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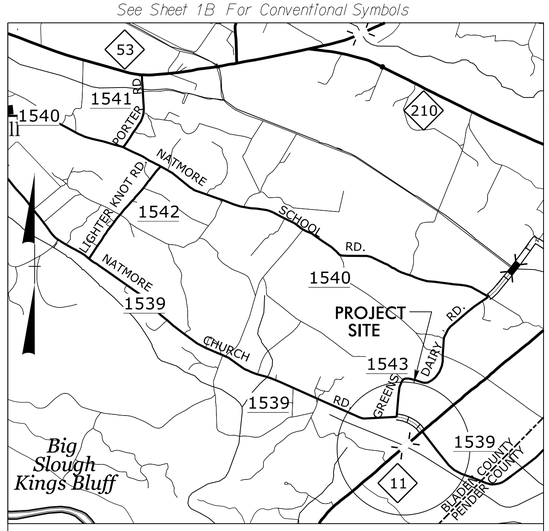
09/08/99

TIP PROJECT: B-5694

CONTRACT: C204362

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



VICINITY MAP (NTS)

FINAL PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BLADEN COUNTY

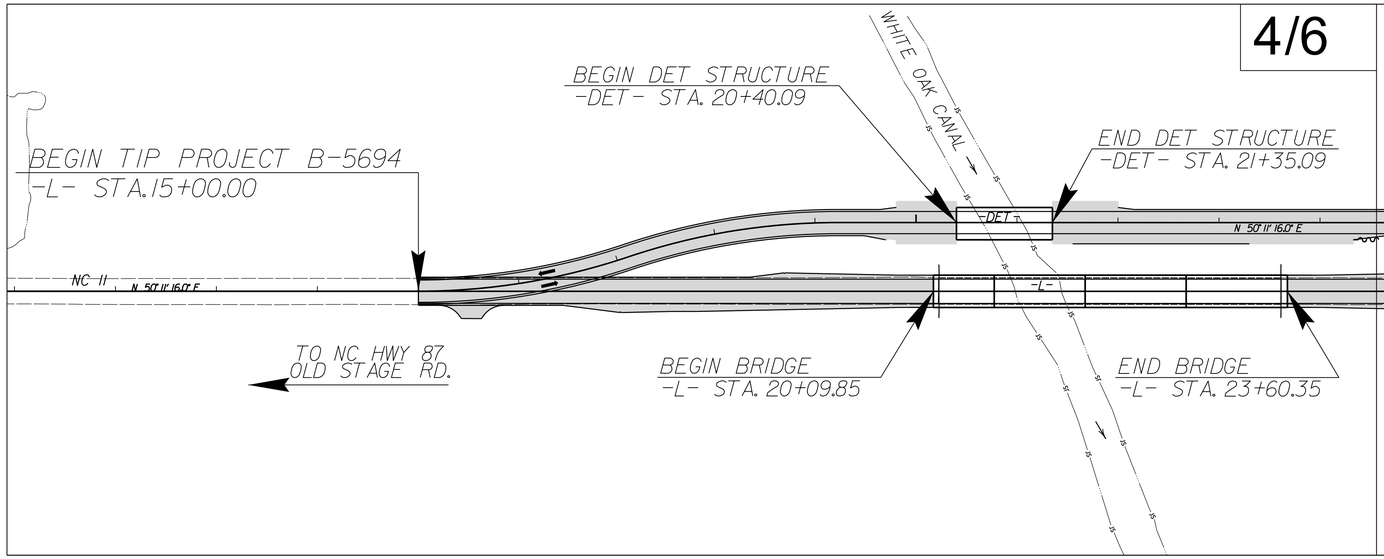
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5694	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
45648.1.1		P.E.
45648.2.1		ROW & UTIL.
45648.3.1		CONSTR.

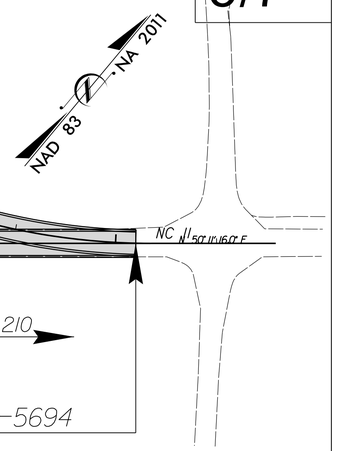
LOCATION: REPLACE BRIDGE NO. 080051 OVER WHITE OAK CANAL ON NC 11

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

4/6



5/7



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2022 = 3326
ADT 2042 = 4075
K = 10 %
D = 55 %
T = 13 % *
V = 60 MPH
V (DET) = 45 MPH
* TTST =11% DUAL 2%
FUNC CLASS =
MAJOR COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-5694 = .219 MILES
LENGTH OF STRUCTURE TIP PROJECT B-5694 = .066 MILES
TOTAL LENGTH OF TIP PROJECT B-5694 = .285 MILES

Prepared In the Office of:
KCI Associates of N.C., P.A.
4505 Falls of Neuse Road, Suite 400
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266
http://www.kci.com

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MAY 31, 2019

LETTING DATE: JUNE 21, 2022

NCDOT CONTACT:

Plans Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh NC, 27610

DEWAYNE L. SYKES, P.E.
PROJECT ENGINEER

BRYAN E. HOUGH, P.E.
PROJECT DESIGN ENGINEER

KRISTY ALFORD, P.E.
STRUCTURES MANAGEMENT UNIT

HYDRAULICS ENGINEER
DocuSigned by: CA0C89016E8C437...
NORTH CAROLINA PROFESSIONAL SEAL 033860 ENGINEER EVAN M YOUNG
P.E. 4/4/2022
SIGNATURE:

ROADWAY DESIGN ENGINEER
DocuSigned by: Bryan Hough 398761EFEF93446...
NORTH CAROLINA PROFESSIONAL SEAL 036853 ENGINEER BRYAN E. HOUGH
P.E. 4/4/2022
SIGNATURE:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

25-MAR-2022 06:46
M:\2018\25180945.12 B-5694\Roadway\Proj\B-5694_Rdy_tsh.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-5694	1A

ROADWAY DESIGN ENGINEER

DocuSigned by: Bryan Hough
398761EFEF93446...
NORTH CAROLINA PROFESSIONAL SEAL 036853 ENGINEER BRYAN E. HOUGH
4/4/2022

EFF. 01-16-2018

INDEX OF SHEETS

GENERAL NOTES:

2018 SPECIFICATIONS
EFFECTIVE: 01-16-2018

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SUBSURFACE DRAINS:

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO.815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

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.

TEMPORARY SHORING:

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

END BENTS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE FOUR COUNTY EMC (OVERHEAD ELECTRIC), WINDSTREAM (BURIED COMMUNICATION), AND STAR COMMUNICATIONS (BURIED COMMUNICATION)

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

2018 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	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 4 - MAJOR STRUCTURES	
422.01	Bridge Approach Fills - Type I Standard Approach Fill
422.03	Reinforced Bridge Approach Fills - Type A Alternate Approach Fill For Integral Abutment
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
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
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
876.01	Rip Rap in Channels
876.02	Guide for Riprap in Channels

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12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
B-5694	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

- Standard Gauge
- RR Signal Milepost
- Switch
- RR Abandoned
- RR Dismantled

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut
- Proposed Slope Stakes Fill
- Proposed Curb Ramp
- 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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

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

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H–Frame Pole
- U/G Power Line Test Hole (SUE – LOS A)*
- U/G Power Line (SUE – LOS B)*
- U/G Power Line (SUE – LOS C)*
- U/G Power Line (SUE – LOS D)*

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole
- Telephone Pedestal
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole
- U/G Telephone Test Hole (SUE – LOS A)*
- U/G Telephone Cable (SUE – LOS B)*
- U/G Telephone Cable (SUE – LOS C)*
- U/G Telephone Cable (SUE – LOS D)*
- U/G Telephone Conduit (SUE – LOS B)*
- U/G Telephone Conduit (SUE – LOS C)*
- U/G Telephone Conduit (SUE – LOS D)*
- U/G Fiber Optics Cable (SUE – LOS B)*
- U/G Fiber Optics Cable (SUE – LOS C)*
- U/G Fiber Optics Cable (SUE – LOS D)*

WATER:

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

TV:

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

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line Test Hole (SUE – LOS A)*
- U/G Gas Line (SUE – LOS B)*
- U/G Gas Line (SUE – LOS C)*
- U/G Gas Line (SUE – LOS D)*
- Above Ground Gas Line

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line
- Above Ground Sanitary Sewer
- SS Force Main Line Test Hole (SUE – LOS A)*
- SS Force Main Line (SUE – LOS B)*
- SS Force Main Line (SUE – LOS C)*
- SS Force Main Line (SUE – LOS D)*

MISCELLANEOUS:

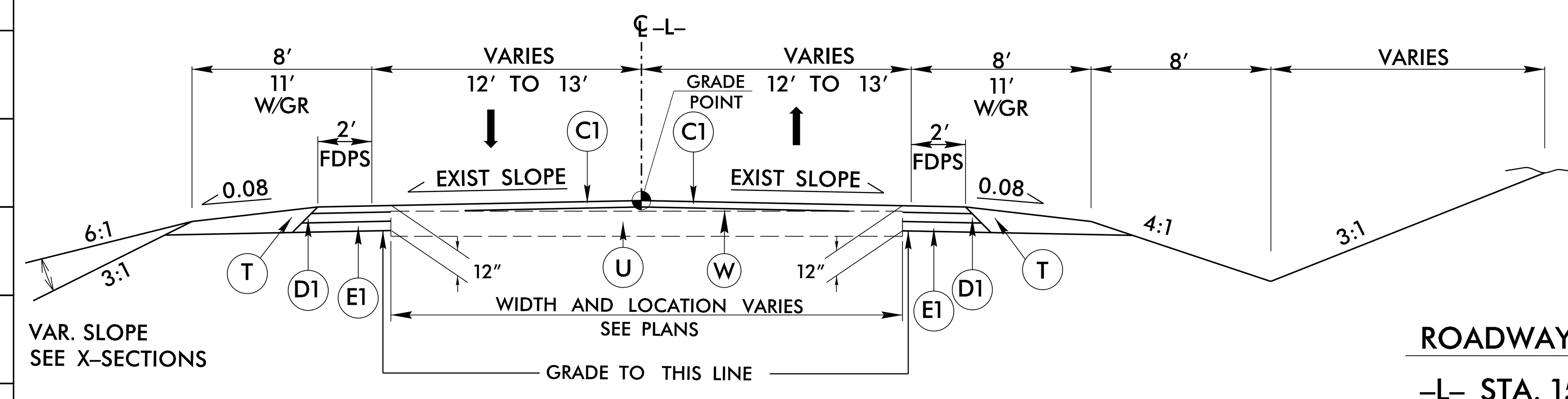
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box
- Utility Unknown U/G Line (SUE – LOS B)*
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc.
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- Abandoned According to Utility Records —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

6/2/99

FINAL PAVEMENT SCHEDULE

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

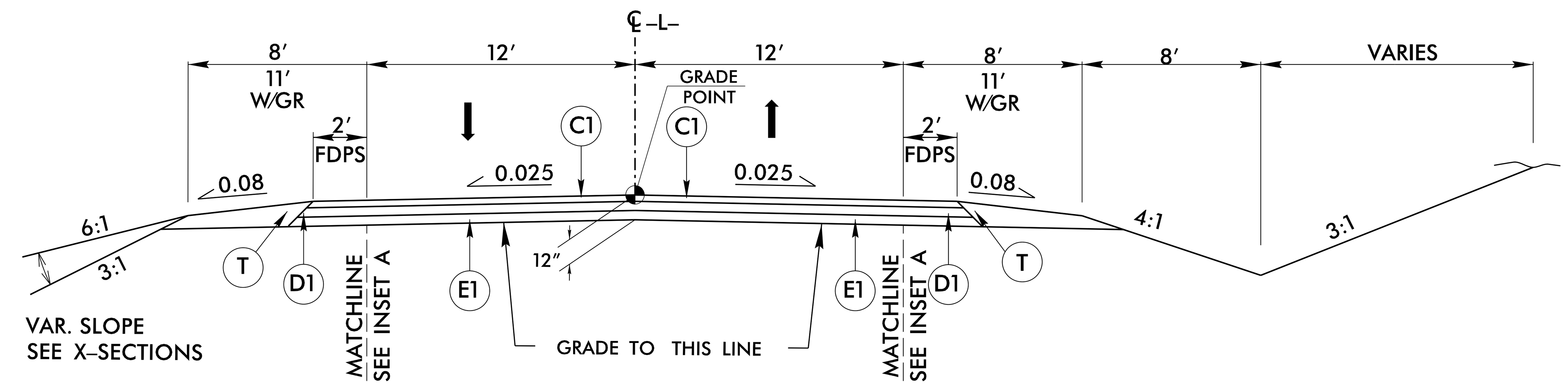
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168.0 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE,TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 2.0" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 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 5½" IN DEPTH.
J1	PROP. 6" AGGREGATE BASE COURSE.
P	PRIME COAT.(APPLY THE PRIME COAT AT A RATE OF .35 GAL/SY)
R1	SHOULDER BERM GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL SHOWING METHOD OF WEDGING).



