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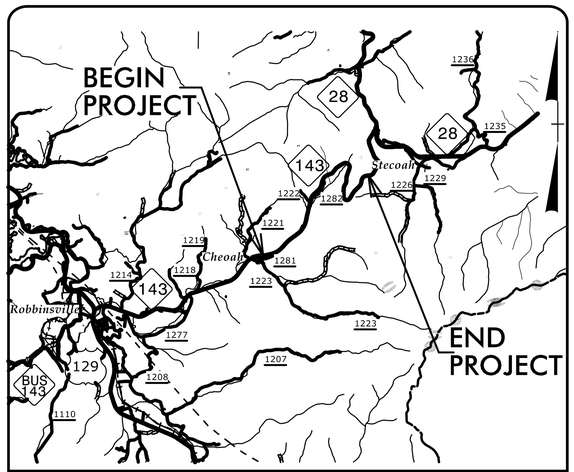
09/08/99

TIP PROJECT: A-0009CB

CONTRACT: C204739

See Sheet 1A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CB	1	

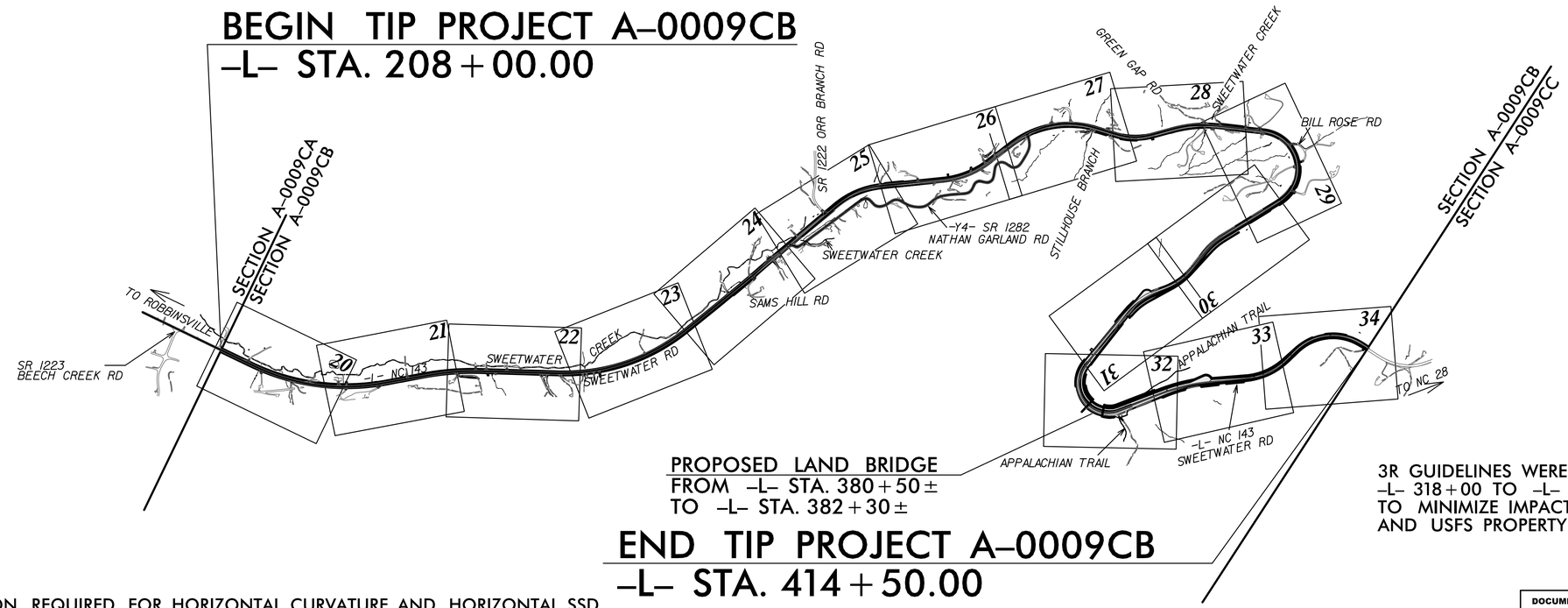
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
32572.1.FS10	APD-0074(178)	PE
32572.2.14	0143010	ROW
32572.2.19	UNASSIGNED	UTIL.
32572.3.14	0129008	CONST.

LOCATION: NC 143 FROM SR 1223 (BEECH CREEK RD) TO 0.5 MILES NORTH OF APPALACHIAN TRAIL

TYPE OF WORK: GRADING, PAVING, DRAINAGE, RETAINING WALLS, STRUCTURE, AND CULVERTS

NAD 83/2011

BEGIN TIP PROJECT A-0009CB
-L- STA. 208+00.00



PROPOSED LAND BRIDGE
FROM -L- STA. 380+50±
TO -L- STA. 382+30±

END TIP PROJECT A-0009CB
-L- STA. 414+50.00

3R GUIDELINES WERE USED FROM -L- 318+00 TO -L- STA 414+50 TO MINIMIZE IMPACTS TO TRIBAL AND USFS PROPERTY.

DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND HORIZONTAL SSD.
THIS IS A PARTIAL CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS SHOWN ON THE PLANS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS 50 25 0 50 100

PROFILE (HORIZONTAL) 50 25 0 50 100

PROFILE (VERTICAL) 10 5 0 10 20

DESIGN DATA

ADT 2022 = 6590
ADT 2045 = 8800
K = 11 %
D = 57.5 %
T = 7 % *
V = 60 MPH
* TTST = 2% DUAL = 5%
FUNC CLASS =
RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT A-0009CB = 3.911 MILES
TOTAL LENGTH TIP PROJECT A-0009CB = 3.911 MILES

NCDOT CONTACT: WANDA H. AUSTIN, PE

PLANS PREPARED BY:
TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 14
252 Webster Rd
Sylva, NC 28779

RIGHT OF WAY DATE: JULY 22, 2021

LETTING DATE: SEPTEMBER 20, 2022

2018 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

AUSTIN TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

7/27/2022

NORTH CAROLINA PROFESSIONAL SEAL 038697 ENGINEER DAVID B. PETTY

DocuSigned by: David B. Petty 40DEE24B5B6465...

P.E.

SIGNATURE:

ROADWAY DESIGN ENGINEER

7/27/2022

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY

DocuSigned by: Jimmy Terry 4DDE...

P.E.

SIGNATURE:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

7/13/2022
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8/17/99

INDEX OF SHEETS

SHEET NUMBER	SHEET
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1B	CONVENTIONAL SYMBOLS
2A-1 THRU 2A-4	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1	ROADWAY DETAIL - WILDLIFE FENCE LAYOUT
2B-2	ROADWAY DETAIL - LANDBRIDGE GRADING
2C-1	SPECIAL DETAILS - GUARDRAIL INSTALLATION (W BEAM RAIL SECTION)
2C-2	SPECIAL DETAILS - 8'GUARDRAIL POST
2C-3	SPECIAL DETAILS - GUARDRAIL AT-1 END UNIT
2C-4	SPECIAL DETAILS - HANDRAIL ON WALL
2C-5	SPECIAL DETAILS - CHAIN LINK FENCE ON RETAINING WALL
2C-6	SPECIAL DETAILS - WILDLIFE FENCE
2C-7	SPECIAL DETAILS - WILDLIFE FENCE ON RETAINING WALL
2C-8	SPECIAL DETAILS - CATTLE GUARD
2C-9	SPECIAL DETAILS - WILDLIFE JUMP OUT DETAIL
2C-10	SPECIAL DETAILS - GUARDRAIL ANCHOR UNIT TYPE B-77SC
2D-1	DRAINAGE DETAIL - CONCRETE CATCH BASIN (3 OR 4 SIDE OPEN THROAT)
2D-2	DRAINAGE DETAIL - CONVERT EXIST. DI, CB, OTCB OR GI TO JUNCTION BOX
2D-3	DRAINAGE DETAIL - TRAFFIC BEARING DROP INLET TYPE "A"
2D-4	DRAINAGE DETAIL - GUIDE FOR BERM DRAINAGE OUTLET - 36" PIPE
2D-5	DRAINAGE DETAIL - GUIDE FOR BERM DRAINAGE OUTLET - 42" PIPE
2D-6	DRAINAGE DETAIL - GUIDE FOR BERM DRAINAGE OUTLET - 48" PIPE
2D-7	DRAINAGE DETAIL - CONC GRATED DI TYPE 'A' MINIMUM DEPTH
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2G-3 THRU 2G-5	GEOTECHNICAL DETAILS - STANDARD TEMPORARY WALL
2G-6	GEOTECHNICAL DETAILS - HORIZONTAL DRAINS
2G-7	GEOTECHNICAL DETAILS - ROCK SLOPE MATERIALS
3B-1	EARTHWORK SUMMARY & ASPHALT PAVEMENT REMOVAL SUMMARY
3B-2	GUARDRAIL SUMMARY
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3D-13	SUMMARY OF STORMWATER CONTROL MEASURES
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3P-1	PARCEL INDEX SHEET
20 THRU 34	PLAN SHEETS
44 THRU 51	PROFILE SHEETS
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TMP-1 THRU TMP-31	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-10	PAVEMENT MARKING PLANS
EC-1 THRU EC-34	EROSION CONTROL PLANS
RF-1	REFORESTATION DETAIL SHEET
RF-2 & RF-3	STREAMBANK REFORESTATION DETAIL SHEETS
L-1 THRU L-10	LANDSCAPE DESIGN ANF DEVELOPMENT PLANS
SIGN-1 THRU SIGN-12	SIGNING PLANS
UO-1 THRU UO-16	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION INDEX
X-1B THRU X-1C	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-289	CROSS-SECTIONS
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C2-1 THRU C2-3	CULVERT PLANS - 12'-10" X 8'-4" ALUMINUM PIPE ARCH CULVERT
C3-1 THRU C3-3	CULVERT PLANS - 20'-11" X 6'-1" ALUMINUM BOX CULVERT
STANDARD NOTES	
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W13-1 THRU W13-4	RETAINING WALLS #13 & # 14
W15-1 THRU W15-5	RETAINING WALL #15
W16-1 THRU W16-8	RETAINING WALL #16
W17-1 THRU W17-3	RETAINING WALL #17
W18-1 THRU W18-6	RETAINING WALL #18
W19-1 THRU W19-11	RETAINING WALL #19A & #19B
W19C-1 THRU W19C-2	RETAINING WALL #19C
W20-1 THRU W20-3	RETAINING WALL #20
W28_29-1 THRU W28_29-10	RETAINING WALL2 #28 & #29
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W42-1 THRU W42-5	RETAINING WALL #42

GENERAL NOTES

GENERAL NOTES: 2018 SPECIFICATIONS
EFFECTIVE: 01-16-2018
REVISED:

GRADE LINE:
GRADING AND SURFACING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

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

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.

GUARDRAIL:

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

TEMPORARY SHORING:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE DUKE ENERGY, FRONTIER, & ZITO MEDIA.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

ROCK

ROCK IS ANTICIPATED BETWEEN -L- 255+00 TO 261+00, -L- 264+75 TO 262+25, -L- 285+25 TO 285+75, -L- 294+75 TO 295+25, -L- 314+75 TO 315+25, -L- 344+00 TO 344+50, -L- 355+25 TO 355+75, -L- 357+25 TO 357+75, -L- 359+75 TO 362+50, -L- 364+00 TO 367+50, -L- 371+00 TO 374+50, -L- 380+50 TO 384+00, -L- 395+00 TO 396+00, -L- 402+00 TO 403+00, & -L- 406+75 TO 407+75.
BLASTING MAY BE REQUIRED FOR EXCAVATION ON THE PROJECT. SEE SECTION 220 OF THE STANDARD SPECIFICATIONS AND IF APPLICABLE, ROCK BLASTING PROVISION.

The Contractor should be advised that any clearing within the Permanent Easement (PE) along USFS property shall adhere to the agreement between NCDOT and the USFS. The Contractor is to coordinate with the Resident Engineer and Division Environmental Officer prior to starting clearing operations to ensure compliance. See Plan Sheets 29 thru 34.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST., STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY
ENGINEER
JIMMY L. TERRY 6/27/2022

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	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.03	Deceleration and Acceleration Lanes
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
240.01	Guide for Berm Ditch Construction
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
560.02	Method of Shoulder Constructio - High Side of Superelevated Curve - Method II
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
610.04	Guide for Paving Shoulders Under Bridges - Method IV
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.04	Conc. Endwall for Single & Double Pipe Culvert - 17"x13" thru 71"x47" Arch 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.14	Brick Endwall for Single & Double Pipe Culverts - 17"x13" thru 71"x47" Arch 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.20	Frames and Wide Slot Flat Grates
840.22	Frames and Wide Slot Sag Grates
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.41	Spring Box - Concrete or Brick
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.52	Precast Manhole - 4', 5' and 6' Diameter
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
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
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
854.02	Double Faced Concrete Barrier - Types 'T', 'T1' and 'T2'
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
866.01	Chain Link Fence - 4', 5' and 6' High Fence
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

6/13/2022
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9/10/2021

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP) — EIP
- Computed Property Corner
- Existing Concrete Monument (ECM) — 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 — S
- Potential Contamination Area: Soil — S
- Known Contamination Area: Water — W
- Potential Contamination Area: Water — W
- 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 & PROJECT CONTROL:

- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Secondary Horiz and Vert Control Point
- Vertical Benchmark
- Existing Right of Way Monument
- Proposed Right of Way Monument (Rebar and Cap)
- Proposed Right of Way Monument (Concrete)
- Existing Permanent Easement Monument
- Proposed Permanent Easement Monument (Rebar and Cap)
- Existing C/A Monument
- Proposed C/A Monument (Rebar and Cap)
- Proposed C/A Monument (Concrete)
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Existing Control of Access Line — CA
- Proposed Control of Access Line — CA
- Proposed ROW and CA Line — RW 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

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 — Vlneyard

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:

** SUE – Subsurface Utility Engineering*
LOS – Level of Service – A,B,C or D (Accuracy)

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 — HH
- H–Frame Pole
- U/G Power Line Test Hole (SUE – LOS A)*
- U/G Power Line (SUE – LOS B)* — P
- U/G Power Line (SUE – LOS C)* — P
- U/G Power Line (SUE – LOS D)* — 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 Test Hole (SUE – LOS A)*
- U/G Telephone Cable (SUE – LOS B)* — T
- U/G Telephone Cable (SUE – LOS C)* — T
- U/G Telephone Cable (SUE – LOS D)* — T
- U/G Telephone Conduit (SUE – LOS B)* — TC
- U/G Telephone Conduit (SUE – LOS C)* — TC
- U/G Telephone Conduit (SUE – LOS D)* — TC
- U/G Fiber Optics Cable (SUE – LOS B)* — T FO
- U/G Fiber Optics Cable (SUE – LOS C)* — T FO
- U/G Fiber Optics Cable (SUE – LOS D)* — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line Test Hole (SUE – LOS A)*
- U/G Water Line (SUE – LOS B)* — W
- U/G Water Line (SUE – LOS C)* — W
- U/G Water Line (SUE – LOS D)* — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Test Hole (SUE – LOS A)*
- U/G TV Cable (SUE – LOS B)* — TV
- U/G TV Cable (SUE – LOS C)* — TV
- U/G TV Cable (SUE – LOS D)* — TV
- U/G Fiber Optic Cable (SUE – LOS B)* — TV FO
- U/G Fiber Optic Cable (SUE – LOS C)* — TV FO
- U/G Fiber Optic Cable (SUE – LOS D)* — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line Test Hole (SUE – LOS A)*
- U/G Gas Line (SUE – LOS B)* — G
- U/G Gas Line (SUE – LOS C)* — G
- U/G Gas Line (SUE – LOS D)* — 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 Force Main Line Test Hole (SUE – LOS A)*
- SS Force Main Line (SUE – LOS B)* — FSS
- SS Force Main Line (SUE – LOS C)* — FSS
- SS Force Main Line (SUE – LOS D)* — FSS

MISCELLANEOUS:

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

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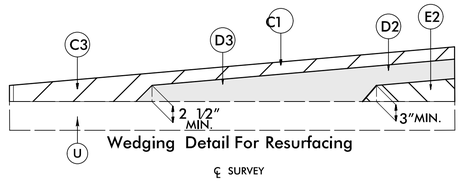
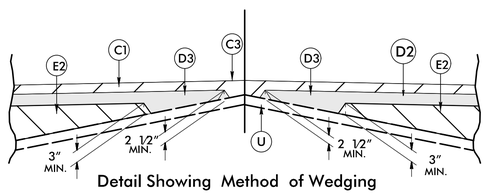
PAVEMENT SCHEDULE

C1	PROP. APPROX. 1 ½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1 ½" IN DEPTH.
D2	PROP. APPROX. 2 ½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LSSS THAN 2 ½" OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5 ½" IN DEPTH.
K	CLASS IV SUBGRADE STABILIZATION
J1	PROP. 4" AGGREGATE BASE COURSE.
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
R2	EXPRESSWAY GUTTER
R4	SHOULDER BERM GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING EXISTING PAVEMENT, SEE THIS SHEET FOR DETAILS
Y1	5 1/2" CONCRETE OVERLAY

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

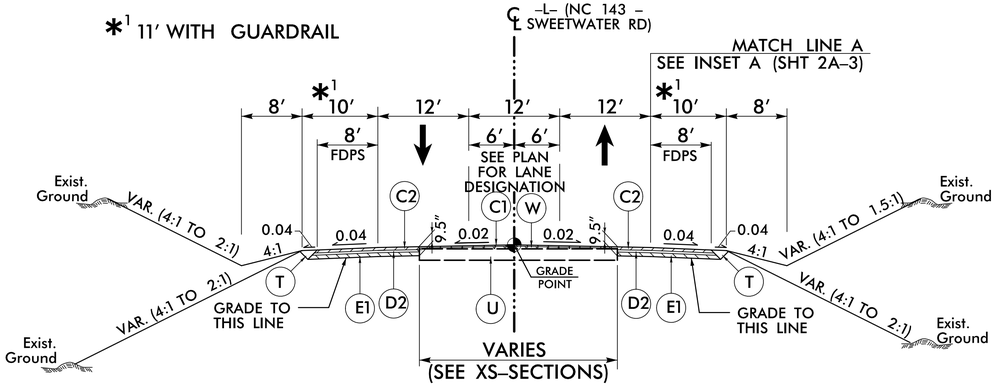


Wedging Detail For Resurfacing



Detail Showing Method of Wedging

NOTE:
ANYWHERE ALONG THE PROJECT IN WHICH LESS THAN 3" OF OVERLAY HAS BEEN CALLED FOR THE CONTRACTOR SHALL MILL EXISTING PAVEMENT AND PROVIDE A MINIMUM OF TWO FULL LAYERS OF S9.5C TO SATISFY RIDEABILITY REQUIREMENTS PER CONTRACT FOR –L–.

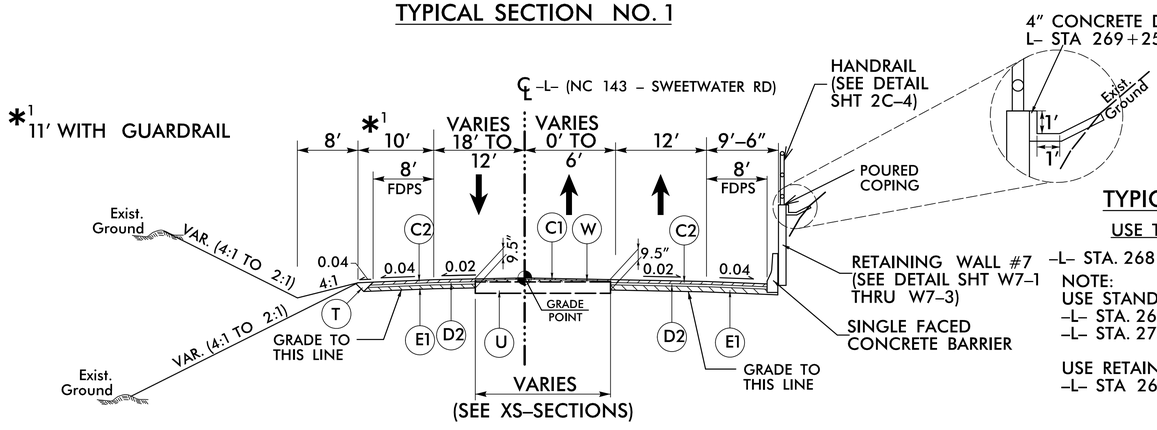


TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1

–L– STA. 208+00.00 TO –L– STA. 268+90.00

TYPICAL SECTION NO. 1



TYPICAL SECTION NO. 2

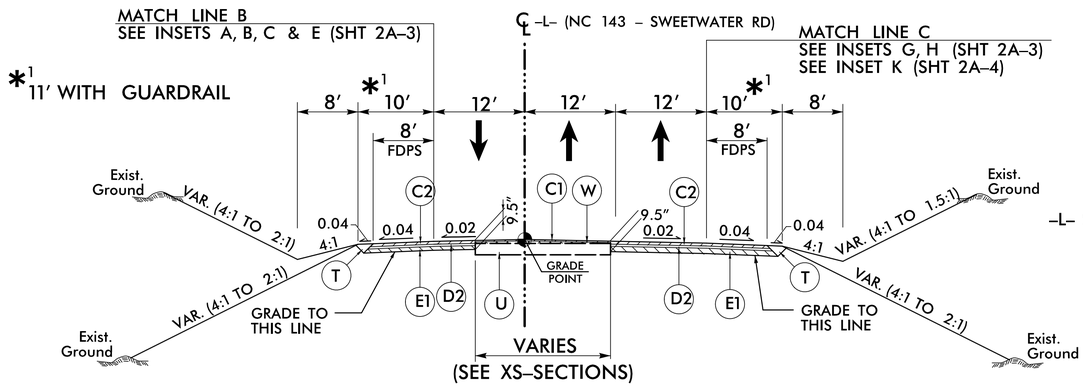
USE TYPICAL SECTION NO. 2

–L– STA. 268+90.00 TO –L– STA. 272+50.00

NOTE:
USE STANDARD DITCH:
–L– STA. 268+90.00 TO –L– STA. 269+25.00,RT
–L– STA. 272+19+/– TO –L– STA. 272+50.00, RT

USE RETAINING WALL:
–L– STA 269+25± TO –L– STA 272+19±,RT

TYPICAL SECTION NO. 2



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3

–L– STA. 272+50.00 TO –L– STA. 360+80.00

TYPICAL SECTION NO. 3

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2A-1

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 035018 ENGINEER JIMMY L TERRY
5/27/2022

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER
5/26/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

7/1/2022
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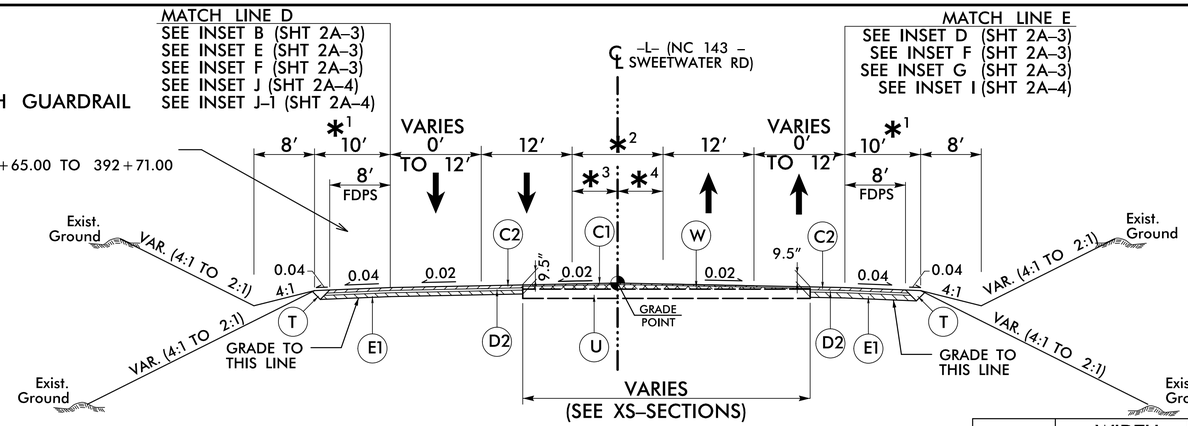
jterrell

DocuSign Envelope ID: 99505397-2A58-4433-AAE8-4D7FD9ACF5F5

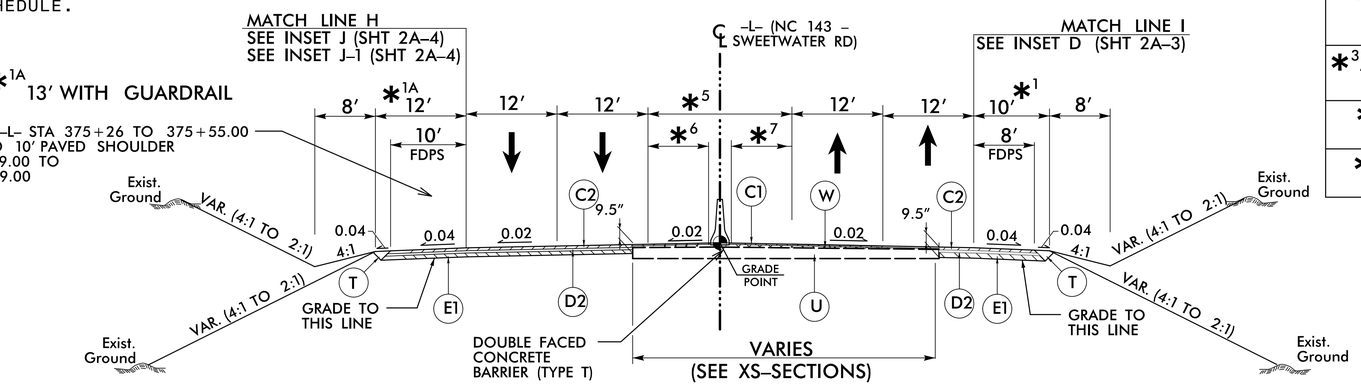
6/2/99

PAVEMENT SCHEDULE	
C1	1.5″ S9.5C
C2	3″ S9.5C
D2	2 ½″ I19.0C
E1	4″ B25.0C
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

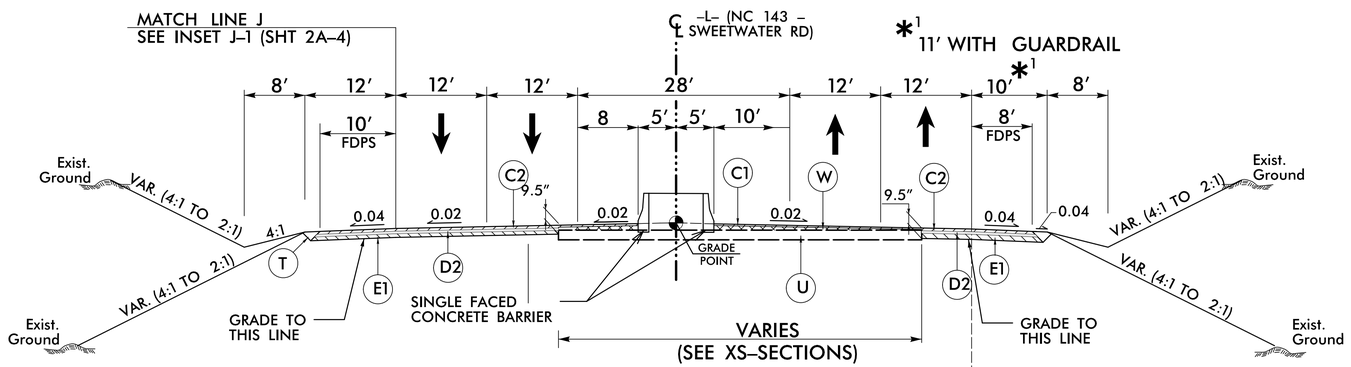
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE. SEE SHEET 2A-1 FOR DETAILED PAVEMENT SCHEDULE.



TYPICAL SECTION NO. 4



TYPICAL SECTION NO. 5

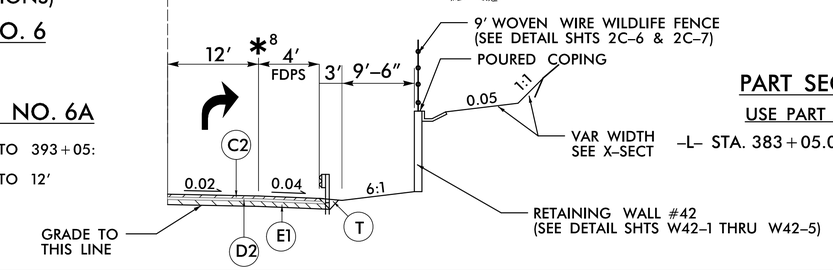


TYPICAL SECTION NO. 6

PART SECTION NO. 6A

*8 –L– STA 382+30.00 TO 393+05:

LANE WIDTH: VAR 0′ TO 12′
FDPS: VAR. 8′ TO 4′



PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2A-2

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY
5/27/2022

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER
5/26/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4

Exist. Ground –L– STA. 360+80.00 TO –L– STA. 375+26.00
–L– STA. 385+65.00 TO –L– STA. 395+15.00

	WIDTH	STA TO STA
*2	0′ TO 12′	–L– STA. 360+80.00 TO –L– STA. 364+10.00
	12′	–L– STA. 364+10.00 TO –L– STA. 373+33.00
	12′ TO 19′	–L– STA. 373+33.00 TO –L– STA. 375+26.00
	22′ TO 12′	–L– STA. 385+65.00 TO –L– STA. 389+50.00
*3, *4	0′ TO 6′	–L– STA. 360+80.00 TO –L– STA. 364+10.00 LT & RT
	6′	–L– STA. 364+10.00 TO –L– STA. 373+33.00 LT & RT
*3	6′ TO 9.5′	–L– STA. 373+33.00 TO –L– STA. 375+26.00 LT
	9′ TO 6′	–L– STA. 385+65.00 TO –L– STA. 389+50.00 LT
*4	6′ TO 9.5′	–L– STA. 373+33.00 TO –L– STA. 375+26.00 RT
	13′ TO 6′	–L– STA. 385+65.00 TO –L– STA. 389+50.00 RT

TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5

–L– STA. 375+26.00 TO –L– STA. 379+10.00
–L– STA. 383+55.00 TO –L– STA. 385+65.00

	WIDTH	STA TO STA
*5	19′	–L– STA. 375+26.00 TO –L– STA. 379+10.00
	22′	–L– STA. 383+55.00 TO –L– STA. 385+65.00
*6	8′	–L– STA. 375+26.00 TO –L– STA. 379+10.00 LT
	8.5′	–L– STA. 383+55.00 TO –L– STA. 385+65.00 LT
*7	8′	–L– STA. 375+26.00 TO –L– STA. 379+10.00 RT
	10.5′	–L– STA. 383+55.00 TO –L– STA. 385+65.00 RT

NOTE:
TRANSITION BETWEEN TYP. SECT. NO. 5 AND TYP. SECT. NO 6 AS FOLLOWS:
–L– STA. 379+10.00 TO –L– STA. 380+25.00

TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6

–L– STA. 380+25.00 TO –L– STA. 382+55.00

NOTE:
TRANSITION BETWEEN TYP. SECT. NO. 6 AND TYP. SECT. NO. 5 AS FOLLOWS:
–L– STA. 382+55.00 TO –L– STA. 383+55.00

PART SECTION NO. 6A

USE PART SECTION NO. 6A

–L– STA. 383+05.00 TO –L– STA. 383+50.00

5/26/2022
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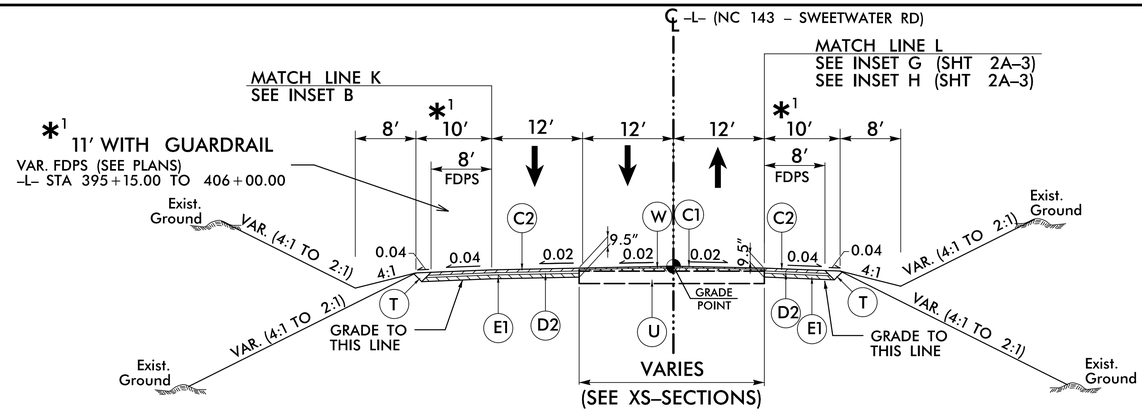
6/2/99

PAVEMENT SCHEDULE

C1	1.5″ S9.5C	R4	SHOULDER BERM GUTTER
C2	3″ S9.5C	T	EARTH MATERIAL
D2	2 ½″ I19.0C	U	EXISTING PAVEMENT
E1	4″ B25.0C	W	WEDGING
J1	4″ ABC	Y1	5 1/2″ CONC. OVERLAY
R2	EXPRESSWAY GUTTER		

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE. SEE SHEET 2A-1 FOR DETAILED PAVEMENT SCHEDULE.



