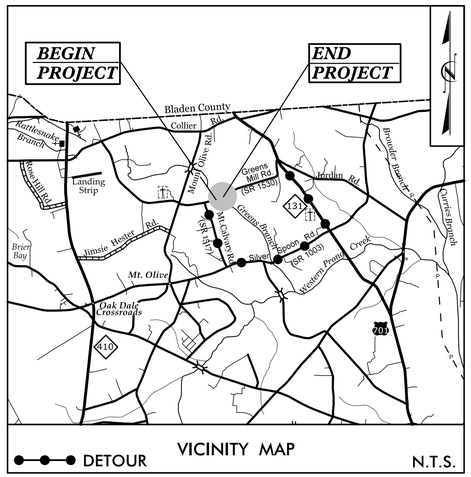
PROJECT: DF15406.2024250

CONTRACT: DF00269

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



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

COLUMBUS COUNTY

LOCATION: BRIDGE No. 230197 OVER BIG BRANCH ON SR 1530 (GREENS MILL RD.)

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

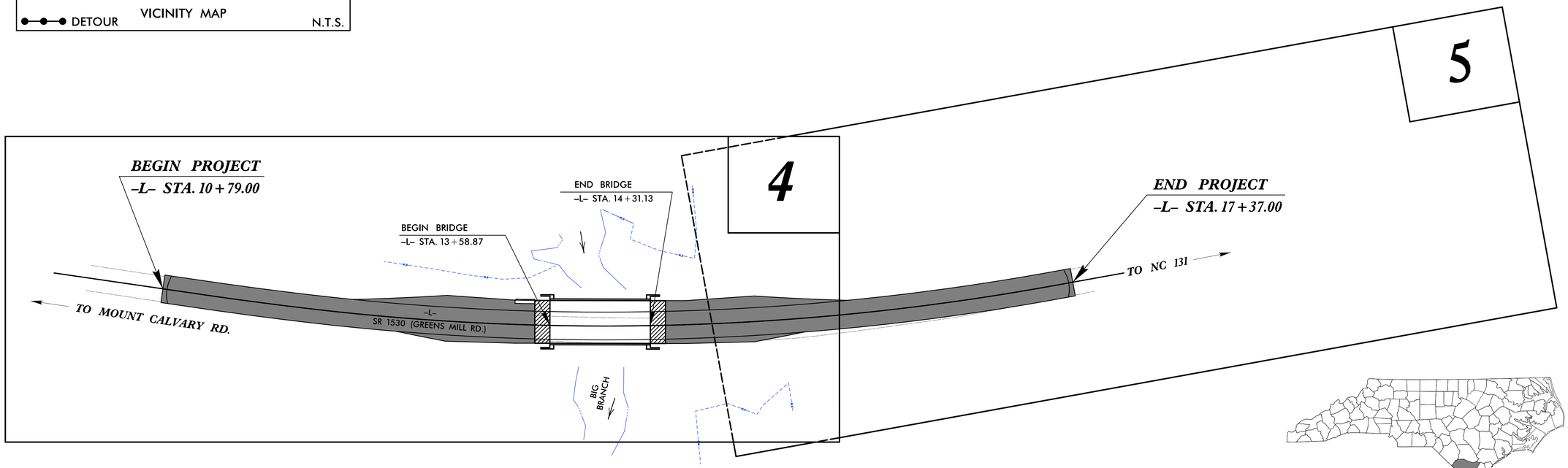
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	DF15406.2024250	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
DF15406.2024250		PE, ROW, CONST.

RFC PLANS SUBMITTAL

SUBMITTED: 06-13-19

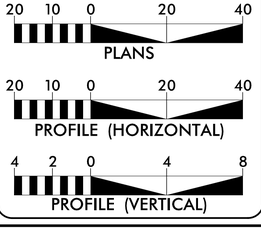
NAD 83 NA 2011



DESIGN EXCEPTION REQUIRED FOR HORIZONTAL STOPPING SIGHT DISTANCE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 120
DHV = N/A
D = N/A
T = 6%
V = 55 MPH

FUNC. CLASSIFICATION:
LOCAL RURAL
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT DF15406.2024250 = 0.111 MILES

LENGTH OF STRUCTURE PROJECT DF15406.2024250 = 0.013 MILES

TOTAL LENGTH OF PROJECT DF15406.2024250 = 0.124 MILES

NCDOT CONTACT: CHRISTY W. HUFF, PE
DIVISION BRIDGE PROGRAM MANAGER

PLANS PREPARED FOR THE NCDOT BY:
STV ENGINEERS, INC.
900 West Trade St., Ste. 715, Charlotte NC, 28202
NC License Number F-0991

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 12, 2019

LETTING DATE:
JULY 17, 2019

J. ADAM FREEMAN, PE
PROJECT ENGINEER

NARONG PHAL, EI
PROJECT DESIGNER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029984 ENGINEER DAVID P. BOCKER P.E.

DocuSigned by: David P. Bocker
SIGNATURE: 6/13/2019

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN P.E.

DocuSigned by: Joseph A. Freeman
SIGNATURE: 6/13/2019

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

6/12/2019
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lt_eaman

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 6/13/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BRIDGE #230197

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS
1B	CONVENTIONAL SYMBOLS
RW02C-1 THRU RW02C-2	SURVEY CONTROL SHEETS
2A-1 THRU 2A-2	TYPICAL SECTIONS AND PAVEMENT SCHEDULE
2C-1 THRU 2C-2	GUARDRAIL DETAIL SHEETS
3B-1	COMBO SUMMARY SHEET
3D-1	DRAINAGE SUMMARY SHEET
3P-1	PARCEL INDEX SHEET
4 THRU 5	PLAN AND PROFILE SHEETS
TMP-1 THRU TMP-3	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-3	PAVEMENT MARKING PLANS
EC-1 THRU EC-7	EROSION CONTROL PLANS
UC-1 THRU UC-X	UTILITY CONSTRUCTION PLANS
X-1 THRU X-4	CROSS-SECTIONS
S-1 THRU S-13	STRUCTURE PLANS

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 (MODIFIED).

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.05 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.02

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3 FOOT RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS 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.

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE:

RIGHT-OF-WAY MARKERS:

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

STANDARD DRAWINGS

2018 ROADWAY ENGLISH STANDARD DRAWINGS — EFF. January, 2018

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 (MODIFIED)
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.02	Driveway Turnout - Radius Type
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets

8/17/99

6/12/2019
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jfreeman

12/2/2016

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

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

BRIDGE #230197

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	1B

BOUNDARIES AND PROPERTY:

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

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easment Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line — RW
- New Right of Way Line with Pin and Cap — RW
- New Right of Way Line with Concrete or Granite R/W Marker — RW
- New Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- New Control of Access — CA
- Existing Easement Line — E
- New Temporary Construction Easement — E
- New Temporary Drainage Easement — TDE
- New Permanent Drainage Easement — PDE
- New Permanent Drainage / Utility Easement — DUE
- New Permanent Utility Easement — PUE
- New Temporary Utility Easement — TUE
- New 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 — Vineyard

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

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

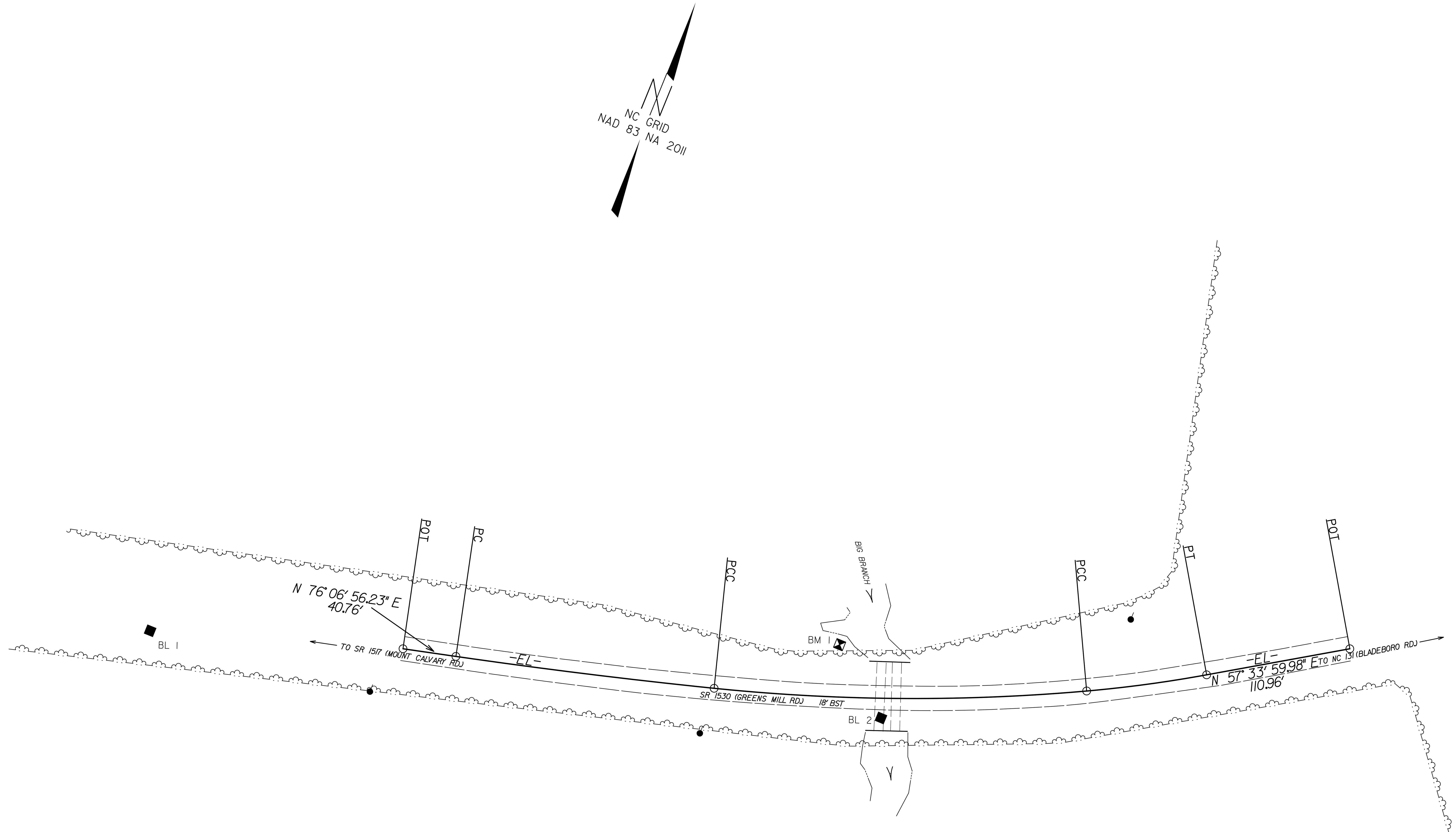
PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	RW02C-1

Location and Surveys

NCDOT

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION



NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

REVISIONS

6/2/99

6/12/2019
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freeman

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
DFI5406.2024250	RW02C-2
Location and Surveys	
NCDOT	

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

BL

POINT	DESC.	NORTH	EAST	ELEVATION
1	230197 BL1	252521.3043	2064990.3471	91.30
2	230197 BL2	252669.5085	2065531.4880	87.35
3	230197 BL3	252930.7203	2065990.0269	98.60

****
BM1 ELEVATION = 84.97
N 252709 E 2065481
RR SPIKE SET IN 12" GUM
****

EL

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	252581.194	2065174.108							
LINE			N 76°06'56.3" E	40.76					
PC	252590.974	2065213.673							
CURVE			N 74°55'09.6" E	198.34	02°23'33.3"(LT)	01°12'22.4"	198.35	99.19	4750.00
PCC	252642.578	2065405.181							
CURVE			N 68°17'26.7" E	284.01	10°51'52.4"(LT)	03°49'11.0"	284.43	142.64	1500.00
PCC	252747.631	2065669.045							
CURVE			N 60°12'45.2" E	92.27	05°17'30.5"(LT)	05°43'59.7"	92.30	46.18	999.36
PT	252793.468	2065749.122							
LINE			N 57°34'00.0" E	110.96					
POT	252852.977	2065842.772							

NOTES:

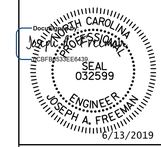
1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

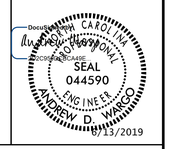
STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	2A-1

ROADWAY DESIGN ENGINEER

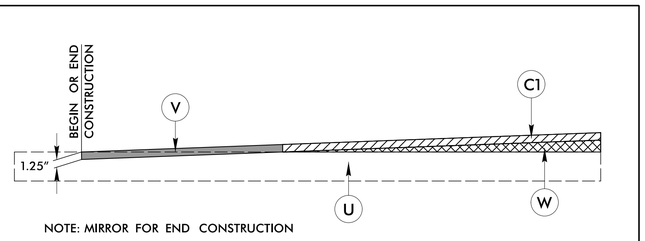


PAVEMENT DESIGN ENGINEER



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

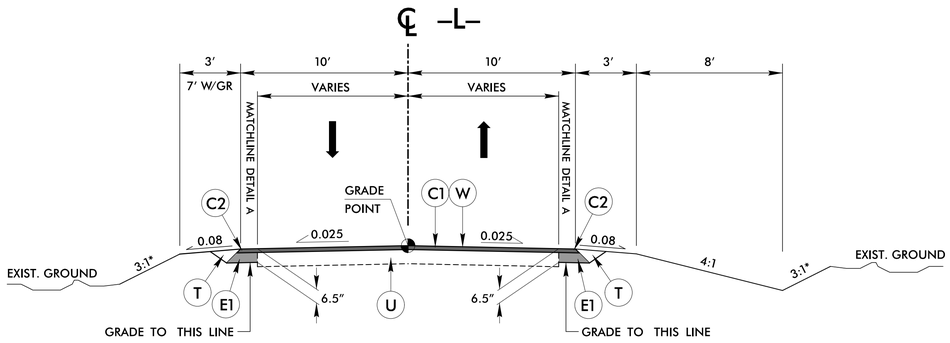
BRIDGE #230197



NOTE: MIRROR FOR END CONSTRUCTION

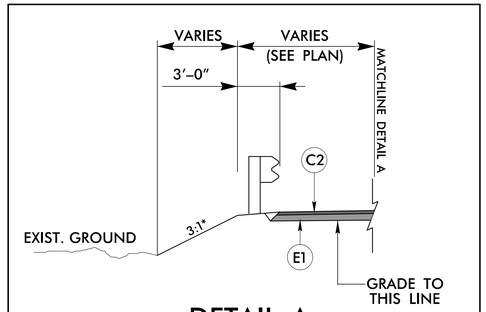
MILLING DETAIL

LINE	FROM	TO
–L–	10+79	11+06
–L–	17+15	17+37



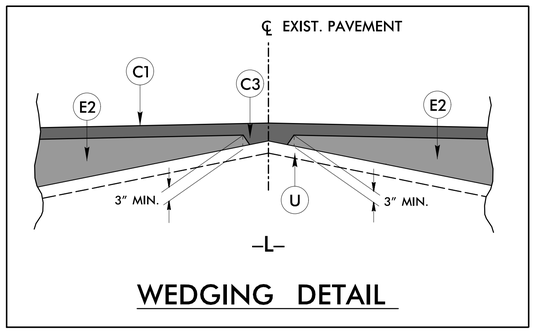
TYPICAL SECTION NO. 1

–L– STA. 10+79.00 TO 12+50.00
–L– STA. 14+50.00 TO 17+37.00



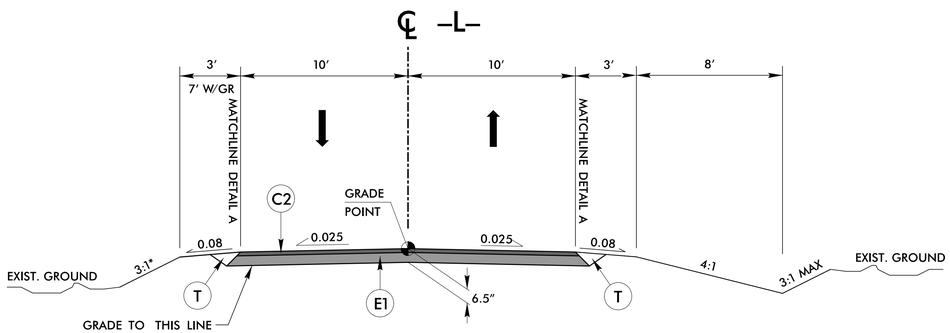
DETAIL A

USE IN CONJUNCTION WITH TYPICAL NO. 1 & 2 (MIRROR FOR RT SIDE)



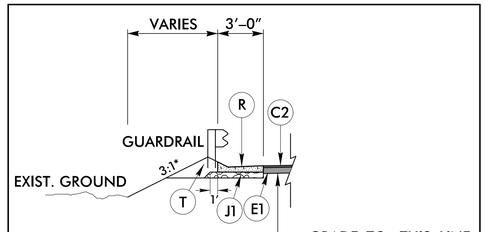
WEDGING DETAIL

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1.25″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD.
C2	PROP. APPROX. 2.5″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ.YD.IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1″ IN DEPTH OR GREATER THAN 1.5″ 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″ IN DEPTH OR GREATER THAN 5.5″ IN DEPTH.
J1	PROPOSED 6″ AGGREGATE BASE COURSE
R	3′-0″ CONCRETE SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	VARIABLE DEPTH MILLING (0″ TO 1.25″)
W	PAVEMENT WEDGING (SEE WEDGING DETAIL)



TYPICAL SECTION NO. 2

–L– STA. 12+50.00 TO 13+58.87 (BEGIN BRIDGE)
–L– STA. 14+31.13 (END BRIDGE) TO 14+50.00



SHOULDER BERM GUTTER DETAIL

–L– STA. 13+33.21 TO 13+47.59 LT

NOTES:
ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

* 2:1 SLOPES MAY BE USED PROVIDED EXISTING SLOPES ARE STABLE AND EROSION CONTROL MEASURES ARE UTILIZED

8/17/99

6/12/2019
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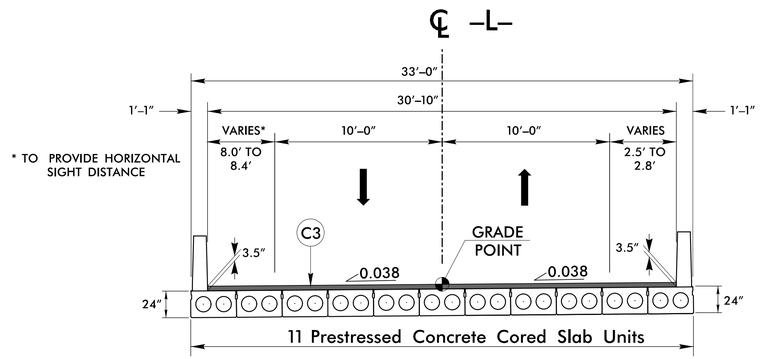
tfreeman

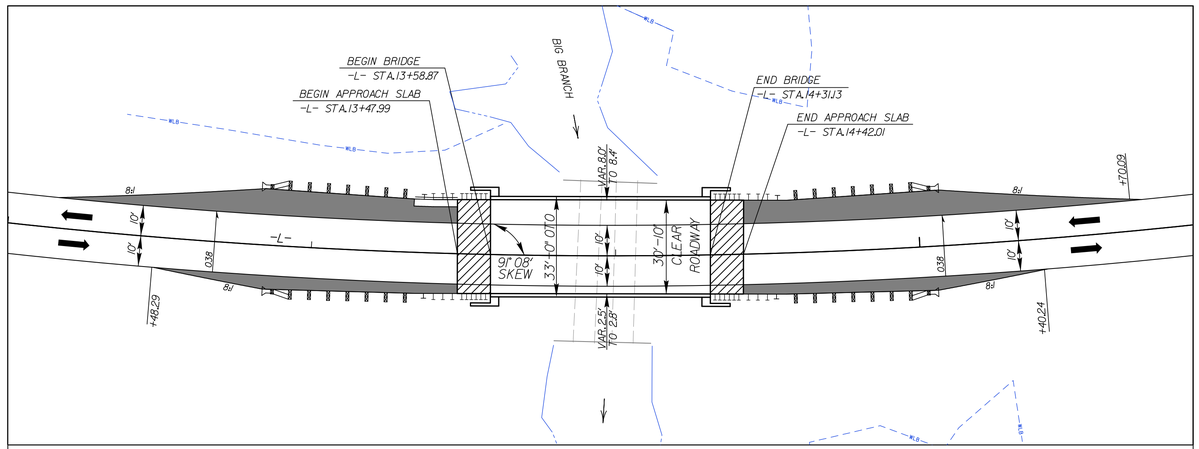
8/17/99

PAVEMENT SCHEDULE	
C1	1.25″ SURFACE COURSE TYPE S9.5B
C2	2.5″ SURFACE COURSE TYPE S9.5B
C3	VAR. SURFACE COURSE TYPE S9.5B
E1	4″ BASE COURSE TYPE B25.0C
E2	VAR. BASE COURSE TYPE B25.0C
J1	6″ AGGREGATE BASE COURSE
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	VARIABLE DEPTH MILLING
W	PAVEMENT WEDGING



TYPICAL SECTION NO. 3

–L– STA. 13+58.87 (BEGIN BRIDGE) TO 14+31.13 (END BRIDGE)



SKETCH SHOWING ROADWAY IN RELATION TO PROPOSED STRUCTURE

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Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	2A-2

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032599 ENGINEER JOSEPH A. FREEMAN
6/13/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BRIDGE #230197

6/13/2019
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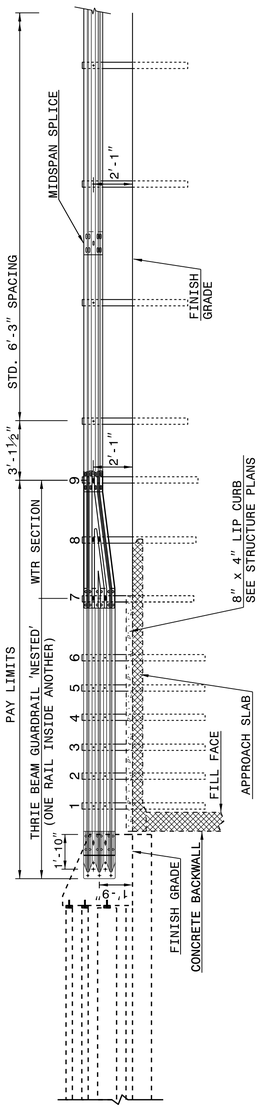
jfreeman

PROJECT REFERENCE NO.	SHEET NO.
DF15406.230197	2C-1

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

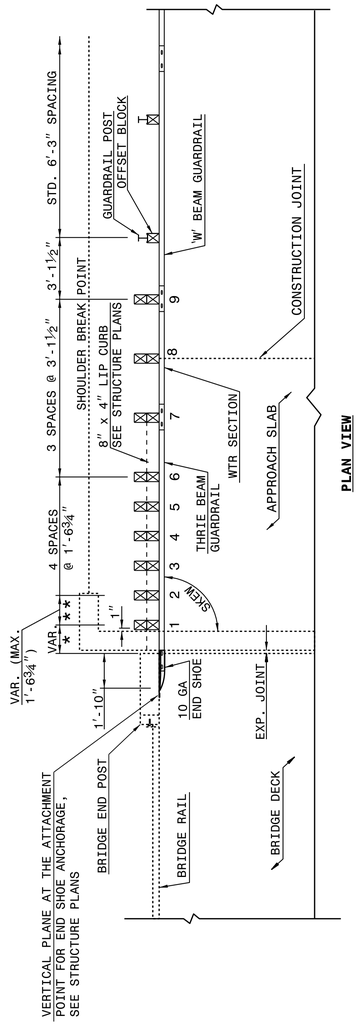
ROADWAY DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III
FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7
862D03



ELEVATION

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



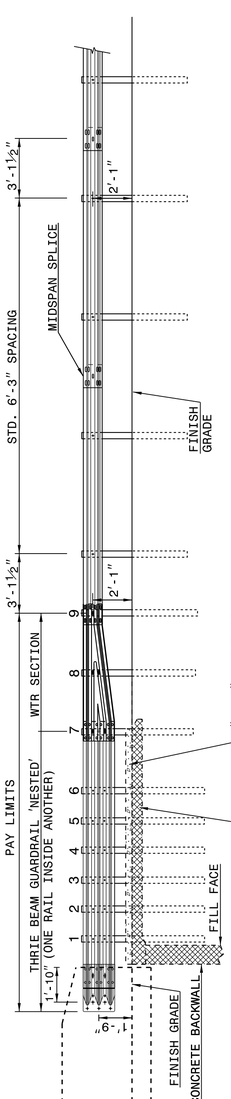
PLAN VIEW

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

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

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

SHEET 2 OF 7
862D03



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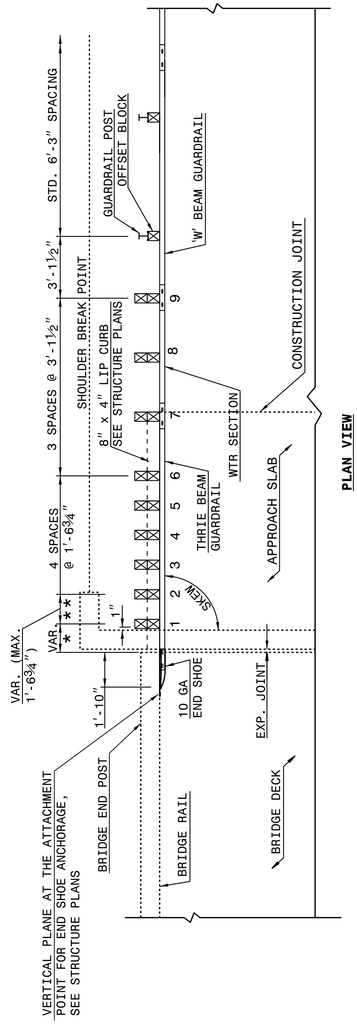


PLAN VIEW

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 Joel S. Howerton
6/13/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

ORIGINAL BY: J HOWERTON DATE: 06-22-12
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

14-DEC-2017 10:36
S:\Contracts\Contracts\Special Details\jhowerton\Standard Drawings\2018 Standard Drawings\Details in Lieu of Standards\Division 8\862d0301.dgn
jhowerton AT CSD-2425965

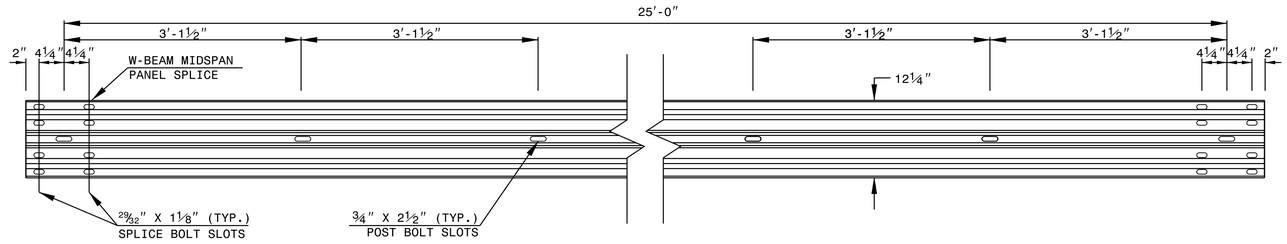
PROJECT REFERENCE NO.	SHEET NO.
DF15406.230197	2C-2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

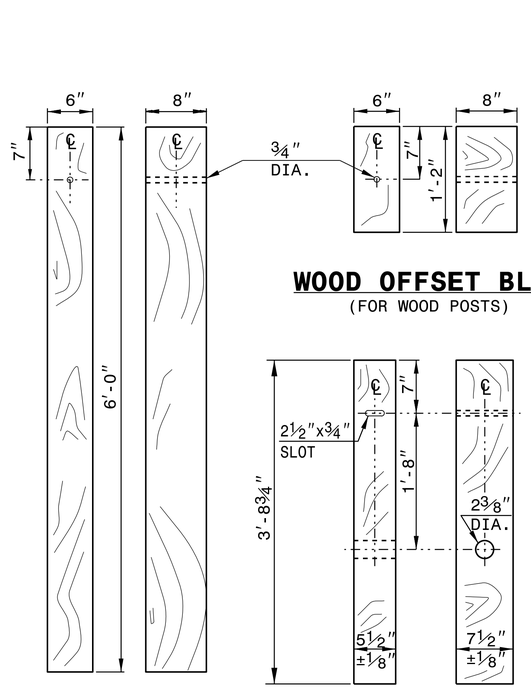
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02



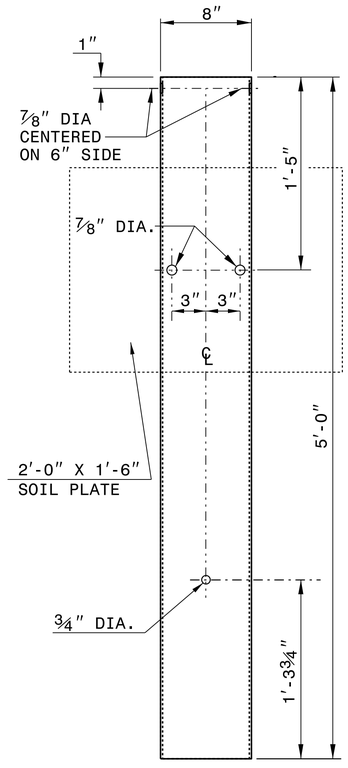
STANDARD W-BEAM GUARDRAIL



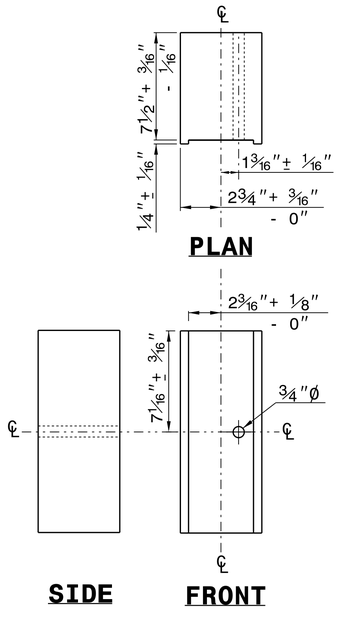
WOOD OFFSET BLOCK
(FOR WOOD POSTS)

