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8/17/99

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8/17/99

GENERAL NOTES

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

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

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

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

SHOULDER CONSTRUCTION:
ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01 AND 560.02

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

BERM DITCHES:
BERM DITCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 240.01 AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

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

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.

STANDARD DRAWINGS

EFF. 01-16-2018
REV.

2018 ROADWAY ENGLISH STANDARD DRAWINGS

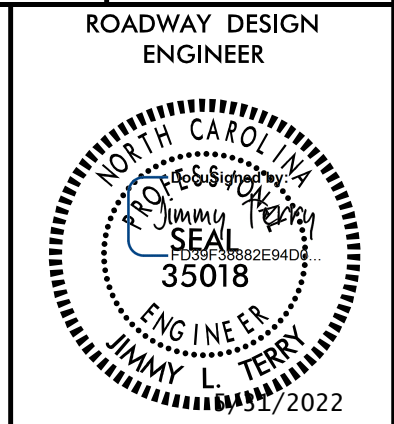
The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE	STD.NO.	TITLE
DIVISION 2 - EARTHWORK			
200.02	Method of Clearing - Method II	840.20	Frames and Wide Slot Flat Grates
225.02	Guide for Grading Subgrade - Secondary and Local	840.22	Frames and Wide Slot Sag Grates
225.03	Deceleration and Acceleration Lanes	840.24	Frames and Narrow Slot Sag Grates
225.04	Method of Obtaining Superlevation - Two Lane Pavement	840.25	Anchorage for Frames - Brick or Concrete or Precast
225.06	Method of Grading Sight Distance at Intersections	840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
240.01	Guide for Berm Ditch Construction	840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29		840.29	Frames and Narrow Slot Flat Grates
DIVISION 3 - PIPE CULVERTS			
300.01	Method of Pipe Installation	840.31	Concrete Junction Box - 12" thru 66" Pipe
310.10	Driveway Pipe Construction	840.32	Brick Junction Box - 12" thru 66" Pipe
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS			
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I	840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
560.02	Method of Shoulder Construction - High Side of Superelevated Curve - Method II	840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
DIVISION 6 - ASPHALT BASES AND PAVEMENTS			
654.01	Pavement Repairs	840.41	Spring Box - Concrete or Brick
DIVISION 8 - INCIDENTALS			
815.02	Subsurface Drain	840.45	Precast Drainage Structure
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew	840.46	Traffic Bearing Precast Drainage Structure
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew	840.54	Manhole Frame and Cover
840.00	Concrete Base Pad for Drainage Structures	840.66	Drainage Structure Steps
840.01	Brick Catch Basin - 12" thru 54" Pipe	840.71	Concrete and Brick Pipe Plug
840.02	Concrete Catch Basin - 12" thru 54" Pipe	840.72	Pipe Collar
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin	846.01	Concrete Curb, Gutter and Curb & Gutter
840.04	Concrete Open Throat Catch Basin - 12" thru 48" Pipe	846.02	Drop Inlet Installation in Expressway Gutter
840.05	Brick Open Throat Catch Basin - 12" thru 48" Pipe	846.04	Drop Inlet Installation in Shoulder Berm Gutter
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15	848.01	Concrete Sidewalk
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe	848.02	Driveway Turnout - Radius Type
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe	848.04	Street Turnout
		848.05	Curb Ramp - Proposed Curb & Gutter
		850.01	Concrete Paved Ditches
		850.10	Guide for Berm Drainage Outlet - 15" and 18" Pipe
		850.11	Guide for Berm Drainage Outlet - 24" and 30" Pipe
		852.01	Concrete Islands
		852.06	Method for Placement of Drop Inlets in Concrete Islands
		857.01	Precast Reinforced Concrete Barrier - 41" Single Faced
		862.01	Guardrail Placement
		862.02	Guardrail Installation
		862.03	Structure Anchor Units
		862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
		866.01	Chain Link Fence - 4', 5' and 6' High Fence
		876.01	Rip Rap in Channels
		876.02	Guide for Rip Rap at Pipe Outlets
		876.04	Drainage Ditches with Class 'B' Rip Rap

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 1A
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**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

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



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

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

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

UTILITIES:
UTILITY OWNERS ON THIS PROJECT ARE DUKE ENERGY, FRONTIER, TOWN OF ROBBINSVILLE (WATER & SEWER), BALSAM WEST, AND ZITO MEDIA
ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

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

CURB RAMPS
CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. CONSTRUCT ALL CURB RAMPS ACCORDANCE WITH STD 848.05 and/or 848.06.

ROCK
ROCK IS ANTICIPATED BETWEEN -L- STA 187+76 TO 191+21. BLASTING MAY BE REQUIRED FOR EXCAVATION ON THE PROJECT. SEE SECTION 220 OF THE STANDARD SPECIFICATIONS AND IF APPLICABLE, ROCK BLASTING PROVISION.

