMOVE WHEN DETOUR REMOVED (SEE PLANSHEET 12)

SPECIAL LATERAL 'V' DITCH SEE PLANSHEET 12

BERM SEE PLANSHEET 12

TOE PROTECTION SEE PLANSHEET 12

STANDARD 'V' DITCH SEE DETAIL DET-B

SPECIAL TBDI SEE DETAIL SHT. 2-W W/STEEL COVER

STD. BERM DITCH STA. 38+30 TO STA 43+50 -SR5- (R

GREENHOUSE

PAVE DRIVE W/ASPHALT

TEMPORARY SHORING – SEE WORK ZONE TRAFFIC CONTROL PLANS

SEE SHEET NO. 2-AL FOR -TA4- PROFILE
SEE SHEET NOS. 2-AM & 2-AN FOR -TA5- PROFILE
SEE SHEET NO. 2-AN FOR -TA8- PROFILE
SEE SHEET NOS. 12 & 13 FOR PROPOSED DESIGN

-TA5-

PI Sta 54+84.64	PI Sta 71+04.91
Δ = 12° 30' 00.0" (LT)	Δ = 8° 26' 57.5" (LT)
D = 0° 59' 33.8"	D = 1° 54' 35.5"
L = 1,259.16'	L = 442.41'
T = 632.09'	T = 221.60'
R = 5,771.58'	R = 3,000.00'
SE = 0.04 ft/ft	SE = 0.03 ft/ft
RO = 100'	RO = 75'
V = 75 MPH	V = 45 MPH

3/18/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AG
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 3-18-2013

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL A. ATKINSON, JR. — 3/18/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS

-SR4-

PI Sta 89+05.63	PI Sta 106+23.86
Δ = 3° 15' 21.6" (RT)	Δ = 39° 28' 01.6" (LT)
D = 0° 21' 19.2"	D = 4° 46' 28.7"
L = 916.35'	L = 826.60'
T = 458.30'	T = 430.46'
R = 16,125.00'	R = 1,200.00'
SE = N.C.	SE = 0.07 ft/ft
V = 50 MPH	R0 = 168 ft
	V = 50 MPH

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NOS. 38 AND 39 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NOS. 61 AND 62 FOR -SR4- PROFILE
SEE SHEET NO. 66 FOR -SR5- PROFILE

SEE SHEET NO. 2-AP FOR -TA6- PROFILE
SEE SHEET NO. 2-AQ FOR -TA7- PROFILE
SEE SHEET NOS. 17 & 18 FOR PROPOSED DESIGN

-TA6-

PI Sta 103+14.36	PI Sta 109+40.49
Δ = 7° 39' 10.7" (RT)	Δ = 7° 36' 47.3" (LT)
D = 1° 13' 08.6"	D = 1° 13' 08.6"
L = 627.78'	L = 624.51'
T = 314.36'	T = 312.72'
R = 4,700.00'	R = 4,700.00'
SE = 0.02 ft/ft	SE = 0.02 ft/ft
R0 = 50'	R0 = 50'
V = 45 MPH	V = 45 MPH

-Y19-

PI Sta 11+56.63
Δ = 55° 13' 29.1" (LT)
D = 28° 38' 52.4"
L = 192.77'
T = 104.61'
R = 200.00'
SE = 0.05 ft/ft
R0 = 75 ft
V = 15 MPH

NAD 83/95

-SR4- POCSta. 109+60.00
-Y19- POT Sta. 10+00.00

-TA6- POT Sta. 95+00.00 LA =
-SR4- POT Sta. 95+00.00

-TA6- PC Sta. 100+00.00 =
-SR4- POT Sta. 100+00.00

PCSta. 101+93.40

-TA6- PRC Sta. 106+27.78

-TA7- PRC Sta. 106+21.92

-TA7- PC Sta. 100+00.00 =
-SR5- POT Sta. 100+00.00

-TA7- POT Sta. 95+00.00 LA =
-SR5- POT Sta. 95+00.00

BEGIN CONSTRUCTION
-TA6- STA. 98+00.00

BEGIN CONSTRUCTION
-TA7- STA. 98+00.00

PERMANENT RDWY DITCH DO NOT REMOVE WHEN DETOUR REMOVED (SEE PLANSHEET 17)

PERMANENT PIPES DO NOT REMOVE WHEN DETOUR REMOVED (SEE PLANSHEET 17)

PERMANENT RDWY DITCH DO NOT REMOVE WHEN DETOUR REMOVED (SEE PLANSHEET 17)

PERMANENT SYSTEM DO NOT REMOVE WHEN DETOUR REMOVED (SEE PLANSHEET 17)

PERMANENT SYSTEM DO NOT REMOVE WHEN DETOUR REMOVED (SEE PLANSHEET 17)

RETAIN SYSTEM WHILE DETOUR IS IN PLACE

REMOVE SYSTEM

TIE TEMP GR TO PROP GR

15" RCP-III

18" RCP

24" RCP-III

30" RCP-III

30" CSP W/2 ELBOWS

ROD & LUG W/ SLEEVE GASKETS

30" CSP

36" RCP-III

2GI w/STEEL COVER

TEMP. 15"

TEMP. 2GI-D

TEMP. 2GI

TEMP. 15"

JB W/SLAB

REMOVE EXIST. HW

CONVERT 2GI TO 1 JB W/SLAB

APPROXIMATE JUNCTION OF PIPES AND CULVERT, INV. UNKNOWN

MEDIAN GUIDERAIL ANCHORS (2 EA)

MEDIAN GUIDERAIL

CLASS I RIP RAP EST. 11 TONS EST. 22 SY FF

3' BASE SPECIAL LATERAL DITCH W/EST. 171 SY PSRM SEE DETAIL H1

CLASS B RIP RAP EST. 3.5 TONS

TIE TO EXIST. SWALE

CLASS B RIP RAP EST. 2 TONS

TIE TO EXIST. SWALE

CLASS I RIP RAP EST. 15 TONS EST. 30 SY FF

SPECIAL LATERAL 3' BASE DITCH SEE DETAIL J1

-TA7-

PI Sta 103+11.41	PI Sta 109+37.36
Δ = 7° 34' 53.7" (LT)	Δ = 7° 40' 45.3" (RT)
D = 1° 13' 08.6"	D = 1° 13' 08.6"
L = 621.92'	L = 629.93'
T = 311.41'	T = 315.44'
R = 4,700.00'	R = 4,700.00'
SE = 0.02 ft/ft	SE = 0.02 ft/ft
R0 = 50'	R0 = 50'
V = 45 MPH	V = 45 MPH

-TA6- STA. 109+00.00
-L- STA. 549+65.36
-TA7- STA. 108+85.00

MATCH LINE SEE SHEET NO. 2-AH

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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AH
R/W SHEET NO.	

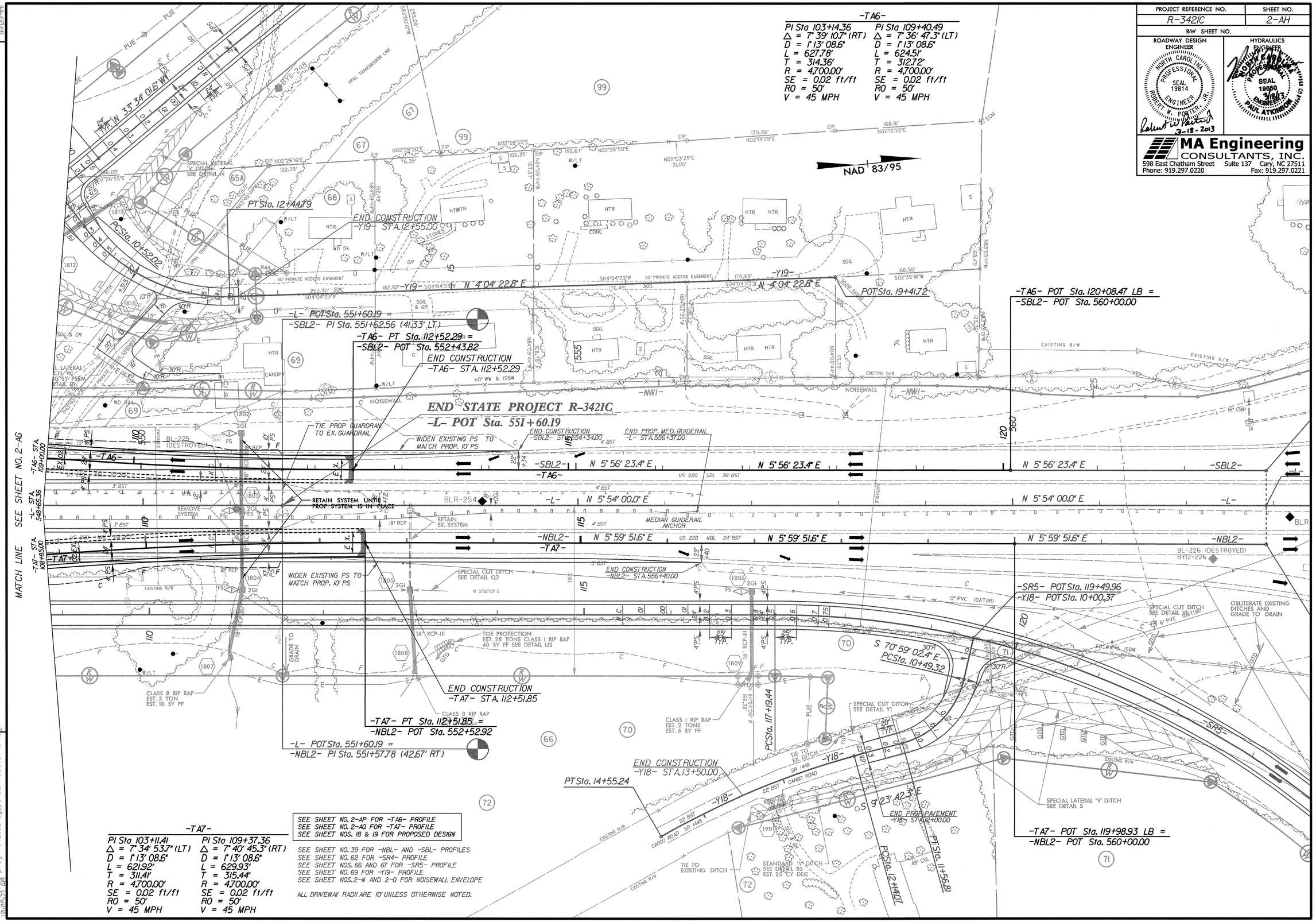
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter, Jr. 3-18-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19680 ENGINEER PAUL ATKINSON JR.
3/18/13

MA Engineering
CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS

9/12/94



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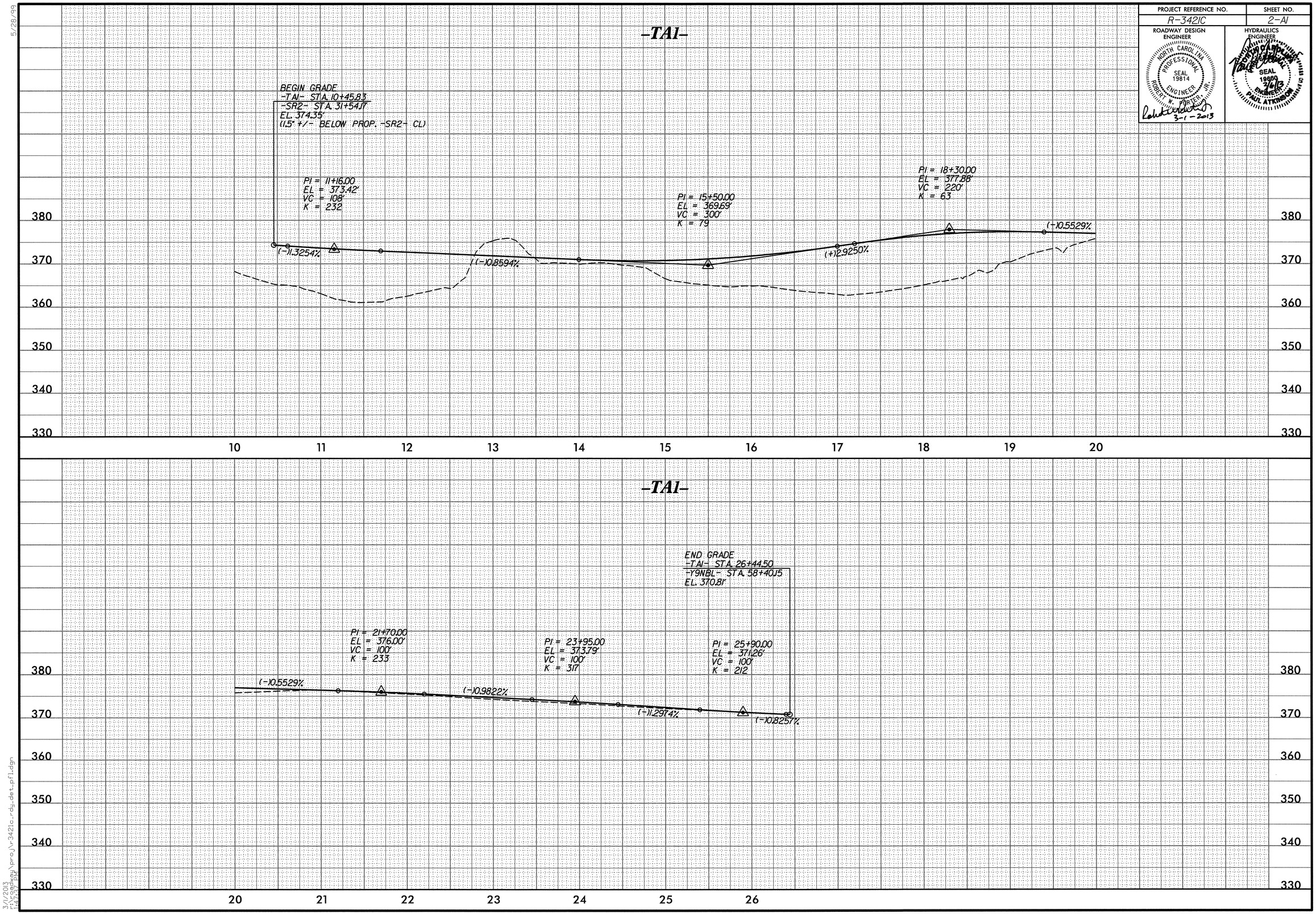
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-A1

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER
ROBERT W. PORTER, JR.
3-1-2013

HYDRAULICS ENGINEER
SEAL 19660 ENGINEER
PAUL ATKINSON
3/6/13



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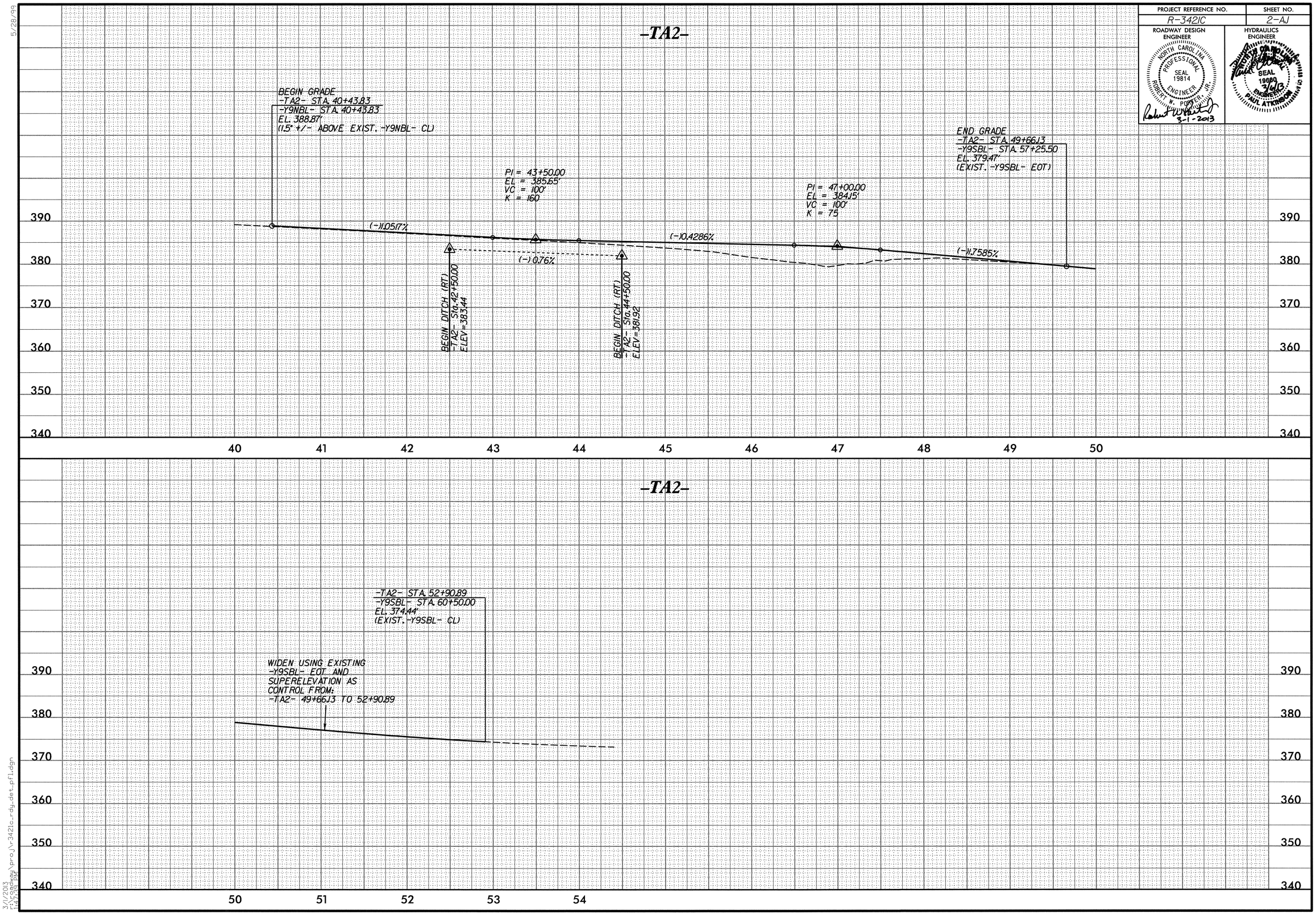
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AJ
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPPER, JR.
3-1-2013

NORTH CAROLINA SEAL 19680 ENGINEER PAUL ATKINSON JR.
3/6/13



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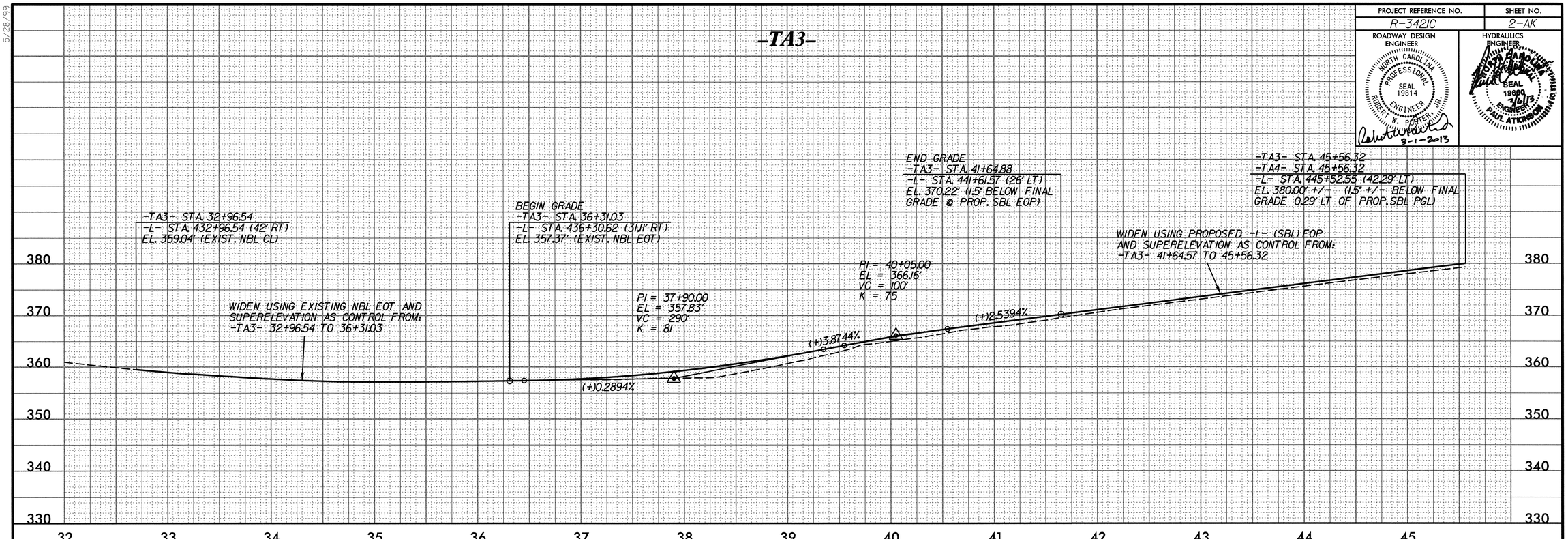
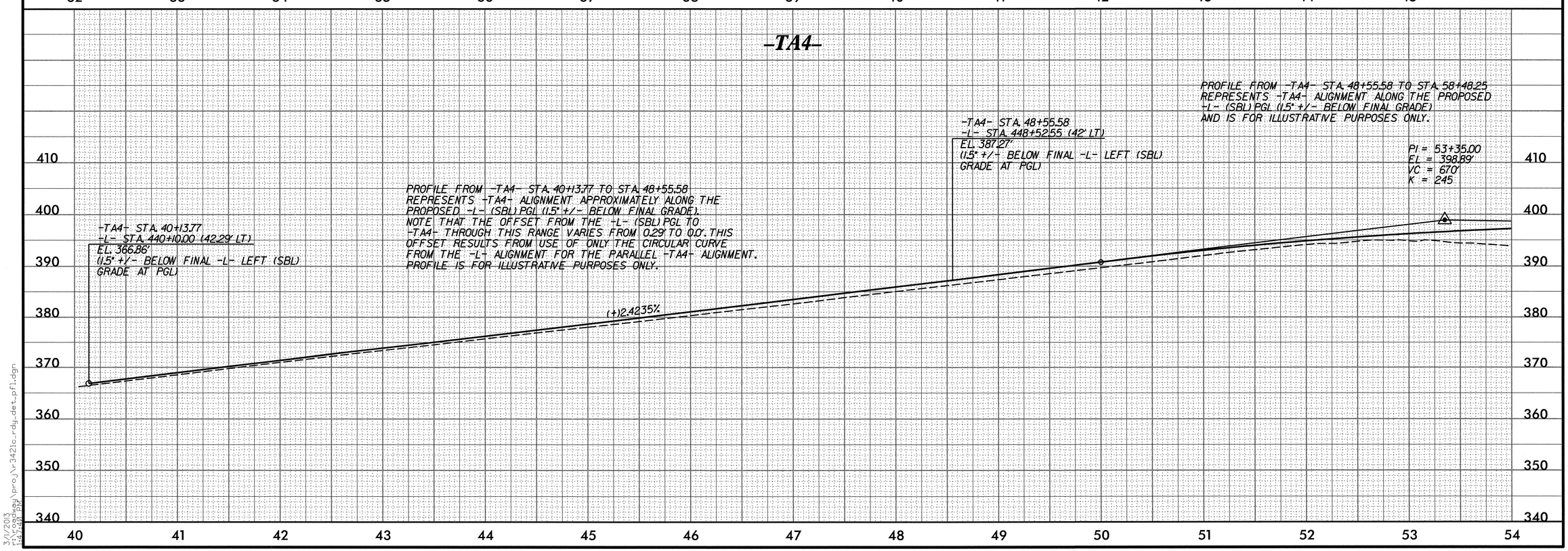
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AK

ROADWAY DESIGN ENGINEER
NORTH CAROLINA
PROFESSIONAL SEAL 19814 ENGINEER
ROBERT W. POTTER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA
SEAL 19680 ENGINEER
PAUL ATKINSON, JR.
3/1/13





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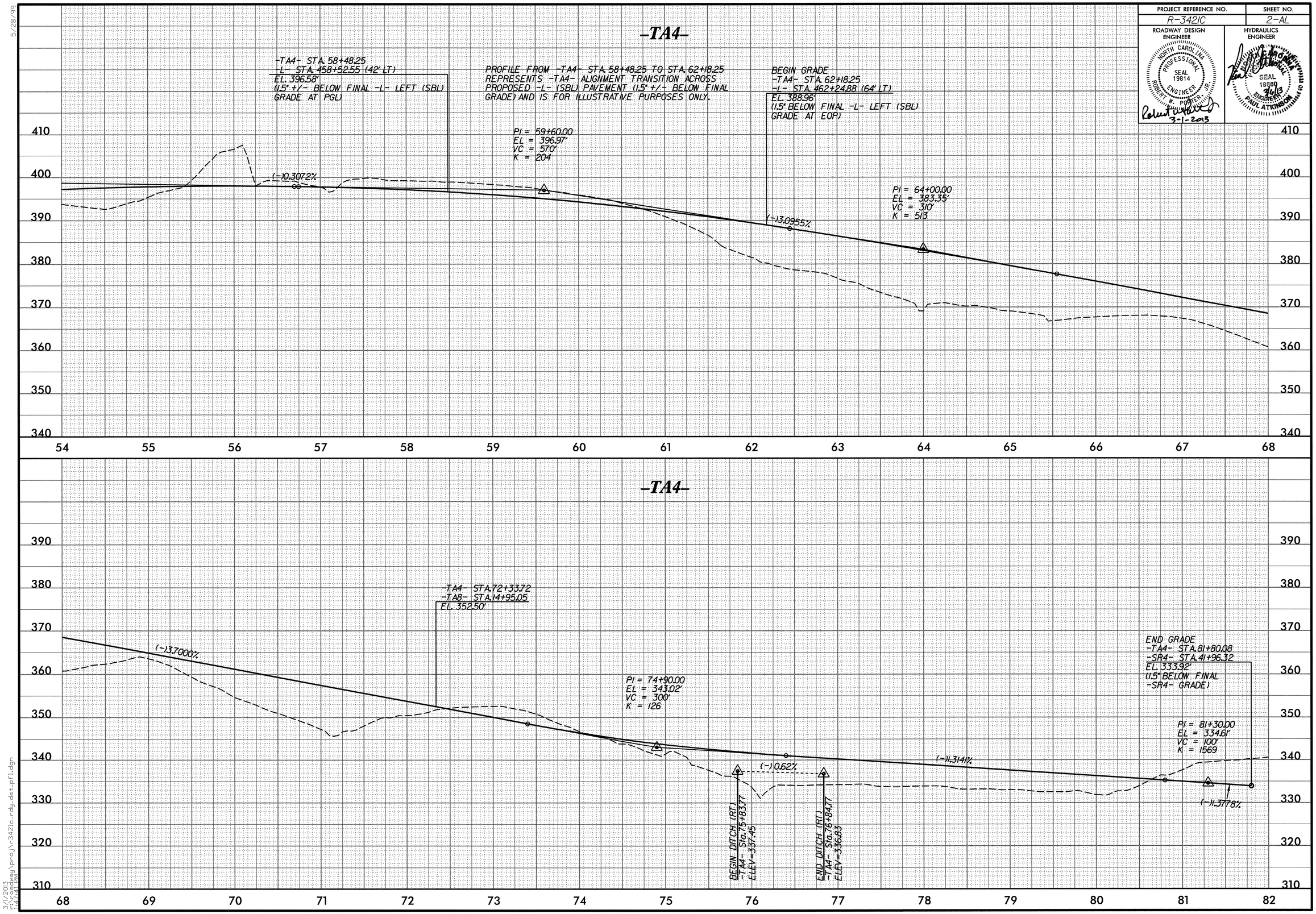
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AL

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPE, JR.
Robert W. Pope 3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19880 ENGINEER PAUL ATKINSON
Paul Atkinson 3/6/13



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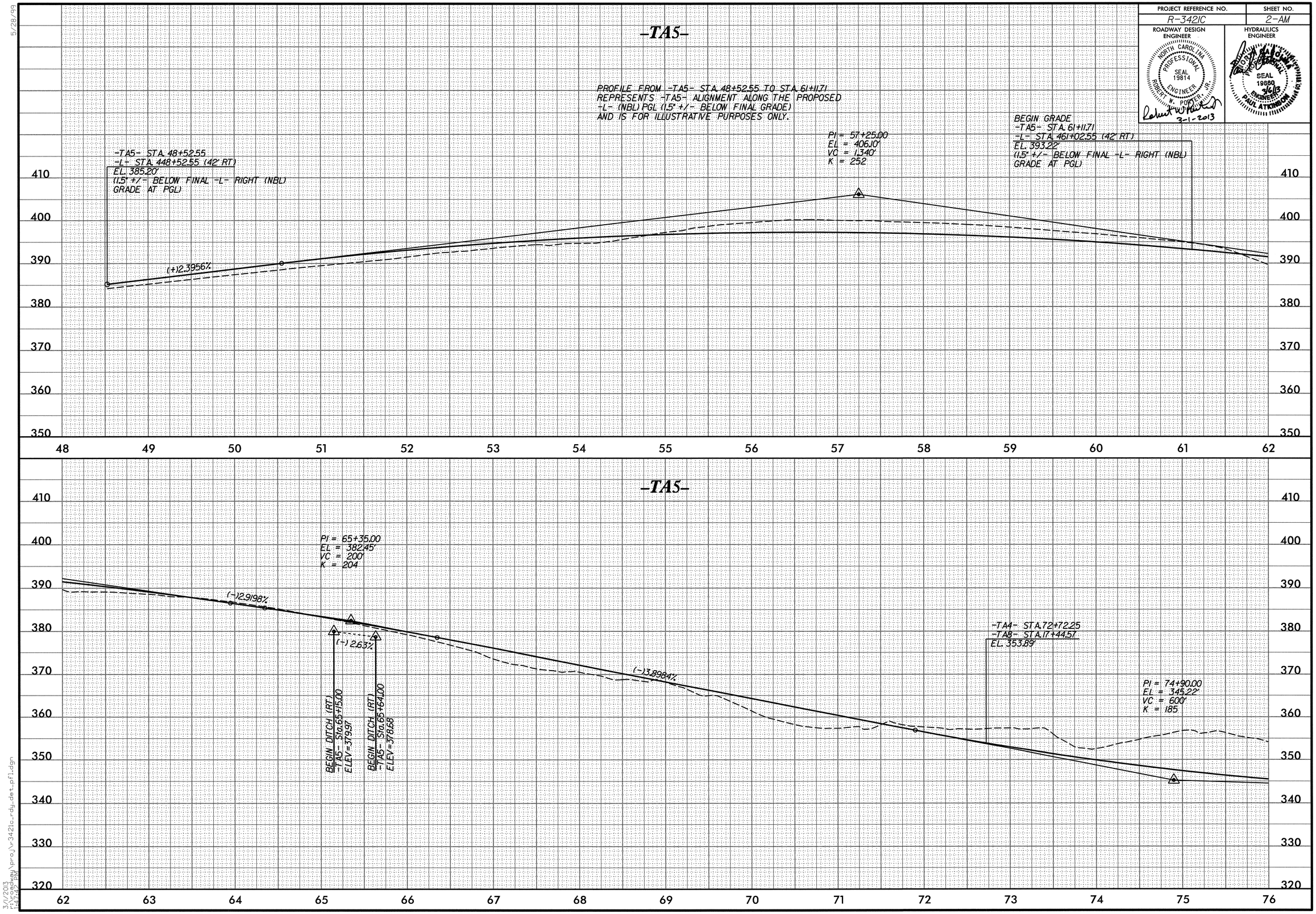
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AM

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPPER
3-1-2013

HYDRAULICS ENGINEER
PROFESSIONAL SEAL 19880 ENGINEER PAUL ATKINSON
3/6/13



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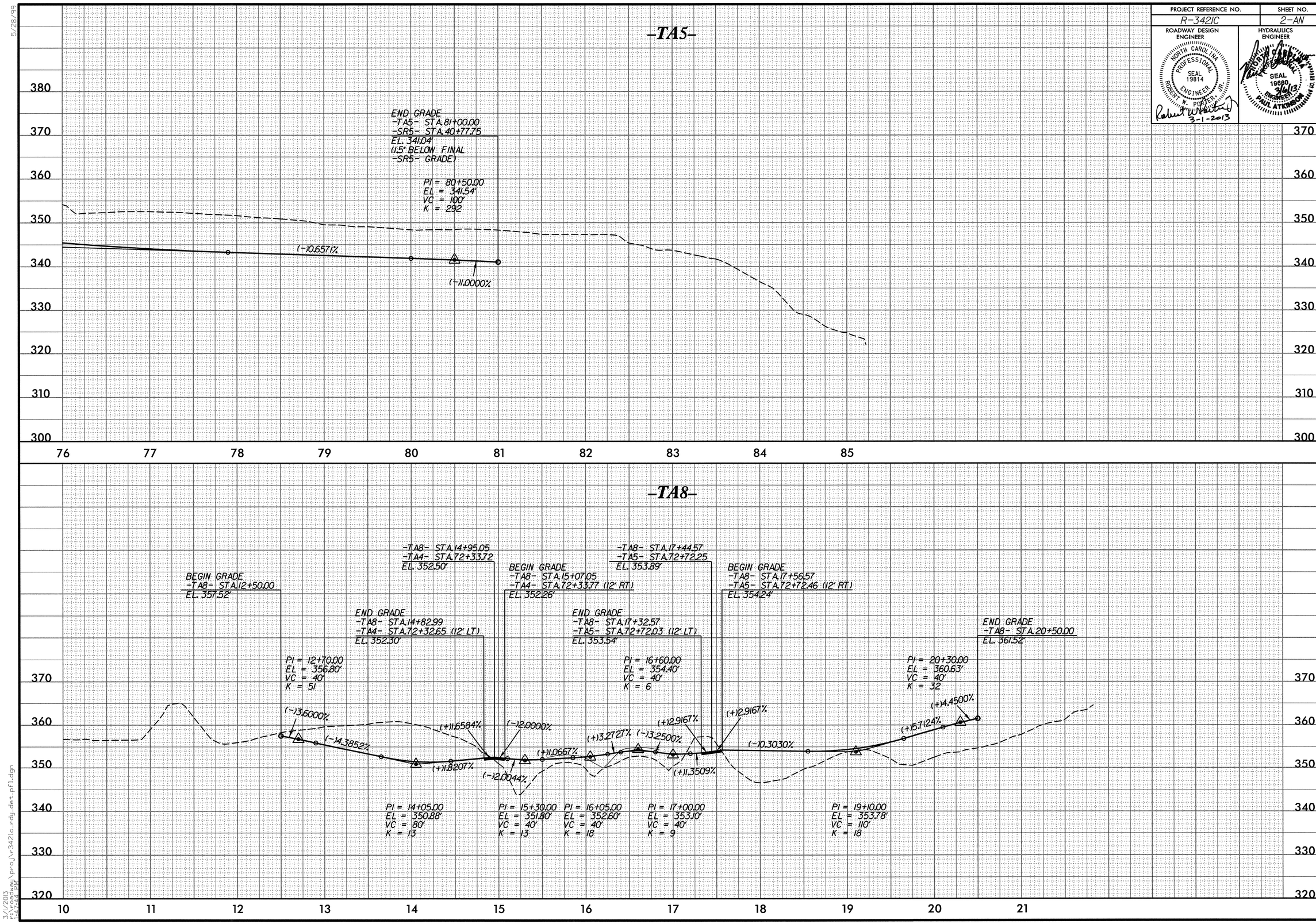
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AN

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POWER, JR.
Robert W. Power Jr. 3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
3/6/13



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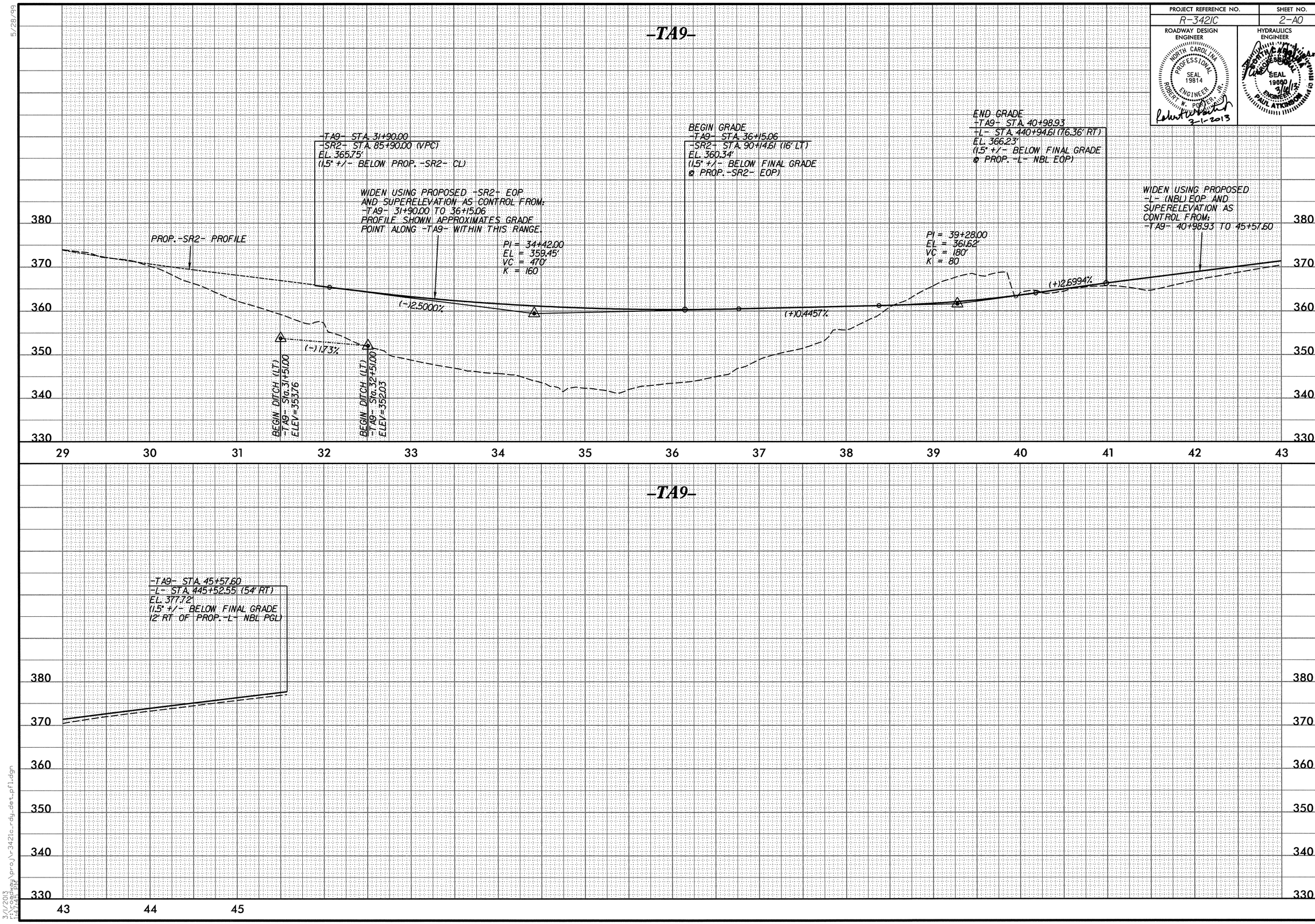
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-A0

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POWER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
3/1/13



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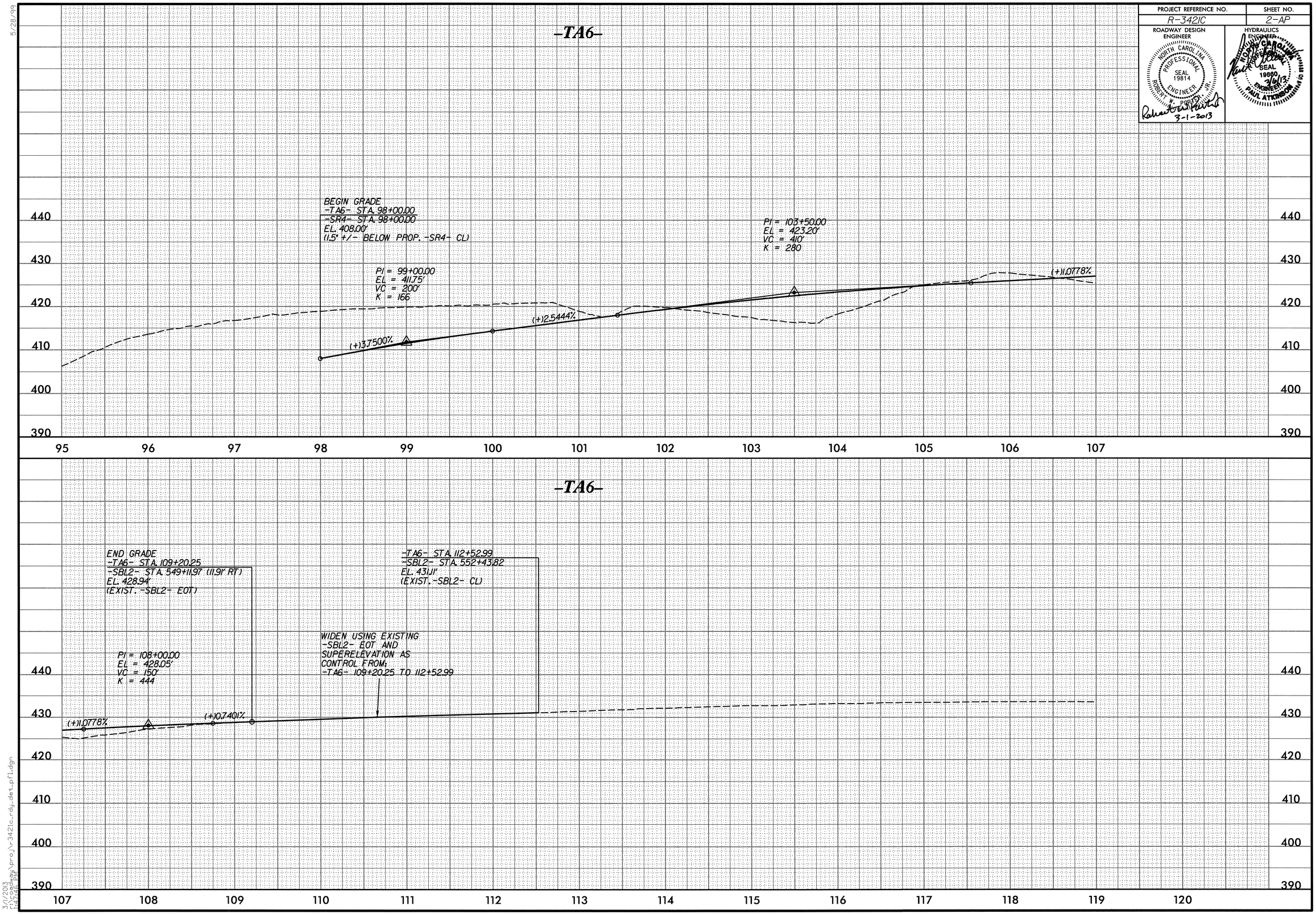
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AP

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter, Jr.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19680 ENGINEER PAUL ATKINSON
Paul Atkinson
3/6/13



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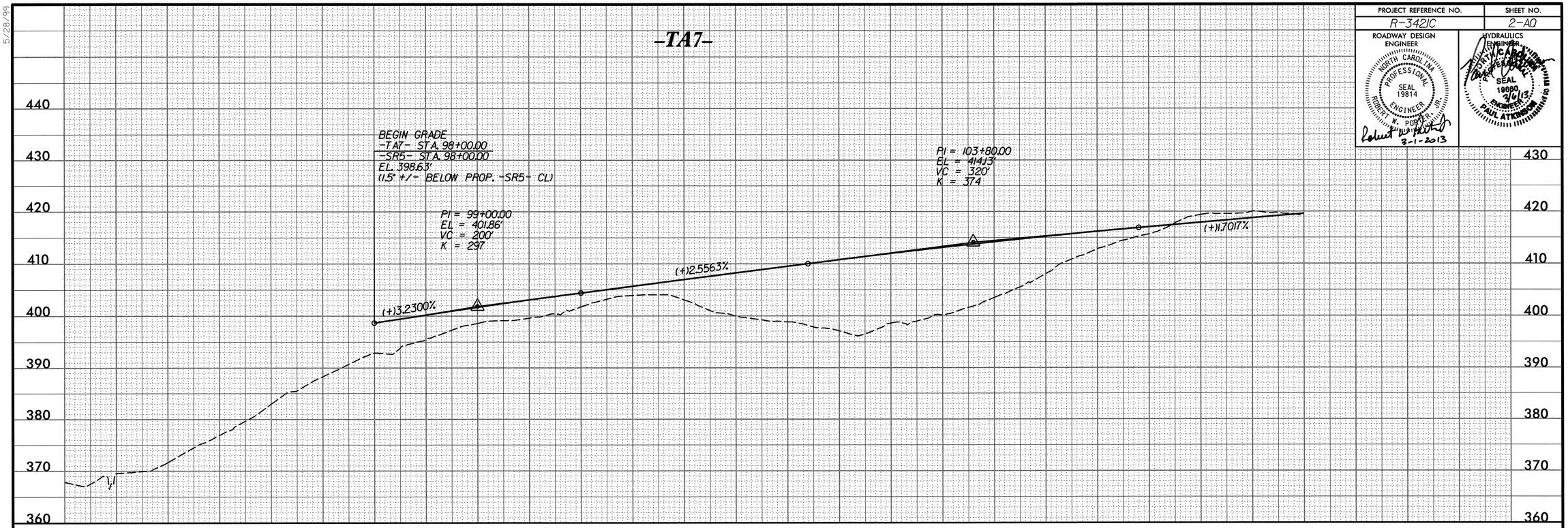
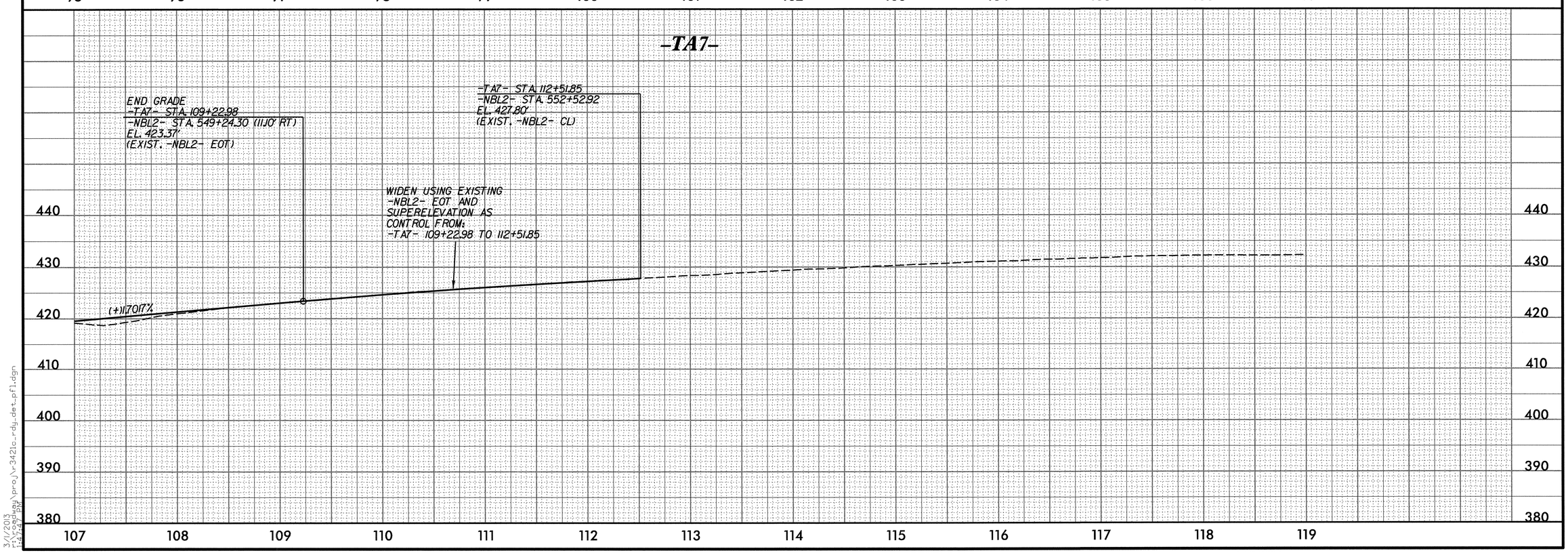
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-AQ

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPPER, JR.
Robert W. Popper Jr. 3-1-2013

HYDRAULICS ENGINEER
SEAL 19680 3/6/13 ENGINEER PAUL ATKINSON JR.





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PROJECT REFERENCE NO.	SHEET
R-3421C	2-AR

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 8/10/12

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

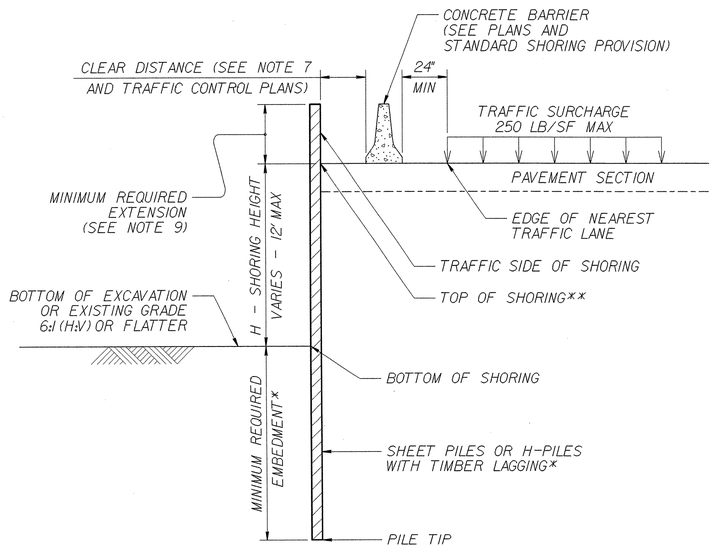
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS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

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

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

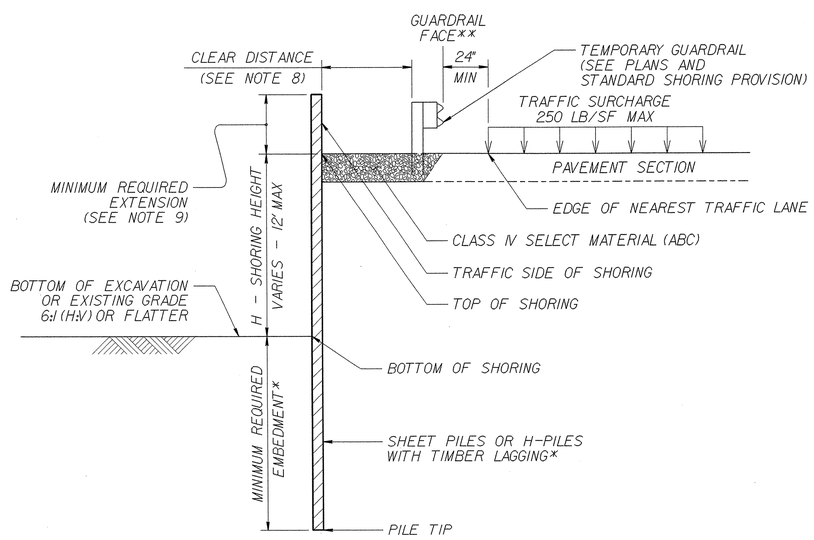
NOTES:

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



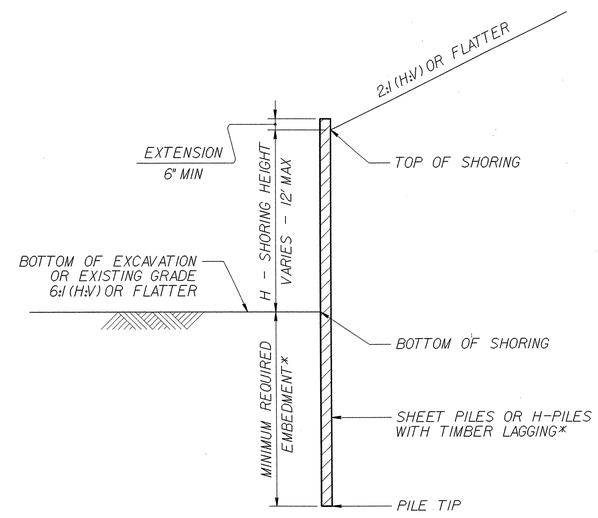
CONCRETE BARRIER

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



TEMPORARY GUARDRAIL

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



STANDARD TEMPORARY SHORING

(SLOPE CASE)

***SEE TABLE ABOVE.**

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)

***SEE TABLE ABOVE.**

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-20-12

PROJECT REFERENCE NO.	SHEET
R-3421C	2-AS

GEOTECHNICAL ENGINEER

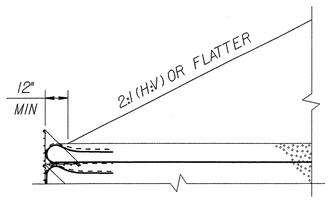
NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 8/10/12

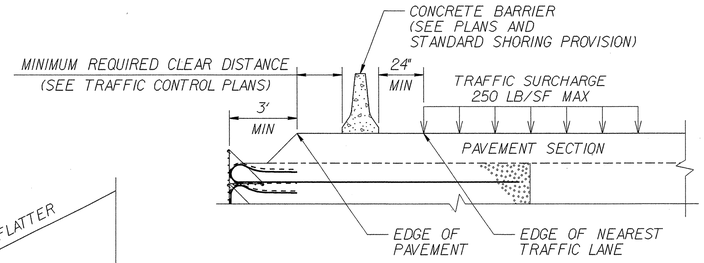
SIGNATURE DATE

ENGINEER

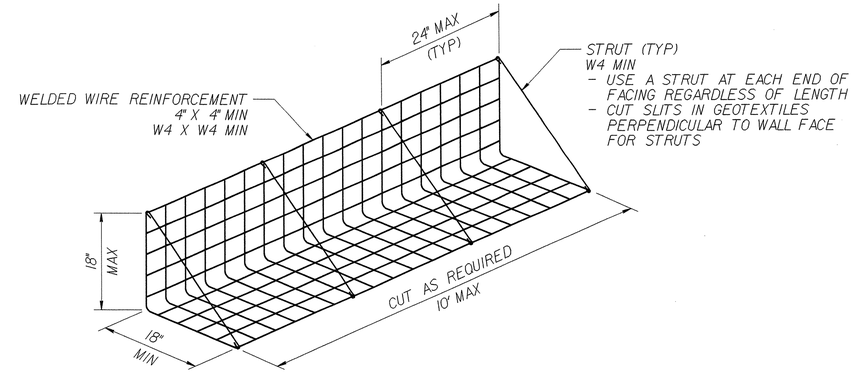
SIGNATURE DATE



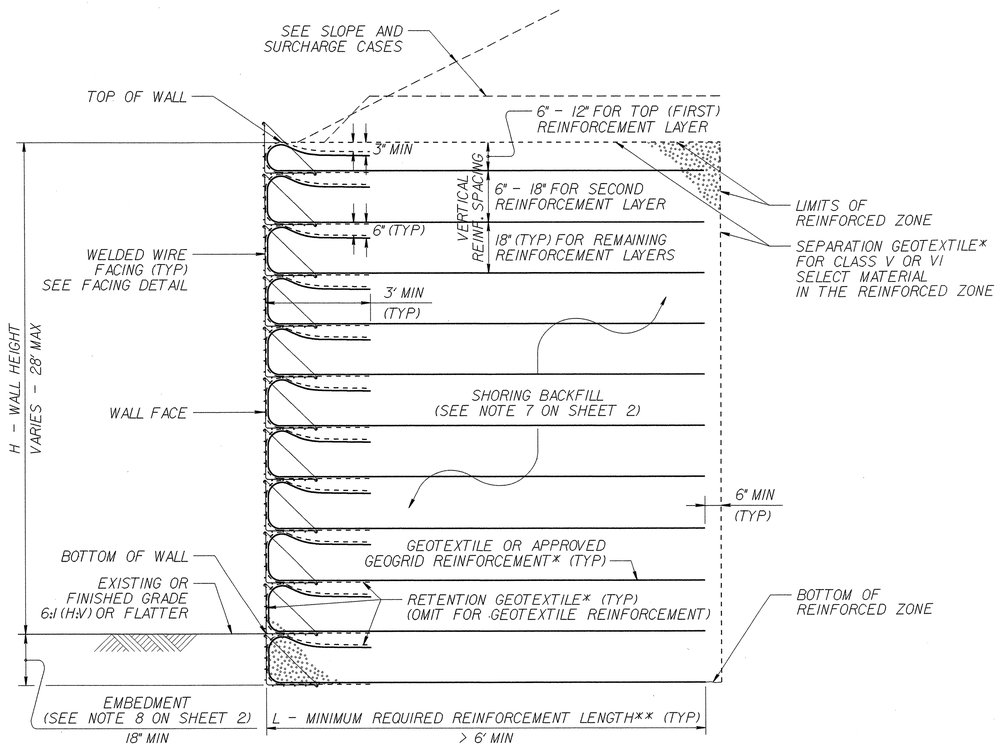
SLOPE CASE



SURCHARGE CASE

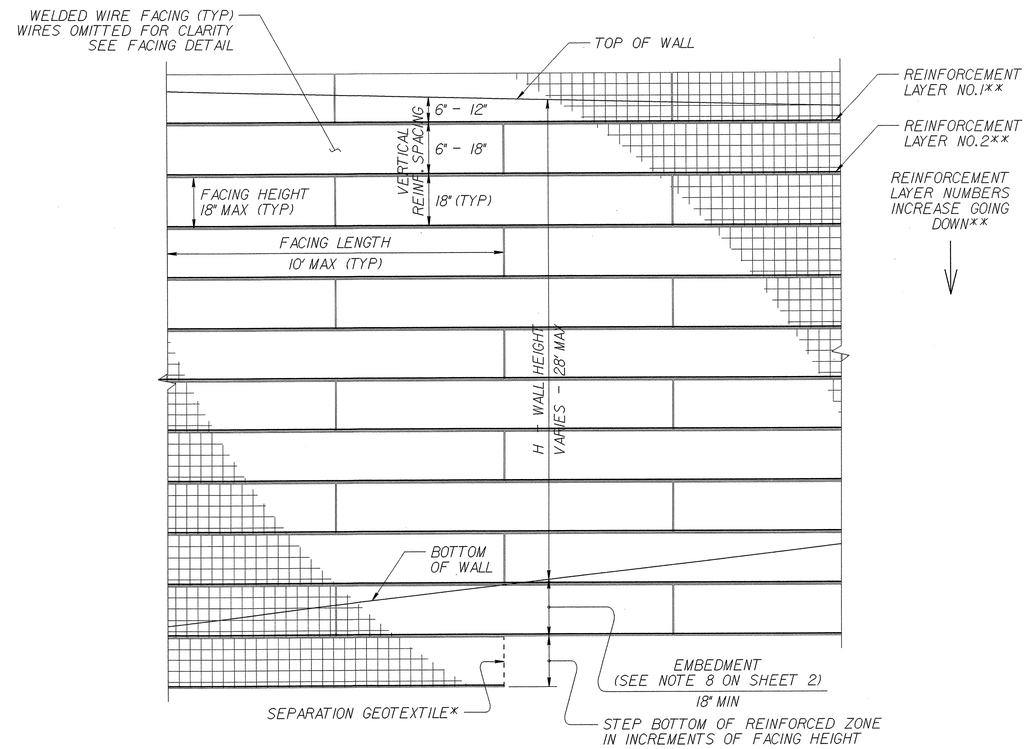


FACING DETAIL



STANDARD TEMPORARY WALL

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
***SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.**
****SEE REINFORCEMENT TABLES ON SHEET 3.**



STANDARD TEMPORARY WALL – PARTIAL ELEVATION

***SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.**
****SEE REINFORCEMENT TABLES ON SHEET 3.**

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 WALL
Sheet 1 of 3

DATE: 11-20-12

PROJECT REFERENCE NO.	SHEET
R-3421C	2-AT

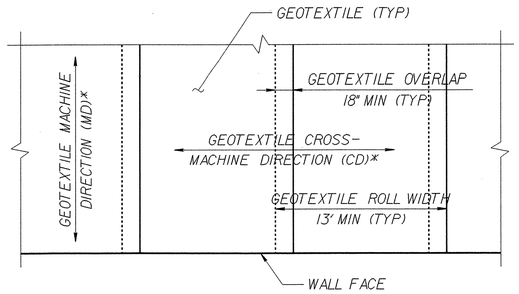
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 3/19/12
SIGNATURE DATE

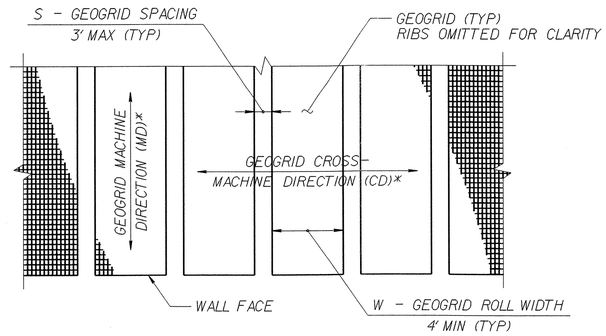
ENGINEER

SIGNATURE DATE



GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

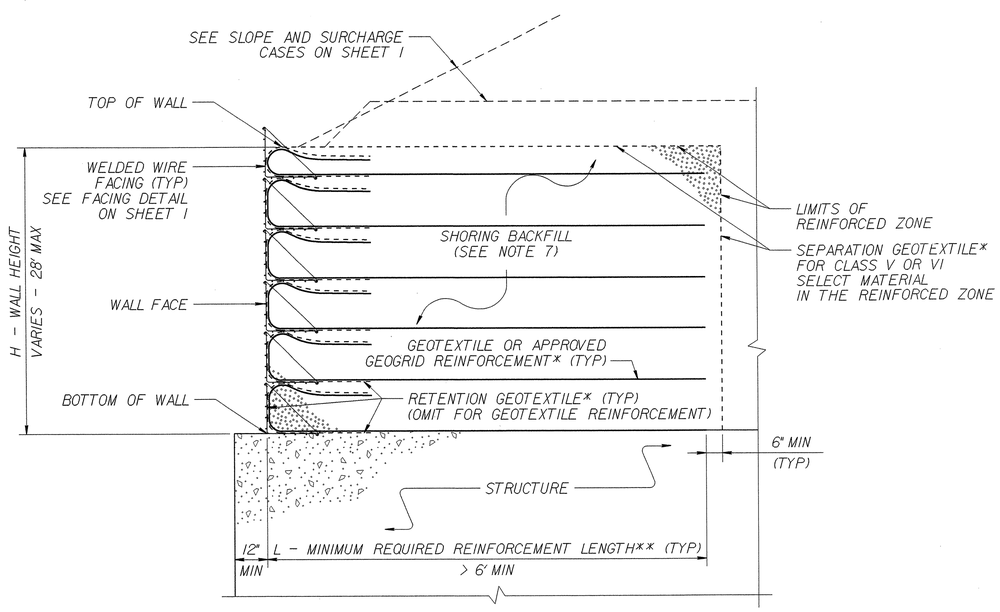


GEOGRID PLACEMENT

(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT – $\frac{W}{W+S} \times 100 \geq 80\%$, SEE NOTE 11)

GEOSYNTHETIC PLACEMENT DETAILS

(PLAN VIEW)
***SEE NOTE 12.**



TEMPORARY WALL ON STRUCTURE DETAIL

***SEE GEOSYNTHETIC PLACEMENT DETAILS.**
****SEE REINFORCEMENT TABLES ON SHEET 3.**

NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 LB/CF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 LB/SF
4. DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
7. DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
8. EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
9. DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
10. GEOGRIDS ARE APPROVED FOR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) BASED ON MATERIAL TYPE. FOR DETAILS OF APPROVED GEOGRIDS AND SHORT-TERM DESIGN STRENGTHS, SEE www.ncdot.org/doh/operations/materials/soils/gep.html
    DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

11. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
12. AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH THE FOLLOWING CONDITIONS OCCUR:
    - W (REINFORCEMENT ROLL WIDTH) ≥ L (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
    - REINFORCEMENT STRENGTH IN CD ≥ MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
13. SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION.
14. DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
15. FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
16. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
17. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
18. FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
19. FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

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 WALL
Sheet 2 of 3

DATE: 11-20-12

PROJECT REFERENCE NO.	SHEET
R-3421C	2-AU

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 8/10/12
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H - WALL HEIGHT (FT)																								
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SLOPE CASE	> 0	CLASS II, TYPE I, CLASS III, CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27
SURCHARGE CASE	> 0 TO 7 FOR H < 20′ > 0 TO 10 FOR H ≥ 20′	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22
	> 7 FOR H < 20′ > 10 FOR H ≥ 20′	A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21
		CLASS II, TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20
		CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19

L – MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)

(FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 - 4	3
4 - 5.5	4
5.5 - 7	5
7 - 8.5	6
8.5 - 10	7
10 - 11.5	8
11.5 - 13	9
13 - 14.5	10
14.5 - 16	11
16 - 17.5	12
17.5 - 19	13
19 - 20.5	14
20.5 - 22	15
22 - 23.5	16
23.5 - 25	17
25 - 26.5	18
26.5 - 28	19
28 - 29.5	20

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

GEOGRID REINFORCEMENT
SHORT-TERM DESIGN STRENGTH (LB/FT)
(SEE NOTE 10 ON SHEET 2.)

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD
(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1
FOR REINFORCEMENT LAYER NUMBERING.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

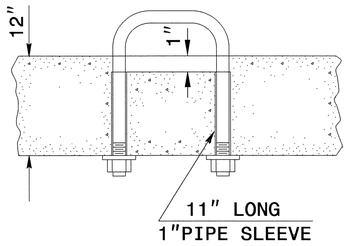
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

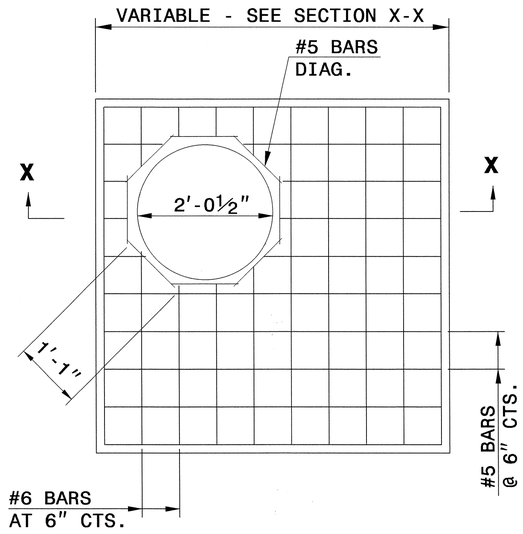
STANDARD
TEMPORARY WALL
Sheet 3 of 3

DATE: 11-20-12

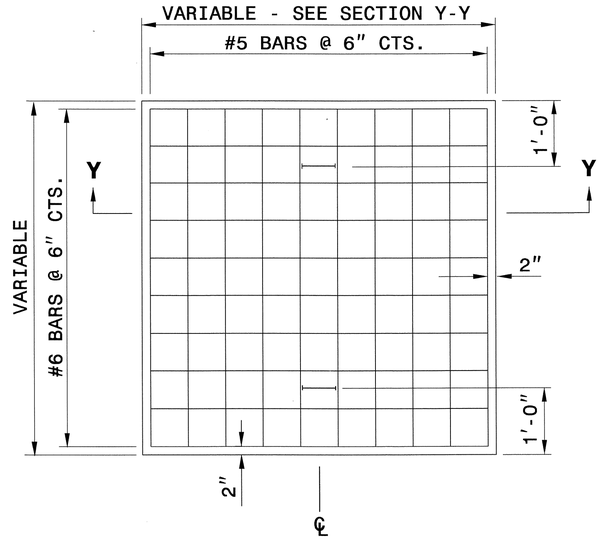
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2 AV



PARTIAL SECTION



PLAN



PLAN

GENERAL NOTES:

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

FIELD VERIFY THE DIMENSIONS FOR THE EXISTING BOXES.

BILL OF MATERIALS

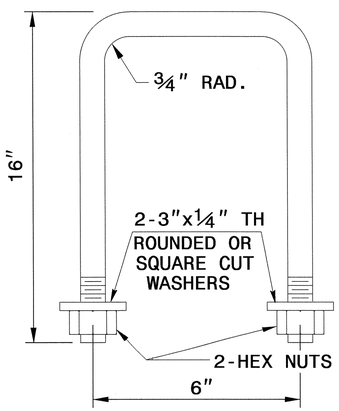
MASONRY	
TOP SLAB CONCRETE CLASS "A"	.037YDS^3 PER FT^2
BRICK MASONRY	.025YDS^3 PER FT^2
REINFORCING STEEL	7.64LBS PER FT^2

MANHOLE OPTION QUANTITIES

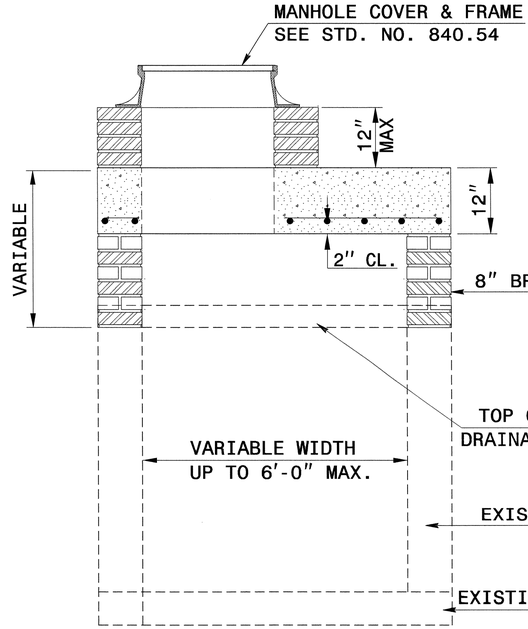
SIZE	QTY.	LENGTH	REINF. STEEL LBS.
#5 DIAG.	8	1'-1"	9.04

NOTE:
CONCRETE AND REINFORCING STEEL QUANTITIES BASED ON SQUARE FOOT AREA OF THE PROPOSED TOP SLAB FOR THE EXISTING DRAINAGE STRUCTURE.

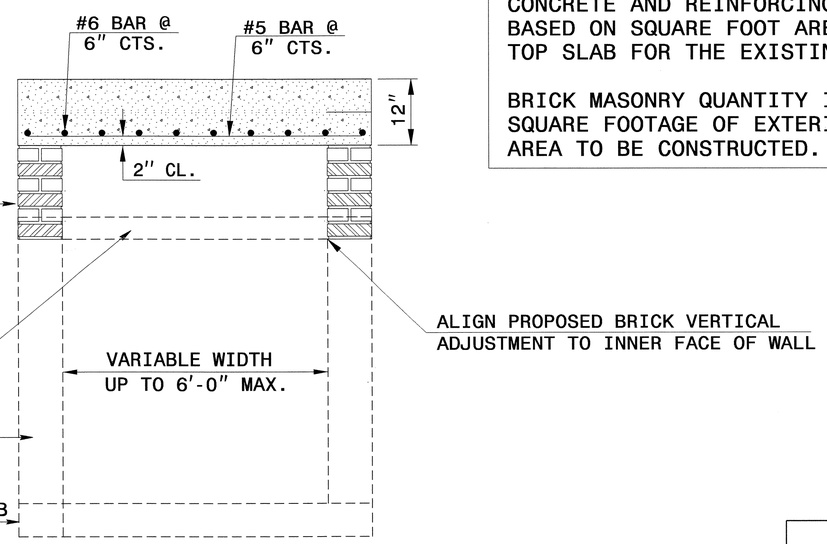
BRICK MASONRY QUANTITY IS BASED ON THE TOTAL SQUARE FOOTAGE OF EXTERIOR WALL SURFACE AREA TO BE CONSTRUCTED.