TYPICAL SECTION NO. 7

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2A-3

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY 7/27/2022

PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 041986 MATTHEW D. BREWER 7/26/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

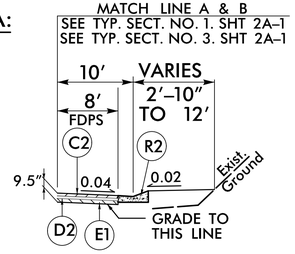
NOTE:
TRANSITION BETWEEN TYP. SECT. NO. 4 AND TYP. SECT. NO 7 AS FOLLOWS:
–L– STA. 395+15.00 TO –L– STA. 398+45.00

TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7

–L– STA. 398+45.00 TO –L– STA. 414+50.00

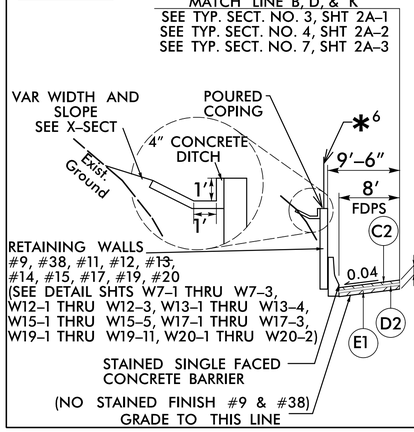
INSET A:



USE INSET A

–L– STA. 229+00.00 TO –L– STA. 235+36±, RT
–L– STA. 319+50.00 TO –L– STA. 322+00.00, LT

INSET B:



USE INSET B

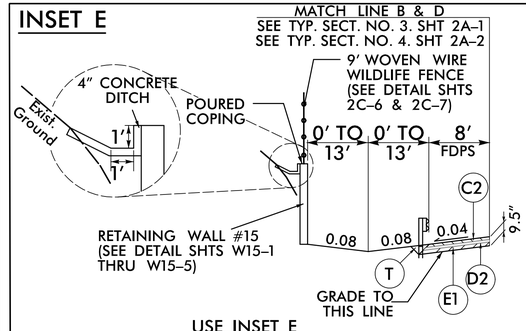
–L– STA. 290+80±	TO	–L– STA. 292+85±, LT		
–L– STA. 319+29±	TO	–L– STA. 321+08±, RT		
–L– STA. 330+82±	TO	–L– STA. 333+24±, LT		
–L– STA. 341+76±	TO	–L– STA. 344+11±, LT		
–L– STA. 344+69±	TO	–L– STA. 346+76±, LT		
–L– STA. 347+95±	TO	–L– STA. 350+64±, LT		
–L– STA. 358+77±	TO	–L– STA. 362+94±, LT		
–L– STA. 369+40±	TO	–L– STA. 375+26±, LT		
–L– STA. 393+22±	TO	–L– STA. 408+04±, LT	*5	
–L– STA. 409+44±	TO	–L– STA. 411+75±, LT		

NOTE – BARRIER MAY NOT BE AT FACE OF WALL ON RETAINING WALL # 15 (SEE PLANS)

*5 SEE PLANS FOR FPDS WIDTH

*6	9′ WOVEN WIRE WILDLIFE FENCE	#15, #17, #19B (SEE DETAIL SHTS 2C–6 & 2C–7)
	48″ BLACK VINYL COATED CHAIN LINK FENCE	#38, #14, #20 (SEE DETAIL SHT 2C–5)
	HANDRAIL	#9, #11, #12, #13 (SEE DETAIL SHT 2C–4)

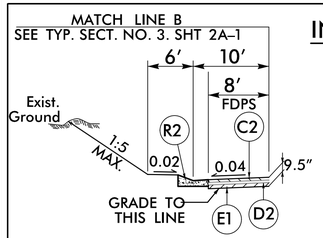
INSET E



USE INSET E

–L– STA. 352+25± TO –L– STA. 358+77±, LT
–L– STA. 362+94± TO –L– STA. 368+35±, LT

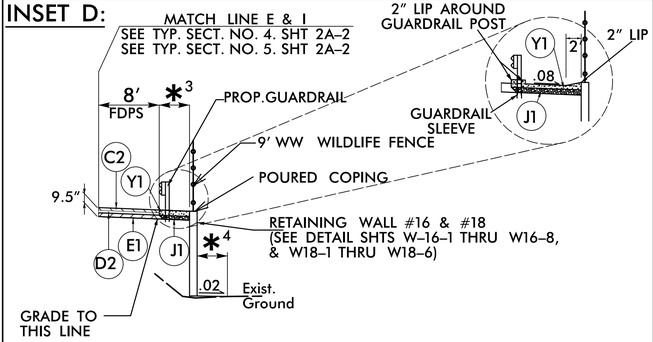
INSET C:



USE INSET C

–L– STA. 302+62± TO –L– STA. 303+96±, LT

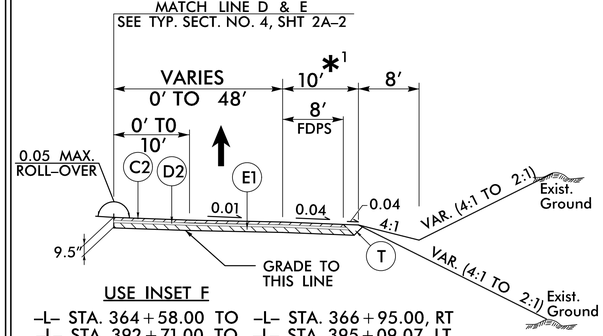
INSET D:



USE INSET D

–L– STA. 366+70± TO –L– STA. 369+72±, RT
(*3=VARIES 5.6′ TO 17.9′, *4=MIN 6′)
–L– STA. 375+25± TO –L– STA. 378+15±, RT
(*3=5.5′, *4=10′)

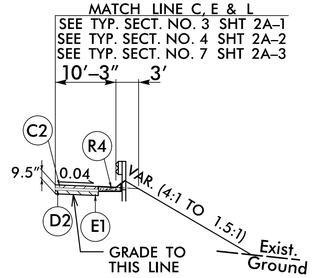
INSET F (U–TURN BULB)



USE INSET F

–L– STA. 364+58.00 TO –L– STA. 366+95.00, RT
–L– STA. 392+71.00 TO –L– STA. 395+09.07, LT

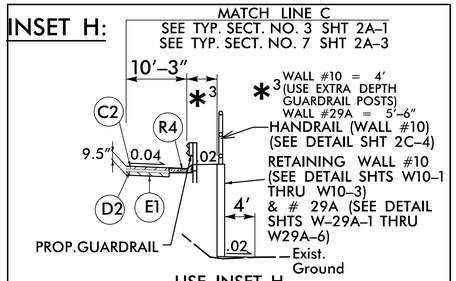
INSET G:



USE INSET G

–L– STA. 279+50±	TO	–L– STA. 284+00±, RT		
–L– STA. 286+93±	TO	–L– STA. 290+00±, RT		
–L– STA. 292+10±	TO	–L– STA. 295+00±, RT		
–L– STA. 310+44±	TO	–L– STA. 313+40±, RT		
–L– STA. 326+00±	TO	–L– STA. 328+25±, RT		
–L– STA. 331+75±	TO	–L– STA. 334+50±, RT		
–L– STA. 335+94±	TO	–L– STA. 337+62±, RT		
–L– STA. 339+10±	TO	–L– STA. 341+47±, RT		
–L– STA. 344+13±	TO	–L– STA. 348+53±, RT		
–L– STA. 350+17±	TO	–L– STA. 352+22±, RT		
–L– STA. 360+04±	TO	–L– STA. 363+61±, RT		
–L– STA. 388+00±	TO	–L– STA. 392+19±, RT		
–L– STA. 393+69±	TO	–L– STA. 399+00±, RT		
–L– STA. 405+23±	TO	–L– STA. 406+66±, RT		
–L– STA. 407+52±	TO	–L– STA. 409+81±, RT		
–L– STA. 411+00±	TO	–L– STA. 413+70±, RT		

INSET H:



USE INSET H

–L– STA. 316+45± TO –L– STA. 317+67±, RT
–L– STA. 396+75± TO –L– STA. 398+75±, RT

7/5/2022
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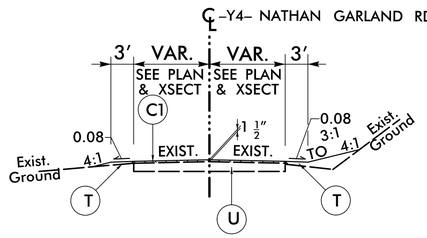
6/2/99

PAVEMENT SCHEDULE	
C1	1.5" S9.5C
C2	3" S9.5C
D2	2 ½" I19.0C
E1	4" B25.0C
K	CL IV SUBGRADE STABILIZATION
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
R4	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE. SEE SHEET 2A-1 FOR DETAILED PAVEMENT SCHEDULE.

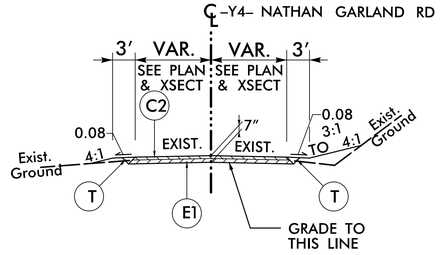
THE TIE–IN ELEVATION WITH –L– ARE AS FOLLOWS:
–L– STA. 277+89.66, 24′ RT @ EL 2359.32′
–L– STA. 308+34.14, 24′ RT @ EL 2596.87′
WEDGING MAY BE REQUIRED TO ESTABLISH A PROPER TIE–IN, SEE CROSS SECTIONS FOR DETAILS



TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8

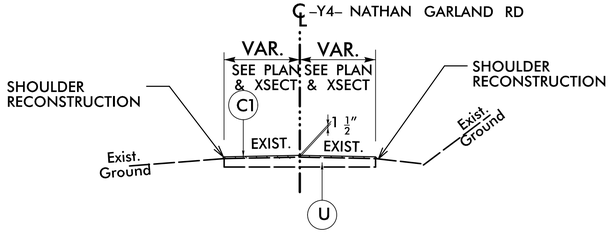
–Y4– STA. 10+28.12 TO –Y4– STA. 11+75.00



TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9

–Y4– STA. 11+75.00 TO –Y4– STA. 12+50.00



TYPICAL SECTION NO. 10

USE TYPICAL SECTION NO. 10

–Y4– STA. 12+50.00 TO –Y4– STA. 44+93.19

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2A-4

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 JIMMY L. TERRY ENGINEER
7/7/2022

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 041986 MATTHEW BREWER ENGINEER
7/6/2022

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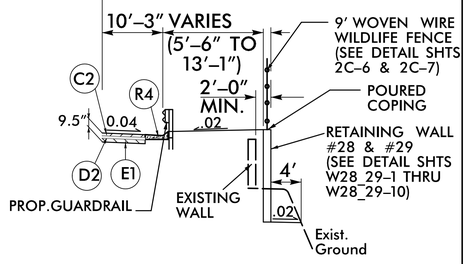
TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476–0003
CORP. LICENSE NO.: C–0275

INSET I:

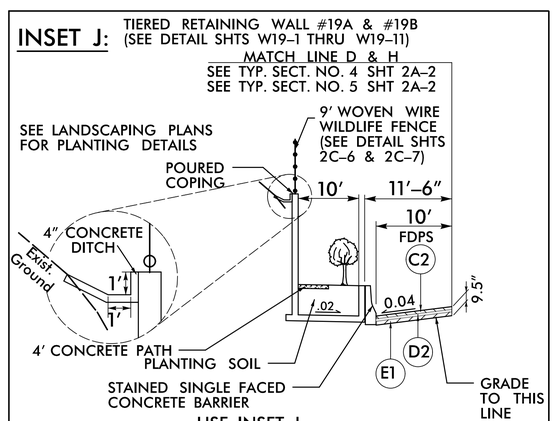


USE INSET I

–L– STA. 389+25± TO –L– STA. 392+00, RT
–L– STA. 393+90± TO –L– STA. 395+90±, RT

INSET J:

TIERED RETAINING WALL #19A & #19B (SEE DETAIL SHTS W19–1 THRU W19–11)

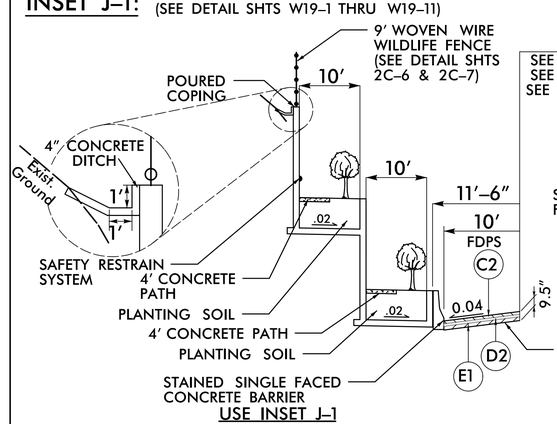


USE INSET J

–L– STA. 376+65± TO –L– STA. 378+20±, LT
–L– STA. 388+60± TO –L– STA. 393+22±, LT

INSET J–1:

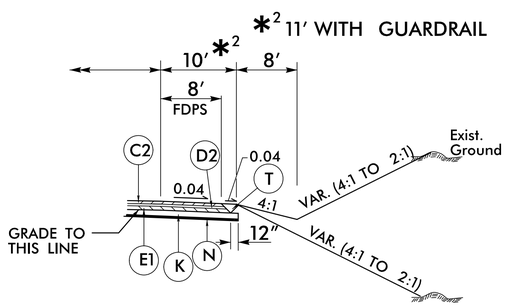
TIERED RETAINING WALL #19A & #19B (SEE DETAIL SHTS W19–1 THRU W19–11)



USE INSET J–1

–L– STA. 378+20± TO –L– STA. 380+50±, LT (BEGIN LANDBRIDGE)
–L– STA. 382+30± (END LANDBRIDGE) TO –L– STA. 388+60± LT

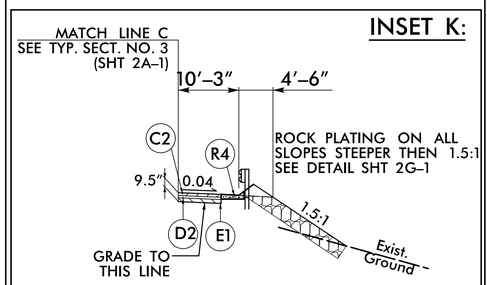
GEOTEXTILE FOR PAVEMENT STABILIZATION DETAIL



STA TO STA	LOC
–L– STA. 278+25 TO –L– STA. 278+75	LT
–L– STA. 279+75 TO –L– STA. 282+75	LT
–L– STA. 288+25 TO –L– STA. 290+25	LT & RT
–L– STA. 292+25 TO –L– STA. 294+75	LT & RT
–L– STA. 310+75 TO –L– STA. 313+25	RT
–L– STA. 366+75 TO –L– STA. 370+25	RT
–L– STA. 375+25 TO –L– STA. 378+25	RT
–L– STA. 389+25 TO –L– STA. 392+25	RT
–L– STA. 393+75 TO –L– STA. 395+75	RT
–L– STA. 396+75 TO –L– STA. 398+75	RT

AREAS WILL BE INVESTIGATED DURING CONSTRUCTION

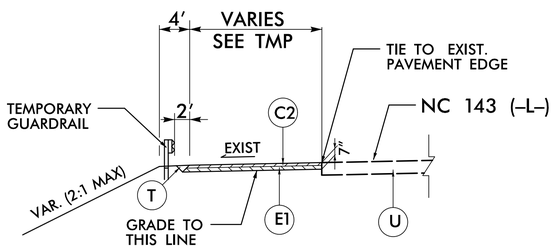
INSET K:



USE INSET K

–L– STA. 288+00± TO –L– STA. 288+50±, RT

TEMPORARY PAVEMENT DETAIL



–L– STA. 247+50± TO –L– STA. 252+25±, LT (PHASE I, STEP 1A)
–L– STA. 248+50± TO –L– STA. 251+50±, RT (PHASE I, STEP 1B)
–L– STA. 313+87± TO –L– STA. 318+65±, LT (PHASE II, STEP 1A)

7/15/2022
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WILDLIFE FENCE LAYOUT

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2B-1
RW SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 35018 ENGINEER JIMMY L. TERRY

7/27/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST., STE 200
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS 8/17/99

–L– STA. 409+00.00, 52.87' RT
END WILDLIFE FENCE
(AT EXISTING ROW)
SEE DETAIL SHEET 2C–6

409+00.00
28.00RT

–L– STA. 409+00±, 70.45' LT
END WILDLIFE FENCE
SEE DETAIL SHEET 2C–6

409+00.00
41.50RT

408+04.26±
33.50LT

408+25.00
37.00RT

406+72.00±
28.00RT

406+72.00±
32.00RT±

PROP. JUMP OUT
SEE DETAIL SHEET 2C–9

406+38.00±
32.00RT±

406+38.00±
28.00RT±

405+74.97
28.00RT

403+05.00±
26.50RT±

404+25.50
26.50RT

403+05.00±
57.08RT±

PROP. JUMP OUT
SEE DETAIL SHEET 2C–9

402+85.00±
58.04RT±

402+85.00±
26.50RT±

–L– NC 143

R=786.5'

399+38.59
26.50RT

398+75±
28.83RT

WILDLIFE FENCE ALONG
RETAINING WALL #29A
SEE SHEET 2C–7

396+75±
31.93RT

395+90±
37.69RT

WILDLIFE FENCE
ALONG RETAINING
WALL #29
SEE SHEET 2C–7

393+90±
40.82RT

393+22.00±
50.00RT±

393+22.00±
60.00RT±

PROP. JUMP OUT
SEE DETAIL SHEET 2C–9

392+90.00±
60.00RT±

392+90.00±
50.00RT±

WILDLIFE FENCE ALONG
RETAINING WALL #28
SEE SHEET 2C–7

392+00±
39.93RT

390+00±
45.16RT

389+25±
47.85RT

PROP. JUMP OUT
SEE DETAIL SHEET 2C–9

385+19.00
51.50RT

384+31.00
144.00RT

384+58.00
120.00RT

PROP. CATTLE GUARD
SEE DETAIL SHT 2C–8

PROP. WILDLIFE GATE
SEE DETAIL SHT 2C–6

EXISTING
APPALACHIAN
TRAIL
(DO NOT
DISTURB)

384+11.00
149.00RT

384+04.00
123.00RT

PROP. CATTLE GUARD
SEE DETAIL SHT 2C–8

383+50±
65.61RT

WILDLIFE FENCE
ALONG
RETAINING WALL #42
SEE SHEET 2C–7

PROP. CATTLE GUARD
SEE DETAIL SHT 2C–8

380+50.00
132.13RT
TIE TO WALL

PROP.
WILDLIFE
GATE SEE
DETAIL
SHT 2C–6

380+28.64
133.41RT

380+38.00±
107.00RT±

380+36.00±
54.09RT±

R=387'

379+10.00
48.00RT

WILDLIFE FENCE ALONG
RETAINING WALL #18
SEE SHEET 2C–7

376+65±
56.00LT
45.16LT

375+25±
48.00RT

374+05.01
46.00RT

373+73.00
46.00RT

PROP. CATTLE GUARD, 2@16'
SEE DETAIL SHT 2C–8

373+50.00±
44.50RT±

373+50.00±
67.32RT±

373+16.00±
44.50RT±

373+16.00±
67.78RT±

PROP. JUMP OUT
SEE DETAIL SHEET 2C–9

369+81.00
44.50RT

369+72±
50.21RT

WILDLIFE FENCE ALONG
RETAINING WALL #16
SEE SHEET 2C–7

366+70±
50.11RT

366+15.00±
62.00RT±

366+18.10±
74.39RT±

PROP. JUMP OUT
SEE DETAIL SHEET 2C–9

365+85.00±
71.00RT±

365+87.89±
82.54RT±

365+37.82
86.81RT

364+50.28
46.01RT

R=73'

362+83.93
44.38RT

358+81.45
38.50RT

R=680'

356+98.29
38.50RT

355+17.00±
38.50RT±

355+17.00±
65.00RT±

R=798.5'

354+83.00±
38.50RT±

354+83.00±
65.00RT±

354+13.94
38.50RT

R=798.5'

352+25.00
38.50RT

–L– STA. 352+25.00, 51.42'±RT
BEGIN WILDLIFE FENCE
(AT SHOULDER POINT)
SEE DETAIL SHEET 2C–6

PROP. JUMP OUT
SEE DETAIL SHEET 2C–9

–L– NC 143

WILDLIFE FENCE ALONG
RETAINING WALL #15
SEE SHEET 2C–7

352+25±
46.00LT

–L– STA. 352+25.00, 61.00' LT
BEGIN WILDLIFE FENCE
SEE DETAIL SHEET 2C–6

WILDLIFE FENCE ALONG
RETAINING WALL #17
SEE SHEET 2C–7

368+35±
52.00LT

369+40.00
37.00LT

369+40±
29.74LT

PROP. WILDLIFE GATE
SEE DETAIL SHT 2C–6

–L– NC 143

PROP. JUMP OUT
SEE DETAIL SHEET 2C–9

WILDLIFE FENCE ALONG
RETAINING WALL #19A
SEE SHEET 2C–7

BEGIN LAND BRIDGE
–L STA 380+50±

376+10.00±
66.00LT±

380+50.00
70.50LT

376+10.00±
48.00LT±

375+76.00±
66.00LT±

375+76.00±
48.00LT±

375+26±
43.00LT

376+65±
67.00LT
56.00LT

END LAND BRIDGE
–L STA 382+30±

382+30.00
70.50LT

PROP. JUMP OUT
SEE DETAIL SHEET 2C–9

WILDLIFE FENCE ALONG
RETAINING WALL #19B
SEE SHEET 2C–7

PROP. WILDLIFE GATE
SEE DETAIL SHT 2C–6

388+69.50
64.13LT

388+69.50
53.13LT

EXISTING APPALACHIAN TRAIL
(TO BE ABANDONED AND
OBLITERATED ONCE NEW TRAIL
IS COMPLETED)

WILDLIFE FENCE ALONG
RETAINING WALL #19B
SEE SHEET 2C–7

TIE IN LOCATION
BETWEEN EXISTING
APPALACHIAN TRAIL
AND THE ALIGNMENT
OF THE NEW TRAIL.

WILDLIFE FENCE ALONG
RETAINING WALL #29
SEE SHEET 2C–7

WILDLIFE FENCE ALONG
RETAINING WALL #29A
SEE SHEET 2C–7

TIE IN LOCATION
BETWEEN EXISTING
APPALACHIAN TRAIL
AND THE ALIGNMENT
OF THE NEW TRAIL.

APPROX. PROPOSED
APPALACHIAN TRAIL
LOCATION

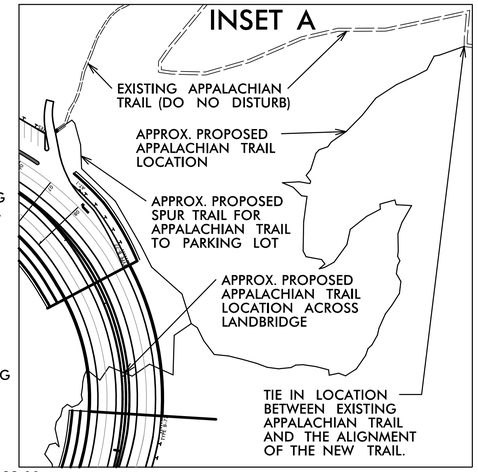
APPROX. PROPOSED
APPALACHIAN TRAIL
LOCATION

REFER TO INSET A FOR APPROX.
APPALACHIAN TRAIL LOCATION
ACROSS AND SOUTH OF
LANDBRIDGE AND FOR APPROX.
SPUR TRAIL LOCATION.

APPROX. PROPOSED
APPALACHIAN TRAIL
LOCATION

NAD 83/2011

INSET A



NOTE: CONTRACTOR TO EXTEND WILDLIFE FENCE AND GATES AROUND CATTLE GUARD TO PROPERLY SEAL OFF ANIMAL ACCESS AS DIRECTED BY THE ENGINEER.

NOTE: JUMP OUT LOCATIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.

NOTE: CONTRACTOR TO CONSTRUCT ~5,550 LF OF NEW APPALACHIAN NATIONAL SCENIC TRAIL.

NOTE: CONTRACTOR TO BE RESPONSIBLE FOR ~2,050 LF OF THE OBLITERATION OF ABANDONED TRAIL.

7/14/2022
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User:jlterry

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PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2B-2
RW SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 ENGINEER JIMMY L. TERRY
Jimmy Terry
7/27/2022

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038697 ENGINEER DAVID B. PETTY
David B. Petty
7/27/2022

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REVISIONS

8/17/99

CONC. DITCH BEHIND RETAINING WALL SEE SHEET 32 DETAIL 32A

PROP. RETAINING WALL #19A TIERED WALLS W/9' WW WILDLIFE FENCE & CONCRETE DITCH BEGIN –L– STA. 376+65± END –L– STA. 380+50±

PROP. RETAINING WALL #19B TIERED WALLS W/9' WW WILDLIFE FENCE & CONCRETE DITCH BEGIN –L– STA. 382+30± END –L– STA. 393+22±

NOTE: CONTRACTOR SHALL ENSURE MAX FILL ON CROWN OF EACH ARCH DOES NOT EXCEED 14 FEET.

BEGIN LAND BRIDGE –L– STA. 380+50±

END LAND BRIDGE –L– STA. 382+30±

GRASS LINED SWALE SEE SHEET 32 DETAIL 32C

CONCRETE DITCH SEE SHEET 32 DETAIL 32D

CLASS II RIPRAP KEYED–IN 7 TONS, NO GEO

PROP. RETAINING WALL #19C RT OF –L– STA 380+50±

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 32A

CLASS B RIPRAP KEYED–IN 5 TONS, NO GEO

CONCRETE DITCH SEE SHEET 32 DETAIL 32D

PROP. RETAINING WALL #42 W/9' WW WILDLIFE FENCE BEGIN –L– STA. 382+30± END –L– STA. 383+50±

CONC. DITCH BEHIND RETAINING WALL SEE SHEET 32 DETAIL 32A

CONCRETE SILL SEE SHEET 32 DETAIL 32B

PROP. CONC. 4' STEPS (3EA) TIE TO EXIST. STEPS

GRADE TO DRAIN REMOVE

TB JB W/MH

TB 2GI

AT–1

TYPE B–77

JB W/MH

CLASS II RIPRAP

EXISTING R/W

S 30°01'24" W 137.99'

S 18°13'23" E 357.46'

109 TABERNACLE BAPTIST CHURCH DB 205 PG 226

113

APPALACHIAN TRAIL

BST PARKING

(SWEETWATER RD.)

WD STEPS

WD HANDRAIL

GRAPHIC SCALE 20' 0' 20' 40' 60'

6/9/2022
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PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2C-1

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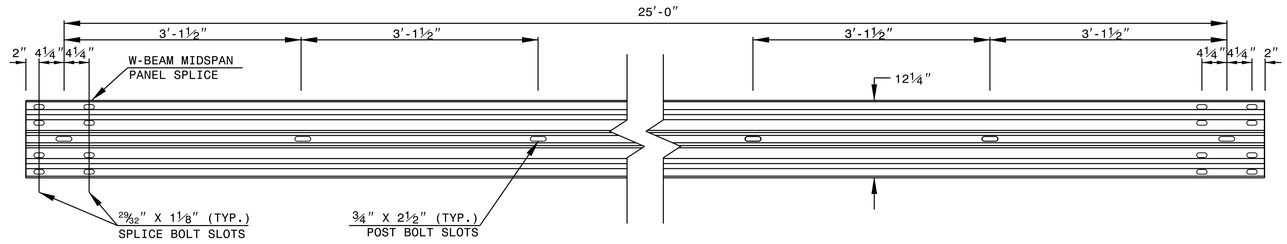
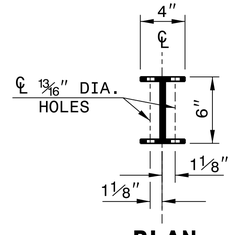
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

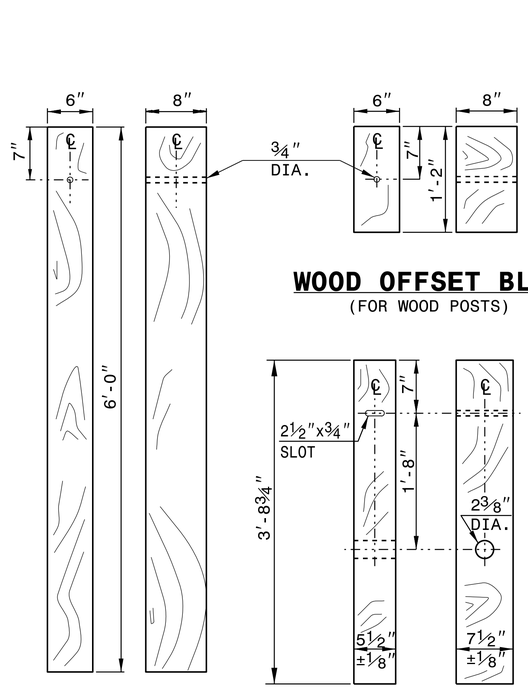
SHEET 6 OF 8
862D02



STANDARD W-BEAM GUARDRAIL



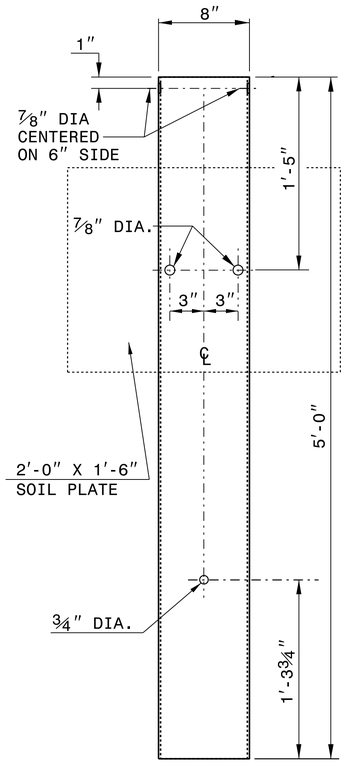
PLAN



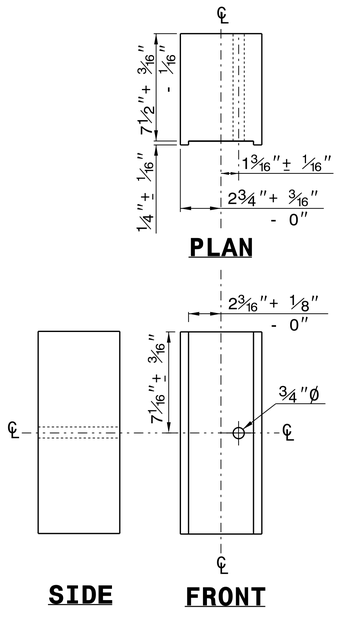
WOOD OFFSET BLOCK
(FOR WOOD POSTS)

STANDARD LINE POST

SHORT WOOD BREAKAWAY POST



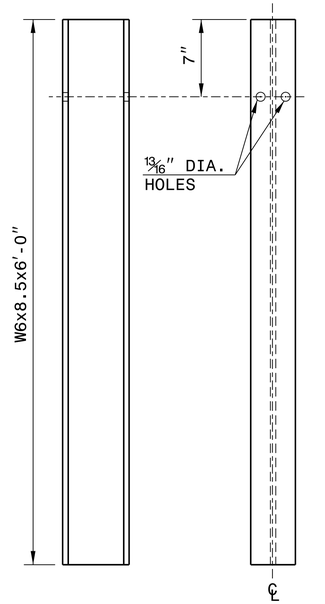
STEEL TUBE
TS 6"x8"x0.1875"



PLAN

SIDE **FRONT**

ROUTED OFFSET BLOCK



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 ENGINEER SEAL 022071 ENGINEERING CONSTRUCTION DIVISION

7/27/2022

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.:

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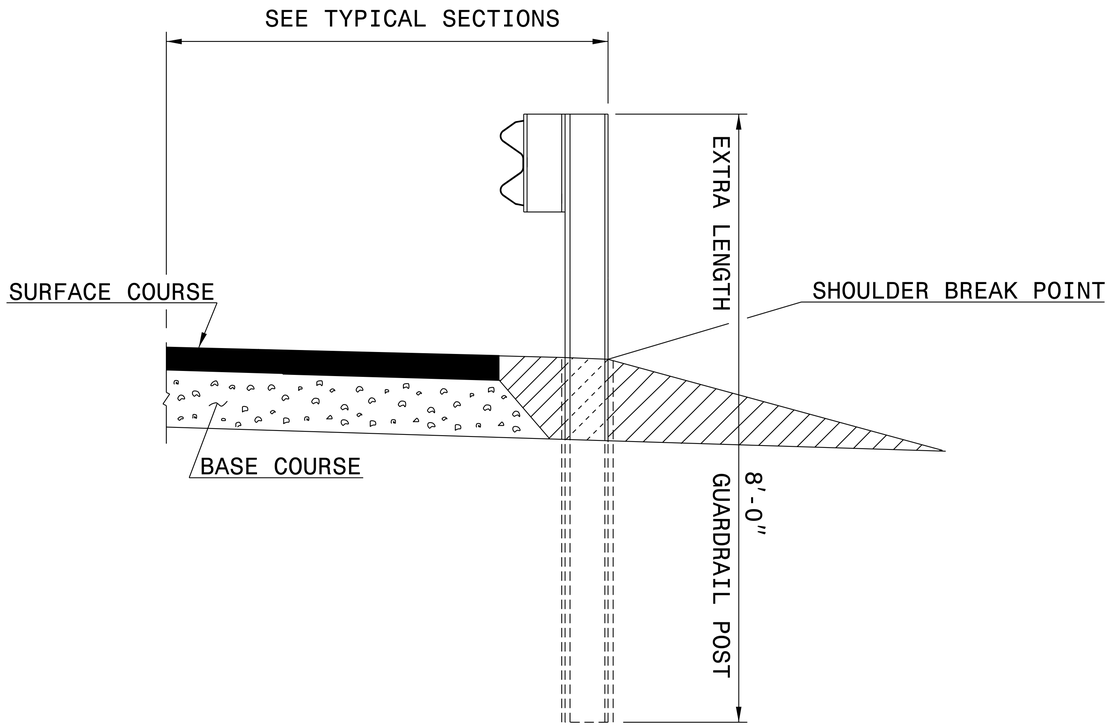
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2C-2



NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022071 RICHARD ELTON DAVENPORT JR

7/27/2022

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

8′ GUARDRAIL POST

ORIGINAL BY: L. Robinson DATE: 1995
MODIFIED BY: L. Robinson DATE: Feb. 1996
CHECKED BY: DATE:
FILE SPEC.: s:7'postguardrail.dgn

09-MAY-2018 14:21
S:\Contracts\Contracts\Special Details\jhowerton\7'postguardrail.dgn
jhowerton AT CSD-242595

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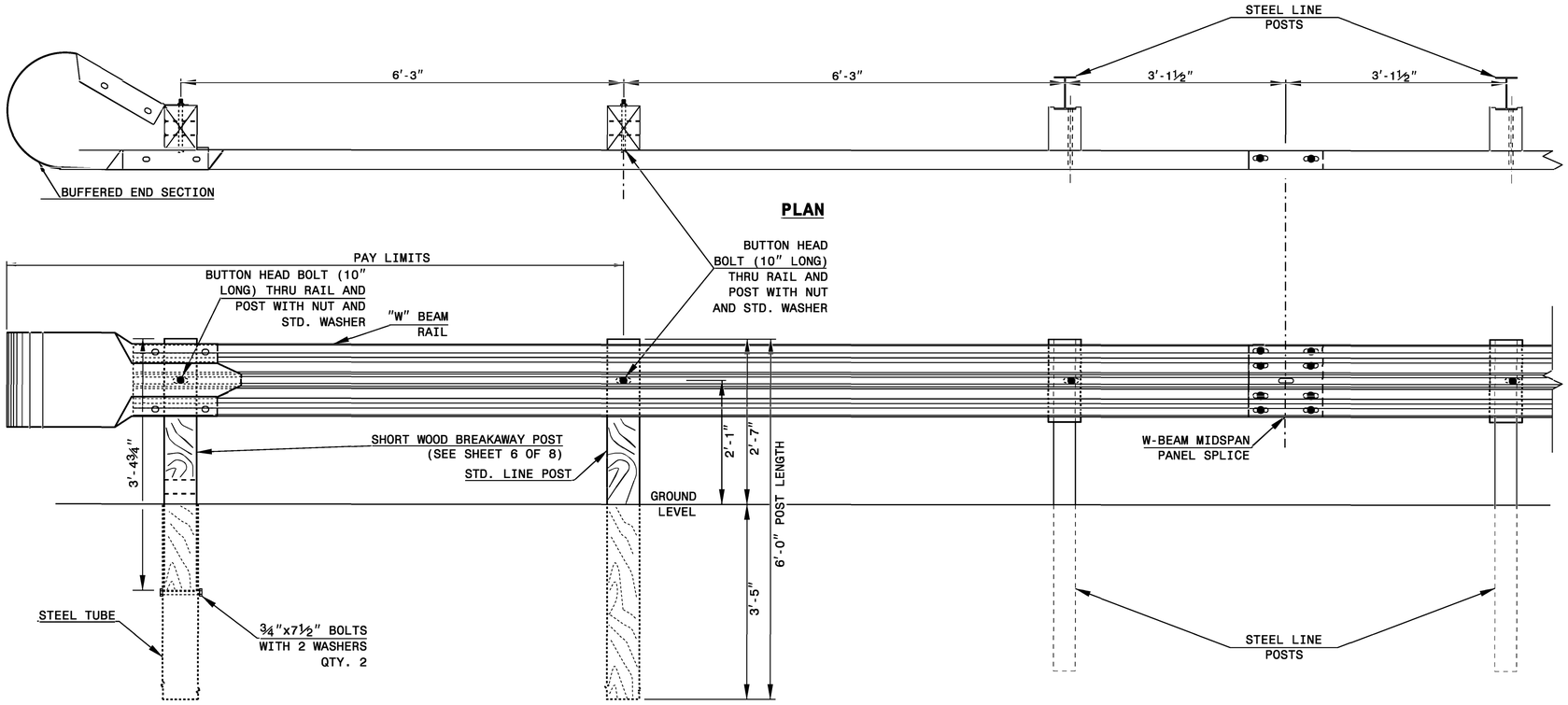
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2C-3

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION



TRAILING END UNIT ASSEMBLY

A.T.-1 SYSTEM

SHEET OF

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET OF

NORTH CAROLINA PROFESSIONAL SEAL 022071 ENGINEER RONALD ELTON DAVENPORT JR
Ron Davenport
7/27/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

A.T.-1 SYSTEM

ORIGINAL BY:_____ DATE:_____
MODIFIED BY:_____ DATE:_____
CHECKED BY:_____ DATE:_____
FILE SPEC.:_____

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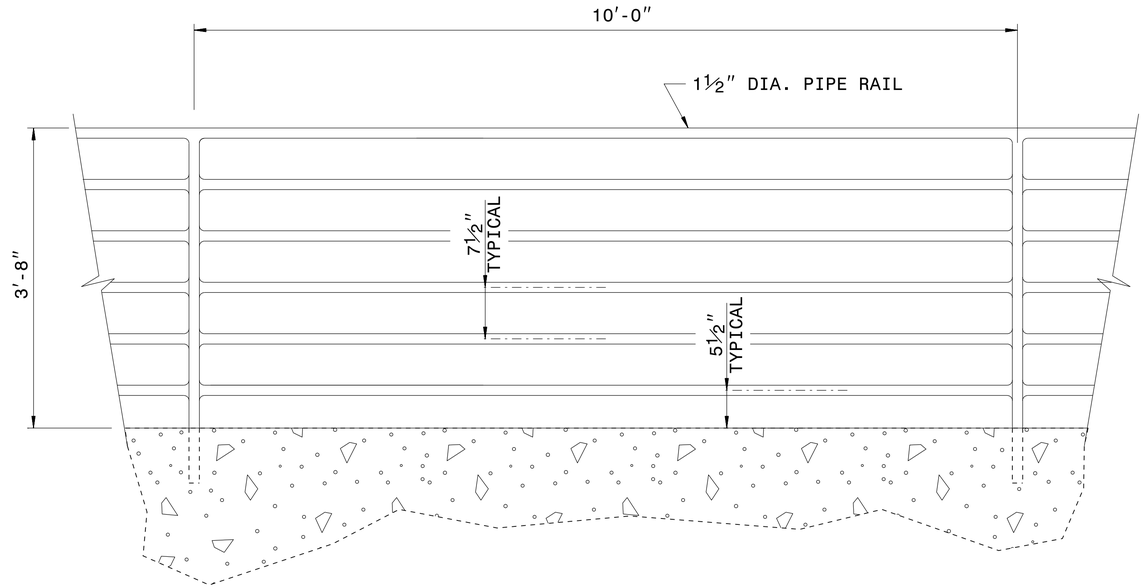
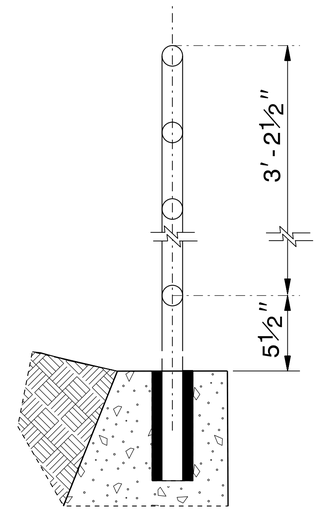
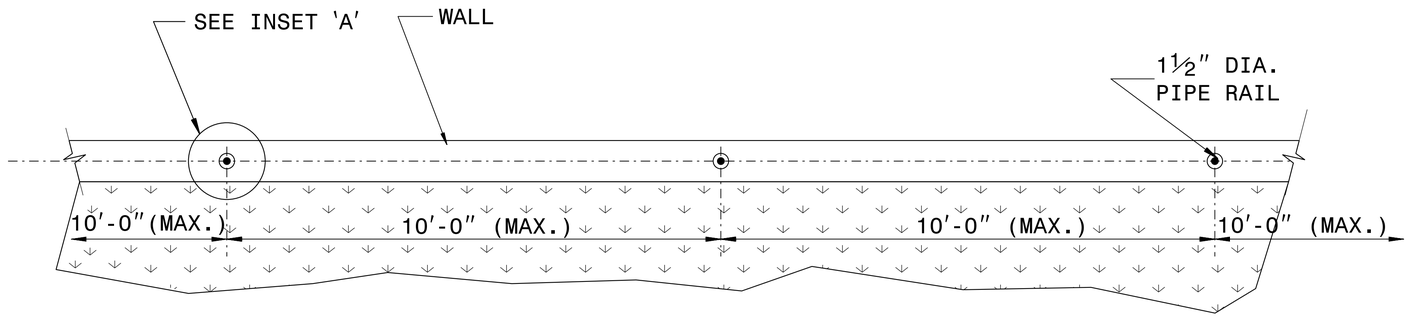
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2C-4



ELEVATION OF HANDRAIL



INSET 'A'



PLAN VIEW

NOTES:

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

EMBED PIPE RAIL INTO PROPOSED WALL WITH CHEMICAL OR CONCRETE GROUT ANCHORING SYSTEM PER THE WALL MANUFACTURER'S RECOMMENDATIONS.