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	(23)
Existing Fence Line	-x-x-x-
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-S-
Potential Contamination Area: Soil	-S-S-
Known Contamination Area: Water	-W-W-
Potential Contamination Area: Water	-W-W-
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	-JS-
Buffer Zone 1	-BZ 1-
Buffer Zone 2	-BZ 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.

6/2/2022

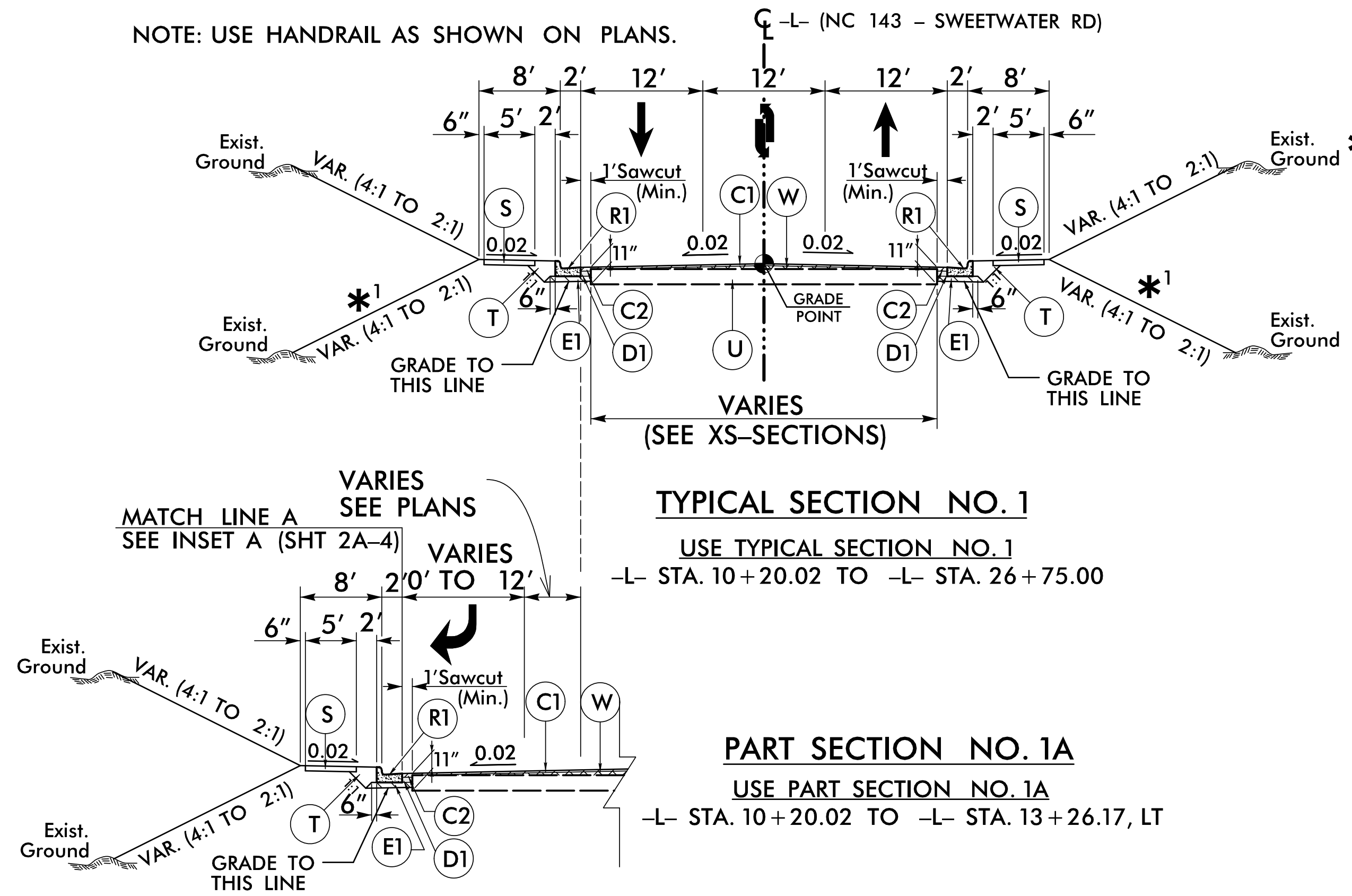
PAVEMENT SCHEDULE

C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1 1/2" 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. APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5 1/2" IN DEPTH.
K	CLASS IV SUBGRADE STABILIZATION
J1	PROP. 6" AGGREGATE BASE COURSE.
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	EXPRESSWAY GUTTER
R3	8" X 12" CONCRETE CURB
R4	SHOULDER BERM GUTTER
S	CONCRETE SIDEWALK
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V1	MILLING, 0 TO 3" DEPTH, SEE THIS SHEET FOR DETAIL
W	WEDGING EXISTING PAVEMENT, SEE THIS SHEET FOR DETAILS

