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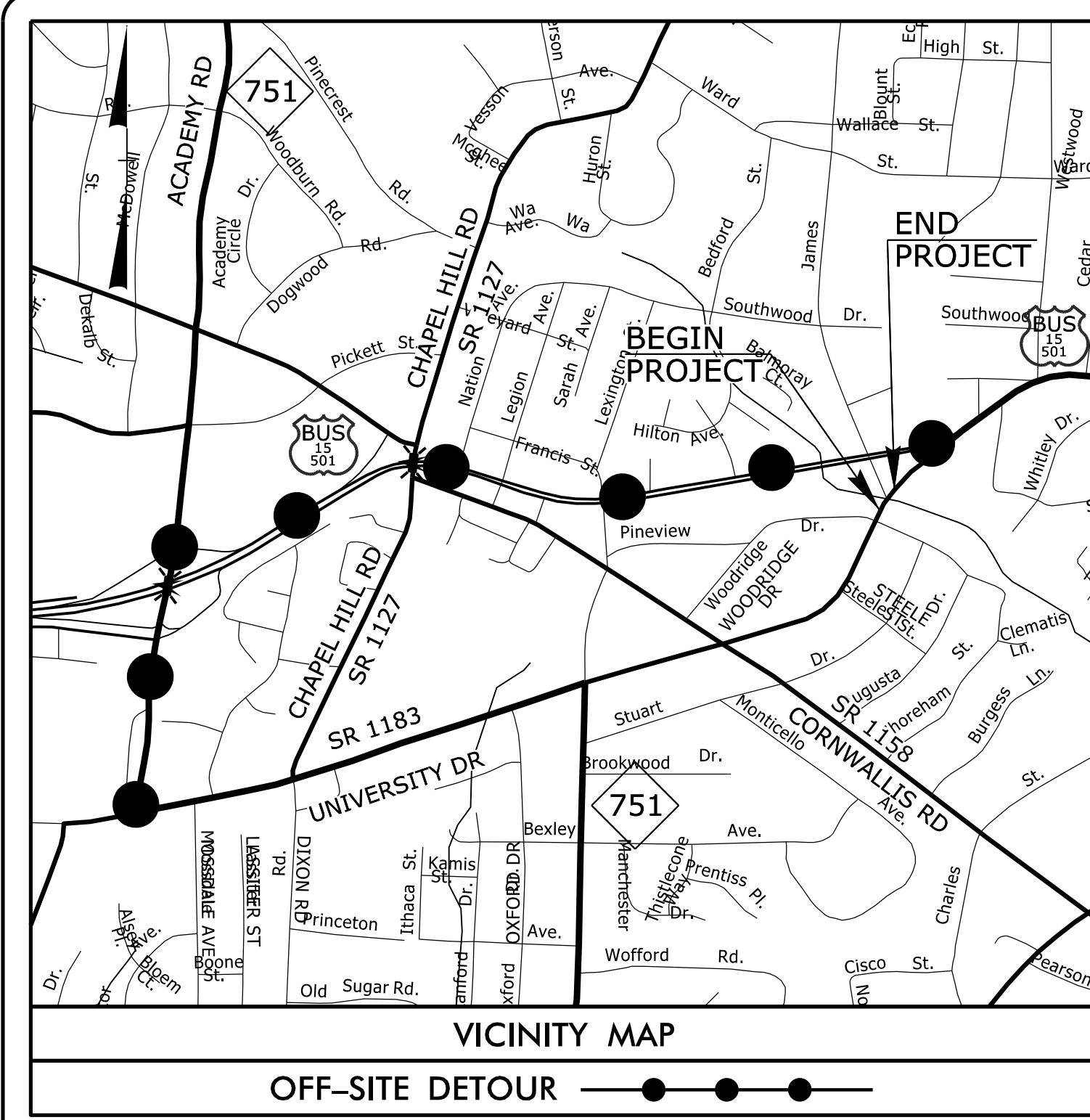
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**This file or an individual page
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09_08/19

TIP PROJECT: 17BP.5.C.02

CONTRACT: C204270



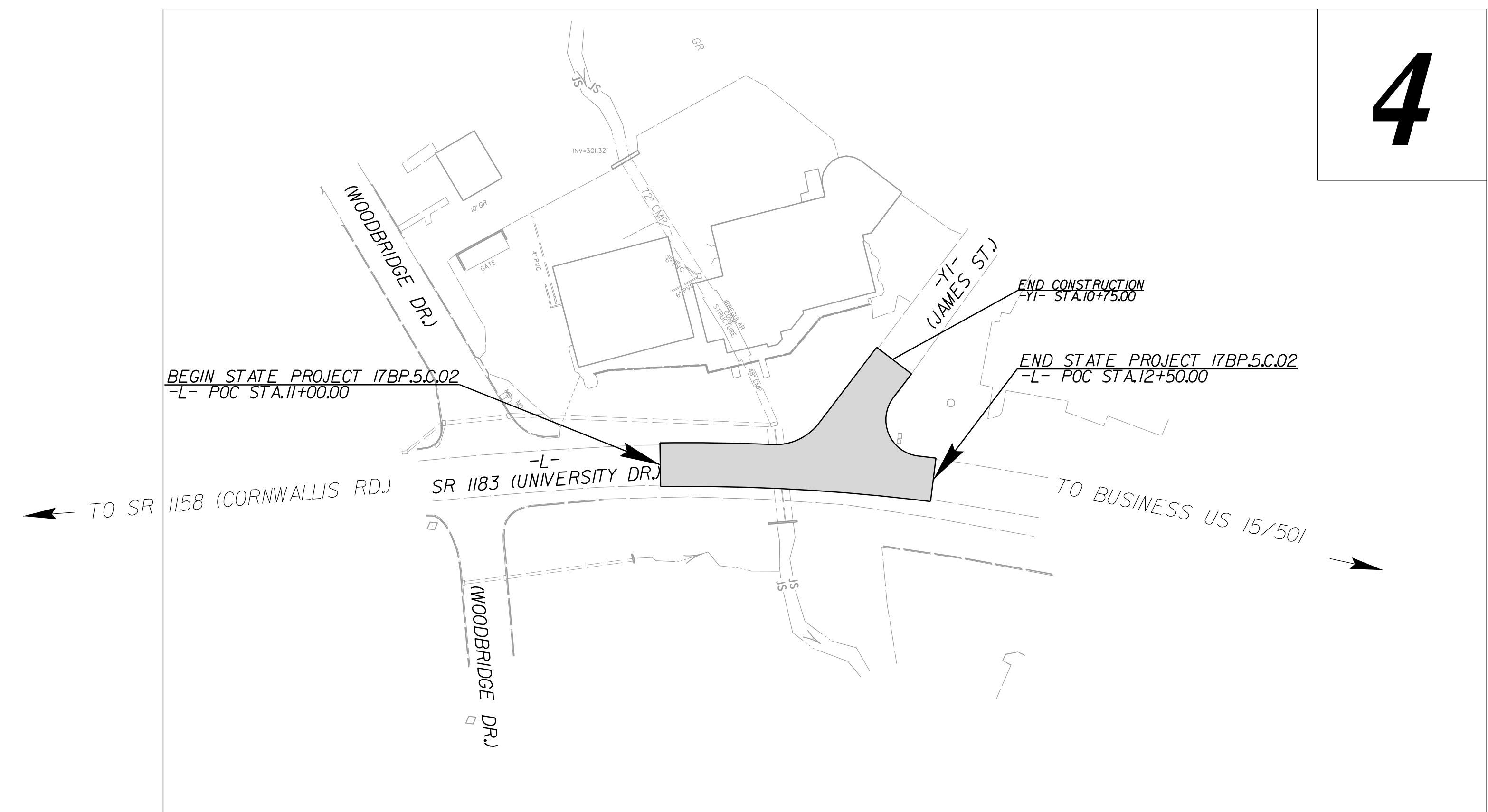
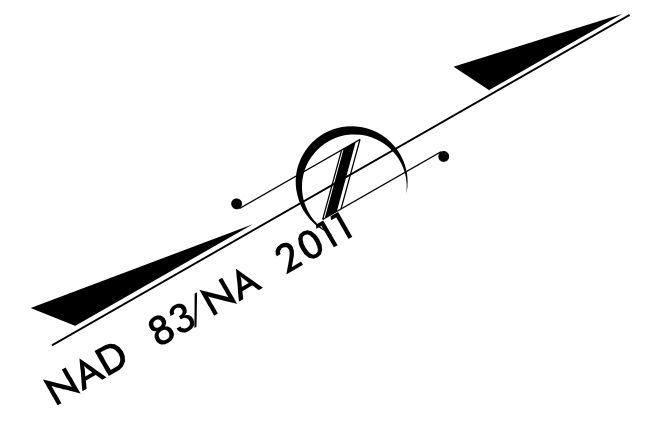
See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
DURHAM COUNTY

**LOCATION: PIPE REPLACEMENT AT SR 1183 UNIVERSITY DR.
AND JAMES ST.**
TYPE OF WORK: DRAINAGE, GRADING AND PAVING

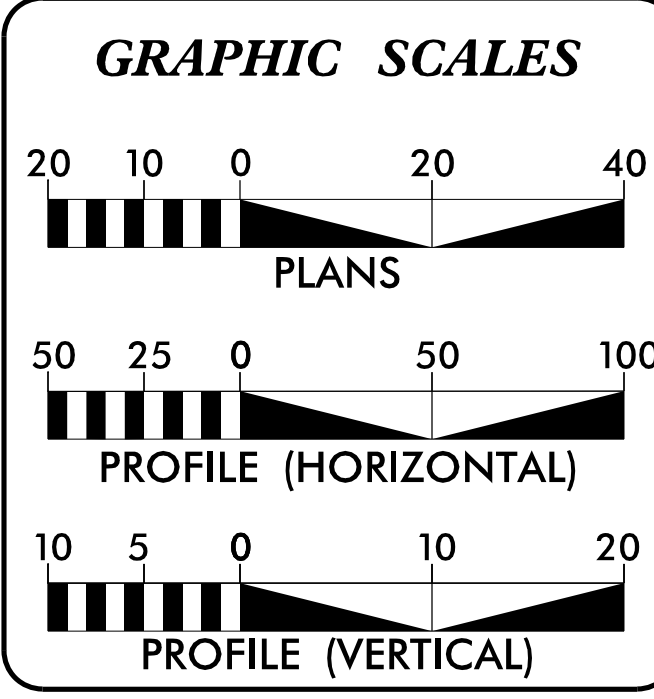
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.C.02	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.5.C.02	N/A	PE	
17BP.5.C.02	N/A	ROW	
17BP.5.C.02	N/A	UTILITIES	
17BP.5.C.02	N/A	CONSTRUCTION	

PART 2



4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA
ADT = 7,700
V = 35 MPH
CLASS = MINOR ARTERIAL
STATEWIDE TIER

PROJECT LENGTH
LENGTH ROADWAY STATE PROJECT 17BP.5.C.02 = 0.028 mi.
LENGTH STRUCTURES STATE PROJECT 17BP.5.C.02 = 0.000 mi.
TOTAL LENGTH STATE PROJECT 17BP.5.C.02 = 0.028 mi.