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

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

CENTER THE PROPOSED RAILING ON TOP OF THE WALL WITH POST SPACING SYMMETRICAL ABOUT THE CENTER-LINE OF THE WALL.

WELD IN ACCORDANCE WITH ARTICLE 1072-18 OF THE STANDARD SPECIFICATIONS.

SUBMIT THE ATTACHMENT OF THE HANDRAIL TO THE RETAINING WALL TO THE CONTRACTS AND STANDARDS OFFICE FOR APPROVAL.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

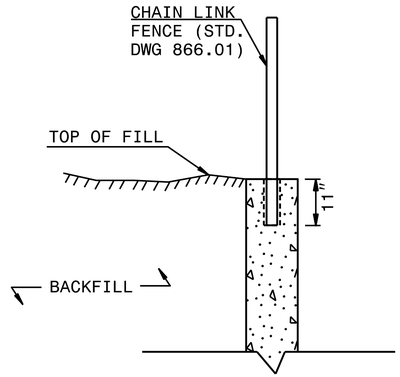
DETAIL OF PIPE HANDRAIL MOUNTED ON A WALL

ORIGINAL BY: E.E. WARD DATE: 12-99
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: jhowerton/handrail on retaining wall.dgn

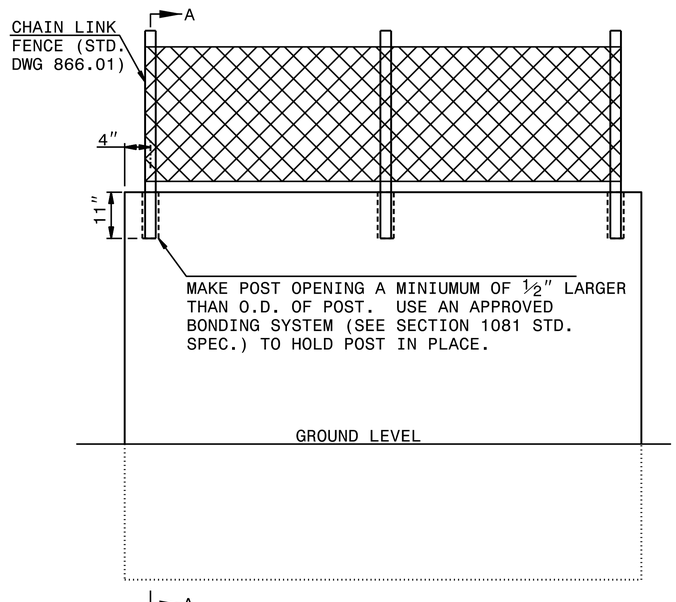
24-MAY-2018 14:10
S:\Contracts\Contracts\Special Details\jhowerton\Handrail on Retaining Wall.dgn
jhowerton AT CSD-292595

DocuSign Envelope ID: 99505397-2A58-4433-AAE8-4D7FD9ACF5F5

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2C-5



SECTION A-A
RETAINING WALL



ELEVATION VIEW
OF RETAINING WALL

EMBED CHAIN LINK FENCE 11″ INTO PROPOSED WALL IN A SLEEVE OR BLOCKOUT WITH EPOXY OR CONCRETE GROUT ANCHORING SYSTEM. PRE-MEASURE AND CENTER THE PROPOSED FENCE ON TOP OF WALL FOR POST SPACINGS. IFF DRILLING THE HOLES FOR POSTS, USE A ROTARY DRILL TO DRILL HOLES IN THE CONCRETE. NO IMPACT DRILLS WILL BE ALLOWED, TO ELIMINATE ANY POSSIBILITY OF STRUCTURAL DAMAGES TO THE PROPOSED WALL.

NORTH CAROLINA
PROFESSIONAL
SEAL
022071
ENGINEER
TRANSPORTATION
CONSTRUCTION DIVISION
7/27/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

CHAIN LINK FENCE ON RETAINING WALL

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: K.A. KEMPF DATE: SEP. 2017
CHECKED BY: _____ DATE: _____
FILE SPEC.: usr/details/jhowerton/chain link on retaining wall.dgn

$$$$$$$SYSTIME$$$$$$
$$$$$$$

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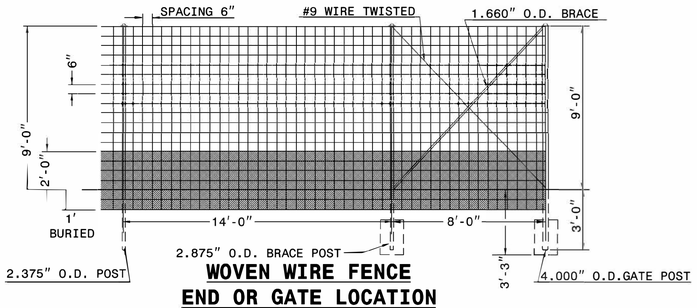
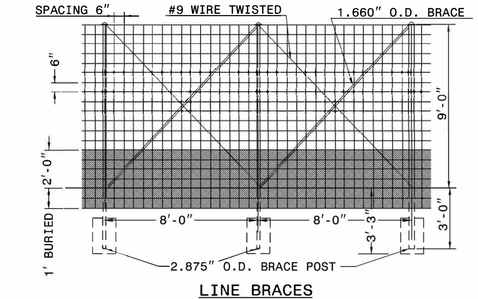
8/17/99

REVISIONS



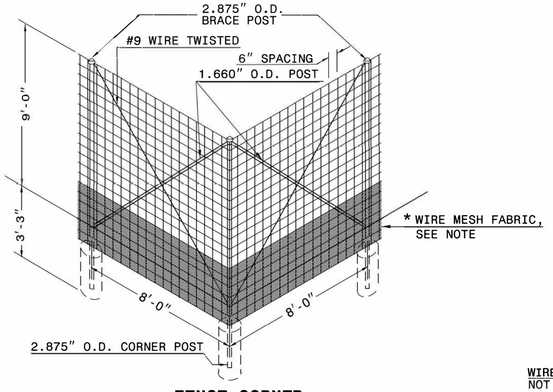
WOVEN WIRE FENCE END OR GATE LOCATION



LINE BRACES

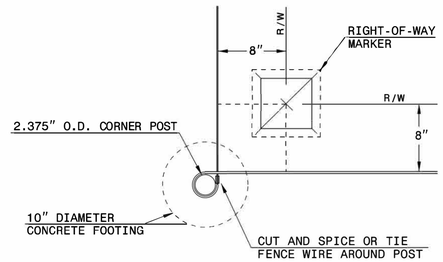
PLACE THE BRACE WIRE AROUND THE POST. DRAW THE WIRE TAUT BY TWISTING BETWEEN EACH POST. THIS APPLIES TO ALL BRACE WIRES.

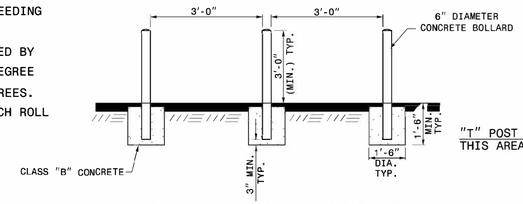
ERECT LINE BRACES BETWEEN END, CORNER OR GATE POSTS AT INTERVALS NOT EXCEEDING 324 FEET.
THIS MAXIMUM INTERVAL MAY BE REDUCED BY THE ENGINEER ON CURVES WHERE THE DEGREE OF CURVATURE IS GREATER THAN 3 DEGREES. PLACE LINE BRACES AT THE END OF EACH ROLL OR PIECE OF WOVEN WIRE.



FENCE CORNER

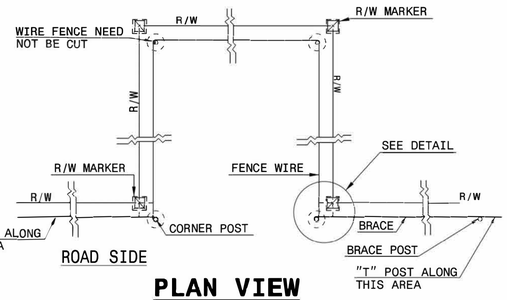
USE WHEN CORNER ANGLE IS 15° OR GREATER



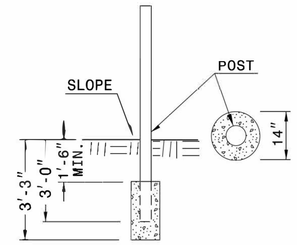


BOLLARDS FOR BLOCKING DRIVEWAYS AND OTHER ENTRANCES

INSTALL IN ADDITION TO FENCE WHERE SHOWN IN PLANS OR WHERE DIRECTED BY THE ENGINEER



PLAN VIEW



DETAIL OF POST ANCHOR

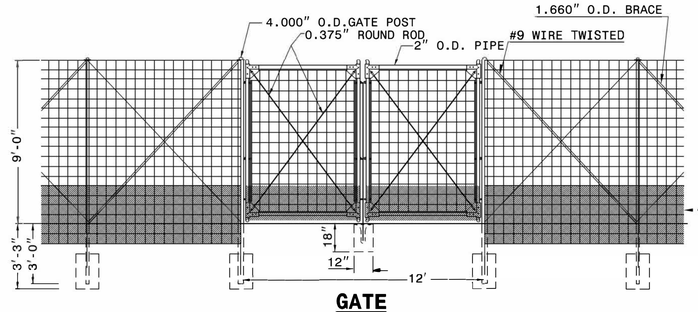
USE CONCRETE FOOTING ON ALL CORNER, END, GATE AND BRACE POSTS.

GENERAL NOTES:

— INSTALL THE FENCE FACING THE PROPERTY OWNER EXCEPT ON HORIZONTAL CURVES GREATER THAN THREE DEGREES, INSTALL THE FENCE TO PULL AGAINST ALL POSTS.

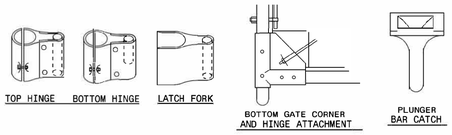
— IN LIEU OF 2.375" O.D. TUBULAR POSTS 2½" x 2½" x¼" ANGLE SECTIONS MAY BE USED.

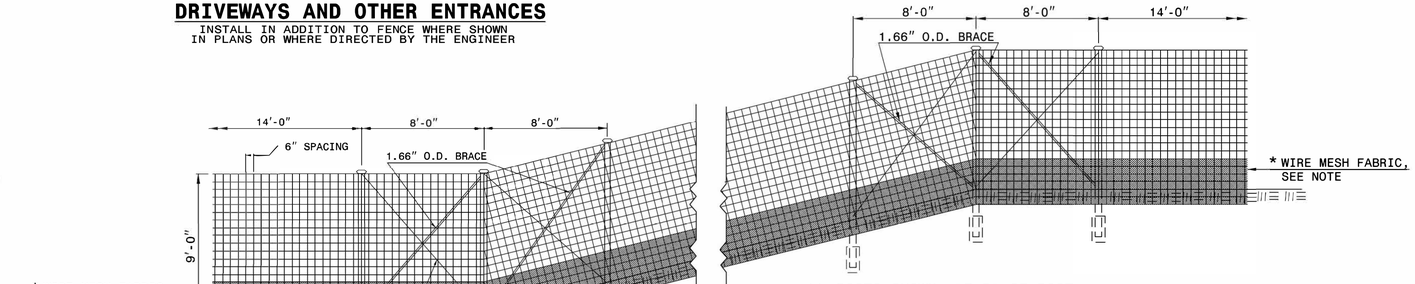
— IN LIEU OF 1.660" O.D. TUBULAR BRACES 2" x 2" x¼" ANGLE SECTIONS MAY BE USED.



GATE

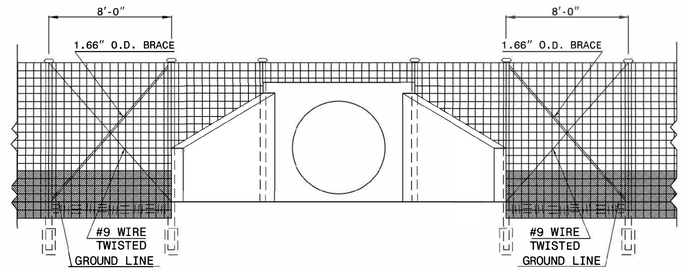
USE LATCH DEVICE APPROVED BY THE ENGINEER. HINGE ASSEMBLY, AS DETAILED, IS SUGGESTED. SUBSTITUTION MAY BE MADE SUBJECT TO THE APPROVAL OF THE ENGINEER.

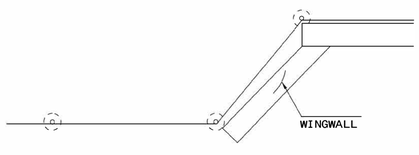




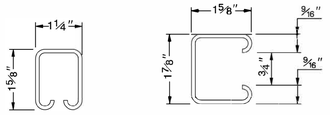
ALL POSTS SHOWN ARE BRACE POST

DETAIL SHOWING METHOD OF CONSTRUCTING FENCE ON SHARP BREAK IN GRADE





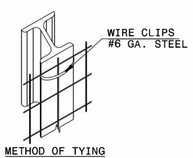
PLAN



BRACE RAIL (ROLL FORMED)

LINE POST (ROLL FORMED)

ROLL FORMED LINE POST MAY BE DRIVEN TO A MINIMUM OF 3'-0" IN LIEU OF CONCRETE ANCHOR, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.



METHOD OF TYING FABRIC TO "H" POST

NORTH CAROLINA PROFESSIONAL SEAL 022071 ENGINEER KEVIN KEMPF REGISTERED DAVIDSON
7/27/2022

* — 1¼" X 1¼" OPENING, 23 GAUGE HOT DIPPED GALVANIZED WIRE MESH.

— MESH TIES @ 24' CENTERS TO WELDED FABRIC. 18 GA OR 20 GA STAINLESS STEEL.

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

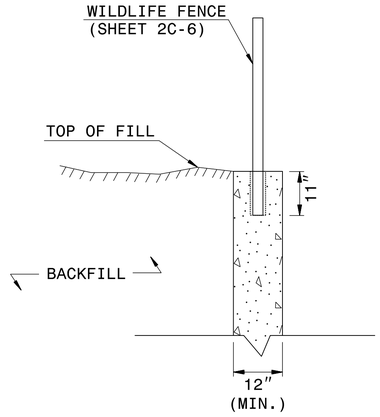
WILDLIFE FENCE

ORIGINAL BY: K A KEMPF DATE: 10/30/12
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: kkempf\english\wildlifefence.dgn

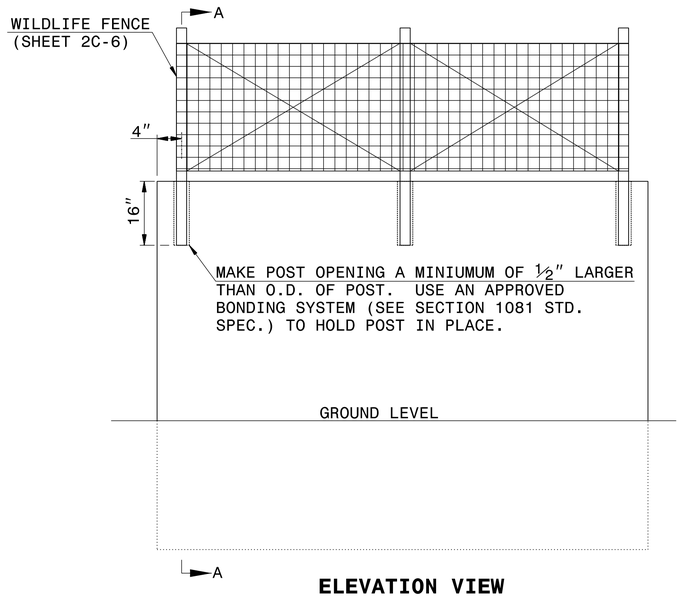
$$$$$$CYCTM$$$$$$
USER:kkempf
PLOT DATE:
Roadway Design Details.dgn

DocuSign Envelope ID: 99505397-2A58-4433-AAE8-4D7FD9ACF5F5

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2C-7



SECTION A-A
RETAINING WALL



ELEVATION VIEW
OF RETAINING WALL

EMBED WILDLIFE FENCE 16″ INTO PROPOSED WALL IN A SLEEVE OR BLOCKOUT WITH EPOXY OR CONCRETE GROUT ANCHORING SYSTEM. PRE-MEASURE AND CENTER THE PROPOSED FENCE ON TOP OF WALL FOR POST SPACINGS. IF DRILLING THE HOLES FOR POSTS, USE A ROTARY DRILL TO DRILL HOLES IN THE CONCRETE. NO IMPACT DRILLS WILL BE ALLOWED, TO ELIMINATE ANY POSSIBILITY OF STRUCTURAL DAMAGES TO THE PROPOSED WALL.

7/27/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

WILDLIFE FENCE ON RETAINING WALL

ORIGINAL BY: C.B. PRUETT DATE: MAY 2022
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

5/4/2022
N:\A-0009\Roadway\Proj\A-0009CB Plan Sheets\Details\Wildlife Fence on Retaining Wall.dgn
User:cpruett

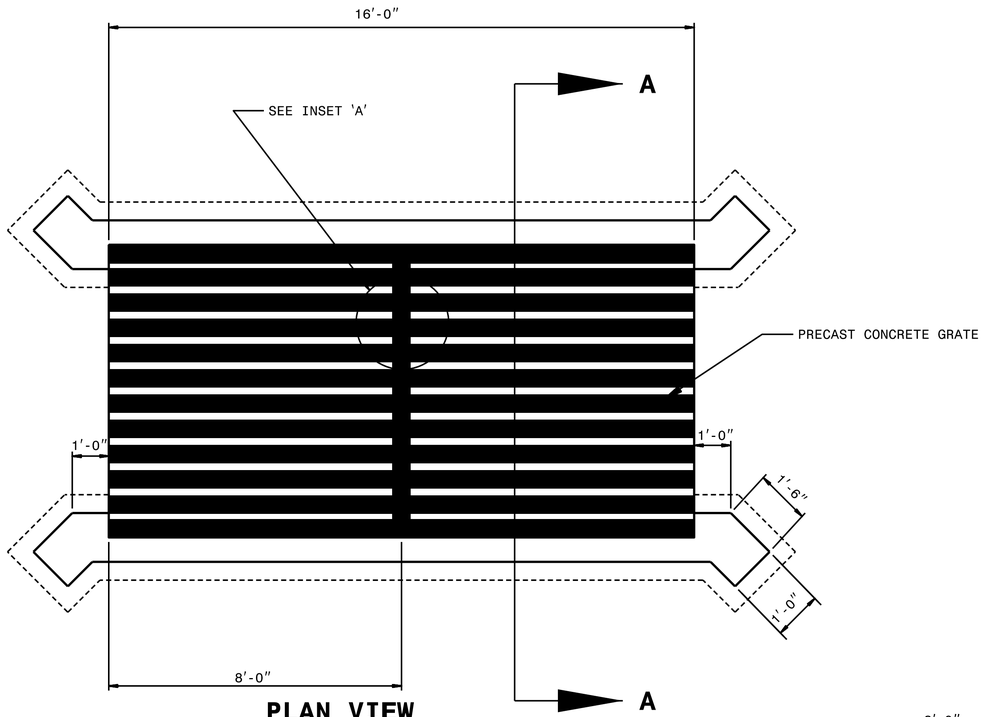
DocuSign Envelope ID: 99505397-2A58-4433-AAE8-4D7FD9ACF5F5

PROJ. REFERENCE NO.	SHEET NO.
A-0009CB	2C-8

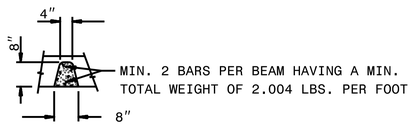
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

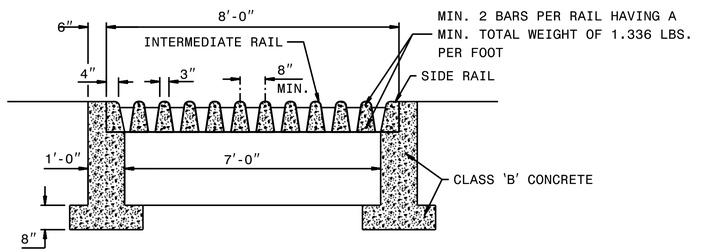
CATTLEGUARD



PLAN VIEW



INSET 'A'



SECTION 'A-A'

GENERAL NOTES:

ANY MANUFACTURER'S FABRICATION MEETING OR EXCEEDING THE MINIMUM DESIGN REQUIREMENTS DETAILED HEREIN WILL BE ACCEPTABLE.

ALL CONCRETE IN PRECAST MEMBERS TO BE 4000 PSI. CONCRETE IN FOOTINGS TO BE CLASS 'B'.

MINIMUM SECTIONAL AREA OF MEMBERS

INTERMEDIATE RAIL	20 SQ. IN.
SIDE RAIL	50 SQ. IN.
BEAM	46 SQ. IN.

SHEET 1 OF 1

CATTLE

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

ENGLISH DETAIL DRAWING FOR

CATTLEGUARD

SHEET 1 OF 1

CATTLE

NORTH CAROLINA PROFESSIONAL SEAL 022071 ENGINEER RONALD ELTON DAVENPORT JR
Ron Davenport
7/27/2022

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

SEE PLATE FOR TITLE

ORIGINAL BY: I. STEPHENSON DATE: 12-96
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: DS37:\usr\details\stand\cattle.dgn

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PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2C-9

WILDLIFE JUMP OUT DETAILS

NOTES:

1. THE LANDING ZONE SHALL BE FLAT, STABLE, AND EARTHEN. THE AREA SHALL BE VOID OF OBJECTS THAT MAY HINDER OR ENDANGER WILDLIFE. THE ENGINEER MAY ADJUST THE GAME RAMP LOCATION AND WIDTH AS NEEDED.

2. THERE SHALL BE NO DISTURBANCE BEYOND THE ROW OR TEMPORARY/PERMANENT EASEMENTS.

3. FILL MATERIAL SHALL BE NO.57 STONE

4. FOUR INCHES OF TOPSOIL SHALL BE PLACED.

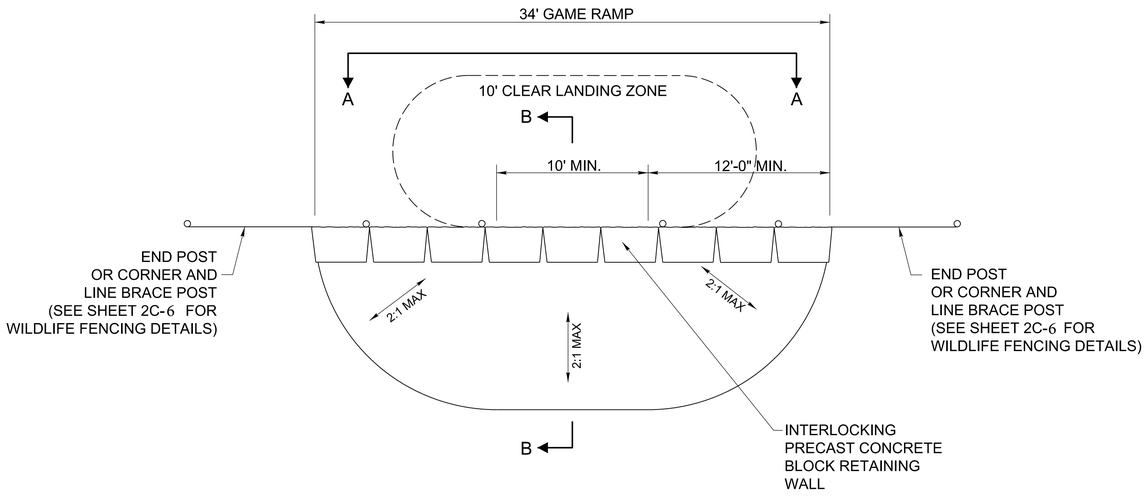
5. FINISHED HEIGHT OF BACKFILL/TOPSOIL SHALL BE 2" ABOVE CONCRETE BLOCK.

6. SEEDING SHALL BE COMPLETED AFTER THE ENGINEER APPROVES GRADING.

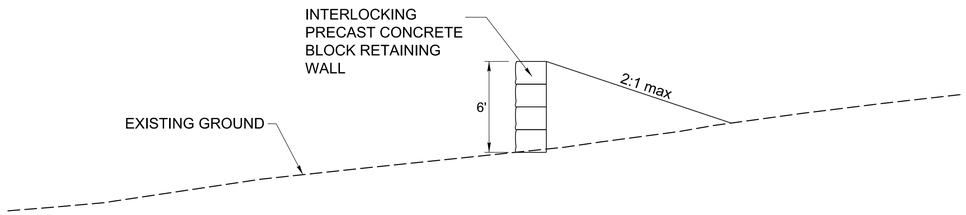
7. WALL FACE NOT TO BE MORE THAN 2" OUT OF VERTICAL.

8. INTERLOCKING PRECAST CONCRETE BLOCK RETAINING WALL H18"-24" x W36"-48" x D VARIES. VARIATION IN BLOCK SIZE IS ALLOWED WITH DIRECTION FROM THE ENGINEER.

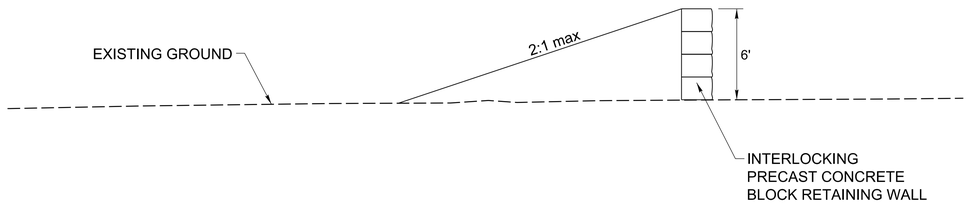
9. WILDLIFE FENCE SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE PRECAST CONCRETE BLOCK.



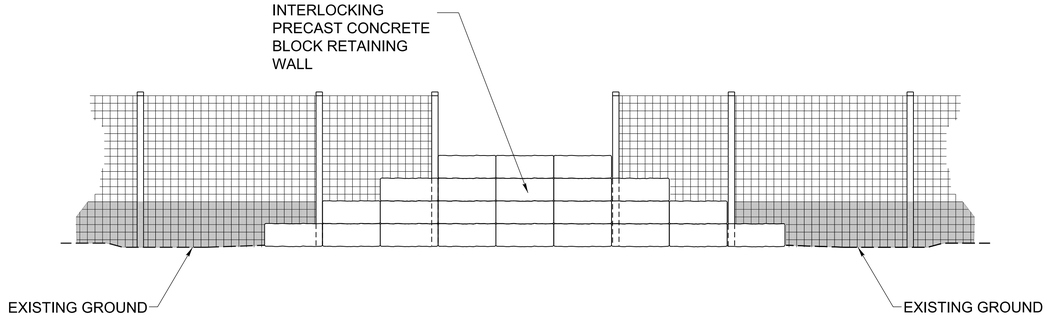
PLAN VIEW



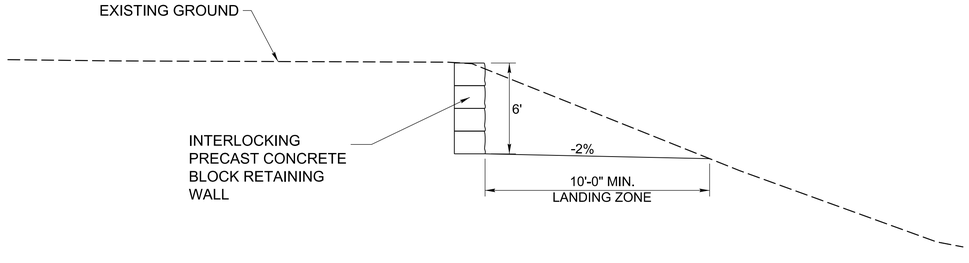
JUMP OUT DETAIL A



JUMP OUT DETAIL B



SECTION A-A
REAR ELEVATION VIEW



JUMP OUT DETAIL C

NORTH CAROLINA
PROFESSIONAL
Ken Davenport
SEAL
022071
ENGINEER
RONALD ELTON DAVENPORT, PE

7/27/2022

8/17/99

REVISIONS

$$$$$$SYSTIME$$$$$
$$$$$$SYSLOGIN$$$$$
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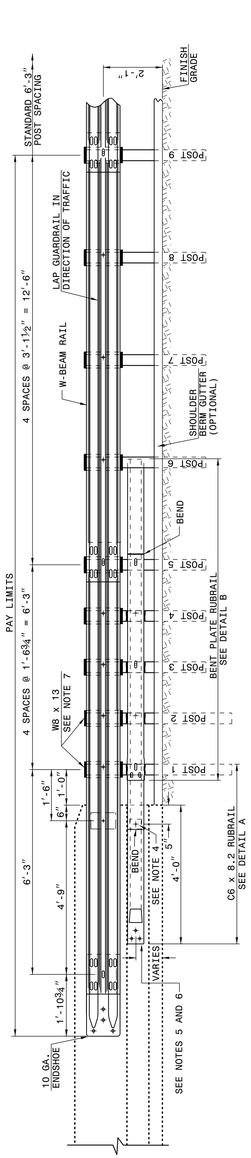
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2C-10

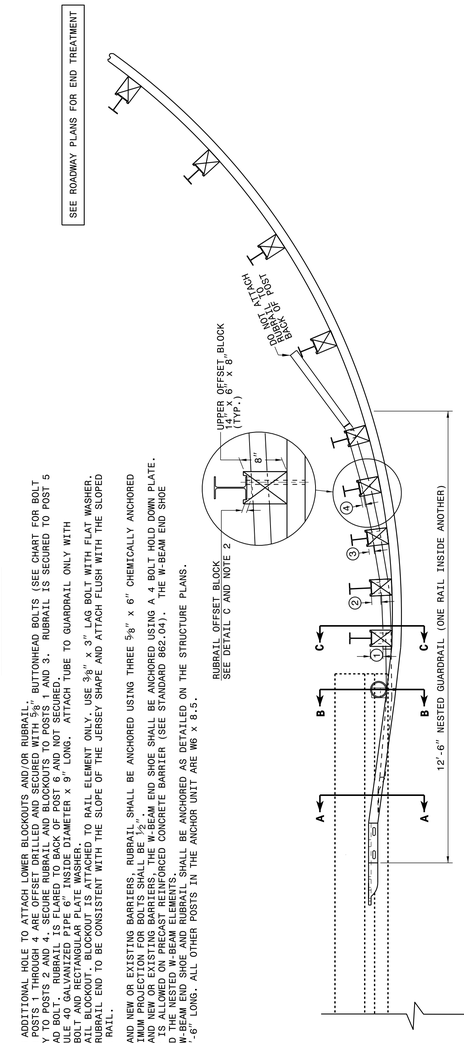
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
GUARDRAIL ANCHOR UNIT
TYPE B-77 SHOP CURVED

SHEET 1 OF 2 | **B-77SC**



ELEVATION



PLAN

GUARDRAIL ANCHOR UNIT TYPE B-77

GENERAL NOTES:
1) POSTS 1 THROUGH 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKOUTS AND/OR RUBRAIL; RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH ⅝" BUTTONHEAD BOLTS (SEE CHART FOR BOLT LENGTHS). SECURE BLOCKS ONLY TO POSTS 2 AND 4; SECURE RUBRAIL AND BLOCKOUTS TO POSTS 1 AND 3. RUBRAIL IS SECURED TO POST 5 WITH A ⅝" x 2½" BUTTONHEAD BOLT. RUBRAIL IS ATTACHED TO BACK OF POSTS 6 AND 7.
2) RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH ⅝" BUTTONHEAD BOLTS (SEE CHART FOR BOLT LENGTHS). SECURE BLOCKS ONLY TO POSTS 2 AND 4; SECURE RUBRAIL AND BLOCKOUTS TO POSTS 1 AND 3. RUBRAIL IS SECURED TO POST 5 WITH A ⅝" x 2½" BUTTONHEAD BOLT. RUBRAIL IS ATTACHED TO BACK OF POSTS 6 AND 7.
3) STEEL SPACER TUBE IS A SCHEDULE 40 GALVANIZED PIPE 6" INSIDE DIAMETER x 9" LONG. ATTACH TUBE TO GUARDRAIL ONLY WITH ⅝" x 1¼" LONG BUTTONHEAD BOLT AND RECTANGULAR PLATE WASHER.
4) SEE DETAIL C FOR SLOPED RUBRAIL BLOCKOUT. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE ⅜" x 3" LAG BOLT WITH FLAT WASHER. SHOP FABRICATE THE 6" x 2" RUBRAIL END TO BE CONSISTENT WITH THE SLOPE OF THE JERSEY SHAPE AND ATTACH FLUSH WITH THE SLOPED TOE OF THE BARRIER OR BRIDGE RAIL.
5) ANCHORAGE:
   (a) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, RUBRAIL SHALL BE ANCHORED USING THREE ⅝" x 6" CHEMICALLY ANCHORED BOLTS WITH WASHER. MAXIMUM PROJECTION FOR BOLT SHALL BE 2". THE W-BEAM END SHOE SHALL BE ANCHORED USING A 4 BOLT HOLD DOWN PLATE. A 4 BOLT INSERT ASSEMBLY IS ALLOWED ON PRECAST REINFORCED CONCRETE BARRIER (SEE STANDARD 862.04). THE W-BEAM END SHOE SHALL BE INSTALLED BEHIND THE NESTED W-BEAM ELEMENTS.
   (b) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, THE W-BEAM END SHOE AND RUBRAIL SHALL BE ANCHORED AS DETAILED ON THE STANDARD PLAN SHEET.
   (c) AT THE BRIDGE RAIL TO THE 6 x 2 RUBRAIL END TO BE CONSISTENT WITH THE SLOPE OF THE JERSEY SHAPE AND ATTACH FLUSH WITH THE SLOPED TOE OF THE BARRIER OR BRIDGE RAIL.
6) POSTS 1 AND 2 ARE W8 x 13, 7'-6" LONG. ALL OTHER POSTS IN THE ANCHOR UNIT ARE W6 x 8.5.