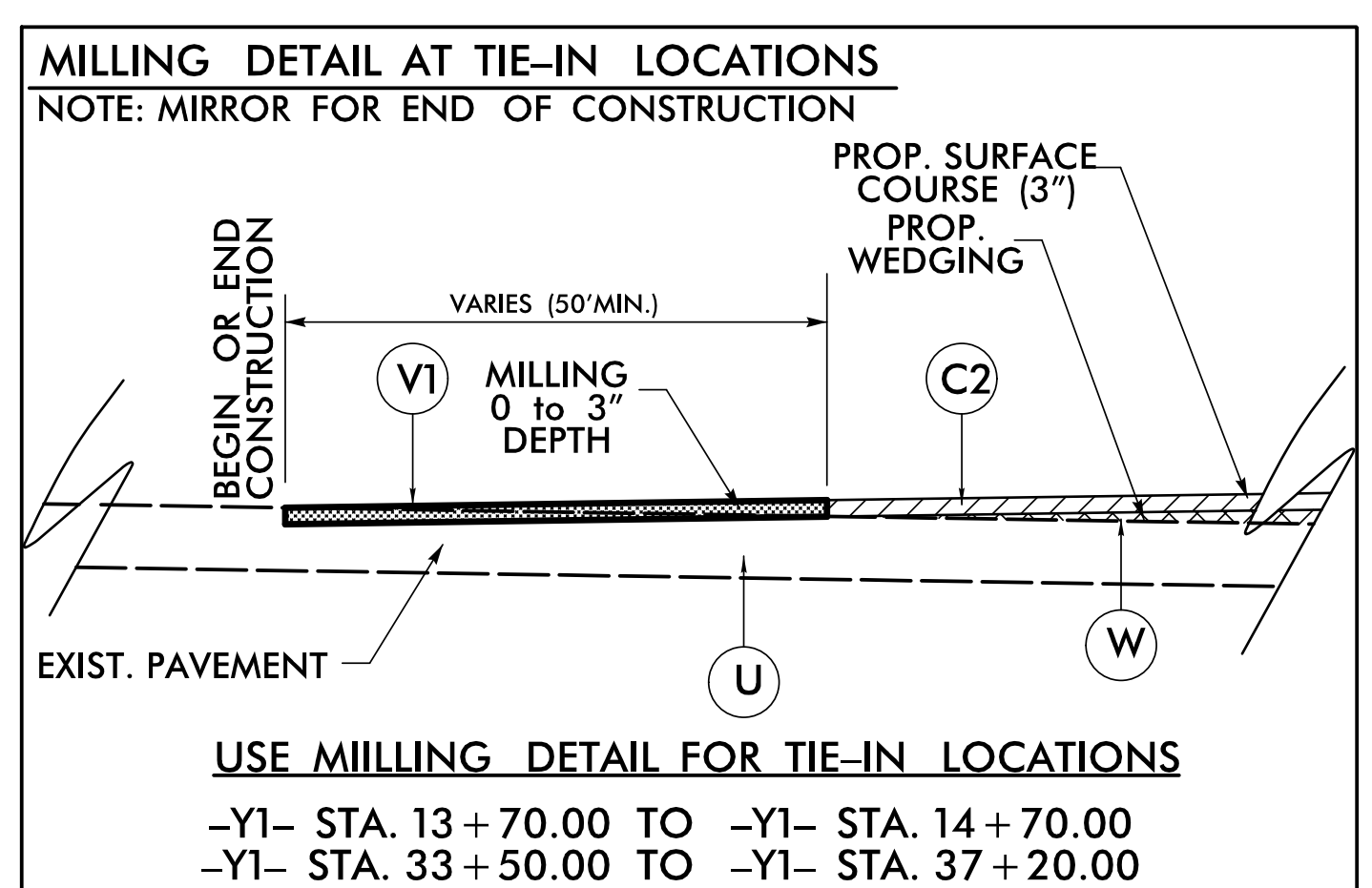
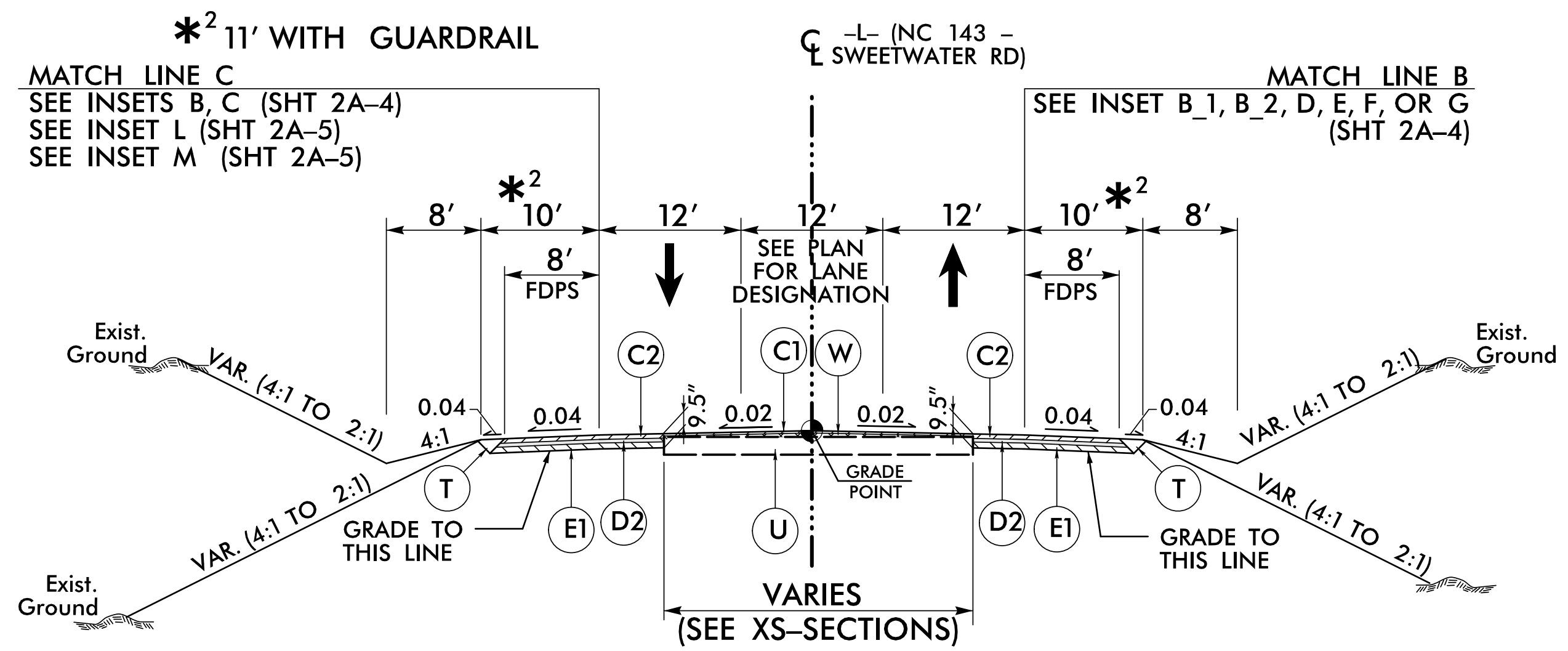
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER 	PAVEMENT DESIGN ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 TGS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	