DETAIL OF HANDLE



SECTION X-X



SECTION Y-Y

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER
3/7/13

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

DETAIL TO CONVERT EXISTING TRAFFIC BEARING DROP INLET OR CATCH BASIN TO TRAFFIC BEARING JUNCTION BOX (MANHOLE OPTIONAL)

ORIGINAL BY: T.S.S. DATE: FEB.2000
MODIFIED BY: E.E.W. DATE: NOV.2001
CHECKED BY: DATE: 2/26/13
FILE SPEC.: w:ericward/usr/details/stand/boxtotbjbe.dgn

5/14/99

COMPUTED BY: RWP DATE: 08/06/2012

CHECKED BY: KSH DATE: 10/09/2012

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

STATEWIDE

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

PROJECT NO.	SHEET NO.
R-3421C	3-A

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) SIZE / THICKNESS OR GAUGE	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS III	12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV	15"	18'	24"	30"	36"	48"	R.C. PIPE CLASS V	15"	18"	24"	30"	36"	48"
								THICKNESS OR GAUGE												.064	.064	.064	.079	.079	.109	.109																						
-L- 356+50	LT	0401		397.4	394.6																																											
		0401	0402		394.6	392.4																																					164					
-L- 358+15	LT	0402		395.2	392.4																																											
		0402	0403		392.4	389.3																																					84					
-L- 358+57	CL	0403		392.1	389.3		X																																									
		0403	0404		389.3	388.8	X																						88																			
-L- 358+57	RT	0404		391.8	388.1		X																																									
		0404	0406		388.1	387.2	X			208							X	X																														
-L- 358+57	RT	0405			415.8																																											
		0405	0404		415.8	388.3																88																										
-L- 356+50	RT	0406		394.4	387.2																																											
		0406	0408		387.2	383.1				88							X	X																														
-L- 356+65	RT	0407		398.4	395.6																																											
		0407	0408		395.6	384.7														36																												
-L- 356+65	RT	0408		387.5	382.6																																											
		0408	0409		382.6	368.9																	116																									
-L- 361+00	RT	0501			424.2																																											
		0501	0502		424.2	384.0																124																										
-L- 361+00	RT	0502		388.7	384.0		X																																									
		0502	0503		384.0	380.4	X			404							X	X																														
-L- 365+00	RT	0503		385.2	380.4																																											
		0503	0504		380.4	379.8																																	88										
-L- 365+00	CL	0504		383.8	379.3																																											
		0504	0505		379.3	377.8																														88												
-L- 365+00	LT	0505		383.1	377.8																																											
		0505	0506		377.8	372.7						396					X	X																														
-L- 369+00	LT	0506		378.0	372.2																																											
		0506	0509		372.2	370.1							196				X	X																														
-L- 369+00	CL	0507		378.7	375.7																																											
		0507	0506		375.7	374.7	X																							88																		
-L- 369+00	RT	0508		380.1	377.3																																											
		0508	0507		377.3	375.9																							88																			
-L- 371+00	LT	0509		375.4	369.6																																											
		0509	0601		369.6	360.5							140				X	X																														
-L- 371+50	RT	0510		376.9	373.9																																											
		0510	0604		373.9	371.3				204							X	X																														
-L- 371+50	RT	0511			421.3																																											
		0511	0510		421.3	373.9															160																										
-L- 372+40	LT	0601		365.4	352.0																																											
		0601	0602		352.0	357.0							56				X	X																														
-L- 373+50	RT	0603			397.4																																											
		0603	0604		397.4	371.5														92																												
-L- 373+50	RT	0604		374.3	370.8																																											
		0604	0605		370.8	369.5																									88																	
-L- 373+50	CL	0605		373.0	369.5																																											
		0605	0606		369.5	368.8	X																								88																	
-L- 374+00	LT	0606		374.6	368.8																																											
		0606	0607		368.8	359.4																28																										
-L- 374+00	LT	0607		362.9	359.4																																											
		0607	0608		359.4	359.0				36							X	X																														
-L- 377+50	RT	0609		369.1	366.3																																											
		0609	0610		366.3	365.3																							76																			
-L- 377+70	CL	0610		370.3	365.3																																											
		0610	0611		365.3	365.1																							40																			
-L- 377+80	CL	0611		370.3	365.1																																											
		0611	0612		365.1	364.8	X																																52										
-L- 377+80	LT	0612		369.7	360.3																																											
		0612	0613		360.3	359.7				60							X	X																														
-Y8- 35+54	LT	0614		396.3	393.5																																											
		0614	0615		393.5	393.3																																					28					
-Y8- 35+54	RT	0615		396.3	393.3																																											
		0615	0616		393.3	392.8																																					96					
-Y8- 36+50	RT	0616		397.0	392.8																																											
		0616	0617		392.8	379.2														64																												
SHEET TOTALS										264	736	396	392							192	160	240	116				292	88	176	88					52		88				372						

STATION	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	ENDWALLS CU. YARDS C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE: COL. 'A' + (1.3 X COL. 'B') LIN. FT.* A: 5.0' THRU 10.0'	B: 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	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	T.B.D.I. STD. 840.35	T.B.J.B. STD. 840.34	G.D.I. FRAME WITH TWO FLAT GRATES STD. 840.20	G.D.I. FRAME WITH SAG GRATE STD. 840.22	G.D.I. FRAME WITH TWO SAG GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH SAG GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO SAG GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD. 840.54	TEMPORARY 1" STEEL COVER (SEE DETAIL ON SHEET 2-V)	BERM DRAINAGE OUTLET STD. 650.10 OR 850.11	CONVERT EXIST. D.I. TO J.B. (SEE DETAIL ON SHEET 2-Z)	CONVERT EXIST. T.B.D.I. TO T.B.J.B. (SEE DETAIL ON SHEET 2-AV)	ADJUST EXIST. D.I.	FLOWABLE FILL (CY)	CORR. STEEL PIPE ELBOWS - NO. & SIZE (INCHES)	SIDE DRAIN PIPE ELBOWS - NO. & SIZE (INCHES)	CONC. & BRICK PIPE PLUG (C.Y.) STD. 840.71	CONC. COLLARS CL. "B" (C.Y.) STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L- 356+50			1										1			1																				
-L- 358+15			1										1			1																				
-L- 358+57			1										1						1																	
-L- 358+57			1									1							1																	
-L- 356+57																									1											
																																				ROD & LUG W/SLEEVE GASKETS
-L- 356+50			1	2.2								1							1																	
-L- 356+65			1										1			1																				
																																2 @ 15				ROD & LUG W/SLEEVE GASKETS
-L- 356+65			1																			1	1													
-L- 361+00																									1											
																																1 @ 24				ROD & LUG W/SLEEVE GASKETS
-L- 361+00			1									1							1																	
-L- 365+00			1									1							1																	
-L- 365+00			1										1						1																	
-L- 365+00			1	0.3								1							1																	
-L- 369+00			1	0.8								1							1																	
-L- 369+00			1										1						1																	
-L- 369+00			1										1						1																	
-L- 371+00			1	0.8								1							1																	
-L- 371+50			1										1						1																	
-L- 371+50																									1											
																																1 @ 18				ROD & LUG W/SLEEVE GASKETS
-L- 372+40			1	5.0	3.4																	1	1													
-L- 373+50																									1											
																																1 @ 15				ROD & LUG W/SLEEVE GASKETS
-L- 373+50			1										1						1																	
-L- 373+50			1										1						1																	
-L- 374+00			1	0.8									1				1																			
																																2 @ 24				ROD & LUG W/SLEEVE GASKETS
-L- 374+00			1																				1	1												
-L- 377+50			1										1						1																	
-L- 377+70			1										1						1																	
-L- 377+80			1	0.2									1						1																	
-L- 377+80			1	4.4									1				1																			
-Y8- 35+54			1												1						1															
-Y8- 35+54			1												1						1															
-Y8- 36+50			1												1						1															
																																2 @ 15				ROD & LUG W/SLEEVE GASKETS
SHEET TOTALS			28	14.5	3.4							7	15		3		5		17			3	3	3		4					5 @ 15 1 @ 18 3 @ 24 @ 30	@ 15 @ 18 @ 24 @ 30				

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

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COMPUTED BY: RWP DATE: 08/06/2012

CHECKED BY: KSH DATE: 08/13/2012

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
R-3421C	3-B

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

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".

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109
-Y8- 36+50	LT	0618		397.0	394.2																				
		0618	0616		394.2	394.0																			
-Y8- 38+00	LT	0619		400.6	397.8																				
		0619	0620		397.8	397.6																			
-Y8- 38+00	RT	0620		400.6	397.6																				
		0620	0621		397.6	386.9													48						
-Y8- 32+70	RT	0622		392.6	389.8																				
		0622	0623		389.8	389.6																			
-Y8- 32+70	LT	0623		392.6	389.6																				
		0623	0624		389.6	359.1													106						
-Y8- 30+59	LT	0625		387.2	384.4																				
		0625	0626		384.4	353.7													106						
-L- 382+00	LT	0627		364.7	361.9																				
		0627	0628		361.9	350.2													32						
NOT USED		0629																							
NOT USED		0630																							
-L- 384+50	RT	0631		363.7	360.9																				
		0631	0632		360.9	359.5																			
-L- 384+50	CL	0632		362.3	358.4																				
		0632	0641		358.4	355.0																			
-L- 375+88	CL	0633	0634		368.5	359.4																			
-L- 376+53	CL	0635	0636		367.4	358.4																			
-L- 383+56	LT	0639		363.7	361.0																				
		0639	0640		361.0	353.2													28						
-Y9SBL- 42+58	RT	0701		388.5	385.7																				
		0701	2412		385.7	382.6		56								X	X								
-SR2- 40+60	RT	0702		391.0	386.2																				
		0702	0704		386.2	382.2				196						X	X								
-SR2- 40+60	RT	0703			395.4																				
		0703	0702		395.4	387.4				20															
-SR2- 38+65	RT	0704		387.0	382.2																				
		0704	2409		382.2	381.7																			
-SR2- 38+65	RT	0705			391.6																				
		0705	0704		391.6	383.5															22				
-SR2- 47+00	RT	0706		405.1	400.8																				
		0706	0707		400.8	397.2			324							X	X								
-SR2- 43+75	RT	0707		400.2	396.7																				
		0707	0708		396.7	391.0																			
-Y9NBL- 30+55	LT	0708		394.5	391.0																				
		0708	0709		391.0	388.5	X																		
-Y9NBL- 31+00	RT	0709		393.8	387.5																				
		0709	0711		387.5	387.0																			
-Y9LPA- 23+85	LT	0710		399.4	396.6																				
		0710	0709		396.6	390.5		56								X	X								
-Y9LPA- 24+79	RT	0711		397.6	387.0																				
		0711	2410		387.0	384.6																			
-Y9LPA- 16+77	LT	0712		413.3	410.5																				
		0712	0713		410.5	409.6																			
-Y9SBL- 31+45	RT	0713		413.2	409.6																				
		0713	0715		409.6	379.0													78						
-L- 393+93	RT	0714			398.4																				
		714	0715		398.4	379.0													60						
-L-.393+93	RT	0715		381.8	378.8																				
		0715	0718		378.8	368.0			248							X	X								
-Y9RPC- 6+50	RT	0716		375.4	372.6																				
		0716	0717		372.6	372.3																			
-Y9RPC- 6+50	LT	0717		377.5	372.3																				
		0717	0718		372.3	368.2		52								X	X								
-L- 391+50	RT	0718		371.0	367.0																				
		0718	0719		367.0	366.5																			
-L- 391+50	CL	0719		376.8	366.5																				
		0719	0720		366.5	366.3	X																		
-L- 391+50	CL	0720		376.8	366.3																				
		0720	0721		366.3	366.0	X																		
SHEET TOTALS								164	572	216									458		22				

STATION	FROM	TO	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 15"	18'	24"	30"	36"	48"	R.C. PIPE CLASS V 15"	18"	24"	30"	36"	48"	ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE: COL. 'A' + (1.3 X COL. 'B') LIN. FT.* A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN
-Y8- 36+50	0618																								1								
	0618	0616															32																
-Y8- 38+00	0619																								1								
	0619	0620															40																
-Y8- 38+00	0620																								1								
	0620	0621																															
-Y8- 32+70	0622																								1								
	0622	0623															28																
-Y8- 32+70	0623																								1								
	0623	0624																															
-Y8- 30+59	0625																								1								
	0625	0626																															
-L- 382+00	0627																								1								
	0627	0628																															
NOT USED	0629																																
NOT USED	0630																																
-L- 384+50	0631																								1								
	0631	0632		100																													
-L- 384+50	0632																								1								
	0632	0641				112																											
-L- 375+88	0633	0634			212																												
-L- 376+53	0635	0636						196															3.4										
-L- 383+56	0639																								1								
	0639	0640																															
-Y9SBL- 42+58	0701																								1								
	0701	2412																															
-SR2- 40+60	0702																								1								
	0702	0704																															
-SR2- 40+60	0703																																
	0703	0702																															
-SR2- 38+65	0704																								1								
	0704	2409				56																											
-SR2- 38+65	0705																																
	0705	0704																															
-SR2- 47+00	0706																								1								
	0706	0707																															
-SR2- 43+75	0707																								1								
	0707	0708				76																											
-Y9NBL- 30+55	0708																								1								
	0708	0709				112																											
-Y9NBL- 31+00	0709																								1	1.3							
	0709	0711						88																									
-Y9LPA- 23+85	0710																								1								
	0710	0709																															
-Y9LPA- 24+79	0711																								1	5.0	0.6						
	0711	2410						440																									
-Y9LPA- 16+77	0712																								1								
	0712	0713															76																
-Y9SBL- 31+45	0713																								1								
	0713	0715																															
-L- 393+93	0714																																
	714	0715																															
-L-.393+93	0715																								1								
	0715	0718																															
-Y9RPC- 6+50	0716																								1								
	0716	0717		76																													
-Y9RPC- 6+50	0717																								1	0.2							
	0717	0718																															
-L- 391+50	0718																								1								
	0718	0719					96																										
-L- 391+50	0719																								1	5.0	0.3						
	0719	0720					40																										
-L- 391+50	0720																								1	5.0	0.5						
	0720	0721					80																										
SHEET TOTALS				176	212	356	216	724									176						3.4		27	16.5	1.4						

STATION	FROM	TO	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	T.B.D.I. STD. 840.35	T.B.J.B. STD. 840.34	G.D.I. FRAME WITH TWO FLAT GRATES STD. 840.20	G.D.I. FRAME WITH SAG GRATE STD. 840.22	G.D.I. FRAME WITH TWO SAG GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH SAG GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO SAG GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD. 840.54	TEMPORARY 1" STEEL COVER (SEE DETAIL ON SHEET 2-V)	BERM DRAINAGE OUTLET STD. 850.10 OR 850.11	CONVERT EXIST. D.I. TO J.B. (SEE DETAIL ON SHEET 2-Z)	CONVERT EXIST. T.B.D.I. TO T.B.J.B. (SEE DETAIL ON SHEET 2-AV)	ADJUST EXIST. D.I.	FLOWABLE FILL (CY)	CORR. STEEL PIPE ELBOWS - NO. & SIZE (INCHES)	SIDE DRAIN PIPE ELBOWS - NO. & SIZE (INCHES)	CONC. & BRICK PIPE PLUG (C.Y.) STD. 840.71	CONC. COLLARS CL. "B" (C.Y.) STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-Y8- 36+50	0618					1							1														
	0618	0616																									
-Y8- 38+00	0619					1							1														
	0619	0620																									
-Y8- 38+00	0620					1							1														
	0620	0621																				2 @ 15					ROD & LUG W/SLEEVE GASKETS
-Y8- 32+70	0622					1							1														
	0622	0623																									
-Y8- 32+70	0623					1							1														
	0623	0624																				2 @ 15					ROD & LUG W/SLEEVE GASKETS
-Y8- 30+59	0625					1							1														
	0625	0626																				2 @ 15					ROD & LUG W/SLEEVE GASKETS
-L- 382+00	0627			1				1																			
	0627	0628																				2 @ 15					ROD & LUG W/SLEEVE GASKETS
NOT USED	0629																										
NOT USED	0630																										
-L- 384+50	0631			1						1																	
	0631	0632																									
-L- 384+50	0632			1						1																	
	0632	0641																									
-L- 375+88	0633	0634																									
-L- 376+53	0635	0636																									HW @ 0635 (-L- 376+47 RT; INLET)
-L- 383+56	0639			1				1																			
	0639	0640																				2 @ 15					ROD & LUG W/SLEEVE GASKETS
-Y9SBL- 42+58	0701			1						1																	
	0701	2412																									
-SR2- 40+60	0702		1									1														24	REM. 18"
	0702	0704																									
-SR2- 40+60	0703																1										
	0703	0702																					1 @ 24				
-SR2- 38+65	0704		1									1															
	0704	2409																									
-SR2- 38+65	0705																1										
	0705	0704																				1 @ 24					ROD & LUG W/SLEEVE GASKETS
-SR2- 47+00	0706		1								1	1															
	0706	0707																									
-SR2- 43+75	0707			1								1															
	0707	0708																									
-Y9NBL- 30+55	0708			1						1																24	REM. 15"
	0708	0709																									
-Y9NBL- 31+00	0709		1						1	1																	
	0709	0711																									
-Y9LPA- 23+85	0710			1						1																	
	0710	0709																									
-Y9LPA- 24+79	0711		1					1																			
	0711	2410																								102	REM. 18"
-Y9LPA- 16+77	0712			1				1																			
	0712	0713																									
-Y9SBL- 31+45	0713			1				1																			
	0713	0715																				2 @ 15					ROD & LUG W/SLEEVE GASKETS
-L- 393+93	0714																1										
	714	0715																				1 @ 15					ROD & LUG W/SLEEVE GASKETS
-L-.393+93	0715			1						1																	
	0715	0718																									
-Y9RPC- 6+50	0716			1						1																	
	0716	0717																									
-Y9RPC- 6+50	0717			1						1																	
	0717	0718																									
-L- 391+50	0718			1						1																	
	0718	0719																									
-L- 391+50	0719			1						1																	
	0719	0720																									
-L- 391+50	0720			1						1																	
	0720	0721																									
SHEET TOTALS			5	16		6		5	1	12	1	4	6				3					13 @ 15 @ 18 1 @ 24 @ 30	@ 15 @ 18 1 @ 24 @ 30			150	

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

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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

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

PROJECT NO.	SHEET NO.
R-3421C	3-C

Station	Location (LT, RT, or CL)	Structure No. From	Structure No. To	Top Elevation	Invert Elevation	Invert Elevation	Slope Critical	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 15"	SD 18"	SD 24"	SD 30"	SD 36"	SD 42"	SD 48"	Do Not Use RCP	Do Not Use CSP	Do Not Use CAAP	Do Not Use HDPE	C.S. Pipe 15" (.064)	C.S. 18" (.064)	C.S. 24" (.064)	C.S. 30" (.079)	C.S. 36" (.079)	C.S. 42" (.109)	C.S. 48" (.109)
-L- 391+50	LT	0721		372.6	366.0																				
		0721	0722		366.0	356.2					592					X	X								
-L- 385+50	LT	0722		361.3	355.5																				
		0722	0724		355.7	355.0							44			X	X								
-L- 385+50	CL	0723		362.9	360.1																				
		0723	0632		360.1	359.1	X	100								X	X								
-Y9LPA- 11+12	LT	0725		413.4	410.4																				
		0725	0732		410.4	410.2																			
-Y9SBL- 27+46	LT	0726		415.4	409.1																				
		0726	0727		409.1	371.5													130						
-L- 397+50	CL	0728		391.5	388.7																				
		0728	0729		388.7	388.3																			
-L- 397+50	CL	0729		391.4	388.3																				
		0729	0730		388.3	386.0																			
-Y9SBL- 25+70	LT	0732		415.0	410.2																				
		0732	0726		410.2	409.1																			
		0733	0734		372.1	371.8	X																		
-L- 399+43	CL	0735	0734		377.0	371.0																			
-Y9LPA- 2+35	LT	0736		399.8	393.8																				
		0736	0734		393.8	371.0																			
-L- 401+50	CL	0737		398.5	395.7																				
		0737	0736		395.7	394.9	X																		
-Y9LPA- 3+28	RT	0738	0736		394.5	393.8	X																		
-Y9LPA- 3+90	RT	0739		400.0	395.2																				
		0739	0740		395.2	394.7	X			52						X	X								
-Y9NBL- 20+00	LT	0741		400.6	397.8																				
		0741	0744		397.8	396.9	X	144								X	X								
-Y9NBL- 20+00	LT	0742		409.0	406.2																				
		0742	0741		406.2	397.8		28																	
-Y9NBL- 18+55	LT	0744		400.0	395.7																				
		0743	0744		398.3	395.7																			
		0744	0745		395.7	390.0																			
-Y9SBL- 19+50	RT	0746		416.1	413.3																				
		0746	0747		413.3	411.9																			
-Y9SBL- 19+50	LT	0747		414.7	411.7																				
		0747	0748		411.7	405.3			128							X	X								
-Y9LPA- 6+00	RT	0748		408.3	403.5																				
		0748	0739		403.5	395.2				248						X	X								
-Y9LPA- 6+00	LT	0749		409.6	406.6																				
		0749	0748		406.6	405.5																			
-SBL1- 408+78	LT	0750		414.2	406.6																				
		0750	0753		406.6	405.0	X				228					X	X								
-SBL1- 408+78	LT	0751			423.4																				
		0751	0750		423.4	411.7		38																	
-L- 406+50	CL	0752		411.0	408.2																				
		0752	0753		408.2	407.1																			
-SBL1- 406+47	LT	0753		409.9	404.5																				
		0753	0754		404.5	404.1	x					88				X	X								
-NBL1- 411+54	RT	0755		415.2	412.4																				
		0755	0756		412.4	410.4		400								X	X								
-NBL1- 407+54	RT	0756		413.2	410.4																				
		0756	0757		410.4	409.9	X	56								X	X								
-SR2- 62+70	LT	0758		411.3	408.5																				
		0758	0759		408.5	408.1	X																		
-SR2- 62+82	RT	0760						36								X	X								
-Y9SBL- 32+00	RT	0761		412.7	409.9																				
		0761	0713		409.9	409.6		56								X	X								
-Y9NBL- 22+23	LT	0762		406.5	403.8																				
		0762	0763		403.8	398.9		24																	
-Y9NBL- 22+23	LT	0763		401.7	398.9																				
		0763	0741		398.9	397.8		224								X	X								
SHEET TOTALS								1106	128	300	820	88	44						130						

Station	From	To	R.C. Pipe Class III 12"	III 15"	III 18"	III 24"	III 30"	III 36"	III 42"	III 48"	R.C. Pipe Class IV 15"	IV 18'	IV 24"	IV 30"	IV 36"	IV 48"	R.C. Pipe Class V 15"	V 18"	V 24"	V 30"	V 36"	V 48"	Endwalls Std. 838.01, 838.11 or Std. 838.80 (unless noted otherwise) Cu. Yards R.C.P.	Endwalls C.S.P.
-L- 391+50	0721																							
	0721	0722																						
-L- 385+50	0722																							
	0722	0724																						
-L- 385+50	0723																							
	0723	0632																						
-Y9LPA- 11+12	0725																							
	0725	0732															40							
-Y9SBL- 27+46	0726																							
	0726	0727																						
-L- 397+50	0728																							
	0728	0729															40							
-L- 397+50	0729																							
	0729	0730															80							
-Y9SBL- 25+70	0732																							
	0732	0726															176							
	0733	0734				36																		
-L- 399+43	0735	0734							312														4.5	
-Y9LPA- 2+35	0736																							
	0736	0734						264																
-L- 401+50	0737																							
	0737	0736									120													
-Y9LPA- 3+28	0738	0736													120								3.4	
-Y9LPA- 3+90	0739																							
	0739	0740																						
-Y9NBL- 20+00	0741																							
	0741	0744																						
-Y9NBL- 20+00	0742																							
	0742	0741																						
-Y9NBL- 18+55	0744																							
	0743	0744					76																	
	0744	0745					160																	
-Y9SBL- 19+50	0746																							
	0746	0747		92																				
-Y9SBL- 19+50	0747																							
	0747	0748																						
-Y9LPA- 6+00	0748																							
	0748	0739																						
-Y9LPA- 6+00	0749																							
	0749	0748															52							
-SBL1- 408+78	0750																							
	0750	0753																						
-SBL1- 408+78	0751																							
	0751	0750																						
-L- 406+50	0752																							
	0752	0753		88																				
-SBL1- 406+47	0753																							
	0753	0754																						
-NBL1- 411+54	0755																							
	0755	0756																						
-NBL1- 407+54	0756																							
	0756	0757																						
-SR2- 62+70	0758																							
	0758	0759		84																				
-SR2- 62+82	0760																							
-Y9SBL- 32+00	0761																							
	0761	0713																						
-Y9NBL- 22+23	0762																							
	0762	0763																						
-Y9NBL- 22+23	0763																							
	0763	0741																						
SHEET TOTALS				264		36	236	264	312		120				120		388						7.9	

Station	From	To	Quantities for Drainage Structures: Per Each (0' thru 5.0')	*Total L.F. for Pay Quantity shall be: Col. 'A' + (1.3 X Col. 'B') — Lin. Ft. A: 5.0' thru 10.0'	Lin. Ft. B: 10.0' and above	C.B. Std. 840.01 or Std. 840.02	Frame, Grates, and Hood Standard 840.03 — Type of Grate E	F	G	Concrete Transitional Section: Drop Inlet	Catch Basin	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	T.B.D.I. Std. 840.35	T.B.J.B. Std. 840.34	G.D.I. Frame with Two Flat Grates Std. 840.20	G.D.I. Frame with Sag Grate Std. 840.22	G.D.I. Frame with Two Sag Grates Std. 840.22	G.D.I. (N.S.) Frame with Sag Grate Std. 840.24	G.D.I. (N.S.) Frame with Two Sag Grates Std. 840.24	G.D.I. (N.S.) Frame with Two Flat Grates Std. 840.29
-L- 391+50	0721		1	1.6								1							1			
	0721	0722																				
-L- 385+50	0722		1	0.8								1							1			
	0722	0724																				
-L- 385+50	0723		1										1						1			
	0723	0632																				
-Y9LPA- 11+12	0725		1			1		1														
	0725	0732																				
-Y9SBL- 27+46	0726		1	1.3									1				1					
	0726	0727																				
-L- 397+50	0728		1										1						1			
	0728	0729																				
-L- 397+50	0729		1										1						1			
	0729	0730																				
-Y9SBL- 25+70	0732		1										1				1					
	0732	0726																				
	0733	0734																				
-L- 399+43	0735	0734																				
-Y9LPA- 2+35	0736		1	1.0		1		1														
	0736	0734																				
-L- 401+50	0737		1										1						1			
	0737	0736																				
-Y9LPA- 3+28	0738	0736																				
-Y9LPA- 3+90	0739		1									1							1			
	0739	0740																				
-Y9NBL- 20+00	0741		1										1						1			
	0741	0744																				
-Y9NBL- 20+00	0742		1										1				1					
	0742	0741																				
-Y9NBL- 18+55	0744		1										1								1	
	0743	0744																				
	0744	0745																				
-Y9SBL- 19+50	0746		1										1						1			
	0746	0747																				
-Y9SBL- 19+50	0747		1										1						1			
	0747	0748																				
-Y9LPA- 6+00	0748		1									1							1			
	0748	0739																				
-Y9LPA- 6+00	0749		1			1		1														
	0749	0748																				
-SBL1- 408+78	0750		1	2.6								1							1			
	0750	0753																				
-SBL1- 408+78	0751																					
	0751	0750																				
-L- 406+50	0752		1										1						1			
	0752	0753																				
-SBL1- 406+47	0753		1	0.4								1							1			
	0753	0754																				
-NBL1- 411+54	0755		1										1						1			
	0755	0756																				
-NBL1- 407+54	0756		1										1						1			
	0756	0757																				
-SR2- 62+70	0758		1										1								1	
	0758	0759																				
-SR2- 62+82	0760																					
-Y9SBL- 32+00	0761		1										1				1					
	0761	0713																				
-Y9NBL- 22+23	0762		1										1				1					
	0762	0763																				
-Y9NBL- 22+23	0763		1										1						1			
	0763	0741																				
SHEET TOTALS			27	7.7		3		3				6	18				5		17		2	

Station	From	To	J.B. Std. 840.31 or 840.32	Manhole Frame and Cover Std. 840.54	Temporary 1" Steel Cover (see detail on sheet 2-V)	Berm Drainage Outlet Std. 850.10 or 850.11	Convert Exist. D.I. to J.B. (see detail on sheet 2-Z)	Convert Exist. T.B.D.I. to T.B.J.B. (see detail on sheet 2-AV)	Adjust Exist. D.I.	Flowable Fill (CY)	Corr. Steel Pipe Elbows - No. & Size (Inches)	Side Drain Pipe Elbows - No. & Size (Inches)	Conc. & Brick Pipe Plug (C.Y.) Std. 840.71	Conc. Collars Cl. "B" (C.Y.) Std. 840.72	Pipe Removal Lin. Ft.	Remarks
-L- 391+50	0721															
	0721	0722														
-L- 385+50	0722															
	0722	0724													210	REM. (3) 18" & (1) 24" ALONG OLD SR 1304
-L- 385+50	0723															
	0723	0632														
-Y9LPA- 11+12	0725															
	0725	0732														
-Y9SBL- 27+46	0726															
	0726	0727									2 @ 15					ROD & LUG W/SLEEVE GASKETS
-L- 397+50	0728															
	0728	0729														
-L- 397+50	0729															
	0729	0730														
-Y9SBL- 25+70	0732															
	0732	0726														
	0733	0734														
-L- 399+43	0735	0734														HW @ 0735 (-L- 399+50 RT; INLET)
-Y9LPA- 2+35	0736															
	0736	0734														
-L- 401+50	0737															
	0737	0736														
-Y9LPA- 3+28	0738	0736														HW @ 0738 (-Y9LPA- 3+28 RT; INLET)
-Y9LPA- 3+90	0739															
	0739	0740														
-Y9NBL- 20+00	0741															
	0741	0744														
-Y9NBL- 20+00	0742															
	0742	0741										2 @ 15				
-Y9NBL- 18+55	0744															
	0743	0744														
	0744	0745													133	REM. SYSTEM
-Y9SBL- 19+50	0746															
	0746	0747														
-Y9SBL- 19+50	0747															
	0747	0748														
-Y9LPA- 6+00	0748															
	0748	0739														
-Y9LPA- 6+00	0749															
	0749	0748														
-SBL1- 408+78	0750															
	0750	0753														
-SBL1- 408+78	0751					1										
	0751	0750										1 @ 15				
-L- 406+50	0752															
	0752	0753														
-SBL1- 406+47	0753															
	0753	0754														
-NBL1- 411+54	0755															
	0755	0756													348	REM. (3) 15" & (1) 18"
-NBL1- 407+54	0756															
	0756	0757											0.090			PLUG 15" RCP @ -Y9NBL- 12+84 CL
-SR2- 62+70	0758															
	0758	0759														
-SR2- 62+82	0760															
-Y9SBL- 32+00	0761															
	0761	0713														
-Y9NBL- 22+23	0762															
	0762	0763										2 @ 15				
-Y9NBL- 22+23	0763															
	0763	0741														
SHEET TOTALS						1					2 @ 15 @ 18 @ 24 @ 30	5 @ 15 @ 18 @ 24 @ 30	0.090		691	

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

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COMPUTED BY:	RWP	DATE:	08/06/2012
CHECKED BY:	KSH	DATE:	08/13/2012

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

PROJECT NO.	SHEET NO.
R-3421C	3-D

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
-SBL1- 415+46	LT	0801		412.4	410.2													
		0801	0802		410.2	409.5												
-SBL1- 414+46	LT	0802		416.1	408.5													
		0802	0750		408.5	406.6	X				568					X	X	
-Y9SBL- 8+16	RT	0803		412.0	409.3													
		0803	0802		409.3	408.9												
-Y9SBL- 8+16	RT	0804			428.1													
		0804	0803		428.1	409.2		58										
-Y9SBL- 4+00	RT	0805		405.8	403.1													
		0805	0806		403.1	402.4												
-L- 419+00	CL	0806		408.4	401.7													
		0806	0809		401.7	394.1				292						X	X	
-Y9NBL- 0+83	LT	0807		406.7	403.9													
		0807	0806		403.9	403.2												
-Y9SBL- 1+13	RT	0808		397.8	395.1													
		0808	0809		395.1	394.4												
-L- 421+90	CL	0809		398.9	393.6													
		0809	0901		393.6	377.2				424						X	X	
-L- 425+81	RT	0810		381.2	377.7													
		0810	0901		377.7	376.5												
-SR2- 79+64	RT	0811		384.0	380.5													
		0811	0810		380.5	377.7												
-SR2- 79+64	RT	0812			401.9													
		0812	0811		401.9	381.3		64										
-SR2- 77+15	RT	0813		393.6	390.9													
		0813	0811		390.9	381.3		248										
-SR2- 77+15	RT	0814			412.0													
		0814	0813		412.0	390.9		64								X	X	
-SR2- 68+77	RT	0815						36								X	X	
-SR2- 66+67		0816						36								X	X	
-SR2- 73+32	RT	0817						36								X	X	
NOT USED		0818																
-SR2- 74+61	RT	0819						36								X	X	
-L- 426+15	CL	0901		381.9	375.5													
		0901	0902		375.5	367.9												
-L- 426+38	LT	0902		373.7	365.7													
		0902	0913		365.7	364.0				92						X	X	
-SR2- 84+50	RT	0903		366.7	363.9													
		0903	0904		363.9	361.1												
-L- 430+50	RT	0904		363.8	360.8													
		0904	0905		360.8	353.5			260							X	X	
-L- 433+10	RT	0905		357.8	353.0													
		0905	0907		353.0	342.9				144						X	X	
-L- 433+04	CL	0906		359.7	356.9													
		0906	0905		356.9	353.8												
-L- 436+00	RT	0908		355.4	348.7													
		0908	0907		348.7	341.8						144				X	X	
-L- 436+00	CL	0909		357.1	354.3													
		0909	0908		354.3	351.4												
-SR2- 92+10	RT	0910		357.8	355.1													
		0910	0911		355.1	352.5												
-L- 438+10	RT	0911		355.8	350.8													
-L- 438+10	RT	0911A		356.5	350.8													
		0911	0908		350.8	348.7	X					212				X	X	
-L- 439+12	CL	0912		359.8	357.0													
-L- 439+12	CL	0912A		359.8	357.0													
		0912	0928		357.0	355.9												
-L- 438+87	RT	0928		359.3	355.9													
-L- 438+87	RT	0928A		359.3	355.9													
		0928	0911		355.9	352.5												
NOT USED		914	915															
-SR2- 85+90	RT	0916						40								X	X	
NOT USED		0917																
-L- 434+50	LT	0921		361.3	358.6													
		0921	0922		358.6	358.2		120								X	X	
SHEET TOTALS								738	260	952	568	356						

FROM	TO	C.S. PIPE 15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 15"	18'	24"	30"	36"	48"	R.C. PIPE CLASS V 15"	18"	24"	30"	36"	48"
0801																												
0801	0802										100																	
0802																												
0802	0750																											
0803																												
0803	0802											132																
0804																												
0804	0803																											
0805																												
0805	0806									124																		
0806																												
0806	0809																											
0807																												
0807	0806									112																		
0808																												
0808	0809									104																		
0809																												
0809	0901																											
0810																												
0810	0901											120																
0811																												
0811	0810											64																
0812																												
0812	0811																											
0813																												
0813	0811																											
0814																												
0814	0813																											
0815																												
0816																												
0817																												
0818																												
0819																												
0901																												
0901	0902													80														
0902																												
0902	0913																											
0903																												
0903	0904									64																		
0904																												
0904	0905																											
0905																												
0905	0907																											
0906																												
0906	0905									112																		
0908																												
0908	0907																											
0909																												
0909	0908									112																		
0910																												
0910	0911									76																		
0911																												
0911A																												
0911	0908																											
0912																												
0912A																												
0912	0928																40											
0928																												
0928A																												
0928	0911																112											
914	915																											
0916																												
0917																												
0921																												
0921	0922																											
SHEET TOTALS										704	100	316		80			152											

FROM	TO	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE: COL. 'A' + (1.3 X COL. 'B') LIN. FT.* A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN
0801				1								
0801	0802											
0802				1	2.6							
0802	0750											
0803				1								
0803	0802											
0804												
0804	0803											
0805				1								
0805	0806											
0806				1	1.7							
0806	0809											
0807				1								
0807	0806											
0808				1								
0808	0809											
0809				1	0.3							
0809	0901											
0810				1								
0810	0901											
0811				1								
0811	0810											
0812												
0812	0811											
0813				1								
0813	0811											
0814												
0814	0813											
0815												
0816												
0817												
0818												
0819												
0901				1	1.4							
0901	0902											
0902				1	3.0							
0902	0913											
0903				1								
0903	0904											
0904				1								
0904	0905											
0905				1								
0905	0907											
0906				1								
0906	0905											
0908				1	1.7							
0908	0907											
0909				1								
0909	0908											
0910				1								
0910	0911											
0911				1								
0911A					0.7							
0911	0908											
0912				1								
0912A												
0912	0928											
0928				1								
0928A												
0928	0911											
914	915											
0916												
0917												
0921				1								
0921	0922											
SHEET TOTALS				24	11.4							

FROM	TO	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	T.B.D.I. STD. 840.35	T.B.J.B. STD. 840.34	G.D.I. FRAME WITH TWO FLAT GRATES STD. 840.20	G.D.I. FRAME WITH SAG GRATE STD. 840.22	G.D.I. FRAME WITH TWO SAG GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH SAG GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO SAG GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD. 840.54	TEMPORARY 1" STEEL COVER (SEE DETAIL ON SHEET 2-V)	BERM DRAINAGE OUTLET STD. 850.10 OR 850.11	CONVERT EXIST. D.I. TO J.B. (SEE DETAIL ON SHEET 2-Z)	CONVERT EXIST. T.B.D.I. TO T.B.J.B. (SEE DETAIL ON SHEET 2-AV)	ADJUST EXIST. D.I.	FLOWABLE FILL (CY)	CORR. STEEL PIPE ELBOWS - NO. & SIZE (INCHES)	SIDE DRAIN PIPE ELBOWS - NO. & SIZE (INCHES)	CONC. & BRICK PIPE PLUG (C.Y.) STD. 840.71	CONC. COLLARS CL. "B" (C.Y.) STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
0801				1					1																185	REM. SYSTEM
0801	0802																									
0802		1							1																	
0802	0750																									
0803				1					1																	
0803	0802																									
0804																1										
0804	0803																					1 @ 15				
0805			1						1																	
0805	0806																									
0806		1							1																	
0806	0809																									
0807			1						1																	
0807	0806																									
0808			1						1																	
0808	0809																									
0809		1							1																84	REM 15"
0809	0901																						0.130			PLUG 18" RCP @ -L- 424+94 RT
0810			1						1														0.130			PLUG 18" RCP @ -L- 425+42 LT
0810	0901																								49	REM. 15" & 18"
0811			1								1															
0811	0810																									
0812																1										
0812	0811																					1 @ 15				
0813			1								1															
0813	0811																									
0814																1										
0814	0813																					1 @ 15				
0815																										
0816																										
0817																										
0818																										
0819																										
0901		1							1																	
0901	0902																									
0902						1																				
0902	0913																									
0903			1								1															
0903	0904																									
0904			1						1																	
0904	0905																								34	REM. 15"
0905		1							1																	
0905	0907																									
0906			1						1														0.090			PLUG 15" RCP @ -L- 432+99 RT
0906	0905																						0.930			PLUG 48" RCP @ -L- 433+17 CL
0908		1							1						1											USE STEEL COVER DURING DETOUR -TA9-
0908	0907																									
0909			1						1																	
0909	0908																									
0910			1								1															
0910	0911																									
0911					1										1										20	TBDI w/ COVER FOR DETOUR -TA9-, REM. 18"
0911A									1																	REMOVE -TA9- & COVER, FINISH TBDI
0911	0908																									
0912					1										1											TBDI w/ COVER FOR DETOUR -TA4-
0912A									1																	REMOVE -TA4- & COVER, FINISH TBDI
0912	0928																									
0928					1				1																	PLACE TBDI FOR DETOUR -TA3-
0928A																		1								CONVERT TO TBJB AFTER DETOUR REMOVAL
0928	0911																									
914	915																									
0916																										
0917																										
0921			1				1																			
0921	0922																									
SHEET TOTALS		6	12	2	3	1	1		18		4				3	3		1			@ 15 @ 18 @ 24 @ 30	3 @ 15 @ 18 @ 24 @ 30	1.280		372	

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

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COMPUTED BY: RWP DATE: 08/06/2012

CHECKED BY: KSH DATE: 08/13/2012

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

PROJECT NO. R-3421C | SHEET NO. 3-E

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
-L- 435+69		0922		360.9	358.1													
		0922	0923		358.1	346.6												
-L- 436+50	LT	0924		361.1	358.3													
		0924	0922		358.3	358.1		84								X	X	
-L- 440+00	LT	0926		362.8	360.0													
		0926	0912		360.0	357.0												
NOT USED		1001																
-L- 443+00		1002		370.1	367.1													
		1002	1003		367.1	365.7												
-L- 443+00	CL	1003		368.7	365.2													
		1003	1004		365.2	362.5												
-L- 443+00	RT	1004		367.2	362.5													
		1004	0911		362.5	351.8				492						X	X	
-SR2- 97+00	RT	1005		371.7	368.9													
		1005	1004		368.9	364.4												
-SR2- 103+13	RT	1007		389.2	377.2													
		1007	1015		377.2	359.3					56							
-L- 449+08	RT	1008		382.8	377.8													
		1008	1007		377.8	377.2												
-L- 449+14	CL	1009		383.3	378.0													
		1009	1008		378.0	377.1												
-L- 451+64	CL	1010		388.1	380.9													
		1010	1009		380.9	378.0					252					X	X	
-SR2- 94+25	RT	1011						48								X	X	
NOT USED		1012																
-SR2- 101+38	RT	1013						36								X	X	
NOT USED		1014																
-SR2- 103+14	RT	1015		364.2	358.8													
		1015	1006		358.8	358.7						36				X	X	
-L- 451+64	LT	1016	1010		381.5	380.9												
-SR4- 16+00	RT	1101		415.6	412.6													
		1101	1105		412.6	388.7		576								X	X	
-Y10RPA- 23+58	RT	1102		416.1	411.3													
		1102	1103		411.3	407.6				364						X	X	
-Y10RPA- 20+00	RT	1103		412.4	407.6													
		1103	1104		407.6	392.2				348						X	X	
-Y10RPA- 16+70	RT	1104		396.9	391.7													
		1104	1105		391.7	387.5					44					X	X	
-SR4- 21+80	RT	1105		392.7	387.5													
		1105	1107		387.5	375.7					364					X	X	
-Y10RPA- 14+10	LT	1106		382.9	380.2													
		1106	1107		380.2	376.9												
-Y10RPA- 14+10	RT	1107		380.9	375.7													
		1107	1201		375.7	356.1					376					X	X	
-SR4- 24+42	LT	1108		380.7	378.0													
		1108	1107		378.0	376.9												
-Y10LPA- 7+57	LT	1109		398.9	395.7													
		1109	1137		395.7	390.2		48										
-Y10- 29+00	RT	1110		419.0	416.2													
		1110	1136		416.2	415.8												
-Y10LPA- 5+14	LT	1111		389.0	386.0													
		1111	1112		386.0	385.3												
-Y10LPA- 4+34	LT	1112		388.3	381.3													
		1112	1140		381.3	376.1												
-Y10LPA- 3+40	LT	1113		389.3	385.3													
		1113	1112		385.3	384.1												
-Y10LPA- 2+27	LT	1114		390.6	387.6													
		1114	1113		387.6	385.3												
-SR2- 107+66	RT	1115		398.3	395.6													
		1115	1144		395.6	367.7												
-Y10- 35+00	RT	1116		422.6	419.9													
		1116	1143		419.9	402.4												
-Y10- 37+00	LT	1117		420.1	417.6													
		1117	1145		417.6	405.1												
SHEET TOTALS								792		1,204	1092	36						

STATION	FROM	TO	C.S. PIPE 15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"
-L- 435+69	0922																
	0922	0923	54														
-L- 436+50	0924																
	0924	0922															
-L- 440+00	0926																
	0926	0912															
NOT USED	1001																
-L- 443+00	1002																
	1002	1003										96					
-L- 443+00	1003																
	1003	1004											104				
-L- 443+00	1004																
	1004	0911															
-SR2- 97+00	1005																
	1005	1004									72						
-SR2- 103+13	1007																
	1007	1015															
-L- 449+08	1008																
	1008	1007												60			
-L- 449+14	1009																
	1009	1008												104			
-L- 451+64	1010																
	1010	1009															
-SR2- 94+25	1011																
NOT USED	1012																
-SR2- 101+38	1013																
NOT USED	1014																
-SR2- 103+14	1015																
	1015	1006															
-L- 451+64	1016	1010												124			
-SR4- 16+00	1101																
	1101	1105															
-Y10RPA- 23+58	1102																
	1102	1103															
-Y10RPA- 20+00	1103																
	1103	1104															
-Y10RPA- 16+70	1104																
	1104	1105															
-SR4- 21+80	1105																
	1105	1107															
-Y10RPA- 14+10	1106																
	1106	1107									88						
-Y10RPA- 14+10	1107																
	1107	1201															
-SR4- 24+42	1108																
	1108	1107									56						
-Y10LPA- 7+57	1109																
	1109	1137															
-Y10- 29+00	1110																
	1110	1136															
-Y10LPA- 5+14	1111																
	1111	1112															
-Y10LPA- 4+34	1112																
	1112	1140										96					
-Y10LPA- 3+40	1113																
	1113	1112															
-Y10LPA- 2+27	1114																
	1114	1113															
-SR2- 107+66	1115																
	1115	1144	66														
-Y10- 35+00	1116																
	1116	1143	66														
-Y10- 37+00	1117																
	1117	1145	64														
SHEET TOTALS			250								216	192	104	288			

STATION	FROM	TO	R.C. PIPE CLASS IV 15"	18'	24"	30"	36"	48"	R.C. PIPE CLASS V 15"	18"	24"	30"	36"	48"		ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
-L- 435+69	0922																
	0922	0923															
-L- 436+50	0924																
	0924	0922															
-L- 440+00	0926																
	0926	0912	132														
NOT USED	1001																
-L- 443+00	1002																
	1002	1003															
-L- 443+00	1003																
	1003	1004															
-L- 443+00	1004																
	1004	0911															
-SR2- 97+00	1005																
	1005	1004															
-SR2- 103+13	1007																
	1007	1015															
-L- 449+08	1008																
	1008	1007															
-L- 449+14	1009																
	1009	1008															
-L- 451+64	1010																
	1010	1009															
-SR2- 94+25	1011																
NOT USED	1012																
-SR2- 101+38	1013																
NOT USED	1014																
-SR2- 103+14	1015																
	1015	1006															
-L- 451+64	1016	1010															
-SR4- 16+00	1101																
	1101	1105															
-Y10RPA- 23+58	1102																
	1102	1103															
-Y10RPA- 20+00	1103																
	1103	1104															
-Y10RPA- 16+70	1104																
	1104	1105															
-SR4- 21+80	1105																
	1105	1107															
-Y10RPA- 14+10	1106																
	1106	1107															
-Y10RPA- 14+10	1107																
	1107	1201															
-SR4- 24+42	1108																
	1108	1107															
-Y10LPA- 7+57	1109																
	1109	1137															
-Y10- 29+00	1110																
	1110	1136							84								
-Y10LPA- 5+14	1111																
	1111	1112							76								
-Y10LPA- 4+34	1112																
	1112	1140															
-Y10LPA- 3+40	1113																
	1113	1112							88								
-Y10LPA- 2+27	1114																
	1114	1113							104								
-SR2- 107+66	1115																
	1115	1144															
-Y10- 35+00	1116																
	1116	1143															
-Y10- 37+00	1117																
	1117	1145															
SHEET TOTALS			132						352								

STATION	FROM	TO	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE: COL. 'A' + (1.3 X COL. 'B') LIN. FT.* A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN		
-L- 435+69	0922		1										
	0922	0923											
-L- 436+50	0924		1										
	0924	0922											
-L- 440+00	0926		1										
	0926	0912											
NOT USED	1001												
-L- 443+00	1002		1										
	1002	1003											
-L- 443+00	1003		1										
	1003	1004											
-L- 443+00	1004		1										
	1004	0911											
-SR2- 97+00	1005		1										
	1005	1004											
-SR2- 103+13	1007		1	5.0	2.0								
	1007	1015											
-L- 449+08	1008		1										
	1008	1007											
-L- 449+14	1009		1	0.3									
	1009	1008											
-L- 451+64	1010		1	2.2									
	1010	1009											
-SR2- 94+25	1011												
NOT USED	1012												
-SR2- 101+38	1013												
NOT USED	1014												
-SR2- 103+14	1015		1	0.4									
	1015	1006											
-L- 451+64	1016	1010											
-SR4- 16+00	1101		1										
	1101	1105											
-Y10RPA- 23+58	1102		1										
	1102	1103											
-Y10RPA- 20+00	1103		1										
	1103	1104											
-Y10RPA- 16+70	1104		1	0.2									
	1104	1105											
-SR4- 21+80	1105		1	0.2									
	1105	1107											
-Y10RPA- 14+10	1106		1										
	1106	1107											
-Y10RPA- 14+10	1107		1	0.2									
	1107	1201											
-SR4- 24+42	1108		1										
	1108	1107											
-Y10LPA- 7+57	1109		1			1		1					
	1109	1137											
-Y10- 29+00	1110		1										
	1110	1136											
-Y10LPA- 5+14	1111		1			1		1					
	1111	1112											
-Y10LPA- 4+34	1112		1	2.0		1	1						
	1112	1140											
-Y10LPA- 3+40	1113		1			1			1				
	1113	1112											
-Y10LPA- 2+27	1114		1										
	1114	1113											
-SR2- 107+66	1115		1										
	1115	1144											
-Y10- 35+00	1116		1										
	1116	1143											
-Y10- 37+00	1117		1										
	1117	1145											
SHEET TOTALS			29	10.5	2.0	4	1	2	1				

STATION	FROM	TO	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	T.B.D.I. STD. 840.35	T.B.J.B. STD. 840.34	G.D.I. FRAME WITH TWO FLAT GRATES STD. 840.20	G.D.I. FRAME WITH SAG GRATE STD. 840.22	G.D.I. FRAME WITH TWO SAG GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH SAG GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO SAG GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD. 840.54	TEMPORARY 1" STEEL COVER (SEE DETAIL ON SHEET 2-V)	BERM DRAINAGE OUTLET STD. 850.10 OR 850.11	CONVERT EXIST. D.I. TO J.B. (SEE DETAIL ON SHEET 2-Z)	CONVERT EXIST. T.B.D.I. TO T.B.J.B. (SEE DETAIL ON SHEET 2-AV)	ADJUST EXIST. D.I.	FLOWABLE FILL (CY)
-L- 435+69	0922			1				1													
	0922	0923																			
-L- 436+50	0924			1				1													
	0924	0922																			
-L- 440+00	0926			1						1											
	0926	0912																			
NOT USED	1001																				
-L- 443+00	1002			1						1											
	1002	1003																			
-L- 443+00	1003			1						1											
	1003	1004																			
-L- 443+00	1004		1							1											
	1004	0911																			
-SR2- 97+00	1005			1								1									
	1005	1004																			
-SR2- 103+13	1007					1							1								
	1007	1015																			
-L- 449+08	1008			1						1											
	1008	1007																			
-L- 449+14	1009		1							1											
	1009	1008																			
-L- 451+64	1010		1							1											4.7
	1010	1009																			
-SR2- 94+25	1011																				
NOT USED	1012																				
-SR2- 101+38	1013																				
NOT USED	1014																				
-SR2- 103+14	1015													1	1						
	1015	1006																			
-L- 451+64	1016	1010																			
-SR4- 16+00	1101			1								1									
	1101	1105																			
-Y10RPA- 23+58	1102		1						1	1											
	1102	1103																			
-Y10RPA- 20+00	1103		1							1											
	1103	1104																			
-Y10RPA- 16+70	1104		1							1											
	1104	1105																			
-SR4- 21+80	1105		1							1											
	1105	1107																			
-Y10RPA- 14+10	1106			1						1											
	1106	1107																			
-Y10RPA- 14+10	1107		1							1											
	1107	1201																			
-SR4- 24+42	1108			1								1									
	1108	1107																			
-Y10LPA- 7+57	1109																				
	1109	1137																			
-Y10- 29+00	1110			1									1								
	1110	1136																			
-Y10LPA- 5+14	1111																				
	1111	1112																			
-Y10LPA- 4+34	1112																				
	1112	1140																			
-Y10LPA- 3+40	1113																				
	1113	1112																			
-Y10LPA- 2+27	1114			1						1											
	1114	1113																			
-SR2- 107+66	1115					1							1								
	1115	1144																			
-Y10- 35+00	1116			1									1								
	1116	1143																			
-Y10- 37+00	1117			1									1								
	1117	1145																			
SHEET TOTALS			8	14		2		2	1	14		3	5	1	1						4.7

STATION	FROM	TO	CORR. STEEL PIPE ELBOWS - NO. & SIZE (INCHES)	SIDE DRAIN PIPE ELBOWS - NO. & SIZE (INCHES)	CONC. & BRICK PIPE PLUG (C.Y.) STD. 840.71	CONC. COLLARS CL. "B" (C.Y.) STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L- 435+69	0922							
	0922	0923	2 @ 15					
-L- 436+50	0924							
	0924	0922						
-L- 440+00	0926							
	0926	0912			0.090			PLUG 15" RCP @ -L- 440+49 LT
NOT USED	1001							
-L- 443+00	1002							
	1002	1003						
-L- 443+00	1003							
	1003	1004						
-L- 443+00	1004							
	1004	0911					36	REM. 18"
-SR2- 97+00	1005							
	1005	1004						
-SR2- 103+13	1007							
	1007	1015						
-L- 449+08	1008							
	1008	1007						
-L- 449+14	1009							
	1009	1008						
-L- 451+64	1010							FILL 103' OF 15" CMP WITH FLOWABLE FILL
	1010	1009			0.130			PLUG 18" RCP @ -L- 451+48 CL
-SR2- 94+25	1011							
NOT USED	1012							
-SR2- 101+38	1013						36	REM. 15"
NOT USED	1014							
-SR2- 103+14	1015							
	1015	1006						
-L- 451+64	1016	1010						
-SR4- 16+00	1101							
	1101	1105						
-Y10RPA- 23+58	1102							
	1102	1103						
-Y10RPA- 20+00	1103							
	1103	1104						
-Y10RPA- 16+70	1104							
	1104	1105						
-SR4- 21+80	1105							
	1105	1107						
-Y10RPA- 14+10	1106							
	1106	1107						
-Y10RPA- 14+10	1107							
	1107	1201						
-SR4- 24+42	1108							
	1108	1107						
-Y10LPA- 7+57	1109							
	1109	1137		2 @ 15				
-Y10- 29+00	1110							
	1110	1136						
-Y10LPA- 5+14	1111							
	1111	1112						
-Y10LPA- 4+34	1112							
	1112	1140					24	REM. 18" (NOT SHOWN)
-Y10LPA- 3+40	1113						24	REM. PIPE
	1113	1112						
-Y10LPA- 2+27	1114							
	1114	1113						
-SR2- 107+66	1115		2 @ 15					ROD & LUG W/SLEEVE GASKETS
	1115	1144						
-Y10- 35+00	1116						125	REM. (2) 15"
	1116	1143	2 @ 15					ROD & LUG W/SLEEVE GASKETS
-Y10- 37+00	1117						61	REM. 15"
	1117	1145	2 @ 15					ROD & LUG W/SLEEVE GASKETS
SHEET TOTALS			8 @ 15 @ 18 @ 24 @ 30	2 @ 15 @ 18 @ 24 @ 30	0.220		306	

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

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COMPUTED BY: RWP DATE: 08/06/2012

CHECKED BY: KSH DATE: 08/13/2012

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

PROJECT NO.	SHEET NO.
R-3421C	3-F

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109
-Y10LPD- 3+66	RT	1118		380.8	377.8																				
		1118	1119		377.8	373.6																			
-L- 464+27	CL	1119		381.6	373.1																				
		1119	1142		373.1	367.4																			
-Y10LPD- 5+83	RT	1120		379.8	376.5																				
		1120	1122		376.5	376.3																			
NOT USED		1121																							
-Y10LPD- 6+13	RT	1122		379.8	376.3																				
		1122	1123		376.3	375.5																			
-Y10LPD- 7+49	RT	1123		381.2	375.5																				
		1123	1124		375.5	374.8			116																
-Y10LPD- 8+81	RT	1124		383.7	373.4																				
		1124	1125		373.4	372.9					48														
-Y10RPD- 14+26	RT	1125		381.4	372.9																				
		1125	1126		372.9	366.3					148														
-SR5- 26+71	LT	1126		370.3	366.3																				
		1126	1149		366.3	361.9					108														
-SR5- 25+50	LT	1127		378.4	372.7																				
		1127	1126		372.7	367.6		128								X	X								
-SR2- 114+04	RT	1128		406.6	404.7																				
		1128	1129		404.7	401.8		312								X	X								
-SR2- 117+20	RT	1129		409.1	401.1																				
		1129	1130		401.1	400.5																			
-SR2- 117+20	LT	1130		407.3	400.5																				
		1130	1131		400.5	400.1																			
-Y10- 41+00	RT	1131		404.3	400.1																				
		1131	1146		400.1	396.9																			
-Y10- 47+58	LT	1132		400.9	390.9																				
		1132	1154		390.9	390.3																			
-SR4- 12+00	RT	1133						30								X	X								
NOT USED		1134																							
-Y10- 27+50	RT	1135	1102		414.5	411.3																			
-Y10LPA- 5+30	CL	1138	1139		380.9	370.5																			
-Y10LPA- 2+30	LT	1141	1114		398.2	387.8		40																	
-Y10LPD- 9+11	RT	1147	1124		374.2	373.4																			
-Y10LPD- 5+83	RT	1148	1120		379.0	376.5			20							X	X								
-SR5- 23+00	CL	1151	1150		377.4	371.3																			
-SR5- 21+30	RT	1152						40								X	X								
NOT USED		1153																							
-SR2- 126+84	CL	1156	1155		397.7	397.2																			
-SR2- 119+40	RT	1157						36								X	X								
-Y10- 47+55	CL	1158	1132		396.9	395.5																			
-Y1O- 49+09	RT	1159							36							X	X								
-Y10RPA- 10+32	RT	1201		361.4	356.1																				
		1201	1202		356.1	347.0					224					X	X								
-Y10RPA- 8+03	RT	1202		352.3	342.5																				
		1202	1225		342.5	341.2							100			X	X								
-Y10RPA- 7+00	RT	1225		348.9	341.2																				
		1225	1206		341.2	339.9							104			X	X								
-SR4- 30+20	LT	1203		355.6	352.6																				
		1203	1202		352.6	348.3																			
-SR4- 30+20	LT	1204			361.8																				
		1204	1203		361.8	352.6		28																	
-L- 471+56	LT	1205		347.9	345.2																				
		1205	1206		345.2	342.1																			
-Y10RPA- 5+93	RT	1206		345.4	339.9																				
-Y10RPA- 5+93	RT	1206A		346.1	339.9																				
		1206	1209		339.9	336.3							196			X	X								
-L- 473+50	RT	1207		346.5	343.7																				
		1207	1208		343.7	342.7																			
-L- 473+65	CL	1208		347.2	342.5																				
		1208	1209		342.5	338.3																			
SHEET TOTALS								614	172		528		400												

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 15"	18'	24"	30"	36"	48"	R.C. PIPE CLASS V 15"	18"	24"	30"	36"	48"	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
-Y10LPD- 3+66	1118																							
	1118	1119			120																			
-L- 464+27	1119																							
	1119	1142				124																		
-Y10LPD- 5+83	1120																							
	1120	1122																28						
NOT USED	1121																							
-Y10LPD- 6+13	1122																							
	1122	1123																128						
-Y10LPD- 7+49	1123																							
	1123	1124																						
-Y10LPD- 8+81	1124																							
	1124	1125																						
-Y10RPD- 14+26	1125																							
	1125	1126																						
-SR5- 26+71	1126																							
	1126	1149																						
-SR5- 25+50	1127																							
	1127	1126																						
-SR2- 114+04	1128																							
	1128	1129																						
-SR2- 117+20	1129																							
	1129	1130				60																		
-SR2- 117+20	1130																							
	1130	1131				48																		
-Y10- 41+00	1131																							
	1131	1146				132																		
-Y10- 47+58	1132																							
	1132	1154						32																
-SR4- 12+00	1133																							
NOT USED	1134																							
-Y10- 27+50	1135	1102										164												
-Y10LPA- 5+30	1138	1139					172																	
-Y10LPA- 2+30	1141	1114																						
-Y10LPD- 9+11	1147	1124					72																	
-Y10LPD- 5+83	1148	1120																						
-SR5- 23+00	1151	1150						136															3.4	
-SR5- 21+30	1152																							
NOT USED	1153																							
-SR2- 126+84	1156	1155																		56				
-SR2- 119+40	1157																							
-Y10- 47+55	1158	1132																			72		3.4	
-Y1O- 49+09	1159																							
-Y10RPA- 10+32	1201																							
	1201	1202																						
-Y10RPA- 8+03	1202																							
	1202	1225																						
-Y10RPA- 7+00	1225																							
	1225	1206																						
-SR4- 30+20	1203																							
	1203	1202		64																				
-SR4- 30+20	1204																							
	1204	1203																						
-L- 471+56	1205																							
	1205	1206		100																				
-Y10RPA- 5+93	1206																							
-Y10RPA- 5+93	1206A																							
	1206	1209																						
-L- 473+50	1207																							
	1207	1208		100																				
-L- 473+65	1208																							
	1208	1209			136																			
SHEET TOTALS				264	256	364	244	168				164						156		56	72		6.8	

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE: COL. 'A' + (1.3 X COL. 'B') LIN. FT.* A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	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	T.B.D.I. STD. 840.35	T.B.J.B. STD. 840.34	G.D.I. FRAME WITH TWO FLAT GRATES STD. 840.20	G.D.I. FRAME WITH SAG GRATE STD. 840.22	G.D.I. FRAME WITH TWO SAG GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH SAG GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO SAG GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD. 840.54	TEMPORARY 1" STEEL COVER (SEE DETAIL ON SHEET 2-V)	BERM DRAINAGE OUTLET STD. 850.10 OR 850.11	CONVERT EXIST. D.I. TO J.B. (SEE DETAIL ON SHEET 2-Z)	CONVERT EXIST. T.B.D.I. TO T.B.J.B. (SEE DETAIL ON SHEET 2-AV)	ADJUST EXIST. D.I.	FLOWABLE FILL (CY)	CORR. STEEL PIPE ELBOWS - NO. & SIZE (INCHES)	SIDE DRAIN PIPE ELBOWS - NO. & SIZE (INCHES)	CONC. & BRICK PIPE PLUG (C.Y.) STD. 840.71	CONC. COLLARS CL. "B" (C.Y.) STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-Y10LPD- 3+66	1118		1										1						1																70	REM. 15" & 18"
	1118	1119																																		
-L- 464+27	1119		1	3.5									1						1																88	REM. 15"
	1119	1142																																		
-Y10LPD- 5+83	1120		1			1		1																												
	1120	1122																																		
NOT USED	1121																																			
-Y10LPD- 6+13	1122		1			1	1																													
	1122	1123																																		
-Y10LPD- 7+49	1123		1	0.7		1			1																											
	1123	1124																																		
-Y10LPD- 8+81	1124		1	5.0	0.3	1			1																											
	1124	1125																																		
-Y10RPD- 14+26	1125		1	3.5									1						1																	
	1125	1126																																		
-SR5- 26+71	1126		1										1								1															
	1126	1149																																		
-SR5- 25+50	1127		1	0.7									1								1															
	1127	1126																																		
-SR2- 114+04	1128		1											1							1															
	1128	1129																																		
-SR2- 117+20	1129		1	3.0									1								1															
	1129	1130																																		
-SR2- 117+20	1130		1	1.8									1								1															
	1130	1131																																		
-Y10- 41+00	1131		1										1								1															
	1131	1146																																	134	REM. (4) 15"
-Y10- 47+58	1132		1	5.0												1								1												
	1132	1154																																	40	REM. 18"
-SR4- 12+00	1133																																			
NOT USED	1134																																			
-Y10- 27+50	1135	1102																																		
-Y10LPA- 5+30	1138	1139																																		
-Y10LPA- 2+30	1141	1114																							1						1 @ 15					
-Y10LPD- 9+11	1147	1124																																		
-Y10LPD- 5+83	1148	1120																																		
-SR5- 23+00	1151	1150																																		HW @ 1151 (-SR5- 22+69 LT; INLET)
-SR5- 21+30	1152																																			
NOT USED	1153																																			
-SR2- 126+84	1156	1155																																		
-SR2- 119+40	1157																																			
-Y10- 47+55	1158	1132																																		HW @ 1158 (-Y10- 47+50 RT; INLET)
-Y1O- 49+09	1159																																		24	REM. 15"
-Y10RPA- 10+32	1201		1	0.3								1							1																	
	1201	1202																																	120	REM. 6"
-Y10RPA- 8+03	1202		1	4.8								1							1																	
	1202	1225																																		
-Y10RPA- 7+00	1225		1	2.7								1							1																	REQUIRED FOR DETOURS -TA4- & -TA8-
	1225	1206																																		
-SR4- 30+20	1203		1										1								1															
	1203	1202																																		
-SR4- 30+20	1204																								1											
	1204	1203																													1 @ 15					
-L- 471+56	1205		1										1						1																	
	1205	1206																																		
-Y10RPA- 5+93	1206		1	0.5											1										1											TBDI w/ COVER FOR DETOUR -TA4-
-Y10RPA- 5+93	1206A			0.7															1																	REMOVE -TA4- & COVER, FINISH TBDI
	1206	1209																																		
-L- 473+50	1207		1										1						1																	
	1207	1208																																	92	REM. 36" (PART IN TRENCH)
-L- 473+65	1208		1										1						1																	
	1208	1209																															0.090			PLUG 15" RCP @ -Y10RPA- 4+33 LT
SHEET TOTALS			22	32.2	0.3	4	1	1	2			3	12	1	1	1			10		7			1	1	2					@ 15 @ 18 @ 24 @ 30	2 @ 15 @ 18 @ 24 @ 30	0.090		568	

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

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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

PROJECT NO.	SHEET NO.
R-3421C	3-G

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
-Y10RPA- 3+90	RT	1209		341.8	336.3													
-Y10RPA- 3+90	RT	1209A		342.6	336.3													
		1209	1303		336.3	330.9							296			X	X	
-SR4- 34+11	LT	1210		343.7	341.0													
		1210	1209		341.0	338.6												
-SR4- 34+11	LT	1211			362.2													
		1211	1210		362.2	341.0		64										
-L- 470+50	RT	1212		356.6	352.3													
		1212	1213		352.3	350.9	X		144							X	X	
-Y10RPD- 8+50	RT	1213		355.9	350.6													
		1213	1214		350.6	347.5												
-Y10RPD- 8+00	RT	1214		352.3	346.0													
		1214	1301		346.0	336.2							436			X	X	
-SR5- 31+90	RT	1215		352.7	349.2													
		1215	1214		349.2	347.5												
-SR5- 31+90	RT	1216			360.4													
		1216	1215		360.4	349.9		20										
-SR5- 31+41	RT	1217	1215		352.5	349.7			52							X	X	
-Y10RPD- 9+30	LT	1218		358.0	351.7													
		1218	1214		351.7	346.0							132			X	X	
-SR5- 29+60	RT	1219	1218		355.1	351.7												
-SR5- 35+55	RT	1220		343.3	340.5													
		1220	1301		340.5	338.4												
-SR5- 35+55	RT	1221			362.2													
		1221	1220		362.2	340.5		60										
-SR5- 35+00	RT	1222						36								X	X	
-Y1ORPA- 8+92	LT	1223	1202		350.8	343.0												
-SR4- 28+14	LT	1224	1201		357.2	356.6												
-Y10RPD- 3+50	LT	1301		342.4	335.7													
		1301	1302		335.7	332.4												
-L- 476+64	CL	1302		342.4	332.4													
		1302	1303		332.4	330.4												
-SR5- 39+61	RT	1304			347.6													
		1304	1305		347.6	336.1				36								
-SR5- 39+61	RT	1305		339.6	336.1													
		1305	1306		336.1	335.3												
-L- 479+80	RT	1306		339.6	335.3													
		1306	1307		335.3	334.0												
-L- 480+04	CL	1307		337.5	334.0													
		1307	1308		334.0	331.0												
-L- 480+26	LT	1308		333.6	331.0													
		1308	1322		331.0	330.2												
-SR5- 43+50	RT	1309			337.8													
		1309	1310		337.8	332.2				16								
-SR5- 43+50	RT	1310		335.7	332.2													
		1310	1311		332.2	331.6												
-L- 483+50	RT	1311		335.1	331.6													
		1311	1312		331.6	328.7												
-L- 484+05	CL	1312		332.2	328.7													
		1312	1313		328.7	323.3												
-L- 484+60	LT	1313		328.1	323.3													
		1313	1315		323.3	322.0				100						X	X	
-SR4- 44+60	LT	1314		327.9	325.2													
		1314	1313		325.2	324.1												
-SR5- 47+00	RT	1319						36								X	X	
-L- 489+00	RT	1401		333.7	331.0													
		1401	1402		331.0	325.3		44								X	X	
-L- 490+00	CL	1404		334.1	326.1													
		1404	1403		326.1	323.1				56						X	X	
-SR4- 51+00	LT	1405		334.6	331.9													
		1405	1406		331.9	329.0												
-L- 490+25	LT	1406		331.7	329.0													
		1406	1404		329.0	326.8												
SHEET TOTALS								260	196	208			864					

SIZE / THICKNESS OR GAUGE — C.S. PIPE: 15" .064, 18" .064, 24" .064, 30" .079, 36" .079, 42" .109, 48" .109

FROM	TO	C.S. PIPE 15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 15"	18'	24"	30"	36"	48"	R.C. PIPE CLASS V 15"	18"	24"	30"	36"	48"	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
1209																														
1209A																														
1209	1303																													
1210																														
1210	1209									64																				
1211																														
1211	1210																													
1212																														
1212	1213																													
1213																														
1213	1214											96																		
1214																														
1214	1301																													
1215																														
1215	1214											60																		
1216																														
1216	1215																													
1217	1215																													
1218																														
1218	1214																													
1219	1218														136														4.5	
1220																														
1220	1301									88																				
1221																														
1221	1220																													
1222																														
1223	1202													124															3.4	
1224	1201											84																		
1301																														
1301	1302															128														
1302																														
1302	1303															116														
1304																														
1304	1305																													
1305																														
1305	1306											56																		
1306																														
1306	1307											104																		
1307																														
1307	1308											100																		
1308																														
1308	1322											64																		
1309																														
1309	1310																													
1310																														
1310	1311											56																		
1311																														
1311	1312											116																		
1312																														
1312	1313											112																		
1313																														
1313	1315																													
1314																														
1314	1313									56																				
1319																														
1401																														
1401	1402																													
1404																														
1404	1403																													
1405																														
1405	1406									100																				
1406																														
1406	1404									92																				
SHEET TOTALS										400		848		124	136	244													7.9	