ROADWAY TYPICAL SECTION NO. 1

ROADWAY TYPICAL SECTION NO. 1

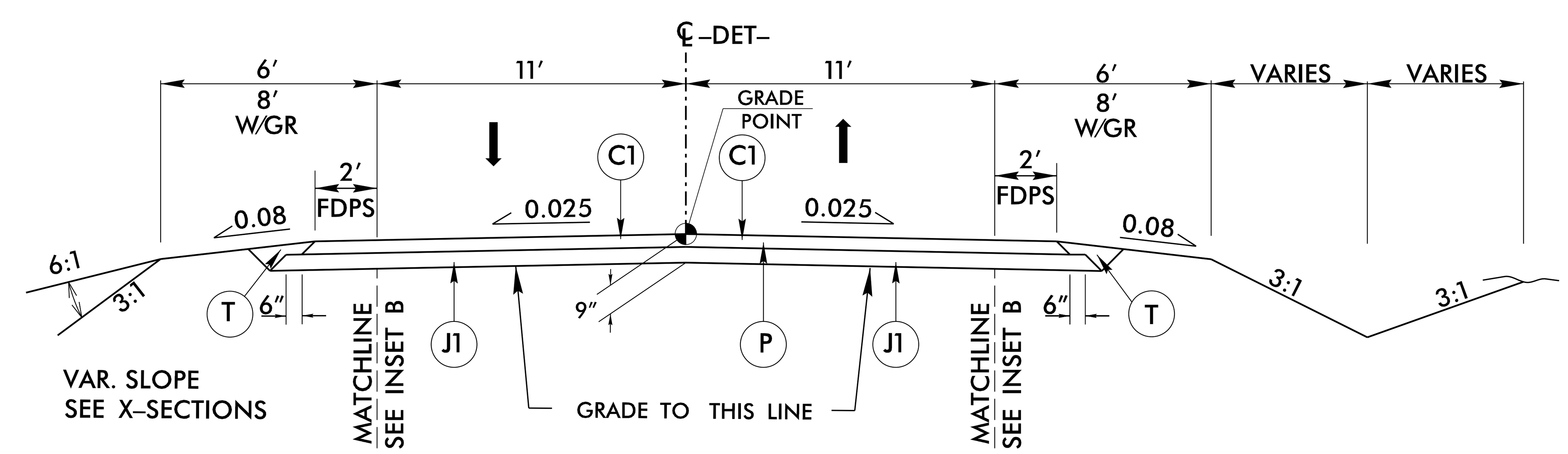
–L– STA. 15+00.00 TO STA. 17+18.00
–L– STA. 28+14.00 TO STA. 30+05.22



ROADWAY TYPICAL SECTION NO. 2

ROADWAY TYPICAL SECTION NO. 2

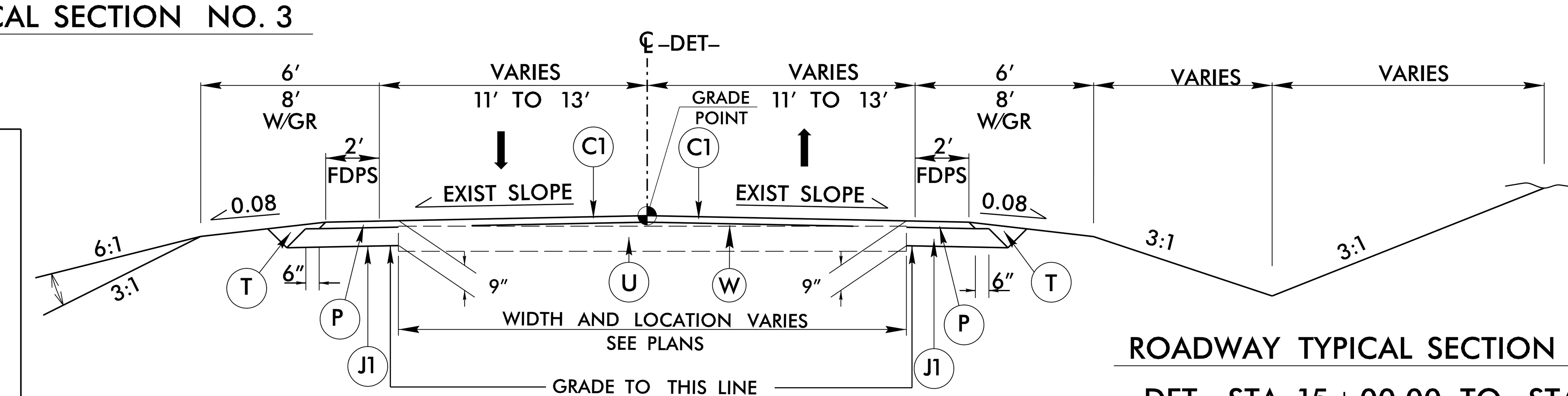
–L– STA. 17+18.00 TO STA. 20+09.85 (BEGIN BRIDGE)
–L– STA. 23+60.35 (END BRIDGE) TO STA. 28+14.00



ROADWAY TYPICAL SECTION NO. 3

ROADWAY TYPICAL SECTION NO. 3

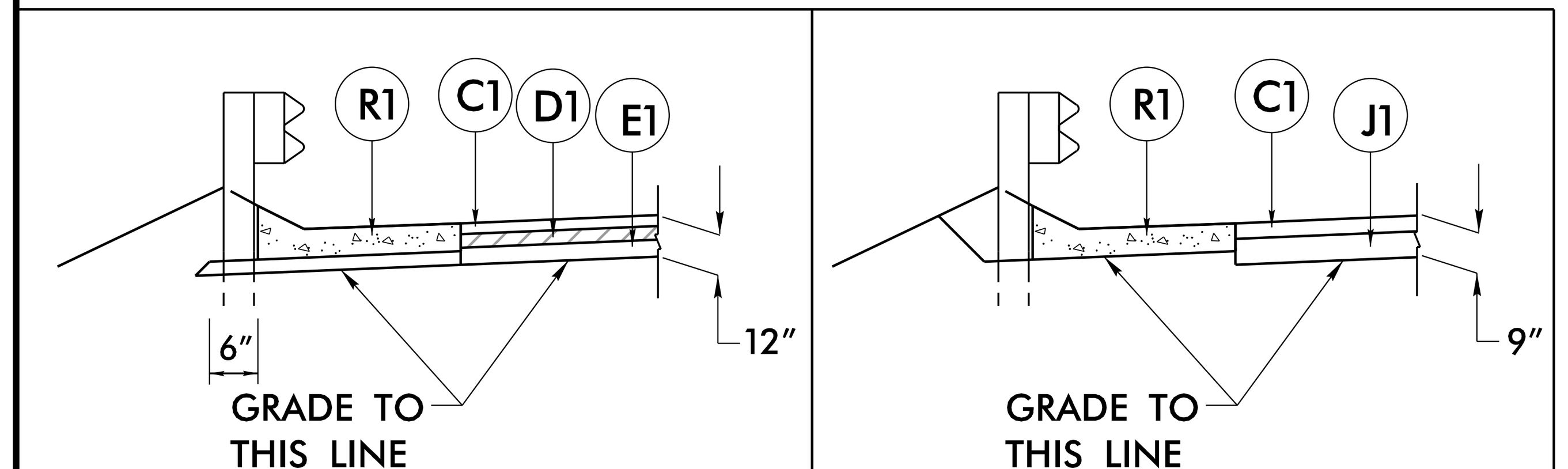
–DET– STA. 16+83.99 TO STA. 20+40.09 (BEGIN BRIDGE)
–DET– STA. 21+35.09 (END BRIDGE) TO STA. 28+52.00



ROADWAY TYPICAL SECTION NO. 4

ROADWAY TYPICAL SECTION NO. 4

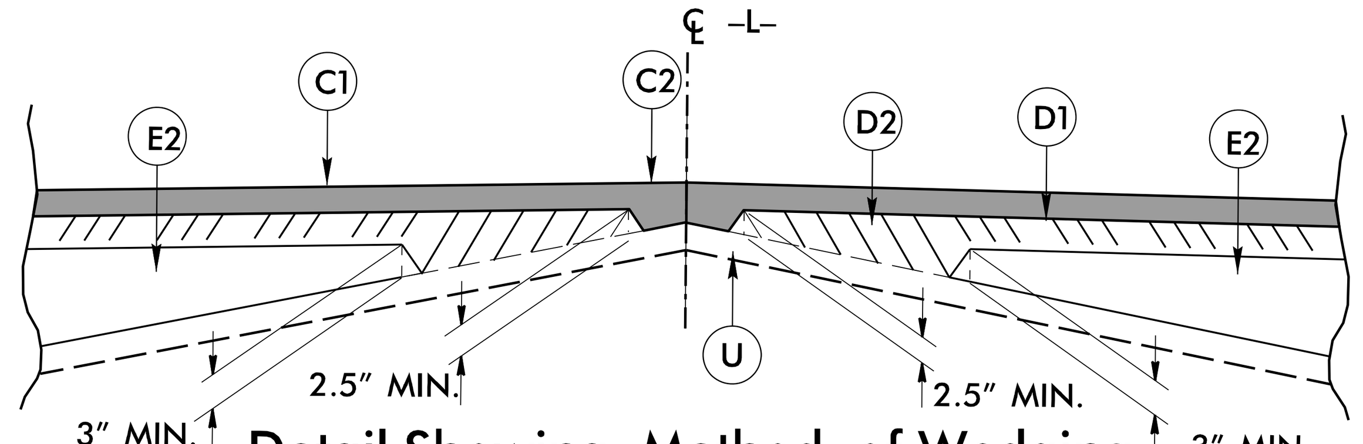
–DET– STA. 15+00.00 TO STA. 16+83.99
–DET– STA. 28+52.00 TO STA. 30+20.00



USE WITH TYPICAL 1 OR 2 WHERE SHOULDER BERM GUTTER IS REQUIRED
–L– STA. 19+85.00 TO 19+95.68 LT
–L– STA. 19+85.00 TO 19+95.68 RT

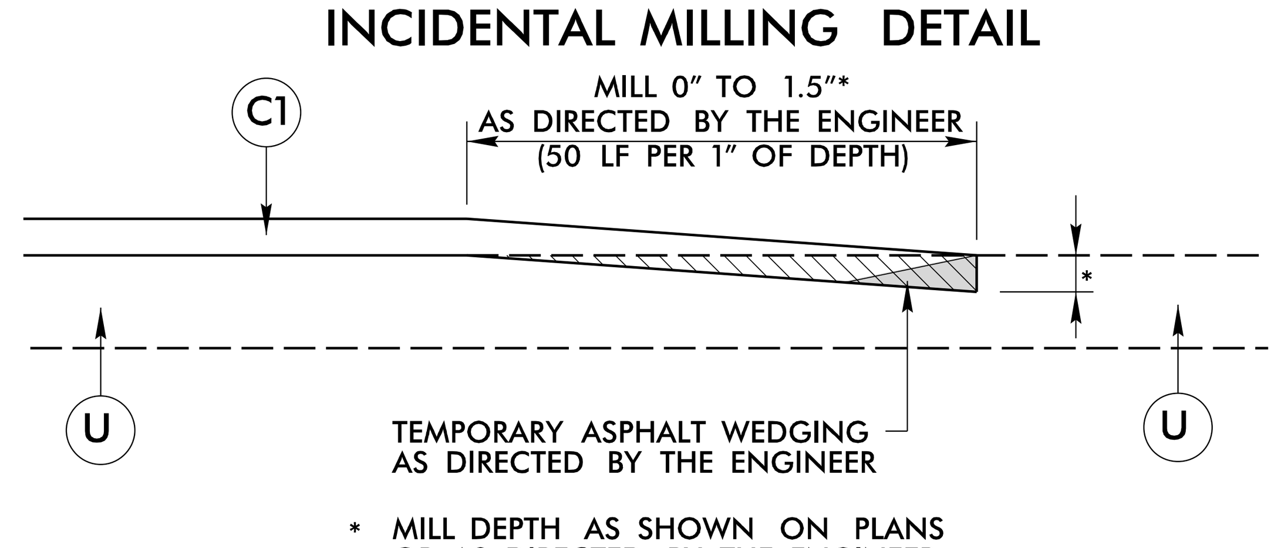
USE WITH TYPICAL 3 WHERE SHOULDER BERM GUTTER IS REQUIRED
–DET– 19+70.00 TO 19+80.60 RT

DETAIL SHOWING SHOULDER BERM GUTTER (SBG) ON TOP OF SUBGRADE



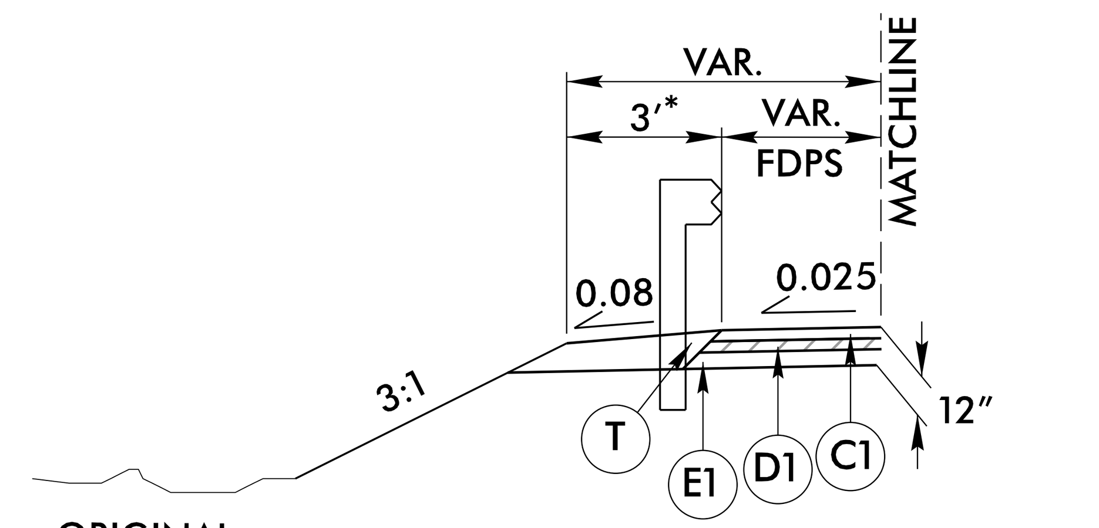
Detail Showing Method of Wedging

INCIDENTAL MILLING DETAIL



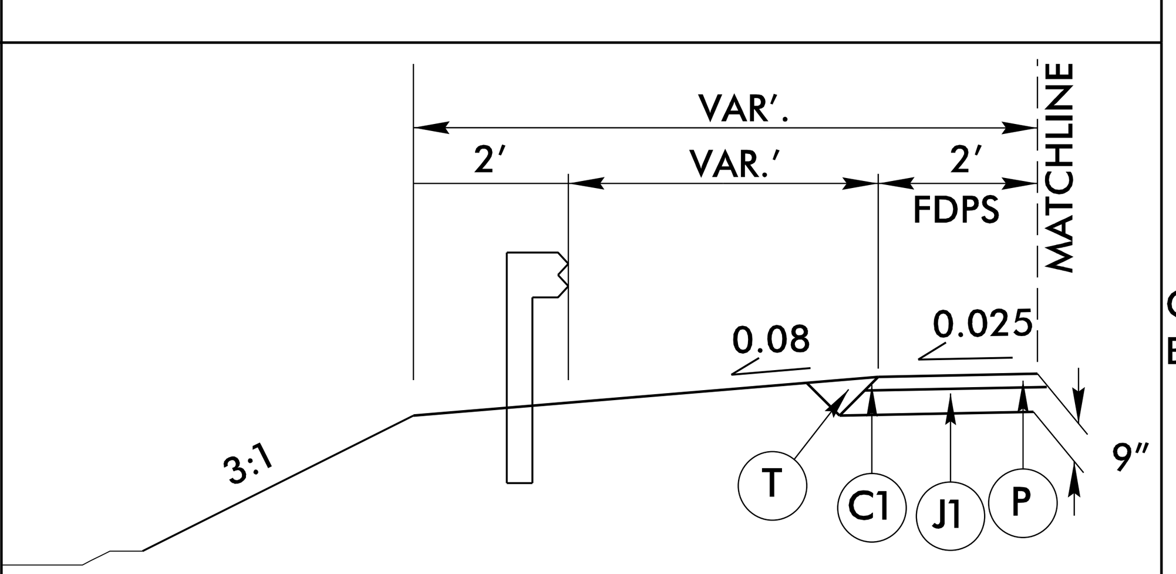
* MILL DEPTH AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER