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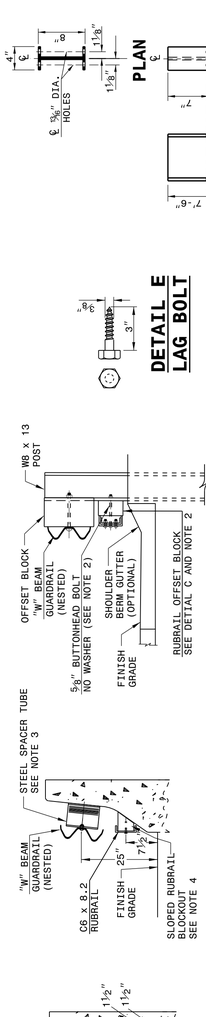
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
GUARDRAIL ANCHOR UNIT
TYPE B-77 SHOP CURVED

SHEET 2 OF 2 | **B-77SC**

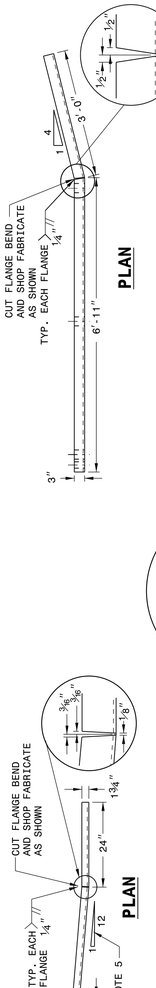


DETAIL F STEEL POST "W8 X 13 X 7'-6"

DETAIL E LAG BOLT

SECTION C-C

DETAIL D SLOPED RUBRAIL BLOCKOUT



GUARDRAIL ANCHOR UNIT TYPE B-77

DETAIL C RUBRAIL BLOCKOUT

GUARDRAIL ANCHOR UNIT TYPE B-77

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: E.E. WARD DATE: 06-04-04
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
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AT CSD-292595

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5/14/99

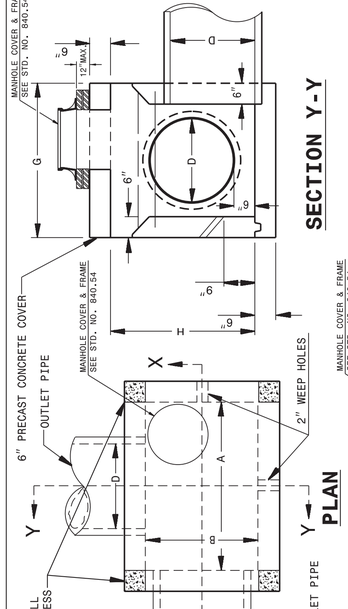
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2D-1

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

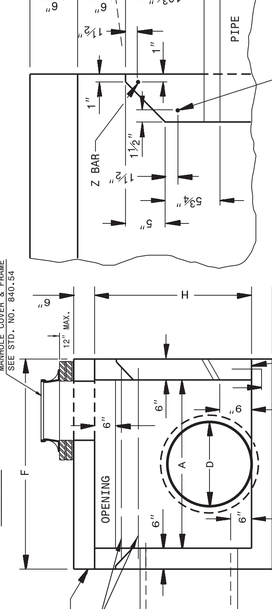
ENGLISH DETAIL DRAWING FOR
CONCRETE CATCH BASIN
(3 OR 4 SIDE OPEN THROAT)
(MANHOLE OPTIONAL)

SHEET 1 OF 2 — 840D04

GENERAL NOTES:
ALL CATCH BASINS OVER 3'-6" IN DEPTH TO BE PROVIDED WITH STEPS 12" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 840.66.
ALL EXPOSED CORNERS TO BE CHAMFERED 1".
CLASS "B" CONCRETE TO BE USED THROUGHOUT.
2" PIPE WEEPHOLES TO BE PLACED AS DIRECTED BY ENGINEER.
THE 6" OPENING SHOWN MAY BE INCREASED TO 8" MAXIMUM IF DEEMED TO BE NECESSARY BY THE ENGINEER.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #5 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STD. DWG. 840.00.
A STONE DRAIN CONSISTING OF 1 CUBIC FOOT OF NO. 78M STONE CONTAINED IN A BAG OF POROUS FABRIC SHALL BE PLACED AT EACH WEEP HOLE. FOR 8' IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB; OVER 8' IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. QUANTITIES TO BE ADJUSTED ACCORDINGLY.
DIMENSIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.



SECTION Y-Y



PART SECTION Y-Y
SHOWING METHOD OF CONSTRUCTION IF INCREASED OPENING IS USED

SECTION X-X

PART SECTION Y-Y
SHOWING METHOD OF CONSTRUCTION FOR 6" OPENING

DIM'S OF BOX & PIPE / *MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN (BASED ON MIN. HEIGHT, H)*

PIPE D	*SPAN* A	*WIDTH* B	*HEIGHT* H	*REINFORCING* *BARS – X* NO.	LENGTH	*BARS – Y* NO.	LENGTH	*BARS – Z* NO.	LENGTH	F	G	*TOP & BOT. SLAB DIMENSIONS* TOP SLAB	BOT. SLAB	*CU. YDS. CONC. IN BOX* WALL/FT.	*TOTAL QUANTITIES BOX & SLABS* LBS. REINF.	HT.	YD³	*DEDUCTION ONE PIPE* C.S.	R.C.	*DED. ONE (1) THROAT OPENING* YD³
12"	3'-6"	2'-3"	1'-10"	4	3'-0"	6	4'-3"	2	4'-3"	4'-6"	3'-3"	6"	6"	0.181	0.271	0.250	1.046	0.015	0.032	0.046
15"	3'-6"	2'-3"	2'-1"	4	3'-0"	6	4'-3"	2	4'-3"	4'-6"	3'-3"	6"	6"	0.181	0.271	0.250	1.108	0.023	0.036	0.046
18"	4'-0"	2'-8"	2'-4"	5	3'-5"	7	4'-9"	2	4'-9"	5'-3"	3'-8"	6"	6"	0.226	0.340	0.284	1.379	0.033	0.049	0.053
24"	4'-0"	2'-8"	2'-10"	5	3'-5"	7	4'-9"	2	4'-9"	5'-3"	3'-8"	6"	6"	0.226	0.340	0.284	1.521	0.059	0.085	0.053
30"	4'-0"	3'-6"	3'-4"	5	4'-3"	9	4'-3"	2	4'-3"	5'-6"	4'-0"	6"	6"	0.278	0.417	0.315	1.916	0.092	0.127	0.053
36"	4'-6"	4'-0"	3'-10"	5	4'-9"	10	5'-3"	2	5'-3"	5'-9"	5'-0"	6"	6"	0.340	0.510	0.352	2.390	0.132	0.178	0.059
42"	5'-0"	4'-6"	4'-4"	5	5'-3"	12	5'-9"	2	5'-9"	6'-3"	5'-6"	6"	6"	0.407	0.611	0.389	64	2.914	0.180	0.243	0.066
48"	5'-0"	5'-0"	4'-10"	5	5'-9"	13	5'-9"	2	5'-9"	6'-9"	6'-0"	6"	6"	0.444	0.666	0.407	68	3.298	0.235	0.317	0.066

STATE OF
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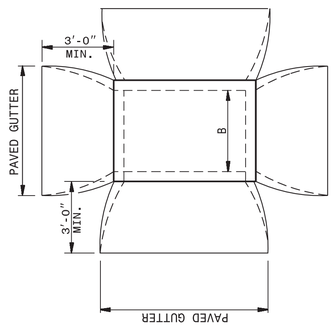
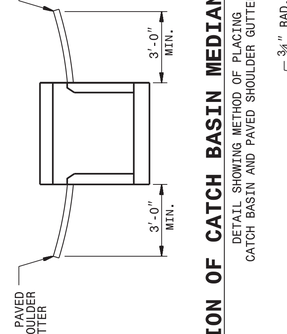
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE CATCH BASIN
(3 OR 4 SIDE OPEN THROAT)
(MANHOLE OPTIONAL)

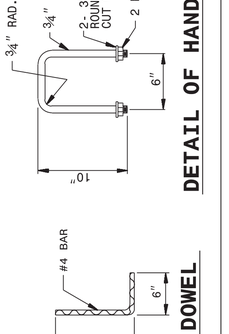
SHEET 2 OF 2 — 840D04

PLAN OF CATCH BASIN IN MEDIAN STRIP

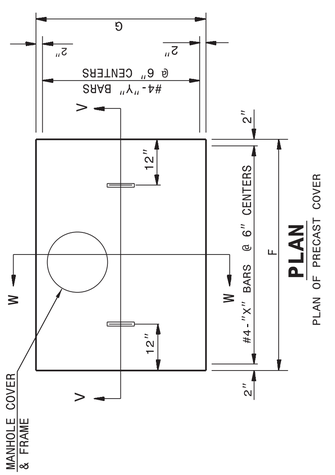


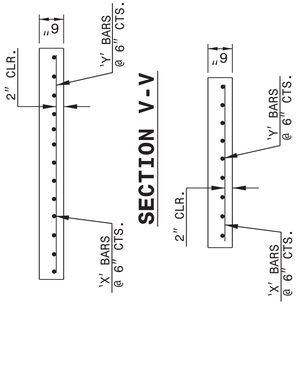


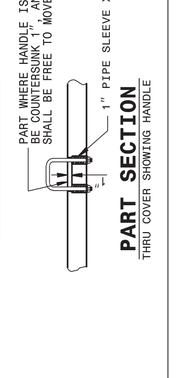
SECTION OF CATCH BASIN MEDIAN STRIP
DETAIL SHOWING METHOD OF PLACING CATCH BASIN AND PAVED SHOULDER GUTTER



DETAIL OF HANDLE
DOWEL







7/27/2022

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MODIFIED BY: rnbritt DATE: 07-03-2014
CHECKED BY: _____ DATE: _____
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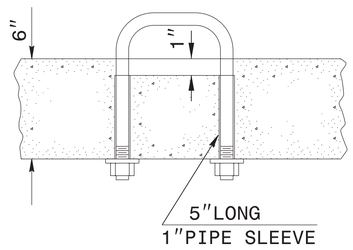
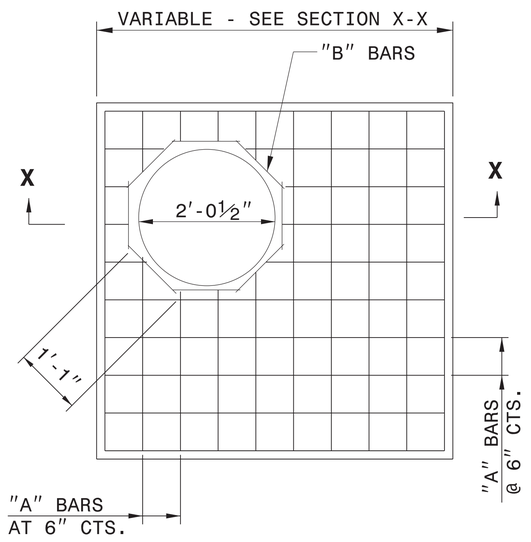
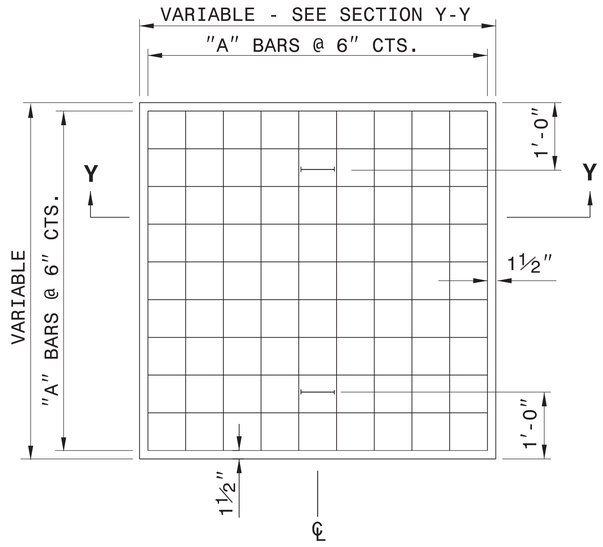
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2D-2



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.

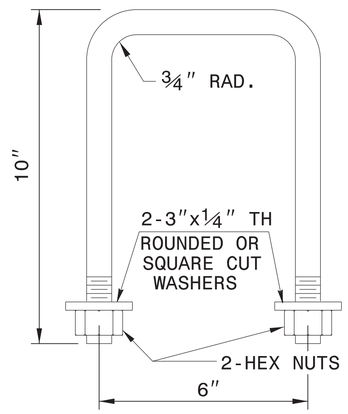
BILL OF MATERIALS

REINFORCING STEEL

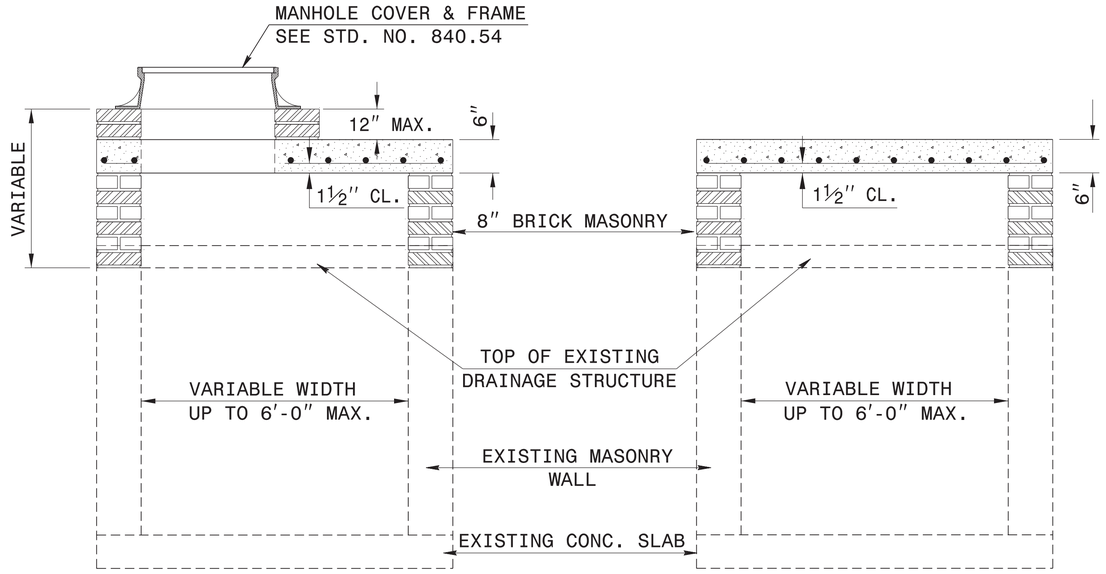
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4′-6″	60.12
B	#4	8	1′-1″	5.79
TOTAL				65.91 *

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 ENGINEER SEAL 022071 Ken Davenport ROWLAND-TATON DAVENPORT, JR.

7/27/2022

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CONTRACT STANDARDS AND DEVELOPMENT UNIT
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DETAIL TO CONVERT EXISTING DI, CB, OTCB or GI TO JUNCTION BOX (MANHOLE OPTIONAL)

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MODIFIED BY: T.S.S. DATE: FEB.2000
CHECKED BY: DATE:
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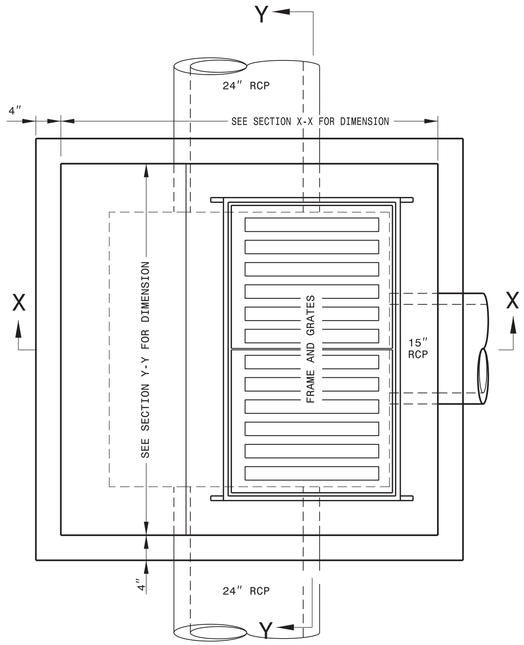
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2D-3



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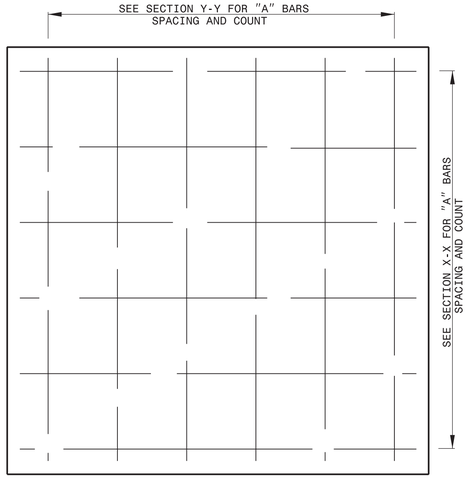
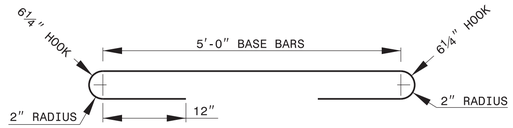


PLAN OF BASE

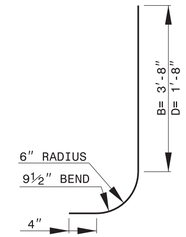
GENERAL NOTES:
-USE CLASS 'AA' CONCRETE FOR CAST IN PLACE CONCRETE BOX.
-USE CLASS 'M' CONCRETE IN THE WALL CAVITY FOR REINFORCED BRICK CONSTRUCTION AND CLASS 'AA' FOR THE FOOTING BASE.
-CHAMFER ALL EXPOSED CONCRETE CORNERS 1".
-USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
-IF PIPES ARE SET IN THE BASE FOLLOW CONSTRUCTION PROCEDURES SHOWN BY STD. DWG. 840.00.
-PRECAST UNITS MADE OF CLASS 'AA' CONCRETE MAY BE USED IN LIEU OF BRICK MASONRY CONSTRUCTION.
-INCLUDE REINFORCING STEEL COST IN THE UNIT OR LINEAR FOOT BID PRICE FOR "MASONRY DRAINAGE STRUCTURE".
-REFERENCE STD. DWG. 840.25 FOR FRAME ANCHORAGE.
-CONCRETE BRICK, JUMBO BRICK AND 4" SOLID CONCRETE BLOCK WILL BE PERMITTED.
-CONCRETE FOR BRICK BOX REFER TO SECTION 832 OF THE STANDARD SPECIFICATIONS.
-PROVIDE GRATED DROP INLETS OVER 3'-6" DEEP WITH STEPS SPACED 12" ON CENTER AS DIRECTED BY STD. DWG. 840.66.
-FRAME AND GRATES ARE SEPARATE CONTRACT ITEMS.

STRAIGHT BARS

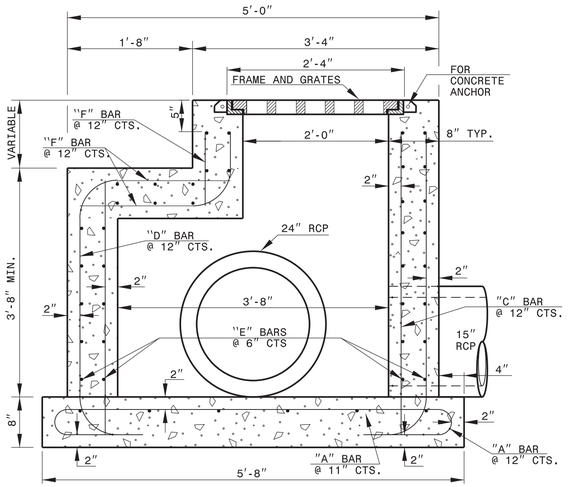


BASE BARS

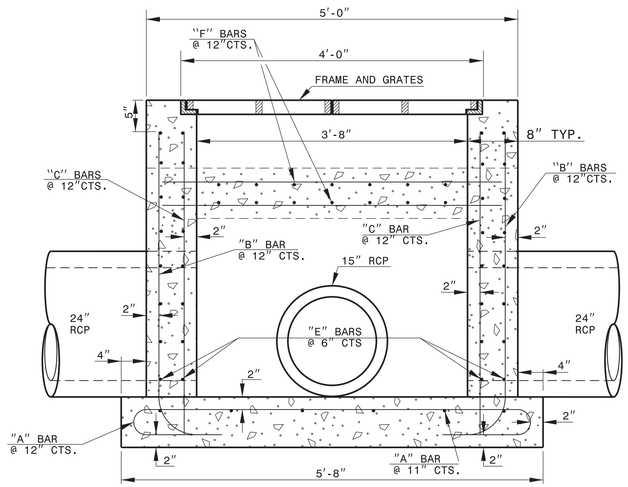
"A" BARS



CORNER BARS



SECTION X-X



SECTION Y-Y

BILL OF MATERIALS

BAR	SIZE	LENGTH	QUANTITY	WEIGHT
A	#5	8'-0½"	12	100.6
B	#5	4'-9½"	20	99.6
C	#5	5'-6"	20	114.7
D	#5	2'-9½"	16	46.6
E	#5	4'-8"	68	331.0
F	#5	2'-0"	44	91.8
REINF. STEEL (TOTAL WEIGHT LBS.)				784.3
CONCRETE IN BASE CLASS 'AA' (CUBIC YARDS)				0.79
CONCRETE IN WALLS CLASS 'AA' (CUBIC YARDS)				2.30
CONCRETE TOTAL (CUBIC YARDS)				3.09
CONC. CUBIC YARDS IN WALL/FOOT OF HEIGHT				0.46
LBS. OF REINF. STEEL IN WALL/FOOT OF HEIGHT				128.9

* PIPE DEDUCTIONS AND INLET OPENING DEDUCTION HAVE BEEN MADE.

NOTES:
-HORIZONTAL AND VERTICAL DIMENSIONS MAY BE ADJUSTED AS THE FIELD CONDITIONS AND/OR ALTERNATE DESIGN REQUIRE.
-MAXIMUM HEIGHT FOR THIS STRUCTURE SHALL BE 20'-0".
-ALL ADJUSTMENTS ARE TO BE MADE AS DIRECTED BY THE ENGINEER.
-DEPTH OF STEEL GRATE WILL REQIURE DEEPER SEAT ALONG SHORT WALLS.

7/27/2022

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TRAFFIC BEARING DROP INLET TYPE "A"

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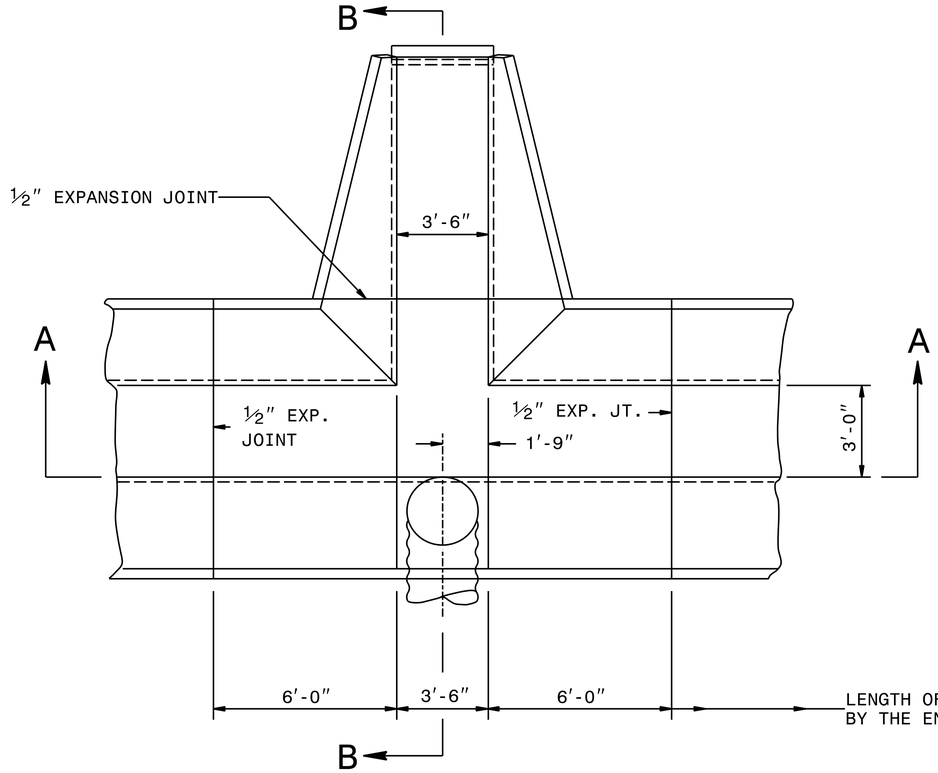
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2D-4

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

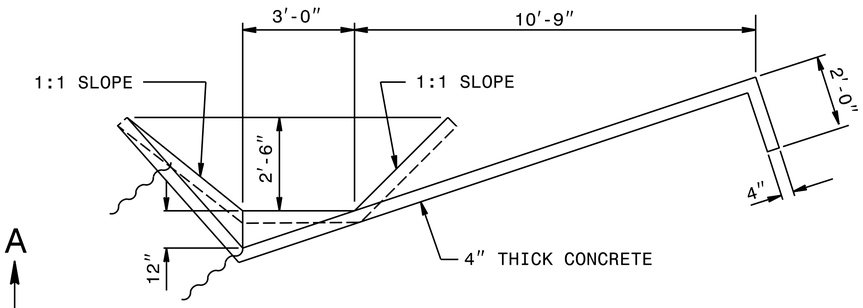
ENGLISH DETAIL DRAWING FOR

GUIDE FOR BERM DRAINAGE OUTLET

36" PIPE



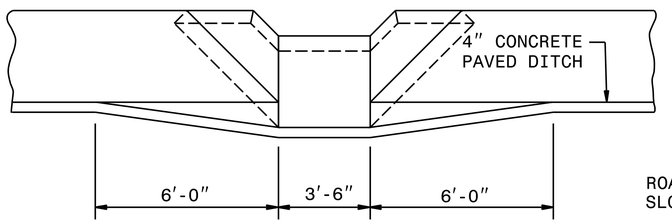
PLAN



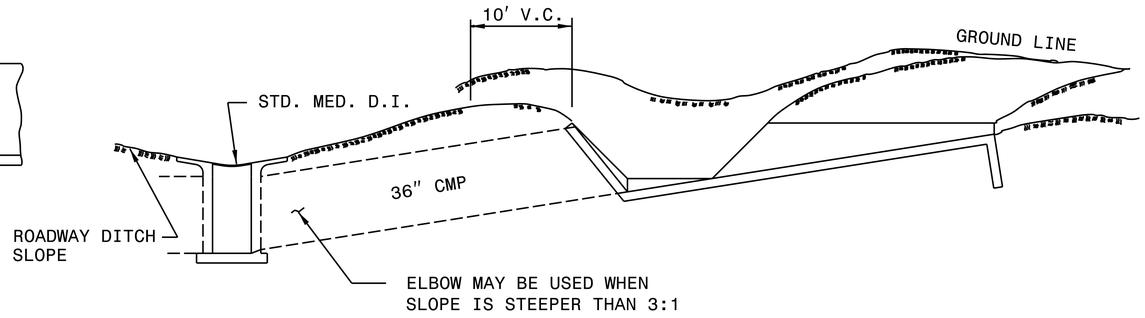
SECTION BB

GENERAL NOTES:

WHERE NECESSARY, ELBOWS MAY BE USED TO SKEW PIPE TO FIT INLETS WHERE THERE IS OFFSET BETWEEN THE INLET END AT BERM AND THE D.I.



SECTION AA



ELEVATION

SHEET 1 OF 1

DETAIL PREPARED BY:	DETAIL PREPARED FOR:
TGS ENGINEERS 706 HILLSBOROUGH ST SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	NORTH CAROLINA DEPARTMENT OF TRANSPORATION DIVISION 14 252 Webster Rd Sylva, NC 28779

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038697 DAVID B. PETTY

7/27/2022

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3/17/2022
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User:rrichard

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

ENGLISH DETAIL DRAWING FOR

GUIDE FOR BERM DRAINAGE OUTLET

36" PIPE

SHEET 1 OF 1

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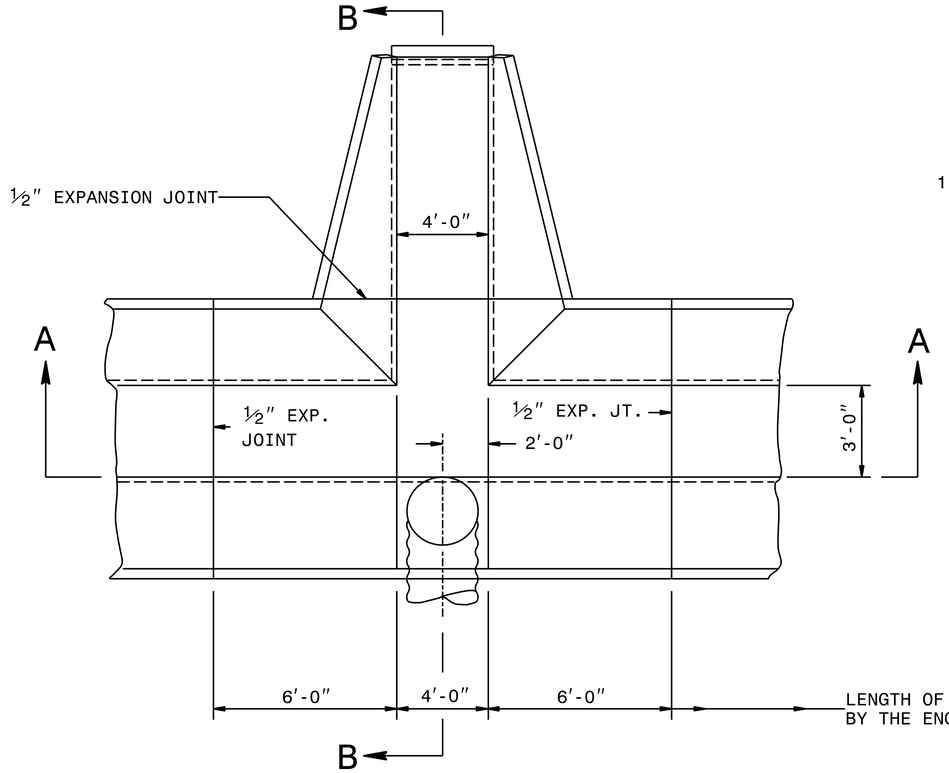
ENGLISH DETAIL DRAWING FOR

GUIDE FOR BERM DRAINAGE OUTLET

42" PIPE



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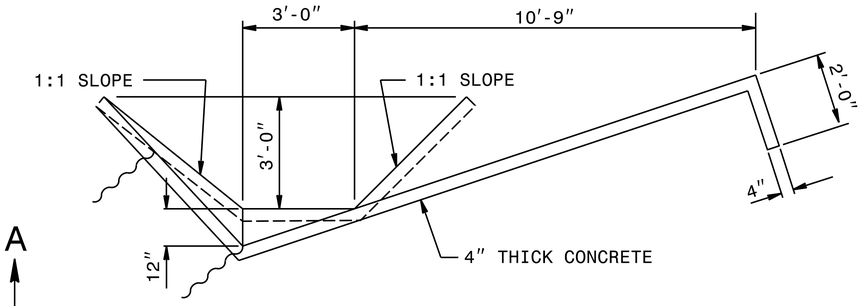

SECTION BB

GENERAL NOTES:

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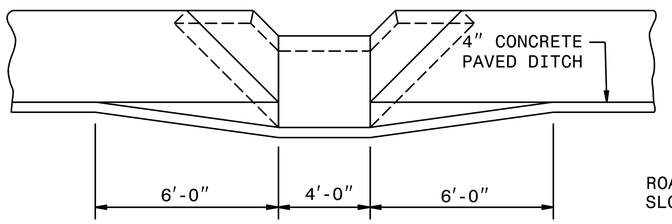
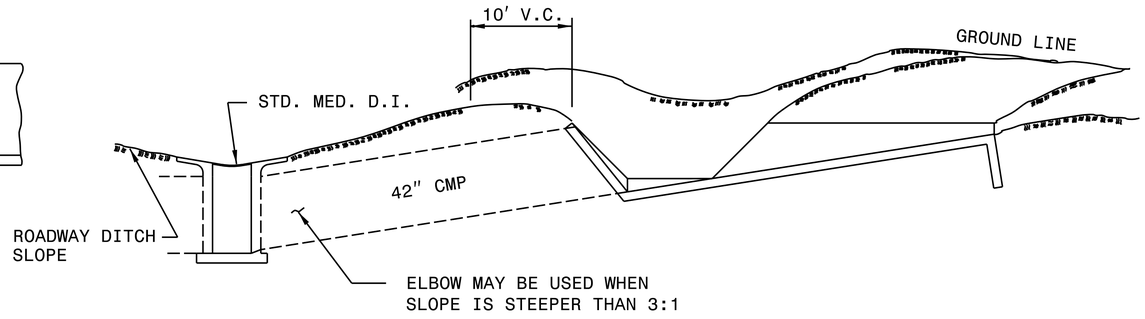


SECTION AA



ELEVATION

SHEET 1 OF 1

DETAIL PREPARED BY:	DETAIL PREPARED FOR:
TGS ENGINEERS 706 HILLSBOROUGH ST SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	NORTH CAROLINA DEPARTMENT OF TRANSPORATION DIVISION 14 252 Webster Rd Sylva, NC 28779

NORTH CAROLINA
Professional
SEAL
038697
ENGINEER
DAVID B. PETTY

7/27/2022

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SEE PLATE FOR TITLE

ORIGINAL BY:	2002 STANDARDS	DATE:	01-15-02
MODIFIED BY:	DAVID B. PETTY	DATE:	3-16-22
CHECKED BY:		DATE:	
FILE SPEC.:	usr/details/stand/850d01.dgn		

3/18/2022
X:\NCDOT\A-0009\Drainage\Special Details for A-0009\850dll Special Design BDO.dgn
User:rrichard

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

ENGLISH DETAIL DRAWING FOR
GUIDE FOR BERM DRAINAGE OUTLET
42" PIPE

SHEET 1 OF 1

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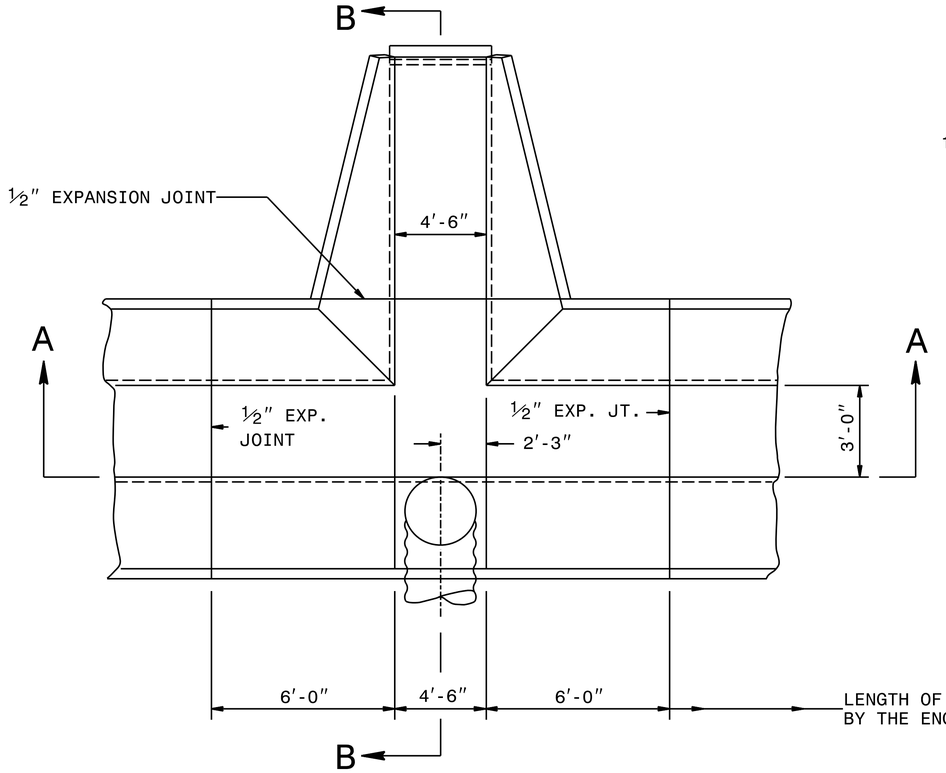
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2D-6

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

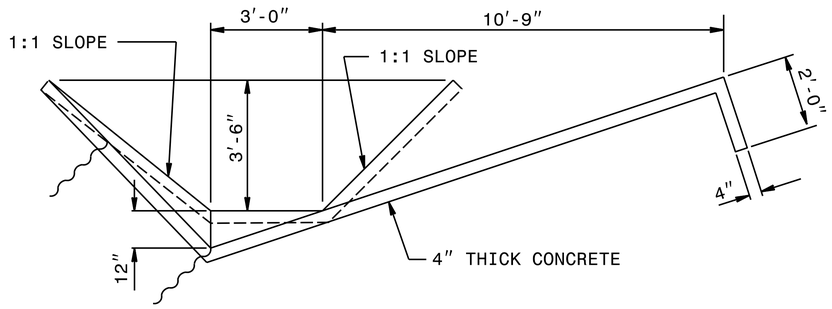
ENGLISH DETAIL DRAWING FOR

GUIDE FOR BERM DRAINAGE OUTLET

48" PIPE



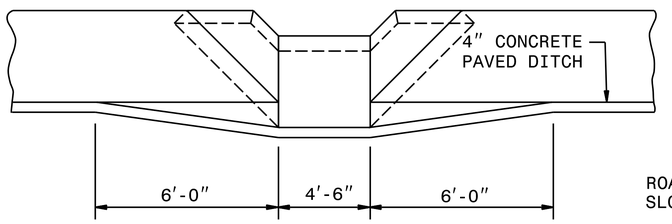
PLAN



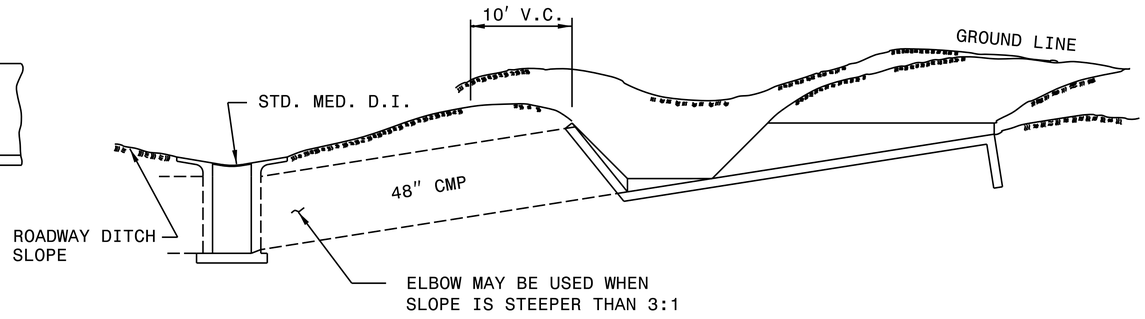
SECTION BB

GENERAL NOTES:

WHERE NECESSARY, ELBOWS MAY BE USED TO SKEW PIPE TO FIT INLETS WHERE THERE IS OFFSET BETWEEN THE INLET END AT BERM AND THE D.I.