Prepared in the Offices of:

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 9, 2018
RIGHT OF WAY COMPLETE:

LETTING DATE: JANUARY 15, 2019

ANDY YOUNG, PE
PROJECT ENGINEER

MICHAEL BURNS, PE
PROJECT DESIGN ENGINEER

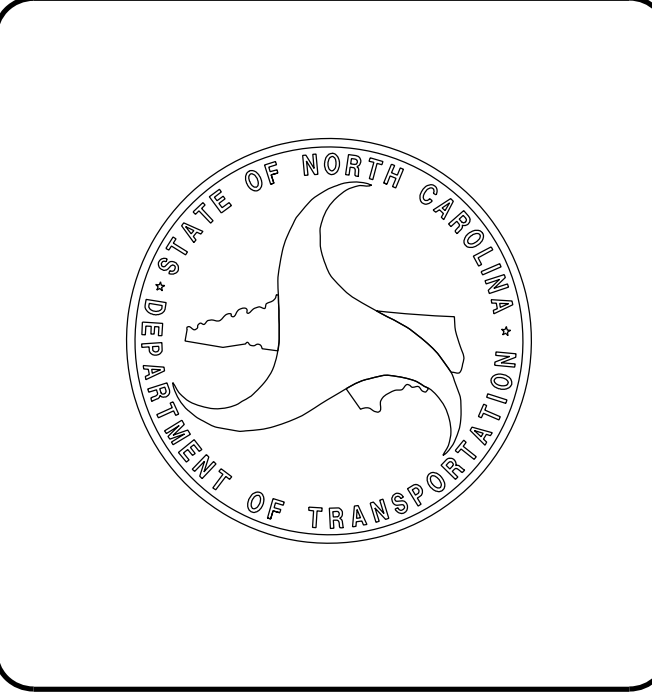
LISA GILCHRIST, EI
NCDOT CONTACT

HYDRAULICS ENGINEER

DocuSigned by: Galen Cail
11/26/2018
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

DocuSigned by: Andrew P. Young
11/26/2018
SIGNATURE: P.E.



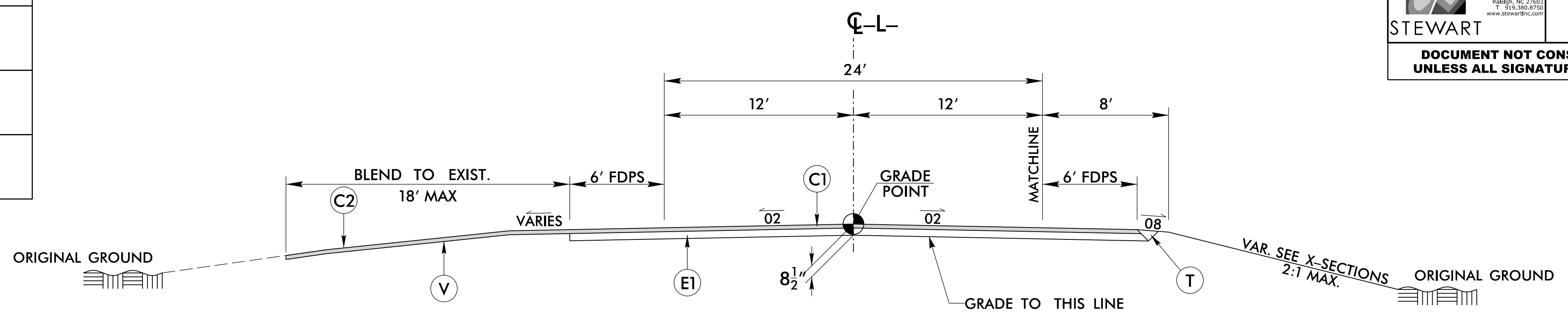
11/26/2018 I:\Roadway\Proj\Nana_RDY_TSH.dgn USER:ayoung

5/14/18

PROJECT REFERENCE NO. 17BP.5.C.02	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER ANDREW P. YOUNG SEAL 034407 12/14/2018	PAVEMENT DESIGN ENGINEER CLARK MORRISON SEAL 22896 12/14/2018
<p>DocuSigned by: Andrew P. Young</p> <p>DocuSigned by: Clark Morrison</p>	
<p>STEWART</p> <p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>	

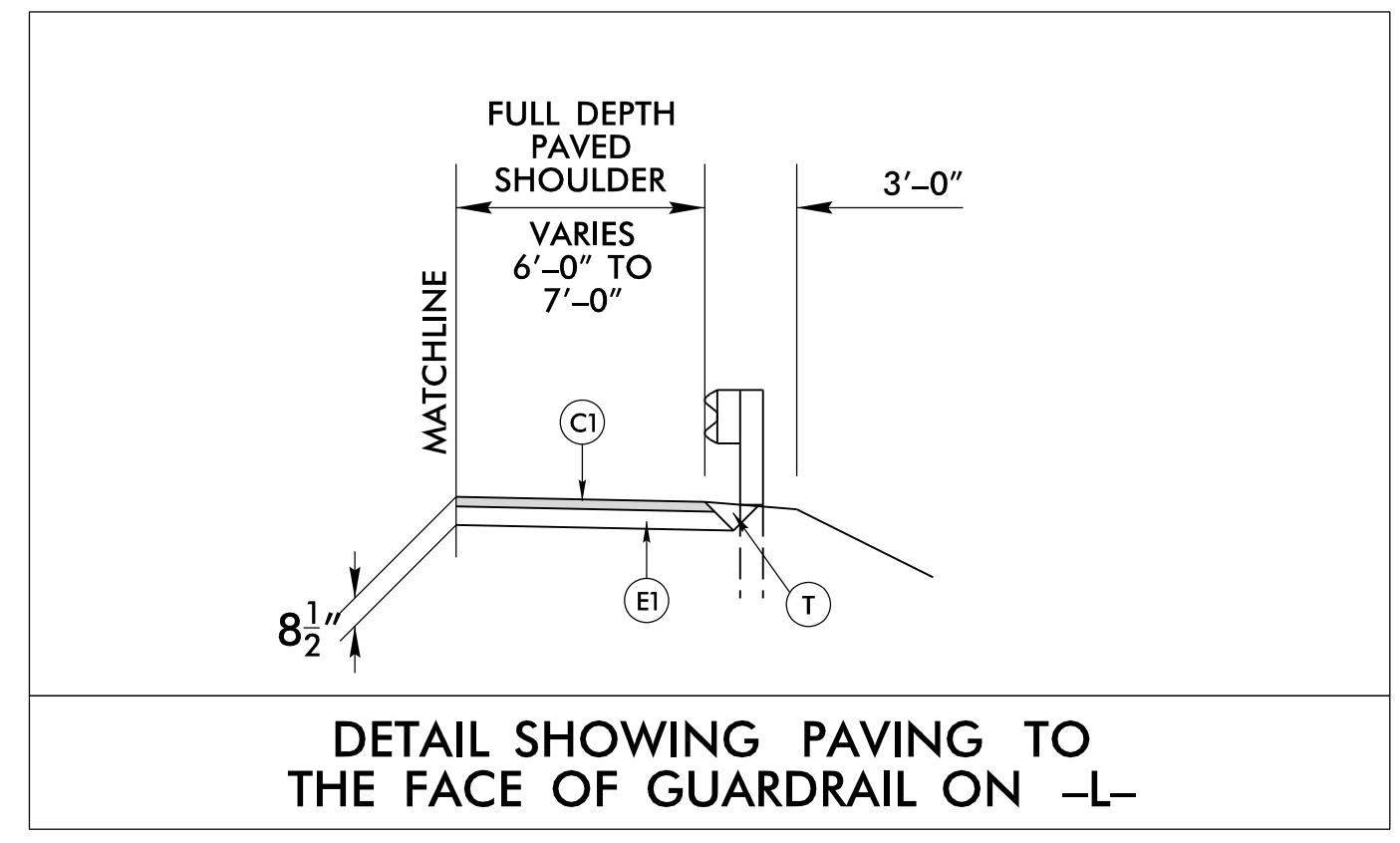
PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)	
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS
C2	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
E1	PROP. APPROX. 5 1/2" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
T	EARTH MATERIAL
V	1 1/2" MILLING

