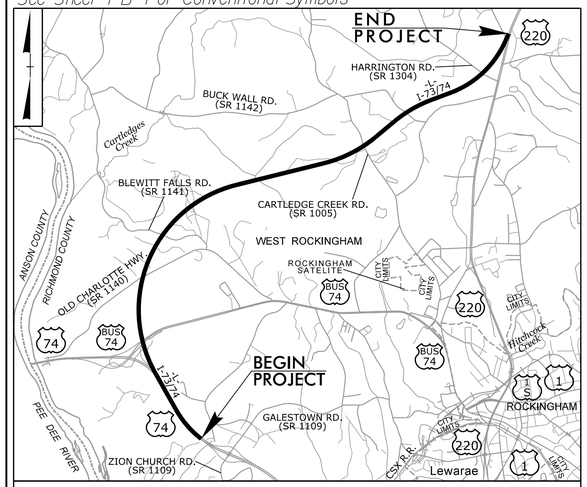
09/08/99

CONTRACT: C204368 TIP PROJECT: R–3421A/R–3421B

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RICHMOND COUNTY

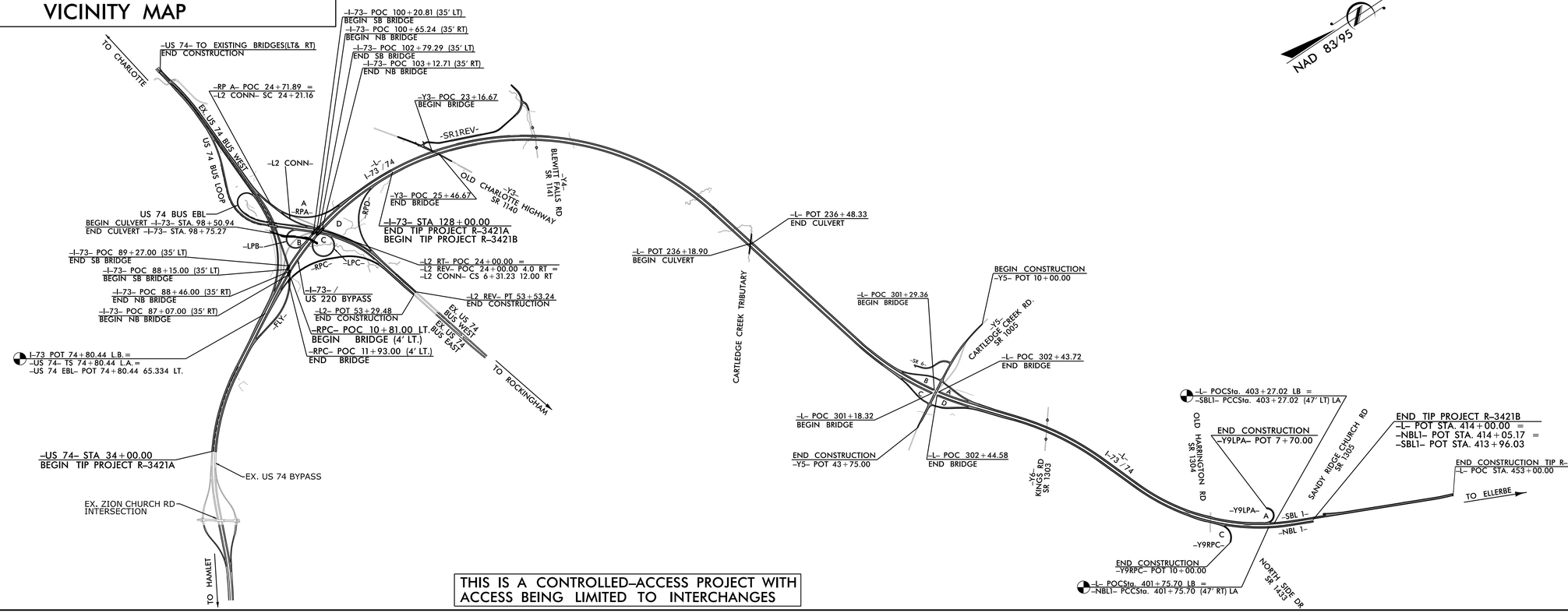
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R–3421A/R–3421B	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
	R–3421A	
34542.1.FR4	NHF–0220(75)	P.E.
34542.2.4	HPPF–0220(30)	R/W
34542.2.6	HPPF–0220(30)	UTIL.
34542.3.6	N/A	CONST.
	R–3421B	
34542.1.FR3	NHF–0220(76)	P.E.
34542.2.3	NHF–0220(43)	R/W & UTIL.
34542.3.7	N/A	CONST.

LOCATION: I–73/74 FROM US 74 BYPASS WEST OF ROCKINGHAM AT SR 1109 (ZION CHURCH RD.) INTERCHANGE TO NORTH OF SR 1304 (HARRINGTON ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING, STRUCTURES, CULVERT, & RETAINING WALLS

NAD 83/95



THIS IS A CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R–3421A	1.709 miles
LENGTH STRUCTURES TIP PROJECT R–3421A	0.071 miles
TOTAL LENGTH OF TIP PROJECT R–3421A	1.780 miles
(SB LANES WERE USED FOR LENGTH OF R–3421A)	
LENGTH ROADWAY TIP PROJECT R–3421B	5.395 miles
LENGTH STRUCTURES TIP PROJECT R–3421B	0.022 miles
TOTAL LENGTH OF TIP PROJECT R–3421B	5.417 miles
TOTAL LENGTH OF TIP PROJECTS R–3421A /R–3421B	7.197 miles

Prepared in the Office of:
RK&K — RUMMEL, KLEPPER & KAHL, LLP, 900 RIDGEFIELD DRIVE, SUITE 350, RALEIGH, NORTH CAROLINA 27609, NC LICENSE NO. F-0112
CALYX ENGINEERS + CONSULTANTS

FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: R–3421A: JUNE 20, 2008
RIGHT OF WAY DATE: R–3421B: SEPTEMBER 23, 2009
LETTING DATE: OCTOBER 15, 2019

NCDOT CONTACT: GREGORY S. DAVIS, P.E.
DIVISION 8 PROJECT ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

7/18/2019
R:\Roadway\Proj\r3421a_rdy_tsh_comb.dgn
default

8/17/99

INDEX OF SHEETS, GENERAL NOTES, and LIST OF STANDARDS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A/R-3421B	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

DocuSigned by: Mike Merritt

8/7/2019

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARDS
1B	CONVENTIONAL SYMBOLS
PART 1 - R-3421A	
1	TITLE SHEET
1C-1 THRU 1C-4	SURVEY CONTROL SHEETS
2A-1 THRU 2A-7	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1 THRU 2B-2	SHEAR POINT DETAILS
2B-3	BRIDGE SKETCH
2B-4 THRU 2B-7	ROADWAY DETAILS
2C-1	DETAIL OF SHOULDER BERM GUTTER TO EXPRESSWAY GUTTER
2C-2	DETAIL OF SHOULDER BERM GUTTER TO 2'-6" CURB & GUTTER
2C-3 THRU 2C-6	DETAIL FOR METHOD OF SHOULDER CONSTRUCTION
2C-7	DETAIL TO CONVERT EXISTING DI, CB, OTCB OR GI TO JUNCTION BOX (MANHOLE OPTIONAL)
2C-8	DETAIL TO CONVERT EXISTING TRAFFIC BEARING DI OR CB TO TRAFFIC BEARING JUNCTION BOX (MANHOLE OPTIONAL)
2C-9	DETAIL OF GUARDRAIL INSTALLATION
2C-10	DETAIL OF STRUCTURE ANCHOR UNITS, TYPE III
2C-11	DETAIL OF TEMPORARY 1" STEEL COVER OVER DRAINAGE STRUCTURE
2D-1	DETAILS OF STREAM RELOCATION
2G-1	DETAIL OF HORIZONTAL SLOPE DRAINS
2G-2	DETAIL OF CELLULAR CONFINEMENT SYSTEM
2G-3	DETAIL OF REINFORCED SOIL SLOPES
2G-4	STANDARD TEMPORARY SHORING
3B-1 THRU 3B-4	ROADWAY SUMMARIES
3D-1 THRU 3D-9	DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
3P-1	PARCEL INDEX SHEET
4A THRU 17	PLAN SHEETS
18 THRU 41	PROFILE SHEETS
TMP-1 THRU TMP-35	TRANSPORTATION MANAGEMENT PLANS
PMP-1 THRU PMP-15	PAVEMENT MARKING PLANS
EC-1 THRU EC-31	EROSION CONTROL PLANS
RF-1 THRU RF-5	REFORESTATION PLANS
SIGN-1 THRU SIGN-32	SIGNING PLANS
UC-1 THRU UC-19	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-15	UTILITIES BY OTHERS PLANS
X-1	CROSS-SECTION INDEX
X-1A THRU X-1C	CROSS-SECTIONS SUMMARY
X-2 THRU X-542	CROSS-SECTIONS
S01-1 THRU S05-26	STRUCTURE PLANS
C1-1 THRU C5-9	CULVERT PLANS
W-1 THRU W-24	WALL PLANS
PART 2 - R-3421B	
1	TITLE SHEET
1C-1 THRU 1C-4	SURVEY CONTROL SHEETS
2A-1 THRU 2A-8	TYPICAL SECTIONS
2B-1	SHEAR POINT DIAGRAM
2C-1	DETAIL FOR GUARDRAIL INSTALLATION W BEAM RAIL SECTION
2C-2	DETAIL FOR REINFORCED APPROACH FILLS TYPE III
2C-3 THRU 2C-8	DETAIL FOR METHOD OF SHOULDER CONSTRUCTION
2C-9	DETAIL FOR REINFORCED CONCRETE ENDWALL FOR 78"PIPE
2C-10	DETAIL FOR SPECIAL JUNCTION BOX WITH SLAB LID
2C-11	DETAIL FOR JUNCTION BOX FOR 48", 60" & 72" RCP UNDER 65' FILL
2D-1	DETAIL FOR RIP-RAPPED ENERGY DISSIPATER BASIN
2G-1	DETAIL OF REINFORCED SOIL SLOPES
2G-2	DETAIL OF CELLULAR CONFINEMENT SYSTEM
2G-3	DETAIL OF HORIZONTAL SLOPE DRAINS
3B-1	SUMMARY EARTHWORK AND ROADWAY SUMMARIES
3B-2	SUMMARY OF GUARDRAIL
3D-1 THRU 3D-11	SUMMARY OF DRAINAGE
3G-1	SUMMARY OF GEOTECHNICAL ITEMS
3P-1	PARCEL INDEX SHEET
4 THRU 28	PLAN SHEETS
29 THRU 58	PROFILE SHEETS
TMP-1 THRU TMP-8	TRANSPORTATION MANAGEMENT PLANS
PMP-1 THRU PMP-20	PAVEMENT MARKING PLANS
EC-1 THRU EC-43	EROSION CONTROL PLANS
RF-1	REFORESTATION PLANS
SIGN-1 THRU SIGN-20	SIGNING PLANS
UC-1 THRU UC-8	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-21	UTILITIES BY OTHERS PLANS
X-0	CROSS SECTION INDEX
X-0A THRU X-0D	EARTHWORK VOLUME SUMMARIES
X-1 THRU X-469	CROSS SECTIONS
S6-1 THRU S8-25	STRUCTURE PLANS
C6-1 THRU C6-5	CULVERT PLANS
W-1 THRU W-6	WALL PLANS

LIST OF STANDARD DRAWINGS

EFF. 01-16-2018
REV.

2018 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2018 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
225.08	Earth Berm Median Pier Protection
225.09	Guide for Shoulder and Ditch Transition at Grade Separations
235.01	Embankment Monitoring
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	
422.01	Bridge Approach Fills - Type I Standard Approach Fill
422.03	Reinforced Bridge Approach Fills - Type A Alternate Approach Fill for Integral Abutment
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
665.01	Asphalt Shoulders - Milled Rumble Strips
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.02	Subsurface Drain
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
838.27	Reinforced Concrete Endwall - for Single 60" Pipe 90 Skew
838.28	Reinforced Concrete Endwall - for Double and Triple 60" Pipes 90 Skew
838.33	Reinforced Concrete Endwall - for Single 66" Pipe 90 Skew
838.39	Reinforced Concrete Endwall - for Single 72" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.57	Reinforced Brick Endwall - for Single 60" Pipe 90 Skew
838.58	Reinforced Brick Endwall - for Double and Triple 60" Pipes 90 Skew
838.63	Reinforced Brick Endwall - for Single 66" Pipe 90 Skew
838.69	Reinforced Brick Endwall - for Single 72" 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
840.04	Concrete Open Throat Catch Basin - 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin - 12" thru 48" Pipe
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 72" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 72" 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
840.31	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
840.36	Traffic Bearing Grated Drop Inlet - for Steel (840.37) Double Frame and Grates
840.37	Steel Grate and Frame
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.51	Brick Manhole - 12" thru 36" Pipe
840.52	Precast Manhole - 4', 5' and 6' Diameter
840.53	Precast Manhole with Masonry Base - 12" thru 42" Pipe
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
846.02	Drop Inlet Installation in Expressway Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.02	Driveway Turnout - Radius Type
848.04	Street Turnout
850.01	Concrete Paved Ditches
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
857.01	Precast Reinforced Concrete Barrier - 41" Single Faced
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
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

LIST OF GENERAL NOTES

EFFECTIVE: 01-16-2018
REV.

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD.NO. 225.04 STD. NO. 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.

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.

SUBSURFACE DRAINS:

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS 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.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.03 AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

STREET TURNOUT:

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

GUARDRAIL:

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

TEMPORARY SHORING:

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

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE DUKE ENERGY (DISTRIBUTION), DUKE ENERGY (TRANSMISSION), PEE DEE EMC, PIEDMONT NATURAL GAS (DISTRIBUTION), PIEDMONT NATURAL GAS (TRANSMISSION), AT&T, MCNC, CHARTER/SPECTRUM, RICHMOND COUNTY

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

RIGHT-OF-WAY MARKERS:

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

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

8/7/2019
R:\Roadway\Proj\r3421a_rdy_sh01A.dgn
default

04/06/15

PROJECT REFERENCE NO.	SHEET NO.
R-3421A/R-3421B	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

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

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
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

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

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (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
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

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

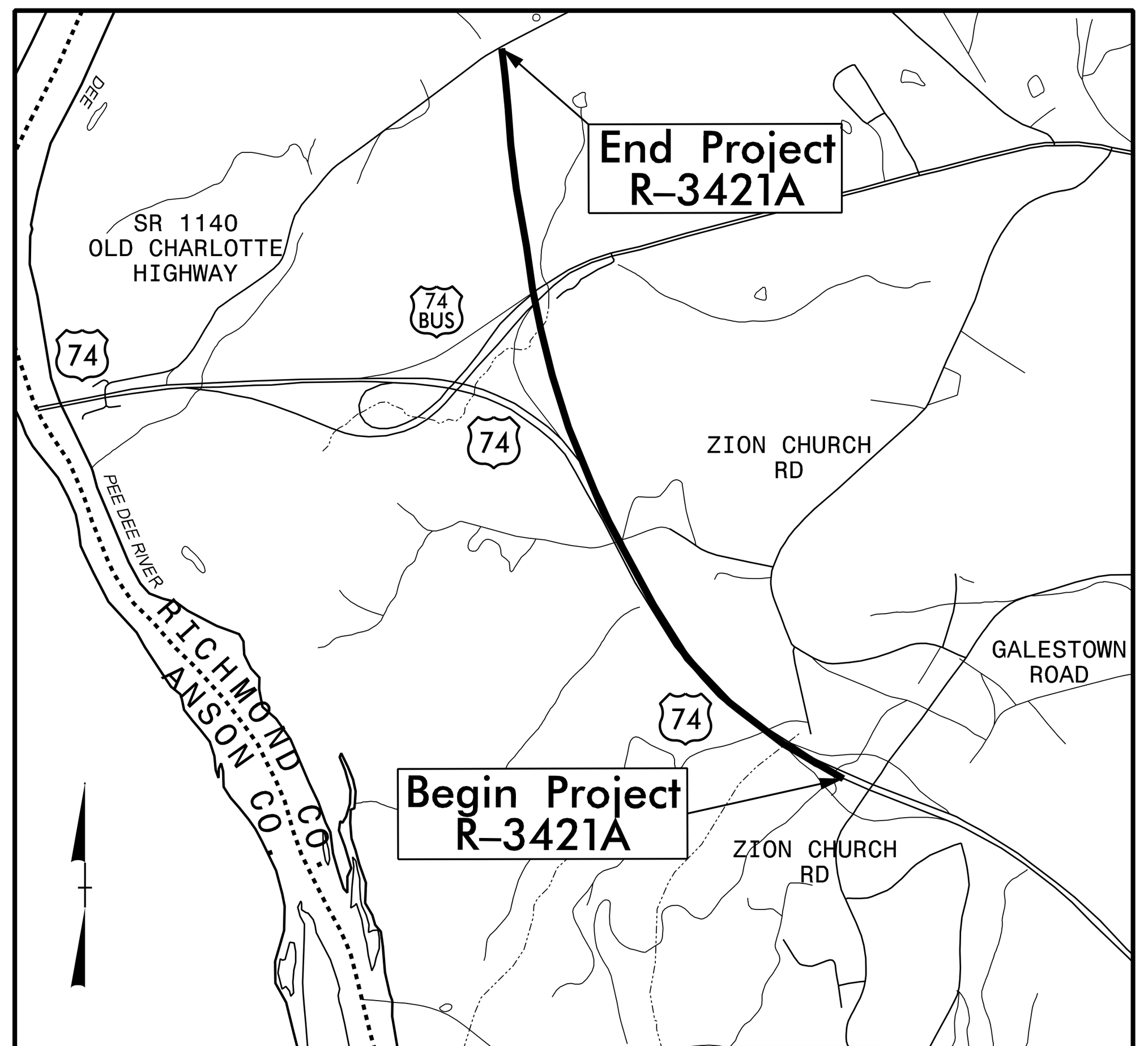
DocuSign Envelope ID: 075D7E2D-0543-44E3-9B2E-FBC24EC9ED31

09/08/99

TIP PROJECT: R-3421A

CONTRACT: C204368

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RICHMOND COUNTY

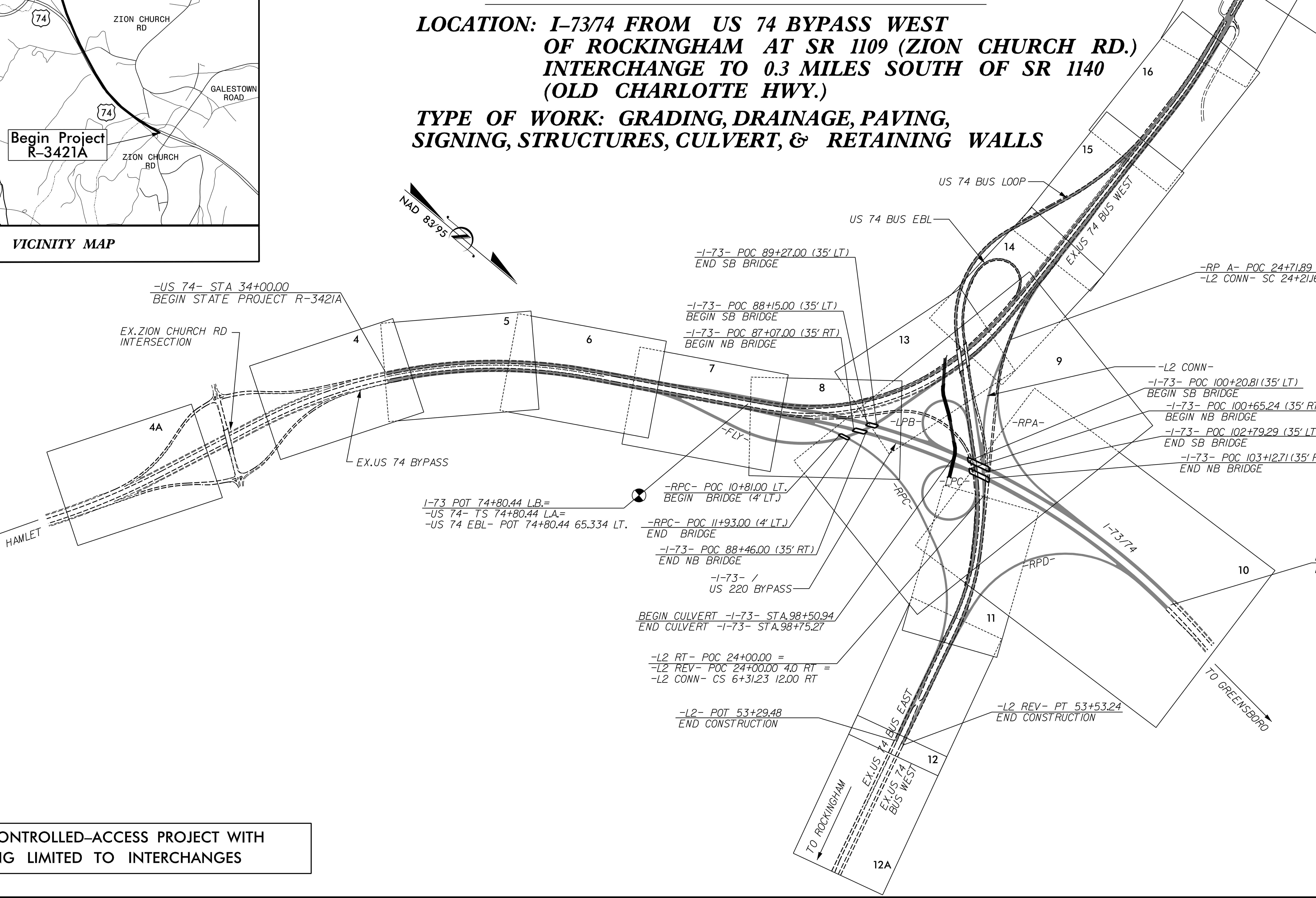
LOCATION: I-73/74 FROM US 74 BYPASS WEST OF ROCKINGHAM AT SR 1109 (ZION CHURCH RD.) INTERCHANGE TO 0.3 MILES SOUTH OF SR 1140 (OLD CHARLOTTE HWY.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING, STRUCTURES, CULVERT, & RETAINING WALLS

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

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34542.1.FR4	HPPF-0220(75)	P.E.
34542.2.4	HPPF-0220(30)	R/W, UTIL.
34542.3.FS4	HPPF-0220(30)	P.E.
34542.3.6		CONST.

PART 1



THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

7/18/2019
R:\Roadway\Proj\r3421a_rdy_tsh.dgn
default

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 (2019) = 9,330
ADT (2036) = 19,900–23,800
K = 10%
D = 60%
T = 26% *
V = 70 mph

FUNC. CLASS. = INTERSTATE
STATEWIDE TIER

* (TTST 9% + DUAL 17%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3421A = 1.709 miles
LENGTH STRUCTURES TIP PROJECT R-3421A = 0.071 miles
TOTAL LENGTH OF TIP PROJECT R-3421A = 1.780 miles

(SB LANES WERE USED FOR LENGTH OF PROJECT)

Prepared In the Office of:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO. F-0112
FOR NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 20, 2008

LETTING DATE:
OCTOBER 15, 2019

MICHAEL T. MERRITT, PE
PROJECT ENGINEER
RK&K, LLP

SCOTT BLEVINS, P.E.
PROJECT DESIGN ENGINEER
RK&K, LLP

NCDOT CONTACT: GREGORY S. DAVIS, P.E.
DIVISION 8 PROJECT ENGINEER

HYDRAULICS ENGINEER

DocuSigned by:
Stephen Morgan 8/7/2019 P.E.
SIGNATURE:

NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN

ROADWAY DESIGN ENGINEER

DocuSigned by:
Mike Merritt 8/8/2019 P.E.
SIGNATURE:

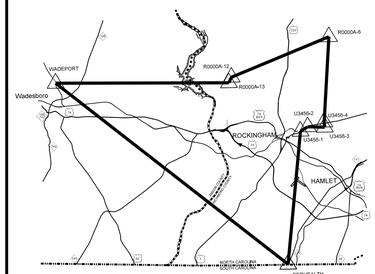
NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

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

SURVEY CONTROL SHEET



GPS CONTROL NETWORK

NOT TO SCALE

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "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 -US74- STATION 34+00.00 S 22° 50' 00.9" E 6875.627' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NOTES

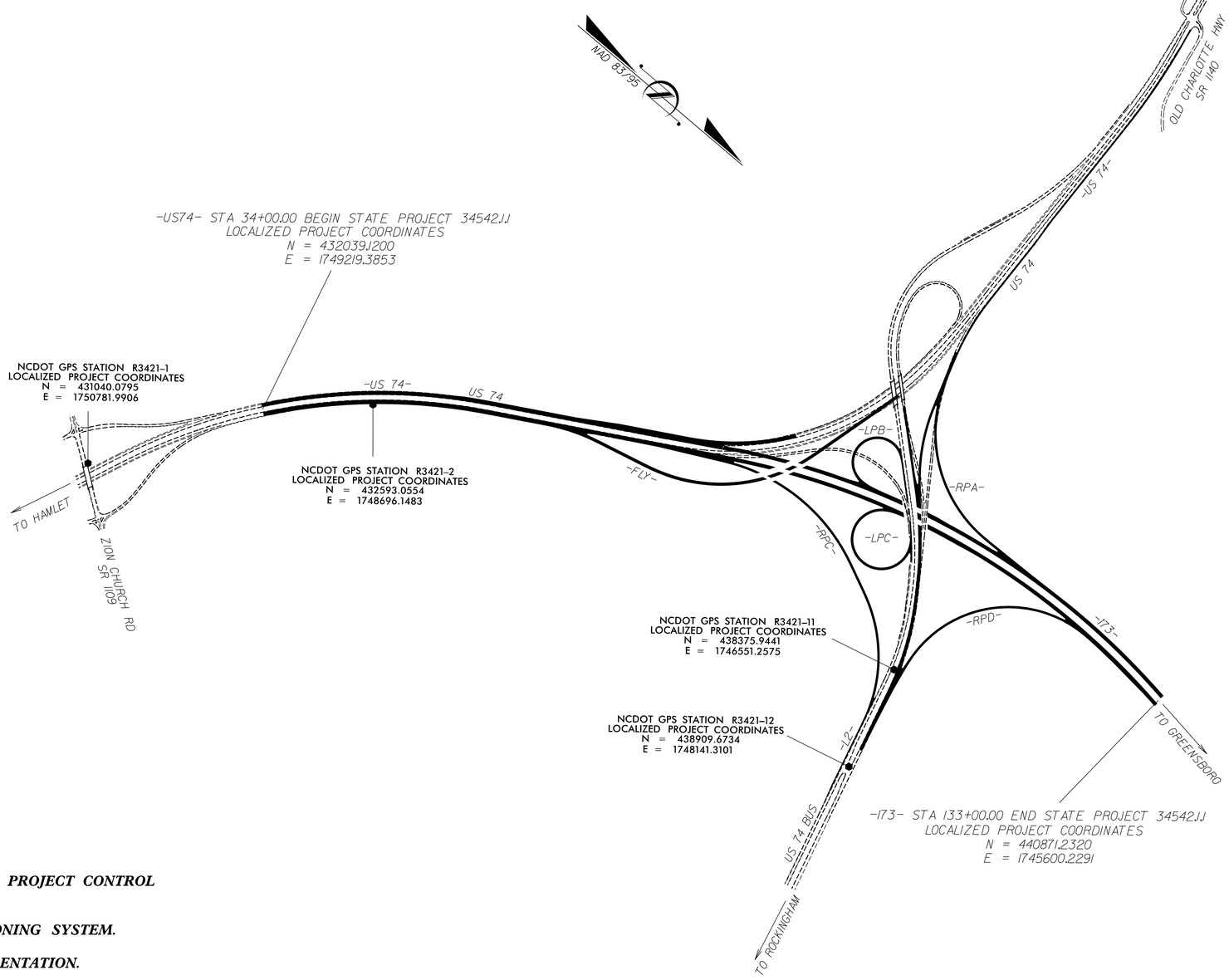
1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS 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.



● ***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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421A	1C-2	
LOCATION AND SURVEYS			

SURVEY CONTROL SHEET R-3421A

GPS CALIBRATION REPORT

PROJECT : R3421A&B

TIP NUMBER

USER NAME	SCRANFORD	DATE & TIME	8:24:07 PM 11/23/04
COORDINATE SYSTEM	US STATE PLANE 1983(AT GROUND)	ZONE	NORTH CAROLINA 3200
HORIZONTAL DATUM	NAD 1983 (CONUS)		
VERTICAL DATUM		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	1.0001243700
HEIGHT	127.740SFT

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	443319.836SFT
EASTING COORDINATE OF ROTATION CENTER	1750826.203SFT
ROTATION ABOUT THE CENTER POINT	0°00'00"
TRANSLATION NORTH	0.023SFT
TRANSLATION EAST	-0.015SFT
SCALE FACTOR	1.00000004

VERTICAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ORIGIN POINT	454623.608SFT
EASTING COORDINATE OF ORIGIN POINT	1746608.017SFT
VERTICAL SEPARATION AT ORIGIN	-0.015SFT
SLOPE NORTH	3.056PPM
SLOPE EAST	-1.475PPM

GEOID MODEL DEFINITION

GEOID99 (CONUS)

RESIDUAL DIFFERENCES BETWEEN GPS (WGS84) AND LOCAL COORDINATES

SUMMARY

	MAXIMUM ERROR	ROOT MEAN SQUARE ERROR	POINT
HORIZONTAL	0.025SFT	0.003	R0000A-13 - WGS84
VERTICAL	0.016SFT	0.002	R0000A-13 - WGS84
THREE-DIMENSIONAL	0.030SFT	0.003	R0000A-13 - WGS84

POINT RESIDUALS

WGS84 COORDINATES		CALCULATED POINT FOR DISPLAY ONLY		LOCAL COORDINATES	
POINT	R0000A-13 - WGS84	NORTHING	454623.608SFT	POINT	R0000A-13
LATITUDE	34°59'46.27678"N	EASTING	1746608.017SFT	NORTHING	454623.588SFT
LONGITUDE	79°50'46.02070"W	ELEVATION	200.758SFT	EASTING	1746608.033SFT
HEIGHT	99.248SFT	HORZ ERROR	0.025SFT	ELEVATION	200.774SFT
		VERT ERROR	0.016SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.030SFT	QUALITY	SURVEY QUALITY

POINT	R3421-2 - WGS84	NORTHING	432593.055SFT	POINT	R3421-2
LATITUDE	34°56'08.56265"N	EASTING	1748696.151SFT	NORTHING	432593.053SFT
LONGITUDE	79°50'18.68696"W	ELEVATION	352.093SFT	EASTING	1748696.148SFT
HEIGHT	250.360SFT	HORZ ERROR	0.004SFT	ELEVATION	352.099SFT
		VERT ERROR	0.006SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.007SFT	QUALITY	SURVEY QUALITY

POINT	R3421-5 - WGS84	NORTHING	444001.291SFT	POINT	R3421-5
LATITUDE	34°58'01.27395"N	EASTING	1747263.823SFT	NORTHING	444001.296SFT
LONGITUDE	79°50'37.05364"W	ELEVATION	315.459SFT	EASTING	1747263.821SFT
HEIGHT	213.864SFT	HORZ ERROR	0.005SFT	ELEVATION	315.456SFT
		VERT ERROR	0.003SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.006SFT	QUALITY	SURVEY QUALITY

POINT	R3421-1 - WGS84	NORTHING	431040.072SFT	POINT	R3421-1
LATITUDE	34°55'53.37663"N	EASTING	1750781.997SFT	NORTHING	431040.078SFT
LONGITUDE	79°49'53.47966"W	ELEVATION	331.251SFT	EASTING	1750781.993SFT
HEIGHT	229.448SFT	HORZ ERROR	0.007SFT	ELEVATION	331.261SFT
		VERT ERROR	0.010SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.012SFT	QUALITY	SURVEY QUALITY

POINT	R3421-3 - WGS84	NORTHING	435928.678SFT	POINT	R3421-3
LATITUDE	34°56'40.47449"N	EASTING	1736102.080SFT	NORTHING	435928.673SFT
LONGITUDE	79°52'50.29688"W	ELEVATION	185.928SFT	EASTING	1736102.080SFT
HEIGHT	84.488SFT	HORZ ERROR	0.006SFT	ELEVATION	185.923SFT
		VERT ERROR	0.005SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.008SFT	QUALITY	SURVEY QUALITY

POINT	R3421-4 - WGS84	NORTHING	436244.154SFT	POINT	R3421-4
LATITUDE	34°56'43.74783"N	EASTING	1737853.794SFT	NORTHING	436244.149SFT
LONGITUDE	79°52'29.28993"W	ELEVATION	171.011SFT	EASTING	1737853.792SFT
HEIGHT	69.547SFT	HORZ ERROR	0.006SFT	ELEVATION	171.006SFT
		VERT ERROR	0.004SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.007SFT	QUALITY	SURVEY QUALITY

POINT	R3421-11 - WGS84	NORTHING	438375.940SFT	POINT	R3421-11
LATITUDE	34°57'05.57740"N	EASTING	1746551.262SFT	NORTHING	438375.944SFT
LONGITUDE	79°50'45.03890"W	ELEVATION	229.358SFT	EASTING	1746551.258SFT
HEIGHT	127.743SFT	HORZ ERROR	0.006SFT	ELEVATION	229.355SFT
		VERT ERROR	0.003SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.007SFT	QUALITY	SURVEY QUALITY

POINT	R3421-12 - WGS84	NORTHING	438909.670SFT	POINT	R3421-12
LATITUDE	34°57'10.98975"N	EASTING	1748141.316SFT	NORTHING	438909.674SFT
LONGITUDE	79°50'25.99291"W	ELEVATION	305.729SFT	EASTING	1748141.311SFT
HEIGHT	204.081SFT	HORZ ERROR	0.006SFT	ELEVATION	305.726SFT
		VERT ERROR	0.003SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.007SFT	QUALITY	SURVEY QUALITY

POINT	R3421-6 - WGS84	NORTHING	444453.289SFT	POINT	R3421-6
LATITUDE	34°58'05.65167"N	EASTING	1746163.498SFT	NORTHING	444453.289SFT
LONGITUDE	79°50'50.31998"W	ELEVATION	277.096SFT	EASTING	1746163.496SFT
HEIGHT	175.528SFT	HORZ ERROR	0.002SFT	ELEVATION	277.089SFT
		VERT ERROR	0.007SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.007SFT	QUALITY	SURVEY QUALITY

POINT	R3421-7 - WGS84	NORTHING	448190.702SFT	POINT	R3421-7
LATITUDE	34°58'43.71408"N	EASTING	1759522.273SFT	NORTHING	448190.705SFT
LONGITUDE	79°48'10.17962"W	ELEVATION	318.920SFT	EASTING	1759522.273SFT
HEIGHT	217.073SFT	HORZ ERROR	0.002SFT	ELEVATION	318.920SFT
		VERT ERROR	0.001SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.002SFT	QUALITY	SURVEY QUALITY

POINT	R3421-8 - WGS84	NORTHING	449771.952SFT	POINT	R3421-8
LATITUDE	34°58'59.28900"N	EASTING	1758721.173SFT	NORTHING	449771.957SFT
LONGITUDE	79°48'19.96013"W	ELEVATION	348.603SFT	EASTING	1758721.175SFT
HEIGHT	246.791SFT	HORZ ERROR	0.005SFT	ELEVATION	348.600SFT
		VERT ERROR	0.002SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.006SFT	QUALITY	SURVEY QUALITY

POINT	R3421-9 - WGS84	NORTHING	453321.095SFT	POINT	R3421-9
LATITUDE	34°59'35.03521"N	EASTING	1766882.129SFT	NORTHING	453321.099SFT
LONGITUDE	79°46'42.22392"W	ELEVATION	393.410SFT	EASTING	1766882.130SFT
HEIGHT	291.417SFT	HORZ ERROR	0.005SFT	ELEVATION	393.408SFT
		VERT ERROR	0.002SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.005SFT	QUALITY	SURVEY QUALITY

POINT	R3421-10 - WGS84	NORTHING	455704.658SFT	POINT	R3421-10
LATITUDE	34°59'58.65371"N	EASTING	1767452.924SFT	NORTHING	455704.661SFT
LONGITUDE	79°46'35.58791"W	ELEVATION	423.027SFT	EASTING	1767452.928SFT
HEIGHT	321.043SFT	HORZ ERROR	0.005SFT	ELEVATION	423.024SFT
		VERT ERROR	0.003SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.006SFT	QUALITY	SURVEY QUALITY

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "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 -US74- STATION 34+00.00
S 22° 50' 00.9" E 6875.627'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

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.

SURVEY CONTROL SHEET R-3421A

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421A	1C-3	
LOCATION AND SURVEYS			

BL

POINT	DESC.	NORTH	EAST	ELEVATION	US74 STATION	OFFSET
101	BL-101	431036.1720	1751103.3090	304.39	12+57.57	1.62 LT
199	BL-199	431145.7337	1750859.6692	NOT SET	15+24.59	6.27 RT
102	BL-102	431548.9520	1749963.0050	326.52	25+08.54	0.87 LT
103	BL-103	432225.3260	1748969.2000	350.15	37+11.19	14.52 LT
104	BL-104	433024.8590	1748206.6240	349.54	48+14.91	15.27 LT
105	BL-105	434042.6940	1747573.6510	319.74	60+13.43	0.25 RT
106	BL-106	435298.6260	1746863.0190	276.21	74+56.47	0.97 LT

POINT	DESC.	NORTH	EAST	ELEVATION	I73 STATION	OFFSET
107	BL-107	436176.9310	1746311.6410	250.43	84+90.35	54.90 LT
108	BL-108	437005.4640	1745621.5990	215.25	94+98.82	357.96 LT
109	BL-109	437763.1560	1745773.7340	225.90	101+62.63	12.14 RT
110	BL-110	438146.1670	1745688.8550	283.74	105+55.71	17.43 RT
111	BL-111	438268.3540	1745655.6580	278.45	106+82.25	8.86 RT
112	BL-112	438395.6960	1745628.8550	248.60	108+12.46	5.39 RT
113	BL-113	438659.0680	1745582.8100	283.26	110+79.90	0.48 RT
114	BL-114	439019.5630	1745541.0300	312.89	114+42.85	0.22 LT
115	BL-115	439398.6640	1745513.2920	332.59	118+22.90	3.34 LT
116	BL-116	439677.0210	1745510.2270	337.50	121+01.20	0.35 LT
117	BL-117	439878.1640	1745512.5080	328.39	123+02.36	0.01 LT
118	BL-118	440260.6730	1745527.3430	298.82	126+85.09	3.49 LT
119	BL-119	440542.7670	1745555.6390	324.67	129+68.52	1.07 LT
120	BL-120	440833.7770	1745594.5470	367.98	132+62.12	0.01 RT

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	US74 STATION	OFFSET
200	BY1-200	430630.8940	1750495.7280	333.59	16+63.59	608.70 LT
1	R3421-1	431040.0795	1750781.9906	331.26	15+55.88	121.08 LT
199	BL-199	431145.7337	1750859.6692	NOT SET	15+24.59	6.27 RT
201	BY1-201	431700.5190	1751267.5560	327.90	13+60.30	674.98 RT

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	US74 STATION	OFFSET
202	BY2-202	436606.5720	1739753.2450	171.47	152+04.90	7.93 RT
203	BY2-203	436812.2160	1741091.1740	203.30	138+51.18	6.83 RT
204	BY2-204	436831.9550	1742123.2470	231.03	128+19.18	10.12 LT
205	BY2-205	436209.2550	1743862.4210	200.09	110+99.28	684.23 LT
206	BY2-206	436936.7330	1744989.0550	235.80	99+73.27	118.08 RT

POINT	DESC.	NORTH	EAST	ELEVATION	L2 STATION	OFFSET
109	BL-109	437763.1560	1745773.7340	225.90	21+26.59	20.19 LT
11	R3421-11	438375.9441	1746551.2575	229.36	31+13.82	22.49 LT
12	R3421-12	438909.6734	1748141.3101	305.72	47+89.35	46.10 LT
207	BY2-207	439167.2830	1749438.3640	378.18	61+09.83	24.94 RT

BM1 ELEVATION = 332.28
N 431043 E 1750787
US74 STATION 15+52 116 LEFT
BOLT IN CONCRETE WINGWALL NW SIDE OF BRIDGE

BM2 ELEVATION = 340.50
N 432171 E 1749300
US74 STATION 34+18 154 RIGHT
RR SPIKE IN BASE OF 10" PINE TREE

BM3 ELEVATION = 373.98
N 433455 E 1748122
US74 STATION 52+18 170 RIGHT
RR SPIKE IN BASE OF 10" PINE TREE

BM4 ELEVATION = 300.00
N 435151 E 1746745
US74 STATION 73+86 176 LEFT
RR SPIKE IN BASE OF 12" POPLAR TREE

BM5 ELEVATION = 236.20
N 436914 E 1745014
US74 STATION 99+45 102 RIGHT
PAINTED 'X' ON CONCRETE WINGWALL AT NW CORNER OF BRIDGE LEFT OF US 74 BUSINESS EASTBOUND LANES

BM6 ELEVATION = 266.10
N 438216 E 1745869
I73 STATION 105+88 208 RIGHT
RR SPIKE IN BASE OF 15" GUM TREE

BM7 ELEVATION = 293.09
N 440230 E 1745726
173 STATION 126+69 197 RIGHT
RR SPIKE IN BASE OF 15" GUM TREE

BM8 ELEVATION = 262.10
N 436968 E 1742463
US74 STATION 124+76 116 RIGHT
RR SPIKE IN BASE OF 8" PINE TREE

BM9 ELEVATION = 173.76
N 436472 E 1740138
US74 STATION 148+51 194 LEFT
RR SPIKE IN BASE OF POWER POLE

BM10 ELEVATION = 384.73
N 439051 E 1749484
L2 STATION 61+25 149 RIGHT
RR SPIKE IN BASE OF 24" OAK TREE

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.