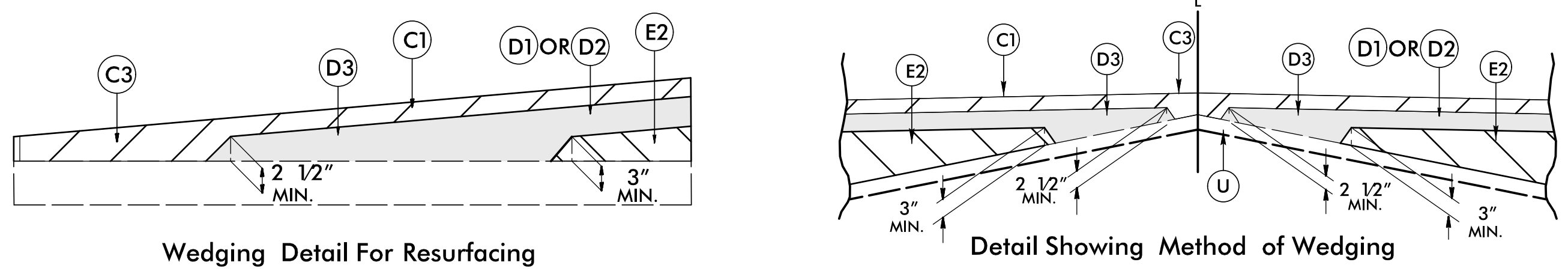
NOTE: USE HANDRAIL AS SHOWN ON PLANS.



*NOTE:
 USE 1.5:1 BACK SLOPES TO TIE TO EXISTING CULVERT:
 -L- STA. 17+21± TO
 -L- STA. 17+74± LT
 -L- STA. 16+95± TO
 -L- STA. 17+51± RT
 (SEE XS-SECTIONS)



NOTE:
 ANYWHERE ALONG THE PROJECT IN WHICH LESS THAN 3" OF OVERLAY HAS BEEN CALLED FOR THE CONTRACTOR SHALL MILL EXISTING PAVEMENT AND PROVIDE A MINIMUM OF TWO FULL LAYERS OF S9.5C TO SATISFY RIDEABILITY REQUIREMENTS PER CONTRACT FOR -L- AND -Y1-.