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

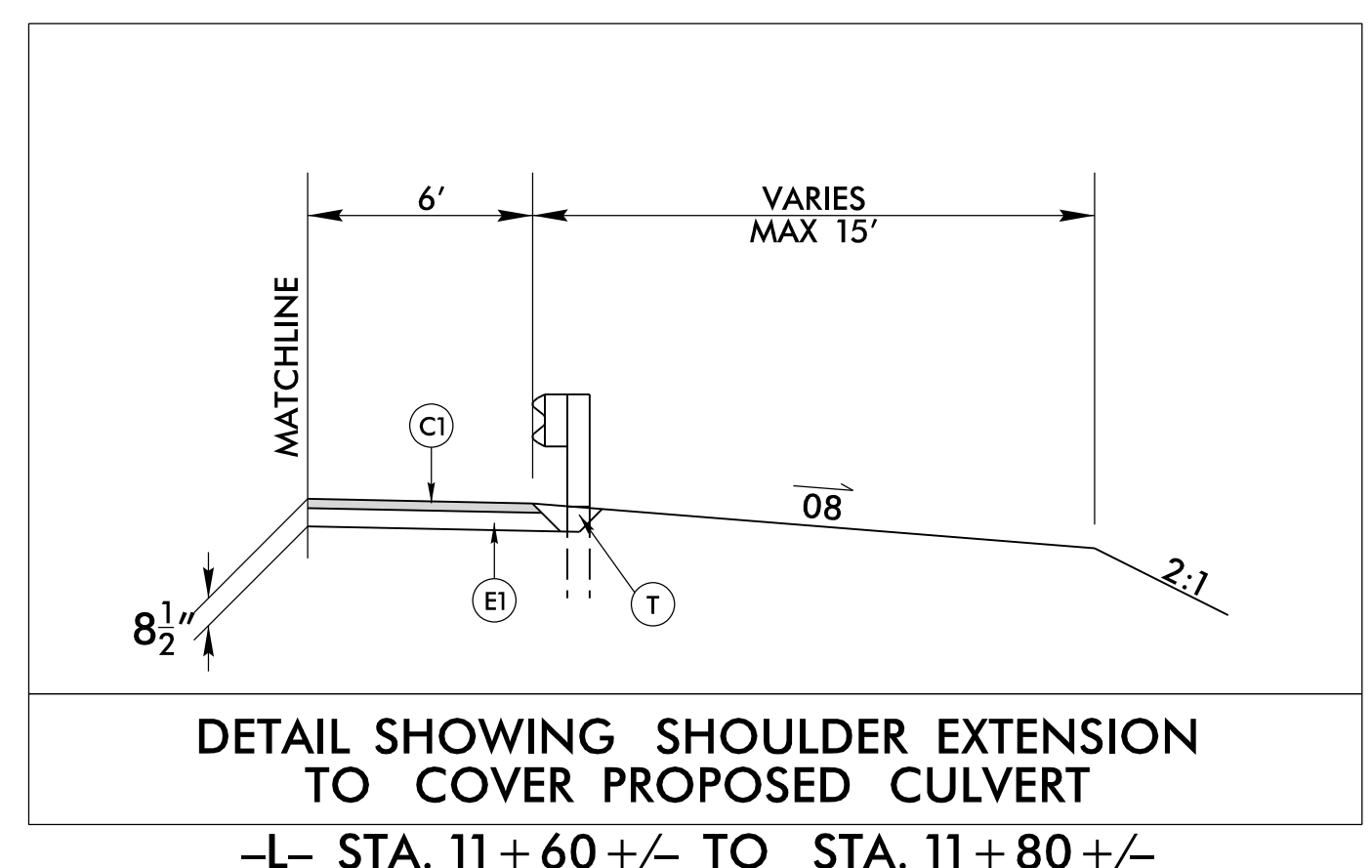


TYPICAL SECTION NO. 1
-L- STA. 11+00.00 TO -L- STA. 12+50.00

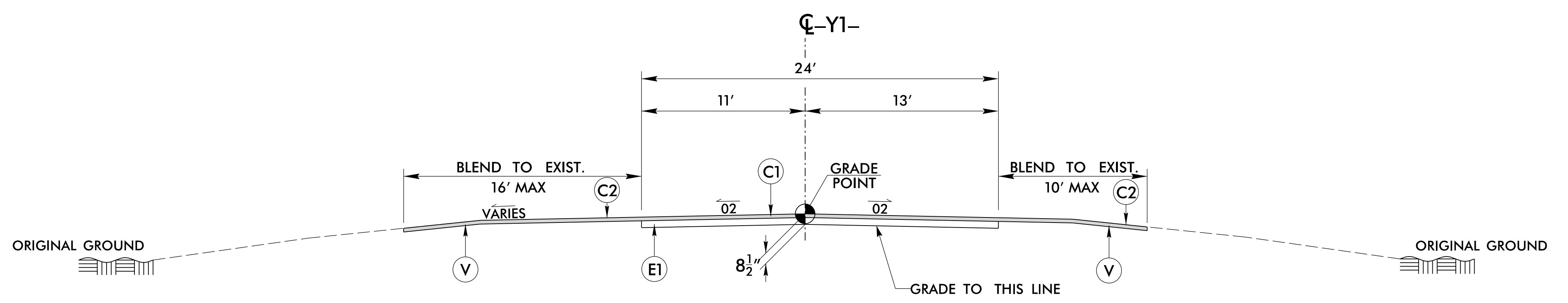
NOTE
6' FDPS IS TO ACCOMODATE
EXISTING BIKE LANES.



DETAIL SHOWING PAVING TO THE FACE OF GUARDRAIL ON -L-



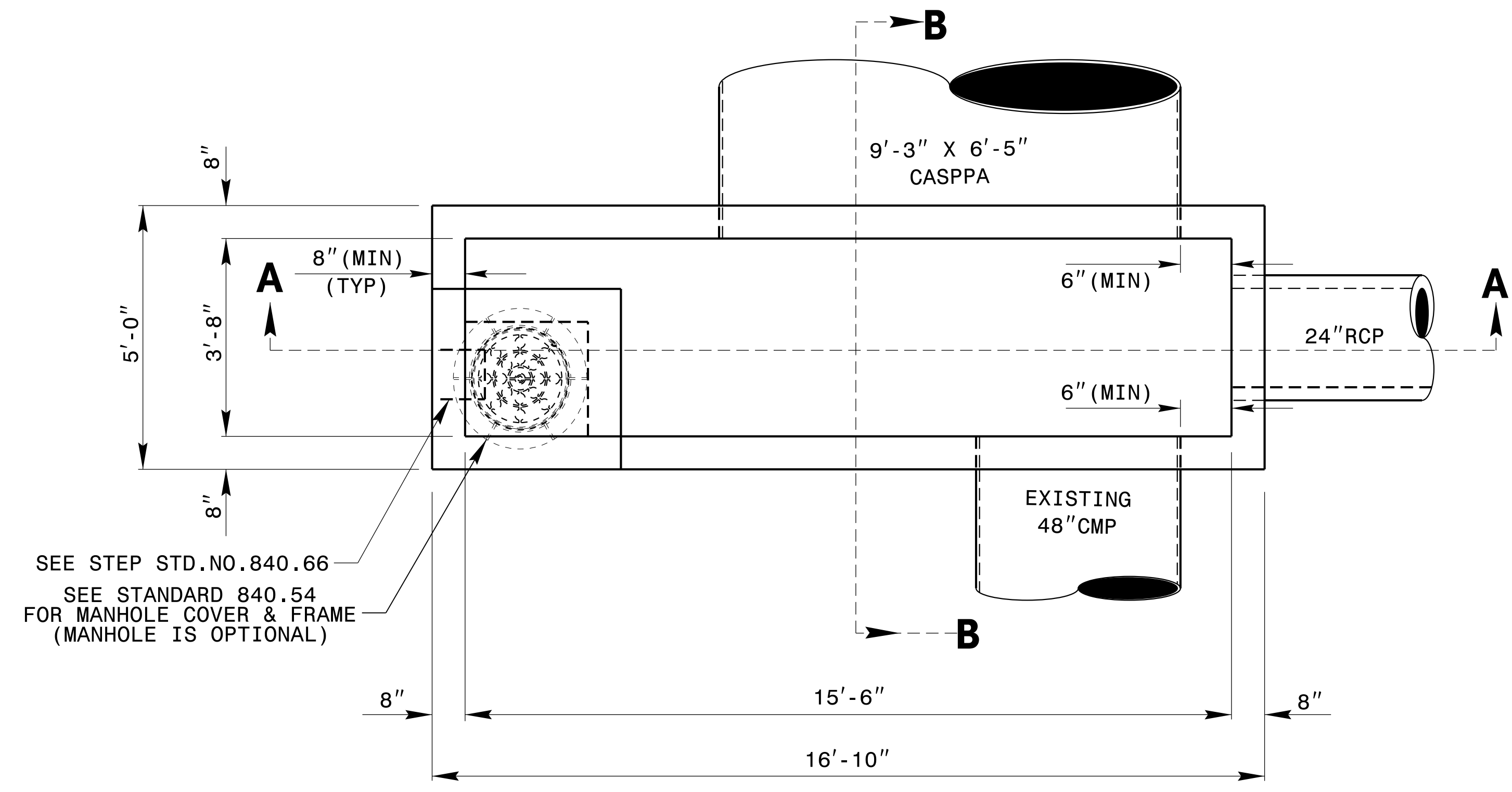
DETAIL SHOWING SHOULDER EXTENSION TO COVER PROPOSED CULVERT
-L- STA. 11+60 +/- TO STA. 11+80 +/-



TYPICAL SECTION NO. 2
-Y1- STA. 10+21.56 TO -Y1- STA. 10+75.00

REVISIONS

12/14/2018
I:\Projects\17BP.5.C.02\Drawings\RDY_TYP.dgn

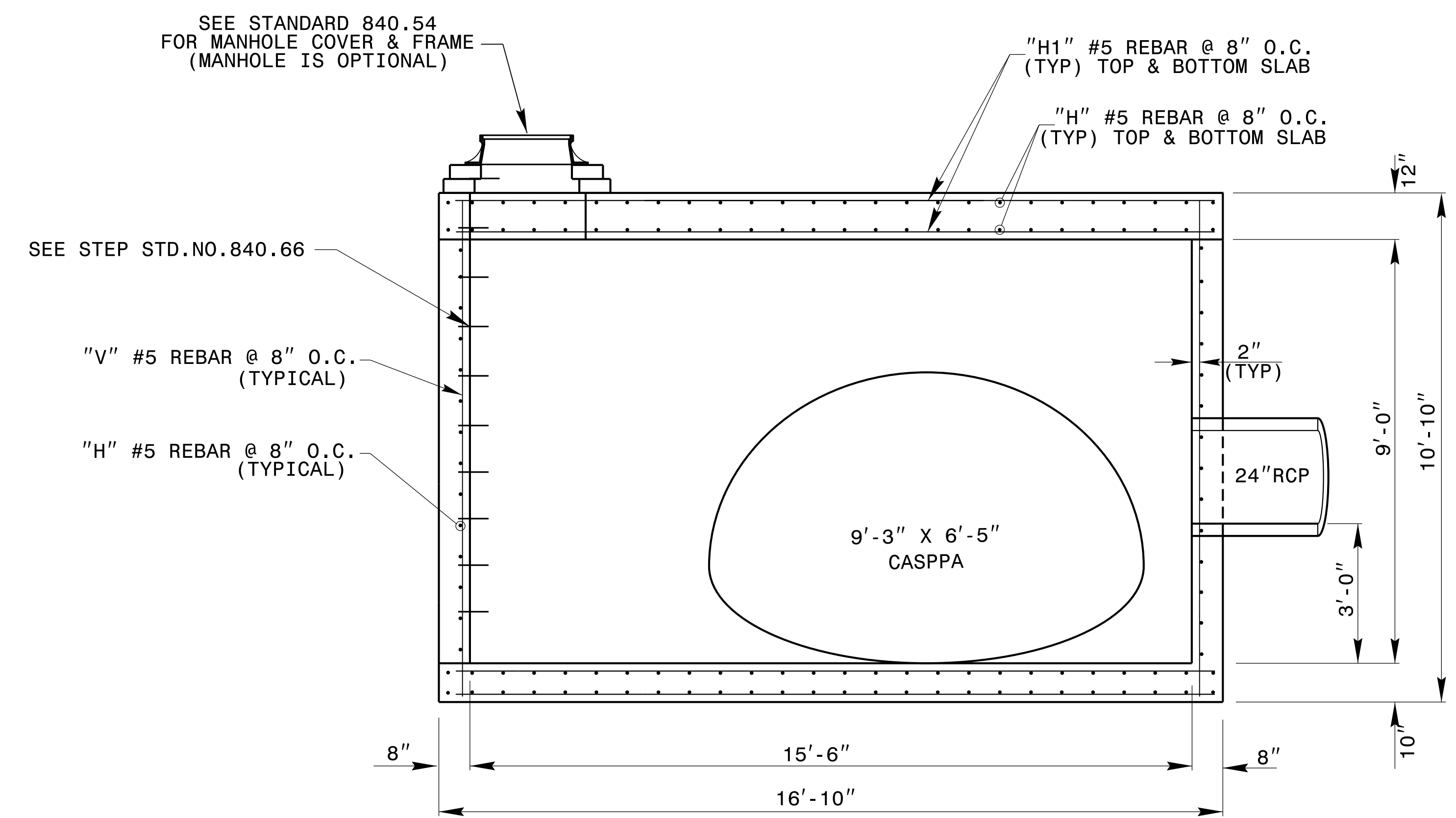


SEE STEP STD.NO.840.66
SEE STANDARD 840.54
FOR MANHOLE COVER & FRAME
(MANHOLE IS OPTIONAL)

PLAN VIEW

GENERAL NOTES:
 USE CLASS "AA" CONCRETE THROUGHOUT.
 PROVIDE ALL JUNCTION BOXES OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
 OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
 USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB, SEE STD. DRAWING 840.00.
 INSTALL MANHOLE IN POSITION AS DIRECTED BY THE ENGINEER. CUT AND BEND ALL REBAR CROSSING THIS OPENING TO ALLOW 2" MINIMUM CONCRETE COVERAGE.
 CHAMFER ALL EXPOSED CORNERS 1".
 2" MINIMUM CONCRETE COVERAGE ON ALL REBAR.
 DIMENSIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.