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 -US74- STATION 34+00.00 S 22° 50' 00.9" E 6875.627' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R–3421A	1C-4	
	LOCATION AND SURVEYS		

SURVEY CONTROL SHEET

FINAL

US74BUS

TYPE	STATION	NORTH	EAST
POT	10+00.00	430939.0120	1751341.8550
TS	17+06.56	431209.6341	1750689.1781
SC	20+34.65	431338.1735	1750387.3291
CS	55+16.71	433611.6875	1747820.4692
ST	58+44.79	433895.7957	1747656.4227
TS	74+80.44	435319.9980	1746852.0638
SC	78+40.44	435629.5230	1746668.3620
CS	102+77.15	436874.0630	1744663.1805
SC	106+37.15	436897.7456	1744304.0951
CS	108+65.32	436899.0373	1744075.9471
ST	110+65.32	436894.1949	1743876.0081
PC	135+71.72	436819.7050	1741370.7155
PT	145+61.50	436715.2213	1740387.4213
POT	152+24.98	436595.1343	1739734.9000

I73

TYPE	STATION	NORTH	EAST
POT	74+80.44	435319.9976	1746852.0639
TS	81+00.59	435859.9797	1746547.0935
SC	83+00.59	436034.5511	1746449.5015
CS	221+71.42	447094.1953	1751214.5519
ST	223+71.42	447143.1736	1751408.4604
TS	275+39.93	448387.0314	1756425.0601
SC	277+39.93	448436.0098	1756618.9686
CS	309+84.38	449890.0056	1759492.1281
ST	311+84.38	450017.2442	1759646.4321
TS	324+51.86	450827.8732	1760620.8000
SC	326+51.86	450955.1118	1760775.1040
CS	350+24.67	452140.7115	1762819.4786
ST	352+24.67	452211.4477	1763006.5502
TS	362+32.49	452563.7824	1763950.7803
SC	364+32.49	452634.7902	1764137.7477
CS	407+26.90	455491.9996	1767208.7264
ST	409+26.90	455673.3670	1767293.0164
TS	446+44.96	459054.1458	1768840.3701
SC	448+44.96	459236.4816	1768922.5440
CS	468+39.89	461165.5455	1769389.8936
ST	470+39.89	461365.2729	1769400.2812
TS	521+43.97	466463.9284	1769635.7214
SC	523+43.97	466663.7017	1769645.2375
CS	534+46.43	467762.9870	1769727.3516
ST	536+46.43	467961.9571	1769747.6208
POT	552+00.01	469507.3081	1769907.3173

US74EBL

TYPE	STATION	NORTH	EAST
POT	74+80.44	435287.8689	1746795.1757
TS	76+45.72	435431.7818	1746713.8968
SC	78+85.72	435638.8199	1746592.5567
PCC	88+57.24	436340.9694	1745929.9601
PT	102+35.26	436833.3520	1744658.3217

FLY

TYPE	STATION	NORTH	EAST
TS	0+00.00	434251.0823	1747517.0205
SC	2+00.00	434426.8959	1747421.7325
CS	5+33.33	434736.7291	1747299.9516
ST	7+33.33	434930.3717	1747250.0236
TS	10+92.51	435279.6857	1747166.4307
SC	13+32.51	435511.6087	1747104.9136
CS	28+58.75	436564.7356	1746076.8037
ST	30+98.75	436631.8097	1745846.4265
TS	37+99.37	436811.1994	1745169.1617
SC	40+30.37	436867.2990	1744945.0949

FLY_REV

TYPE	STATION	NORTH	EAST
TS	0+56.00	434304.4083	1747500.6764
SC	2+56.00	434480.3020	1747405.5413
CS	5+64.20	434766.7972	1747292.9335
ST	7+64.20	434960.3942	1747242.8390
TS	10+92.51	435279.6857	1747166.4307
SC	13+32.51	435511.6087	1747104.9136
CS	28+58.75	436564.7356	1746076.8037
ST	30+98.75	436631.8097	1745846.4265
TS	37+99.37	436811.1994	1745169.1617
SC	40+30.37	436867.2990	1744945.0949

L2

TYPE	STATION	NORTH	EAST
POT	10+00.00	436909.8573	1745037.0673
TS	19+32.99	437606.0705	1745658.1655
SC	21+29.84	437751.6574	1745790.6470
CS	29+60.78	438277.8222	1746430.9719
SC	31+57.63	438377.6065	1746600.6178
CS	37+69.60	438610.7122	1747165.1891
ST	39+66.45	438661.5650	1747355.3464
POT	61+40.35	439198.9961	1749461.7662

L2RT

TYPE	STATION	NORTH	EAST
POT	9+00.00	436901.1536	1744923.5712
TS	17+90.58	437566.6599	1745515.3701
SC	18+98.58	437647.0381	1745587.5030
PT	24+00.00	437994.7831	1745948.2796

L2REV

TYPE	STATION	NORTH	EAST
PC	24+00.00	437997.8329	1745945.6914
PT	28+93.35	438292.8494	1746340.7173
PC	29+88.47	438344.9150	1746420.3183
PT	39+59.82	438734.4377	1747305.3673
POT	54+23.79	439096.5793	1748723.8305

L2CONN

TYPE	STATION	NORTH	EAST
CS	6+31.23	438003.9326	1745940.5151
ST	7+39.23	437933.3093	1745858.8073
TS	11+55.27	437659.8297	1745545.2876
SC	13+44.27	437537.9828	1745400.8352
CS	19+24.95	437253.2173	1744897.3636
ST	21+13.95	437192.1990	1744718.5063
TS	24+36.00	437093.2801	1744412.0196
SC	26+25.00	437037.4154	1744231.4762
CS	31+64.93	436945.1615	1743700.4727
ST	33+64.93	436936.6557	1743500.6668

RPA

TYPE	STATION	NORTH	EAST
POT	0+00.00	439071.6842	1745477.5405
TS	4+54.15	438617.6845	1745489.1216
SC	6+94.15	438377.7640	1745488.3859
CS	22+71.89	437163.7687	1744614.9210
ST	24+71.89	437097.8401	1744426.1479

RPC

TYPE	STATION	NORTH	EAST
TS	2+47.14	435562.6009	1746776.2990
SC	4+47.14	435737.8195	1746679.8911
PCC	10+14.67	436262.7659	1746466.4393
CS	22+89.44	437512.5583	1746521.2869
ST	24+78.44	437685.6876	1746597.0456
TS	26+10.86	437806.1060	1746652.1351
SC	28+26.86	438000.2696	1746746.6604
CS	39+36.44	438698.7903	1747576.1794
ST	41+76.44	438764.3319	1747806.9857

RPD

TYPE	STATION	NORTH	EAST
POT	0+00.00	438746.0648	1747302.3989
TS	2+07.43	438709.1937	1747098.2687
SC	4+23.43	438677.1776	1746884.7327
CS	23+81.36	439835.1916	1745573.2826
SC	25+31.36	439985.1508	1745574.7458

LPB

TYPE	STATION	NORTH	EAST
POT	0+00.00	437393.9905	1745806.2725
TS	0+45.50	437350.0392	1745818.0492
SC	3+42.50	437058.2766	1745836.8635
CS	11+39.49	437232.2033	1745368.2323
ST	13+14.49	437374.6611	1745468.2266

LPC

TYPE	STATION	NORTH	EAST
CS	0+00.00	437733.3733	1745830.1509
SC	3+00.00	437465.4768	1745957.0813
CS	15+69.89	437963.3544	1746080.1600
ST	18+69.89	437786.8886	1745841.6674

ROW MARKER (REBAR AND CAP)

ALIGN	STATION	OFFSET	NORTH	EAST
US74BUS	60+61.28	174.78	434170.2473	1747702.1418
US74BUS	53+30.00	163.40	433542.2945	1748056.5845
US74BUS	53+30.00	-182.50	433354.1192	1747766.3435
US74BUS	51+23.00	-197.11	433168.6560	1747873.7690
US74BUS	45+82.00	163.72	432960.1678	1748490.7065
US74BUS	61+47.67	192.78	434254.3280	1747675.3277
US74BUS	117+80.00	233.00	437105.8516	1743154.7181
US74BUS	119+15.00	295.00	437163.8123	1743017.9350
US74BUS	129+35.00	117.00	436955.5765	1742003.6757
US74BUS	135+75.00	195.00	437014.5176	1741361.5420
US74BUS	136+30.00	99.61	436917.2517	1741308.6154
US74BUS	49+78.00	211.50	433289.8138	1748289.9803
US74BUS	53+88.19	-172.46	433410.0338	1747742.4142
US74BUS	133+75.00	160.00	436985.4808	1741562.5922
US74BUS	131+50.00	160.00	436992.1678	1741787.4928
US74BUS	58+30.00	253.76	434007.7231	1747884.6416
US74BUS	60+00.00	252.60	434155.1630	1747800.0395

ROW MARKER(REBAR AND CAP)

ALIGN	STATION	OFFSET	NORTH	EAST
I73	127+00.00	-177.50	440288.5622	1745354.9185
I73	121+90.00	-320.00	439768.4114	1745190.7904
I73	117+50.00	-190.00	439316.5749	1745330.1205
I73	128+10.00	-115.00	440395.1675	1745426.3948
I73	128+00.00	130.00	440363.5385	1745669.5498
I73	120+05.00	-330.00	439575.5072	1745181.5654

ROW MARKERS(REBAR AND CAP)

ALIGN	STATION	OFFSET	NORTH	EAST
FLY	8+25.00	415.00	435116.1092	1747632.2930
FLY	13+90.00	328.00	435676.4251	1747395.4057
FLY	17+70.00	275.00	436055.5042	1747149.3559
FLY	1+25.00	245.00	434476.4329	1747672.0413

ROW MARKERS(REBAR AND CAP)

ALIGN	STATION	OFFSET	NORTH	EAST
L2	47+00.00	175.00	438673.3452	1748109.3896
L2	53+29.48	180.00	438824.1204	1748720.5663
L2	53+30.00	112.25	438889.8945	1748704.3195

ROW MARKERS(REBAR AND CAP)

ALIGN	STATION	OFFSET	NORTH	EAST
L2REV	46+12.00	-54.29	438948.3682	1747923.8457
L2REV	46+12.00	-85.00	438978.1263	1747916.2510
L2REV	45+00.00	-85.00	438950.4200	1747807.7294
L2REV	44+35.00	-200.00	439045.7668	1747716.3019
L2REV	43+75.00	-205.00	439035.7691	1747656.9298

ROW MARKERS(REBAR AND CAP)

ALIGN	STATION	OFFSET	NORTH	EAST
L2CONN	25+72.00	200.00	437243.7763	1744224.5010
L2CONN	29+12.00	141.40	437114.1030	1743928.2883
L2CONN	31+20.00	117.44	437065.6202	1743735.2442

ROW MARKERS(REBAR AND CAP)

ALIGN	STATION	OFFSET	NORTH	EAST
RPA	9+30.00	292.00	438210.8367	1745170.0785
RPA	12+75.00	167.00	437897.9942	1745187.3613
RPA	1+60.00	125.50	438908.5360	1745356.1615
RPA	4+54.15	80.00	438615.6418	1745409.1478
RPA	6+60.00	90.00	438415.2495	1745400.1080
RPA	24+45.00	135.56	437235.0675	1744409.9318
RPA	14+88.00	152.00	437729.5332	1745101.3605
RPA	19+25.00	100.00	437412.6497	1744858.2862
RPA	21+55.00	117.70	437317.0795	1744668.3645

ROW MARKER(REBAR AND CAP)

ALIGN	STATION	OFFSET	NORTH	EAST
RPC	24+80.00	390.00	437524.8635	1746952.3456
RPC	32+10.00	160.00	438199.4745	1747087.7552
RPC	36+90.00	245.00	438384.5093	1747466.8710
RPC	41+10.37	80.55	438669.9290	1747763.4100
RPC	29+00.00	255.00	437930.2926	1747000.7622
RPC	13+40.00	113.50	436594.4640	1746512.6550
RPC	20+50.00	395.00	437186.1630	1746829.2513

ROW MARKER(REBAR AND CAP)

ALIGN	STATION	OFFSET	NORTH	EAST
RPD	10+15.00	85.00	438846.6231	1746339.4815
RPD	16+00.00	73.50	439162.8777	1745900.1895
RPD	18+40.00	100.00	439362.9308	1745799.6138
RPD	24+10.00	101.00	439865.1568	1745673.5925
RPD	0+25.00	68.00	438808.5382	1747265.7101
RPD	2+05.00	46.00	438754.8938	1747092.4869
RPD	2+83.00	122.00	438816.3218	1747003.4900
RPD	6+56.50	200.00	438877.8668	1746672.8670
RPD	12+50.00	73.50	438941.5419	1746141.5707

PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
US74BUS	117+76.02	247.68	437120.6423	1743158.2592
US74BUS	119+12.98	310.58	437179.4444	1743019.4901
US74BUS	129+34.81	132.26	436970.8348	1742003.4101
US74BUS	131+48.51	175.00	437007.2053	1741788.5316
US74BUS	133+73.70	175.00	437000.5129	1741563.4477
US74BUS	135+81.00	211.32	437030.6383	1741354.8597

PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
I73	117+46.39	-204.95	439312.1371	1745315.3732
I73	117+41.61	-224.89	439306.2201	1745295.7102
I73	119+97.39	-365.59	439566.9621	1745146.1168
I73	120+01.73	-345.25	439571.8450	1745166.3732
I73	121+92.43	-334.91	439771.0705	1745175.9005
I73	121+95.66	-354.79	439774.6159	1745156.0472
I73	127+05.39	-191.61	440295.1281	1745341.2613
I73	127+12.55	-210.43	440303.8827	1745323.0517
I73	128+17.88	-150.51	440406.3350	1745391.7435
I73	128+17.09	-128.16	440403.5208	1745413.9359
I73	128+81.34	-158.39	440471.5280	1745390.0045
I73	128+75.34	-177.61	440467.3192	1745370.2835
I73	128+70.00	-153.00	440459.4905	1745394.2405
I73	128+86.00	-128.76	440473.3321	1745419.9575
I73	130+03.34	-202.61	440600.4091	1745359.3229
I73	130+06.54	-182.87	440601.4028	1745379.3088
I73	130+11.36	-153.26	440602.8935	1745409.2876
I73	130+24.79	172.43	440578.3643	1745734.3288
I73	130+29.07	157.80	440584.2412	1745720.2886
I73	130+23.11	192.37	440574.4072	1745753.9408
I73	127+99.24	165.23	440359.7073	1745704.5821
I73	127+99.68	145.10	440361.8966	1745684.5637

PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
L2CONN	25+70.19	215.31	437258.9243	1744221.6998
L2CONN	25+67.76	235.72	437279.1218	1744217.9649
L2CONN	29+15.90	155.94	437127.8440	1743922.2728
L2CONN	29+19.43	175.74	437146.8412	1743915.7963
L2CONN	31+19.18	132.86	437081.0480	1743734.7020
L2CONN	31+19.23	153.10	437101.2173	1743732.9234
L2CONN	32+19.37	165.99	437107.7500	1743637.8159
L2CONN	31+90.29	142.41	437085.7147	1743666.7604

PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
RPA	9+26.47	308.42	438217.2393	1745154.7019
RPA	9+21.60	330.31	438225.7761	1745134.1998
RPA	12+79.71	181.98	437901.2089	1745172.1608
RPA	12+86.16	201.93	437905.4952	1745151.8935
RPA	14+89.09	167.03	437737.5748	1745088.6242
RPA	14+90.60	187.07	437748.2969	1745071.6424
RPA	19+26.00	115.36	437424.5048	1744848.4752
RPA	19+27.38	135.84	437440.3116	1744835.3938
RPA	21+53.69	132.70	437331.0074	1744662.6727
RPA	21+51.88	152.69	437349.5780	1744655.0837
RPA	24+38.20	170.45	437270.3133	1744405.5185
RPA	24+42.10	150.52	437250.1729	1744408.0404
RPA	6+43.76	124.81	438431.5933	1745365.8097
RPA	6+53.12	104.94	438422.2540	1745385.4087
RPA	4+54.78	95.08	438614.6320	1745394.0869
RPA	4+55.61	115.19	438613.2856	1745374.0059
RPA	1+61.44	140.46	438906.7172	1745341.2471
RPA	1+63.36	160.40	438904.2921	1745321.3611

PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
RPD	24+14.41	136.01	439869.6206	1745708.5574
RPD	24+11.86	116.01	439867.0698	1745688.5775
RPD	18+37.86	114.97	439368.1883	1745813.7595
RPD	18+34.92	134.91	439375.1983	1745832.6206
RPD	15+95.83	108.50	439182.0422	1745929.7289
RPD	15+98.24	88.50	439171.0845	1745912.8526
RPD	12+52.86	108.50	438971.9563	1746159.0912
RPD	12+51.21	88.50	438954.5788	1746149.0750
RPD	10+24.00	120.37	438882.3754	1746345.8723
RPD	10+18.79	100.17	438861.9455	1746342.2205
RPD	6+59.09	235.28	438913.1701	1746674.4673
RPD	6+57.59	215.12	438892.9968	1746673.5528
RPD	2+63.17	152.24	438849.3651	1747017.2309
RPD	2+74.52	134.97	438830.4832	1747009.3789
RPD	1+99.59	61.77	438771.3781	1747095.0104
RPD	1+92.37	82.80	438793.3572	1747098.3752
RPD	0+33.19	102.26	438840.7973	1747251.5640
RPD	0+28.51	82.68	438822.3635	1747259.6475

PERMANENT EASEMENT

ALIGN	STATION	OFFSET	NORTH	EAST
L2REV	43+12.14	-202.77	439018.0597	1747596.5743
L2REV	43+01.60	-220.57	439032.6985	1747581.9571
L2REV	43+20.00	-189.37	439007.0243	1747607.5043
L2REV	43+54.46	-245.75	439070.1770	1747626.9484
L2REV	43+37.14	-256.67	439076.4683	1747607.4663
L2REV	43+60.00	-230.00	439056.2816	1747636.2117
L2REV	44+45.00	-220.00	439067.6189	1747721.0437
L2REV	44+57.79	-233.60	439083.9585	1747730.0694
L2REV	44+74.84	-251.73	439105.7447	1747742.1037
L2REV	44+69.31	-169.78	439024.9758	1747757.0200
L2REV	44+88.39	-176.67	439036.3712	1747773.8021
L2REV	44+55.00	-164.62	439016.4293	1747744.4334
L2REV	45+08.75	-100.00	438967.1188	1747812.4988
L2REV	45+20.42	-120.00	438989.3839	1747818.8580
L2REV	46+12.00	-120.00	439012.0378	1747907.5906
L2REV	46+12.00	-100.00	438992.6594	1747912.5380
L2REV	51+52.08	-54.53	439082.1983	1748447.0838

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 -US74- STATION 34+00.00
S 22° 50' 00.9" E 6875.627'
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.

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2A-1

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

DocuSigned by: Mike Merritt 7/2019

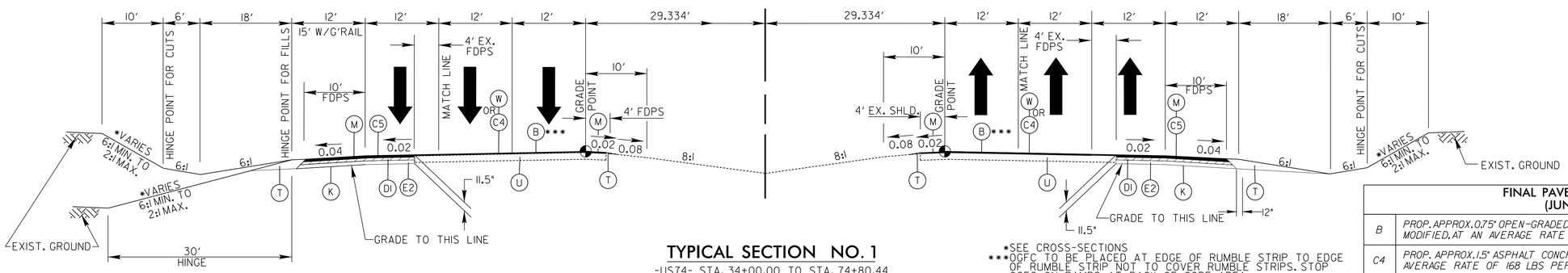
PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038176 ENGINEER SHIHAI ZHANG

DocuSigned by: Shihai Zhang 7/2019

REVISIONS

6/03/19

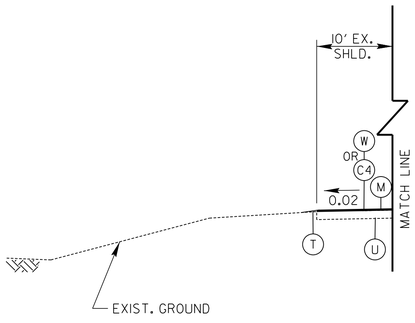


TYPICAL SECTION NO. 1

-US74- STA. 34+00.00 TO STA. 74+80.44
-I73- STA. 74+80.44 TO STA. 81+22.06 (LT. SIDE)

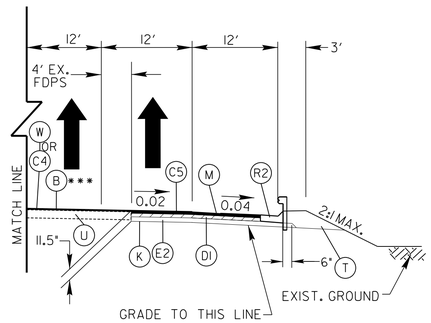
*SEE CROSS-SECTIONS
***OGFC TO BE PLACED AT EDGE OF RUMBLE STRIP TO EDGE OF RUMBLE STRIP NOT TO COVER RUMBLE STRIPS. STOP OGFC ON RAMPS AT BACK OF GORE AREA.

NOTE: EQUALITY
-US74- STA 74+80.44 L.B. =
-I73- STA 74+80.44 L.A.



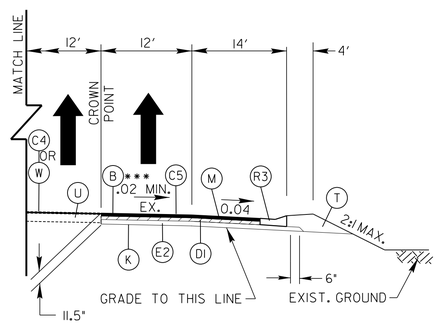
TYPICAL SECTION NO. 1-A

USE IN CONJUNCTION WITH TYPICAL No. 1
-US74- STA. 34+00.00 TO STA. 48+45.72 (LT. SIDE)



TYPICAL SECTION NO. 1-B

USE IN CONJUNCTION WITH TYPICAL No. 1
-US74- STA. 39+00.00 TO STA. 44+00.00 (RT. SIDE)
-US74- STA. 53+76.00 TO STA. 56+77.00 (RT. SIDE)



TYPICAL SECTION NO. 1-C

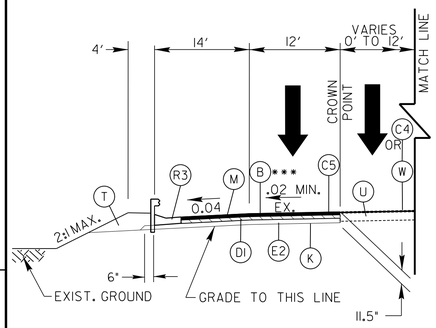
USE IN CONJUNCTION WITH TYPICAL No. 1
-US74- STA. 44+00.00 TO STA. 53+76.00 (RT. SIDE)
-US74- STA. 56+77.00 TO STA. 62+77.17 (RT. SIDE)

TRANSITION FROM SHOULDER BERM GUTTER (TS I-B) TO EXPRESSWAY GUTTER (TS I-C):
FROM STA 56+42 TO 56+77 (RT SIDE)
SEE DETAIL SHEET 2C-2

FINAL PAVEMENT SCHEDULE (JUNE 8, 2019)

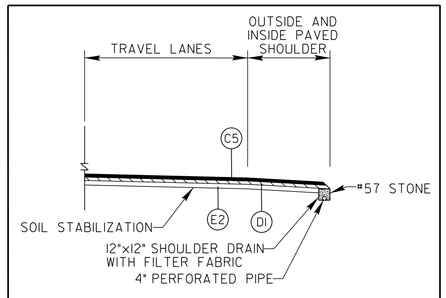
B	PROP. APPROX. 0.75" OPEN-GRADED ASPHALT FRICTION COURSE, TYPE FC-1 MODIFIED, AT AN AVERAGE RATE OF 90 LBS PER SQ.YARD.
C4	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS PER SQ.YARD.
C5	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS PER SQ.YARD IN EACH OF TWO LAYERS.
C6	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS PER SQUARE YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
DI	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS PER SQ.YARD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS PER SQ.YARD PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 2.5 " OR GREATER THAN 4" IN DEPTH.
E2	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ.YARD.
E3	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 627 LBS. PER SQ.YARD.
E4	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ.YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
K	PROP. 8" LIME STABILIZATION (METHOD SLURRY) AT RATE OF 24 LBS. PER SQ.YD. OR PROP. 7" CEMENT STABILIZATION AT A RATE OF 56 LBS. PER SQ.YD.
M	RUMBLE STRIPS
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
RI	2'-6" CONCRETE CURB AND GUTTER
R2	3'-0" SHOULDER BERM GUTTER
R3	4'-0" CONCRETE EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING 1.5" DEPTH
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET)

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.



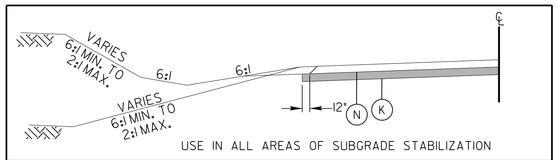
TYPICAL SECTION NO. 1-D

USE IN CONJUNCTION WITH TYPICAL No. 1
-US74- STA. 59+50 TO STA. 74+80.44 (LT. SIDE)
-US74 EBL- STA. 74+80.44 TO STA. 77+02.10 (LT. SIDE)

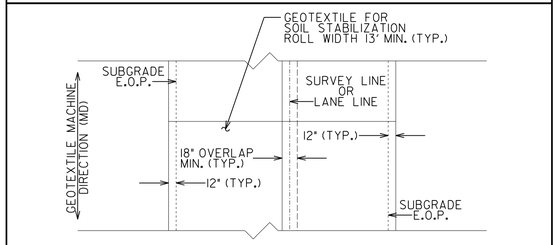


SHOULDER DRAIN DETAIL

SHOULDER DRAINS:
-US74- WB (RT. OUTSIDE SHOULDER) FROM STA. 39+50 TO STA. 49+90
OUTLETS AT STA. 39+50 (2GI) & 49+90 (2GI)
-I73- NB (RT. OUTSIDE SHOULDER) FROM STA. 83+00 TO STA. 86+60
OUTLETS AT STA. 85+50 (2GI) & 86+60 (2GI)
-I73- NB (RT. OUTSIDE SHOULDER) FROM STA. 90+40 TO STA. 97+40
OUTLET AT STA. 94+87 (JBw/MH)
-I73- SB (LT. INSIDE SHOULDER) FROM STA. 83+00 TO STA. 86+50
OUTLETS AT STA. 85+50 (2GI) & 86+50 (2GI)
-I73- SB (LT. INSIDE SHOULDER) FROM STA. 89+90 TO STA. 99+90
OUTLET AT STA. 94+90 (2GI)

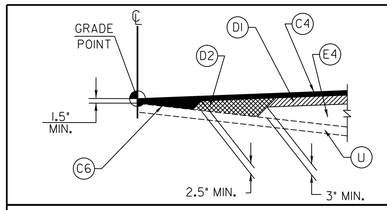


DETAIL FOR GEOTEXTILE FOR PAVEMENT STABILIZATION

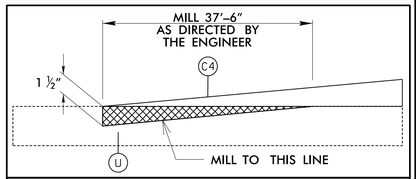


DETAIL FOR GEOTEXTILE FOR PAVEMENT STABILIZATION PLACEMENT

GEOTEXTILE FOR PAVEMENT STABILIZATION:
-US74- STA. 41+50 TO STA. 43+50 RT.
-US74- STA. 130+75 TO STA. 136+50 RT.
-I73- STA. 85+50 TO STA. 88+15 CL.
-I73- STA. 96+00 TO STA. 102+50 LT. & RT.
-I73- STA. 107+50 TO STA. 108+00 LT. & RT.
-I73- STA. 109+50 TO STA. 112+00 RT.
-I73- STA. 126+00 TO STA. 127+50 RT.
-L2- STA. 40+50 TO STA. 44+00 RT.
-L2CONN- STA. 32+25 TO STA. 33+50 RT.
-RPA- STA. 5+50 TO STA. 7+50 CL.
-RPC- STA. 11+93 TO STA. 13+00 CL.
-RPC- STA. 29+50 TO STA. 37+50 CL.
-RPD- STA. 0+00 TO STA. 3+00 CL.
-RPD- STA. 10+25 TO STA. 12+00 CL.
-LPB- STA. 0+00 TO STA. 1+50 CL.
-LPB- STA. 5+00 TO STA. 11+53 CL.
-LPC- STA. 0+00 TO STA. 5+00 CL.
-LPC- STA. 11+75 TO STA. 14+75 CL.



DETAIL SHOWING METHOD OF WEDGING (W)



DETAIL OF INCIDENTIAL MILLING PAVEMENT TIE-IN

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

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

ROADWAY DESIGN ENGINEER

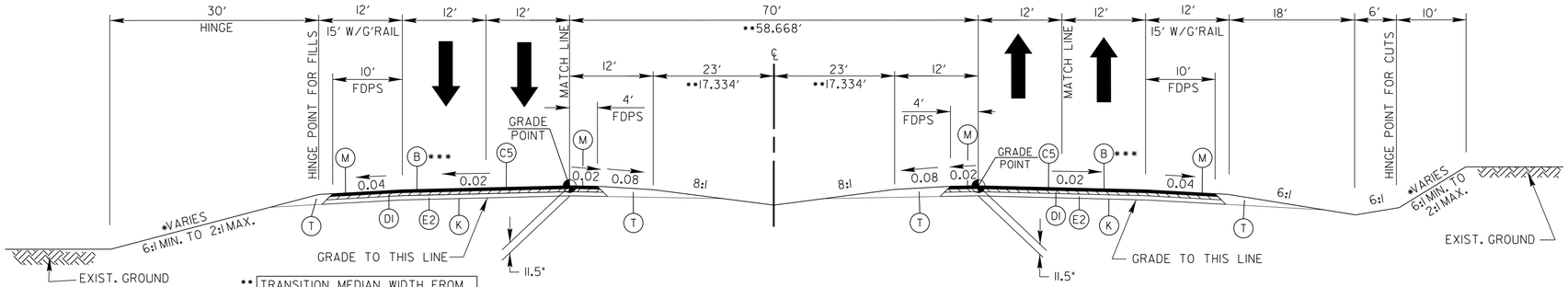
NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

DocuSigned by: Mike Merritt 6/7/2019

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038176 ENGINEER SHIHAI ZHANG

DocuSigned by: Shihai Zhang 6/7/2019

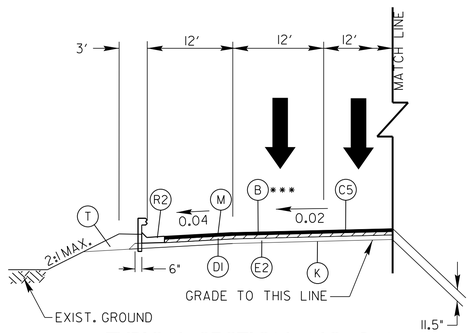


** TRANSITION MEDIAN WIDTH FROM STA. 81+00.59 TO STA. 85+00.59.

TYPICAL SECTION NO. 2

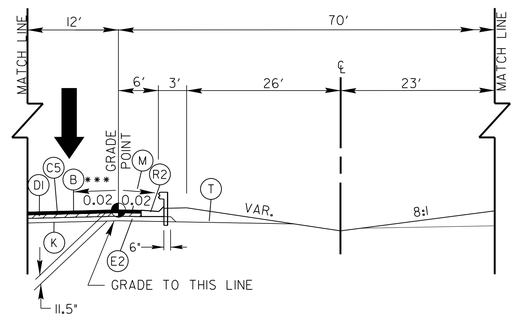
-I73- STA. 74+80.44 TO STA. 86+83.12 (RT. SIDE APPROACH SLAB)
-I73- STA. 81+22.06 TO STA. 87+91.34 (LT. SIDE APPROACH SLAB)
-I73- STA. 88+69.90 (RT. SIDE APPROACH SLAB) TO STA. 100+41.30 (RT. SIDE APPROACH SLAB)
-I73- STA. 89+50.68 (LT. SIDE APPROACH SLAB) TO STA. 99+97.10 (LT. SIDE APPROACH SLAB)
-I73- STA. 103+03.06 (LT. SIDE APPROACH SLAB) TO STA. 128+00.00 (LT. SIDE)
-I73- STA. 103+36.69 (RT. SIDE APPROACH SLAB) TO STA. 128+00.00 (RT. SIDE)

***OGFC TO BE PLACED AT EDGE OF RUMBLE STRIP TO EDGE OF RUMBLE STRIP NOT TO COVER RUMBLE STRIPS. STOP OGFC ON RAMPS AT BACK OF GORE AREA.



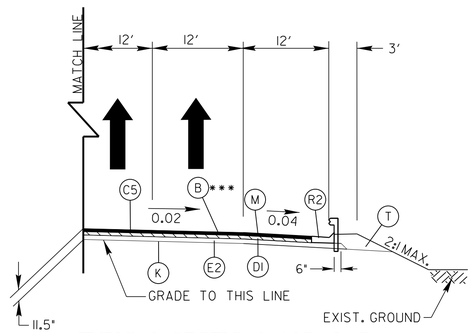
TYPICAL SECTION NO. 2-A

USE IN CONJUNCTION WITH TYPICAL No. 2
-I73- STA. 98+00.00 TO STA. 99+71.00 (LT. SIDE)



TYPICAL SECTION NO. 2-B

USE IN CONJUNCTION WITH TYPICAL No. 2
-I73- STA. 89+46.00 TO STA. 89+90.00 (MED. LT.)



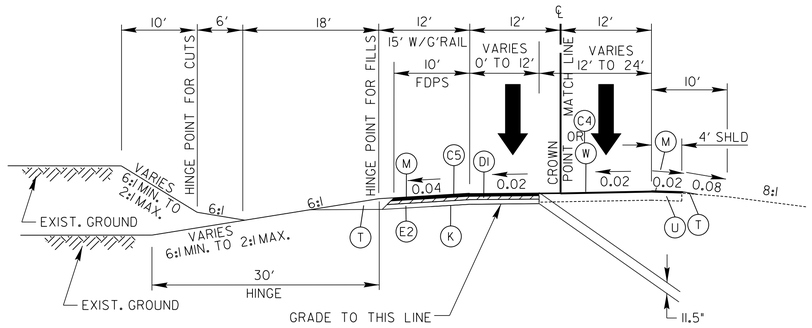
TYPICAL SECTION NO. 2-C

USE IN CONJUNCTION WITH TYPICAL No. 2
-I73- STA. 85+52.00 TO STA. 86+60.00 (RT. SIDE)
-I73- STA. 88+45.00 TO STA. 88+85.00 (RT. SIDE)

FINAL PAVEMENT SCHEDULE (JUNE 8, 2019)

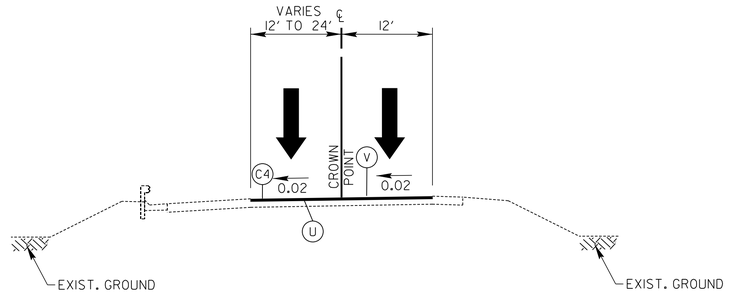
B	0.75" OPEN-GRADED ASPHALT FC
C4	1.5" S9.5C
C5	3" S9.5C
C6	VAR. DEPTH S9.5C
DI	4" I19.0C
D2	VAR. DEPTH I19.0C
E2	4.5" B25.0C
E3	5.5" B25.0C
E4	VAR. DEPTH B25.0C
K	SOIL-CEMENT/LIME-TREATED SOIL
M	RUMBLE STRIPS
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
RI	2'-6" CURB AND GUTTER
R2	3'-0" SH. BERM GUTTER
R3	4'-0" EXPR. GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V	MILLING 1.5" DEPTH
W	WEDGING

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.