FROM	TO	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE: COL. 'A' + (1.3 X COL. 'B') LIN. FT.* A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	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	T.B.D.I. STD. 840.35	T.B.J.B. STD. 840.34	G.D.I. FRAME WITH TWO FLAT GRATES STD. 840.20	G.D.I. FRAME WITH SAG GRATE STD. 840.22	G.D.I. FRAME WITH TWO SAG GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH SAG GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO SAG GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO FLAT GRATES STD. 840.29
1209		1	0.5											1							
1209A			0.8															1			
1209	1303																				
1210		1										1								1	
1210	1209																				
1211																					
1211	1210																				
1212		1									1						1	1			
1212	1213																				
1213		1	0.3									1						1			
1213	1214																				
1214		1	1.3								1							1			
1214	1301																				
1215		1										1								1	
1215	1214																				
1216																					
1216	1215																				
1217	1215																				
1218		1	1.3								1							1			
1218	1214																				
1219	1218																				
1220		1										1								1	
1220	1301																				
1221																					
1221	1220																				
1222																					
1223	1202																				
1224	1201																				
1301		1	1.7								1							1			
1301	1302																				
1302		1	5.0								1							1			
1302	1303																				
1304																					
1304	1305																				
1305		1										1								1	
1305	1306																				
1306		1										1						1			
1306	1307																				
1307		1										1						1			
1307	1308																				
1308		1										1						1			
1308	1322																				
1309																					
1309	1310																				
1310		1										1								1	
1310	1311																				
1311		1										1						1			
1311	1312																				
1312		1										1						1			
1312	1313																				
1313		1									1							1			
1313	1315																				
1314		1										1								1	
1314	1313																				
1319																					
1401		1										1						1			
1401	1402																				
1404		1	3.0								1							1			
1404	1403																				
1405		1										1								1	
1405	1406																				
1406		1										1						1			
1406	1404																				
SHEET TOTALS		23	13.9								7	15		1			1	16		7	

FROM	TO	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD. 840.54	TEMPORARY 1" STEEL COVER (SEE DETAIL ON SHEET 2-V)	BERM DRAINAGE OUTLET STD. 850.10 OR 850.11	CONVERT EXIST. D.I. TO J.B. (SEE DETAIL ON SHEET 2-Z)	CONVERT EXIST. T.B.D.I. TO T.B.J.B. (SEE DETAIL ON SHEET 2-AV)	ADJUST EXIST. D.I.	FLOWABLE FILL (CY)	CORR. STEEL PIPE ELBOWS - NO. & SIZE (INCHES)	SIDE DRAIN PIPE ELBOWS - NO. & SIZE (INCHES)	CONC. & BRICK PIPE PLUG (C.Y.) STD. 840.71	CONC. COLLARS CL. "B" (C.Y.) STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
1209				1											TBDI w/ COVER FOR DETOUR -TA4-
1209A															REMOVE -TA4- & COVER, FINISH TBDI
1209	1303														
1210															
1210	1209														
1211					1										
1211	1210										1 @ 15				
1212														48	REM. (2) 15"
1212	1213														
1213															
1213	1214														
1214				1											USE STEEL COVER DURING DETOUR -TA8-
1214	1301														
1215															
1215	1214														
1216					1										
1216	1215										2 @ 15				
1217	1215														
1218															
1218	1214														
1219	1218														HW @ 1219 (-SR5- 29+60 RT; INLET)
1220															
1220	1301														
1221					1										
1221	1220										1 @ 15				
1222															
1223	1202														HW @ 1223 (-Y1ORPA- 8+92 LT; INLET)
1224	1201														
1301															
1301	1302													216	REM. SYSTEM
1302															
1302	1303														
1304					1										
1304	1305										1 @ 24				
1305															
1305	1306														
1306														58	REM. 15"
1306	1307														
1307												0.130			PLUG 18" RCP @ -L- 479+13 RT
1307	1308											0.130			PLUG 15" RCP @ -L- 479+52 LT
1308															
1308	1322														
1309					1										
1309	1310														
1310															
1310	1311														
1311															
1311	1312														
1312															
1312	1313														
1313															
1313	1315											0.090			PLUG 15" RCP @ -L- 486+08 LT
1314															
1314	1313														
1319															
1401															
1401	1402														
1404															
1404	1403														
1405															
1405	1406														
1406															
1406	1404														
SHEET TOTALS				2	5					@ 15 @ 18 @ 24 @ 30	4 @ 15 @ 18 1 @ 24 @ 30	0.350		322	

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

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COMPUTED BY: RWP DATE: 08/06/2012

CHECKED BY: KSH DATE: 08/13/2012

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

PROJECT NO.	SHEET NO.
R-3421C	3-H

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
-L- 490+86	RT	1407		336.3	333.3													
		1407	1404		333.3	331.1												
-L- 495+72	RT	1408		338.4	334.4													
		1408	1420		334.4	325.8												
-SR5- 59+50	RT	1409		339.7	337.0													
		1409	1419		337.0	335.9		52								X	X	
-L- 501+50	RT	1410		330.8	328.1													
		1410	1411		328.1	325.7												
-L- 501+50	CL	1411		328.4	325.4													
		1411	1412		325.4	319.8												
-L- 501+50	LT	1412		322.8	319.8													
		1412	1413		319.8	318.0												
-SR4- 61+50	LT	1413		322.8	315.2													
		1413	1421		315.2	312.9				56						X	X	
-SR5- 51+50	RT	1414	1407		337.0	333.3												
-SR5- 52+01	RT	1415						36								X	X	
NOT USED		1416																
-SR5- 56+50	RT	1417						36								X	X	
NOT USED		1418																
-SR5- 55+60	RT	1421	1408		339.5	334.4												
-L- 502+68	RT	1423		320.1	316.3													
		1423	1424		316.3	316.0												
-L- 502+76	RT	1424		319.7	314.0													
		1424	1422		314.0	307.3												
-SR5- 62+38	RT	1427	1423		323.4	316.3												
-L- 508+50	LT	1501		309.1	305.1													
		0501	1514		305.1	303.3												
-L- 508+24	CL	1502		312.1	308.6													
		1502	1501		308.6	305.6												
-L- 508+00	RT	1503		314.0	310.5													
		1503	1502		310.5	308.6												
-SR5- 67+81	RT	1504		316.5	313.8													
		1504	1503		313.8	311.2												
-SR5- 67+81	RT	1505			320.1													
		1505	1504		320.1	313.8		24										
-L- 513+00	RT	1506		311.1	308.4													
		1506	1507		308.4	307.0		152								X	X	
-L- 511+50	RT	1507		309.7	306.7													
		1507	1508		306.7	305.9												
-L- 510+78	CL	1508		310.7	304.9													
		1508	1509		304.9	302.8												
-L- 510+00	LT	1509		308.1	302.8													
		1509	1515		302.8	300.9												
-L- 516+50	CL	1510		319.5	316.5													
		1510	1508		316.5	306.5			572							X	X	
-L- 516+50	LT	1511		320.0	317.0													
		1511	1510		317.0	316.5												
-SR5- 63+43	RT	1512	1424		317.6	315.0												
-SR5- 69+50	RT	1513						44								X	X	
-SR4- 76+17	LT	1516						64								X	X	
-L- 518+50	RT	1601		324.8	322.0													
		1601	1612		322.0	318.5												
-L- 522+86	RT	1602		340.8	335.5													
		1602	1613		335.5	331.7												
-L- 522+86	CL	1603		338.3	334.8													
		1603	1602		334.8	333.2												
-L- 523+42	LT	1604		339.4	335.9													
		1604	1603		335.9	334.8												
-SR4- 83+41	LT	1605		340.5	337.5													
		1605	1604		337.5	336.4												
SHEET TOTALS								408	572	56								

STATION	FROM	TO	C.S. PIPE 15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 15"	18'	24"	30"	36"	48"	R.C. PIPE CLASS V 15"	18"	24"	30"	36"	48"		ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE: COL. 'A' + (1.3 X COL. 'B') LIN. FT.* A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN		
-L- 490+86	1407																																1										
	1407	1404										128																															
-L- 495+72	1408																																1										
	1408	1420											280																														
-SR5- 59+50	1409																																1										
	1409	1419																																									
-L- 501+50	1410																																1										
	1410	1411									88																																
-L- 501+50	1411																																1										
	1411	1412										96																															
-L- 501+50	1412																																1										
	1412	1413											56																														
-SR4- 61+50	1413																																1	2.6									
	1413	1421																																									
-SR5- 51+50	1414	1407																	96																								
-SR5- 52+01	1415																																										
NOT USED	1416																																										
-SR5- 56+50	1417																																										
NOT USED	1418																																										
-SR5- 55+60	1421	1408																			80																						
-L- 502+68	1423																																1										
	1423	1424																		8																							
-L- 502+76	1424																																1	0.7									
	1424	1422															272																										
-SR5- 62+38	1427	1423																		88																							
-L- 508+50	1501																																1										
	0501	1514												20																													
-L- 508+24	1502																																1										
	1502	1501											100																														
-L- 508+00	1503																																1										
	1503	1502											88																														
-SR5- 67+81	1504																																1										
	1504	1503									72																																
-SR5- 67+81	1505																																										
	1505	1504																																									
-L- 513+00	1506																																1										
	1506	1507																																									
-L- 511+50	1507																																1										
	1507	1508										116																															
-L- 510+78	1508																																1	0.8									
	1508	1509												124																													
-L- 510+00	1509																																1	0.3									
	1509	1515												88																													
-L- 516+50	1510																																1										
	1510	1508																																									
-L- 516+50	1511																																1										
	1511	1510										92																															
-SR5- 63+43	1512	1424																					104								6.0												
-SR5- 69+50	1513																																										
-SR4- 76+17	1516																																										
-L- 518+50	1601																																1										
	1601	1612									108																																
-L- 522+86	1602																																1	0.3									
	1602	1613												132																													
-L- 522+86	1603																																1										
	1603	1602											84																														
-L- 523+42	1604																																1										
	1604	1603											112																														
-SR4- 83+41	1605																																1										
	1605	1604										56																															
SHEET TOTALS											268	488	720	364			272		96	96	80		104								6.0		24	4.7									

STATION	FROM	TO	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	T.B.D.I. STD. 840.35	T.B.J.B. STD. 840.34	G.D.I. FRAME WITH TWO FLAT GRATES STD. 840.20	G.D.I. FRAME WITH SAG GRATE STD. 840.22	G.D.I. FRAME WITH TWO SAG GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH SAG GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO SAG GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD. 840.54	TEMPORARY 1" STEEL COVER (SEE DETAIL ON SHEET 2-V)	BERM DRAINAGE OUTLET STD. 850.10 OR 850.11	CONVERT EXIST. D.I. TO J.B. (SEE DETAIL ON SHEET 2-Z)	CONVERT EXIST. T.B.D.I. TO T.B.J.B. (SEE DETAIL ON SHEET 2-AV)	ADJUST EXIST. D.I.	FLOWABLE FILL (CY)	CORR. STEEL PIPE ELBOWS - NO. & SIZE (INCHES)	SIDE DRAIN PIPE ELBOWS - NO. & SIZE (INCHES)	CONC. & BRICK PIPE PLUG (C.Y.) STD. 840.71	CONC. COLLARS CL. "B" (C.Y.) STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L- 490+86	1407			1						1																	
	1407	1404																									
-L- 495+72	1408			1						1																	
	1408	1420																								204	REM. 15" & 18"
-SR5- 59+50	1409			1								1														27	REM. 18"
	1409	1419																									
-L- 501+50	1410			1						1																	
	1410	1411																									
-L- 501+50	1411			1						1																	
	1411	1412																						0.090			PLUG 15" RCP @ -L- 501+11 LT
-L- 501+50	1412			1						1																24	REM. 18"
	1412	1413																									
-SR4- 61+50	1413		1									1															
	1413	1421																									
-SR5- 51+50	1414	1407																									
-SR5- 52+01	1415																										
NOT USED	1416																										
-SR5- 56+50	1417																										
NOT USED	1418																										
-SR5- 55+60	1421	1408																									
-L- 502+68	1423													1													
	1423	1424																									
-L- 502+76	1424													1													
	1424	1422																									
-SR5- 62+38	1427	1423																									
-L- 508+50	1501			1						1																	
	0501	1514																									1514 (CONNECT TO 9'X9' RCBC)
-L- 508+24	1502			1						1																	
	1502	1501																						0.090			PLUG 15" RCP @ -L- 506+00 LT
-L- 508+00	1503			1						1																24	REM. ?"
	1503	1502																									
-SR5- 67+81	1504			1								1															
	1504	1503																									
-SR5- 67+81	1505																1										
	1505	1504																					1 @ 15				
-L- 513+00	1506			1						1																	
	1506	1507																									
-L- 511+50	1507			1						1																	
	1507	1508																									
-L- 510+78	1508			1						1																108	REM. SYSTEM
	1508	1509																									
-L- 510+00	1509		1							1																	
	1509	1515																									1515 (CONNECT TO 9'X9' RCBC)
-L- 516+50	1510			1						1																	
	1510	1508																									
-L- 516+50	1511			1						1																50	REM. 15"
	1511	1510																									
-SR5- 63+43	1512	1424																									HW @ 1512 (-SR5- 63+43 RT; INLET)
-SR5- 69+50	1513																										
-SR4- 76+17	1516																										
-L- 518+50	1601			1						1																108	REM. 15"
	1601	1612																									
-L- 522+86	1602		1							1																	
	1602	1613																									
-L- 522+86	1603			1						1																556	REM. SYSTEM
	1603	1602																									
-L- 523+42	1604			1						1																	
	1604	1603																									
-SR4- 83+41	1605			1								1															
	1605	1604																									
SHEET TOTALS			3	19						18		4		2			1					@ 15 @ 18 @ 24 @ 30	1 @ 15 @ 18 @ 24 @ 30	0.180		1101	

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

COMPUTED BY:	RWP	DATE:	08/06/2012
CHECKED BY:	KSH	DATE:	08/13/2012

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

PROJECT NO.	SHEET NO.
R-3421C	3-I

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

Pipes and elevations

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 15"	18'	24"	30"	36"	48"	R.C. PIPE CLASS V 15"	18"	24"	30"	36"	48"
THICKNESS OR GAUGE																			.064	.064	.064	.079	.079	.109	.109																				
-SR4- 85+79	LT	1606		349.5	346.5																																								
		1606	1605		346.5	337.7			240							X	X																												
-SR4- 85+79	LT	1607			352.6																																								
		1607	1606		352.6	346.5			16																																				
-NBL2- 529+66	RT	1608		363.1	357.8																																								
		1608	1602		357.8	335.5					680					X	X																												
-L- 529+67	CL	1609		364.2	360.2																																								
		1609	1608		360.2	357.8																								88															
-SBL2- 529+89	LT	1610		366.2	361.9																																								
		1610	1609		361.9	360.7																							92																
-SR4- 78+48	LT	1611						48								X	X																												
-SR4- 90+04	LT	1614	1610		362.5	361.9	X																						88																
-SR5- 87+79	RT	1615							48							X	X																												
-SR4- 92+56	LT	1701		381.2	378.4																																								
		1701	1713		378.4	374.5		56								X	X																												
-SR4- 95+94	LT	1702		396.9	394.2																																								
		1702	1703		394.2	388.2																					72																		
-SBL2- 535+89	LT	1703		391.0	388.0																																								
		1703	1704		388.0	384.9																						88																	
-L- 535+60	CL	1704		387.9	384.4																																								
		1704	1705		384.4	382.4																							92																
-NBL2- 535+53	RT	1705		385.9	382.4																																								
		1705	1706		382.4	382.1																								48															
-SR5- 95+46	RT	1706		389.4	379.2																																								
		1706	1714		379.2	361.8																116																							
-NBL2- 543+40	RT	1707		403.7	399.0																																								
		1707	1717		399.0	391.6																									156														
-NBL2- 543+78	RT	1708		410.7	408.0																																								
		1708	1707		408.0	400.7		44								X	X																												
-L- 544+00	CL	1709		415.0	412.2																																								
		1709	1710		412.2	408.5																					20																		
-L- 543+84	CL	1710		411.6	404.7																																								
-SBL2- 543+55	LT	1711		417.4	411.6																																								
-SR4- 103+54	LT	1712		420.0	417.3																																								
		1712	1711		417.3	414.6																					80																		
-SR4- 97+36	LT	1715						28								X	X																												
-SR4- 101+35	LT	1716						28								X	X																												
NOT USED		1801																																											
-SBL2- 551+16	LT	1802		426.7	423.7																																								
		1802	1803		423.7	420.0																						92																	
-L- 551+13	CL	1803		423.0	420.0																																								
		1803	1804		420.0	417.5																						92																	
-NBL2- 551+11	RT	1804		420.5	417.5																																								
		1804	1807		417.5	417.0																						72																	
-NBL2- 553+04	RT	1805		420.3	417.3																																								
		1805	1808		417.3	411.8																						84																	
-NBL2- 556+98	RT	1806		425.2	420.2																																								
		1806	1809		420.2	414.0																					92																		
-SR4- 109+14	LT	1811		409.8	404.6																																								
		1811	1810		404.6	404.3																								60															
-SR4- 108+96	RT	1812		421.4	413.8																																								
		1812	1811		413.8	404.6																								76															
-SR4- 110+14	RT	1813	1812		418.8	417.5																						124																	
-SR4- 108+92	RT	1814	1812		416.5	414.3																								20															
-Y19- 11+66	RT	1815						44								X	X																												
-Y18- 13+18	LT	1901						24								X	X																												
SHEET TOTALS								272	304		680											116					264	552	272	292	156														

Drainage structures and remarks

STATION	STRUCTURE NO. FROM	STRUCTURE NO. TO		ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE: COL. 'A' + (1.3 X COL. 'B') LIN. FT.* A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN			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	T.B.D.I. STD. 840.35	T.B.J.B. STD. 840.34	G.D.I. FRAME WITH TWO FLAT GRATES STD. 840.20	G.D.I. FRAME WITH SAG GRATE STD. 840.22	G.D.I. FRAME WITH TWO SAG GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH SAG GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO SAG GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD. 840.54	TEMPORARY 1" STEEL COVER (SEE DETAIL ON SHEET 2-V)	BERM DRAINAGE OUTLET STD. 850.10 OR 850.11	CONVERT EXIST. D.I. TO J.B. (SEE DETAIL ON SHEET 2-Z)	CONVERT EXIST. T.B.D.I. TO T.B.J.B. (SEE DETAIL ON SHEET 2-AV)	ADJUST EXIST. D.I.	FLOWABLE FILL (CY)	CORR. STEEL PIPE ELBOWS - NO. & SIZE (INCHES)	SIDE DRAIN PIPE ELBOWS - NO. & SIZE (INCHES)	CONC. & BRICK PIPE PLUG (C.Y.) STD. 840.71	CONC. COLLARS CL. "B" (C.Y.) STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-SR4- 85+79	1606					1												1								1															
	1606	1605																																							
-SR4- 85+79	1607																														1										
	1607	1606																																							
-NBL2- 529+66	1608					1	0.3										1							1																	
	1608	1602																																							
-L- 529+67	1609					1												1						1																314	REM. (2) 15" & SYSTEM
	1609	1608																																							
-SBL2- 529+89	1610					1												1						1																	
	1610	1609																																							
-SR4- 78+48	1611																																							65	REM. 15"
-SR4- 90+04	1614	1610																																							
-SR5- 87+79	1615																																								
-SR4- 92+56	1701					1												1								1															
	1701	1713																																							
-SR4- 95+94	1702					1												1								1															
	1702	1703																																							
-SBL2- 535+89	1703					1												1						1																	
	1703	1704																																							
-L- 535+60	1704					1												1						1																	
	1704	1705																																							
-NBL2- 535+53	1705					1												1						1																	
	1705	1706																																							
-SR5- 95+46	1706					1	5.0	0.2													1								1												
	1706	1714																																		2 @ 30					ROD & LUG W/SLEEVE GASKETS
-NBL2- 543+40	1707					1																						1													
	1707	1717																																							
-NBL2- 543+78	1708					1												1						1																	
	1708	1707																																							
-L- 544+00	1709					1												1						1																	
	1709	1710																																							
-L- 543+84	1710																															1									
-SBL2- 543+55	1711					1	0.8											1						1						1											USE STEEL COVER DURING DETOUR -TA6-
-SR4- 103+54	1712					1												1								1															
	1712	1711																																							
-SR4- 97+36	1715																																								
-SR4- 101+35	1716																																							300	REM. 18"
NOT USED	1801																																								
-SBL2- 551+16	1802					1												1						1																	
	1802	1803																																							
-L- 551+13	1803					1												1						1																	
	1803	1804																																							
-NBL2- 551+11	1804					1												1						1																	
	1804	1807																																							
-NBL2- 553+04	1805					1												1						1																	
	1805	1808																																							
-NBL2- 556+98	1806					1												1						1																	
	1806	1809																																							
-SR4- 109+14	1811					1	0.2																					1	1												
	1811	1810																																							
-SR4- 108+96	1812					1	2.6																					1	1												
	1812	1811																																							
-SR4- 110+14	1813	1812																																							
-SR4- 108+92	1814	1812																																							
-Y19- 11+66	1815																																							44	REM. 15"
-Y18- 13+18	1901																																							24	REM. 15"
																																								20	REM. 15" -SR5- 124+75 LT
SHEET TOTALS						22	8.9	0.2									1	17			1			14		4		3	3	1	1	1				@ 15 @ 18 @ 24 2 @ 30	@ 15 @ 18 @ 24 @ 30			767	

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

COMPUTED BY:	RWP	DATE:	08/06/2012
CHECKED BY:	KSH	DATE:	08/13/2012

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

PROJECT NO.	SHEET NO.
R-3421C	3-J

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

Station	Location (LT, RT, or CL)	Structure No. From	Structure No. To	Top Elevation	Invert Elevation	Invert Elevation	Slope Critical	Side Drain Pipe (RCP, CSP, CAAP, HDPE, or PVC) 15"	18"	24"	30"	36"	42"	48"	Do Not Use RCP	Do Not Use CSP	Do Not Use CAAP	Do Not Use HDPE
-Y8REV- 23+50	RT	2001		356.9	354.1													
		2001	2002		354.1	335.8												
-Y8REV- 26+50	RT	2003		368.7	365.9													
		2003	2004		365.9	341.4												
-Y8REV- 20+76	LT	2005						36								X	X	
-Y8REV- 20+90	LT	2006						44								X	X	
-Y8REV- 22+31	CL	2007	2008		345.1	337.0												
-Y8- 12+13	LT	2011						30								X	X	
-Y8- 16+68	LT	2014						30								X	X	
-Y8- 17+80	RT	2015						30								X	X	
-Y8REV- 41+09	CL	2101	2102		405.8	405.0												
-Y8REV- 45+33	CL	2103	2104		419.3	416.5												
-Y15- 11+30	RT	2105	2106		422.8	419.5												
-Y15- 11+85	RT	2106		421.7	419.5													
-Y15- 12+82	RT	2106	2107		419.5	419.0												
-Y13- 10+62	LT	2301		365.9	362.9													
		2301	2302		362.9	362.2												
-Y9NBL- 60+16	LT	2302		365.2	362.2													
		2302	2303		362.2	360.1												
-Y9NBL- 60+16	LT	2303		365.3	362.1													
-DR1- 12+20	RT	2304	2341															
-Y9SBL- 67+75	RT	2305		359.1	356.5													
-DR1- 11+66	CL	2305	2307		356.5	355.6												
-Y8REV- 60+16	CL	2306	2305		363.0	357.0												
-Y9SBL- 65+86	LT	2308		370.3	367.3													
		2308	2309		367.3	363.2												
-Y9SBL- 66+27	LT	2309		366.5	363.2													
-Y8REV- 53+81	RT	2310		386.7	383.9													
-Y8REV- 54+14	CL	2310	2311		383.9	382.0												
-Y9SBL- 62+81	LT	2312		370.4	366.8													
-Y9NBL- 55+18	LT	2313		364.9	361.6													
		2313	2314		361.6	355.9			64							X	X	
-SR2- 19+02	RT	2315		363.6	360.8													
		2315	2316		360.8	345.8												
-Y9SBL- 59+38	RT	2317		372.3	367.3													
		2317	2321		367.3	361.2												
-DR2- 12+81	LT	2318		375.5	370.4													
		2318	2317		370.4	367.3												
-DR2- 12+65	LT	2319	2343		373.0	370.9				16						X	X	
-DR2- 12+25	LT	2320	2318		380.0	371.1				64						X	X	
-SR2- 21+60	LT	2321		365.2	361.2													
		2321	2322		361.2	360.9												
-SR2- 21+60	RT	2322		365.2	357.9													
		2322	2323		357.9	357.7						20				X	X	
-SR2- 23+61	LT	2324		364.7	359.2													
-SR2- 23+61	LT	2324A		366.1	359.2													
		2324	2325		359.2	358.8	x											
-Y9SBL- 57+75	RT	2326		373.6	368.8													
		2326	2327		368.8	366.9												
-Y9SBL- 58+01	LT	2327		375.4	366.8													
-Y9SBL- 57+35	RT	2328	2326		376.3	370.8		64								X	X	
-SR2- 12+00	RT	2329		375.4	372.6													
		2329	2330		372.6	370.3												
-SR2- 12+00	LT	2330		373.1	370.3													
		2330	2331		370.3	362.6		92								X	X	
-DR2- 12+25	CL	2332																
-Y8REV- 52+19	RT	2333		397.5	394.8													
		2333	2339		394.8	394.4	x											
-SR2- 18+39	CL	2335	2334		348.6	343.7												
-Y8REV- 59+06	CL	2337	2336		361.8	360.0												
SHEET TOTALS								326	64	80		20						

Station	Structure No. From	Structure No. To	C.S. Pipe 15" (.064)	18" (.064)	24" (.064)	30" (.079)	36" (.079)	42" (.109)	48" (.109)	R.C. Pipe Class III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. Pipe Class IV 15"	18"	24"	30"	36"	48"	R.C. Pipe Class V 15"	18"	24"	30"	36"	48"	Endwalls Std. 838.01, 838.11 or Std. 838.80 (Unless Noted Otherwise) Cu. Yards R.C.P.	C.S.P.
	2001	2002	88																												
	2003	2004	88																												
-Y8REV- 22+31	2007	2008										156																			
-Y8REV- 41+09	2101	2102										92																			
-Y8REV- 45+33	2103	2104										92																			
-Y15- 11+30	2105	2106																	56												
-Y15- 12+82	2106	2107																	100												
	2301	2302										132																			
	2302	2303										24																			
-DR1- 12+20	2304	2341								12																					
-DR1- 11+66	2305	2307												64																	
-Y8REV- 60+16	2306	2305											152																		
	2308	2309										40																			
-Y8REV- 54+14	2310	2311																100													
	2315	2316	42																												
	2317	2321												228																	
	2318	2317												52																	
	2321	2322																			44										
	2324	2325												68																	
	2326	2327											96																		
	2329	2330									52																				
-DR2- 12+25	2332																							44							
	2333	2339										72																			
-SR2- 18+39	2335	2334													128															3.4	
-Y8REV- 59+06	2337	2336											104																		
SHEET TOTALS			218							12	52	608	352	412	128			100	156		44			44						3.4	

Station	Structure No. From	Structure No. To	Quantities for Drainage Structures Per Each (0' thru 5.0')	*Total L.F. for pay quantity shall be: Col. 'A' + (1.3 X Col. 'B') Lin. Ft.* A 5.0' thru 10.0'	B 10.0' and above	C.B. Std. 840.01 or Std. 840.02	Frame, Grates, and Hood Standard 840.03 Type of Grate E	F	G	Concrete Transitional Section Drop Inlet	Catch Basin	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	T.B.D.I. Std. 840.35	T.B.J.B. Std. 840.34	G.D.I. Frame with Two Flat Grates Std. 840.20	G.D.I. Frame with Sag Grate Std. 840.22	G.D.I. Frame with Two Sag Grates Std. 840.22	G.D.I. (N.S.) Frame with Sag Grate Std. 840.24	G.D.I. (N.S.) Frame with Two Sag Grates Std. 840.24	G.D.I. (N.S.) Frame with Two Flat Grates Std. 840.29	J.B. Std. 840.31 or 840.32	Manhole Frame and Cover Std. 840.54	Temporary 1" Steel Cover (See Detail on Sheet 2-V)	Berm Drainage Outlet Std. 850.10 or 850.11	Convert Exist. D.I. to J.B. (See Detail on Sheet 2-Z)	Convert Exist. T.B.D.I. to T.B.J.B. (See Detail on Sheet 2-AV)	Adjust Exist. D.I.	Flowable Fill (CY)	Corr. Steel Pipe Elbows - No. & Size (Inches)	Side Drain Pipe Elbows - No. & Size (Inches)	Conc. & Brick Pipe Plug (C.Y.) Std. 840.71	Conc. Collars Cl. "B" (C.Y.) Std. 840.72	Pipe Removal Lin. Ft.	Remarks
-Y8REV- 23+50	2001		1										1									1														
	2001	2002																														2 @ 15					ROD & LUG W/SLEEVE GASKETS
-Y8REV- 26+50	2003		1										1									1														
	2003	2004																														2 @ 15					ROD & LUG W/SLEEVE GASKETS
-Y8- 16+68	2014																																			30	REM. 15"
-Y15- 11+30	2105	2106																																		32	REM. 15"
-Y15- 11+85	2106		1											1								1														
-Y13- 10+62	2301		1										1								1														114	REM. 15" & 18"
-Y9NBL- 60+16	2302		1										1								1														40	REM. 15"
-Y9NBL- 60+16	2303		1																				1													
-DR1- 12+20	2304	2341																																	0.353		USE 12" COLLAR @ 2304, -DR1- 12+20 RT
-Y9SBL- 67+75	2305		1									1									1														32	REM. 18"
-Y8REV- 60+16	2306	2305																																		93	REM. 15"
-Y9SBL- 65+86	2308		1										1						1																	
-Y9SBL- 66+27	2309		1																				1													
-Y8REV- 53+81	2310		1										1								1															
-Y9SBL- 62+81	2312																		1										1							
-Y9NBL- 55+18	2313		1																				1												16	REM. 18" (PARTIAL)
-SR2- 19+02	2315		1												1							1														
	2315	2316																														2 @ 15					ROD & LUG W/SLEEVE GASKETS
-Y9SBL- 59+38	2317		1										1						1																	
	2317	2321																																		169	REM. 18"
-DR2- 12+81	2318		1	0.1																			1	1												
-SR2- 21+60	2321		1										1								1															
-SR2- 21+60	2322		1	2.3											1							1														
-SR2- 23+61	2324		1	0.5											1										1											TBDI w/ COVER FOR DETOUR -TA1-
-SR2- 23+61	2324A			1.4																	1															REMOVE -TA1- & COVER, FINISH TBDI
-Y9SBL- 57+75	2326		1									1						1	1																	
	2326	2327																																		96	REM. SYSTEM
-Y9SBL- 58+01	2327																		1										1							
-Y9SBL- 57+35	2328	2326																																		58	REM. 15"
-SR2- 12+00	2329		1										1								1															
-SR2- 12+00	2330		1										1								1															
-DR2- 12+25	2332																																				DRIVE PIPE
-Y8REV- 52+19	2333		1											1							1															
-SR2- 18+39	2335	2334																																			HW @ 2335 (-SR2- 18+57 LT; INLET)
SHEET TOTALS			21	4.3								2	10	2	3			1	5		9	5	4	1	1				2		6 @ 15 @ 18 @ 24 @ 30	@ 15 @ 18 @ 24 @ 30		0.353	680	

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

COMPUTED BY: RWP DATE: 08/06/2012

CHECKED BY: KSH DATE: 08/13/2012

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

PROJECT NO.	SHEET NO.
R-3421C	3-K

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109
-Y8REV- 55+12	LT	2338						28								X	X								
-Y13- 10+91	LT	2340						28								X	X								
-SR2- 23+62	LT	2342	2324		360.8	359.7																			
-DR2- 12+80	LT	2343		375.3	370.9																				
		2343	2318		370.9	370.9				8						X	X								
-Y9SBL- 56+00	RT	2401		378.7	375.9																				
		2401	2326		375.9	370.8		176								X	X								
-Y15- 17+00	LT	2402	2416		408.0	386.0				232						X	X								
NOT USED		2403																							
NOT USED		2404																							
NOT USED		2405																							
NOT USED		2406																							
-SR2- 32+99	RT	2407		374.2	371.4																				
		2407	2408		371.4	371.2																			
-SR2- 32+99	LT	2408		374.2	370.9																				
		2408	2420		370.9	367.6			260							X	X								
-SR2- 38+47	LT	2409		386.5	381.7																				
		2409	2410		381.7	380.8	X																		
-Y9SBL- 43+58	LT	2410		390.4	380.8																				
		2410	2411		380.8	380.3	X																		
SEE 0701		2412			382.6																				
-Y15- 16+10	LT	2413							32							X	X								
-Y15- 16+05	CL	2415	2414		411.5	411.2																			
-Y9SBL- 51+03	RT	2416		390.8	386.0																				
		2416	2417		386.0	381.0																			
-Y9SBL- 51+03	RT	2417		385.8	381.0																				
		2417	2418		381.0	378.9																			
-Y9SBL- 51+10	LT	2418		383.7	378.4																				
		2418	2419		378.4	378.0																			
-Y9NBL- 43+57	LT	2419		382.9	378.0																				
		2419	2420		378.0	365.3																32			
-SR2- 30+39	LT	2420		370.6	359.5																				
		2420	2421		359.5	358.2																			
-Y14- 12+67	CL	2423	2422		354.3	352.3																			
-SR2- 34+15	RT	2424						40								X	X								
-SR2- 36+99	RT	2425						40								X	X								
-Y10- 15+65	LT	2502	2503		412.8	411.2																			
-Y10- 15+38	RT	2503		416.1	404.1																				
		2503	2501		404.1	401.9																			
-Y10- 50+51	RT	2504							36							X	X								
-Y10- 54+06	RT	2505						32								X	X								
-Y10- 55+90	RT	2506						32								X	X								
-SR4- 119+50	RT	2601		413.3	410.5																				
		2601	2602		410.5	409.9	X																		
-SR4- 119+50	LT	2602		414.2	409.6																				
		2602	2605		409.6	401.6			128							X	X								
-SR4- 117+88	CL	2604	2603		402.0	400.7																			
-SR4- 125+31	RT	2606						32								X	X								
-SR4- 128+20	CL	2608	2607		416.1	415.4																			
-SR4- 122+19	LT	2609						32								X	X								
SHEET TOTALS								440	456	240												32			

STATION	STRUCTURE NO. FROM	TO	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 15"	18"	24"	30"	36"	48"	R.C. PIPE CLASS V 15"	18"	24"	30"	36"	48"		ENDWALLS STD. 838.01, 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
-SR2- 23+62	2342	2324				16																			
	2407	2408		52																					
	2409	2410				124																			
	2410	2411						124																	
-Y15- 16+05	2415	2414																	76						
	2416	2417				40																			
	2417	2418				76																			
	2418	2419																		76					
	2420	2421							80																
-Y14- 12+67	2423	2422																				64		6.0	
-Y10- 15+65	2502	2503					72																		
	2503	2501					60																		
	2601	2602		60																					
-SR4- 117+88	2604	2603					112																		
-SR4- 128+20	2608	2607																68							
SHEET TOTALS				112		256	244	124	80									68	76	76		64		6.0	

STATION	STRUCTURE NO. FROM	TO	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE: COL. 'A' + (1.3 X COL. 'B') LIN. FT.* A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN			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	T.B.D.I. STD. 840.35	T.B.J.B. STD. 840.34	G.D.I. FRAME WITH TWO FLAT GRATES STD. 840.20	G.D.I. FRAME WITH SAG GRATE STD. 840.22	G.D.I. FRAME WITH TWO SAG GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH SAG GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO SAG GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD. 840.54	TEMPORARY 1" STEEL COVER (SEE DETAIL ON SHEET 2-V)	BERM DRAINAGE OUTLET STD. 850.10 OR 850.11	CONVERT EXIST. D.I. TO J.B. (SEE DETAIL ON SHEET 2-Z)	CONVERT EXIST. T.B.D.I. TO T.B.J.B. (SEE DETAIL ON SHEET 2-AV)	ADJUST EXIST. D.I.	FLOWABLE FILL (CY)	CORR. STEEL PIPE ELBOWS - NO. & SIZE (INCHES)	SIDE DRAIN PIPE ELBOWS - NO. & SIZE (INCHES)	CONC. & BRICK PIPE PLUG (C.Y.) STD. 840.71	CONC. COLLARS CL. "B" (C.Y.) STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-Y13- 10+91	2340																																					DRIVE PIPE FOR PARCEL 90
-SR2- 23+62	2342	2324																																		0.553		USE 24" COLLAR @ 2342, -SR2- 23+62 LT
-DR2- 12+80	2343		1																						1	1												
-Y9SBL- 56+00	2401		1												1						1																	
-Y15- 17+00	2402	2416																																			21	REM. 12"
-SR2- 32+99	2407		1												1								1															
-SR2- 32+99	2408		1												1								1															
-SR2- 38+47	2409		1												1								1															
-Y9SBL- 43+58	2410		1	4.6										1							1																	
-Y9SBL- 51+03	2416		1												1						1																	
-Y9SBL- 51+03	2417		1												1						1																90	REM. 18"
	2417	2418																																			68	REM. 18"
-Y9SBL- 51+10	2418		1	0.3											1						1											6.2						FILL 94' OF 18" RCP WITH FLOWABLE FILL
	2418	2419																																	0.130			PLUG 18" RCP @ -Y9NBL- 42+42 CL
-Y9NBL- 43+57	2419		1																						1	1												
	2419	2420																															2 @ 30					
-SR2- 30+39	2420		1	5.0	1.1									1									1															
-Y14- 12+67	2423	2422																																				HW @ 2423 (-Y14- 12+67 LT; INLET)
-SR2- 34+15	2424																																				40	REM. 15"
-SR2- 36+99	2425																																				36	REM. 15"
-Y10- 15+65	2502	2503																																	0.232			PLUG 24" RCP @ -Y10- 15+71 CL
-Y10- 15+38	2503		1	5.0	2.0																				1	1												
-SR4- 119+50	2601		1												1								1															
-SR4- 119+50	2602		1												1								1															
-SR4- 128+20	2608	2607																																			30	REM. 12"
SHEET TOTALS			14	14.9	3.1									2	9						5		6		3	3						6.2	@ 15 @ 18 @ 24 2 @ 30	@ 15 @ 18 @ 24 @ 30	0.362	0.553	285	

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

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COMPUTED BY:	RWP	DATE:	08/06/2012
CHECKED BY:	KSH	DATE:	08/13/2012

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

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

PROJECT NO.	SHEET NO.
R-3421C	3-L

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
TEMPORARY DRAINAGE STRUCTURES AND PIPES																		
-TA1- 15+53	RT	202		368.5	365.8													
		202	250		365.8	357.9		90										
-TA1- 12+67		203		381.9	378.6													
-TA2- 44+65	RT	203	201		378.6	378.1			4									
-TA1- 12+63	RT	204		375.3	366.2													
		204	2420		366.2	365.5	X		100							X	X	
-TA1- 10+44	RT	205	251		366.4	363.4			84									
-TA6- 102+09	RT	207		414.6	412.6													
		207	1711		412.6	412.1	X	152								X	X	
-TA8- 15+38	LT	208						88										
-TA7- 101+95	LT	209		403.6	400.8													
		209	1707		400.8	399.0		140								X	X	
-TA8- 16+08	LT	210						64										
-TA8- 16+98	LT	211						80										
-TA3- 33+08	RT	212		348.6	345.6													
		212	213		345.6	343.9		28								X	X	
-TA3- 33+35	RT	213		346.9	341.2	.												
		213	0927		341.2	340.8								112				
-TA3- 34+98	RT	214		349.4	344.7													
		214	0927		344.7	343.0				56								
-TA9- 39+50	RT	216		360.5	357.8													
		216	911		357.8	352.5		140										
-TA3- 41+50	RT	220		364.5	361.8													
		220	912		361.8	357.0		236								X	X	
-TA5- 51+90	RT	222	223		359.5	357.7			120							X	X	
-TA4- 63+89	RT	225		371.4	368.4													
		225	226		368.4	364.8		80										
-TA4- 76+12	RT	235		337.3	334.9													
		235	1303		334.9	332.4			84									
-TA4- 79+69	RT	241		335.2	332.0													
		241	1308		332.0	331.5			44									
-TA4- 73+74	RT	243		339.6	336.6													
		243	244		336.6	336.5		8										
-TA4- 73+83	RT	244		341.7	336.5													
		244	1209		336.5	336.3							44					
-TA8- 17+95	RT	245		350.2	344.5													
		245	247		344.5	344.1						140				X	X	
-TA8- 18+00	LT	246		349.2	346.4													
		246	245		346.4	346.2		88								X	X	
		1214	245		346.0	344.5						88						
NOT USED		206																
NOT USED		215																
NOT USED		217	219															
NOT USED		221																
NOT USED		224																
NOT USED		227	234															
NOT USED		236	240															
NOT USED		242																
NOT USED		248	249															
SHEET TOTALS								1194	436	56		228	44	112				
PROJECT TOTALS FROM SHEET 3-M																		
PROJECT TOTALS								6,314	3,424	4,048	4,084	1,120	1,352	112				

STATION	C.S. PIPE 15" (.064)	18" (.064)	24" (.064)	30" (.079)	36" (.079)	42" (.109)	48" (.109)	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 15"	18'	24"	30"	36"	48"	R.C. PIPE CLASS V 15"	18"	24"	30"	36"	48"		ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
SHEET TOTALS																														
PROJECT TOTALS FROM SHEET 3-M																														
PROJECT TOTALS	1,248	160	262	264				12	3,012	2,496	3,800	2,384	1,768	528	516	556	416	184	124	120	104	1,332	224	76	132	72	64		41.4	

STATION	FROM	TO	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE: COL. 'A' + (1.3 X COL. 'B') LIN. FT.* A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN			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	T.B.D.I. STD. 840.35	T.B.J.B. STD. 840.34
-TA1- 15+53	202		1												1			
-TA1- 12+67	203		1												1			
-TA1- 12+63	204		1	4.1														
-TA6- 102+09	207		1													1		
-TA7- 101+95	209		1												1			
-TA3- 33+08	212		1															
-TA3- 33+35	213		1	0.7														
-TA3- 34+98	214		1											1				
-TA9- 39+50	216		1												1			
-TA3- 41+50	220		1												1			
-TA4- 63+89	225		1															
-TA4- 76+12	235		1													1		
-TA4- 79+69	241		1															
-TA4- 73+74	243		1															
-TA4- 73+83	244		1	0.2														
-TA8- 17+95	245		1	0.7										1				
-TA8- 18+00	246		1												1			
SHEET TOTALS			17	5.7										2	6	2		
PROJECT TOTALS FROM SHEET 3-M																		
PROJECT TOTALS			278	145.2 158.7	10.4	11	2	6	3					52	163	7	19	3

STATION	FROM	TO	G.D.I. FRAME WITH TWO FLAT GRATES STD. 840.20	G.D.I. FRAME WITH SAG GRATE STD. 840.22	G.D.I. FRAME WITH TWO SAG GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH SAG GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO SAG GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO FLAT GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD. 840.54	TEMPORARY 1" STEEL COVER (SEE DETAIL ON SHEET 2-V)	BERM DRAINAGE OUTLET STD. 850.10 OR 850.11	CONVERT EXIST. D.I. TO J.B. (SEE DETAIL ON SHEET 2-Z)	CONVERT EXIST. T.B.D.I. TO T.B.J.B. (SEE DETAIL ON SHEET 2-AV)	ADJUST EXIST. D.I.	FLOWABLE FILL (CY)	CORR. STEEL PIPE ELBOWS - NO. & SIZE (INCHES)	SIDE DRAIN PIPE ELBOWS - NO. & SIZE (INCHES)	CONC. & BRICK PIPE PLUG (C.Y.) STD. 840.71	CONC. COLLARS CL. "B" (C.Y.) STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-TA1- 15+53	202				1																	
	202	250																			90	
-TA1- 12+67	203				1																	
-TA2- 44+65	203	201																		0.447	4	18" COLLAR @ 201, -TA2- 44+65 RT
-TA1- 12+63	204								1													
	204	2420																			100	
-TA1- 10+44	205	251																		0.447	84	18" COLLAR @ 205, -TA1- 10+44 RT
-TA6- 102+09	207				1																	
	207	1711																			152	
-TA8- 15+38	208																				88	
-TA7- 101+95	209				1																	
	209	1707																			140	
-TA8- 16+08	210																				64	
-TA8- 16+98	211																				80	
-TA3- 33+08	212								1													JB w/SLAB
	212	213																			28	
-TA3- 33+35	213								1													JB w/SLAB
	213	0927																			112	
-TA3- 34+98	214				1																	
	214	0927																			56	
-TA9- 39+50	216				1																	
	216	911																			140	
-TA3- 41+50	220				1																	
	220	912																			236	
-TA5- 51+90	222	223																		0.447	120	18" COLLAR @ 222, -TA5- 51+78 RT
-TA4- 63+89	225								1													JB w/SLAB
	225	226																			80	
-TA4- 76+12	235				1																	
	235	1303																			84	
-TA4- 79+69	241								1													JB w/SLAB
	241	1308																			44	
-TA4- 73+74	243								1													JB w/SLAB
	243	244																			8	
-TA4- 73+83	244								1													JB w/SLAB
	244	1209																			44	
-TA8- 17+95	245				1																	
	245	247																			140	
-TA8- 18+00	246				1																	
	246	245																			88	
	1214	245																			88	
SHEET TOTALS					10				7								@ 15 @ 18 @ 24 @ 30	@ 15 @ 18 @ 24 @ 30		1.340	2070	
PROJECT TOTALS FROM SHEET 3-M					4					1	1										110	
PROJECT TOTALS			18	4	160	1	50	19	23	13	9	20	1	1	2	10.9	34 @ 15 1 @ 18 4 @ 24 4 @ 30	17 @ 15 @ 18 2 @ 24 @ 30	2.572	2.245	7,422	

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

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COMPUTED BY: RWP DATE: 08/06/2012

CHECKED BY: KSH DATE: 10/15/2013

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

PROJECT NO.	SHEET NO.
R-3421C	3-M

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 54"	60"	66"	72"	78"	84"	54" (CLASS IV)	60" (CLASS IV)	84" (CLASS IV)
-L- 382+34	RT	0637			351.4											
-L- 382+38	CL	0637	0638		351.4	348.2		232								
-L- 399+50	LT	0734		377.0	365.4											
		0734	0731		365.4	363.4										
-L- 433+00	LT	0920			342.2											
-L- 433+88	CL	0920	0927		342.2	340.0									280	
-L- 434+47	RT	0927		346.8	340.0											
	CL	0927	0907		340.0	339.9									16	
-L- 434+55	RT	0907		346.7	339.9											
-SR2- 88+57	CL	0907	0918		339.9	339.2									100	
-L- 437+54	LT	0925			346.6											
-L- 436+95	CL	0925	0919		346.6	339.1								360		
-Y10RPA- 0+92	RT	1303		337.6	328.4											
		1303	1323		328.4	326.8				80						
-L- 485+60	LT	1315		326.7	315.0											
-SR4- 45+79	CL	1315	1321		315.0	313.3			100							
-L- 485+37	CL	1316		330.3	318.3											
		1316	1315		318.3	315.0			92							
-L- 485+15	RT	1317		332.5	318.7											
		1317	1316		318.7	318.3			100							
-SR5- 44+88	RT	1318			319.1											
-SR5- 45+05	CL	1318	1317		319.1	318.7			92							
-L- 489+46	RT	1402		328.3	322.0											
		1402	1403		322.0	320.6		92								
-L- 489+44	CL	1403		326.8	320.6											
-SR4- 49+16	CL	1403	1425		320.6	317.2		184								
-SR5- 49+74	RT	1426			322.9											
-SR5- 49+57	CL	1426	1402		322.9	322.0		92								
-Y8REV- 25+53	LT	2010			333.4											
-Y8REV- 25+09	CL	2010	2009		333.4	332.0										180
-Y8- 14+07	LT	2012			341.7											
-Y8- 14+07	CL	2012	2013		341.7	336.8									68	
PROJECT TOTALS								600	384	80				360	464	180

STATION	C.S. PIPE 54" .109	54" .138	54" .168	54" SHOP ELONGATED .138	54" SHOP ELONGATED .168	60" .138	60" .168	66" .138	66" .168	72" .139	72" .168	STRUCTURAL PLATE PIPE 60" 12	60" 10	66" 12	66" 10	72" 12	72" 10
PROJECT TOTALS																	

STATION	54" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	REINFORCED ENDWALLS WITH R.C. - C.Y.	REINFORCED ENDWALLS WITH C.S. - C.Y.	MASONRY DRAINAGE STRUCTURES CUBIC YARDS	C.B. STD. 840.01 OR 840.02	FRAMES, GRATES & HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	G.D.I. TYPE "A" STD. 840.17 OR 840.26	SPECIAL T.B.D.I. (SEE SPECIAL DETAIL ON SHEET 2-W)	G.D.I. FRAME WITH TWO SAG GRATES STD. 840.22	J.B. STD. 840.31 OR 840.32	MANHOLE FRAME AND COVER STD. 840.54	TEMPORARY 1" STEEL COVER (SEE DETAIL ON SHEET 2-V)	REINF. CONC. FLARED END SECTIONS NO. & SIZE (INCHES)	CORR. STEEL FLARED END SECTIONS NO. & SIZE (INCHES)	CORR. STEEL PIPE ELBOWS NO. & SIZE (INCHES)	CONC. & BRICK PIPE PLUG (C.Y.) STD. 840.71	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
-L- 382+34		5.1																					HW @ 0637 (INLET)
-L- 382+38																							
-L- 399+50				7.076										1	1								
	356																						
-L- 433+00		5.7																					HW @ 0920 (INLET)
-L- 433+88																							
-L- 434+47				5.065										1									SLAB LID
-L- 434+55				4.714										1									SLAB LID
-SR2- 88+57																							
-L- 437+54		5.1																					HW @ 0925 (INLET)
-L- 436+95																							
-Y10RPA- 0+92				12.6								1	1			1							USE STEEL COVER DURING DETOUR -TA4-
-L- 485+60				7.167							1		1										
-SR4- 45+79																							
-L- 485+37				7.349							1		1										
-L- 485+15				8.169							1		1										
-SR5- 44+88		5.7																					HW @ 1318 (INLET)
-SR5- 45+05																							
-L- 489+46				4.287										1									SLAB LID
-L- 489+44				4.221										1								110	SLAB LID; REM. SYSTEM
-SR4- 49+16																							
-SR5- 49+74		5.1																					HW @ 1426 (INLET)
-SR5- 49+57																							
-Y8REV- 25+53		7.9																					HW @ 2010 (INLET) (SEE DETAIL ON SHT. 2-X)
-Y8REV- 25+09																							
-Y8- 14+07		6.5																					HW @ 2012 (INLET); USE CONC. ENDWALL SILL (SEE DETAIL ON SHEET 2-Y)
-Y8- 14+07																							
PROJECT TOTALS	356	41.1		60.648							3	1	4	5	1	1						110	

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

10/15/2013 10:51
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COMPUTED BY: R. PORTER DATE: 7/20/2012

CHECKED BY: K. HUTCHENS DATE: 10/9/2013

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	3-N

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

GUARDRAIL SUMMARY

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS						IMPACT ATTENUATOR TYPE 350			VARIABLE HEIGHT CONCRETE MEDIAN BARRIER, TYPE T1 (LF)	VARIABLE HEIGHT CONCRETE MEDIAN BARRIER, TYPE T2 (LF)	CONCRETE MEDIAN BARRIER TRANSITION, (SEE DETAIL SHEET 2-U) (EA)	REMOVE EXISTING GUARDRAIL (LF)	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU 350 TL-3	M-350	CAT-1	AT-1	B-77	GRAU 350 TL-2	NO.	PERMITTED G	PERMITTED NG					
-L-	355+00.00	358+75.00	LT	375.00			357+00	R-3421B	12.00	15.00	50.00	NA	1.00	NA	1													NOTE: THE INFORMATION IN THESE ROWS IS FOR THE CONTRACTORS USE IN COMPLETING THE GRADED SECTION ONLY. NO GUARDRAIL ON THESE ROWS WILL BE PLACED UNDER THIS CONTRACT. THE SUMMARY QUANTITIES BELOW DO NOT INCLUDE QUANTITIES FROM THESE ROWS.
-L-	355+00.00	355+87.50	RT	87.50			R-3421B	355+88	12.00	15.00	NA	NA	NA	NA			1											
-L-	372+30.00	385+75.00	LT	1337.50			384+00	372+30	12.00	15.00	50.00	NA	1.00	NA	1		1											
-L-	375+00.00	384+25.00	RT	937.50			377+90	384+00	12.00	15.00	50.00	NA	1.00	NA	1		1											
-L-	391+75.00	396+00.00	RT	425.00			394+00	396+00	12.00	15.00	50.00	NA	1.00	NA	1		1											
-L-	395+00.00	-Y9LPA- 0+37.00	LT	512.50			397+55	395+50	VAR.	VAR.	245.00	NA	6.30	NA	1		1											
-L-	431+44.00	440+00.00	LT	862.50			438+50	431+50	12.00	15.00	50.00	NA	1.00	NA	1		1										1800	
-L-	424+87.50	427+62.50	MED LT	275.00			425+00	NA	10.00	10.00	50.00	NA	1.00	NA	1		1											OH SIGN 'D'
-L-	432+75.00	435+12.50	RT	237.50			435+00	NA	12.00	15.00	50.00	NA	1.00	NA	1		1											OH SIGN 'C'
-L-	451+08.75	458+55.00	MED LT	750.00			457+31	451+25	10.00	13.00	112.50	NA	9.00	NA		1	1										535	FLARE: 75' @ 15:1; M-350: 37.5' @ 9.375:1
-L-	455+45.00	464+10.50	MED RT	875.00			456+68	464+00	10.00	10.00	112.50	NA	9.00	NA		1	1											FLARE: 75' @ 15:1; M-350: 37.5' @ 9.375:1
-L-	463+30.00	467+28.00	LT																								400	
-L-	470+93.00	473+67.00	RT																								275	
-L-	473+69.50	479+25.75	MED RT	562.50			476+90	479+50	10.00	10.00	50.00	NA	1.00	NA	1		1											OH SIGN 'G'
-L-	476+81.25	479+50.00	MED LT	275.00			476+90	NA	10.00	10.00	50.00	NA	1.00	NA	1		1											OH SIGN 'G'
-Y10RPA-/-L-	-Y10RPA- 1+27.05	-L- 479+05.00	RT/LT	237.50			1+11	NA	12.00	15.00	50.00	NA	1.00	NA	1		1										405	OH SIGN 'G'
-L-	503+23.75	506+30.00	LT	312.50			503+40	NA	12.00	15.00	50.00	NA	1.00	NA	1		1										955	GM SIGN '102'
-L-	529+62.50	532+55.00	LT	300.00			529+80	NA	12.00	15.00	50.00	NA	1.00	NA	1		1											GM SIGN '104'
-L-	531+80.00	537+85.00	RT																								605	
-L-	542+50.00	551+60.19	MED LT	912.50			551+60	543+50	12.00	15.00	NA	50.00	NA	1.00	1												980	TIE TO EXISTING GUARDRAIL @ -L- 551+60.19+/-
-SR2-	12+00.00	20+55.00	RT	875.00			13+00	NA	6.00	9.00	50.00	50.00	1.00	1.00	2													GUARDRAIL BREAK FOR DRIVEWAY
-SR2-	21+05.00	27+50.00	RT	637.50			NA	26+50	6.00	9.00	50.00	50.00	1.00	1.00	2													
-SR2-	16+50.00	20+50.00	LT	425.00			17+50	19+65	6.00	9.00	50.00	50.00	1.00	1.00	2													
-Y14-/-SR2-	-Y14- 13+00.00	-SR2- 32+75.00	LT/RT	425.00	112.50		-Y14- 12+67	-SR2- 31+50	6.00	9.00	50.00	50.00	1.00	1.00	2													
-Y14-	11+30.00	13+00.00	RT	175.00			12+25	12+67	6.00	9.00	50.00	50.00	1.00	1.00	2													
-SR2-	86+10.00	91+60.00	RT	550.00			86+50	91+00	6.00	9.00	50.00	50.00	1.00	1.00	2												940	DRIVEWAYS (BOTH ENDS) AFFECT WARRANTS
-SR2-	102+14.00	111+31.00	RT	900.00	50.00		103+00	110+31	6.00	9.00	NA	50.00	NA	1.00	1			1									805	DRIVEWAY AFFECTS APPROACH WARRANT
-SR4-	24+25.00	29+50.00	LT	525.00			25+25	28+45	6.00	9.00	50.00	50.00	1.00	1.00	2													
-SR4-	36+00.00	39+50.00	LT	350.00			37+00	38+50	6.00	9.00	50.00	50.00	1.00	1.00	2													
-SR4-	44+50.00	51+00.00	LT	650.00			45+50	50+00	6.00	9.00	50.00	50.00	1.00	1.00	2												705	
-SR4-	61+00.00	70+00.00	LT	900.00			62+00	69+00	6.00	9.00	50.00	50.00	1.00	1.00	2													
-SR4-	92+50.00	105+50.00	LT	1350.00			93+50	104+00	6.00	9.00	50.00	50.00	1.00	1.00	2													
-SR4-	115+00.00	119+50.00	LT	450.00			116+00	118+50	6.00	9.00	50.00	50.00	1.00	1.00	2													
-SR4-	115+50.00	119+50.00	RT	400.00			116+50	118+50	6.00	9.00	50.00	50.00	1.00	1.00	2													
-SR5-	26+00.00	28+55.00	RT	250.00			27+00	27+40	6.00	9.00	50.00	50.00	1.00	1.00	2													
-SR5-	43+25.00	46+50.00	RT	325.00			44+50	45+50	6.00	9.00	50.00	50.00	1.00	1.00	2												850	DRIVEWAY AFFECTS TRAILING WARRANT
-SR5-	48+25.00	51+00.00	RT	275.00			49+25	50+00	6.00	9.00	50.00	50.00	1.00	1.00	2													
-SR5-	59+00.00	64+75.00	RT	575.00			58+00	63+75	6.00	9.00	50.00	50.00	1.00	1.00	2												1865	REM. 2 SECT. EX. GR [1402' (MED) + 463' (RT)]
-SR5-	69+70.00	75+20.00	RT	550.00			70+00	74+00	6.00	9.00	50.00	50.00	1.00	1.00	2												180	DRIVEWAY AFFECTS APPROACH WARRANT
-Y8REV-	22+66.00	33+07.45	RT	1037.50			24+00	33+07	8.00	11.00	50.00	250.00	1.00	5.00	1				1									
-Y8REV-	23+66.00	33+00.53	LT	937.50			33+00	25+00	8.00	11.00	250.00	50.00	5.00	1.00	1				1									
-Y8REV-	35+20.45	41+83.00	RT	662.50			35+20	40+50	8.00	11.00	250.00	50.00	5.00	1.00	1				1									
-Y8REV-	35+13.53	41+76.00	LT	662.50			40+50	35+13	8.00	11.00	50.00	250.00	1.00	5.00	1				1									
-Y9NBL-	10+90.00	22+77.50	LT	1187.50			21+50	11+45	12.00	15.00	50.00	NA	1.00	NA	1		1										2605	REM. 2 SECT. EX. GR [1326' (LT) + 1279' (RT)]
-Y9NBL-	37+87.50	52+75.00	LT	1487.50			51+50	38+00	12.00	15.00	50.00	NA	1.00	NA	1		1										1645	REM. 3 SECT. EX. GR [478' + 732' + 435' (LT)]
-Y9SBL-	19+75.00	28+54.33	RT	900.00			21+00	28+54	12.00	15.00	50.00	100.00	1.00	2.00	1				1									
-Y9SBL-	31+10.33	32+48.00	RT	137.50			31+10	32+48	12.00	15.00	NA	100.00	NA	2.00			1		1									
-Y9SBL-	39+32.00	47+97.00	MED. LT	875.00			39+32	44+51	6.00	6.00	184.18	NA	9.00	NA			1		1								700	
-Y8REV-/-Y9SBL-	-Y8REV- 59+94.00	-Y9SBL- 69+68	RT/RT	200.00	100.00		60+00	69+60	12.00	15.00	25.00	NA	1.00	NA			1			1								
-Y9LPA-	10+92.00	13+44.92	LT	250.00			13+44	11+40	12.00	VAR.*	100.00	NA	2.00	NA			1		1									* - VAR. BERM WIDTH (SEE CROSS SECTIONS)
-Y9LPA-	16+00.92	18+65.00	LT	262.50			16+87	16+00	12.00	15.00	50.00	100.00	1.00	2.00	1				1									
-Y9LPA-/-Y9NBL-	-Y9LPA- 24+82.00	-Y9NBL- 40+58.00	MED. RT	900.00			29+00	24+82	6.00	6.00	137.50	NA	10.67	NA	1		1											FLARE: 100' @ 15:1; M-350: 37.5' @ 9.375:1
-Y9LPA-	7+70.00	10+90.00	MED. RT																					331.00				
-Y9LPA-	10+90.00	12+05.00	MED. RT																						117.00			
-Y9LPA-	12+05.00	13+21.77	MED. RT																					118.00				
-Y9LPA-	13+21.77	13+41.77	MED. RT										CONCRETE BARRIER TRANSITION = 20 LF													1		SEE DETAIL SHEET 2-U FOR CONCRETE BARRIER TRANSITION BETWEEN THE ROADWAY AND STRUCTURE BARRIER.
-Y9LPA-	13+41.77	16+45.41	MED. RT										BARRIER FROM -Y9LPA- STA. 13+41.77 TO 16+45.41 IS A STRUCTURE PAY ITEM											NA	NA				
-Y9LPA-	16+45.41	16+65.41	MED. RT										CONCRETE BARRIER TRANSITION = 20 LF													1		
-Y9LPA-	16+65.41	24+82.14	MED. RT																					812.00				
-Y10-	28+16.00	31+54.90	RT	337.50			29+50	31+54	8.00	11.00	50.00	100.00	1.00	2.00	1				1									
-Y10-	34+22.90	35+85.00	RT	162.50			34+22	35+25	8.00	11.00	93.75	50.00	1.88	1.00	1				1									
-Y10-	34+59.30	38+34.00	LT	375.00			37+00	34+59	8.00	11.00	50.00	100.00	1.00	2.00	1				1									
		SUBTOTAL (LF)		26,562.50	262.50							TOTAL ANCHORS OR ATTENUATORS (EA)			58	2	17	1	12	1				1,261.00	117.00	2.00	16,250.00	TOTAL
		LESS ANCHORS (LF)		3,337.50																								
		TOTAL GUARDRAIL (LF)		23,225.00	262.50							ANCHOR UNIT LENGTH (LF)			50	37.5	6.25	6.25	18.75	25				1,261 LF	117 LF	2 EA	16,300 LF	SAY
		SAY GUARDRAIL (LF)		23,250.00	275.00		ADDITIONAL GUARDRAIL POSTS : 200 EA					DEDUCTION PER TYPE (LF)			2900.00	75.00	106.25	6.25	225.00	25.00								
												TOTAL DEDUCTION (LF)			3337.50													

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COMPUTED BY: R. PORTER DATE: 1/28/2013

CHECKED BY: K. HUTCHENS DATE: 2/25/2013

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	3-O

"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

TEMPORARY GUARDRAIL SUMMARY

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS (TEMPORARY)						IMPACT ATTENUATOR TYPE 350			RELAP GUARDRAIL (LF)		REMOVE EXISTING GUARDRAIL (LF)	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU 350 TL-3	M-350	CAT-1	AT-1	B-77	GRAU 350 TL-2	NO.	PERMITTED G	PERMITTED NG				
TEMPORARY GUARDRAIL																											
-TA1-	16+25.00	23+20.00	LT	700.00			EX. GR	16+50	6.00	8.00	NA	NA	NA	NA			1									93*	REM. 93' OF EX. GR AND TIE TEMP. GR TO EX. GR
-Y9NBL-	49+50.00	50+00.00	LT	50.00							50.00		1.00		1											362*	REM. 362' OF EX. GR; PLACE TEMP. GRAU 350
-Y9NBL-	44+94.00	45+82.00	LT	87.50																							REM. EX. ANCHORS AND CLOSE GAP AT EX. -Y14-
-Y9NBL-	38+00.00	40+45.00	LT	250.00			40+00		EX.	EX.	50.00	NA	1.00	NA	1												REM. EX. ANCHOR AND TIE TEMP. GR TO EX. GR
-Y9NBL-	40+45.00	45+00.00	LT																					450.00			RELAP EX. GR FOR SB (-TA2-) DIRECTION OF TRAVEL
-Y9NBL-	10+09.00	10+59.00	RT	50.00			EX.		EX.	EX.	50.00	NA	1.00	NA	1											50*	REM. 50' OF EX. GR; PLACE TEMP. GRAU 350
-Y9NBL-	10+59.00	23+34.00	RT																					1275.00			RELAP EX. GR FOR SB (DET.) DIRECTION OF TRAVEL
-Y9NBL-	10+38.00	10+88.00	LT	50.00			EX.		EX.	EX.	50.00	NA	1.00	NA	1											50*	REM. 50' OF EX. GR; PLACE TEMP. GRAU 350
-Y9NBL-	10+88.00	20+27.00	LT																					950.00			RELAP EX. GR FOR SB (DET.) DIRECTION OF TRAVEL
-Y9NBL-	20+27.00	23+08.00	LT	287.50				EX.	4.00	6.00	NA	NA	NA	NA			1									289*	REM. 289' OF EX. GR; REPLACE GR & TEMP. CAT-1
-Y9NBL- / -L-	3+90.00	425+00.00	LT	925.00			-L- 423+50	-Y9NBL- 3+90	4.00	EX.	50.00	NA	1.00	NA	1		1										INSTALL FOR PHASE 2 TRAFFIC PATTERN (SB TRAFFIC USING NB LANES)
-TA9-	31+37.00	37+57.00	LT	625.00			34+25	36+95	4.00	6.00	50.00	NA	1.00	NA	1		1										SHORING 1 & 3 PROTECTION. USE REDUCED POST SPACING ADJACENT TO SHORING #3.
-L- SBL	433+00.00	440+83.00	MED(RT)	787.50			437+30	433+50	4.00	EX.	50.00	NA	1.00	NA	1		1										SHORING 2,4, & 4A PROTECTION
-TA3-	33+00.00	40+35.00	LT	737.50			37+30	33+50	4.00	6.00	50.00	NA	1.00	NA	1		1										SHORING 2,4, & 4A PROTECTION. USE REDUCED POST SPACING ADJACENT TO SHORING #4.
-L- NBL	428+14.00	431+76.00	RT																					365.00			EX. FILL SLOPE & SHORING 1 & 3 PROTECTION. RELAP EX. GR FOR SB (-TA3-) DIRECTION OF TRAVEL
-L- NBL	431+76.00	432+26.00	RT	50.00					EX.	EX.																	REM. EX. ANCHORS AND CLOSE GAP AT DRIVEWAY
-L- NBL	432+26.00	437+72.00	RT																					548.00			RELAP EX. GR FOR SB (-TA3-) DIRECTION OF TRAVEL
-TA5-	73+54.00	77+23.00	LT	375.00			76+20	76+70	4.00	6.00	50.00	NA	1.00	NA	1		1										SHORING 5 PROTECTION
-L- NBL	473+61.00	477+11.00	RT	350.00			476+05	476+70	8.00	11.00	NA	NA	NA	NA			1										SHORING 5; REM. EX. ANCHOR; TIE TEMP. GR TO EX. GR
-TA4-	76+20.00	79+89.00	RT	375.00			77+24	76+61	4.00	6.00	50.00	NA	1.00	NA	1		1										SHORING 5A PROTECTION
-L- SBL	476+01.00	480+39.00	LT	437.50			477+33	EXIST. GR	8.00	11.00	50.00	NA	1.00	NA	1											83*	SHORING 5A; REM. 83' OF EX. GR; TIE TEMP. GR TO EX. GR
-SR5-	42+26.00	50+14.00	LT	800.00			44+97	49+78	4.00	6.00	50.00	NA	1.00	NA	1		1										SHORING 6 & 7 AND SHORING 10 & 11 PROTECTION
-SR4-	44+84.00	52+40.00	RT	762.50			49+67	45+33	4.00	6.00	50.00	NA	1.00	NA	1		1										SHORING 8 & 9 AND SHORING 12 & 13 PROTECTION
-SR5-	59+56.00	71+75.00	LT	1225.00			62+32	71+22	4.00	6.00	50.00	NA	1.00	NA	1		1										SHORING 14 & 15 AND SHORING 20 & 21 PROTECTION
-SR4-	61+77.00	72+34.00	RT	1062.50			69+80	62+27	4.00	6.00	50.00	NA	1.00	NA	1		1										SHORING 16 & 17 AND SHORING 18 & 19 PROTECTION
-TA6-	98+00.00	102+00.00	RT	400.00			100+00	98+00	6.00	8.00	50.00	NA	1.00	NA	1												TIE TO PROP. -SR4- GR. REMOVE WITH -TA6- REMOVAL.
SUBTOTAL (LF)				10,387.50							TOTAL ANCHORS OR ATTENUATORS (TEMPORARY) (EA)		16		13									3,588.00		NA	TOTAL
LESS ANCHORS (LF)				881.25							ANCHOR UNIT LENGTH (LF)		50	37.5	6.25	6.25	18.75	25									
TOTAL GUARDRAIL (TEMPORARY) (LF)				9,506.25							DEDUCTION PER TYPE (LF)		800.00		81.25									3,600 LF		NA	SAY
SAY GUARDRAIL (TEMPORARY) (LF)				9,525.00							TOTAL DEDUCTION (LF)		881.25														

NOTE: GUARDRAIL REMOVAL QUANTITIES SHOWN WITH AN ASTERIK ARE ACCOUNTED FOR IN THE PROPOSED GUARDRAIL SUMMARY. PAYMENT FOR REMOVAL OF TEMPORARY GUARDRAIL IS INCLUDED IN THE PRICE FOR TEMPORARY STEEL BEAM GUARDRAIL.