BILL OF MATERIALS				
BAR	NO.	SIZE	LENGTH	WEIGHT
H	132	#5	4'-8"	643
H1	62	#5	11'-6"	744
V	64	#5	10'-6"	701
TOTAL REINF. STEEL (LBS.)				2088
TOTAL CONC. (CU. YDS.)				14.8
* NO DEDUCTION HAS BEEN MADE FOR PIPES				



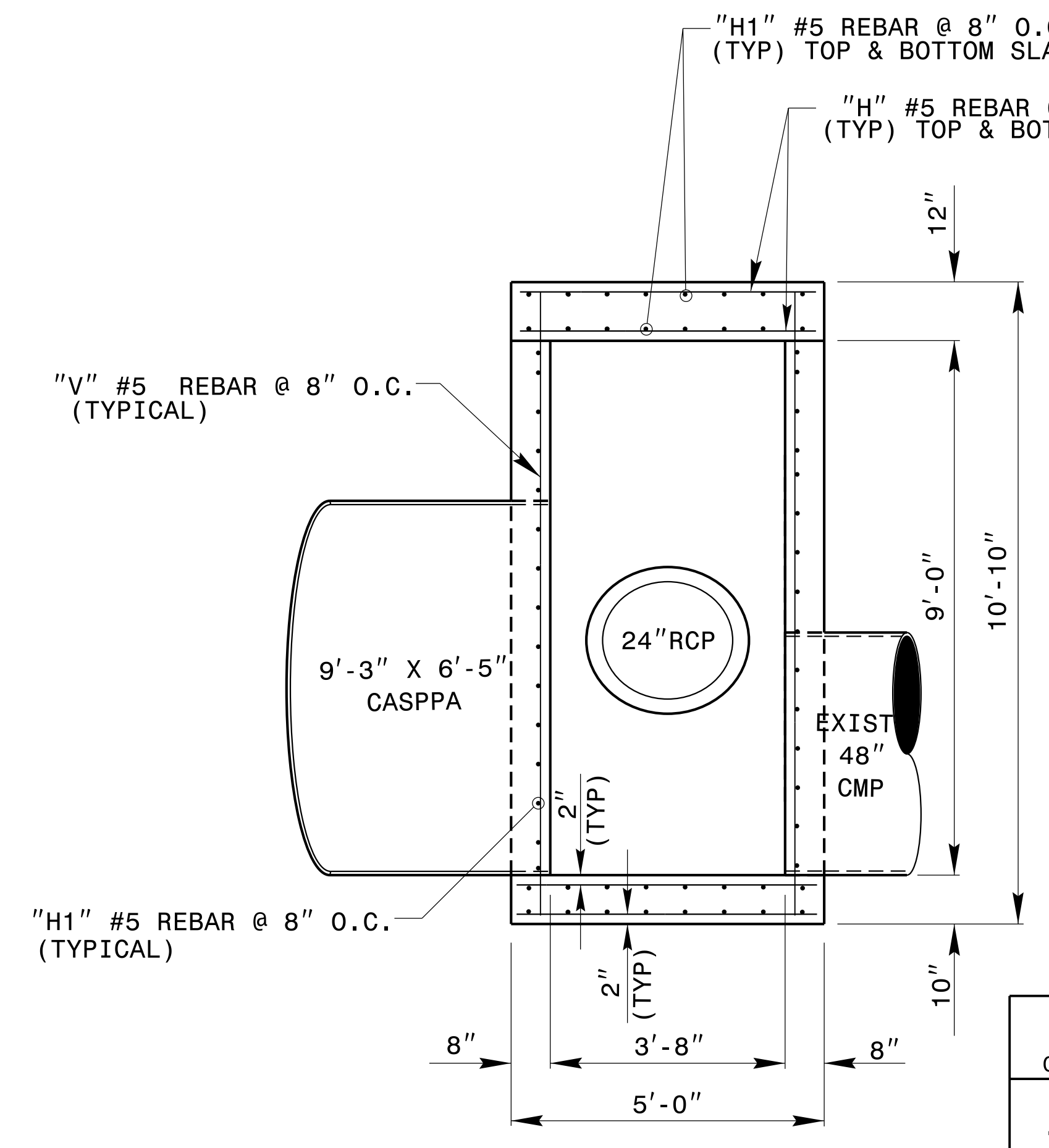
SEE STANDARD 840.54
FOR MANHOLE COVER & FRAME
(MANHOLE IS OPTIONAL)

SEE STEP STD.NO.840.66

"V" #5 REBAR @ 8" O.C.
(TYPICAL)

"H" #5 REBAR @ 8" O.C.
(TYPICAL)

SECTION A-A



"H1" #5 REBAR @ 8" O.C.
(TYP) TOP & BOTTOM SLAB

"H" #5 REBAR @ 8" O.C.
(TYP) TOP & BOTTOM SLAB

"V" #5 REBAR @ 8" O.C.
(TYPICAL)

"H1" #5 REBAR @ 8" O.C.
(TYPICAL)

SECTION B-B



DocuSigned by:
Joel S. Howerton
973F3D17DCDC45F... 12/14/2018

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

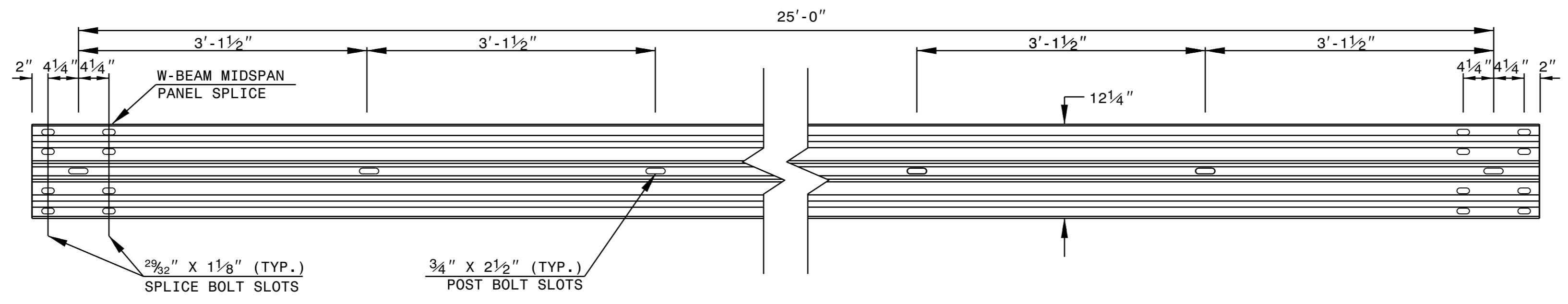
TRAFFIC BEARING JUNCTION BOX

ORIGINAL BY: kkempf DATE: 7/27/17
 MODIFIED BY: DATE:
 CHECKED BY: DATE:
 FILE SPEC.: special_details/kkempf/english/112x75_tbjb.dgn

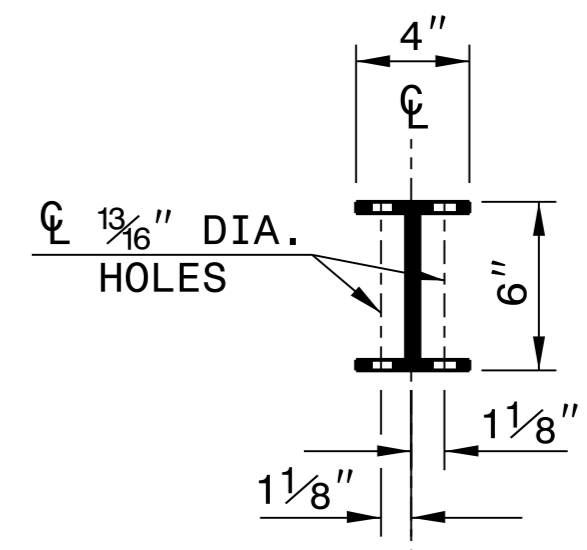
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