TYPICAL SECTION NO. 3

-US74EBL- STA. 74+80.44 TO STA. 88+57.24



TYPICAL SECTION NO. 3-A

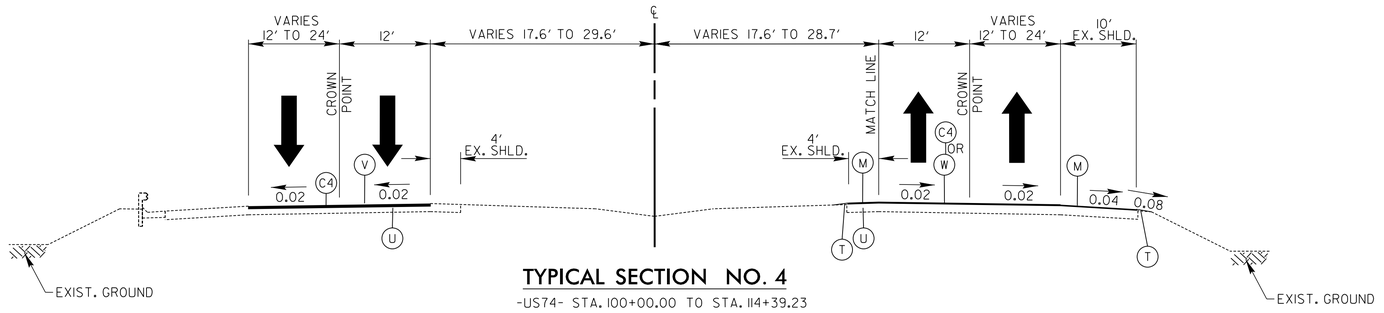
USE IN CONJUNCTION WITH TYPICAL No. 3
-US74EBL- STA. 88+57.24 TO STA. 99+62.18

REVISIONS

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

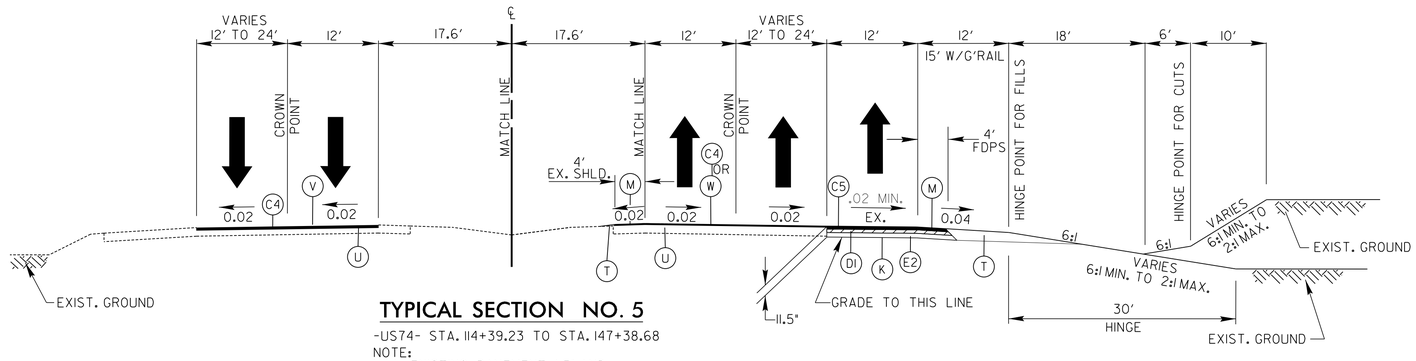
6/03/19

REVISIONS



TYPICAL SECTION NO. 4

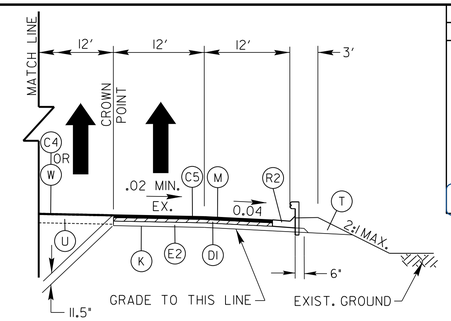
-US74- STA. 100+00.00 TO STA. 114+39.23



TYPICAL SECTION NO. 5

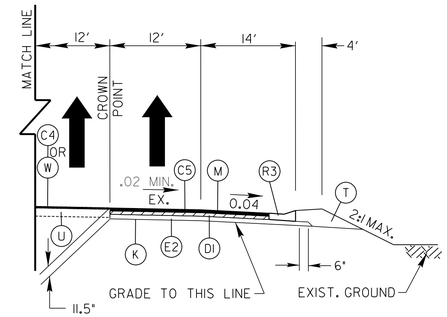
-US74- STA. 114+39.23 TO STA. 147+38.68

NOTE:
MILL EXISTING PAVEMENT 1.5" AND
REPLACE WITH 1.5" S9.5C BETWEEN
-US74- STA. 147+38.68 TO BRIDGE(LT & RT)



TYPICAL SECTION NO. 5-A

USE IN CONJUNCTION WITH TYPICAL No. 5
-US74- STA. 114+39.23 TO STA. 115+50.00 (RT. SIDE)
-US74- STA. 130+50.00 TO STA. 136+35.00 (RT. SIDE)



TYPICAL SECTION NO. 5-B

USE IN CONJUNCTION WITH TYPICAL No. 5
-US74- STA. 136+35.00 TO STA. 140+00.00 (RT. SIDE)

TRANSITION FROM SHOULDER BERM GUTTER (TS 5-A) TO EXPRESSWAY GUTTER (TS 5-B):
FROM STA 136+00.00 TO STA. 136+35.00 (RT SIDE)
SEE DETAIL SHEET 2C2

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2A-3

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

DocuSigned by: Mike Merritt 6/7/2019

PAVEMENT DESIGN ENGINEER

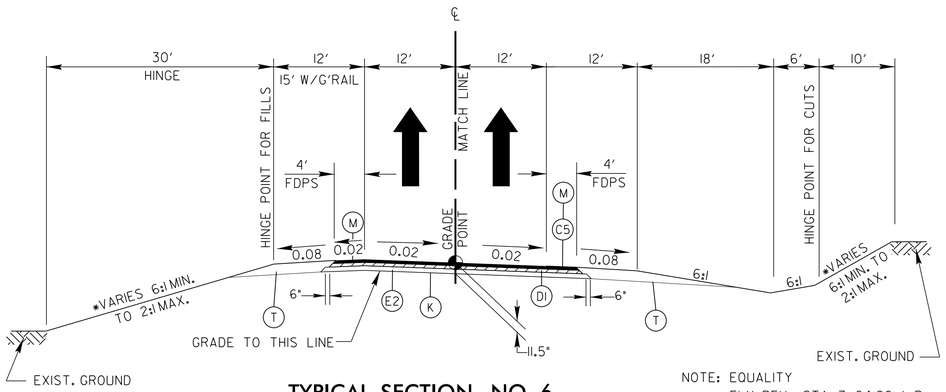
NORTH CAROLINA PROFESSIONAL SEAL 038176 ENGINEER SHIHAI ZHANG

DocuSigned by: Shihai Zhang 6/7/2019

FINAL PAVEMENT SCHEDULE (JUNE 8, 2019)

B	0.75" OPEN-GRADED ASPHALT FC
C4	1.5" S9.5C
C5	3" S9.5C
C6	VAR. DEPTH S9.5C
DI	4" I19.0C
D2	VAR. DEPTH I19.0C
E2	4.5" B25.0C
E3	5.5" B25.0C
E4	VAR. DEPTH B25.0C
K	SOIL-CEMENT/LIME-TREATED SOIL
M	RUMBLE STRIPS
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
RI	2'-6" CURB AND GUTTER
R2	3'-0" SH. BERM GUTTER
R3	4'-0" EXPR. GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V	MILLING 1.5" DEPTH
W	WEDGING

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

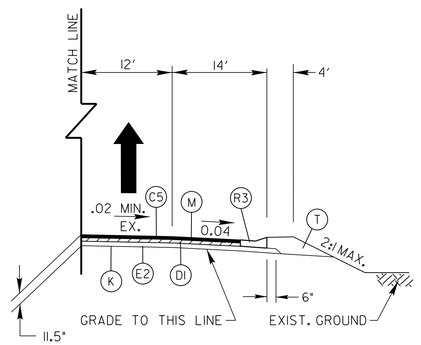


TYPICAL SECTION NO. 6

-FLYREV- STA. 0+56.00 TO -FLY- STA. 34+56.00

NOTE: EQUALITY
-FLY_REV- STA 7+64.20 L.B. =
-FLY- STA 7+64.20 L.A.

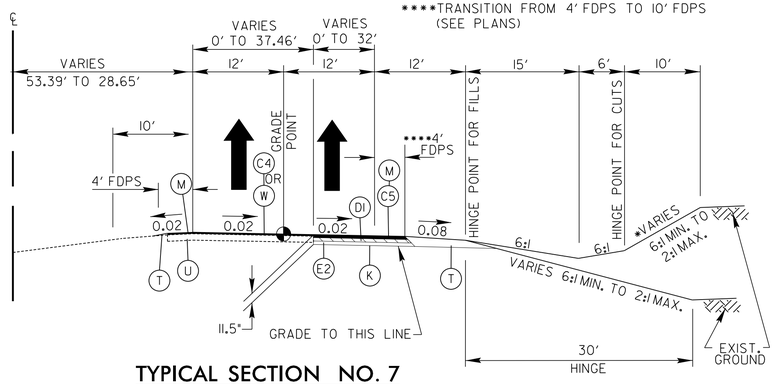
*SEE CROSS-SECTIONS



TYPICAL SECTION NO. 6-A

USE IN CONJUNCTION WITH TYPICAL No. 6
-FLYREV- STA. 0+56.00 TO STA. 3+95.00 (RT. SIDE)

*SEE CROSS-SECTIONS
****TRANSITION FROM 4' FDPS TO 10' FDPS (SEE PLANS)



TYPICAL SECTION NO. 7

-FLY- STA. 34+56.00 TO STA. 40+30.37

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2A-4

ROADWAY DESIGN ENGINEER

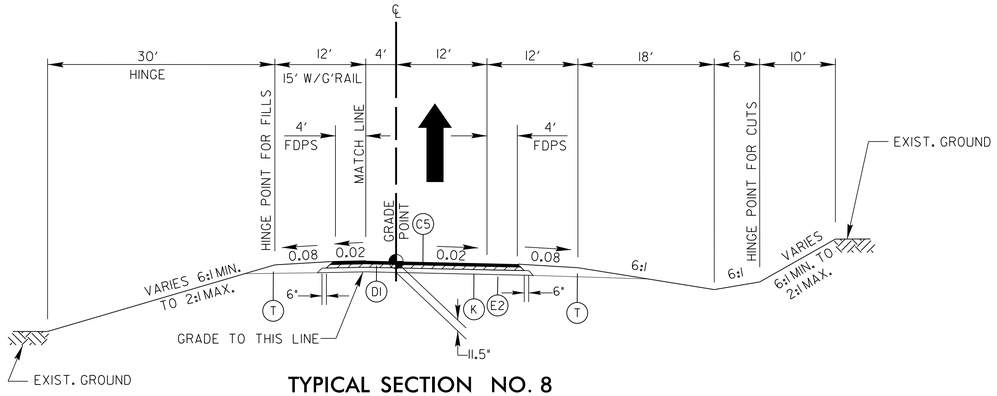
NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

DocuSigned by: Mike Merritt 7/7/2019

PAVEMENT DESIGN ENGINEER

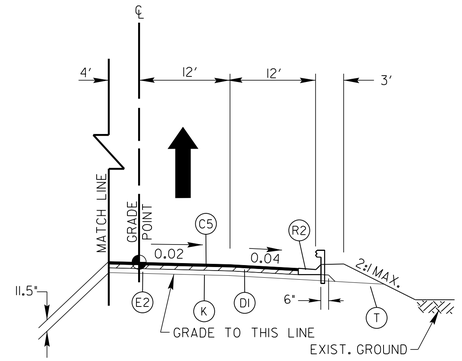
NORTH CAROLINA PROFESSIONAL SEAL 038176 ENGINEER SHIHAI ZHANG

DocuSigned by: Shihai Zhang 7/7/2019



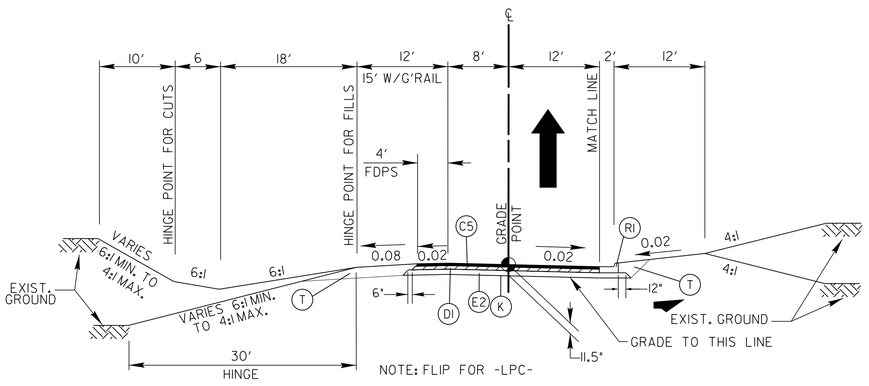
TYPICAL SECTION NO. 8

-RPA- STA. 0+00.00 TO STA. 24+71.89
-RPC- STA. 2+47.14 TO STA. 10+57.25 (APPROACH SLAB)
-RPC- STA. 12+16.80 (APPROACH SLAB) TO STA. 41+76.44
-RPD- STA. 0+00.00 TO STA. 25+31.36



TYPICAL SECTION NO. 8-A

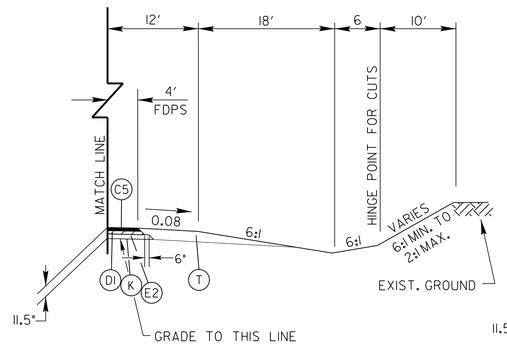
USE IN CONJUNCTION WITH TYPICAL No. 8
-RPA- STA. 20+50.00 TO STA. 21+65.00 (RT. SIDE)
-RPC- STA. 7+71.00 TO STA. 10+42.00 (RT. SIDE)
-RPC- STA. 12+04.00 TO STA. 12+50.00 (RT. SIDE)
-RPC- STA. 32+50.00 TO STA. 41+18.50 (RT. SIDE)



NOTE: FLIP FOR -LPC-

TYPICAL SECTION NO. 9

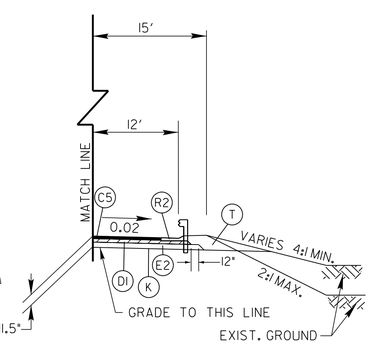
-LPB- STA. 0+00.00 TO STA. 13+14.49
-LPC- STA. 0+00.00 TO STA. 18+69.89



NOTE: FLIP FOR -LPC-

TYPICAL SECTION NO. 9-A

USE IN CONJUNCTION WITH TYPICAL No. 9
-LPB- STA. 11+50.62 TO STA. 13+14.49 (RT. SIDE)
-LPC- STA. 15+59.57 TO STA. 18+69.89 (LT. SIDE)



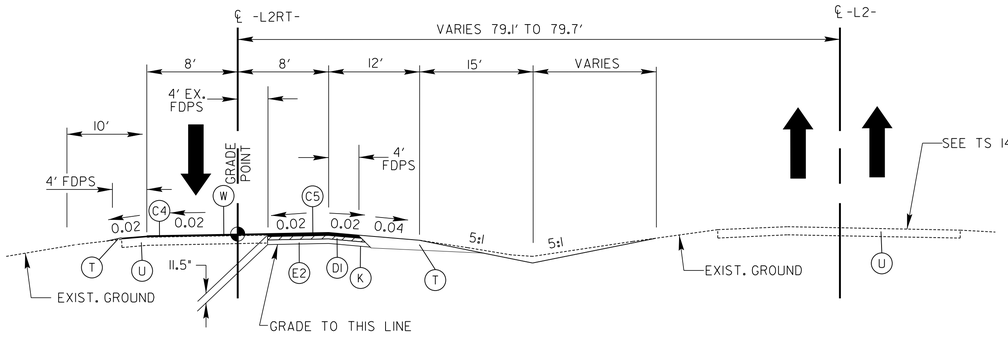
NOTE: FLIP FOR -LPC-

TYPICAL SECTION NO. 9-B

USE IN CONJUNCTION WITH TYPICAL No. 9
-LPB- STA. 0+00.00 TO 2+93.89 (RT. SIDE)
-LPC- STA. 0+51.00 TO STA. 6+10.99 (LT. SIDE)

FINAL PAVEMENT SCHEDULE (JUNE 8, 2019)	
B	0.75" OPEN-GRADED ASPHALT FC
C4	1.5" S9.5C
C5	3" S9.5C
C6	VAR.DEPTH S9.5C
DI	4" 119.0C
D2	VAR. DEPTH 119.0C
E2	4.5" B25.0C
E3	5.5" B25.0C
E4	VAR. DEPTH B25.0C
K	SOIL-CEMENT/LIME-TREATED SOIL
M	RUMBLE STRIPS
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
RI	2'-6" CURB AND GUTTER
R2	3'-0" SH. BERM GUTTER
R3	4'-0" EXPR.GUTTER
T	EARTH MATERIAL
U	EXIST.PAVEMENT
V	MILLING 1.5" DEPTH
W	WEDGING

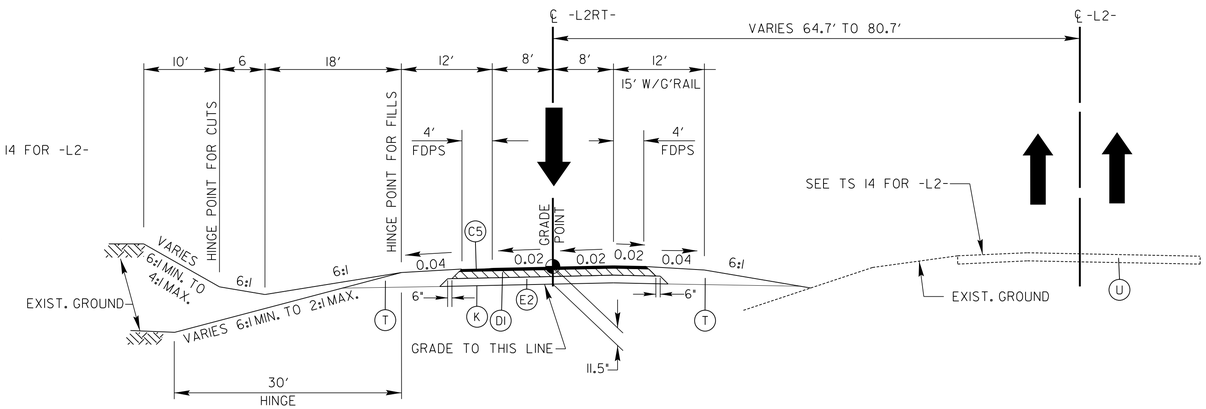
NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.



TYPICAL SECTION NO. 10

-L2RT- STA. 9+39.20 (END BRIDGE) TO STA. 10+00.00*
-L2RT- STA. 10+00.00 TO STA. 13+75.00

*RESURFACE EXISTING LANES AND SHOULDERS



TYPICAL SECTION NO. 11

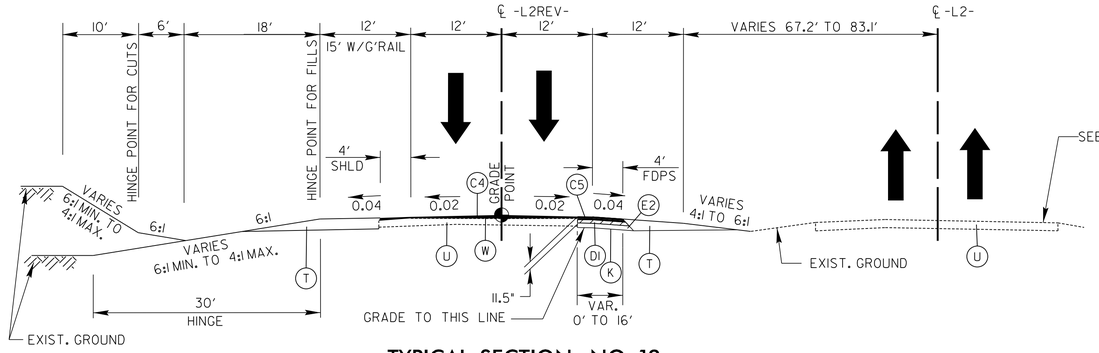
-L2RT- STA. 13+75.00 TO STA. 24+00.00 (L.B.)

NOTE: EQUALITY
-L2RT- STA 24+00.00 L.B. =
-L2REV- STA 24+00.00 L.A.

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

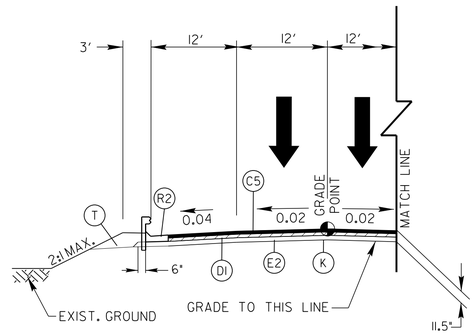
6/20/19

REVISIONS



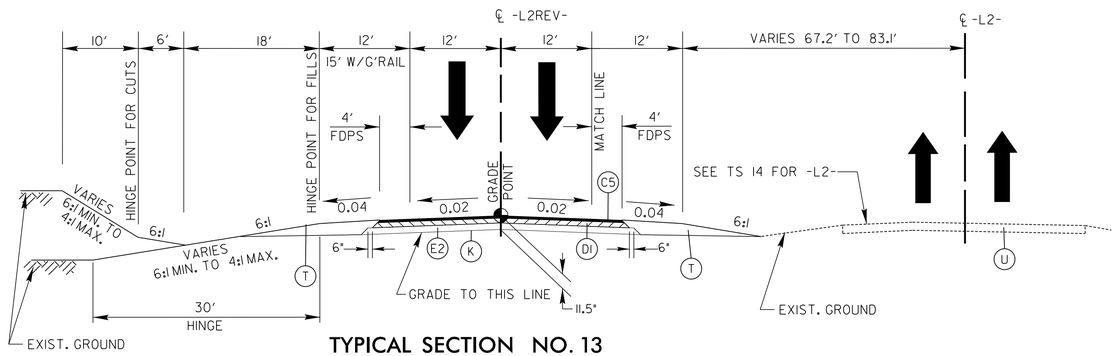
TYPICAL SECTION NO. 12

-L2REV- STA. 24+00.00 TO STA. 32+00.00
-L2REV- STA. 44+23.00 TO STA. 53+53.24



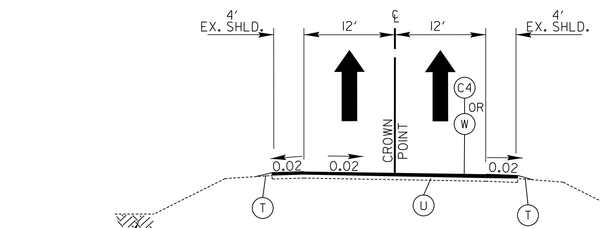
TYPICAL SECTION NO. 13-A

USE IN CONJUNCTION WITH TYPICAL No. 13
-L2REV- STA. 40+31.45 TO STA. 45+48.00 (LT. SIDE)



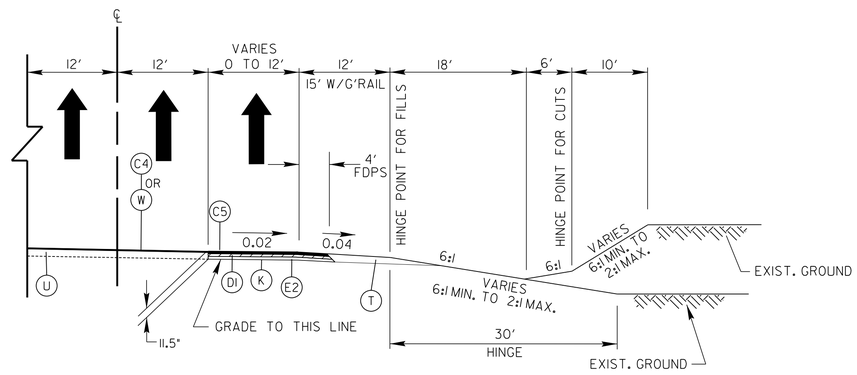
TYPICAL SECTION NO. 13

-L2REV- STA. 32+00.00 TO STA. 44+23.00



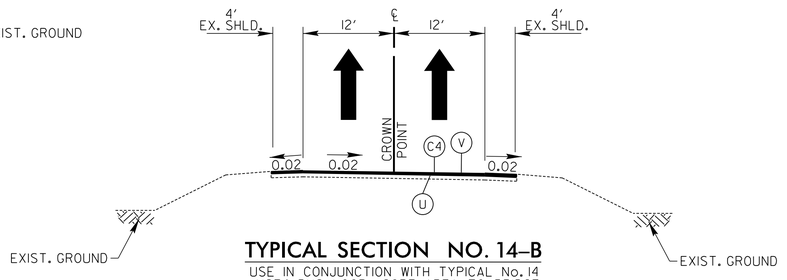
TYPICAL SECTION NO. 14-A

USE IN CONJUNCTION WITH TYPICAL No. 14
-L2- STA. 10+00.00 (END BRIDGE) TO STA. 16+33.87
-L2- STA. 21+90.73 TO STA. 44+29.48



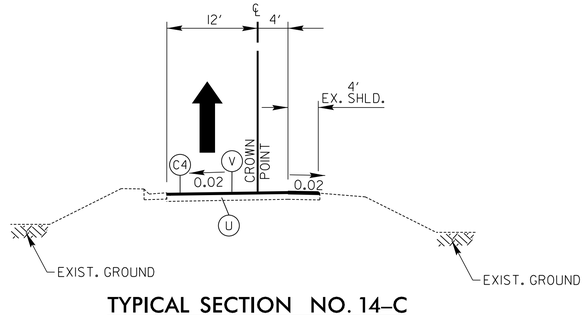
TYPICAL SECTION NO. 14

-L2- STA. 16+33.87 TO STA. 21+90.73
-L2- STA. 44+29.48 TO STA. 53+29.48



TYPICAL SECTION NO. 14-B

USE IN CONJUNCTION WITH TYPICAL No. 14
-US74 BUS. LOOP- GORE AREA TO BRIDGE
(APPROX. LENGTH 3,400 LF.)



TYPICAL SECTION NO. 14-C

USE IN CONJUNCTION WITH TYPICAL No. 14
-US74 BUS. EBL- GORE AREA TO BRIDGE
(APPROX. LENGTH 1,500 LF.)

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2A-5

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

DocuSigned by: Mike Merritt 7/2019

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038176 ENGINEER SHIHAI ZHANG

DocuSigned by: Shihai Zhang 7/2019

FINAL PAVEMENT SCHEDULE (JUNE 8, 2019)

B	0.75" OPEN-GRADED ASPHALT FC
C4	1.5" S9.5C
C5	3" S9.5C
C6	VAR. DEPTH S9.5C
DI	4" 119.0C
D2	VAR. DEPTH 119.0C
E2	4.5" B25.0C
E3	5.5" B25.0C
E4	VAR. DEPTH B25.0C
K	SOIL-CEMENT/LIME-TREATED SOIL
M	RUMBLE STRIPS
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
R1	2′-6" CURB AND GUTTER
R2	3′-0" SH. BERM GUTTER
R3	4′-0" EXPR. GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V	MILLING 1.5" DEPTH
W	WEDGING

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2A-6

ROADWAY DESIGN ENGINEER

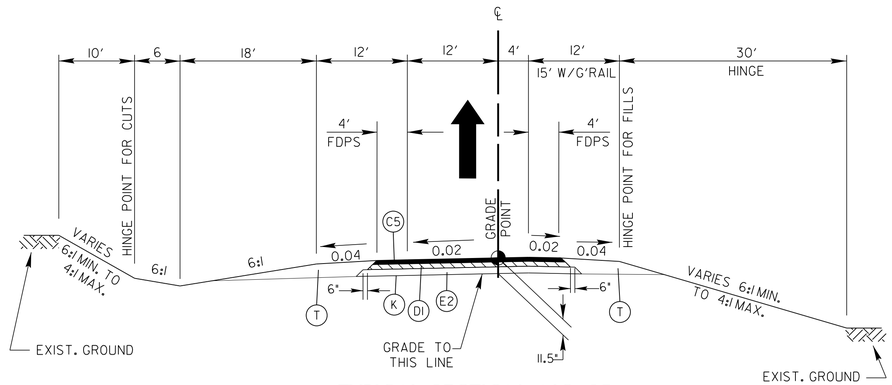
NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

DocuSigned by: Mike Merritt 7/7/2019

PAVEMENT DESIGN ENGINEER

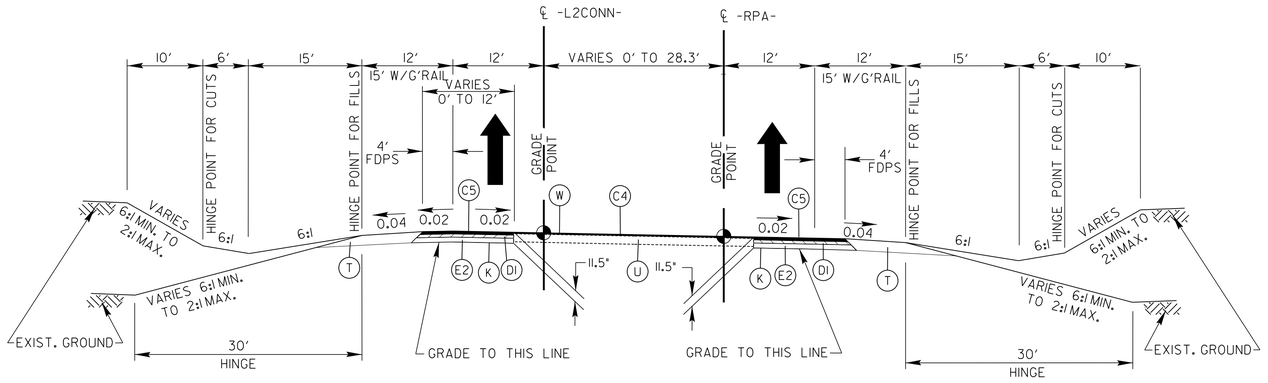
NORTH CAROLINA PROFESSIONAL SEAL 038176 ENGINEER SHIHAI ZHANG

DocuSigned by: Shihai Zhang 7/7/2019



TYPICAL SECTION NO. 15

-L2CONN- STA. 6+31.23 TO STA. 20+47.04

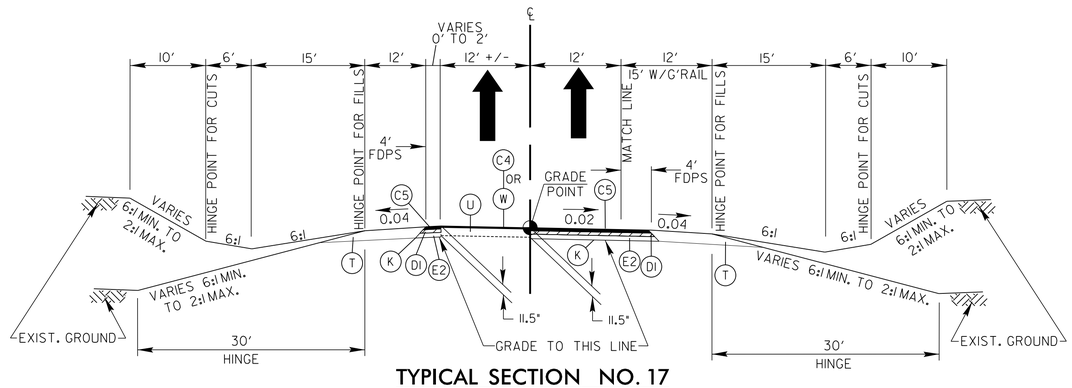


TYPICAL SECTION NO. 16

-L2CONN- STA. 20+47.04 STA. 24+21.16
-RPA- STA. 20+97.06 TO STA. 24+71.89

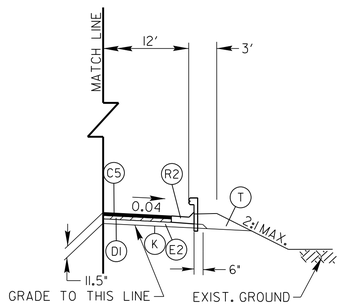
FINAL PAVEMENT SCHEDULE (JUNE 8, 2019)	
B	0.75″ OPEN-GRADED ASPHALT FC
C4	1.5″ S9.5C
C5	3″ S9.5C
C6	VAR. DEPTH S9.5C
DI	4″ I19.0C
D2	VAR. DEPTH I19.0C
E2	4.5″ B25.0C
E3	5.5″ B25.0C
E4	VAR. DEPTH B25.0C
K	SOIL-CEMENT/LIME-TREATED SOIL
M	RUMBLE STRIPS
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
RI	2′-6″ CURB AND GUTTER
R2	3′-0″ SH. BERM GUTTER
R3	4′-0″ EXPR. GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V	MILLING 1.5″ DEPTH
W	WEDGING

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.



TYPICAL SECTION NO. 17

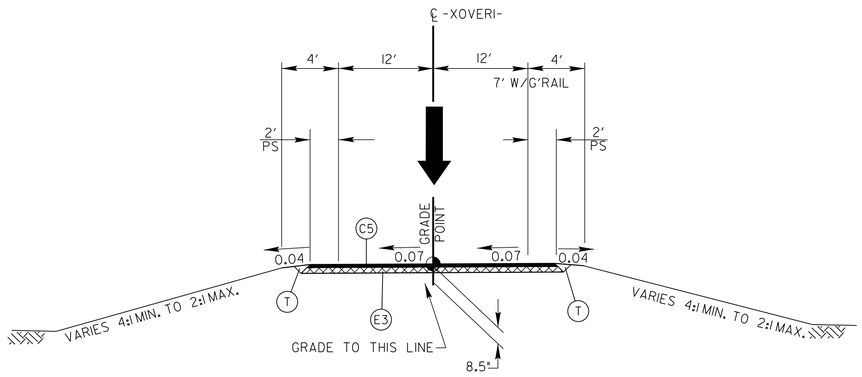
-L2CONN- STA. 24+21.16 TO STA. 31+80.00 (RT. SIDE)
-L2CONN- STA. 24+21.16 TO STA. 26+25.00 (LT. SIDE)



TYPICAL SECTION NO. 17–A

USE IN CONJUNCTION WITH TYPICAL No. 17
-L2CONN- STA. 31+80.00 TO STA. 33+64.93 (RT. SIDE)

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions



TYPICAL SECTION NO. 18

-XOVER1- STA. 11+62.60 TO STA. 18+17.72
-XOVER1- STA. 29+50.00 TO STA. 33+08.00

TYPICAL SECTION NO. 19

-XOVER2- STA. 29+71.24 TO STA. 33+53.38
-XOVER2- STA. 41+29.96 TO STA. 48+05.00

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2A-7

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

DocuSigned by: Mike Merritt 6/7/2019

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 038176 ENGINEER SHIHAI ZHANG

DocuSigned by: Shihai Zhang 6/7/2019

FINAL PAVEMENT SCHEDULE (JUNE 8, 2019)

B	0.75" OPEN-GRADED ASPHALT FC
C4	1.5" S9.5C
C5	3" S9.5C
C6	VAR. DEPTH S9.5C
D1	4" 119.0C
D2	VAR. DEPTH 119.0C
E2	4.5" B25.0C
E3	5.5" B25.0C
E4	VAR. DEPTH B25.0C
K	SOIL-CEMENT/LIME-TREATED SOIL
M	RUMBLE STRIPS
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
R1	2'-6" CURB AND GUTTER
R2	3'-0" SH. BERM GUTTER
R3	4'-0" EXPR. GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V	MILLING 1.5" DEPTH
W	WEDGING

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2B-1

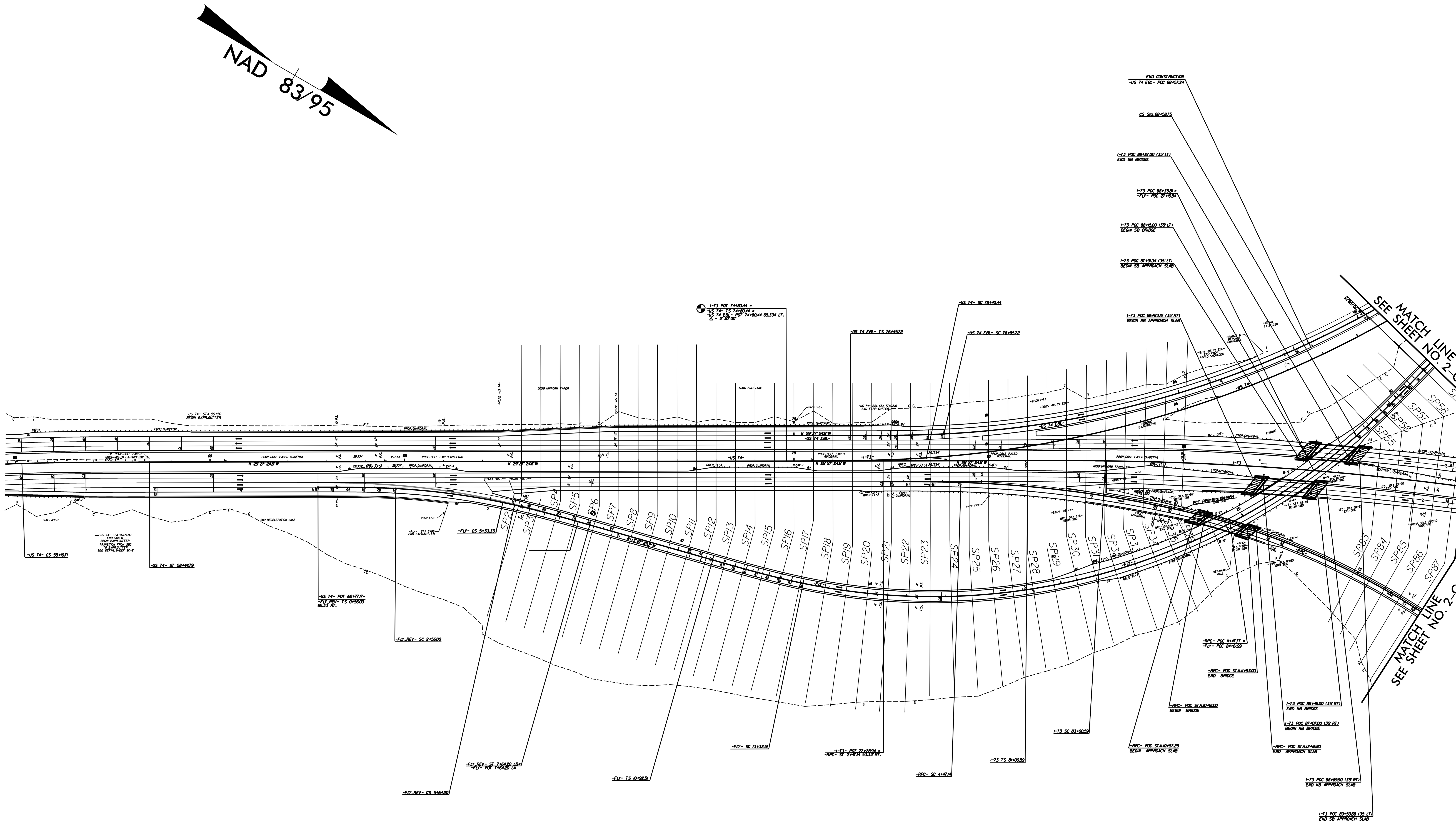
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

DocuSigned by: Mike Merritt
19FDB651D4B3490...
7/24/2019

REVISIONS

6/09/99



DETAIL SHOWING SHEAR POINT LAYOUT

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

7/18/2019
R:\Roadway\Proj\r3421a_rdy_psh_2B-1.dgn
default

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

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

Mike Merritt

7/24/2019

REVISIONS

NAD 83/95

A

B

C

D

MATCH LINE SEE SHEET NO. 2-F

MATCH LINE SEE SHEET NO. 2-F

MATCH LINE SEE SHEET NO. 2-F

DETAIL SHOWING SHEAR POINT LAYOUT

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

7/18/2019
R:\Roadway\Proj\r-3421a_rdy_psh_2B-2.dgn
default

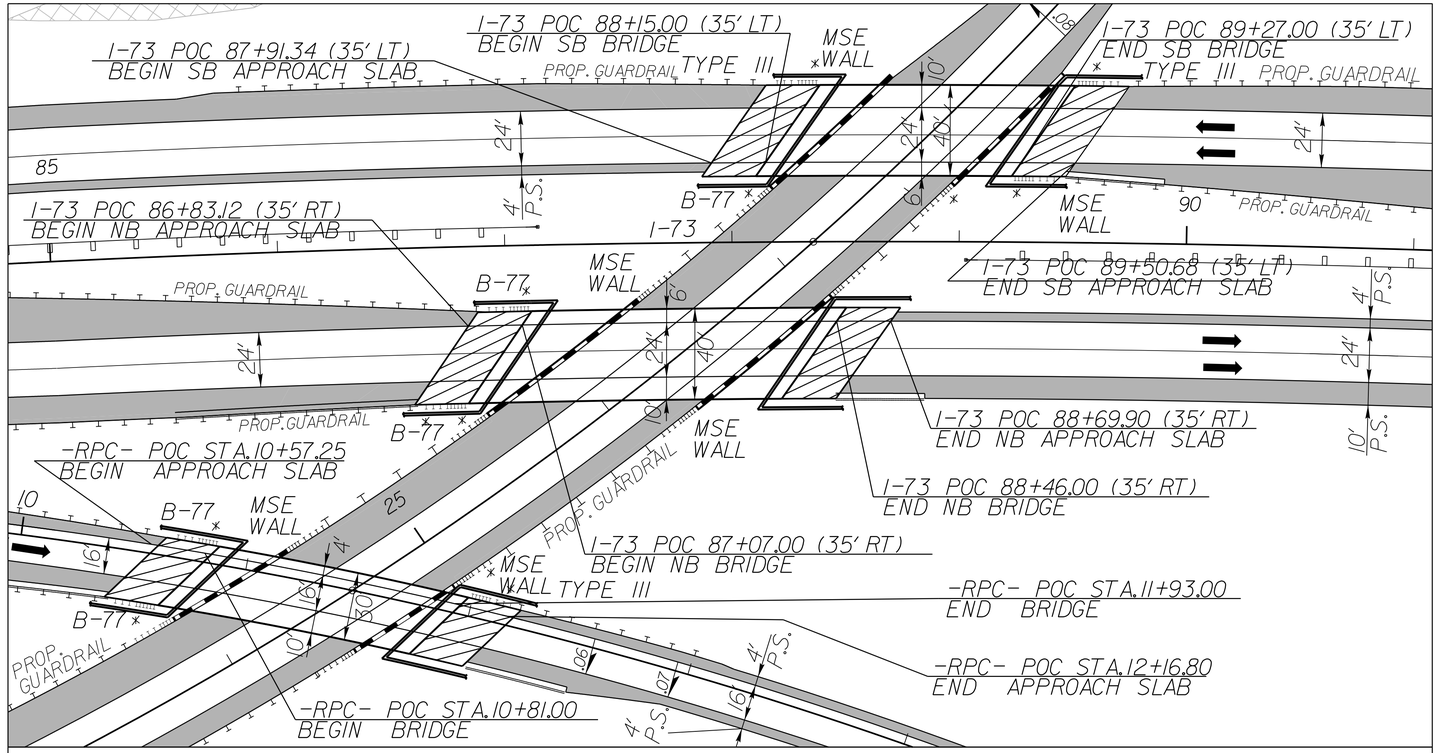
8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2B-3
R/W SHEET NO.	