STANDARD LINE POST

SHORT WOOD BREAKAWAY POST



STEEL TUBE
TS 6"x8"x0.1875"

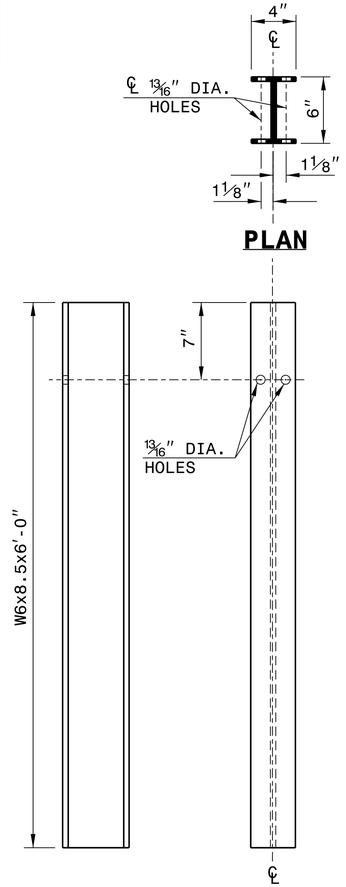


PLAN

SIDE

FRONT

ROUTED OFFSET BLOCK



PLAN

SIDE

FRONT

"W6" STEEL POST

SYSTEM PARTS

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 JOHN S. HOWERTON
6/13/2019

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

SEE TITLE BLOCK

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

6/21/00

COMPUTED BY: EPW DATE: 05-02-19
CHECKED BY: JAF DATE: 05-02-19

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	3B-1

BRIDGE #230197

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
-L- (LT)	13+33.21	13+47.59	14.38'
		TOTAL:	14.38'
		SAY:	15'

SUMMARY OF EARTHWORK

STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
10+79.00	13+58.87	2	214	212	
	BEGIN BRIDGE				
SUBTOTAL SUMMARY NO. 1		2	214	212	
14+31.13	17+37.00	94	78		15
END BRIDGE					
SUBTOTAL SUMMARY NO. 2		94	78		15
SUBTOTAL SUMMARY NO. 1 THRU 2		96	292	211	15
USE WASTE IN LIEU OF BORROW				-15	-15
PROJECT TOTAL		96	292	196	
5% FOR TOPSOIL ON BORROW PITS				10	
GRAND TOTAL		96	292	206	
SAY		100		250	

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END		
-L-	12+84.13	13+59.13	RT	75'			BRIDGE		3.5'	6.5'
-L-	14+30.87	15+05.87	RT	75'				BRIDGE	3.5'	6.5'
-L-	12+83.81	13+58.81	LT	75'				BRIDGE	7.5'	10.5'
-L-	14+31.49	15+06.49	LT	75'			BRIDGE		7.5'	10.5'
			SUBTOTAL	300'						
			TOTAL ANCHOR LENGTH	275'						
			TOTAL GUARDRAIL LENGTH	25'						
			SAY	25'						
			ADDITIONAL GUARDRAIL POSTS	5 EACH						

ANCHOR	DEDUCTIONS	TOTAL
GREU TL-3	4 @ 50'	200'
TYPE III	4 @ 18.75'	75'

TOTAL DEDUCTIONS = 275'
LESS DEDUCTIONS = 25'

SURVEY LINE	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
	APPROACH END	TRAILING END	APPROACH END	TRAILING END	TYPE-III	B-77	GREU TL-3	GREU TL-2	CAT-1	AT-1				EA	G	NG				
-L-	50'		1'		1		1													
-L-		50'		1'	1		1													
-L-		50'		1'	1		1													
-L-	50'		1'		1		1													

6/12/2019
I:\Projects\4019742\4019742_0001\50_Deliverables & Submittals\Bridge 197 Project Folder\Roadway\Proj\PSH\230197_RDY_PSH_3B-1.dgn
jfreeman

COMPUTED BY:	CJ HUND, EI	DATE:	5/22/2019
CHECKED BY:	DP BOCKER, PE	DATE:	5/22/2019

PROJECT NO.	SHEET NO.
DF 15406.2009455	3D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.

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

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL
13+38	LT	0401		88.2			
		0401	0400		84.9	84.8	
PROJECT/SHEET TOTALS							

STATION	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
13+38												
PROJECT/SHEET TOTALS												

STATION	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109
13+38								
PROJECT/SHEET TOTALS			0					

STATION	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
13+38																
			12													
PROJECT/SHEET TOTALS																

STATION	18" R.C. PIPE (CLASS V)	**** RC PIPE CULVERTS, CONTRACTOR DESIGN	**** RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G
13+38								1						
PROJECT/SHEET TOTALS								1						

STATION	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME WITH TWO GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	T.B.D.I. STD. 840.35	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. FRAME WITH TWO GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32					SIDE DRAIN PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
13+38								1			1										
PROJECT/SHEET TOTALS								1			1										

ABBREVIATIONS

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

PROJ. REFERENCE NO.	SHEET NO.
DF15406.2024250	3P-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	MATTHEW KEITH YOUNG
2	4 & 5	MJWS LANDS LLC
3	4	CHARLES K. YOUNG & JEANETTE
4	4 & 5	CONNIE HARGROVE

PARCEL No.	SHEET No.	PROPERTY OWNER NAME

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	4
R/W SHEET NO.	

STV Engineers, Inc. 900 West Trade St., Suite 715 Charlotte, NC 28202 NC License Number F-0991

ROADWAY DESIGN ENGINEER — SEAL 032599 — JOSEPH A. FREEMAN — 6/13/2019

HYDRAULICS ENGINEER — SEAL 029984 — DAVID P. BOCKER — 6/13/2019

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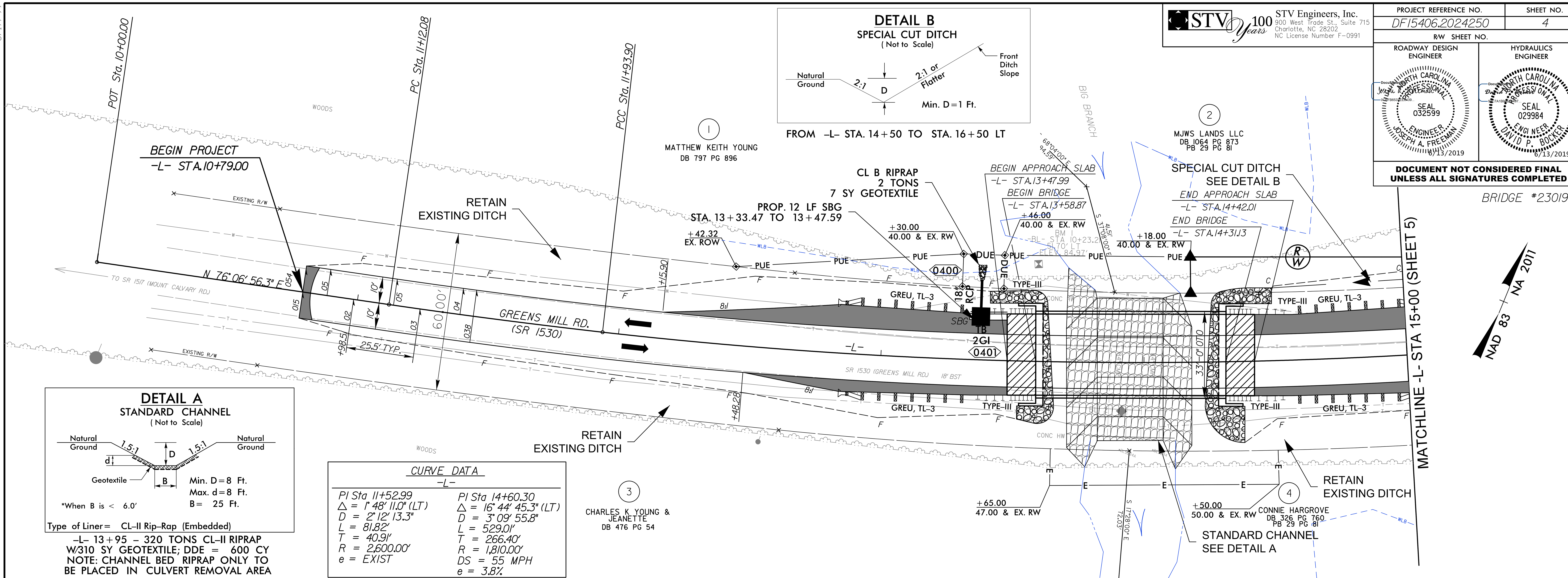
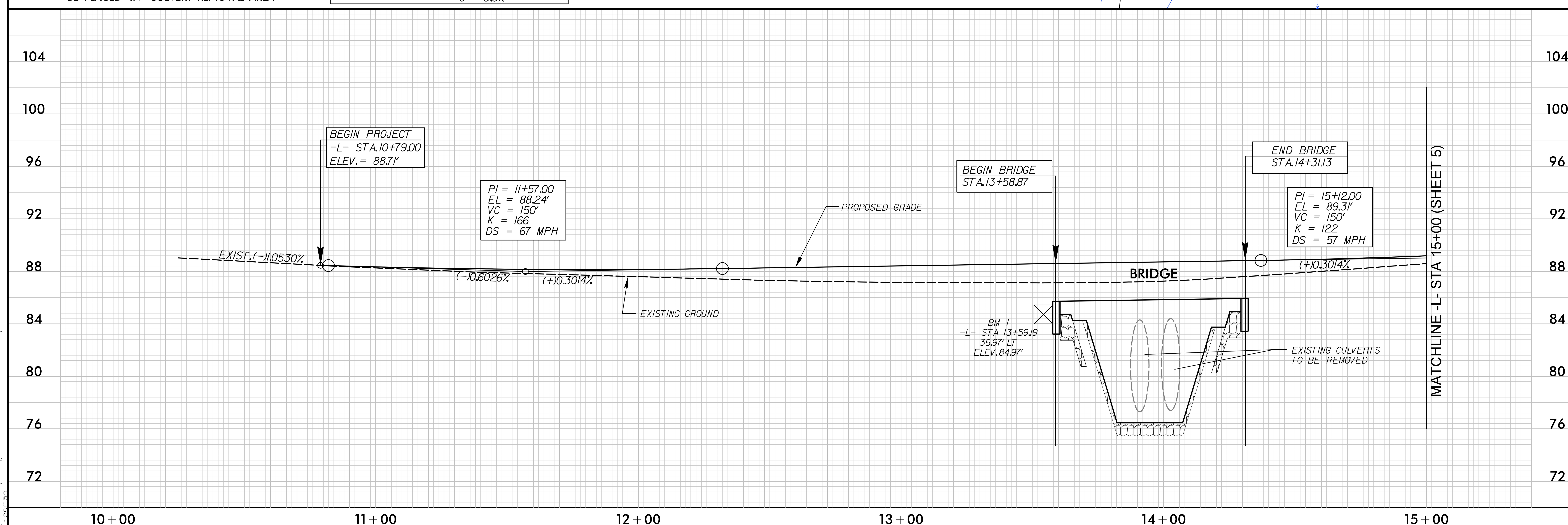
BRIDGE #230197



POT Sta. 10+00.00
PC Sta. 11+12.08
PCC Sta. 11+93.90
BEGIN PROJECT
-L- STA.10+79.00
RETAIN EXISTING DITCH
N 76°06' 56.3" E
GREENS MILL RD. (SR 1530)
25.5' TYP.
DETAIL B
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
2:1
D
2:1 or Flatter
Front Ditch Slope
Min. D=1 Ft.
FROM -L- STA. 14+50 TO STA. 16+50 LT
MATTHEW KEITH YOUNG
DB 797 PG 896
MJWS LANDS LLC
DB 1064 PG 873
PB 29 PG 81
CL B RIPRAP
2 TONS
7 SY GEOTEXTILE
PROP. 12 LF SBG
STA. 13+33.47 TO 13+47.59
+42.32 EX. ROW
+30.00 40.00 & EX. RW
+46.00 40.00 & EX. RW
+18.00 40.00 & EX. RW
BEGIN APPROACH SLAB
-L- STA.13+47.99
BEGIN BRIDGE
-L- STA.13+58.87
END APPROACH SLAB
-L- STA.14+42.01
END BRIDGE
-L- STA.14+31.13
SPECIAL CUT DITCH
SEE DETAIL B
BIG BRANCH
NAD 83
NA 2011
MATCHLINE -L- STA 15+00 (SHEET 5)
GREU, TL-3
TYPE-III
18" RCP
TB 2GI
0400
0401
DETAIL A
STANDARD CHANNEL
(Not to Scale)
Natural Ground
1.5:1
D
d
B
Geotextile
Min. D=8 Ft.
Max. d=8 Ft.
B= 25 Ft.
*When B is < 6.0'
Type of Liner= CL-II Rip-Rap (Embedded)
-L- 13+95 - 320 TONS CL-II RIPRAP
W/310 SY GEOTEXTILE; DDE = 600 CY
NOTE: CHANNEL BED RIPRAP ONLY TO BE PLACED IN CULVERT REMOVAL AREA
CURVE DATA
-L-
PI Sta 11+52.99
Δ = 1° 48' 11.0" (LT)
D = 2° 12' 13.3"
L = 81.82'
T = 40.91'
R = 2,600.00'
e = EXIST
PI Sta 14+60.30
Δ = 16° 44' 45.3" (LT)
D = 3° 09' 55.8"
L = 529.01'
T = 266.40'
R = 1,810.00'
DS = 55 MPH
e = 3.8%
CHARLES K YOUNG & JEANETTE
DB 476 PG 54
+65.00 47.00 & EX. RW
+50.00 50.00 & EX. RW
CONNIE HARGROVE
DB 326 PG 760
PB 29 PG 81
STANDARD CHANNEL
SEE DETAIL A
RETAIN EXISTING DITCH



104
100
96
92
88
84
80
76
72
BEGIN PROJECT
-L- STA.10+79.00
ELEV.= 88.71'
EXIST.(-)1.0530%
PI = 11+57.00
EL = 88.24'
VC = 150'
K = 166
DS = 67 MPH
(-)0.6026%
(+)0.3014%
EXISTING GROUND
PROPOSED GRADE
BEGIN BRIDGE
STA.13+58.87
BRIDGE
END BRIDGE
STA.14+31.13
PI = 15+12.00
EL = 89.31'
VC = 150'
K = 122
DS = 57 MPH
(+)0.3014%
BM 1
-L- STA 13+59.19
36.97' LT
ELEV.84.97'
EXISTING CULVERTS TO BE REMOVED
MATCHLINE -L- STA 15+00 (SHEET 5)
10+00
11+00
12+00
13+00
14+00
15+00

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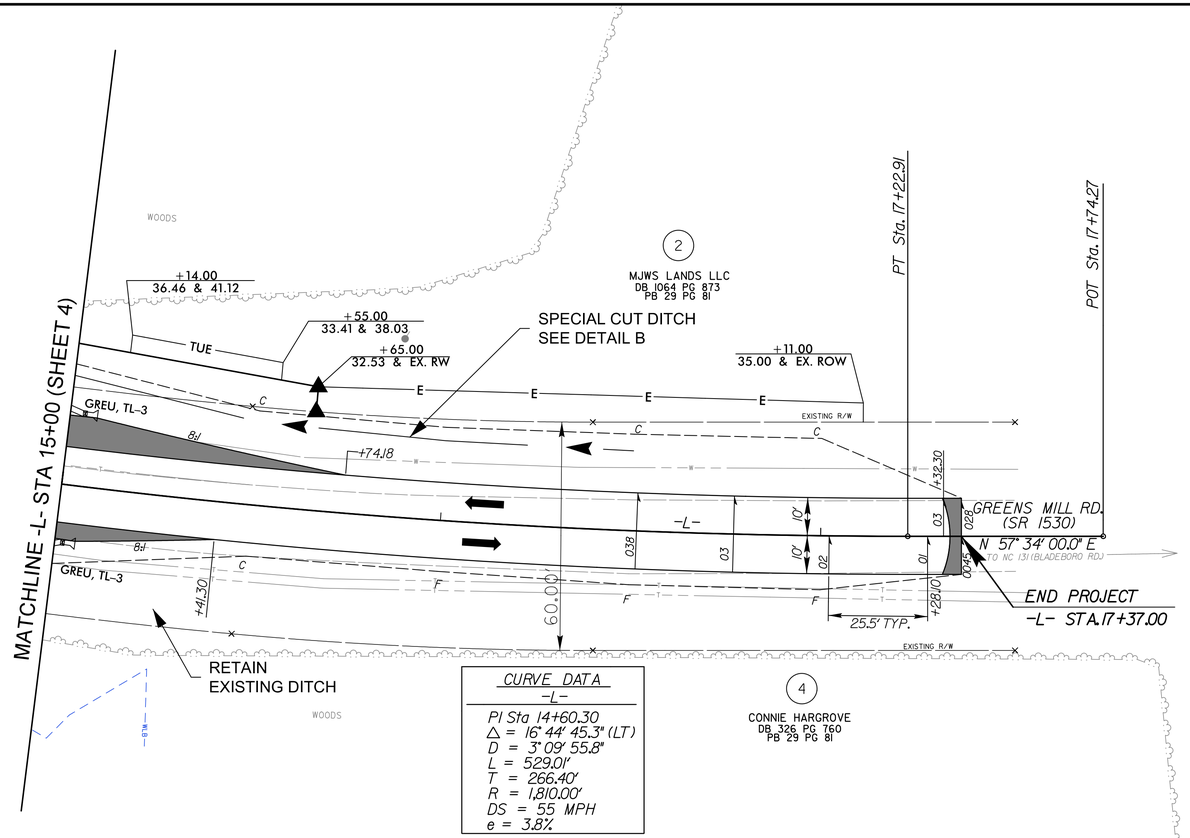
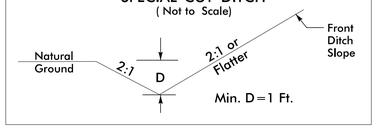
8/17/99



CURVE DATA -L-
PI Sta 14+60.30
△ = 16° 44' 45.3" (LT)
D = 3° 09' 55.8"
L = 529.01'
T = 266.40'
R = 1,810.00'
DS = 55 MPH
e = 3.8%

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



FROM -L- STA. 14+50 TO STA. 16+50 LT

NAD 83 NA 2011

BL 3

STV 100 Years
STV Engineers, Inc.
300 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A FREEMAN
6/13/2019

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 029984 ENGINEER DAVID P. BOCKER
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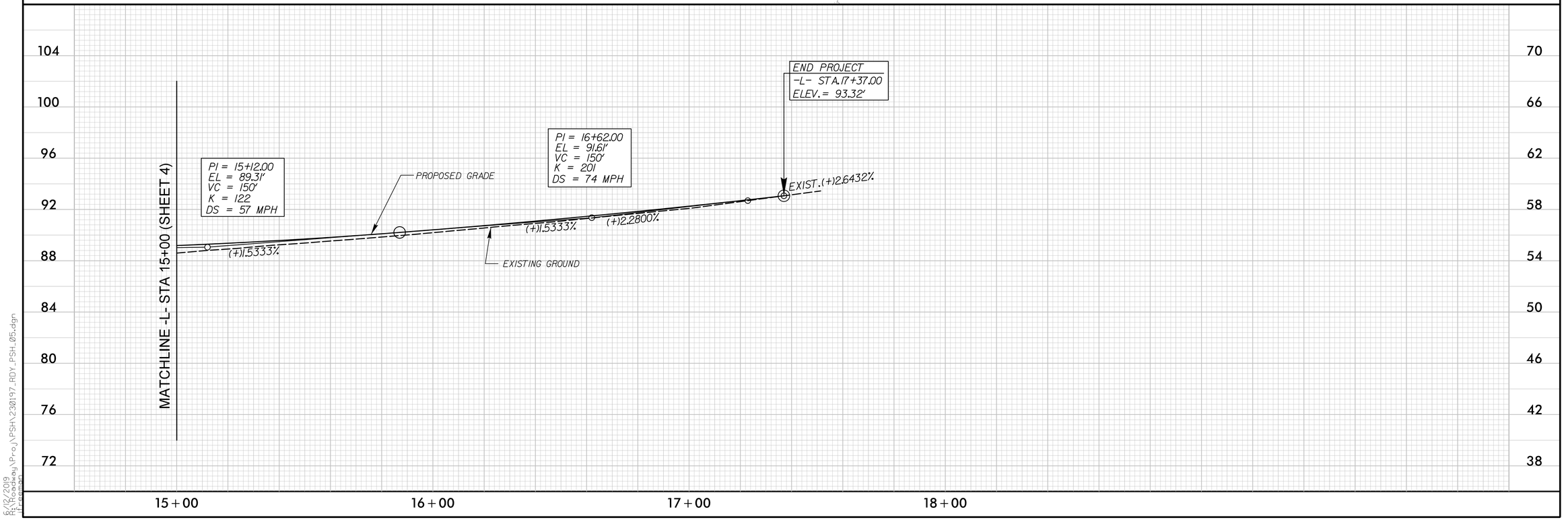

6/12/2019
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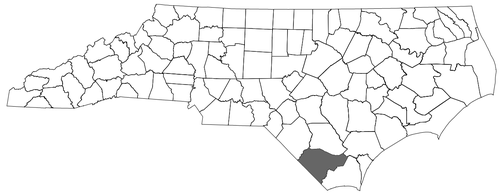
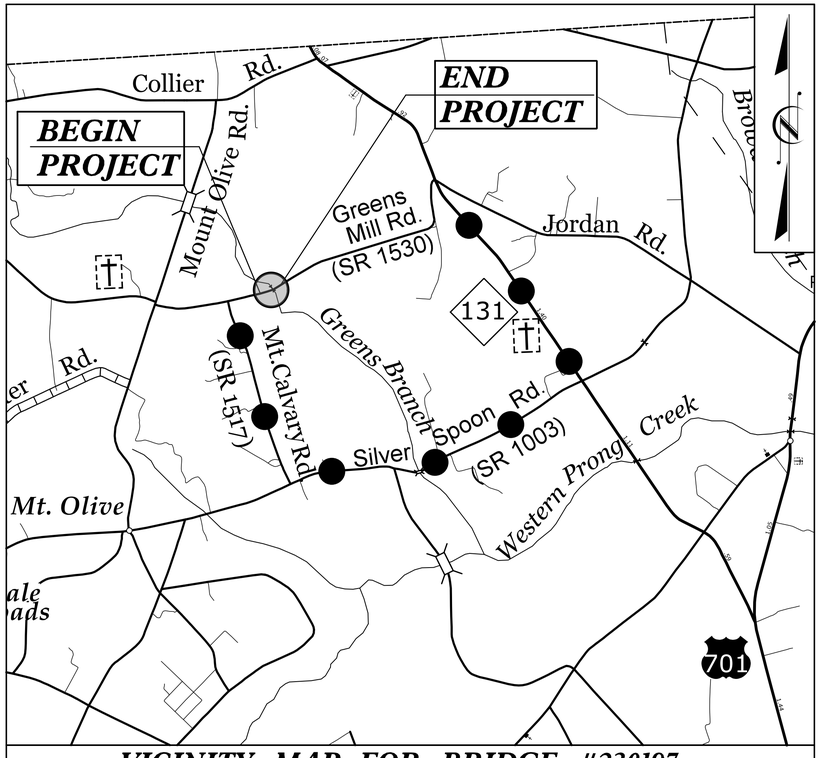
jfreeman

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

COLUMBUS COUNTY





VICINITY MAP FOR BRIDGE #230197

OFFSITE DETOUR ●—●—● *N.T.S.*

WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

DIVISION TRAFFIC ENGINEERING
PO BOX 1150, 28302 (MAIL)
450 TRANSPORTATION DRIVE, FAYETTEVILLE, NC 28301 (DELIVERY)
PHONE: (910) 364-0606 FAX: (910) 437-2599

FRANK D. WEST, JR. *DIVISION TRAFFIC ENGINEER*

DIVISION OF HIGHWAYS * STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION * WORK ZONE TRAFFIC CONTROL

INDEX OF SHEETS

SHEET NO.
TMP-1

PROJECT: DF15406.2024250

CONTRACT: DF00269

RFC TRAFFIC MANAGEMENT PLANS
SUBMITTED: 06-07-19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

J. ADAM FREEMAN, PE
TRAFFIC ENGINEER

ETHAN P. WRIGHT, PE
TRANSPORTATION DESIGNER

APPROVED: Joseph A. Freeman
DATE: 6/12/2019

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN

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6/7/2019

PROJ. REFERENCE NO.	SHEET NO.
DF15406.2024250	TMP-1A

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

BRIDGE #230197

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANAUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.03	TEMPORARY ROAD CLOSURES
1101.05	WORK ZONE VEHICLE ACCESSES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- WORK AREA
- REMOVAL/BREAKING OF PAVEMENT
- TEMPORARY PAVEMENT

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM
- SKINNY DRUM
- TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW PANEL (TYPE C)
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED IMPACT ATTENUATOR (TMIA)
- CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

SIGNALS

- EXISTING
- PROPOSED
- T E M P TEMPORARY
- PORTABLE TRAFFIC SIGNAL

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

PAVEMENT MARKERS

- CRYSTAL/CRYSTAL
- CRYSTAL/RED
- YELLOW/YELLOW

PAVEMENT MARKING SYMBOLS

- PAVEMENT MARKING SYMBOLS

APPROVED: Joseph A. Freeman

DATE: 6/12/2019

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

ROADWAY STANDARD DRAWINGS & LEGEND

6/7/2019
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jfreeman

PROJ. REFERENCE NO.	SHEET NO.
DF15406.2024250	TMP-1B

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

BRIDGE #230197

PROJECT NOTES

MANAGEMENT STRATEGIES

- CLOSE SR 1530 (GREENS MILL RD).
- DETOUR THRU TRAFFIC OFFSITE.
- MAINTAIN LOCAL TRAFFIC.

PHASING NOTES

STEP 1: USING RSD 1101.03 SHEET 1 AND 2 OF 9, AND TMP-2, INSTALL DETOUR SIGNS AND PLACE TYPE III BARRICADES TO CLOSE SR 1530 (GREENS MILL RD.) TO THRU TRAFFIC AND DETOUR ONTO PROPOSED DETOUR.

STEP 2: AWAY FROM TRAFFIC, PERFORM THE FOLLOWING:

REMOVE EXISTING CULVERT AND CONSTRUCT PROPOSED STRUCTURE FROM -L- STATION 13+60.03 TO -L- STATION 14+30.03 (SEE ROADWAY AND STRUCTURE PLANS).

CONSTRUCT PROPOSED -L- UP TO BUT NOT INCLUDING FINAL LAYER OF SURFACE COURSE FROM STATION 10+79 TO STATION 17+37.

STEP 3: PLACE FINAL PAVEMENT MARKINGS AND FINAL LAYER OF SURFACE COURSE FROM -L- STATION 10+79 TO -L- STATION 17+37, AND TIE TO EXISTING MARKINGS (SEE PAVEMENT MARKING PLAN).

STEP 4: REMOVE ALL TRAFFIC CONTROL DEVICES, SIGNING AND DETOUR ROUTE SIGNING.

OPEN SR 1530 (GREENS MILL RD.) TO FINAL TRAFFIC PATTERN.

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS, OR RESULT IN DUPLICATE, OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING OR REMOVAL OF DEVICES, AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

TRAFFIC PATTERN ALTERATIONS

A) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

B) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

C) PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

D) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

E) COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

F) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC CONTROL DEVICES

G) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

H) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

LOCAL NOTES

1. NOTIFY THE ENGINEER, COLUMBUS COUNTY EMERGENCY SERVICES AND PUBLIC SCHOOLS AT LEAST ONE MONTH PRIOR TO ROAD CLOSURE.

APPROVED: Joseph A. Freeman (DocuSigned by: 0CBFB6533EE6439...)