** SEE TYPICALS FOR MIX TYPE



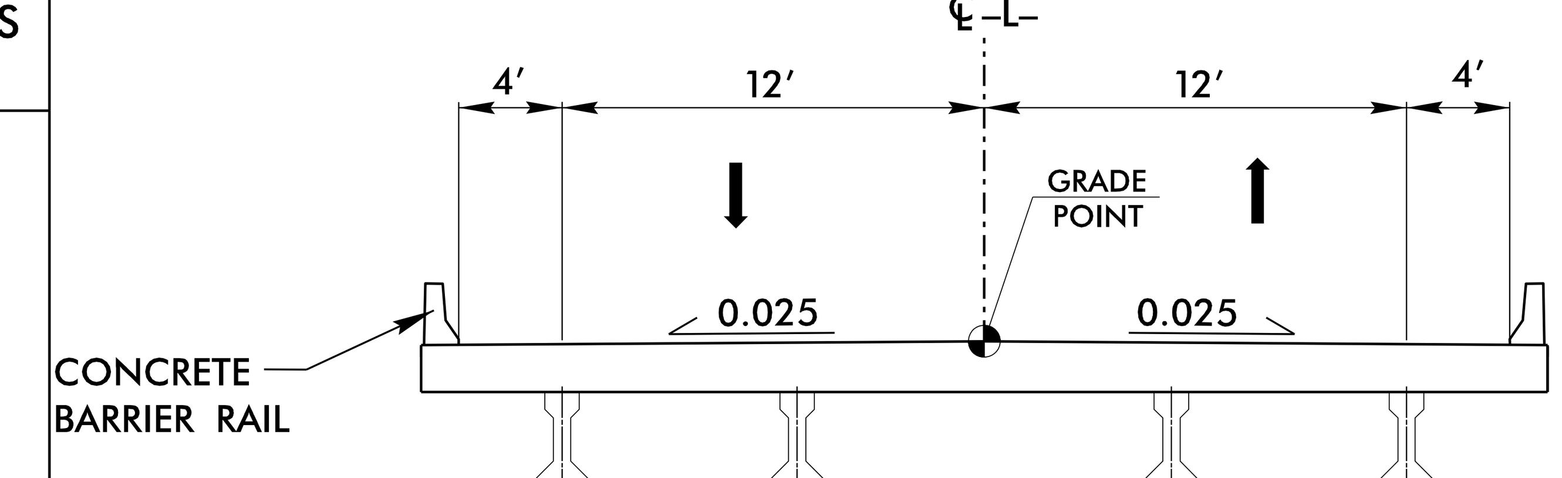
INSET A

USE IN GUARDRAIL LOCATIONS



INSET B

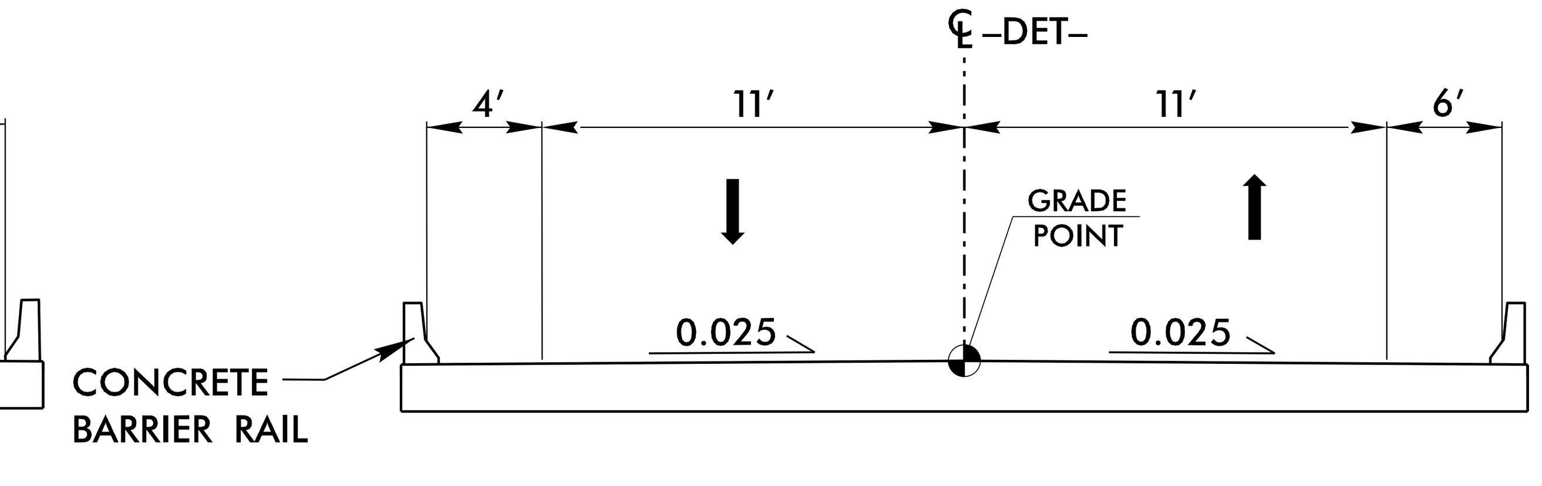
USE IN GUARDRAIL LOCATIONS



BRIDGE TYPICAL SECTION

–L– BRIDGE TYPICAL SECTION

–L– STA. 20+09.85 TO STA. 23+60.35



BRIDGE TYPICAL SECTION

–DET– BRIDGE TYPICAL SECTION

–DET– STA. 20+40.09 TO STA. 21+35.09

PROJECT REFERENCE NO.	SHEET NO.
B-5694	2A-1

ROADWAY DESIGN ENGINEER — DocuSigned by: Bryan Hough — 398761EFEF93446... — NORTH CAROLINA PROFESSIONAL SEAL 036853 ENGINEER BRYAN E. HOUGH — 4/4/2022

PAVEMENT DESIGN ENGINEER — DocuSigned by: Clark S. Morrison — B0A140DD1E004C4... — NORTH CAROLINA PROFESSIONAL SEAL 022896 ENGINEER CLARK S. MORRISON — 4/4/2022

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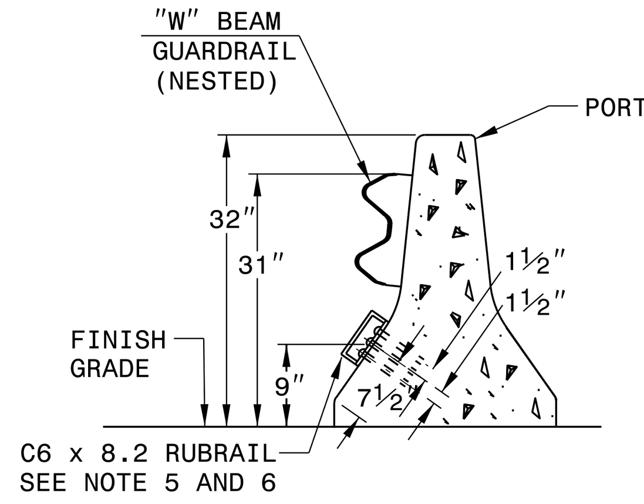
PROJECT REFERENCE NO.	SHEET NO.
B-5694	2C-1



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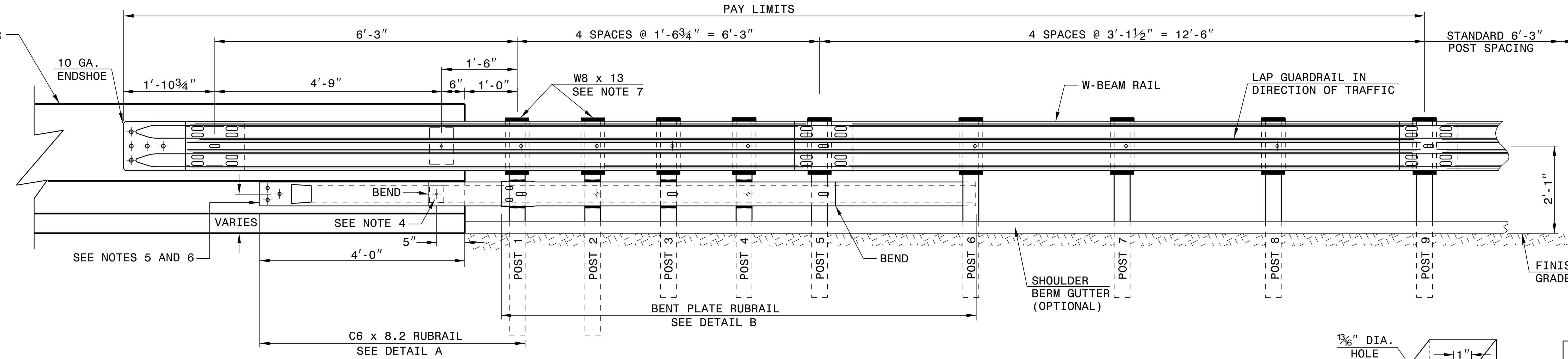
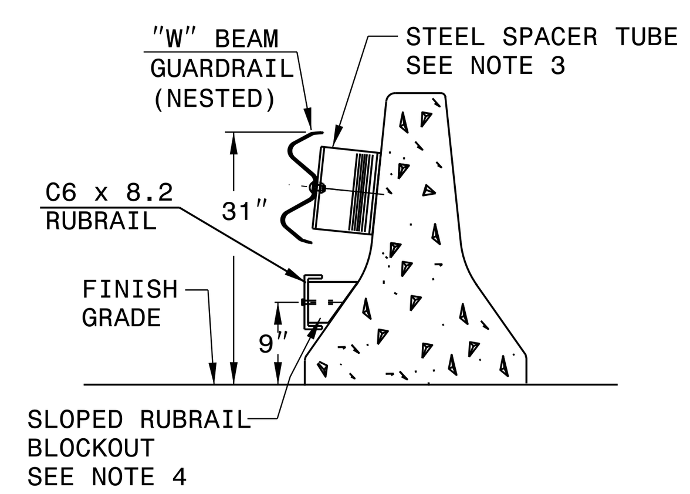
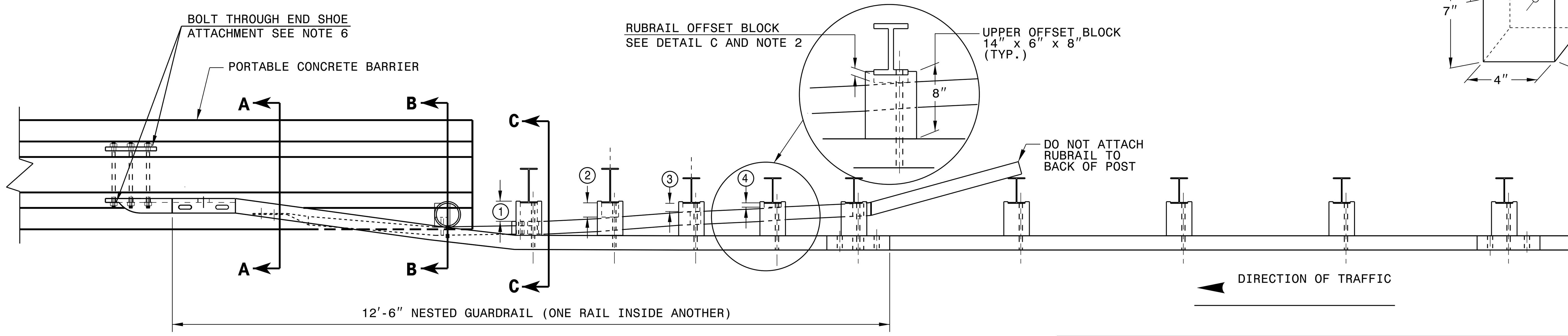