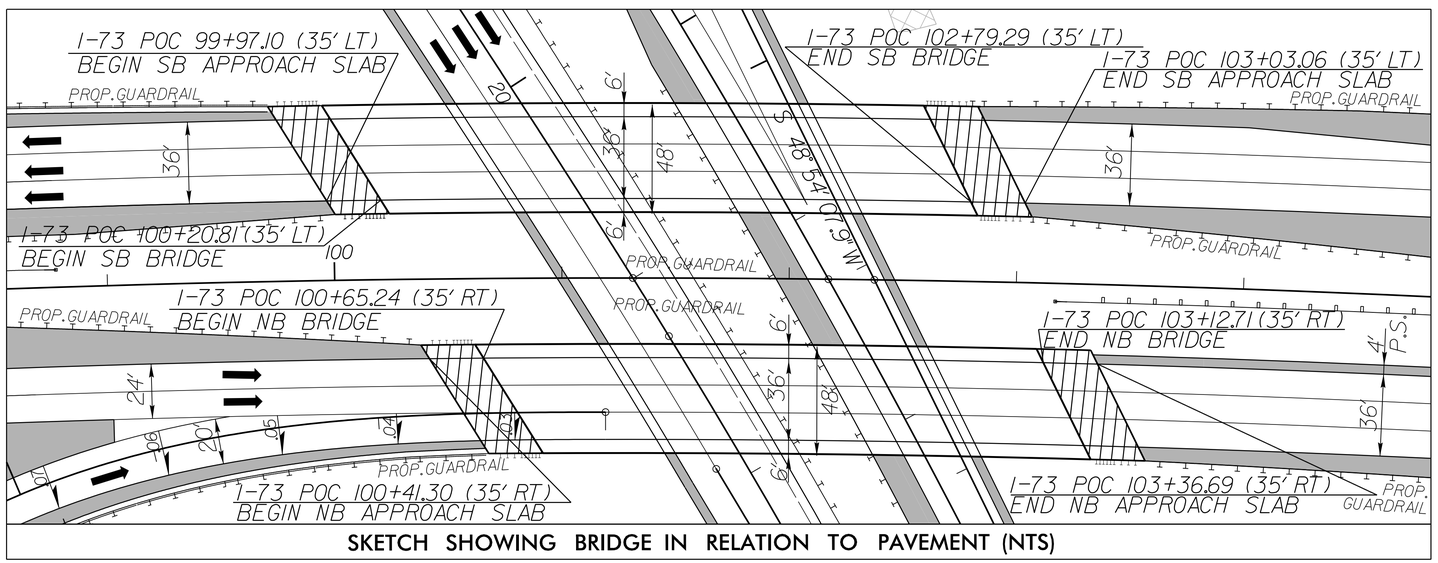
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. METRITT	NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN
DocuSigned by: Mike Metritt 8/8/2019	DocuSigned by: Stephen Morgan 8/8/2019

SKETCHES SHOWING PAVEMENT WIDTH TO BRIDGE WIDTH RELATIONSHIP



SKETCH SHOWING BRIDGE IN RELATION TO PAVEMENT (NTS)

SEE SHEET 8 FOR LOCATION OF BRIDGES



SKETCH SHOWING BRIDGE IN RELATION TO PAVEMENT (NTS)

SEE SHEET 9 FOR LOCATION OF BRIDGES

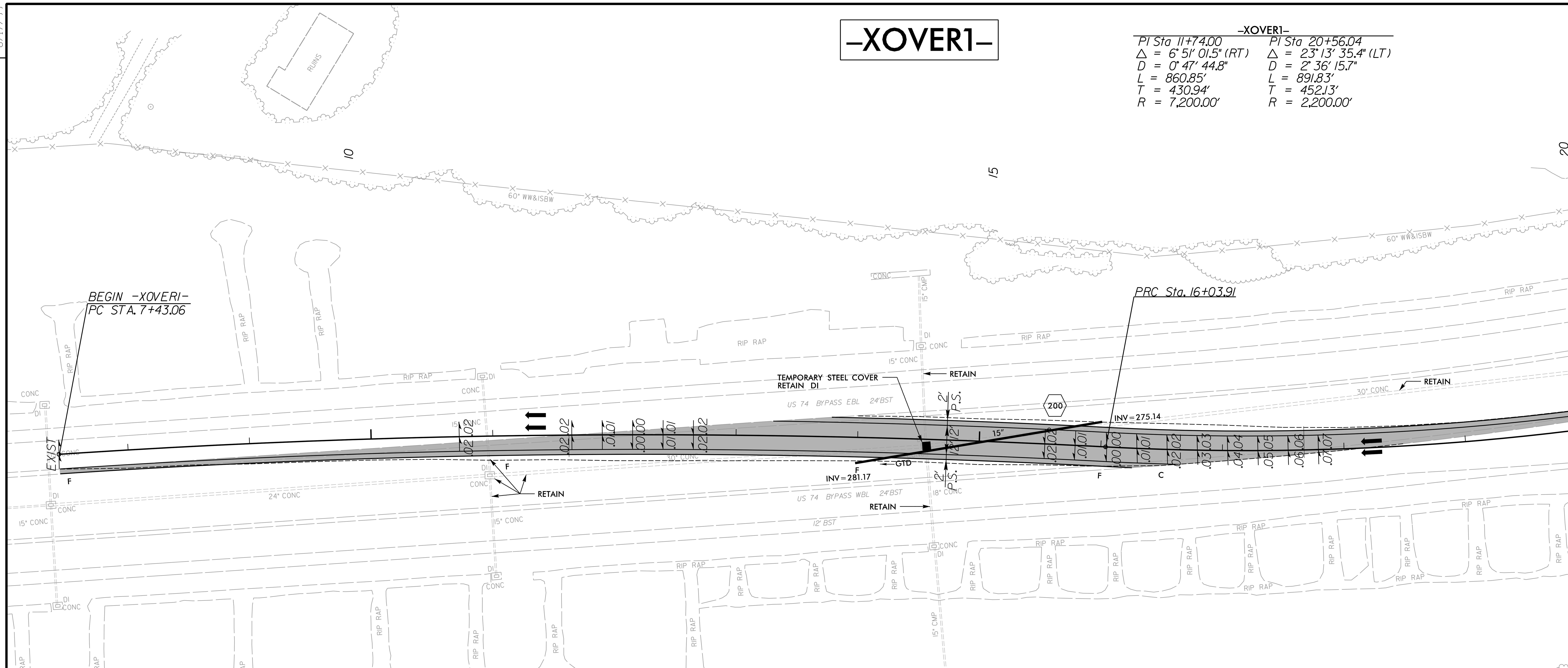
RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

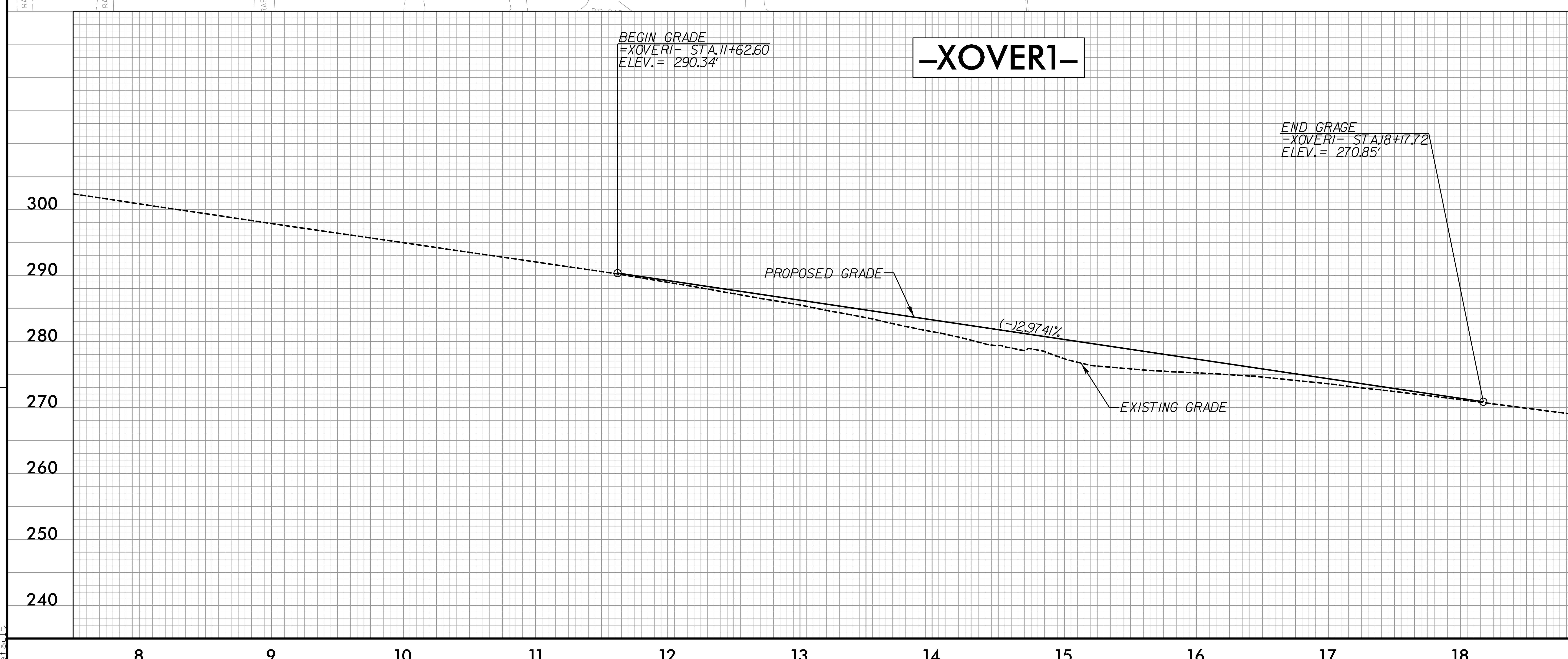
7/18/2019
R:\Projects\Survey\Proj\r3421a_rdy_psh_2B-3.dgn
default

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2B-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT	NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN
Mike Merritt 7/27/2019	Stephen Morgan 7/26/2019





RK&K

P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112

Engineers | Construction Managers | Planners | Scientists
www.rkk.com

Responsive People | Creative Solutions

7/26/2019
R:\Roadway\Proj\r3421a_rdy_psh_2B-4.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2B-5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT

DocuSigned by: Mike Merritt 7/27/2019

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN

DocuSigned by: Stephen Morgan 8/26/2019

–XOVER1–

–XOVER1–
PI Sta 28+64.13
Δ = 21° 45' 19.7" (LT)
D = 3° 29' 37.1"
L = 622.72'
T = 315.15'
R = 1,640.00'

BEGIN –XOVER1–
POC STA. 25+75.00

PT Sta. 24+95.74

PC Sta. 25+48.98

PT Sta. 31+71.69

END –XOVER1–
POT STA. 36+05.24

N 45° 49' 58.5" W

N 67° 35' 18.2" W

TOP = 231.19 2GI
INV = 228.44
D = 2.75

INV = 226.45

RETAIN

US 74 BYPASS EBL 24' BST

US 74 BYPASS WBL 24' BST

4' BST

10' BST

11' BST

24' BST

30" C&G

MTL

RIPRAP

36" CONC

18" CMP

12" CMP

15" CONC

15" CMP

6' CONC HW
2'-4" CONC WW

37' CONC HW
17' CONC WW

RIP RAP

60" WW & ISBW

JS

ST

DI

201

–XOVER1–

BEGIN GRADE
–XOVER1– STA. 29+50
ELEV. = 236.96'

END GRADE
–XOVER1– STA. 33+08.00
ELEV. = 227.89'

PROPOSED GRADE

(–)2.5335%

EXISTING GRADE

280
270
260
250
240
230
220
210
200

24 25 26 27 28 29 30 31 32 33 34 35 36

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

REVISIONS

8/17/99

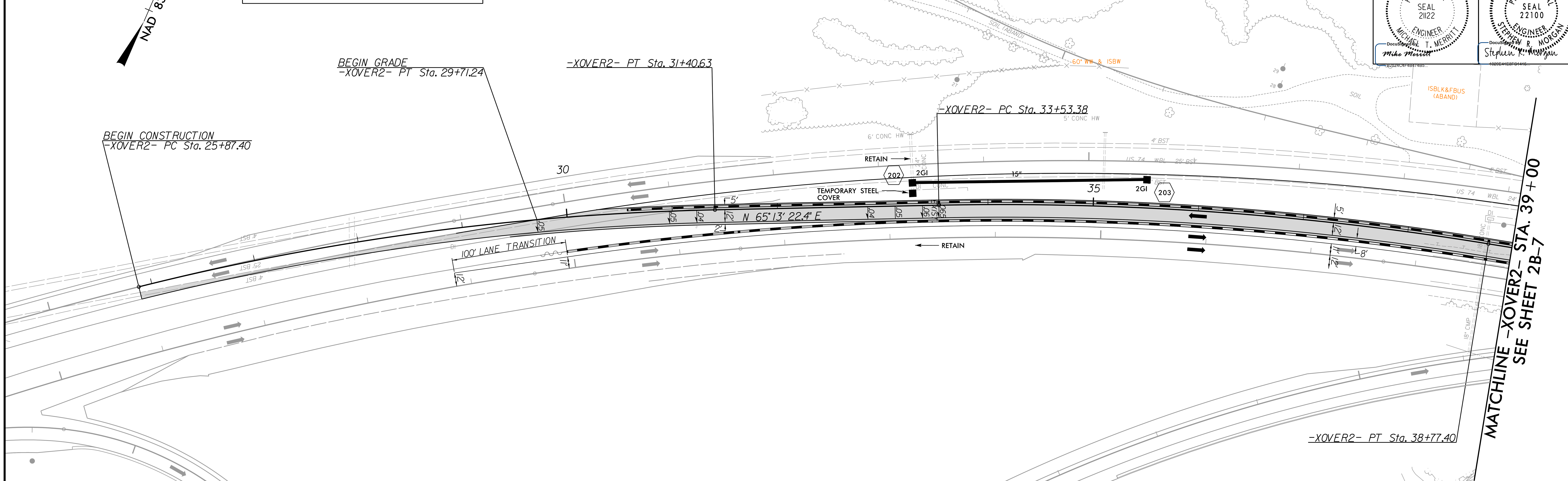
7/26/2019
R:\3421a_Eng\Proj\r-3421a_rdy_psh_2B-5.dgn
default

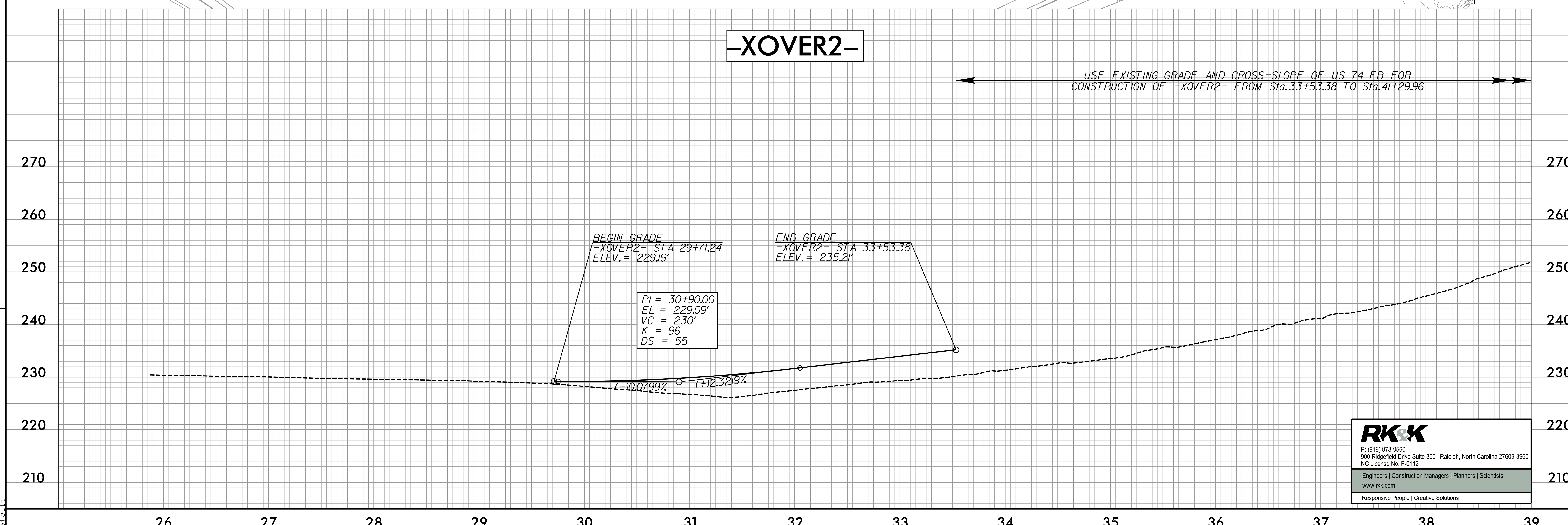
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2B-6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
8/6/2021 NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT — DocuSigned by: Mike Merritt B2524C4F4B474B5...	8/6/2021 NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN — DocuSigned by: Stephen R. Morgan 1029E41E3FC1415...

-XOVER2-

-XOVER2-	
PI Sta 28+65.18	PI Sta 36+16.11
△ = 12° 49' 59.1" (RT)	△ = 10° 24' 38.4" (RT)
D = 2° 19' 10.8"	D = 1° 59' 12.0"
L = 553.23'	L = 524.02'
T = 277.78'	T = 262.74'
R = 2,470.00'	R = 2,884.00'





RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

REVISIONS
DRAINAGE REVISION: ELIMINATED DRAINAGE SYSTEM BETWEEN STRUCTURES 204 TO 205. JRGO 08/09/2021

8/17/99
8/6/2021
R:\Roadway\Proj\r3421a_rdy_psh_2B-6.dgn

8/17/99

–XOVER2–

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2B-7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 21122 ENGINEER MICHAEL T. MERRITT	NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN
Mike Merritt 7/27/2019	Stephen Morgan 8/26/2019

–XOVER2–	
PI Sta 43+44.73	PI Sta 48+97.24
△ = 5° 22' 10.2" (LT)	△ = 5° 24' 50.2" (RT)
D = 1° 15' 03.6"	D = 0° 48' 04.8"
L = 429.22'	L = 675.61'
T = 214.77'	T = 338.06'
R = 4,580.00'	R = 7,150.00'

MATCHLINE –XOVER2– STA. 39+00 SEE SHEET 2B-6

–XOVER2– PC Sta. 41+29.96

–XOVER2– PRC Sta. 45+59.18

END GRADE
–XOVER2– PT Sta. 48+05.00

END CONSTRUCTION
–XOVER2– PT Sta. 52+34.79

N 75° 38' 00.8" E

REMOVE EXISTING DI COLLAR AND EXTEND 18" RCP w/ 6LF 18"

206 2GI

207

208 RETAIN

2GI

NAD 83

PROP WW FENCE

END WW FENCE

BEGIN WW FENCE

BLK PUMP HOUSE

CONC ROCK DAM

W/L

MTL GATE

SOIL

60" WW&2SBW

72" CHL&3SBW

5' CONC WW

9' CONC WW

17" CONC HW

2-6' X 6' CONC

US 74 WBL 24' BST

US 74 EBL 22' BST

4' BST

27.0'

8" CMP

15" CMP

30" CONC

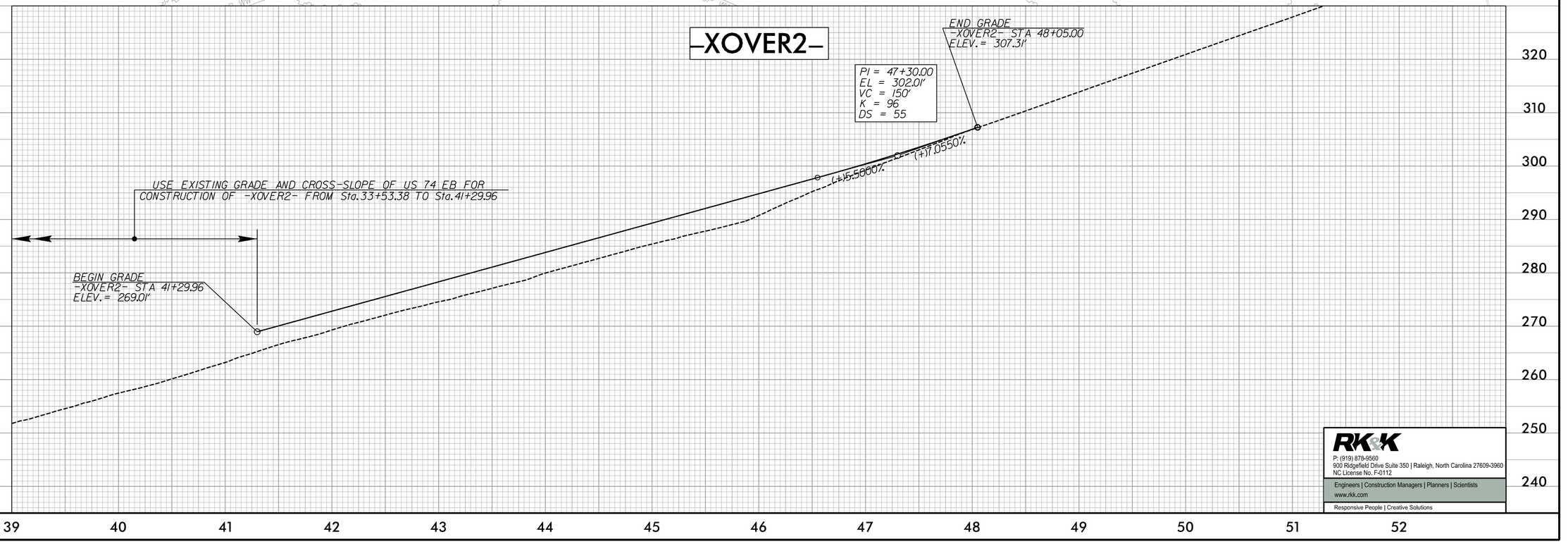
15" CONC

DI

CONC

MTL

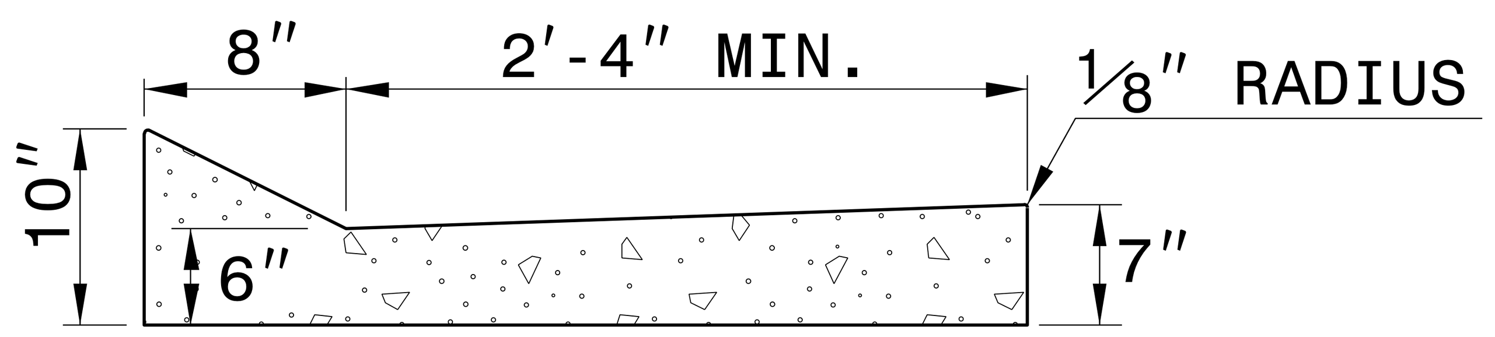
WW FENCE



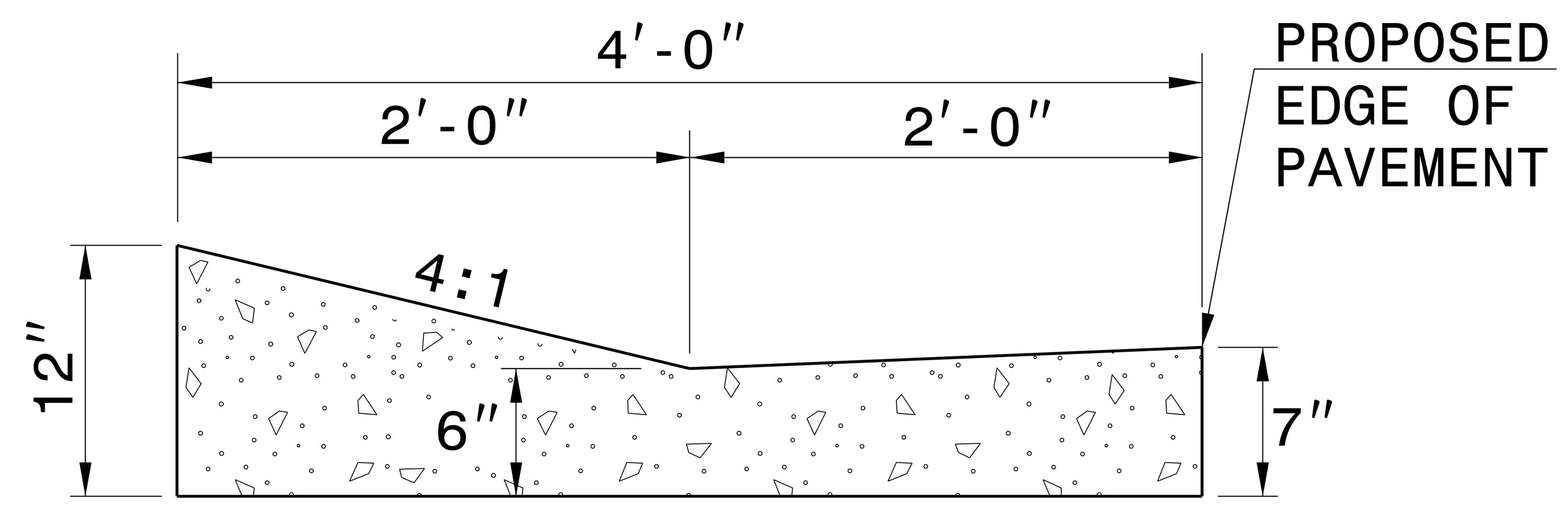
RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

7/26/2019
R:\Roadway\Proj\r3421a_rdy_psh_2B-7.dgn
default

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2C-1



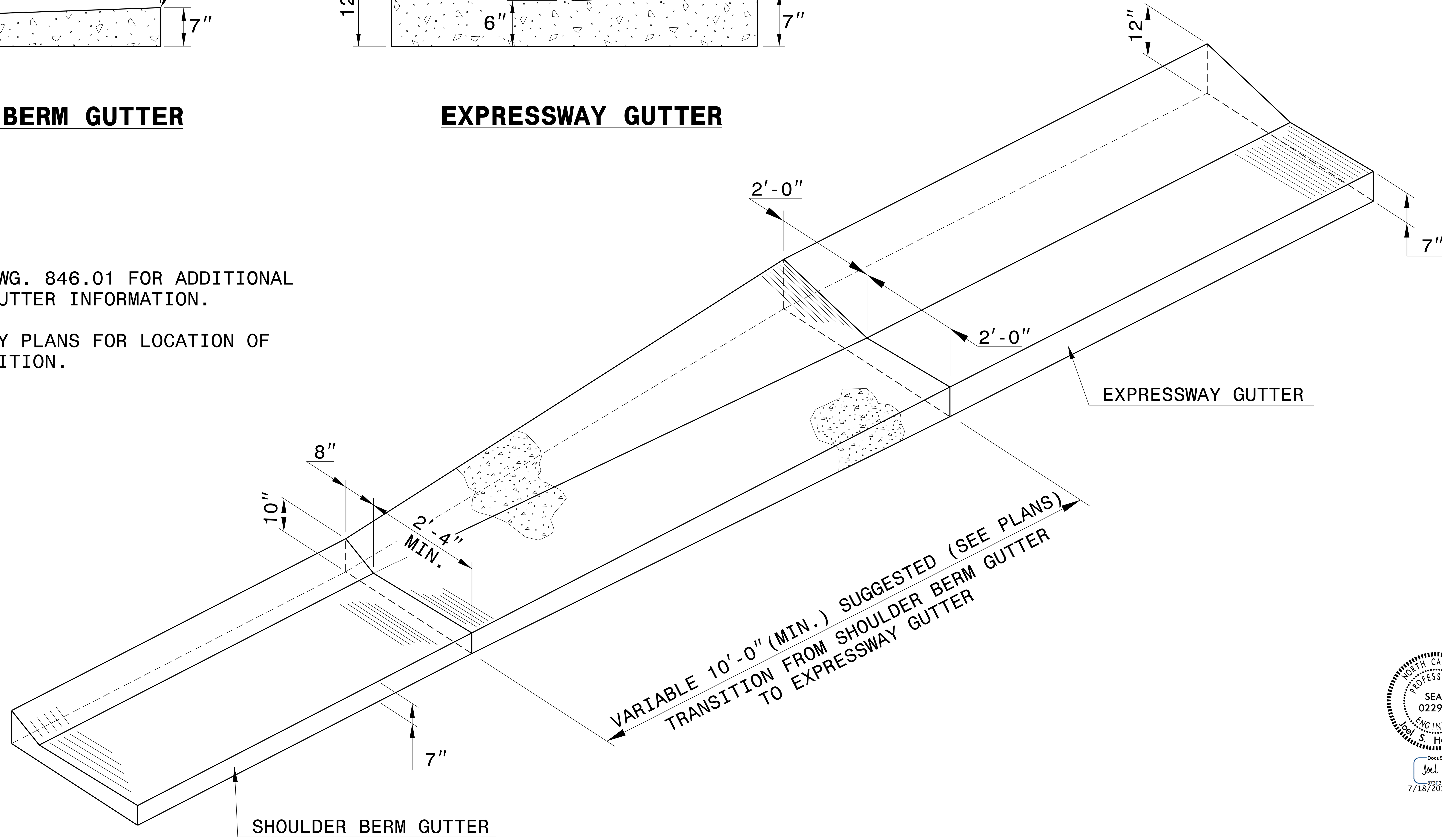
SHOULDER BERM GUTTER



EXPRESSWAY GUTTER

NOTE: SEE STD. DWG. 846.01 FOR ADDITIONAL CURB AND GUTTER INFORMATION.

SEE ROADWAY PLANS FOR LOCATION OF CURB TRANSITION.