SECTION AA



ELEVATION

SHEET 1 OF 1

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

ENGLISH DETAIL DRAWING FOR

GUIDE FOR BERM DRAINAGE OUTLET

48" PIPE

SHEET 1 OF 1

DETAIL PREPARED BY:	*DETAIL PREPARED FOR:*
TGS ENGINEERS 706 HILLSBOROUGH ST SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	NORTH CAROLINA DEPARTMENT OF TRANSPORATION DIVISION 14 252 Webster Rd Sylva, NC 28779

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038697 DAVID B. PETTY

7/27/2022

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MODIFIED BY: DAVID B. PETTY DATE: 3-16-22
CHECKED BY: DATE:
FILE SPEC.: usr/details/stand/850d01.dgn

3/18/2022
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User:rrichard

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PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2D-7

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

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

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

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.01.

CONSTRUCT WITH PIPE CROWNS MATCHING.

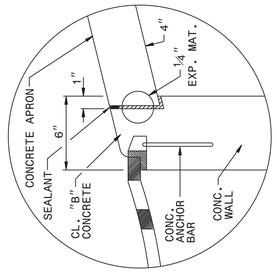
USE STANDARD FRAMES AND GRATES 840.22 (SHOWN), 840.24(SHOWN), 840.20 (NOT SHOWN) OR 840.29 (NOT SHOWN).

SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES.

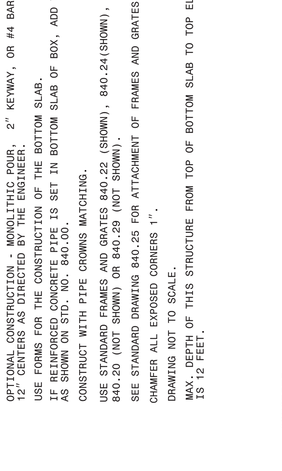
CHAMFER ALL EXPOSED CORNERS 1".

DRAWING NOT TO SCALE.

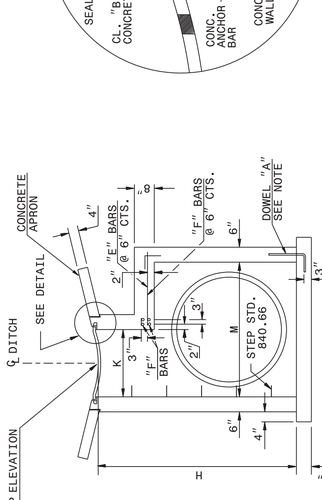
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12 FEET.



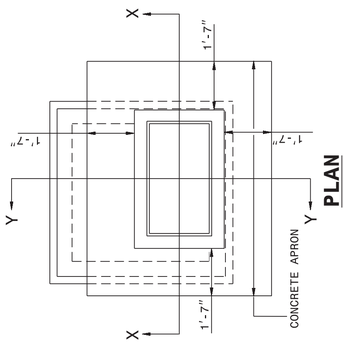
DETAIL
(APRON SUPPORT NOTCH)



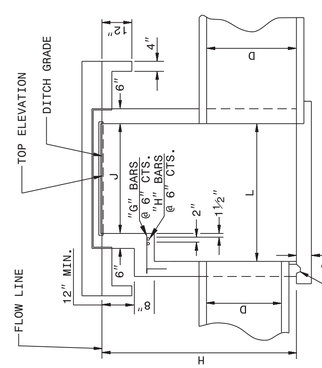
DOWEL-A



SECTION Y-Y

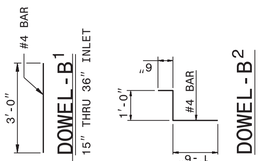


PLAN



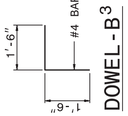
SECTION X-X

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR **CONCRETE GRATED DROP INLET TYPE 'A' MINIMUM DEPTH** 12" THRU 72" PIPE	SHEET 1 OF 2 **840d17**



DOWEL-B¹
FOR 15" THRU 36" INLET

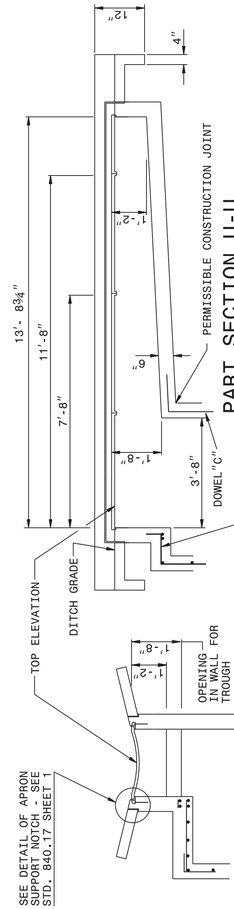
DOWEL-B²
FOR 42" INLET



DOWEL-B³

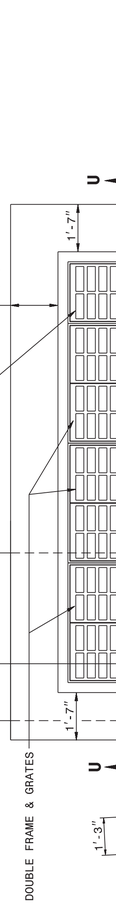
QUANTITY TO BE ADDED FOR EACH 2' INCREMENT INLET OPENING

	2'-0"	4'-0"	6'-0"	8'-0"	10'-0"	12'-0"
ADDITIONAL INLETS						
CONCRETE CU. YDS.	0.191	0.417	0.665	0.897	1.145	1.380
CONCRETE APRON CU. YDS.	0.074	0.148	0.222	0.296	0.370	0.444



PART SECTION U-U

PART SECTION V-V



DOWEL-C

MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE GRATED DROP INLET(BASED ON MIN. HEIGHT, H)

DIMENSIONS OF BOX AND PIPE					REINFORCING STEEL - NO. 4 BARS								CU YDS CONC. IN BOX			DEDUCTIONS FOR ONE PIPE	TOTAL BOTTOM SLAB LBS.
PIPE	SPAN	WIDTH	SPAN	WIDTH	HEIGHT	BARS E		BARS F		BARS G		BARS H			H TOTAL	H PER FT HT	APRON	TOTAL	C.S.	R.C.	
D	J	K	L	M	H	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	TOTAL LBS.							
12"	3'-8"	2'-0"	3'-8"	2'-0"	2'-3"	—	—	—	—	—	—	—	—	—	0.926	0.247	0.395	1.683	0.015	0.024	0.362
15"	3'-8"	2'-0"	3'-8"	2'-0"	2'-5"	—	—	—	—	—	—	—	—	—	0.988	0.247	0.395	1.745	0.023	0.036	0.362
18"				2'-0"	2'-8"	—	—	—	—	—	—	—	—	—	1.050	0.247		1.807	0.033	0.049	0.362
24"				2'-10"	3'-3"	8	1'-5"	6	4'-9"	—	—	—	—	27	1.362	0.278		2.201	0.059	0.085	0.444
30"			3'-8"	3'-5"	3'-10"	8	2'-0"	7	4'-9"	—	—	—	—	33	1.644	0.288		2.541	0.092	0.127	0.502
36"			4'-0"	4'-0"	4'-4"	8	2'-5"	8	4'-11"	4	0'-9"	2	4'-11"	47	1.931	0.321		2.920	0.132	0.178	0.560
42"			4'-10"	4'-10"	5'-0"	10	3'-1"	9	5'-7"	4	1'-5"	3	5'-7"	67	2.500	0.370		3.677	0.180	0.243	0.704
48"			5'-4"	5'-4"	5'-6"	11	3'-7"	10	6'-1"	4	1'-11"	4	6'-1"	87	3.013	0.407		4.315	0.235	0.317	0.823
54"			6'-0"	6'-0"	6'-0"	12	4'-1"	11	6'-7"		2'-5"	5	6'-7"	107	3.589	0.444		5.072	0.297	0.401	0.951
60"			6'-6"	6'-6"	6'-7"	13	4'-9"	12	7'-3"		3'-1"	6	7'-3"	135	4.539	0.494		6.170	0.367	0.495	1.311
66"			7'-2"	7'-2"	7'-1"	14	5'-4"	14	7'-10"		3'-7"	7	7'-10"	168	5.061	0.537		6.901	0.444	0.599	1.136
72"	3'-8"	2'-0"	7'-8"	7'-8"	7'-8"	15	5'-11"	15	8'-5"	4	4'-3"	8	8'-5"	199	5.860	0.580	0.395	7.868	0.528	0.713	1.500

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR **CONCRETE GRATED DROP INLET TYPE 'A' MINIMUM DEPTH** 12" THRU 72" PIPE	SHEET 2 OF 2 **840d17**

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: 1/22/14
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: jhowerton\minimum depth type A.dgn

11-SEP-2017 11:55
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jhowerton AT CSD-212015

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A-0009CB	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

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ENGINEER

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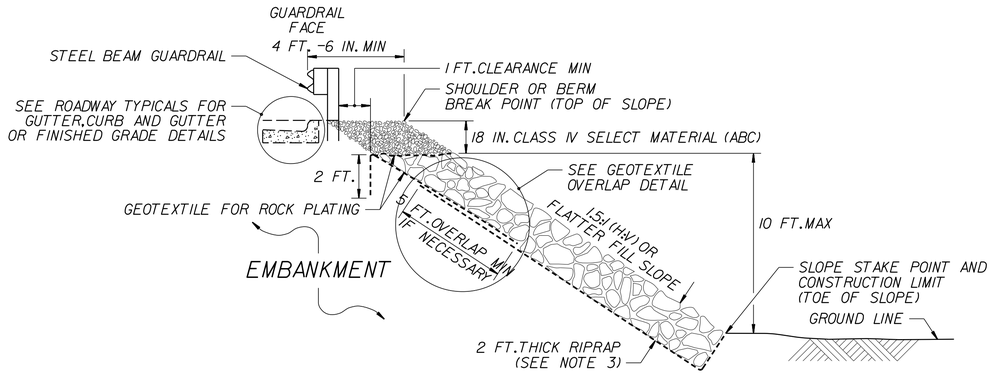
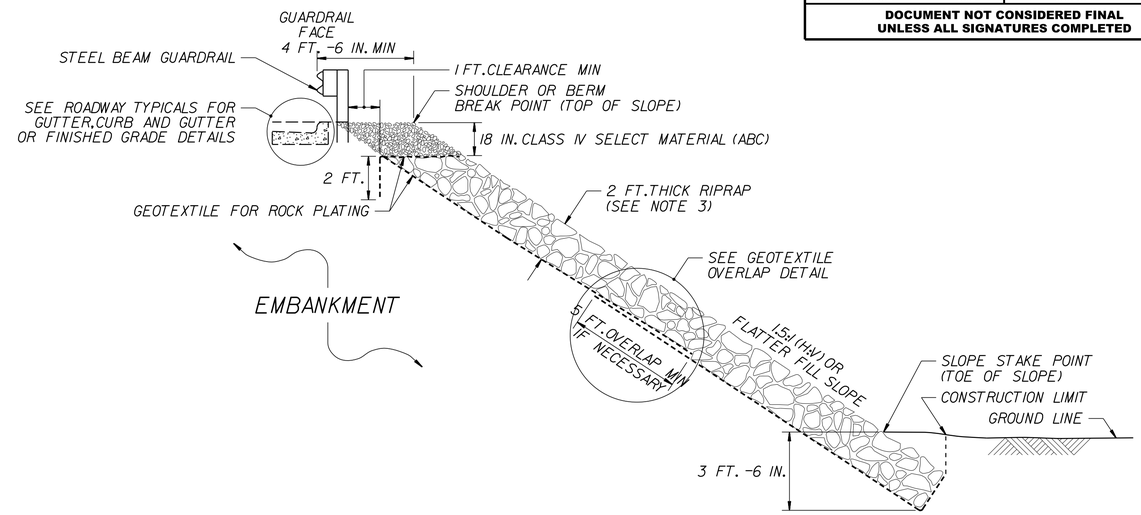
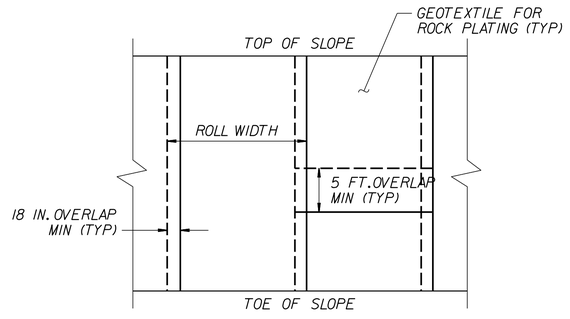


ROCK PLATING DETAIL NO. 1 – TYPICAL SECTION



ROCK PLATING DETAIL NO. 2 – TYPICAL SECTION



GEOTEXTILE OVERLAP DETAIL

ROCK PLATING

FOR ROCK PLATING, SEE SECTION 275 OF THE STANDARD SPECIFICATIONS

USE ROCK PLATING AT THE FOLLOWING LOCATIONS:

LINE	BEGINNING SLOPE	APPROX. STATION	ENDING SLOPE	APPROX. STATION	LOCATION LT/RT	ROCK PLATING DETAIL NO. 1/2	RIPRAP CLASS* 1/2/B	SY
–L–	1.5:1	288+00	1.5:1	288+50	RT	2	*	340

*USE CLASS 1, 2 OR B RIPRAP UNLESS REQUIRED OTHERWISE IN THE ROADWAY SUMMARY SHEETS.

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 7/14/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 7/14/22

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP
2400 CROWNPOINT EXECUTIVE DRIVE
SUITE 800
CHARLOTTE, NC 28227
(980) 339-8684

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL CONSTRUCTION DETAILS - ROCK PLATING NOTES & DETAILS

REVISIONS

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

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NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

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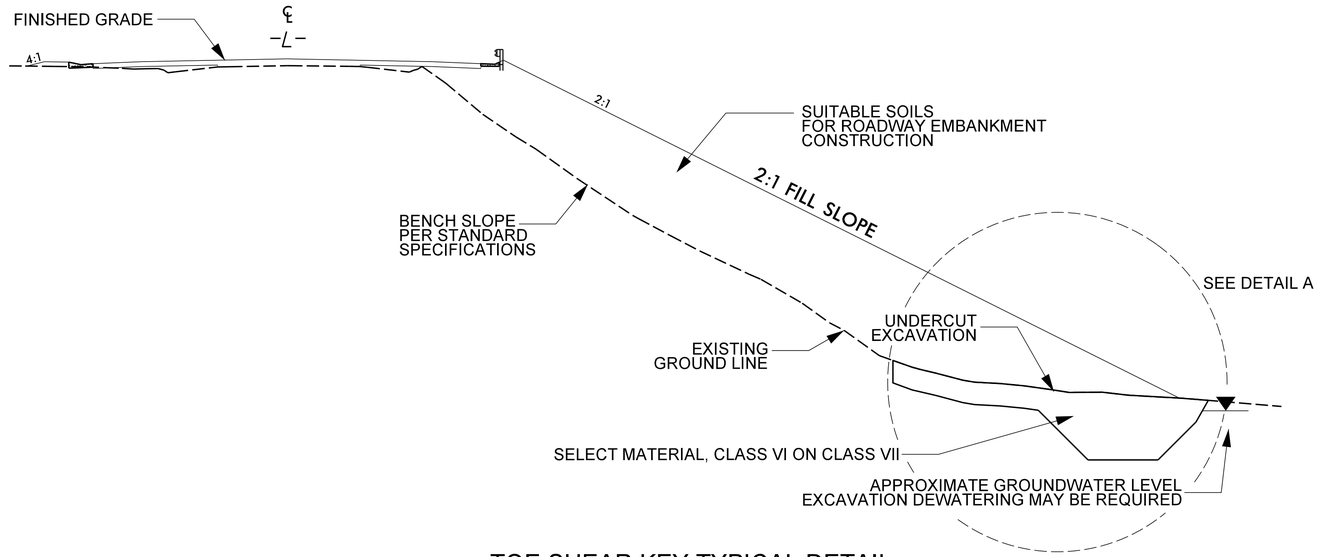
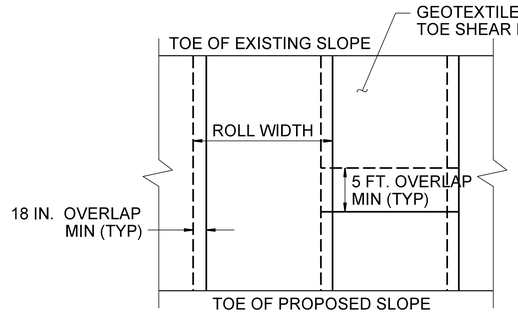


TOE SHEAR KEY TYPICAL DETAIL
NOT TO SCALE



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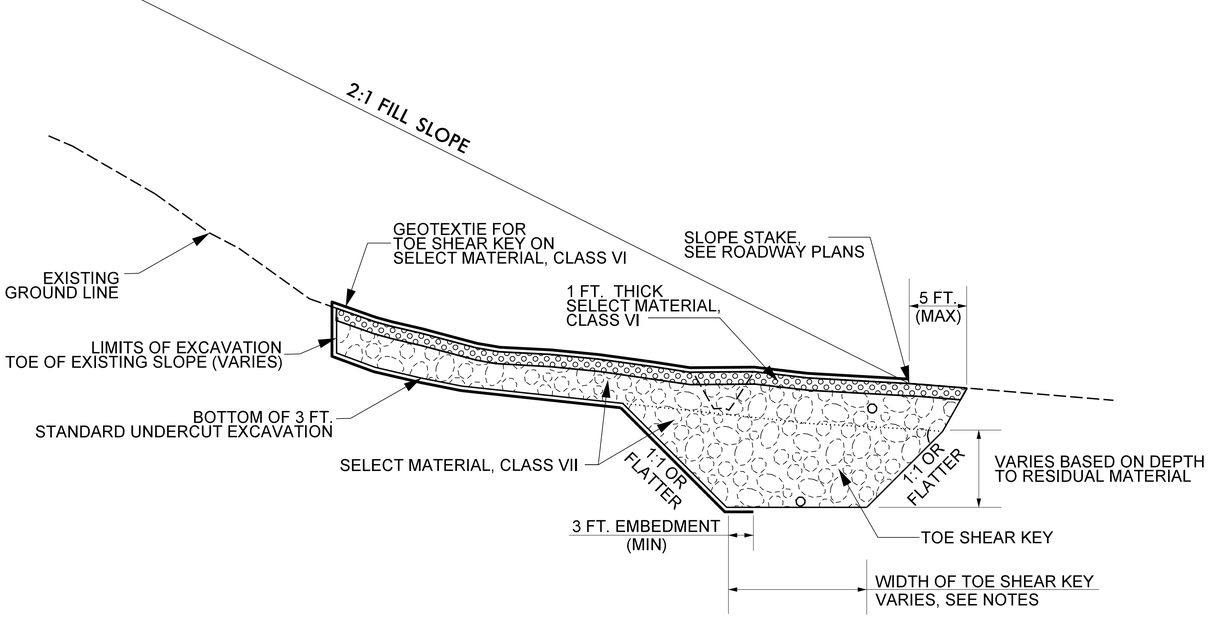

DETAIL A - TOE SHEAR KEY ADDITIONAL DETAILS AND DIMENSIONS
NOT TO SCALE

FOR USE IN THE FOLLOWING LOCATIONS, OR AS DIRECTED BY THE ENGINEER
STATION: -L-, 310+00 to 313+50 RT

NOTES:

FOR TOE SHEAR KEY, SEE TOE SHEAR KEY SPECIAL PROVISION

PERFORM UNDERCUT EXCAVATION IN THE AREAS NOTED. UNDERCUT SHALL EXTEND FROM TOE OF EXISTING SLOPE TO FIVE FEET BEYOND OF TOE OF PROPOSED SLOPE. UNDERCUT EXCAVATION SHALL EXTEND TO A DEPTH OF 3 FEET BELOW EXISTING GRADE.

FOR SELECT MATERIAL, CLASS VII, SEE TOE SHEAR KEY SPECIAL PROVISION.

FOR SELECT MATERIAL, CLASS VI, SEE TOE SHEAR KEY SPECIAL PROVISION.

FOR GEOTEXTILE FOR TOE SHEAR KEY AND SELECT MATERIAL, CLASS VI, SEE TOE SHEAR KEY SPECIAL PROVISION

WIDTH OF TOE SHEAR KEY AT -L-, 310+00 TO 313+50 RT IS 15 FT.

ESTIMATED QUANTITIES
TOE SHEAR KEY

SELECT MATERIAL, CLASS VII FOR TOE SHEAR KEY	7,100 TON
SELECT MATERIAL, CLASS VI FOR TOE SHEAR KEY	1,750 TON
GEOTEXTILE FOR TOE SHEAR KEY	5,250 SY
UNDERCUT EXCAVATION FOR TOE SHEAR KEY	4,400 CY

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 7/14/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 7/14/22

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP
2400 CROWNPOINT EXECUTIVE DRIVE
SUITE 800
CHARLOTTE, NC 28227
(980) 339-8684

GEOTECHNICAL CONSTRUCTION DETAILS - TOE SHEAR KEY

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1			3		
2			4		

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GEOTECHNICAL ENGINEER

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ENGINEER

SIGNATURE DATE

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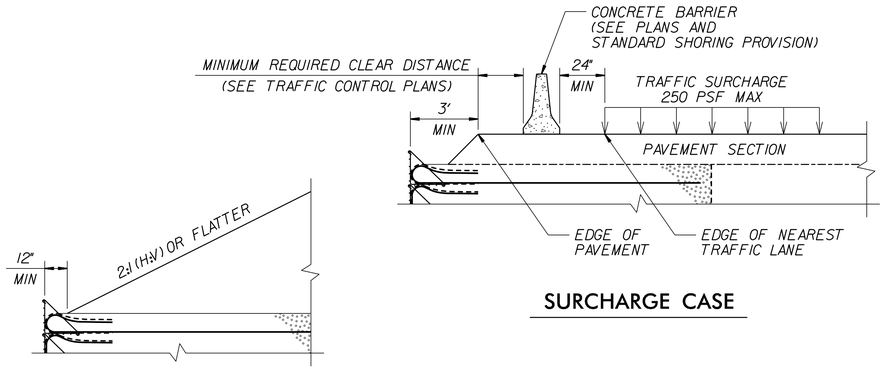
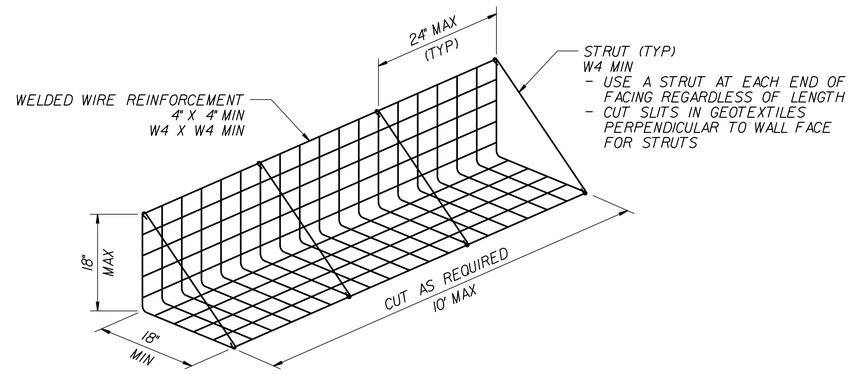
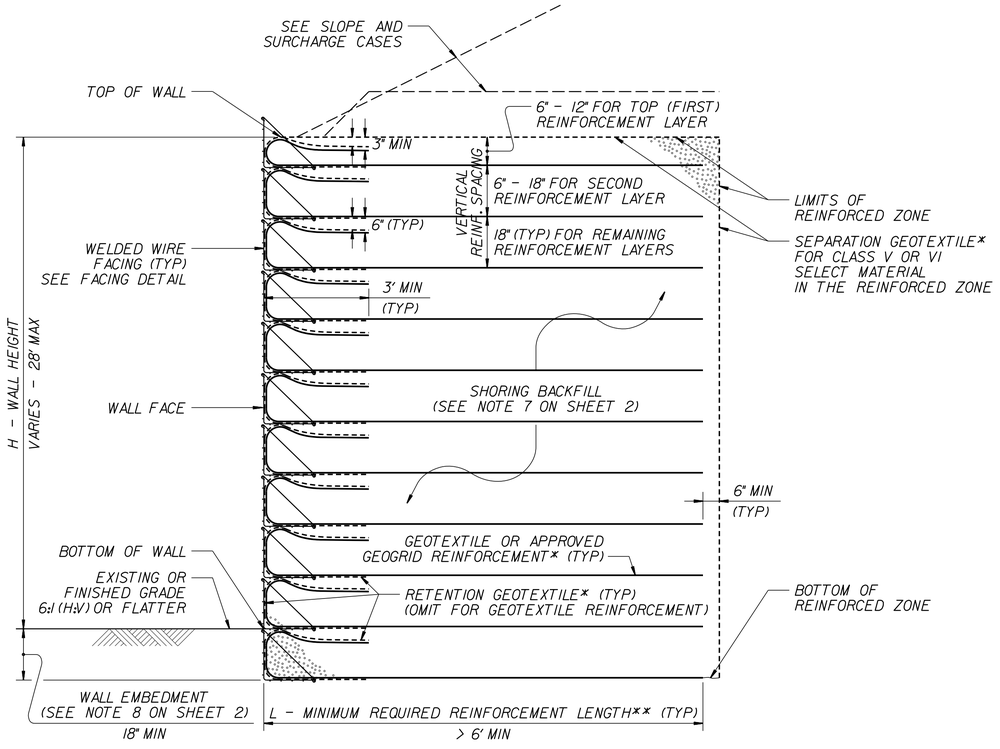


SURCHARGE CASE

SLOPE CASE

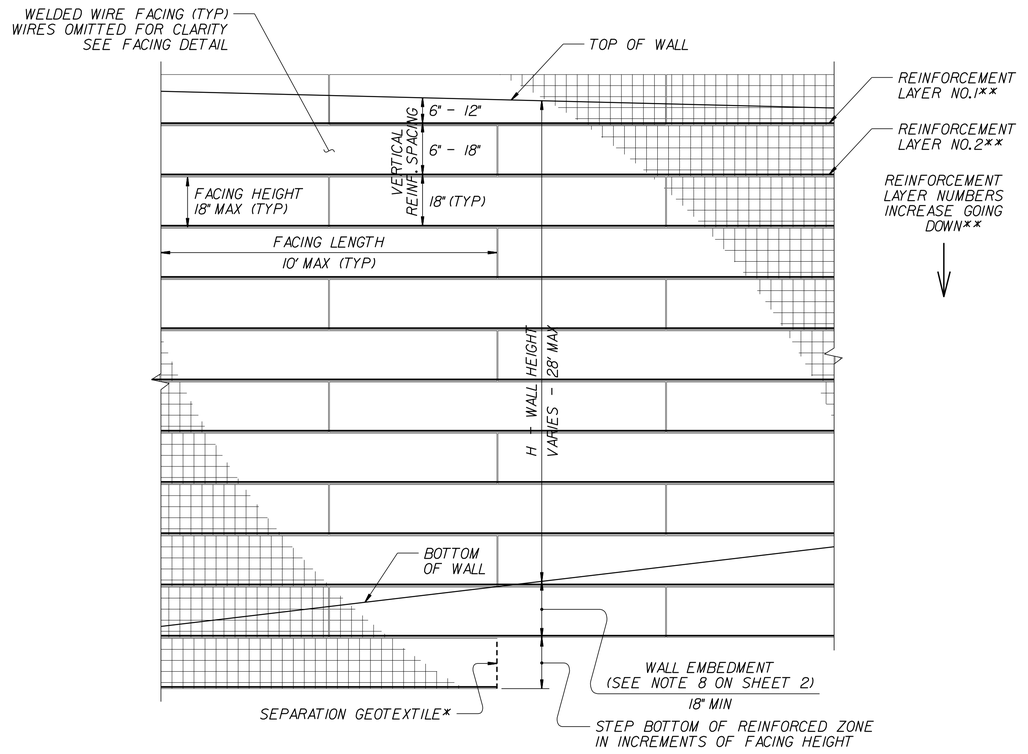


FACING DETAIL



STANDARD TEMPORARY WALL

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



STANDARD TEMPORARY WALL – PARTIAL ELEVATION

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 1 OF 3

DATE: 11-19-13

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A-0009CB	2G-4

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

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SIGNATURE DATE

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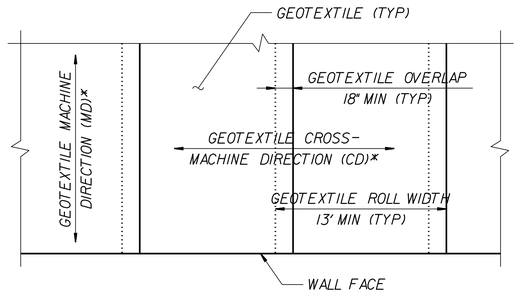
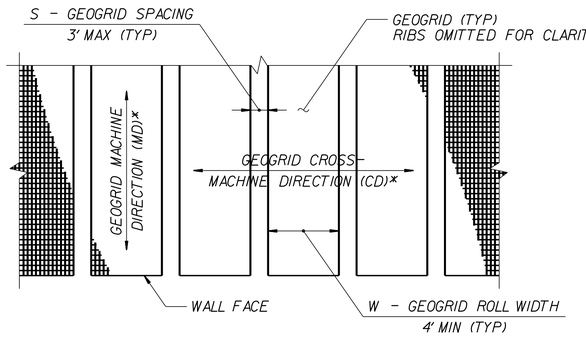


GEOTEXTILE PLACEMENT

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)

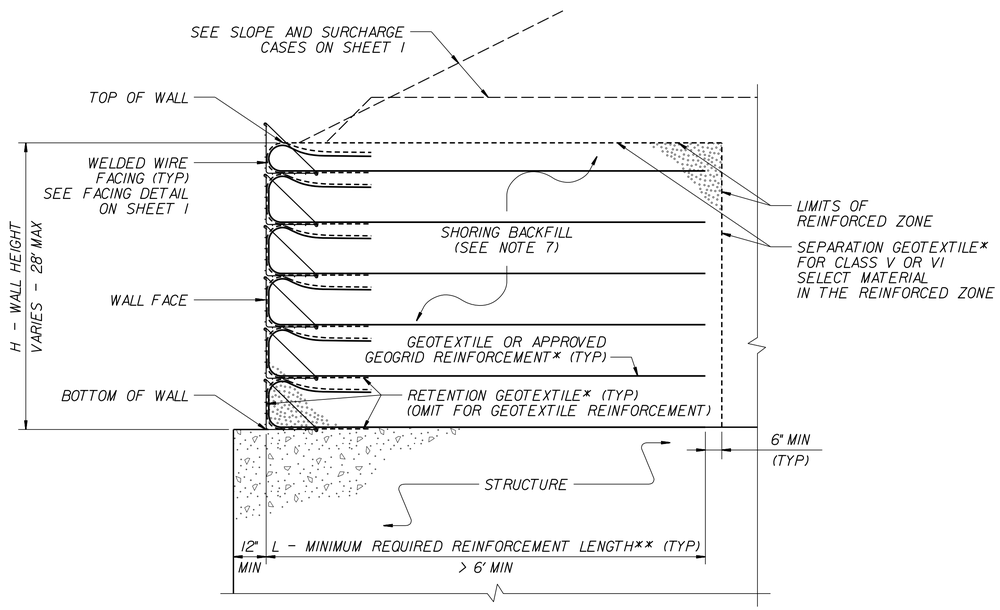


GEOGRID PLACEMENT

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

GEOSYNTHETIC PLACEMENT DETAILS

(PLAN VIEW)
*SEE NOTE 12.