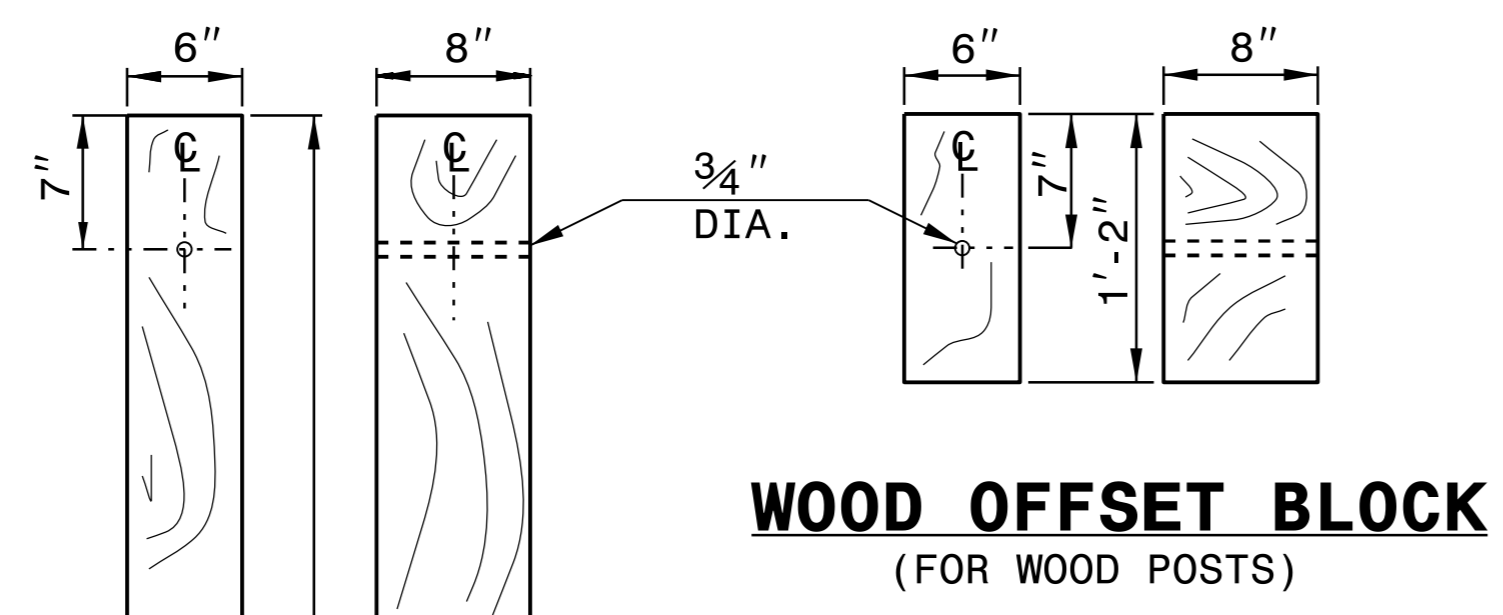
SHEET 6 OF 8
862D02



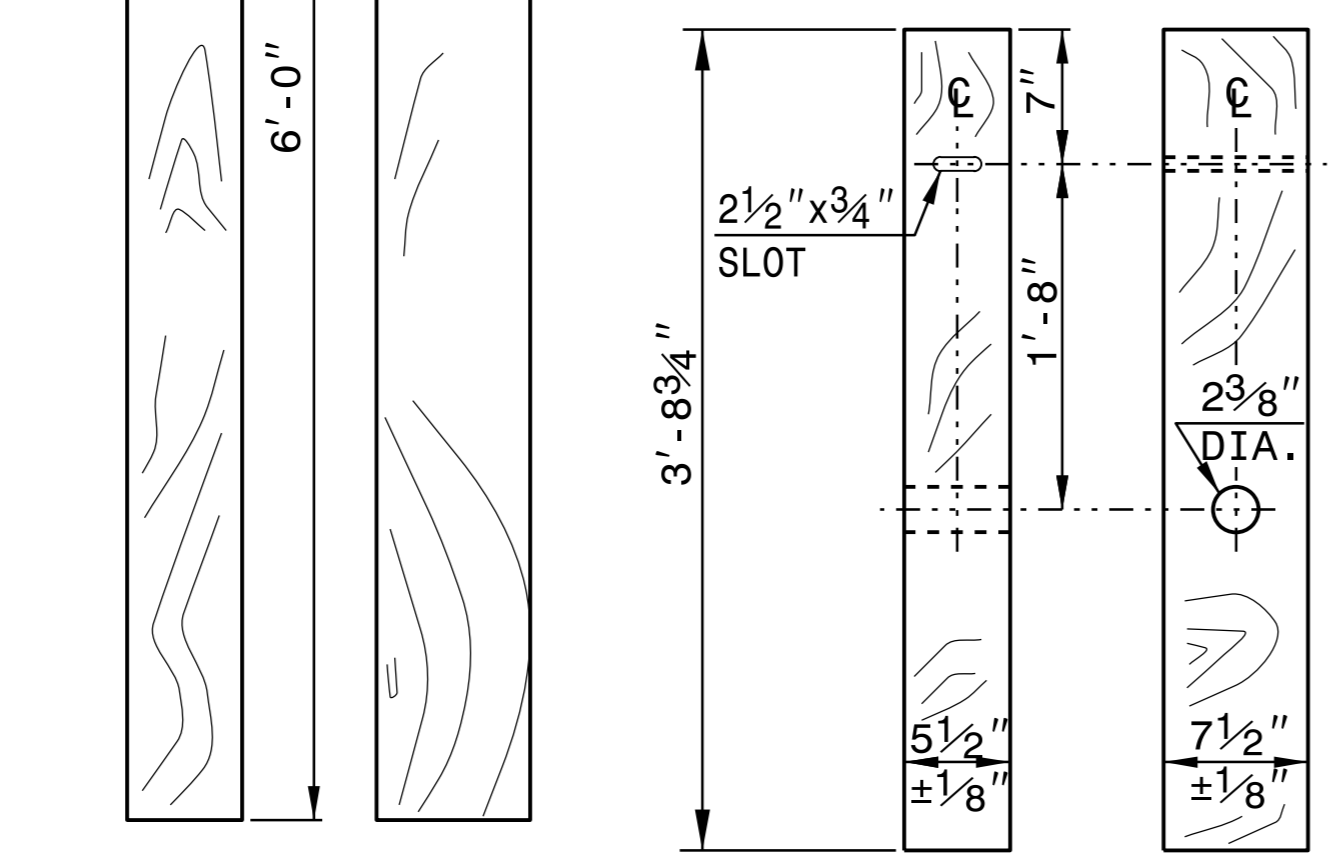
STANDARD W-BEAM GUARDRAIL



PLAN

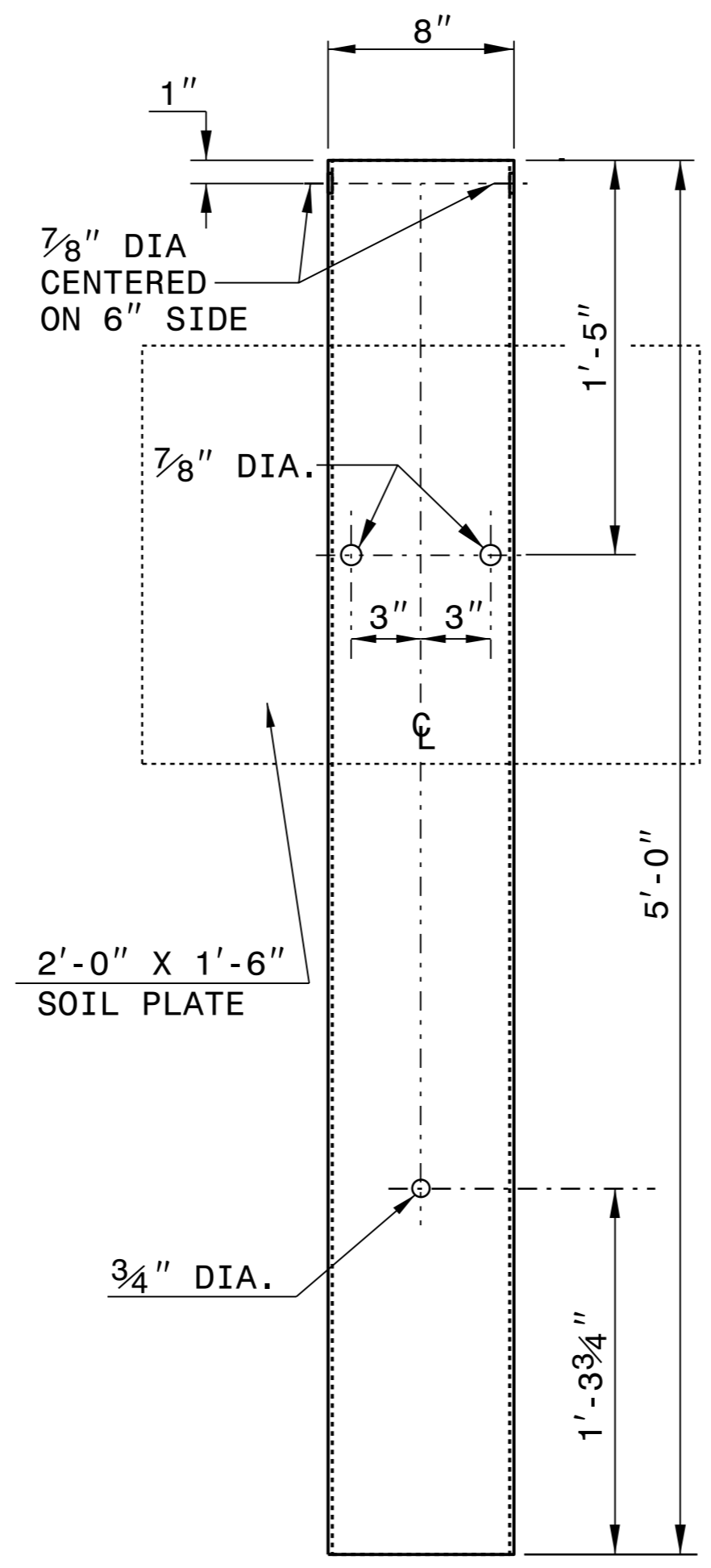


**WOOD OFFSET BLOCK
(FOR WOOD POSTS)**

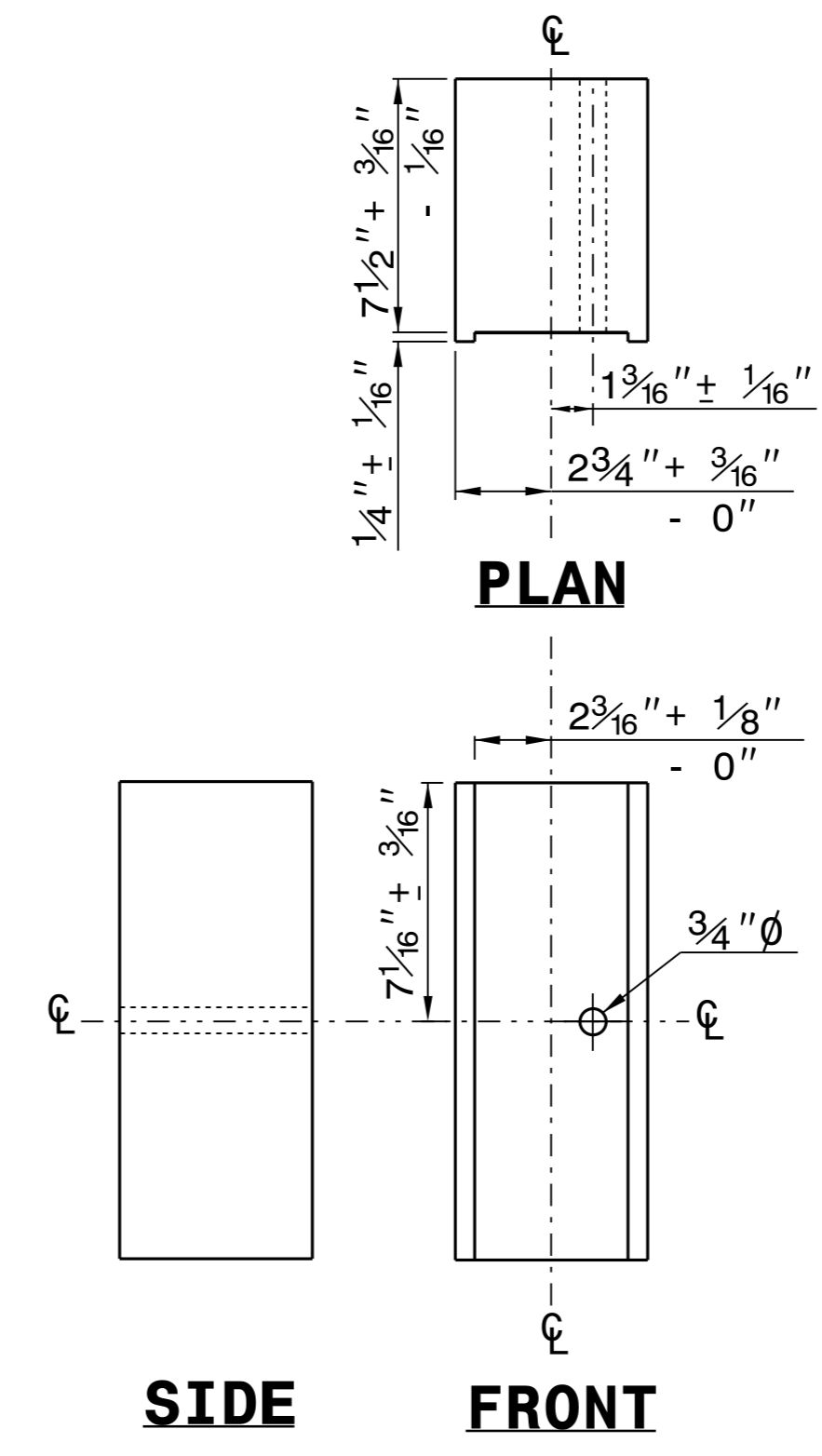


**STANDARD
LINE POST**

**SHORT WOOD
BREAKAWAY POST**



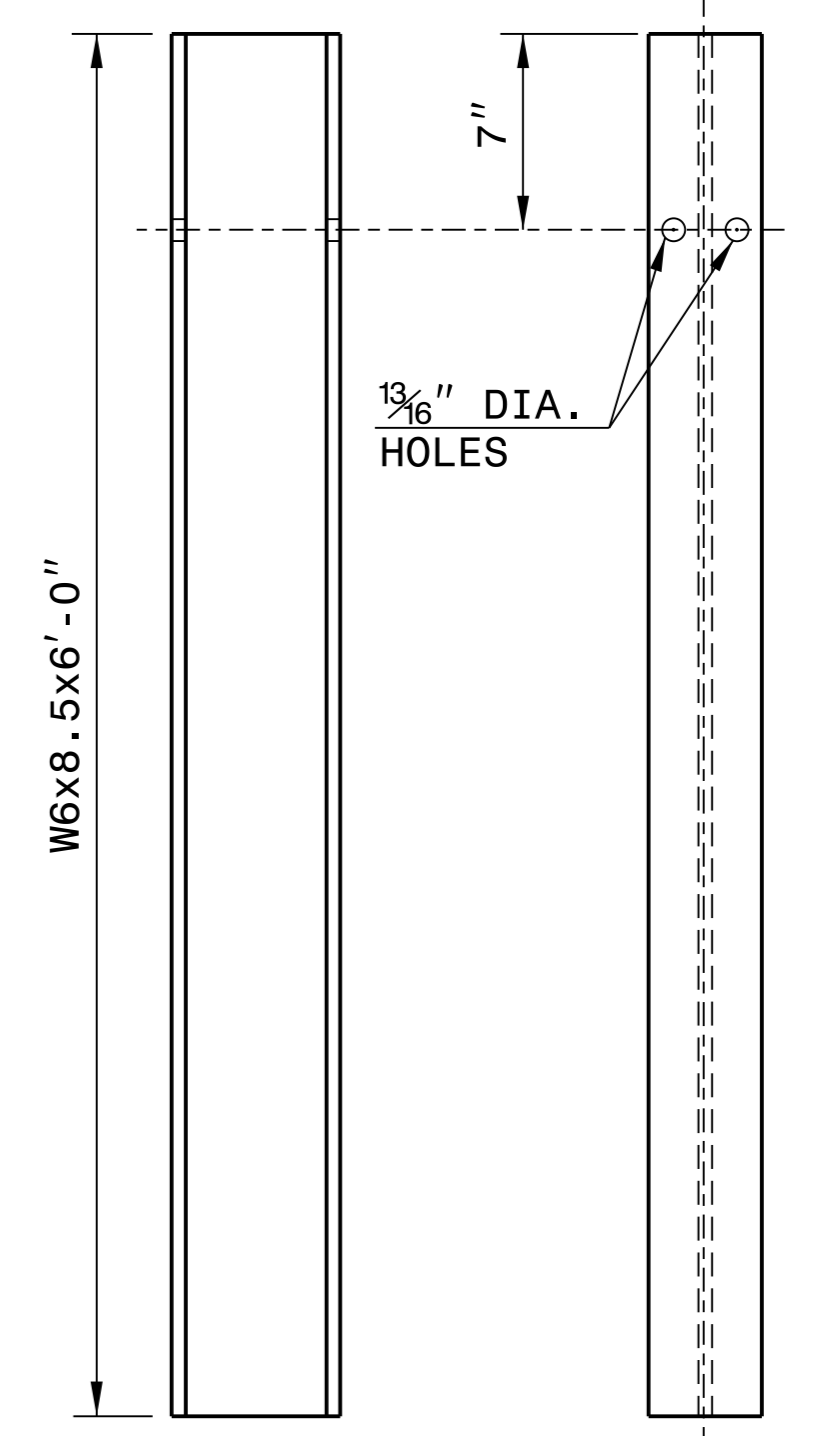
**STEEL TUBE
TS 6"x8"x0.1875"**



SIDE

FRONT

**ROUTED
OFFSET BLOCK**



SIDE

FRONT

"W6" STEEL POST

SYSTEM PARTS

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02



**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.: _____

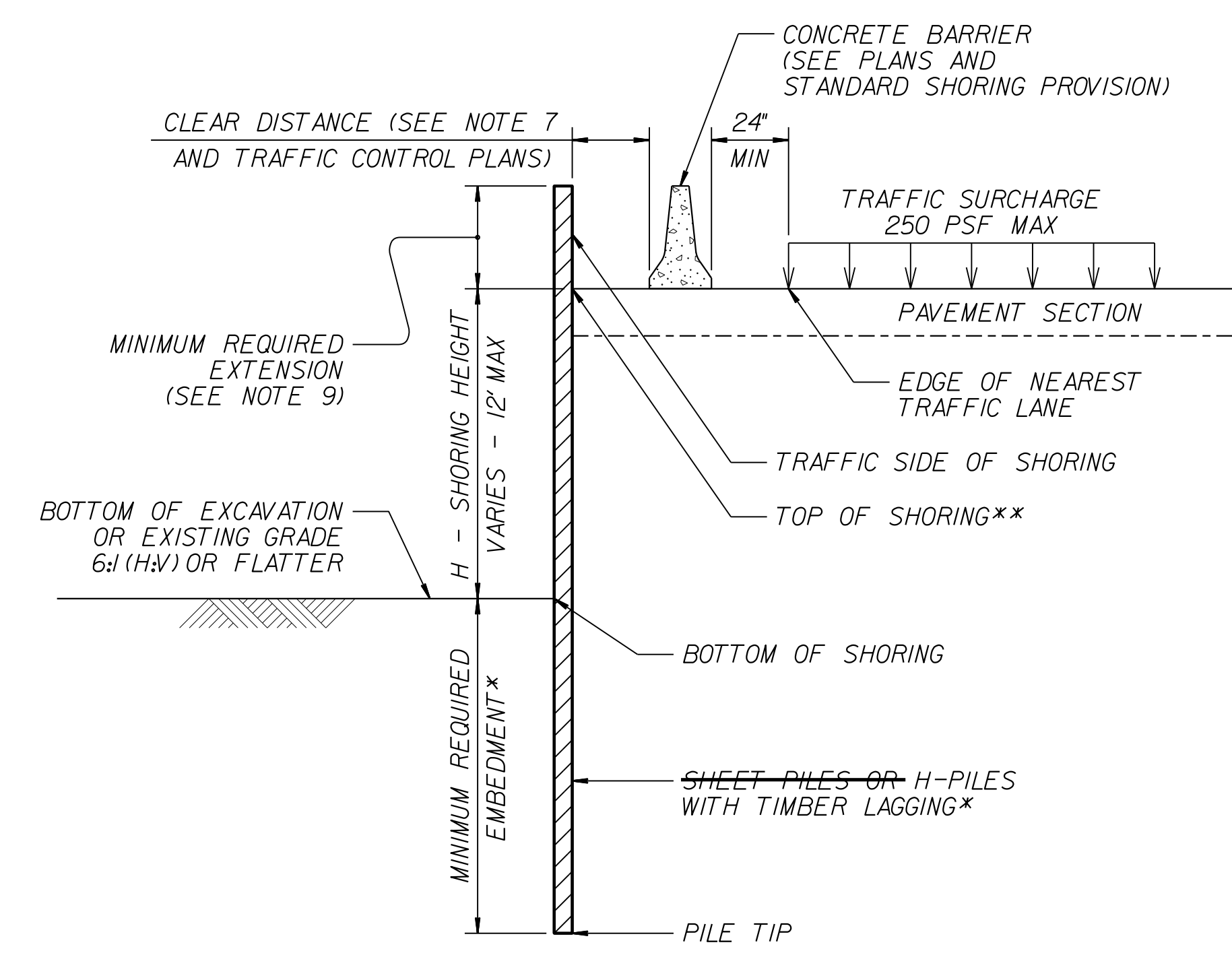
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT						SURCHARGE CASE WITH TRAFFIC IMPACT									
		SHEET PILES		H-PILES WITH TIMBER LAGGING				SHEET PILES		H-PILES WITH TIMBER LAGGING							
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION 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 BETWEEN 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	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	14.5	14.5				