ISOMETRIC VIEW OF TRANSITION

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

DocuSigned by: Joel S. Howerton
7/18/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DETAIL OF SHOULDER BERM GUTTER TO EXPRESSWAY GUTTER TRANSITION SECTION

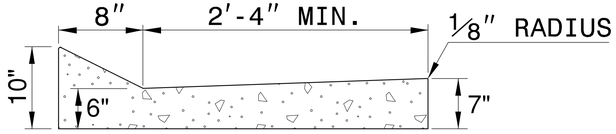
ORIGINAL BY: T.S.Spell DATE: 8-13-02
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: w:usr/details/stand/cgtransit.dgn

5/14/99

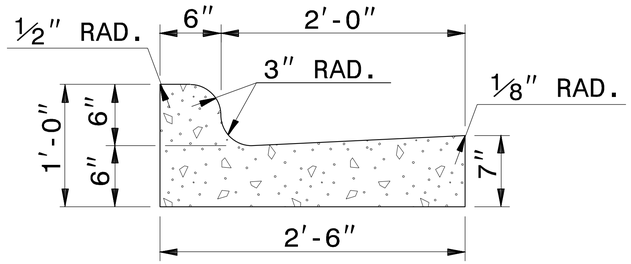
$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

5/14/99

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

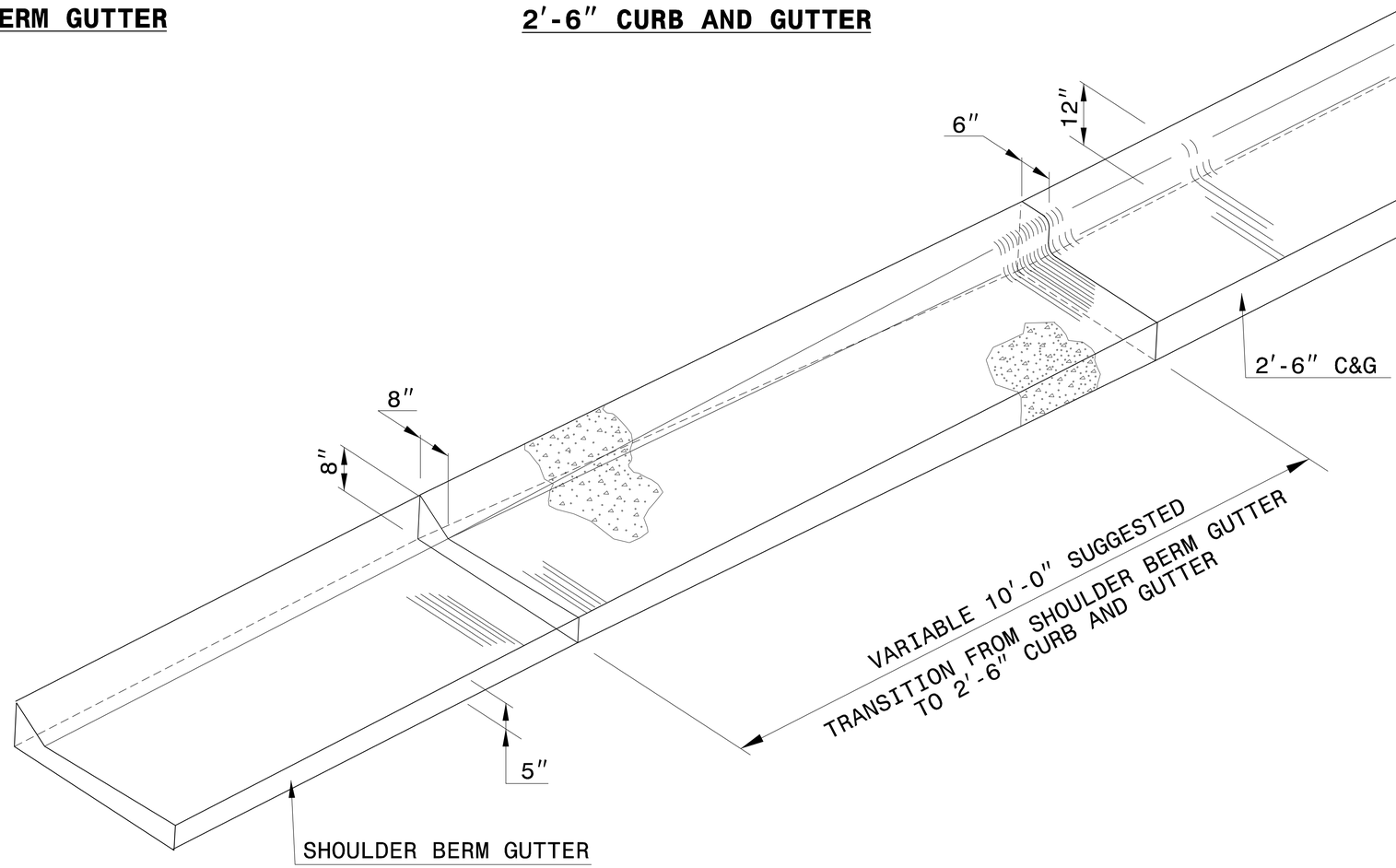


SHOULDER BERM GUTTER



2'-6" CURB AND GUTTER

*NOTE: SEE STD. DWG. 846.01 FOR GENERAL NOTES



ISOMETRIC VIEW OF TRANSITION

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

DocuSigned by: Joel S. Howerton 873E3D17DCDC45F...
7/18/2019

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

DETAIL OF SHOULDER BERM GUTTER TO 2'-6" CURB & GUTTER TRANSITION SECTION

ORIGINAL BY: E.E. WARD DATE: 5-29-02
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: /usr/details/stand/cgtransit.dgn

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

DocuSign Envelope ID: CD0FF9A1-D93B-4E82-8585-4B12C771690E

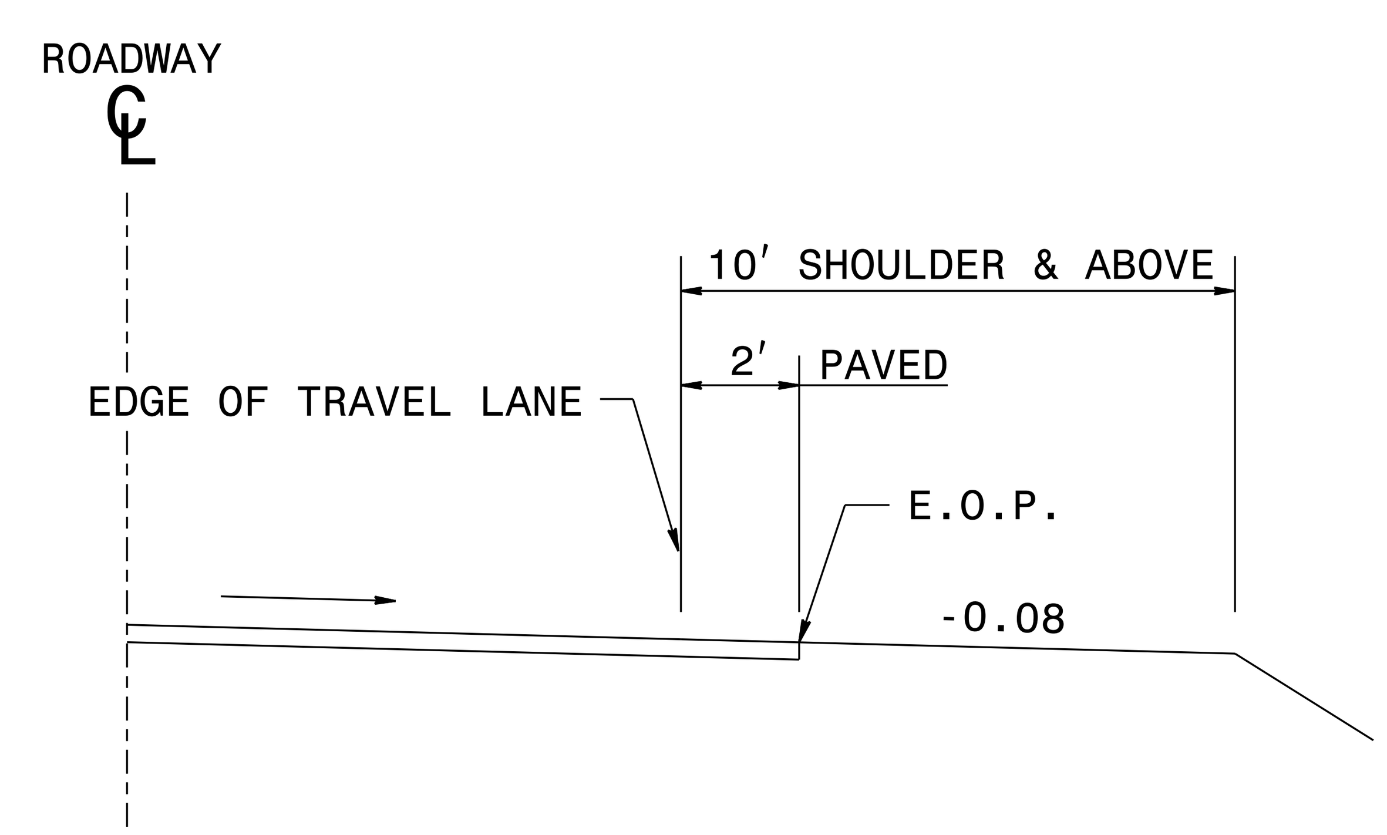
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2C-3

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

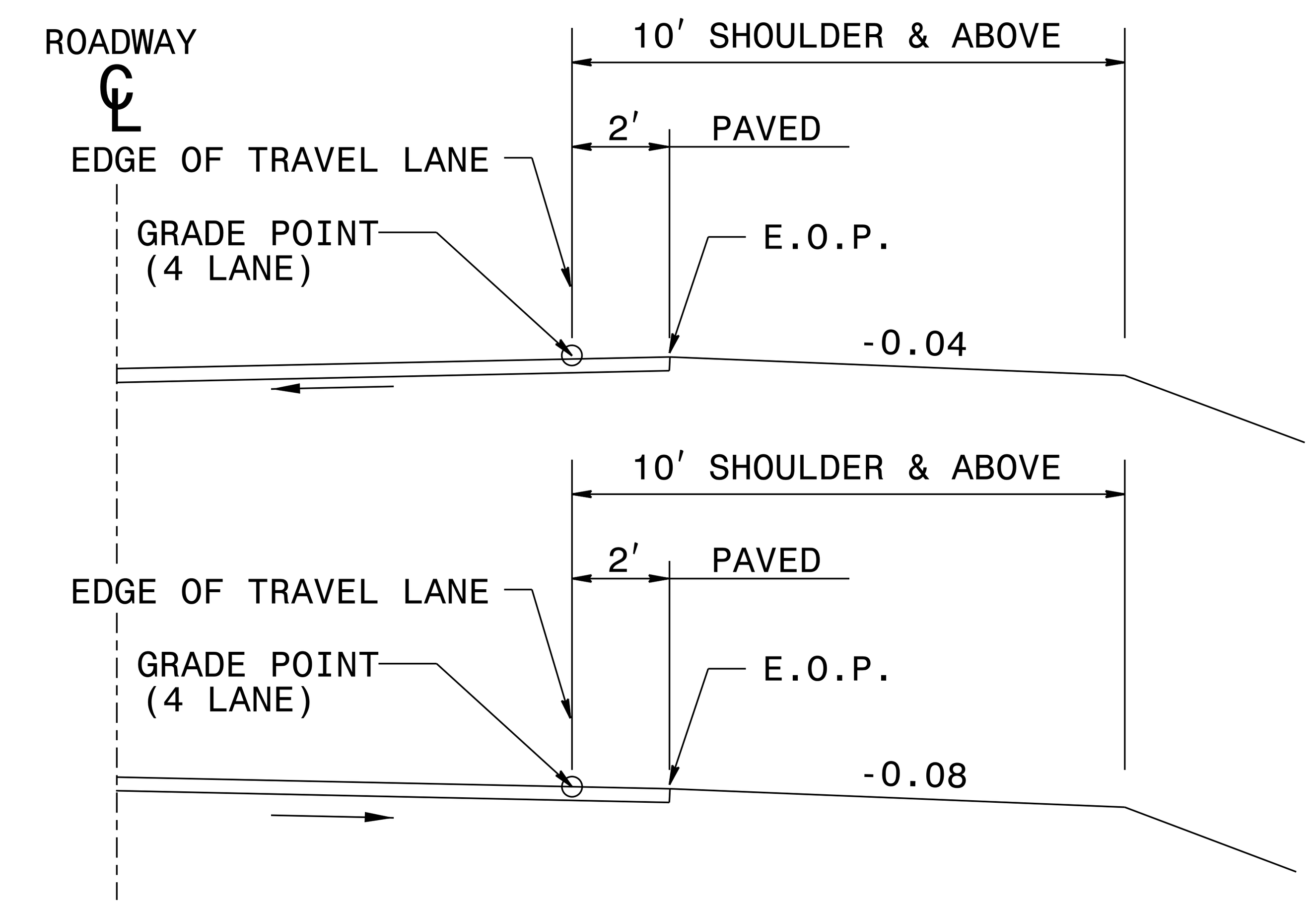
ENGLISH DETAIL DRAWING FOR
METHOD OF SHOULDER CONSTRUCTION
HIGH SIDE OF SUPERELEVATED CURVE
METHOD II (SHOULDERS 10' AND ABOVE)

SHEET 1 OF 4
560D02

NORMAL OUTSIDE SHOULDER SLOPES

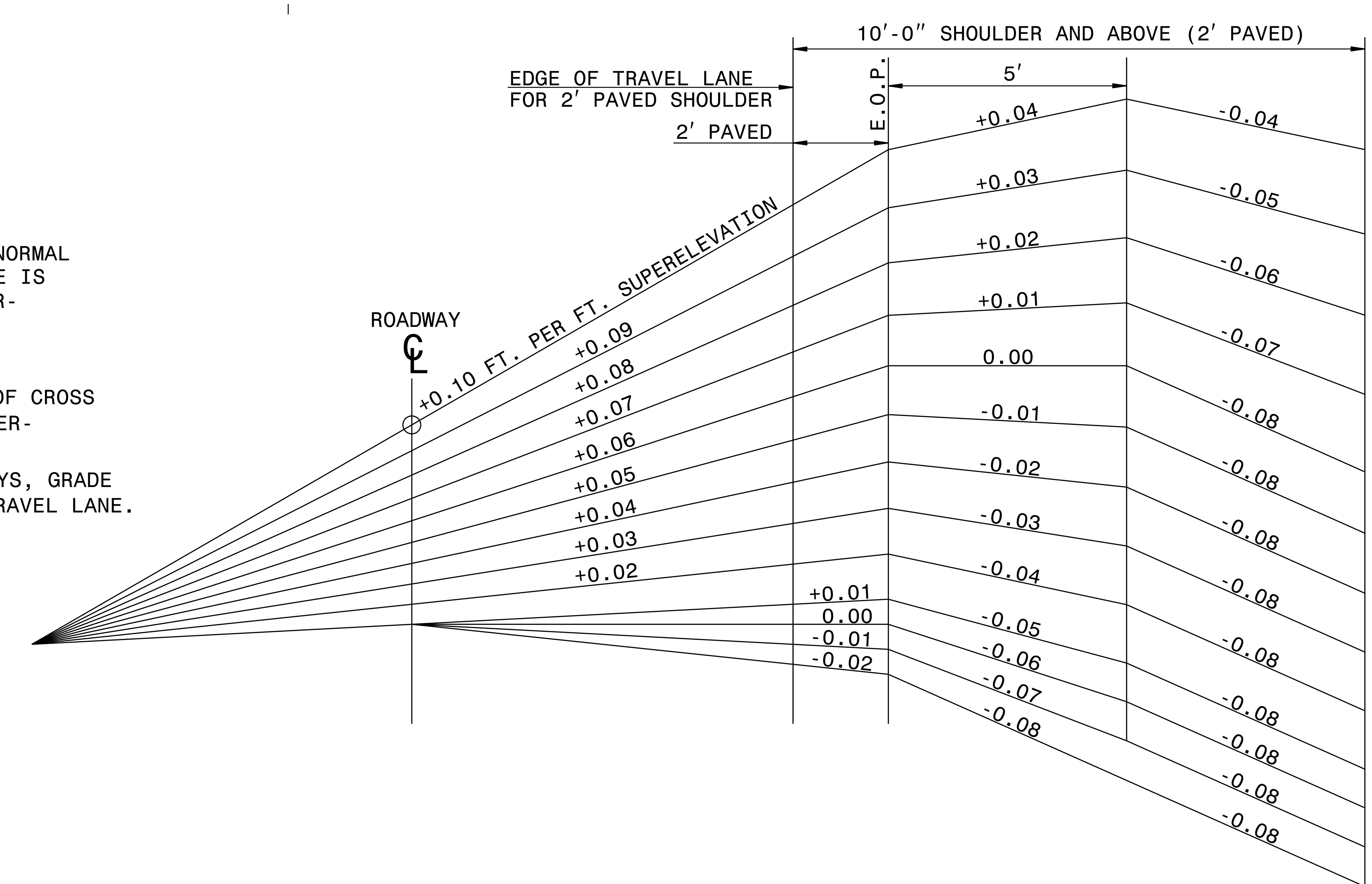


NORMAL MEDIAN SHOULDER SLOPES



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 INSIDE 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 II (SHOULDERS 10' AND ABOVE)

SHEET 1 OF 4
560D02

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

DocuSigned by: Joel S. Howerton
7/18/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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:
FILE SPEC.: ricward/stds/stdstodetails/30001/0300d01.dgn

30-MAY-2019 09:21
S:\Contracts\Contracts\Special Details\jhowerton\Standard Drawings\2002stds\english\div05\05600201.dgn
jhowerton AT CSD-292595

5/14/99

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2C-4

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

ENGLISH DETAIL DRAWING FOR

METHOD OF SHOULDER CONSTRUCTION

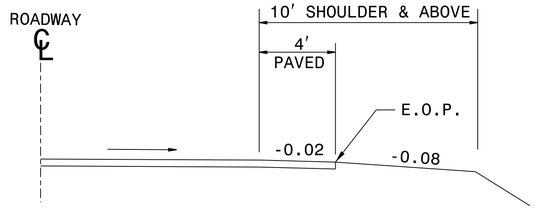
HIGH SIDE OF SUPERELEVATED CURVE

METHOD II (SHOULDERS 10′ AND ABOVE)

SHEET 2 OF 4

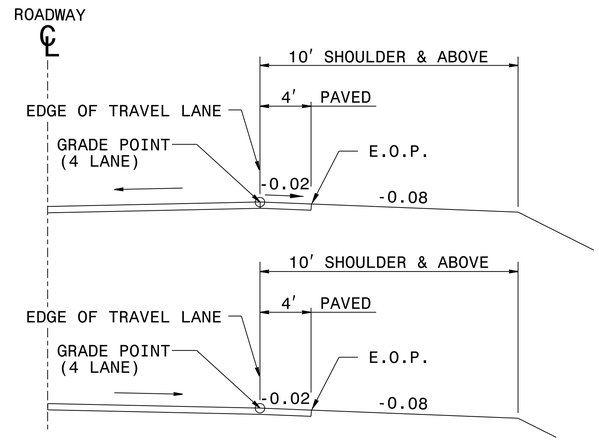
560D02

NORMAL OUTSIDE SHOULDER SLOPES

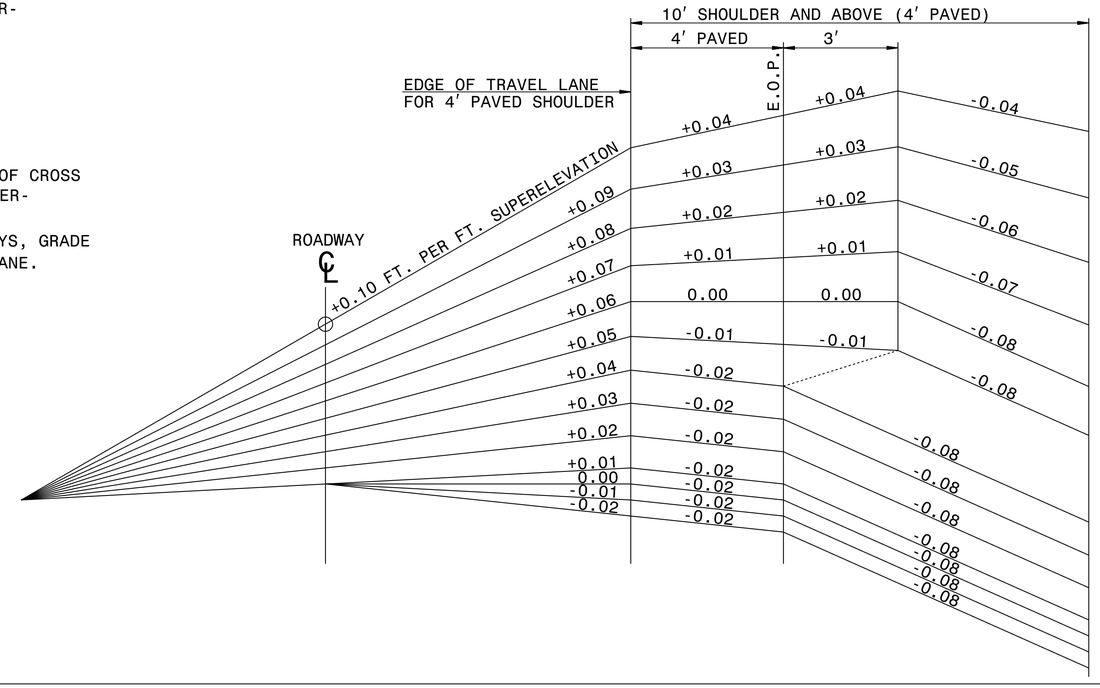


NOTE: ON LOW SIDE OF SUPERELEVATED PAVEMENT USE NORMAL SHOULDER SLOPE UNLESS NORMAL SHOULDER SLOPE IS FLATTER THAN SUPERELEVATION, THEN USE SUPER-ELEVATION RATE ON SHOULDER.

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
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 2 OF 4

560D02

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

DocuSigned by: Joel S. Howerton 873CFD7DCDC45F... 7/18/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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:
FILE SPEC: c:/pricward/stds/stdstodetails/30001/0300d01.dgn

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2C-5

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

ENGLISH DETAIL DRAWING FOR

METHOD OF SHOULDER CONSTRUCTION

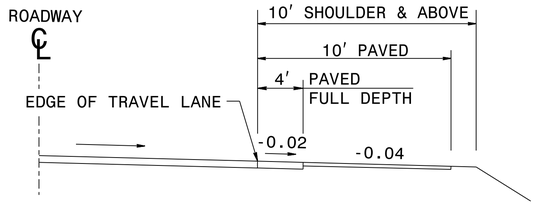
HIGH SIDE OF SUPERELEVATED CURVE

METHOD II (SHOULDERS 10′ AND ABOVE)

SHEET 3 OF 4

560D02

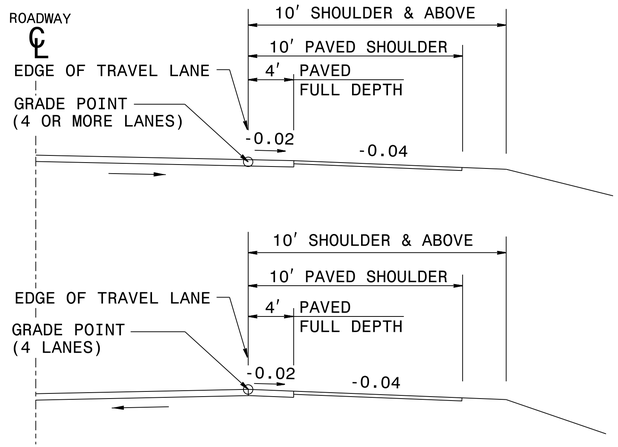
NORMAL OUTSIDE SHOULDER SLOPES

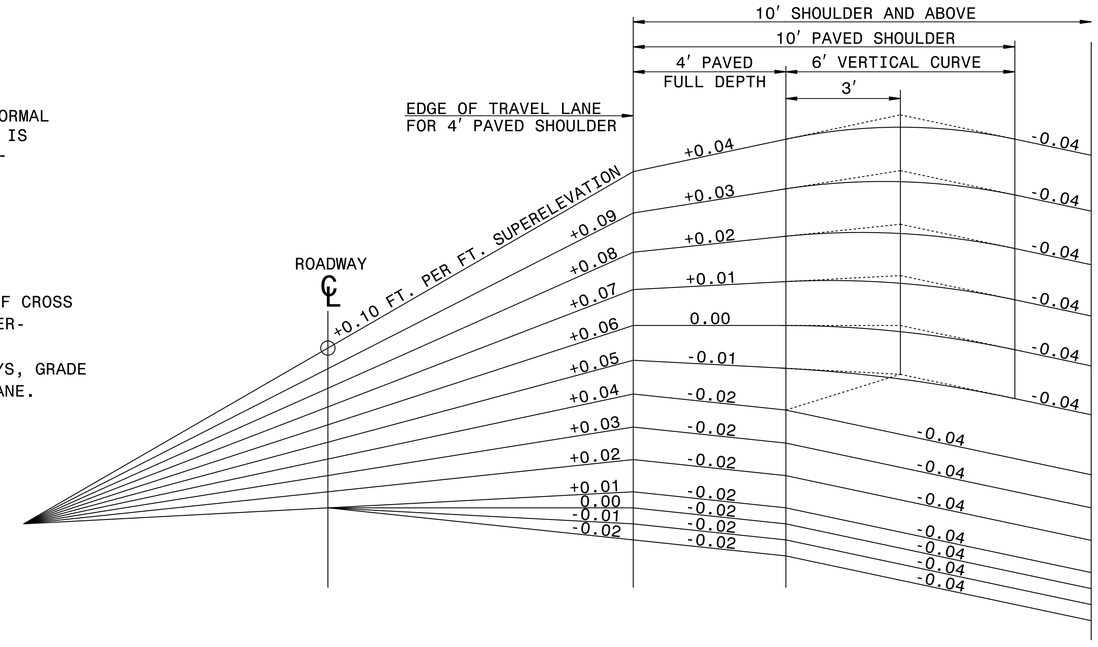


NOTE: ON LOW SIDE OF SUPERELEVATED PAVEMENT USE NORMAL SHOULDER SLOPE UNLESS NORMAL SHOULDER SLOPE IS FLATTER THAN SUPERELEVATION, THEN USE SUPER-ELEVATION RATE ON SHOULDER.

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.

NORMAL MEDIAN SHOULDER SLOPES





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 3 OF 4

560D02

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

DocuSigned by: Joel S. Howerton 873CBD1D7DCDC45F...
7/18/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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:
FILE SPEC: c:/pricward/stds/stdstodetails/30001/0300d01.dgn

30-MAY-2019 09:19
S:\Contracts\Contracts\Special Details\jhowerton\Standard Drawings\2002stds\english\dv\05\05600203.dgn
jhowerton
AT CSD-292595

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2C-6

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

ENGLISH DETAIL DRAWING FOR

METHOD OF SHOULDER CONSTRUCTION

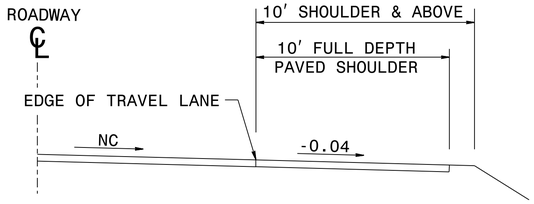
HIGH SIDE OF SUPERELEVATED CURVE

METHOD II (FULL DEPTH SHOULDERS 10′ AND ABOVE)

SHEET 4 OF 4

560D02

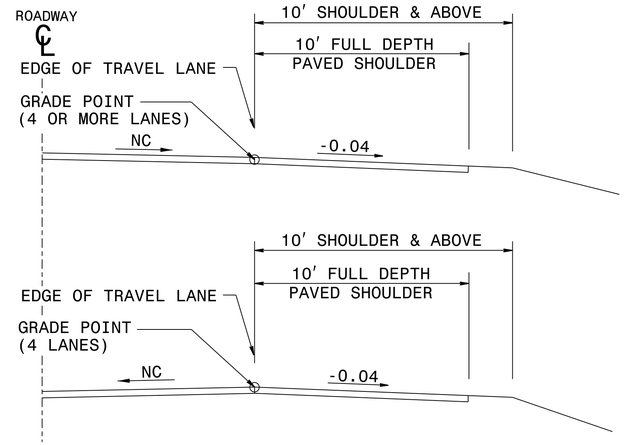
NORMAL OUTSIDE SHOULDER SLOPES

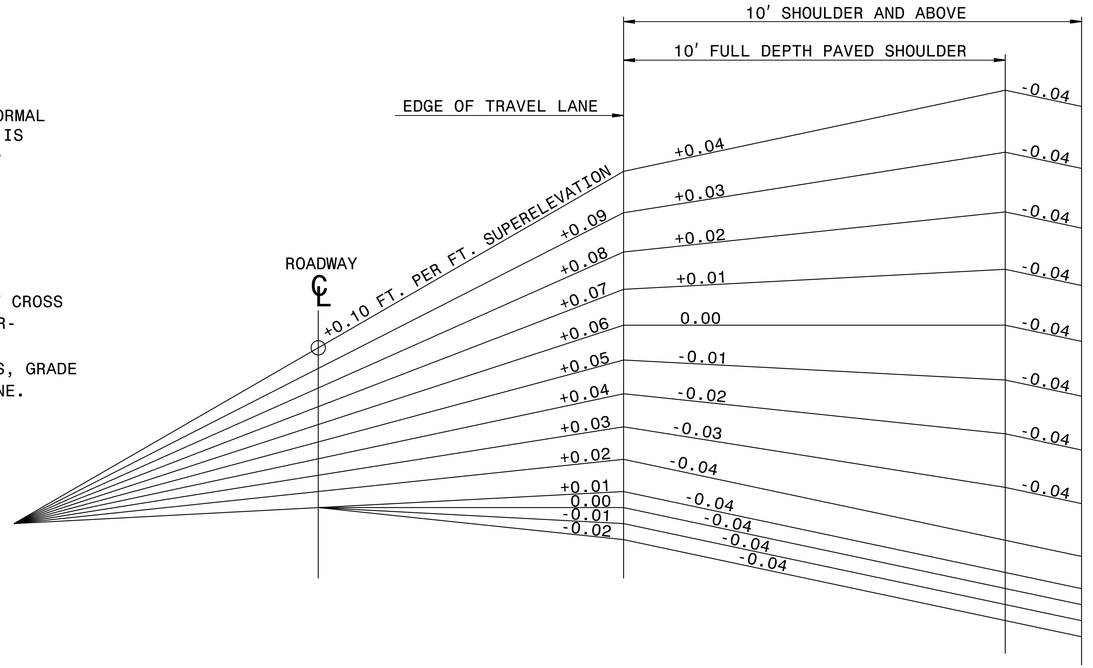


NOTE: ON LOW SIDE OF SUPERELEVATED PAVEMENT USE NORMAL SHOULDER SLOPE UNLESS NORMAL SHOULDER SLOPE IS FLATTER THAN SUPERELEVATION, THEN USE SUPER-ELEVATION RATE ON SHOULDER.

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.

NORMAL MEDIAN SHOULDER SLOPES





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 (FULL DEPTH SHOULDERS 10′ AND ABOVE)

SHEET 4 OF 4

560D02

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

DocuSigned by: Joel S. Howerton 7/18/2019

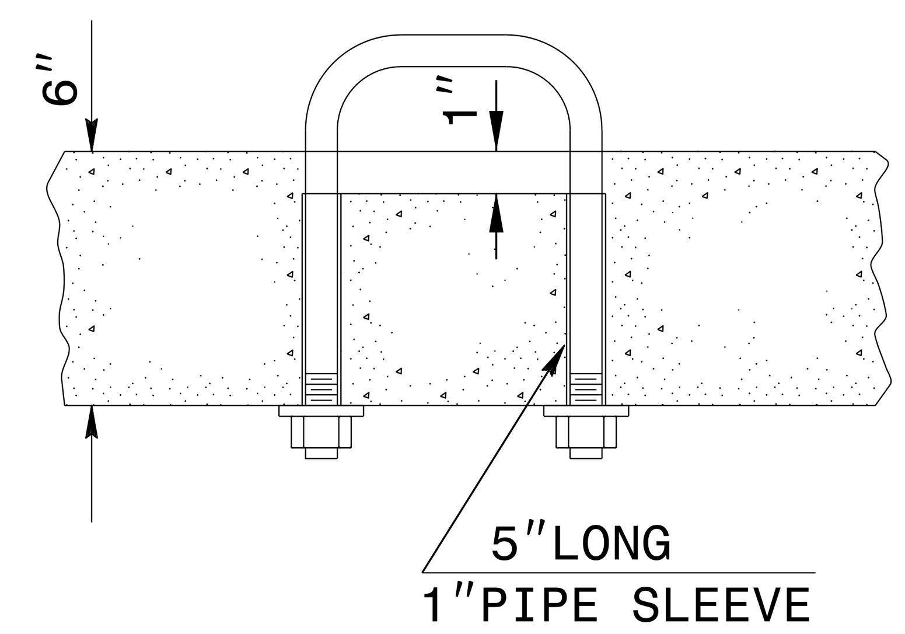
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

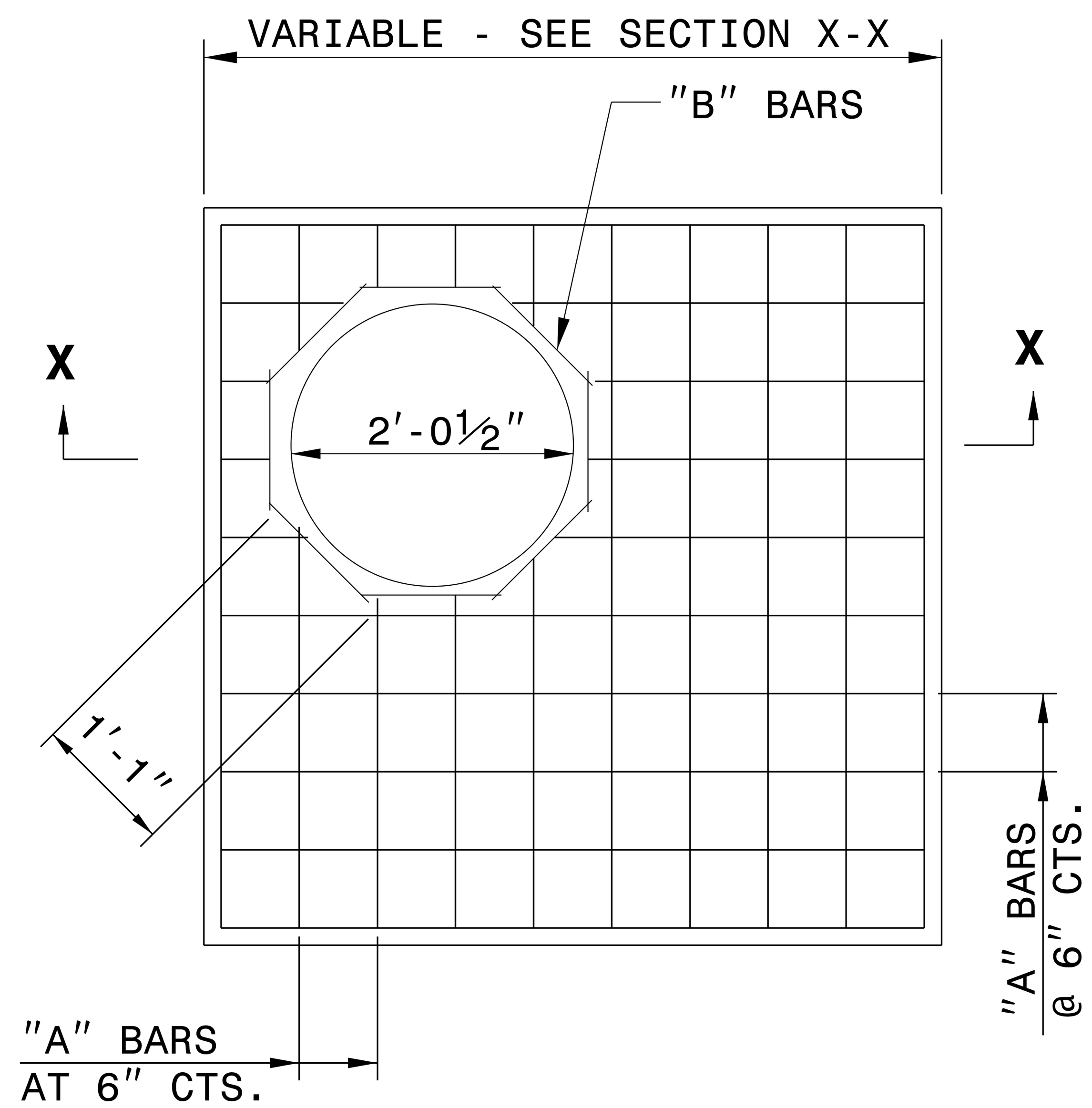
SEE PLATE FOR TITLE

ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC'd: pricward/stds/stdstodetails/30001/0300d01.dgn

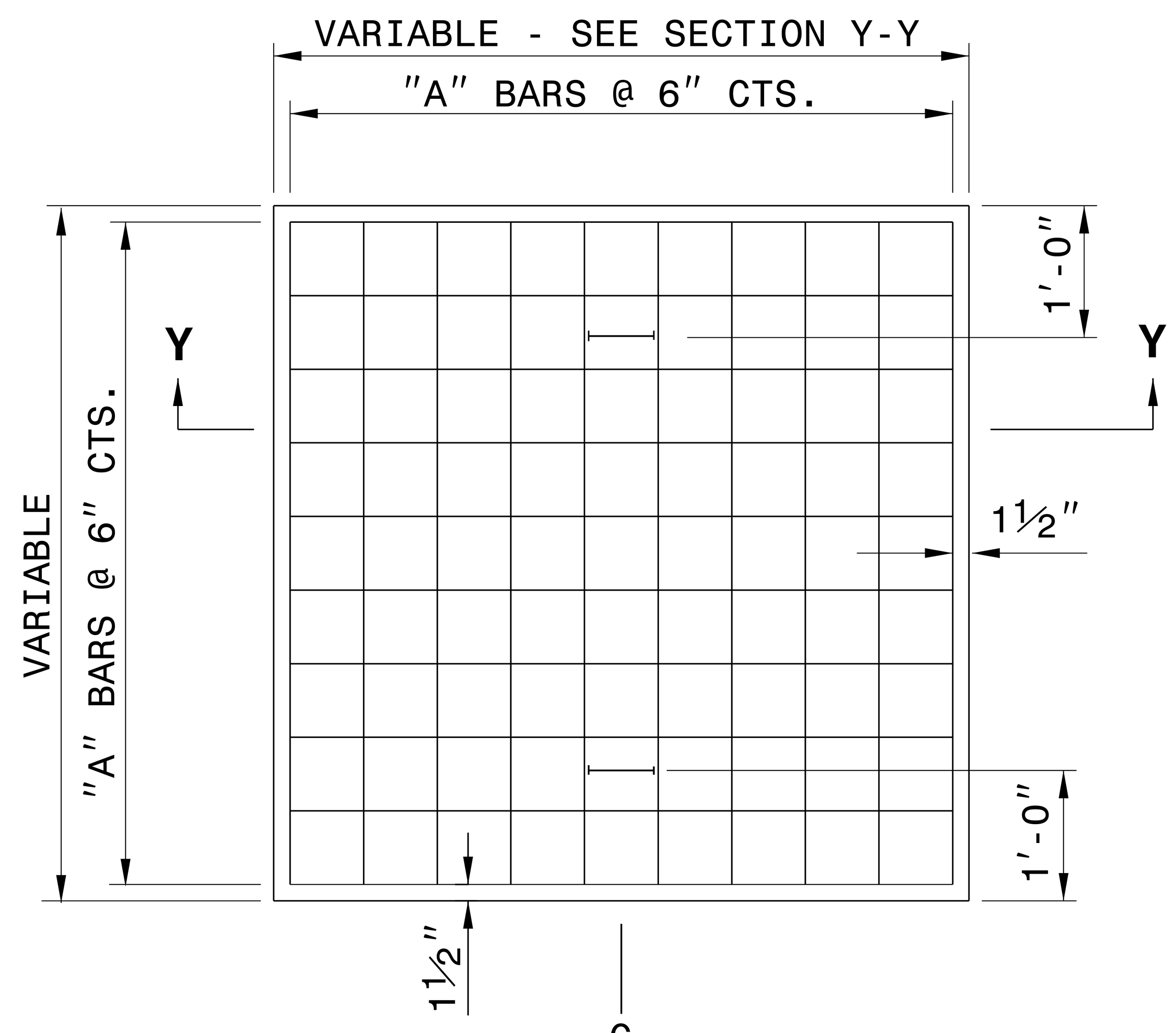
30-MAY-2019 09:17
S:\Contracts\Contracts\Special Details\jhowerton\Standard Drawings\2002stds\english\div05\056002d4.dgn
jhowerton AT CSD-232595



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.

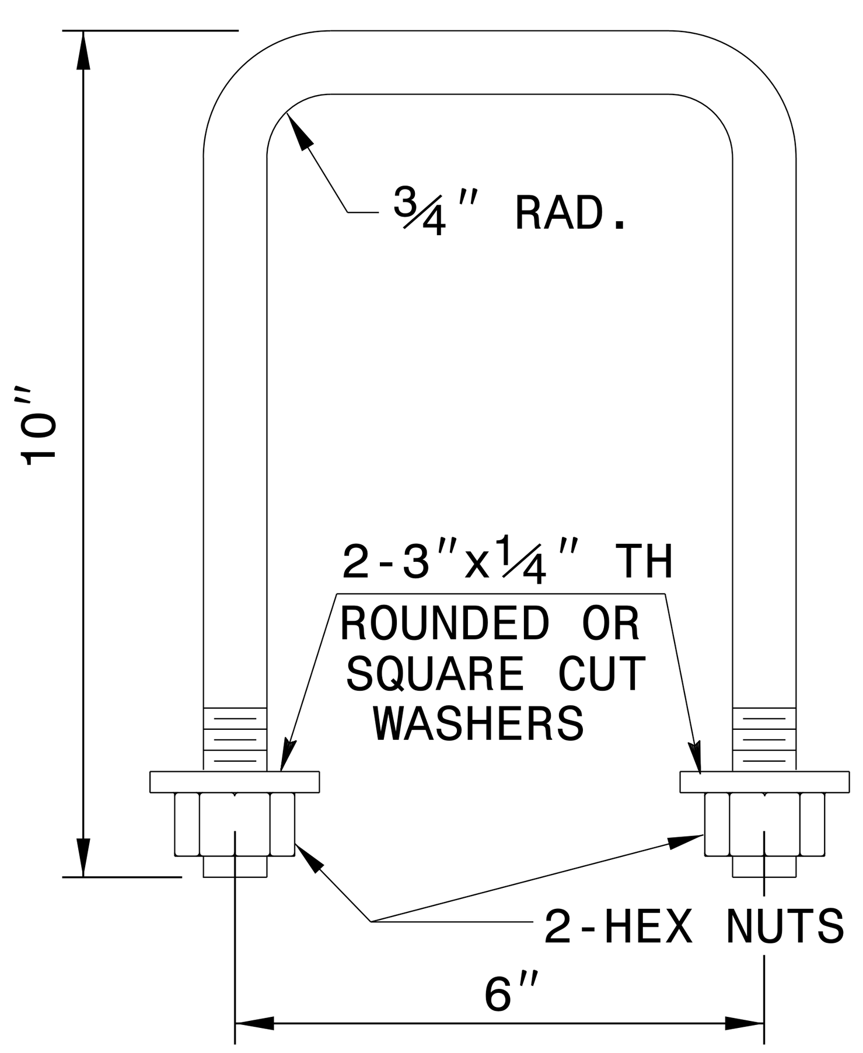
DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.