TEMPORARY WALL ON STRUCTURE DETAIL

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

NOTES:

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

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

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD TEMPORARY WALL
SHEET 2 OF 3

DATE: 10-19-21

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PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2G-5

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

DocuSigned by: D. Matthew Brewer 7/14/22
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SIGNATURE DATE

ENGINEER

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

L – MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)

(FOR ALL REINFORCEMENT TYPES)

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

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

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

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

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

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD

(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 3 OF 3

DATE: 11-19-13

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PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2G-6

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

DocuSigned by: D. Matthew Brewer 7/14/22
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SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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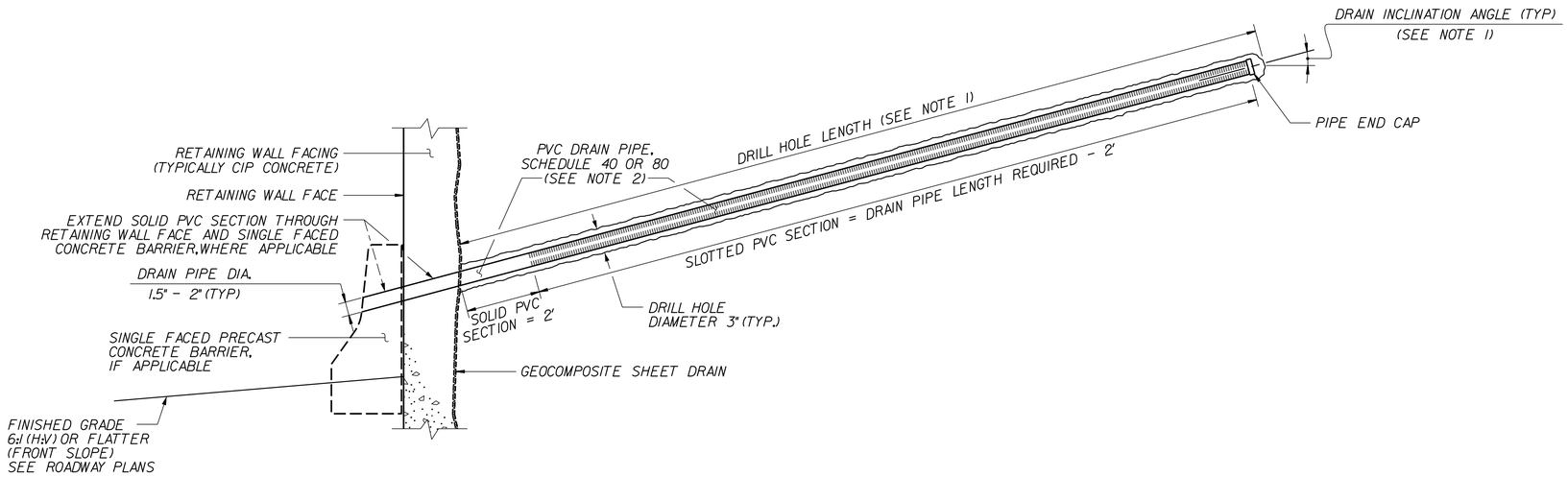
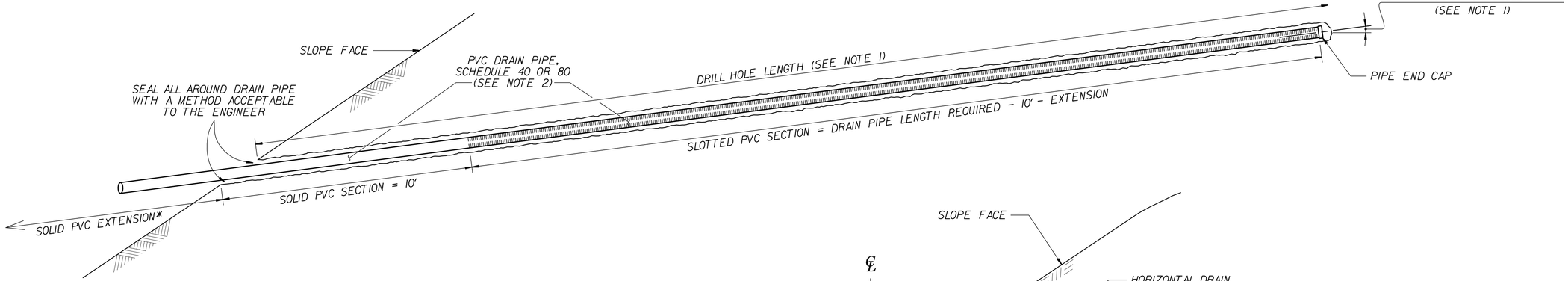
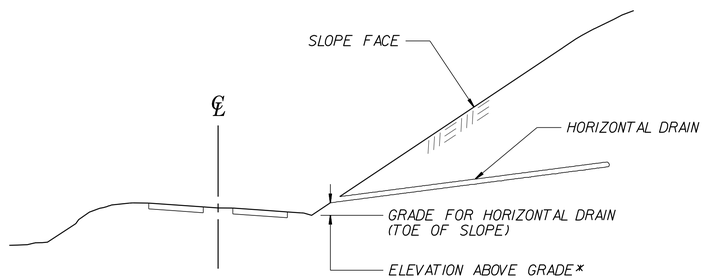


RETAINING WALL HORIZONTAL DRAIN



SLOPE HORIZONTAL DRAIN

*EXTEND SOLID PVC SECTION TO CONNECT PIPE TO A DRAINAGE SYSTEM OR DISCHARGE WATER AS DIRECTED



EXAMPLE CROSS-SECTION WITH SLOPE HORIZONTAL DRAIN

*SEE NOTE 1 FOR DRAIN ELEVATIONS ABOVE (OR BELOW) GRADE

NOTES:

1. SEE ROADWAY SUMMARY SHEETS FOR APPROXIMATE KNOWN HORIZONTAL DRAIN LOCATIONS, ELEVATIONS, INCLINATION AND LENGTHS. ADDITIONAL DRAINS MAY BE REQUIRED AS DETERMINED BY THE ENGINEER.
2. DRAIN PIPES MAY BE OMITTED FOR SOME HORIZONTAL DRAINS. SEE ROADWAY SUMMARY SHEETS FOR DRAIN PIPE REQUIREMENTS INCLUDING THOSE DRAINS WITHOUT PIPES.
3. FOR HORIZONTAL DRAINS, SEE HORIZONTAL DRAINS SPECIAL PROVISION (GT-12).

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 5/26/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 5/26/22

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP
2400 CROWNPOINT EXECUTIVE DRIVE
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CHARLOTTE, NC 28227
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL CONSTRUCTION DETAILS - HORIZONTAL DRAINS

REVISIONS

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

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GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

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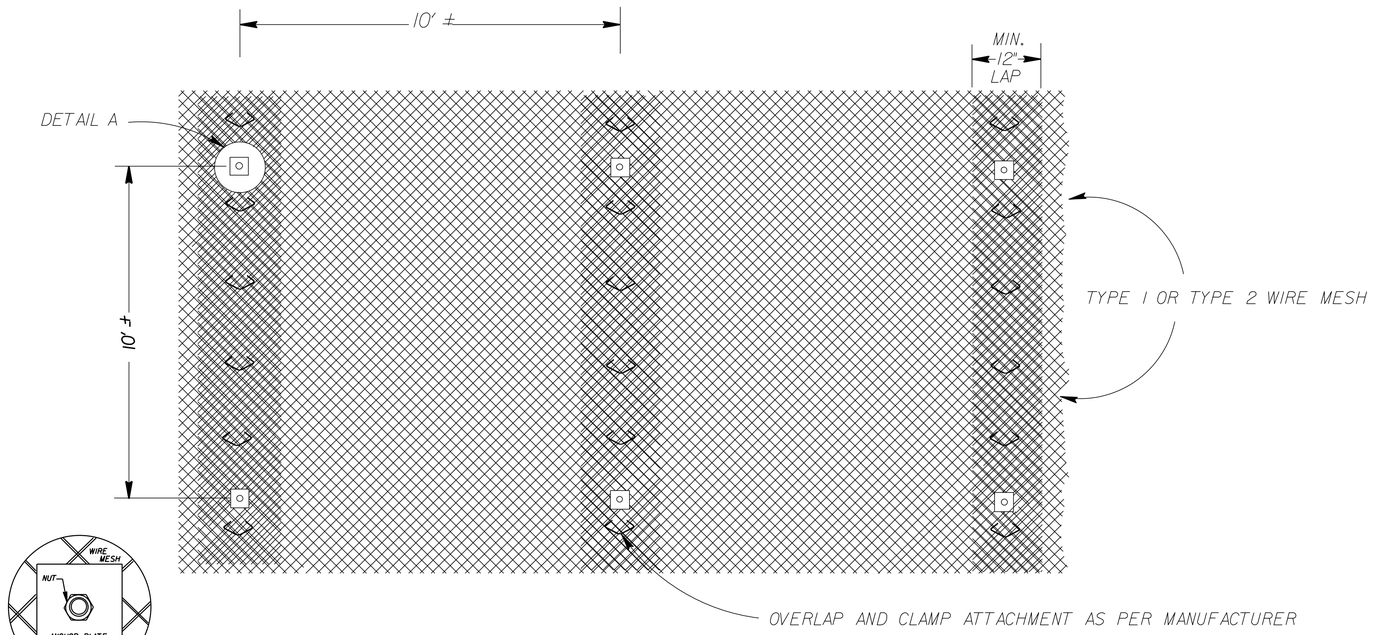
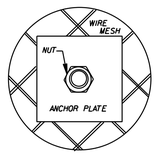
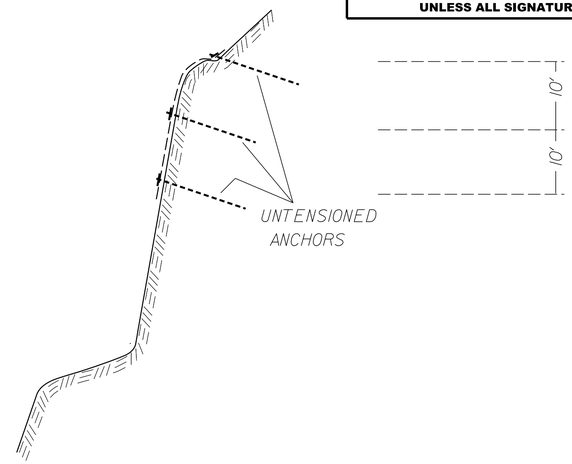


DETAIL OF WIRE MESH

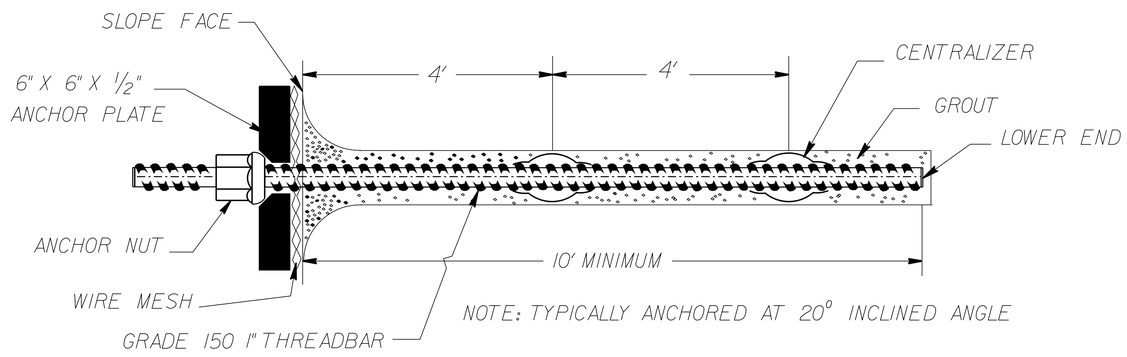


DETAIL A

ROCK BOLT ASSEMBLY



TYPICAL SECTION



UNTENSIONED ROCK ANCHORS

NOTES:

1) WIRE MESH SHALL BE INSTALLED ON SLOPES AT LOCATIONS AS DIRECTED BY THE ENGINEER.

ESTIMATED QUANTITIES	
WIRE MESH (TYPE 1)	300 SY
WIRE MESH (TYPE 2)	300 SY
UNTENSIONED ROCK ANCHOR FOR WIRE MESH	1,250 LF

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 7/14/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 7/14/22

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL CONSTRUCTION DETAILS - ROCK SLOPE MATERIALS

REVISIONS

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

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PROJECT REFERENCE NO.	SHEET NO.
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GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER MATTHEW BREWER

DocuSigned by: D. Matthew Brewer 3861206C0A614EB... SIGNATURE 7/15/2022 DATE

ENGINEER

SIGNATURE DATE

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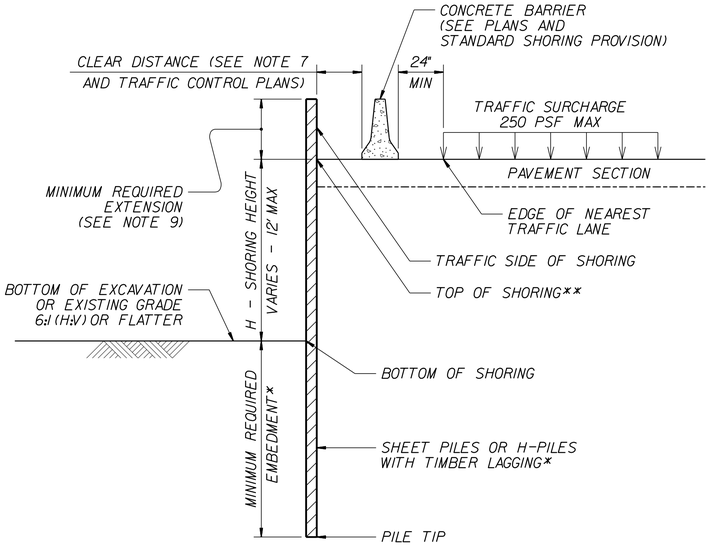
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS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

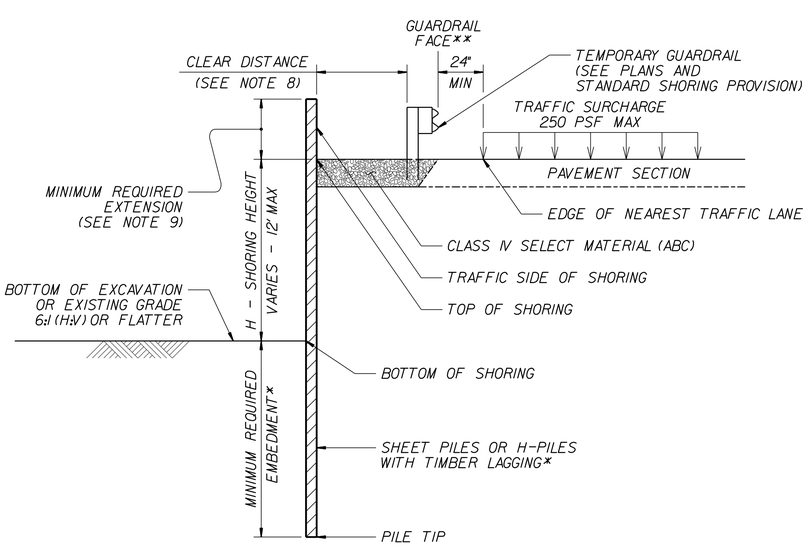
NOTES:

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.



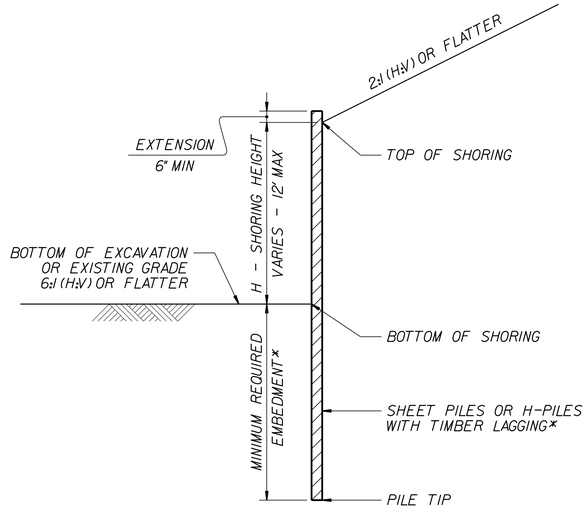
CONCRETE BARRIER

**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

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COMPUTED BY: SGM DATE: 7/72022
CHECKED BY: JLT DATE: 7/7/2022

PROJECT NO.	SHEET NO.
A-0009CB	3B-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Undercut	Embank. +%	Borrow	Waste
-L- 208+00.00	-L- 238+00.00	2,816		4,605	1,789	
SUBTOTAL 1		**2,816**		**4,605**	**1,789**	
-L- 238+00.00	-L- 268+00.00	77,236		1,713		75,523
SUBTOTAL 2		**77,236**		**1,713**		**75,523**
-L-268+00.00	-L- 298+00.00	43,233		13,070		30,163
-L- 277+75.00	-L- 278+75.00		280			280
-L- 279+75.00	-L- 282+75.00		820			820
-Y4- 11+21.11	-Y4- 12+72.04	9		317	308	
SUBTOTAL 3		**43,242**	**1,100**	**13,387**	**308**	**31,263**
-L- 298+00.00	-L- 328+00.00	33,088		16,128		16,960
SUBTOTAL 4		**33,088**		**16,128**		**16,960**
-L- 328+00.00	-L- 358+00.00	26,101		3,725		22,376
-L- 344+50.00	-L- 344+95.00		160			160
SUBTOTAL 5		**26,101**	**160**	**3,725**		**22,536**
-L- 358+00.00	-L- 380+50.00	32,214		5,949		26,265
Retaining Wall # 16			4,550			4,550
-L- 374+75.00	-L- 375+25.00		150			150
Retaining Wall # 18			10,200			10,200
SUBTOTAL 6		**32,214**	**14,900**	**5,949**		**41,165**
LAND BRIDGE						
-L- 382+30.00	-L- 414+50.00	45,057		2,843		42,214
Retaining Wall # 28			6,900			6,900
Retaining Wall # 29			3,400			3,400
Retaining Wall # 29A			3,850			3,850
SUBTOTAL 7		**45,057**	**14,150**	**2,843**		**56,364**
TOTALS:		**259,754**	**30,310**	**48,350**	**2,097**	**243,811**
LOSS DUE TO CLEARING & GRUBBING		-8,000				-8,000
ADDITIONAL UNDERCUT (EMBANKMENT & SUBGRADE STABILITY)			3,750			3,750
HARD ROCH TO REPLACE BORROW					-1,459	-1,459
ADJUST FOR ROCK SWELL				-365	-365	
ELIMINATE EARTH SHRINKAGE FACTOR SINCE NOW ROCK				-273	-273	
HARD ROCK TO REPLACE EMBANKMENT						
ADJUST FOR ROCK SWELL				-5,559		5,559
ELIMINATE EARTH SHRINKAGE FACTOR SINCE NOW ROCK				-4,169		4,169
APPLY ROCK SWELL FACTOR TO PERM. WASTED HARD ROCK						3,264
APPLY EARTH SHRINKAGE FACTOR TO PERM. WASTED HARD ROCK						2,448
GRAND TOTALS:		**251,754**	**34,060**	**37,984**	**0**	**253,542**
SAY		**255,000**	**34,060**			

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

EST. DDE = 640 CUBIC YARDS
SELECT GRANULAR MATERIAL, CLASS III = 34,960 CY
EST. SHALLOW UNDERCUT = 1,500 CY

PER GEOTECH RECOMMENDATION, ESTIMATED 4,400 CUBIC YARDS OF UNDERCUT FOR TOE SHEAR KEY.

PAVEMENT STRUCTURE VOLUME = 9,880 CY

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

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L-	214+87	224+77	RT	331.33			
-L-	229+64	235+02	RT	135.01			
-L-	249+90	271+51	LT	934.64			
-L-	273+94	276+24	LT	218.62			
-L-	274+97	277+98	RT	139.88			
-L-	278+23	289+88	RT	1,493.34			
-L-	278+80	283+59	LT	213.61			
-L-	292+47	307+61	RT	839.54			
-L-	302+89	306+44	LT	92.07			
-L-	309+85	328+62	LT	1,027.53			
-L-	310+84	313+07	RT	113.74			
-L-	318+05	323+17	RT	424.63			
-L-	332+72	373+53	RT	3,597.90			
-L-	364+10	370+58	LT	186.03			
-L-	373+21	397+44	RT	2,292.05			
-L-	377+91	379+76	RT	53.06			
-L-	385+03	414+50	RT	2,449.40			
Remove Temporary Pavement							
-L-	248+59	251+78	LT	161.41			
-L-	248+94	251+00	RT	18.66			
-L-	314+85	317+74	LT	38.32			
		TOTAL:		14,760.78			
		SAY:		**14,770**			

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COMPUTED BY: SGM DATE: 5/16/2022
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DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	3B-2

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

GUARDRAIL SUMMARY

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

SURVEY LINE	BEG. STA.	END STA.	LOC	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS							IMPACT ATTENUATOR		EXTRA LENGTH GUARDRAIL POSTS (8' STEEL)	REMOVE & RESET EXISTING GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END		B-77	GREU, TL-3	GREU, TL-2	CAT-1	AT-1	B-77 SC	END SECTION	G	NG				
-L-	211+50.00	216+50.00	LT	500.00					8'	11'	50'	50'	1'	1'			2										
-L-	237+78.00	238+79.00	LT	62.50	62.5				8'	11'										2							SHOP CURVED GUARDRAIL = 20'R
-L-	239+06.25	241+00.00	LT	193.75					8'	11'	50'	50'	1'	1'			2										
-L-	241+43.75	251+00.00	LT	956.25					8'	11'	50'	50'	1'	1'			2										
-L-	259+50.00	268+75.00	LT	925.00					8'	11'	50'	50'	1'	1'			2									414.6	
-L-	268+45.88	269+25.00	RT	79.125					8'	8'	50'		1'			1	1										TIE TO SGL FACED BARRIER
-L-	269+40.00	271+71.25	LT	231.25					8'	11'	50'	50'	1'	1'			2										
-L-	275+22.50	278+85.00	LT	362.50					8'	11'	50'	50'	1'	1'			2									162.9	
-L-	279+10.00	282+92.00	LT	393.75	37.5				8'	11'		50'		1'			1	1								448.2	SHOP CURVED GUARDRAIL = 20'R
-L-	10+84 -Y4-	296+20.00	RT	1,712.50	37.5				8'	11'		50'		1'			1			1						1,722.8	SHOP CURVED GUARDRAIL = 20'R
-L-	296+70.00	298+20.00	RT	150.00					8'	11'	50'	50'	1'	1'			2									186.6	
-L-	299+23.40	301+48.40	RT	225.00					8'	11'	50'	50'	1'	1'			2									173.9	
-L-	302+26.60	306+51.60	RT	425.00					8'	11'	50'	50'	1'	1'			2									303.6	
-L-	304+02.00	306+07.00	LT																							205.7	
-L-	309+25.00	314+25.00	RT	500.00					10.3'	13.3'	50'	50'	1'	1'			2									352.6	SHOULDER GUTTER INSTALLATION
-L-	311+61.00	313+30.00	LT	156.25	37.5				8'	11'		50'		1'			1			1						203.0	SHOP CURVED GUARDRAIL = 20'R
-L	316+37.50	317+81.25	RT	131.25	18.75				10.3'	13.3'									1	1				20			SHOULDER BERM GUTTER INSTALLATION, SHOP CURVED GUARDRAIL = 20'R, **USE EXTRA DEPTH GUARDRAIL POSTS: 117FT@65.25=18.7; SAY 20 EA**
-L-	318+50.13	319+29.25	RT	79.125					8'	8'	50'		1'			1	1										TIE TO SGL FACED BARRIER
-L-	321+08.37	321+87.50	RT	79.125					8'	8'		50'		1'		1	1										TIE TO SGL FACED BARRIER
-L-	325+00.00	328+75.00	RT	375.00					10.3'	13.3'	50'	50'	1'	1'			2										SHOULDER GUTTER INSTALLATION
-L-	330+66.00	330+81.78	LT		29.125				8'	11'										1	1						TIE TO SGL FACED BARRIER, TYPE B-77 SC = 15'R
-L-	333+24.11	333+24.11	LT		29.125				8'	11'										1	1						TIE TO SGL FACED BARRIER, TYPE B-77 SC = 20'R
-L-	331+75.00	335+00.00	RT	325.00					10.3'	13.3'	50'	50'	1'	1'			2									269.3	SHOULDER GUTTER INSTALLATION
-L-	335+67.00	341+61.00	RT	506.25	62.5				10.3'	13.3'										2						476.2	SHOULDER GUTTER INSTALLATION, SHOP CURVED GUARDRAIL = 20'R
-L-	339+28.45	341+20.00	LT	175.00	31.25				8'	11'		50'		1'			1			1						197.7	SHOP CURVED GUARDRAIL = 20'R
-L-	341+36.00	341+76.20	LT	22.875	31.25				8'	11'						1				1						34,463.0	TIE TO SGL FACED BARRIER, SHOP CURVED GUARDRAIL = 20'R
-L-	344+10.55	344+48.15	LT	22.875	25				8'	11'						1				1							TIE TO SGL FACED BARRIER, SHOP CURVED GUARDRAIL = 20'R
-L-	343+60.00	354+47.50	RT	1,087.50					10.3'	13.3'	50'	50'	1'	1'			2									1,067.5	SHOULDER GUTTER INSTALLATION
-L-	344+63.00	344+81.00	LT		29.125															1	1						TIE TO SGL FACED BARRIER, TYPE B-77 SC = 20'R
-L-	346+76.12	347+94.84	LT	120.75					8'	11'						2											TIE TO SGL FACED BARRIER
-L-	350+64.13	358+77.00	LT	814.50					8'	11'						2											TIE TO SGL FACED BARRIER
-L-	356+52.00	373+64.51	RT	1,633.25	125				8'/10.3'	11'/13.3'	50'	50'	1'	1'		2										1,434.4	SHOULDER GUTTER INSTALLATION, SHOPED CURVED GUARDRAIL = 20'R & 68'R
-L-	362+94.00	369+40.00	LT	650.00					8'	11'						2											TIE TO SGL FACED BARRIER
-L-	374+12.50	380+50.00	RT	637.50					8'	11'	50'		1'			1										730.7	TIE TO SGL FACED BARRIER
-L-	375+26.00	376+65.00	LT	143.75					8'	11'						2											TIE TO SGL FACED BARRIER
-L-	375+53.58		CL																				1				TIE TO DBL FACED BARRIER
-L-	385+30.00		CL																				1				TIE TO DBL FACED BARRIER
-L-	382+30.00	383+32.93	RT	116.625					8'	11						1				1							TIE TO SGL FACED BARRIER
-L-	383+28.40	384+80.29	RT	87.50																2							
-L-	384+80.00	414+07.00	RT	2,842.50	93.75				8'/10.3'	11'/13.3'										2				10		2,989.3	SHOULDER GUTTER INSTALLATION, SHOPED CURVED GUARDRAIL = 10'R; **USE EXTRA DEPTH GUARDRAIL POSTS:50FT @6.25=8, SAY 10 EA**
-L-	408+04.00	409+44.00	LT	143.75												2											TIE TO SGL FACED BARRIER
-L-	411+75.00	413+04.13	RT	129.000					8'	11'		50'		1'		1	1										TIE TO SGL FACED BARRIER
SUB-TOTALS				16996.000	649.875											20	34	1	1	18	3		2	30		45,802.0	
LESS ANCHOR DEDUCTIONS																											
	TYPE B-77	20@22.875 FT		457.500																							
	TYPE TL-3	34 @ 50.00 FT		1,700.00																							
	TYPE TL-2	1@ 25.00 FT		25.00																							
	CAT-1	1@ 6.25 FT		6.25																							
	AT-1	18@ 6.25 FT		12.50	100.00																						
	TYPE B-77 SC	3@22.875 FT			68.625																						
ANCHOR TOTAL				2,201.250	168.625																						
GRAND-TOTALS				14,794.75	481.25											20	34	1	1	18	3		2	30		45,802.00	
SAY				**14,825**	**500**											**20**	**34**	**1**	**1**	**18**	**3**		**2**	**30**		**45,802**	
ADDITIONAL GUARDRAIL POSTS =				**10 EA**																							
TEMPORARY GUARDRAIL																											
-L-	247+50.00	252+25.00	LT	475.00														2									TEMPORARY ANCHOR UNITS
-L-	249+22.00	250+78.25	RT	156.25														2									TEMPORARY ANCHOR UNITS
-L-	315+37.20	316+93.45	LT	156.25														2									TEMPORARY ANCHOR UNITS
SUB-TOTALS				787.50														6									
LESS ANCHOR DEDUCTIONS																											
	TEMP. TYPE TL-2	6@ 25.00 FT		150.00																							
ANCHOR TOTAL				150.00																							
GRAND-TOTALS				637.50														6									
SAY				**650**														**6**									

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COMPUTED BY: Zachary Richard, PE DATE: 3/23/2022

CHECKED BY: David Petty, PE DATE: 5/25/2022

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CB	3D-1

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

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

| LINE & STATION | OFFSET | | STRUCTURE NUMBER FROM | STRUCTURE NUMBER TO | TOP ELEVATION FT. | INVERT ELEVATION FT. | INVERT ELEVATION FT. | MINIMUM REQUIRED SLOPE % | Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE 15 | 18 | 24 | 30 | 36 | 42 | 48 | DO NOT USE RCP | DO NOT USE CSP | DO NOT USE CAAP | DO NOT USE HDPE | DO NOT USE PVC | C. S. PIPE SIZE 15 | 18 | 24 | 30 | 36 | 42 | 48 | R. C. PIPE CLASS III 15 | 18 | 24 | 30 | 36 | 42 | 48 | R. C. PIPE CLASS IV 15 | 18 | 24 | 30 | 36 | 42 | 36" CAA PIPE, 0.075" THICK | 48" CAA PIPE, 0.105" THICK | 36" WELDED STEEL PIPE 0.5" THICK, GRADE B, IN SOIL | 36" WELDED STEEL PIPE 0.5" THICK, GRADE B, NOT IN SOIL | 18" PIPE REHABILITATION CIPP LINER | 24" PIPE REHABILITATION CIPP LINER | ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY | QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) A: 0' THRU 5' EACH | B: 5' THRU 10' LIN. FT. | 10' AND ABOVE LIN. FT. | 4-SIDED OTCB, SEE DETAIL SHEET 2D-1 | D.I. STD. 840.14 OR STD. 840.15 | D.I. FRAME AND GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17, 840.26, OR 840.45 | G.D.I. TYPE "B" STD. 840.18, 840.27, OR 840.45 | G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28 | 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 STD. 840.32 | T.B.J.B. STD. 840.34 | T.B.D.I. STD. 840.35 | 6" PVC PIPE (SPRING BOX) | SPRING BOX STD. 840.41 | 6" HDPE PIPE (LF) | M.H. FRAME AND COVER STD. 840.54 | TB PRECAST DRAINAGE STRUCTURE STD. 840.46 | PRECAST 4' DIA MH STD 840.52 | CONTRACTOR DESIGN 4' DIA MH OVER 30' | T.B. G.D.I TYPE "A" SEE SHEET 2D-3 | CONVERT EXISTING D.I. TO J.B. SEE SHEET 2D-2 | ADJUST D.I. | MIN DEPTH TYPE A SPECIAL DSN SEE SHEET 2D-7 | 15" C.S. ELBOW, 0.064" THICK | 18" C.S. ELBOW, 0.064" THICK | 24" C.S. ELBOW, 0.064" THICK | 30" C.S. ELBOW, 0.064" THICK | 36" C.S. ELBOW, 0.064" THICK | 42" C.S. ELBOW, 0.064" THICK | 48" C.S. ELBOW, 0.064" THICK | 48" C.A.A. ELBOW, 0.105" THICK | BERM DRAINAGE OUTLET STD. 850.10 (SY) | BERM DRAINAGE OUTLET STD. 850.11 (SY) | BERM DRAINAGE OUTLET 36" DSN,SHT 2D-4 (SY) | BERM DRAINAGE OUTLET 42" DSN,SHT 2D-5 (SY) | BERM DRAINAGE OUTLET 48" DSN,SHT 2D-6 (SY) | FLOWABLE FILL CY | CONCRETE COLLARS CL. "B" STD. 840.72 CY | PIPE REMOVAL LIN. FT. | REMARKS |
|---|---|---

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COMPUTED BY: Zachary Richard, PE DATE: 3/23/2022

CHECKED BY: David Petty, PE DATE: 5/25/2022

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CB	3D-2

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

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

LINE & STATION	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE 15	18	24	30	36	42	48
L 258+68	36 RT	2303	2304		2404.4	2302.8								
		2304	2305		2302.3	2298.1	1.3			184				
L 256+83	36 RT	2305		2302.9										
		2305	2306		2298.1	2295.1	1.7			132				
L 255+50	36 RT	2306		2299.9										
		2306	2307		2295.1	2291.7	1.9			152				
L 254+00	36 RT	2307		2296.5										
		2307	2309		2291.7	2288.1	2.1			152				
L 252+50	79 RT	2308		2311.2										
		2308	2309		2307.7	2287.1	0.8							
L 252+50	36 RT	2309		2292.9										
		2309	2311		2287.1	2285.6	1.8					60		
L 251+90	63 RT	2310		2299.5										
		2310	2311		2298.0	2287.1								
L 251+88	36 RT	2311		2291.4										
		2311	2312		2285.6	2283.9	2.0					68		
L 251+18	36 RT	2312		2289.7										
		2312	2313		2283.9	2282.3	2.1					68		
L 250+50	32 RT	2313		2289.0										
		2313	2314		2282.3	2280.7	0.5							
L 262+06	36 RT	2315		2314.8										
		2315	2316		2311.3	2304.4								
L 267+41	0 CL	2401			2322.7	2319.0								
L 272+55	42 RT	2402		2338.1										
		2402	2403		2336.6	2334.4	1.4			40				
L 272+16	31 RT	2403		2337.9										
		2403	2406		2334.4	2331.0	0.4							
L 270+82	46 RT	2404		2340.2										
		2404	2405		2336.7	2329.6	1.0							
L 270+90	34 RT	2405		2337.6										
		2405	2406		2329.6	2329.5								
L 270+90	29 RT	2406		2335.0										
		2406	2407		2329.5	2328.0	0.3							
L 272+11	29 LT	2408						36						
L 275+94	41 RT	2410						64						
L 279+13	52 LT	2501			2356.8	2351.0								
L 279+85	34 RT	2502		2370.9										
		2502	2503		2367.7	2366.2								
L 279+62	34 RT	2503		2369.4										
		2503	2504		2366.2	2357.8	0.3							
L 281+76	59 LT	2505												
L 282+26	47 LT	2506												
L 285+93	30 LT	2508		2419.6										
		2508	2509		2416.8	2407.9	0.7	108						
L 284+88	30 LT	2509		2410.7										
		2509	2510		2407.7	2399.7								
L 287+00	33 RT	2511		2425.9										
		2511	2512		2423.9	2423.7		12						
L 290+20	45 RT	2513		2448.6										
SHEET TOTALS								220	40	620		196		

Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) THICKNESS OR GAUGE	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
		X	X		
		X	X		
		X	X		
		X	X		
		X	X		
		X	X		
		X	X		
		X	X		

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COMPUTED BY: Zachary Richard, PE DATE: 3/23/2022

CHECKED BY: David Petty, PE DATE: 5/25/2022

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CB	3D-3

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

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

LINE & STATION	OFFSET		STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE 15	18	24	30	36	42	48
			2513	2514		2445.8	2412.3								
L 290+47	26	LT	2515		2454.2										
			2515	2516		2451.4	2431.0	0.8							
L 289+62	48	LT	2517		2438.0										
			2517	2521		2422.6	2404.9								
L 282+79	75	LT	2518			2391.4	2367.5								
L 281+75	69	LT	2519									50			
L 289+72	70	LT	2520	2517		2426.3	2422.6					24			
L 288+51	78	RT	2521		2417.9										
			2521	2522		2404.9	2404.7					28			
L 292+41	34	RT	2601		2469.2										
			2601	2602		2465.7	2444.0	1.6							
L 293+91	37	LT	2603		2476.1										
			2603	2605		2474.6	2470.8	0.9		52					
L 293+43	35	LT	2604		2472.6										
			2604	2605		2471.3	2471.1		20						
L 293+44	17	LT	2605		2477.9										
			2605	2606		2470.8	2466.3	0.3							
L 292+41	18	LT	2606		2469.8										
			2606	2601		2466.3	2465.7	0.3							
L 295+00	30	LT	2608		2488.1										
			2608	2609		2485.3	2479.0	0.3	68						
L 297+45	0	CL	2610			2502.3	2480.2								
L 298+35	42	RT	2611						32						
L 303+82	22	LT	2612		2561.4										
			2612	2613		2558.2	2547.8								
L 302+68	22	LT	2613		2551.0										
			2613	2614		2547.8	2543.2	0.4	32						
L 302+34	30	LT	2614		2546.0										
			2614	2615		2543.2	2531.7	0.5	124						
L 301+02	30	LT	2615		2534.5										
			2615	2617		2531.7	2526.3	1.0	44						
L 300+76	49	LT	2616		2537.0										
			2616	2617		2535.5	2527.8	1.3							
L 300+56	30	LT	2617		2530.8										
			2617	2618		2526.3	2510.6	3.1		204					
L 298+42	30	LT	2618		2513.6										
			2618	2619		2510.6	2503.6	4.3		64					
L 302+02	43	RT	2620		2546.2										
			2620	2621		2543.4	2539.0		44						
L 304+50	36	LT	2622		2563.0										
			2622	2623		2560.1	2546.8	0.7							
Y4 38+95	0	CL	2624			2537.6	2525.3								
L 307+94	30	LT	2701		2594.8										
			2701	2702		2591.8	2588.4								
L 310+50	30	LT	2703		2614.3										
			2703	2704		2611.3	2609.0								
L 310+50	34	RT	2704		2612.5										
			2704	2705		2609.0	2556.0								
L 311+17	115	RT	2706												
SHEET TOTALS									364	320		102			

	C. S. PIPE SIZE 15	18	24	30	36	42	48	R. C. PIPE CLASS III SIZE 15	18	24	30	36	42	48	R. C. PIPE CLASS IV SIZE 15	18	24	30	36	42
THICKNESS OR GAUGE	.064	.064	.064	.064	.064	.064	.064													
	108																			
	80																			
					88															
	56																			