DATE: 6/12/2019

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

TRANSPORTATION OPERATIONS PLAN

6/7/2019
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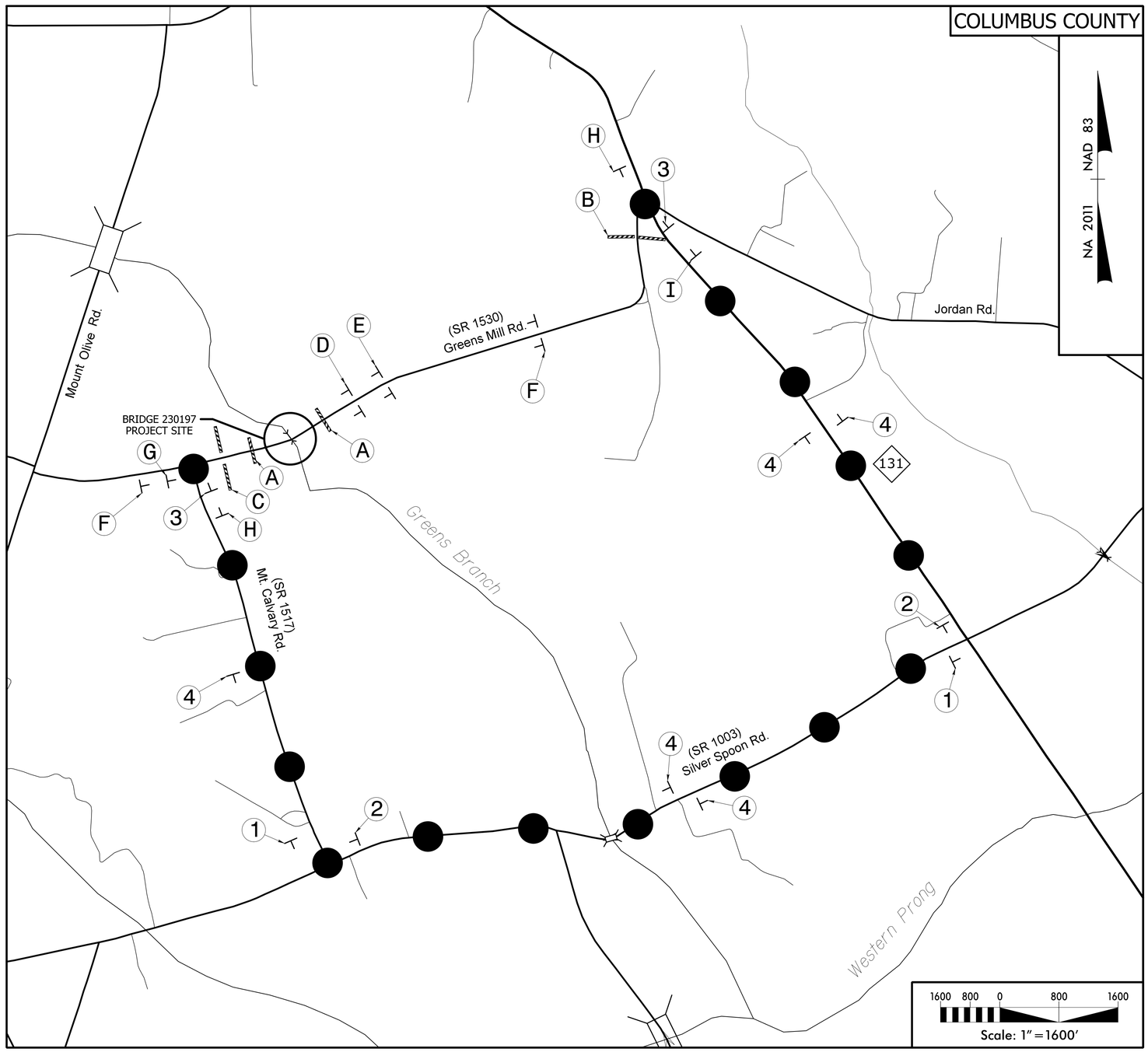
jfreeman

PROJ. REFERENCE NO.	SHEET NO.
DF15406.2024250	TMP-2

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

BRIDGE #230197

OFF-SITE DETOUR SIGNING AND ROAD CLOSURE SIGNING



R11-2
48" X 30"
ROAD CLOSED
TYPE III BARRICADE(S)
A

R11-3
60" x 30"
ROAD CLOSED
1 MILES AHEAD
LOCAL TRAFFIC ONLY
DETOUR
M4-10L
48" x 18"
TYPE III BARRICADE
B

R11-4
60" x 30"
ROAD CLOSED
0.3 MILES AHEAD
LOCAL TRAFFIC ONLY
DETOUR
M4-10R
48" x 18"
TYPE III BARRICADE
C

ROAD CLOSED 500 FT
W20-3
48" X 48"
D

ROAD CLOSED 1000 FT
W20-3
48" X 48"
E

ROAD CLOSED AHEAD
W20-3
48" X 48"
F

Greens Mill Rd
DETOUR AHEAD
W20-2
48" X 48"
G

ROAD CLOSED AHEAD
W20-3
48" X 48"
NEXT RIGHT
SP-4R
42" X 12"
H

ROAD CLOSED AHEAD
W20-3
48" X 48"
NEXT LEFT
SP-4L
42" X 12"
I

Greens Mill Rd
DETOUR
M4-8
24" X 12"
M6-1 L
21" X 15"
1

Greens Mill Rd
DETOUR
M4-8
24" X 12"
M6-1 R
21" X 15"
2

Greens Mill Rd
END DETOUR
M4-8 A
24" X 18"
3

Greens Mill Rd
DETOUR
M4-8
24" X 12"
M6-3
21" X 15"
4

NOTES:

TRAFFIC CONTROL DEVICES A THRU I SHALL BE INSTALLED ACCORDING TO ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9.

TRAFFIC CONTROL DEVICES 1 THRU 4 SHALL BE INSTALLED AS PER ENGINEER'S INSTRUCTION.

APPROVED: Joseph A. Freeman
Docusigned by: DCBF86533EE6439...
DATE: 6/12/2019

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS * STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION * WORK ZONE TRAFFIC CONTROL

OFFSITE DETOUR SIGNING AND ROAD CLOSURE SIGNING

6/7/2019
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jfreeman

PROJ. REFERENCE NO.	SHEET NO.
DF15406.2024250	TMP-3

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

BRIDGE #230197

SIGN NUMBER: I-1
TYPE: D
QUANTITY: See Plans

SIGN WIDTH: 36″
HEIGHT: 24″
TOTAL AREA: 6.0 Sq.Ft.

BORDER TYPE: FLUSH
RECESS: 0.47″
WIDTH: 0.63″
RADII: 1.5″

NO. Z BARS:
LENGTH:

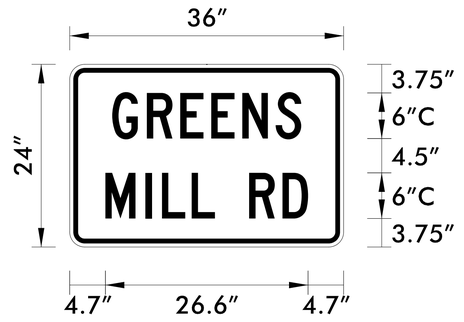
BACKG COLOR: Orange
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT'L: 0.080″ (2.0 mm) ALUMINUM

USE NOTES: 1,2
1. Legend and border shall be direct applied encapsulated lens reflective sheeting.
2. Background shall be NC Grade B fluorescent.

DESIGN BY: JCT
CHECKED BY: JAF
PROJECT ID: DF15406.2024250
DIV: 6
DATE: Apr 2, 2019



BORDER
R=1.5″
TH=0.63″
IN=0.47″

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter positions are to the lower left corners

																											Series/Size Text Length
	G	R	E	E	N	S																					C 2000 / 6
	5.6	10.1	14.5	18.6	22.7	27.1																					24.8
	M	I	L	L		R	D																				C 2000 / 6
	4.7	10	12.1	16	19.1	23.6	28																				26.6

NORTH CAROLINA D.O.T. SIGN DETAIL

APPROVED: Joseph A. Freeman (Docusigned by: 0CBF86533EE6439...)
DATE: 6/12/2019

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

SPECIAL SIGN DESIGN

6/7/2019
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lfreeman

PROJECT: DF15406.2024250

CONTRACT: DF00269

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	PMP-1

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PLAN FOR PROPOSED PAVEMENT MARKING

BRIDGE 230197

COLUMBUS COUNTY

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - 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
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTI-LANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1250.01	PAVEMENT MARKER SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY

INDEX OF SHEETS

GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT. EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

A) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
SR 1530	PAINT	RAISED

B) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

C) REPLACE ANY PAVEMENT MARKINGS THAT HAVE BEEN DAMAGED BY THE END OF EACH DAY'S OPERATION.

D) REMOVE ANY CONFLICTING MARKINGS OR MARKERS BEFORE SHIFTING TRAFFIC TO A NEW PATTERN.

E) PASSING ZONE(S) WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE ENGINEER.

RFC PAVEMENT MARKING PLANS
SUBMITTED: 06-07-19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

APPROVED: Docusigned by: Joseph A. Freeman 0CBFB6555EE0439...
DATE: 6/12/2019

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN

PLAN PREPARED FOR N.C.D.O.T. BY: STV ENGINEERS, INC.

J. ADAM FREEMAN, PE — *PROJECT ENGINEER*
ETHAN P. WRIGHT, PE — *DESIGN ENGINEER*
_____ — *DESIGN TECHNICIAN*

6/7/2019
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jfreeman

PROJ. REFERENCE NO.	SHEET NO.
DF15406.2024250	PMP-2

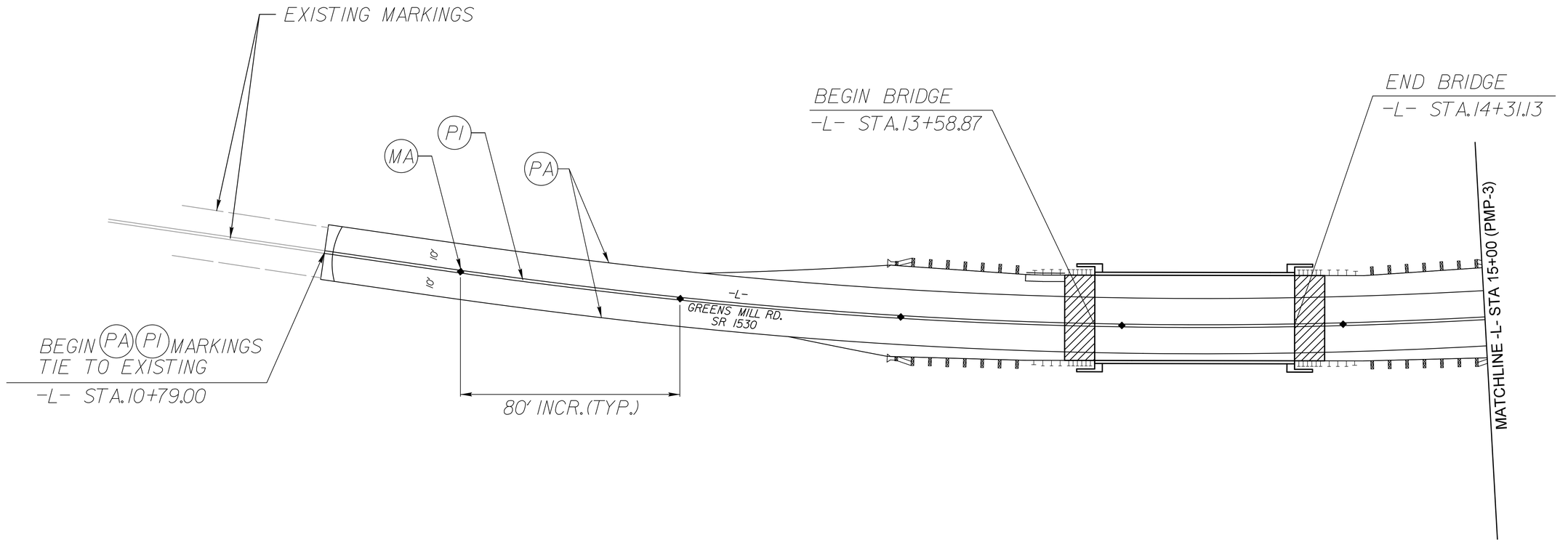
STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

BRIDGE #230197

PAVEMENT MARKING SCHEDULE

PA - PAINT (4")	WHITE EDGELINE
PI - PAINT (4")	DOUBLE YELLOW CENTER LINE
MA - RAISED PAVEMENT MARKERS (80' SPACING)	YELLOW/YELLOW

NAD 83 NA 2011



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

APPROVED: Joseph A. Freeman DocuSigned by: 0CBFB6533EE6439... DATE: 6/12/2019

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN

PAVEMENT MARKING DETAIL

SCALE:	NONE
DATE:	04/18/19
DWG. BY:	EPW
DESIGN BY:	EPW
REVIEWED BY:	JAF

REVISIONS	
CADD FILE	

6/7/2019 R:\Traffic\Traffic Control\TCP\PM\230197_PM2.dgn

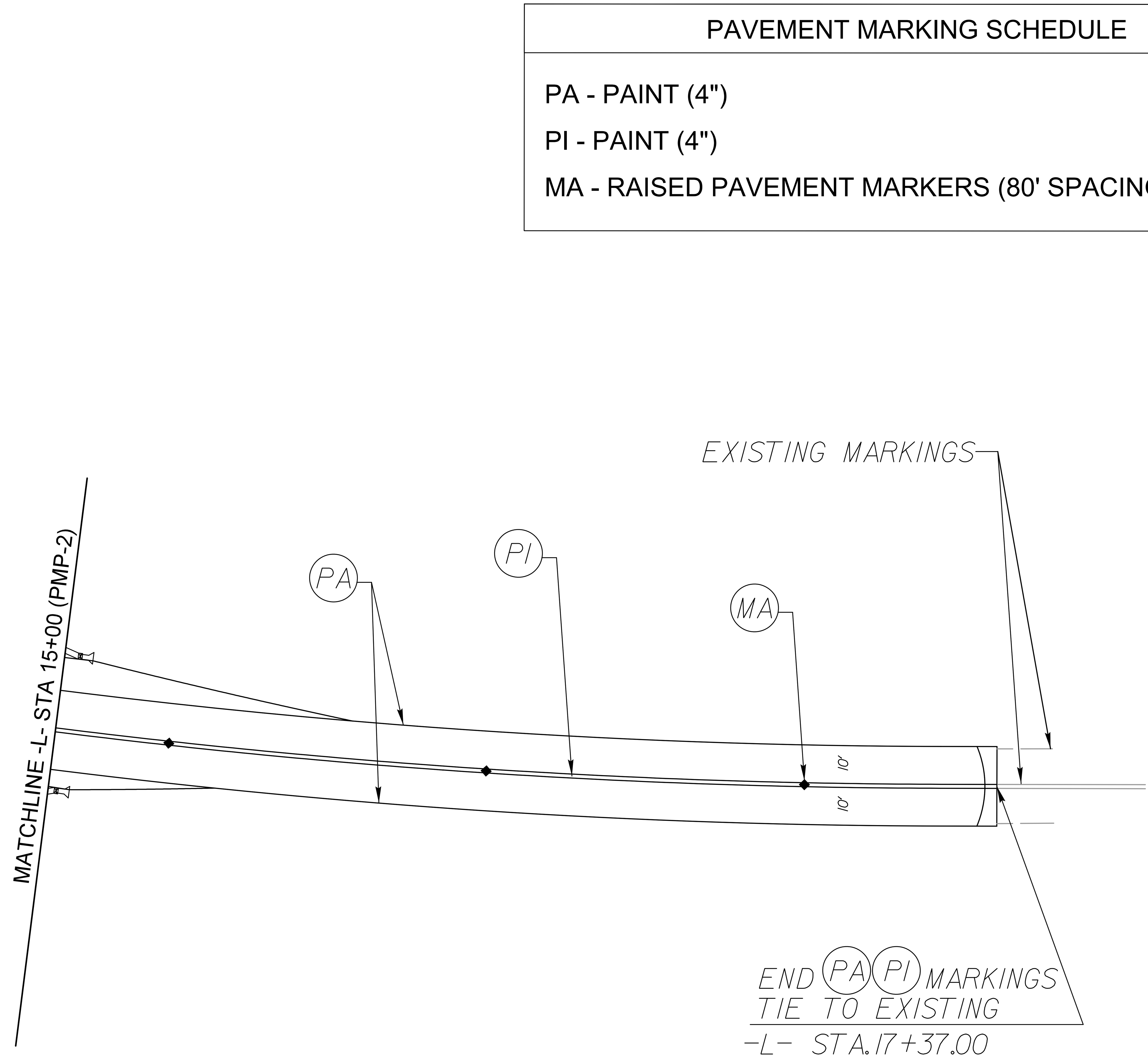
PROJ. REFERENCE NO.	SHEET NO.
DF15406.2024250	PMP-3

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

BRIDGE #230197

PAVEMENT MARKING SCHEDULE

PA - PAINT (4")	WHITE EDGELINE
PI - PAINT (4")	DOUBLE YELLOW CENTER LINE
MA - RAISED PAVEMENT MARKERS (80' SPACING)	YELLOW/YELLOW



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6/7/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

APPROVED: Joseph A. Freeman DATE: 6/12/2019

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN

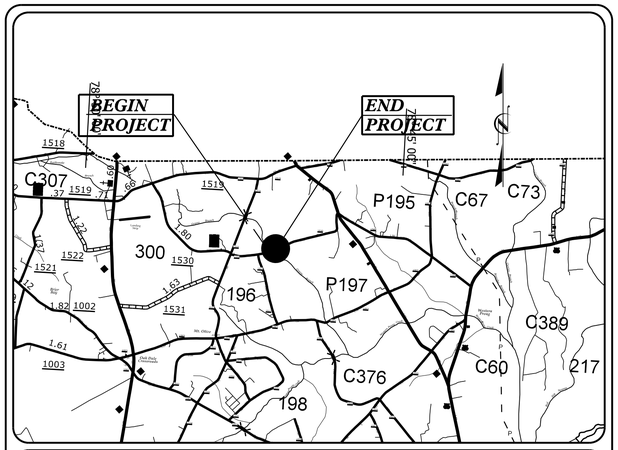
PAVEMENT MARKING DETAIL

SCALE:	NONE
DATE:	04/18/19
DWG. BY:	EPW
DESIGN BY:	EPW
REVIEWED BY:	JAF

REVISIONS

CADD FILE

TIP PROJECT: DF15406.2024250

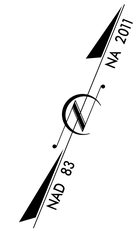


VICINITY MAP
NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

COLUMBUS COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	DF15406.2024250	EC-1	EC-7
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
DF15406.2024250		PE, ROW, CONST.	



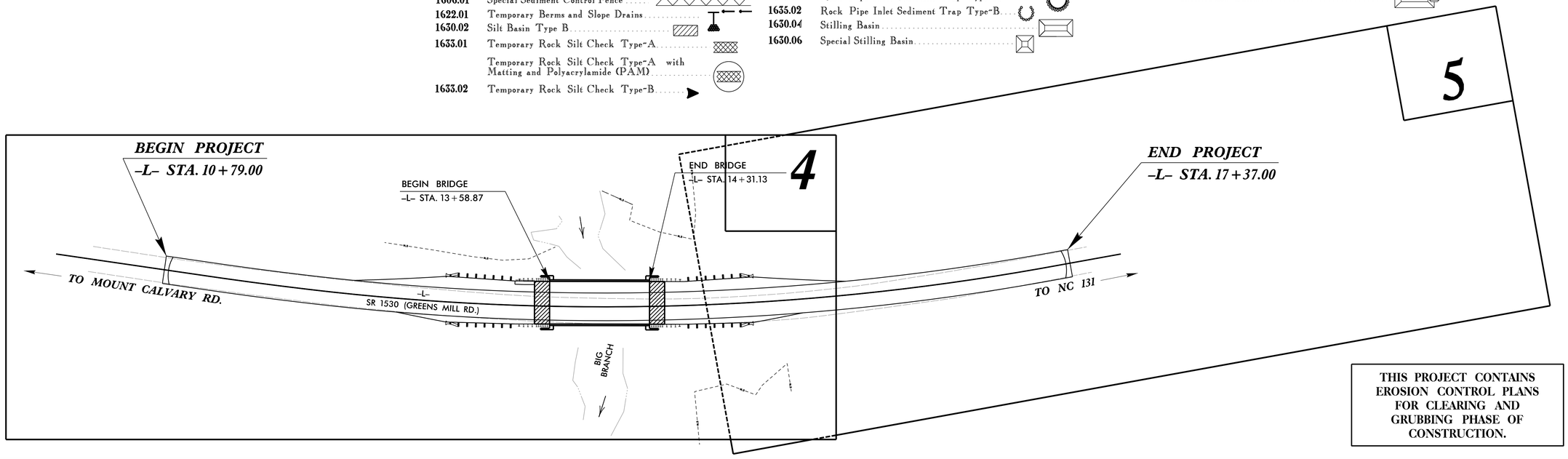
LOCATION: BRIDGE No. 230197 OVER BALDWIN BRANCH ON SR 1530 (GREENS MILL RD.)

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

EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle / Coir Fiber Wattle	EW CFW
	Wattle / Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	

1632.01	Rock Inlet Sediment Trap: Type A	A
	Type B	B
	Type C	C
1632.02	Skimmer Basin	
1632.03	Tiered Skimmer Basin	
	Infiltration Basin	



THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

GRAPHIC SCALE

50 25 0 50 100
PLANS

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE APPLICABLE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE APRIL 1, 2019 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER RESOURCES.

CALYX
ENGINEERS + CONSULTANTS
Formerly Mulkey Engineers & Consultants
7500 EAST INDEPENDENCE BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

Prepared in the Office of:

CALYX Engineers + Consultants

Designed by:

David P Bocker, P.E. ***3664***
NAME *LEVEL III CERTIFICATION NO.*

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2018 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

6/17/2019
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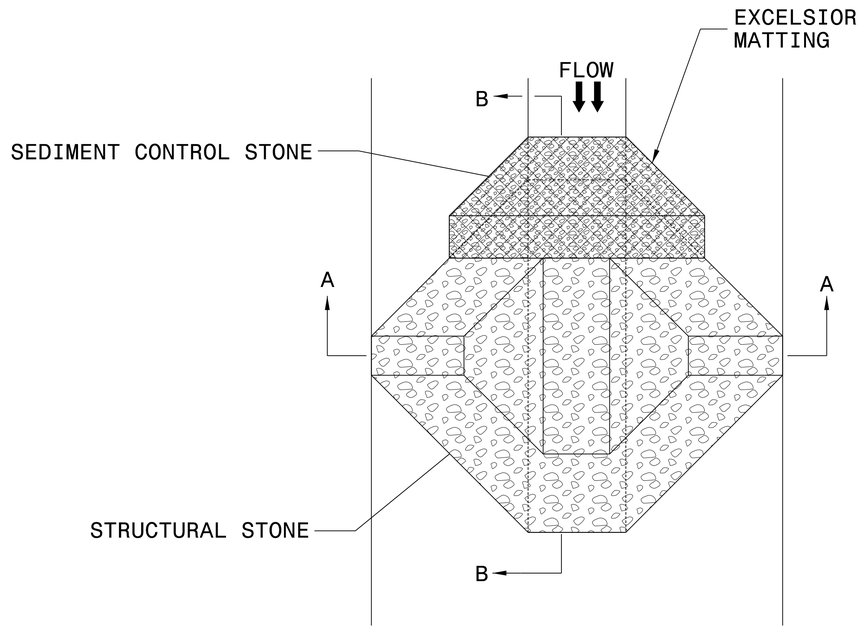
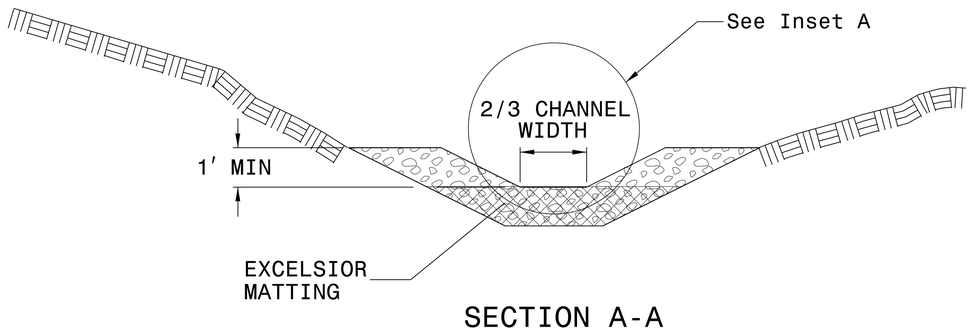
dbocker

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	EC-2

TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



PLAN



SECTION A-A

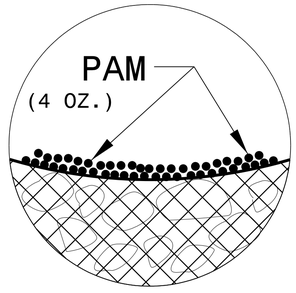
NOTES:

INSTALL TEMPORARY ROCK SILT CHECK TYPE A IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1633.01.

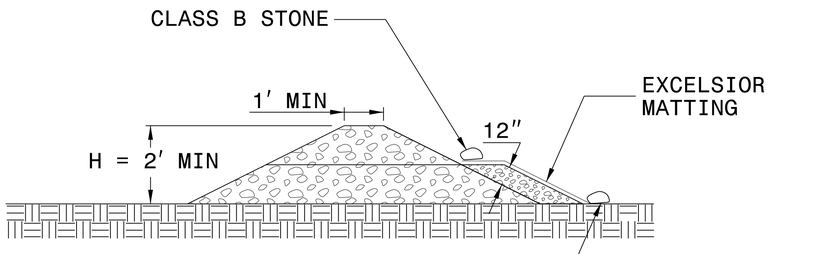
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



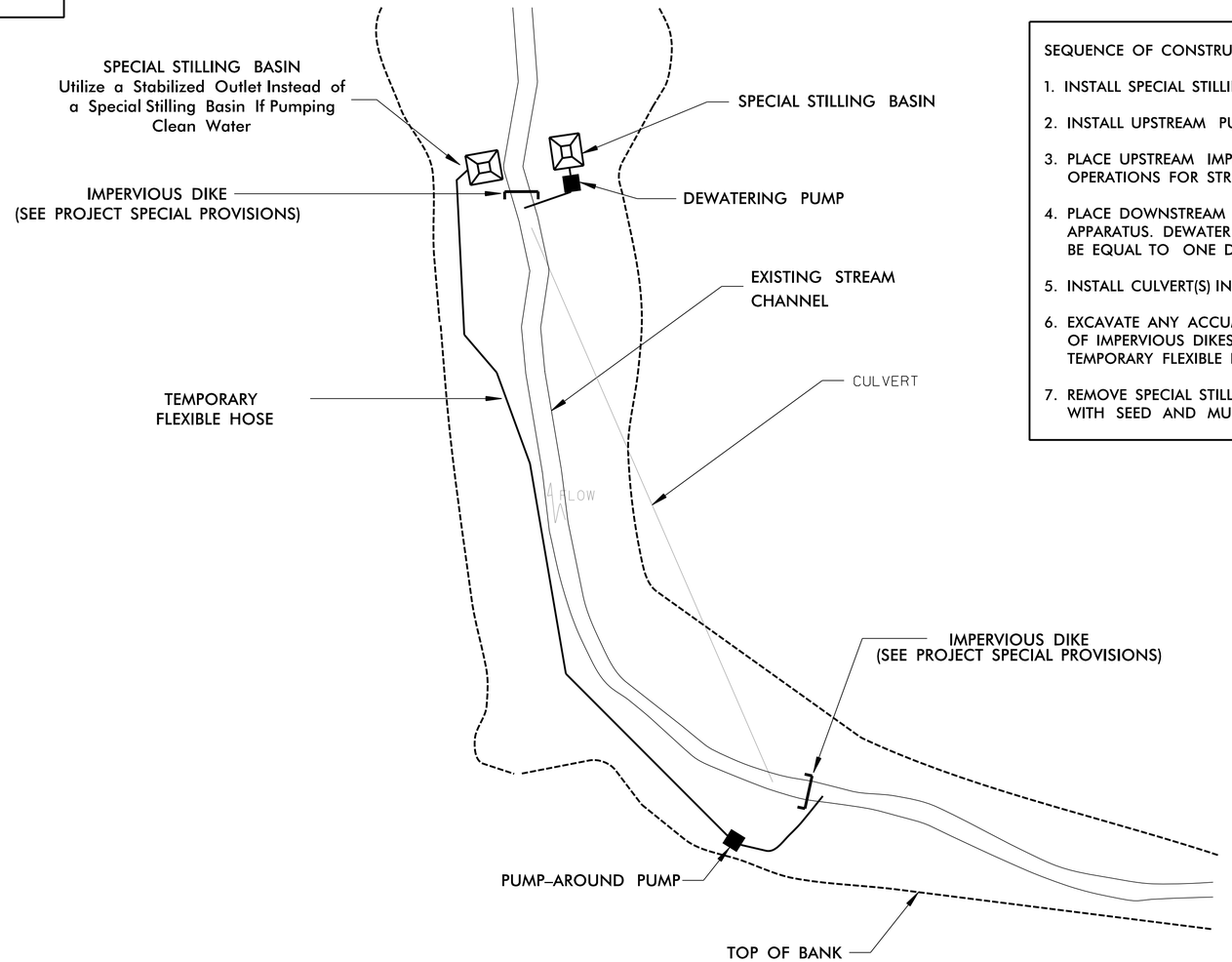
SECTION B-B

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	EC-2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

EXAMPLE OF PUMP–AROUND OPERATION

NOTES:
1) All excavation shall be performed in only dry or isolated areas of the work zone.
2) Impervious dikes are to be used to isolate work from stream flow when necessary.
3) Maintenance of stream flow operations shall be incidental to the work. This includes polyethylene sheeting, diversion pipes, pumps and hoses.
4) Pumps and hoses shall be of sufficient size to dewater the work area.