BILL OF MATERIALS

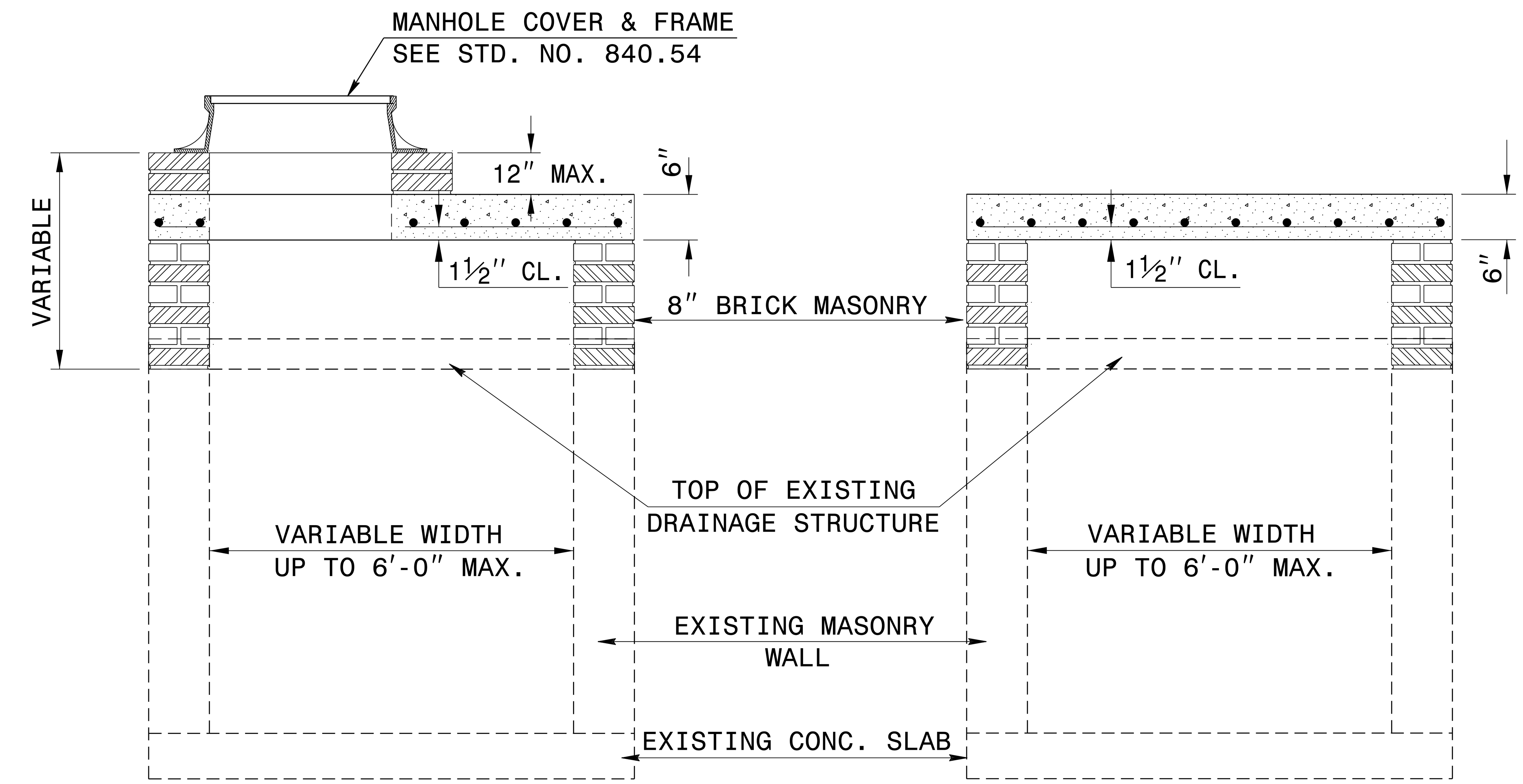
REINFORCING STEEL				
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4'-6"	60.12
B	#4	8	1'-1"	5.79
TOTAL				65.91 *

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 Joel S. Howerton

DocuSigned by: Joel S. Howerton
873F3D17DCDC45F...
7/18/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

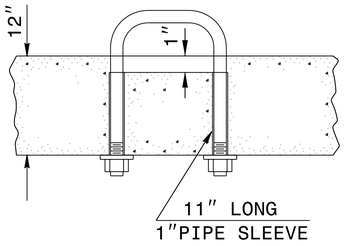
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

DETAIL TO CONVERT EXISTING DI, CB, OTCB or GI TO JUNCTION BOX (MANHOLE OPTIONAL)

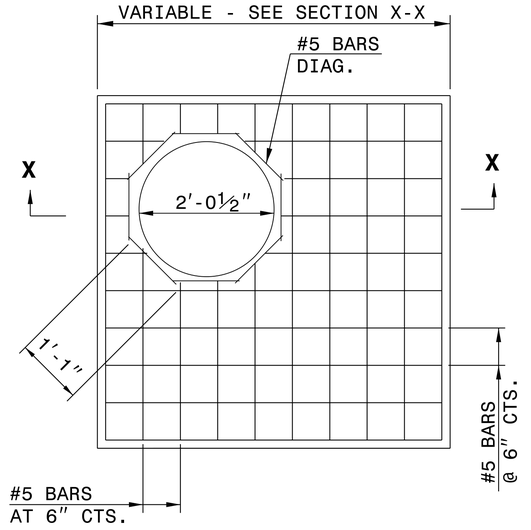
ORIGINAL BY: T.S.S. DATE: NOV.1997
MODIFIED BY: T.S.S. DATE: FEB.2000
CHECKED BY: DATE:
FILE SPEC.: ds174:/usr/details/stand/boxtojbe.dgn

5/14/99

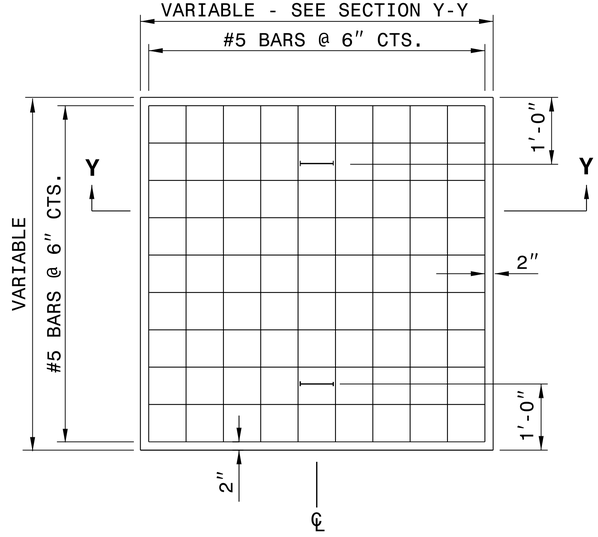
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2C-8



PARTIAL SECTION



PLAN



PLAN

GENERAL NOTES:

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

FIELD VERIFY THE DIMENSIONS FOR THE EXISTING BOXES.

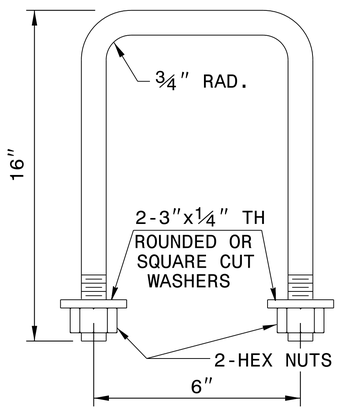
BILL OF MATERIALS

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

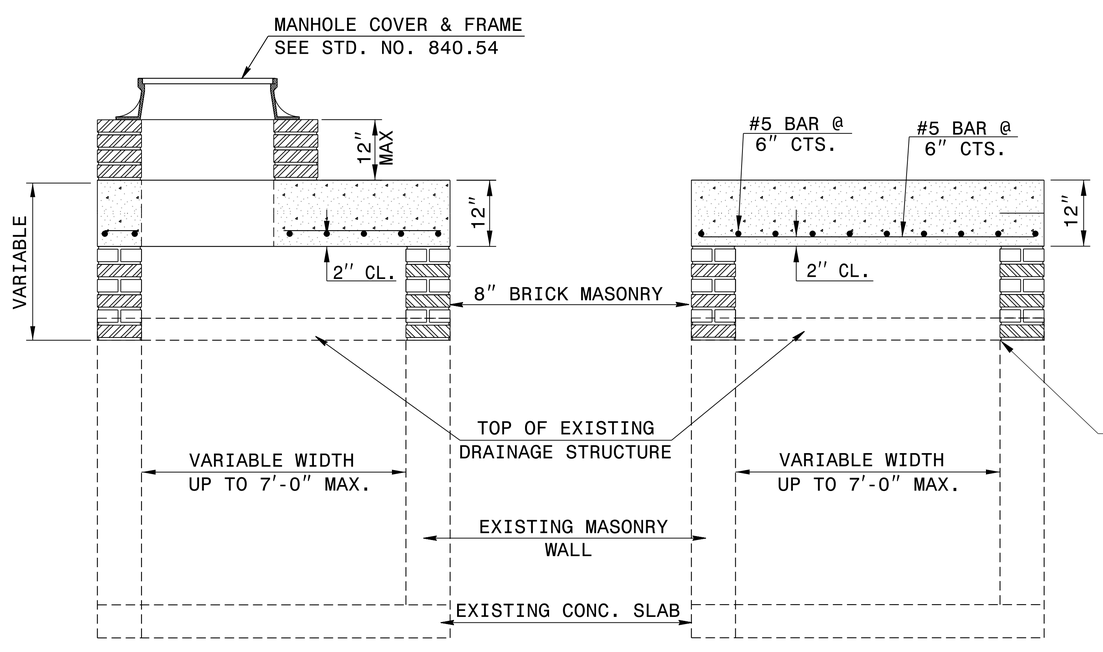
MANHOLE OPTION QUANTITIES			
SIZE	QTY.	LENGTH	REINF. STEEL LBS.
#5 DIAG.	8	1'-1"	9.04

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 Joel S. Howerton

DocuSigned by: Joel S. Howerton 973F2D12DCDC45F... 7/18/2019

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:
FILE SPEC.: w:ericward/usr/details/stand/boxtotbjbe.dgn

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

05-MAR-2018 08:W
S:\Contracts\Contracts\Special Details\ericward\usr\details\stand\boxtotbjbe.dgn
jhowerton AT CSD-292595

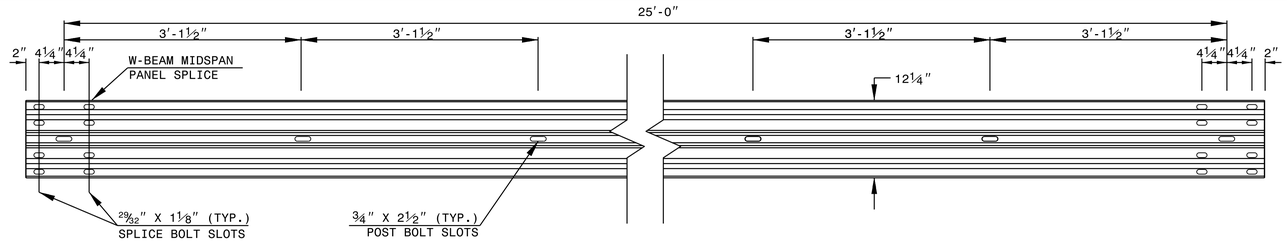
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2C-9

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

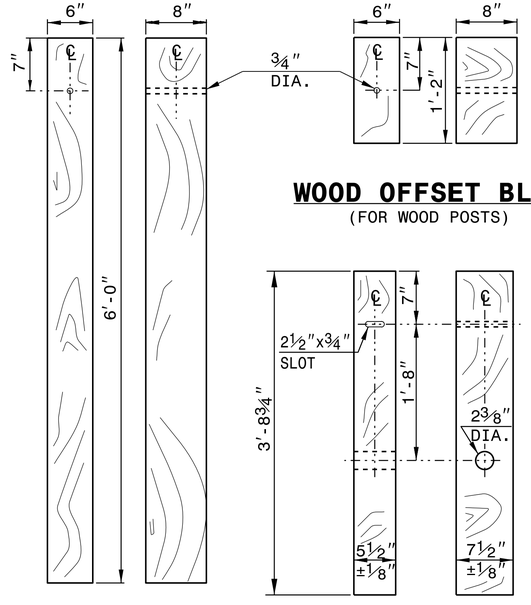
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02



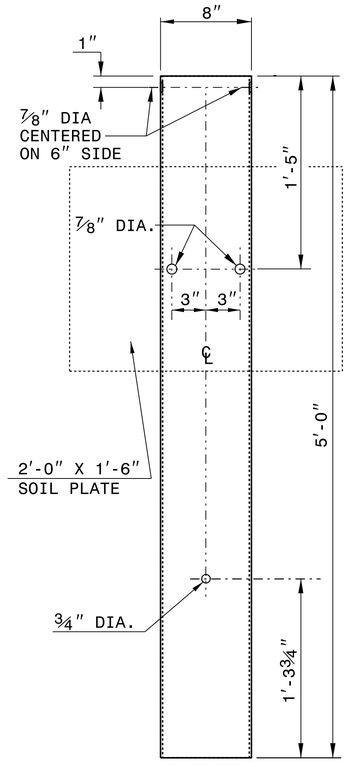
STANDARD W-BEAM GUARDRAIL



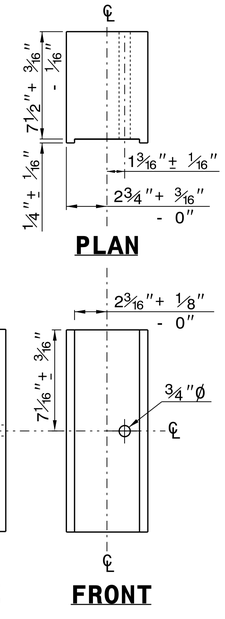
WOOD OFFSET BLOCK
(FOR WOOD POSTS)

STANDARD LINE POST

SHORT WOOD BREAKAWAY POST



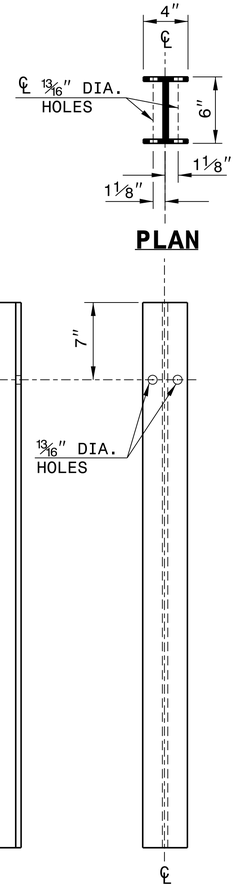
STEEL TUBE
TS 6"x8"x0.1875"



PLAN

SIDE **FRONT**

ROUTED OFFSET BLOCK



PLAN

SIDE **FRONT**

"W6" STEEL POST

SYSTEM PARTS

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON

DocuSigned by: Joel S. Howerton 97CE3D17DCDC45F... 7/18/2019

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

SEE TITLE BLOCK

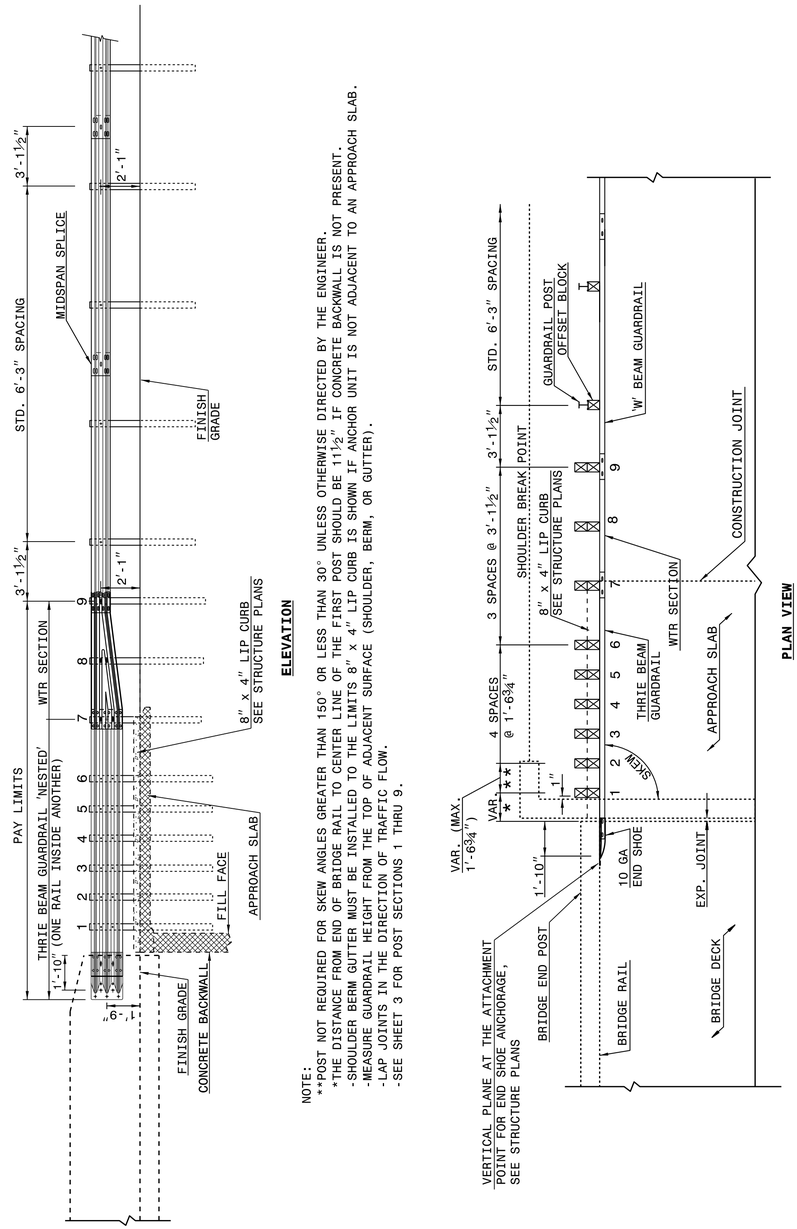
ORIGINAL BY: J.HOWERTON DATE: 3-7-2018
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2C-10

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

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862D03



ELEVATION

PLAN VIEW

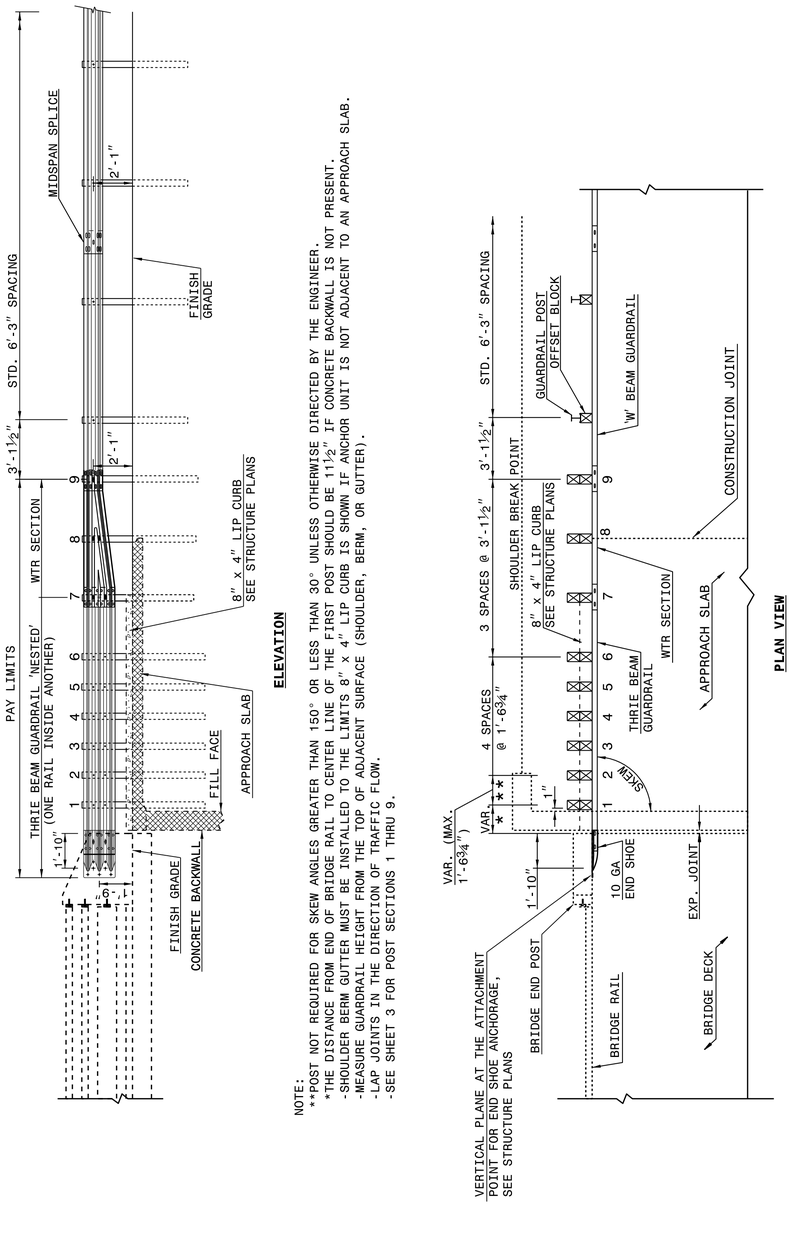
NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

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

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03



ELEVATION

PLAN VIEW

NOTE:
**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.
-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.

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

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

ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

DocuSigned by:
Joel S. Howerton
87F3D17DCDC45F...
7/18/2019

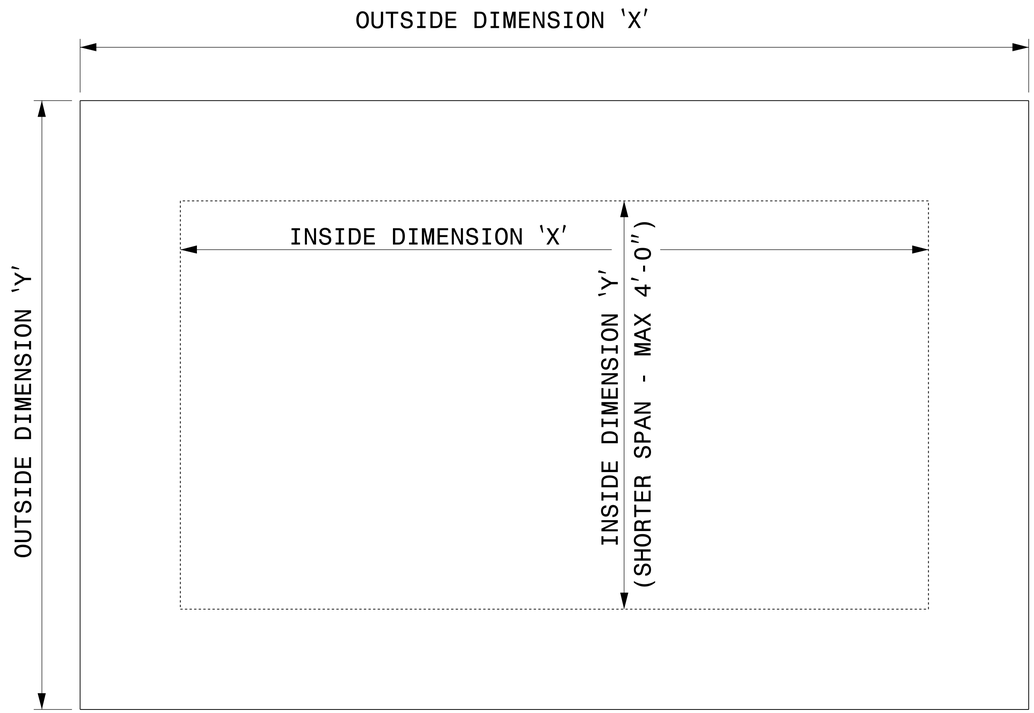
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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: _____
FILE SPEC.: _____

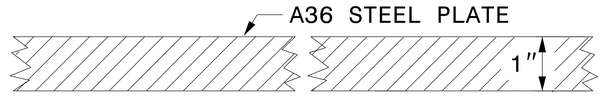
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2C-11



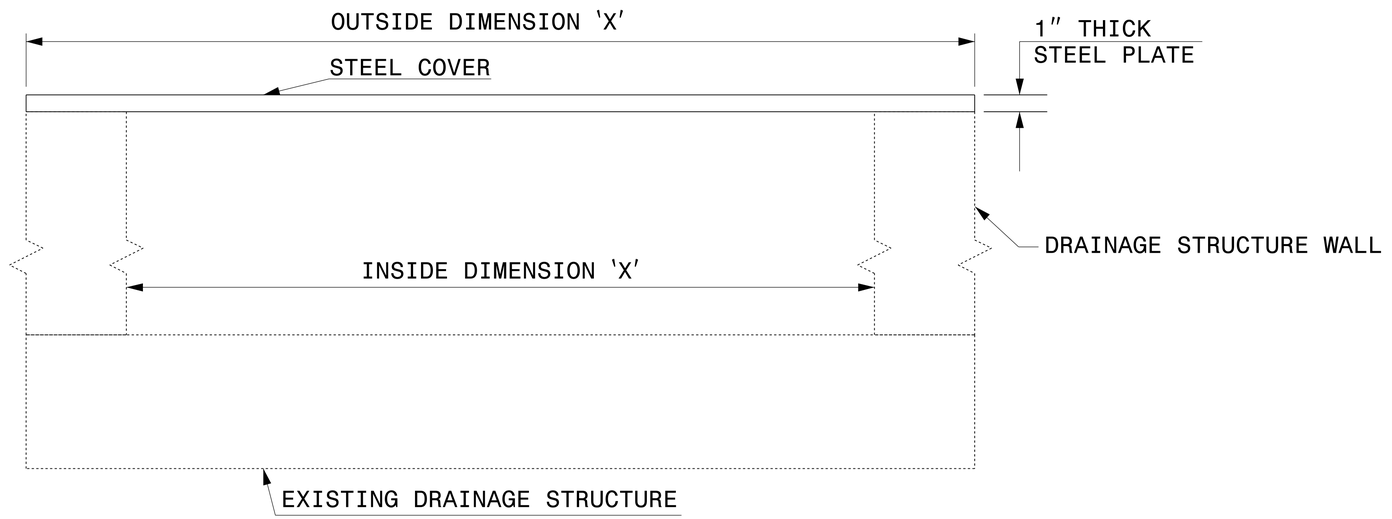
PLAN VIEWS

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

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER Joel S. Howerton

DocuSigned by: Joel S. Howerton 8/7/2019 873F3D17DCDC45F...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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: _____ DATE: _____
FILE SPEC.: eric:/usr/details/metric/stand/stlcvr2.dgn

$$$$SYSTIME$$$$
$$$$TIME$$$$
$$$$USERNAME$$$$

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2D-1

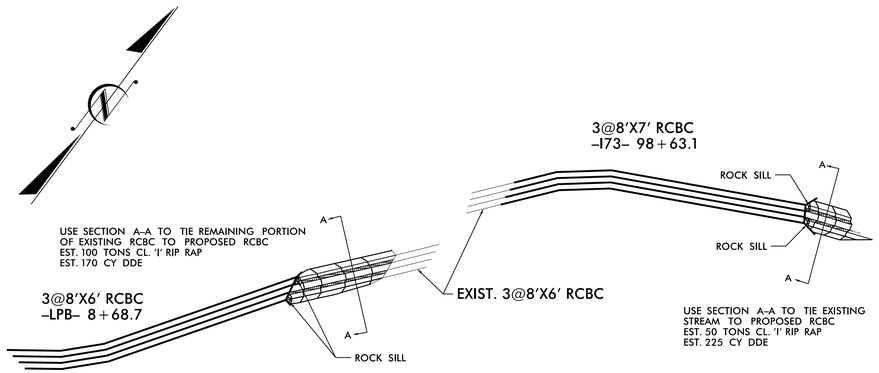
ROADWAY DESIGN ENGINEER

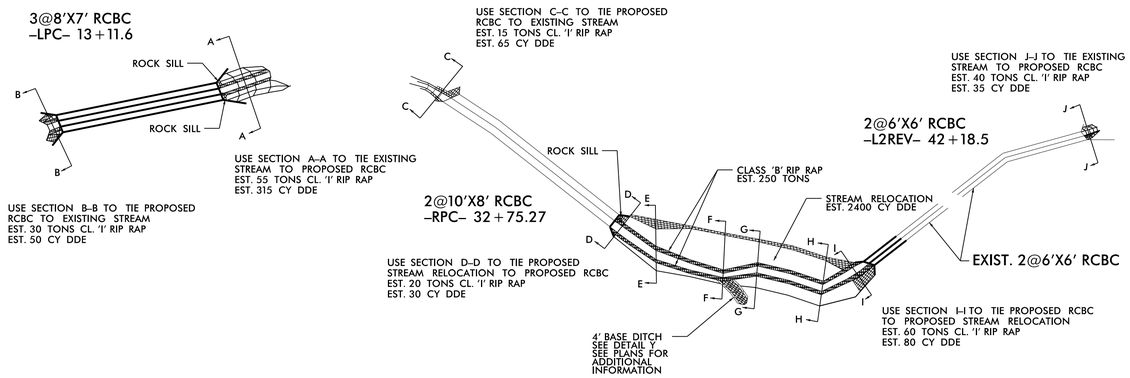
Docusigned by: Mike Merritt 8/6/2019

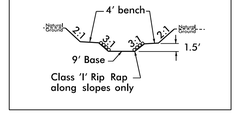
HYDRAULICS ENGINEER

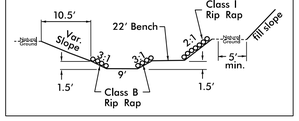
Docusigned by: Stephen Morgan 8/6/2019

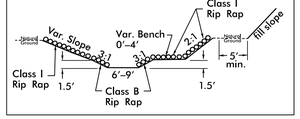
STREAM RELOCATION DETAILS

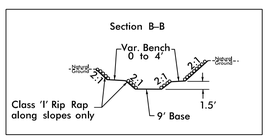


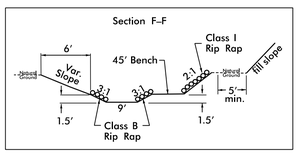


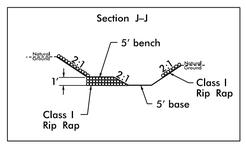


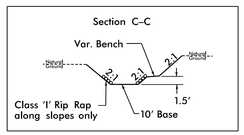


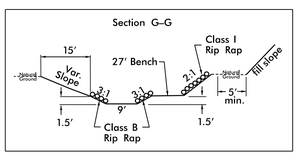


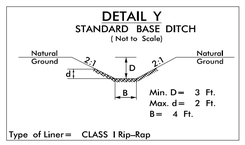


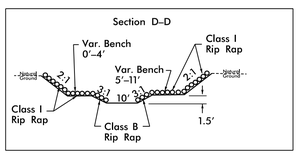


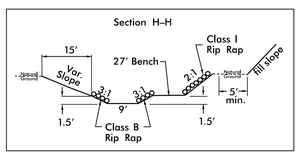










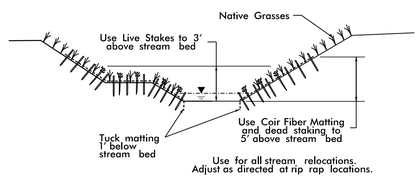


Section Distances And Elevations Along CL Stream Relocation From Outlet Of 2@6'x6' RCBC

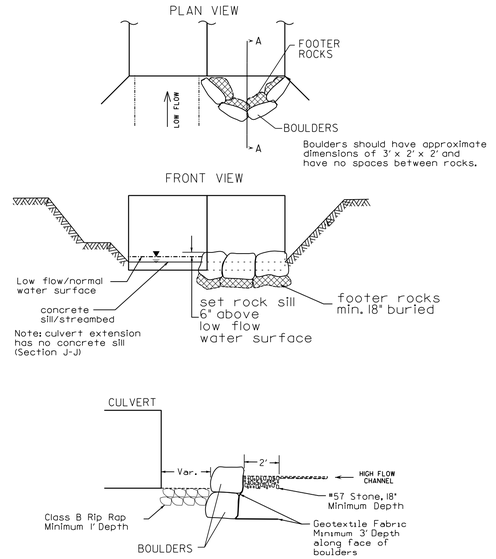
Section	Distance From Outlet	Centerline Elevation
H–H	69' +/–	215.4' +/–
G–G	158' +/–	214.5' +/–
F–F	204' +/–	214.3' +/–
E–E	297' +/–	213.3' +/–

All distances and elevations listed are approximate.

Matting Detail and Revegetation Detail



ROCK SILL AT CULVERT ENTRANCE



QUANTITIES PER EACH ROCK SILL (APPROX.)

Est. 30 Tons Boulders
Est. 10 SY Geotextile
Est. 1 Ton Class B Rip Rap
Est. 3 Tons #57 Stone

NOTES:
THE TYPICAL BANKFULL DEPTH FOR THE RELOCATED STREAM IS 1.5'.
BENCH WIDTHS MAY VARY FROM DIMENSIONS SHOWN DEPENDING ON FIELD CONDITIONS, THE INTENT IS TO PROVIDE FLOODPLAIN TO THE MAXIMUM EXTENT POSSIBLE BETWEEN SECTIONS D–D AND I–I.
OTHER DIMENSIONS, ELEVATIONS AND GEOMETRY MAY VARY DEPENDING ON FIELD CONDITIONS AND WITH THE ENGINEER'S APPROVAL.
ADDITIONAL INFORMATION MAY BE SHOWN ON THE PLAN SHEETS.

RK&K
P: (919) 878-9560
900 Ridgefield Drive Suite 350 | Raleigh, North Carolina 27609-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

8/5/2019
R:\Roadway\Projects\r-3421a-rdy_psh02D-1.dgn
default

PROJECT REFERENCE NO.	SHEET NO.
34542.1.1 (R-3421A)	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

DocuSigned by: Michael H. Stephens 8196315B3C7046C...

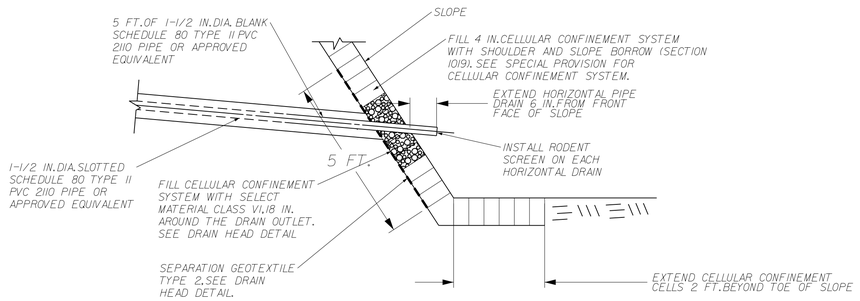
8/15/2019 SIGNATURE DATE

ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 023916 ENGINEER BRIAN D. KEANEY

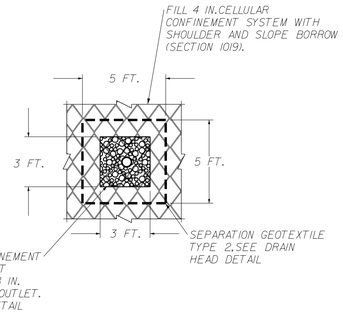
DocuSigned by: Brian D. Keaney 79CD97E4882C436...

8/15/2019 SIGNATURE DATE

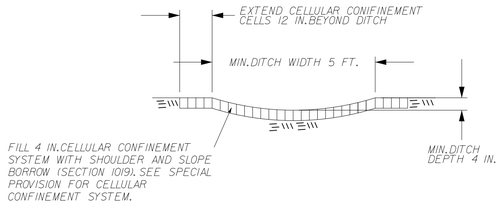


DETAIL OF HORIZONTAL DRAINS
N.T.S.

HORIZONTAL SLOPE DRAIN LOCATIONS			
ALIGNMENT	START STATION	END STATION	NUMBER OF DRAINS
-US74- RIGHT	60+00	67+00	70
-I73-	123+00	128+00	50
-US74- LEFT	61+00	70+00	90
CONTINGENCY (20%)			45
		TOTAL	255

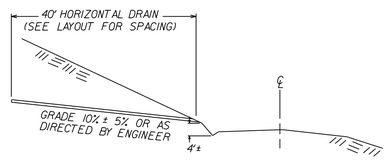


DRAIN HEAD DETAIL
N.T.S.

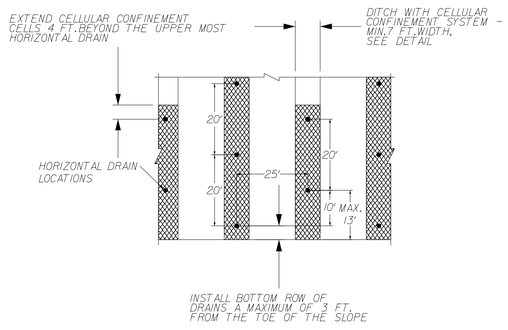


HORIZONTAL DRAIN DITCH DETAIL
N.T.S.

ESTIMATED QUANTITES	
HORIZONTAL DRAIN BOREHOLE	10,200 LF
1-1/2" SLOTTED PVC 2110 PIPE,TYPE II	8,925 LF
1-1/2" UNSLOTTED PVC 2110 PIPE,TYPE II	1,275 LF
4" CELLULAR CONFINEMENT SYSTEM	3,970 SY
GEOTEXTILE,TYPE II	710 SY
SELECT MATERIAL CLASS VI	28 CY



TYPICAL CROSS SECTION
N.T.S.



TYPICAL PLAN - HORIZONTAL DRAIN INSTALLATION LAYOUT
N.T.S.

ESTIMATED QUANTITES	
HORIZONTAL SLOPE DRAIN	255 EA
4" CELLULAR CONFINEMENT SYSTEM (INCLUDES SHOULDER AND SLOPE MATERIAL)	3,970 SY

NOTES:
1) INSTALL CELLULAR CONFINEMENT SYSTEM IN ACCORDANCE WITH SPECIAL PROVISIONS.

2) CONTRACTOR TO INSTALL PIEZOMETERS IN SLOPES WHERE HORIZONTAL SLOPE DRAINS ARE REQUIRED PRIOR TO EXCAVATING THE SLOPES,TO DETERMINE DRAIN LOCATIONS.

3) INSTALL 4 IN.CELLULAR CONFINEMENT SYSTEM IN ACCORDANCE WITH SPECIAL PROVISION.

PREPARED BY: MHS	DATE: 12/2015
REVIEWED BY: SCC	DATE: 12/2015

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

HORIZONTAL SLOPE DRAINS

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PROJECT REFERENCE NO.	SHEET NO.
34542.1.1 (R-3421A)	2G-2

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

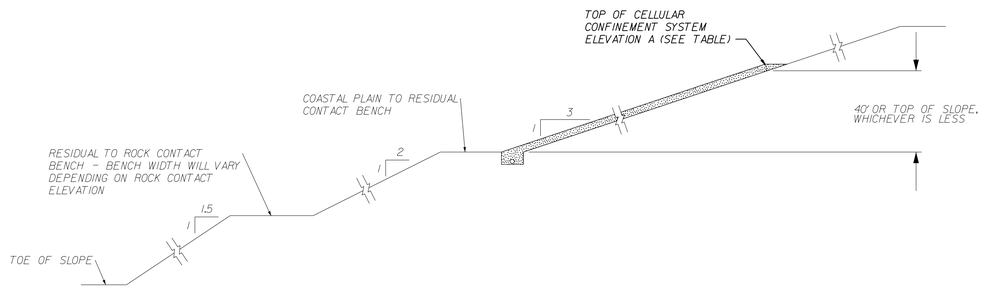
DocuSigned by: Michael H. Stephens C447682092314CC...

12/1/2015

SIGNATURE DATE

ENGINEER

SIGNATURE DATE



NOTE: SEE ROADWAY CROSS SECTIONS FOR APPROXIMATE BENCH CONTACT ELEVATIONS

CELLULAR CONFINEMENT SYSTEM SLOPE DETAIL

N.T.S.