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CB	3D-4

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

LINE & STATION	OFFSET		STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE 15	18	24	30	36	42	48
L 312+40	79	LT	2707		2599.0										
			2707	2708		2596.0	2559.5	0.7							
L 311+65	100	RT	2708		2591.4										
			2708	2709		2559.5	2559.0	0.7							
L 312+39	79	RT	2710												
L 313+50	45	RT	2711		2634.2										
			2711	2712		2631.4	2588.0	0.3							
L 313+40	43	LT	2713						48						
L 316+11	67	LT	2714		2672.3										
			2714	2715		2667.8	2652.4	1.2							
L 316+17	29	LT	2715		2658.0										
L 318+50	42	RT	2717		2678.1										
			2717	2718		2675.3	2670.5		72						
L 317+78	34	RT	2718		2673.7										
			2718	2719		2670.5	2659.6								
L 316+54	34	RT	2719		2662.8										
			2719	2720		2659.6	2652.0	0.7							
L 307+96	84	LT	2722												
			2722	2701		2617.5	2591.8								
L 317+68	31	LT	2723							64					
L 322+21	30	LT	2801		2707.6										
			2801	2802		2706.3	2701.8		40						
L 321+80	22	LT	2802		2705.0										
			2802	2803		2701.8	2693.0								
L 320+75	22	LT	2803		2696.2										
			2803	2804		2693.0	2683.9								
L 319+57	22	LT	2804		2687.1										
			2804	2805		2683.9	2683.2	1.1	36						
L 323+85	52	LT	2806		2717.3										
			2806	2807		2714.3	2713.5								
L 323+85	42	RT	2807		2720.1										
			2807	2808		2713.5	2712.4	0.5						128	
L 323+79	171	RT	2808		2719.3										
			2808	2809		2712.4	2677.2	0.5							
L 326+05	34	RT	2810		2737.9										
			2810	2811		2734.7	2732.0		16						
L 329+14	35	LT	2812		2763.7										
			2812	2813		2759.4	2750.9	2.2		124					
L 327+90	30	LT	2813		2753.9										
			2813	2814		2750.9	2734.8	2.3							
L 330+75	28	LT	2815		2777.9										
			2815	2817		2775.1	2766.6	1.2	104						
L 329+71	59	LT	2816		2784.2										
			2816	2817		2779.7	2763.8	0.5							
L 329+72	27	LT	2817		2770.6										
			2817	2819		2763.8	2757.3								
L 330+09	42	RT	2818		2769.3										
			2818	2819		2766.5	2760.1	0.3	56						
L 329+50	42	RT	2819		2764.1										
			2819	2820		2757.3	2756.2	0.6						28	
							SHEET TOTALS		372	188			128		28

Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC)	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
L 312+40					
L 311+65					
L 312+39					
L 313+50					
L 313+40					
L 316+11					
L 316+17					
L 318+50					
		X	X		
L 317+78					
L 316+54					
L 307+96					
L 317+68					
L 322+21					
	X				
L 321+80					
L 320+75					
L 319+57					
		X	X		
L 323+85					
L 323+85					
L 323+79					
L 326+05					
	X				
L 329+14					
		X	X		
L 327+90					
L 330+75					
		X	X		
L 329+71					
L 329+72					
L 330+09					
	X				
L 329+50					
		X	X		
	164	156		164	32

C. S. PIPE	.064	.064	.064	.064	.064	.064	.064
	15	18	24	30	36	42	48
L 312+40							
L 311+65							
					60		
L 312+39							
L 313+50							
	116						
L 313+40							
L 316+11							
L 316+17							
L 318+50							
L 317+78							
L 316+54							
	48						
L 307+96							
		56					
L 317+68							
L 322+21							
L 321+80							
L 320+75							
L 319+57							
L 323+85							
L 323+85							
L 323+79							
					104		
L 326+05							
L 329+14							
		100					
L 327+90							
L 330+75							
L 329+71							
						32	
L 329+72							
L 330+09							
L 329+50							
	164	156		164		32	

R. C. PIPE CLASS III	15	18	24	30	36	42	48
L 312+40							
L 311+65							
L 312+39							
L 313+50							
L 313+40							
L 316+11							
L 316+17							
L 318+50							
L 317+78							
L 316+54							
L 307+96							
L 317+68							
L 322+21							
L 321+80							
L 320+75							
L 319+57							
L 323+85							
L 323+85							
L 323+79							
L 326+05							
L 329+14							
L 327+90							
L 330+75							
L 329+71							
L 329+72							
L 330+09							
L 329+50							
						96	72

R. C. PIPE CLASS IV	15	18	24	30	36	42
L 312+40						
L 311+65						
L 312+39						
L 313+50						
L 313+40						
L 316+11						
L 316+17						
L 318+50						
L 317+78						
L 316+54						
L 307+96						
L 317+68						
L 322+21						
L 321+80						
L 320+75						
L 319+57						
L 323+85						
L 323+85						
L 323+79						
L 326+05						
L 329+14						
L 327+90						
L 330+75						
L 329+71						
L 329+72						
L 330+09						
L 329+50						
						72
	336					

36" CAA PIPE, 0.075" THICK	48" CAA PIPE, 0.105" THICK	36" WELDED STEEL PIPE 0.5" THICK, GRADE B, IN SOIL	36" WELDED STEEL PIPE 0.5" THICK, GRADE B, NOT IN SOIL	18" PIPE REHABILITATION CIPP LINER	24" PIPE REHABILITATION CIPP LINER	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY
L 312+40						2.800
		96	96			
L 311+65						
L 312+39						
L 313+50						
L 313+40						
L 316+11						
	40					
L 316+17						
L 318+50						
L 317+78						
L 316+54						
L 307+96						
L 317+68						
L 322+21						
L 321+80						
L 320+75						
L 319+57						
L 323+85						3.400
L 323+85						
L 323+79						
L 326+05						
L 329+14						
L 327+90						
L 330+75						
L 329+71						
L 329+72						
L 330+09						
L 329+50						
	40	96	96			6.200

QUANTITIES FOR DRAINAGE STRUCTURES

NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)

	A	B
	0' THRU 5'	5' THRU 10'	10' AND ABOVE
	EACH	LIN. FT.	LIN. FT.
L 312+40			
L 311+65			
L 312+39	1		
L 313+50	1		
L 313+40			
L 316+11			
L 316+17	1	1.6	
L 318+50	1		
L 317+78	1		
L 316+54	1		
L 307+96			
L 317+68			
L 322+21			
L 321+80	1		
L 320+75	1		
L 319+57	1		
L 323+85			
L 323+85	1	1.6	
L 323+79	1	1.9	
L 326+05	1		
L 329+14	1		
L 327+90	1		
L 330+75	1		
L 329+71			
L 329+72	1	1.8	
L 330+09	1		
L 329+50	1	1.8	
	18	8.7	

4-SIDED OTCB, SEE DETAIL SHEET 2D-1	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17, 840.26, OR 840.45	G.D.I. TYPE "B" STD. 840.18, 840.27, OR 840.45	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	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 STD. 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35
L 312+40											
L 311+65											
L 312+39											
L 313+50				1				1			
L 313+40											
L 316+11											
L 316+17								2			
L 318+50				1				1			
L 317+78						1					1
L 316+54						1					1
L 307+96											
L 317+68											
L 322+21											
L 321+80						1					1
L 320+75						1					1
L 319+57						1					1
L 323+85											
L 323+85				1		1					
L 323+79				1		1					
L 326+05						1					1
L 329+14					1		1	1			
L 327+90				1				1			
L 330+75				1				1			
L 329+71											
L 329+72				1				1			
L 330+09				1				1			
L 329+50				1				1			
	3	7		8	1	10		6	40	1	

6" PVC PIPE (SPRING BOX)	SPRING BOX STD. 840.41	6" HDPE PIPE (LF)	M.H. FRAME AND COVER STD. 840.54	TB PRECAST DRAINAGE STRUCTURE STD. 840.46	PRECAST 4' DIA MH STD 840.52	CONTRACTOR DESIGN 4' DIA MH OVER 30'	T.B. G.D.I TYPE "A" SEE SHEET 2D-3	CONVERT EXISTING D.I. TO J.B. SEE SHEET 2D-2	ADJUST D.I.	MIN DEPTH TYPE A SPECIAL DSN SEE SHEET 2D-7	15" C.S. ELBOW, 0.064" THICK
L 312+40											
L 311+65				1							
L 312+39	40	1									
L 313+50											
L 313+40											
L 316+11											
L 316+17										1	
L 318+50											
											2
L 317+78											
L 316+54											
L 307+96											
L 317+68											
L 322+21											
L 321+80											
L 320+75											
L 319+57											
L 323+85											
L 323+85											
L 323+79											
L 326+05											
L 329+14											
L 327+90											
L 330+75											
L 329+71											
L 329+72											
L 330+09											
L 329+50											
	40	1		1		1				1	2

15" C.S. ELBOW, 0.064" THICK	18" C.S. ELBOW, 0.064" THICK	24" C.S. ELBOW, 0.064" THICK	30" C.S. ELBOW, 0.064" THICK	36" C.S. ELBOW, 0.064" THICK	42" C.S. ELBOW, 0.064" THICK	48" C.S. ELBOW, 0.064" THICK	48" C.A.A. ELBOW, 0.105" THICK	BERM DRAINAGE OUTLET STD. 850.10 (SY)	BERM DRAINAGE OUTLET STD. 850.11 (SY)	BERM DRAINAGE OUTLET 36" DSN,SHT 2D-4 (SY)	BERM DRAINAGE OUTLET 36" DSN,SHT 2D-5 (SY)	BERM DRAINAGE OUTLET 42" DSN,SHT 2D-5 (SY)	BERM DRAINAGE OUTLET 48" DSN,SHT 2D-6 (SY)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 312+40																	
																	TRENCHLESS INSTALLATION, L=192'
L 311+65																	
L 312+39																	
L 313+50																	
	2																
L 313+40																	
L 316+11																	
								1									48" BDO SPECIAL DSN SEE SHEET 2D-6
L 316+17	1																4GI SPECIAL DSN SEE SHEET 2D-7
L 318+50																	
L 317+78																	
L 316+54																	
L 307+96								11									
	1																
L 317+68																	
L 322+21																	
L 321+80																	
L 320+75																	
L 319+57																	
L 323+85																	
L 323+85																	
L 323+79																	
L 326+05																	
L 329+14																	3GI
L 327+90																	
L 330+75																	
L 329+71																	48" BDO SPECIAL DSN SEE SHEET 2D-6
L 329+72								1									
L 330+09																	
L 329+50																	
	2	3		2		1	1	11						62			

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

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

LINE & STATION	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE: 15	18	24	30	36	42	48
L 332+29	33 RT	2821		2789.1										
		2821	2822		2785.9	2781.3								
L 331+69	35 RT	2822		2784.5										
		2822	2823		2781.3	2777.9		56						
L 321+34	65 RT	2824			2704.3	2704.0		60						
L 333+30	27 LT	2901		2797.1										
		2901	2902		2794.8	2794.5		52						
L 333+90	43 LT	2903		2797.0										
		2903	2904		2794.0	2793.2								
L 333+80	33 RT	2904		2801.8										
		2904	2905		2793.2	2773.4	0.7							
L 335+29	54 LT	2906		2818.5										
		2906	2908		2816.5	2810.2	1.0			20				
L 335+40	30 LT	2907		2815.4										
		2907	2908		2814.1	2811.0		24						
L 335+19	39 LT	2908		2815.0										
		2908	2909		2810.2	2802.7	1.1			68				
L 334+50	26 LT	2909		2807.5										
		2909	2910		2802.7	2797.0	1.2			56				
L 336+00	34 RT	2911		2818.6										
		2911	2912		2815.4	2815.2		24						
L 337+50	30 LT	2913		2831.6										
		2913	2914		2828.6	2825.0								
L 339+37	84 LT	2915		2846.9										
		2915	2916		2843.4	2837.7	1.3						52	
L 339+57	39 LT	2916		2844.0										
		2916	2918		2837.2	2836.8								
L 339+17	33 RT	2917		2842.1										
		2917	2918		2838.9	2838.6								
L 339+75	33 RT	2918		2846.3										
		2918	2919		2836.8	2821.6	0.7							
L 340+60	50 LT	2920		2844.3										
		2920	2921		2841.8	2838.6	0.8				20			
L 340+64	29 LT	2921		2854.5										
		2921	2922											
L 341+70	62 RT	2923												
L 344+25	26 LT	2924		2880.5										
		2924	2925		2877.5	2873.2								
L 344+20	33 RT	2925		2878.2										
		2925	2926		2873.2	2862.7	0.7							
L 344+67	41 LT	2927		2887.5										
		2927	2928		2884.7	2881.0		36						
L 346+54	34 RT	2929		2895.1										
		2929	2930		2890.6	2864.9	0.6							
L 337+41	72 LT	2931		2850.0										
		2931	2913		2848.5	2828.6								
L 341+25	29 LT	2932						48						
L 347+27	39 LT	3001		2895.5										
		3001	2929		2893.0	2890.6								
L 347+34	37 LT	3002		2896.7										
SHEET TOTALS								300		144	20		52	

Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC)	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
L 332+29					
L 331+69					
		X	X		
L 321+34					
L 333+30					
		X	X		
L 333+90					
L 333+80					
L 335+29					
	X				
L 335+40					
	X				
L 335+19					
	X				
L 334+50					
	X				
L 336+00					
		X	X		
L 337+50					
L 339+37					
	X				
L 339+57					
L 339+17					
L 339+75					
L 340+60					
	X				
L 340+64					
L 341+70					
L 344+25					
L 344+20					
L 344+67					
	X				
L 346+54					
L 337+41					
L 341+25					
L 347+27					
L 347+34					

C. S. PIPE (.064 THICK)	15	18	24	30	36	42	48
L 332+29							
L 331+69							
L 321+34							
L 333+30							
L 333+90							
L 333+80							
					60		
L 335+29							
L 335+40							
L 335+19							
L 334+50							
L 336+00							
L 337+50							
L 339+37							
L 339+57							
L 339+17							
L 339+75							
							48
L 340+60							
L 340+64							
L 341+70	56						
L 344+25							
					60		
L 344+20							
					36		
L 344+67							
L 346+54							
					56		
L 337+41							
	44						
L 341+25							
L 347+27							
					104		
L 347+34							
	100		56	96		48	

R. C. PIPE CLASS III (15 THRU 48)	15	18	24	30	36	42	48
L 332+29							
L 331+69							
L 321+34							
L 333+30							
L 333+90							
					76		
L 333+80							
L 335+29							
L 335+40							
L 335+19							
L 334+50							
L 336+00							
L 337+50							
L 339+37							
L 339+57							
							72
L 339+17							
L 339+75							
L 340+60							
L 340+64							
L 341+70							
L 344+25							
L 344+20							
L 344+67							
L 346+54							
L 337+41							
L 341+25							
L 347+27							
L 347+34							
	84			76		72	

R. C. PIPE CLASS IV (15 THRU 42)	15	18	24	30	36	42
L 332+29						
	60					
L 331+69						
L 321+34						
L 333+30						
L 333+90						
L 333+80						
L 335+29						
L 335+40						
L 335+19						
L 334+50						
L 336+00						
L 337+50						
L 339+37						
L 339+57						
L 339+17						
	52					
L 339+75						
L 340+60						
L 340+64						
L 341+70						
L 344+25						
			60			
L 344+20						
L 344+67						
L 346+54						
L 337+41						
L 341+25						
L 347+27						
			104			
L 347+34						
	112		104	60		

	18" PIPE REHABILITATION CIPP LINER	24" PIPE REHABILITATION CIPP LINER	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY
L 332+29			
L 331+69			
L 321+34			
L 333+30			
L 333+90			3.400
L 333+80			
L 335+29			
L 335+40			
L 335+19			
L 334+50			
L 336+00			
L 337+50			
L 339+37			4.500
L 339+57			
L 339+17			
L 339+75			
L 340+60			2.300
L 340+64			
L 341+70			
L 344+25			3.400
L 344+20			
L 344+67			
L 346+54			
L 337+41			
L 341+25			
L 347+27			2.300
L 347+34			
			15.900

QUANTITIES FOR DRAINAGE STRUCTURES — NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)	0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.
L 332+29	1		
L 331+69	1		
L 321+34			
L 333+30	1		
L 333+90			
L 333+80	1	3.6	
L 335+29			
L 335+40			
L 335+19	1		
L 334+50	1		
L 336+00	1		
L 337+50	1		
L 339+37			
L 339+57	1	1.8	
L 339+17	1		
L 339+75	1	4.5	
L 340+60			
L 340+64	1	5.0	6.0
L 341+70			
L 344+25			
L 344+20	1		
L 344+67	1		
L 346+54	1		
L 337+41			
L 341+25			
L 347+27			
L 347+34		2.7	
	15	17.6	6.0

	4-SIDED OTCB, SEE DETAIL SHEET 2D-1	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17, 840.26, OR 840.45	G.D.I. TYPE "B" STD. 840.18, 840.27, OR 840.45	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	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 STD. 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	6" PVC PIPE (SPRING BOX)	SPRING BOX STD. 840.41	6" HDPE PIPE (LF)	M.H. FRAME AND COVER STD. 840.54	TB PRECAST DRAINAGE STRUCTURE STD. 840.46	PRECAST 4' DIA MH STD 840.52	CONTRACTOR DESIGN 4' DIA MH OVER 30'	T.B. G.D.I TYPE "A" SEE SHEET 2D-3	CONVERT EXISTING D.I. TO J.B. SEE SHEET 2D-2	ADJUST D.I.	MIN DEPTH TYPE A SPECIAL DSN SEE SHEET 2D-7	15" C.S. ELBOW, 0.064" THICK	18" C.S. ELBOW, 0.064" THICK	24" C.S. ELBOW, 0.064" THICK	30" C.S. ELBOW, 0.064" THICK	36" C.S. ELBOW, 0.064" THICK	42" C.S. ELBOW, 0.064" THICK	48" C.S. ELBOW, 0.064" THICK	48" C.A.A. ELBOW, 0.105" THICK	BERM DRAINAGE OUTLET STD. 850.10 (SY)	BERM DRAINAGE OUTLET STD. 850.11 (SY)	BERM DRAINAGE OUTLET 36" DSN,SHT 2D-4 (SY)	BERM DRAINAGE OUTLET 42" DSN,SHT 2D-5 (SY)	BERM DRAINAGE OUTLET 48" DSN,SHT 2D-6 (SY)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 332+29					1		1																																		
L 331+69		1	1																																						
L 321+34																																									
L 333+30		1	1																																						
L 333+90																																									
L 333+80							1				1																														
L 335+29																																									
L 335+40																																									
L 335+19					1					1																														
L 334+50					1					1																														
L 336+00							1					1																													
L 337+50					1					1																														
L 339+37																																									
L 339+57					1					1																														
L 339+17						1	1																																
L 339+75					1		1																																
L 340+60																																									
L 340+64																																									
L 341+70																																									
L 344+25																																									
L 344+20					1		1																																
L 344+67					1					1																														
L 346+54							1					1																												
L 337+41																																									
L 341+25																																									
L 347+27																																									
L 347+34																																									
	4	5	7		5		3			2	1									1	1			3		2	4		2		11									

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

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T:\SZJR-LAPTOP

COMPUTED BY: Zachary Richard, PE DATE: 3/23/2022

CHECKED BY: David Petty, PE DATE: 5/25/2022

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CB	3D-6

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

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

LINE & STATION	OFFSET		STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE: 15	18	24	30	36	42	48
									DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC		
L 350+20	34	RT	3003		2921.5										
			3003	3004		2918.3	2907.4								
L 351+72	0	CL	3005												
L 354+12	33	LT	3006		2947.2										
			3006	3007		2944.2	2943.6								
L 357+89	48	LT	3008		2992.0										
			3008	3009		2990.5	2984.0								
L 357+89	36	LT	3009		2987.5										
			3009	3010		2972.4	2972.3								
L 357+89	26	LT	3010		2975.6										
			3010	3011		2972.3	2971.5								
L 360+32	36	LT	3012		3006.1										
			3012	3013		3003.5	2998.1	1.0							
L 360+29	24	LT	3013		3001.6										
			3013	3014		2991.3	2991.2								
L 360+29	20	LT	3014		2995.1										
			3014	3015		2991.2	2986.2	1.8							
L 360+10	34	RT	3015		2990.2										
			3015	3016		2986.2	2978.4	2.4							
L 363+00	33	LT	3101		3027.2										
			3101	3102		3008.8	3008.7								
L 363+00	27	LT	3102		3012.1										
			3102	3103		3008.7	3001.9								
L 361+65	20	LT	3103		3005.1										
			3103	3014		3001.9	2991.9								
L 363+52	48	LT	3104												
			3104	3105		3029.4	3025.1	0.6							
L 363+50	39	LT	3105		3028.6										
			3105	3108		3011.5	3011.4								
L 366+50	39	LT	3106		3032.4										
			3106	3107		3029.4	3019.6	1.6		140					
L 365+00	39	LT	3107		3022.6										
			3107	3108		3019.6	3011.7	2.2		144					
L 363+50	31	LT	3108		3014.7										
			3108	3109		3010.9	3010.2	0.4							
L 363+50	39	RT	3109		3014.9										
			3109	3110		3010.2	2974.0	1.5							
L 369+90	33	LT	3111		3067.9										
			3111	3112		3056.5	3056.4								
L 369+90	29	LT	3112		3060.2										
			3112	3113		3056.4	3044.0								
L 371+45	35	LT	3114		3089.1										
			3114	3115		3067.5	3067.4								
L 371+45	32	LT	3115		3071.2										
			3115	3116		3067.4	3057.0	1.0							
L 375+00	4	RT	3117		3096.1										
			3117	3118		3091.9	3091.6								
L 373+35	51	RT	3119						44						
L 373+89	57	RT	3120						40						
L 375+37	0	CL	3201												
SHEET TOTALS									84	284					

C. S. PIPE .064 THICK: 15	18	24	30	36	42	48	R. C. PIPE CLASS III: 15	18	24	30	36	42	48	R. C. PIPE CLASS IV: 15	18	24	30	36	42	36" CAA PIPE, 0.075" THICK	48" CAA PIPE, 0.105" THICK	36" WELDED STEEL PIPE 0.5" THICK, GRADE B, IN SOIL	36" WELDED STEEL PIPE 0.5" THICK, GRADE B, NOT IN SOIL	18" PIPE REHABILITATION CIPP LINER	24" PIPE REHABILITATION CIPP LINER	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY
40																									
								96																	
12																									
														12											
														72											
12																									
														4											
56																									
32																									
														4											
56																									
32																									
														4											
8																									
														8											
														68											
76																									
														4											
96																									
														4											
116																									
								52																	
																								176	
40	232	176					52	96						276	100	72								176	209

QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) A: 0' THRU 5' EACH	A: 5' THRU 10' LIN. FT.	B: 10' AND ABOVE LIN. FT.	4-SIDED OTCB, SEE DETAIL SHEET 2D-1	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17, 840.26, OR 840.45	G.D.I. TYPE "B" STD. 840.18, 840.27, OR 840.45	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	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 STD. 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	6" PVC PIPE (SPRING BOX)	SPRING BOX STD. 840.41	6" HDPE PIPE (LF)	M.H. FRAME AND COVER STD. 840.54	TB PRECAST DRAINAGE STRUCTURE STD. 840.46	PRECAST 4' DIA MH STD 840.52	CONTRACTOR DESIGN 4' DIA MH OVER 30'	T.B. G.D.I TYPE "A" SEE SHEET 2D-3	CONVERT EXISTING D.I. TO J.B. SEE SHEET 2D-2	ADJUST D.I.	MIN DEPTH TYPE A SPECIAL DSN SEE SHEET 2D-7	15" C.S. ELBOW, 0.064" THICK	18" C.S. ELBOW, 0.064" THICK	24" C.S. ELBOW, 0.064" THICK	30" C.S. ELBOW, 0.064" THICK	36" C.S. ELBOW, 0.064" THICK	42" C.S. ELBOW, 0.064" THICK	48" C.S. ELBOW, 0.064" THICK	48" C.A.A. ELBOW, 0.105" THICK	BERM DRAINAGE OUTLET STD. 850.10 (SY)	BERM DRAINAGE OUTLET STD. 850.11 (SY)	BERM DRAINAGE OUTLET 36" DSN,SHT 2D-4 (SY)	BERM DRAINAGE OUTLET 42" DSN,SHT 2D-5 (SY)	BERM DRAINAGE OUTLET 48" DSN,SHT 2D-6 (SY)	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	PIPE REMOVAL LIN. FT.	REMARKS
1							1		1																																	
																													2														
																																												Reline 24" CMP
1						1					1																																	
															1																													
1	5.0	5.1									1								1																									
																													1														
1						1					1																																	
1	5.0	0.3					1				1																																	
1								1					1																															
1						1		1					1																																
1	5.0	8.4									1																																	
1						1					1																																	
1						1		1																																			
1	5.0	7.1									1																																	
1						1					1																																	
1						1					1																																	
1								1					1																															
																													2														
1	5.0	1.4				1					1																																	
1								1					1																															
																													2														
1	5.0	11.6									1																																	
1								1					1																															
																													2														
1							1								1																													
20	30.0	33.9				9	7		12		1	6							1	3	1				2	6	5					22	31									

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

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COMPUTED BY: Zachary Richard, PE DATE: 3/23/2022

CHECKED BY: David Petty, PE DATE: 5/25/2022

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CB	3D-7

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

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

LINE & STATION	OFFSET		STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE: 15	18	24	30	36	42	48	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC
									THICKNESS OR GAUGE:												
L 376+27	4	RT	3202		3104.6																
			3202	3203		3101.4	3096.6														
L 375+56	4	RT	3203		3099.8																
			3203	3117		3096.6	3091.9														
L 376+69	44	LT	3204		3103.8																
			3204	3205		3096.8	3096.3		40								X	X			
L 385+50	69	LT	3206		3167.9																
			3206	3211		3148.4	3148.3														
L 385+50	43	LT	3207		3129.4																
			3207	3208		3122.1	3121.8														
L 385+28	4	RT	3208		3131.1																
			3208	3209		3121.8	3121.4														
L 388+48	41	LT	3210		3123.1																
			3210	3302		3119.9	3118.0														
L 385+50	61	LT	3211		3157.9																
			3211	3207		3123.4	3123.1														
L 382+36	5	RT	3212		3131.2																
			3212	3213		3128.0	3123.8														
L 382+36	47	LT	3213		3127.0																
			3213	3214		3123.8	3123.3														
L 383+47	36	LT	3214		3129.2																
			3214	3207		3123.3	3122.3														
L 380+43	47	LT	3215		3122.5																
			3215	3216		3119.0	3118.7														
L 380+43	5	RT	3216		3126.6																
			3216	3217		3118.7	3118.4														
L 380+43	57	RT	3217		3127.6																
			3217	3218		3118.4	3118.2			40							X	X			
L 383+47	68	RT	3219		3138.5																
			3219	3214		3133.4	3126.0														
L 381+35	75	RT	3220			3161.0	3157.0			128							X				
L 384+21	142	RT	3221							32											
L 389+00	55	LT	3301		3147.8																
			3301	3302		3115.1	3114.8														
L 389+00	41	LT	3302		3121.2																
			3302	3303		3114.8	3113.3														
L 389+12	42	RT	3303		3116.8																
			3303	3304		3113.3	3106.0	0.6													
L 391+90	63	LT	3305		3113.1																
			3305	3306		3111.6	3107.3														
L 391+90	55	LT	3306		3110.3																
			3306	3307		3098.4	3098.1														
L 391+90	40	LT	3307		3104.4																
			3307	3308		3098.1	3094.2														
L 392+13	31	RT	3308		3097.7																
			3308	3309		3094.2	3093.5	2.0		24							X	X			
L 394+57	98	LT	3310		3109.1																
			3310	3311		3107.6	3103.2														
L 394+56	90	LT	3311		3106.2																
			3311	3313		3080.8	3080.7														
SHEET TOTALS									40	224											

C. S. PIPE THICKNESS OR GAUGE:	15	18	24	30	36	42	48
	.064	.064	.064	.064	.064	.064	.064

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T:\SZJR-LAPTOP

COMPUTED BY: Zachary Richard, PE DATE: 3/23/2022

CHECKED BY: David Petty, PE DATE: 5/25/2022

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CB	3D-8

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

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

LINE & STATION	OFFSET	STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE: 15	18	24	30	36	42	48
L 395+15	47 LT	3312		3080.2										
		3312	3313		3077.0	3076.6								
L 394+56	86 LT	3313		3084.5										
		3313	3314		3076.3	3075.6								
L 393+80	28 RT	3314		3085.9										
		3314	3315		3075.6	3075.3	0.9		32					
L 396+65	26 RT	3316		3067.2										
		3316	3317		3064.0	3063.8								
L 396+30	26 RT	3317		3069.5										
		3317	3318		3063.8	3045.0								
L 399+00	46 LT	3319		3066.2										
		3319	3320		3044.9	3044.8								
L 399+00	41 LT	3320		3048.7										
		3320	3327		3044.8	3044.5	0.3							
L 401+00	54 LT	3322		3048.0										
		3322	3323		3046.5	3042.1								
L 401+00	45 LT	3323		3045.1										
		3323	3324		3028.8	3028.7								
L 401+00	41 LT	3324		3032.7										
		3324	3325		3028.7	3020.7								
L 402+17	42 LT	3325		3024.2										
		3325	3326		3020.7	3019.6								
L 398+94	22 RT	3327		3051.9										
		3327	3321		3044.5	3044.3	0.4			24				
L 402+95	31 RT	3328							36					
L 405+50	34 LT	3401		3005.0										
		3401	3404		3001.8	2999.2								
L 406+00	45 LT	3402		3005.5										
		3402	3403		3004.0	3001.4	0.3							
L 406+00	36 LT	3403		3004.4										
		3403	3404		2998.8	2998.7	0.4							
L 406+00	32 LT	3404		3002.4										
		3404	3405		2998.7	2997.1	0.6							
L 406+00	22 RT	3405		3000.6										
		3405	3406		2997.1	2992.3	0.7							
L 406+60	22 RT	3406		2995.8										
		3406	3407		2989.8	2988.0	3.0							
L 409+20	51 LT	3408		2976.5										
		3408	3409		2974.5	2972.3								
L 409+20	22 RT	3409		2977.3										
		3409	3410		2972.3	2968.4								
L 409+75	22 RT	3410		2973.4										
		3410	3411		2968.4	2960.0	0.9							
L 412+82	44 LT	3412		2950.4										
		3412	3413		2948.4	2947.4								
L 412+82	22 RT	3413		2952.4										
		3413	3414		2947.4	2943.2								
L 413+47	22 RT	3414		2948.2										
		3414	3415		2943.2	2921.3	0.7							
L 384+22	149 RT													
				SHEET TOTALS				36	56					

								C. S. PIPE						
								15	18	24	30	36	42	48
L 395+15	47 LT	3312		3080.2										
		3312	3313		3077.0	3076.6								
L 394+56	86 LT	3313		3084.5										
		3313	3314		3076.3	3075.6								
L 393+80	28 RT	3314		3085.9										
		3314	3315		3075.6	3075.3	0.9							
L 396+65	26 RT	3316		3067.2										
		3316	3317		3064.0	3063.8								
L 396+30	26 RT	3317		3069.5										
		3317	3318		3063.8	3045.0		40						
L 399+00	46 LT	3319		3066.2										
		3319	3320		3044.9	3044.8								
L 399+00	41 LT	3320		3048.7										
		3320	3327		3044.8	3044.5	0.3							
L 401+00	54 LT	3322		3048.0										
		3322	3323		3046.5	3042.1		8						
L 401+00	45 LT	3323		3045.1										
		3323	3324		3028.8	3028.7								
L 401+00	41 LT	3324		3032.7										
		3324	3325		3028.7	3020.7								
L 402+17	42 LT	3325		3024.2										
		3325	3326		3020.7	3019.6								
L 398+94	22 RT	3327		3051.9										
		3327	3321		3044.5	3044.3	0.4							
L 402+95	31 RT	3328												
L 405+50	34 LT	3401		3005.0										
		3401	3404		3001.8	2999.2								
L 406+00	45 LT	3402		3005.5										
		3402	3403		3004.0	3001.4	0.3		8					
L 406+00	36 LT	3403		3004.4										
		3403	3404		2998.8	2998.7	0.4							
L 406+00	32 LT	3404		3002.4										
		3404	3405		2998.7	2997.1	0.6							
L 406+00	22 RT	3405		3000.6										
		3405	3406		2997.1	2992.3	0.7							
L 406+60	22 RT	3406		2995.8										
		3406	3407		2989.8	2988.0	3.0							
L 409+20	51 LT	3408		2976.5										
		3408	3409		2974.5	2972.3								
L 409+20	22 RT	3409		2977.3										
		3409	3410		2972.3	2968.4								
L 409+75	22 RT	3410		2973.4										
		3410	3411		2968.4	2960.0	0.9				32			
L 412+82	44 LT	3412		2950.4										
		3412	3413		2948.4	2947.4								
L 412+82	22 RT	3413		2952.4										
		3413	3414		2947.4	2943.2								
L 413+47	22 RT	3414		2948.2										
		3414	3415		2943.2	2921.3	0.7				44			
L 384+22	149 RT													
				SHEET TOTALS				40	16	76				

								R. C. PIPE CLASS III						
								15	18	24	30	36	42	48
L 395+15	47 LT	3312		3080.2										
		3312	3313		3077.0	3076.6								
L 394+56	86 LT	3313		3084.5										
		3313	3314		3076.3	3075.6			136					
L 393+80	28 RT	3314		3085.9										
		3314	3315		3075.6	3075.3	0.9							
L 396+65	26 RT	3316		3067.2										
		3316	3317		3064.0	3063.8								
L 396+30	26 RT	3317		3069.5										
		3317	3318		3063.8	3045.0								
L 399+00	46 LT	3319		3066.2										
		3319	3320		3044.9	3044.8								
L 399+00	41 LT	3320		3048.7										
		3320	3327		3044.8	3044.5	0.3							
L 401+00	54 LT	3322		3048.0										
		3322	3323		3046.5	3042.1								
L 401+00	45 LT	3323		3045.1										
		3323	3324		3028.8	3028.7								
L 401+00	41 LT	3324		3032.7										
		3324	3325		3028.7	3020.7								
L 402+17	42 LT	3325		3024.2										
		3325	3326		3020.7	3019.6								
L 398+94	22 RT	3327		3051.9										
		3327	3321		3044.5	3044.3	0.4							
L 402+95	31 RT	3328												
L 405+50	34 LT	3401		3005.0										
		3401	3404		3001.8	2999.2								
L 406+00	45 LT	3402		3005.5										
		3402	3403		3004.0	3001.4	0.3							
L 406+00	36 LT	3403		3004.4										
		3403	3404		2998.8	2998.7	0.4							
L 406+00	32 LT	3404		3002.4										
		3404	3405		2998.7	2997.1	0.6							
L 406+00	22 RT	3405		3000.6										
		3405	3406		2997.1	2992.3	0.7							
L 406+60	22 RT	3406		2995.8										
		3406	3407		2989.8	2988.0	3.0							
L 409+20	51 LT	3408		2976.5										
		3408	3409		2974.5	2972.3				72				
L 409+20	22 RT	3409		2977.3										
		3409	3410		2972.3	2968.4				52				
L 409+75	22 RT	3410		2973.4										
		3410	3411		2968.4	2960.0	0.9							
L 412+82	44 LT	3412		2950.4										
		3412	3413		2948.4	2947.4				68				
L 412+82	22 RT	3413		2952.4										
		3413	3414		2947.4	2943.2				60				
L 413+47	22 RT	3414		2948.2										
		3414	3415		2943.2	2921.3	0.7							
L 384+22	149 RT													
				SHEET TOTALS				36	56	72	52	68	60	108