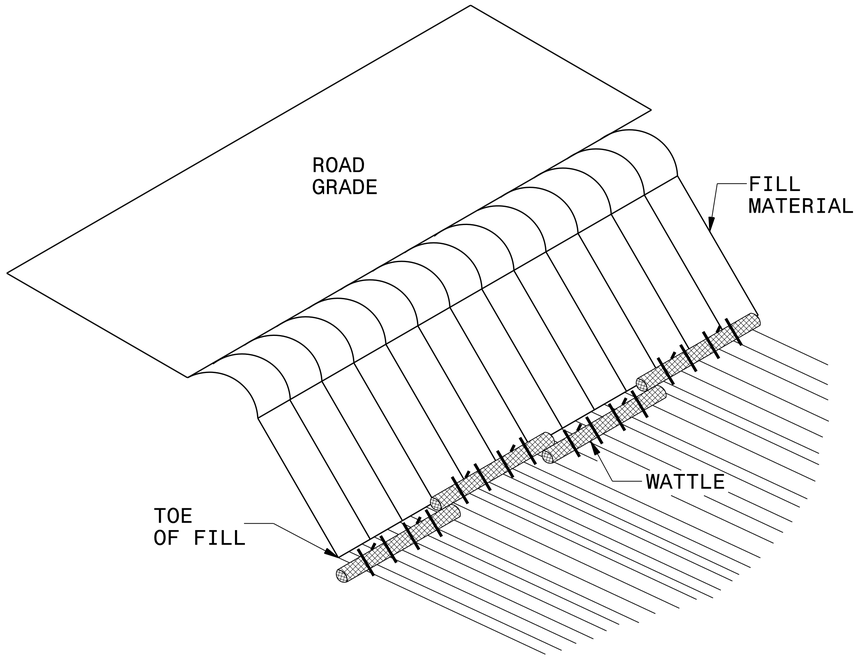


SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA

1. INSTALL SPECIAL STILLING BASIN(S).
2. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.
3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
5. INSTALL CULVERT(S) IN ACCORDANCE WITH THE PLANS.
6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKES. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE. (DOWNSTREAM IMPERVIOUS DIKES FIRST).
7. REMOVE SPECIAL STILLING BASIN(S) AND BACKFILL. STABILIZE DISTURBED AREA WITH SEED AND MULCH.

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	EC-2B

COIR FIBER WATTLE BARRIER DETAIL



ISOMETRIC VIEW

NOTES:

USE MINIMUM 18 IN. NOMINAL DIAMETER COIR FIBER (COCONUT) WATTLE AND LENGTH OF 10 FT.

EXCAVATE A 2 TO 3 INCH TRENCH FOR WATTLE TO BE PLACED.

DO NOT PLACE WATTLES ON TOE OF SLOPE.

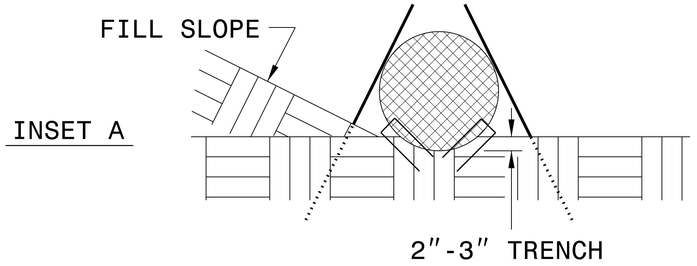
USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

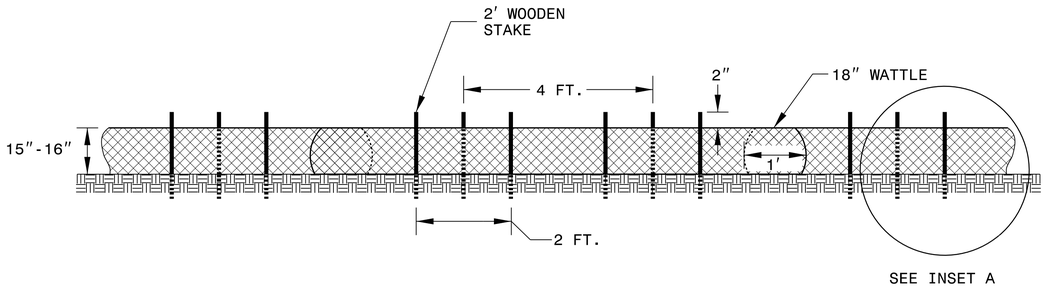
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

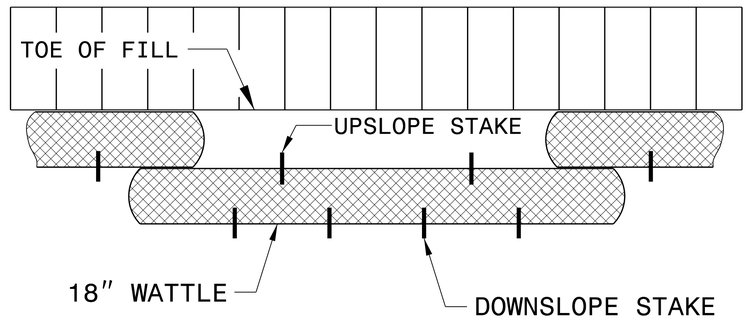
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

FOR BREAKS ALONG LARGE SLOPES, USE MAXIMUM SPACING OF 25 FT.





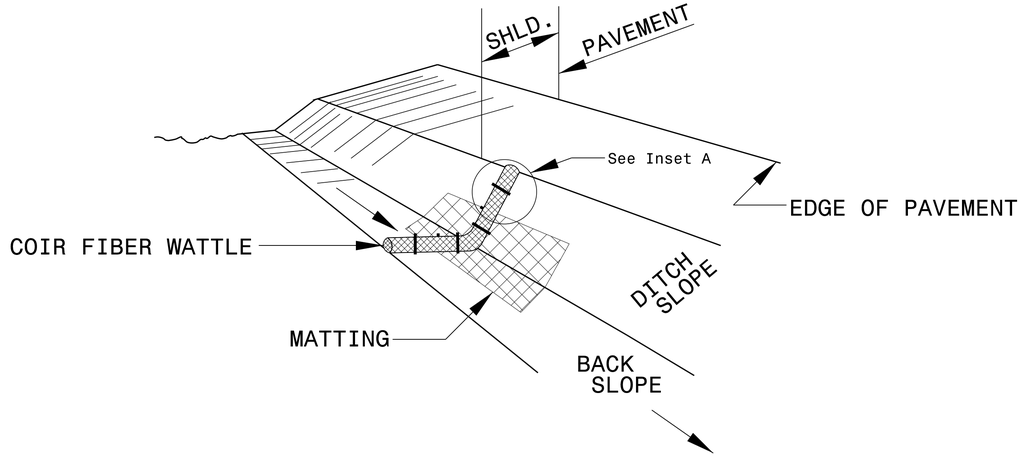
FRONT VIEW



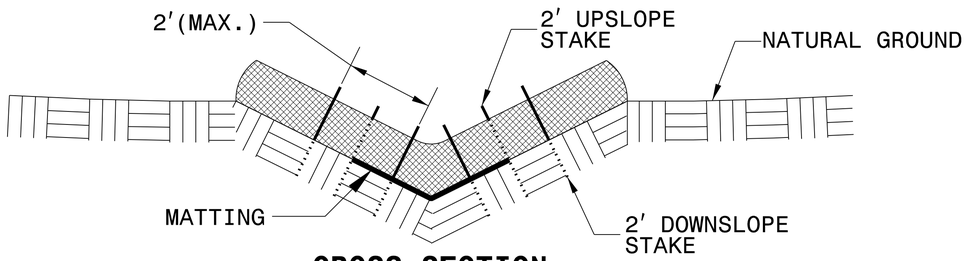
TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	EC-2C

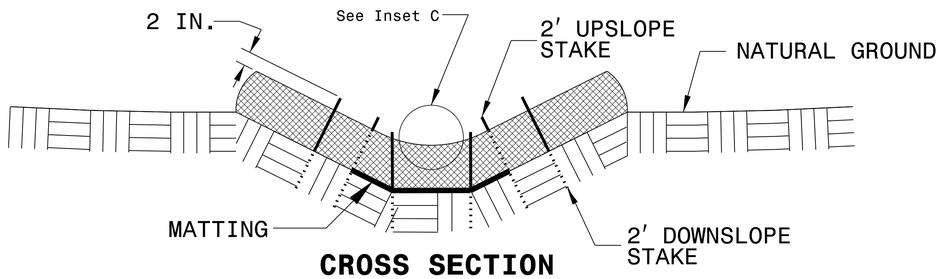
COIR FIBER WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



ISOMETRIC VIEW



CROSS SECTION VEE DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

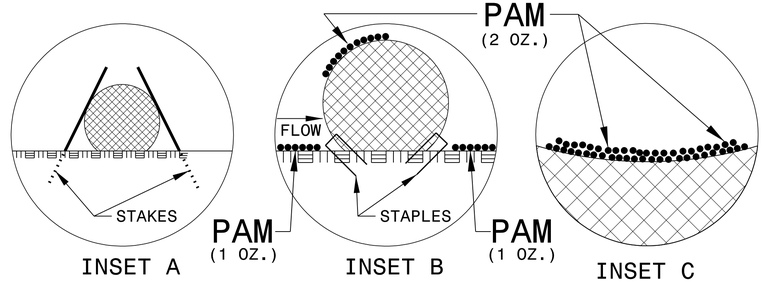
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

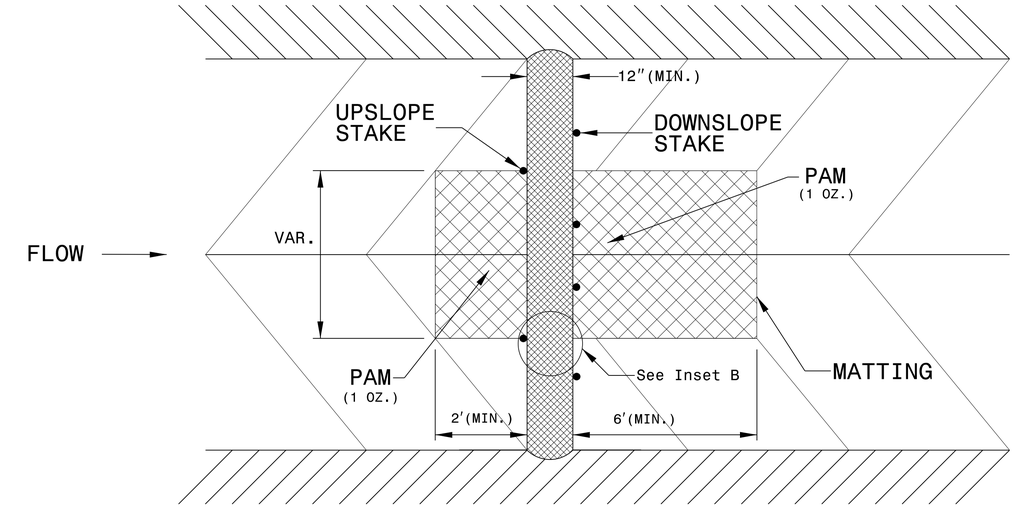
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.

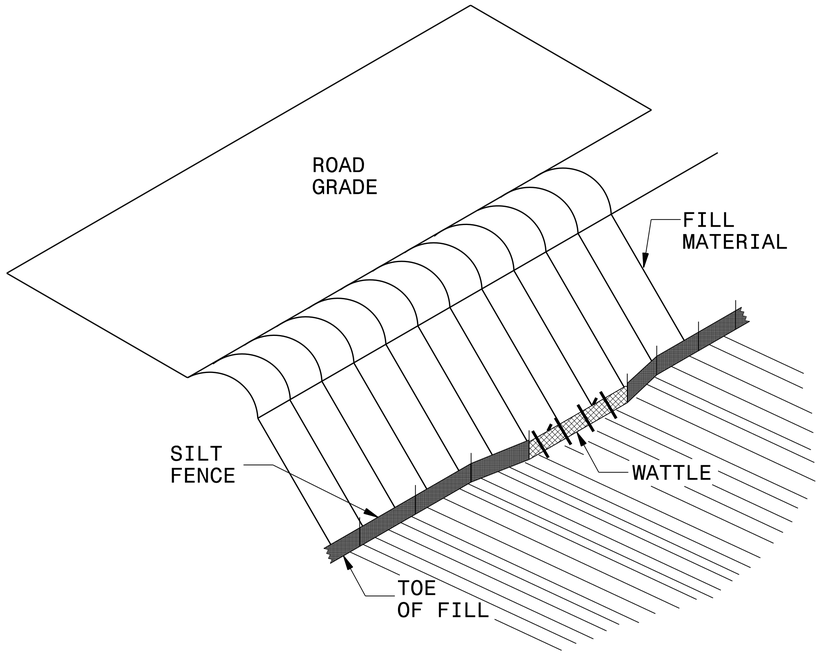




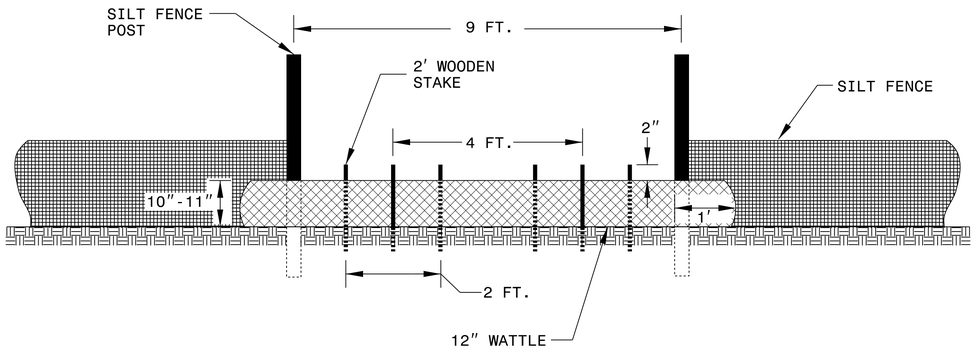
TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	EC-2D

SILT FENCE COIR FIBER WATTLE BREAK DETAIL



ISOMETRIC VIEW



VIEW FROM SLOPE

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE AND LENGTH OF 10 FT.

EXCAVATE A 1 TO 2 INCH TRENCH FOR WATTLE TO BE PLACED.

DO NOT PLACE WATTLE ON TOE OF SLOPE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

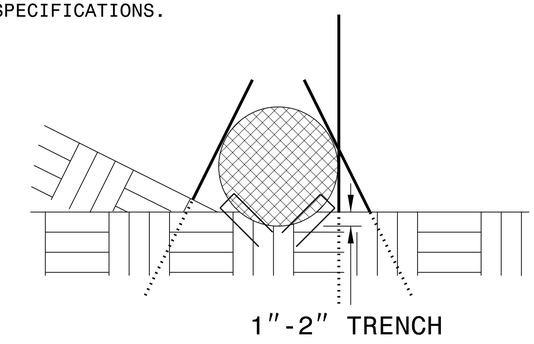
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

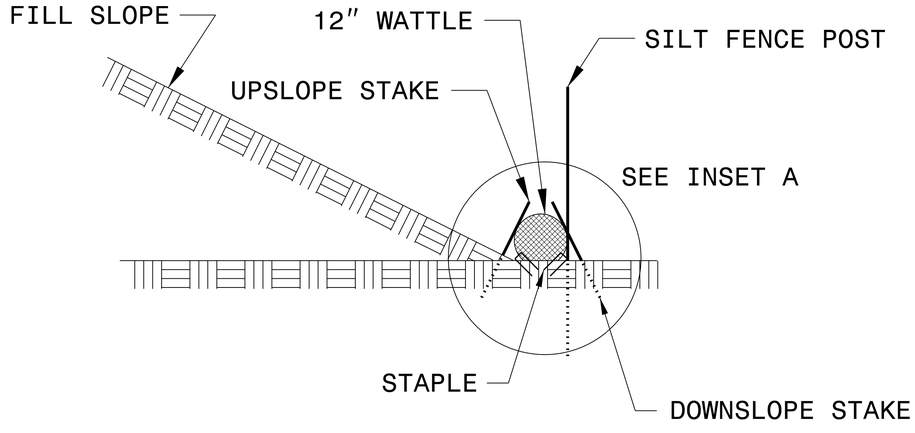
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

WATTLE INSTALLATION CAN BE ON OUTSIDE OF THE SILT FENCE AS DIRECTED.

INSTALL TEMPORARY SILT FENCE IN ACCORDANCE WITH SECTION 1605 OF THE STANDARD SPECIFICATIONS.

INSET A





SIDE VIEW

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	EC-3

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

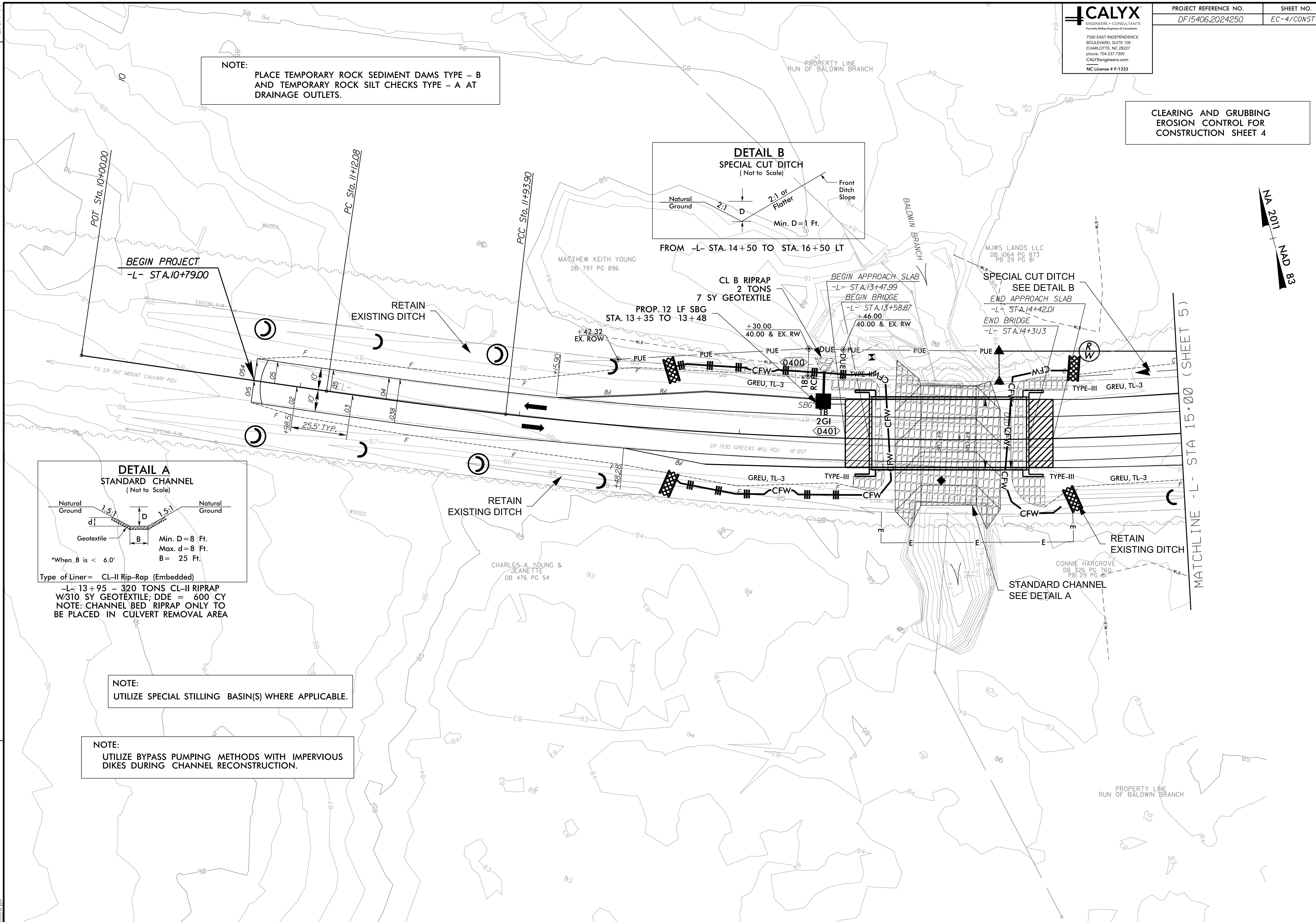
SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

CALYX ENGINEERS + CONSULTANTS
Formerly McKim Engineers & Consultants
7500 EAST INDEPENDENCE BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	EC-4/CONST.4

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE – B AND TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.



DETAIL B
SPECIAL CUT DITCH
(Not to Scale)

FROM -L- STA. 14+50 TO STA. 16+50 LT

DETAIL A
STANDARD CHANNEL
(Not to Scale)

Type of Liner= CL-II Rip-Rap (Embedded)

-L- 13+95 – 320 TONS CL-II RIPRAP
W/310 SY GEOTEXTILE; DDE = 600 CY
NOTE: CHANNEL BED RIPRAP ONLY TO BE PLACED IN CULVERT REMOVAL AREA

NOTE:
UTILIZE SPECIAL STILLING BASIN(S) WHERE APPLICABLE.

NOTE:
UTILIZE BYPASS PUMPING METHODS WITH IMPERVIOUS DIKES DURING CHANNEL RECONSTRUCTION.

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6/17/2019
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ENGINEERS + CONSULTANTS
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7500 EAST INDEPENDENCE
BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

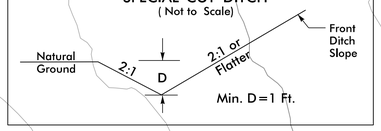
PROJECT REFERENCE NO.	SHEET NO.
DF 15406.2024250	EC-5/CONST.5

NA 2011 | NAD 83

NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE – B AND TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 5

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



FROM –L– STA. 14+50 TO STA. 16+50 LT

MATCHLINE -L- STA 15+00 (SHEET 4)

SPECIAL CUT DITCH
SEE DETAIL B

PT Sta. 17+22.91

POT Sta. 17+74.27

+52.30

GREENS MILL RD.
(SR 1530)

N 57° 34' 00.0" E
TO NC 131 (BLADEBORO RD.)

10'

10'

-L-

+40.24

+28.10

25.5' TYP.

END PROJECT
-L- STA. 17+37.00

RETAIN
EXISTING DITCH

MJWS LANDS LLC
DB 1064 PG 873
PB 29 PG 81

CONNIE HARGROVE
DB 326 PG 760
PB 29 PG 81

WOODS

EXISTING R/W

6/17/2019
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dbooker

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ENGINEERS + CONSULTANTS
Formerly Mulkey Engineers & Consultants
7500 EAST INDEPENDENCE
BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	EC-6/CONST.4

8/17/99

REVISIONS

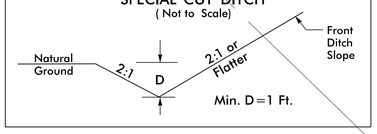
10

PROPERTY LINE
RUN OF BALDWIN BRANCH

Place Matting for Erosion Control in Ditch as Work Allows. Sta. 14+50 to Sta. 16+50

NA 2011 + NAD 83

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



FROM –L– STA. 14+50 TO STA. 16+50 LT

POT Sta. 10+00.00
PC Sta. 11+12.08
PCC Sta. 11+93.90

WOODS

MATTHEW KEITH YOUNG
DB 797 PG 896

BEGIN PROJECT
–L– STA. 10+79.00

EXISTING R/W

TO SR 1517 (MOUNT CALVARY RD.)

RETAIN EXISTING DITCH

+42.32
EX. ROW

+15.90

+98.5

25.5' TYP.

+48.28

SR 1530 (GREENS MILL RD.) 18' BST

RETAIN EXISTING DITCH

CL B RIPRAP
2 TONS
7 SY GEOTEXTILE

PROP. 12 LF SBG
STA. 13+35 TO 13+48

+30.00
40.00 & EX. RW

+46.00
40.00 & EX. RW

BEGIN APPROACH SLAB
–L– STA. 13+47.99
BEGIN BRIDGE
–L– STA. 13+58.87

END APPROACH SLAB
–L– STA. 14+42.01
END BRIDGE
–L– STA. 14+31.13

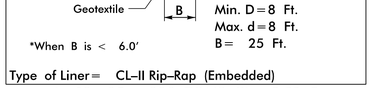
SPECIAL CUT DITCH
SEE DETAIL B

BALDWIN BRANCH

MJWS LANDS LLC
DB 1064 PG 873
PB 29 PG 81

PUE
CFW
GREU, TL–3
TYPE–III
18" RCP
DDE
W.L.B.

DETAIL A
STANDARD CHANNEL
(Not to Scale)



Min. D=8 Ft.
Max. d=8 Ft.
B= 25 Ft.
*When B is < 6.0'

Type of Liner= CL–II Rip–Rap (Embedded)

–L– 13+95 – 320 TONS CL–II RIPRAP
W/310 SY GEOTEXTILE; DDE = 600 CY
NOTE: CHANNEL BED RIPRAP ONLY TO BE PLACED IN CULVERT REMOVAL AREA

CURVE DATA
–L–

PI Sta 11+52.99	PI Sta 14+60.30
△ = 1° 48' 11.0" (LT)	△ = 16° 44' 45.3" (LT)
D = 2° 12' 13.3"	D = 3° 09' 55.8"
L = 81.82'	L = 529.01'
T = 40.91'	T = 266.40'
R = 2,600.00'	R = 1,810.00'
e = EXIST	DS = 55 MPH
	e = 3.8%

CHARLES K. YOUNG &
JEANETTE
DB 476 PG 54

CONNIE HARGROVE
DB 326 PG 760
PB 29 PG 81

STANDARD CHANNEL
SEE DETAIL A

MATCHLINE –L– STA 15+00 (SHEET 5)

PROPERTY LINE
RUN OF BALDWIN BRANCH

NOTE:
UTILIZE SPECIAL STILLING BASIN(S) WHERE APPLICABLE.

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cbaker

CALYX
ENGINEERS + CONSULTANTS
Formerly Mulkey Engineers & Consultants
7500 EAST INDEPENDENCE
BOULEVARD, SUITE 100
CHARLOTTE, NC 28227
phone: 704.537.7300
CALYXengineers.com
NC License # F-1333

PROJECT REFERENCE NO.	SHEET NO.
DF 15406.2024250	EC-7/CONST.5

NAD 83 / NA 2011

8/17/99

15

-L- STA 15+00 (SHEET 4)

WOODS

MJWS LANDS LLC
DB 1064 PG 873
PB 29 PG 81

Place Matting for Erosion Control
in Ditch as Work Allows.
Sta. 14+50 to Sta. 16+50

SPECIAL CUT DITCH
SEE DETAIL B

GREU, TL-3

+74.18

EXISTING R/W

+32.30

GREENS MILL RD.
(SR 1530)

-L-

10'

10'

N 57° 34' 00.0" E
TO NC 131/BLADENBORO RD

GREU, TL-3

+41.30

+28.10

25.5' TYP.

END PROJECT
-L- STA.17+37.00

RETAIN
EXISTING DITCH

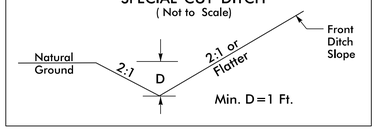
WOODS

CONNIE HARGROVE
DB 326 PG 760
PB 29 PG 81

EXISTING R/W

MATCHLINE -L- STA 15+00 (SHEET 4)

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



FROM -L- STA. 14+50 TO STA. 16+50 LT

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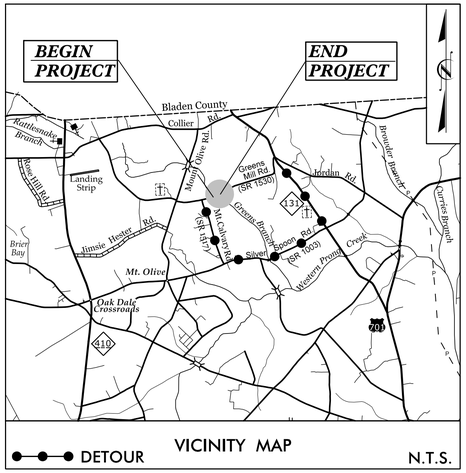
jbecker

09/08/99

TIP PROJECT: DF15406.2024250

CONTRACT: DF00269

See Sheet UC-1 For Index of Sheets
See Sheet UC-2 For Standard Symbology Sheet



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

T.I.P. NO.	SHEET NO.
DF15406.2024250	UC–1

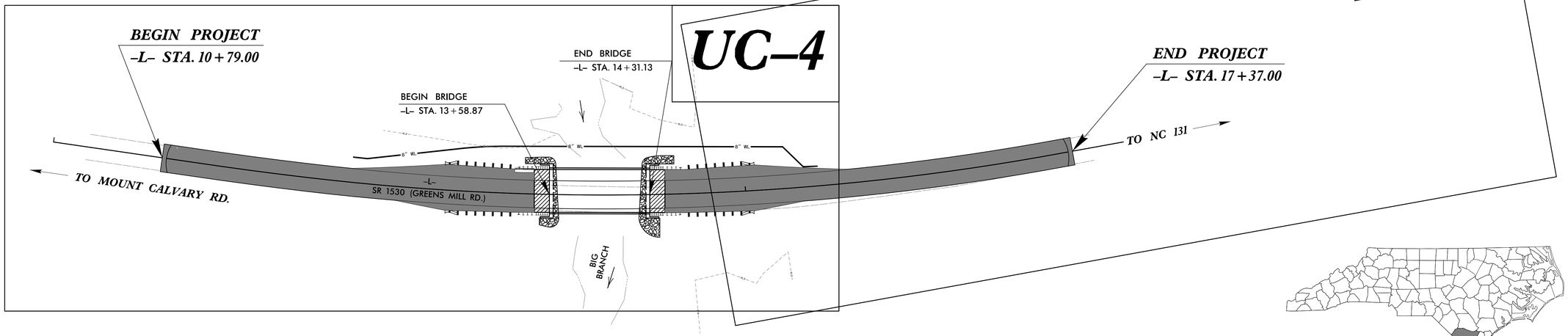
UTILITY CONSTRUCTION PLANS
COLUMBUS COUNTY

LOCATION: BRIDGE No. 230197 OVER BIG BRANCH ON SR 1530 (GREENS MILL RD.)