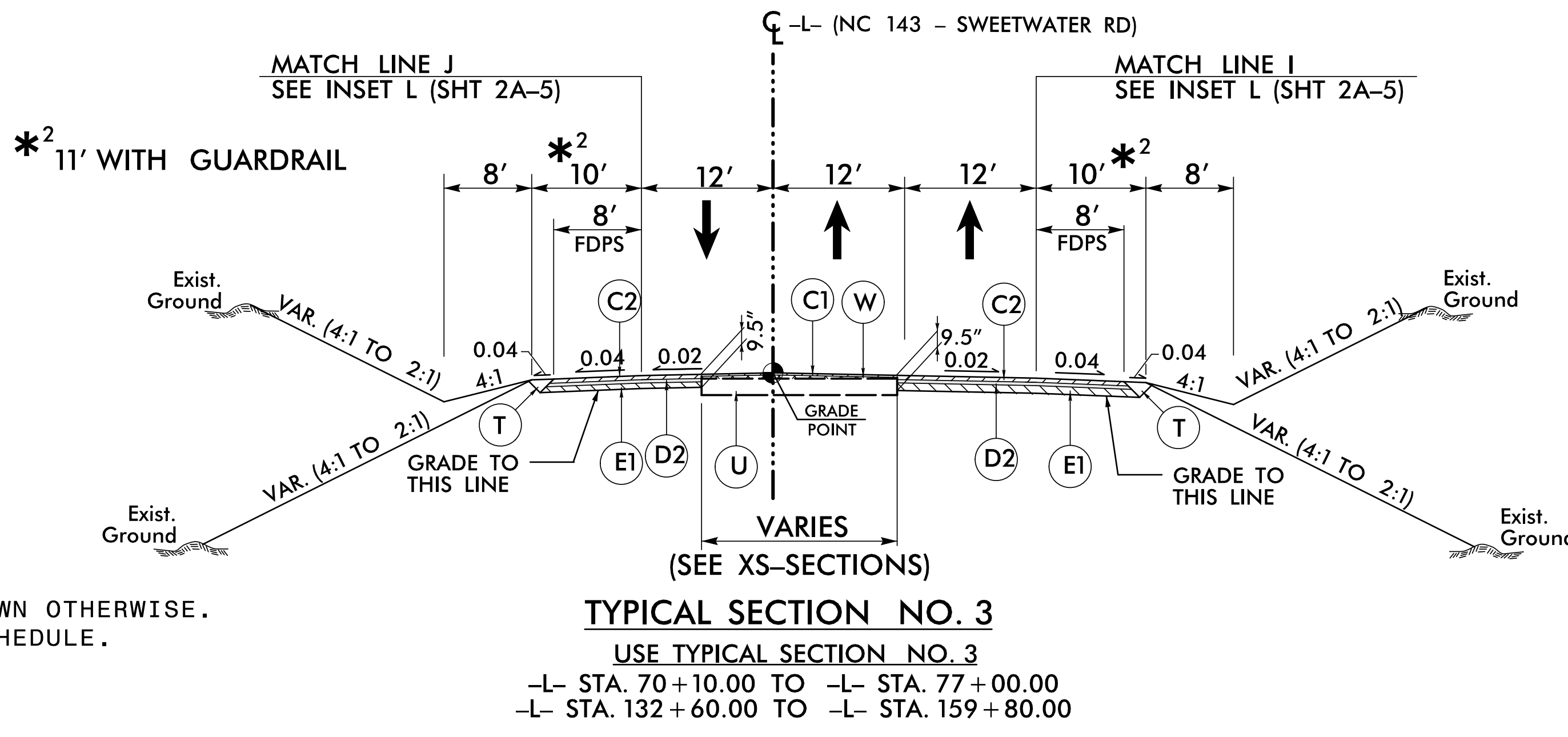


5/19/2022
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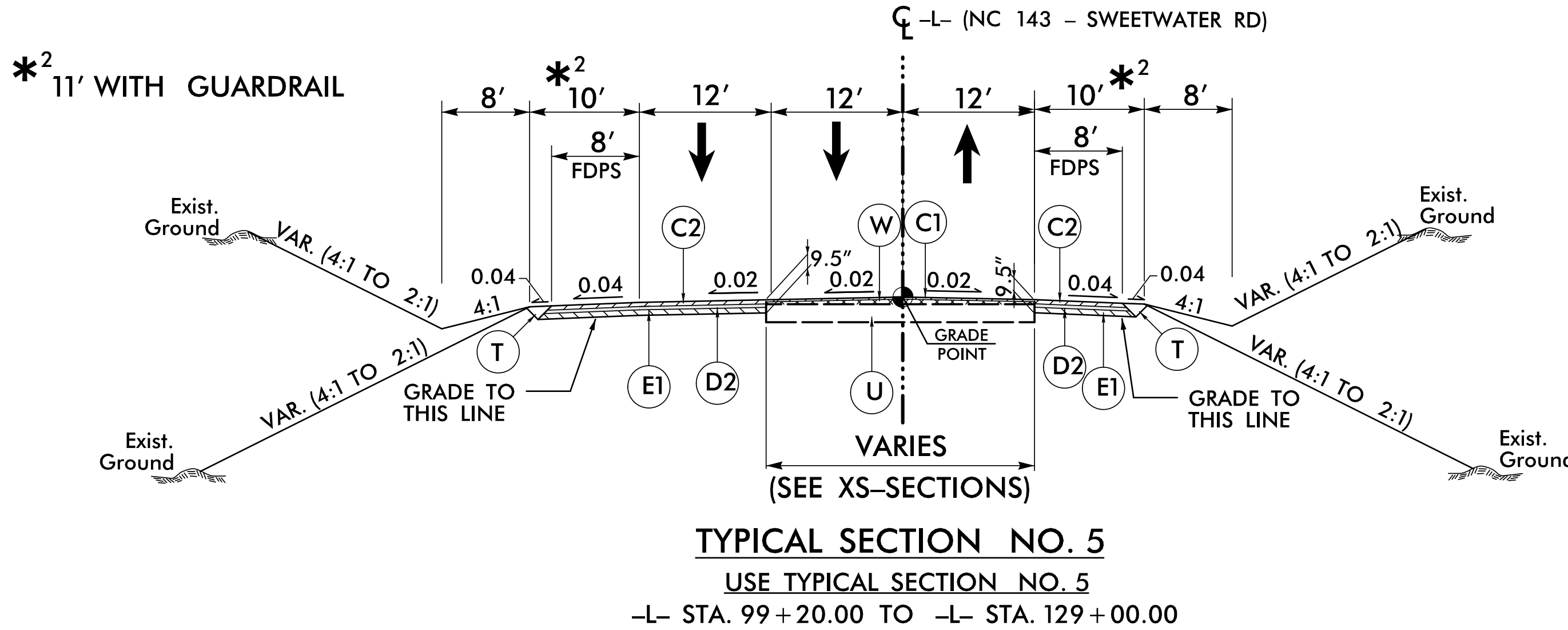