								R. C. PIPE CLASS IV					
								15	18	24	30	36	42
L 395+15	47 LT	3312		3080.2									
		3312	3313		3077.0	3076.6		68					
L 394+56	86 LT	3313		3084.5									
		3313	3314		3076.3	3075.6							
L 393+80	28 RT	3314		3085.9									
		3314	3315		3075.6	3075.3	0.9						
L 396+65	26 RT	3316		3067.2									
		3316	3317		3064.0	3063.8		32					
L 396+30	26 RT	3317		3069.5									
		3317	3318		3063.8	3045.0							
L 399+00	46 LT	3319		3066.2									
		3319	3320		3044.9	3044.8		4					
L 399+00	41 LT	3320		3048.7									
		3320	3327		3044.8	3044.5	0.3	60					
L 401+00	54 LT	3322		3048.0									
		3322	3323		3046.5	3042.1							
L 401+00	45 LT	3323		3045.1									
		3323	3324		3028.8	3028.7		4					
L 401+00	41 LT	3324		3032.7									
		3324	3325		3028.7	3020.7		108					
L 402+17	42 LT	3325		3024.2									
		3325	3326		3020.7	3019.6		108					
L 398+94	22 RT	3327		3051.9									
		3327	3321		3044.5	3044.3	0.4						
L 402+95	31 RT	3328											
L 405+50	34 LT	3401		3005.0									
		3401	3404		3001.8	2999.2		48					
L 406+00	45 LT	3402		3005.5									
		3402	3403		3004.0	3001.4	0.3						
L 406+00	36 LT	3403		3004.4									
		3403	3404		2998.8	2998.7	0.4	4					
L 406+00	32 LT	3404		3002.4									
		3404	3405		2998.7	2997.1	0.6	52					
L 406+00	22 RT	3405		3000.6									
		3405	3406		2997.1	2992.3	0.7	56					
L 406+60	22 RT	3406		2995.8									
		3406	3407		2989.8	2988.0	3.0	36					
L 409+20	51 LT	3408		2976.5									
		3408	3409		2974.5	2972.3							
L 409+20	22 RT	3409		2977.3									
		3409	3410		2972.3	2968.4							
L 409+75	22 RT	3410		2973.4									
		3410	3411		2968.4	2960.0	0.9						
L 412+82	44 LT	3412		2950.4									
		3412	3413		2948.4	2947.4							
L 412+82	22 RT	3413		2952.4									
		3413	3414		2947.4	2943.2							
L 413+47	22 RT	3414		2948.2									
		3414	3415		2943.2	2921.3	0.7						
L 384+22	149 RT												
				SHEET TOTALS				148	432				

								36" CAA PIPE, 0.075" THICK	48" CAA PIPE, 0.105" THICK	36" WELDED STEEL PIPE 0.5" THICK, GRADE B, IN SOIL	36" WELDED STEEL PIPE 0.5" THICK, GRADE B, NOT IN SOIL	18" PIPE REHABILITATION CIPP LINER	24" PIPE REHABILITATION CIPP LINER	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY
L 395+15	47 LT	3312		3080.2										
		3312	3313		3077.0	3076.6								
L 394+56	86 LT	3313		3084.5										
		3313	3314		3076.3	3075.6								
L 393+80	28 RT	3314		3085.9										
		3314	3315		3075.6	3075.3	0.9							
L 396+65	26 RT	3316		3067.2										
		3316	3317		3064.0	3063.8								
L 396+30	26 RT	3317		3069.5										
		3317	3318		3063.8	3045.0								
L 399+00	46 LT	3319		3066.2										
		3319	3320		3044.9	3044.8								
L 399+00	41 LT	3320		3048.7										
		3320	3327		3044.8	3044.5	0.3							
L 401+00	54 LT	3322		3048.0										
		3322	3323		3046.5	3042.1								
L 401+00	45 LT	3323		3045.1										
		3323	3324		3028.8	3028.7								
L 401+00	41 LT	3324		3032.7										
		3324	3325		3028.7	3020.7								
L 402+17	42 LT	3325		3024.2										
		3325	3326		3020.7	3019.6								
L 398+94	22 RT	3327		3051.9										
		3327	3321		3044.5	3044.3	0.4							
L 402+95	31 RT	3328												
L 405+50	34 LT	3401		3005.0										
		3401	3404		3001.8	2999.2								
L 406+00	45 LT	3402		3005.5										
		3402	3403		3004.0	3001.4	0.3							
L 406+00	36 LT	3403		3004.4										
		3403	3404		2998.8	2998.7	0.4							
L 406+00	32 LT	3404		3002.4										
		3404	3405		2998.7	2997.1	0.6							
L 406+00	22 RT	3405		3000.6										
		3405	3406		2997.1	2992.3	0.7							
L 406+60	22 RT	3406		2995.8										
		3406	3407		2989.8	2988.0	3.0							
L 409+20	51 LT	3408		2976.5										
		3408	3409		2974.5	2972.3								
L 409+20	22 RT	3409		2977.3										
		3409	3410		2972.3	2968.4								
L 409+75	22 RT	3410		2973.4										
		3410	3411		2968.4	2960.0	0.9							
L 412+82	44 LT	3412		2950.4										1.500
		3412	3413		2948.4	2947.4								
L 412+82	22 RT	3413		2952.4										
		3413	3414		2947.4	2943.2								
L 413+47	22 RT	3414		2948.2										
		3414	3415		2943.2	2921.3	0.7							
L 384+22	149 RT													
				SHEET TOTALS										1.500

								QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) A: 0' THRU 5' EACH	B: 5' THRU 10' LIN. FT.	B: 10' AND ABOVE LIN. FT.	4-SIDED OTCB, SEE DETAIL SHEET 2D-1	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17, 840.26, OR 840.45	G.D.I. TYPE "B" STD. 840.18, 840.27, OR 840.45
L 395+15	47 LT	3312		3080.2				1						1
		3312	3313		3077.0	3076.6								
L 394+56	86 LT	3313		3084.5				1	3.2					1
		3313	3314		3076.3	3075.6								
L 393+80	28 RT	3314		3085.9				1	5.0	0.3				
		3314	3315		3075.6	3075.3	0.9							
L 396+65	26 RT	3316		3067.2				1						
		3316	3317		3064.0	3063.8								
L 396+30	26 RT	3317		3069.5				1	0.7					
		3317	3318		3063.8	3045.0								
L 399+00	46 LT	3319		3066.2				1	5.0	11.3				
		3319	3320		3044.9	3044.8								
L 399+00	41 LT	3320		3048.7				1						
		3320	3327		3044.8	3044.5	0.3							
L 401+00	54 LT	3322		3048.0										
		3322	3323		3046.5	3042.1								
L 401+00	45 LT	3323		3045.1				1	5.0	6.3				
		3323	3324		3028.8	3028.7								
L 401+00	41 LT	3324		3032.7				1						
		3324	3325		3028.7	3020.7								
L 402+17	42 LT	3325		3024.2				1						
		3325	3326		3020.7	3019.6								
L 398+94	22 RT	3327		3051.9				1	2.4					
		3327	3321		3044.5	3044.3	0.4							
L 402+95	31 RT	3328												
L 405+50	34 LT	3401		3005.0				1						
		3401	3404		3001.8	2999.2								
L 406+00	45 LT	3402		3005.5										
		3402	3403		3004.0	3001.4	0.3							
L 406+00	36 LT	3403		3004.4				1	0.6			1		
		3403	3404		2998.8	2998.7	0.4							
L 406+00	32 LT	3404		3002.4				1						
		3404	3405		2998.7	2997.1	0.6							
L 406+00	22 RT	3405		3000.6				1						
		3405	3406		2997.1	2992.3	0.7							
L 406+60	22 RT	3406		2995.8				1	1.0					
		3406	3407		2989.8	2988.0	3.0							
L 409+20	51 LT	3408		2976.5										
		3408	3409		2974.5	2972.3								
L 409+20	22 RT	3409		2977.3				1						
		3409	3410		2972.3	2968.4								
L 409+75	22 RT	3410		2973.4				1						
		3410	3411		2968.4	2960.0	0.9							
L 412+82	44 LT	3412		2950.4										
		3412	3413		2948.4	2947.4								
L 412+82	22 RT	3413		2952.4				1						
		3413	3414		2947.4	2943.2								
L 413+47	22 RT	3414		2948.2				1						
		3414	3415		2943.2	2921.3	0.7							
L 384+22	149 RT													
				SHEET TOTALS				20	22.9	17.9		3		17

								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	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.32	J.B. STD. 840.31 OR STD. 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	6" PVC PIPE (SPRING BOX)
L 395+15	47 LT	3312		3080.2				1							
		3312	3313		3077.0	3076.6									
L 394+56	86 LT	3313		3084.5				1							
		3313	3314		3076.3	3075.6									
L 393+80	28 RT	3314		3085.9				1						1	
		3314	3315		3075.6	3075.3	0.9								
L 396+65	26 RT	3316		3067.2				1						1	
		3316	3317		3064.0	3063.8									
L 396+30	26 RT	3317		3069.5				1						1	
		3317	3318		3063.8	3045.0									
L 399+00	46 LT	3319		3066.2					1						
		3319	3320		3044.9	3044.8									
L 399+00	41 LT	3320		3048.7				1						1	
		3320	3327		3044.8	3044.5	0.3								
L 401+00	54 LT	3322		3048.0											
		3322	3323		3046.5	3042.1									
L 401+00	45 LT	3323		3045.1					1						
		3323	3324		3028.8	3028.7									
L 401+00	41 LT	3324		3032.7				1						1	
		3324	3325		3028.7	3020.7									
L 402+17	42 LT	3325		3024.2				1						1	
		3325	3326		3020.7	3019.6									
L 398+94	22 RT	3327		3051.9				1						1	
		3327	3321		3044.5	3044.3	0.4								
L 402+95	31 RT	3328													
L 405+50	34 LT	3401		3005.0				1						1	
		3401	3404		3001.8	2999.2									
L 406+00	45 LT	3402		3005.5											
		3402	3403		3004.0	3001.4	0.3								
L 406+00	36 LT	3403		3004.4					1		1				
		3403	3404		2998.8	2998.7	0.4								
L 406+00	32 LT	3404		3002.4				1						1	
		3404	3405		2998.7	2997.1	0.6								
L 406+00	22 RT	3405		3000.6				1						1	
		3405	3406		2997.1	2992.3	0.7								
L 406+60	22 RT	3406		2995.8				1						1	
		3406	3407		2989.8	2988.0	3.0								
L 409+20	51 LT	3408		2976.5											
		3408	3409		2974.5	2972.3									
L 409+20	22 RT	3409		2977.3				1							
		3409	3410		2972.3	2968.4									
L 409+75	22 RT	3410		2973.4				1							
		3410	3411		2968.4	2960.0	0.9								
L 412+82	44 LT	3412		2950.4											
		3412	3413		2948.4	2947.4									
L 412+82	22 RT	3413		2952.4				1							
		3413	3414		2947.4	2943.2									
L 413+47	22 RT	3414		2948.2				1							
		3414	3415		2943.2	2921.3	0.7								
L 384+22	149 RT														
				SHEET TOTALS				17	3			11			

								SPRING BOX STD. 840.41	6" HDPE PIPE (LF)	M.H. FRAME AND COVER STD. 840.54	TB PRECAST DRAINAGE STRUCTURE STD. 840.46	PRECAST 4' DIA MH STD 840.52	CONTRACTOR DESIGN 4' DIA MH OVER 30'	T.B. G.D.I TYPE "A" SEE SHEET 2D-3
L 395+15	47 LT	3312		3080.2										
		3312	3313		3077.0	3076.6

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COMPUTED BY: Zachary Richard, PE DATE: 3/23/2022

CHECKED BY: David Petty, PE DATE: 5/25/2022

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CB	3D-9

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

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

| LINE & STATION | OFFSET | | STRUCTURE NUMBER FROM | STRUCTURE NUMBER TO | TOP ELEVATION FT. | INVERT ELEVATION FT. | INVERT ELEVATION FT. | MINIMUM REQUIRED SLOPE % | Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE 15 | 18 | 24 | 30 | 36 | 42 | 48 | DO NOT USE RCP | DO NOT USE CSP | DO NOT USE CAAP | DO NOT USE HDPE | DO NOT USE PVC | C. S. PIPE SIZE 15 | 18 | 24 | 30 | 36 | 42 | 48 | R. C. PIPE CLASS III 15 | 18 | 24 | 30 | 36 | 42 | 48 | R. C. PIPE CLASS IV 15 | 18 | 24 | 30 | 36 | 42 | 36" CAA PIPE, 0.075" THICK | 48" CAA PIPE, 0.105" THICK | 36" WELDED STEEL PIPE 0.5" THICK, GRADE B, IN SOIL | 36" WELDED STEEL PIPE 0.5" THICK, GRADE B, NOT IN SOIL | 18" PIPE REHABILITATION CIPP LINER | 24" PIPE REHABILITATION CIPP LINER | ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY | QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) A: 0' THRU 5' LIN. FT. | B: 5' THRU 10' LIN. FT. | B: 10' AND ABOVE LIN. FT. | 4-SIDED OTCB, SEE DETAIL SHEET 2D-1 | D.I. STD. 840.14 OR STD. 840.15 | D.I. FRAME AND GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17, 840.26, OR 840.45 | G.D.I. TYPE "B" STD. 840.18, 840.27, OR 840.45 | G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28 | 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 STD. 840.32 | T.B.J.B. STD. 840.34 | T.B.D.I. STD. 840.35 | 6" PVC PIPE (SPRING BOX) | SPRING BOX STD. 840.41 | 6" HDPE PIPE (LF) | M.H. FRAME AND COVER STD. 840.54 | TB PRECAST DRAINAGE STRUCTURE STD. 840.46 | PRECAST 4' DIA MH STD 840.52 | CONTRACTOR DESIGN 4' DIA MH OVER 30' | T.B. G.D.I TYPE "A" SEE SHEET 2D-3 | CONVERT EXISTING D.I. TO J.B. SEE SHEET 2D-2 | ADJUST D.I. | MIN DEPTH TYPE A SPECIAL DSN SEE SHEET 2D-7 | 15" C.S. ELBOW, 0.064" THICK | 18" C.S. ELBOW, 0.064" THICK | 24" C.S. ELBOW, 0.064" THICK | 30" C.S. ELBOW, 0.064" THICK | 36" C.S. ELBOW, 0.064" THICK | 42" C.S. ELBOW, 0.064" THICK | 48" C.S. ELBOW, 0.064" THICK | 48" C.A.A. ELBOW, 0.105" THICK | BERM DRAINAGE OUTLET STD. 850.10 (SY) | BERM DRAINAGE OUTLET STD. 850.11 (SY) | BERM DRAINAGE OUTLET 36" DSN,SHT 2D-4 (SY) | BERM DRAINAGE OUTLET 42" DSN,SHT 2D-5 (SY) | BERM DRAINAGE OUTLET 48" DSN,SHT 2D-6 (SY) | FLOWABLE FILL CY | CONCRETE COLLARS CL. "B" STD. 840.72 CY | PIPE REMOVAL LIN. FT. | REMARKS |
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COMPUTED BY: Zachary Richard, PE DATE: 3/23/2022

CHECKED BY: David Petty, PE DATE: 5/25/2022

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CB	3D-10

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

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

| LINE & STATION | OFFSET | STRUCTURE NUMBER FROM | STRUCTURE NUMBER TO | TOP ELEVATION FT. | INVERT ELEVATION FT. | INVERT ELEVATION FT. | MINIMUM REQUIRED SLOPE % | Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE: 15 | 18 | 24 | 30 | 36 | 42 | 48 | DO NOT USE RCP | DO NOT USE CSP | DO NOT USE CAAP | DO NOT USE HDPE | DO NOT USE PVC | C. S. PIPE SIZE: 15 | 18 | 24 | 30 | 36 | 42 | 48 | THICKNESS OR GAUGE: .064 | .064 | .064 | .064 | .064 | .064 | .064 | R. C. PIPE CLASS III 15 | 18 | 24 | 30 | 36 | 42 | 48 | R. C. PIPE CLASS IV 15 | 18 | 24 | 30 | 36 | 42 | 36" CAA PIPE, 0.075" THICK | 48" CAA PIPE, 0.105" THICK | 36" WELDED STEEL PIPE 0.5" THICK, GRADE B, IN SOIL | 36" WELDED STEEL PIPE 0.5" THICK, GRADE B, NOT IN SOIL | 18" PIPE REHABILITATION CIPP LINER | 24" PIPE REHABILITATION CIPP LINER | ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY | QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) A: 0' THRU 5' EACH | A: 5' THRU 10' LIN. FT. | B: 10' AND ABOVE LIN. FT. | 4-SIDED OTCB, SEE DETAIL SHEET 2D-1 | D.I. STD. 840.14 OR STD. 840.15 | D.I. FRAME AND GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17, 840.26, OR 840.45 | G.D.I. TYPE "B" STD. 840.18, 840.27, OR 840.45 | G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28 | 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 STD. 840.32 | T.B.J.B. STD. 840.34 | T.B.D.I. STD. 840.35 | 6" PVC PIPE (SPRING BOX) | SPRING BOX STD. 840.41 | 6" HDPE PIPE (LF) | M.H. FRAME AND COVER STD. 840.54 | TB PRECAST DRAINAGE STRUCTURE STD. 840.46 | PRECAST 4' DIA MH STD 840.52 | CONTRACTOR DESIGN 4' DIA MH OVER 30' | T.B. G.D.I TYPE "A" SEE SHEET 2D-3 | CONVERT EXISTING D.I. TO J.B. SEE SHEET 2D-2 | ADJUST D.I. | MIN DEPTH TYPE A SPECIAL DSN SEE SHEET 2D-7 | 15" C.S. ELBOW, 0.064" THICK | 18" C.S. ELBOW, 0.064" THICK | 24" C.S. ELBOW, 0.064" THICK | 30" C.S. ELBOW, 0.064" THICK | 36" C.S. ELBOW, 0.064" THICK | 42" C.S. ELBOW, 0.064" THICK | 48" C.S. ELBOW, 0.064" THICK | 48" C.A.A. ELBOW, 0.105" THICK | BERM DRAINAGE OUTLET STD. 850.10 (SY) | BERM DRAINAGE OUTLET STD. 850.11 (SY) | BERM DRAINAGE OUTLET 36" DSN,SHT 2D-4 (SY) | BERM DRAINAGE OUTLET 42" DSN,SHT 2D-5 (SY) | BERM DRAINAGE OUTLET 48" DSN,SHT 2D-6 (SY) | FLOWABLE FILL CY | CONCRETE COLLARS CL. "B" STD. 840.72 CY | PIPE REMOVAL LIN. FT. | REMARKS |
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COMPUTED BY: Zachary Richard, PE DATE: 3/23/2022

CHECKED BY: David Petty, PE DATE: 5/25/2022

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CB	3D-11

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

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

| LINE & STATION | OFFSET | STRUCTURE NUMBER FROM | STRUCTURE NUMBER TO | TOP ELEVATION FT. | INVERT ELEVATION FT. | INVERT ELEVATION FT. | MINIMUM REQUIRED SLOPE % | Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE: 15 | 18 | 24 | 30 | 36 | 42 | 48 | DO NOT USE RCP | DO NOT USE CSP | DO NOT USE CAAP | DO NOT USE HDPE | DO NOT USE PVC | C. S. PIPE SIZE: 15 | 18 | 24 | 30 | 36 | 42 | 48 | R. C. PIPE CLASS III: 15 | 18 | 24 | 30 | 36 | 42 | 48 | R. C. PIPE CLASS IV: 15 | 18 | 24 | 30 | 36 | 42 | 36" CAA PIPE, 0.075" THICK | 48" CAA PIPE, 0.105" THICK | 36" WELDED STEEL PIPE 0.5" THICK, GRADE B, IN SOIL | 36" WELDED STEEL PIPE 0.5" THICK, GRADE B, NOT IN SOIL | 18" PIPE REHABILITATION CIPP LINER | 24" PIPE REHABILITATION CIPP LINER | ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY | QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) A: 0' THRU 5' EACH | A: 5' THRU 10' LIN. FT. | B: 10' AND ABOVE LIN. FT. | 4-SIDED OTCB, SEE DETAIL SHEET 2D-1 | D.I. STD. 840.14 OR STD. 840.15 | D.I. FRAME AND GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17, 840.26, OR 840.45 | G.D.I. TYPE "B" STD. 840.18, 840.27, OR 840.45 | G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28 | 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 STD. 840.32 | T.B.J.B. STD. 840.34 | T.B.D.I. STD. 840.35 | 6" PVC PIPE (SPRING BOX) | SPRING BOX STD. 840.41 | 6" HDPE PIPE (LF) | M.H. FRAME AND COVER STD. 840.54 | TB PRECAST DRAINAGE STRUCTURE STD. 840.46 | PRECAST 4' DIA MH STD 840.52 | CONTRACTOR DESIGN 4' DIA MH OVER 30' | T.B. G.D.I TYPE "A" SEE SHEET 2D-3 | CONVERT EXISTING D.I. TO J.B. SEE SHEET 2D-2 | ADJUST D.I. | MIN DEPTH TYPE A SPECIAL DSN SEE SHEET 2D-7 | 15" C.S. ELBOW, 0.064" THICK | 18" C.S. ELBOW, 0.064" THICK | 24" C.S. ELBOW, 0.064" THICK | 30" C.S. ELBOW, 0.064" THICK | 36" C.S. ELBOW, 0.064" THICK | 42" C.S. ELBOW, 0.064" THICK | 48" C.S. ELBOW, 0.064" THICK | 48" C.A.A. ELBOW, 0.105" THICK | BERM DRAINAGE OUTLET STD. 850.10 (SY) | BERM DRAINAGE OUTLET STD. 850.11 (SY) | BERM DRAINAGE OUTLET 36" DSN,SHT 2D-4 (SY) | BERM DRAINAGE OUTLET 42" DSN,SHT 2D-5 (SY) | BERM DRAINAGE OUTLET 48" DSN,SHT 2D-6 (SY) | FLOWABLE FILL CY | CONCRETE COLLARS CL. "B" STD. 840.72 CY | PIPE REMOVAL LIN. FT. | REMARKS |
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TGSZJR-LAPTOP

COMPUTED BY: Zachary Richard, PE DATE: 3/23/2022

CHECKED BY: David Petty, PE DATE: 5/25/2022

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
A-0009CB	3D-12

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

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

| LINE & STATION | OFFSET | | STRUCTURE NUMBER FROM | STRUCTURE NUMBER TO | TOP ELEVATION FT. | INVERT ELEVATION FT. | INVERT ELEVATION FT. | MINIMUM REQUIRED SLOPE % | Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) SIZE: 54 | 60 | 66 | 72 | 78 | 84 | DO NOT USE RCP | DO NOT USE CSP | DO NOT USE CAAP | DO NOT USE HDPE | DO NOT USE PVC | C. A. A. PIPE SIZE: 54 | 60 | 66 | 72 | 78 | 84 | THICKNESS OR GAUGE: 0.135 | R. C. PIPE CLASS III SIZE: 54 | 60 | 66 | 72 | 78 | 84 | R. C. PIPE CLASS IV SIZE: 54 | 66 | 72 | 78 | 84 | 64"x43" CAA PIPE ARCH CULVERT, 0.135" THICK | 95"x67" CAA PIPE ARCH CULVERT, 0.105" THICK | ENDWALLS STD. 838.01 OR STD. 838.14 (UNLESS NOTED OTHERWISE) CY | REINFORCED ENDWALLS CY | DRAINAGE STRUCTURE MASONRY CY | QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) A: 0' THRU 5' EACH | A: 5' THRU 10' LIN. FT. | A: 10' AND ABOVE LIN. FT. | B | C.B. STD. 840.01 OR STD. 840.02 | FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E | F | G | CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06 | C.B. STD. 852.05 | OPEN THROAT C.B. STD. 840.04 OR STD. 840.05 | CONCRETE BRIDGE APPROACH D.I. STD. 840.13 | D.I. STD. 840.14 OR STD. 840.15 | D.I. FRAME AND GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26 | G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27 | G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28 | G.D.I. (W.S. FLAT) FRAME WITH 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 | G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24 | G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24 | G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29 | G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29 | M.H. FRAME AND COVER STD. 840.54 | T.B. PRECAST DRAINAGE STRUCTURE STD. 840.46 | MODIFIED CONC. FLUME | PREFORMED SCOUR HOLE (PER EACH) | ENERGY DISSIPATION BASIN | FLOWABLE FILL CY | CONCRETE COLLARS CL. "B" STD. 840.72 CY | CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY | PIPE REMOVAL LIN. FT. | REMARKS |
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COMPUTED BY:	Zachary Richard, PE	DATE:	5/16/2022
CHECKED BY:	David Petty, PE	DATE:	5/16/2022

(08-05-21)

TIP/PROJECT NO.	SHEET NO.
A-0009CB	3D- 13

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

Note: Not intended for use in determining bid quantities. Only a stormwater control measure device summary list for easy reference and location.

SUMMARY OF STORMWATER CONTROL MEASURES

CONST SHEET NO.	SCM TYPE	LINE	STATION	Location LT/RT/CL	Latitude	Longitude
20/21	Swale	L	223+00	LT	35.34265	-83.74207
21	Swale	L	223+00	LT	35.34331	-83.74099
21	Swale	L	227+16	RT	35.34396	-83.73984
23	Swale	L	264+00	RT	35.35176	-83.73235
24	Swale	L	272+50	LT	35.35408	-83.73187

SUMMARY OF STORMWATER CONTROL MEASURES

CONST SHEET NO.	SCM TYPE	LINE	STATION	Location LT/RT/CL	Latitude	Longitude

SUMMARY OF STORMWATER CONTROL MEASURES

CONST SHEET NO.	SCM TYPE	LINE	STATION	Location LT/RT/CL	Latitude	Longitude

DocuSign Envelope ID: 99505397-2A58-4433-AAE8-4D7FD9ACF5F5

COMPUTED BY: D. Matthew Brewer DATE: 5/26/22
CHECKED BY: Robert E. Kral DATE: 5/26/22

(12-17-19)

PROJECT NO.	SHEET NO.
A-0009CB	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
-L-	210+00	228+00	LT to RT	SD	3600
-L-	236+00	238+00	LT to RT	SD	400
-L-	252+00	254+00	LT to RT	SD	400
-L-	257+00	258+00	LT to RT	SD	200
-L-	263+00	265+00	LT to RT	SD	400
-L-	270+00	276+00	LT to RT	SD	1200
-L-	290+50	292+50	LT to RT	SD	400
-L-	330+83	333+24	LT to RT	SD	600
-L-	336+25	337+25	LT to RT	SD	200
-L-	364+00	365+50	LT to RT	SD	300
-L-	382+00	383+00	LT to RT	SD	200
-L-	398+50	400+50	LT to RT	SD	400
-L-	406+50	407+50	LT to RT	SD	200
CONTINGENCY				SD	500
				TOTAL LF:	9000

*UD = Underdrain
*BD = Blind Drain
*SD = Subsurface Drain

SUMMARY OF GEOTEXTILE FOR PAVEMENT STABILIZATION

LINE	Station	Station	Geotextile for Pavement Stabilization SY	Class IV Subgrade Stabilization TONS
-L-	278+25	278+75	240	110
-L-	279+75	282+75	1050	450
-L-	288+25	290+25	400	170
-L-	292+25	294+75	630	270
-L-	310+75	313+25	790	340
-L-	366+75	370+25	930	400
-L-	375+25	378+25	670	280
-L-	389+25	392+25	380	160
-L-	393+75	395+75	260	110
-L-	396+75	398+75	260	110
CONTINGENCY				
		TOTAL SY/TONS:	5610	2400*

*Total tons of "Class IV Subgrade Stabilization" is only the estimated quantity for pavement stabilization and may only represent a portion of the subgrade stabilization quantity shown in the Item Sheets of the Proposal.

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU (1)	12	1500	3000	4500	600	0
			TOTAL CY/TONS/SY:		1500	3000**	4500**	600	0

*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)
*AST = Aggregate Stabilization
**Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Soil Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.

SUMMARY OF ROCK PLATING

LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
-L-	1.5:1	288+00	1.5:1	288+50	RT	2	*	340
							TOTAL SY:	340

*Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.

SUMMARY OF HORIZONTAL DRAINS

LINE	Approximate Station	Location LT/RT	Elevation Above or Below Grade (+/-) FT	Inclination Angle DEGREES	PVC Pipe Schedule 40/80 or NO PIPE	Horizontal Drain FT	Horizontal Drain W/O Pipe FT
CONTINGENCY						3335	
					TOTAL FT:	3335	0

SUMMARY OF REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL

LINE	Beginning Slope/ RSS (H:V)	Approx. Station	Ending Slope/ RSS (H:V)	Approx. Station	Location LT/RT	Reinforced Soil Slope (RSS) SY	Geocells SY	Coir Fiber Mat SY	Matting for Erosion Control SY
-L-	1.5:1	254+25	1.5:1	262+75	RT				14560
-L-	1.5:1	270+45	1.5:1	271+25	LT				70
-L-	1.5:1	275+25	1.5:1	275+75	RT				100
-L-	1.5:1	283+75	1.5:1	288+75	LT				6650
-L-	1.5:1	290+25	1.5:1	291+00	LT				410
-L-	1.5:1	295+75	1.5:1	296+75	LT				830
-L-	1.5:1	302+75	1.5:1	303+75	LT				290
-L-	1.5:1	305+75	1.5:1	307+25	RT				830
-L-	1.5:1	306+75	1.5:1	311+25	LT				4490
-L-	1.5:1	329+90	1.5:1	330+75	LT				160
-L-	1.5:1	333+20	1.5:1	333+50	LT				50
-L-	1.5:1	336+25	1.5:1	338+75	LT				2070
-L-	1.5:1	350+75	1.5:1	351+25	RT				20
-L-	1.5:1	352+75	1.5:1	353+25	LT				240
-L-	1.5:1	363+25	1.5:1	363+75	RT				70
-L-	1.5:1	368+00	1.5:1	368+50	LT				140
-L-	1.5:1	377+75	1.5:1	378+25	LT				50
-L-	1.5:1	382+75	1.5:1	383+75	LT				210
-L-	1.5:1	386+25	1.5:1	388+75	RT				500
-L-	1.5:1	413+25	1.5:1	414+25	RT				530
					TOTAL SY:	0	0	0*	32270

*Total square yards of "Coir Fiber Mat" is only the estimated quantity for slopes steeper than 2:1 (H:V) and may only represent a portion of the coir fiber mat quantity shown in the Item Sheets of the Proposal.

**Total square yards of "Matting for Erosion Control" is only the estimated quantity for RSS and may only represent a portion of the matting quantity shown in the Item Sheets of the Proposal.

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PROJ. REFERENCE NO.	SHEET NO.
A-0009CB	3P-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

REVISIONS

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
53	20 & 21	MADELINE P. MEENTS, TRUSTEE
54	20 & 21	LLOYD SCOTT ORR
56	20	MAXINE CRISP
57	20	ERNEST D. PHILLIPS, JR
58	21	THOMAS A. CARPENTER
59	21 & 22	LLOYD SCOTT ORR
60	22	LANDON ORR
61	22	MARY S. LAMBERTH
62	22 & 23	DEBORAH E. JUSTICE
63	21 & 22	ALVIN J. HALL, ET AL
64	22	RAUL H. OLIVERA
65	22	DEBORAH & RONNIE JUSTICE
66	22	GERALD V. JONES
67	22	DEBORAH & RONNIE JUSTICE
68	22	JOSEPH A. BRADLEY
69	22 & 23	MATT SHIPLET
70	23 & 24	MACK N. CALHOUN, ET AL, TRUSTEE
71	23	LOWELL CABLE, ET AL
72	24	WILLIAM A. DITMORE
73	24	MONICA D. SAWYER
73A	24	FRANK & BRENDA DEYTON
74	24	SAVANNAH DANIELS
75	24	LANDON E. FARLEY
76	24	EUGENE FARLEY
77	24 & 25	PAM WIRZ
78	24 & 25	RAYMOND KARR & WIFE KELLY KARR
79	25	KYLE F. EDWARDS
80	25	SHAWN W. RODGERS
81	25	ETHEL CARRINGER
82	25 & 26	STEVEN R. HENSLEY, ET AL
83	25	TERRY T. JORDAN
84	25	GERALD M. GARLAND
85	25	WILLIAM N. GARLAND, JR
86	26	MATTHEW R. ZEUNEN
87	26 & 27	DARRELL R. GARLAND & WIFE LINDA GARLAND
88	26	RICHARD W. ROGERS
89	26 & 27	PHILLIPS PROPERTY HOLDINGS, LLC
90	27	JERRY TIPTON, SR
91	27	TAYLOR HILL
92	27 & 28	MARTY D. JORDAN
93	27 & 28	WILLEM VAN DE WEERD
94	27	JAMES D. JORDAN
95	27 & 28	JOSEPH R. BULLOCK

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
96	28	BRENDA GAIL BOWMAN WILLIAMS (TRIBAL LAND)
97	28	JOHN N. GINN
98	28	NCDOT
99	28	ROBERT ROY HILL (TRIBAL LAND)
100	28 & 29	ESTATE OF ALBERT JACK BOWMAN (TRIBAL LAND)
101	29 & 30	KYLIE SHARON CROWE SHULER (TRIBAL LAND)
102	28 & 29	AMBER MICHELLE GREENE HAYES (TRIBAL LAND)
103	29	ELLA MAE TEESATESKIE (TRIBAL LAND)
104	29	EASTERN BAND OF THE CHEROKEE INDIANS (TRIBAL LAND)
105		NOT USED
106	30 & 31	US FOREST SERVICE TRACT N-667
107	30	EASTERN BAND OF THE CHEROKEE INDIANS (TRIBAL LAND)
108	30 & 31	PHILLIPS PROPERTY HOLDINGS, LLC
109	31 & 32	GRACE TABERNACLE BAPTIST CHURCH (TOTAL TAKE)
110	31 & 32	US FOREST SERVICE TRACT N-696
111	32 & 33	US FOREST SERVICE TRACT N-608
112	31 & 32	JESSE CRISP
113	32 & 33	US FOREST SERVICE TRACT N-605
114	33 & 34	LOYDE C. CODY
115	33 & 34	US FOREST SERVICE TRACT N-599
116	34 & 35 (CC)	NOT USED
117	34 & 35 (CC)	DELMAR LOWELL HOLDER & WIFE MARTHA HOLDER: AND THEODORE C. HOLDER, SINGLE
118	33	UNITED STATES FOREST SERVICE

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8/17/99

REVISIONS

–L– CURVE DATA

PI Sta 219+95.61
△ = 36° 39' 28.8" (LT)
D = 2° 17' 30.6"
L = 1,599.51'
T = 828.20'
R = 2,500.00'
SE = 0.06
DS = 60 MPH

DETAIL 20A
BANK STABILIZATION
(Not to Scale)

Length = 14 Ft.
Min. d = 3 Ft.

–L– STA 212+83(44' LT) TO 212+83(58' LT)

DETAIL 20B
BANK STABILIZATION
(Not to Scale)

Length = 15 Ft.
Min. d = 3 Ft.

–L– STA 215+37(51' LT) TO 215+47(40' LT)

DETAIL 20C
LATERAL 'V' DITCH
(Not to Scale)

Min. D = 1.5 Ft.
b = 3 Ft.

–L– STA. 213+50 TO 215+00 RT
SEE PFL FOR DITCH GRADE

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	20
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 35018 ENGINEER JIMMY L. TERRY
1/27/2022

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038697 ENGINEER DAVID B. PETT
1/27/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476–0003
CORP. LICENSE NO.: C–0275

NAD 83/2011

BEGIN TIP PROJECT A–0009CB
–L– STA. 208+00.00

END SECTION A–0009CA
BEGIN SECTION A–0009CB

–L– PC 211+67.41

MATCH LINE STA –L– 221+00.00
MATCH TO SHEET NO. 21

53 MADELINE P. MEENTS, TRUSTEE
DB 373 PG 548
DB 326 PG 496

54 LLOYD SCOTT ORR
DB 304 PG 107

56 MAXINE CRISP
DB 101PG 46
DB 57 PG 37

57 ERNEST D. PHILLIPS, JR.
DB 378 PG 260

LLOYD SCOTT ORR
DB 212 PG 584
DB 158 PG 15
DB 221PG 7

ERNEST PHILLIPS, ET AL
DB 370 PG 773

DO NOT DISTURB SWEETWATER CREEK

CLASS B RIPRAP
3 TONS, 11 SY GEO

BANK STABILIZATION
SEE DETAIL 20A
CLASS I RIPRAP
20 TONS, NO GEO

BANK STABILIZATION
SEE DETAIL 20B
CLASS I RIPRAP
22 TONS, NO GEO

CUT TO FILL TRANSITION
CLASS B RIPRAP
10 TONS, 22 SY GEO

BURY INVERT 0.7'

BURY INVERT 0.8'

LATERAL 'V' DITCH
SEE DETAIL 20C
DDE=60 CY

PROP. DRIVE

REMOVE GRADE TO DRAIN (GTD)

REMOVE HW
DO NOT DISTURB SIGN

SR 1218 (ERNEST PHILLIPS RDJ 16' BST

SWEETWATER CREEK

NC 143 (SWEETWATER RDJ 24' BST

N 77°45' 39.3" E

SA ELIGIBLE AND UNASSESSED SITES

FOR –L– PROFILE, SEE SHEET NO. 44

6/3/2022
J:\W2001\A-0009\Roadway\Proj\A-0009CB Plan Sheets\A-0009CB_Rdy_psh_20.dgn
User:jmelvin