TYPE OF WORK: WATER LINE RELOCATION

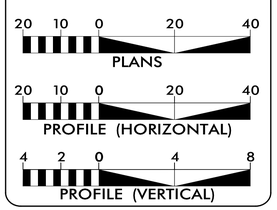
NAD 83/2011

RFC WATER LINE
RELOCATION PLANS
SUBMITTED: 06–21–2019



DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES ARE COMPLETED

GRAPHIC SCALES



INDEX OF SHEETS

SHEET NO.:	*DESCRIPTION:*
UC–1	*TITLE SHEET*
UC–2	*UTILITY SYMBOLOGY*
UC–3	*NOTES*
UC–3A	*DETAILS*
UC–4 THRU UC–5	*UTILITY CONSTRUCTION SHEETS*

WATER AND SEWER OWNERS ON PROJECT

(A) WATER – COLUMBUS COUNTY PUBLIC UTILITIES

PREPARED IN THE OFFICE OF

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F–0991
(704) 372–1885 FAX: (704) 372–3393

J. ADAM FREEMAN, PE	*CONSULTANT CONTACT #1*
ANDREW VANE, PE	*CONSULTANT CONTACT #2*
ETHAN P. WRIGHT, PE	*CONSULTANT CONTACT #3*

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 025221 ENGINEER ANDREW S. VANE

6/21/2019

DIVISION OF HIGHWAYS
UTILITIES UNIT
1555 MAIL SERVICES CENTER
RALEIGH NC 27699–1555
PHONE (919) 707–6690
FAX (919) 250–4151

BO HEMPHILL, PE	*UTILITIES REGIONAL ENGINEER*
–	*UTILITIES ENGINEER*
KYLE PLEASANT	*UTILITIES AREA COORDINATOR*
–	*UTILITIES COORDINATOR*

6/21/2019
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hughesct

5/14/99

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	UC-2

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

- Water Line (Sized as Shown) — 12" WL
- 11¼ Degree Bend
- 22½ Degree Bend
- 45 Degree Bend
- 90 Degree Bend
- Plug
- Tee
- Cross
- Reducer
- Gate Valve — GV
- Butterfly Valve — BV
- Tapping Valve — TGV
- Line Stop — LS
- Line Stop with Bypass — LS/BP
- Blow Off — BO
- Fire Hydrant — PFH
- Relocate Fire Hydrant — RFH
- Remove Fire Hydrant — REM FH
- Water Meter — PWM
- Relocate Water Meter — RWM
- Remove Water Meter — REM WM
- Water Pump Station — PS(W)
- RPZ Backflow Preventer — PRPZ
- DCV Backflow Preventer — PBFP
- Relocate RPZ Backflow Preventer — RRPZ
- Relocate DCV Backflow Preventer — RBFP

PROPOSED SEWER SYMBOLS

- Gravity Sewer Line (Sized as Shown) — 12" SS
- Force Main Sewer Line (Sized as Shown) — 12" FSS
- Manhole (Sized per Note)
- Sewer Pump Station — PS(SS)

PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

- Power Pole
- Telephone Pole
- Joint Use Pole
- Telephone Pedestal — TEL PED
- Utility Line by Others (Type as Shown) — PROP O/H POW LINES
- Trenchless Installation — 12" TL INSTALL
- Encasement by Open Cut — 24" ENCAS BY OC
- Encasement — 24" ENCASEMENT
- Thrust Block
- Air Release Valve — AR
- Utility Vault — UV
- Concrete Pier — CP
- Steel Pier — SP
- Plan Note — NOTE
- Pay Item Note — PAY ITEM

EXISTING UTILITIES SYMBOLS

- Power Pole
- Telephone Pole
- Joint Use Pole
- Utility Pole
- Utility Pole with Base
- H-Frame Pole
- Power Transmission Line Tower
- Water Manhole
- Power Manhole
- Telephone Manhole
- Sanitary Sewer Manhole
- Hand Hole for Cable
- Power Transformer
- Telephone Pedestal — T
- CATV Pedestal — C
- Gas Valve
- Gas Meter
- Located Miscellaneous Utility Object
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.
- *Underground Power Line
- *Underground Telephone Cable
- *Underground Telephone Conduit
- *Underground Fiber Optics Telephone Cable
- *Underground TV Cable
- *Underground Fiber Optics TV Cable
- *Underground Gas Pipeline
- Aboveground Gas Pipeline — A/G Gas
- *Underground Water Line
- Aboveground Water Line — A/G Water
- *Underground Gravity Sanitary Sewer Line — SS
- Aboveground Gravity Sanitary Sewer Line — A/G Sanitary Sewer
- *Underground SS Forced Main Line
- Underground Unknown Utility Line
- SUE Test Hole
- Water Meter
- Water Valve
- Fire Hydrant
- Sanitary Sewer Cleanout

*For Existing Utilities

- Utility Line Drawn from Record (Type as Shown)
- Designated Utility Line (Type as Shown)

REV: 2/1/2012

6/2/2019
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PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	UC-3
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 025221 ENGINEER ANDREW S. VINE 6/21/2019

UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

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UTILITY CONSTRUCTION

GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2018.

2. THE EXISTING UTILITIES BELONG TO COLUMBUS COUNTY PUBLIC UTILITIES . HAROLD NOBLES, (910) 642-5257, DIRECTOR OF COLUMBUS COUNTY PUBLIC UTILITIES, WILL SERVE AS THE UTILITY OWNER CONTACT.

3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, PUBLIC WATER SUPPLY SECTION. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT QUALITY, DIVISION OF WATER RESOURCES, WATER QUALITY SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.

4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.

5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPORTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.

6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE DEPARTMENT.

7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.

8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.

9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

PROJECT SPECIFIC NOTES:

1. PROPOSED WATER LINE FROM -WL1- LINE STATION 10+00.00 TO -WL1- LINE STATION 13+39.61 SHALL BE HDPE PIPE. HDPE PIPE SHALL MEET THE REQUIREMENTS, AS DEFINED IN ASTM D-3350, WITH A MINIMUM CELL CLASSIFICATION OF PE 445574. THE MATERIAL SHALL BE TESTED AND APPROVED FOR POTABLE WATER IN ACCORDANCE WITH NSF/ANSI 61. MINIMUM PIPE WALL THICKNESS SHALL BE BASED ON AN SDR OF 9. CONTRACTOR AND PIPE MANUFACTURER SHALL MUTUALLY DETERMINE ACTUAL WALL THICKNESS REQUIRED, BASED ON STATIC AND DYNAMIC LOADS, WITH AN APPLIED FACTOR OF SAFETY OF 2.5.

2. IN ADVANCE OF BEGINNING UTILITY WORK, SOFT DIGS SHALL BE PERFORMED BY CONTRACTOR TO VERIFY ACTUAL WATER LINE DEPTH AND LOCATION AT PROPOSED TIE-IN LOCATIONS.

3. JOINTS OF HDPE PIPE SEGMENTS SHALL BE BUTT-WELDED FLUSH TO THE OUTSIDE DIAMETER OF THE PIPE. PRIOR TO PERFORMING THE FINAL HYDROSTATIC TEST, THE ENDS OF PIPE SHALL BE PROVIDED WITH A DUCTILE IRON BLIND FLANGE, WITH A FLANGE CONNECTION TO THE HDPE PIPE. FLANGED JOINTS SHALL MEET THE REQUIREMENTS OF ANSI B16.1, CLASS 125.

4. THE CONTRACTOR SHALL INSTALL THE HDPE PIPE BY THE HORIZONTALLY-DRILLED, DIRECTIONALLY-CONTROLLED METHOD OF CONSTRUCTION. PIPE SHALL BE FILLED WITH POTABLE WATER AND NOT BE CONNECTED TO ANY OTHER PIPE OR FITTINGS FOR ONE WEEK FROM TIME OF INSTALLATION.

5. THE CONTRACTOR SHALL EMPLOY EXPERIENCED PERSONNEL TO OPERATE THE DIRECTIONAL DRILLING EQUIPMENT AND THE POSITION MONITORING AND STEERING EQUIPMENT. THE CONTRACTOR SHALL USE CERTIFIED FUSING PERSONNEL APPROVED BY THE PIPE MANUFACTURER.

6. THE CONTRACTOR SHALL AT ALL TIMES, PROVIDE AND MAINTAIN INSTRUMENTATION THAT WILL ACCURATELY LOCATE THE PILOT HOLE POSITION IN THE X, Y, AND Z AXES RELATIVE TO THE GROUND SURFACE. DRILL FLUID FLOW RATE AND PRESSURE SHALL ALSO BE MONITORED. THE CONTRACTOR SHALL MAINTAIN AND PROVIDE TO THE ENGINEER ACCESS TO THE DATA GENERATED BY THE DOWNHOLE SURVEY TOOLS.

7. PIPE INSTALLED BY HORIZONTAL DIRECTIONAL DRILLING SHALL BE LOCATED AS SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL PLOT THE ACTUAL HORIZONTAL AND VERTICAL ALIGNMENT OF THE PILOT BORE AT INTERVALS NOT EXCEEDING 30 FEET. THIS "AS-BUILT" PLAN AND PROFILE SHALL BE UPDATED AS THE PILOT BORE IS ADVANCED. AT THE COMPLETION OF THE PILOT HOLE, THE CONTRACTOR SHALL PROVIDE THE COORDINATES OF THE PILOT HOLE AS SPECIFIED.

8. THE CONTRACTOR SHALL HAVE ACCURATE WORKING GAUGES THAT REGISTER TENSILE FORCE BEING USED TO PULL THE PIPELINE BACK THROUGH THE REAMED BOREHOLE.

9. DEVIATIONS FROM, AND CORRECTIONS TO, THE DESIGN CENTERLINE SHALL NOT EXCEED 2% OF THE DEPTH PER 100 FEET AND 2% HORIZONTALLY PER 100 FEET. CONTRACTOR TO ENSURE NEWLY CONSTRUCTED UTILITIES ARE ENTIRELY WITHIN RIGHT-OF-WAY OR UTILITY EASEMENT.

10. THE HORIZONTAL DIRECTIONAL DRILLING OPERATION SHALL BE CONDUCTED IN A MANNER TO ELIMINATE THE DISCHARGE OF WATER, DRILLING MUD, AND CUTTINGS TO AREAS NOT INVOLVED IN THE CONSTRUCTION PROCESS. THE CONTRACTOR SHALL IMMEDIATELY CONTAIN AND CLEAN UP ANY INADVERTENT RETURNS. THE CONTRACTOR SHALL ALSO PROVIDE EQUIPMENT AND PROCEDURES TO MAXIMIZE THE RECIRCULATION OR REUSE OF DRILLING MUD TO MINIMIZE WASTE DISPOSAL.

11. AFTER INSTALLING DIRECTIONAL DRILL, CONTRACTOR TO DIG DOWN, CUT PIPE AND INSTALL FITTINGS REQUIRED TO COMPLETE CONNECTION.

12. HAROLD NOBLES, DIRECTOR OF COLUMBUS COUNTY PUBLIC UTILITIES, WILL SERVE AS THE UTILITY OWNER CONTACT ON THIS PROJECT. CONTRACTOR, AS REQUIRED BY STANDARD SPECIFICATION SECTION 1500-2, SHALL CONTACT HIM AT (910) 642-5257.

13. NO INTERRUPTION TO EXISTING SERVICE SHALL TAKE PLACE UNTIL ALL CUSTOMERS HAVE BEEN NOTIFIED A MINIMUM OF 24 HOURS IN ADVANCE. NOTICE OF INTERRUPTION SHALL BE PREPARED BY THE PUBLIC WORKS OFFICE ON OFFICIAL LETTERHEAD. CONTRACTOR TO CONTACT HAROLD NOBLES 1 MONTH IN ADVANCE OF ANY WORK TO ALLOW SUFFICIENT TIME TO PREPARE NOTICE OF INTERRUPTION TO AFFECTED CUSTOMERS. DISTRIBUTION TO EACH CUSTOMER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR UNDER THE DIRECTION OF THE PUBLIC WORKS OFFICE.

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PROJECT REFERENCE NO.	SHEET NO.
DF15406.2024250	UC-3A

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DocuSigned by: Andrew S. Vane 7A9EE7209AED4F1...
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6/21/2019

UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

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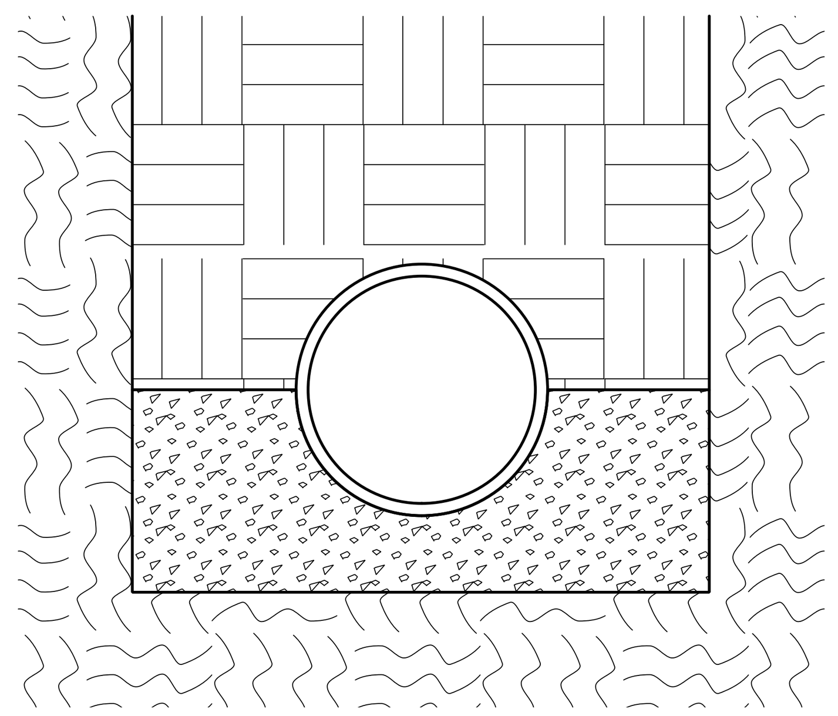
PROJECT TYPICAL DETAILS

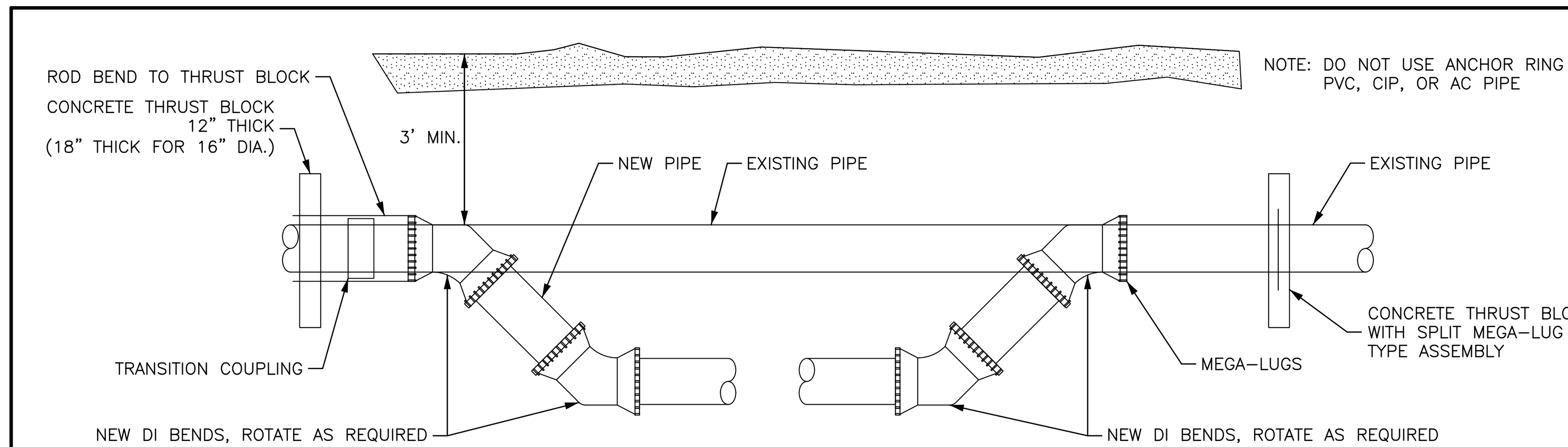
PIPE BEDDING DETAIL



PIPE BEDDED IN SAND, GRAVEL OR CRUSHED STONE TO A DEPTH OF ½ PIPE DIAMETER, 4" MINIMUM UNDER PIPE. TRENCH BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL, IF APPROVED BY THE ENGINEER, OR SELECT MATERIAL. ALL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH. COMPACTION SHALL BE TO APPROX. 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

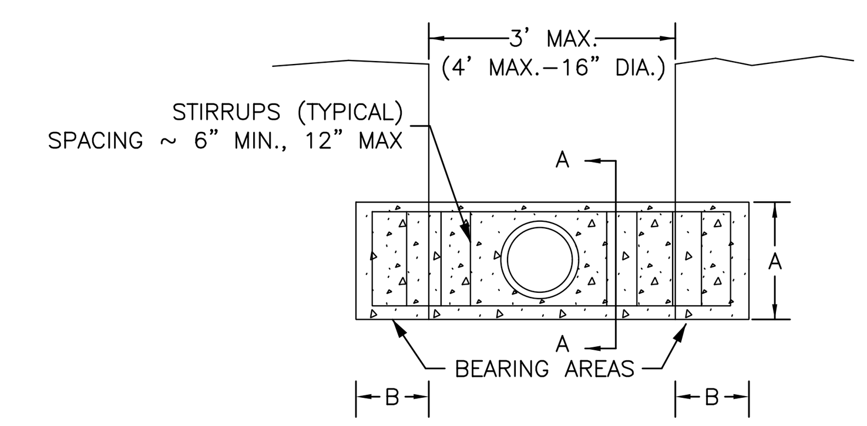
MAXIMUM TRENCH WIDTH AT TOP OF PIPE

NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)	NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		



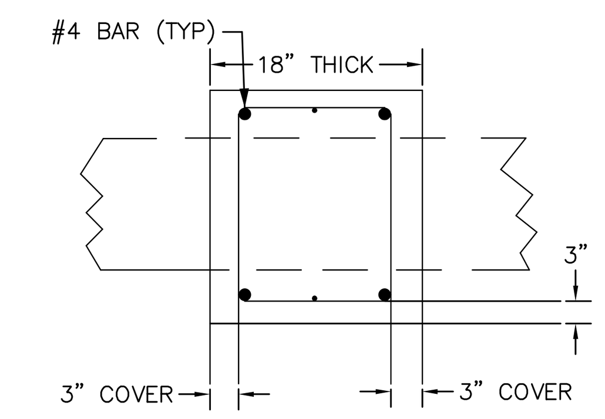
NOTE: DO NOT USE ANCHOR RING ON PVC, CIP, OR AC PIPE

PROFILE VIEW
NOT TO SCALE



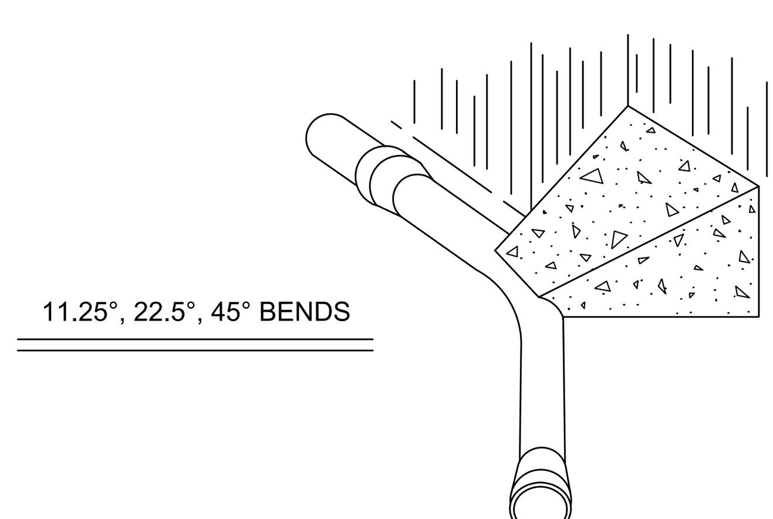
CONCRETE THRUST COLLAR (TYPICAL)
NOT TO SCALE

SIZE	"A"	"B"
4"	36"	24"
6"	36"	24"
8"	36"	30"
10"	36"	48"
12"	48"	48"
16"	36"	60"

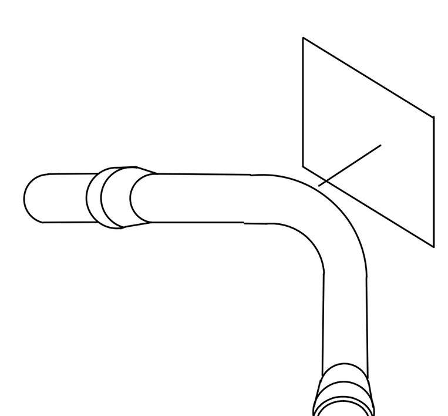


SECTION A-A
NOT TO SCALE

THRUST BLOCKING



11.25°, 22.5°, 45° BENDS



THRUST BLOCK AREA

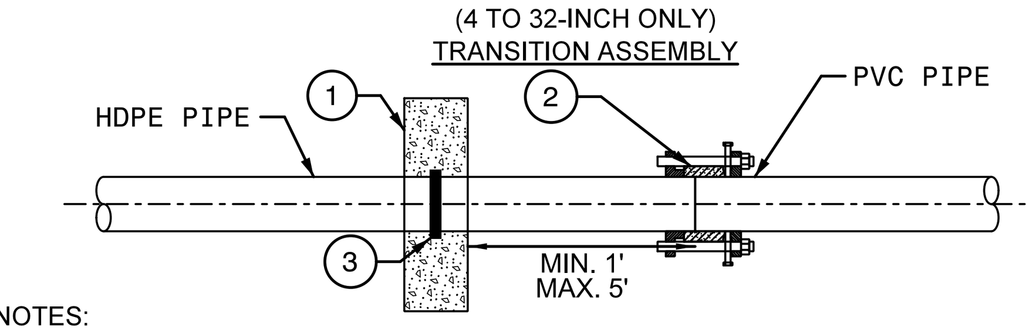
NOTES:

1. CONCRETE SHALL BE 3000 PSI
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
3. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING.

6 INCH DIAMETER PIPE CONCRETE THRUST BLOCKS

BEND ANGLE	CONCRETE [CY]	AREA [SF]	HEIGHT [FT]	WIDTH [FT]	DEPTH [FT]
11.25°	0.1	1.2	1.2	1.2	1.0
22.5°	0.2	2.5	1.6	1.6	1.5
45°	0.4	4.8	2.2	2.2	2.0

HDPE TO PVC
(4 TO 32-INCH ONLY)
TRANSITION ASSEMBLY



NO. DESCRIPTION
1. WALL BLOCKING
2. BELL MJ ADAPTER WITH MECHANICAL RESTRAINT KIT
3. WALL ANCHOR OR FLEX RESTRAINT

NOTES:
A. FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C906
B. MECHANICAL FITTINGS USED SHALL BE SPECIFICALLY DESIGNED FOR USE WITH HDPE PIPE.
C. STAINLESS STEEL INTERNAL STIFFENERS SHALL BE INSTALLED IN THE END OF THE HDPE PIPE WHEN HDPE PIPE IS INSERTED INTO THE BELL END OF NON-HDPE PIPE, VALVE, FITTING, OR INTO THE HUB OF A BOLTED COUPLING
D. RESTRAINT COUPLER SLEEVE SHALL BE ASTM A513 WITH FUSION BONDED EPOXY. LOW ALLOY STEEL BOLTS CONFORM TO AWWA C111.4
E. WHEN PVC BELL END IS ENCOUNTERED, FIELD CUT PVC TO FORM PLAIN END PER MANUFACTURER'S INSTRUCTIONS.

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REVISIONS

NOTES:
1. CONNECT PROPOSED 8″ DR9 DIPS HDPE WATER MAIN TO EXISTING 6″ WATER MAIN USING NECESSARY FITTINGS AND TRANSITION COUPLINGS RECOMMENDED BY PIPE MANUFACTURERS. CONTRACTOR TO SCHEDULE SHUT DOWN AND CONNECTION TO EXISTING WATER LINE WITH UTILITY OWNER.
2. CONTRACTOR SHALL USE NECESSARY FITTINGS AND MECHANICAL COUPLINGS (OR MECHANICAL JOINT ADAPTORS) DESIGNED FOR JOINING HDPE PIPE TO PVC PIPE, AS RECOMMENDED BY PIPE MANUFACTURERS. CONTRACTOR TO FIELD VERIFY EXISTING PIPE MATERIAL AND DEPTHS AT TIE-IN POINTS.
3. CONTRACTOR SHALL RESTRAIN THE TRANSITION CONNECTION, AND ALSO INSTALL AN IN-LINE ANCHOR ON THE HDPE PIPE BY BUTT-FUSING AND POURING A CONCRETE ANCHOR AROUND IT TO PREVENT DISJOINING IN THE TRANSITION AREA. REFER TO SHEET UC-3A FOR CROSS BLOCKING DETAILS.
4. FOLLOWING SUCESSFUL INSTALLATION OF VALVE, CONTRACTOR AT THE DISCRETION OF UTILITY OWNER MAY SHUTDOWN AND ISOLATE SECTION OF WATER LINE TO BE RELOCATED UNTIL PROPOSED WATER LINE IS INSTALLED, TESTED, AND SUCCESSFULLY TIED IN.
5. PRIOR TO COMMENCING ANY WORK ON THIS TRENCHLESS INSTALLATION ON THIS PROJECT, PROVIDE A DESIGN FOR THE TRENCHLESS INSTALLATION CERTIFIED BY AN ENGINEER LICENSED BY THE STATE OF NORTH CAROLINA, AS REQUIRED BY SUBARTICLE 1550-3(B) OF THE STANDARD SPECIFICATIONS.

SCALE 1" = 20'
0 20 40 60 80

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PROJECT REFERENCE NO.	SHEET NO.
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UTILITY CONSTRUCTION PLANS ONLY

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270.6 LF DIRECTIONAL DRILLING OF 8″ WATER LINE (299.0 LF TOTAL)

280.6 LF 8″ WATER LINE HDPE, DR9 (339.6 LF TOTAL)

6″ VALVE SEE NOTE 4

RETAIN EXISTING DITCH

CL B RIPRAP 2 TONS 7 SY GEOTEXTILE

PROP. 12 LF SBG STA. 13+33.47 TO 13+47.59 HORZ. BEND RAD: 287.5′ BEGIN STA: 10+76.71 END STA: 11+08.38

SPECIAL CUT DITCH SEE DETAIL B

RETAIN EXISTING DITCH

TIE TO EXISTING. 6″ WATER LINE W/ CROSS BLOCKING (SEE NOTE 3) -WL1- STA. 10+00.00 -L- STA. 12+15.97 (18.19′ LT.)

11.25° BEND (HORZ.) -WL1- STA. 10+10.00

ABANDON 282.8 LF 6″ UTILITY PIPE (335.2 LF TOTAL)

RETAIN EXISTING DITCH

STANDARD CHANNEL SEE DETAIL A

MATCHLINE -L- STA 15+00 (SHEET UC-5) -WL1- STA 12+80.55

NAD 83/2011

THE ESTIMATED QUANTITY OF DUCTILE IRON WATER FITTINGS ON THIS PLAN SHEET IS 110 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

SCALE: 1″ = 20′ HORIZONTAL
1″ = 4′ VERTICAL

PROP. 8" WATER LINE -WL1-

EXIST. 6″ WATER LINE APPROX. DEPTH

PROP. GRADE @ WATER LINE

EXIST. GRADE @ WATER LINE

MIN. 3′ CLEARANCE

VERT. BEND RAD: 230′ BEGIN STA. 10+30.00 END STA. 10+58.82

BIG BRANCH

BEGIN WATER LINE CONSTRUCTION (-WL1-) TIE TO EXIST. 6″ WATER LINE -WL1- STA. 10+00.00 -L- STA. 12+15.97 (18.19′ LT.)