CELLULAR CONFINEMENT SYSTEM LOCATIONS

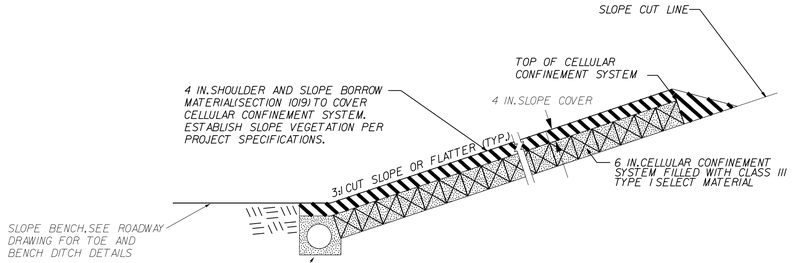
ALIGNMENT	START STATION	END STATION	LENGTH (FT)
US 74	67+00	70+00	300
FLY	5+00	25+00	2,000
RAMP C	17+00	25+50	850
I73	115+00	123+00	800
CONTINGINCY (20%)			790
		TOTAL	4,740

ESTIMATED QUANTITES

6 IN. CELLULAR CONFINEMENT SYSTEM ..... 66,200 SY
SELECT MATERIAL CLASS III, TYPE I ..... 11,040 CY
SHOULDER AND SLOPE MATERIAL ..... 7,360 CY
CORRUGATED PLASTIC PIPE WITH GEOTEXTILE WRAP ..... 4,740 LF

PAY ITEM

6 IN. CELLULAR CONFINEMENT SYSTEM ..... 66,200 SY
(INCLUDES CLASS III TYPE I SELECT MATERIALS)



CELLULAR CONFINEMENT SYSTEM DETAIL

N.T.S.

NOTES:
1) INSTALL CELLULAR CONFINEMENT SYSTEM IN ACCORDANCE WITH SPECIAL PROVISIONS.

2) INSTALL CELLULAR CONFINEMENT SYSTEM ANCHORS TO MINIMUM EMBEDMENT OF 12 IN. BELOW THE CELLULAR CONFINEMENT SYSTEM.

3) INSTALL CELLULAR CONFINEMENT SYSTEM CONCURRENTLY WITH SLOPE EXCAVATION. SEED AND MULCH SLOPES IN ACCORDANCE WITH THE CONTRACT PRIOR TO PROCEEDING TO THE NEXT BENCH LEVEL.

PREPARED BY: _	DATE: _
REVIEWED BY: _	DATE: _

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

CELLULAR CONFINEMENT SYSTEM

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1	_	_	3	_	_
2	_	_	4	_	_

PROJECT REFERENCE NO.	SHEET NO.
34542.1.FR4 (R-3421A)	2G-3

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029869 ENGINEER SHANE C. CLARK

DocuSigned by: Shane C. Clark 1F4E87E6D6AD4EA... 10/11/2019

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ESTIMATED QUANTITES	
SLOPE HEIGHT,H (FT)	SQUARE YDS
< 20	3000
20-40	4000
40 +	4000

1

SLOPE HEIGHT,H (FT)	MIN.ULTIMATE TENSILE STRENGTH (--)	PRIMARY GEOGRID LENGTH (FT)	SECONDARY GEOGRID LENGTH (FT)
< 20 **	600	10	5
20-40	900	15	5
40+	1200	25	10

** - SLOPES 10 FT OR LESS IN HEIGHT USE SECONDARY GEOGRIDS ONLY

LTDS – MINIMUM REQUIRED LONG-TERM DESIGN STRENGTH (LB/FT)

(LTDS IS BASED ON 100% COVERAGE FOR PRIMARY GEOGRID. SEE NOTE 9 FOR LESS THAN 100% COVERAGE.)

NOTES:

1. SEE EROSION CONTROL AND ROADWAY PLANS AND SUMMARY SHEETS FOR REINFORCED SOIL SLOPE (RSS) AND SLOPE EROSION CONTROL LOCATIONS.

2. FOR REINFORCED SOIL SLOPES, SEE REINFORCED SOIL SLOPES PROVISION. FOR STEEL BEAM GUARDRAIL, SEE SECTION 862 OF THE STANDARD SPECIFICATIONS.

3. FOR SHOULDER AND SLOPE BORROW, SEE ARTICLE 1019-2 OF THE STANDARD SPECIFICATIONS. FOR COIR FIBER MAT, MATTING FOR EROSION CONTROL AND COMPOST BLANKET, SEE EROSION CONTROL PROVISIONS, SECTION 1631 OF THE STANDARD SPECIFICATIONS AND ROADWAY STANDARD DRAWING NO. 1631.01. FOR COMPOST BLANKET SEE COMPOST BLANKET PROVISION.

4. RSS SLOPE DESIGNS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 PCF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 10 PSF

5. GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) OR LONG-TERM DESIGN STRENGTHS FOR A 75-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.aspx

6. CONSTRUCT EMBANKMENT SLOPES WITH COASTAL PLAIN MATERIALS MEETING THE STATEWIDE BORROW CRITERIA AS DEFINED IN CURRENT ISSUE OF THE ROADWAY STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.

7. IF THE WEBSITE DOES NOT LIST A LONG-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID IN THE MD, DO NOT USE THE GEOGRID FOR PRIMARY GEOGRID. IF THE WEBSITE DOES NOT LIST A LONG-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID IN THE CD, USE A LONG-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 7 FOR THE SECONDARY GEOGRID.

8. DO NOT OVERLAP PRIMARY GEOGRIDS IN THE MD SO OVERLAPS ARE PARALLEL TO THE TOE OF RSS. POLYOLEFIN (e.g., HDPE OR PP) GEOGRIDS MAY BE SPLICED ONCE PER PRIMARY GEOGRID LENGTH IN ACCORDANCE WITH THE GEOGRID MANUFACTURER'S INSTRUCTIONS. USE POLYOLEFIN GEOGRID PIECES AT LEAST 4' LONG. DO NOT SPLICE POLYESTER TYPE (PET) GEOGRIDS.

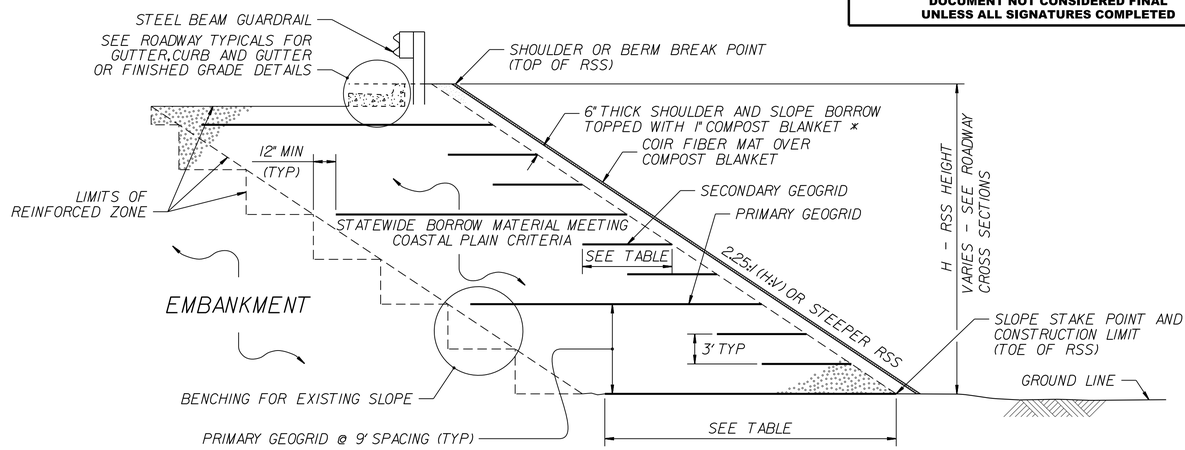
9. FOR PRIMARY GEOGRIDS WITH 100% COVERAGE, PLACE PRIMARY GEOGRIDS SO GEOGRIDS ARE ADJACENT TO EACH OTHER IN THE CD. FOR PRIMARY GEOGRIDS WITH 75% TO LESS THAN 100% COVERAGE,

   MINIMUM REQUIRED LONG-TERM DESIGN STRENGTH = LTDS BASED ON 100% COVERAGE x (W + S) / W

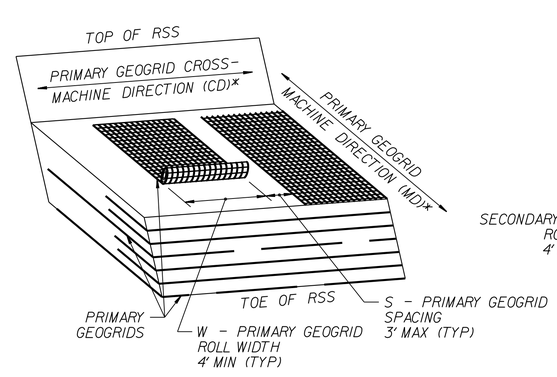
10. SEE TABLE FOR LTDS BASED ON 100% COVERAGE AND GEOGRID PLACEMENT DETAILS FOR PRIMARY GEOGRID ROLL WIDTH (W) AND SPACING (S). FOR PRIMARY GEOGRIDS WITH LESS THAN 100% COVERAGE, STAGGER PRIMARY GEOGRIDS SO GEOGRIDS ARE CENTERED OVER GAPS IN THE PRIMARY GEOGRID LAYER BELOW. DO NOT USE LESS THAN 75% COVERAGE FOR PRIMARY GEOGRIDS.

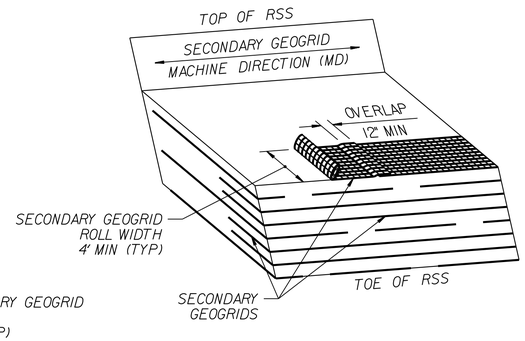
11. DO NOT PLACE ANY GEOGRIDS UNTIL EXCAVATION DIMENSIONS AND IN-SITU MATERIAL ARE APPROVED.

12. FOR SLOPE EROSION CONTROL, USE COIR FIBER MATTING ON SLOPE FACES OF RSS AS SHOWN IN THE DETAILS.



MATTING WITH SHOULDER AND SLOPE BORROW





GEOGRID PLACEMENT DETAILS

(% COVERAGE = $\frac{W}{W+S}$ x 100 $\geq$ 75%)

*SEE NOTES 8 AND 9 ON SHEET 2.

PREPARED BY: MHS	DATE: 6-10-19
REVIEWED BY: SCC	DATE: 6-12-19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

REINFORCED SOIL SLOPE (RSS) DETAILS FOR SLOPES 2.25:1 OR STEEPER

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1	SCC	10/11/19	3		
2			4		

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2G-4

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

DocuSigned by: Scott A. Hidden 7/12/2019
F760CAEB96FC4D3...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

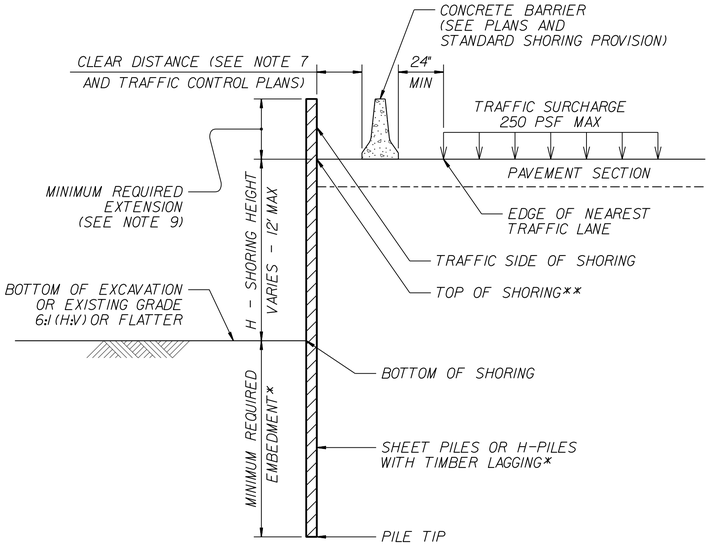
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (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 "--".

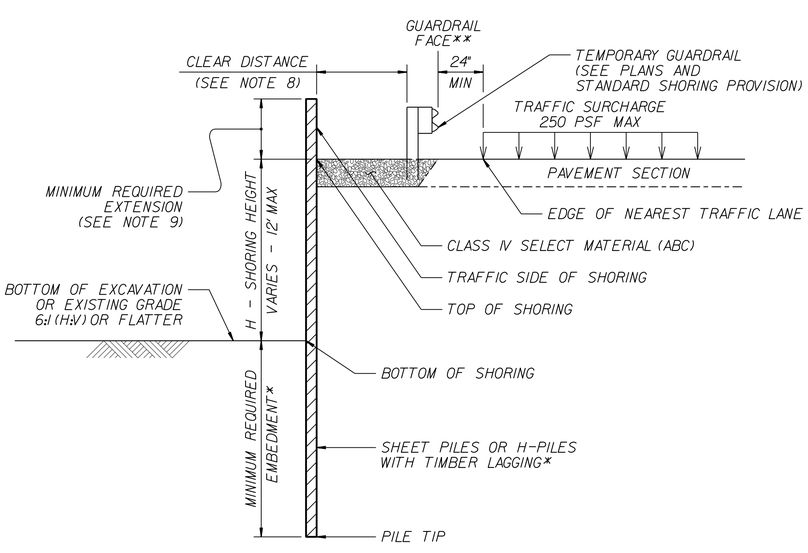
NOTES:

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 PCF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 PSF
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. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



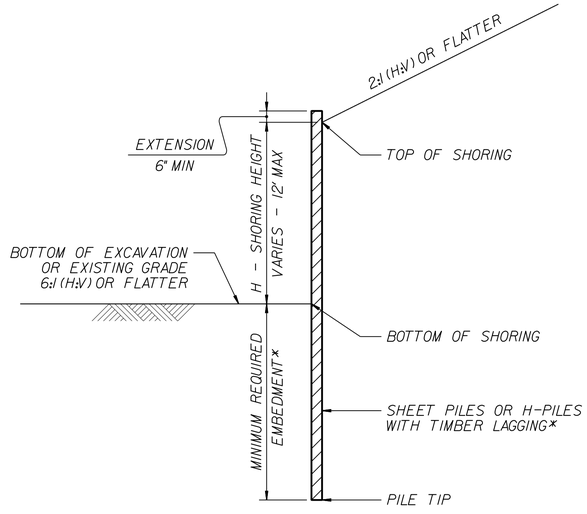
CONCRETE BARRIER

**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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-19-13

COMPUTED BY: WCB DATE: 5/23/2019
CHECKED BY: JRGO DATE: 5/23/2019
REVISED BY: DATE:

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	3B-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

CHAIN	BEGINNING STATION	ENDING STATION	UNCL. EXCA. C.Y.	EMBANK. +% C.Y.	BORROW C.Y.	WASTE C.Y.
SUMMARY 1						
-US74BUS-	34+00.00	64+00.00	18,968	8,855	0	10,113
SUBTOTAL			**18,968**	**8,855**	**0**	**10,113**
SUMMARY 2						
-US74BUS-	64+00.00	74+80.44	86,740	2,976	0	83,674
-I73-	74+80.44	88+15.00	103,114	34,106	0	69,008
-FLY-	5+31.50	40+30.37	1,409,368	11,083	0	1,398,285
SUBTOTAL			**1,599,222**	**48,165**	**0**	**1,551,057**
SUMMARY 3						
-I73-	88+46.00	100+65.58	353,889	229,388	0	124,501
-RPC-	12+50.00	37+95.81	905,314	48,130	0	857,184
-LPB-	1+51.68	11+98.45	23,671	146,645	122,974	0
-LPC-	2+18.73	15+51.45	141,251	58,000	0	83,251
SUBTOTAL			**1,424,125**	**482,163**	**122,974**	**1,064,936**
SUMMARY 4						
-I73-	102+80.35	128+00.00	573,191	40,063	0	533,128
-L2RTEXT-	10+00.00	24+00.00	19,654	25,315	5,661	0
-L2REVEXT-	24+00.00	38+21.74	19,801	10,525	0	9,276
SUBTOTAL			**612,646**	**75,903**	**5,661**	**542,404**
SUMMARY 5						
-L2-	38+00.00	53+29.48	35,963	63,716	27,753	0
-RPD-	2+66.99	21+71.05	148,244	7,343	0	140,901
SUBTOTAL			**184,207**	**71,059**	**27,753**	**140,901**
SUMMARY 6						
-RPA-	4+56.26	19+48.16	204,786	5,171	0	199,615
-L2CONN-	14+39.23	33+64.93	45,733	956	0	44,777
-US74BUS-	114+39.23	147+38.68	37,281	18,368	0	18,913
SUBTOTAL			**287,800**	**24,496**	**0**	**263,304**
SUMMARY 7						
XOVER1	7+43.06	21+50	120	754	0	0
XOVER1	25+75	36+00	210	533	0	0
XOVER2	30+00	48+00	111	7,529	0	0
SUBTOTAL			**441**	**10,579**	**0**	**0**
SHEET TOTALS			**4,127,409**	**721,220**	**166,527**	**3,572,715**
LOSS DUE TO CLEARING AND GRUBBING			**-25,000**			**-25,000**
EARTH WASTE IN LIEU OF BORROW					**-166,527**	**-166,527**
R-3421A TOTAL			**4,102,409**	**721,220**	**0**	**3,381,189**
R-3421A SAY			**4,103,000**			
R-3421B SAY			**3,195,000**		**766,000**	
R-3421B EARTH WASTE IN LIEU OF BORROW					**-766,000**	
					0	
GRAND TOTAL			**7,298,000**			**2,615,189**

UNCLASSIFIED EXCAVATION- ACCEPTABLE BUT NOT TO BE USED IN THE TOP 3' OF EMBANKMENT OR BACKFILL. -US74- 70+00 TO 74+50, -I73- 75+00 TO 82+50, -I73-90+00 TO 94+00, -FLY- 5+50 TO 23+00, -RPC- 14+50 TO 23+00, & -LPC- 7+00 TO 8+00 (1,106,000 CY) PER GEOTECH

PAVEMENT STRUCTURE VOLUME= 22,750 C.Y.

DDE= 3,150 C.Y.
SHOULDER BORROW= 16,910 C.Y.

7/18/2019
R:\Roadway\Proj\R3421A_rdy_sum.dgn
dfpitt

6/16/99

COMPUTED BY:	WCB	DATE:	5/23/2019
CHECKED BY:	JRGO	DATE:	5/23/2019
REVISED BY:		DATE:	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	3B-2

WOVEN WIRE FENCE 47" FABRIC

STATION TO STATION	LOCATION	47" FABRIC L.F.	END BRACE	CORNER BRACE	LINE BRACE	4" POSTS	5" POSTS	ADDITIONAL BARBED WIRE
–US74– 45+82.00 TO 60+61.28	RT	1495.00	2	1	4	96	19	
–US74– 51+53.00 TO 53+88.19	LT	275.20	2			18	4	
–US74– 61+47.67 TO –FLY– 25+00.07	RT	2757.50	1	3	7	179	32	
–FLY– 25+00.07 TO –RPC– 41+10.37	RT	2556.10		3	7	166	30	
–RPC– 41+10.37 TO –L2– 53+30.00	RT	976.00	1		3	64	11	
–L2REV– 46+12.00 TO –I73– 126+28.67	RT	3346.86	2	8	7	212	49	
–I73– 126+34.54 TO –I73– 133+20.01	RT	690.64	2	1	2	42	13	
–I73– 132+45.00 TO 128+07.40	LT	538.60	2		1	35	7	
–I73– 128+02.95 TO –RPA– 5+71.55	LT	2015.93	2	5	4	127	31	
–RPA– 5+77.81 TO –L2CONN– 29+12.00	RT	2304.82	2	7	2	148	31	
–US74– 112+00.93 TO 135+43.18	RT	2393.80	2	4	5	154	31	
–US74– 135+49.61 TO 136+32.62	RT	171.23	2	2		7	10	
R–3421A TOTAL:		19521.68	20	34	42	1248	268	0
R–3421A SAY:		19530				1250	270	0
R–3421B SAY:		48500				3120	580	200
GRAND TOTAL:		68030				4370	850	200

SHOULDER DRAINS

LINE	STATION TO STATION	SHOULDER DRAIN PIPE(FT)	SHOULDER DRAINS (FT)	OUTLET PIPES (FT)	CONCRETE PADS OR DRN. STR	
I–73 NB	90+40.00 TO 97+40.00	695	695	52	2GI	80A
I–73 SB, MED	89+90.00 TO 99+90.00	1005	1005	70	2GI	79A
US–74 RT	39+50.00 TO 49+90.00	1040	1040	40	2GI	1, 4
I–73 RT	83+00.00 TO 86+60.00	360	360	10	2GI	49, 41
I–73 MED	83+00.00 TO 86+50.00	350	350	40	2GI	57, 58
	R–3421A TOTAL:	3450	3450	212	8	
	R–3421A SAY:	3450	3450	220	8	
	R–3421B SAY:	22500	22500	1680	0	
	GRAND TOTAL:	25950	25950	1900	8	

GUIDERAIL

SURVEY LINE	LOCATION	STATION	STATION	LENGTH (FT.) SINGLE FACE	LENGTH (FT.) DOUBLE FACE	ANCHORS INTERMEDIATE	ANCHORS TERMINAL	ADDT'L POSTS
–US74– /–I73–	MED.	58+45.00	86+99.33		2854.33	2	1	
–I73–	MED.	89+18.35	98+75.00		956.65		2	
–I73–	MED.	103+32.63	128+00.00		2467.37	2	1	
–L2_RT–	MED.	11+34.86	18+08.26		673.40		2	
–XOVER1–	RT	13+50+/–					1	
–XOVER1–	LT	19+00+/–					1	
–XOVER1–	LT	28+20+/–					1	
–XOVER1–	RT	32+50+/–					1	
R–3421A TOTAL:					6951.75	4	10	10
R–3421A SAY:					6960	4	10	10
R–3421B SAY:					26600	27	4	20
GRAND TOTAL:					33560	31	14	30

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
–US74–	84+95.00	94+22.00	RT	3083.27
–US74–	86+78.00	89+32.00	RT	432.27
–LPB–	0+00.00	5+99.00	RT	1385.42
–L2CONN–	9+86.00	14+64.00	RT	1079.81
–L2–	45+62.00	51+24.00	LT	866.35
R–3421A TOTAL:				16025.03
R–3421A SAY:				16030
R–3421B SAY:				8800
GRAND TOTAL:				24830

SUMMARY OF BREAKING EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD²
–I73–	83+50.00	87+67.00	LT	1918.95
–L2REV–	33+50.00	43+24.00	CL	3496.49
R–3421A TOTAL:				5415.45
R–3421A SAY:				5420
R–3421B SAY:				450
GRAND TOTAL:				5870

EXPRESSWAY GUTTER SUMMARY

SURVEY LINE	LOCATION	STATION	STATION	LENGTH (FT.)
–US74–	RT	44+00.00	53+76.00	976
–US74–	RT	56+77.00	66+77.00	1000
–US74–	LT	59+50.00	74+80.00	1531
–US74–	RT	136+35.00	140+00.00	365
–US74EBL–	LT	74+80.00	77+00.00	220
–FLY–	RT	0+56.00	3+95.00	339
R–3421A TOTAL:				4431
R–3421A SAY:				4435
R–3421B SAY:				0
GRAND TOTAL:				4435

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	LOCATION	STATION	STATION	LENGTH (FT.)
–US74–	RT	39+00.00	44+00.00	500
–US74–	RT	53+76.00	56+77.00	301
–I73–	RT	85+52.00	86+60.00	108
–I73–	RT	88+45.00	88+85.00	40
–I73–	MED	89+46.00	89+90.00	44
–I73–	LT	98+00.00	99+72.00	172
–US74–	RT	112+55.00	115+50.00	295
–US74–	RT	130+50.00	136+35.00	585
–RPC–	RT	7+71.00	10+42.00	271
–RPC–	RT	12+04.00	12+50.00	46
–RPC–	RT	32+50.00	41+19.00	869
–LPB–	RT	0+00.00	2+94.00	294
–LPC–	LT	0+53.00	6+11.00	558
–L2REV–	LT	40+31.00	45+48.00	517
–RPA–	RT	20+50.00	21+65.00	115
R–3421A TOTAL:				4714
R–3421A SAY:				4715
R–3421B SAY:				13200
GRAND TOTAL:				17915

7/18/2019
R:\Roadway\Proj\R3421A_rdy_sum.dgn
default

COMPUTED BY: WCB DATE: 6/7/2019
CHECKED BY: JRGO DATE: 6/10/2019
REVISED BY: DATE:
REVISED BY: DATE:

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	3B-3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W								IMPACT ATTENUATOR TYPE TL-3		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU TL-2	GREU TL-3	TYPE III	CAT-1	B-77	B-83	G	NG				
US74	SHEET 4-A FOR SIGN A		MED. RT.	218.75					12	15	50		1			1		1								
US74	SHEET 4-A FOR SIGN A		MED. LT.	343.75					12	15	50		1			1		1								
US74	36+83.25	56+77.00	RT.	1993.75			39+00.00	44+00.00	12	15	50		1			1		1								
US74	36+89.56	39+08.31	MED. RT.	218.75			39+00.00		12	15	50		1			1		1								
US74	55+53.25	77+53.25	LT.	2200.00			77+00.00	56+00.00	12	15	50		1			1		1								
US74	63+87.50	66+06.25	MED. RT.	218.75			63+87.50		12	15	50		1			1		1								
US74	72+87.50	75+06.25	MED. RT.	218.75			72+87.50		12	15	50		1			1		1								
US74/I73	77+86.08	80+11.08	MED. RT.	225.00			77+86.08		12	15	50		1			1		1								
I73	83+32.48	86+82.48	RT.	350.00			85+94.00		12	15	50		6						1							
I73	84+11.30	87+11.30	MED. RT.	300.00			86+40.00		7.5	12	50		1			1			1							
I73	85+76.44	88+38.94	LT.	262.50			88+27.50	85+50.00	12	15								1	1					318		
I73	89+22.85	92+22.85	MED. LT.	300.00				89+22.85	7.5	12	50		1			1			1							
I73	89+50.36	92+50.36	LT.	300.00				92+50.36	12	15	50		1			1			1							
I73	95+19.84	99+94.84	LT.	475.00			99+94.84	95+19.84	11	14							1	1						318.5		Follow STD. 862.01 at the culvert
I73	96+86.16	100+23.66	MED. LT.	337.50			100+23.66		12	15							1	1								
I73	97+61.88	100+61.88	MED. RT.	300.00			100+61.88		6.7	15	50		1			1	1									
I73	102+58.96	105+58.96	LT.	300.00			102+58.96		6.7	15	50		1			1	1									
I73	102+83.43	105+83.43	MED. LT.	300.00			102+83.43		6.4	15	50		1			1	1									
I73	103+35.81	113+10.81	RT.	975.00			103+75.81		12	15	50		1				1	1								
I73	113+93.75	116+12.50	MED. LT.	218.75			114+00.00		12.5	15.5	50		1			1		1								
I73	122+12.50	127+75.00	RT.	562.50			126+00.00	127+00.00	12	15	50		1			1		1								
RPC	2+01.87	10+64.37	RT.	862.50			10+64.37		12	15	50		1			1			1							
RPC	8+36.93	10+86.93	LT.	250.00			10+86.93		5.5	8.5									1		1					
RPC	11+98.23	13+10.73	LT.	112.50			12+17.30		4.5	7.5								1	1							
RPC	28+22.19	34+53.44	LT.	631.25			29+50.00	34+00.00	12	15	50		1			1		1								
RPC	31+71.93	41+28.18	RT.	956.25			33+50.00	40+96.96	12	15	50		1			1		1								Follow STD. 862.01 at the culvert
RPD	9+14.69	12+58.44	RT.	343.75			10+50.00	12+50.00	12	15	50		1			1		1								
RPA	3+80.00	6+42.50	RT.	262.50			5+55.00	6+05.00	12	15	50		1			1		1								
RPA	19+89.42	23+33.17	RT.	343.75			21+49.79	23+00.69	12	15	50		1			1		1						387		
LPC	0+27.31	6+02.31	LT.	575.00			5+00.00	0+27.31	11	14	50		1			1	1									Follow STD. 862.01 at the culvert
L2 RT	9+27.54	11+83.79	LT.	256.25			9+27.54		6.7	15	50		1			1				1				116		
L2 RT	9+47.16	11+47.16	RT.	200.00			9+47.16		6.4	15	50		1			1				1				142		
L2 RT	17+62.50	24+00.00	RT.	637.50				20+17.29	12	15								1						114		
L2CONN/US 74	30+46.22	115+76.77	RT.	456.25			32+00.00	115+50.00	12	15	50		1			1		1						482		
US74	128+96.74	136+27.99	RT.	731.25			130+50.00	136+00.00	12	15	50		1			1		1						715		
L2		13+76.25	RT.															1						319		
L2	17+70.83	31+20.83	LT.	1350.00			20+30.76		13	16	50		1			1								115		
L2		25+80.00	RT.													1										
L2	34+40.35	37+71.60	RT.	331.25			34+40.35	37+69.57	12	15								1						332		
L2 REV	24+00.00	32+00.00	RT.	800.00			31+53.68		12	15	50		1			1										
L2 REV	27+00.00	31+31.25	LT.	431.25			31+53.68		12	15	50		1			1		1						235		
L2 REV	38+93.75	42+12.50	RT.	318.75			39+00.00		12	15	50		1			1		1								
L2 REV	40+34.43	48+53.18	LT.	818.75			40+21.93		12	15	50		1					1						474		Tie to Existing
L2	43+03.38	49+78.38	LT.	675.00			43+03.38		12	15								1								Tie to Existing
L2 REV	47+45.21	52+38.96	RT.	493.75			52+38.96		12	15								1								Tie to Existing
FLY	21+48.48	24+48.48	RT.	300.00			24+48.48		12	15	50		1			1			1							
FLY	20+87.38	23+87.38	LT.	300.00			23+87.38		17	19	50		1			1			1							
FLY	23+87.38	24+46.90	LT.																				60			
FLY	24+46.90	25+55.55	LT.	112.50			24+46.90		17	17									2							
FLY	25+55.55	26+40.30	LT.																				85			
FLY	26+40.30	27+18.19	LT.	87.50					17	17									2							
FLY	27+18.19	27+92.20	LT.					28+45.61															74			
FLY	24+48.48	25+00.37	RT.																				52			
FLY	25+00.37	26+30.58	RT.	137.50			25+00.37		10	10									2							
FLY	26+30.58	27+06.93	RT.																				76			
FLY	27+06.93	27+78.08	RT.	75.00					10	10									2							
	SHEET 1 TOTALS			23468.75												34	7	30	18	2	1		346.52	4067.5		

COMPUTED BY: WCB DATE: 6/7/2019
CHECKED BY: JRGO DATE: 6/10/2019
REVISED BY: DATE:
REVISED BY: DATE:

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	3B-4

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W								IMPACT ATTENUATOR TYPE TL-3		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU TL-2	GREU TL-3	TYPE III	CAT-1	B-77	B-83	G	NG				
FLY	27+78.08	28+46.38	RT.					28+96.61															68			
LPB	5+90.63		RT. MED																					429		
LPB	0+00.00	5+21.26	RT. MED																					327.5		
L2	13+70.00	16+88.96	RT.																					319		
L2	24+67.50	26+30.00	RT.																					159		
L2	34+93.58	43+26.64	RT.																					830		
FLY	34+09.11	37+60.75	RT.																					352		
XOVER2	29+97.28	45+09.90	RT.																		2		1513			
XOVER2	30+57.31	47+00.00	LT.																		1		1643			
Remove and Replace Existing Guardrail																										
US74_EBL	87+10.00	99+33.00	LT.	1218.75														1						1223		Remove and Replace
US74	101+45.00	108+93.00	LT.	737.50												1								735		
US74	98+55.00	144+55.00	RT. MED	4587.50												2								4586		Remove Impact Attenuator
US74	98+55.00	144+55.00	LT. MED	4581.25												1		1						4620		
US74	131+94.00	148+04.00	LT.	1606.25												1		1						1600		
US74 BUS. EBL	Gore Area To Bridge		LT.	656.25												1				1				650		
US74 BUS. LOOP	Gore Area To Bridge		RT.	2606.25												1				1				2596		
US74 BUS. LOOP	Gore Area To Bridge		LT.	181.25												1				1				176		
L2	10+14.11	16+88.96	RT.	387.50														1		1				803		
L2	26+30.00	34+40.00	RT.	812.50																				803		
L2	31+21.00	43+03.00	LT.	1187.50																				1189		
L2REV	48+29.00	51+29.00	LT.	306.25														1						300		
L2REV	52+15.00	61+40.00	RT.	1375.00												1								1371		
XOVER2	29+00+/-																									Temporary GREU, TL-3
			SHEET 1 TOTALS	23468.75											0	34	7	30	18	2	1		346.52	4067.5		
			SHEET 2 TOTALS	20243.75											0	9	0	5	0	4	3		3223.61	23068.5		
		QUANTITY	LF PER EA	TOTAL LF																						
	GREU TL-3	43	50	2150.00																						
	TYPE III	7	18.75	131.25																						
	CAT-1	35	6.25	218.75																						
	B-77	18	22.875	411.75																						
	B-83	6	18.75	112.50																						
R-3421A TOTAL (LF)				40688.25	0										0	43	7	35	18	6	4		3570.13	27136		
R-3421A SAY (LF)				40,700	0	(10 ADDITIONAL GUARDRAIL POSTS)									0	43	7	35	18	6	4		3580	27140		
R-3421B SAY (LF)				27,250	150	(10 ADDITIONAL GUARDRAIL POSTS)									7	31	0	16	10	0	0		140			
GRAND TOTAL (LF)				67,950	150	(20 ADDITIONAL GUARDRAIL POSTS)									7	74	7	51	28	6	4		3720	27140		

COMPUTED BY: WCB DATE: 6/7/19
CHECKED BY: JRGO DATE: 6/10/19

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	3D-1

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

STATION / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (HDPE PIPE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"	24" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	30" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	42" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	48" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED) CU. YARDS R.C.P.	HDPE	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. 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 D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. (W.S. FLAT) FRAME W/ GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	J.B. STD. 840.31 OR 840.32	T.B.J.B STD. 840.34	T.B.D.I. STD 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL GRATE AND FRAME STD 840.37	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	MANHOLE FRAME AND COVER STD 840.54	O.T.C.B. STD. 840.04, STD. 840.05	BERM DITCH OUTLET STD. 850.10 (S.Y.)	BERM DITCH OUTLET STD. 850.11 (S.Y.)	FLOWABLE FILL (CY)	CONVERT 2GI TO JB W/ MH	CONVERT 2GI TO TBJB W/ SLAB LID	DRAINAGE PIPE ELBOWS NO. & SIZE (HDPE)			CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
SHEET 5																																																																								
-US74- 39+50.98	RT	1		351.85																																		1										1			1																					
-US74- 39+50.98	RT	1	OUT		349.1	344.33			24																																																										1	@	15			
-US74- 43+98.74	RT	2		352.33																																		1										1			1																					
-US74- 43+98.74	RT	2	OUT		349.58	344.27			32																																																										1	@	15			
-US74- 49+91.42	RT	4		346.74																																		1										1					1																			
-US74- 49+50.00	RT	3	4		344.67	340.86											40																																																							
-US74- 49+50.00	RT	3		347.42																																		1	0.88									1					1																			4	
SHEET 6																																																																								
-US74- 54+83.09	LT	5		336.53																																		1										1					1																			
-US74- 54+83.09	LT	5	6		333.78	328.43											12																																																						
-US74- 54+83.09	LT	6		339.5																																																							1	1					1							
-US74- 54+83.82	RT	7		336.35	EXIST																																	1	0.53									1			1																					
-US74- 56+11.63	RT	10		333.55																																		1										1			1																					
-US74- 56+11.63	RT	10	11		331.63	325.39																			184																																															
-US74- 58+00.11	RT	IN	11		338.17	325.39			36																																																						11					2	@	15			BERM DITCH OUTLET
-US74- 58+00.11	RT	11		328.14																																		1										1			1																					
-US74- 58+00.11	RT	11	12		325.39	316																			232																																															
-US74- 60+35..57		12		321.04																																		1										1			1																					
-US74- 60+35.57		12	OUT		316	EXIST																																																																0.553		
-US74- 60+35.57		IN	12		321	316																					8																																													
-US74- 63+04.22	RT	14		312.83																																		1	3.33									1			1																					
-US74- 63+04.22	RT	14	13		304.5	EXIST											8																																																						
-US74- 63+04.22	RT	13		EXIST																																																																			0.399	4	
US74 63+03.56	LT	15		313.13	304.69																																	1	3.44									1			1																				6	
Temporary Drainage																																																																								
-XOVER1- 15+05.02	CL	200		281.17	275.14												208																																																						Temporary Steel Cover- 1 Each
-XOVER1- 31+00.48	LT	201		231.19																																		1										1					1																			
-XOVER1- 31+00.48	LT	201	OUT		228.44	226.45											160																																																						
-XOVER2- 33+28.73	LT	202		226.50																																		1										1					1																		Temporary Steel Cover- 1 Each
-XOVER2- 33+28.73	LT	203	202		227.74	222.25											220																																																							
-XOVER2- 33+28.74	LT	203		229.66																																		1										1					1																			
-XOVER2- 44+05.88	LT	206		227.10																																		1										1					1																			
-XOVER2- 44+05.88	LT	206	207		273.25	EXIST												8																																																						
-XOVER2- 44+03.54	LT	207		EXIST																																																																					
-XOVER2- 44+16.01	RT	208		278.12																																		1										1					1																			
-XOVER2- 44+16.01	RT	IN	208		277.20	276.20											36																																																							
SHEET TOTALS									92								684	8							416		8											16	8.18									16	0		8		8						1	1		11			1		4	@	15	0.9516	14	

ABBREVIATIONS

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

8/6/2021
R:\Roadway\Proj\R3421A_rdy_sum_3D.dgn
default

COMPUTED BY: WCB	DATE: 6/7/19
CHECKED BY: JRGO	DATE: 6/10/19

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	3D-2

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (HDPE PIPE) 12" (.064)	15" (.064)	18" (.064)	24" (.064)	30" (.079)	36" (.079)	42" (.109)	48" (.109)	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
SHEET 7																															
-US74- 66+65.34	LT	17		302.91																											
-US74- 66+09.61	RT	20		300.4																											
-US74- 66+09.61	RT	20	19		297.65	294.18																			56						
-US74- 66+64.06	RT	19		302.5																											
-US74- 69+00.14	LT	22		295.02																											
-US74- 69+00.14	LT	22	23		292.27	282.75																			124						
-US74- 70+25.19	LT	23		291.24																											
-US74- 70+25.19	LT	23	24		282.75	EXIST																			12						
-US74- 70+25.31	LT	24		EXIST																											
-US74- 73+87.39	LT	26		277.58																											
-US74- 73+87.39	LT	26	27		272.58	EXIST																			12						
-US74- 73+87.06	LT	27		EXIST																											
-US74- 70+25.80	RT	31A		286.46	282.5	EXIST																									
-US74- 70+25.80	RT	31A															12														
-US74- 73+87.4	RT	31		277.5																											
-US74- 73+87.4	RT	31	30		272.5	EXIST												16													
-US74- 73+86.58	RT	30		EXIST																											
-US74- 76+97.96	LT	29		271.24																											
-US74- 76+97.96	LT	29	OUT		268.49	266.08											56														
-FLY- 7+26.89	RT	32		286.49																											
-FLY- 7+26.89	RT	32	33		283.49	271.26												270													
-FLY- 10+01.72	RT	33		275.51																											
-FLY- 10+01.72	RT	33	34		270.76	261.90													244												
-FLY- 12+49.85	RT	34		266.65																											
-FLY- 12+49.85	RT	34	35		261.40	259.80																						80			
-FLY- 12+49.56	RT	35		265.05																											
-FLY- 12+49.56	RT	35	36		259.80	249.38														244											
-FLY- 15+00.51	RT	36		254.63																											
-FLY- 14+99.06	RT	37		257.27																											
-FLY- 14+99.06	RT	37	36		254.27	250.38																				80					
-FLY- 15+00.51	RT	36	42		249.38	239.38														244											
-RPC- 2+47.34	RT	38		267.57																											
-RPC- 2+47.34	RT	38	39		264.82	256.87											244														
SHEET TOTALS																	312	286	244	488					204	80		80			