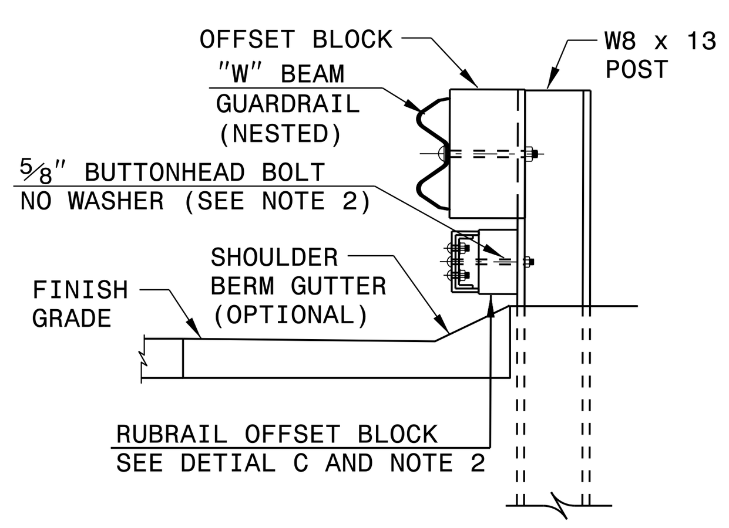
ELEVATION



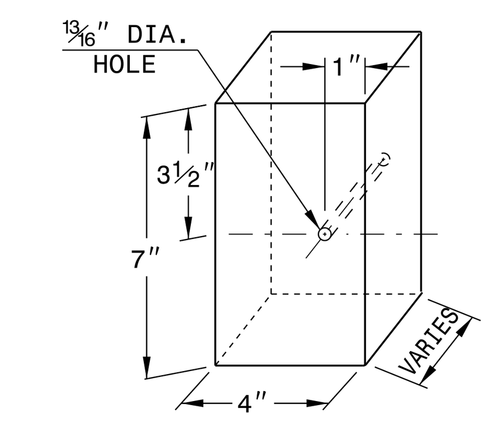
SECTION B-B



PLAN



SECTION C-C



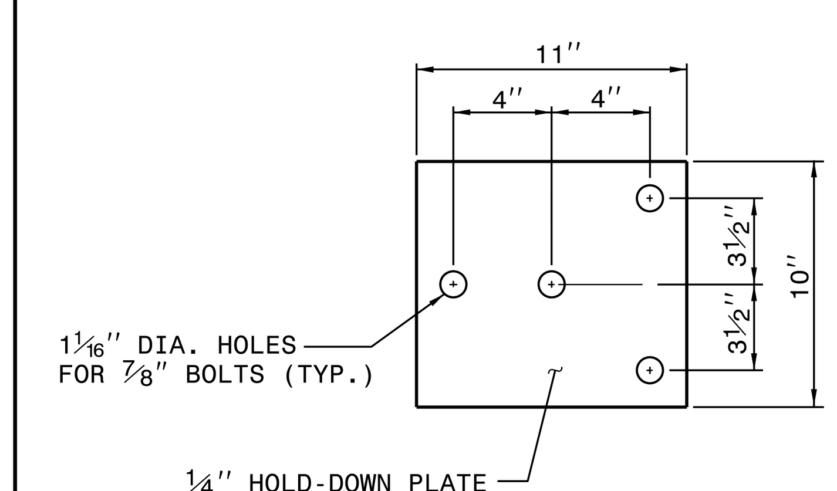
RUBRAIL BLOCKS 7" HIGH x 4" WIDE		
POST	THICKNESS	BOLT LENGTH
①	4¼"	9"
②	3¼"	5" *
③	2"	6"
④	1"	3" *

* BOLTS FOR POSTS 2 AND 4 ARE USED TO ATTACH BLOCK TO POST. RUBRAIL NOT ATTACHED TO BLOCK.

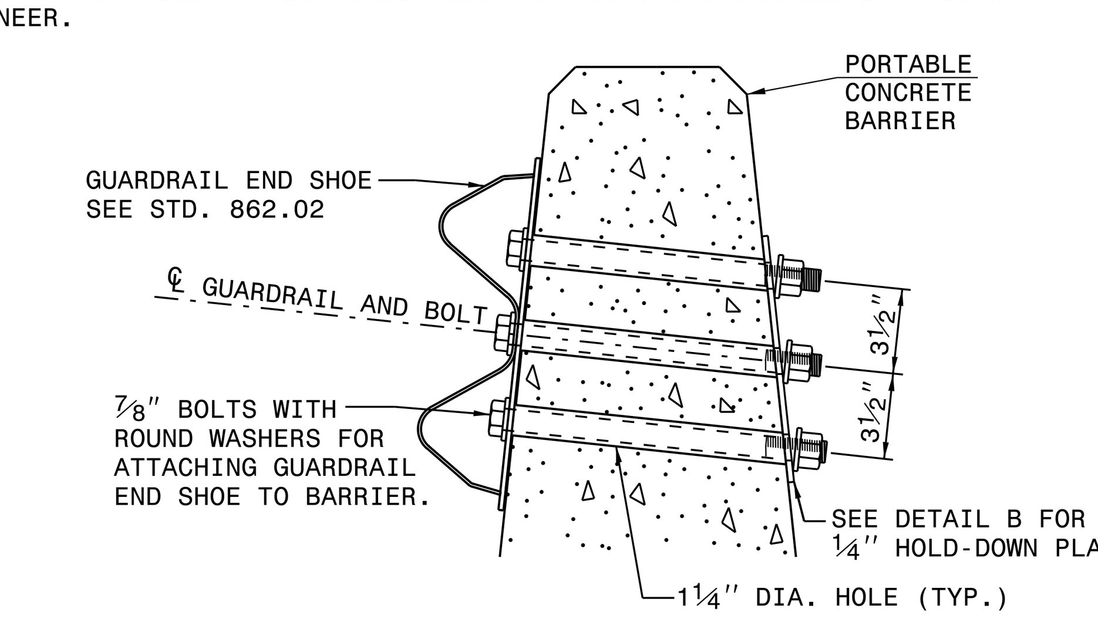
DETAIL C
RUBRAIL BLOCKOUT

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

NOTES FOR 4 BOLT HOLD DOWN PLATE
1) THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼" HOLD DOWN PLATE AND 4 - ⅞" DIA. BOLTS WITH NUTS AND WASHERS.
2) 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.
3) AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL. THE 1¼" DIA. 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.