11.25° BEND (HORZ.) -WL1- STA. 10+10.00

MIN. 15.00′ CLEARANCE

VERT. BEND RAD: 230′ BEGIN STA. 11+41.82 END STA. 12+31.03

280.6 LF 8″ WATER LINE HDPE, DR9 (339.6 LF TOTAL)

MATCHLINE -L- STA 15+00 (SHEET UC-5) -WL1- STA 12+80.55

STA. 10+10.00

299± LF HORIZONTAL DIRECTIONAL DRILLING FROM -WL1- STA. 10+10.00 TO STA. 13+09.01

96 92 88 84 80 76 72 68 64 60

10+00 11+00 12+00 13+00

NOTES:
1. CONNECT PROPOSED 8" DR9 DIPS HDPE WATER MAIN TO EXISTING 6" WATER MAIN USING NECESSARY FITTINGS AND TRANSITION COUPLINGS RECOMMENDED BY PIPE MANUFACTURERS. CONTRACTOR TO SCHEDULE SHUT DOWN AND CONNECTION TO EXISTING WATER LINE WITH UTILITY OWNER.
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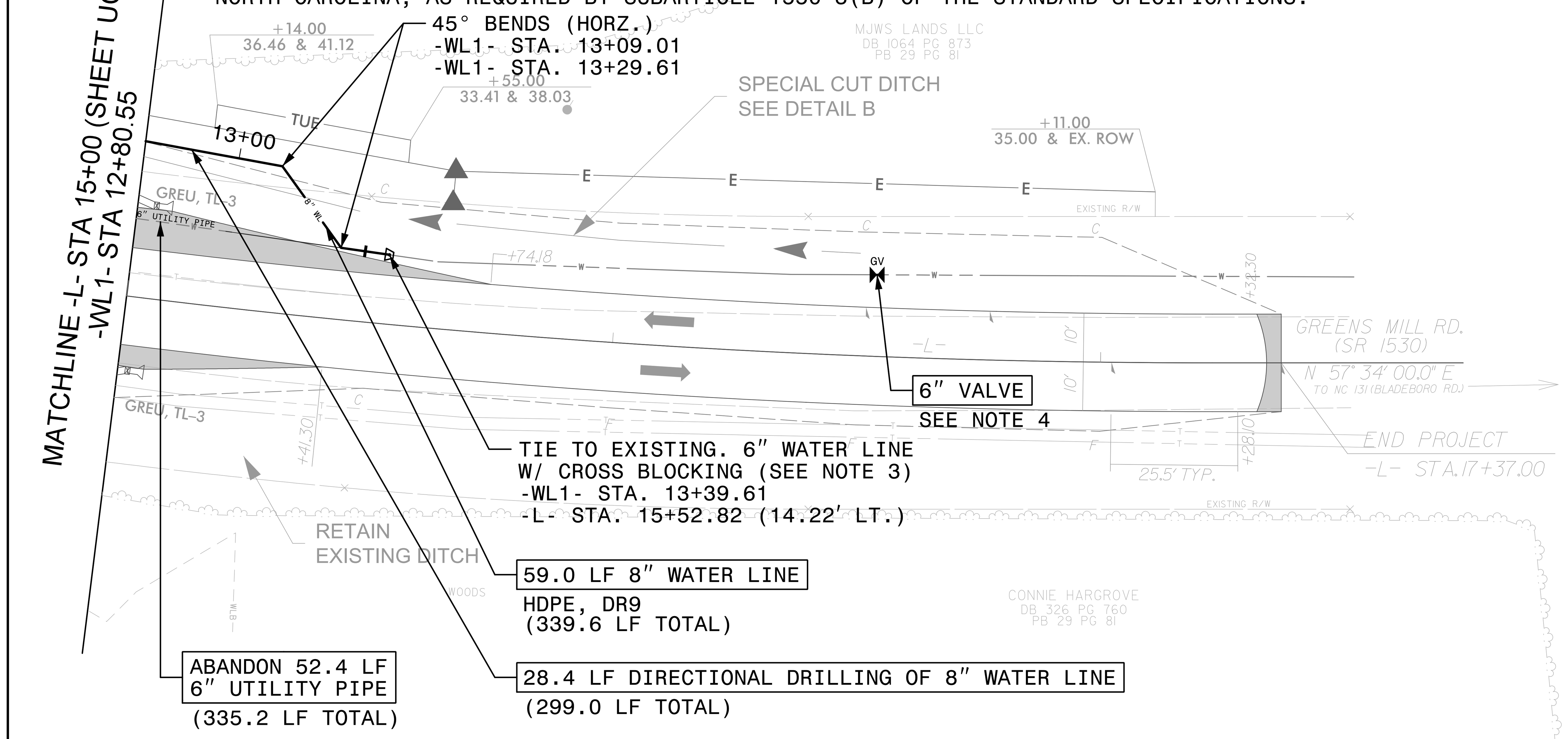
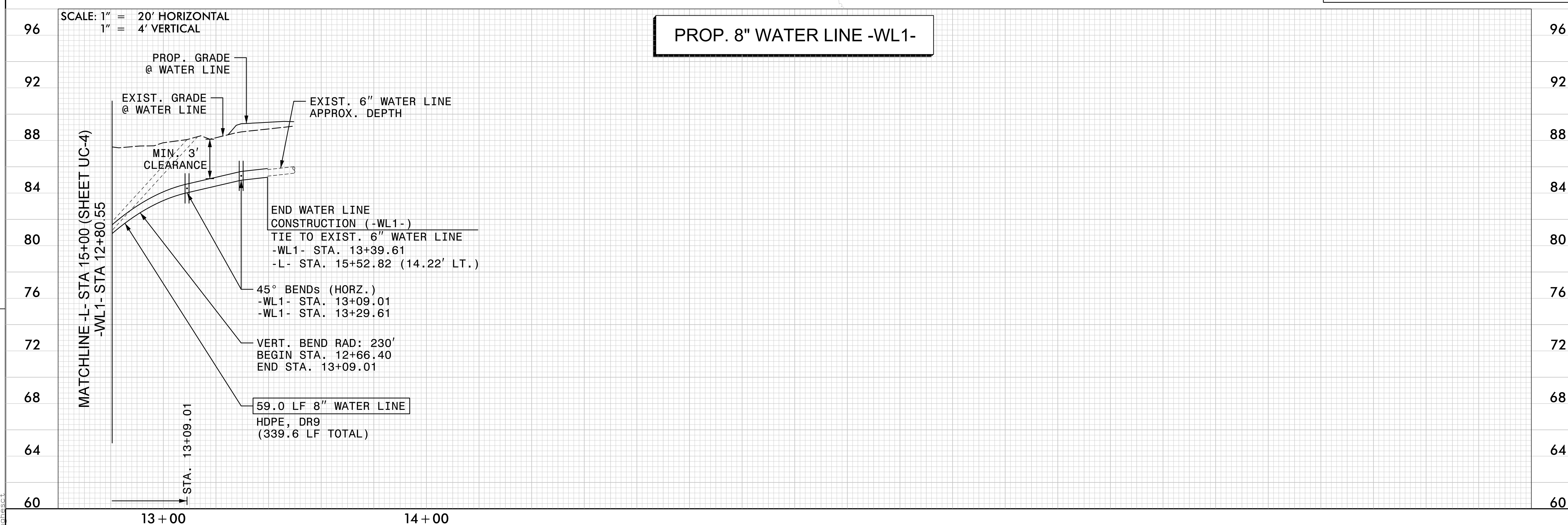
SCALE 1" = 20'
0 20 40 60 80



THE ESTIMATED QUANTITY OF DUCTILE IRON WATER FITTINGS ON THIS PLAN SHEET IS 220 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.



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REVISIONS

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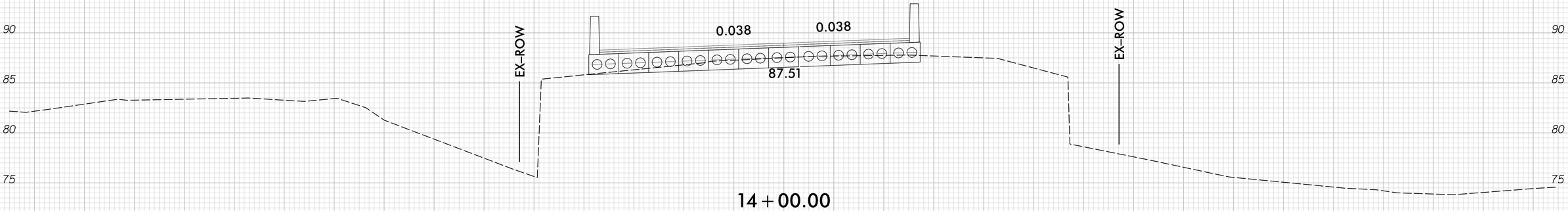
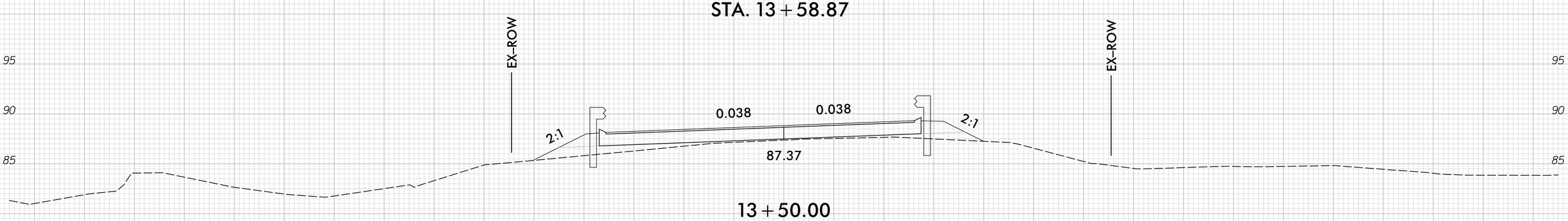
END BRIDGE
STA. 14+31.13

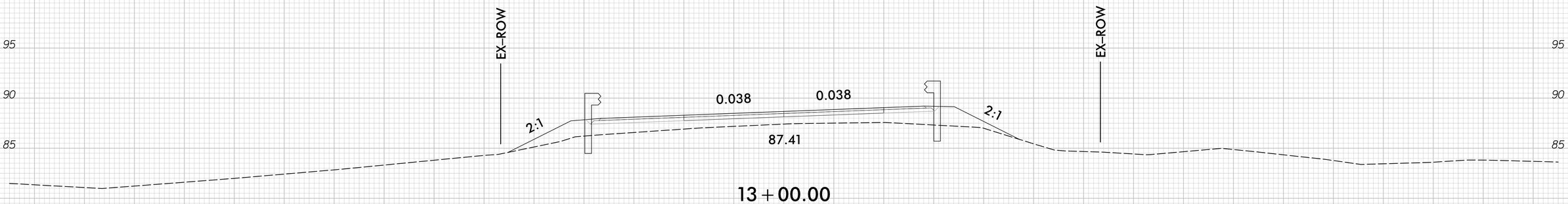


14+00.00

BEGIN BRIDGE
STA. 13+58.87



13+50.00



13+00.00

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

6/12/2019
File: Roadway\CorridorModeling\238197_RDY_XPL_L.dgn
ft_metric

PROJ. REFERENCE NO.	SHEET NO.
DF15406.2024250	X-3

6/12/2019
R:\Roadway\Corridor-Modeling\230197_RDY_XPL_L.dgn

PROJ. REFERENCE NO.	SHEET NO.
DF15406.2024250	X-4

F.A. PROJECT: DF15406.2024250

13+00 13+50 14+00 14+50 15+00

100 90 80 70

SPAN A

FILL FACE @ END BENT 1
STA. 13+58.87 -L-
GRADE POINT EL. 88.85

1'-7" MIN. BERM (TYP.)

1'-0" MIN. EARTH BERM (TYP.)

BEGIN FRONT SLOPE
STA. 13+54.58 -L-
GRADE POINT EL. 88.84

FIX

UNCLASSIFIED STRUCTURE EXCAVATION

BASE DESIGN (Q100) EL. 86.5

25 YR. W.S. EL. 86.2

W.S. EL. 82.6 (04/10/19)

1'-6" TO UNCLASSIFIED EXCAVATION (TYP.)

FILL FACE @ END BENT 2
STA. 14+31.13 -L-
GRADE POINT EL. 89.07

BEGIN FRONT SLOPE
STA. 14+35.48 -L-
GRADE POINT EL. 89.08

APPROX. EXISTING GROUNDLINE

EL. 87±

LOW CHORD EL. 85.84

1'-6" (TYP.)

1 1½ (TYP.)

CLASS II RIP RAP (TYP.)

EXISTING CMP

EL. 76±

LOW CHORD EL. 86.05

HP 12 X 53 STEEL PILES (TYP.)

EXCAVATE TO EL. 84.0± GRADE TO DRAIN (TYP.)

EL. 88±

END BENT 1

END BENT 2

SECTION ALONG -L-

VERTICAL CURVE DATA -L-

(+)0.3014% (+)1.5333%

PI = 15+12.00
EL = 89.31
VC = 150'

I HEREBY CERTIFY THESE ARE THE AS-BUILT PLANS

RESIDENT ENGINEER

72'-3" (FILL FACE END BENT 1 TO FILL FACE END BENT 2)

MEASURED ALONG LONG CHORD

36'-1½" 36'-1½"

EARTH BERM EL. 82.64

FOR CHANNEL DETAILS, SEE ROADWAY PLANS

EARTH BERM EL. 82.85

CLASS II RIP RAP (TYP.)

NOTE: BRIDGE TO BE LAID OUT ALONG LONG CHORD.

EXISTING STRUCTURE

W.P. 1 @ FILL FACE
END BENT 1
STA. 13+58.87 -L-

W.P. 2 @ FILL FACE
END BENT 2
STA. 14+31.13 -L-

TO SR 1517 (MOUNT CALVARY RD.)

BEGIN FRONT SLOPE
STA. 13+54.58 -L-

LONG CHORD

TO NC 131 (BLADEBORO RD.)

-L-

BEGIN APPROACH SLAB
STA. 13+47.99 -L-

ID STA. 13+95.00 -L-

END APPROACH SLAB
STA. 14+42.01 -L-

BEGIN FRONT SLOPE
STA. 14+35.48 -L-

90°-00'-00" (TYP.) (TO LONG CHORD, TYP.)

88°-51'-23" (TO TAN.)

91°-08'-37" (TO TAN.)

EARTH BERM EL. 84.12

1'-7" MIN. BERM (TYP.)

EARTH BERM EL. 84.33

1'-0" MIN. EARTH BERM (TYP.)

FLOW BIG BRANCH

PLAN

(STEEL PILES NOT SHOWN FOR CLARITY)

HYDRAULIC DATA

DESIGN DISCHARGE:	550 CFS
FREQUENCY OF DESIGN FLOOD:	25 YRS.
DESIGN HIGH WATER ELEVATION:	86.2
DRAINAGE AREA:	3.96 SQ. MI.
BASE DISCHARGE (Q100):	850 CFS
BASE HIGH WATER ELEVATION:	86.5

OVERTOPPING DATA

OVERTOPPING DISCHARGE:	2,910 CFS
FREQUENCY OF OVERTOPPING:	>500 YRS.
OVERTOPPING FLOOD ELEVATION:	88.8

OVERTOPPING EXCEEDS 500 YEAR FLOOD EVENT
LOW POINT OVERTOPPING PROFILE OCCURS AT -L- STA. 11+82

HORIZONTAL CURVE DATA -L-

PI STA. = 11+52.99
Δ = 1°-48'-11.0" (LT.)
D = 2°-12'-13.3"
L = 81.82'
T = 40.91'
R = 2600.00'

HORIZONTAL CURVE DATA -L-

PI STA. = 14+60.30
Δ = 16°-44'-45.3" (LT.)
D = 3°-09'-55.8"
L = 529.01'
T = 266.40'
R = 1810.00'

PROJECT NO. DF15406.2024250

COLUMBUS COUNTY

STATION: 13+95.00 -L-

SHEET 1 OF 2 BRIDGE NO. 197

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029429 JASON T. GRISCOM 6/12/2019

STV 100 Years

STV ENGINEERS, INC.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

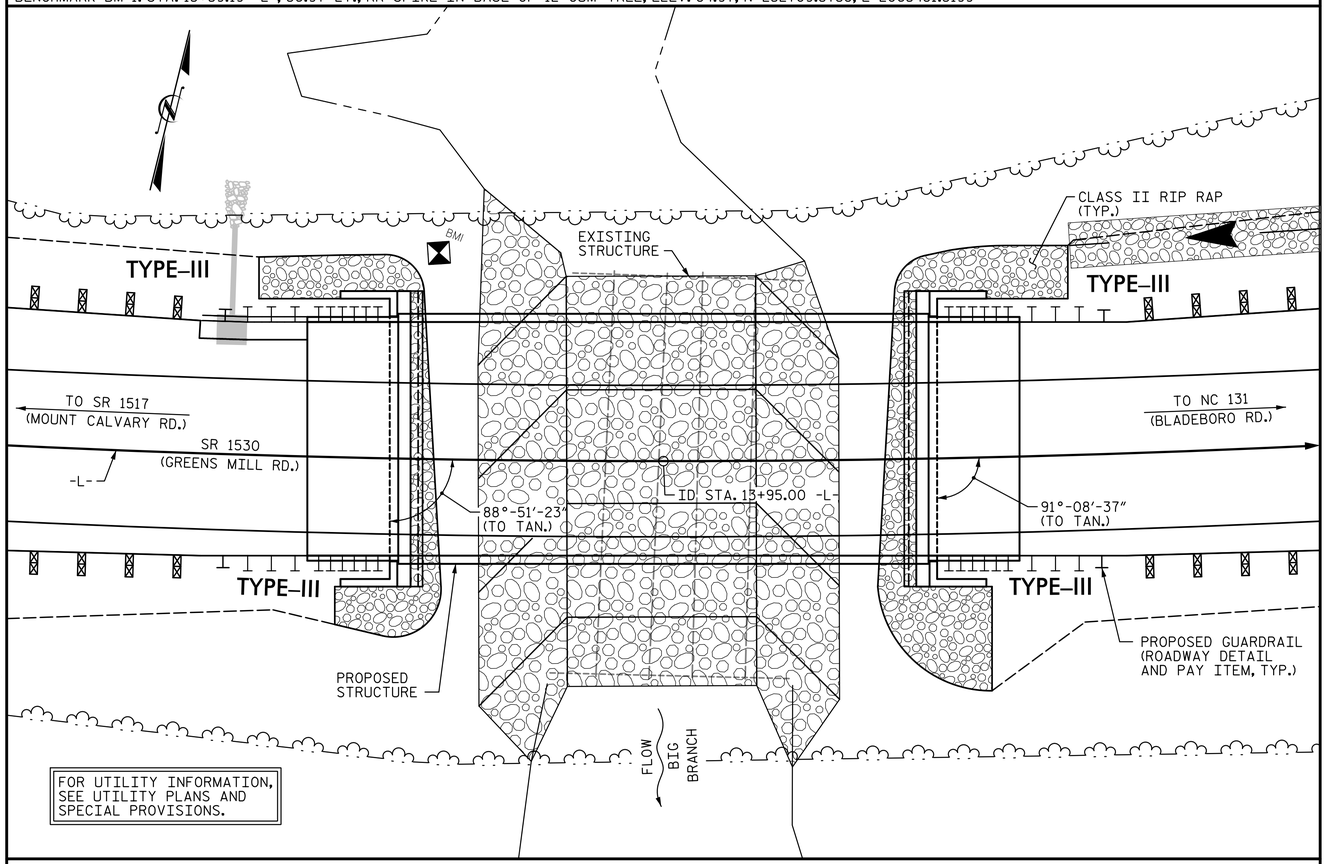
FOR BRIDGE ON SR 1530 (GREEN MILLS RD.) OVER BIG BRANCH BETWEEN SR 1517 AND NC 131

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			13

DRAWN BY : JEB DATE : 5-19
CHECKED BY : JTG DATE : 6-19
DESIGN ENGINEER OF RECORD : J. GRISCOM DATE : 6-19

MelvinLE 6/12/2019 8:30:26 AM R:\Structures\ustation\Final\40L_00L_DF15406.2024250_SMU_GDL_00L_080197.dgn

BENCHMARK BM-1: STA. 13+59.19 -L-, 36.97' LT., RR SPIKE IN BASE OF 12" GUM TREE, ELEV. 84.97, N 252709.3738, E 2065481.3199



LOCATION SKETCH

GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE "STANDARD NOTES" SHEET.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

PAYMENT FOR REMOVAL OF THE EXISTING CMPA AND CONCRETE HEADWALL SHALL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA (ON SHEET 1 OF 2) SHALL BE EXCAVATED AS FOLLOWS:
END BENT 1: TO AN ELEVATION OF 84.0 FOR A DISTANCE OF 33' LT. AND 36' RT, FROM CENTER OF BRIDGE.
END BENT 2: TO AN ELEVATION OF 84.0 FOR A DISTANCE OF 23' LT. AND 34' RT, FROM CENTER OF BRIDGE.
CHANNEL: SEE ROADWAY PLANS.
THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, PRESTRESSED CONCRETE END BENT CAPS MAY BE SUBSTITUTED IN PLACE OF THE CAST-IN-PLACE CAPS. THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER TO RECEIVE REVISED PLANS AND DETAILS FROM THE STRUCTURES MANAGEMENT UNIT. THE REDESIGN AND ANY ADDITIONAL MATERIALS NEEDED WILL BE AT NO ADDITIONAL COST TO THE CONTRACTOR.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30" SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30" SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES".

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENTS NO. 1 AND NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

DRIVE PILES AT END BENTS NO. 1 AND NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 145 TONS PER PILE.

TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING, OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

TOTAL BILL OF MATERIAL

	ASBESTOS ASSESSMENT	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PDA TESTING	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES
	LUMP SUM	LUMP SUM	CU. YD.	LUMP SUM	LBS.	EA.	EA.
SUPERSTRUCTURE							
END BENT 1			14.4		2,115		7
END BENT 2			14.4		2,115		7
TOTAL	LUMP SUM	LUMP SUM	28.8	LUMP SUM	4,230	1	14

TOTAL BILL OF MATERIAL (CONT'D.)

	HP 12 X 53 STEEL PILES		PILE REDRIVES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLABS	
	NO.	LIN. FT.	EA.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE				140.25				11	770.0
END BENT 1	7	490	4		60	70			
END BENT 2	7	385	4		85	95			
TOTAL	14	875	8	140.25	145	165	LUMP SUM	11	770.0

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND f_y = 60ksi

DRAWN BY : JEB DATE : 5-19
CHECKED BY : JTG DATE : 6-19
DESIGN ENGINEER OF RECORD : J. GRISCOM DATE : 6-19

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Charlotte, NC 28202
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PROJECT NO. DF15406.2024250
COLUMBUS COUNTY
STATION: 13+95.00 -L-
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1530 (GREEN MILLS RD.) OVER BIG BRANCH BETWEEN SR 1517 AND NC 131

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			13

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	**1**	1.006	--	1.75	0.273	1.03	70′	EL	34.5	0.507	1.32	70′	EL	6.9	0.80	0.273	**1.01**	70′	EL	**34.5**	
		HL-93(Opr)	N/A	--	1.341	--	1.35	0.273	1.34	70′	EL	34.5	0.507	1.72	70′	EL	6.9	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	**2**	1.306	47.02	1.75	0.273	1.34	70′	EL	34.5	0.507	1.65	70′	EL	6.9	0.80	0.273	**1.31**	70′	EL	**34.5**	
		HS-20(Opr)	36.000	--	1.74	62.64	1.35	0.273	1.74	70′	EL	34.5	0.507	2.14	70′	EL	6.9	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.917	39.379	1.4	0.273	3.75	70′	EL	34.5	0.507	4.87	70′	EL	6.9	0.80	0.273	2.92	70′	EL	34.5	
		SNGARBS2	20.000	--	2.187	43.741	1.4	0.273	2.81	70′	EL	34.5	0.507	3.47	70′	EL	6.9	0.80	0.273	2.19	70′	EL	34.5	
		SNAGRIS2	22.000	--	2.077	45.69	1.4	0.273	2.67	70′	EL	34.5	0.507	3.23	70′	EL	6.9	0.80	0.273	2.08	70′	EL	34.5	
		SNCOTTS3	27.250	--	1.452	39.565	1.4	0.273	1.87	70′	EL	34.5	0.507	2.43	70′	EL	6.9	0.80	0.273	1.45	70′	EL	34.5	
		SNAGGRS4	34.925	--	1.218	42.554	1.4	0.273	1.57	70′	EL	34.5	0.507	2.03	70′	EL	6.9	0.80	0.273	1.22	70′	EL	34.5	
		SNS5A	35.550	--	1.191	42.346	1.4	0.273	1.53	70′	EL	34.5	0.507	2.06	70′	EL	6.9	0.80	0.273	1.19	70′	EL	34.5	
		SNS6A	39.950	--	1.095	43.747	1.4	0.273	1.41	70′	EL	34.5	0.507	1.88	70′	EL	6.9	0.80	0.273	1.10	70′	EL	34.5	
		SNS7B	42.000	--	1.043	43.801	1.4	0.273	1.34	70′	EL	34.5	0.507	1.85	70′	EL	6.9	0.80	0.273	1.04	70′	EL	34.5	
	TTST	TNAGRIT3	33.000	--	1.336	44.087	1.4	0.273	1.72	70′	EL	34.5	0.507	2.23	70′	EL	6.9	0.80	0.273	1.34	70′	EL	34.5	
		TNT4A	33.075	--	1.342	44.401	1.4	0.273	1.72	70′	EL	34.5	0.507	2.17	70′	EL	6.9	0.80	0.273	1.34	70′	EL	34.5	
		TNT6A	41.600	--	1.1	45.746	1.4	0.273	1.41	70′	EL	34.5	0.507	1.98	70′	EL	6.9	0.80	0.273	1.10	70′	EL	34.5	
		TNT7A	42.000	--	1.106	46.462	1.4	0.273	1.42	70′	EL	34.5	0.507	1.94	70′	EL	6.9	0.80	0.273	1.11	70′	EL	34.5	
		TNT7B	42.000	--	1.147	48.18	1.4	0.273	1.47	70′	EL	34.5	0.507	1.8	70′	EL	6.9	0.80	0.273	1.15	70′	EL	34.5	
		TNAGRIT4	43.000	--	1.089	46.838	1.4	0.273	1.4	70′	EL	34.5	0.507	1.74	70′	EL	6.9	0.80	0.273	1.09	70′	EL	34.5	
		TNAGT5A	45.000	--	1.026	46.175	1.4	0.273	1.32	70′	EL	34.5	0.507	1.74	70′	EL	6.9	0.80	0.273	1.03	70′	EL	34.5	
		TNAGT5B	45.000	**3**	1.013	45.579	1.4	0.273	1.3	70′	EL	34.5	0.507	1.66	70′	EL	6.9	0.80	0.273	**1.01**	70′	EL	**34.5**	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

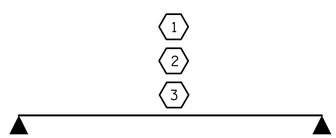
ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING
(1) DESIGN LOAD RATING (HL-93)
(2) DESIGN LOAD RATING (HS-20)
(3) LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

FOR SPAN A

PROJECT NO. DF15406.2024250

COLUMBUS COUNTY

STATION: 13+95.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR 70′ CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			13

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STV ENGINEERS, INC.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

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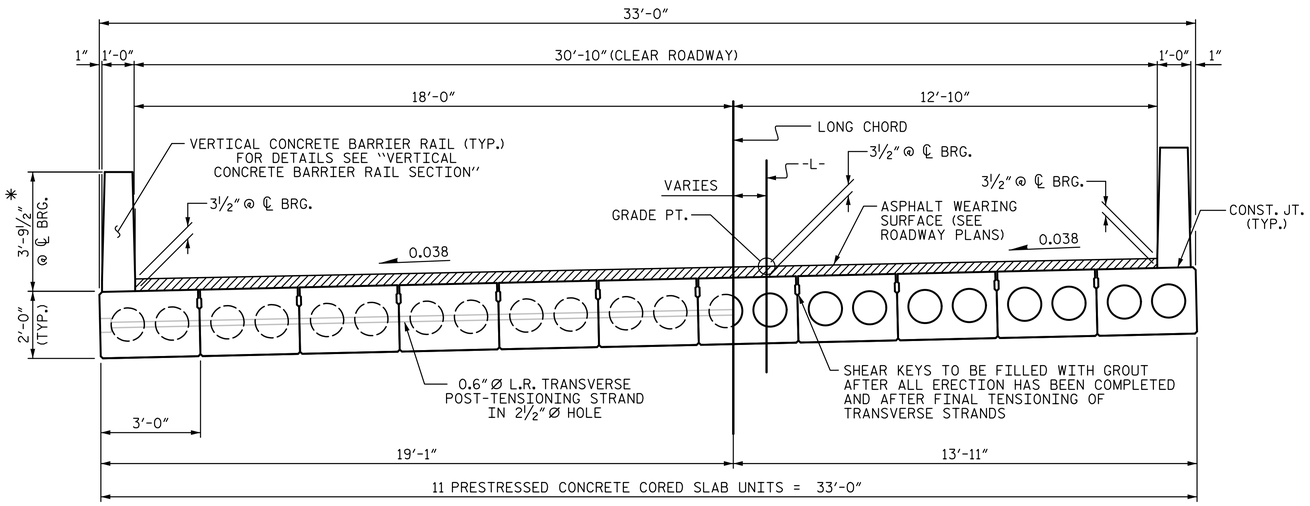
DRAWN BY :	JEB	DATE :	5-19
CHECKED BY :	JTG	DATE :	6-19
DESIGN ENGINEER OF RECORD :	J. GRISCOM	DATE :	6-19
DRAWN BY : CVC 6/10			
CHECKED BY : DNS 6/10			

STANDARD NO. 24LRFR1_90S_70L

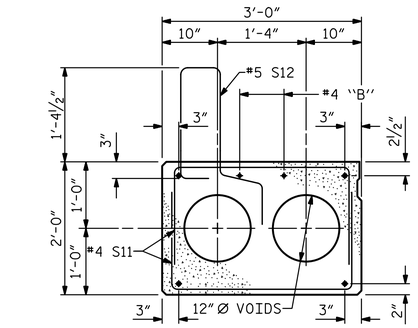


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

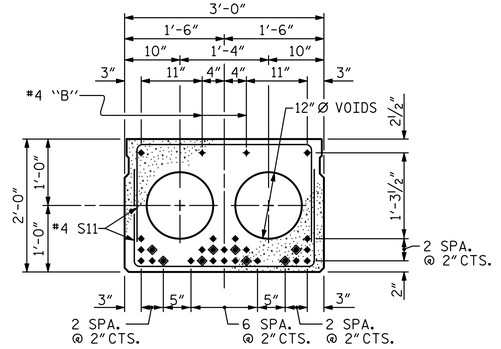
TYPICAL SECTION

✳ - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE ″VERTICAL CONCRETE BARRIER RAIL SECTION″ DETAIL.