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COMPUTED BY: KSH DATE: 8 / 10 / 2012
CHECKED BY: RWP DATE: 12 / 09 / 2013

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	3-P

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

SUMMARY OF ASPHALT PAVEMENT REMOVAL

IN SQUARE YARDS

LINE	BEG STATION	END STATION	LOCATION	SQUARE YARDS
-Y9SBL-	67+28.00	67+58.00	LT PS	6.67
-Y9SBL-	64+19.00	66+20.00	LT PS	35.78
-Y9SBL-	52+20.00	65+22.00	RT PS	269.44
-L-/-Y9SBL-	-L- 426+00.00	-Y9SBL- 45+50.00	EX SBL	16,841.11
-Y9NBL-	26+89.00	45+00.00	LT PS	959.89
-Y9NBL-	12+30.00	45+00.00	RT PS	1,389.33
-Y9NBL-	12+30.00	23+26.00	LT PS	627.78
-Y9NBL-/-L-	-L- 428+50.00	-Y9NBL- 12+30.00	EX NBL	8,101.78
-L-	432+96.54	436+00.00	RT MED PS	123.33
-L-	436+00.00	439+00.00	EX NBL	1,094.67
-L-	436+50.00	439+00.00	EX SBL	895.78
-L-	439+00.00	452+80.00	LT PS	599.67
-L-	439+00.00	452+80.00	LT MED PS	574.67
-L-	439+00.00	453+80.00	RT MED PS	585.22
-L-	439+00.00	453+80.00	RT PS	941.00
-L-	452+80.00	468+00.00	EX SBL	6,506.11
-L-	453+80.00	464+60.00	EX NBL	4,927.89
-L-	464+60.00	468+00.00	LT MED PS	106.78
-L-	464+60.00	468+00.00	RT PS	201.22
-L-	468+00.00	510+50.00	EX SBL	15,153.22
-L-	468+00.00	511+00.00	EX NBL	14,906.11
-L-	513+00.00	551+60.19	EX SBL	13,900.44
-L-	514+00.00	551+60.19	EX NBL	13,781.22
-Y9SBL-	50+00.00	52+22.00	M XOVER	419.89
-Y9SBL-	41+00.00	43+30.00	M XOVER	436.89
-Y9NBL-	22+85.86	25+41.36	M XOVER	544.00
-Y9NBL-	7+89.88	10+31.49	M XOVER	506.11
-L-	424+41.55	427+08.03	M XOVER	662.89
-L-	438+86.79	441+42.73	M XOVER	679.11
-L-	456+40.59	458+68.05	M XOVER	399.44
-L-	473+58.88	475+94.45	M XOVER	635.56
-L-	493+14.03	495+42.35	M XOVER	629.44
-L-	517+35.27	519+60.75	M XOVER	525.22
-L-	539+71.97	541+87.80	M XOVER	470.11
-Y8REV-	15+47.03	2248+79.00	LT	1,398.67
-Y8-	13+97.03	15+75.00	RT/LT	441.44
-Y8-/-Y9SBL-	-Y8- 1887.69	-Y9SBL- 42+00.00	EX SR1304	3,882.89
-Y10-	20+50.00	27+25.00	LT/RT	1,518.22
-Y10-	31+28.64	33+06.74	LT/RT	959.11
-Y10-	42+75.00	44+00.00	LT/RT	295.00
-Y14-	EXIST US220	12+00.00	EX SR1525	843.44
-Y15-	17+30.00	19+82.23	EX SR1302	1,427.22
-Y16-	EXIST US220	20+00.00	EX SR1433	1,354.56
-Y17-	11+50.00	EXIST US220	EX SR1305	2,247.44
-Y18-	11+42.26	-SR5-	EX SR1448	682.11
-SR5-	123+00.00	125+40	EX SR1448	134.22
-TA1-	10+45.83	25+95.00	DET	2,123.00
-TA1-	14+50.00	16+90.28	DET/SR2	280.00
-TA2-	43+90.58	52+90.89	DET	1,366.67
-TA2-	43+00.00	46+67.36	DET/Y9NBL	858.44
-TA3-	36+00.00	45+03.94	DET	1,750.11
-TA4-	60+41.92	81+80.08	DET	5,782.11
-TA5-	65+38.46	79+13.26	DET	4,554.67
-TA6-	101+37.35	111+71.00	DET	2,335.11
-TA7-	100+00.00	111+56.19	DET	2,159.00
-TA8-	13+73.74	14+70.48	DET	340.89
-TA8-	15+11.05	17+28.97	DET	770.89
-TA8-	17+61.76	19+69.02	DET	620.33
-TA9-	32+27.13	43+19.69	DET	1,827.56
			TOTAL	148,390.89
			SAY	148,400

SUMMARY OF ASPHALT PAVEMENT BREAKING

IN SQUARE YARDS

LINE	BEG STATION	END STATION	LOCATION	SQUARE YARDS
-L-	426+00	436+50	LT	3,745.56
-L-	428+50	436+00	RT	2,640.56
-L-	510+50	513+00	LT	899.11
-L-	511+00	514+00	RT	1,033.33
-Y8-	10+65	14+00	LT/RT	821.67
-Y10-	27+25	31+30	LT/RT	950.00
-Y10-	34+40	42+75	LT/RT	2,314.44
-TA3-	32+96.54	36+00	DET	242.44
			GRAND TOTAL (SY)	12,647.11
			SAY (SY)	12,650

SUMMARY OF WOVEN WIRE FENCE

IN LINEAR FEET AND EACH

STATION TO STATION	FABRIC LF	4" POSTS EACH	5" POSTS EACH
-L- 357+29 LT to -Y8REV- 23+75 RT	2,879	187	34
-L- 377+75 LT to -Y8REV- 33+07 RT	144	8	4
-L- 381+25 LT to -Y8REV- 33+00 LT	200	12	4
-Y8REV- 23+75 LT to -Y10- 24+50 RT	9,524	619	112
{SPANS Y8REV, L (LT), Y9SBL, L (LT), Y10}			
-Y10- 24+50 LT to -Y10- 47+50 RT	10,064	653	121
{SPANS Y10, Y10RPA, & L (LT)}			
-L- 356+54 RT to -Y8REV- 39+00 RT	2,458	155	37
-L- 377+25 RT to -Y8REV- 35+20 RT	152	9	4
-L- 380+00 RT to -Y8REV- 35+14 LT	137	8	4
-Y8REV- 39+00 LT to -Y8REV- 59+00 LT	4,114	262	58
{SPANS Y8REV, Y9RPC, Y9SBL, Y8REV}			
-Y13- 11+40 LT to -Y10- 47+50 RT	11,052	717	133
{SPANS Y13, Y9NBL, L (RT), Y10}			
-Y10- 47+31 LT to -Y10- 47+50 RT	10,342	671	124
{SPANS Y10, Y10RPA, & L (LT)}			
GRAND TOTAL	51,066	3,300	635
SAY	51,070	3,310	640

SUMMARY OF AGGREGATE SUBGRADE / STABILIZATION

LINE	BEG STATION	END STATION	AGGREGATE TYPE* ASU / AST	AGGREGATE THICKNESS (INCHES)	SHALLOW UNDERCUT (CY)	CLASS IV SUBGRADE STABILIZATION (TONS)	GEOTEXTILE FOR SOIL STABILIZATION (SY)	STABILIZER AGGREGATE (TONS)	CLASS IV AGGREGATE STABILIZATION (TONS)
		CONTINGENCY	AST	3				500	
				TOTAL				500	
				SAY				500	

* ASU = AGGREGATE SUBGRADE; AST = AGGREGATE STABILIZATION

SUMMARY OF 6" UNDERDRAINS

STATION TO STATION	LOCATION	LENGTH LF
-L- 358+00 to -L- 372+00	LT	1,400
-L- 358+00 to -L- 372+00	MED.	1,400
-L- 358+00 to -L- 372+00	RT	1,400
CONTIGENCY (PER GEOTECHNICAL REPORT)		3,600
GRAND TOTAL (LF)		7,800
SAY (LF)		7,800

SUMMARY OF DOUBLE FACED CABLE GUIDERAIL

IN LINEAR FEET AND EACH

LINE	BEG STATION	LINE	END STATION	LOC.	LENGTH (LF)	INTERMEDIATE ANCHORS (EA)	TERMINAL ANCHORS (EA)
-L-	417+32.00	-L-	455+25.00	RT.	3,794.68	2	2
-L-	458+75.00	-L-	476+55.00	LT.	1,778.31		2
-L-	479+75.00	-L-	476+55.00	LT.	7,613.77	4	2
-Y9SBL-	64+85.00	-Y9NBL-	40+83.00	MED	1,642.20		2
				TOTAL	14,829	6	8
				SAY	14,830	6	8

ADDITIONAL GUIDERAIL POSTS = SAY 40 EA

SUMMARY OF 4" SHOULDER DRAINS

IN LINEAR FEET AND EACH

LINE	BEG STATION	END STATION	SHOULDER DRAIN PIPE FT	SHOULDER DRAINS FT	OUTLET PIPE FT	CONC PADS EA
-L- LT (SB OUTSIDE)	414+00.00	551+60.00	13,760	13,760	250	25
					507	NA (21 @ 2GI)
-L- LT (SB MEDIAN)	414+00.00	446+50.00	3,250	3,250	20	2
					208	NA (8 @ 2GI)
-L- LT (SB MEDIAN)	470+48.00	551+60.00	8,112	8,112	140	14
					330	NA (13 @ 2GI)
-L- RT (NB MEDIAN)	414+00.00	551+60.00	13,760	13,760	230	23
					605	NA (23 @ 2GI)
-L- RT (NB OUTSIDE)	414+00.00	446+50.00	3,250	3,250	40	4
					226	NA (8 @ 2GI)
-L- RT (NB OUTSIDE)	470+47.00	551+60.00	8,113	8,113	110	11
					380	NA (15 @ 2GI)
		TOTAL	50,245	50,245	3,046	79
		SAY	50,800	50,800	3,200	81

NOTE: SEE SHEET 2 FOR SHOULDER DRAIN DETAILS.

SUMMARY OF GEOTEXTILE FOR PAVEMENT STABILIZATION

IN SQUARE YARDS

LINE	BEG STATION	END STATION	AREA (SY)
-Y8REV-	20+50.00	33+03.99	5431
-Y8REV-	35+16.99	39+50.00	1888
-Y9SBL-	21+75.00	28+40.55	2788
-Y9SBL-	30+96.55	32+50.00	725
-Y9LPA-	7+70.00	13+58.70	2484
-Y9LPA-	16+14.70	18+25.00	896
-Y10-	30+50.00	31+73.10	728
-Y10-	34+41.10	39+75.00	3106
-Y10LPA-	4+00.00	7+75.00	1266
-SR2-	13+00.00	20+00.00	3061
-SR2-	30+00.00	31+75.00	744
-SR2-	102+50.00	110+00.00	3187
-SR5-	60+50.00	63+50.00	1275
-SR5-	79+00.00	83+00.00	1611
		TOTAL	21,190
		SAY	30,000

NOTE: SEE SHEET 2 FOR GEOTEXTILE FOR PAVEMENT STABILIZATION DETAIL.

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COMPUTED BY:	RWP	DATE:	2/20/2013
CHECKED BY:	KSH	DATE:	11/14/2013

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	3-Q

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

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

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Quantities are approximate only. The Resident Engineer will recross-section the work accurately when the project is staked out. These cross-section notes will be used in computing the final quantities for which the contractor will be paid.

STATION to STATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBANK. +%	BORROW	WASTE
PHASE I					
AREA 1 (-L-, -Y8REV-, & -Y9- INTERCHANGE NEW LOCATION AREA)					
-L- (NB & SB LANES) 354+25.00 TO 375+00.00	551,510		48,065		503,445
-L- (NB & SB LANES) 375+00.00 TO 390+00.00	92,912		52,326		40,586
INCL. -Y9RPC- 0+00.00 TO 5+02.00 (-L- RT. 385+00.00 TO 390+00.00) -Y9RPC- 5+02.00 TO 10+60.23	64,804				64,804
-L- (NB & SB LANES) 390+00.00 TO 402+50.00	106,651		90,610		16,041
INCL. -Y9LPA- 0+00.00 TO 2+65.00 (-L- LT. 399+75.00 TO 402+50.00) -Y9LPA- 2+65.00 TO 7+65.00	2,096		5,419	3,323	
-L- (NB & SB LANES) 402+50.00 TO 409+00.00	9,248		30,228	20,980	
-Y9SBL- 11+35.00 TO 28+40.55 (BEG. BRIDGE) INCL. -Y9LPA- 7+65.00 (-Y9SBL- 22+00.00) TO 13+58.70 (BEG. BRIDGE)	45,149		196,169	151,020	
-Y9SBL- 30+96.55 (END BRIDGE) TO 36+87.00 INCL. -Y9LPA- 16+14.70 (END BRIDGE) TO 22+31.78	3,700		17,292	13,592	
-Y8- 10+12.00 TO 18+90.00	719		10,247	9,528	
-Y8REV- 13+25.00 TO 33+04.49 (BEG. BRIDGE)	812		174,302	173,490	
-Y8REV- 35+16.49 (END BRIDGE) TO 60+67.89	8,575		46,375	37,800	
-Y15- 10+72.00 TO 12+21.03	42		158	116	
-Y15- 12+45.40 TO 17+30.00	993		554		439
-DR1- 10+20.78 TO 12+83.09	14		1,956	1,942	
-DR2- 10+12.00 TO 12+35.00	724		119		605
AREA I SUBTOTAL	887,949		673,820	411,791	625,920
WASTE TO REPLACE BORROW				-411,791	-411,791
AREA I TOTAL	**887,949**		**673,820**	**0**	**214,129**
AREA 2 (-L- & -Y10- QUADRANT A AREA AND -SR4- LEFT OF -L-)					
-L- LT. (SB LANES) 439+00.00 TO 464+00 INCL. -Y10LPA- 0+00.00 TO 2+60.00 (-L- LT. 457+33.61 TO 460+00.00)	36,310		12,685		23,625
-Y10LPA- 2+60.00 TO 13+95.15	1,611		21,169	19,558	
-Y10- 13+00.00 TO 31+73.60 (BEG. BRIDGE)	1,152		17,826	16,674	
-Y10RPA- 5+00.00 TO 24+45.27	7,204		14,778	7,574	
-SR4- 9+81.25 TO 40+00.00	37,280		27,427		9,853
-SR4- 40+00.00 TO 70+00.00	22,728		43,141	20,413	
-SR4- 70+00.00 TO 100+00.00	44,721		9,562		35,159
-SR4- 100+00.00 TO 128+50.90	18,471		26,922	8,451	
-Y19- 10+12.00 TO 12+55.00	160		3,988	3,828	
-TA3- 32+96.54 TO 45+03.94 (DETOUR)	496		314		182
-TA4- 60+41.92 TO 81+80.08 (DETOUR)	772		12,727	11,955	
-TA8- 12+50.00 TO 14+82.99 (DETOUR)	220				220
-TA8- 15+07.05 TO 15+65.62 (DETOUR)			166	166	
-TA6- 98+00.00 TO 112+52.29 (DETOUR)	907		522		385
AREA 2 SUBTOTAL	172,032		191,227	88,619	69,424
WASTE TO REPLACE BORROW				-69,424	-69,424
AREA 2 TOTAL	**172,032**		**191,227**	**19,195**	**0**
AREA 3 (-L- & -Y10- QUADRANT D AREA, -SR2- LEFT OF -Y9NBL- AND -SR2- & -SR5- RIGHT OF -L-)					
-SR2- 10+81.24 TO 40+00.00	31,551		72,070	40,519	
-Y14- 10+12.00.19 TO 13+25.00	39		2,024	1,985	
-SR2- 40+00.00 TO 70+00.00	39,687		12,414		27,273
-Y16- 10+12.00 TO 12+50.00	283		325	42	
-SR2- 70+00.00 TO 100+00.00	124,159		36,757		87,402
-SR2- 100+00.00 TO 127+06.94	13,783		93,497	79,714	
-TA1- 10+45.83 TO 26+44.50 (DETOUR)	438		3,194	2,756	
-TA9- 32+27.13 TO 43+19.69 (DETOUR)	30		722	692	
-L- RT. (NB LANES) 439+00.00 TO 468+00 INCL. -Y10LPD- 0+00.00 TO 4+50.00 (-L- RT. 461+00.00 TO 465+50.00)	11,910		13,750	1,840	
-Y10LPD- 4+50.00 TO 14+29.01	560		13,206	12,646	
-Y10- 34+38.60 (END BRIDGE) TO 57+00.00	4,524		54,826	50,302	
-Y10RPD- 4+00.00 TO 19+95.51	10,558		13,079	2,521	
-SR5- 19+16.16 TO 40+00.00	38,779		15,731		23,048
-SR5- 40+00 TO 70+00.00	45,948		25,369		20,579
-SR5- 70+00.00 TO 100+00.00	2,141		70,392	68,251	
-SR5- 100+00.00 TO 128+64.00	8,800		28,585	19,785	
-Y18- 10+12.37 TO 12+00.00	219		703	484	
-TA5- 65+38.46 TO 81+00.00 (DETOUR)	1,214		1,532	318	
-TA8- 16+73.25 TO 17+32.57 (DETOUR)			140	140	
-TA8- 17+56.57 TO 20+50.00 (DETOUR)	371		174		197
-TA7- 98+00.00 TO 112+51.85 (DETOUR)	413		98		315
AREA 3 SUBTOTAL	335,407		458,588	281,995	158,814
WASTE TO REPLACE BORROW				-158,814	-158,814
AREA 3 TOTAL	**335,407**		**458,588**	**123,181**	**0**
-TA2- 40+43.83 TO 52+90.89 (DETOUR - AREA 5)	467		1,085	618	
-TA8- 15+90.41 TO 16+49.51 (DETOUR - AREA 4)			166	166	
PHASE I SUBTOTAL (AREA 1+ AREA 2 + AREA 3 + DETOURS)	1,395,855		1,324,886	143,160	214,129
WASTE TO REPLACE BORROW				-143,160	-143,160
PHASE I TOTAL	**1,395,855**		**1,324,886**	**0**	**70,969**

STATION to STATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBANK. +%	BORROW	WASTE
PHASE II					
AREA 1 (-L-, -Y8REV-, & -Y9- INTERCHANGE NEW LOCATION AREA)					
-L- LT. (SB LANES) 409+00.00 TO 414+00.00	26,406				26,406
-L- LT. (SB LANES) 414+00.00 TO 439+00.00 INCL. -Y9SBL- 0+00.00 TO 5+52.24 (-L- LT. 422+96.03 TO 417+50.00)	60,356		45,379		14,977
-Y9SBL- 5+52.24 TO 11+35.00	57,209				57,209
-Y9SBL- 36+87.00 TO 66+59.33 INCL. -Y9RPC- 10+60.23 TO 12+76.51 (-Y9SBL- 36+87.00 TO 39+03.58) INCL. -Y9LPA- 22+31.78 TO 27+26.17 (-Y9SBL- 36+87.00 TO 41+69.08)	26,986		974		26,012
-Y9SBL- 66+59.33 TO 72+60.00	564		258		306
-Y17- 10+93.12 TO 12+00.00	229		90		139
AREA I SUBTOTAL	171,750		46,701		125,049
WASTE TO REPLACE BORROW					
AREA I TOTAL	**171,750**		**46,701**		**125,049**
AREA 4 (-L- NB & SB LANES BETWEEN -SR4- & -SR5- SERVICE ROAD DETOURS)					
-L- LT. (SB LANES) 464+00.00 TO 494+00.00 INCL. -Y10RPA- 0+00.00 TO 5+00.00 (-L- LT. 478+00.00 TO 473+00.00)	830		16,339	15,509	
-L- LT. (SB LANES) 494+00.00 TO 509+50.00	970		6,010	5,040	
-L- LT. (SB LANES) 509+50 TO 524+00.00	195		6,449	6,254	
-L- LT. (SB LANES) 524+00 TO 554+00.00	8,616		7,099		1,517
-L- RT. (NB LANES) 468+00.00 TO 494+00.00 INCL. -Y10RPD- 0+00.00 TO 4+00.00 (-L- RT. 479+55.00 TO 475+50.00)	3,308		5,102	1,794	
-L- RT. (NB LANES) 494+00.00 TO 510+00.00	10,650		1,859		8,791
-L- RT. (NB LANES) 510+00.00 TO 524+00.00	642		8,346	7,704	
-L- RT. (NB LANES) 524+00.00 TO 556+00.00	4,901		14,707	9,806	
-TA8- 15+90.41 TO 16+49.51 (DETOUR REMOVAL)	138				138
AREA 4 SUBTOTAL	30,250		65,911	46,107	10,446
WASTE TO REPLACE BORROW				-10,446	-10,446
AREA 4 TOTAL	**30,250**		**65,911**	**35,661**	**0**
-TA8- 12+50.00 TO 14+82.99 (DETOUR REMOVAL - AREA 2)	13		16	3	
-TA8- 15+07.05 TO 15+65.62 (DETOUR REMOVAL - AREA 2)	138				138
-TA6- 98+00.00 TO 112+52.29 (DETOUR REMOVAL - AREA 2)	568		216		352
PHASE II SUBTOTAL (AREA 1 + AREA 4 + DETOUR REMOVALS)	202,719		112,844	35,664	125,539
WASTE TO REPLACE BORROW				-35,664	-35,664
PHASE II TOTAL	**202,719**		**112,844**	**0**	**89,875**
PHASE III					
AREA 5 (-L- NB LANES BETWEEN -Y9SBL- AND -SR2- SERVICE ROAD DETOURS)					
-L- RT. (NB LANES) 409+00.00 TO 414+00.00	6,167		5		6,162
-L- RT. (NB LANES) 414+00.00 TO 439+00.00 INCL. -Y9NBL- 0+00.00 TO 5+84.38 (-L- RT. 419+82.28 TO 414+00.00)	34,669		16,921		17,748
-Y9NBL- 5+84.38 TO 34+00.00	22,199		5,838		16,361
-Y9NBL- 34+00.00 TO 59+00.00 INCL. -Y9LPA- 27+26.17 TO 31+17.16 (-Y9NBL- 34+00.00 TO 37+89.86)	1,404		2,885	1,481	
-Y9NBL- 59+00.00 TO 66+00.00	3,856		305		3,551
-Y13- 10+12.28 TO 15+25.00	146		30		116
-TA2- 40+43.83 TO 52+90.89 (DETOUR REMOVAL)	612				612
AREA 5 SUBTOTAL	69,053		25,984	1,481	44,550
WASTE TO REPLACE BORROW				-1,481	-1,481
AREA 5 TOTAL	69,053		25,984	0	43,069
-TA1- 10+45.83 TO 26+44.50 (DETOUR REMOVAL - AREA 3)	3,189		107		3,082
-TA3- 32+96.54 TO 45+03.94 (DETOUR REMOVAL - AREA 1)	261				261
-TA4- 60+41.92 TO 81+80.08 (DETOUR REMOVAL - AREA 2)	11,142		18		11,124
-TA9- 32+27.13 TO 43+19.69 (DETOUR REMOVAL - AREA 3)	698				698
-TA5- 65+38.46 TO 81+00.00 (DETOUR REMOVAL -AREA 3)	1,628		373		1,255
-TA8- 16+73.25 TO 17+32.57 (DETOUR REMOVAL - AREA 3)	117				117
-TA8- 17+56.57 TO 20+50.00 (DETOUR REMOVAL - AREA 3)	112				112
-TA7- 98+00.00 TO 112+51.85 (DETOUR REMOVAL - AREA 3)	326				326
PHASE III SUBTOTAL (AREA 5 + DETOUR REMOVALS)	86,526		26,482		60,044
PHASE III TOTAL	**86,526**		**26,482**	**0**	**60,044**
PROJECT SUBTOTAL (PHASE I+II+III)	**1,685,100**		**1,464,212**	**0**	**220,888**
ESTIMATED LOSS DUE TO CLEARING & GRUBBING	-20,000				-20,000
GRAND TOTAL (CUBIC YARDS)	**1,665,100**		**1,464,212**	**0**	**200,888**
SAY (CUBIC YARDS)	**1,665,100**	**0**		**0**	

ESTIMATED SHOULDER BORROW = SAY 66,690 CY
PAVEMENT STRUCTURE VOLUME: -L- = 24,050 CY -SR2- = 9,879 CY -SR4- = 9,889 CY -SR5- = 5,675 CY -Y9NBL- (INCL. -Y9LPA-) = 4,584 CY -Y9SBL- (INCL. -Y9LPA-) = 10,447 CY
PAVEMENT STRUCTURE VOLUME: -Y10RPA- = 1,139 CY -Y10LPA- = 204 CY -Y10RPD- = 1,443 CY -Y10LPD- = 25 CY -Y8REV- = 283 CY
ESTIMATED DRAINAGE DITCH EXCAVATION = 4,570 CY

THE FOLLOWING QUANTITIES ARE PER THE "GEOTECHNICAL REPORT - DESIGN AND CONSTRUCTION RECOMMENDATIONS" LETTER DATED JULY 10, 2012)

ESTIMATED SHALLOW UNDERCUT= 15,200 CY	(CONTINGENCY, AS DIRECTED BY THE ENGINEER.)
ESTIMATED CLASS IV SUBGRADE STABILIZATION = 28,800 TONS	(CONTINGENCY, FOR SHALLOW UNDERCUT AREAS, AS DIRECTED BY THE ENGINEER.
ESTIMATED UNDERCUT = 2,000 CY	(CONTINGENCY, 1,000 CY, FOR UNDERCUT BENEATH EMBANKMENTS; 1,000 CY, UNDERCUT IN PAVEMENT SUBGRADES. ALL, AS DIRECTED BY THE ENGINEER.)
ESTIMATED SELECT GRANULAR MATERIAL = 29,700 CY	(27,700 CY, FOR EMBANKMENT CONSTRUCTION IN SOFT, WET AREAS; 1,000 CY, CONTINGENCY, TO REPLACE UNDERCUT BENEATH EMBANKMENTS; 1,000 CY, CONTINGENCY, TO REPLACE UNDERCUT IN PAVEMENT SUBGRADES. ALL, AS DIRECTED BY THE ENGINEER.)

NOTE: DETOURS TA1, TA4, TA5, TA6, TA7, TA8, & TA9 TIE TO PROPOSED CONSTRUCTION. THEREFORE, EARTHWORK FOR THESE DETOURS IS CALCULATED USING THE ASSUMPTION THAT SOME OR ALL OF THE PROPOSED EARTHWORK NECESSARY FOR L, Y10RPA, Y10RPD, SR2, SR4, & SR5 HAS BEEN CONSTRUCTED. THE DETOUR EARTHWORK QUANTITIES REFLECT ANY ADDITIONAL EARTHWORK NECESSARY TO CONSTRUCT THE DETOURS BASED ON THE AFOREMENTIONED PROPOSED EARTHWORK BEING IN PLACE. SEE DETOUR CROSS SECTIONS.

PROJ. REFERENCE NO.	SHEET NO.
R-3421C	3-R

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	MCRAE FAMILY, LLC
2	4, 5	DEBRA B. WALLACE ET AL
2A	5	RICHMOND COUNTY
3	5, 6, 20, 21	DAN LEWIS ALLEN, JR. ET AL
4	5	FREDERICK T. BROWN
5	5, 6, 7, 21, 24	DAN L. ALLEN, ROGER H. ALLEN, GREGORY B. ALLEN
5A	24	BRAD HUTTON ALLEN
6	6, 20	SANTONIA L. ROBINSON
7	7, 20	ALLEN BROTHERS TIMBER COMPANY
8	7	FAYE P. ATKINSON
9	7	JOHN B. GARRETT
10		NO LONGER USED
11	7, 24	PHYLLIS P. WATERS
11A	7, 24	PHYLLIS P. WATERS, FAYE P. ATKINSON, CARL W. ATKINSON
11B	7, 24	CHERYL SPEIGHT
12	7	WILLIAM WINDLEY
13	7	WILLIAM WINDLEY
14		NO LONGER USED
15		NO LONGER USED
16	7	HUMANE SOCIETY OF RICHMOND COUNTY, INC
17	7, 8	MARIA RIOS
18	7, 8	TRENDEE BOSTICK
19	8	DELPHINA C. YATES
20	8	ANNA THOMAS
21	8	LORENZA NICHOLSON
22		NO LONGER USED
23	8	SUE SPENCER
24	8	SHARNETTE STANBACK
25	8	GUY C. BRYANT
26	8, 9	GUY C. BRYANT
27	8	MATTIE C. THOMAS
28	8	NATHANIEL H. THOMAS
29	8, 9	COMMUNITY INVESTMENT NETWORK, LLC
30	9, 10, 11, 25	VICTOR GOODMAN ESTATE
31	9	MATTIE C. THOMAS
32	9	MILES WORTH
33	9	HAROLD M. HINES
34	9, 10	SAMARITAN COLONY, INC.
35	10	FRANCIS M. PARKER
36	10, 11	BRUCE LUTHER
37	10, 11, 25	STEVE R. WILLIAMS
38	11	EUGENE McINTYRE
39	8, 9, 11, 25	CARLYE HAYWOOD
40	11, 12	VICTOR GOODMAN ESTATE
41	11	VICTOR GOODMAN, JR.
42	11	W. GARRETT JOHNSON
42A	11	WENDELL JOHNSON
43	11	CHARLIE W. WOODELL
44	11, 12	ROY LEE BERRY, III
45	11 ,25	JEANETTE H. ROPER
46	12, 13	TROY LUMBER SALES CORPORATION
47		NO LONGER USED
48	12, 13	ROY L. BERRY, II
49	13, 14	JOAN H. HAMMER
50	13, 14	ANNIE WEBB
51	14	ELTON D. SMITH
52	14, 15	KEMAL SHAFFIE

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
53	14	ORA M. SMITH
54	14	GEORGE MCINTYRE
55	14	EDWARD R. CURRIE
56	14, 15	ROGER H. ALLEN
57	15, 16	JOHNNY B. JOHNSON, JR.
58	15	EDWARD R. CURRIE
58Z	15	EDWARD R. CURRIE
59	15, 16	RANDALL STRICKLAND
60	16	THE LEO F. & WILLIE W. HAWKINS TRUST
61	16, 17	JAMES E. WITHERSPOON
62	16, 17	AMERICAN TIMBERLAND II, LLC
63	16	CITY OF ROCKINGHAM
64	17	FRANK MILLS
65		NO LONGER USED
65A	17, 18	CARL H. DAWKINS, JR
65B	18	JIMMY BRENT KING, ET AL
66	17, 18	R.W. GOODMAN
67	18, 26	MYRA C. SCOTT
68	18	LEON RADFORD
69	18	MICHAEL R. TAYLOR
70	18, 19	SHIRLEY HUDSON
71	19	JOSEPH G. DAVIS, JR
72	18, 19	BRADY LEE CARPENTER & WIFE RUBY CARPENTER
73	19	EMMA ELLERBE & HUSBAND ROLYN ELLERBE
74	19	JOSEPH G DAVIS JR & WIFE BETTY DAVIS
75	20	JAMES B. COVINGTON
76	20	REX A. CROUCH
77	20	FRANCIS ALLEN
78	20	HARMONY BAPTIST CHURCH
79	21	GREGORY B. ALLEN
80	21, 23, 24	SAMUEL CROUCH, JR.
81	21	CARTLEDGE CREEK BAPTIST CHURCH
82	21, 23	DOUGLAS S. ALLEN
83	22, 23	JC EVERETTE PROPERTIES, LLC
83A		NO LONGER USED
84	22	ROBERT E. MORGAN
85	22, 23	ALBEMARLE OIL HOLDINGS, LLC
86	23	DOUGLAS S. ALLEN
87	23	ETHEL P. ALLEN
88	23	WILLIAM POPE
89	23	JEREMY S. FESPERMAN
90	23	BANNER WILLIAMS
91	23	NICOLE ADAMS
92	23, 24	EVERETTE INDUSTRIAL DEVELOPMENT, LLC
93	24	THOMAS C. ALLEN
94	24	ALLEN BROTHERS TIMBER COMPANY
95	11, 25	ROBERT DURDEN
96	25	GERALD W. WITHERSPOON
97	25	GILBERT EVANS
98	25	DAVID B. WITHERSPOON
99	18, 26	DAVID C. STEWART, JR.
100	26	CURTIS C. DAWKINS
101	26	CARL H. DAWKINS, JR.
102	26	GLORIA ATKINS

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 3-6-2013

HYDRAULICS ENGINEER: SEAL 19680 — 3/6/13 — PAUL ATKINSON

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NO.27 FOR -L- PROFILE

"GRADING ONLY" NOTE

ROADWAY CONSTRUCTION SHOWN ON THIS SHEET WITH THE "GRADING ONLY" NOTE WILL NOT BE PAVED UNDER THIS CONTRACT. ANY GUARDRAIL, SHOULDER BERM GUTTER, OR CURB AND GUTTER SHOWN IN THESE LOCATIONS WILL NOT BE CONSTRUCTED UNDER THIS CONTRACT AND ARE SHOWN FOR THE CONTRACTORS USE IN THE GRADING OPERATIONS.

NAD 83/95

END STATE PROJECT R-3421B
BEGIN STATE PROJECT R-3421C
-L- POT STA. 355+00.00

MCRAE FAMILY, LLC
DB 1105 PG 59
PLAT SLIDE 583-J

-L- ST 352+24.67

BEGIN CONSTRUCTION
-L- POT STA. 354+25.00 (RT)

BEG. SHOULDER BERM GUTTER STA. 352+24.67 -L-

RIP RAP ENERGY DISSIPATOR BASIN

TYPE 'A' 2GI

CAT-I

BL-182 BL-183 BL-184 BL-185 BL-186

-L-

PROP. DOUBLE FACE CABLE GUIDERAIL

N 69° 32' 13.9" E

MEDIAN GUIDERAIL ANCHOR (FUT.)

MEDIAN GUIDERAIL (FUTURE)

CL I RIPRAP

CLASS IV W/METHOD B INSTALLATION & BURIED 0.4 FEET.

CLASS IV W/METHOD B INSTALLATION & BURIED 0.6 FEET.

30" CLASS IV W/METHOD B INSTALLATION & BURIED 0.4 FEET.

48" CLASS IV W/METHOD B INSTALLATION & BURIED 0.6 FEET.

24" CSP

Rod & Lug Connections & Sleeve Gaskets & 2 Elbows

HDWL

CLASS B RIP RAP EST. 8 TONS EST. 21 SY FF

TOE PROTECTION

BEGIN SHOULDER BERM GUTTER STA. 349+00 -L-

GRAU 350

BM# 26

BDO

-L- CS 350+24.67

MCRAE FAMILY, LLC
DB 1105 PG 59
PLAT SLIDE 583-J

355

799.99' N08°20'03"W

DEBRA B. WALLACE ET AL
DB 738 PG 823
PLAT SLIDE 580-B

+29.30 -L- 175' LT

R/W TO BE ACQUIRED UNDER R-3421B

BEGIN FENCE (WW)

END SBG STA. 358+20 -L- RT.

FLAT GRATE 2GI

15" RCP-V

FLAT GRATE 2GI GRAU 350

18" RCP-V

BEGIN SBG STA. 355+00 -L- LT. & RT. TIE TO EX. SBG

GRADING ONLY

END SBG STA. 355+70 -L- RT.

FLAT GRATE 2GI

15" CSP W/2 ELBOWS

30" CSP

JB W/MH

ROD & LUG W/SLEEVE GASKETS

2GI-A

24" CSP

ROD & LUG W/ SLEEVE GASKETS

+54.09 -L- 175' RT

BEGIN FENCE (WW)

+25.00 -L- 175' RT

STD. BERM DITCH STA. 358+57 TO STA. 360+90 -L- RT.

DEBRA B. WALLACE ET AL
DB 738 PG 823
PLAT SLIDE 580-B

263.13' N76°21'06"E

CEIP

ECM

-L- STA. 359+00

MATCH LINE SEE SHEET NO.5

-L-

PI Sta 338+47.89
Δ = 17°47'46" (RT)
D = 0°45'00.0"
L = 2,372.81
T = 1,196.04
R = 7,639.44
SE = 0.03
D.S. = 70 mph

PIs Sta 350+91.34
Θs = 0°45'00"
Ls = 200.00
ST = 66.67
LT = 133.33

REVISIONS

3/6/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-6-2013

HYDRAULICS ENGINEER
SEAL 19680 3/6/13 ENGINEER PAUL ATKINSON

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

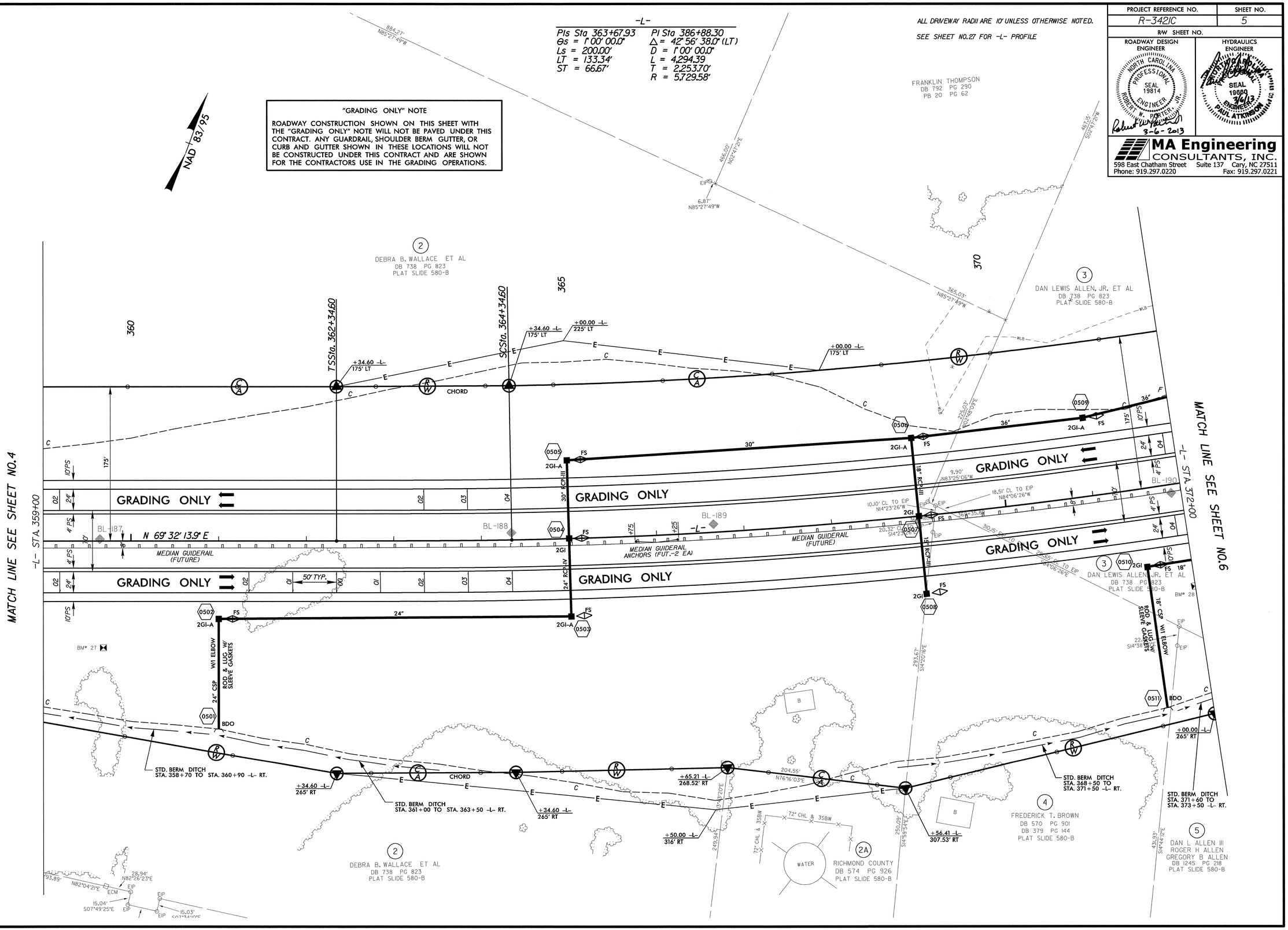
SEE SHEET NO.27 FOR -L- PROFILE

-L-

PIs Sta 363+67.93	PI Sta 386+88.30
Θs = 1° 00' 00.0"	Δ = 42° 56' 38.0" (LT)
Ls = 200.00'	D = 1° 00' 00.0"
LT = 133.34'	L = 4,294.39
ST = 66.67'	T = 2,253.70'
	R = 5,729.58'

"GRADING ONLY" NOTE

ROADWAY CONSTRUCTION SHOWN ON THIS SHEET WITH THE "GRADING ONLY" NOTE WILL NOT BE PAVED UNDER THIS CONTRACT. ANY GUARDRAIL, SHOULDER BERM GUTTER, OR CURB AND GUTTER SHOWN IN THESE LOCATIONS WILL NOT BE CONSTRUCTED UNDER THIS CONTRACT AND ARE SHOWN FOR THE CONTRACTORS USE IN THE GRADING OPERATIONS.



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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POWER, JR.

HYDRAULICS ENGINEER: SEAL 19660 ENGINEER PAUL A. THOMPSON

3-6-2013

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NOS. 27 AND 28 FOR -L- PROFILE
SEE SHEET NO. 40 FOR -Y8REV- PROFILE

-L-
PI Sta 386+88.30
Δ = 42° 56' 38.0" (LT)
D = 1° 00' 00.0"
L = 4,294.39
T = 2,253.70'
R = 5,729.58'

"GRADING ONLY" NOTE

ROADWAY CONSTRUCTION SHOWN ON THIS SHEET WITH THE "GRADING ONLY" NOTE WILL NOT BE PAVED UNDER THIS CONTRACT. ANY GUARDRAIL, SHOULDER BERM GUTTER, OR CURB AND GUTTER SHOWN IN THESE LOCATIONS WILL NOT BE CONSTRUCTED UNDER THIS CONTRACT AND ARE SHOWN FOR THE CONTRACTORS USE IN THE GRADING OPERATIONS.

FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-27

EARTH BERM MEDIAN PIER PROTECTION NOTE:
SEE CROSS-SECTIONS AND ROADWAY STANDARD DRAWING 225.08 FOR SPECIAL MEDIAN GRADING FROM: -L- STA. 373+50.00 TO 384+50.00
NOTE: 4" CONC. SLOPE PROTETION TO BE PLACED UNDER FUTURE PAVING CONTRACT.

NAD 83/95

MATCH LINE SEE SHEET NO.20
-Y8REV- STA. 30+00

MATCH LINE SEE SHEET NO.5
-L- STA. 372+00

MATCH LINE SEE SHEET NO.7
-L- STA. 384+80

-Y8REV- STA. 38+10
MATCH LINE SEE SHEET NO.21

S 23° 05' 05.0" E

BEGIN SBG STA. 30+54 -Y8REV- (LT)
15" CSP W/2 ELBOWS
ROD & LUG W/ SLEEVE GASKETS
FLAT GRATE TB 2GI
CLASS B RIP RAP EST. 1 TON 5 SY FF
+44.00 -Y8REV- 130.61' & 145' LT
+69.00 -Y8REV- 131.64' & 145' LT
+00.00 -Y8REV- 136' RT
+00.00 -Y8REV- 120' RT
+20.05 -Y8REV- 130' RT
+50.00 -Y8REV- 135' LT
+25.00 -L- 175' LT
+75.00 -L- 175' LT
+52.91 -L- 265' LT
+67.89 -L- 175' LT
+00.00 -L- 175' RT
+00.00 -Y8REV- 100' RT
+25.00 -L- 175' RT
+50.00 -Y8REV- 100' RT
+30.00 -Y8REV- 125' LT
+70.00 -Y8REV- 125' LT
+00.00 -L- 265' RT
+05.00 -L- 175' & 190' LT
+31.00 -L- 210' LT
+55.00 -L- 175' & 210' LT
+72.00 -L- 175' & 180' LT
+12.00 -L- 195' LT
+20.00 -L- 175' LT

BEGIN APPROACH SLAB -Y8REV- STA. 32+90.35
BEGIN BRIDGE -Y8REV- STA. 33+04.49

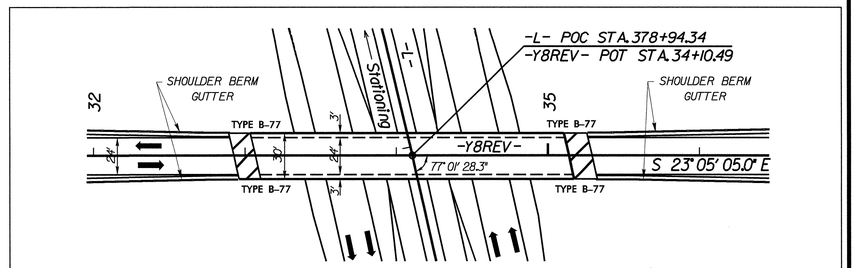
5' BASE DITCH W/CL. I RIP RAP SEE DETAIL Q3 EST. 53.5 CY DDE EST. 58.4 TONS RIP RAP EST. 100.5 SY F.F.
5' BASE DITCH W/CL. I RIP RAP SEE DETAIL Q3 EST. 57.2 TONS RIP RAP EST. 20.6 CY DDE EST. 98.6 SY F.F.
5' BASE DITCH W/CLASS I RIP RAP SEE DETAIL Q3 EST. 41.7 CY DDE EST. 100.6 TONS RIP RAP EST. 172.5 SY F.F.

CLASS I RIP RAP EST. 10 TONS 23 SY FF
CLASS B RIP RAP EST. 2 TONS 7 SY FF
CLASS I RIP RAP EST. 21 TONS EST. 47 SY FF
CLASS B RIP RAP EST. 1 TON EST. 5 SY FF
CLASS B RIP RAP EST. 2 TON EST. 7 SY FF
BURY PIPE END 0.3'
MAX. PIPE SLOPE = 1.0%
BURY 0.3' BOTH ENDS
BURY 0.6' BOTH ENDS
BURY 1.0' BOTH ENDS
600' TAPER
300' TAPER
END SBG STA. 384+50 -L- LT.
BEGIN SBG STA. 372+40 -L- LT.
TYPE B-77
END FENCE (WW)
BEGIN FENCE (WW)
15" RCP-V
18" RCP-III
24" RCP-III
36" RCP-III
24" CSP W/2 ELBOWS
15" CSP W/2 ELBOWS
15" CSP W/1 ELBOW
JB W/MH
BDO
HW
FS
CAT-1
GRAU 350
BM# 28
BL-191
BL-192
BL-193
GRADING ONLY
SPECIAL MEDIAN GRADING
MEDIAN GUIDERAIL (FUTURE)
MEDIAN GUIDERAIL ANCHOR (FUT.)
EARTH BERM MEDIAN PIER PROTECTION
ENVIRONMENTALLY SENSITIVE AREA
TOE PROTECTION SEE DETAIL T3 CLASS I RIP RAP EST. 113 TONS EST. 175 SY FF
STANDARD 'V' DITCH W/PSRM SEE DETAIL C3 EST. 95.7 CY DDE EST. 247 SY PSRM
LATERAL 'V' DITCH W/PSRM EST. 169 CY DDE EST. 279 SY PSRM SEE DETAIL G
STD. BERM DITCH STA. 371+60 TO STA. 373+50 -L- RT.
-L- POC Sta. 378+94.34
-Y8REV- POT Sta. 34+10.49
END BRIDGE -Y8REV- STA. 35+16.49
END APPROACH SLAB -Y8REV- STA. 35+30.63
181.52' TO POC, EIP 598.04' CL TO POC, S 01° 34' 55" E

DAN LEWIS ALLEN, JR. ET AL
DB 738 PG 823
PLAT SLIDE 580-B

SANTONIA L. ROBINSON
DB 1248 PG 161
DB 780 PG 460
PLAT SLIDE 580-B

DAN L ALLEN III
ROGER H ALLEN
GREGORY B ALLEN
DB 1245 PG 218
PLAT SLIDE 580-B



DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -Y8REV- OVER -L-

REVISIONS

3/6/2013
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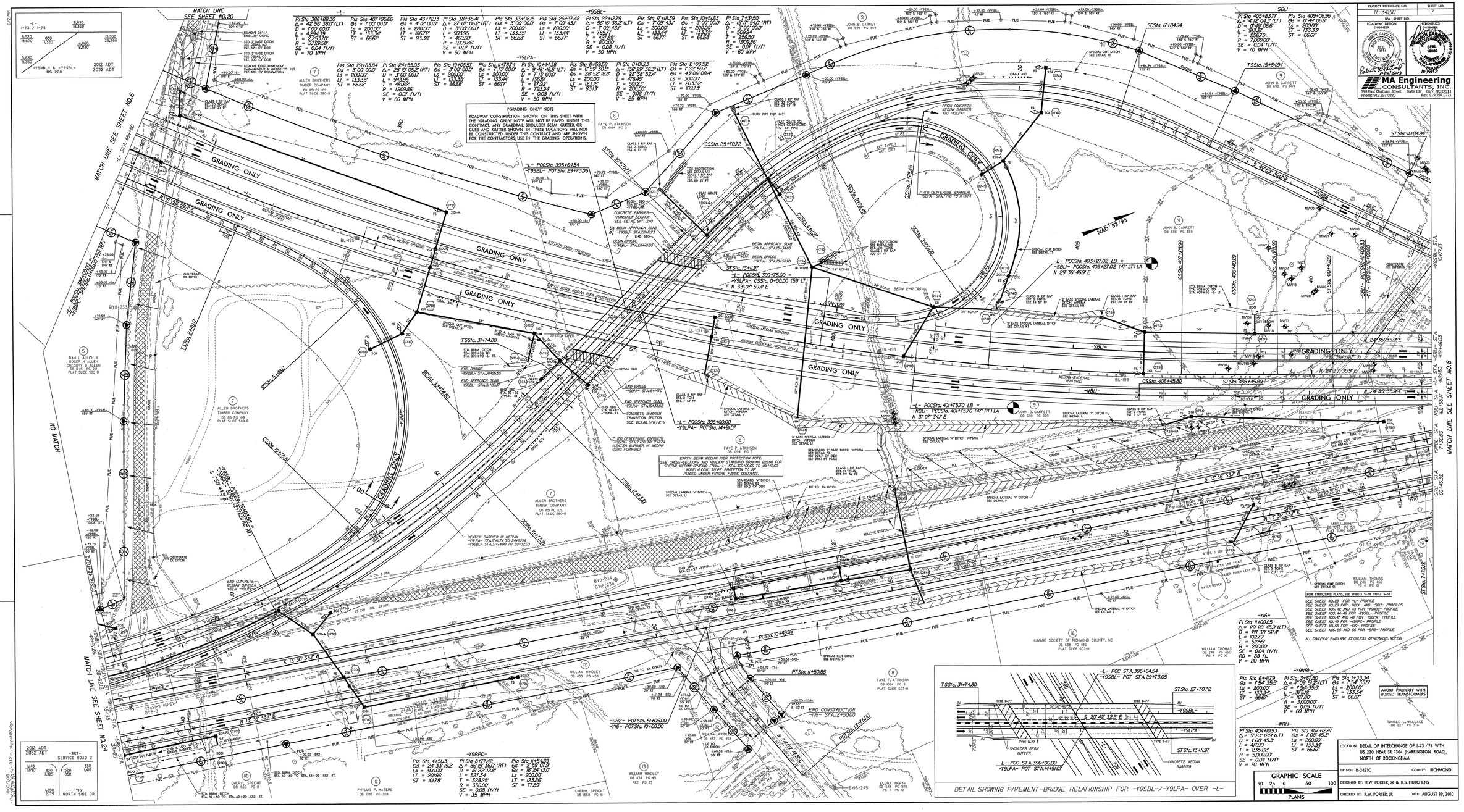

MATCH LINE SEE SHEET NO.20
MATCH LINE SEE SHEET NO.6
MATCH LINE SEE SHEET NO.8
MATCH LINE SEE SHEET NO.24
NO MATCH
GRADING ONLY
NAD 83/95
-L- PI Sta 386+88.30 Δ = 42° 56' 39.2" (LT) D = 1°00'00.0" L = 4294.39' T = 2253.70' R = 5729.58' SE = 0.04 ft/ft V = 70 MPH
-L- PI Sta 407+95.66 Δ = 1°00'00.0" Ls = 200.00' LT = 133.34' ST = 66.67'
-L- PI Sta 43+72.13 Δ = 4° 12' 00.0" Ls = 280.00' LT = 186.72' ST = 93.38'
-L- PI Sta 38+35.41 Δ = 27° 07' 05.2" (RT) D = 3°00'00.0" L = 903.95' T = 460.67' R = 1909.86' SE = 0.07 ft/ft V = 60 MPH
-L- PI Sta 33+08.15 Δ = 3°00'00.0" Ls = 200.00' LT = 133.35' ST = 66.68'
-L- PI Sta 26+37.48 Δ = 9°09'49.3" Ls = 200.00' LT = 133.44' ST = 66.77'
-Y9SBL- PI Sta 22+10.79 Δ = 56° 16' 36.2" (LT) D = 7°09'49.3" L = 765.77' T = 427.85' R = 801.00' SE = 0.08 ft/ft V = 50 MPH
-Y9SBL- PI Sta 17+18.39 Δ = 7°09'49.3" Ls = 200.00' LT = 133.44' ST = 66.77'
-Y9SBL- PI Sta 10+15.63 Δ = 3°00'00.0" Ls = 200.00' LT = 133.35' ST = 66.68'
-Y9SBL- PI Sta 7+31.50 Δ = 15° 11' 54.0" (RT) D = 3°00'00.0" L = 509.94' T = 256.50' R = 1909.86' SE = 0.07 ft/ft V = 60 MPH
-SBU- PI Sta 405+83.77 Δ = 4° 12' 04.3" (LT) D = 0°49'06.6" L = 513.27' T = 256.73' R = 7,000.00' SE = 0.04 ft/ft V = 70 MPH
-SBU- PI Sta 409+06.96 Δ = 0°49'06.6" Ls = 200.00' LT = 133.33' ST = 66.67'
-Y9SBL- PI Sta 29+83.84 Δ = 3°00'00.0" Ls = 200.00' LT = 133.35' ST = 66.68'
PI Sta 24+55.03 Δ = 28° 15' 06.2" (RT) D = 3°00'00.0" L = 943.95' T = 481.62' R = 1909.86' SE = 0.07 ft/ft V = 60 MPH
Pls Sta 19+06.57 Δ = 3°00'00.0" Ls = 200.00' LT = 133.35' ST = 66.68'
Pls Sta 11+78.74 Δ = 7°17'00.0" Ls = 200.00' LT = 133.44' ST = 66.77'
PI Sta 10+44.38 Δ = 91°46' 46.5" (LT) D = 7°13'00.0" L = 135.56' T = 87.92' R = 793.94' SE = 0.08 ft/ft V = 50 MPH
Pls Sta 8+59.58 Δ = 6°59'30.0" Ls = 200.00' LT = 121.18' ST = 83.13'
PI Sta 8+01.23 Δ = 136°52' 38.3" (LT) D = 28°38'52.4" L = 476.45' T = 519.23' R = 200.00' SE = 0.08 ft/ft V = 25 MPH
Pls Sta 2+03.52 Δ = 8°22'50.0" Ls = 300.00' LT = 203.52' ST = 101.73'
-L- POCSta. 395+64.54 -Y9SBL- POT Sta. 29+73.05
-L- POCSta. 403+27.02 LB = -SBU- POCSta. 403+27.02 (41' LT) LA N 29° 36' 46.9" E
-L- POCSta. 399+75.00 = -Y9LPA- CSSta. 0+00.00 (59' LT) N 33°07' 59.4" E
-L- POCSta. 40+75.70 LB = -NBU- POCSta. 40+75.70 (41' RT) LA N 31°07' 34.1" E
-L- POCSta. 396+00.00 -Y9LPA- POT Sta. 14+91.07
-L- POC STA. 395+64.54 -Y9SBL- POT STA.29+73.05
-L- POC STA. 396+00.00 -Y9LPA- POT STA.14+91.07
DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -Y9SBL-/-Y9LPA- OVER -L-
-Y9RPC- Pls Sta 4+54.13 Gs = 24°33'15.2" Ls = 300.00' LT = 201.96' ST = 101.78'
PI Sta 9+77.42 Δ = 85°19'36.0" (RT) D = 16°22'12.2" L = 521.34' T = 338.26' R = 350.00' SE = 0.08 ft/ft V = 35 MPH
Pls Sta 11+54.39 Gs = 2°59'01.3" Gs = 15°24'13.0" Ls = 200.00' LT = 123.96' ST = 77.88'
-SR2- POT Sta. 51+05.00 -Y16- POT Sta. 10+00.00
END CONSTRUCTION -Y16- STA.12+50.00
PCSta. 10+48.09
PTSta. 11+50.88
-Y16- PI Sta 11+00.65 Δ = 29° 26' 45.9" (LT) D = 29° 59' 52.4" L = 102.79' T = 52.65' R = 200.00' SE = 0.04 ft/ft RO = 88 ft. V = 20 MPH
-Y9NBL- Pls Sta 6+46.79 Gs = 1°54'35.5" Ls = 200.00' LT = 133.34' ST = 66.67'
PI Sta 3+87.80 Δ = 7°09'51.2" (LT) D = 1°54'35.5" L = 375.12' T = 187.80' R = 3,000.00' SE = 0.05 ft/ft V = 60 MPH
Pls Sta 1+33.34 Gs = 1°54'35.5" Ls = 200.00' LT = 133.34' ST = 66.67'
-NBU- Pls Sta 404+10.93 Δ = 5°23'12.9" (LT) D = 1°08'45.3" L = 470.00' T = 235.22' R = 5,000.00' SE = 0.04 ft/ft V = 70 MPH
Pls Sta 401+12.47 Gs = 1°08'45.3" Ls = 200.00' LT = 133.34' ST = 66.67'
FOR STRUCTURE PLANS, SEE SHEETS 5-28 THRU 5-58
SEE SHEET NO.09 FOR -L- PROFILE
SEE SHEET NO.29 FOR -NBU- AND -SBU- PROFILES
SEE SHEET NOS.42 AND 43 FOR -Y9NBL- PROFILE
SEE SHEET NOS.44+46 FOR -Y9SBL- PROFILE
SEE SHEET NOS.47 AND 48 FOR -Y9LPA- PROFILE
SEE SHEET NO.49 FOR -Y9RPC- PROFILE
SEE SHEET NO.68 FOR -Y16- PROFILE
SEE SHEET NOS.55 AND 56 FOR -SR2- PROFILE
ALL DRAWING RADII ARE 10' UNLESS OTHERWISE NOTED.
AVOID PROPERTY WITH BURIED TRANSFORMERS
"GRADING ONLY" NOTE
ROADWAY CONSTRUCTION SHOWN ON THIS SHEET WITH THE "GRADING ONLY" NOTE WILL NOT BE PAVED UNDER THIS CONTRACT. ANY GUARDRAIL SHOULDER BERM, GUTTER, OR CURB AND GUTTER SHOWN IN THESE LOCATIONS WILL NOT BE CONSTRUCTED UNDER THIS CONTRACT AND ARE SHOWN FOR THE CONTRACTORS USE IN THE GRADING OPERATIONS.
EARTH BERM MEDIAN PIER PROTECTION NOTE: SEE CROSS-SECTIONS AND ROADWAY STANDARD DRAWING 225.08 FOR SPECIAL MEDIAN GRADING FROM -L- STA. 390+00.00 TO 404+00.00 NOTE: 4" CONC. SLOPE PROTECTION TO BE PLACED UNDER FUTURE PAVING CONTRACT.
2012 ADT 2032 ADT -L- I-73 / I-74 8,690 16,350 9,520 19,070 820 1,520 8,460 16,350 9,520 19,070 -Y9NBL- & -Y9SBL- US 220 2012 ADT 2032 ADT
2012 ADT 2032 ADT -SR2- SERVICE ROAD 2 1,140 1,930 830 1,325 520 850 830 1,415 1,350 2,275 -Y16- NORTH SIDE DR
PROJECT REFERENCE NO. R-3421C SHEET NO. 7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER
MA Engineering CONSULTANTS, INC.
599 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
LOCATION: DETAIL OF INTERCHANGE OF I-73 /74 WITH US 220 NEAR SR 1304 (HARRINGTON ROAD), NORTH OF ROCKINGHAM.
TIP NO.: R-3421C COUNTY: RICHMOND
DESIGNED BY: R.W. PORTER, JR & K.S. HUTCHINS
CHECKED BY: R.W. PORTER, JR DATE: AUGUST 19, 2010
GRAPHIC SCALE 50 25 0 50 100 PLANS

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 4-2-2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19680 ENGINEER PAUL ATKINSON — 4/1/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NOS. 29 AND 30 FOR -NBLI- AND -SBLI- PROFILES
SEE SHEET NO. 42 FOR -Y9NBL- PROFILE
SEE SHEET NO. 69 FOR -Y17- PROFILE

-Y9SBL-

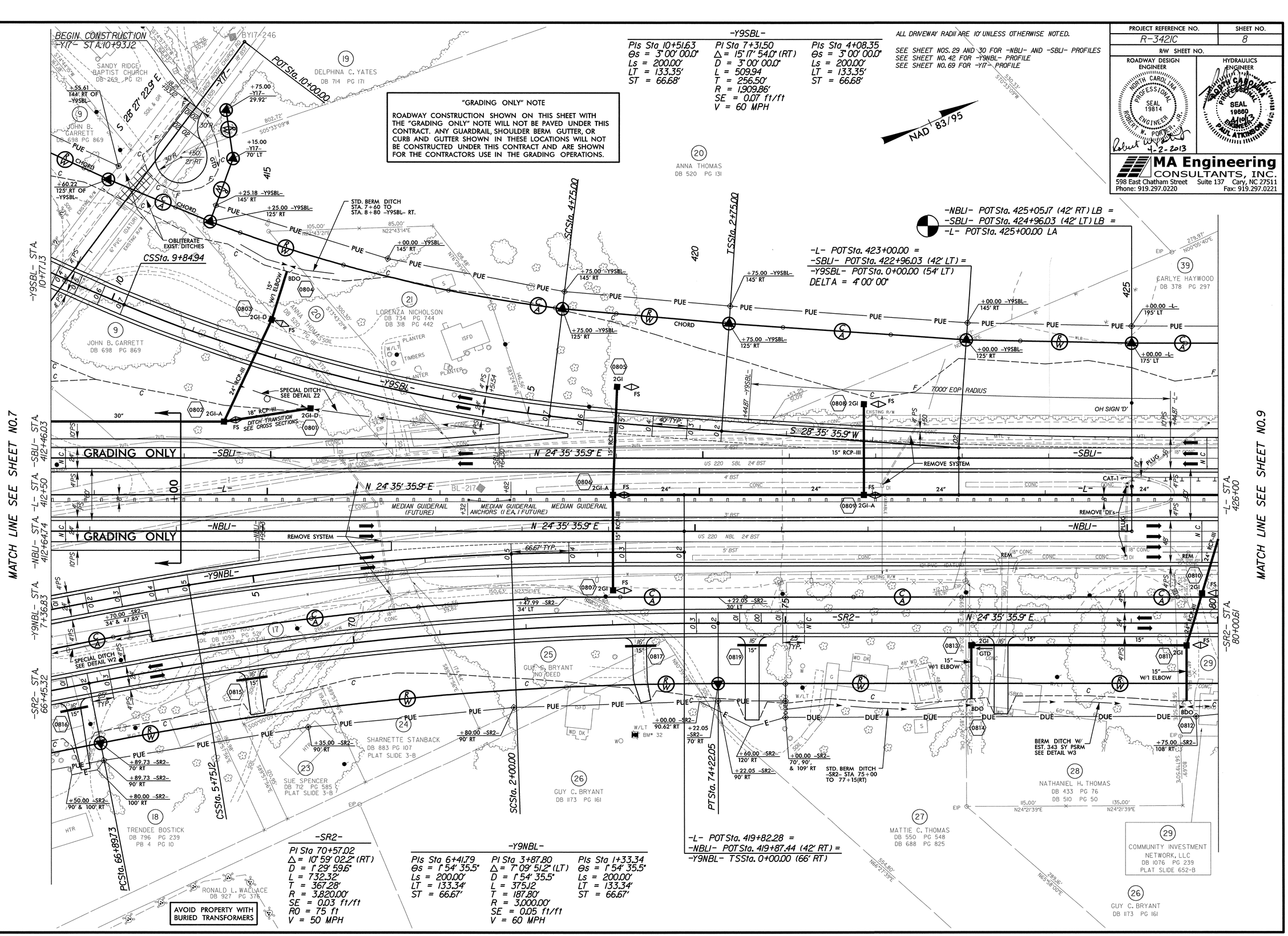
PIs Sta 10+51.63	PI Sta 7+31.50	PIs Sta 4+08.35
Θs = 3° 00' 00.0"	Δ = 15° 17' 54.0" (RT)	Θs = 3° 00' 00.0"
Ls = 200.00'	D = 3° 00' 00.0"	Ls = 200.00'
LT = 133.35'	L = 509.94	LT = 133.35'
ST = 66.68'	T = 256.50'	ST = 66.68'
	R = 1,909.86'	
	SE = 0.07 ft/ft	
	V = 60 MPH	

"GRADING ONLY" NOTE

ROADWAY CONSTRUCTION SHOWN ON THIS SHEET WITH THE "GRADING ONLY" NOTE WILL NOT BE PAVED UNDER THIS CONTRACT. ANY GUARDRAIL, SHOULDER BERM GUTTER, OR CURB AND GUTTER SHOWN IN THESE LOCATIONS WILL NOT BE CONSTRUCTED UNDER THIS CONTRACT AND ARE SHOWN FOR THE CONTRACTORS USE IN THE GRADING OPERATIONS.

-NBLI- POT Sta. 425+05.17 (42' RT) LB =
-SBLI- POT Sta. 424+96.03 (42' LT) LB =
-L- POT Sta. 425+00.00 LA

-L- POT Sta. 423+00.00 =
-SBLI- POT Sta. 422+96.03 (42' LT) =
-Y9SBL- POT Sta. 0+00.00 (54' LT)
DELTA = 4° 00' 00"



-SR2-

PI Sta 70+57.02	
Δ = 10° 59' 02.2" (RT)	
D = 1° 29' 59.6"	
L = 732.32'	
T = 367.28'	
R = 3,820.00'	
SE = 0.03 ft/ft	
R0 = 75 ft	
V = 50 MPH	

-Y9NBL-

PIs Sta 6+41.79	PI Sta 3+87.80	PIs Sta 1+33.34
Θs = 1° 54' 35.5"	Δ = 1° 09' 51.2" (LT)	Θs = 1° 54' 35.5"
Ls = 200.00'	D = 1° 54' 35.5"	Ls = 200.00'
LT = 133.34'	L = 375.12	LT = 133.34'
ST = 66.67'	T = 187.80'	ST = 66.67'
	R = 3,000.00'	
	SE = 0.05 ft/ft	
	V = 60 MPH	

-L- POT Sta. 419+82.28 =
-NBLI- POT Sta. 419+87.44 (42' RT) =
-Y9NBL- TS Sta. 0+00.00 (66' RT)

REVISIONS

4/1/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	9
R/W SHEET NO.	

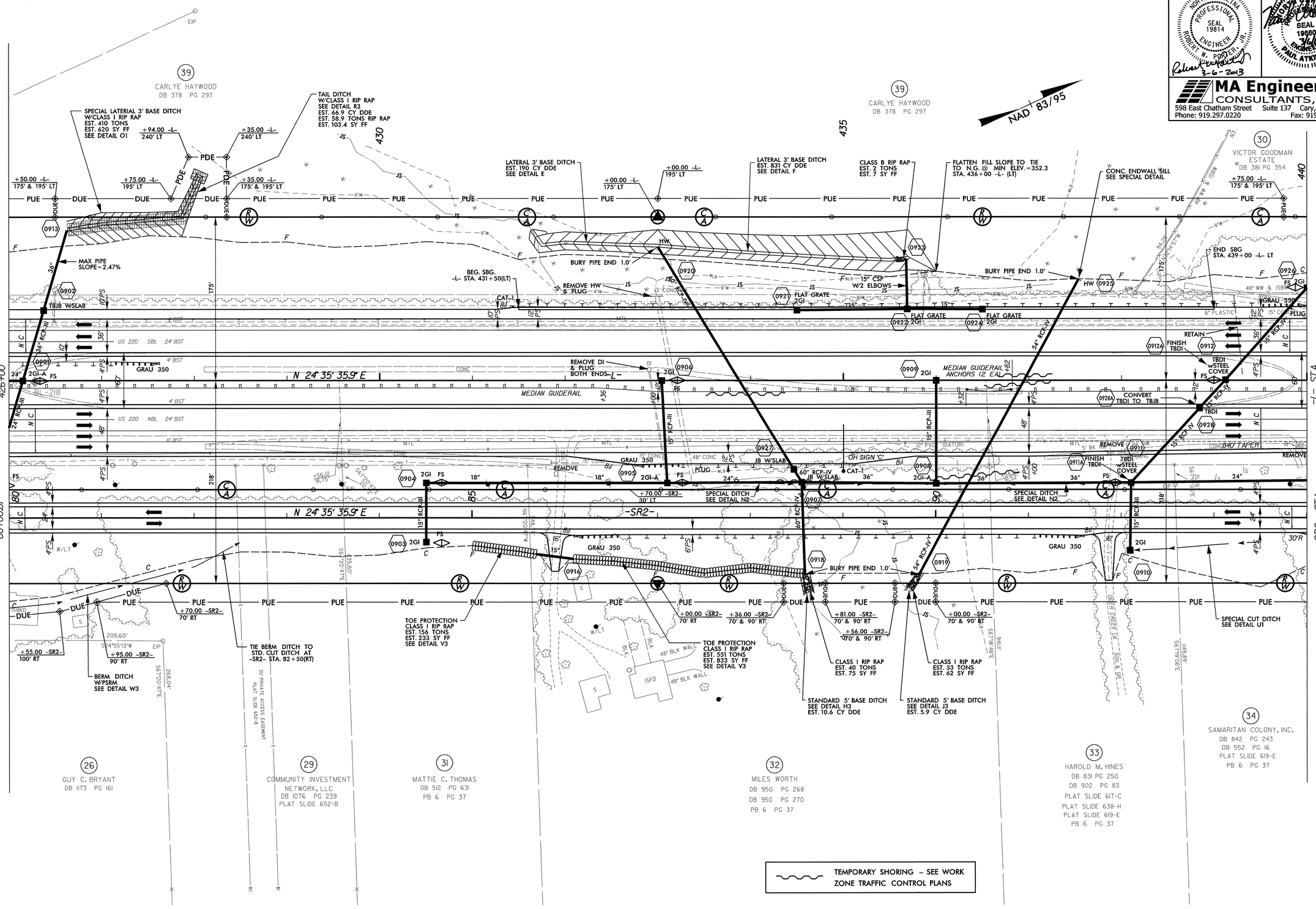
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 3-6-2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19880 ENGINEER PAUL ATKINSON JR. — 3/6/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NOS. 30 AND 31 FOR -NBL- AND -SBU- PROFILES
SEE SHEET NO.57 FOR -SR2- PROFILE



REVISIONS

3/6/2013
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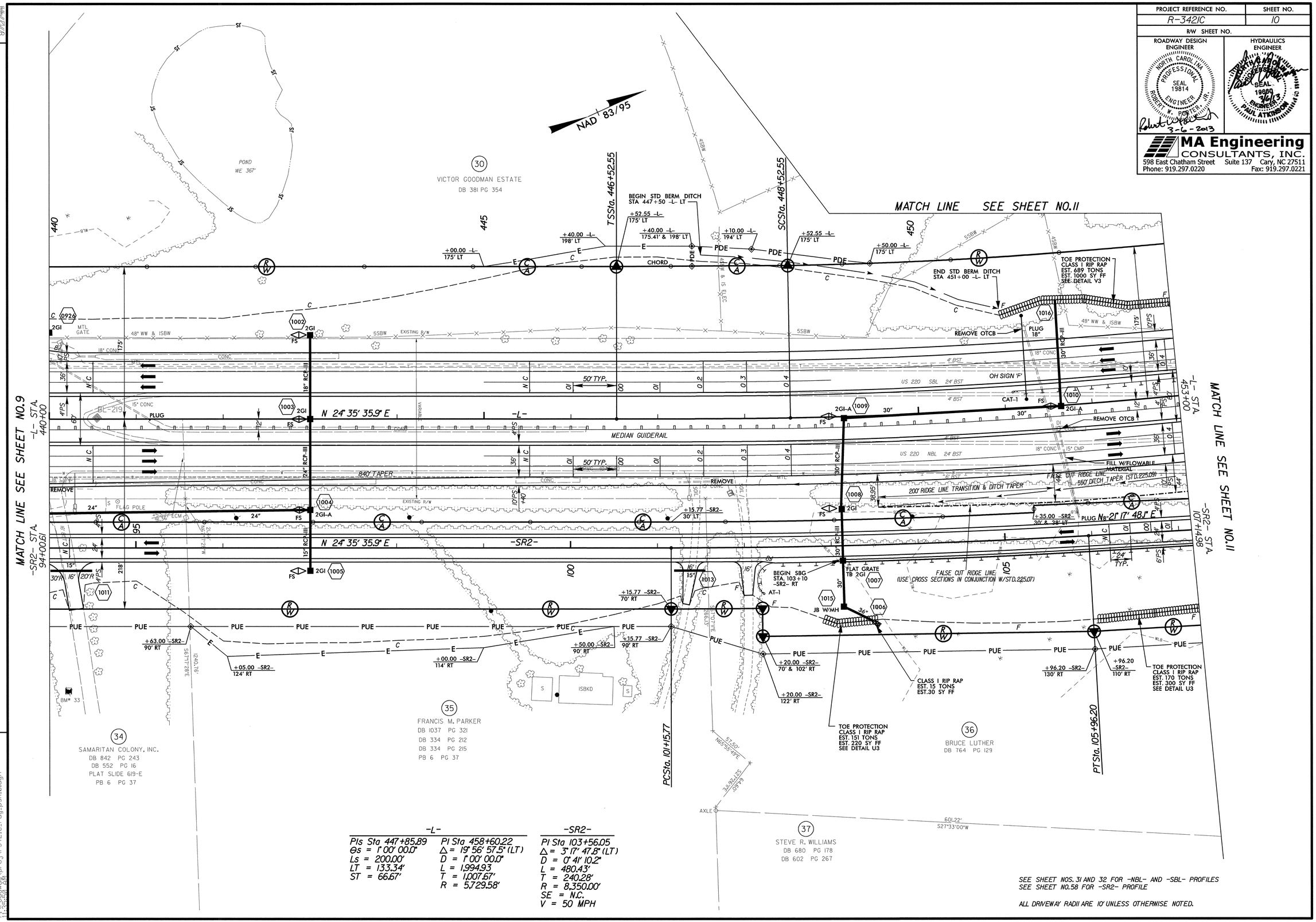
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter, Jr. 3-6-2013

NORTH CAROLINA PROFESSIONAL SEAL 19680 ENGINEER PAUL ATKINSON JR.
3/6/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS



-L-	
PIs Sta 447+85.89	PI Sta 458+60.22
Θs = 1° 00' 00.0"	Δ = 19° 56' 57.5" (LT)
Ls = 200.00'	D = 1° 00' 00.0"
LT = 133.34'	L = 1,994.93
ST = 66.67'	T = 1,007.67'
	R = 5,729.58'

-SR2-
PI Sta 103+56.05
Δ = 3° 17' 47.8" (LT)
D = 0° 41' 10.2"
L = 480.43'
T = 240.28'
R = 8,350.00'
SE = N.C.
V = 50 MPH

SEE SHEET NOS. 31 AND 32 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO.58 FOR -SR2- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

3/6/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	11

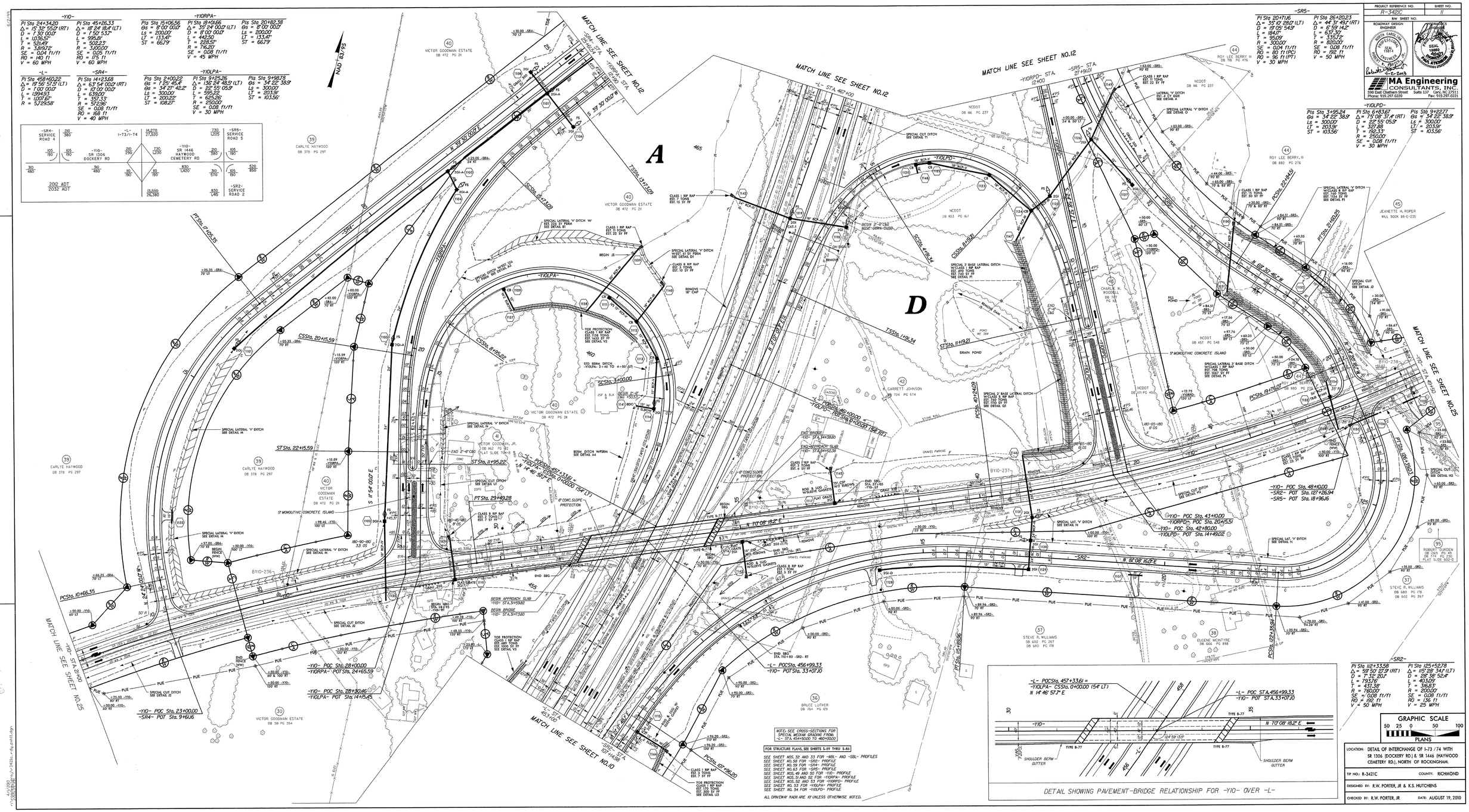
R/W SHEET NO.