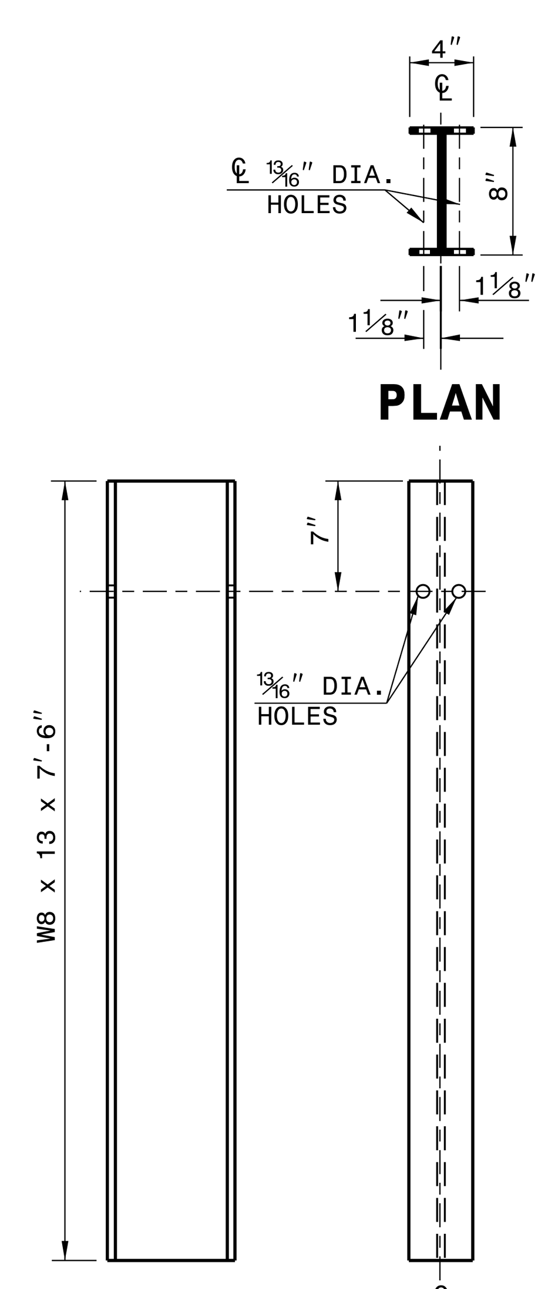


4 BOLT HOLD DOWN PLATE

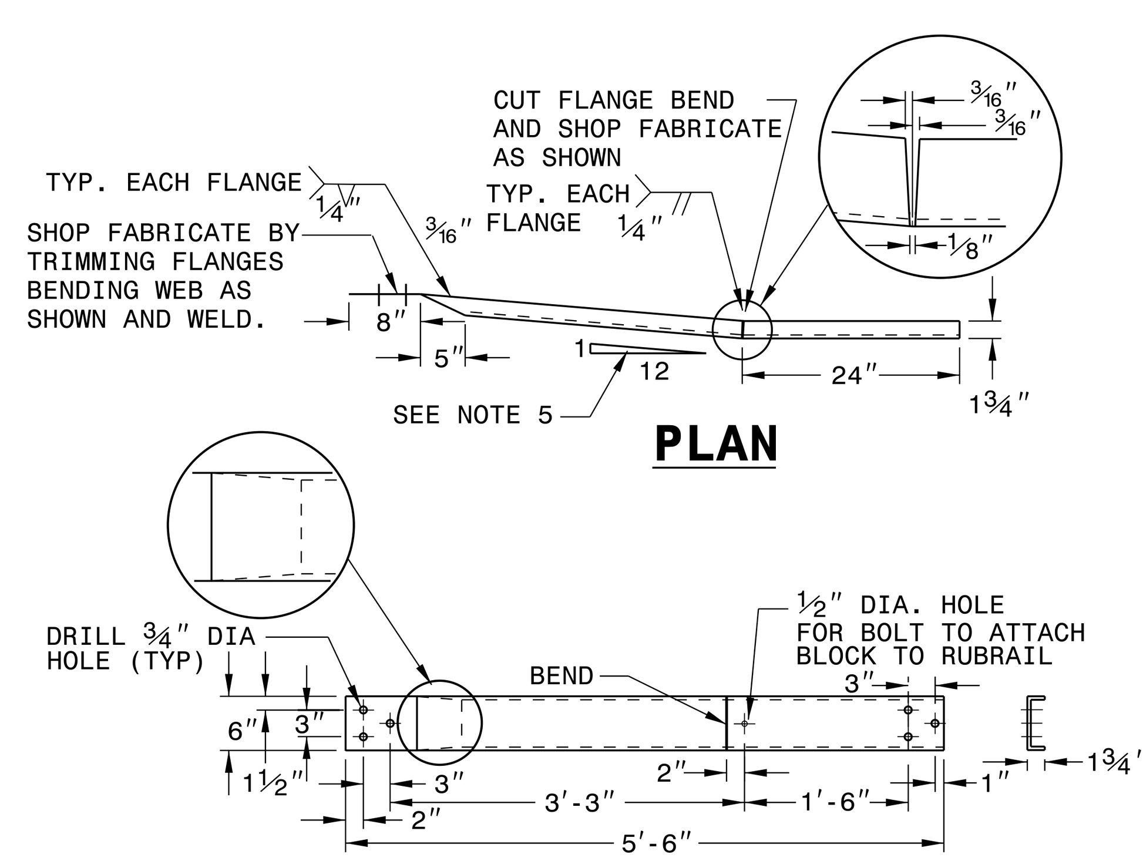


PART SECTION
OF BARRIER OR RAIL

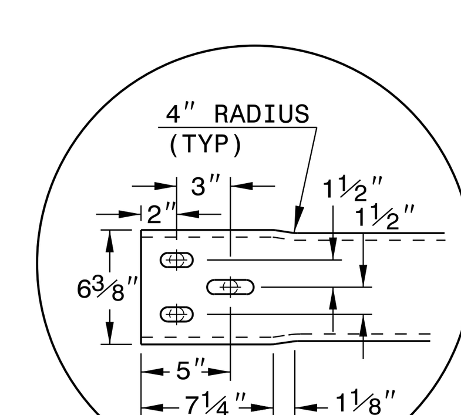
THRU END SHOE SECTION AND 4 BOLT HOLD DOWN PLATE

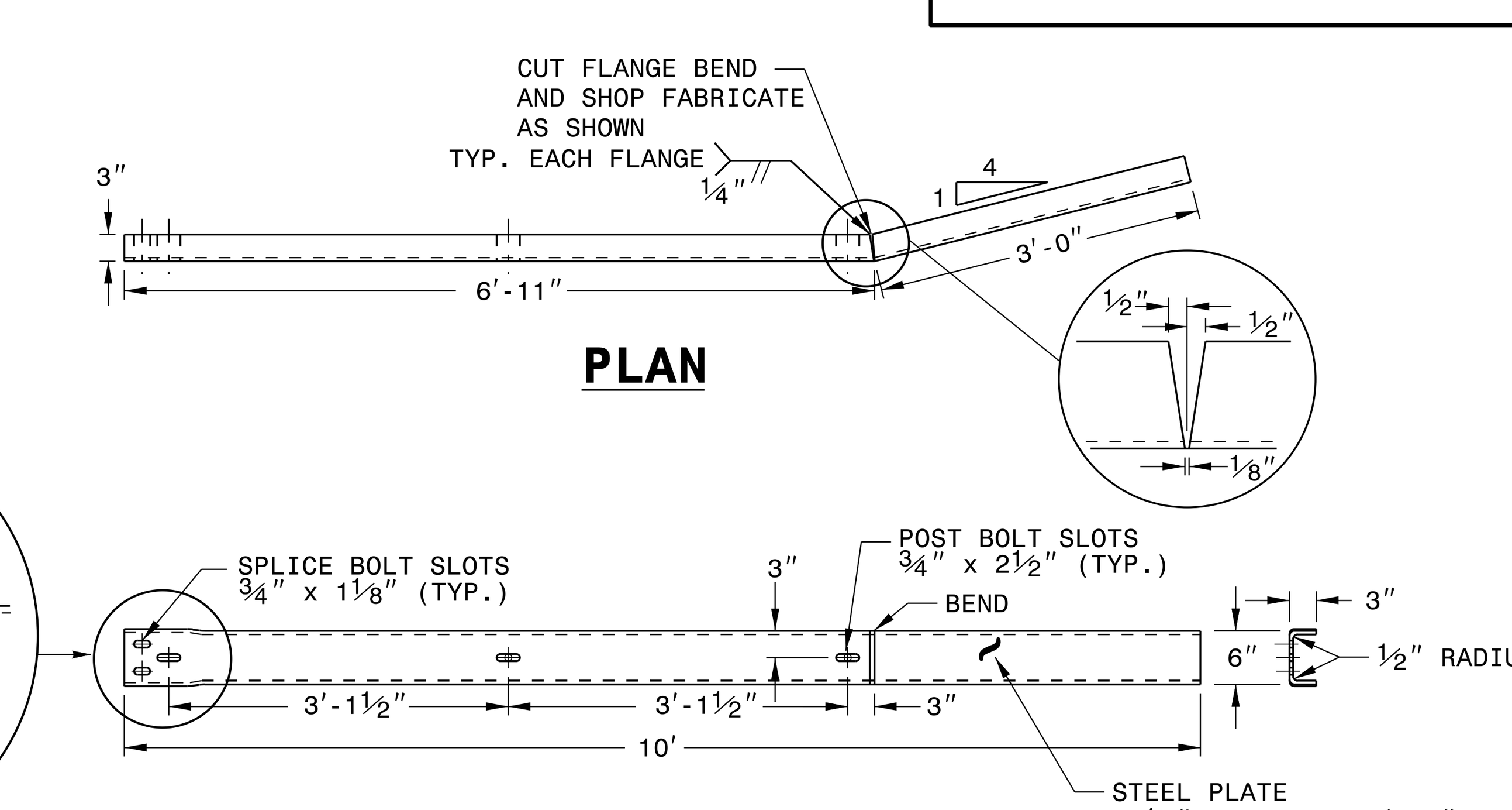


DETAIL F
"W8 X 13 X 7'-6".
STEEL POST

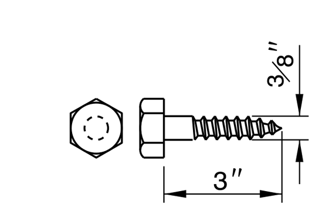


DETAIL A
C6 x 8.2 RUBRAIL

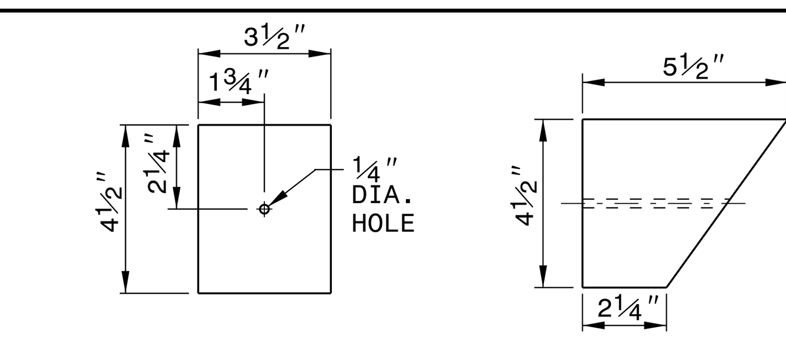




DETAIL B
BENT PLATE RUBRAIL



DETAIL E
LAG BOLT



DETAIL D
SLOPED RUBRAIL BLOCKOUT

DocuSigned by: SEAL 022071 4/4/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TEMPORARY GUARDRAIL ANCHOR UNIT TYPE B-77

ORIGINAL BY: E.E. WARD DATE: 04-07-04
MODIFIED BY: J.S. Howerton DATE: 10-02-18
CHECKED BY: DATE:
FILE SPEC.:

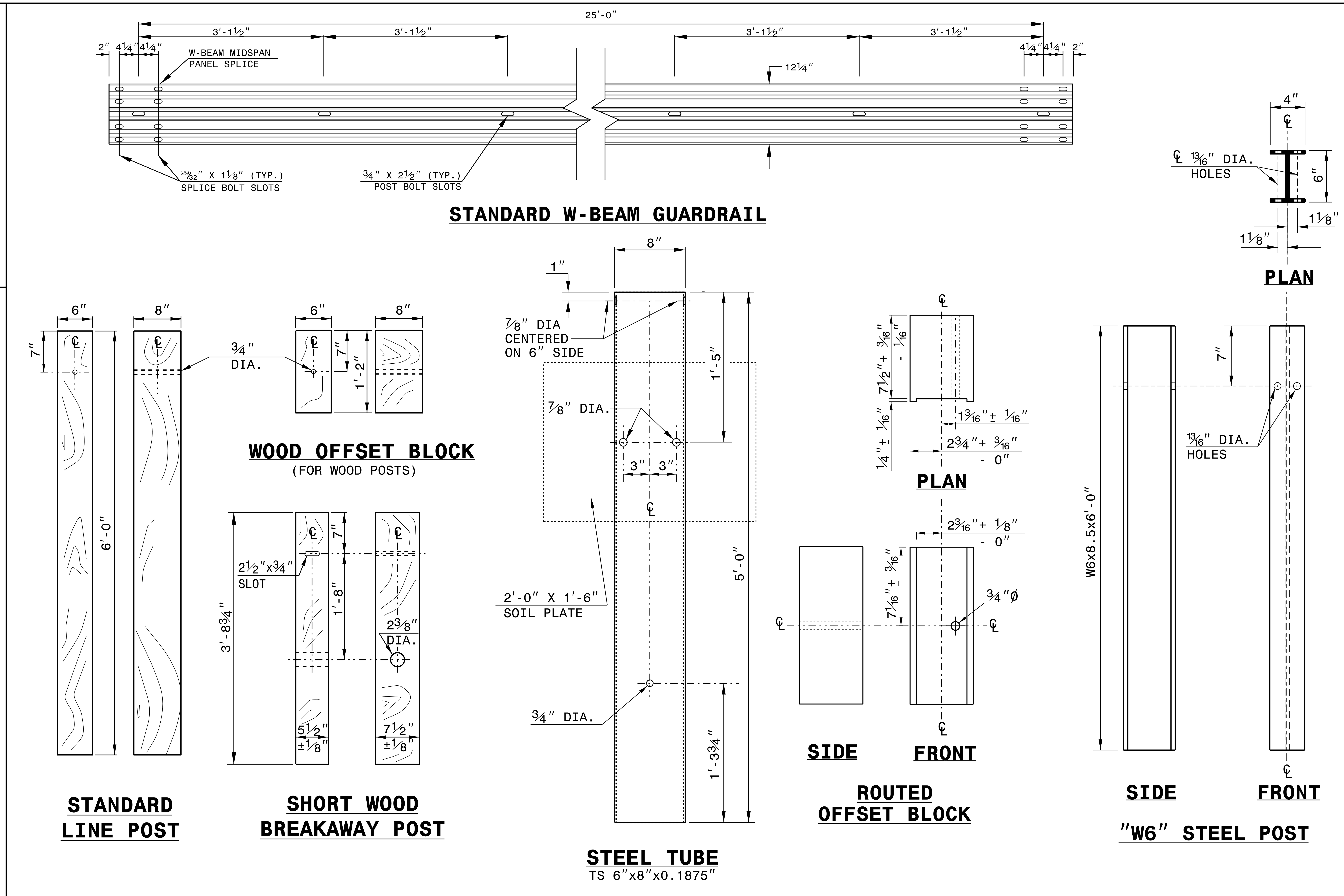
02-OCT-2018 14:39
S:\Contracts\Contracts\Special Details\jhowerton\Temporary B-77 to PCB.dgn
jhowerton AT CSD-292595

PROJECT REFERENCE NO.	SHEET NO.
B-5694	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



SYSTEM PARTS

SHEET 6 OF 8
862D02

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

DocuSigned by: Ron Davenport
SEAL 022071
4/4/2022

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

SEE TITLE BLOCK

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

PROJECT REFERENCE NO.	SHEET NO.
B-5694	2G-1

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

DocuSigned by: Scott A. Hidden 03/22/2022
F760CAEB96FC4D3...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

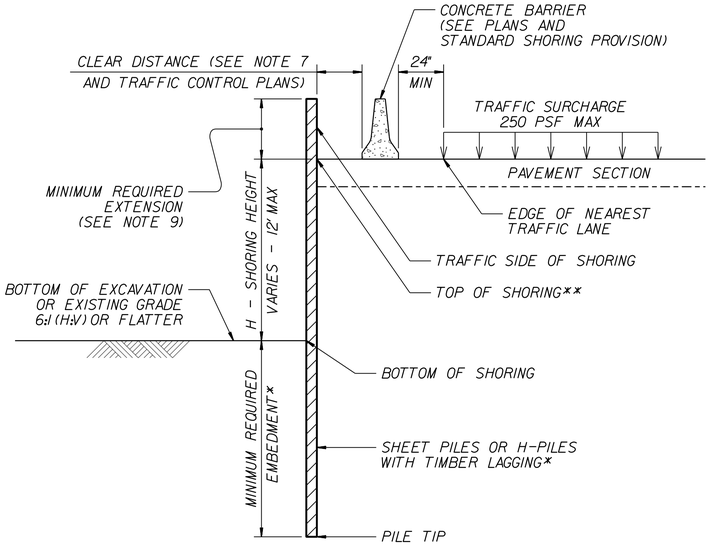
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS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

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

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

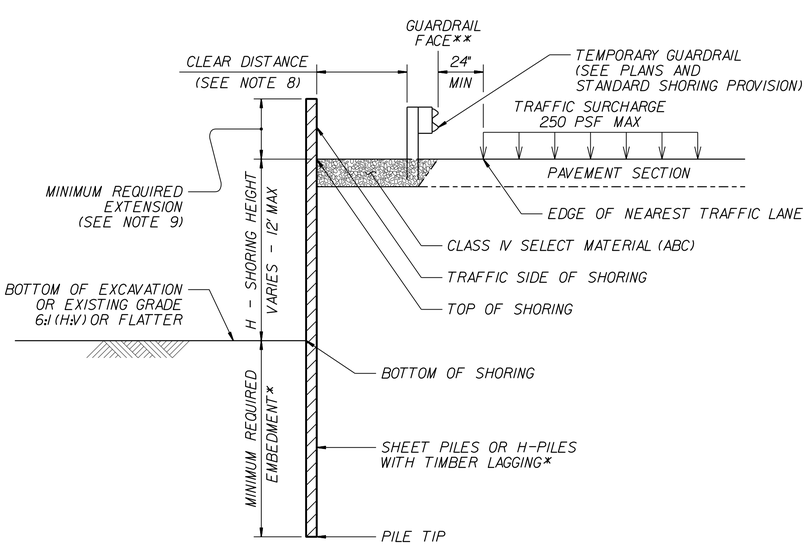
NOTES:

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



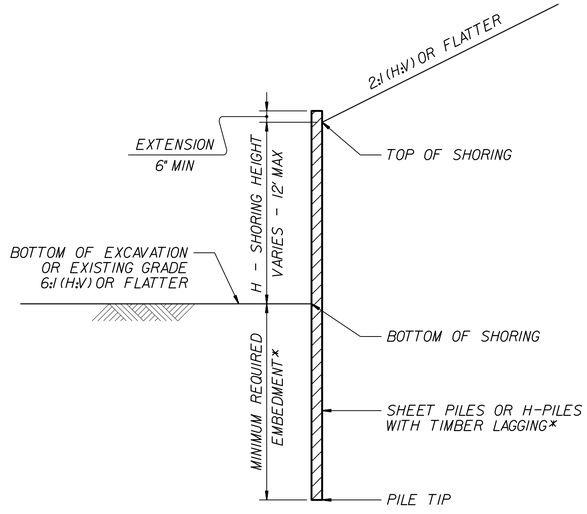
CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT



TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT



STANDARD TEMPORARY SHORING

(SLOPE CASE)
*SEE TABLE ABOVE.

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
*SEE TABLE ABOVE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-19-13

COMPUTED BY: TTC	DATE: 8/22/2019
CHECKED BY: TLK	DATE: 8/22/2019

PROJECT REFERENCE NO.	SHEET NO.
B-5694	3B-1

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK IN CUBIC YARDS

STATION	STATION	UNCL. EXCAV.	UNDERCUT EXCAV.	EMBANK. +%	BORROW	WASTE
–DET– 15+00.00	–DET– 20+40.09			12,004	12,004	
–DET– 21+35.09	–DET– 30+20.00			25,658	25,658	
PHASE 1 (DET) SUBTOTAL:				37,662	37,662	
–L– 15+00.00	–L– 20+09.85	71		3,696	3,625	
–L– 23+60.35	–L– 30+05.22	50		6,614	6,564	
PHASE 2 (L) SUBTOTAL:		121		10,310	10,189	
–L– 15+00.00	–L– 30+05.22	31,401				31,401
PHASE 3 (DET REMOVAL) SUBTOTAL:		31,401				31,401
TOTALS:		31,522		47,972	47,851	31,401
ADDITIONAL UNDERCUT						
WASTE IN LEIU OF BORROW						
SELECT GRANULAR MATERIAL IN LIEU OF BORROW						
PROJECT TOTAL:		31,522		47,972	47,851	31,401
EST 5% TO REPLACE TOP SOIL ON BORROW PIT					2,393	
GRAND TOTAL:		31,522		47,972	50,244	31,401
SAY:		31,530		47,980	50,250	31,410

EST. DDE = 35 CY
PER GEOTECH RECOMMENDATION: EST. SELECT GRANULAR MATERIAL: 300 CY
PER GEOTECH RECOMMENDATION: ESTIMATED 300 CY OF UNDERCUT TO BE USED AT THE DESCRETION OF THE RESIDENT ENGINEER.

NOTE:
APPROXIMATE QUANTITIES ONLY.

THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

SHOULDER BERM GUTTER

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LF
–L–	19+85.00	19+95.68	LT	10.68
–L–	19+85.00	19+95.68	RT	10.68
–DET–	19+70.00	19+80.60	RT	10.6
			TOTAL:	31.96
			SAY:	40

REMOVAL OF EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
–L–	17+18.00	19+46.00	CL	663.41
–L–	27+04.00	28+14.00	CL	321.59
–DET–	15+52.53	20+40.09	CL	1,197.86
–DET–	21+35.09	29+79.40	CL	2,235.86
			TOTAL:	4,418.72
			SAY:	4,861

BREAKING OF EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
–L–	19+46.00	19+96.09	CL	149.44
–L–	23+74.09	27+04.00	CL	961.34
			TOTAL:	1,110.78
			SAY:	1,222

PARCEL INDEX

PARCEL NO.	SHEET NO.	PROPERTY OWNER NAME
1	4	WARD LORIN NEWTON
2	4/5	ALICE HAWES
3	4	WARD LORIN NEWTON
4	4/5	ALICE HAWES

SUMMARY OF PORTABLE CONCRETE BARRIER (ANCHORED)

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LF
–DET–	19+80.00	20+40.09 (BR)	LT	60.09
–DET–	19+80.00	20+40.09 (BR)	RT	60.09
–DET–	21+35.09 (BR)	22+00.00	LT	64.91
–DET–	21+35.09 (BR)	24+33.00	RT	297.91
			TOTAL:	483
			SAY:	485

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	FLARE LENGTH		W		ANCHORS									TEMP. CRASH CUSHIONS			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	B-77	GREU 350	M-350	TEMP. W-BEAM RETROFIT	TYPE III	VI MOD	GREU TL-3	AT-1	EA	G	NG				
–L–	18+62.22	20+09.85 (BR.)	LEFT	147.875				20+10.09 (BR.)	8.00′	11.00′		50′		1.0′		1						1						166.58′		
–L–	16+99.72	20+09.85 (BR.)	RIGHT	310.375′			20+10.09 (BR.)		8.00′	11.00′	50′		1.0′			1						1						166.92′		
–L–	23+60.35 (BR.)	26+70.47	LEFT	310.375′			23+60.09 (BR.)		8.00′	11.00′	50′		1.0′			1						1						166.69′		
–L–	23+60.35 (BR.)	25+07.97	RIGHT	147.875′				23+60.09 (BR.)	8.00′	11.00′		50′		1.0′		1						1						166.55′		
			SUBTOTAL	916.50′																								666.74′		
		LESS ANCHOR DEDUCTIONS:																												
		GREU TL-3	4 @ 50.00′ =	–200.00′																										
		B-77	4 @ 22.875′ =	–91.50′																										
		ANCHOR DEDUCTION TOTAL:		–291.50′																										
			PROJECT TOTAL	625.00′												4						4						666.74′		
			SAY	637.50′												4						4						670.00′		
		ADDITIONAL GUARDRAIL POST =		5 EA																										
TEMPORARY GUARDRAIL																														
–DET–	16+57.625	19+80.50 (PCB)	LT (SEE DET PLANS)	322.875′				20+40.09 (BR.)	2.00′	8.00′		50′		1.0′		1						1								
–DET–	18+32.625	19+80.50 (PCB)	RT (SEE DET PLANS)	147.875′			20+40.09 (BR.)		2.00′	8.00′	50′		1.0′			1						1								
–DET–	22+00.00 (PCB)	27+05.375	LT (SEE DET PLANS)	505.375′			21+35.09 (BR.)		2.00′	8.00′	50′		1.0′			1						1								
–DET–	24+33.00 (PCB)	24+58.00	RT (SEE DET PLANS)	25.00′				21+35.09 (BR.)	2.00′	8.00′		50′		1.0′										1						
			SUBTOTAL	1001.125′																										
		LESS ANCHOR DEDUCTIONS:																												
		TEMP GREU TL-3	3 @ 50.00′ =	–150.00′																										
		TEMP B-77	3 @ 22.875′ =	–68.625′																										
		TEMP. CRASH CUSH.	1 @ 25.00′ =	–25.00′																										
		ANCHOR DEDUCTION TOTAL:		–243.625′																										
			PROJECT TOTAL	757.50′												3						3		1						
			SAY	762.50′												3						3		1						
		ADDITIONAL GUARDRAIL POST =		5 EA																										

4/04/06
11-MAY-2022 13:03
M:\2018\2518019945.12 B-5694\Roadway\Proj\B-5694_Rdy_sum.dgn
$$$$USERNAME$$$$

12-3T3O8H2

COMPUTED BY:	SAW	DATE:	6/13/2019
CHECKED BY:	LMY	DATE:	6/13/2019

PROJECT NO.	SHEET NO.
B-5694	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.
See "Standard Specifications For Roads and Structures, Section 300-5".

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

LINE & STATION	OFFSET		STRUCTURE NUMBER FROM	TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) 12	15	18	24	30	36	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.
L 19+90	16	LT	0401		26.6															1		
			0401	0402		23.4	12.9			52					X	X						
L 19+90	16	RT	0403		26.6															1		
			0403	0404		23.4	14.7			40					X	X						
DET 19+76	17	RT	0401A		25.9															1		
			0401A	0402A		22.8	18.9			20					X	X						
SHEET TOTALS										112										3		
PROJECT TOTALS										112										3		

LINE & STATION	FROM	TO	OPEN THROAT C.B. STD. 840.04 OR STD. 840.05	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.20	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.20	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.22	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.24	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.33	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37	TEMP STEEL PLATE COVER MASONRY DRAINAGE	##" SPRING BOX PIPE	SPRING BOX STD. 840.41
L 19+90	0401																1						1					
	0401	0402																										
L 19+90	0403																1						1					
	0403	0404																										
DET 19+76	0401A																1						1					
	0401A	0402A																										
SHEET TOTALS																	3						3					
PROJECT TOTALS																	3						3					

LINE & STATION	FROM	TO	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	M.H. FRAME AND COVER STD. 840.54	##" x ##" x ##" PERF. C.S.P. TEE RISER ##" THICK	##" x ##" x ##" PERF. C.S.P. TEE RISER ##" THICK	##" PIPE END SECTION	##" PIPE END SECTION	##" PIPE END SECTION	##" PIPE END SECTION	CONVERT EXISTING C.B. TO J.B.	CONVERT EXISTING C.B. TO D.I.	CONVERT EXISTING D.I. TO J.B.	CONVERT EXISTING J.B. TO D.I.	ADJUST C.B.	ADJUST D.I.	15" DRAINAGE PIPE ELBOW	18" DRAINAGE PIPE ELBOW	24" DRAINAGE PIPE ELBOW	##" R.C. ELBOW	BERM DITCH OUTLET STD. 850.10 (PER EACH)	BERM DITCH OUTLET STD. 850.11 (PER EACH)	##" SLUICE GATE (##" SIZE SLUICE GATE)	MODIFIED CONC. FLUME	PREFORMED SCOUR HOLE (PER EACH)	ENERGY DISSIPATION BASIN	FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 19+90	0401																														
	0401	0402															2														
L 19+90	0403																														
	0403	0404															2														
DET 19+76	0401A																														Install for Detour, Remove for Final
	0401A	0402A															2														Install for Detour, Remove for Final
SHEET TOTALS																	6														
PROJECT TOTALS																	6														

ABBREVIATIONS

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

COMPUTED BY: Tyler C. Bottoms DATE: 6/11/19 .
CHECKED BY: Jinyoung Park DATE: 7/11/19

(5-15-18)

PROJECT NO.	SHEET NO.
B-5694	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	200
				TOTAL LF:	200

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

DocuSign Envelope ID: 95935EA3-B55D-41D1-9D32-096A1EE1CF2D

PROJECT REFERENCE NO.	SHEET NO.
B-5694	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
DocuSigned by: Brian Hogan
4/4/2022

HYDRAULICS ENGINEER
DocuSigned by: Leah Young
4/4/2022

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REVISIONS 8/17/99

-L- POT Sta. 10+00.00

BEGIN STATE TIP PROJECT B-5694
-L- STA. 15+00.00
WARD LORIN NEWTON
DB 571PG 453
1

END APPROACH SLAB
-L- STA. 23+74.52
END BRIDGE
-L- STA. 23+60.35

BEGIN APPROACH SLAB
-L- STA. 19+95.68

BEGIN BRIDGE
-L- STA. 20+09.85

MATCH LINE STA. 24+00.0 - SEE SHEET 5

NC GRID
NAD 83 NA 2011

1.5 SBKD
CONC FOUNTAIN
48" BK FENCE
POND
WOODS
GRASS
CULTIVATED
EXISTING R/W
TO NC HWY 87
26' BST HWY 11
WARD LORIN NEWTON
DB 571PG 453
3
SCOTT GOTTFRIED
DB 676 PG 434
ISFRD
ALICE HAWES
DB 233 PG 822
2
4
WHITE OAK CANAL
BRIDGE #51
BM #1
N 50° 11' 16.0" E
GREU TL-3
8:1 TAPER
BEGIN SBG +85.0
END AT APP. SLAB
BL-2 +72.84 19.01' RT
BL-3 +88.33 17.48' RT
B-77 +96.1
+74.1 B-77
+72.0 87.9' RT ELEV. = 13.0'
-L- +00.00 EXIST R/W 35.00' LT
-L- +00.00 75.00' LT
-L- +09.00 75.00' LT
-L- +50.00 EXIST R/W 35.00' LT 75.00' LT
-L- +17.00 145.00' LT
-L- +15.52 150.00' LT
-L- +00.00 EXIST R/W 90.00' RT
-L- +65.00 90.00' RT 95.00' RT
+86.1 66.3' LT ELEV. = 12.9'
+54.5 66.2' LT ELEV. = 10.0'
CLASS B RIPRAP PAD EST 2 TONS EST 7 SY GT
STANDARD 'V' DITCH SEE DETAIL C
EXCAVATION ELEV. = 14.0' (STRUCTURE PAY ITEM)
LATERAL 'V' DITCH SEE DETAIL B
LATERAL 'V' DITCH SEE DETAIL A
CLASS II RIPRAP TO ELEV. = 23.7' (STRUCTURE PAY ITEM)
RIPRAP AT EMBANKMENT SEE DETAIL D
EXCAVATION TO ELEV. = 13.0' (STRUCTURE PAY ITEM)
DECK DRAIN DISSIPATOR PADS SEE DETAIL E
REMOVE EX. BRIDGE
15" PIPE W/ 2 ELBOWS
CLASS B RIPRAP PAD EST 1 TON EST 5 SY GT
CLASS II RIPRAP TO ELEV. = 23.7' (STRUCTURE PAY ITEM)
@END OF RIPRAP
Q2 = 1.8 cfs
V2 = 1.5 f/s
Q10 = 2.3 cfs
V10 = 1.8 f/s
STANDARD 'V' DITCH SEE DETAIL C
PDE
TIP
EOI
BST
TC
FO
F
R/W
RW
WOODS
S 31°07'23" W 99.87'
N 57°57'19" E 398.00'
N 31°07'23" E 300.64'
S 36°09'38" E 208.60'
N 69°16'41" W 276.59'

DETAIL A
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 3:1, D, 3:1, b, 1'/Ft., Fill Slope
Min. D= 1.0 Ft.
b= 2 Ft.
FROM -L- STA. 17+50 LT TO STA. 19+50 LT

DETAIL B
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 3:1, D, 3:1, b, 1'/Ft., Fill Slope
Min. D= 1.0 Ft.
b= 9 Ft.
FROM -L- STA. 19+50 LT TO STA. 20+10.1 LT

DETAIL C
STANDARD 'V' DITCH
(Not to Scale)
Natural Ground, 3:1, D, 3:1, Natural Ground
Min. D= 1.0 Ft.
FROM -L- STA. 20+10.1 LT TO STA. 20+54.5 LT
FROM -L- STA. 23+72 RT TO STA. 24+50 RT

DETAIL D
RIP RAP AT EMBANKMENT
(Not to Scale)
10' min., Ditch Grade, 1.0' min., 2.0', NWS, GEOTEXTILE
Type of Liner= 19 TONS, CL I RIPRAP
Geotextile = 20 SY
FROM -L- STA. 20+44.5 LT TO STA 20+62.1 LT

DETAIL E
DECK DRAIN DISSIPATOR PAD
(Not to Scale)
3.0', 3.0', DISSIPATOR PAD
PLAN VIEW
*NOTE: CENTER PAD DIRECTLY BELOW DECK DRAINS
GROUND, 3.0', GEOTEXTILE, 1.0'
PROFILE VIEW
Type of Liner= 30 TONS CL B Rip-Rap
Geotextile = 60 sy
AT 12' CENTERS
FROM -L- STA. 20+29.1 LT/RT TO STA 20+41.1 LT/RT
FROM -L- STA. 21+89.1 LT/RT TO STA. 22+49.1 LT/RT
FROM -L- STA. 22+65.1 LT/RT TO STA. 23+49.1 LT/RT
AT 6' CENTERS
FROM -L- STA. 20+41.1 LT/RT TO STA. 20+65.1 LT/RT
FROM -L- STA. 21+65.1 LT/RT TO STA. 21+89.1 LT/RT

DETAIL F
TOE PROTECTION
(Not to Scale)
Natural Ground, b, 3:1 or Flatter Fill Slope, d, Geotextile
d= 1.0 Ft.
b= 3.0 Ft.
Type of Liner= Class B Rip-Rap
FROM -L- STA. 23+84.1 LT TO STA. 29+00 LT

FOR -L- PROFILE SEE SHEET 8
FOR DETOUR SEE SHEETS 6/7
FOR STRUCTURES SEE SHEETS S-1 TO S-37

23-MAR-2022 13:18
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-5694	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 036853 BRYAN E. HOUGH	SEAL 033860 LEAH M. YOUNG
4/4/2022	4/4/2022