EXTERIOR SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



INTERIOR SLAB SECTION (70′ UNIT)

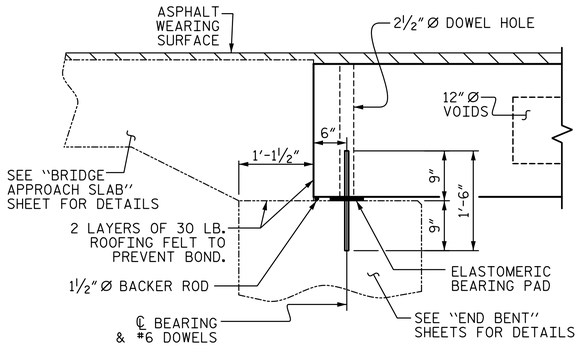
(28 STRANDS REQUIRED)

0.6″ Ø LOW RELAXATION STRAND LAYOUT

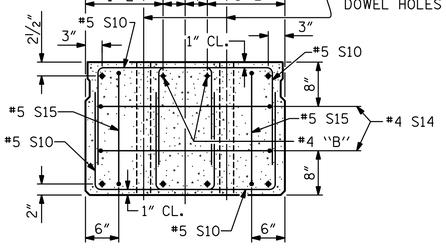
◈ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12′-0″ FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

FIXED END

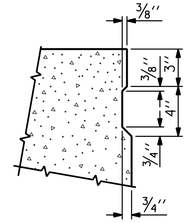


SECTION AT END BENT



END ELEVATION

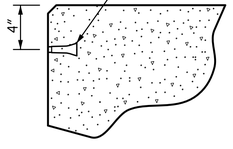
SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



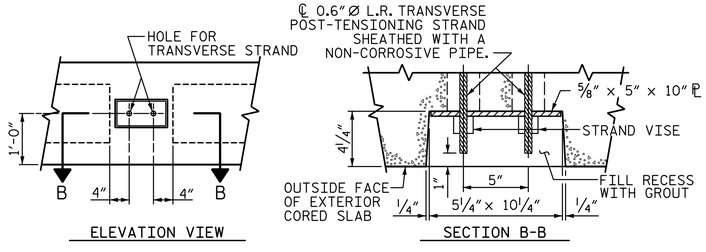
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.

PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED ⅜″. SIZE TO BE DETERMINED BY CONTRACTOR.



THREADED INSERT DETAIL



GROUTED RECESS AT END OF POST-TENSIONED STRAND-CORED SLABS

DRAWN BY :	JEB	DATE :	5-19
CHECKED BY :	JTG	DATE :	6-19
DESIGN ENGINEER OF RECORD :	J. GRISCOM	DATE :	6-19
DRAWN BY : MAA 6/10	CHECKED BY : MKT 7/10	REV. 9/14	MAA/TMG

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3′-0″ X 2′-0″ PRESTRESSED CONCRETE CORED SLAB UNIT

PROJECT NO. DF15406.2024250

COLUMBUS COUNTY

STATION: 13+95.00 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029429 JASON T. GRISCOM 6/12/2019

STV 100 Years STV ENGINEERS, INC. 900 West Trade St., Suite 715 Charlotte, NC 28202 NC License Number F-0991

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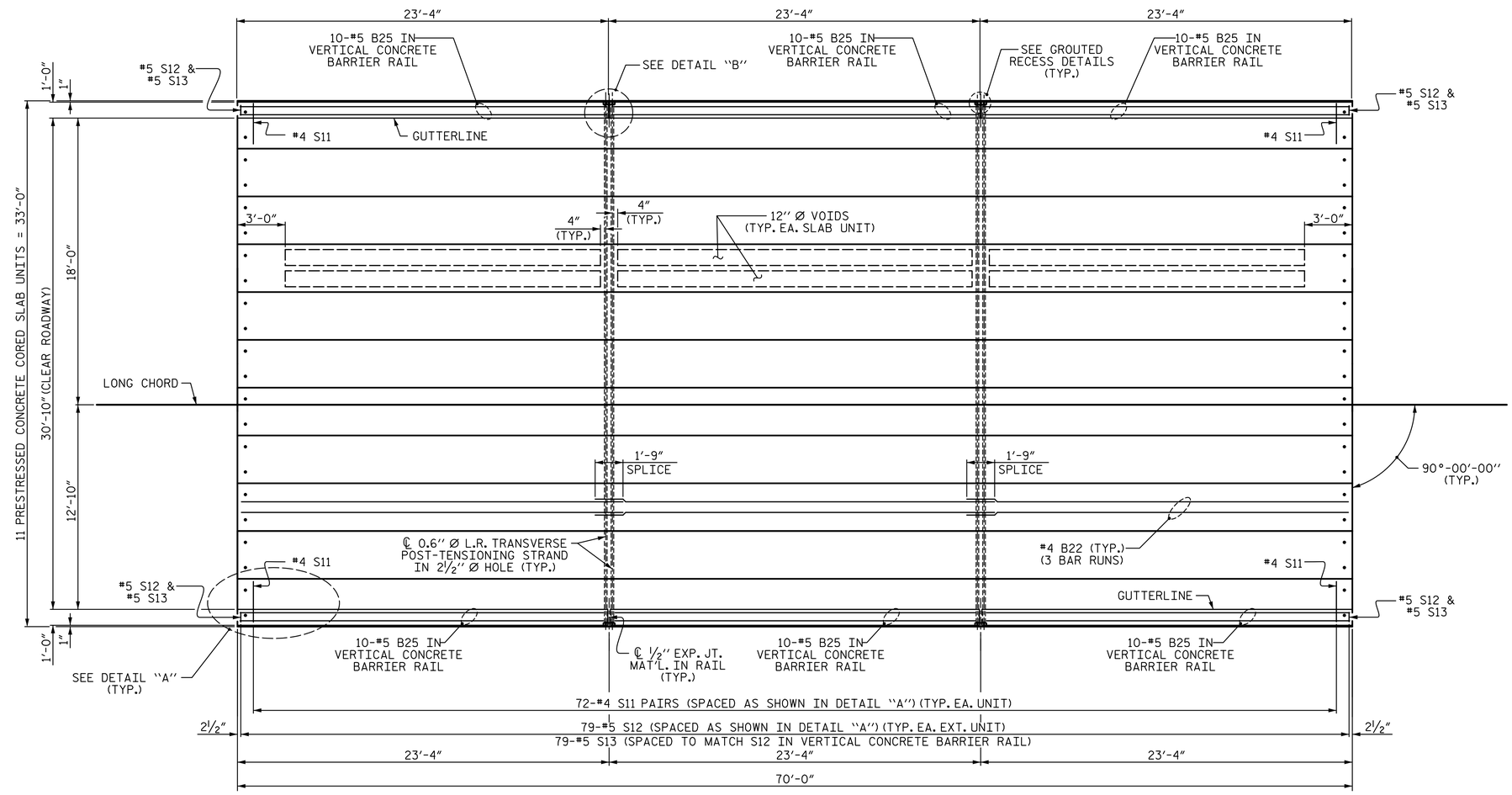
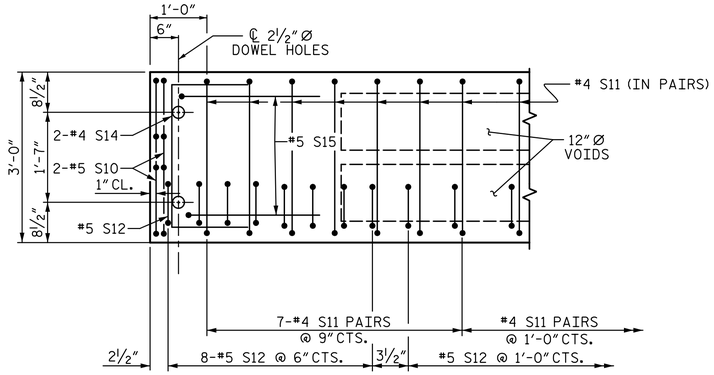
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			13

STANDARD NO. 24PCS4_33_90S

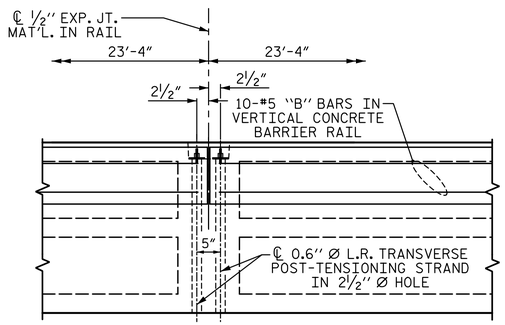


PLAN OF UNIT



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1″ CLEAR TO GROUTED RECESS AND 2½″ Ø TRANSVERSE POST-TENSIONING STRAND HOLES

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CHECKED BY :	JTG	DATE :	6-19
DESIGN ENGINEER OF RECORD :	J. GRISCOM	DATE :	6-19
DRAWN BY : MAA	6/10	REV. 12/5/11	MAA/AAC
CHECKED BY : MKT	7/10	REV. 8/14	MAA/TMG

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COLUMBUS COUNTY
STATION: 13+95.00 -L-

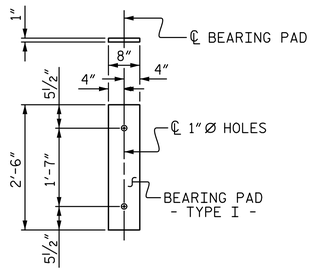
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 70′ UNIT 30′-10″ CLEAR ROADWAY 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			13

STANDARD NO. 24PCS_33_90S_70L

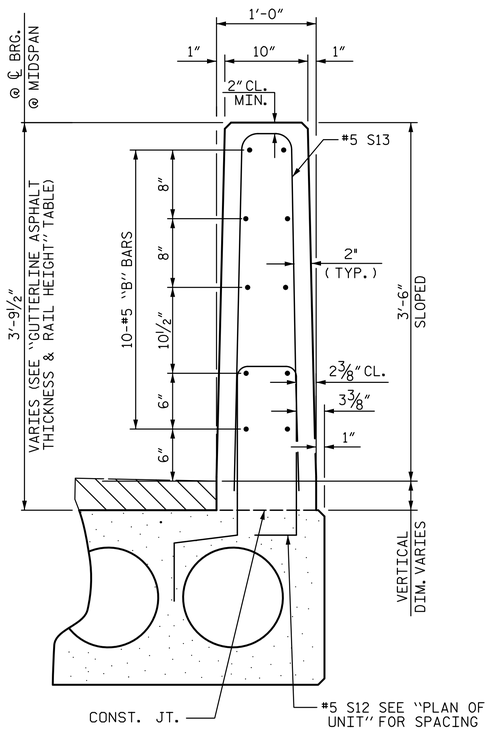


FIXED END
(TYPE I - 22 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

GRADE 270 STRANDS	
	0.6″Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950



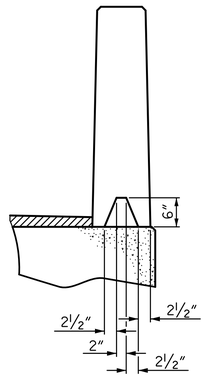
SECTION THRU RAIL

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS 70′ UNIT	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B25	60	60	#5	STR	22′-11″	1434
✳S13	158	158	#5	2	7′-2″	1181
✳EPOXY COATED REINFORCING STEEL				LBS.		2615
CLASS AA CONCRETE				CU.YDS.		18.1
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		140.25

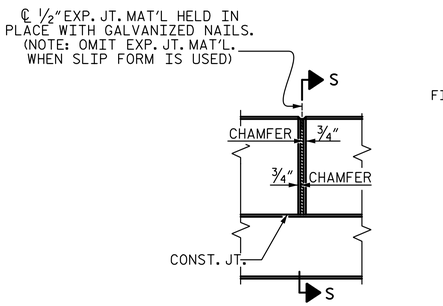
DEAD LOAD DEFLECTION AND CAMBER	
	3′-0″ x 2′-0″
70′ CORED SLAB UNIT	0.6″Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2¼″ ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD✳✳	¾″ ↓
FINAL CAMBER	1½″ ↑

✳✳ INCLUDES FUTURE WEARING SURFACE

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
70′ UNIT			
EXTERIOR C.S.	2	70′-0″	140′-0″
INTERIOR C.S.	9	70′-0″	630′-0″
TOTAL	11		770′-0″



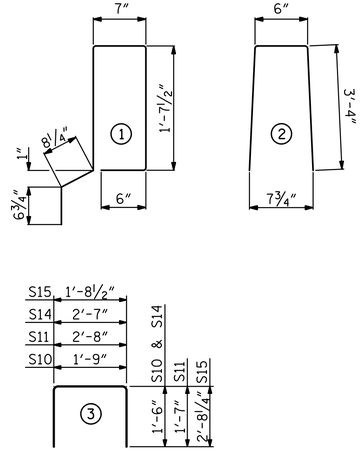
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

VERTICAL CONCRETE BARRIER RAIL DETAILS

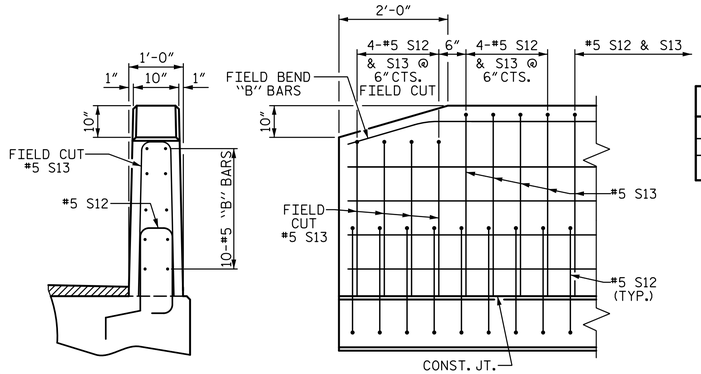
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE 70′ CORED SLAB UNIT							
				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	24′-6″	98	24′-6″	98
S10	8	#5	3	4′-9″	40	4′-9″	40
S11	144	#4	3	5′-10″	561	5′-10″	561
✳S12	79	#5	1	5′-7″	460		
S14	4	#4	3	5′-7″	15	5′-7″	15
S15	4	#5	3	7′-1″	30	7′-1″	30
REINFORCING STEEL			LBS.		744		744
✳EPOXY COATED REINFORCING STEEL			LBS.		460		
7000 P.S.I. CONCRETE			CU. YDS.		11.8		11.8
0.6″Ø L.R. STRANDS			No.		28		28

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
70′ UNITS	2″	3′-8″



END VIEW SIDE VIEW

END OF RAIL DETAILS

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2½″Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4′-0″ CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

CONCRETE RELEASE STRENGTH	
UNIT	PSI
70′ UNITS	5500

PROJECT NO. DF15406.2024250
COLUMBUS COUNTY
STATION: 13+95.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3′-0″X 2′-0″
PRESTRESSED CONCRETE
CORED SLAB UNIT

Digitally signed by JASON T. GRISCOM
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029429
JASON T. GRISCOM
6/12/2019

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NC License Number F-0991

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1			3			TOTAL SHEETS
2			4			13

DRAWN BY :	JEB	DATE : 5-19
CHECKED BY :	JTG	DATE : 6-19
DESIGN ENGINEER OF RECORD :	J. GRISCOM	DATE : 6-19
DRAWN BY : MAA 6/10	CHECKED BY : MKT 7/10	REV. 5/18 MAA/THC

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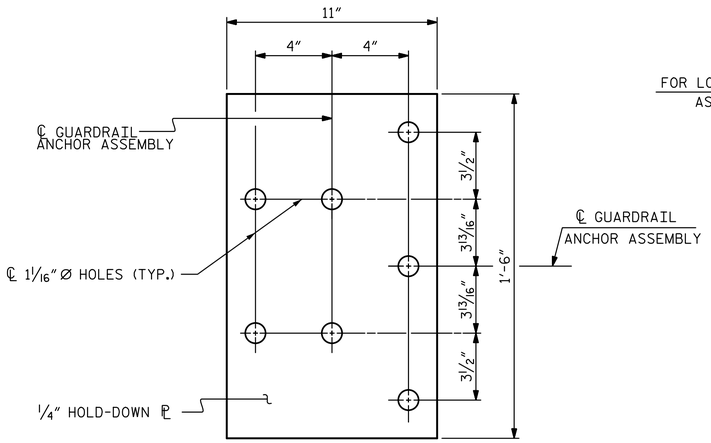
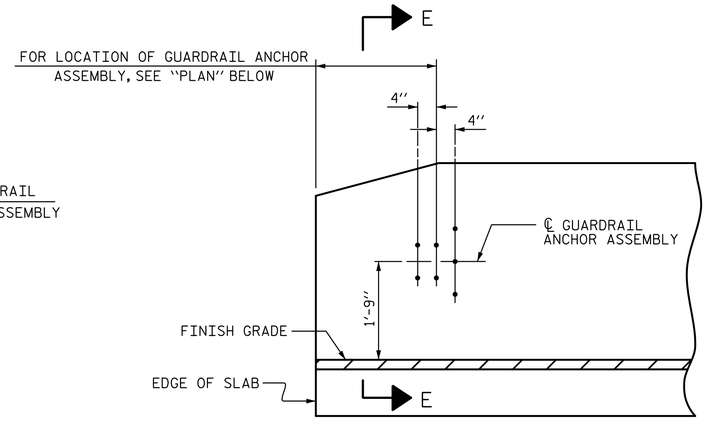


PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4′′ HOLD DOWN PLATE AND 7 - 7/8′′ Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8′′ Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

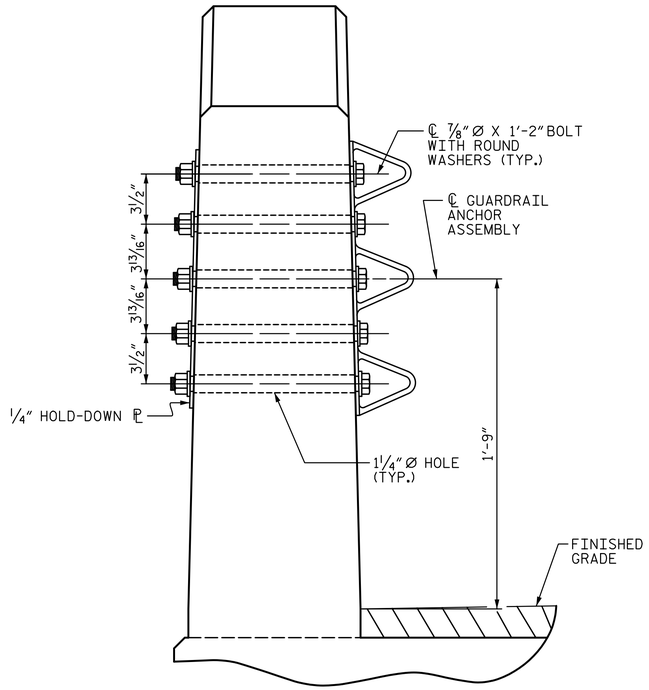
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

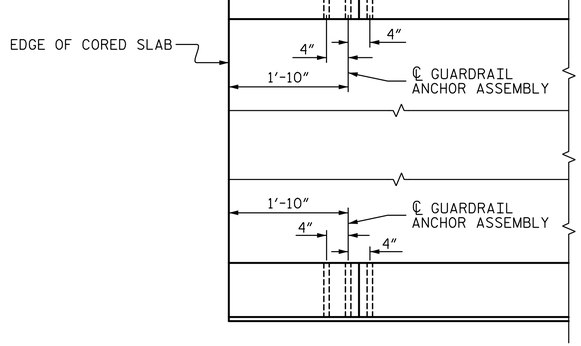
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4′′ Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



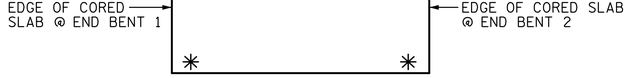
SECTION E-E



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

GUARDRAIL ANCHOR ASSEMBLY DETAILS

DRAWN BY : JEB		DATE : 5-19	
CHECKED BY : JTG		DATE : 6-19	
DESIGN ENGINEER OF RECORD : J. GRISCOM		DATE : 6-19	
DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMG	
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC	
	REV. 5/18	MAA/THC	

NORTH CAROLINA PROFESSIONAL SEAL 029429 ENGINEER JASON T. GRISCOM 6/12/2019

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COLUMBUS COUNTY

STATION: 13+95.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			13

STANDARD NO. GRA3

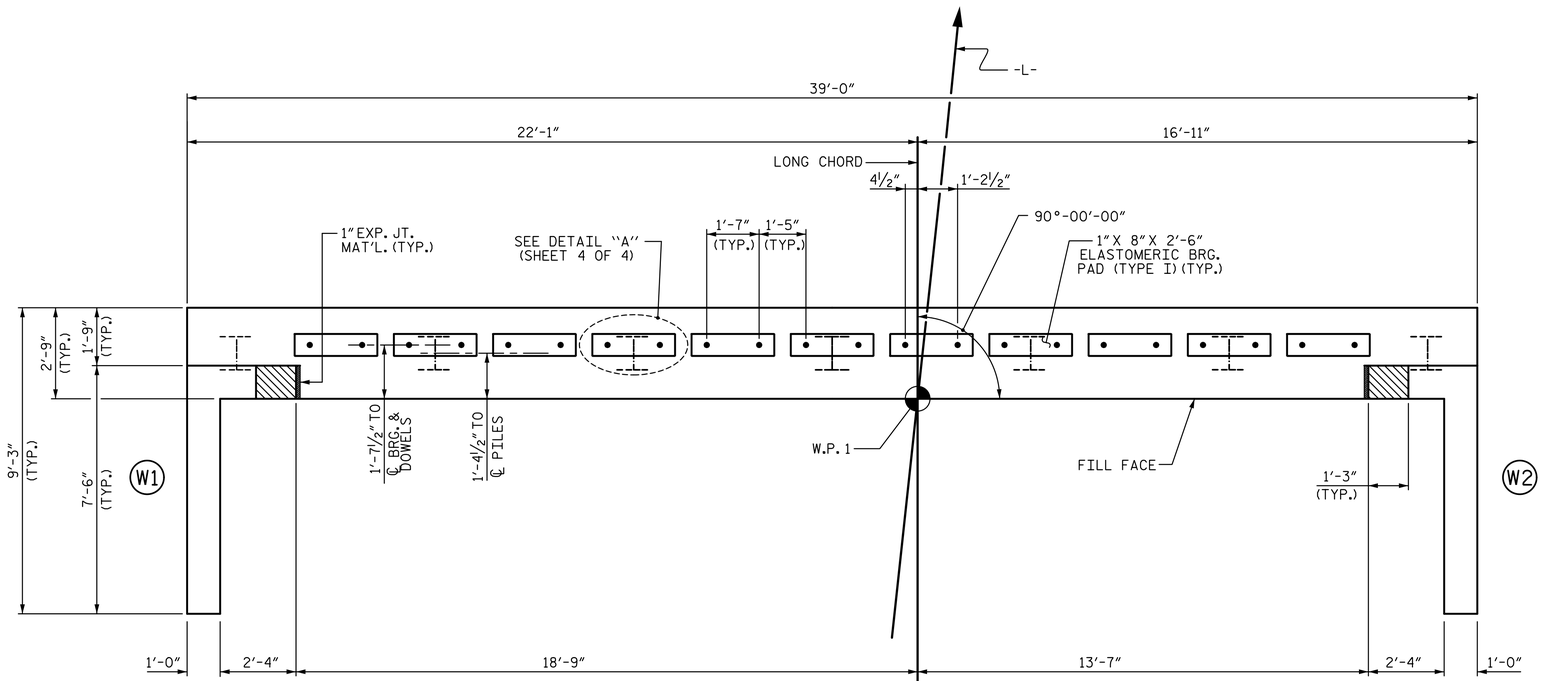
NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

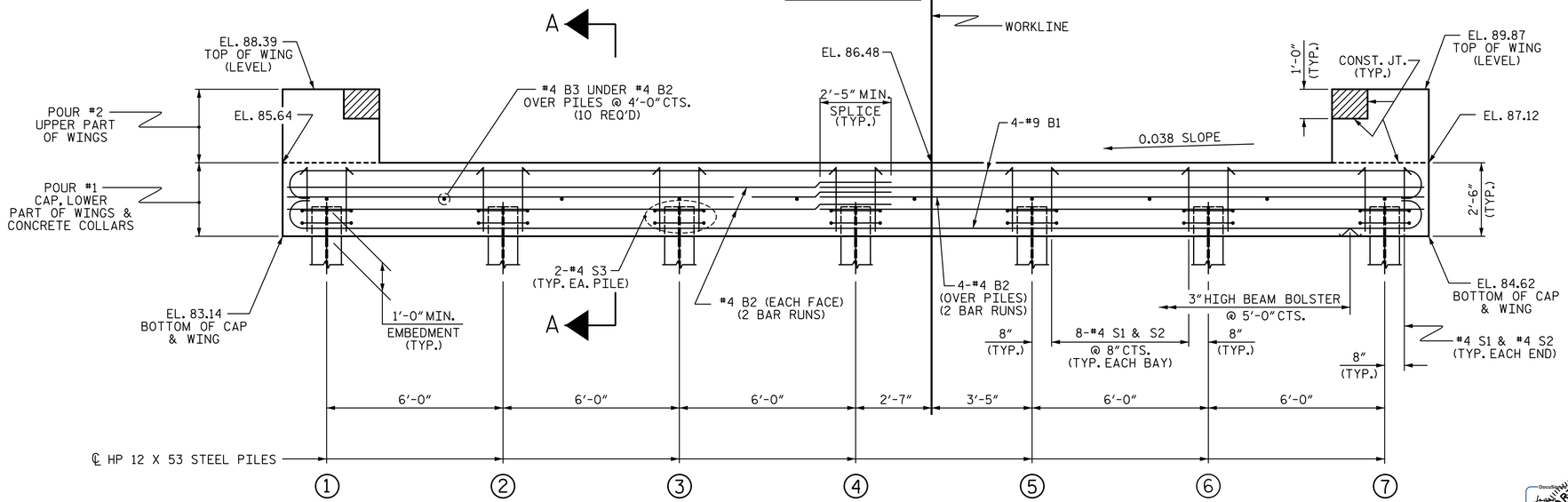
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

TOP OF PILE ELEVATIONS

①	84.22
②	84.44
③	84.67
④	84.90
⑤	85.13
⑥	85.36
⑦	85.58

DRAWN BY :	JEB	DATE :	5-19
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DESIGN ENGINEER OF RECORD :	J. GRISCOM	DATE :	6-19
DRAWN BY : DGE 01/10	REV. 4/15	MAA/TMG	
CHECKED BY : MKT 01/10			

PROJECT NO. DF15406.2024250
COLUMBUS COUNTY
STATION: 13+95.00 -L-

SHEET 1 OF 4

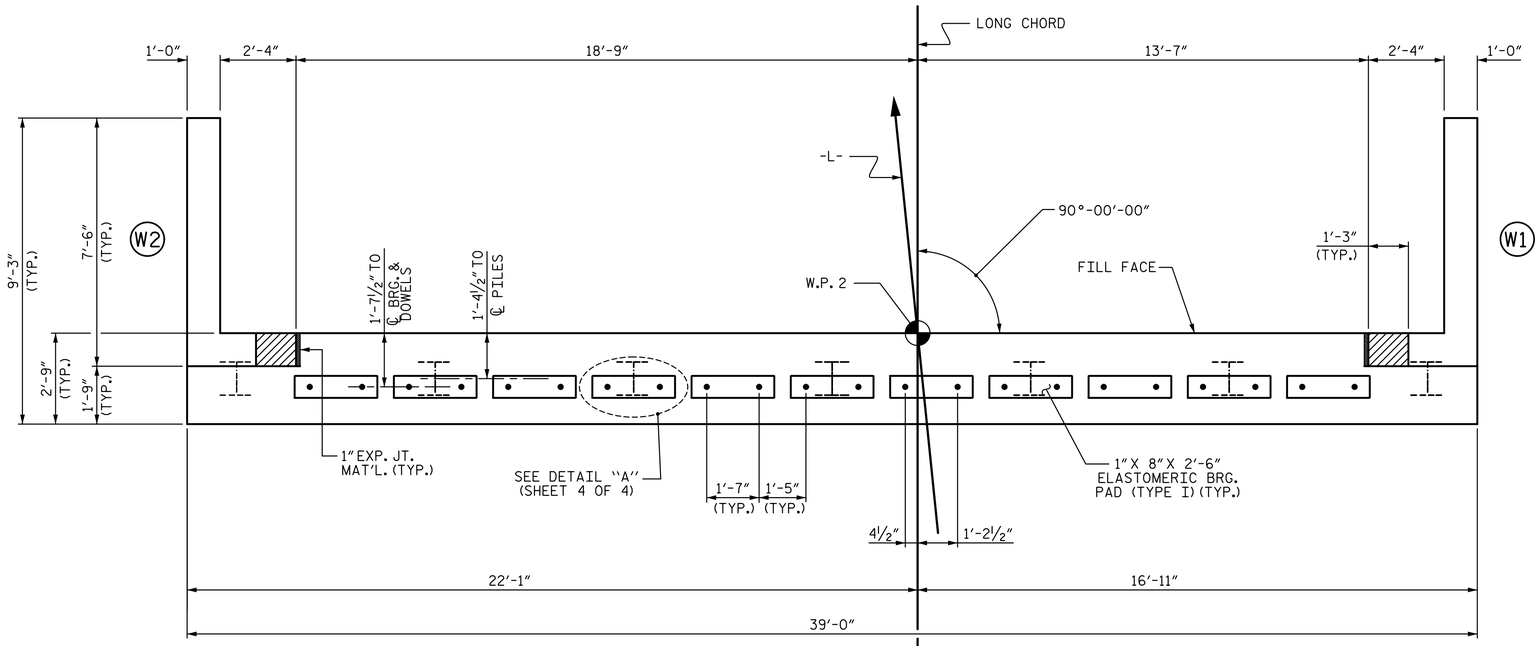
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