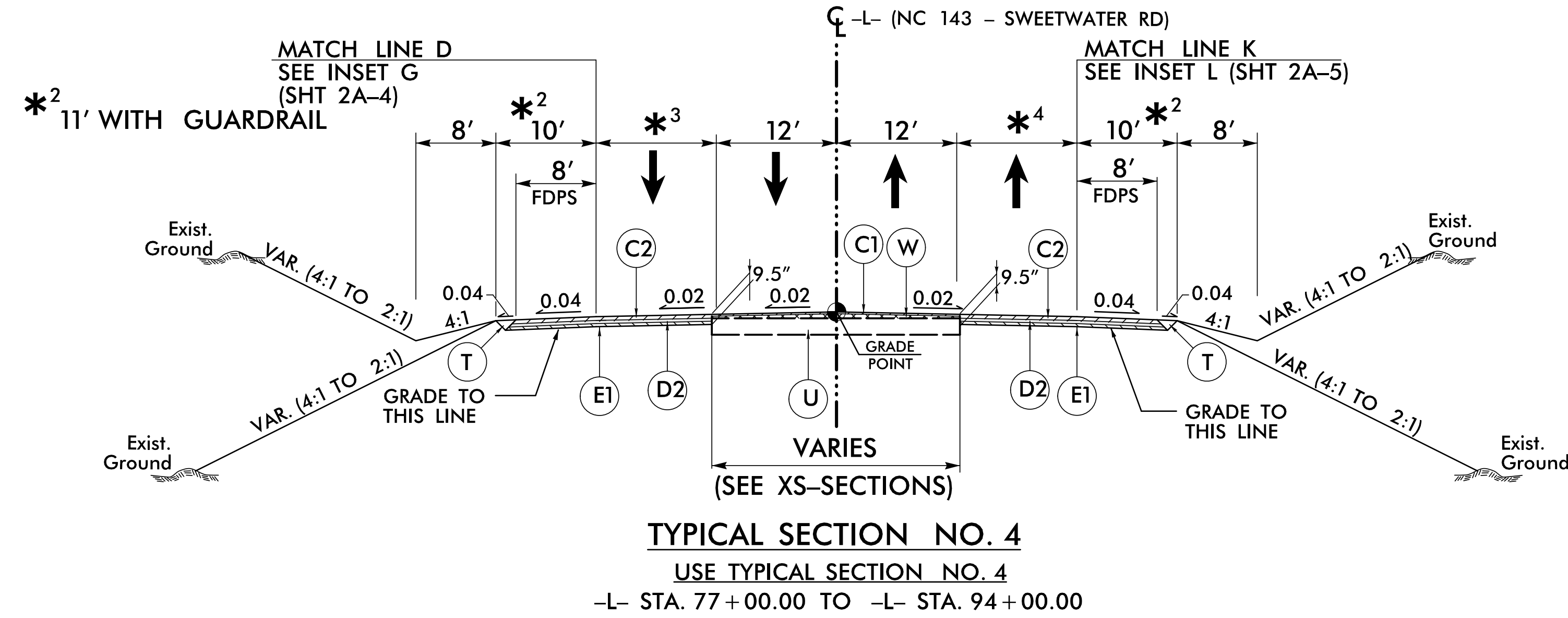
6/2/2019

PAVEMENT SCHEDULE	
C1	1.5" S9.5C
C2	3" S9.5C
D2	2 1/2" I19.0C
E1	4" B25.0C
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