ROADWAY DESIGN ENGINEER

PRELIMINARY

11-2-2013

MA Engineering CONSULTANTS, INC.
206 East Chatham Street Suite 127 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



NOTE: SEE CROSS-SECTIONS FOR SPECIAL MEDIAN GRADING FROM: -L- STA.454+00.00 TO 460+00.00

FOR STRUCTURE PLANS, SEE SHEETS S-59 THRU S-86

SEE SHEET NOS. 32 AND 33 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 58 FOR -SR2- PROFILE
SEE SHEET NO. 59 FOR -SR4- PROFILE
SEE SHEET NO. 63 FOR -SR5- PROFILE
SEE SHEET NOS. 49 AND 50 FOR -Y10- PROFILE
SEE SHEET NOS. 51 AND 52 FOR -Y10RPA- PROFILE
SEE SHEET NOS. 52 AND 53 FOR -Y10RPD- PROFILE
SEE SHEET NO. 53 FOR -Y10LPA- PROFILE
SEE SHEET NO. 54 FOR -Y10LPD- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 3-6-2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19860 ENGINEER PAUL ATKINSON JR. — 3/6/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

-SR4-
PI Sta 31+68.57
Δ = 34° 33' 21.6" (LT)
D = 4° 05' 33.2"
L = 844.36'
T = 435.46'
R = 1,400.00'
SE = 0.065 ft/ft
RO = 156 ft
V = 50 MPH

-Y10RPA-
PIs Sta 2+73.44
Θs = 4° 00' 00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

PI Sta 6+78.09
Δ = 26° 33' 21.6" (RT)
D = 4° 00' 00.0"
L = 663.90
T = 338.02'
R = 1,432.39'
SE = 0.08 ft/ft
V = 60 MPH

PIs Sta 10+70.67
Θs = 4° 00' 00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

-Y10RPD-
PIs Sta 1+33.37
Θs = 4° 00' 00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

PI Sta 4+47.76
Δ = 19° 37' 35.5" (LT)
D = 4° 00' 00.0"
L = 490.66
T = 247.76'
R = 1,432.39'
SE = 0.08 ft/ft
V = 60 MPH

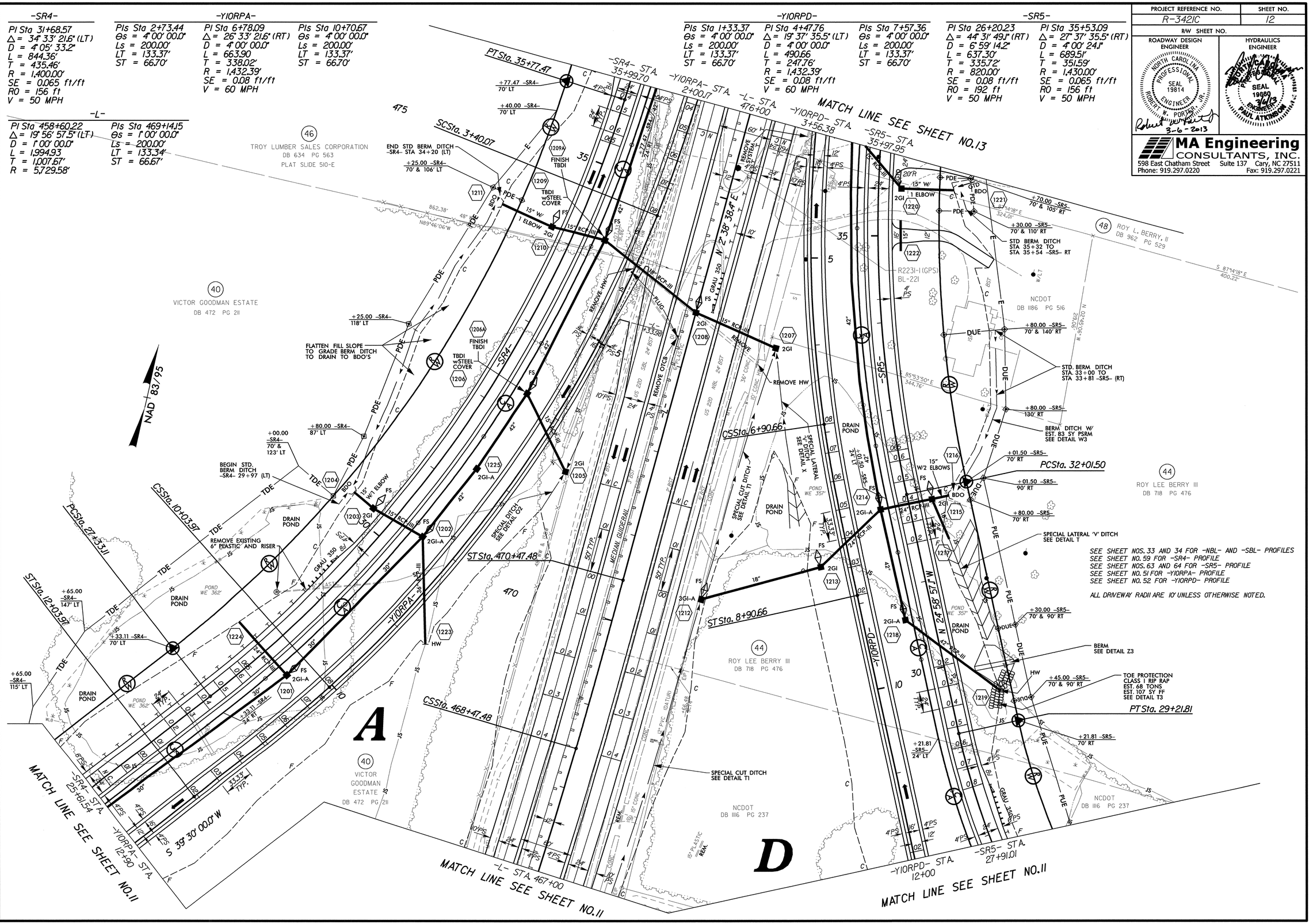
PIs Sta 7+57.36
Θs = 4° 00' 00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

-SR5-
PI Sta 26+20.23
Δ = 44° 31' 49.1" (RT)
D = 6° 59' 14.2"
L = 637.30'
T = 335.72'
R = 820.00'
SE = 0.08 ft/ft
RO = 192 ft
V = 50 MPH

PI Sta 35+53.09
Δ = 27° 37' 35.5" (RT)
D = 4° 00' 24.1"
L = 689.51'
T = 351.59'
R = 1,430.00'
SE = 0.065 ft/ft
RO = 156 ft
V = 50 MPH

-L-
PI Sta 458+60.22
Δ = 19° 56' 57.5" (LT)
D = 1° 00' 00.0"
L = 1,994.93
T = 1,007.67'
R = 5,729.58'

PIs Sta 469+14.15
Θs = 1° 00' 00.0"
Ls = 200.00'
LT = 133.34'
ST = 66.67'



REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	13
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. FOSTER, JR. — 3-6-2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19880 ENGINEER PAUL ATKINSON — 3/6/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS

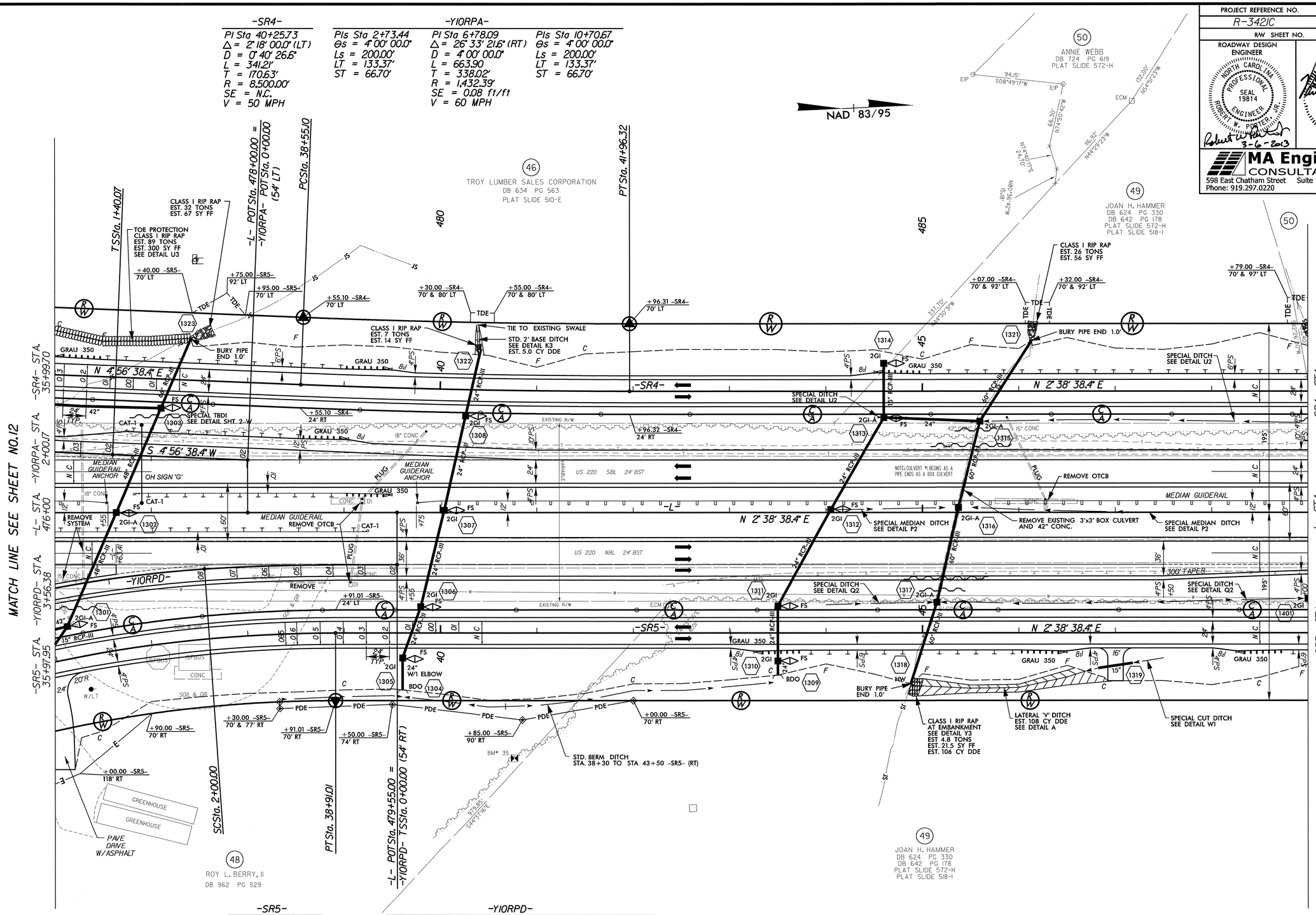
07/23/1998

-SR4-
PI Sta 40+25.73
Δ = 2° 18' 00.0" (LT)
D = 0° 40' 26.6"
L = 341.21'
T = 170.63'
R = 8,500.00'
SE = N.C.
V = 50 MPH

-Y10RPA-
PIs Sta 2+73.44
θs = 4° 00' 00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

PI Sta 6+78.09
Δ = 26° 33' 21.6" (RT)
D = 4° 00' 00.0"
L = 663.90
T = 338.02'
R = 1,432.39'
SE = 0.08 ft/ft
V = 60 MPH

PIs Sta 10+70.67
θs = 4° 00' 00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'



-SR5-
PI Sta 35+53.09
Δ = 27° 37' 35.5" (RT)
D = 4° 00' 24.1"
L = 689.51'
T = 351.59'
R = 1,430.00'
SE = 0.065 ft/ft
RO = 156 ft
V = 50 MPH

-Y10RPD-
PIs Sta 1+33.37
θs = 4° 00' 00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

PI Sta 4+47.76
Δ = 19° 37' 35.5" (LT)
D = 4° 00' 00.0"
L = 490.66
T = 247.76'
R = 1,432.39'
SE = 0.08 ft/ft
V = 60 MPH

PIs Sta 7+57.36
θs = 4° 00' 00.0"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

TEMPORARY SHORING - SEE WORK ZONE TRAFFIC CONTROL PLANS

SEE SHEET NOS. 34 AND 35 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NOS. 59 AND 60 FOR -SR4- PROFILE
SEE SHEET NO. 64 FOR -SR5- PROFILE
SEE SHEET NO. 51 FOR -Y10RPA- PROFILE
SEE SHEET NO. 52 FOR -Y10RPD- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

3/6/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	14
R/W SHEET NO.	

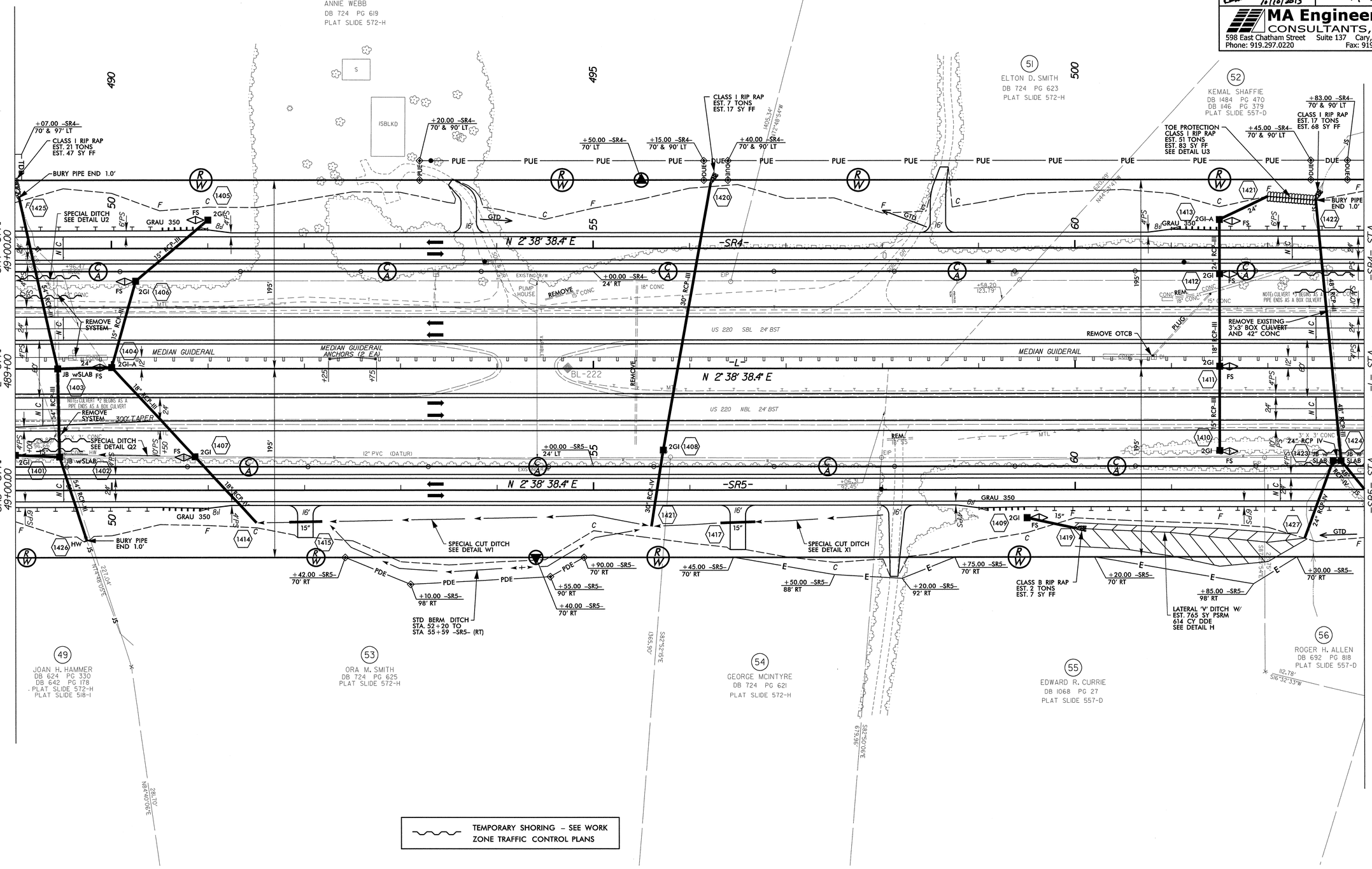
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
10/10/2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
10/9/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NOS. 35 AND 36 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 60 FOR -SR4- PROFILE
SEE SHEET NOS. 64 AND 65 FOR -SR5- PROFILE



REVISIONS

10/10/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	15
RW SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 3-6-2013

HYDRAULICS ENGINEER: SEAL 19660 ENGINEER PAUL ATKINSON — 3/6/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NOS. 36 AND 37 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NOS. 60 AND 61 FOR -SR4- PROFILE
SEE SHEET NO. 65 FOR -SR5- PROFILE

FOR CULVERT PLANS, SEE SHEETS C-1 THRU C-8

NAD 83/95

MATCH LINE SEE SHEET NO.14 -L- STA. 503+00 -SR4- STA. 63+00 -SR5- STA. 63+00

MATCH LINE SEE SHEET NO.16 -L- STA. 517+00 -SR4- STA. 77+00 -SR5- STA. 77+00

CLASS I RIP RAP EST. 20 TONS (TOTAL) EST. 32 SY FF

LATERAL 3' BASE DITCH W/CLASS I RIP RAP EST. 47 TONS EST. 93 SY FF EST. 22 CY DDE SEE DETAIL J

LATERAL 3' BASE DITCH EST. 65 CY DDE SEE DETAIL F

SPECIAL LATERAL 3' BASE DITCH SEE DETAIL N1

SPECIAL LATERAL 3' BASE DITCH SEE DETAIL N1

SPECIAL DITCH SEE DETAIL R2

SPECIAL MEDIAN DITCH SEE DETAIL S2

SPECIAL MEDIAN DITCH SEE DETAIL S2

SPECIAL DITCH SEE DETAIL T2

REMOVE EXISTING 6' X 6' BOX CULVERT

REMOVE OTCB

REMOVE SYSTEM

REMOVE SYSTEM

2 @ 9' x 9' RCBC

30" RCP-III

24" RCP-III

18" RCP-III

15" RCP-III

GRAU 350

GM SIGN '102' CAT-1

MEDIAN GUIDERAIL

MEDIAN GUIDERAIL ANCHORS (2 EA)

FILL POND

POND WE 309'

SOIL & GR

US 220 SBL 24' BST

US 220 NBL 24' BST

APPROXIMATE JUNCTION OF PIPE AND CULVERT ELEVATION N/A

DOUBLE BARRELL BOX CULVERT

-BL-223

N 2° 38' 38.4" E

-SR4-

-SR5-

-L-

+18.00 -SR4- 132' LT

+45.00 -SR4- 90' LT

+60.00 -SR4- 90' LT

+00.00 -SR4- 90' LT

+00.00 -SR4- 70' LT

+85.00 -SR4- 90' & 105' LT

+15.00 -SR4- 90' & 105' LT

+40.00 -SR4- 70' & 90' LT

+00.00 -SR4- 24' RT

+00.00 -SR5- 24' LT

+45.00 -SR5- 70' RT

+25.00 -SR5- 97' RT

+15.00 -SR5- 100' RT

+90.00 -SR5- 80' RT

+00.00 -SR5- 70' RT

+00.00 -SR5- 76' RT

+06.00 -SR5- 70' RT

+29.00 -SR5- 70' RT

+81.00 -SR5- 115' RT

+63.00 -SR5- 129' RT

BURY PIPE END 1.0'

STD BERM DITCH STA 67+25 TO STA 68+00

SPECIAL CUT DITCH SEE DETAIL W1

SPECIAL CUT DITCH SEE DETAIL W1

LATERAL 'V' DITCH EST. 88 CY DDE SEE DETAIL B

CLASS I RIP RAP AT EMBANKMENT SEE DETAIL Y3 EST. 4.6 TONS EST. 14.2 SY F.F.

15" W/1 ELBOW

52 KEMAL SHAFFIE DB 1484 PG 470 DB 1146 PG 379 PLAT SLIDE 557-D

57 JOHNNY B. JOHNSON, JR. DB 931 PG 390 PLAT SLIDE 615-H

56 ROGER H. ALLEN DB 692 PG 818 PLAT SLIDE 557-D

58 EDWARD R. CURRIE DB 690 PG 421 PLAT SLIDE 557-D

59 RANDALL STRICKLAND DB 1154 PG 359 PLAT SLIDE 557-D

322.76' N60°49'49"E

217.03' S16°32'33"W

798.70' S16°32'33"W

300.16' S87°21'07"E

TEMPORARY SHORING - SEE WORK ZONE TRAFFIC CONTROL PLANS

REVISIONS

3/6/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	16
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 3-6-2013

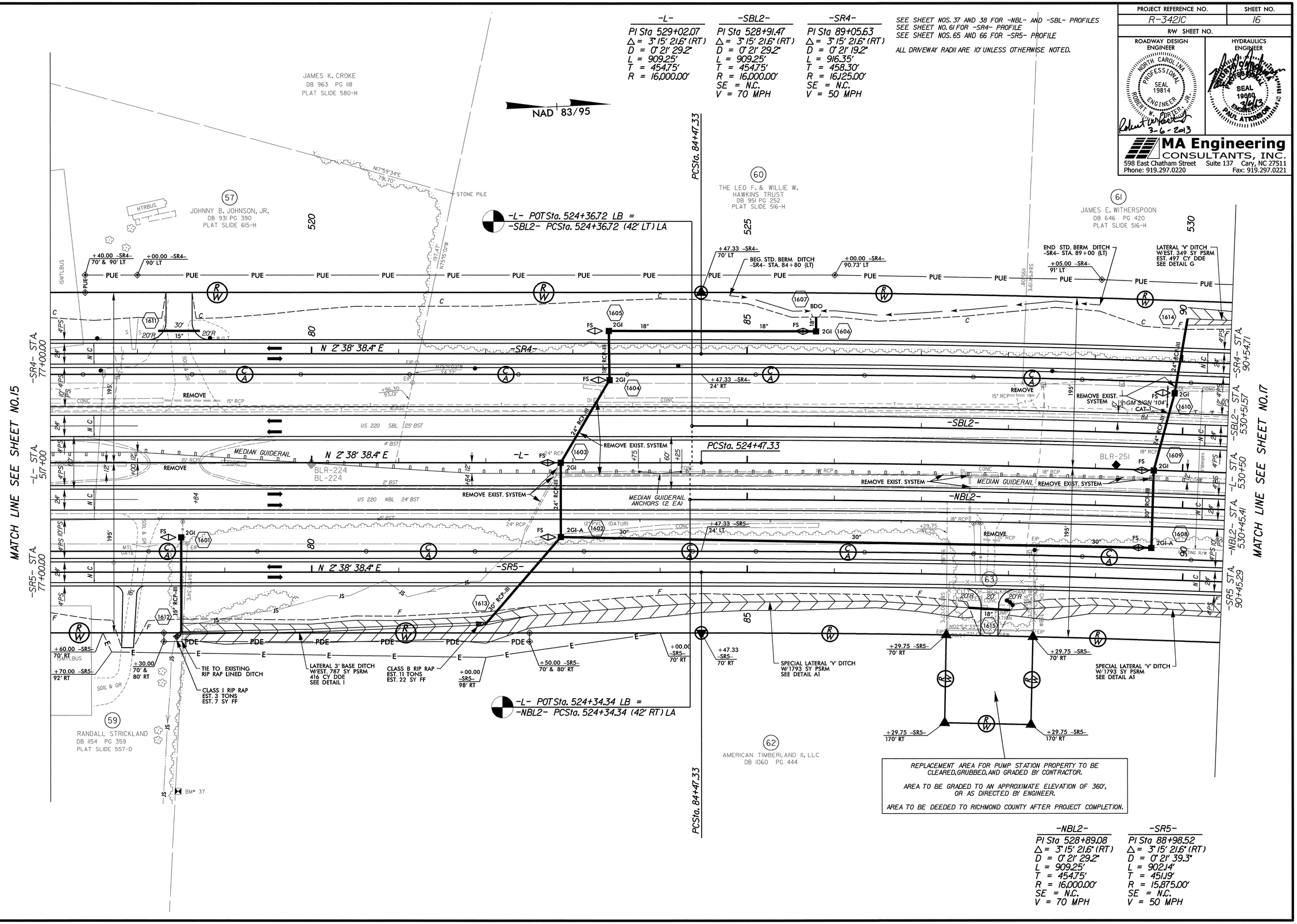
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19880 ENGINEER PAUL ATKINSON — 3/6/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

-L-	-SBL2-	-SR4-
PI Sta 529+02.07	PI Sta 528+91.47	PI Sta 89+05.63
Δ = 3° 15' 21.6" (RT)	Δ = 3° 15' 21.6" (RT)	Δ = 3° 15' 21.6" (RT)
D = 0° 21' 29.2"	D = 0° 21' 29.2"	D = 0° 21' 19.2"
L = 909.25'	L = 909.25'	L = 916.35'
T = 454.75'	T = 454.75'	T = 458.30'
R = 16,000.00'	R = 16,000.00'	R = 16,125.00'
	SE = N.C.	SE = N.C.
	V = 70 MPH	V = 50 MPH

SEE SHEET NOS. 37 AND 38 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 61 FOR -SR4- PROFILE
SEE SHEET NOS. 65 AND 66 FOR -SR5- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.



-NBL2-	-SR5-
PI Sta 528+89.08	PI Sta 88+98.52
Δ = 3° 15' 21.6" (RT)	Δ = 3° 15' 21.6" (RT)
D = 0° 21' 29.2"	D = 0° 21' 39.3"
L = 909.25'	L = 902.14'
T = 454.75'	T = 451.19'
R = 16,000.00'	R = 15,875.00'
SE = N.C.	SE = N.C.
V = 70 MPH	V = 50 MPH

REVISIONS

3/6/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	17
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
10/10/2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON JR.
10/15/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NOS. 38 AND 39 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NOS. 61 AND 62 FOR -SR4- PROFILE
SEE SHEET NO. 66 FOR -SR5- PROFILE

-L-
PI Sta 529+02.07
Δ = 3° 15' 21.6" (RT)
D = 0° 21' 29.2"
L = 909.25'
T = 454.75'
R = 16,000.00'

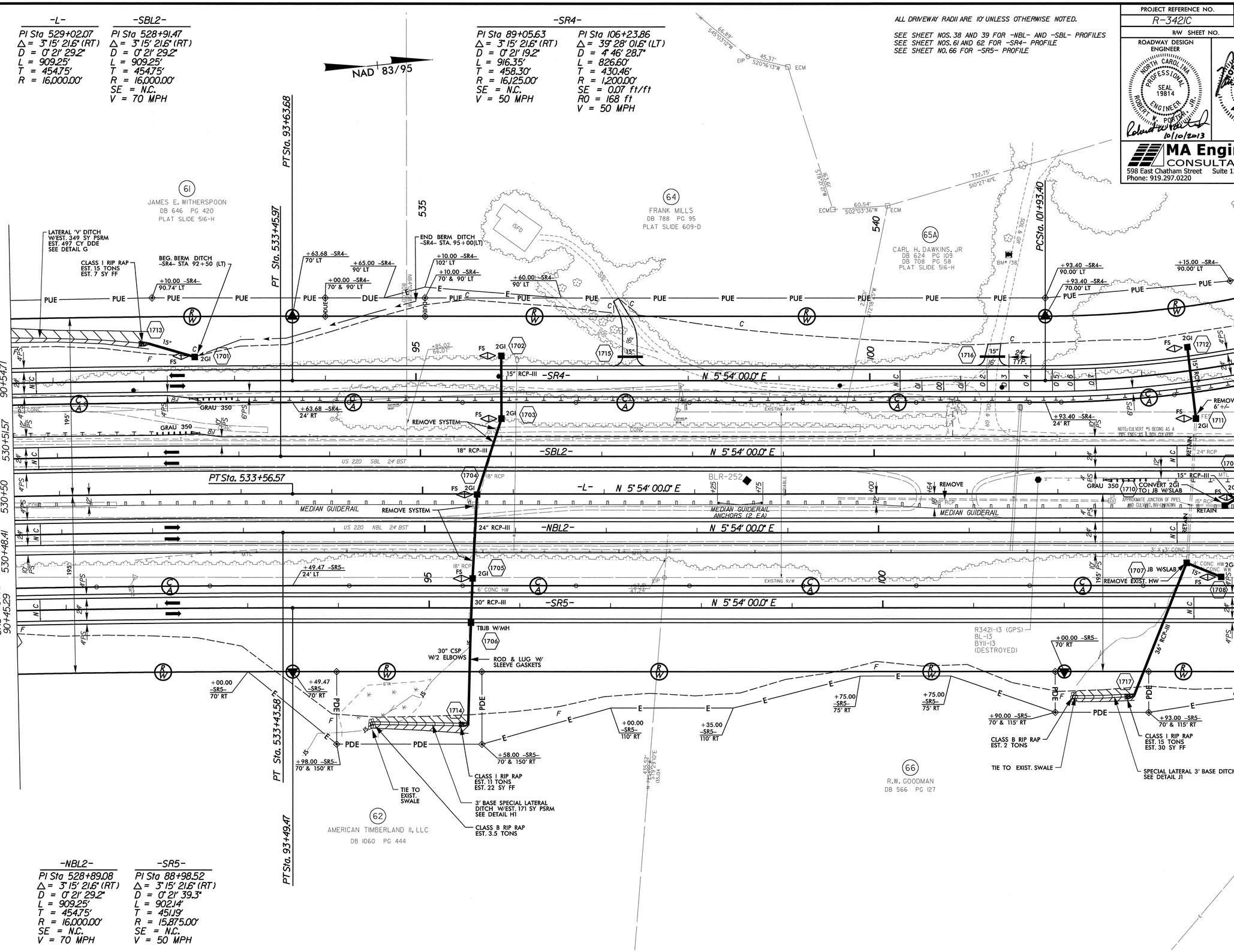
-SBL2-
PI Sta 528+91.47
Δ = 3° 15' 21.6" (RT)
D = 0° 21' 29.2"
L = 909.25'
T = 454.75'
R = 16,000.00'
SE = N.C.
V = 70 MPH

-SR4-
PI Sta 89+05.63
Δ = 3° 15' 21.6" (RT)
D = 0° 21' 19.2"
L = 916.35'
T = 458.30'
R = 16,125.00'
SE = N.C.
V = 50 MPH

PI Sta 106+23.86
Δ = 39° 28' 01.6" (LT)
D = 4° 46' 28.7"
L = 826.60'
T = 430.46'
R = 1,200.00'
SE = 0.07 ft/ft
RO = 168 ft
V = 50 MPH

-NBL2-
PI Sta 528+89.08
Δ = 3° 15' 21.6" (RT)
D = 0° 21' 29.2"
L = 909.25'
T = 454.75'
R = 16,000.00'
SE = N.C.
V = 70 MPH

-SR5-
PI Sta 88+98.52
Δ = 3° 15' 21.6" (RT)
D = 0° 21' 39.3"
L = 902.14'
T = 451.19'
R = 15,875.00'
SE = N.C.
V = 50 MPH



REVISIONS

10/10/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	18
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. 3-6-2013

HYDRAULICS ENGINEER: NORTH CAROLINA SEAL 19660 ENGINEER PAUL ATKINSON 3/6/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

-SR4-
PI Sta 106+23.86
Δ = 39° 28' 01.6" (LT)
D = 4° 46' 28.7"
L = 826.60'
T = 430.46'
R = 1,200.00'
SE = 0.07 ft/ft
RO = 168 ft
V = 50 MPH

-Y19-
PI Sta 11+56.63
Δ = 55° 13' 29.1" (LT)
D = 28° 38' 52.4"
L = 192.77'
T = 104.61'
R = 200.00'
SE = 0.05 ft/ft
RO = 75 ft
V = 15 MPH

NAD 83/95

MATCH LINE SEE SHEET NO.26

MATCH LINE SEE SHEET NO.17

MATCH LINE SEE SHEET NO.19

-SR4- POC Sta. 109+60.00
-Y19- POT Sta. 10+00.00

PT Sta. 12+44.79

END CONSTRUCTION -Y19- ST A. 12+55.00

-L- POT Sta. 551+60.19 =
-SBL2- PI Sta. 551+62.56 (41.33' LT)

END STATE PROJECT R-3421C
-L- POT Sta. 551+60.19

-L- POT Sta. 551+60.19 =
-NBL2- PI Sta. 551+57.78 (42.67' RT)

BEGIN NOISE WALL
-NW1- ST A 10+00.00
-L- ST A 545+93.58 (125' LT)

END CONSTRUCTION -SBL2- ST A. 554+34.00

END PROP. MED. GUIDERAIL -L- ST A. 556+37.00

END CONSTRUCTION -NBL2- ST A. 556+40.00

END CONSTRUCTION -Y18- ST A. 13+50.00

PT Sta. 14+55.24

-SR4- ST A. 104+08.25
-SBL2- ST A. 544+02.37
-L- ST A. 544+00
-NBL2- ST A. 543+97.59
-SR5- ST A. 103+92.90
-SBL2- ST A. 557+09.47
-L- ST A. 557+07.10
-NBL2- ST A. 557+04.70
-SR5- ST A. 117+00
-Y18- ST A. 13+30.95

SEE SHEET NO. 39 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 62 FOR -SR4- PROFILE
SEE SHEET NOS. 66 AND 67 FOR -SR5- PROFILE
SEE SHEET NO. 69 FOR -Y19- PROFILE
SEE SHEET NOS. 2-N AND 2-O FOR NOISEWALL ENVELOPE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

REVISIONS

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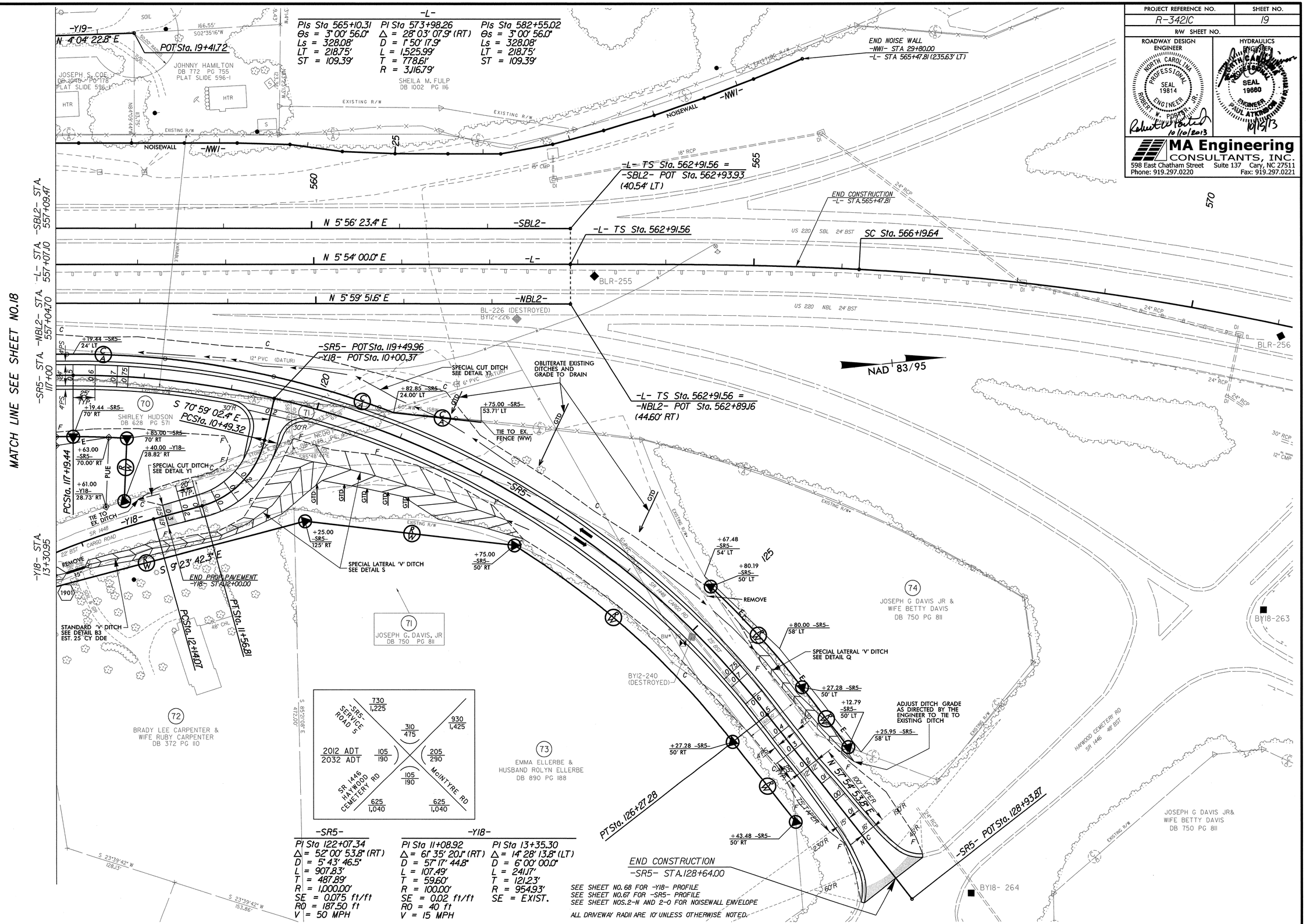
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	19
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
10/10/2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON, JR.
10/15/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



REVISIONS

07/23/99

10/10/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	20
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-6-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19680 ENGINEER PAUL ATKINSON
3/6/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
SEE SHEET NO. 67 FOR -Y8- PROFILE
SEE SHEET NO. 40 FOR -Y8REV- PROFILE

-Y8REV-
PI Sta 21+46.63
Δ = 31° 47' 00.0" (RT)
D = 2° 24' 44.8"
L = 1,317.47'
T = 676.16'
R = 2,375.00'
SE = 0.05 ft/ft
RO = 135 ft
V = 60 MPH

-Y8-
PI Sta 11+34.95
Δ = 72° 05' 43.0" (RT)
D = 57° 17' 44.8"
L = 125.83'
T = 72.78'
R = 100.00'
SE = 0.05 ft/ft
RO = 44 ft
V = STOP COND.

NAD 83/95

76 REX A. CROUCH DB 1077 PG 16 PLAT SLIDE 580-B
77 FRANCIS ALLEN DB 738 PG 817 PLAT SLIDE 580-B
78 HARMONY BAPTIST CHURCH DB 761 PG 613 PLAT SLIDE 580-B
7 ALLEN BROTHERS TIMBER COMPANY DB 851 PG 109 PLAT SLIDE 580-B
3 DAN LEWIS ALLEN, JR. ET AL DB 738 PG 823 PLAT SLIDE 580-B
6 SANTONIA L. ROBINSON DB 1248 PG 161 DB 780 PG 460 PLAT SLIDE 580-B
75 JAMES B. COVINGTON DB 516 PG 79
CLARA WALL DB 1002 PG 45 PLAT SLIDE 462-B

MATCH LINE -Y8REV- STA. 18+50
MATCH LINE -Y8- STA. 19+25 SEE SHEET NO.7
MATCH LINE SEE SHEET NO.6
-Y8REV- STA. 30+00

PT Sta. 11+88.00
POT Sta. 19+25.00
PCSta. 10+62.17
PTSta. 27+87.93
-Y8REV- POC Sta. 22+85.00
-Y8- POT Sta. 10+00.00

S 53° 07' 21.0" E
N 54° 46' 56.0" E
S 23° 05' 05.0" E
S 54° 52' 05.0" E

SR 1304 HARRINGTON RD 22' BST

SPECIAL LATERAL 'V' DITCH SEE DETAIL G1
CONC. ENDWALL SILL SEE SPECIAL DETAIL
TIE EX. DITCH
BURY 1.0' BOTH ENDS
CLASS II RIP RAP EST. 40 TONS EST. 75 SY FF
REMOVE EXIST. ROADWAY EMBANKMENT & GRADE TO NG EST. 880 C.Y. EXCAVATION
SPECIAL CUT DITCH SEE DETAIL B2
LATERAL 'V' DITCH EST. 25 CY DDE SEE DETAIL B
LATERAL 'V' DITCH EST. 59 CY DDE SEE DETAIL A
CLASS B RIP RAP EST. 3 TONS EST. 10 SY FF
SPECIAL LATERAL 'V' DITCH SEE DETAIL T
CLASS B RIP RAP EST. 2 TONS EST. 7 SY FF
CLASS I RIP RAP EST. 57 TONS EST. 104 SY FF
CLASS I RIP RAP @ EMBANKMENT SEE DETAIL Y3 EST. 11.7 TONS TOTAL EST. 26.6 SY F.F. TOTAL
CLASS B RIP RAP EST. 2 TONS EST. 7 SY FF
18" RCP-III
24" RCP-IV
84" RCP-III
15" CSP W/2 ELBOWS
ROD & LUG W/ SLEEVE GASKETS
FLAT GRATE
GRAU 350
BEGIN SBG STA. 23+45 -Y8REV- (RT)
BEGIN FENCE (WW)
EXISTING R/W
PUE
ENVIRONMENTALLY SENSITIVE AREA

BEGIN CONSTRUCTION -Y8REV- STA. 13+25.00
PCSta. 14+70.46
SPECIAL LATERAL 'V' DITCH SEE DETAIL T
TIE EX. DITCH
SPECIAL CUT DITCH SEE DETAIL A2
SPECIAL CUT DITCH SEE DETAIL B2
TIE TO EX. SWALE
PAVE WEBSTER AVE. STREET TURNOUT USING -Y8REV- PAVEMENT DESIGN
WEBSTER AVE SOIL & GR
RETAIN
18" CONC
24" CONC
MATCH LINE -Y8REV- STA. 18+50

REVISIONS

3/6/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	21
R/W SHEET NO.	

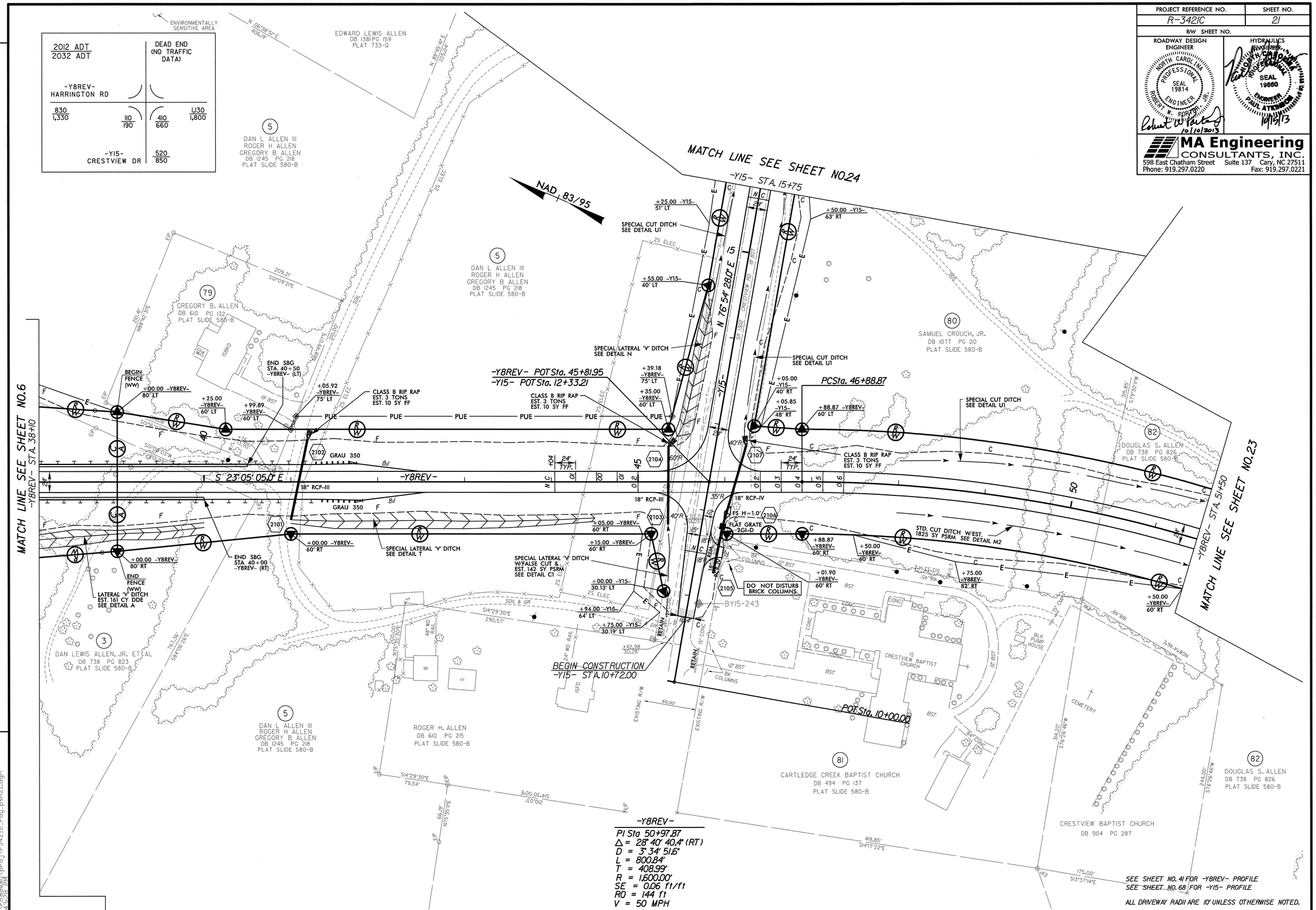
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
10/10/2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL A. TOMKINS
10/15/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS

2012 ADT / 2032 ADT	DEAD END (NO TRAFFIC DATA)
-Y8REV- HARRINGTON RD	
830 / 1,330 — 110 / 190	410 / 660 — 1,130 / 1,800
-Y15- CRESTVIEW DR	520 / 850



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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	22
R/W SHEET NO.	

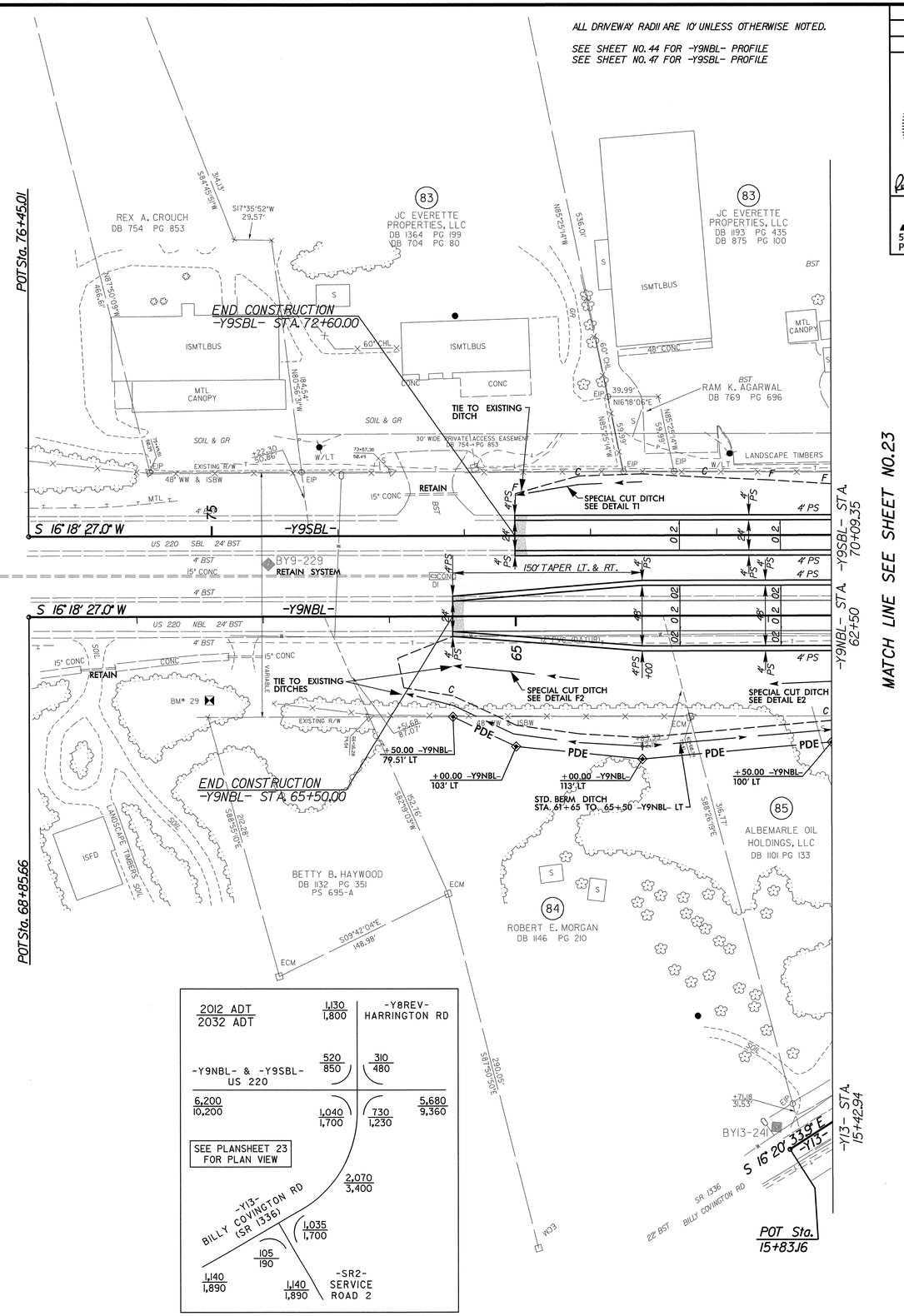
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter, Jr.
3-6-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON JR.
3/6/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NO. 44 FOR -Y9NBL- PROFILE
SEE SHEET NO. 47 FOR -Y9SBL- PROFILE



REVISIONS

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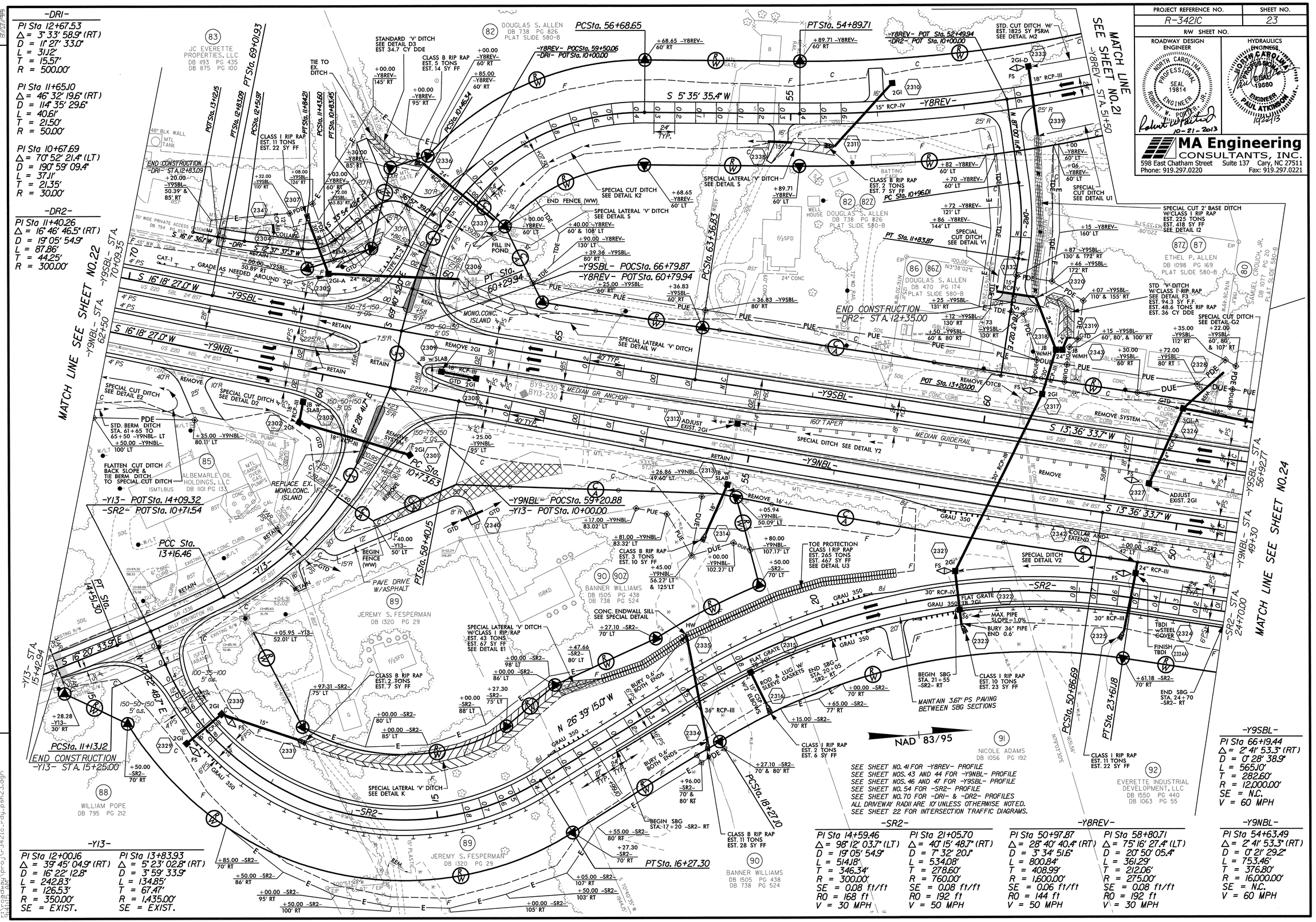
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	23
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
10-21-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
10/22/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

REVISIONS



-DRI-
PI Sta 12+67.53
Δ = 3° 33' 58.9" (RT)
D = 11° 27' 33.0"
L = 31.12'
T = 15.57'
R = 500.00'

PI Sta 11+65.10
Δ = 46° 32' 19.6" (RT)
D = 114° 35' 29.6"
L = 40.61'
T = 21.50'
R = 50.00'

PI Sta 10+67.69
Δ = 70° 52' 21.4" (LT)
D = 190° 59' 09.4"
L = 37.11'
T = 21.35'
R = 30.00'

-DR2-
PI Sta 11+40.26
Δ = 16° 46' 46.5" (RT)
D = 19° 05' 54.9"
L = 87.86'
T = 44.25'
R = 300.00'

-Y9SBL-
PI Sta 66+19.44
Δ = 2° 41' 53.3" (RT)
D = 0° 28' 38.9"
L = 565.10'
T = 282.60'
R = 12,000.00'
SE = N.C.
V = 60 MPH

-Y13-

PI Sta 12+00.16	PI Sta 13+83.93
Δ = 39° 45' 04.9" (RT)	Δ = 5° 23' 02.8" (RT)
D = 16° 22' 12.8"	D = 3° 59' 33.9"
L = 242.83'	L = 134.85'
T = 126.53'	T = 67.47'
R = 350.00'	R = 1,435.00'
SE = EXIST.	SE = EXIST.

-SR2-

PI Sta 14+59.46	PI Sta 21+05.70
Δ = 98° 12' 03.7" (LT)	Δ = 40° 15' 48.7" (RT)
D = 19° 05' 54.9"	D = 7° 32' 20.1"
L = 514.18'	L = 534.08'
T = 346.34'	T = 278.60'
R = 300.00'	R = 760.00'
SE = 0.08 ft/ft	SE = 0.08 ft/ft
R0 = 168 ft	R0 = 192 ft
V = 30 MPH	V = 50 MPH

-Y8REV-

PI Sta 50+97.87	PI Sta 58+80.71
Δ = 28° 40' 40.4" (RT)	Δ = 75° 16' 27.4" (LT)
D = 3° 34' 51.6"	D = 20° 50' 05.4"
L = 800.84'	L = 361.29'
T = 408.99'	T = 212.06'
R = 1,600.00'	R = 275.00'
SE = 0.06 ft/ft	SE = 0.08 ft/ft
R0 = 144 ft	R0 = 192 ft
V = 50 MPH	V = 30 MPH

-Y9NBL-
PI Sta 54+63.49
Δ = 2° 41' 53.3" (RT)
D = 0° 21' 29.2"
L = 753.46'
T = 376.80'
R = 16,000.00'
SE = N.C.
V = 60 MPH

10/21/2013
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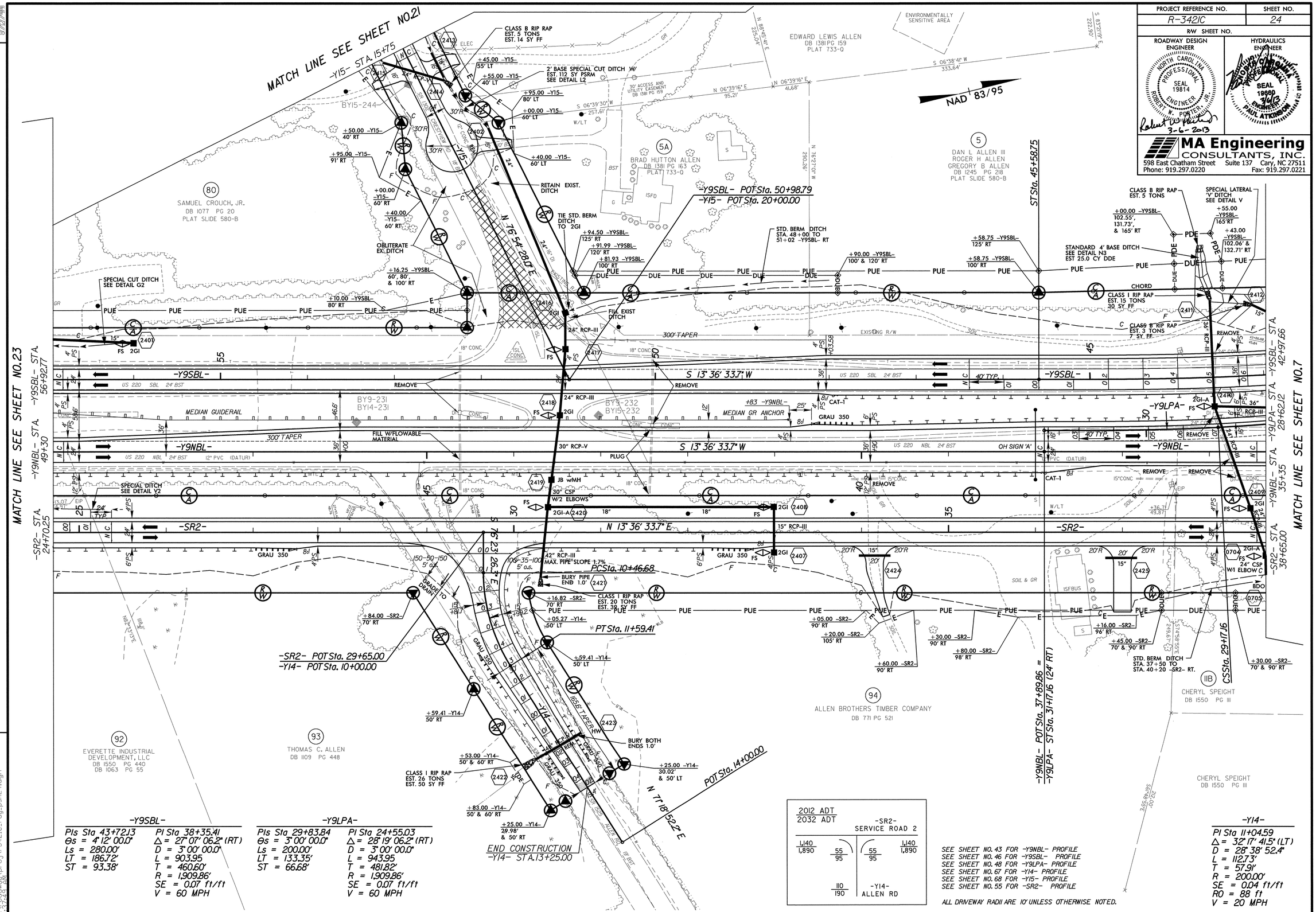
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	24
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. FORTER, JR.
3-6-2013

HYDRAULICS ENGINEER
SOUTH CAROLINA PROFESSIONAL SEAL 19960 9/4/13 ENGINEER PAUL ATKINSON

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



REVISIONS

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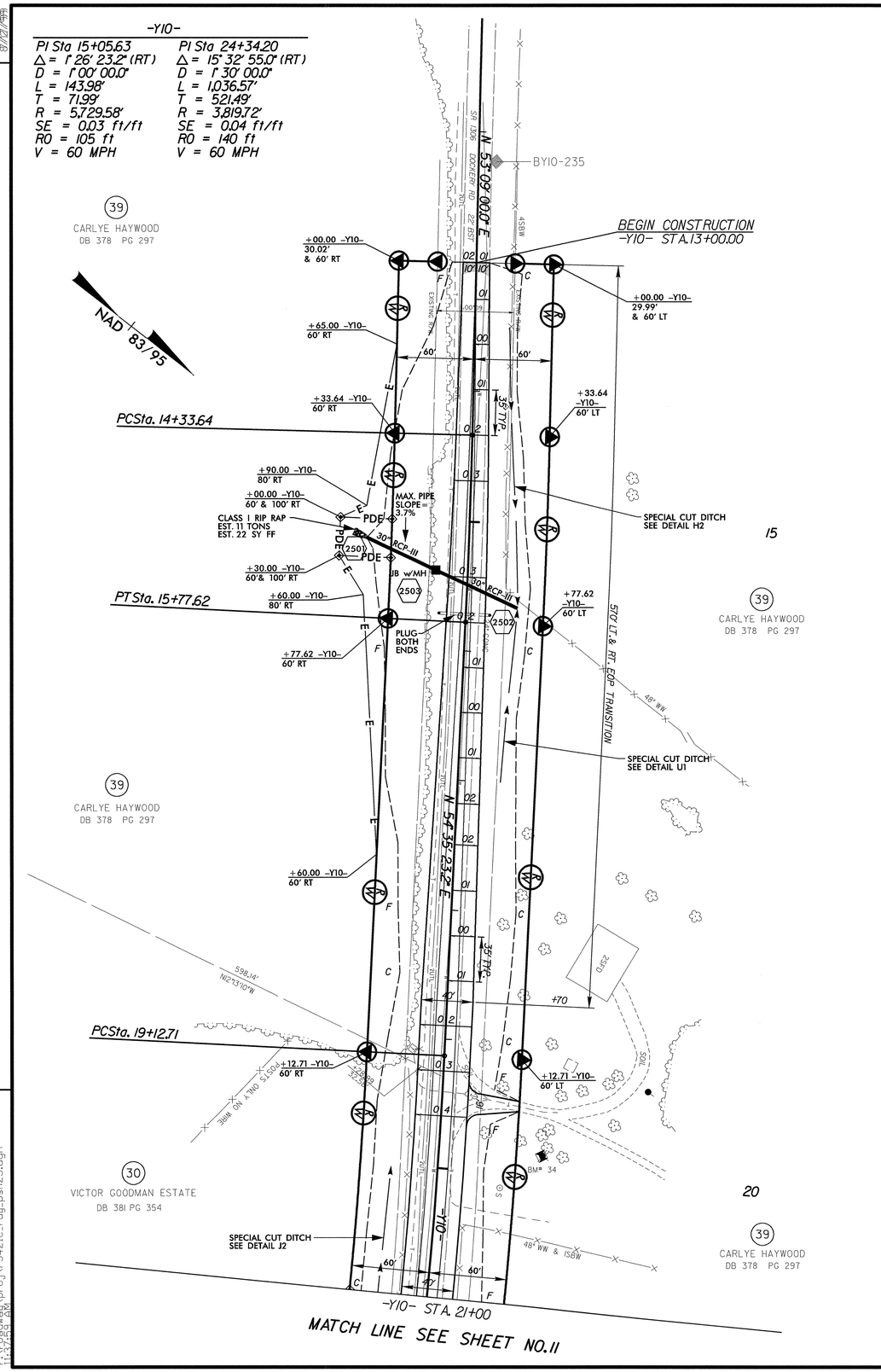
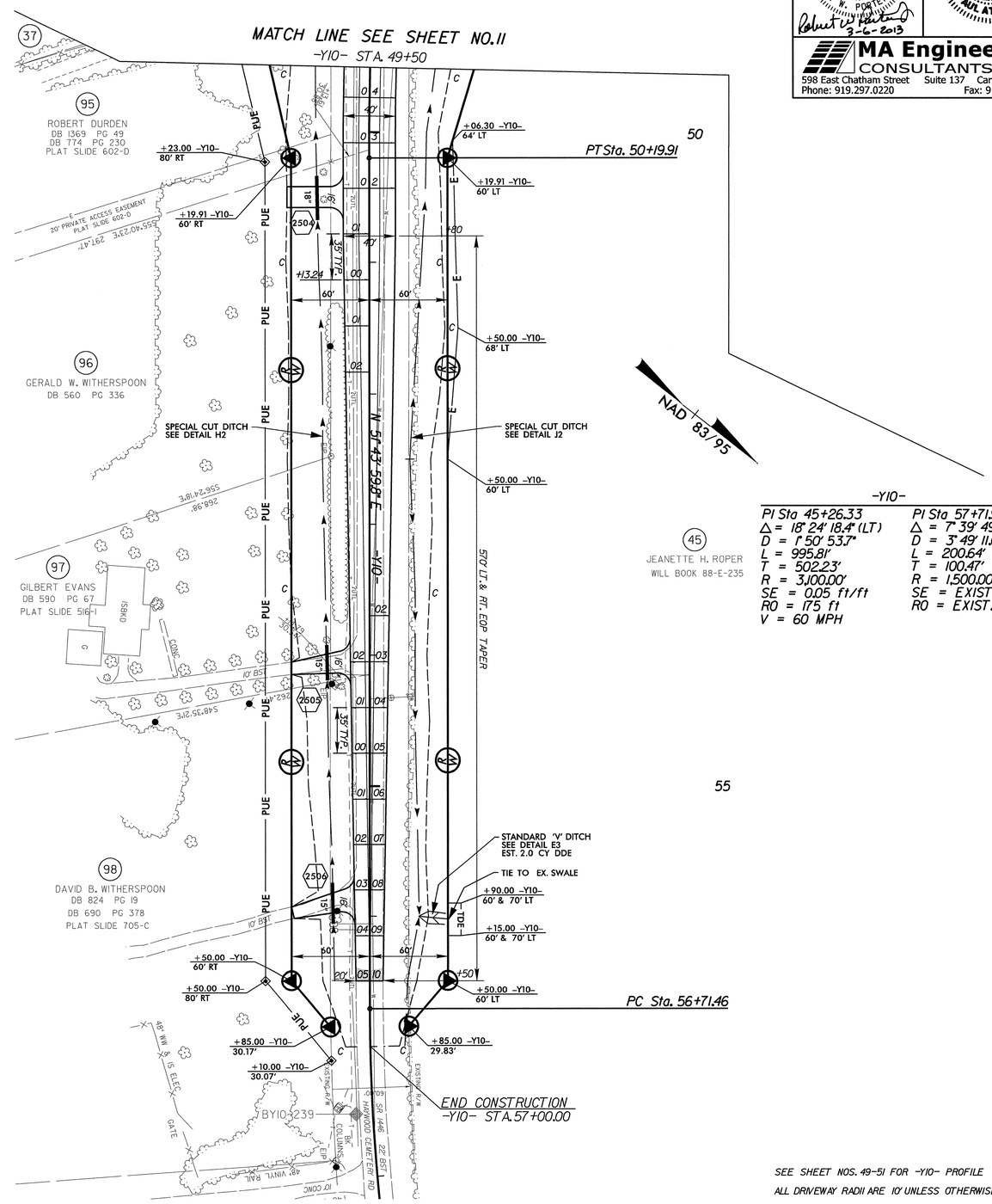
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	25
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 3-6-2013