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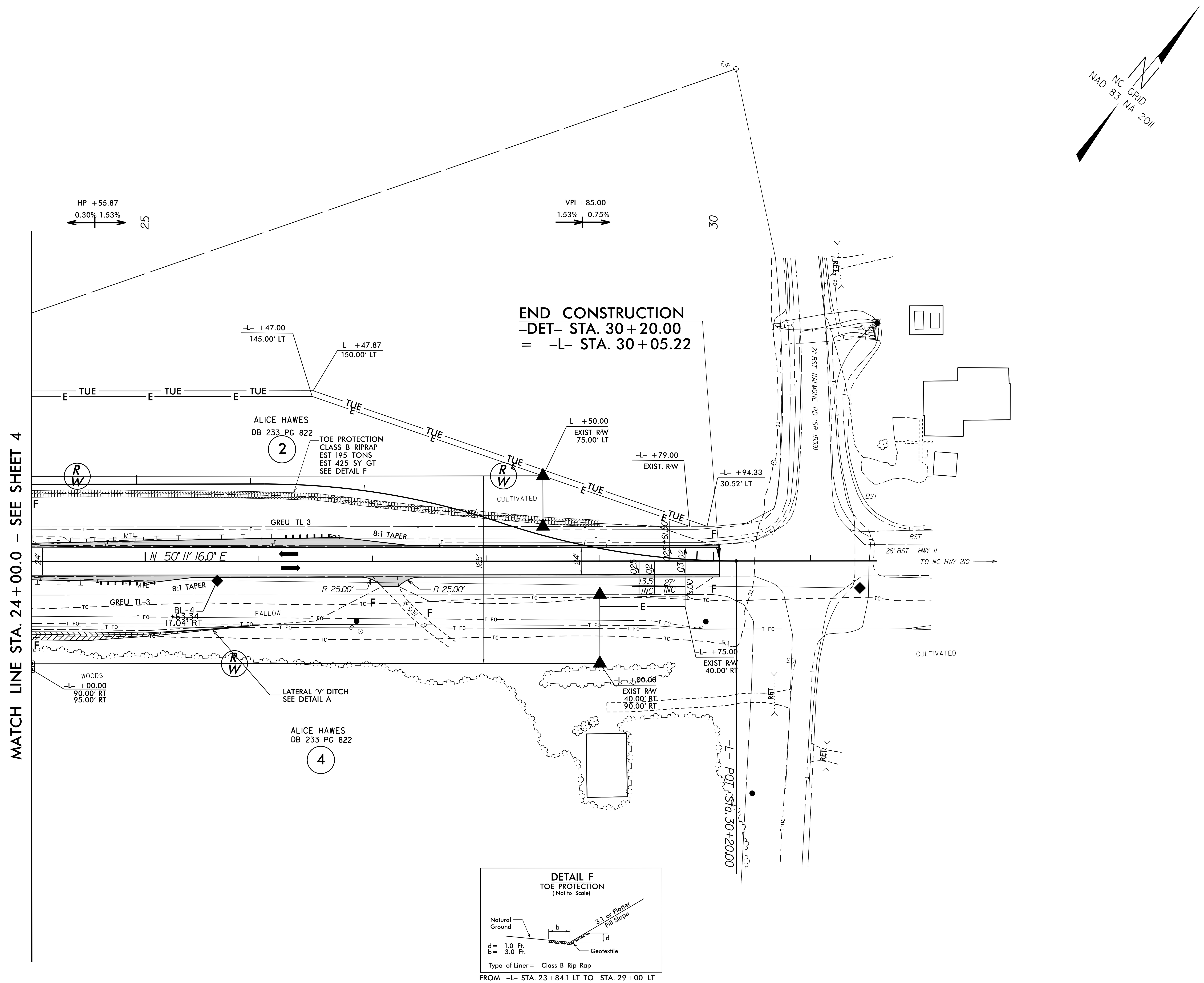
8/17/99

REVISIONS


NC GRID NAD 83 NA 2011
HP +55.87
0.30% 1.53%
VPI +85.00
1.53% 0.75%
25
30
END CONSTRUCTION
-DET- STA. 30+20.00
= -L- STA. 30+05.22
-L- +47.00
145.00' LT
-L- +47.87
150.00' LT
MATCH LINE STA. 24+00.0 - SEE SHEET 4
ALICE HAWES
DB 233 PG 822
2
TOE PROTECTION
CLASS B RIPRAP
EST 195 TONS
EST 425 SY GT
SEE DETAIL F
-L- +50.00
EXIST R/W
75.00' LT
-L- +79.00
EXIST. R/W
-L- +94.33
30.52' LT
CULTIVATED
GREU TL-3
8:1 TAPER
N 50° 11' 16.0" E
R 25.00'
BL-4
+63.34
17.04' RT
FALLOW
-L- +75.00
EXIST R/W
40.00' RT
WOODS
-L- +00.00
90.00' RT
95.00' RT
LATERAL 'V' DITCH
SEE DETAIL A
-L- +00.00
EXIST R/W
40.00' RT
90.00' RT
ALICE HAWES
DB 233 PG 822
4
21' BST NATMORE RD (SR 1539)
26' BST HWY 11
TO NC HWY 210
-L- POT Sta. 30+20.00
CULTIVATED
DETAIL F
TOE PROTECTION
(Not to Scale)
Natural Ground
3:1 or Flatter Fill Slope
d= 1.0 Ft.
b= 3.0 Ft.
Geotextile
Type of Liner= Class B Rip-Rap
FROM -L- STA. 23+84.1 LT TO STA. 29+00 LT

FOR -L- PROFILE SEE SHEET 8
FOR DETOUR SEE SHEETS 6/7

08-FEB-2022 14:00
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PROJECT REFERENCE NO.	SHEET NO.
B-5694	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 036853 BRYAN E. HOUGH 5/11/2022	SEAL 033860 LEAH M. YOUNG 5/11/2022

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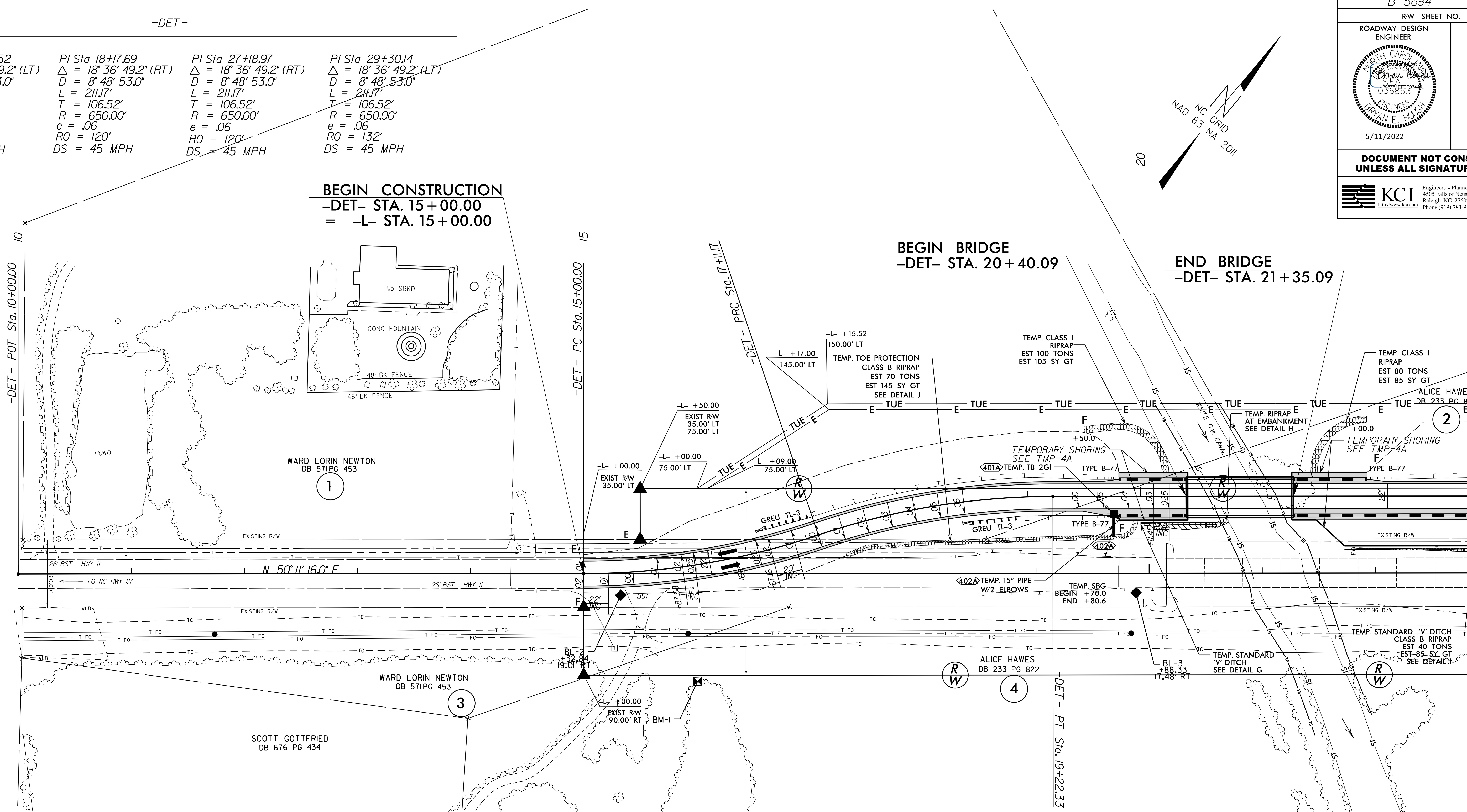
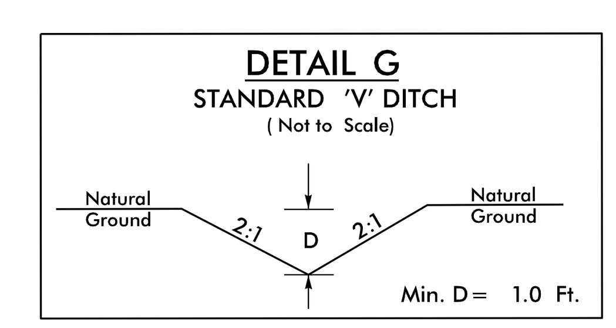
REVISIONS

-DET-

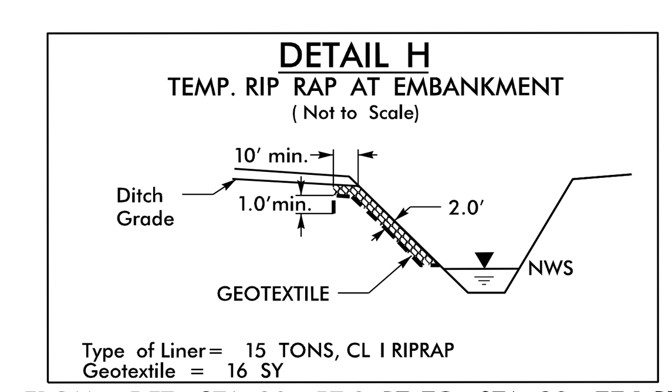
PI Sta 16+06.52	PI Sta 18+17.69	PI Sta 27+18.97	PI Sta 29+30.14
△ = 18° 36' 49.2" (LT)	△ = 18° 36' 49.2" (RT)	△ = 18° 36' 49.2" (RT)	△ = 18° 36' 49.2" (LT)
D = 8° 48' 53.0"	D = 8° 48' 53.0"	D = 8° 48' 53.0"	D = 8° 48' 53.0"
L = 211.17'	L = 211.17'	L = 211.17'	L = 211.17'
T = 106.52'	T = 106.52'	T = 106.52'	T = 106.52'
R = 650.00'	R = 650.00'	R = 650.00'	R = 650.00'
e = .06	e = .06	e = .06	e = .06
RO = 132'	RO = 120'	RO = 120'	RO = 132'
DS = 45 MPH	DS = 45 MPH	DS = 45 MPH	DS = 45 MPH


NC GRID NAD 83 NA 2011
BEGIN CONSTRUCTION
-DET- STA. 15+00.00
= -L- STA. 15+00.00
BEGIN BRIDGE
-DET- STA. 20+40.09
END BRIDGE
-DET- STA. 21+35.09
-DET- POT Sta. 10+00.00
-DET- PC Sta. 15+00.00
-DET- PRC Sta. 17+11.17
-DET- PT Sta. 19+22.33
1.5 SBKD
CONC FOUNTAIN
48" BK FENCE
POND
WARD LORIN NEWTON
DB 571PG 453
SCOTT GOTTFRIED
DB 676 PG 434
ALICE HAWES
DB 233 PG 822
N 50° 11' 16.0" E
26' BST HWY 11
TO NC HWY 87
EXISTING R/W
TEMP. CLASS I RIPRAP EST 100 TONS EST 105 SY GT
TEMP. TOE PROTECTION CLASS B RIPRAP EST 70 TONS EST 145 SY GT SEE DETAIL J
TEMP. CLASS I RIPRAP EST 80 TONS EST 85 SY GT
TEMP. RIPRAP AT EMBANKMENT SEE DETAIL H
TEMPORARY SHORING SEE TMP-4A
TEMP. TB 2GI
TYPE B-77
GREU TL-3
TEMP. 15" PIPE W/2 ELBOWS
TEMP. SBG BEGIN +70.0 END +80.6
TEMP. STANDARD 'V' DITCH SEE DETAIL G
TEMP. STANDARD 'V' DITCH CLASS B RIPRAP EST 40 TONS EST 85 SY GT SEE DETAIL I
BL-3 +88.33 17.48' RT
BL-2 +37.84 19.01' RT
BM-1
EXIST R/W 35.00' LT
EXIST R/W 90.00' RT
WHITE OAK CANAL
ISFRD