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



NOTE:
TRANSITION BETWEEN TYP. SECT. NO. 2 AND TYP. SECT. NO. 3 AS FOLLOWS:
-L- STA. 66+50.00 TO -L- STA. 70+10.00
TRANSITION BETWEEN TYP. SECT. NO. 4 AND TYP. SECT. NO. 3 AS FOLLOWS:
-L- STA. 129+00.00 TO -L- STA. 132+60.00



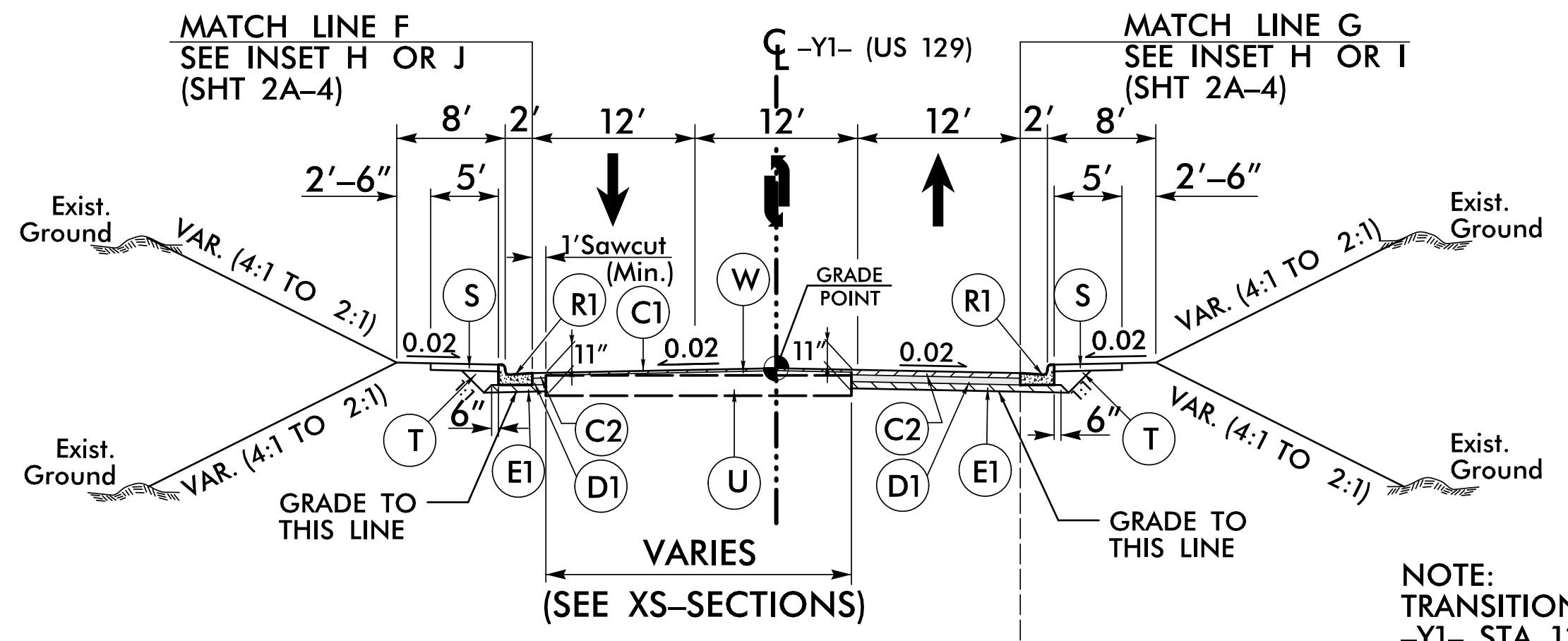
PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2A-2
ROADWAY DESIGN ENGINEER 	PAVEMENT DESIGN ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
TGS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	

5/19/2022
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 User:smal

6/2/2022

PAVEMENT SCHEDULE			
C1	1.5" S9.5C	R1	2'-6" C&G
C2	3" S9.5C	S	SIDEWALK
D1	4" I19.0C	T	EARTH MATERIAL
D2	2 1/2" I19.0C	U	EXISTING PAVEMENT
E1	4" B25.0C	W	WEDGING
J1	6" ABC		