HYDRAULICS ENGINEER: PROFESSIONAL SEAL 19050 ENGINEER PAUL ATKINSON — 3/6/13

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221





SEE SHEET NOS. 49-51 FOR -Y10- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

REVISIONS

3/6/2013
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	26
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PARTEE, JR.
3-6-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19880 ENGINEER PAUL ATKINSON, JR.
3/6/13

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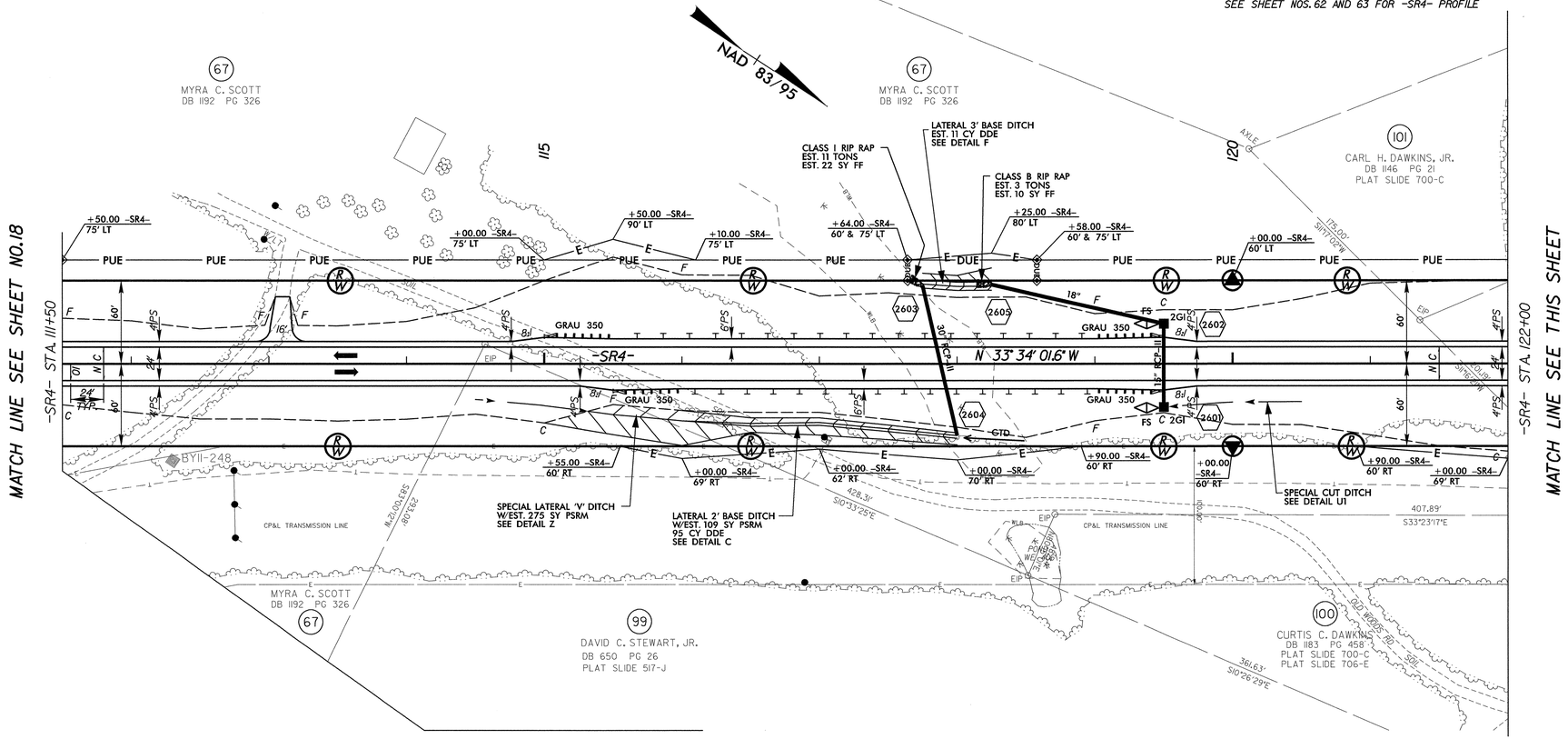
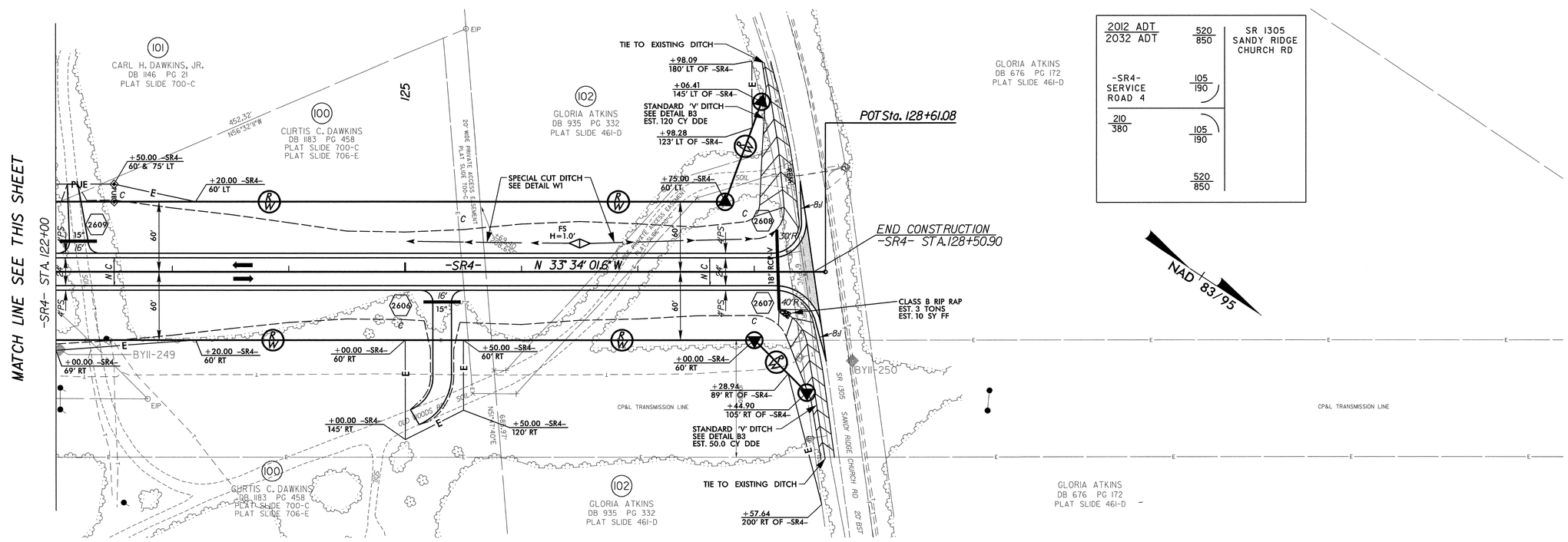
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
SEE SHEET NOS. 62 AND 63 FOR -SR4- PROFILE





2012 ADT / 2032 ADT		SR 1305 SANDY RIDGE CHURCH RD
	520 / 850	
-SR4- SERVICE ROAD 4	105 / 190	
210 / 380	105 / 190	
	520 / 850	

REVISIONS

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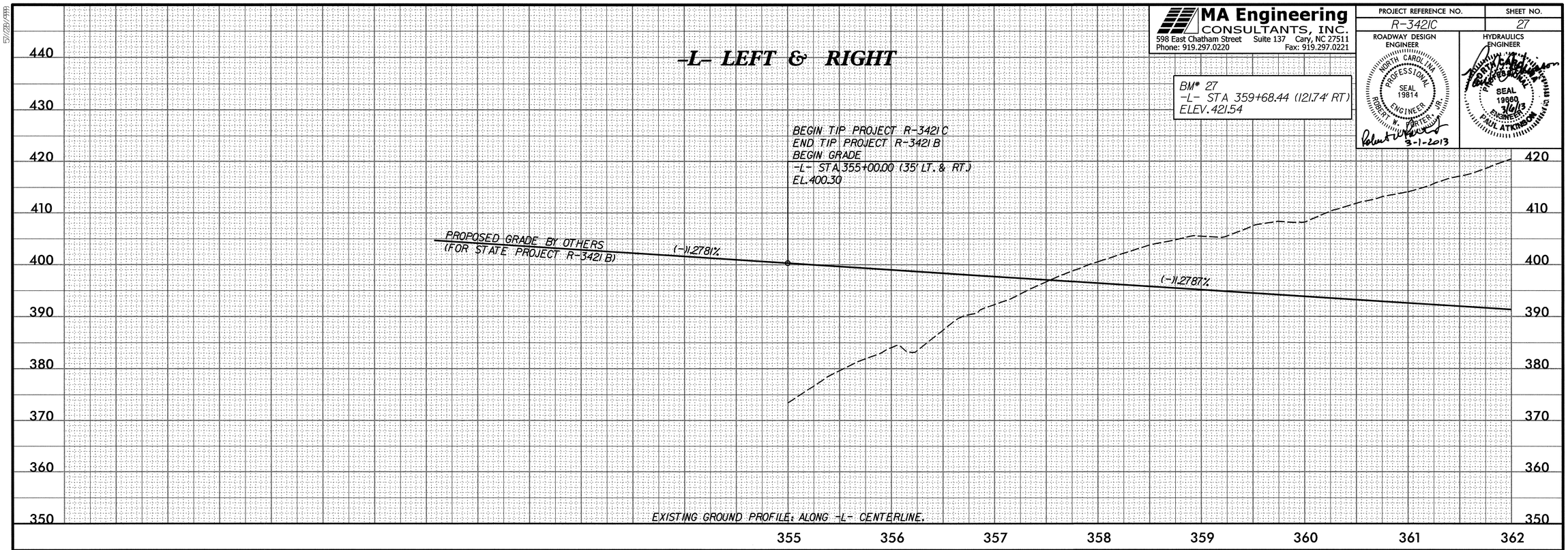
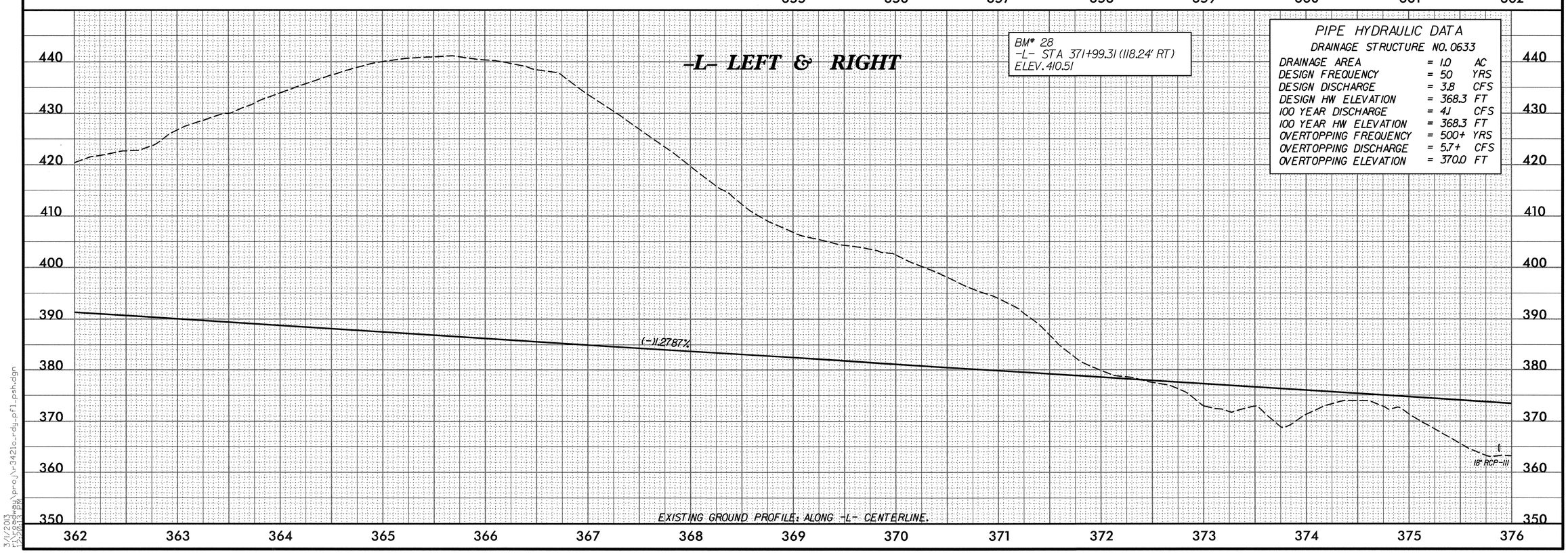
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	27

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19060 ENGINEER PAUL ATKINSON
3/6/13





PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 0633

DRAINAGE AREA	=	1.0	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	3.8	CFS
DESIGN HW ELEVATION	=	368.3	FT
100 YEAR DISCHARGE	=	4.1	CFS
100 YEAR HW ELEVATION	=	368.3	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	5.7+	CFS
OVERTOPPING ELEVATION	=	370.0	FT

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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	28

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPPER, JR. — 2-1-2013

HYDRAULICS ENGINEER — SEAL 19660 ENGINEER PAUL ATKINSON — 3/1/13

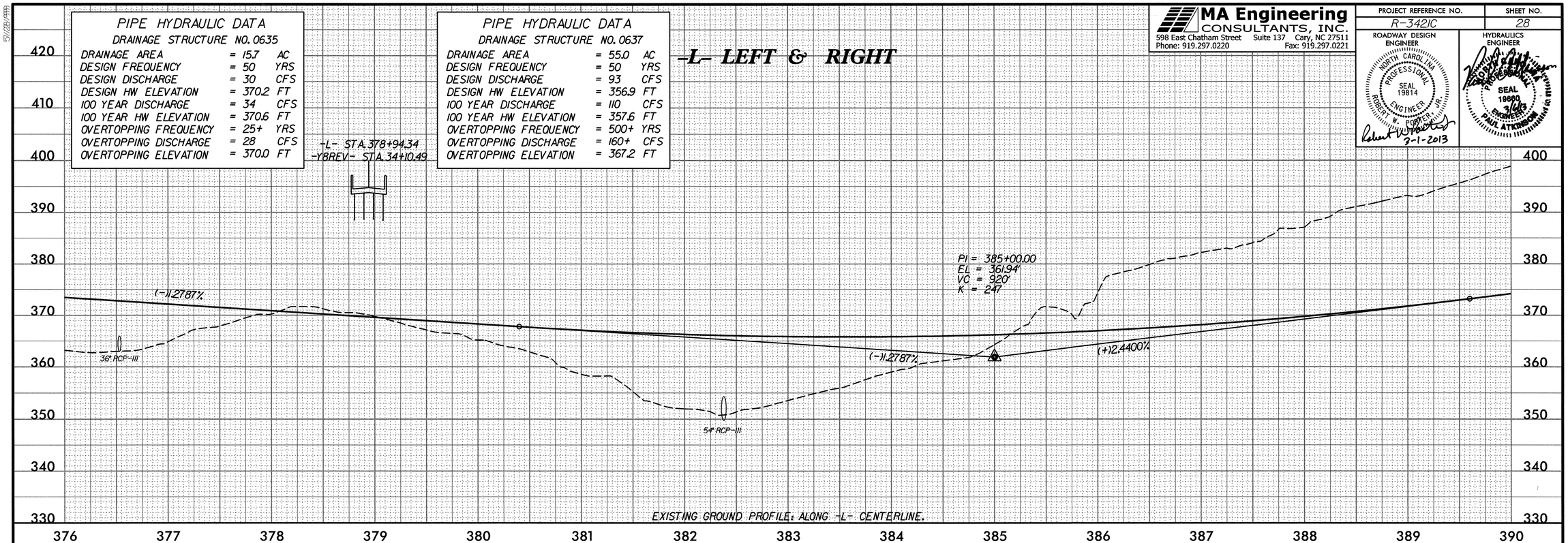
-L- LEFT & RIGHT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 0635

DRAINAGE AREA	= 15.7	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 30	CFS
DESIGN HW ELEVATION	= 370.2	FT
100 YEAR DISCHARGE	= 34	CFS
100 YEAR HW ELEVATION	= 370.6	FT
OVERTOPPING FREQUENCY	= 25+	YRS
OVERTOPPING DISCHARGE	= 28	CFS
OVERTOPPING ELEVATION	= 370.0	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 0637

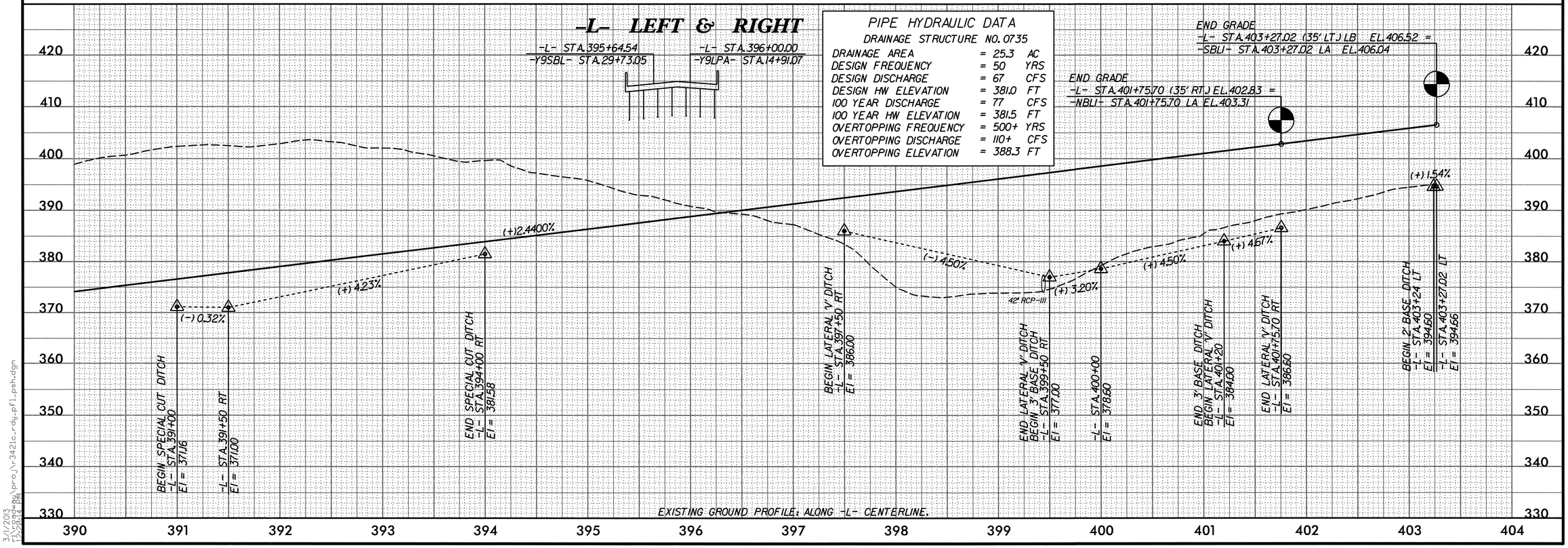
DRAINAGE AREA	= 55.0	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 93	CFS
DESIGN HW ELEVATION	= 356.9	FT
100 YEAR DISCHARGE	= 110	CFS
100 YEAR HW ELEVATION	= 357.6	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 160+	CFS
OVERTOPPING ELEVATION	= 367.2	FT



-L- LEFT & RIGHT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 0735

DRAINAGE AREA	= 25.3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 67	CFS
DESIGN HW ELEVATION	= 381.0	FT
100 YEAR DISCHARGE	= 77	CFS
100 YEAR HW ELEVATION	= 381.5	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 110+	CFS
OVERTOPPING ELEVATION	= 388.3	FT



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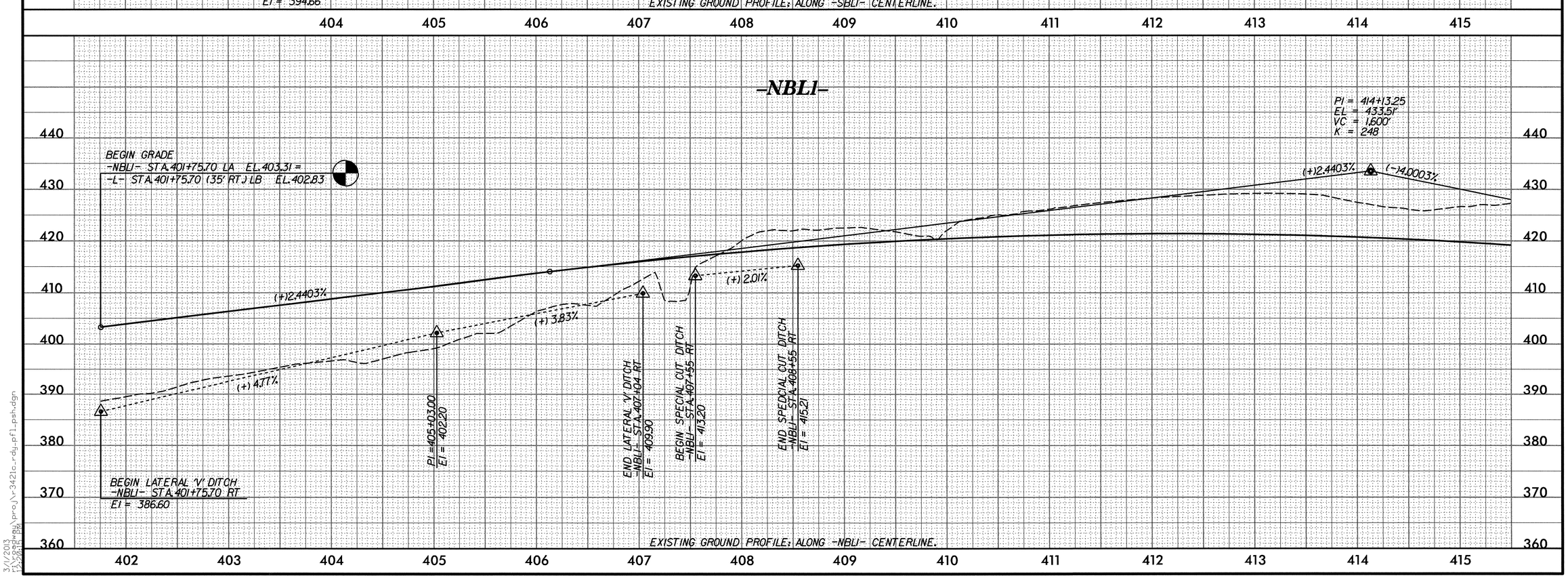
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	29

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPE, JR. 3-1-2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19680 ENGINEER PAUL ATHOMAS 3/6/13



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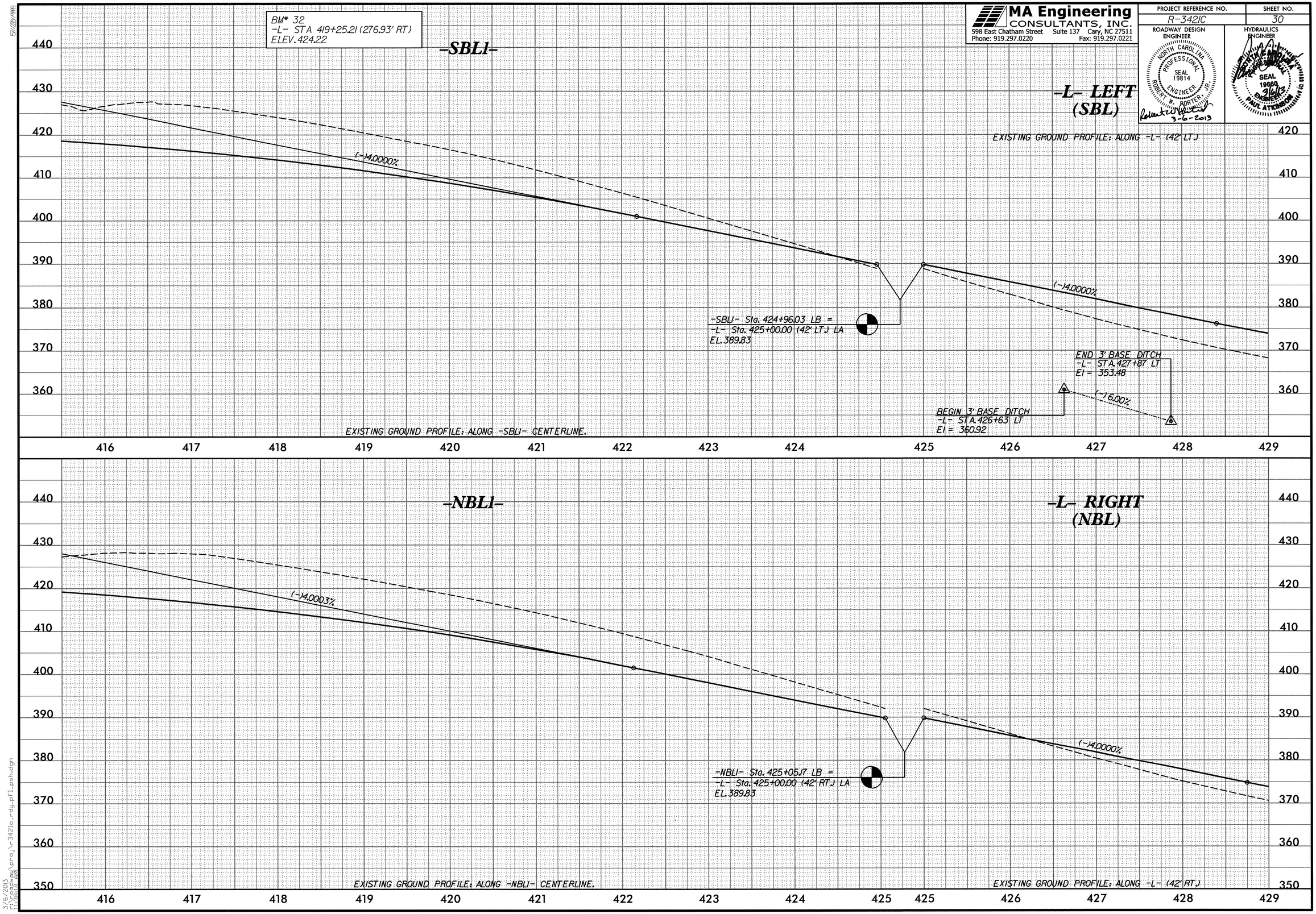
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	30

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. 3-6-2013

HYDRAULICS ENGINEER: SEAL 19080 3/6/13 PAUL ATKINSON



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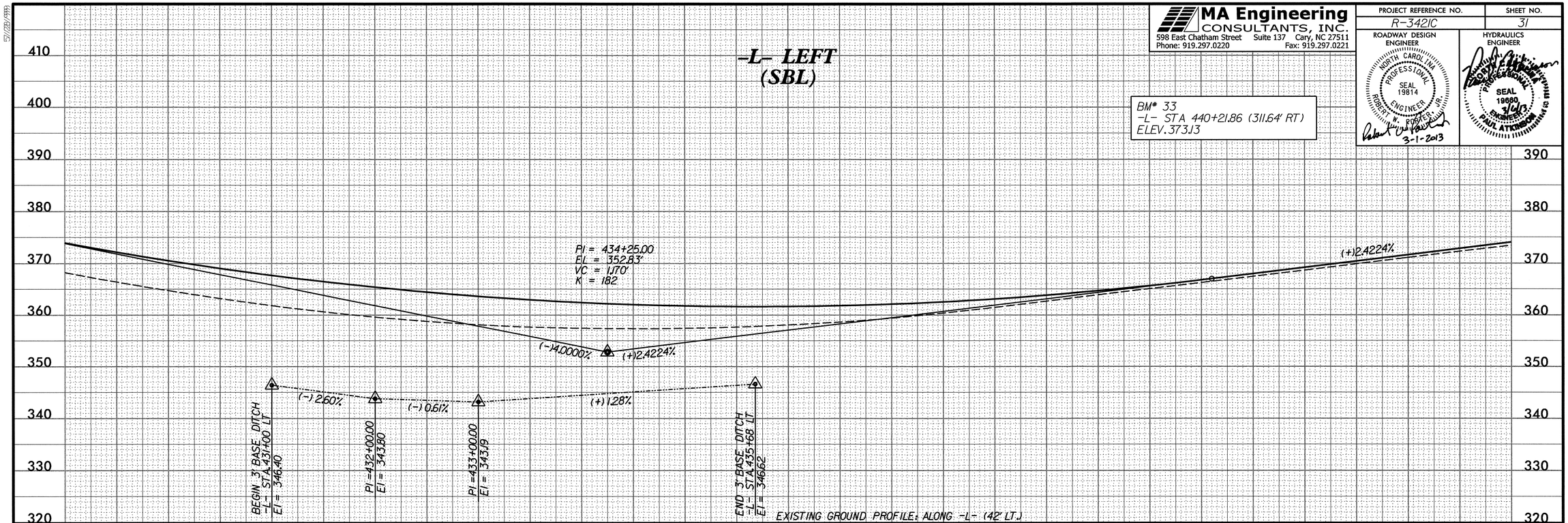
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	31

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. ROGERS, JR. 3-1-2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19680 3/6/13 ENGINEER PAUL ATKINSON

BM# 33
-L- STA 440+21.86 (311.64' RT)
ELEV. 373.13

-L- LEFT (SBL)



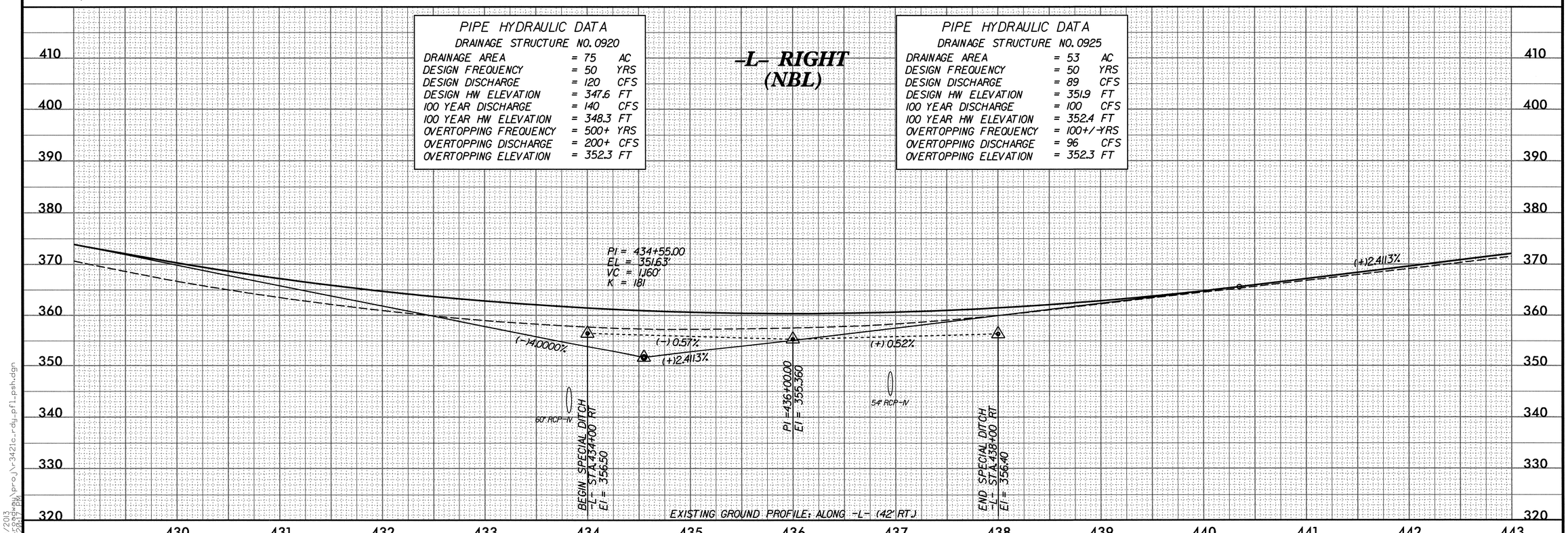
-L- RIGHT (NBL)

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 0920

DRAINAGE AREA	= 75	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 120	CFS
DESIGN HW ELEVATION	= 347.6	FT
100 YEAR DISCHARGE	= 140	CFS
100 YEAR HW ELEVATION	= 348.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 200+	CFS
OVERTOPPING ELEVATION	= 352.3	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 0925

DRAINAGE AREA	= 53	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 89	CFS
DESIGN HW ELEVATION	= 351.9	FT
100 YEAR DISCHARGE	= 100	CFS
100 YEAR HW ELEVATION	= 352.4	FT
OVERTOPPING FREQUENCY	= 100+/-	YRS
OVERTOPPING DISCHARGE	= 96	CFS
OVERTOPPING ELEVATION	= 352.3	FT



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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	32

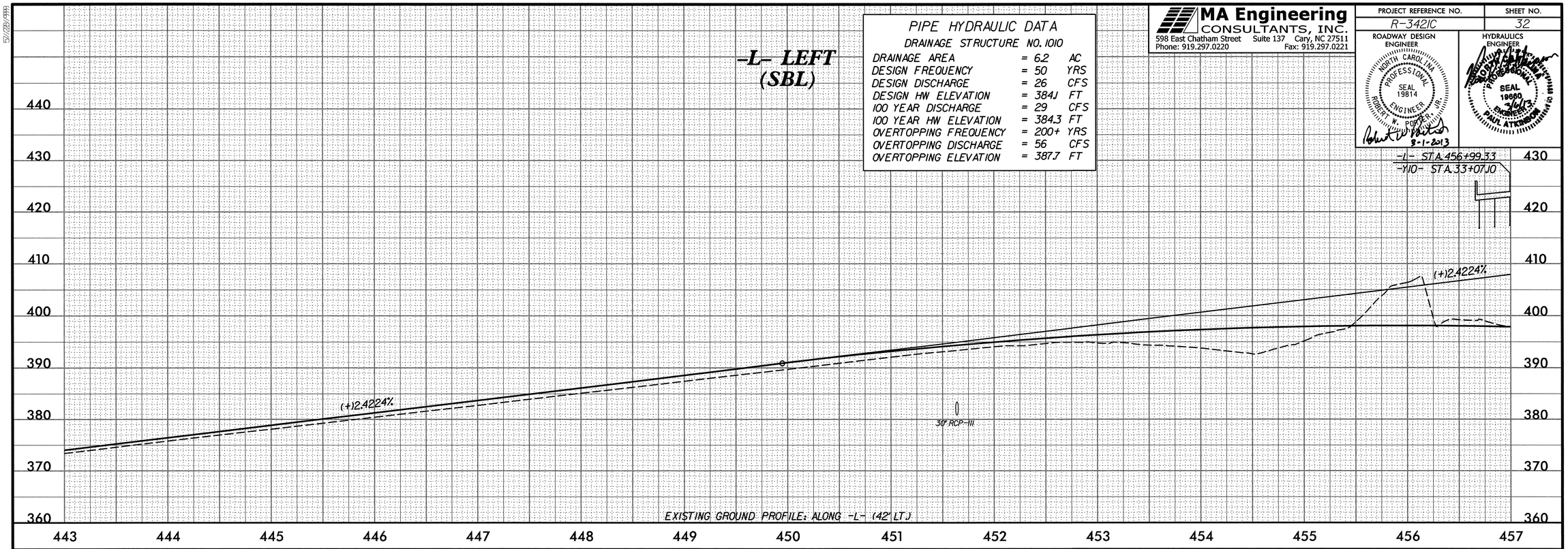
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
8-1-2013

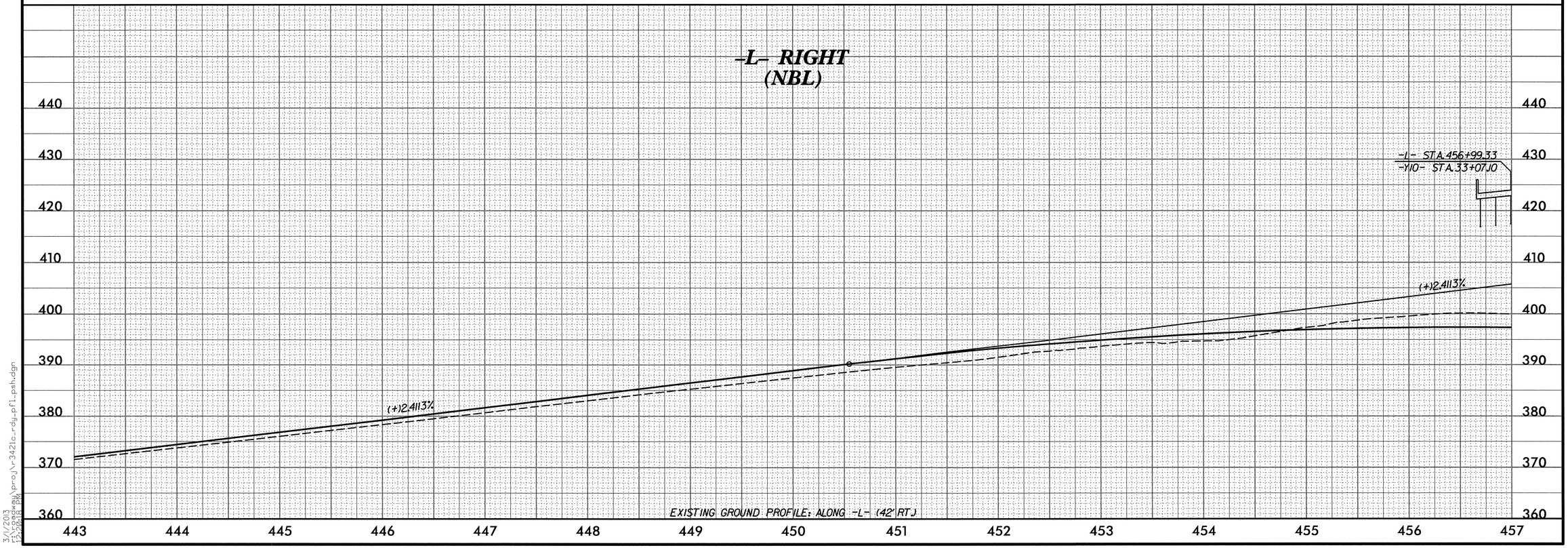
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19680 ENGINEER PAUL ATKINSON
3/6/13

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 1010

DRAINAGE AREA	= 6.2	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 26	CFS
DESIGN HW ELEVATION	= 384.1	FT
100 YEAR DISCHARGE	= 29	CFS
100 YEAR HW ELEVATION	= 384.3	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 56	CFS
OVERTOPPING ELEVATION	= 387.7	FT





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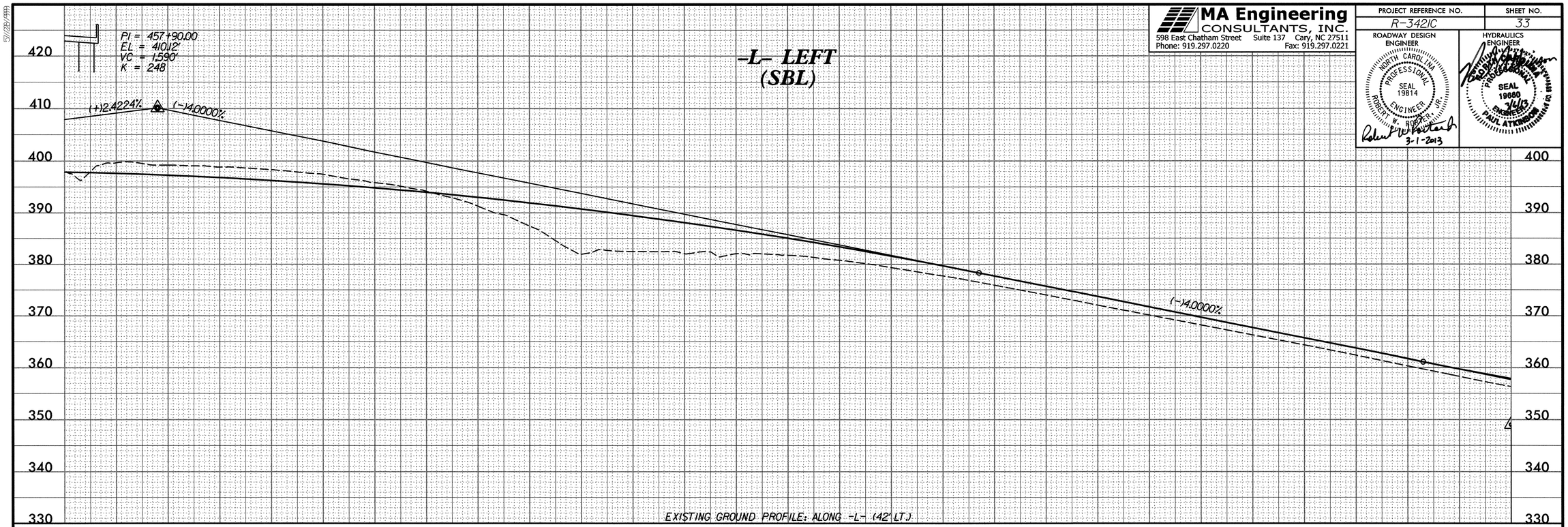
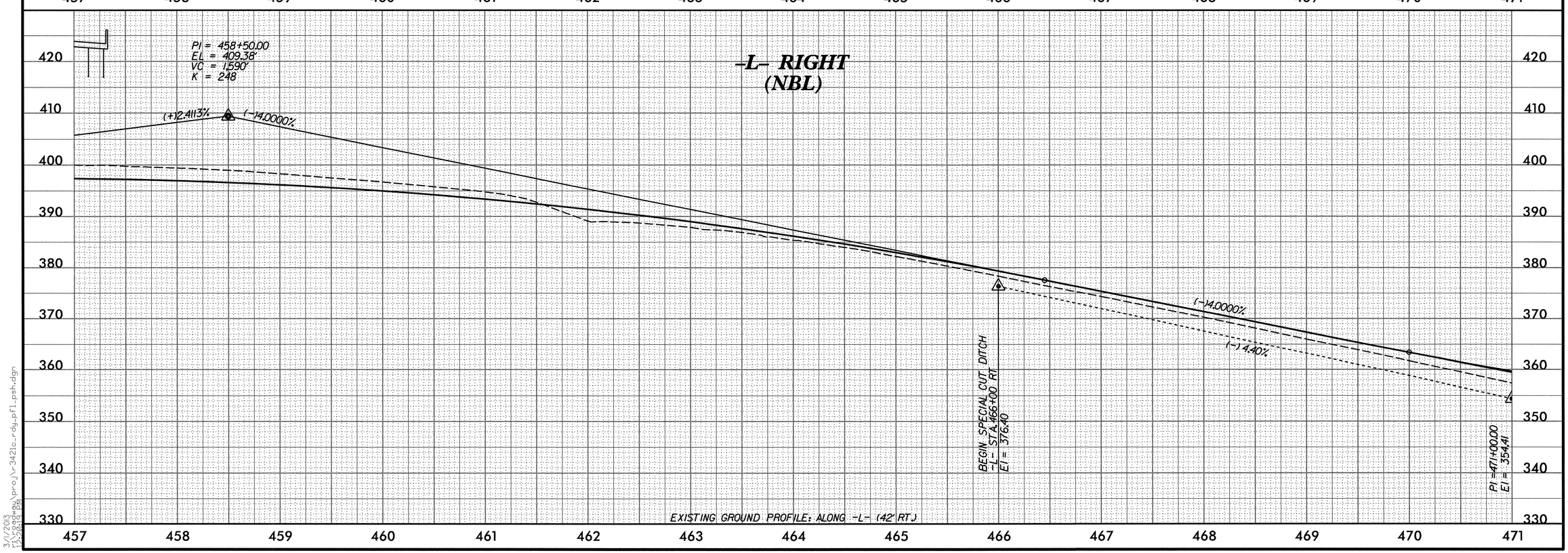
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	33

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. ROBERTS, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON JR.
3/6/13





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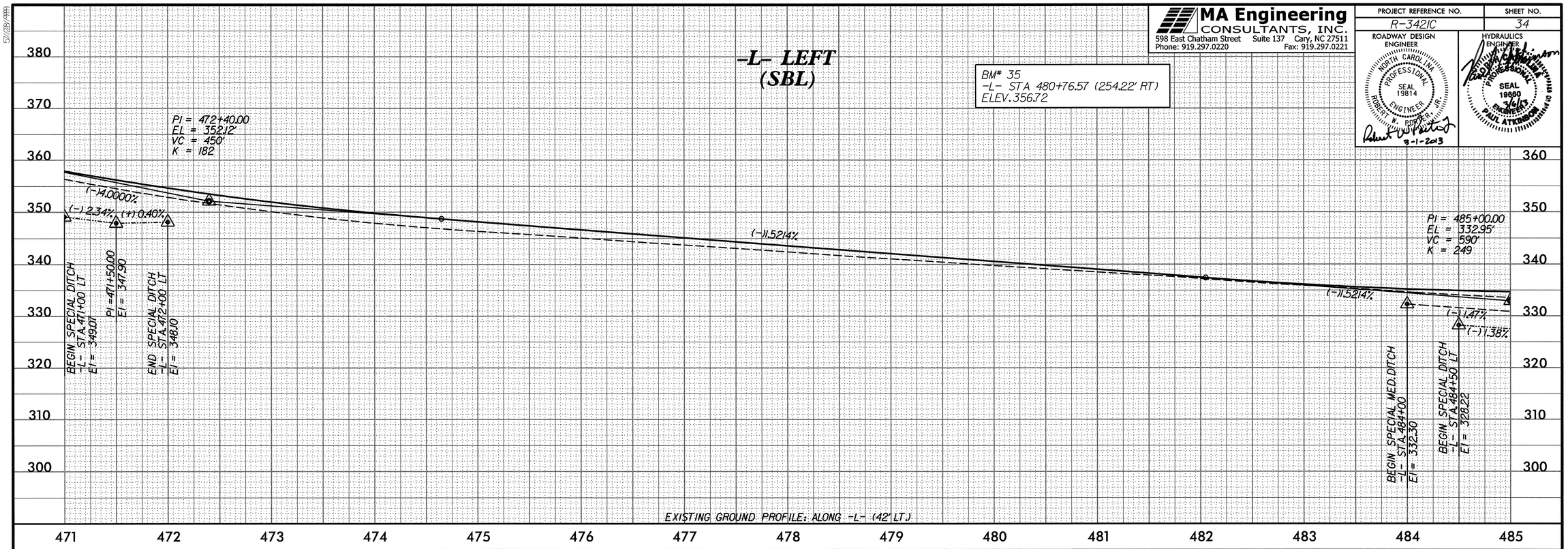
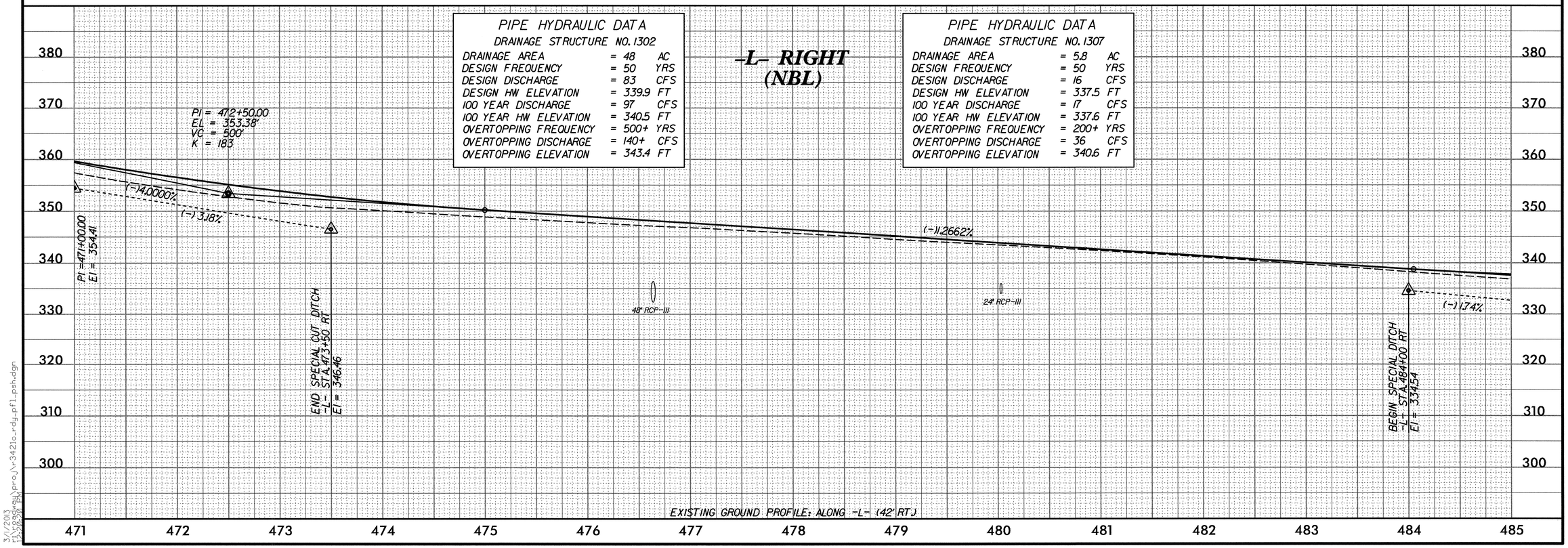
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	34

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. ROPER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19880 ENGINEER PAUL ATKINSON JR.
3/6/13





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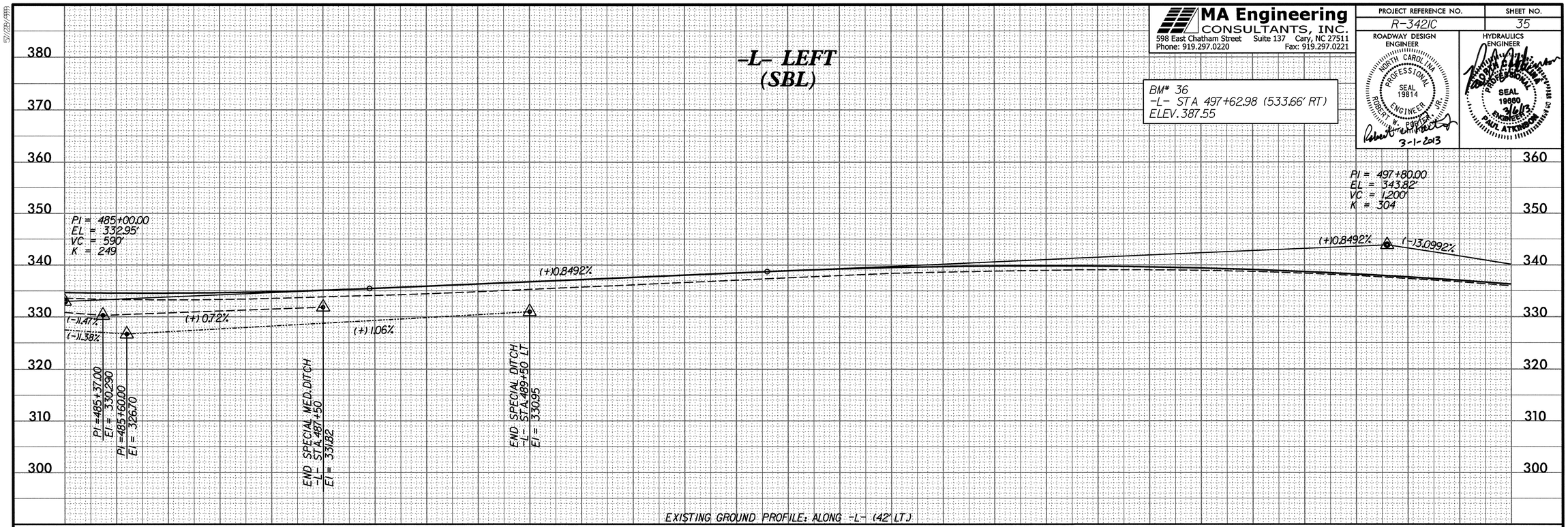
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	35

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. ROBERTS JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
3/6/13

BM# 36
-L- STA 497+62.98 (533.66' RT)
ELEV. 387.55

-L- LEFT (SBL)



-L- RIGHT (NBL)

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1316

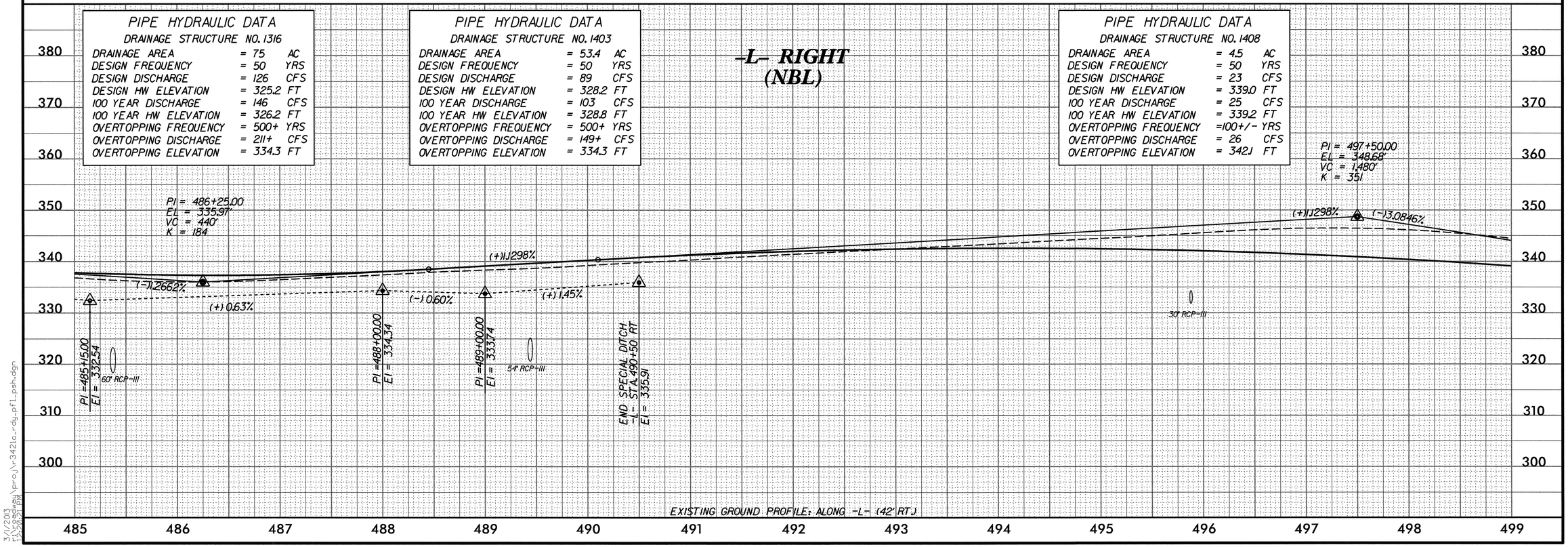
DRAINAGE AREA	= 75	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 126	CFS
DESIGN HW ELEVATION	= 325.2	FT
100 YEAR DISCHARGE	= 146	CFS
100 YEAR HW ELEVATION	= 326.2	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 211+	CFS
OVERTOPPING ELEVATION	= 334.3	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1403

DRAINAGE AREA	= 53.4	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 89	CFS
DESIGN HW ELEVATION	= 328.2	FT
100 YEAR DISCHARGE	= 103	CFS
100 YEAR HW ELEVATION	= 328.8	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 149+	CFS
OVERTOPPING ELEVATION	= 334.3	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1408

DRAINAGE AREA	= 4.5	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 23	CFS
DESIGN HW ELEVATION	= 339.0	FT
100 YEAR DISCHARGE	= 25	CFS
100 YEAR HW ELEVATION	= 339.2	FT
OVERTOPPING FREQUENCY	=100+/-	YRS
OVERTOPPING DISCHARGE	= 26	CFS
OVERTOPPING ELEVATION	= 342.1	FT



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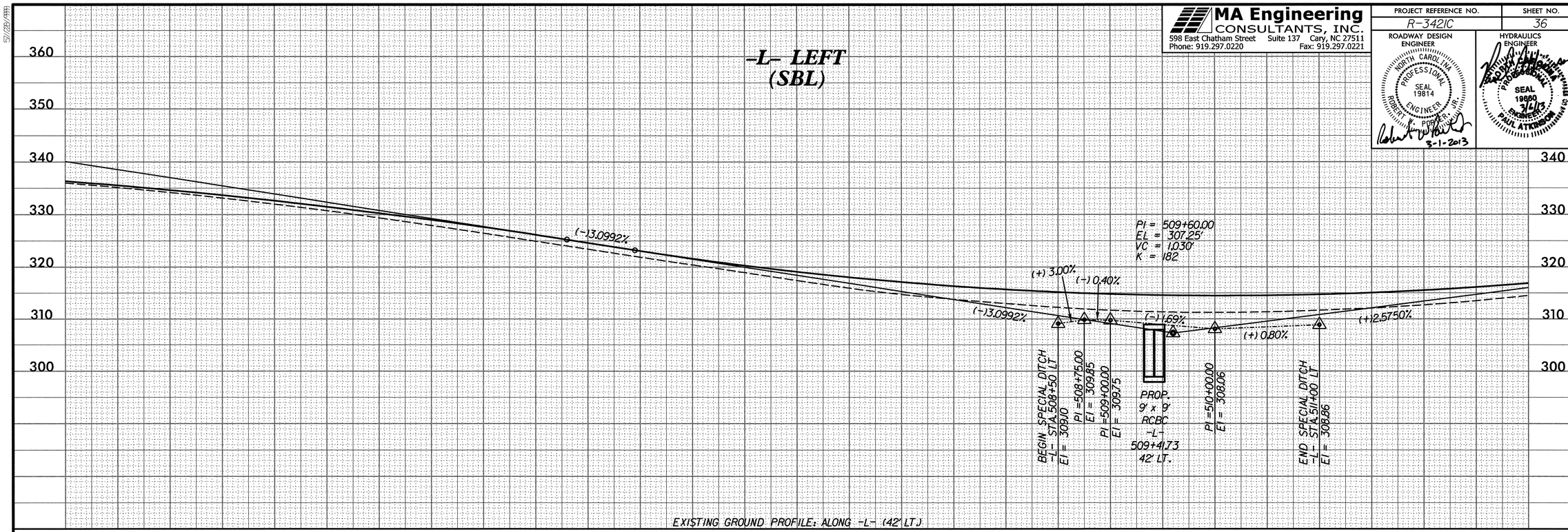
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	36

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT L. POPER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19680 ENGINEER PAUL ATKINSON
3/6/13

-L- LEFT (SBL)



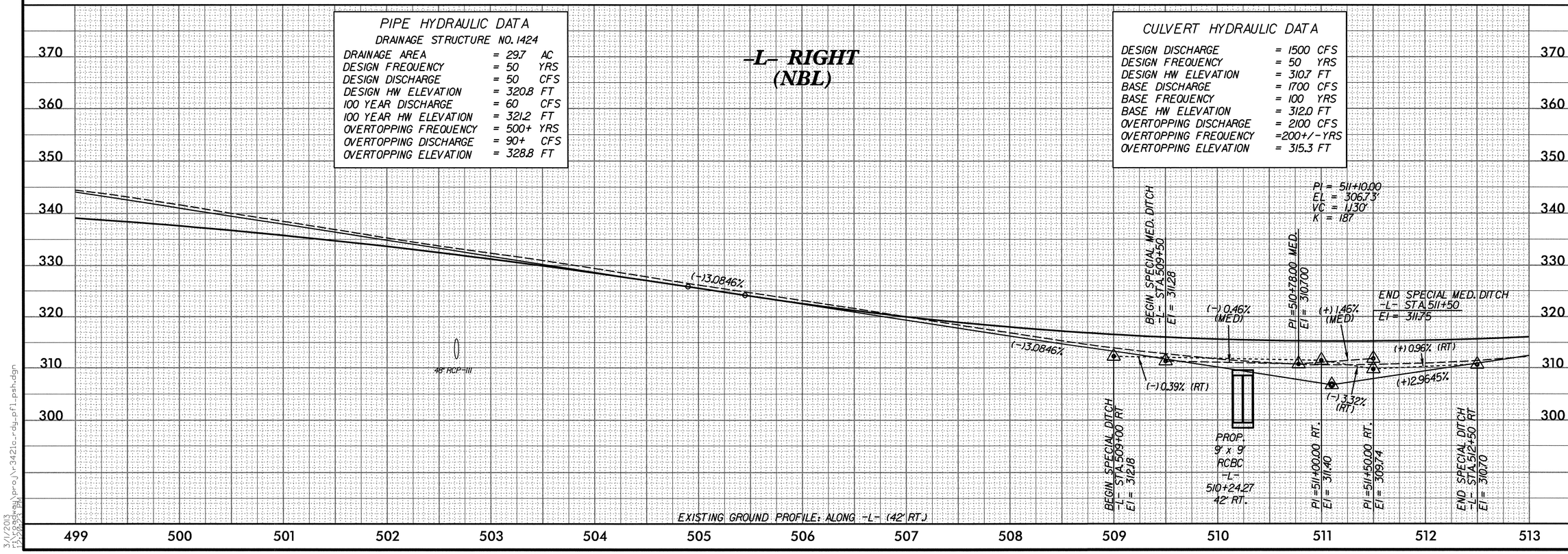
-L- RIGHT (NBL)

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1424

DRAINAGE AREA	= 29.7	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 50	CFS
DESIGN HW ELEVATION	= 320.8	FT
100 YEAR DISCHARGE	= 60	CFS
100 YEAR HW ELEVATION	= 321.2	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 90+	CFS
OVERTOPPING ELEVATION	= 328.8	FT

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1500	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 310.7	FT
BASE DISCHARGE	= 1700	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 312.0	FT
OVERTOPPING DISCHARGE	= 2100	CFS
OVERTOPPING FREQUENCY	=200+/-	YRS
OVERTOPPING ELEVATION	= 315.3	FT



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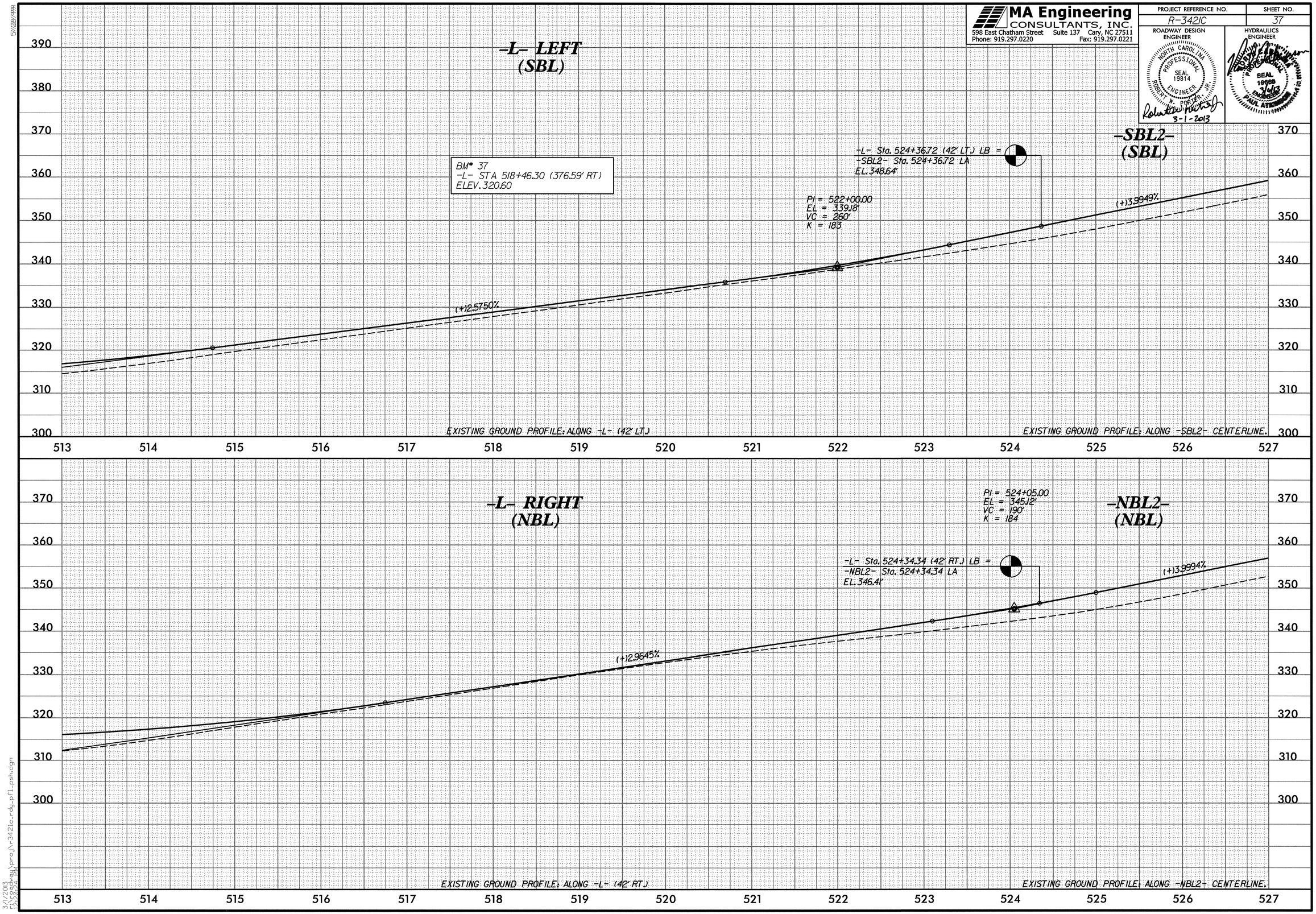
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	37

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 3-1-2013

HYDRAULICS ENGINEER: SEAL 19069 ENGINEER PAUL A. TEMPLETON — 3/1/13



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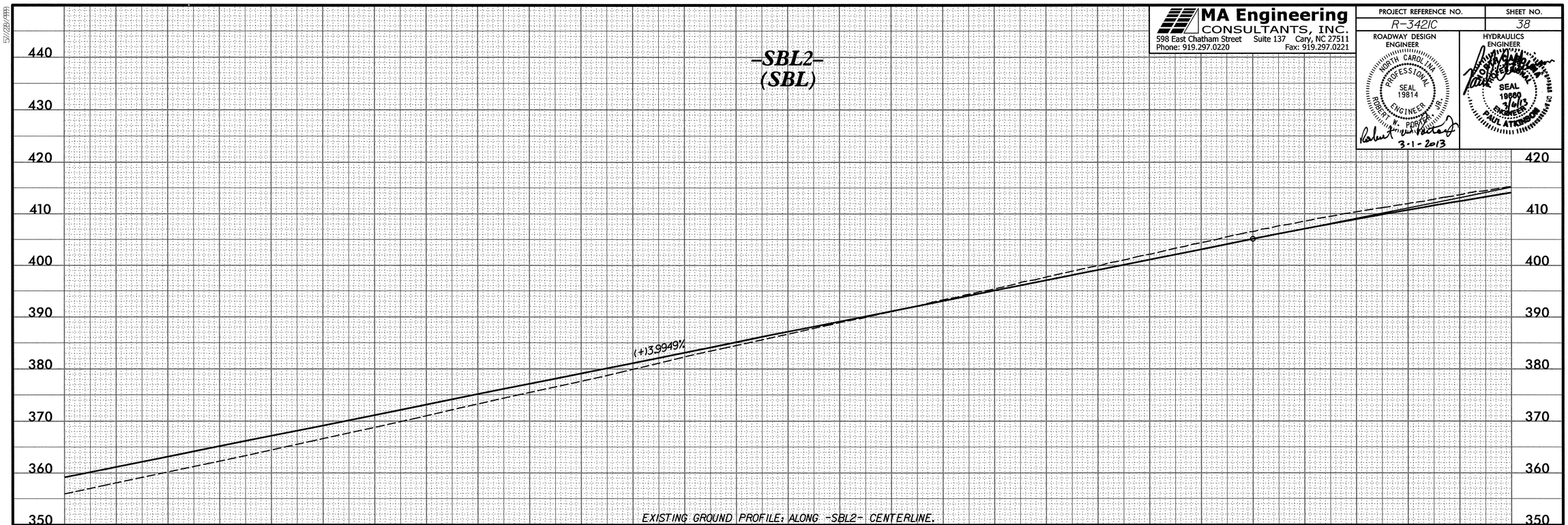
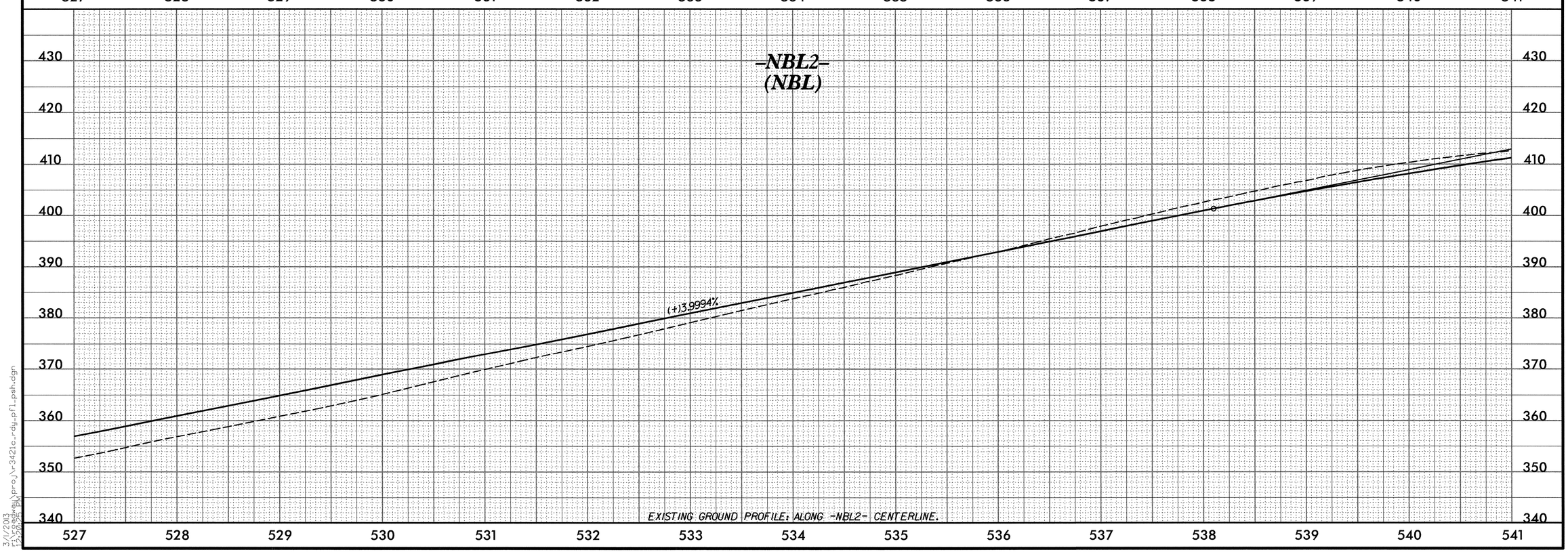
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	38