STATION	24" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	30" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	42" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	48" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	HDPE	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. 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 D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. (W.S. FLAT) FRAME W/ GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	J.B. STD. 840.31 OR 840.32	T.B.J.B STD. 840.34	T.B.D.I. STD 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL GRATE AND FRAME STD 840.37	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	MANHOLE FRAME AND COVER STD 840.54	O.T.C.B. STD. 840.04, STD. 840.05	BERM DITCH OUTLET STD. 850.10 (S.Y.)	BERM DITCH OUTLET STD. 850.11 (S.Y.)	FLOWABLE FILL (CY)	CONVERT 2GI TO JB W/ MH	CONVERT 2GI TO TBJB W/ SLAB LID	DRAINAGE PIPE ELBOWS NO. & SIZE (HDPE)	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
SHEET 7																																							
-US74- 66+65.34							1	3.66									1			1																		6	
-US74- 66+09.61							1										1			1																			
-US74- 66+09.61																																							
-US74- 66+64.06																																			1				
-US74- 69+00.14							1										1			1																			
-US74- 69+00.14																																							
-US74- 70+25.19							1	3.49									1			1																			
-US74- 70+25.19																																							
-US74- 70+25.31																																					0.399	4	
-US74- 73+87.39							1										1			1																			
-US74- 73+87.39																																							
-US74- 73+87.06																																					0.399	4	
-US74- 70+25.80							1										1					1																	
-US74- 70+25.80																																					0.399	6	
-US74- 73+87.4							1										1			1																		135	
-US74- 73+87.4																																							
-US74- 73+86.58																																					0.4465		
-US74- 76+97.96							1									1				1																			
-US74- 76+97.96																																							
-FLY- 7+26.89							1										1					1																	
-FLY- 7+26.89																																							
-FLY- 10+01.72							1									1						1																	
-FLY- 10+01.72																																							
-FLY- 12+49.85							1	0.25								1						1																	
-FLY- 12+49.85																																							
-FLY- 12+49.56							1	0.25								1						1																	
-FLY- 12+49.56																																							
-FLY- 15+00.51							1	0.25								1						1																	
-FLY- 14+99.06							1										1					1																	
-FLY- 14+99.06																																							
-FLY- 15+00.51																																							
-RPC- 2+47.34							1										1					1																	
-RPC- 2+47.34																																							
SHEET TOTALS							15	7.9								5	10			7		8													1		1.6435	155	

ABBREVIATIONS

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

COMPUTED BY: JRGO DATE: 2/12/20
CHECKED BY: WCB DATE: 2/13/20

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	3D-3

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (HDPE PIPE) 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE								.064	.064	.064	.064	.079	.079	.109	.109																
SHEET 8																															
-RPC- 4+97.56	RT	39		259.62																											
-RPC- 4+97.56	RT	39	40		256.62	252.32												168													
-RPC- 6+74.10	RT	40		255.32																											
-RPC- 6+74.10	RT	40	44		252.32	230.22				159																					
-FLY- 17+49.06	RT	43		247.27																											
-FLY- 17+49.06	RT	43	42		244.27	240.38																				84					
-FLY- 17+50.06	LT	42		244.63																											
-FLY- 17+50.06	LT	42	44		238.88	228.72															244										
-FLY- 20+01.49	RT	45		237.19																											
-FLY- 20+01.49	RT	45	44		234.19	230.22																				84					
-FLY- 20+00.00	LT	44		234.47																											
-FLY- 20+00.00	LT	44	46		228.22	216.61																332									
-FLY- 23+44.60	LT	46		222.86																											
-FLY- 23+44.60	LT	46	50		216.61	216.21																48									
-FLY- 24+55.99	RT	53	52		235.00	219.30									104																
-FLY- 24+00.43	RT	52		226.05																											
-FLY- 24+00.43	RT	52	50		219.30	216.21																									68
-FLY- 25+00.08	LT	55A		220.78																											
-FLY- 25+00.08	LT	55A	55		218.03	217.00											56														
-FLY- 25+99.91	RT	55B		224.45																											
-FLY- 25+99.91	RT	55B	55		221.70	217.00																			84						
-FLY- 26+75.60	LT	59A		220.07																											
-FLY- 26+75.60	LT	59A	59		217.32	216.00											44														
-FLY- 27+65.42	RT	59B		223.92																											
-FLY- 27+65.42	RT	59B	59		221.17	216.00																			84						
-FLY- 28+01.55	LT	63		220.36																											
-FLY- 28+01.55	LT	63	63A		217.36	216.00												24													
-I73- 88+54.13	RT	61		252.67																											
-I73- 88+54.13	RT	61	61A		249.92	249.66																			28						
-I73- 88+82.83	RT	61A		252.41																											
-I73- 88+54.13	RT	61A	OUT		249.66	249.24																									
-I73- 89+57.85	LT	62		252.52																											
-I73- 89+57.85	LT	62	62A		249.77	249.50																			28						
-I73- 89+57.85	LT	62A		252.25																											
-I73- 89+57.85	LT	62A	OUT		249.50	249.00																			24						
-RPC- 12+47.23	RT	54		252.40																											
-RPC- 12+47.23	RT	54	OUT		249.65	237.00			48																						
-RPC- 10+34.47	RT	48		253.99																											
-RPC- 10+34.47	LT	48	47		251.24	250.20																			64						
-RPC- 10+61.77	LT	47		251.12																											
-RPC- 10+61.77	LT	47	49		250.20	250.00																			24						
-I73- 86+53.30	RT	41		254.45																											
-I73- 86+53.30	RT	41	49		251.70	250.00																			92						
-I73- 85+51.77	RT	49		255.30																											
-I73- 85+51.77	RT	49	57		250.00	249.50																			64						
-I73- 85+52.23	CL	57		253.41																											
-I73- 85+52.23	CL	57	58		249.50	249.00																			96						
-I73- 86+51.23	CL	58		252.08																											
-I73- 86+51.23	CL	58	OUT		249.00	243.50																			112						
-US74EBL- 80+66.02	LT	65		255.85																											
-US74EBL- 80+66.02	LT	65	66		252.00	EXIST											16														
-I73- 80+79.92	CL	68		259.23																											
-I73- 80+79.92	CL	68	67		251.75	249.76																							32		
-I73- 80+74.83	LT	67		EXIST																											
SHEET TOTALS									48	160					104		116	192			244	380			700	168			32		68

STATION	24" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	30" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	42" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	48" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	HDPE	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. 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 D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. (W.S. FLAT) FRAME W/ GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	J.B. STD. 840.31 OR 840.32	T.B.J.B STD. 840.34	T.B.D.I. STD 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL GRATE AND FRAME STD 840.37	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	MANHOLE FRAME AND COVER STD 840.54	O.T.C.B. STD. 840.04, STD. 840.05	BERM DITCH OUTLET STD. 850.10 (S.Y.)	BERM DITCH OUTLET STD. 850.11 (S.Y.)	FLOWABLE FILL (CY)	CONVERT 2GI TO JB W/ MH	CONVERT 2GI TO TBJB W/ SLAB LID	DRAINAGE PIPE ELBOWS NO. & SIZE (HDPE)			CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
SHEET 8																																									
-RPC- 4+97.56							1										1					1																			
-RPC- 4+97.56																																									
-RPC- 6+74.10							1										1					1																			
-RPC- 6+74.10																																				2	@	18			
-FLY- 17+49.06							1										1					1																			
-FLY- 17+49.06																																									
-FLY- 17+50.06							1	0.75								1						1																			
-FLY- 17+50.06																																									
-FLY- 20+01.49							1										1					1																			
-FLY- 20+01.49																																									
-FLY- 20+00.00							1	1.25								1						1																			
-FLY- 20+00.00																																									
-FLY- 23+44.60							1	1.25								1						1																			
-FLY- 23+44.60																																									
-FLY- 24+55.99						4.9																																			
-FLY- 24+00.43							1	1.75								1						1																			
-FLY- 24+00.43																																									
-FLY- 25+00.08							1										1					1																			
-FLY- 25+00.08																																									
-FLY- 25+99.91							1										1					1																			
-FLY- 25+99.91																																									
-FLY- 26+75.60							1										1					1																			
-FLY- 26+75.60																																									
-FLY- 27+65.42							1										1			1																					
-FLY- 27+65.42																																									
-FLY- 28+01.55							1										1					1																			
-FLY- 28+01.55																																									
-I73- 88+54.13							1										1			1																					
-I73- 88+54.13																																									
-I73- 88+82.83							1										1			1																					
-I73- 88+54.13																																									
-I73- 89+57.85							1																			1	1														
-I73- 89+57.85																																									
-I73- 89+57.85							1										1			1																					
-I73- 89+57.85																																									
-RPC- 12+47.23							1																			1	1														
-RPC- 12+47.23																																				1	@	15			
-RPC- 10+34.47							1										1					1																			
-RPC- 10+34.47																																									
-RPC- 10+61.77							1											1				1																			
-RPC- 10+61.77																																									
-I73- 86+53.30							1										1			1																					
-I73- 86+53.30																																									
-I73- 85+51.77							1	0.3									1			1																					
-I73- 85+51.77																																									
-I73- 85+52.23							1										1					1																			
-I73- 85+52.23																																								29	
-I73- 86+51.23							1										1					1																			
-I73- 86+51.23																																		77.81								Fill with Flowable Material
-US74EBL- 80+66.02							1										1			1																					
-US74EBL- 80+66.02																																							0.399		
-I73- 80+79.92							1	2.46									1					1											3.28								Fill with Flowable Material
-I73- 80+79.92																																									
-I73- 80+74.83							1	0.9																1					1												
																																				2	@	18			
																																				1	@	15			
SHEET TOTALS						4.9	27	8.66								4	19	1		7		17	0	1		2	2		1				81.09						0.399	29	

ABBREVIATIONS

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

12/06/07

COMPUTED BY: WCB	DATE: 6/7/19
CHECKED BY: JRGO	DATE: 6/10/19

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	3D-4

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (HDPE PIPE) 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE								.064	.064	.064	.064	.079	.079	.109	.109																
SHEET 9																															
-RPC- 17+78.48	RT	76	77		330.86	237.53				224																					
-RPC- 18+00.50	RT	77		240.53																											
-RPC- 18+00.50	RT	77	78		235.78	229.16													292												
-RPC- 20+99.30	RT	78		233.91																											
-RPC- 20+99.30	RT	78	80		229.16	225.17													140												
-RPC- 24+47.71	RT	80		229.92																											
-RPC- 24+47.71	RT	80	81		224.67	219.33														344											
-RPC- 26+02.89	RT	81		224.58																											
-RPC- 26+02.89	RT	81	84		216.00	205.88																								160	
-RPC- 26+04.68	LT	84		210.21																											
-RPC- 26+04.68	LT	84	OUT		205.88	205.00																84									
-RPC- 28+01.82	RT	82	83		312.40	219.85					184																				
-RPC- 28+02.32	RT	83		223.35																											
-RPC- 28+02.32	RT	83	81		218.11	218.84														196											
-LPC- 13+32.10	LT	87		222.96																											
-LPC- 13+32.10	LT	87	86		219.96	219.50																			48						
-LPC- 12+76.82	LT	86		222.83																											
-LPC- 12+76.82	LT	86	85		219.50	219.00																			72						
-LPC- 12+02.40	LT	85		223.00																											
-LPC- 12+02.40	LT	85	OUT		219.00	211.16			44																						
-LPC- 0+68.54	LT	91		250.42					84																						
-LPC- 0+68.54	LT	91	OUT		247.67	199.30																									
-I73- 99+65.66	LT	90		253.63																											
-I73- 99+65.66	LT	90	OUT		250.88	221.00			84																						
-I73- 98+14.27	LT	89		251.70																											
-I73- 98+14.27	LT	89	OUT		248.95	217.00			116																						
-I73- 94+98.46	CL	78A		245.50																											
-I73- 94+98.46	CL	78A	79A		242.50	242.40												8													
-I73- 94+90.92	CL	79A		245.50																											
-I73- 94+90.92	CL	79A	80A		242.40	241.75																				80					
-I73- 94+86.93	RT	80A		245.65																											
-I73- 94+86.93	RT	80A	81A		241.75	208.51				200																					
-RPC- 19+40.37	LT	81A		211.76																											
-RPC- 19+40.37	LT	81A	OUT		208.43	201.42																						300			
-LPC- 4+99.14	LT	82A		240.00																											
-LPC- 4+99.14	LT	82A	OUT		237.75	201.42			92																						
-LPB- 5+95.87	RT	71		238.22																											
-LPB- 5+95.87	RT	71	OUT		235.22	200.50			108																						
-LPB- 2+28.37	RT	73	OUT		212.50	199.20															44										
-LPB- 10+02.91	RT	74		230.36																											
-LPB- 10+02.91	RT	74	75		227.36	227.00											28														
-LPB- 10+34.09	RT	75		230.25																											
-LPB- 10+34.09	RT	75	OUT		227.00	194.90											196														
SHEET TOTALS									528	424	184						224	8	432	540	44	84			120	80		300		160	

STATION	FROM	TO	24" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	30" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	42" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	48" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	HDPE	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. A 5.0' THRU 10.0'	LIN. 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 D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. (W.S. FLAT) FRAME W/ GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	J.B. STD. 840.31 OR 840.32	T.B.J.B STD. 840.34	T.B.D.I. STD 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL GRATE AND FRAME STD 840.37	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	MANHOLE FRAME AND COVER STD 840.54	O.T.C.B. STD. 840.04, STD. 840.05	BERM DITCH OUTLET STD. 850.10 (S.Y.)	BERM DITCH OUTLET STD. 850.11 (S.Y.)	FLOWABLE FILL (CY)	CONVERT 2GI TO JB W/ MH	CONVERT 2GI TO TBJB W/ SLAB LID	DRAINAGE PIPE ELBOWS NO. & SIZE (HDPE)	CONC. COLLARS CL. "B" C.Y. STD. 840.72 (CY)	PIPE REMOVAL LIN. FT. (CY)	REMARKS
SHEET 9																																									
-RPC- 17+78.48	76	77							1																							1						2 @ 18			
-RPC- 18+00.50	77								1									1				1																			
-RPC- 18+00.50	77	78																																							
-RPC- 20+99.30	78								1									1				1																			
-RPC- 20+99.30	78	80																																							
-RPC- 24+47.71	80								1	0.25								1				1																			
-RPC- 24+47.71	80	81																																							
-RPC- 26+02.89	81								1	3.9								1				1																			
-RPC- 26+02.89	81	84																																							
-RPC- 26+04.68	84								1																							1									
-RPC- 26+04.68	84	OUT																																							
-RPC- 28+01.82	82	83							1																							1						2 @ 24			
-RPC- 28+02.32	83								1	0.25								1			1	1																			3GI-A
-RPC- 28+02.32	83	81																																							
-LPC- 13+32.10	87								1			1		1																											
-LPC- 13+32.10	87	86																																							
-LPC- 12+76.82	86								1			1	1																												
-LPC- 12+76.82	86	85																																							
-LPC- 12+02.40	85								1			1			1																										
-LPC- 12+02.40	85	OUT																																							
-LPC- 0+68.54	91								1										1			1																			
-LPC- 0+68.54	91	OUT																																				2 @ 15			
-I73- 99+65.66	90								1										1			1																			
-I73- 99+65.66	90	OUT																																				2 @ 15			
-I73- 98+14.27	89								1										1			1																			
-I73- 98+14.27	89	OUT																																				2 @ 15			
-I73- 94+98.46	78A								1										1					1																	
-I73- 94+98.46	78A	79A																																							
-I73- 94+90.92	79A								1										1					1																	
-I73- 94+90.92	79A	80A																																							
-I73- 94+86.93	80A								1																1						1										
-I73- 94+86.93	80A	81A																																				2 @ 18			
-RPC- 19+40.37	81A								1																							1									
-RPC- 19+40.37	81A	OUT																																							
-LPC- 4+99.14	82A								1										1			1																			
-LPC- 4+99.14	82A	OUT																																							
-LPB- 5+95.87	71								1			1		1																											
-LPB- 5+95.87	71	OUT																																							
-LPB- 2+28.37	73	OUT					3.4																																	48	
-LPB- 10+02.91	74								1			1	1																												
-LPB- 10+02.91	74	75																																							
-LPB- 10+34.09	75								1			1			1																										
-LPB- 10+34.09	75	OUT																																							
																																						6 @ 15			
																																						4 @ 18			
																																						2 @ 24			
SHEET TOTALS							3.4		22	4.4		6	2	2	2			5	6		1	9		2	1						1	4	0	0						48	

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

7/29/2019
R:\Roadway\Proj\R3421A_rdy_sum_3D.dgn
default

COMPUTED BY: WCB DATE: 6/7/19
CHECKED BY: JRGO DATE: 6/10/19

12/06/07

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	3D-5

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

STATION / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (HDPE PIPE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
SHEET 9 (cont.)																															
-I73- 104+00.45	RT	92		226.74																											
-I73- 104+00.45	RT	92	93		224.82	224.17			64																						
-L2CONN- 7+35.97	RT	93		226.92																											
-L2CONN- 7+35.97	RT	93	94		225.04	223.55																			144						
-I73- 103+80.68	LT	95		255.57																											
-I73- 103+80.68	LT	95	96		252.82	252.05																			92						
-I73- 103+76.69	CL	96		254.80																											
-I73- 103+76.69	CL	96	94		251.80	223.40				108																					
-L2CONN- 8+82.95	RT	94		228.28																											
-L2CONN- 8+82.95	RT	94	97		223.40	223.00																				48					
-L2CONN- 9+35.85	RT	97		227.70																											
-L2CONN- 9+35.85	RT	97	99		222.95	218.40																					276				
-L2CONN- 12+13.63	RT	99		223.15																											
-L2CONN- 12+13.63	RT	99	100		218.40	218.00																					132				
-L2- 19+62.73	LT	98		221.88																											
-L2- 19+62.73	LT	98	100		219.96	218.46																			148						
-L2- 14+17.55	LT	101		230.74																											
-L2- 14+17.55	LT	101	100		227.99	218.46											392														
-L2- 18+12.74	LT	100		223.14																											
-L2- 18+12.74	LT	100	OUT		217.75	217.50																						84			
-L2CONN- 14+23.21	LT	102		223.80																											
-L2CONN- 14+23.21	LT	102	103		221.90	220.80											264														
-L2CONN- 16+82.18	LT	103		222.73																											
-L2CONN- 16+82.18	LT	103	104		220.50	219.30												250													
-L2CONN- 19+27.18	LT	104		223.60																											
-L2CONN- 19+27.18	LT	104	OUT		219.30	219.10												52													
-RPA- 11+15.92	LT	105		253.00																											
-RPA- 11+15.92	LT	105	106		250.25	241.91											212														
-RPA- 13+25.87	LT	106		244.66																											
-RPA- 13+25.87	LT	106	108		241.66	237.40																				80					
-RPA- 13+78.02	RT	107	108		279.95	237.65			92																						
-RPA- 13+65.31	RT	108		240.40																											
-RPA- 13+65.31	RT	108	109		235.65	222.95													276												
-RPA- 16+67.66	RT	110	109		256.54	224.95			64																						
-RPA- 16+53.72	RT	109		227.70																											
-RPA- 16+53.72	RT	109	113		222.95	215.90													136												
-RPA- 17+99.99	RT	111	113		243.79	220.38			40																						
-RPA- 17+88.33	LT	112		219.70																											
-RPA- 17+88.33	LT	112	113		216.70	216.00																				96					
-RPA- 17+95.22	RT	113		223.13																											
-RPA- 17+95.22	RT	113	114		215.80	215.28														128											
-RPA- 19+34.25	RT	114		220.53																											
-RPA- 19+34.25	RT	114	OUT		215.28	215.00														80											
-RPA- 19+34.25	RT	115	114		229.40	215.28			28																						
-RPA- 21+59.66	RT	117		223.46																											
-RPA- 21+59.66	RT	117	116		220.71	220.40											104														
-RPA- 20+52.86	RT	116		223.15																											
-RPA- 20+52.86	RT	116	OUT		220.40	212.75											40														
SHEET TOTALS									288	108							1012	302	412	208					384	224	408	84			

STATION	LOCATION	FROM	TO	24" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	30" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	42" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	48" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	HDPE	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. 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 D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. (W.S. FLAT) FRAME W/ GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	J.B. STD. 840.31 OR 840.32	T.B.J.B STD. 840.34	T.B.D.I. STD 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL GRATE AND FRAME STD 840.37	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	MANHOLE FRAME AND COVER STD 840.54	O.T.C.B. STD. 840.04, STD. 840.05	BERM DITCH OUTLET STD. 850.10 (S.Y.)	BERM DITCH OUTLET STD. 850.11 (S.Y.)	FLOWABLE FILL (CY)	CONVERT 2GI TO JB W/ MH	CONVERT 2GI TO TBJB W/ SLAB LID	DRAINAGE PIPE ELBOWS NO. & SIZE (HDPE)			CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
SHEET 9 (cont.)																																												
-I73- 104+00.45	RT	92								1										1			1																					
-I73- 104+00.45	RT	92	93																																									
-L2CONN- 7+35.97	RT	93								1											1		1																					
-L2CONN- 7+35.97	RT	93	94																																									
-I73- 103+80.68	LT	95								1										1			1																					
-I73- 103+80.68	LT	95	96																																									
-I73- 103+76.69	CL	96								1										1					1																			
-I73- 103+76.69	CL	96	94																																				2	@	18			
-L2CONN- 8+82.95	RT	94								1																1						1												
-L2CONN- 8+82.95	RT	94	97																																									
-L2CONN- 9+35.85	RT	97								1									1				1																					
-L2CONN- 9+35.85	RT	97	99																																									
-L2CONN- 12+13.63	RT	99								1									1				1																					
-L2CONN- 12+13.63	RT	99	100																																									
-L2- 19+62.73	LT	98								1											1		1													5.49								Fill with Flowable Material
-L2- 19+62.73	LT	98	100																																								40	
-L2- 14+17.55	LT	101								1										1			1													7.61								Fill with Flowable Material
-L2- 14+17.55	LT	101	100																																									
-L2- 18+12.74	LT	100								1	0.14									1			1																					
-L2- 18+12.74	LT	100	OUT																																									
-L2CONN- 14+23.21	LT	102								1											1		1																					
-L2CONN- 14+23.21	LT	102	103																																									
-L2CONN- 16+82.18	LT	103								1											1		1																					
-L2CONN- 16+82.18	LT	103	104																																								140	
-L2CONN- 19+27.18	LT	104								1										1			1																					
-L2CONN- 19+27.18	LT	104	OUT																																									
-RPA- 11+15.92	LT	105								1										1			1																					
-RPA- 11+15.92	LT	105	106																																									
-RPA- 13+25.87	LT	106								1										1			1																					
-RPA- 13+25.87	LT	106	108																																									
-RPA- 13+78.02	RT	107	108							1																							1						2	@	15			
-RPA- 13+65.31	RT	108								1									1				1																					
-RPA- 13+65.31	RT	108	109																																									
-RPA- 16+67.66	RT	110	109																															11					2	@	15			BERM DITCH OUTLET
-RPA- 16+53.72	RT	109								1									1				1																					
-RPA- 16+53.72	RT	109	113																																									
-RPA- 17+99.99	RT	111	113																															11					2	@	15			BERM DITCH OUTLET
-RPA- 17+88.33	LT	112								1										1			1																					
-RPA- 17+88.33	LT	112	113																																									
-RPA- 17+95.22	RT	113								1	0.25								1				1																					
-RPA- 17+95.22	RT	113	114																																									
-RPA- 19+34.25	RT	114								1	0.25								1				1																					
-RPA- 19+34.25	RT	114	OUT																																									
-RPA- 19+34.25	RT	115	114																															11					2	@	15			BERM DITCH OUTLET
-RPA- 21+59.66	RT	117								1										1			1																					
-RPA- 21+59.66	RT	117	116																																									
-RPA- 20+52.86	RT	116								1										1			1																					
-RPA- 20+52.86	RT	116	OUT																																									
																																							8	@	15			
																																							2	@	18			
SHEET TOTALS										23	0.64								6	11	4		20		1	1						1	1	33		13.10							180	

ABBREVIATIONS

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

7/29/2019
R:\Roadway\Proj\R3421A_rdy_sum_3D.dgn
default

COMPUTED BY: WCB DATE: 6/7/19
CHECKED BY: JRGO DATE: 6/10/19

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	3D-6

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

STATION / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (HDPE PIPE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"	24" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	30" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	42" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	48" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED CU. YARDS R.C.P.	HDPE	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. 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 D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. (W.S. FLAT) FRAME W/ GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	J.B. STD. 840.31 OR 840.32	T.B.J.B STD. 840.34	T.B.D.I. STD 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL GRATE AND FRAME STD 840.37	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	MANHOLE FRAME AND COVER STD 840.54	O.T.C.B. STD. 840.04, STD. 840.05	BERM DITCH OUTLET STD. 850.10 (S.Y.)	BERM DITCH OUTLET STD. 850.11 (S.Y.)	FLOWABLE FILL (CY)	CONVERT 2GI TO JB W/ MH	CONVERT 2GI TO TBJB W/ SLAB LID	DRAINAGE PIPE ELBOWS NO. & SIZE (HDPE)			CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
SHEET 10																																																																									
-RPA- 7+01.84	RT	118	OUT		274.80	262.68			32																																																					11					2	@	15			BERM DITCH OUTLET
-RPA- 5+74.60	RT	119	OUT		251.50	238.20																									348					6																																						
-I73- 114+95.49	LT	123		276.32																																		1										1			1																						
-I73- 114+95.49	LT	123	124		273.32	272.32																				96																																																
-I73- 114+93.5	CL	124		277.32																																		1	0.75								1						1																			
-I73- 114+93.50	CL	124	122		271.57	262.93													492																																																							
-I73- 110+00.00	CL	122		267.68																																		1									1						1																			
-I73- 110+00.00	CL	122	121		262.93	257.41													244																																																						
-I73- 107+52.32	CL	121		262.16																																		1									1						1																			
-I73- 107+52.52	CL	121	OUT		257.41	251.00																					124																																														
-RPD- 7+14.31	RT	162	125		244.04	223.50														188																																																					
-RPD- 9+23.47	RT	126	125		256.56	228.00			48																																																					11					2	@	15			BERM DITCH OUTLET
-RPD- 9+11.65	RT	125		230.75																																		1	2.75								1				1																					
-RPD- 9+11.65	RT	125	OUT		223.00	220.50																							148																																											
-RPD- 21+64.62	RT	133		287.00																																		1										1			1																						
-RPD- 21+64.62	RT	133	132		284.25	265.35										348																																																										
-RPD- 17+98.69	RT	132		268.10																																		1										1			1																						
-RPD- 17+98.69	RT	132	131		265.35	251.72										284																																																										
-RPD- 14+98.04	RT	131		254.47																																		1										1			1																						
-RPD- 14+98.04	RT	131	OUT		251.47	243.60																				132																																																
-I73- 123+50.23	LT	134	135		319.83	291.83						52																																																				31									BERM DITCH OUTLET
-I73- 123+95.90	LT	136		297.00																																		1										1			1																						
-I73- 123+95.90	LT	136	135		294.00	291.83											44																																																									
-I73- 123+51.91	LT	135		295.83																																		1										1			1																						
-I73- 123+51.91	LT	135	137		291.83	290.88																						84																																														
-I73- 123+54.75	CL	137		294.88																																		1										1					1																			
-I73- 123+54.75	CL	137	OUT		290.88	290.75																						108																																													
-I73- 128+05.16	LT	140	139		299.75	295.60																									140					6																																						
-I73- 127+00.00	CL	139		303.03																																		1	2.43								1						1																			
-I73- 127+00.00	CL	139	138		295.60	289.60																									140					6																																						
SHEET TOTALS									80			52					632	44	736	188						228	124	192	148		628					18		12	5.93								5	7			7		5									22	31				4	@	15			

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

12/06/07

7/29/2019
R:\Roadway\Proj\R3421A_rdy_sum_3D.dgn
default

COMPUTED BY: WCB DATE: 6/7/19
CHECKED BY: JRGO DATE: 6/10/19

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	3D-7

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (HDPE PIPE) 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
THICKNESS OR GAUGE								.064	.064	.064	.064	.079	.079	.109	.109																
SHEET 11																															
-L2REV- 29+46.45	LT	147		224.50																											
-L2REV- 29+46.45	LT	147	OUT		221.50	219.80											40														
-L2- 28+85.08	LT	148		227.50																											
-L2- 31+26.01	LT	149		226.76																											
-L2- 31+26.01	LT	149	153		223.76	221.35																				196					
-L2- 31+74.57	RT	150		218.00																											
-L2- 33+22.76	LT	153		227.70																											
-L2- 33+22.76	LT	153			221.35	EXIST													8												
-L2REV- 33+31.92	LT	151		228.93																											
-L2REV- 33+31.92	LT	151	152		225.00	EXIST													8												
-L2REV- 35+15.17	LT	154		233.15																											
-L2REV- 35+15.17	LT	154	155		227.50	227.10												12													
-L2REV- 35+15.24	LT	155		230.37																											
-RPC- 32+09.84	RT	156		267.10																											
-RPC- 32+09.84	RT	156	156A		267.10	227.57			80																						
-RPC- 32+03.07	RT	156A		229.49																											
-RPC- 32+03.07	RT	156A	157		227.57	227.00																			48						
-RPC- 32+50.39	RT	157		234.40																											
-RPC- 36+50.39	RT	157	158		227.00	226.50																			108						
-RPC- 33+61.96	RT	158		237.92																											
-RPC- 33+61.96	RT	158	158A		226.00	225.50																				28					
-RPC- 33+59.16	LT	158A		240.60																											
-RPC- 33+59.16	LT	158A	OUT		225.50	214.00				84																					
-RPC- 36+50.48	RT	159		252.27																											
-RPC- 36+50.48	RT	159	159A		249.52	241.64																			144						
-RPC- 34+99.76	RT	159A		244.39																											
-RPC- 34+99.76	RT	159A	158		241.64	235.17																			132						
-L2- 38+63.03	LT	161		246.90																											
-L2- 38+63.03	LT	161	161A		244.15	227.50											363														
-L2- 35+01.05	LT	161A		231.50		222.50																									
-RPD- 1+93.43	RT	165A		243.75																											
-RPD- 1+93.43	RT	165A	165	241.42	237.76													80													
-RPD- 2+83.51	RT	164	165		255.39	235.76					44																				
-RPD- 2+81.08	RT	165		240.51																											
-RPD- 2+81.08	RT	165	163		237.76	227.17													212												
-RPD- 5+02.76	RT	163		231.92																											
-RPD- 5+02.76	RT	163	162		227.17	224.54													204												
-RPD- 7+14.31	RT	162		229.29																											
SHEET 12																															
-L2REV- 40+99.21	LT	166		261.50																											
-L2REV- 40+99.21	LT	166	OUT		258.75	235.50			76																						
-L2REV- 44+12.43	RT	167		276.98																											
-L2- 43+88.43	RT	169		289.43																											
-L2- 43+88.43	RT	169	170		286.68	268.22			108																						
-RPC- 43+46.64	RT	168	170		EXIST	268.22												16													
-RPC- 40+40.91	RT	170		271.28																											
-RPC- 43+40.91	RT	170	OUT		268.22	233.00				156																					
-L2- 49+44.64	RT	172		311.90																											
-L2- 49+44.64	RT	172	171		309.15	EXIST											20														
-L2- 52+88.66	RT	174		331.56																											
-L2- 52+88.66	RT	174	173		328.81	EXIST											12														
SHEET 13																															
-FLY- 34+78.64	LT	175		217.01																											
-FLY- 37+04.75	RT	176		199.80																											
-FLY- 37+04.75	RT	176	OUT		197.05	184.00			20																						
SHEET TOTALS									284	240	44						435	108	432						432	224					

STATION	LOCATION	FROM	TO	24" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	30" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	42" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	48" R.C. PIPE CULVERTS, CONTRACTOR DESIGN	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED) CU. YARDS R.C.P.	HDPE	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. 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 D.I. STD. 852.04 OR STD. 852.06	C.B. STD. 852.05	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. (W.S. FLAT) FRAME W/ GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22
SHEET 11																									
-L2REV- 29+46.45	LT	147								1										1			1		
-L2REV- 29+46.45	LT	147	OUT																						
-L2- 28+85.08	LT	148								1										1			1		
-L2- 31+26.01	LT	149								1										1			1		
-L2- 31+26.01	LT	149	153																						
-L2- 31+74.57	RT	150								1										1			1		
-L2- 33+22.76	LT	153								1	1.35									1			1		
-L2- 33+22.76	LT	153						1.5																	
-L2REV- 33+31.92	LT	151								1										1					1
-L2REV- 33+31.92	LT	151	152					1.5																	
-L2REV- 35+15.17	LT	154								1	0.65									1			1		
-L2REV- 35+15.17	LT	154	155																						
-L2REV- 35+15.24	LT	155								1															
-RPC- 32+09.84	RT	156																							
-RPC- 32+09.84	RT	156	156A							1															
-RPC- 32+03.07	RT	156A								1											1		1		
-RPC- 32+03.07	RT	156A	157																						
-RPC- 32+50.39	RT	157								1	2.4									1			1		
-RPC- 36+50.39	RT	157	158																						
-RPC- 33+61.96	RT	158								1	5	1.92													
-RPC- 33+61.96	RT	158	158A																						
-RPC- 33+59.16	LT	158A								1	5	5.1													
-RPC- 33+59.16	LT	158A	OUT																						
-RPC- 36+50.48	RT	159								1															
-RPC- 36+50.48	RT	159	159A																						
-RPC- 34+99.76	RT	159A								1															
-RPC- 34+99.76	RT	159A	158																						
-L2- 38+63.03	LT	161								1										1			1		
-L2- 38+63.03	LT	161	161A																						
-L2- 35+01.05	LT	161A								1	4									1			1		
-RPD- 1+93.43	RT	165A								1															
-RPD- 1+93.43	RT	165A	165																						
-RPD- 2+83.51	RT	164	165																						
-RPD- 2+81.08	RT	165								1									1				1		
-RPD- 2+81.08	RT	165	163																						
-RPD- 5+02.76	RT	163								1									1						1
-RPD- 5+02.76	RT	163	162																						
-RPD- 7+14.31	RT	162								1									1					1	1
SHEET 12																									
-L2REV- 40+99.21	LT	166								1										1			1		
-L2REV- 40+99.21	LT	166	OUT																						
-L2REV- 44+12.43	RT	167								1										1			1		
-L2- 43+88.43	RT	169								1										1			1		
-L2- 43+88.43	RT	169	170																						
-RPC- 43+46.64	RT	168	170																						
-RPC- 40+40.91	RT	170								1											1		1		
-RPC- 43+40.91	RT	170	OUT																						
-L2- 49+44.64	RT	172								1										1			1		
-L2- 49+44.64	RT	172	171																						
-L2- 52+88.66	RT	174								1										1			1		
-L2- 52+88.66	RT	174	173																						
SHEET 13																									
-FLY- 34+78.64	LT	175								1										1			1		
-FLY- 37+04.75	RT	176								1										1			1		
-FLY- 37+04.75	RT	176	OUT																						
SHEET TOTALS								3		29	18.4	7.02							3	17	2		19	1	3

STATION	LOCATION	FROM	TO	J.B. STD. 840.31 OR 840.32	T.B.J.B STD. 840.34	T.B.D.I. STD 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL GRATE AND FRAME STD 840.37	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	MANHOLE FRAME AND COVER STD 840.54	O.T.C.B. STD. 840.04, STD. 840.05	BERM DITCH OUTLET STD. 850.10 (S.Y.)	BERM DITCH OUTLET STD. 850.11 (S.Y.)	FLOWABLE FILL (CY)	CONVERT 2GI TO JB W/ MH	CONVERT 2GI TO TBJB W/ SLAB LID	DRAINAGE PIPE ELBOWS NO. & SIZE (HDPE)			CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
SHEET 11																						
-L2REV- 29+46.45	LT	147																				
-L2REV- 29+46.45	LT	147	OUT																			
-L2- 28+85.08	LT	148																			4	
-L2- 31+26.01	LT	149																				
-L2- 31+26.01	LT	149	153																			
-L2- 31+74.57	RT	150																				
-L2- 33+22.76	LT	153																				
-L2- 33+22.76	LT	153																				
-L2REV- 33+31.92	LT	151																		0.5526		
-L2REV- 33+31.92	LT	151	152																			
-L2REV- 35+15.17	LT	154																				
-L2REV- 35+15.17	LT	154	155																			
-L2REV- 35+15.24	LT	155		1																		
-RPC- 32+09.84	RT	156																				
-RPC- 32+09.84	RT	156	156A								1						2	@	15			
-RPC- 32+03.07	RT	156A																				
-RPC- 32+03.07	RT	156A	157																			
-RPC- 32+50.39	RT	157																				
-RPC- 36+50.39	RT	157	158																			
-RPC- 33+61.96	RT	158					1	1														
-RPC- 33+61.96	RT	158	158A																			
-RPC- 33+59.16	LT	158A		1						1												
-RPC- 33+59.16	LT	158A	OUT																			
-RPC- 36+50.48	RT	159					1	1														
-RPC- 36+50.48	RT	159	159A																			
-RPC- 34+99.76	RT	159A					1	1														
-RPC- 34+99.76	RT	159A	158																			
-L2- 38+63.03	LT	161												7.33							16	Fill with Flowable Fill
-L2- 38+63.03	LT	161	161A																			
-L2- 35+01.05	LT	161A																				
-RPD- 1+93.43	RT	165A									1											
-RPD- 1+93.43	RT	165A	165																			
-RPD- 2+83.51	RT	164	165										31				2	@	24		20	BERM DITCH OUTLET
-RPD- 2+81.08	RT	165																				
-RPD- 2+81.08	RT	165	163																			
-RPD- 5+02.76	RT	163																				
-RPD- 5+02.76	RT	163	162																			
-RPD- 7+14.31	RT	162																				3GI-A
SHEET 12																						
-L2REV- 40+99.21	LT	166																				
-L2REV- 40+99.21	LT	166	OUT														2	@	15			
-L2REV- 44+12.43	RT	167																			4	
-L2- 43+88.43	RT	169																				
-L2- 43+88.43	RT	169	170																			
-RPC- 43+46.64	RT	168	170																	0.4465	25	
-RPC- 40+40.91	RT	170																				
-RPC- 43+40.91	RT	170	OUT														2	@	18			
-L2- 49+44.64	RT	172																				
-L2- 49+44.64	RT	172	171																	0.399	4	
-L2- 52+88.66	RT	174																				
-L2- 52+88.66	RT	174	173																	0.399	4	
SHEET 13																						
-FLY- 34+78.64	LT	175																			48	
-FLY- 37+04.75	RT	176																				
-FLY- 37+04.75	RT	176	OUT														1	@	15			
																	5	@	15			
																	2	@	18			
																	2	@	24			
SHEET TOTALS				2			3	3		1	2	0	31	7.33						1.7971	125	

ABBREVIATIONS

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