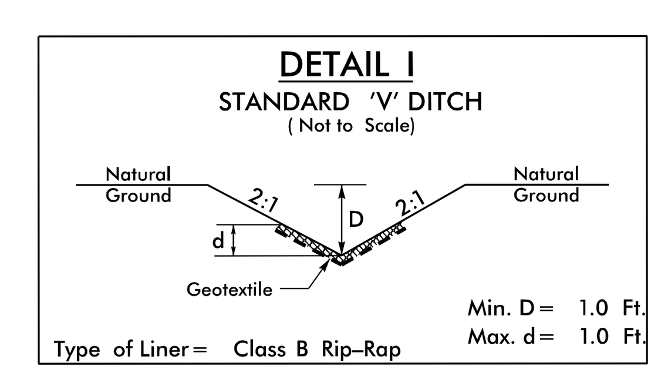
MATCH LINE STA. 23+00.00 – SEE SHEET 7



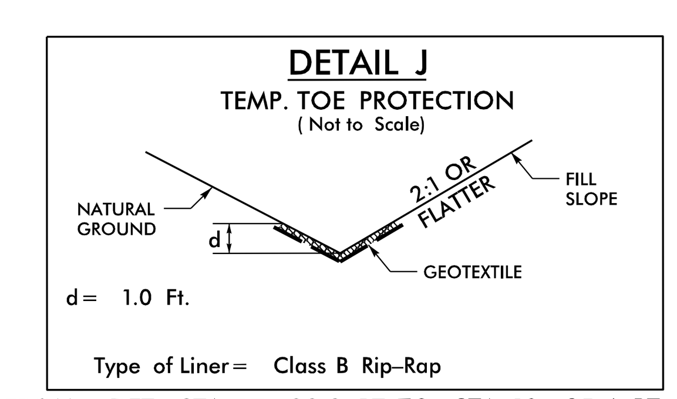
FROM -DET- 20+00 RT STA. TO STA. 20+67.3 RT



FROM -DET- STA. 20+57.3 RT TO STA 20+77.1 RT



FROM -DET- 21+80.1 RT STA. TO STA. 24+15.0 RT



FROM -DET- STA. 17+29.9 RT TO STA. 19+95.4 RT

FOR -DET- PROFILE SEE SHEET 9
FOR -L- SEE SHEETS 4/5
FOR STRUCTURES SEE SHEETS S-1 TO S-37

DocuSign Envelope ID: 95935EA3-B55D-41D1-9D32-096A1EE1CF2D

PROJECT REFERENCE NO.	SHEET NO.
B-5694	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — 4/4/2022

HYDRAULICS ENGINEER — 4/4/2022

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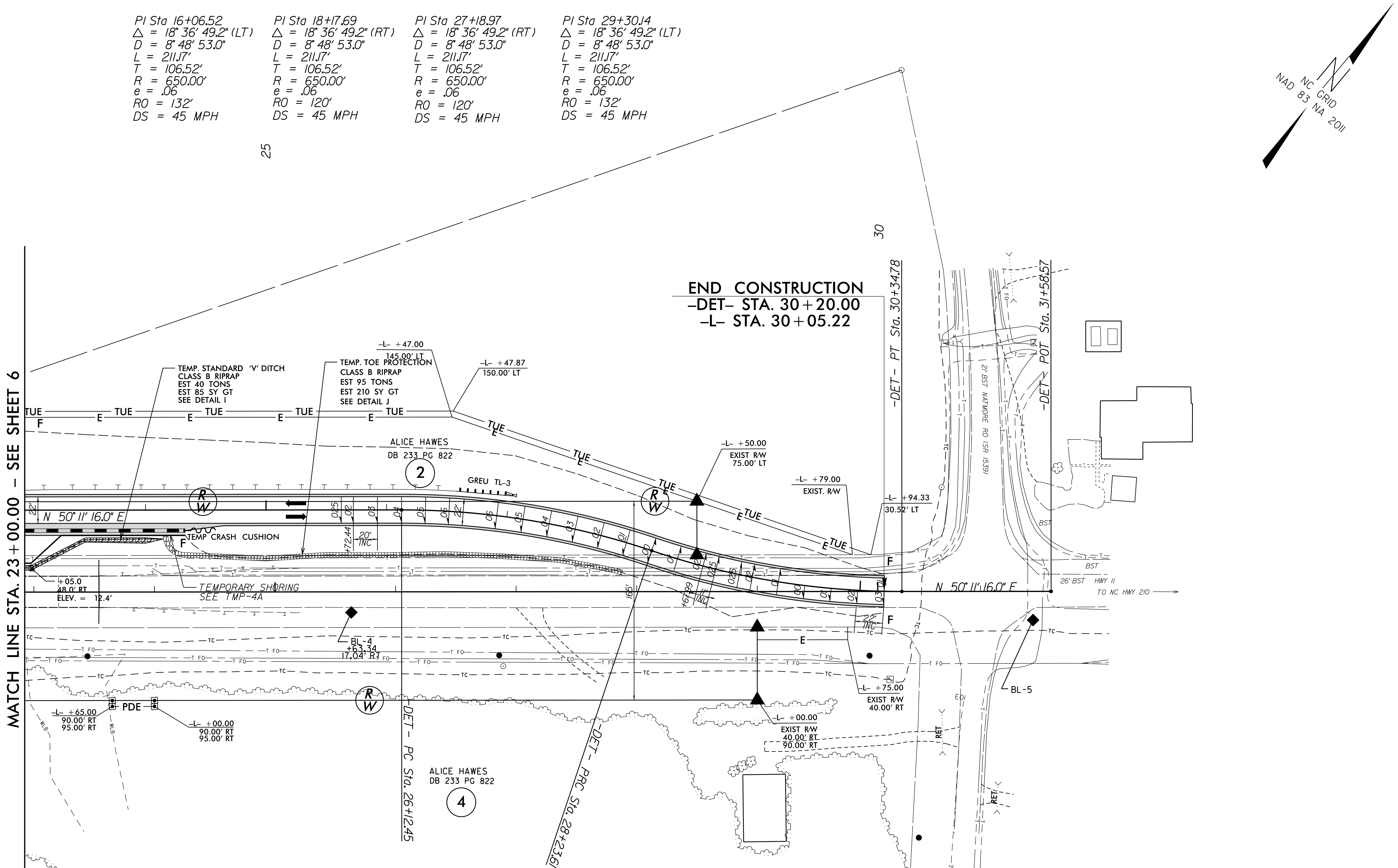
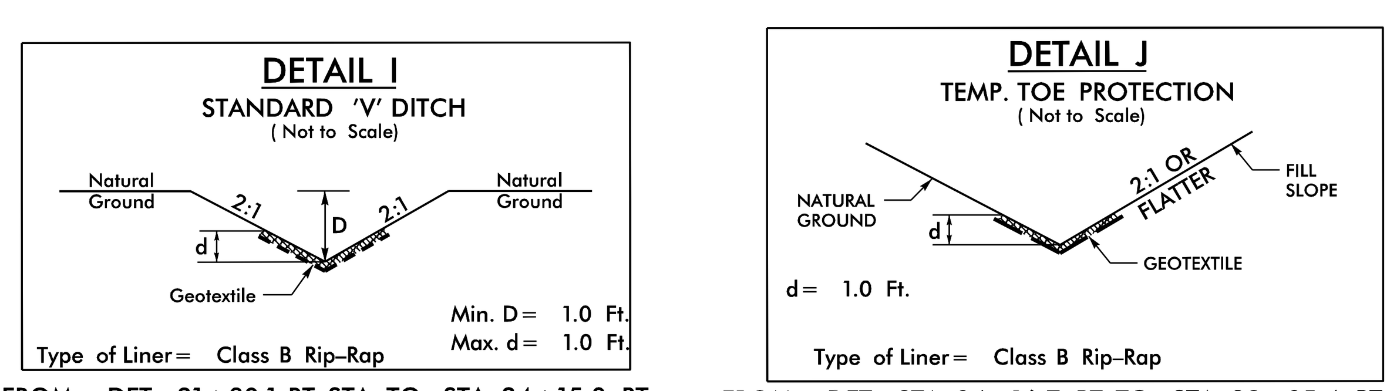
-DET-

PI Sta 16+06.52	PI Sta 18+17.69	PI Sta 27+18.97	PI Sta 29+30.14
Δ = 18° 36' 49.2" (LT)	Δ = 18° 36' 49.2" (RT)	Δ = 18° 36' 49.2" (RT)	Δ = 18° 36' 49.2" (LT)
D = 8° 48' 53.0"	D = 8° 48' 53.0"	D = 8° 48' 53.0"	D = 8° 48' 53.0"
L = 211.17'	L = 211.17'	L = 211.17'	L = 211.17'
T = 106.52'	T = 106.52'	T = 106.52'	T = 106.52'
R = 650.00'	R = 650.00'	R = 650.00'	R = 650.00'
e = .06	e = .06	e = .06	e = .06
RO = 132'	RO = 120'	RO = 120'	RO = 132'
DS = 45 MPH	DS = 45 MPH	DS = 45 MPH	DS = 45 MPH





FROM -DET- 21+80.1 RT STA. TO STA. 24+15.0 RT

FROM -DET- STA. 24+16.7 RT TO STA. 28+05.4 RT

FOR -DET- PROFILE SEE SHEET 9
FOR -L- SEE SHEETS 4/5

REVISIONS

8/17/99

23-MAR-2022 13:17

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-5694	8

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 036853 ENGINEER BRYAN E. HOGE

4/4/2022

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 033860 ENGINEER LEAH W. YOUNG

4/4/2022

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BM #1 - WOODED AREA
-L- STA. 16+00.71, 95.36' RT
EL = 18.15'

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 950	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 12.8	FT
BASE DISCHARGE	= 1200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 13.7	FT
OVERTOPPING DISCHARGE	= 17000	CFS
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING ELEVATION	= 22.8	FT
DATE OF SURVEY	= 08/16/2017	
W.S.ELEVATION AT DATE OF SURVEY	= 5.3	FT

-L-

BEGIN GRADE -L- STA 15+
ELEV. 23.37'

PI = 16+75.00
EL = 24.59'
VC = 218'
K = 68.4
DS = 60 mph

PI = 18+74.00
EL = 26.62'
VC = 180'
K = 250
DS = 60 mph

(+)0.7000%
(+)1.0186%
(+)1.0186%
(+)0.3000%

100YR CAPE FEAR RIVER
WS ELEV. = 23.7'

BEGIN BRIDGE
-L- STA. 20+09.85
ELEV = 27.03

END BRIDGE
-L- STA. 23+60.35
ELEV = 28.08

C/L STA 21+85.1
ELEV. 27.56'
SKEW = 90 DEG
54" GIRDER
1@ 60'; 1@ 90'; 2@ 100' (OAL = 350')
35.25' OTO
(32.0' CLEAR ROADWAY WIDTH)

LOWEST
LOW CHORD
+86.1 LT
EL=12.9

4'-0" DEEP CAPS
(3'-3" WIDE)

-1.00%
BEGIN LAT. 'V' DITCH
+50.0 LT
EL=14.0

+00.0 LT
EL=13.5

-0.30%
BEGIN STD. 'V' DITCH
+10.1 LT
EL=11.9

+0.31%
BEGIN STD. 'V' DITCH
+72.0 RT
EL=13.0

CLASS II RIPRAP
1.5:1
MIN DEPTH OF
RIPRAP = 3.5'

EXCAVATION
ELEV. = 13.0'

CLASS II RIPRAP
1.5:1
MIN DEPTH OF
RIPRAP = 3.5'
EXCAVATION
ELEV. = 14.0'

-4.24%

END STD. 'V' DITCH
+54.5 LT
EL=10.0

100YR WS ELEV. = 13.7'
50YR WS ELEV. = 12.8'
NWS ELEV. = 5.3

RIGHT DITCH ----------
LEFT DITCH -·-·-·-·-·-

PI = 25+50.00
EL = 28.65'
VC = 280'
K = 153
DS = 60 mph

PI = 28+85.00
EL = 23.52'
VC = 180'
K = 231
DS = 60 mph

END GRADE/BEGIN MILL&OVERLAY -L- STA 29+75.00
ELEV. 22.84'

END MILL&OVERLAY -L- STA 30+05.22
ELEV. 22.60'

(+)0.3000%
(-)1.5313%
(-)1.5313%
(-)0.7514%

+0.31%
BEGIN LAT. 'V' DITCH
+50.0 RT
EL=13.2

-1.00%

END LAT. 'V' DITCH
+00.0 RT
EL=14.7

FOR -L- ALIGNMENT SEE SHEETS 4/5

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5/28/99

-DET-

PROJECT REFERENCE NO.	SHEET NO.
B-5694	9

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036853 ENGINEER BRIAN E. HOGE

4/4/2022

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 033860 ENGINEER JEAN M. YOUNG

4/4/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BM #1 - WOODED AREA
-L- STA. 16+00.71, 95.36' RT
EL = 18.15'

BEGIN GRADE -DET- STA 15+00.00
ELEV. 23.37'

DETOUR BRIDGE HYDRAULIC DATA		
DESIGN DISCHARGE	= 550	CFS
DESIGN FREQUENCY	= 10	YRS
DESIGN HW ELEVATION	= 10.8	FT
BASE DISCHARGE	= 1200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 13.8	FT
OVERTOPPING DISCHARGE	= 17000	CFS
OVERTOPPING FREQUENCY	= >500+	YRS
OVERTOPPING ELEVATION	= 24.7	FT
DATE OF SURVEY	= 08/16/2017	
W.S.ELEVATION AT DATE OF SURVEY	= 5.3	FT

C/L -DET- STA 20+87.6
ELEV. 27.49'
1@95' TEMPORARY
DETOUR BRIDGE
SKEW = 90 DEG
36.0' OTO
(32.0' CLEAR ROADWAY WIDTH)

PI = 22+92.00
EL = 28.92'
VC = 240'
K = 153
DS = 60 mph

(+)0.7000%

(-)0.8670%

TEMP. VERTICAL ABUTMENTS

3' MAX STRUCTURE DEPTH

TEMP. VERTICAL ABUTMENTS

BEGIN TEMP.STD.'V' DITCH
+00.0 RT
EL=14.8

-4.17%

BEGIN TEMP.STD.'V' DITCH
+80.1 RT
EL=10.9

+2.43%

-0.30%

END TEMP.STD.'V' DITCH
+67.3 RT
EL=12.0

+50.0 RT
EL=11.1

+00.0 RT
EL=14.7

RIGHT DITCH ----------

100YR WS ELEV. = 13.8'
10YR WS ELEV. = 10.8'
NWS ELEV. = 5.3'

BEGIN GRADE -DET- STA 30+20.00
ELEV. 22.61'

(-)0.8670%

END TEMP.STD.'V' DITCH
+15.0 RT
EL=15.9

+8.20%

+00.0 RT
EL=14.7

FOR -DET- ALIGNMENT SEE SHEETS 6/7

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