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-1-2013

HYDRAULICS ENGINEER
SEAL 19660 3/6/13 ENGINEER PAUL ATKINSON





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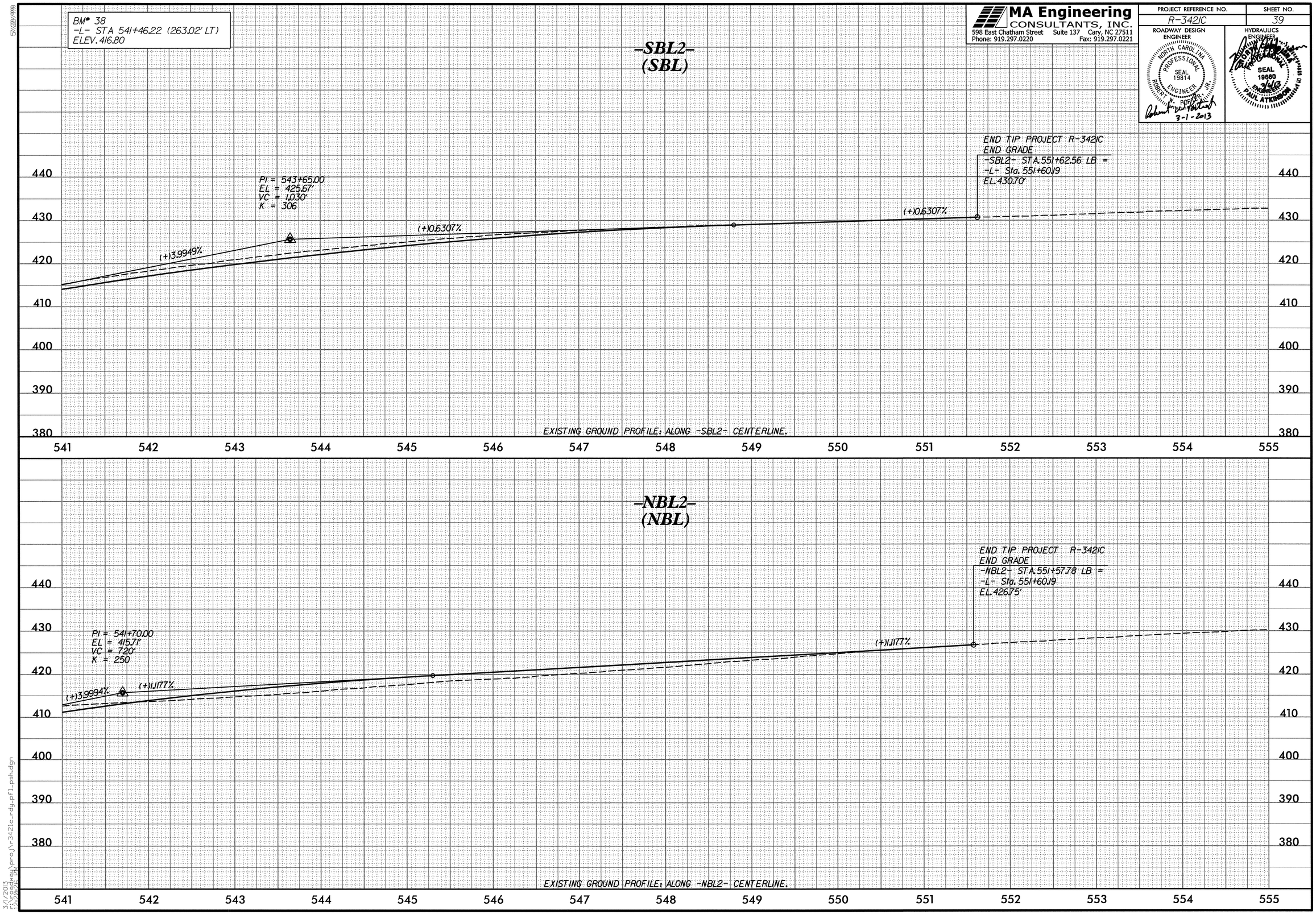
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	39

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPE, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
3/1/13



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MA Engineering CONSULTANTS, INC.
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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	40

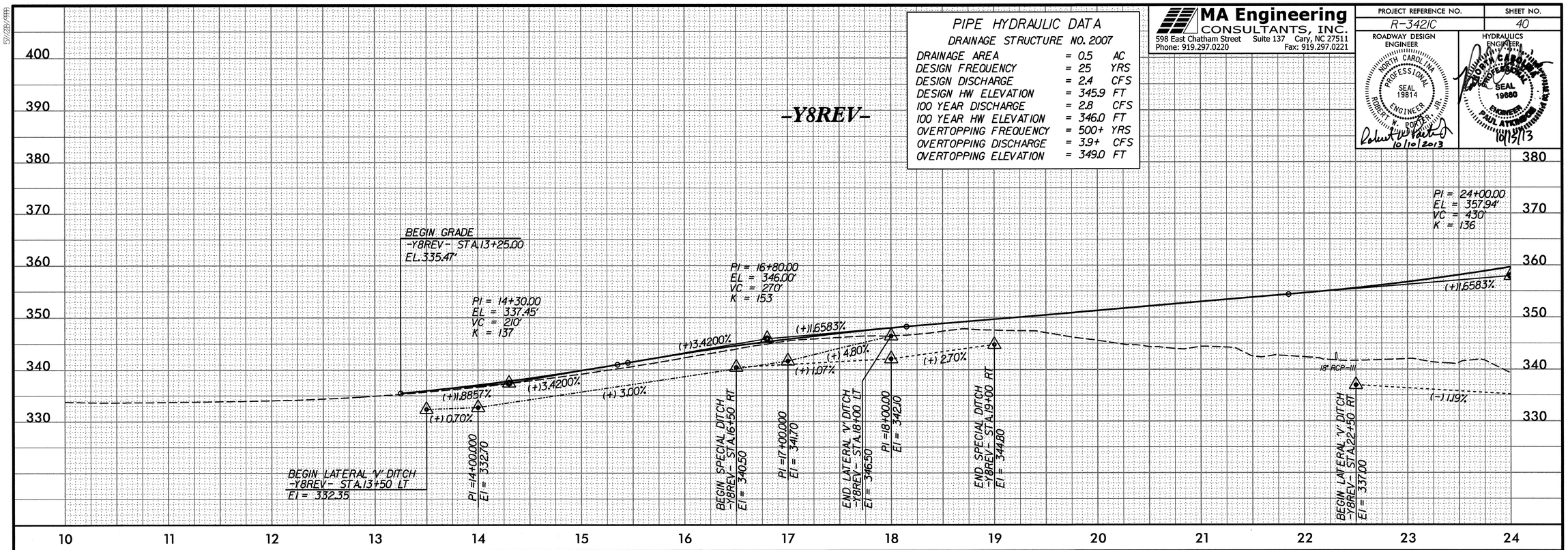
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POTTER JR. — 10/10/2013

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON — 10/10/13

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 2007

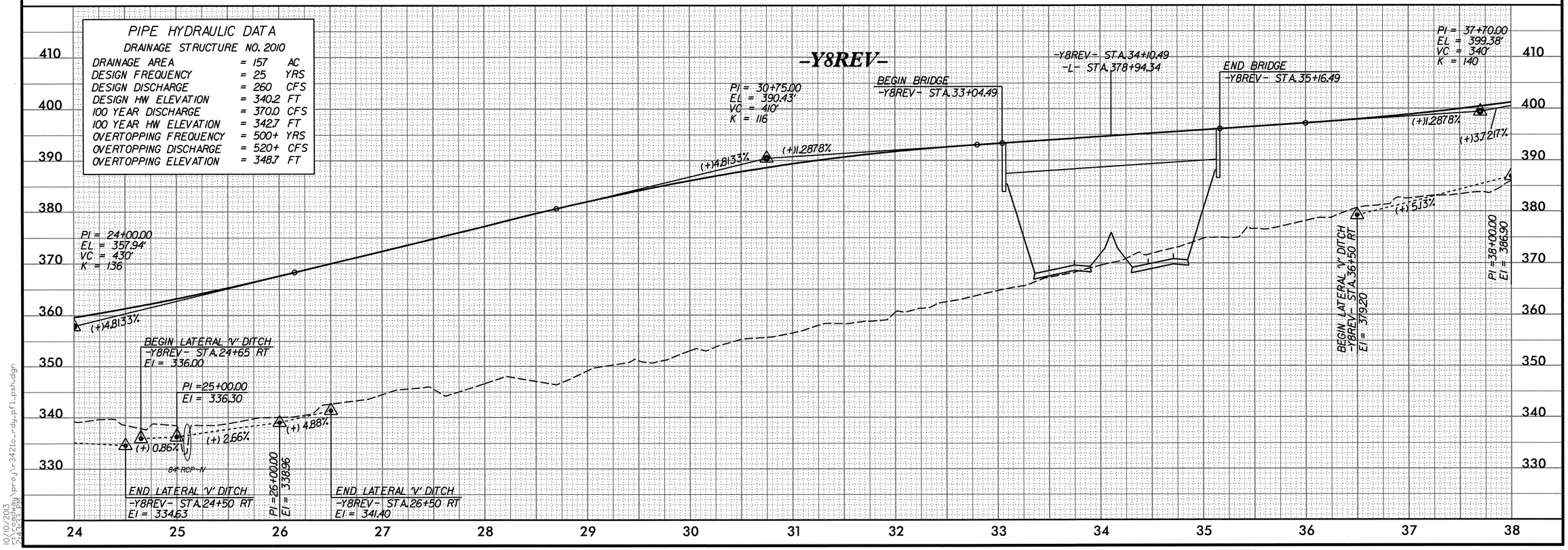
DRAINAGE AREA	= 0.5	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 2.4	CFS
DESIGN HW ELEVATION	= 345.9	FT
100 YEAR DISCHARGE	= 2.8	CFS
100 YEAR HW ELEVATION	= 346.0	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 3.9+	CFS
OVERTOPPING ELEVATION	= 349.0	FT



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 2010

DRAINAGE AREA	= 157	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 260	CFS
DESIGN HW ELEVATION	= 340.2	FT
100 YEAR DISCHARGE	= 370.0	CFS
100 YEAR HW ELEVATION	= 342.7	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 520+	CFS
OVERTOPPING ELEVATION	= 348.7	FT



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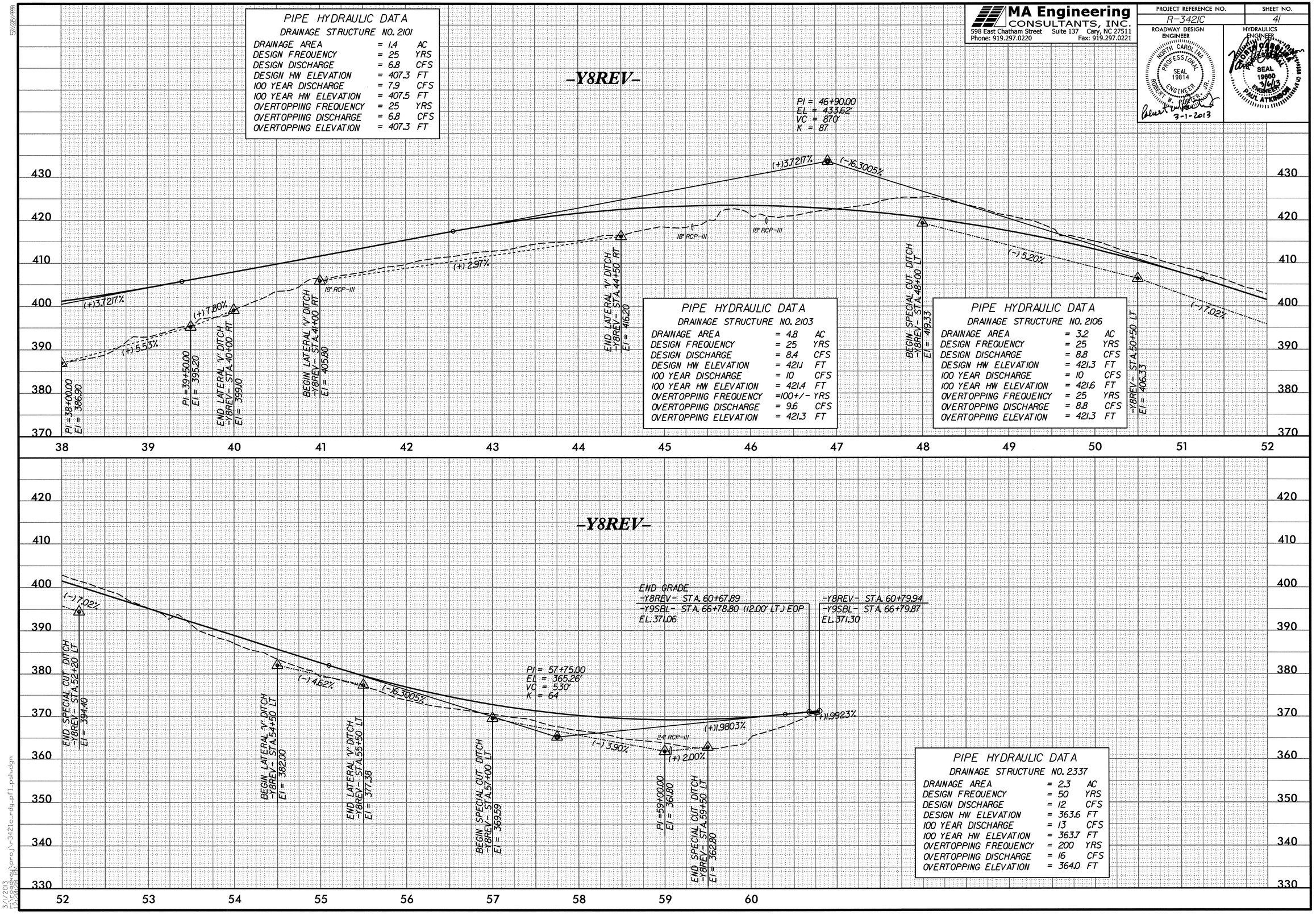
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	41

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POWER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19960 ENGINEER PAUL ATKINSON
3/6/13



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 2101

DRAINAGE AREA	= 1.4	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 6.8	CFS
DESIGN HW ELEVATION	= 407.3	FT
100 YEAR DISCHARGE	= 7.9	CFS
100 YEAR HW ELEVATION	= 407.5	FT
OVERTOPPING FREQUENCY	= 25	YRS
OVERTOPPING DISCHARGE	= 6.8	CFS
OVERTOPPING ELEVATION	= 407.3	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 2103

DRAINAGE AREA	= 4.8	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 8.4	CFS
DESIGN HW ELEVATION	= 421.1	FT
100 YEAR DISCHARGE	= 10	CFS
100 YEAR HW ELEVATION	= 421.4	FT
OVERTOPPING FREQUENCY	=100+/-	YRS
OVERTOPPING DISCHARGE	= 9.6	CFS
OVERTOPPING ELEVATION	= 421.3	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 2106

DRAINAGE AREA	= 3.2	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 8.8	CFS
DESIGN HW ELEVATION	= 421.3	FT
100 YEAR DISCHARGE	= 10	CFS
100 YEAR HW ELEVATION	= 421.6	FT
OVERTOPPING FREQUENCY	= 25	YRS
OVERTOPPING DISCHARGE	= 8.8	CFS
OVERTOPPING ELEVATION	= 421.3	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 2337

DRAINAGE AREA	= 2.3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 12	CFS
DESIGN HW ELEVATION	= 363.6	FT
100 YEAR DISCHARGE	= 13	CFS
100 YEAR HW ELEVATION	= 363.7	FT
OVERTOPPING FREQUENCY	= 200	YRS
OVERTOPPING DISCHARGE	= 16	CFS
OVERTOPPING ELEVATION	= 364.0	FT

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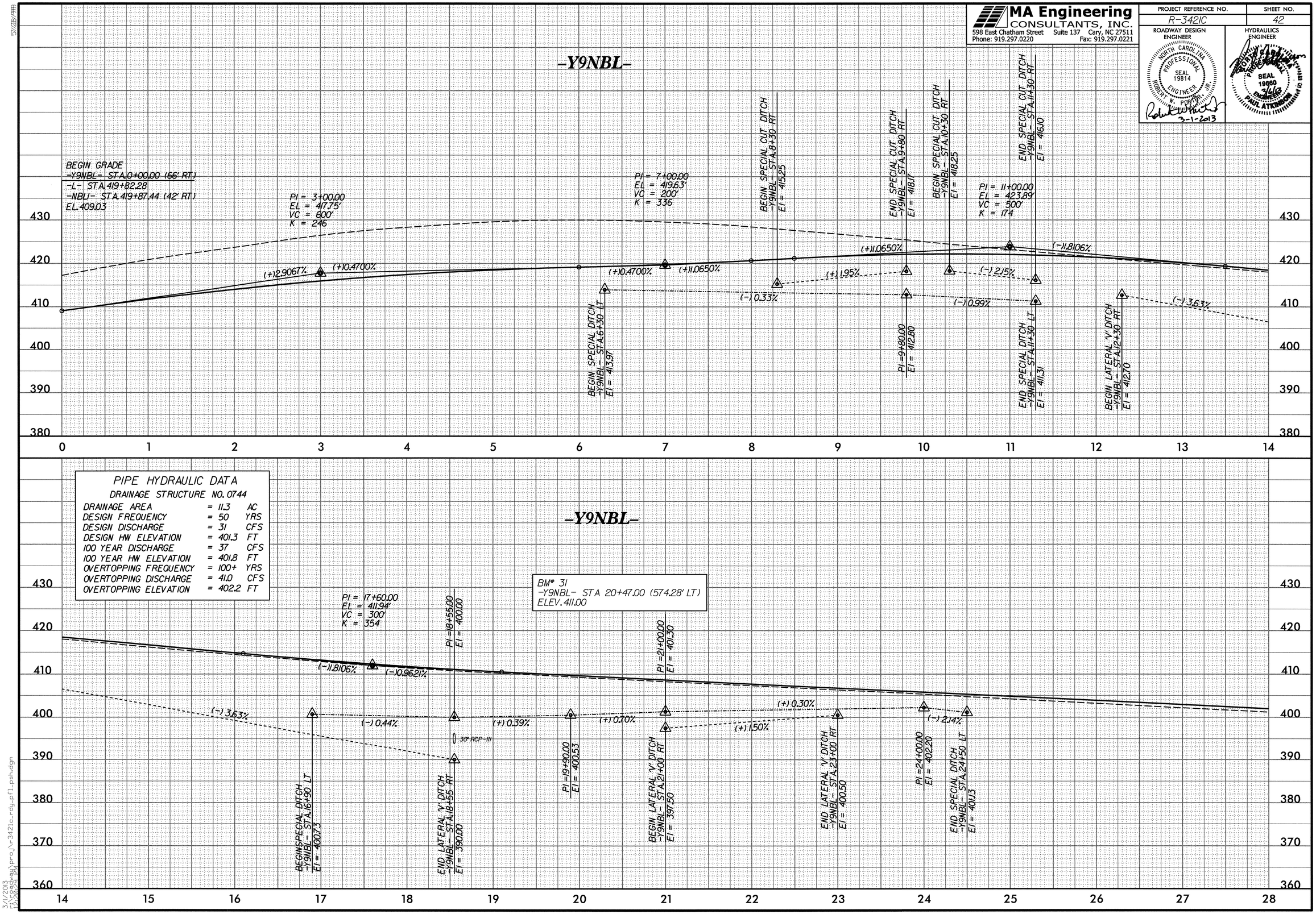
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	42

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19960 ENGINEER PAUL ATKINSON JR.
3/1/13



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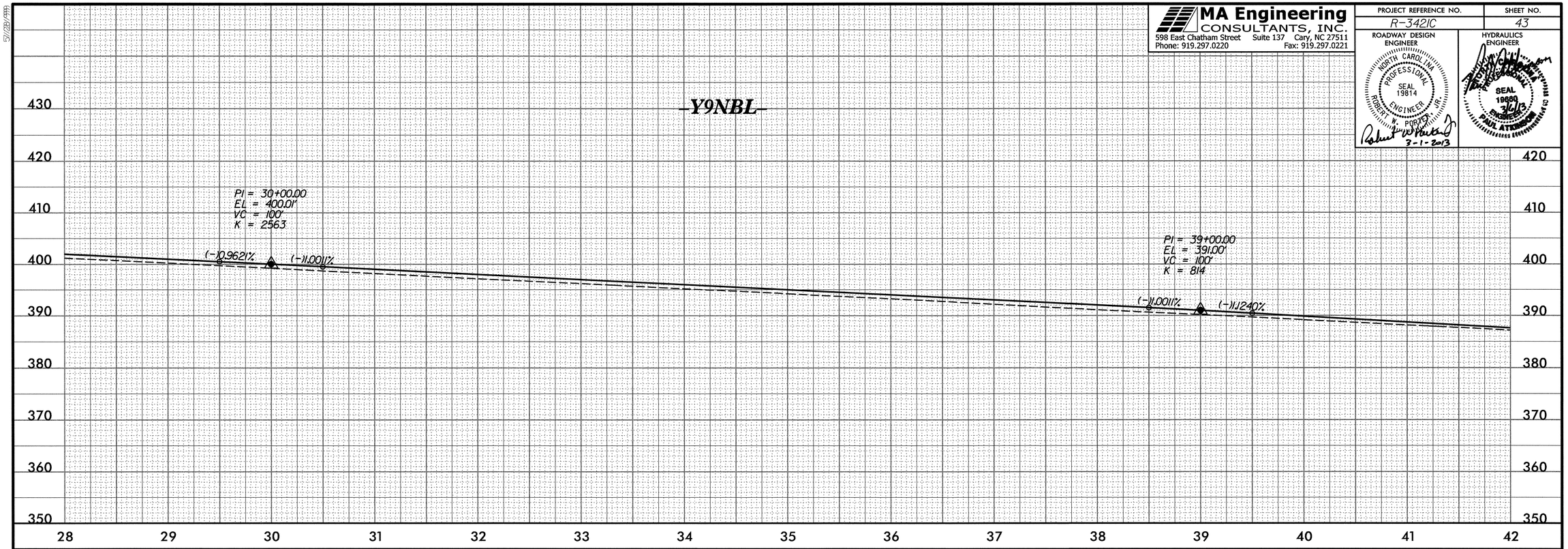
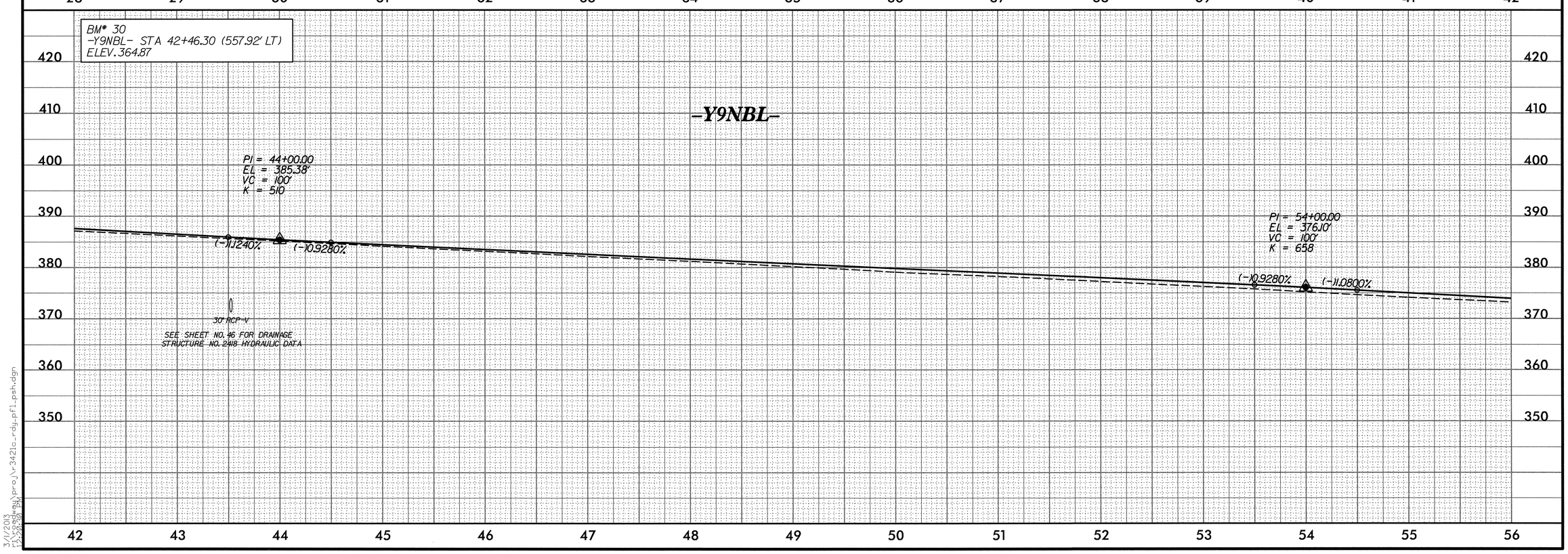
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	43

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON JR.
3/1/13





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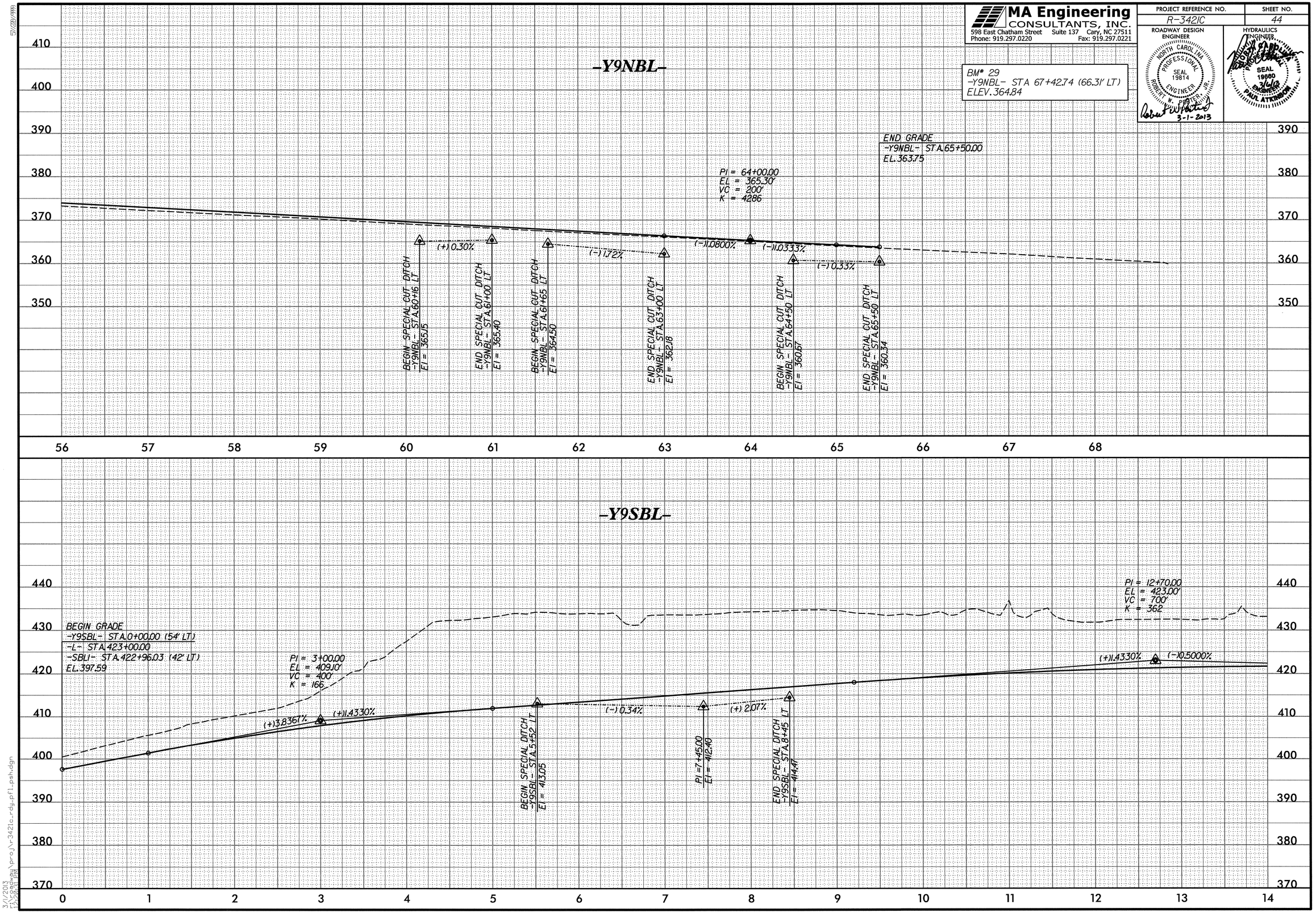
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	44

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter Jr. 3-1-2013

HYDRAULICS ENGINEER
SEAL 19660 ENGINEER PAUL A. TOMPKINS
3/6/13

BM* 29
-Y9NBL- STA 67+42.74 (66.31' LT)
ELEV. 364.84



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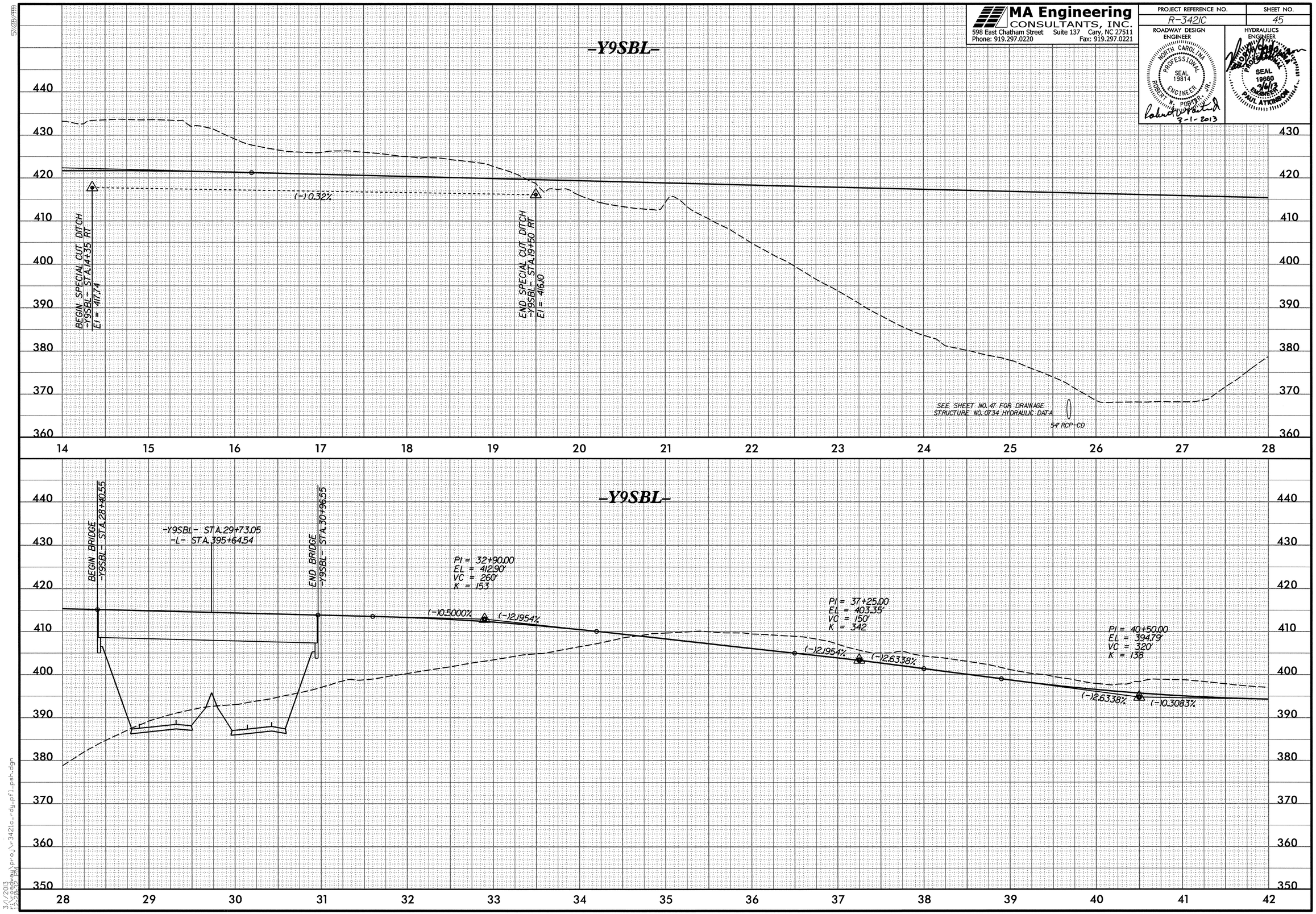
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	45

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPTAR, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
3/6/13



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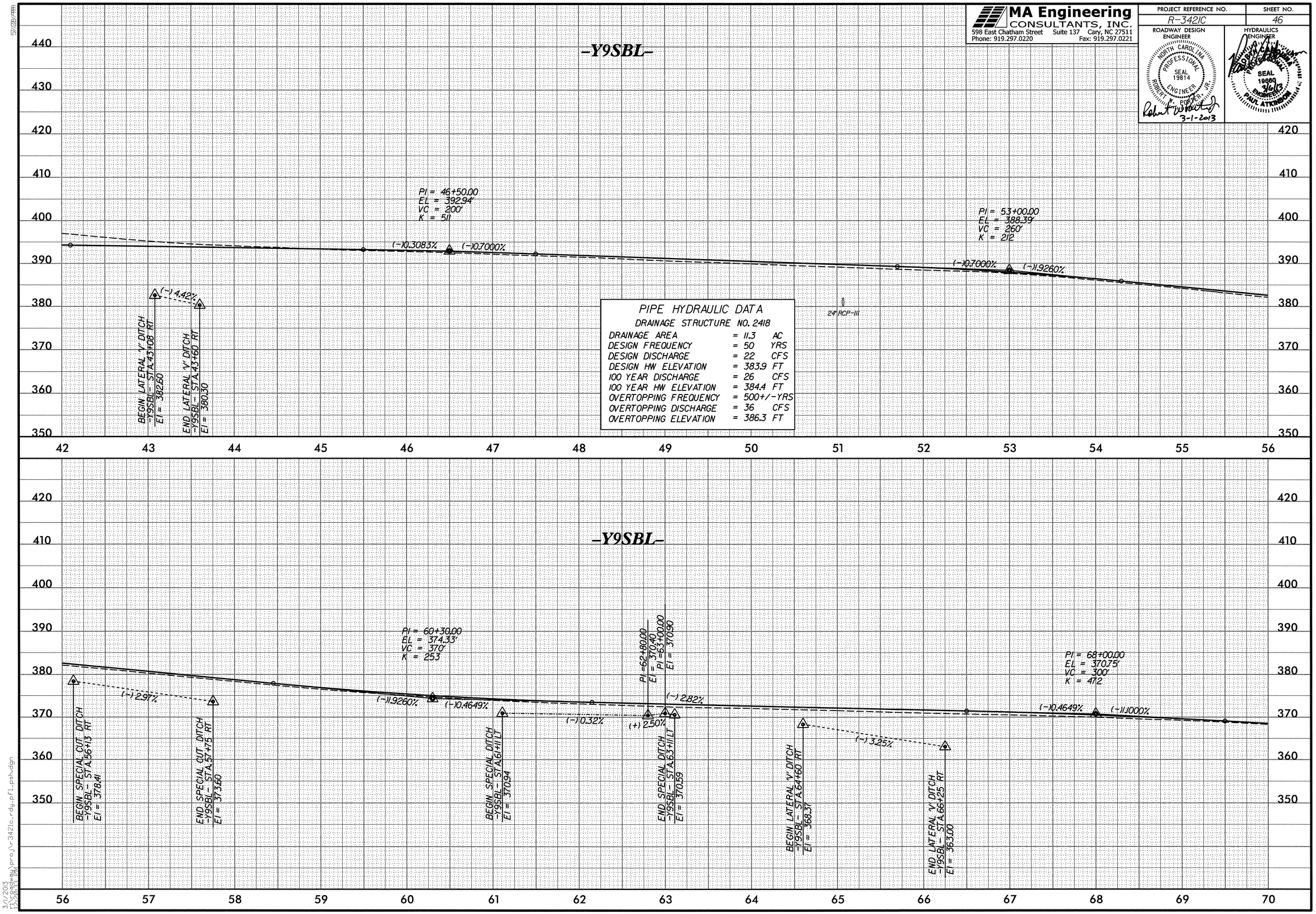
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	46

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT J. POWER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19860 ENGINEER PAUL ATKINSON, JR.
3/6/13



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 2418

DRAINAGE AREA	= 11.3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 22	CFS
DESIGN HW ELEVATION	= 383.9	FT
100 YEAR DISCHARGE	= 26	CFS
100 YEAR HW ELEVATION	= 384.4	FT
OVERTOPPING FREQUENCY	= 500+/-	YRS
OVERTOPPING DISCHARGE	= 36	CFS
OVERTOPPING ELEVATION	= 386.3	FT

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PROJECT REFERENCE NO.	SHEET NO.
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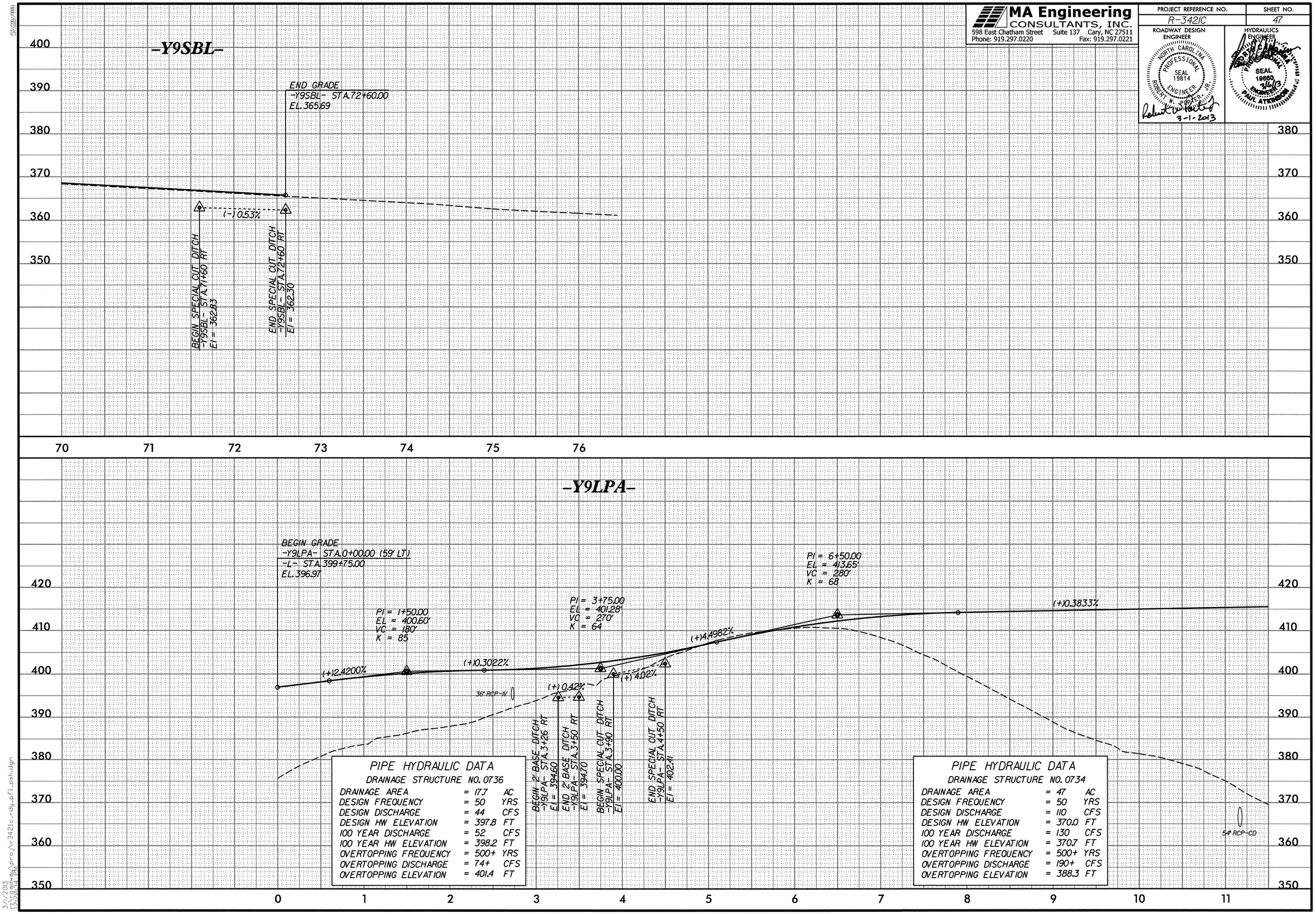
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POWER, JR.
3-1-2013

HYDRAULICS ENGINEER
PROFESSIONAL SEAL 19660 3/6/13 ENGINEER PAUL ATKINSON



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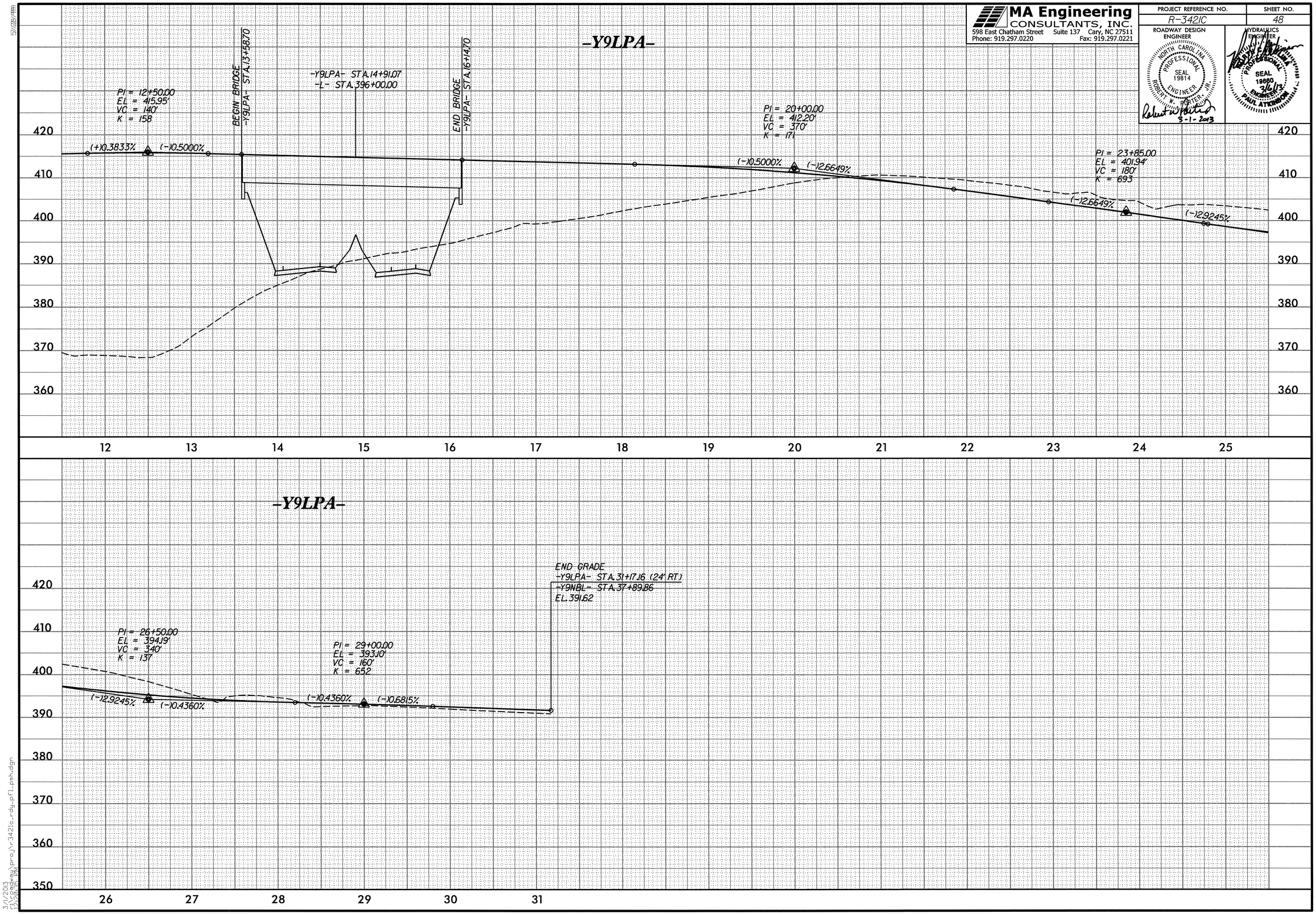
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	48

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON, JR.
3/6/13



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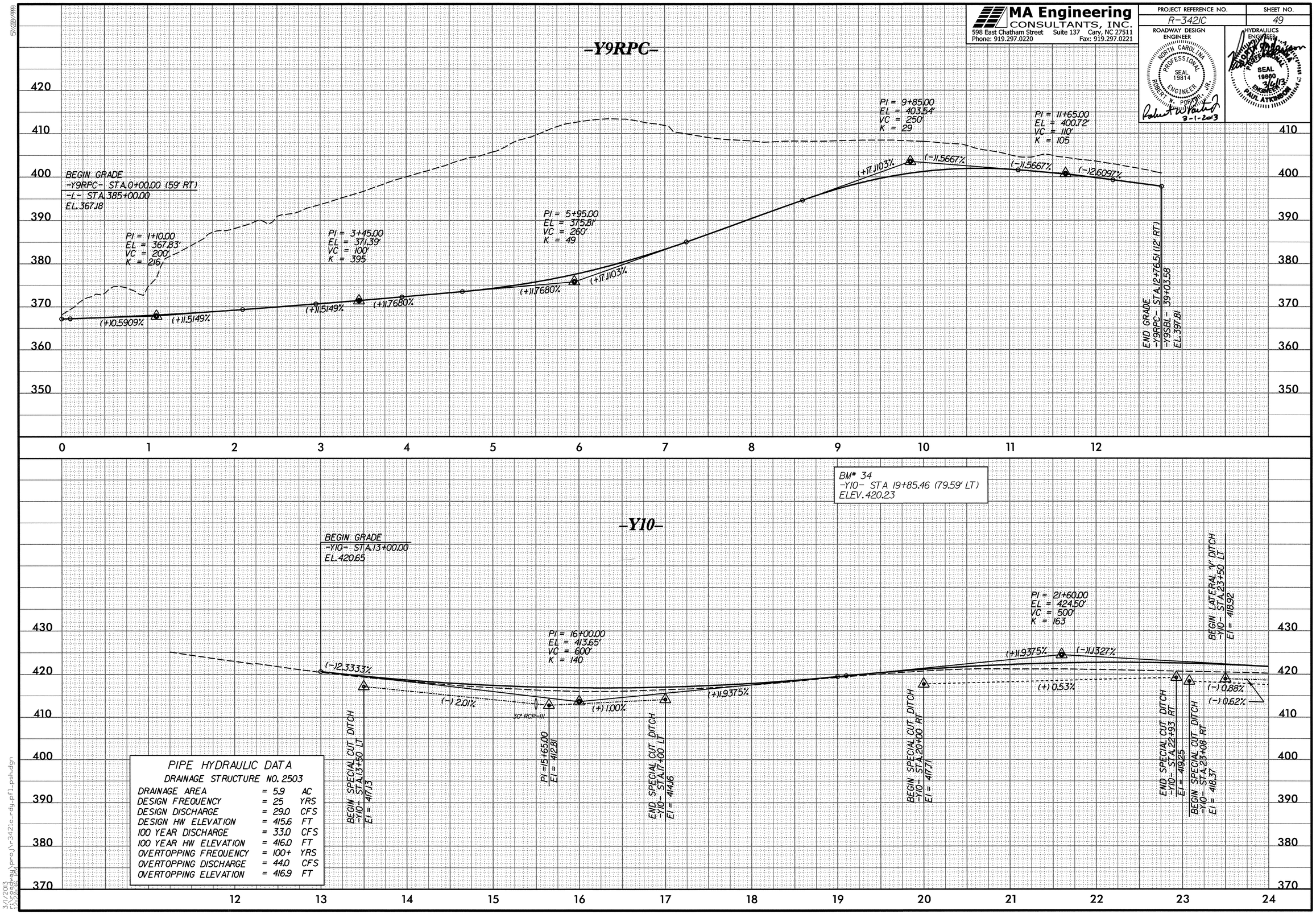
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	49

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter, Jr. 3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19860 ENGINEER PAUL ATKINSON JR.
3/6/13



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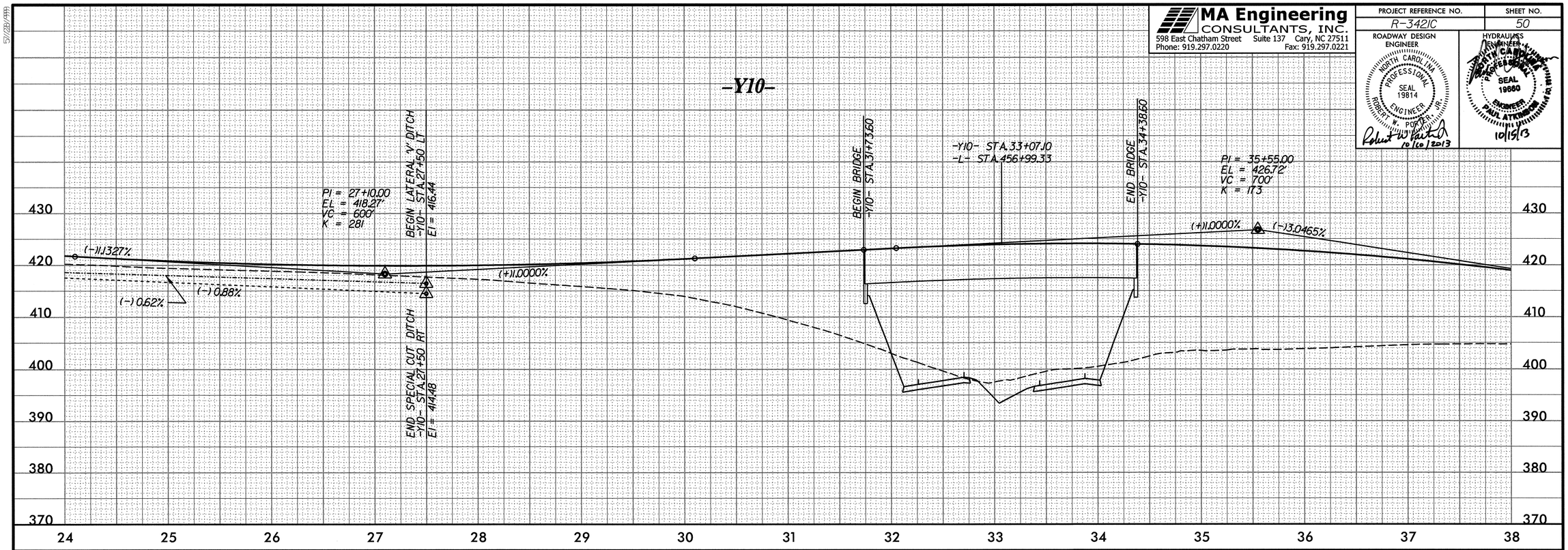
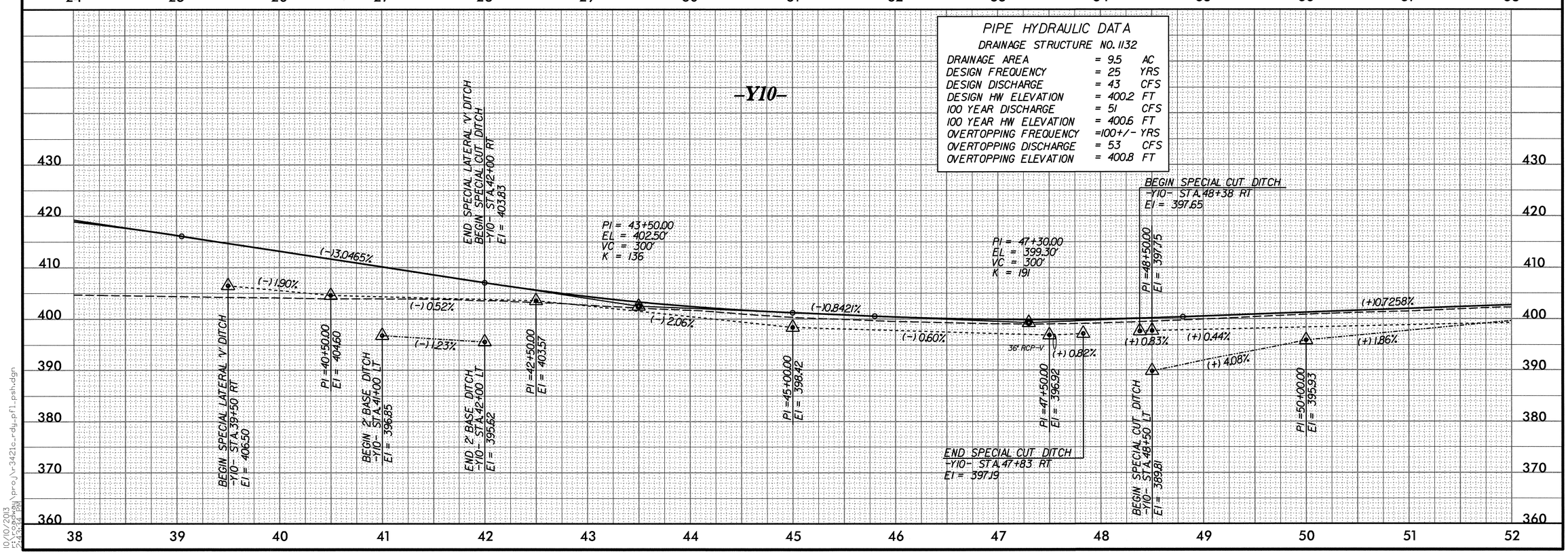
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	50

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter 10/10/2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19860 ENGINEER PAUL ATKINSON, JR.
10/15/13





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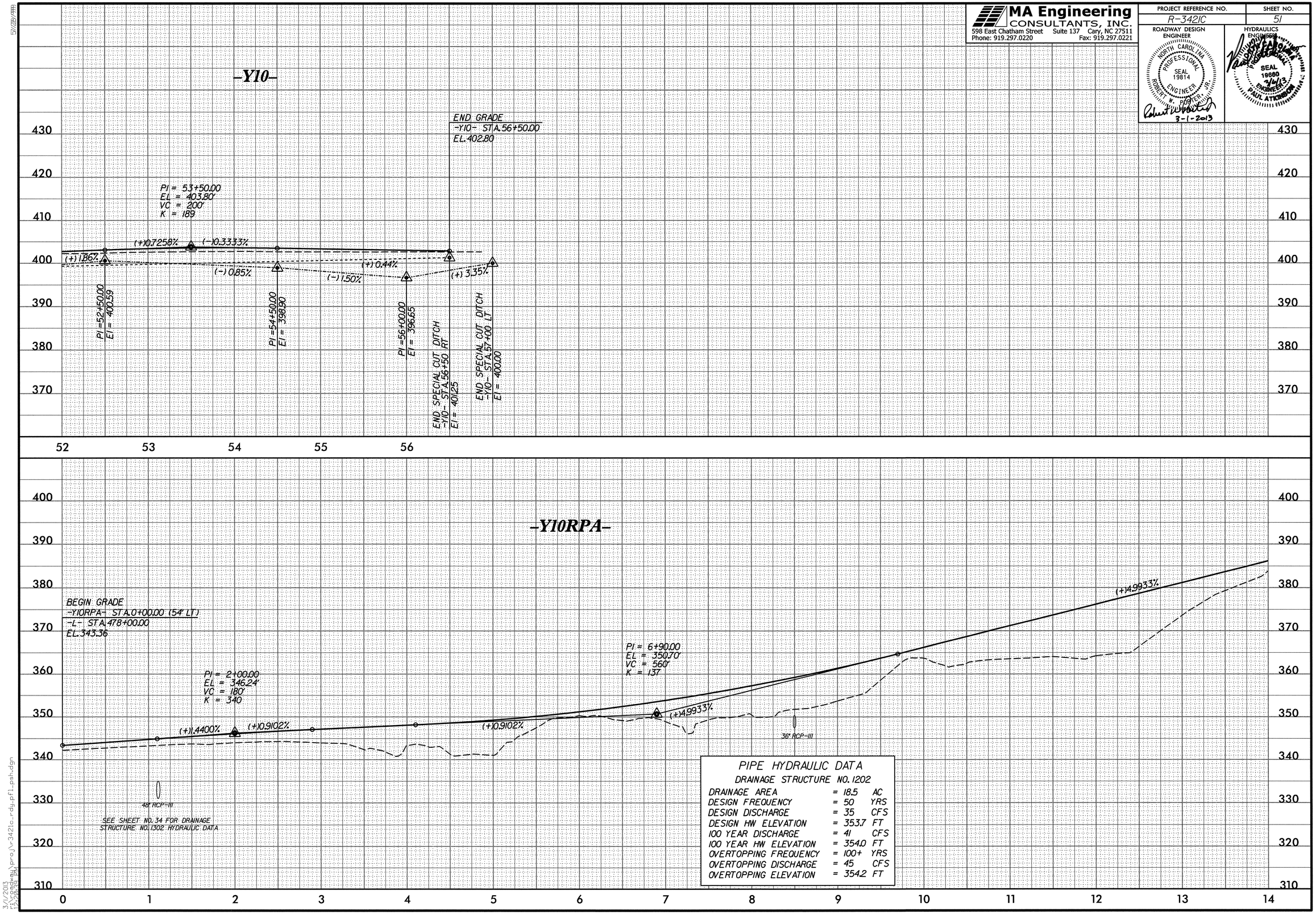
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	51

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPPER, JR.
Robert W. Popper Jr. 3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19880 ENGINEER PAUL A. THOMPSON
Paul A. Thompson 3/6/13



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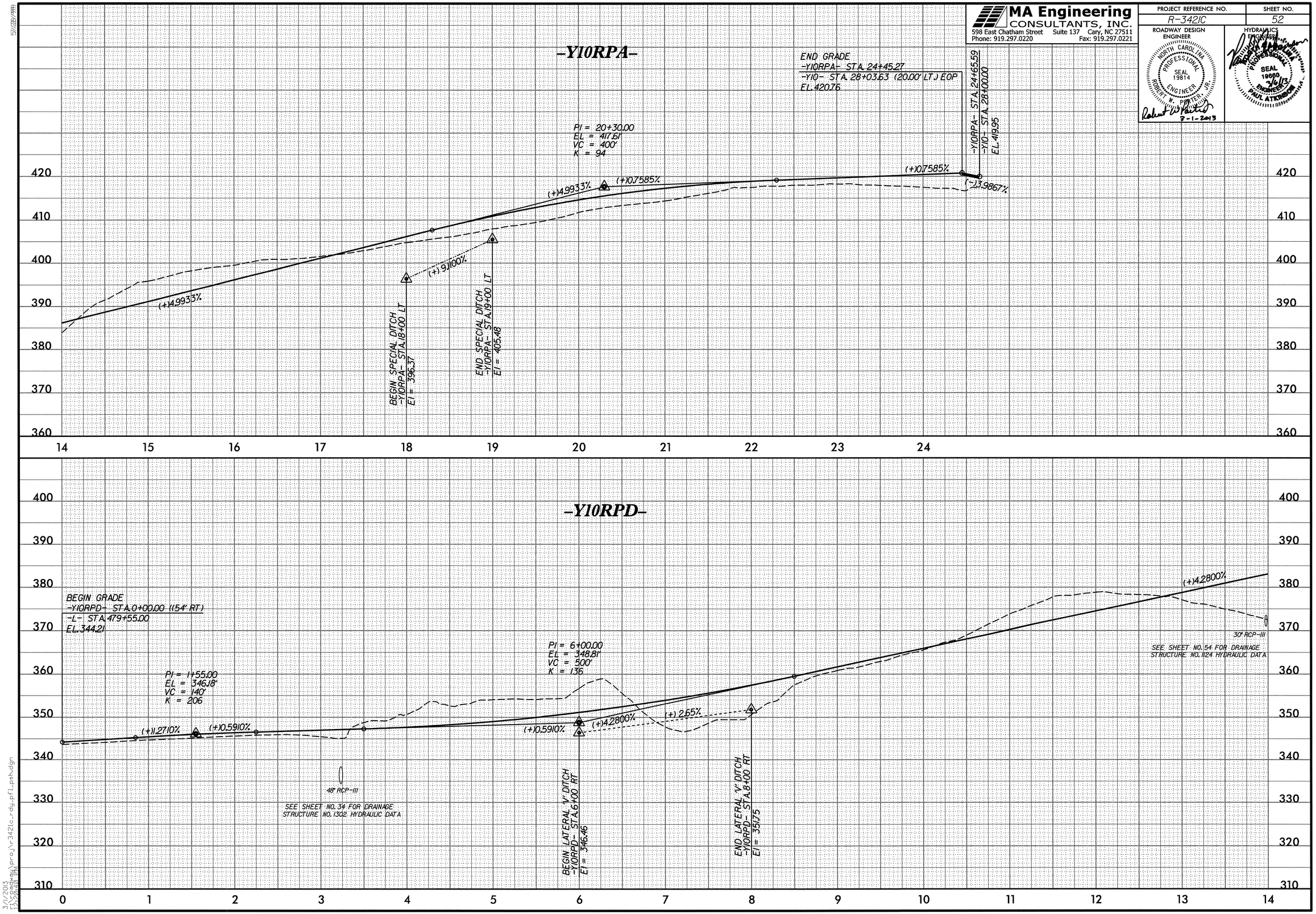
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	52

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
7-1-2013

HYDRAULICS ENGINEER
PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON, JR.
7/1/13



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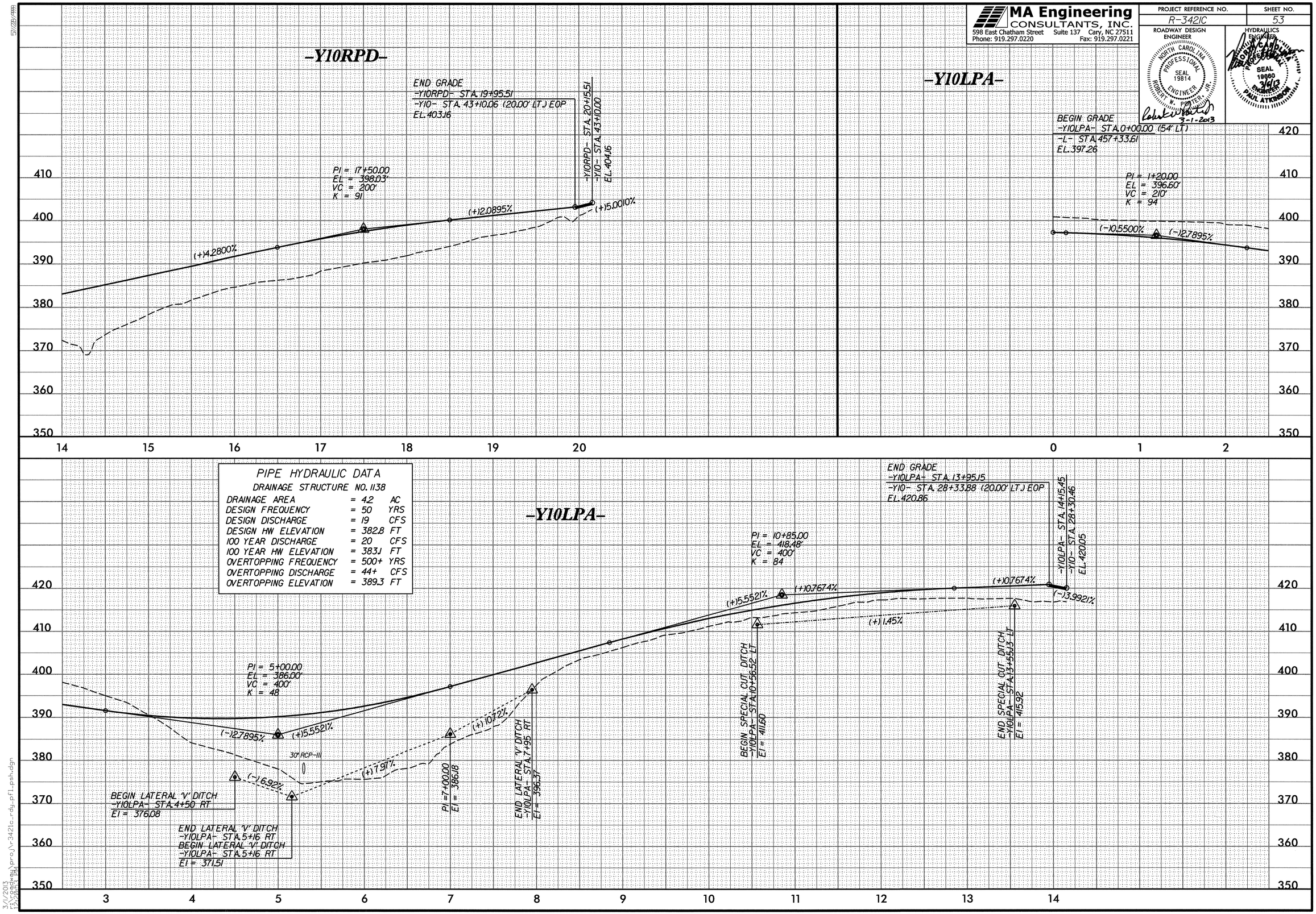
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	53

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PROFFITT, JR.
3-1-2013

HYDRAULICS ENGINEER
SEAL 19660 3/6/13 ENGINEER PAUL ATKINSON



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PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO. 1124		
DRAINAGE AREA	= 12.5	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 23	CFS
DESIGN HW ELEVATION	= 376.6	FT
100 YEAR DISCHARGE	= 27	CFS
100 YEAR HW ELEVATION	= 376.9	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 39+	CFS
OVERTOPPING ELEVATION	= 382.0	FT

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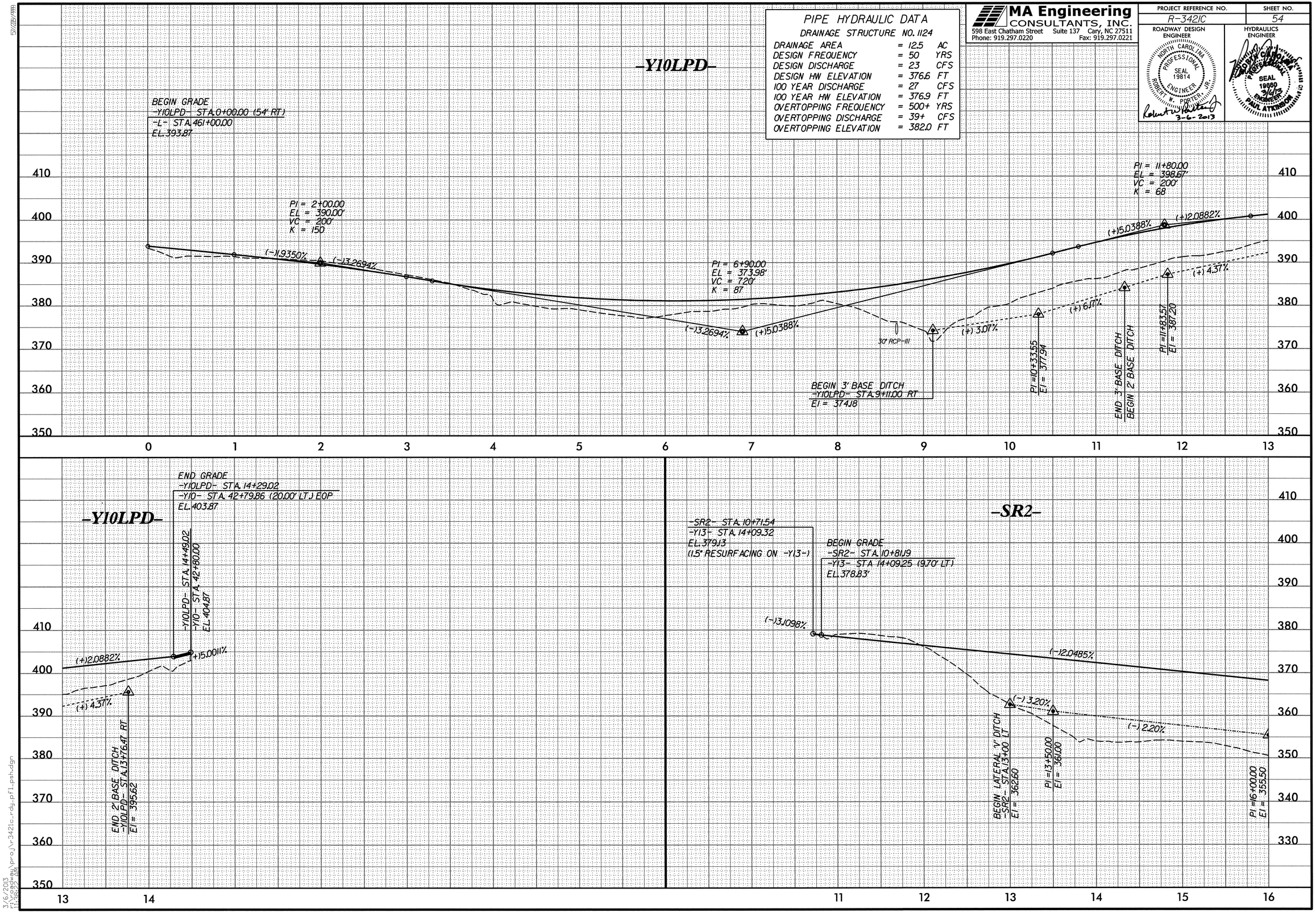
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	54

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 3-6-2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL A. TOMKINS — 3/6/13



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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	55

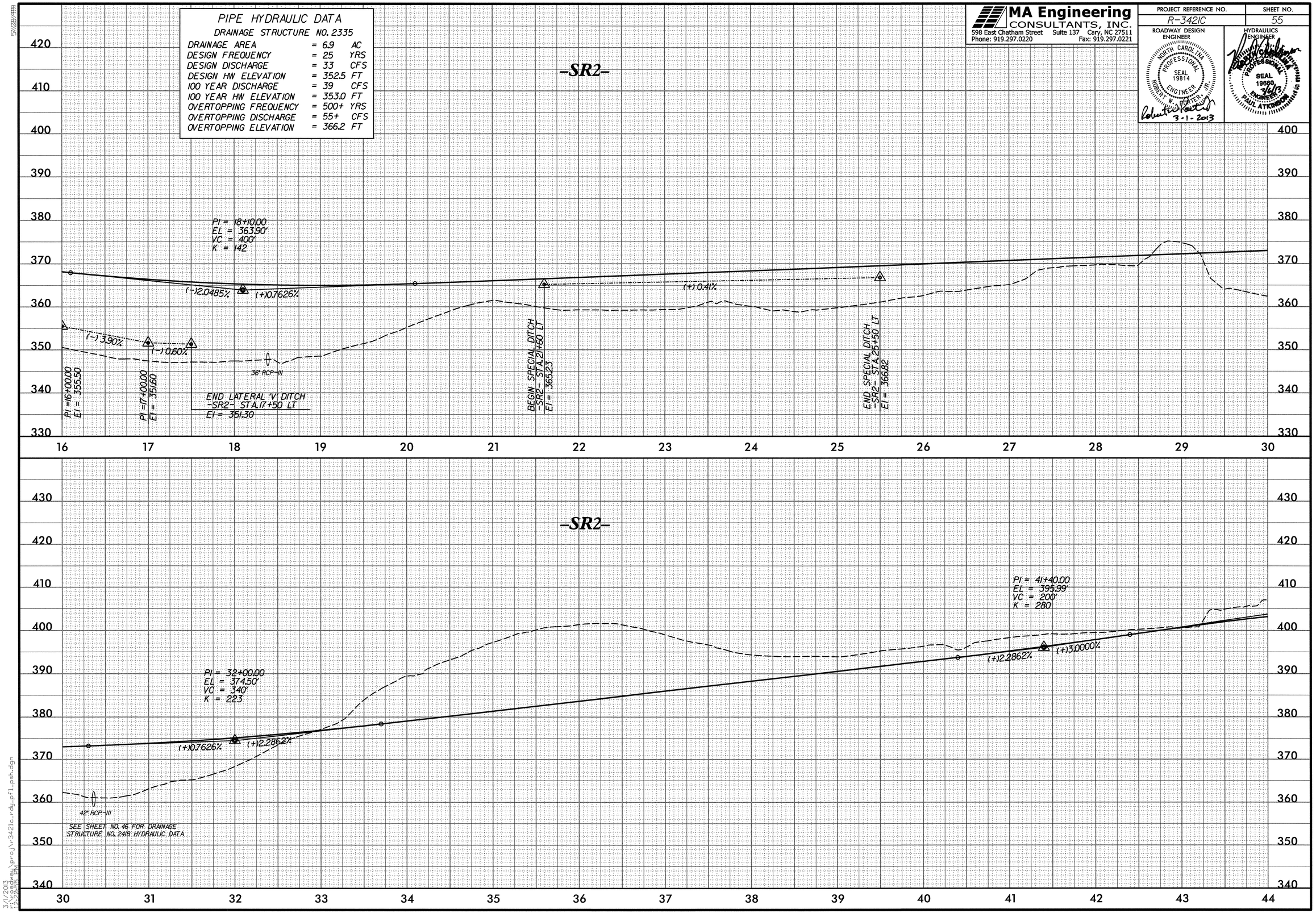
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POWTER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19680 ENGINEER PAUL ATKINSON JR.
3/1/13