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5	15.5	15.5				
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0	17.0	17.0				
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5	18.5	18.5				
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0	20.0	20.0				
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5	21.5	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	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	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	11.5	11.5				
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5	12.5	12.5				
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5	13.5	13.5				
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5	14.5	14.5				
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5	15.5	15.5				

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

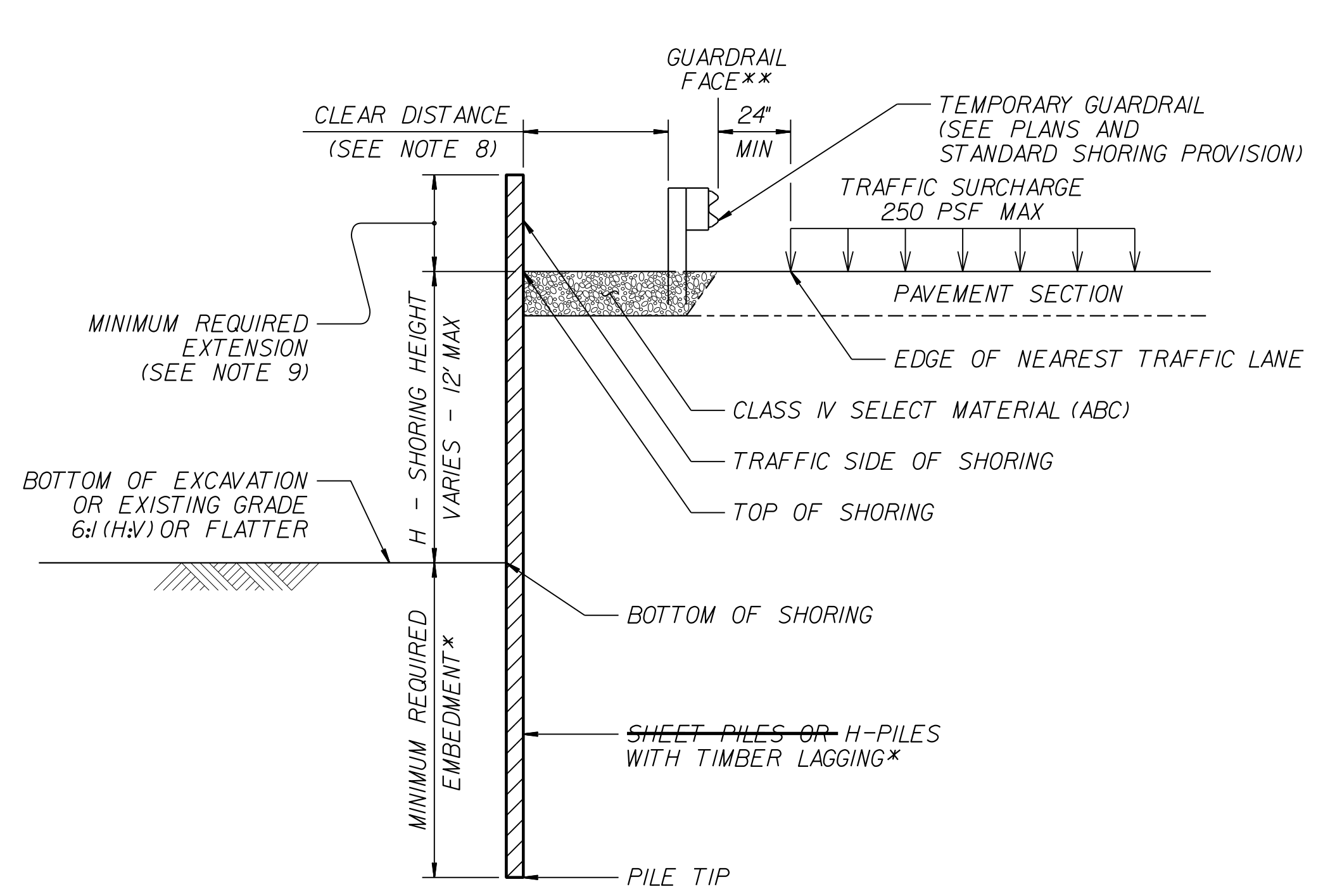
~~*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".~~

NOTES:

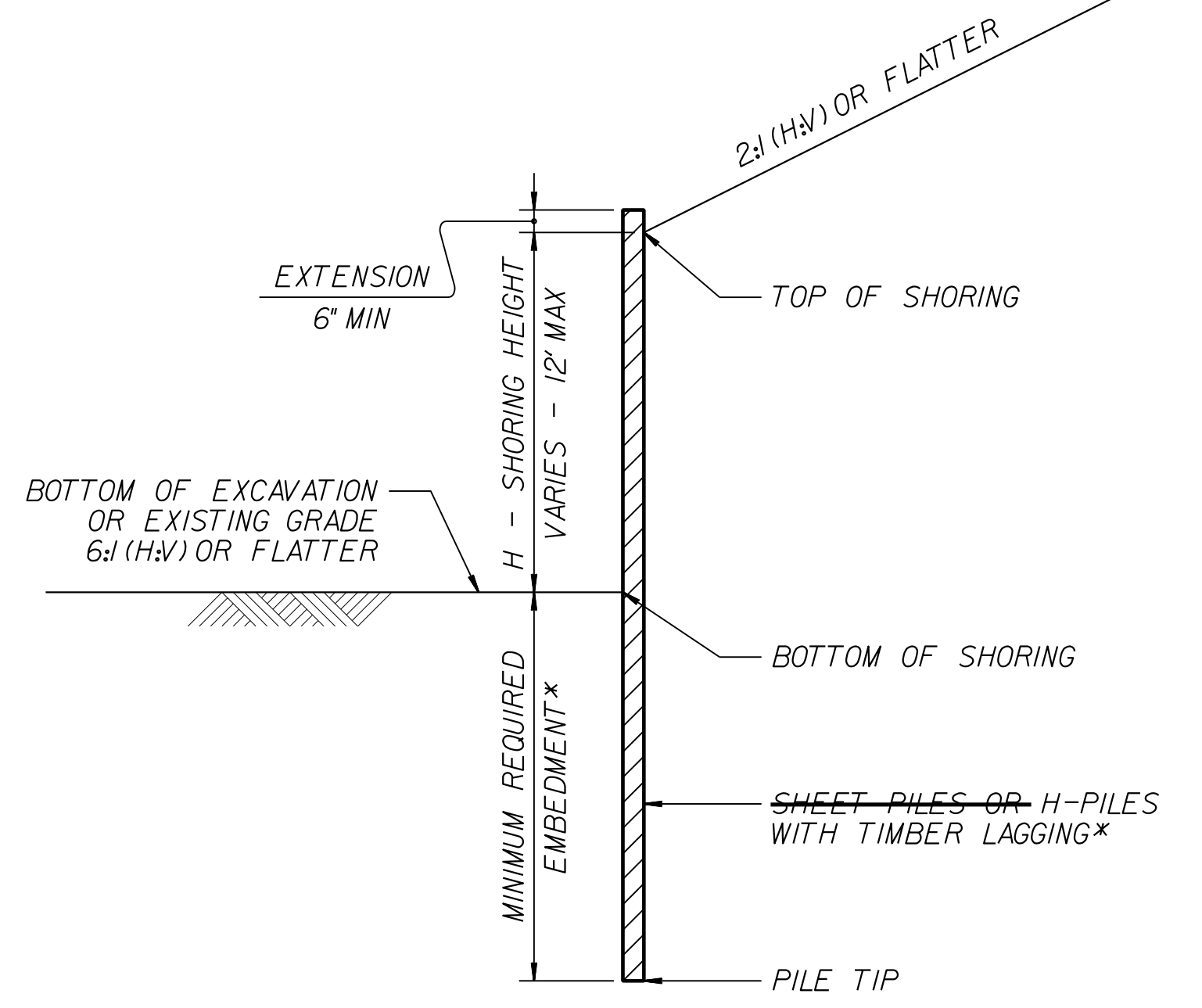
- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
- DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
- 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.
- 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".
- 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".
- MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
- ~~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.~~
- 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
- 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

8/17/99

COMPUTED BY: WGC
CHECKED BY: WGC

DATE: 10/5/2018
DATE: 11/5/2018

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO. 17BP.5.C.02
SHEET NO. 3D-1

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)

Table with columns for Station, Location, Structure No., Top Invert, Invert, Slope, Pipe Size, Material (R.C. Pipe Class III/IV, Side Drain Pipe, C.S. Pipe, Endwalls), Quantities, Frame/Grates, and Abbreviations. Includes a 'SHEET TOTALS' row at the bottom.

REVISIONS

COMPUTED BY: WGC
CHECKED BY: WGC

DATE: 10/5/2018
DATE: 11/5/2018

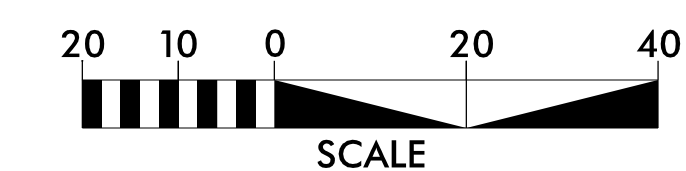
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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 54" & OVER)

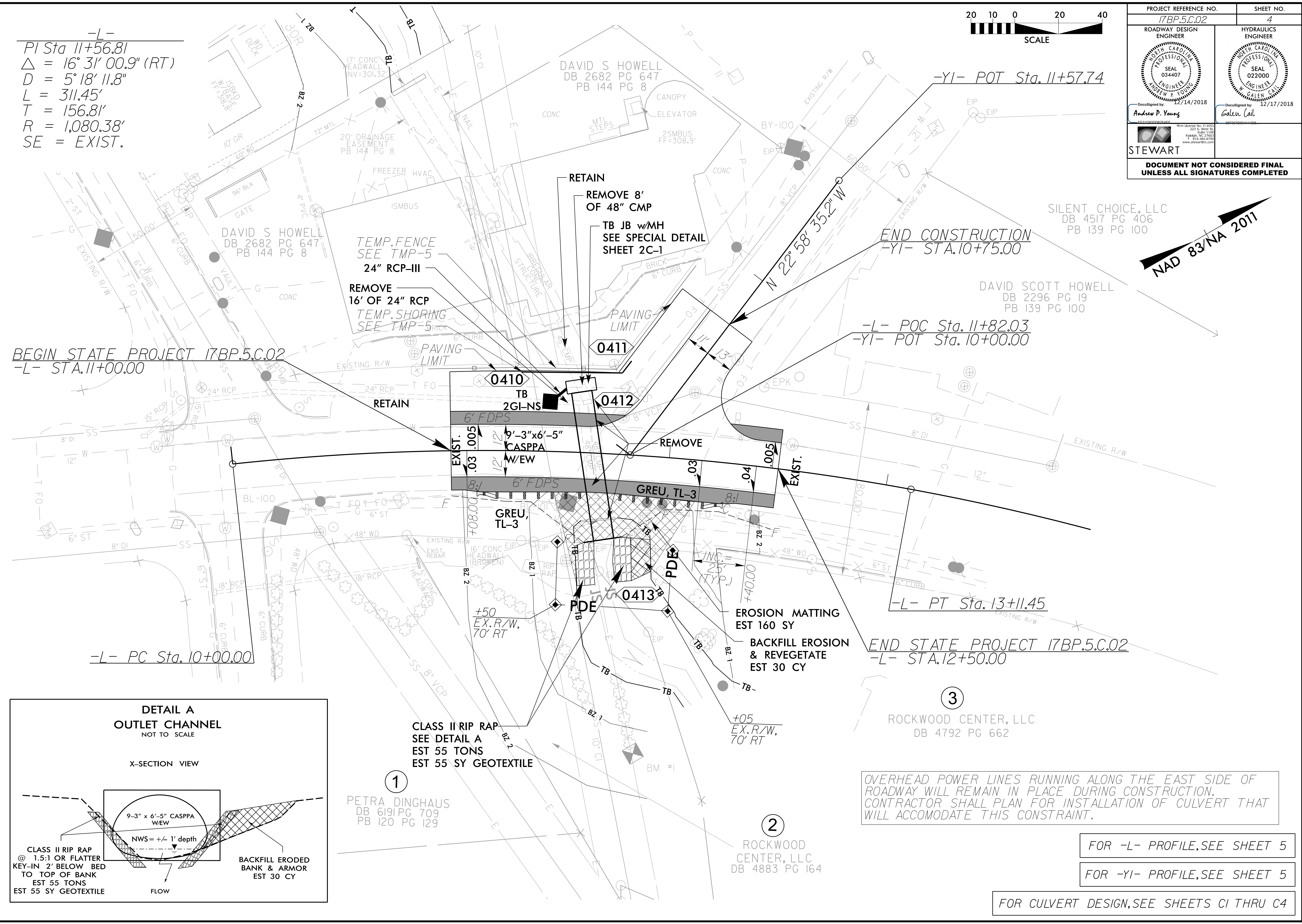
Table with columns for Station, Location, Structure No., Top Invert, Invert, Slope, Pipe Size, Material (Class III R.C. Pipe, C.S. Pipe, Aluminum Alloy Structural Plate Pipe Arch, Reinforced Endwalls), Frames/Grates, and Abbreviations. Includes a 'SHEET TOTALS' row at the bottom.

11/5/2018 Nc.DOT\SUM_3D-1.dgn



PROJECT REFERENCE NO. 17BP.5.C.02	SHEET NO. 4
ROADWAY DESIGN ENGINEER ANDREW P. YOUNG SEAL 034407	HYDRAULICS ENGINEER GALEN CAL SEAL 022000
DocuSigned by: Andrew P. Young 12/14/2018	DocuSigned by: Galen Cal 12/17/2018
STEWART	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-L-
 PI Sta 11+56.81
 $\Delta = 16^\circ 31' 00.9''$ (RT)
 $D = 5^\circ 18' 11.8''$
 $L = 311.45'$
 $T = 156.81'$
 $R = 1,080.38'$
 SE = EXIST.