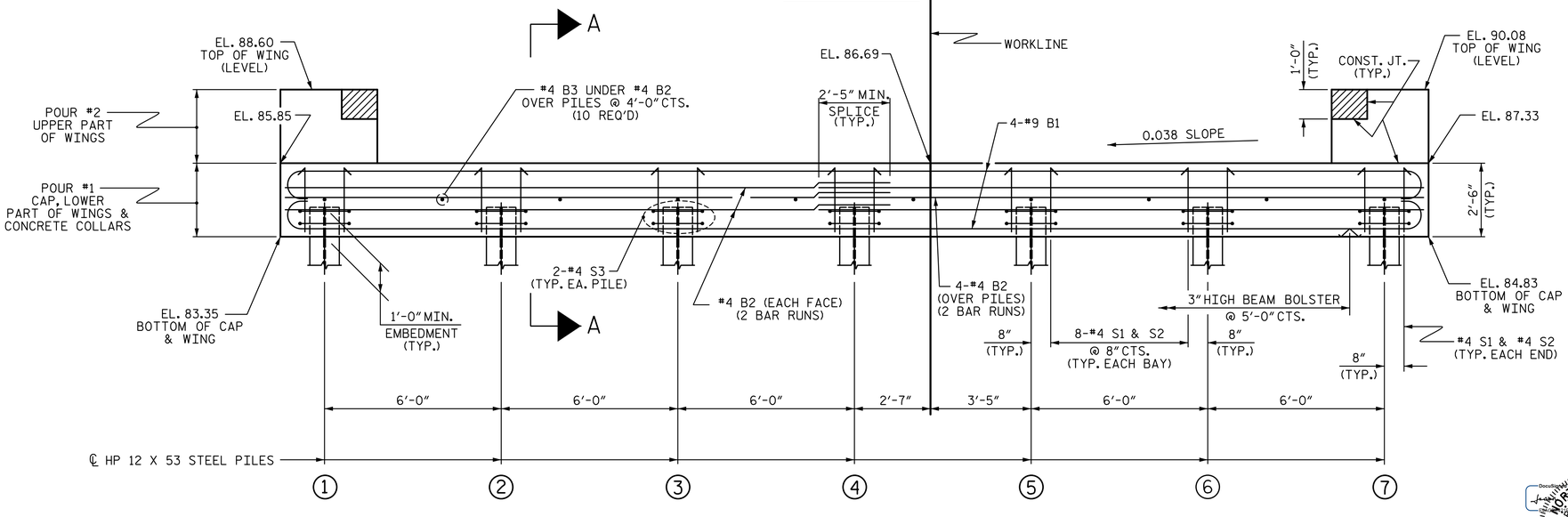
END BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			13

STANDARD NO. EB_33_90S



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE ″CORROSION PROTECTION FOR STEEL PILES DETAIL″, SHEET 4 OF 4.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS

①	84.43
②	84.65
③	84.88
④	85.11
⑤	85.34
⑥	85.57
⑦	85.79

PROJECT NO. DF15406.2024250
COLUMBUS COUNTY
STATION: 13+95.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

NORTH CAROLINA PROFESSIONAL SEAL 029429 ENGINEER JASON T. GRISCOM
6/12/2019

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DRAWN BY : DGE 01/10	REV. 4/15	MAA/TMG	
CHECKED BY : MKT 01/10			

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			13

STANDARD NO. EB_33_90S

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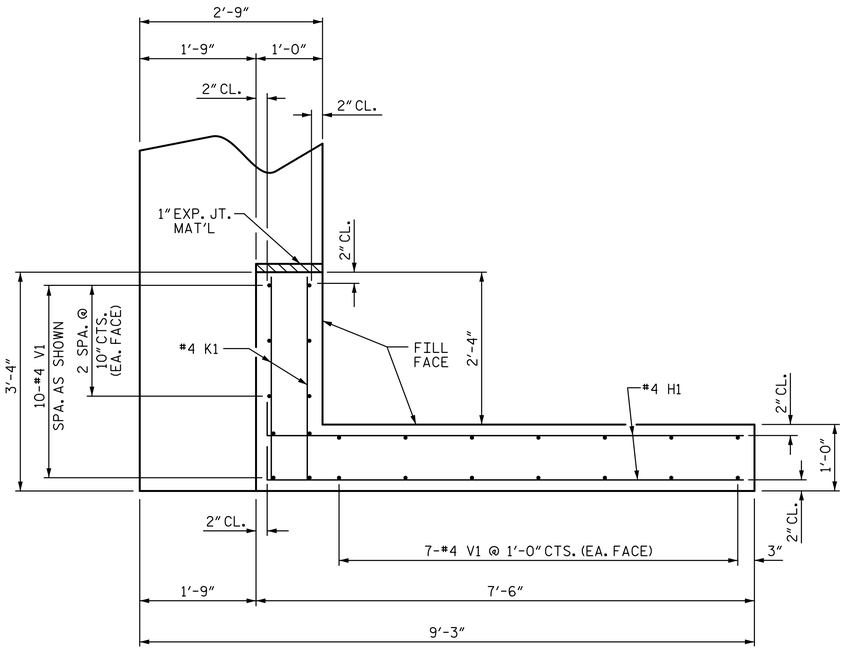
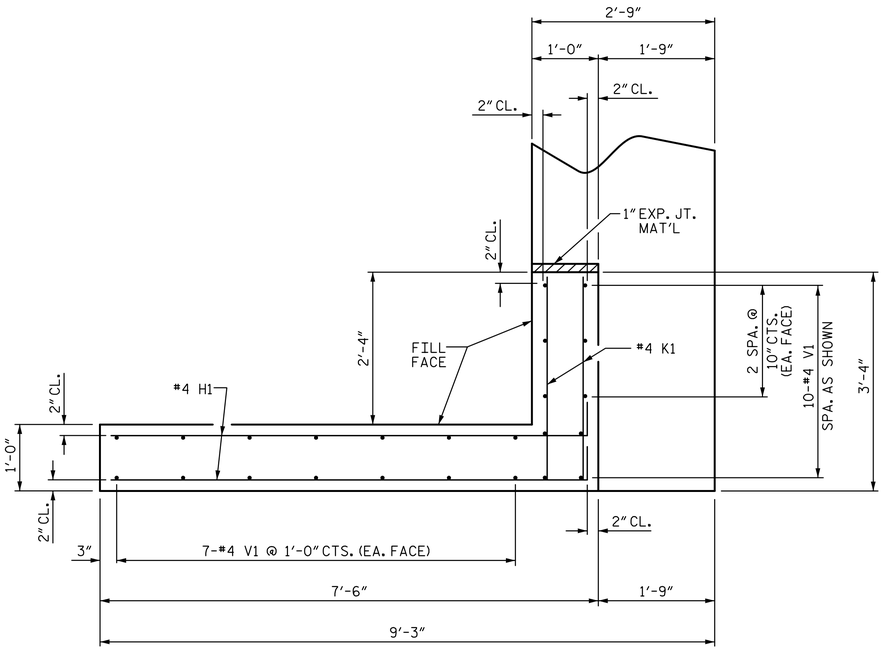
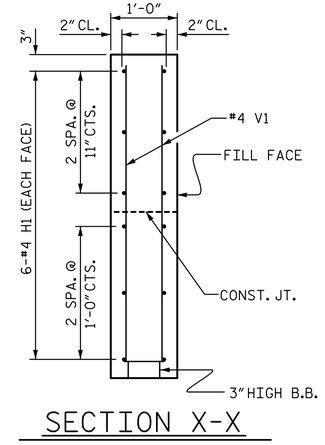


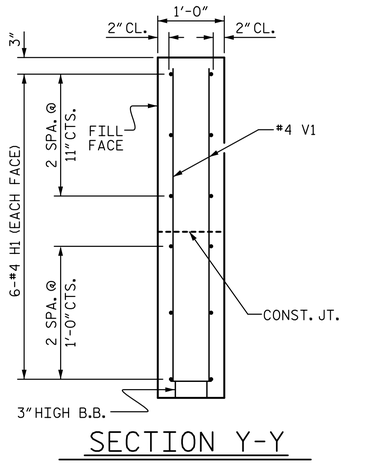
PLAN OF WING (W1)



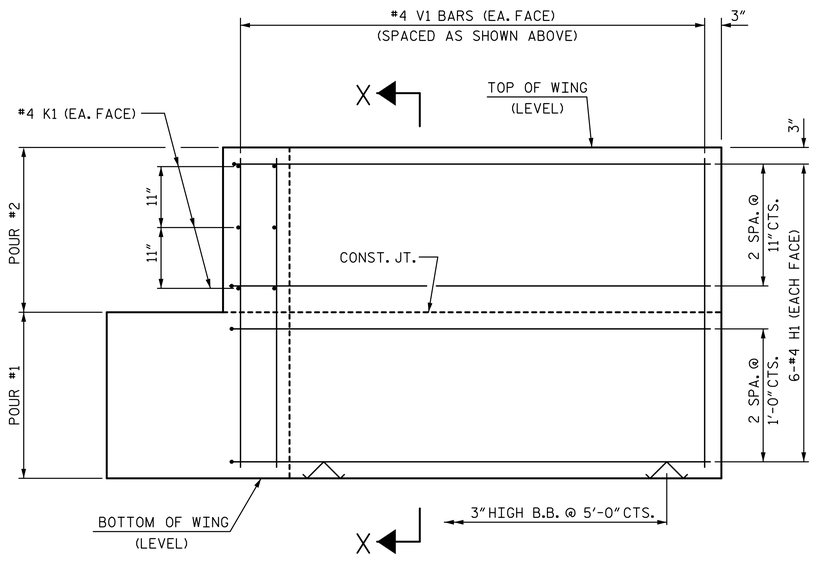
PLAN OF WING (W2)



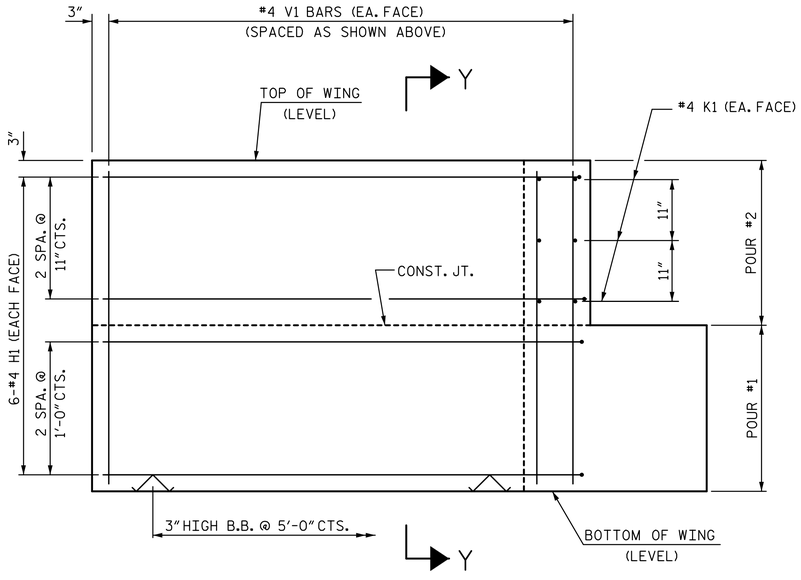
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

DRAWN BY :	JEB	DATE :	5-19
CHECKED BY :	JTG	DATE :	6-19
DESIGN ENGINEER OF RECORD :	J. GRISCOM	DATE :	6-19
DRAWN BY : DGE 02/10	REV. 4/15	MAA/TMG	
CHECKED BY : MKT 02/10			

NORTH CAROLINA PROFESSIONAL SEAL 029429 ENGINEER JASON T. GRISCOM 6/12/2019

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NC License Number F-0991

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PROJECT NO. DF15406.2024250

COLUMBUS COUNTY

STATION: 13+95.00 -L-

SHEET 3 OF 4

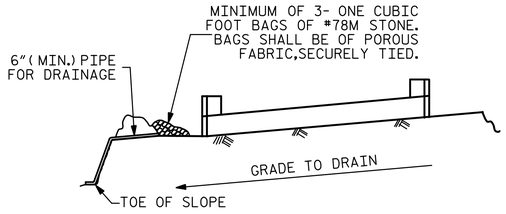
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT
WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			13

STANDARD NO. EB_33_90S

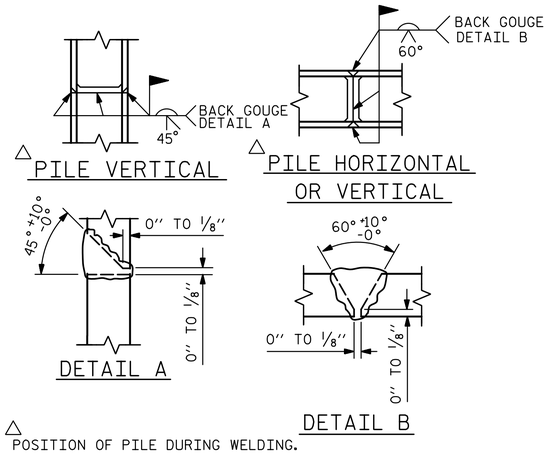


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

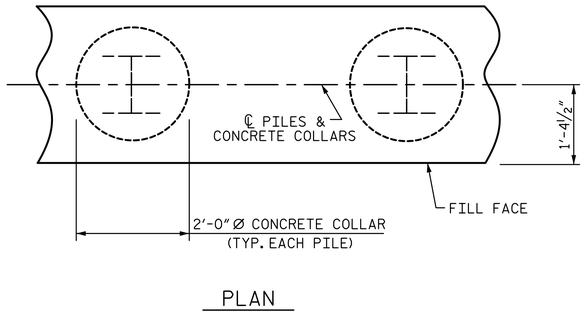
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

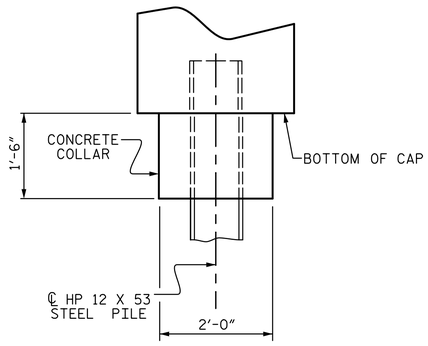


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



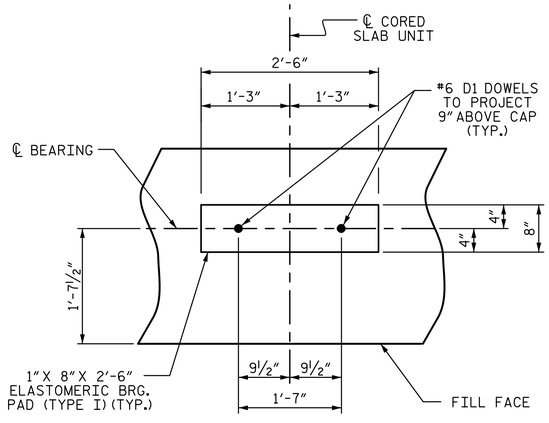
PLAN



ELEVATION

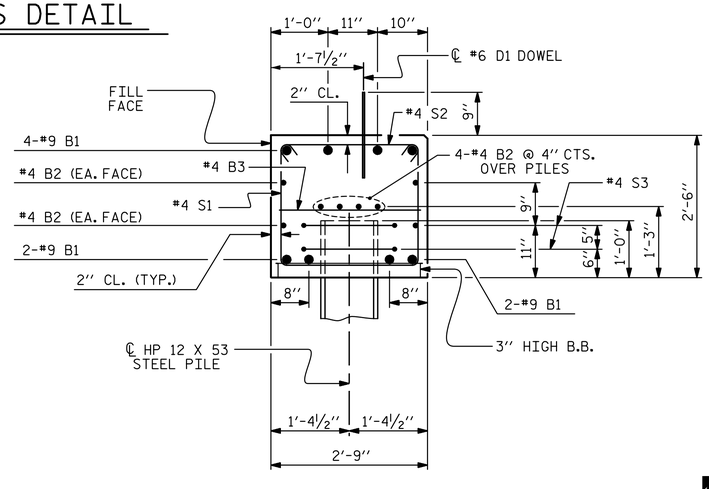
CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



DETAIL "A"

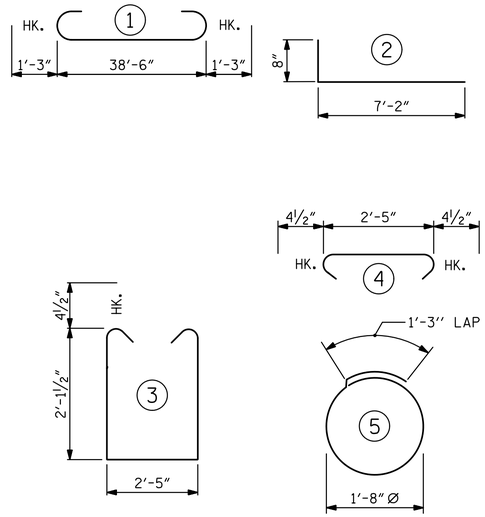
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES NO: 7 LIN. FT.= 490	HP 12 X 53 STEEL PILES NO: 7 LIN. FT.= 385
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7
PILE REDRIVES NO: 4	PILE REDRIVES NO: 4

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-0"	1115
B2	16	#4	STR	20'-7"	220
B3	10	#4	STR	2'-5"	16
D1	22	#6	STR	1'-6"	50
H1	24	#4	2	7'-10"	126
K1	12	#4	STR	2'-11"	23
S1	50	#4	3	7'-5"	248
S2	50	#4	4	3'-2"	106
S3	14	#4	5	6'-6"	61
V1	48	#4	STR	4'-8"	150

REINFORCING STEEL (FOR ONE END BENT) 2115 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 12.4 C.Y.

POUR #2 UPPER PART OF WINGS 2.0 C.Y.

TOTAL CLASS A CONCRETE 14.4 C.Y.

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PROJECT NO. DF15406.2024250

COLUMBUS COUNTY

STATION: 13+95.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

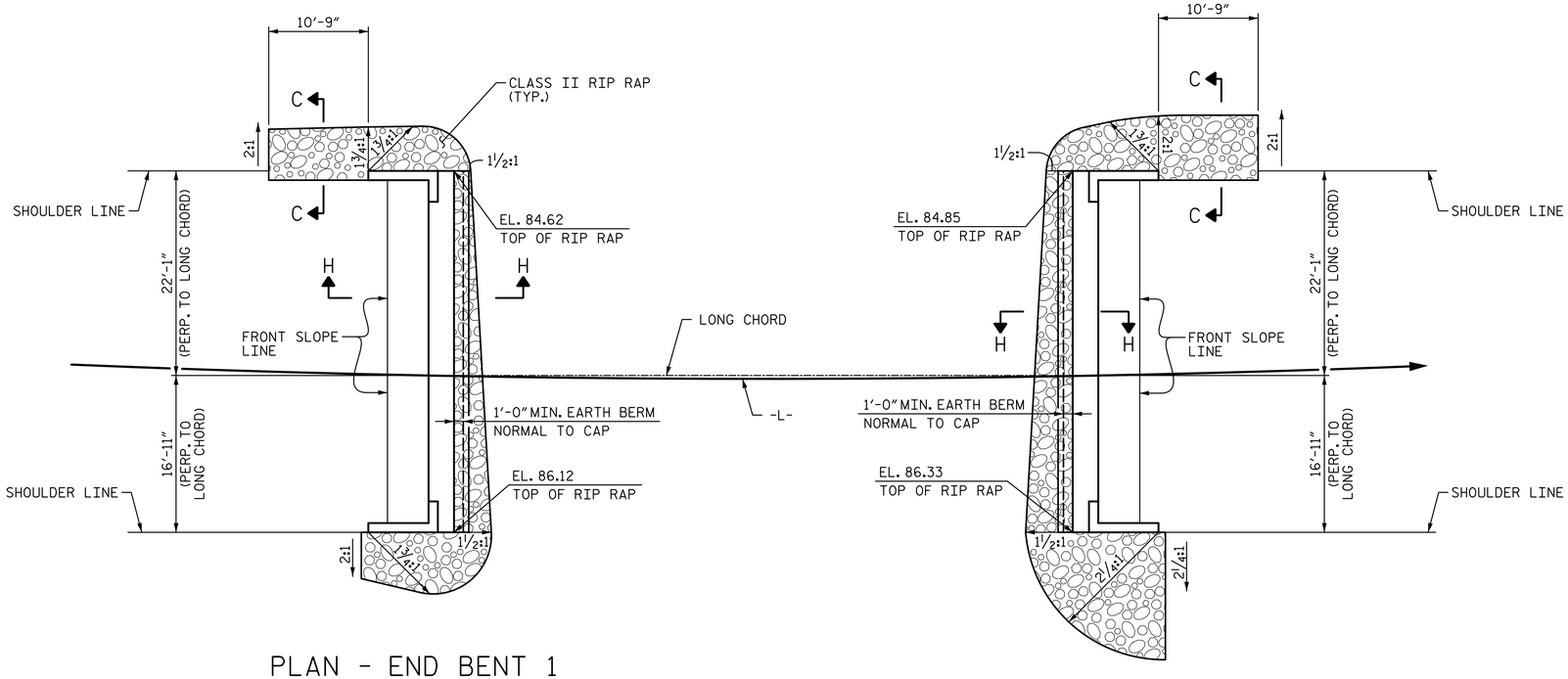
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			13

DRAWN BY :	JEB	DATE :	5-19
CHECKED BY :	JTG	DATE :	6-19
DESIGN ENGINEER OF RECORD :	J. GRISCOM	DATE :	6-19
DRAWN BY : DGE 12/09	REV. 4/17 MAA/THC		
CHECKED BY : MKT 01/10			

STANDARD NO. EB_33_90S

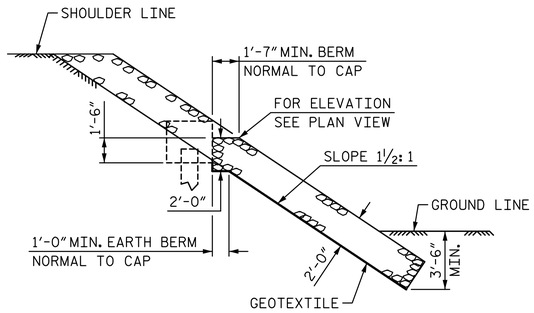
ESTIMATED QUANTITIES

BRIDGE @ STA. 13+95.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	60	70
END BENT 2	85	95

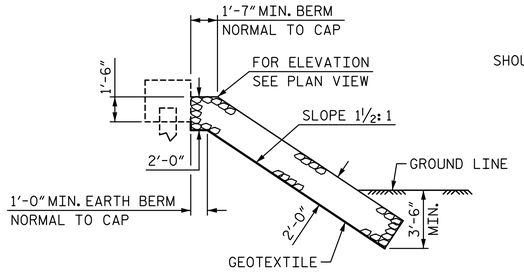


PLAN - END BENT 1

PLAN - END BENT 2



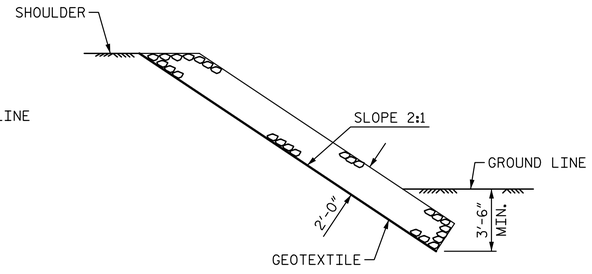
SECTION H-H



℄ SECTION

BERM RIP RAPPED

END BENT 1 SHOWN, END BENT 2 SIMILAR



SECTION C-C

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029429 JASON T. GRISCOM 6/12/2019

STV 100 Years

STV ENGINEERS, INC.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

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PROJECT NO. DF15406.2024250

COLUMBUS COUNTY

STATION: 13+95.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			13

DRAWN BY : JEB DATE : 5-19
CHECKED BY : JTG DATE : 6-19
DESIGN ENGINEER OF RECORD : J. GRISCOM DATE : 6-19

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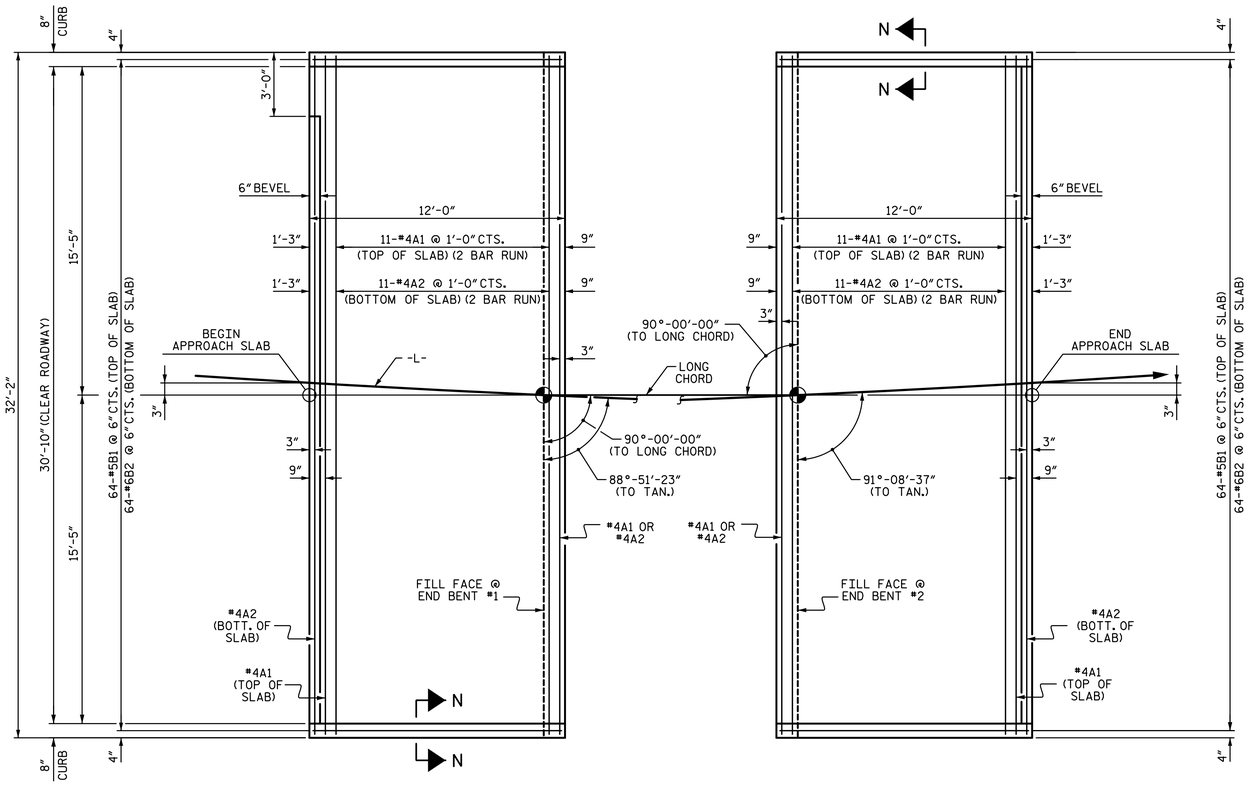
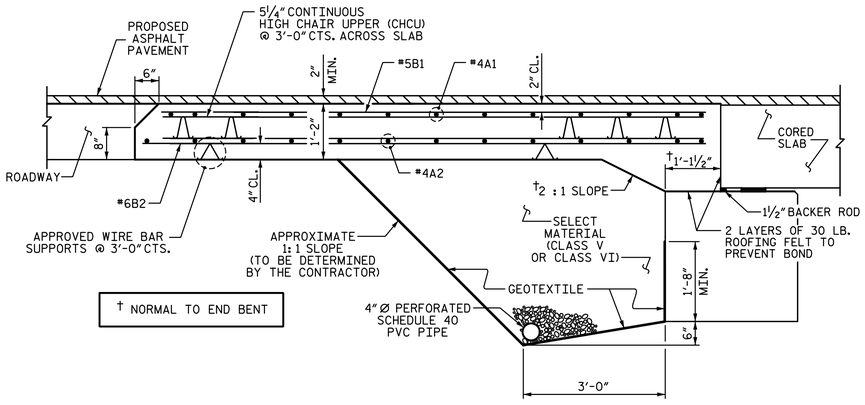


PLAN @ END BENT #1

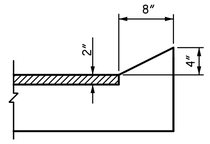
PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

(TYPE II - MODIFIED APPROACH FILL)



SECTION N-N

CURB DETAILS

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

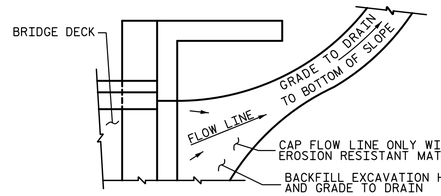
SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

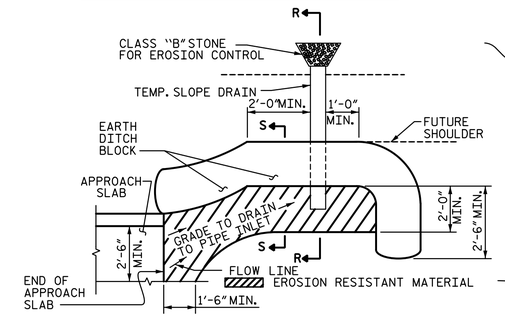
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



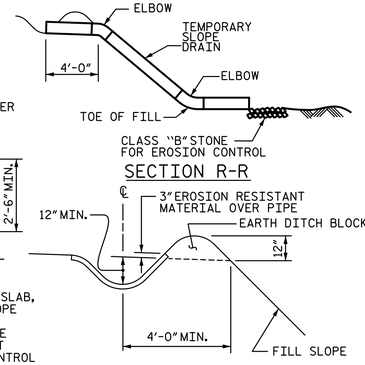
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW



SECTION R-R

SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

BILL OF MATERIAL					
APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
✳ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
✳ EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C.Y.	19.5

APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
✳ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
✳ EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C.Y.	19.5

PROJECT NO. DF15406.2024250

COLUMBUS COUNTY

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			13

DRAWN BY :	JEB	DATE : 5-19
CHECKED BY :	JTG	DATE : 6-19
DESIGN ENGINEER OF RECORD :	J. GRISCOM	DATE : 6-19
DRAWN BY : SHS/MAA 5-09	REV. 12-17	MAA/THC
CHECKED BY : BCH 5-09		

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STANDARD NO. BAS_33_90S

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

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