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 2335

DRAINAGE AREA	= 6.9	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 33	CFS
DESIGN HW ELEVATION	= 352.5	FT
100 YEAR DISCHARGE	= 39	CFS
100 YEAR HW ELEVATION	= 353.0	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 55+	CFS
OVERTOPPING ELEVATION	= 366.2	FT



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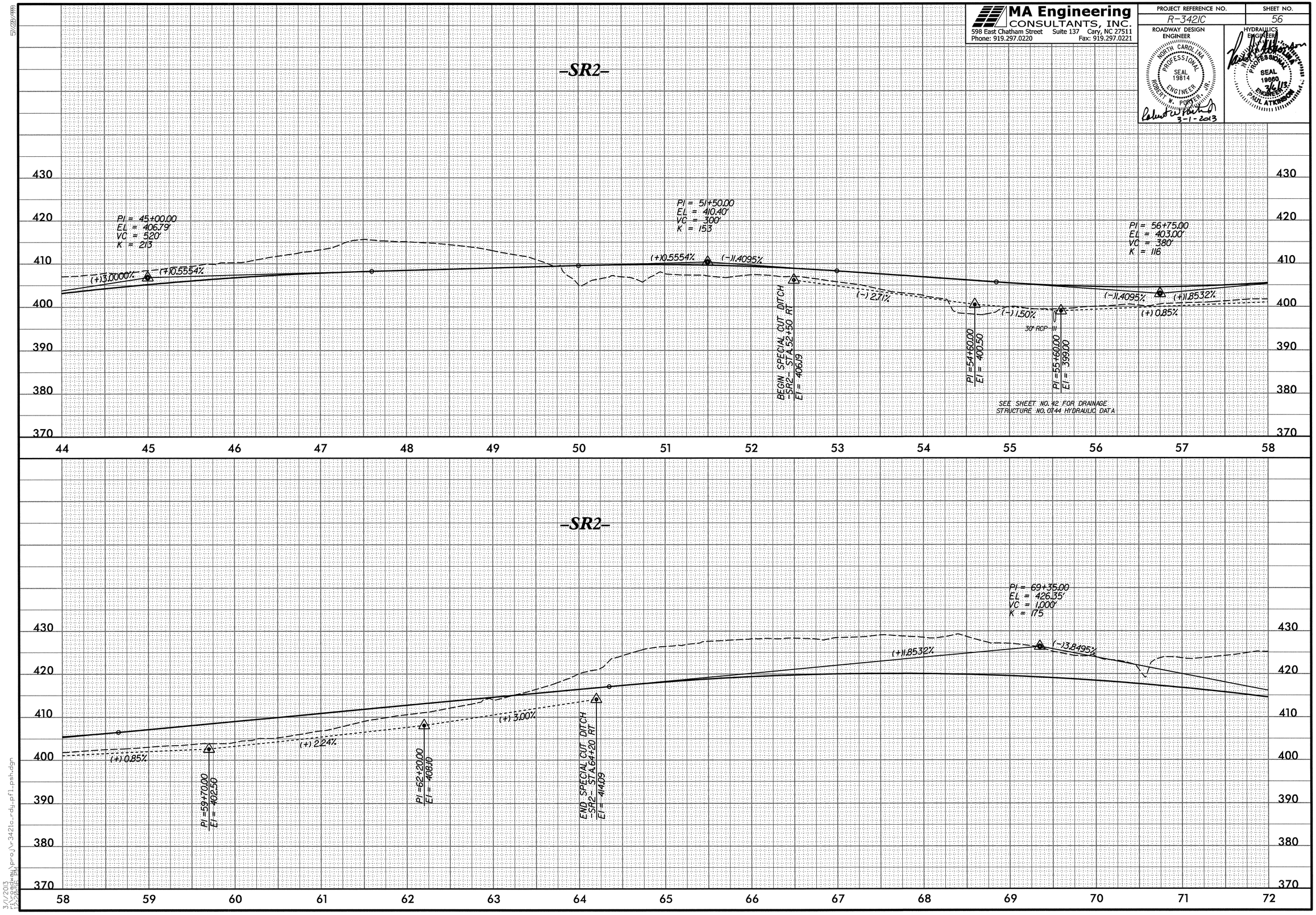
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	56

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON, JR.
3/1/13



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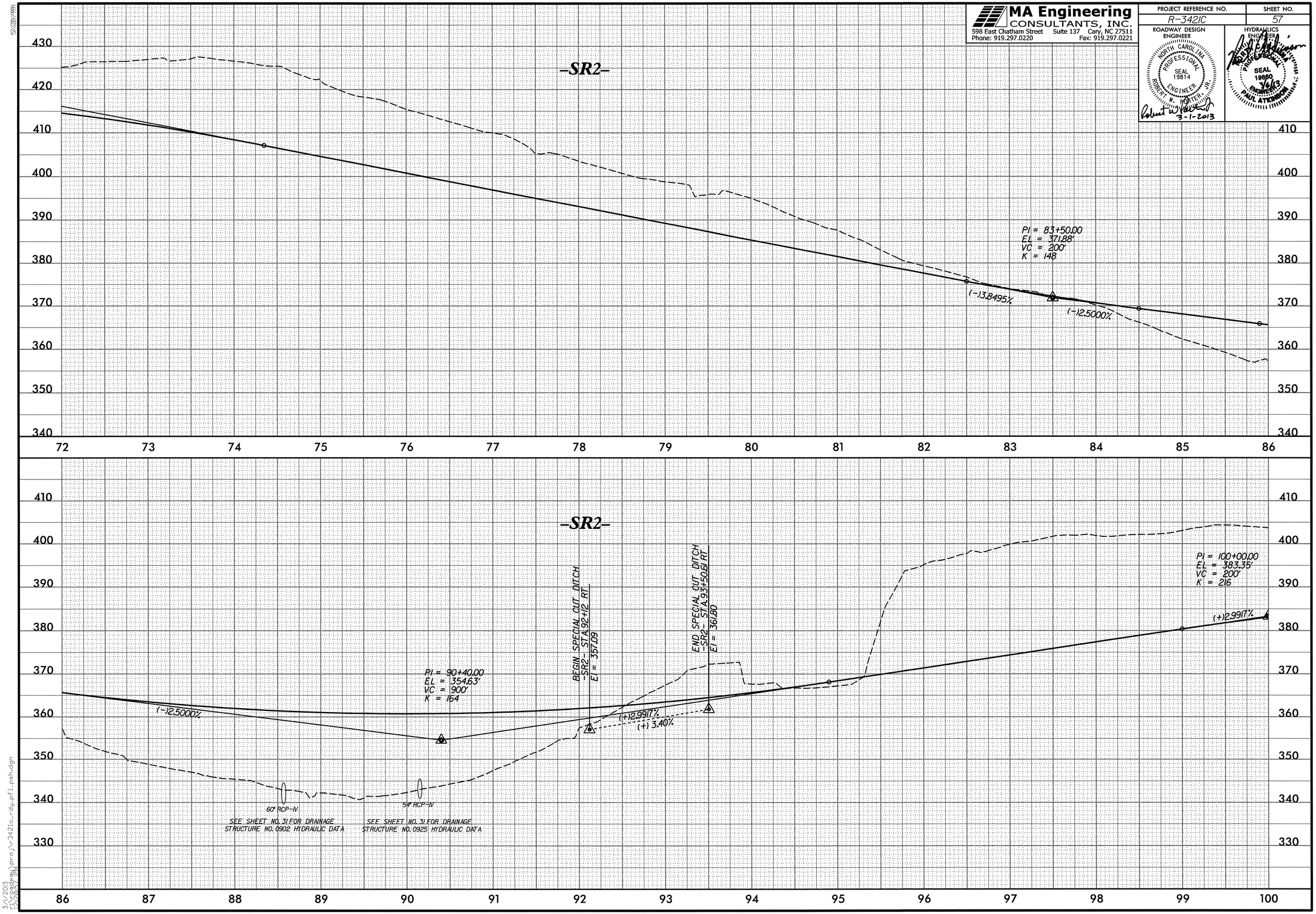
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	57

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter, Jr. 3-1-2013

HYDRAULICS ENGINEER
PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON JR.
Paul E. Atkinson Jr. 3/6/13



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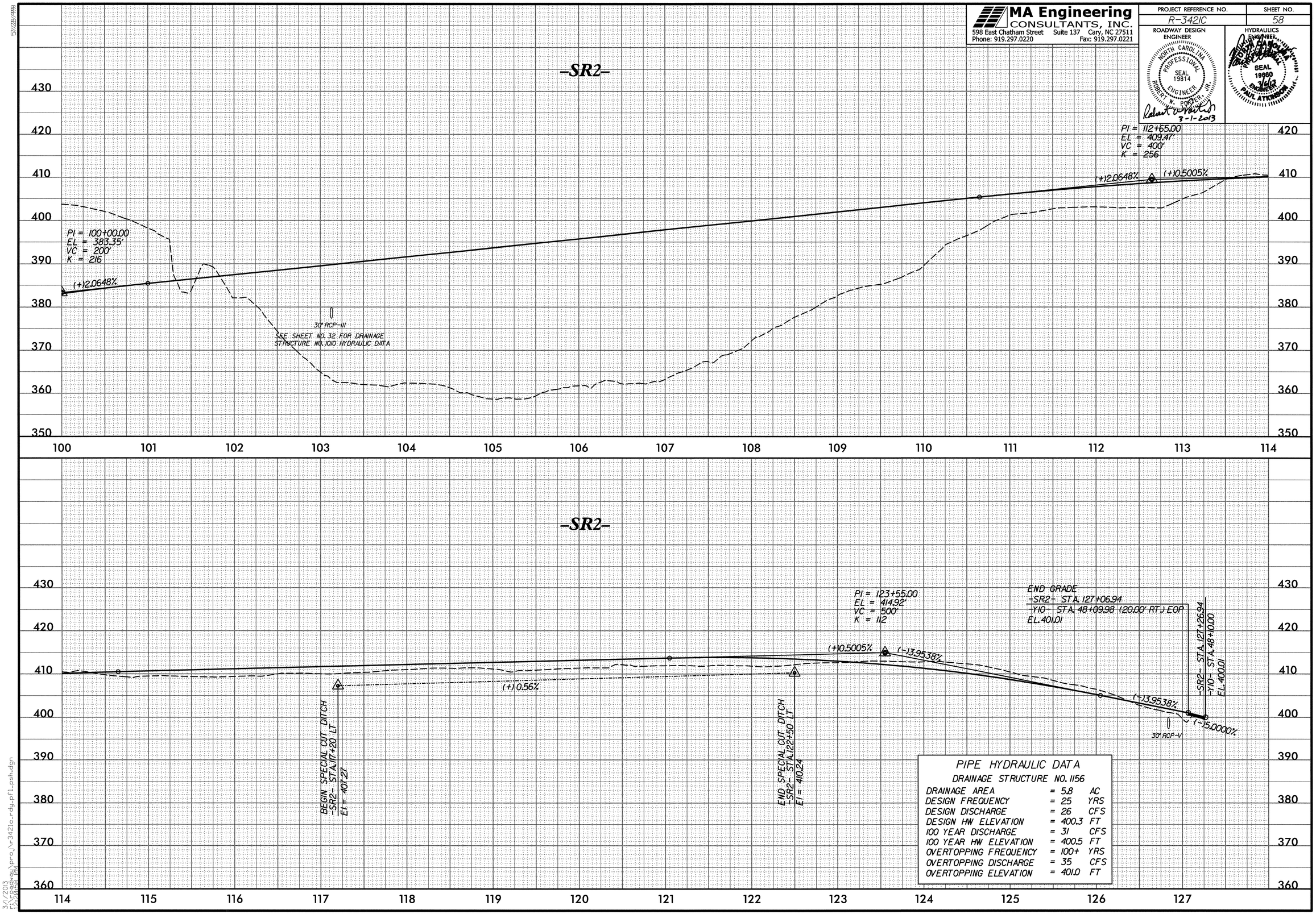
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	58

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. FOSTER, JR.
Robert W. Foster Jr. 3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON JR.
3/6/13



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1156

DRAINAGE AREA	= 5.8	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 26	CFS
DESIGN HW ELEVATION	= 400.3	FT
100 YEAR DISCHARGE	= 31	CFS
100 YEAR HW ELEVATION	= 400.5	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 35	CFS
OVERTOPPING ELEVATION	= 401.0	FT

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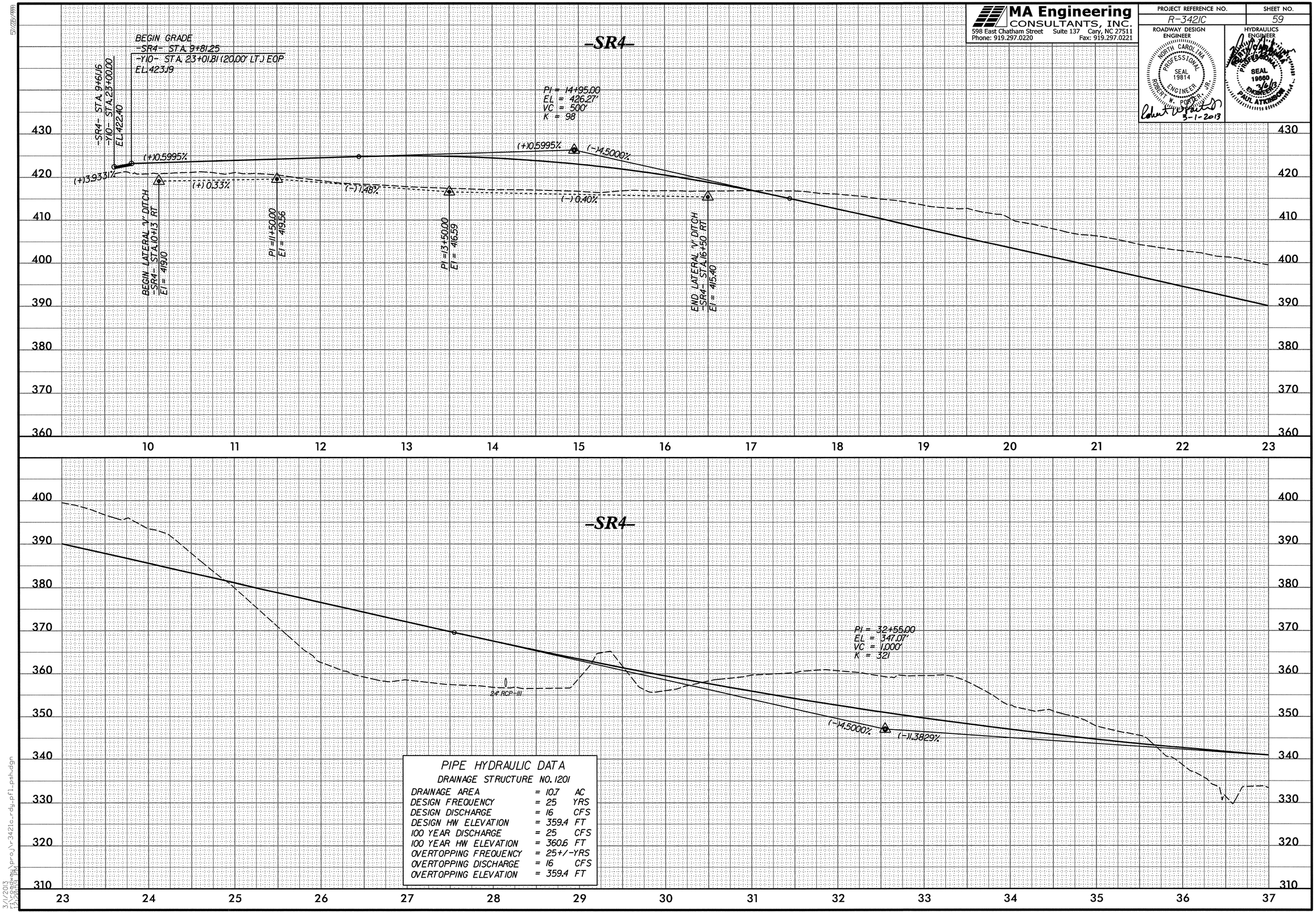
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	59

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-1-2013

HYDRAULICS ENGINEER
PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
3/6/13



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 1201

DRAINAGE AREA	= 10.7	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 16	CFS
DESIGN HW ELEVATION	= 359.4	FT
100 YEAR DISCHARGE	= 25	CFS
100 YEAR HW ELEVATION	= 360.6	FT
OVERTOPPING FREQUENCY	= 25+/-	YRS
OVERTOPPING DISCHARGE	= 16	CFS
OVERTOPPING ELEVATION	= 359.4	FT

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PROJECT REFERENCE NO.	SHEET NO.
R-3421C	60

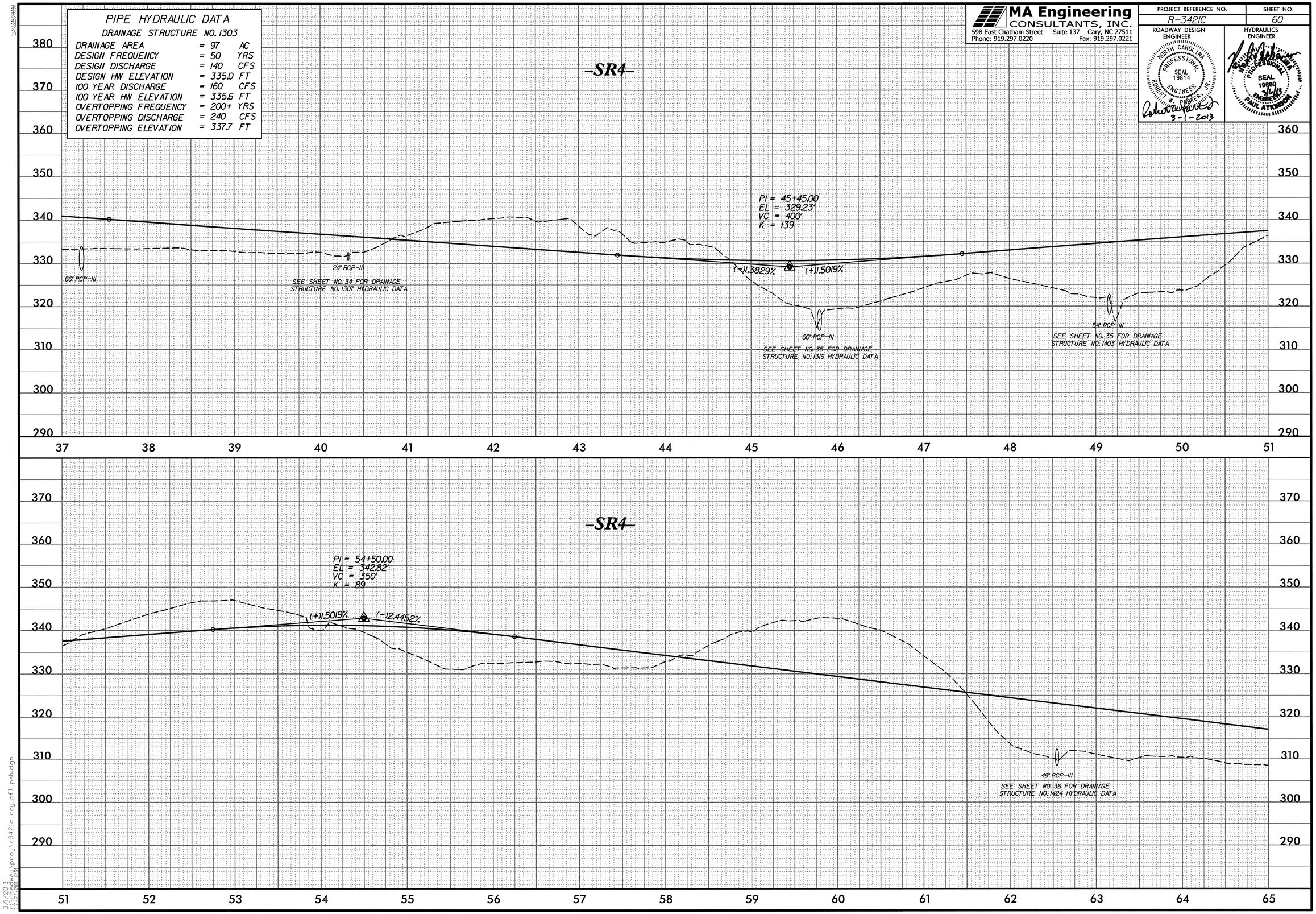
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPE, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19680 ENGINEER PAUL ATKINSON
3/1/13

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 1303

DRAINAGE AREA	=	97	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	140	CFS
DESIGN HW ELEVATION	=	335.0	FT
100 YEAR DISCHARGE	=	160	CFS
100 YEAR HW ELEVATION	=	335.6	FT
OVERTOPPING FREQUENCY	=	200+	YRS
OVERTOPPING DISCHARGE	=	240	CFS
OVERTOPPING ELEVATION	=	337.7	FT



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PROJECT REFERENCE NO.	SHEET NO.
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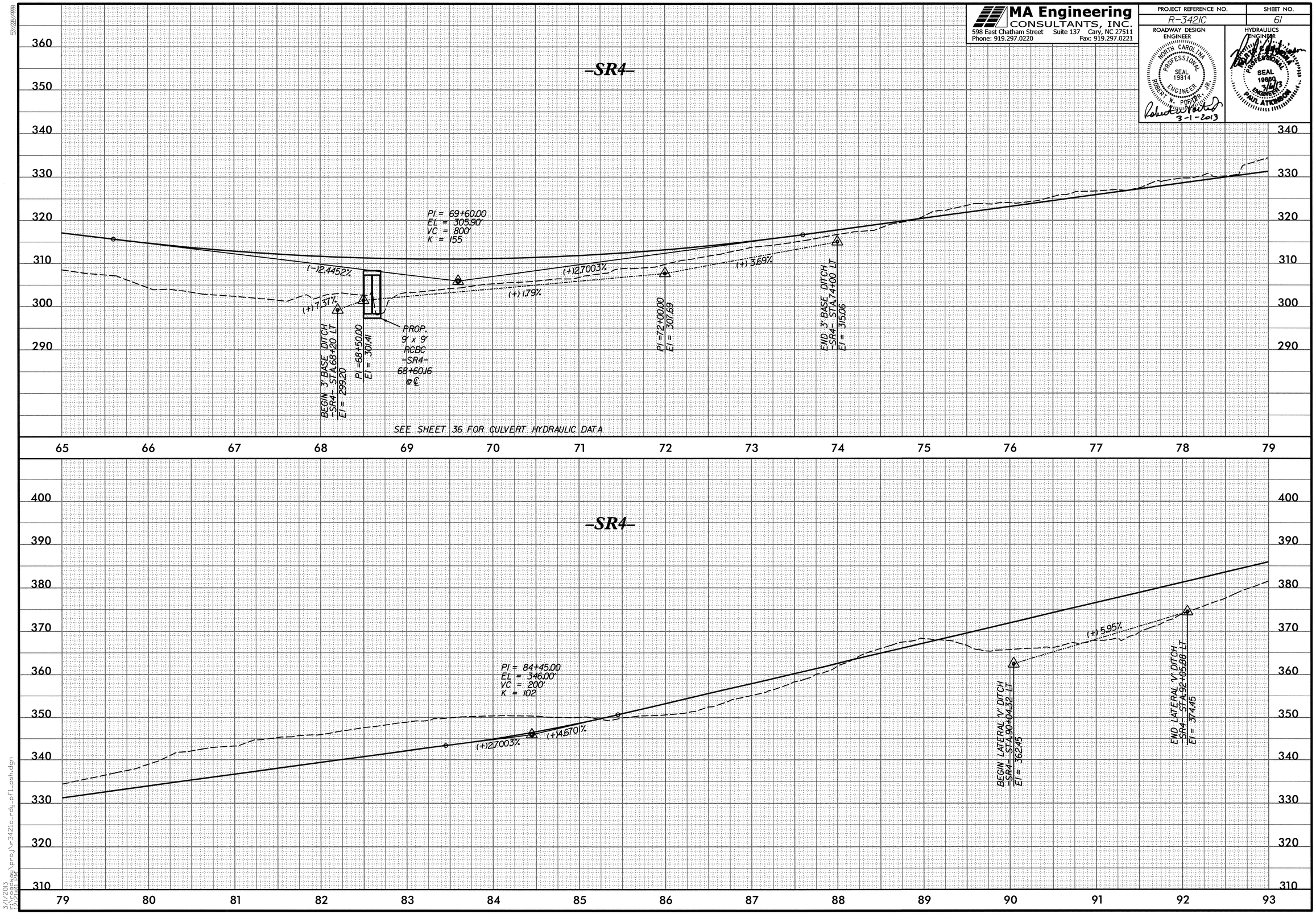
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POPE JR.
3-1-2013

HYDRAULICS ENGINEER
PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON JR.
3/1/13



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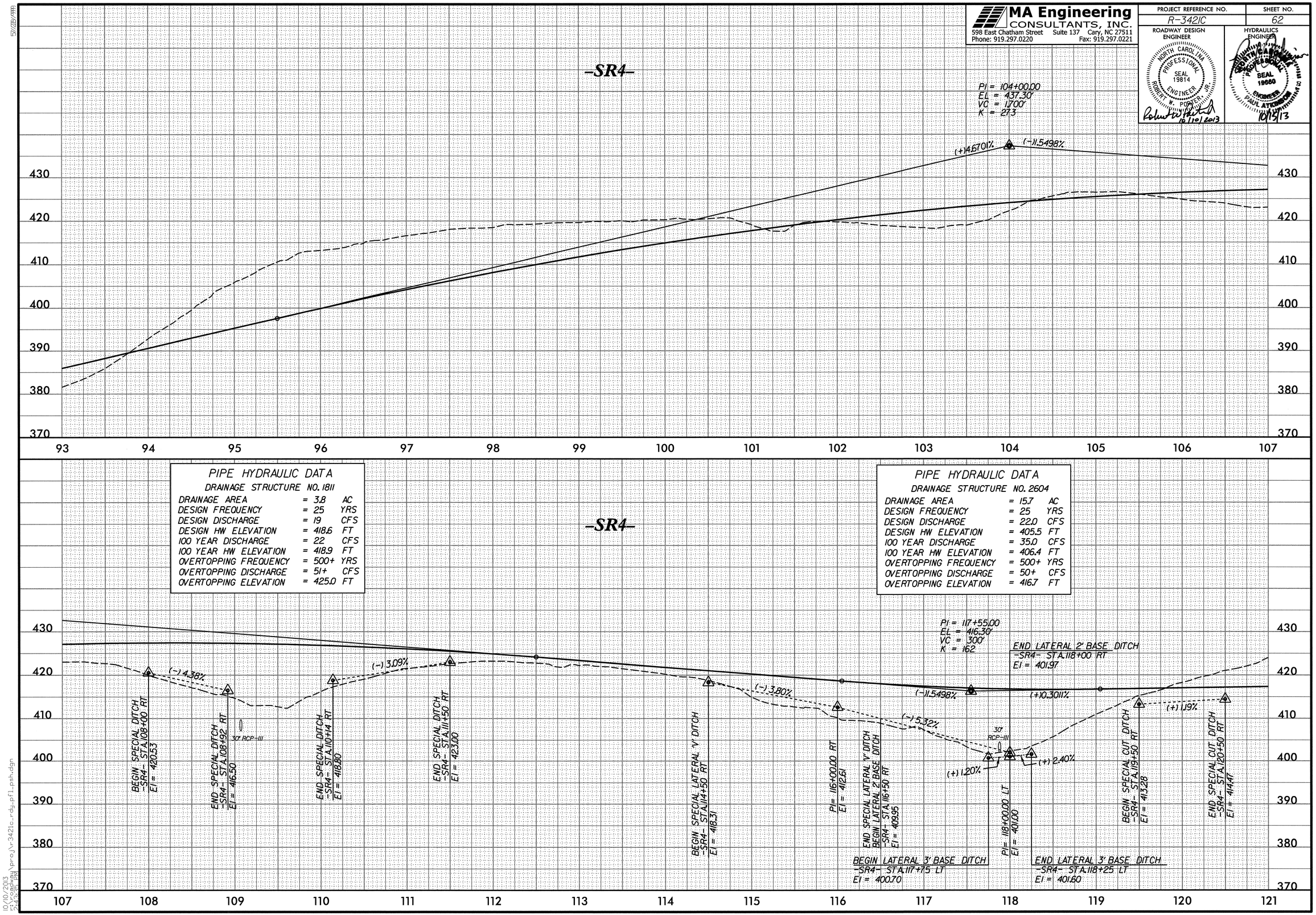
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	62

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POWER, JR.
10/10/2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19060 ENGINEER PAUL ATKINSON, JR.
10/15/13



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PROJECT REFERENCE NO.	SHEET NO.
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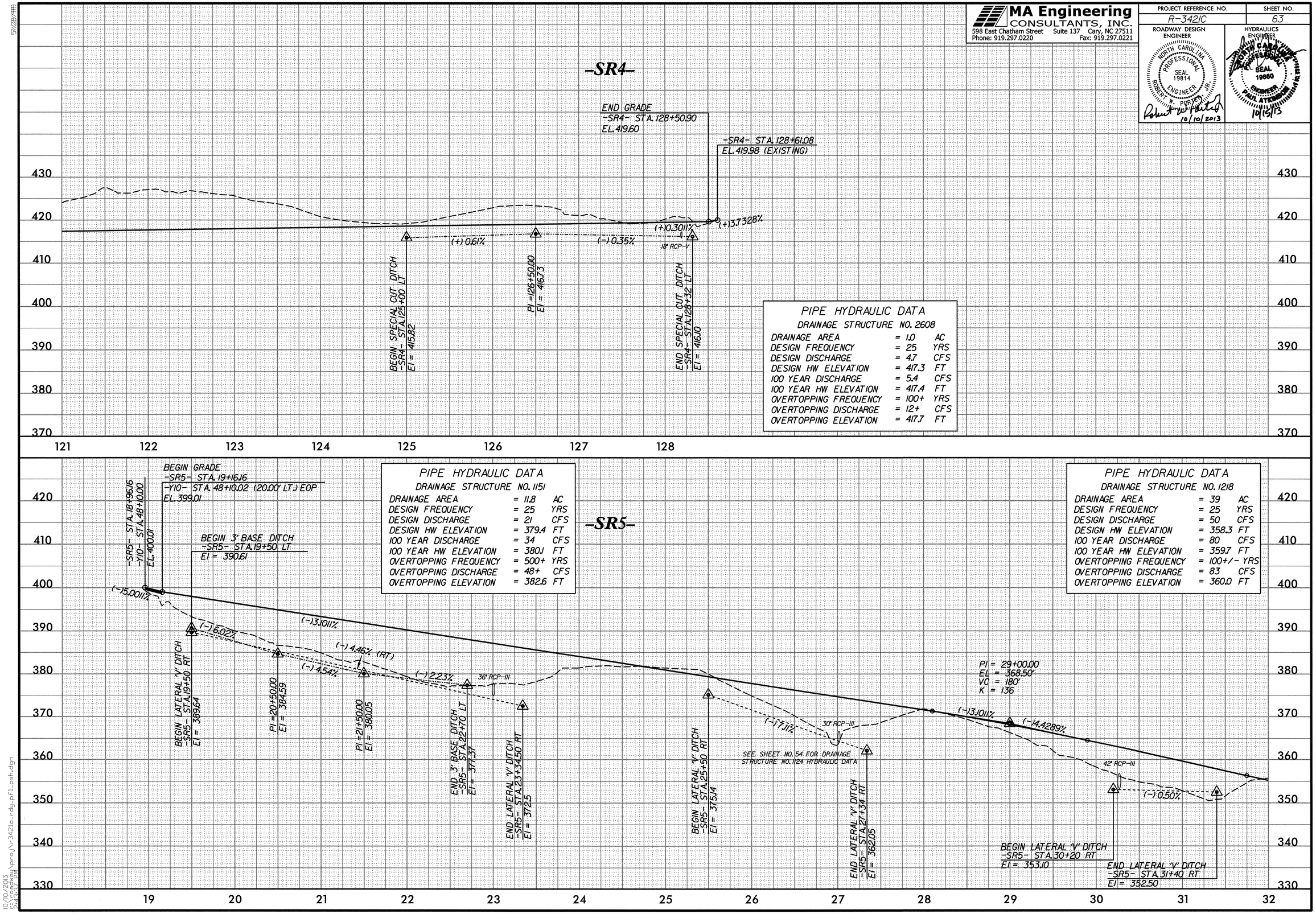
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 10/10/2013

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON — 10/15/13



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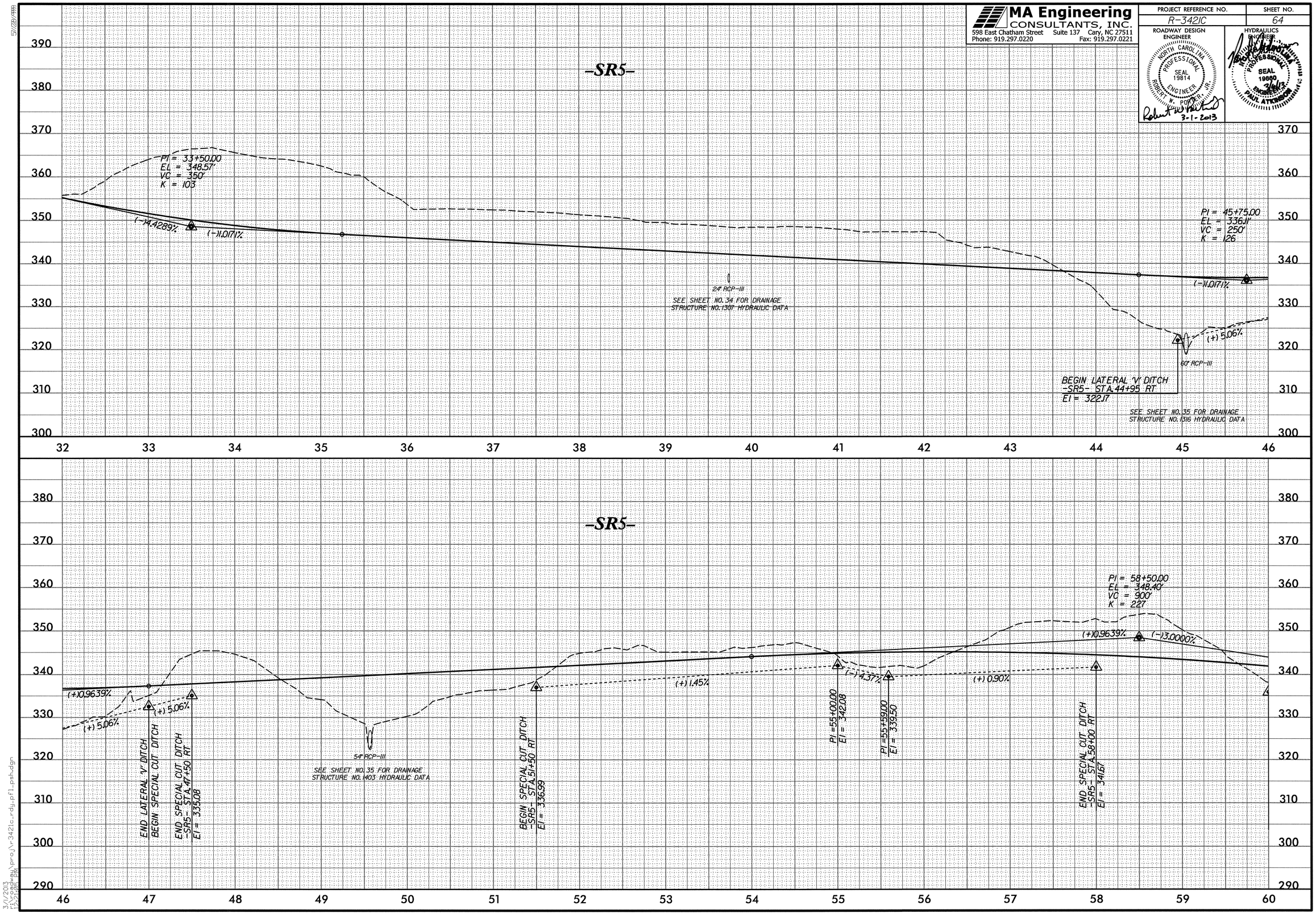
PROJECT REFERENCE NO.	SHEET NO.
R-3421C	64

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
3/6/13



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PROJECT REFERENCE NO.	SHEET NO.
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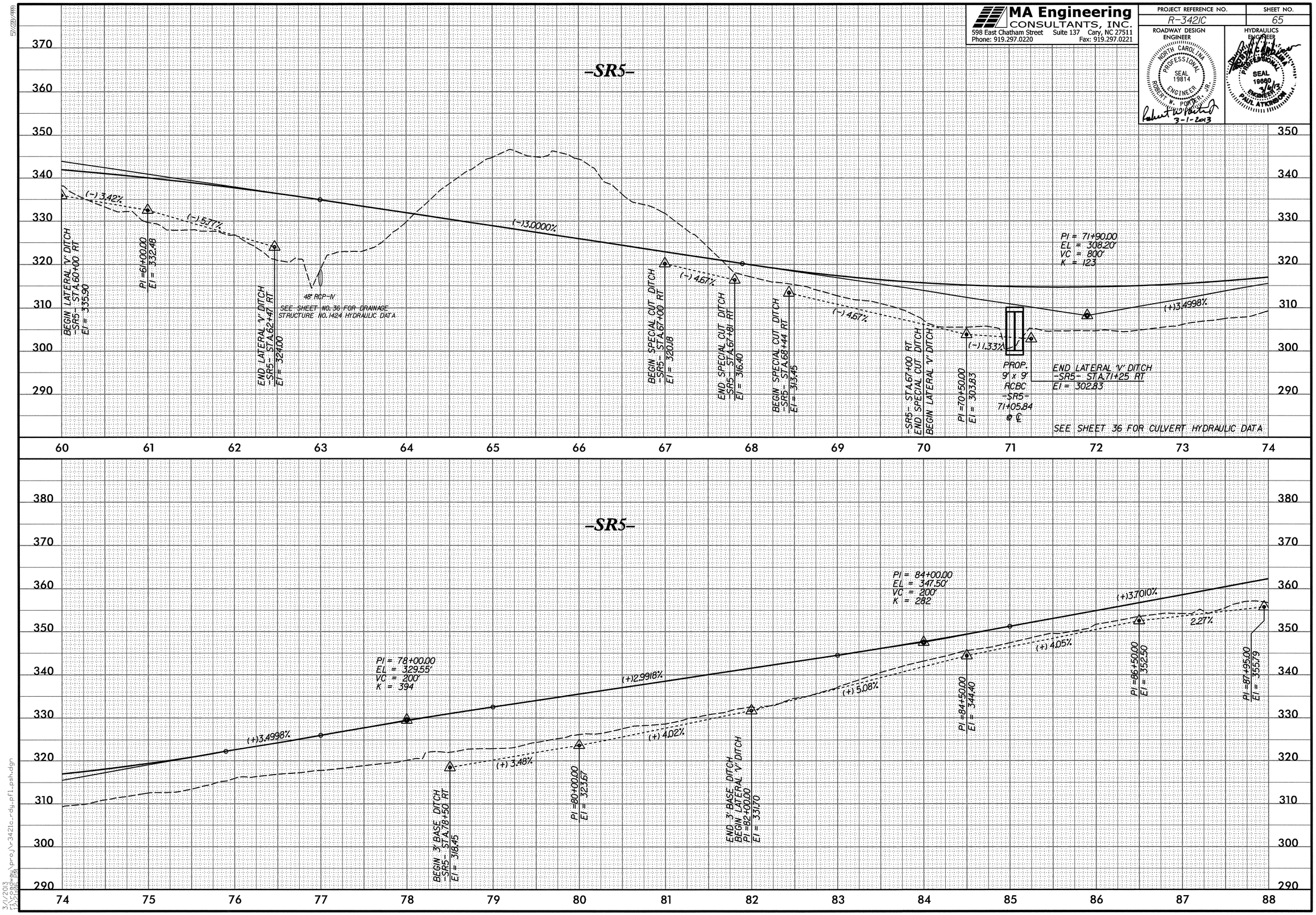
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter 3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON JR.
3/5/13



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PROJECT REFERENCE NO.	SHEET NO.
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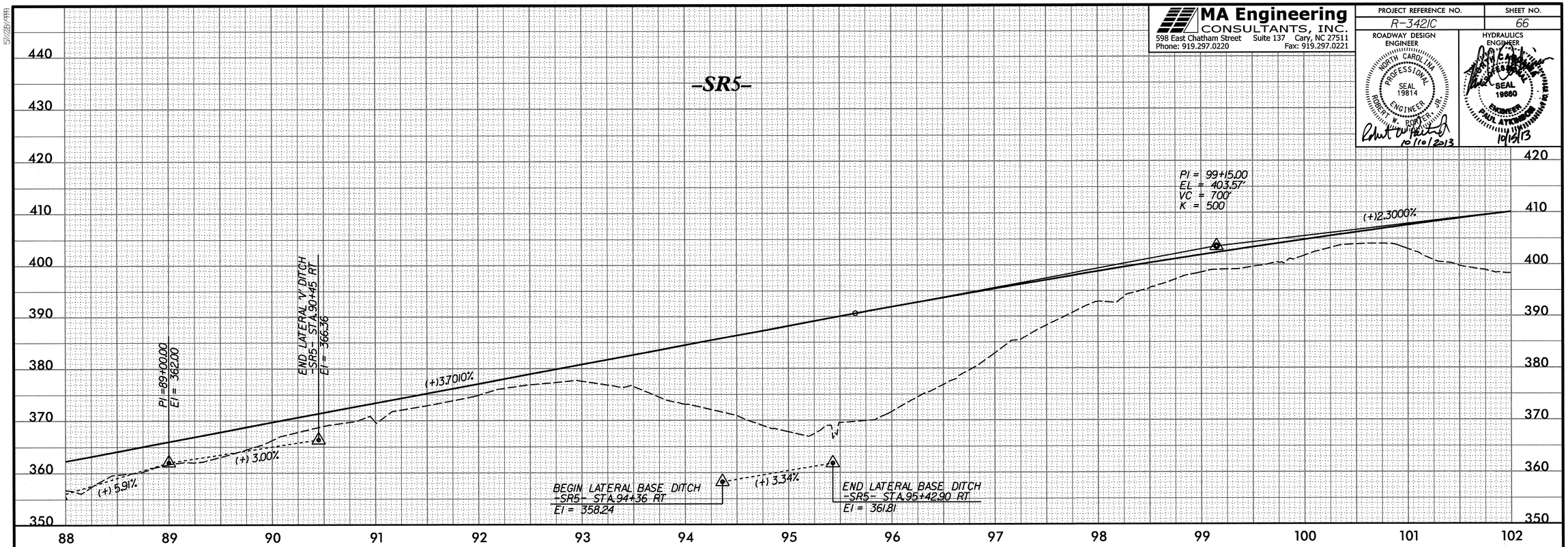
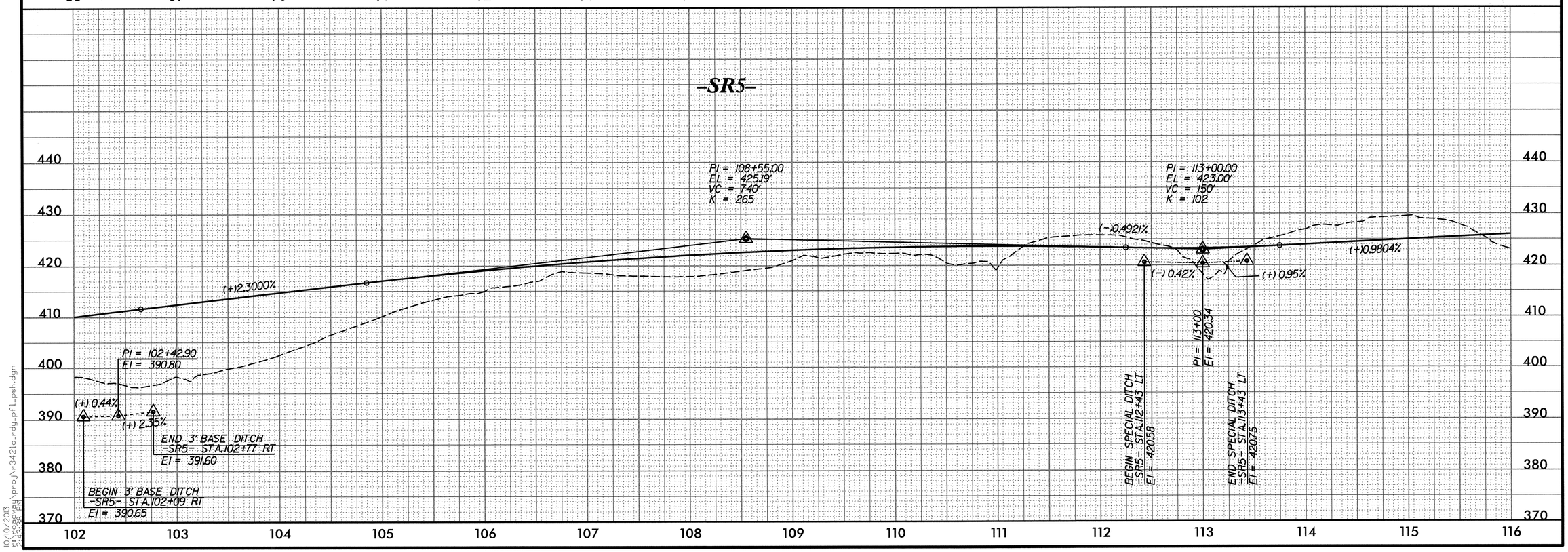
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. ROUTER, JR.
10/10/2013

HYDRAULICS ENGINEER
SEAL 19660 ENGINEER PAUL A. TYCHOWSKI
10/10/13





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PROJECT REFERENCE NO.	SHEET NO.
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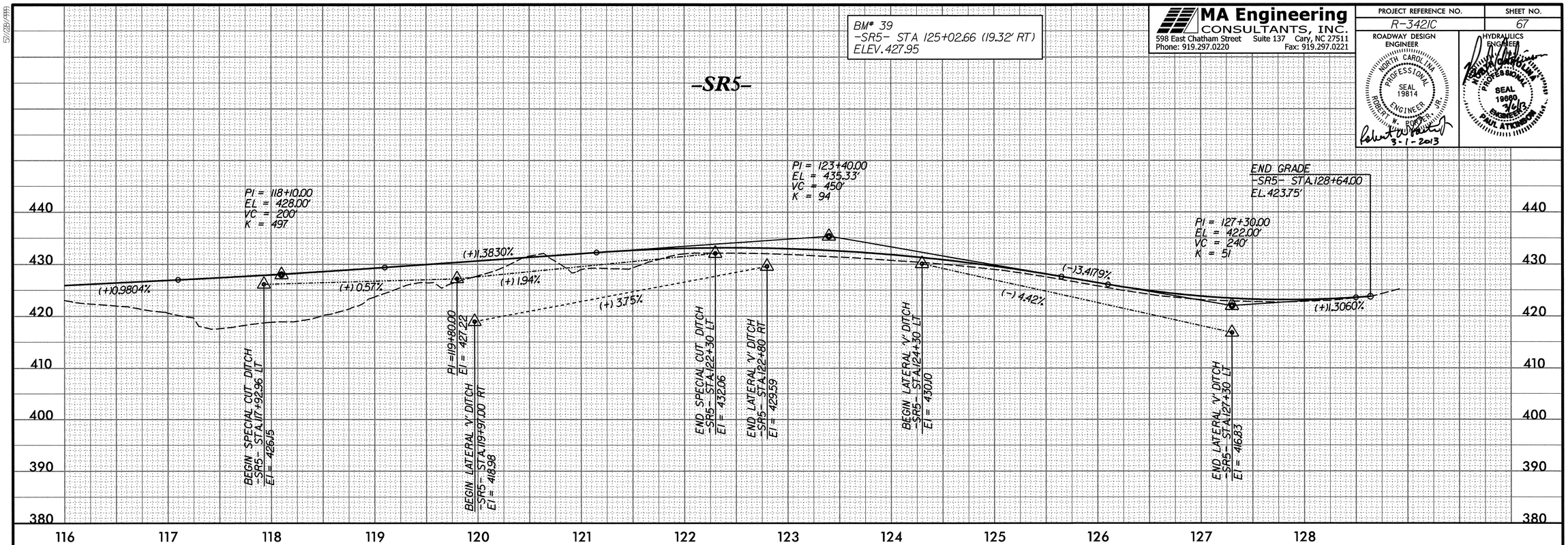
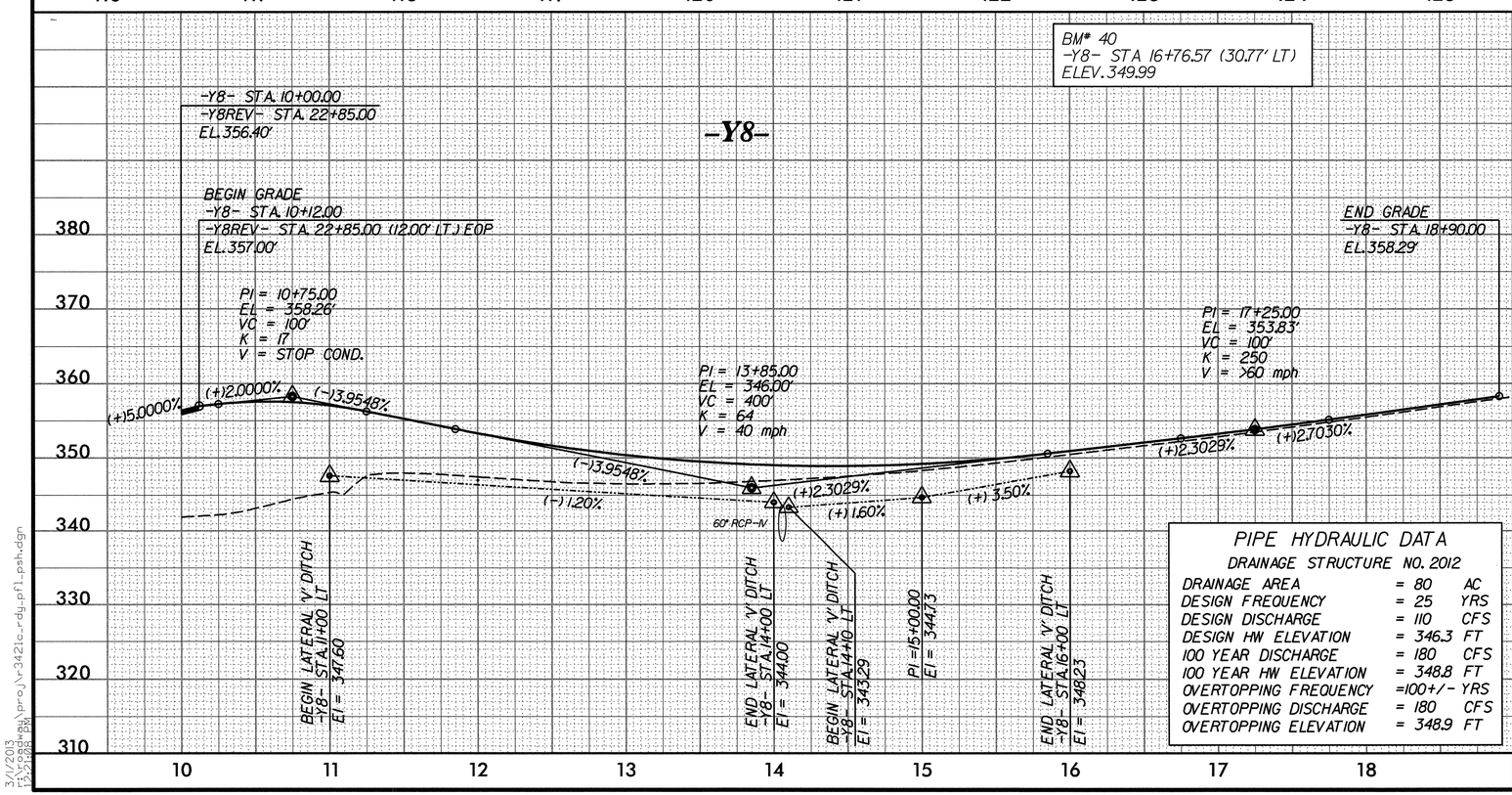
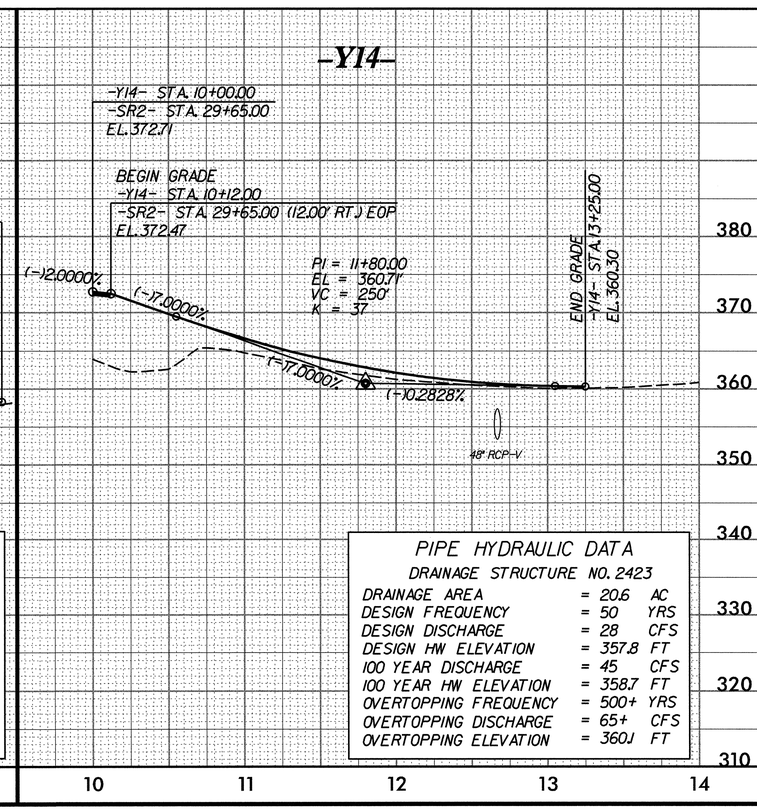
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR. — 3-1-2013

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON — 3/6/13







PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 2012

DRAINAGE AREA	= 80	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 110	CFS
DESIGN HW ELEVATION	= 346.3	FT
100 YEAR DISCHARGE	= 180	CFS
100 YEAR HW ELEVATION	= 348.8	FT
OVERTOPPING FREQUENCY	=100+/-	YRS
OVERTOPPING DISCHARGE	= 180	CFS
OVERTOPPING ELEVATION	= 348.9	FT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 2423

DRAINAGE AREA	= 20.6	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 28	CFS
DESIGN HW ELEVATION	= 357.8	FT
100 YEAR DISCHARGE	= 45	CFS
100 YEAR HW ELEVATION	= 358.7	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 65+	CFS
OVERTOPPING ELEVATION	= 360.1	FT

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PROJECT REFERENCE NO.	SHEET NO.
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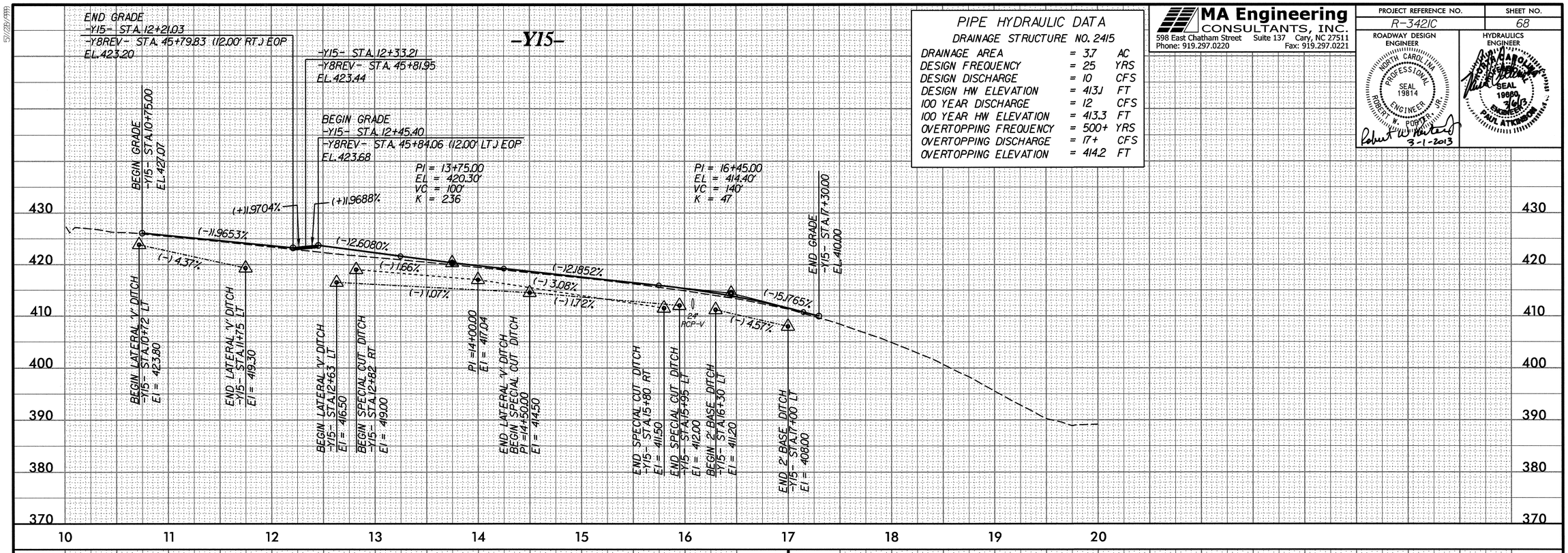
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
Robert W. Porter 3-1-2013

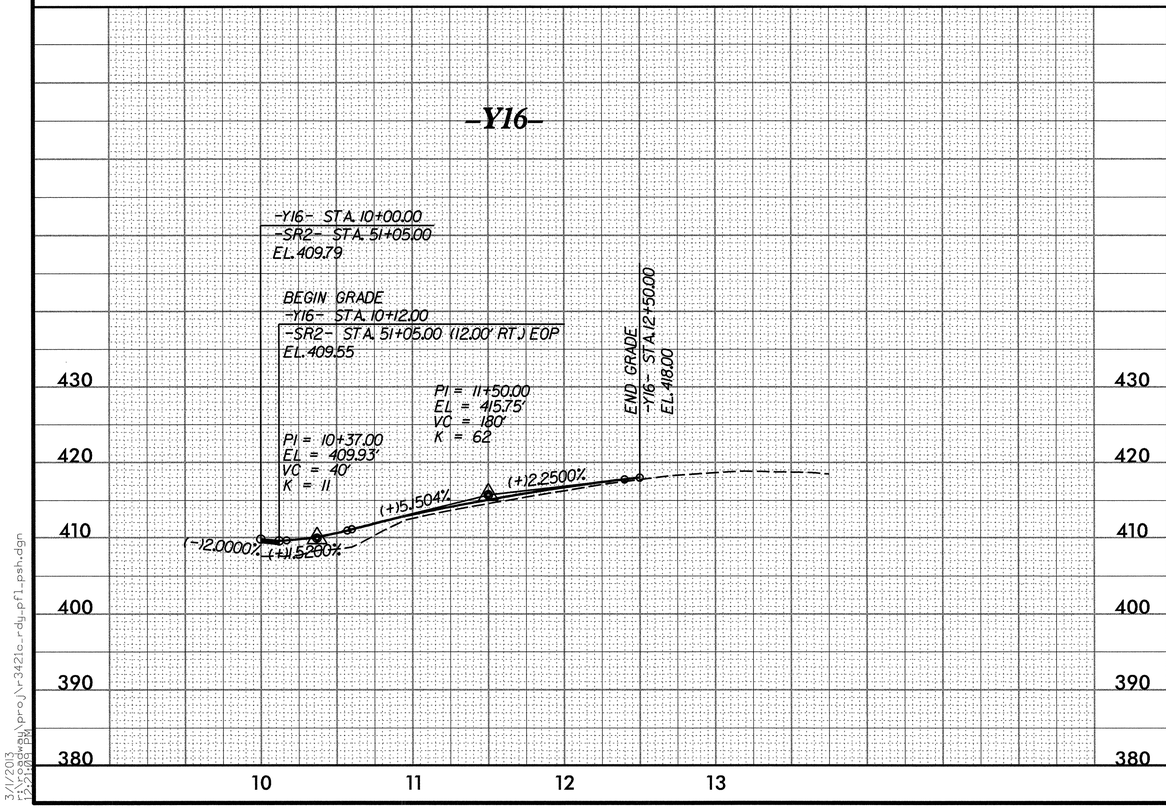
HYDRAULICS ENGINEER
NORTH CAROLINA SEAL 19680 ENGINEER PAUL ATKINSON
3/6/13

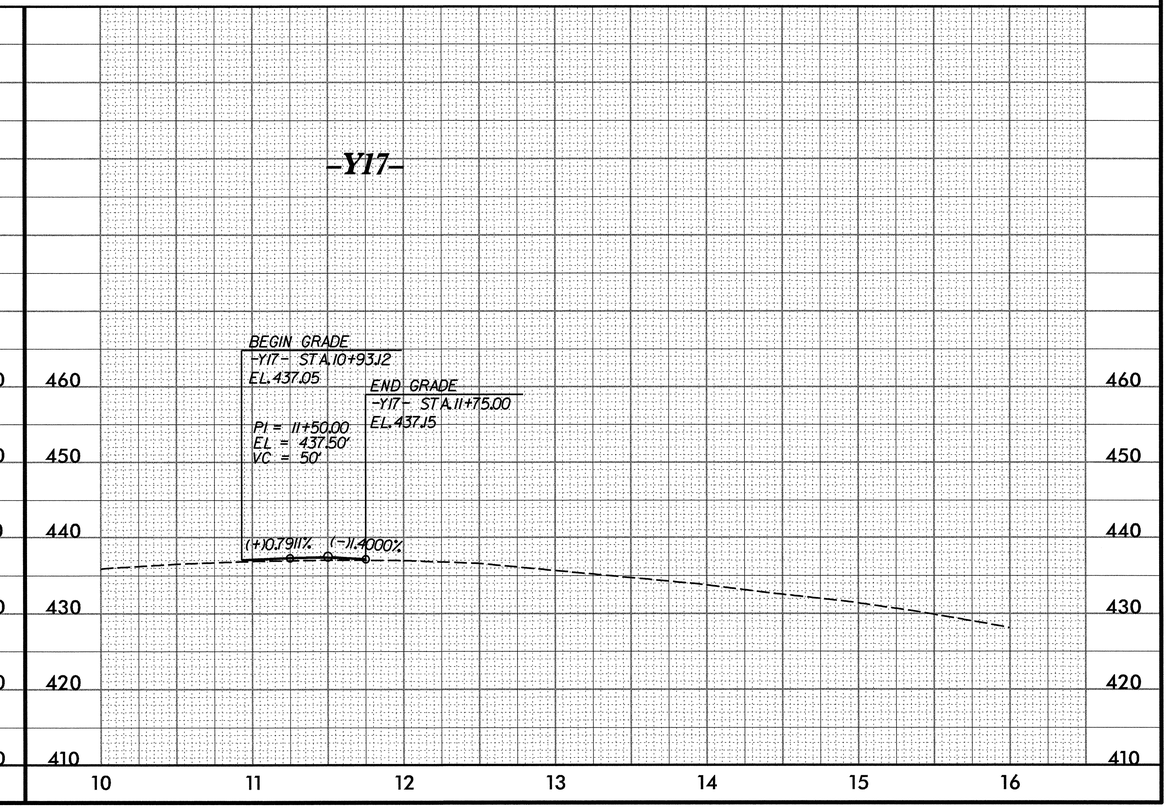
PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 2415

DRAINAGE AREA	= 3.7	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 10	CFS
DESIGN HW ELEVATION	= 413.1	FT
100 YEAR DISCHARGE	= 12	CFS
100 YEAR HW ELEVATION	= 413.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 17+	CFS
OVERTOPPING ELEVATION	= 414.2	FT







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PROJECT REFERENCE NO.	SHEET NO.
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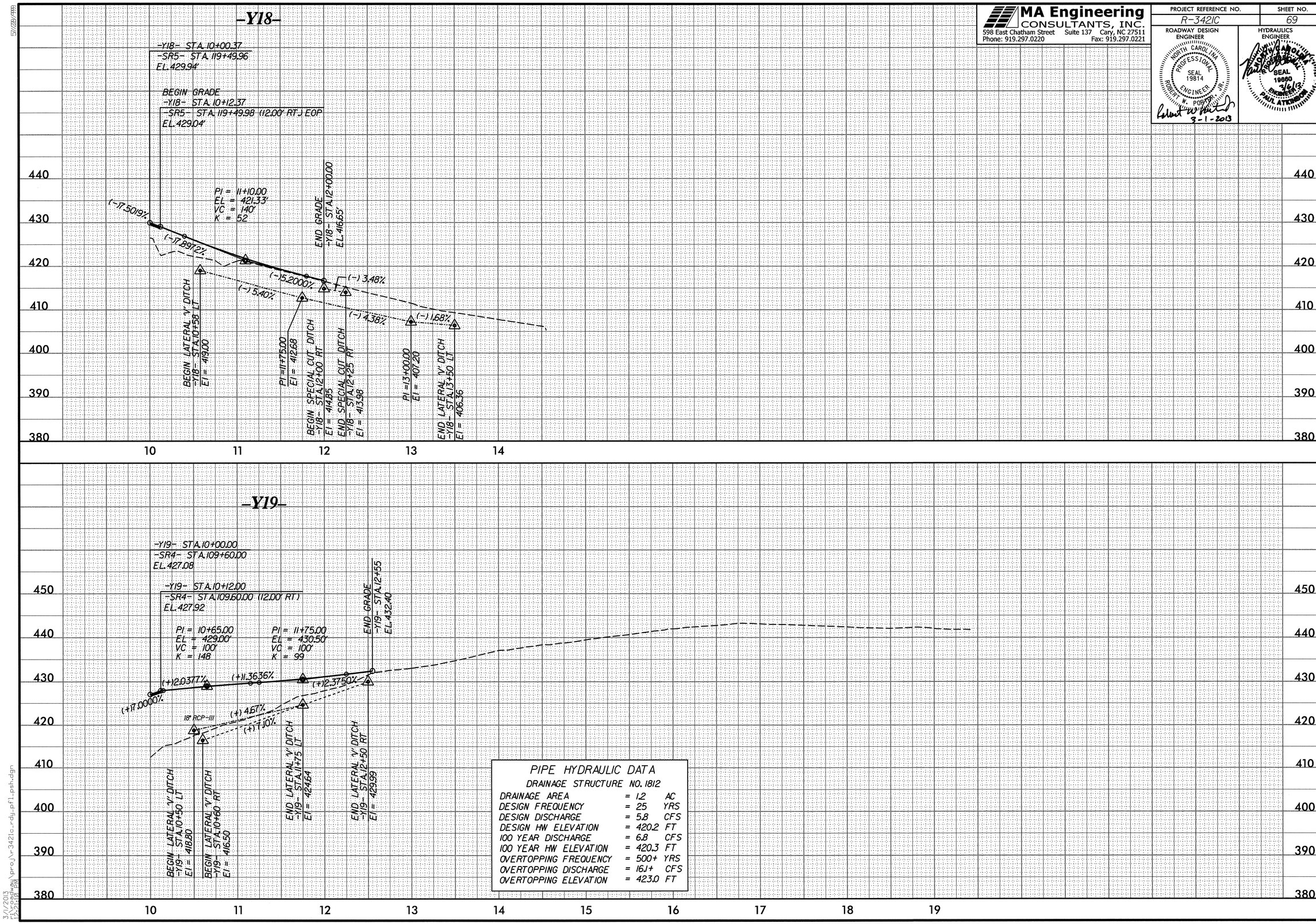
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. PORTER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
3/6/13



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 1812

DRAINAGE AREA	= 1.2	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 5.8	CFS
DESIGN HW ELEVATION	= 420.2	FT
100 YEAR DISCHARGE	= 6.8	CFS
100 YEAR HW ELEVATION	= 420.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 16.1+	CFS
OVERTOPPING ELEVATION	= 423.0	FT

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PROJECT REFERENCE NO.	SHEET NO.
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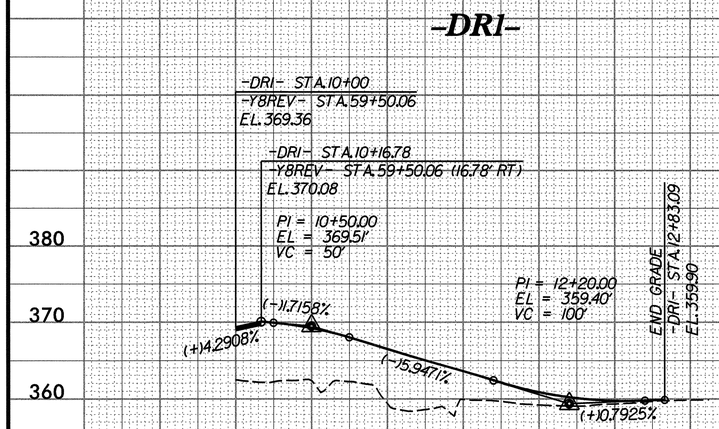
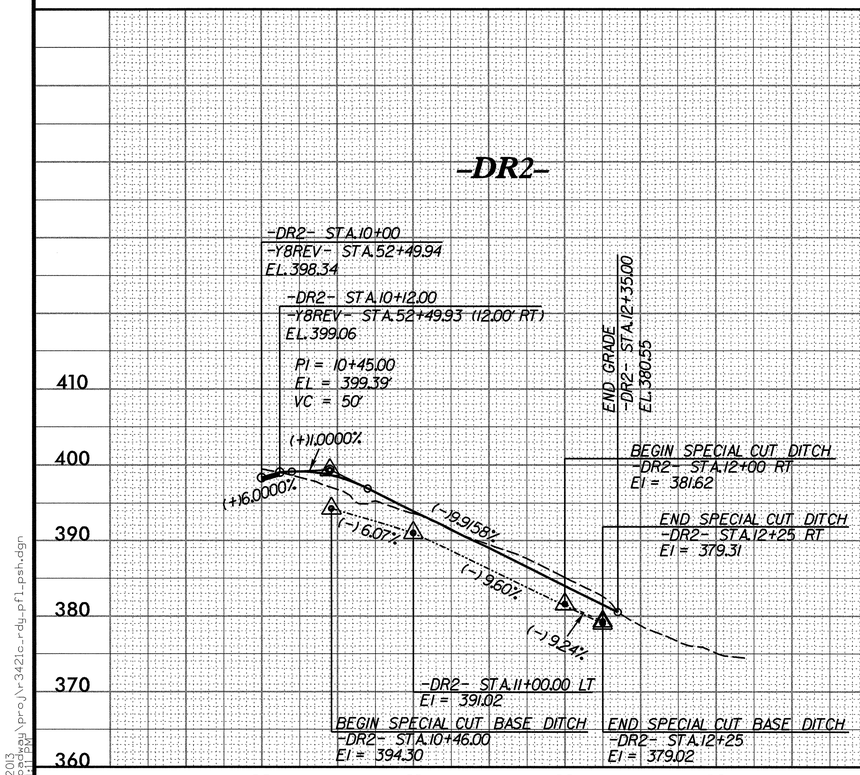
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19814 ENGINEER ROBERT W. POWER, JR.
3-1-2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19660 ENGINEER PAUL ATKINSON
3/6/13





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