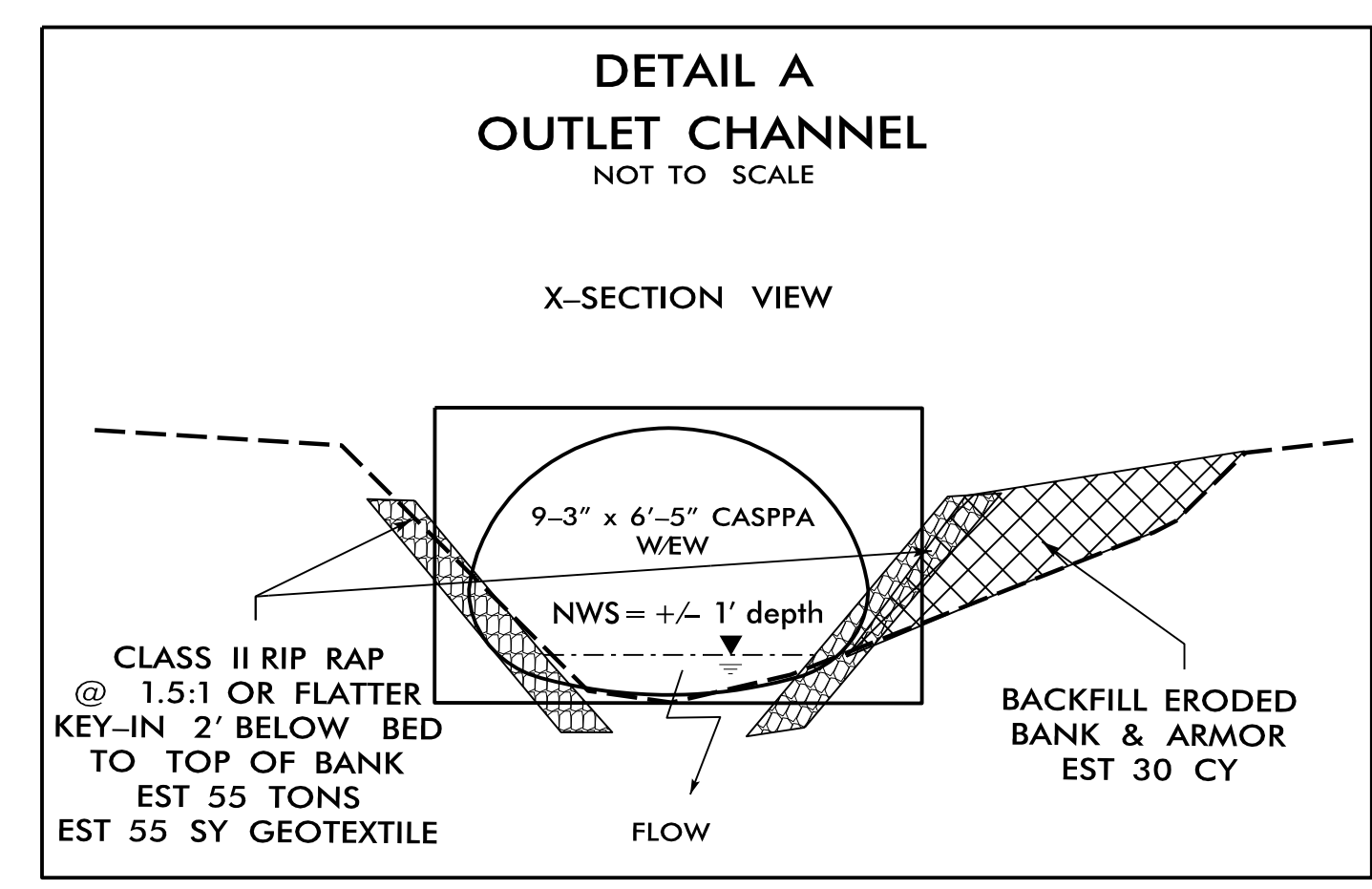
BEGIN STATE PROJECT 17BP.5.C.02
 -L- STA. 11+00.00

END CONSTRUCTION
 -YI- STA. 10+75.00

-L- POC Sta. 11+82.03
 -YI- POT Sta. 10+00.00

-L- PC Sta. 10+00.00

END STATE PROJECT 17BP.5.C.02
 -L- STA. 12+50.00



CLASS II RIP RAP
 SEE DETAIL A
 EST 55 TONS
 EST 55 SY GEOTEXTILE

1
 PETRA DINGHAUS
 DB 619 PG 709
 PB 120 PG 129

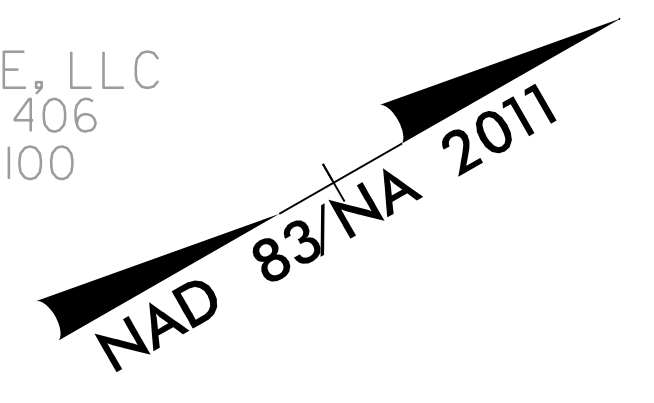
2
 ROCKWOOD CENTER, LLC
 DB 4883 PG 164

OVERHEAD POWER LINES RUNNING ALONG THE EAST SIDE OF ROADWAY WILL REMAIN IN PLACE DURING CONSTRUCTION. CONTRACTOR SHALL PLAN FOR INSTALLATION OF CULVERT THAT WILL ACCOMODATE THIS CONSTRAINT.

FOR -L- PROFILE, SEE SHEET 5

FOR -YI- PROFILE, SEE SHEET 5

FOR CULVERT DESIGN, SEE SHEETS C1 THRU C4



SILENT CHOICE, LLC
 DB 4517 PG 406
 PB 139 PG 100

DAVID SCOTT HOWELL
 DB 2296 PG 19
 PB 139 PG 100

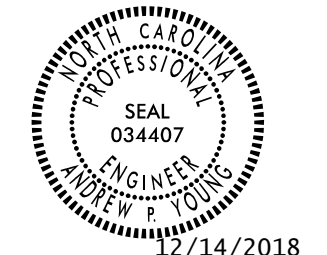

3
 ROCKWOOD CENTER, LLC
 DB 4792 PG 662

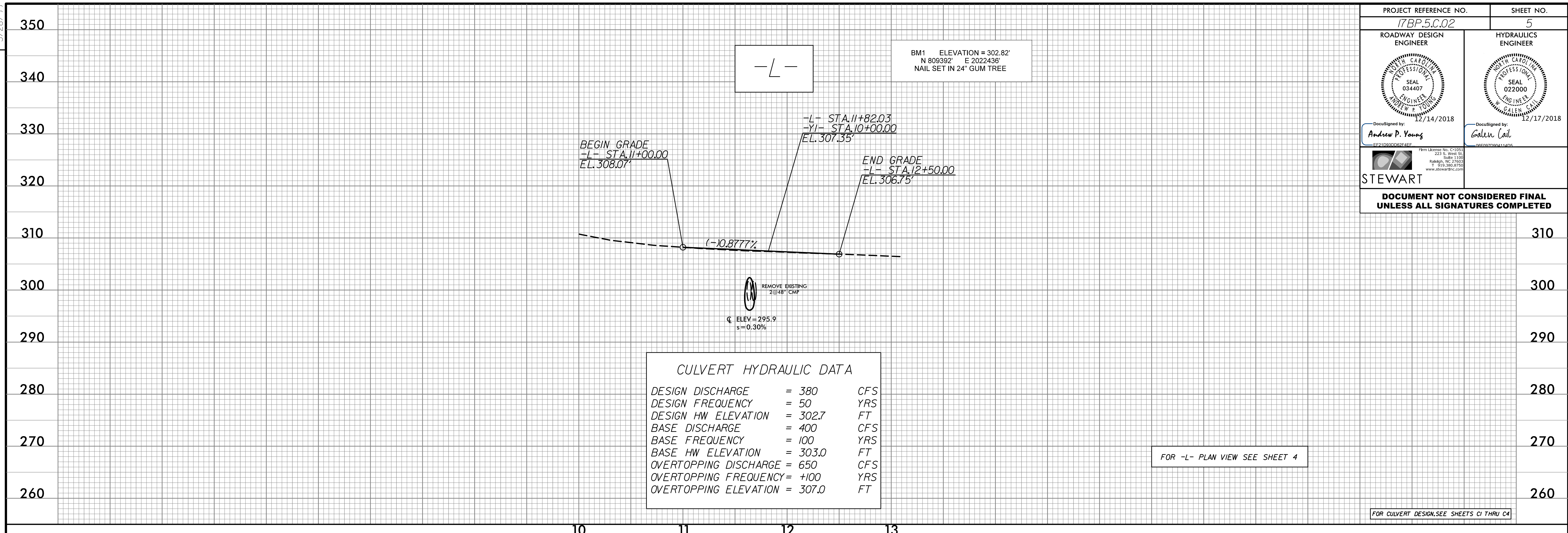
REVISIONS

8/17/99
 11/2/2018 Name: RDY_PSH04.dgn
 User: R1000000

5/28/99

REVISIONS

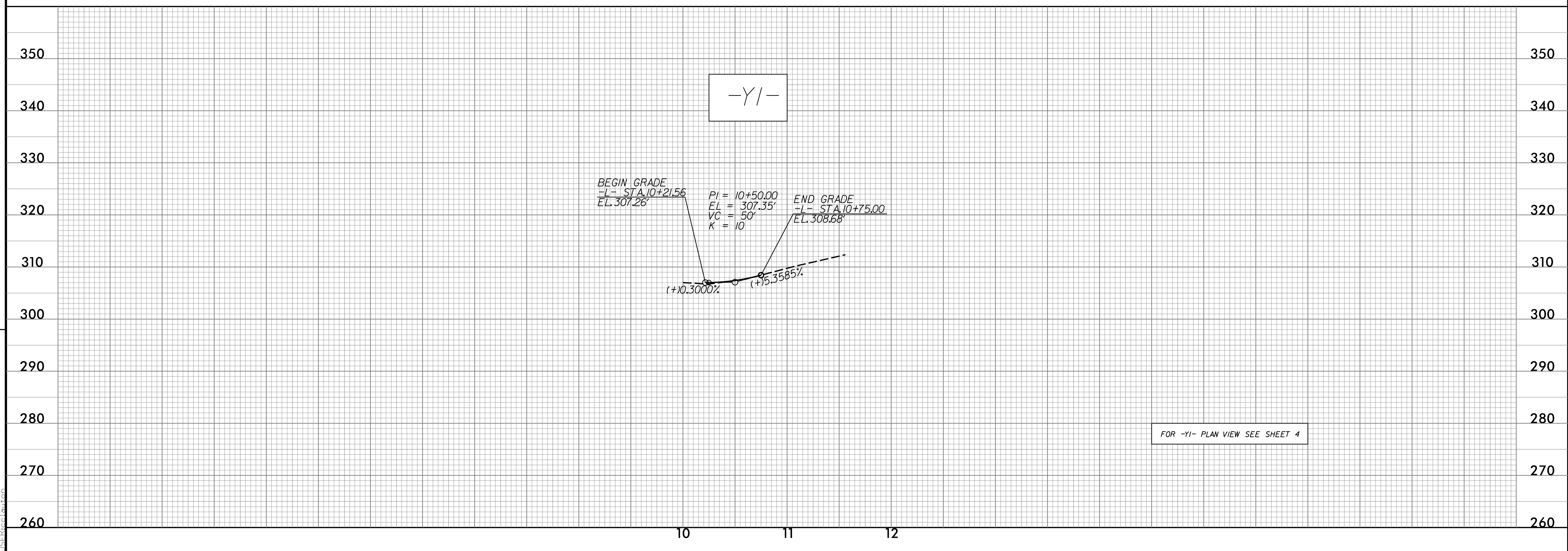
PROJECT REFERENCE NO. 17BP.5.C.02	SHEET NO. 5
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 
DocuSigned by: Andrew P. Young EE21D33D027EE	DocuSigned by: Galen Cal 06E927041445
STEWART	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



CULVERT HYDRAULIC DATA		
DESIGN DISCHARGE	= 380	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 302.7	FT
BASE DISCHARGE	= 400	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 303.0	FT
OVERTOPPING DISCHARGE	= 650	CFS
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING ELEVATION	= 307.0	FT

FOR -L- PLAN VIEW SEE SHEET 4

FOR CULVERT DESIGN, SEE SHEETS C1 THRU C4



FOR -Y| - PLAN VIEW SEE SHEET 4

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