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



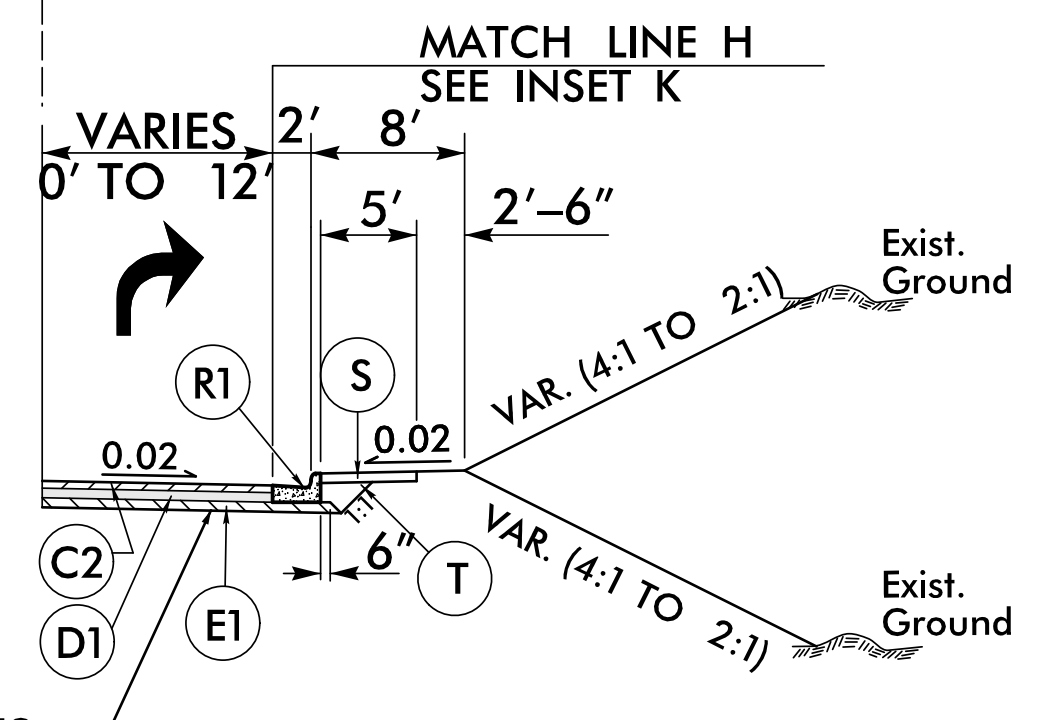
TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6
-Y1- STA. 14+70.00 TO -Y1- STA. 35+70.00

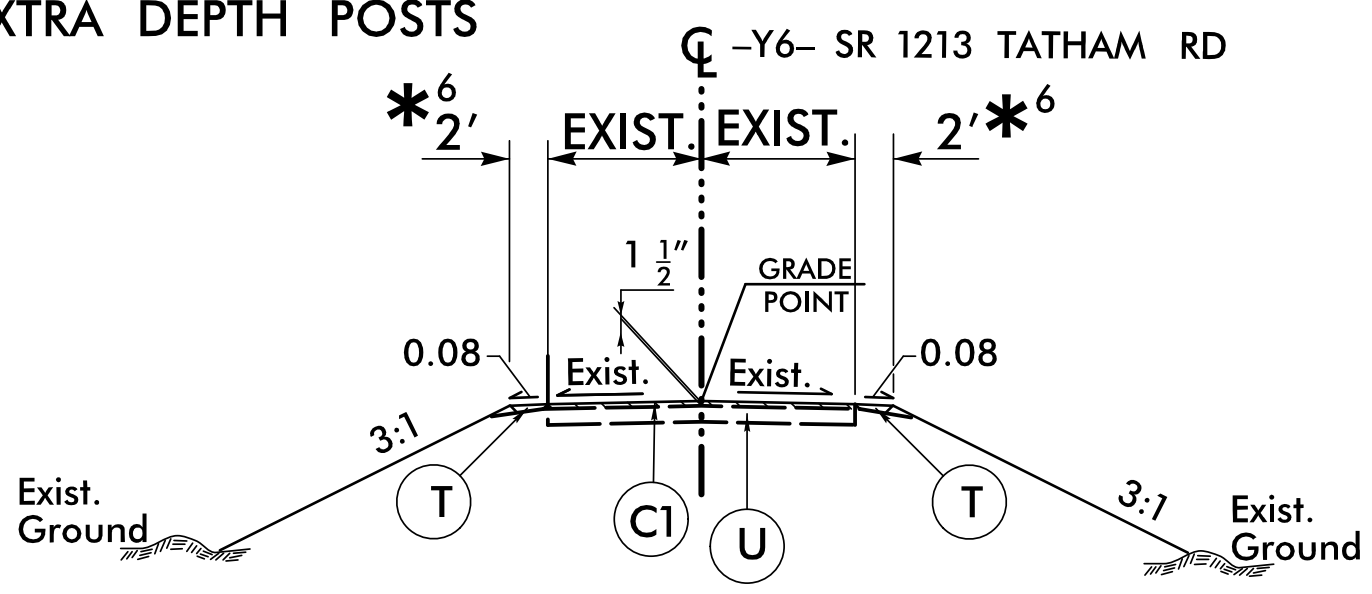
NOTE:
TRANSITION BETWEEN EXISTING AND TYP. SECT. NO 6 AS FOLLOWS:
-Y1- STA. 13+70.00 TO -Y1- STA. 14+70.00
-Y1- STA. 35+70.00 TO -Y1- STA. 36+70.00
NOTE:
SEE PLANS FOR SIDEWALK LOCATION.

PART SECTION NO. 6A

USE PART SECTION NO. 6A
-Y1- STA. 32+50.00 TO -Y1- STA. 35+76.33,RT

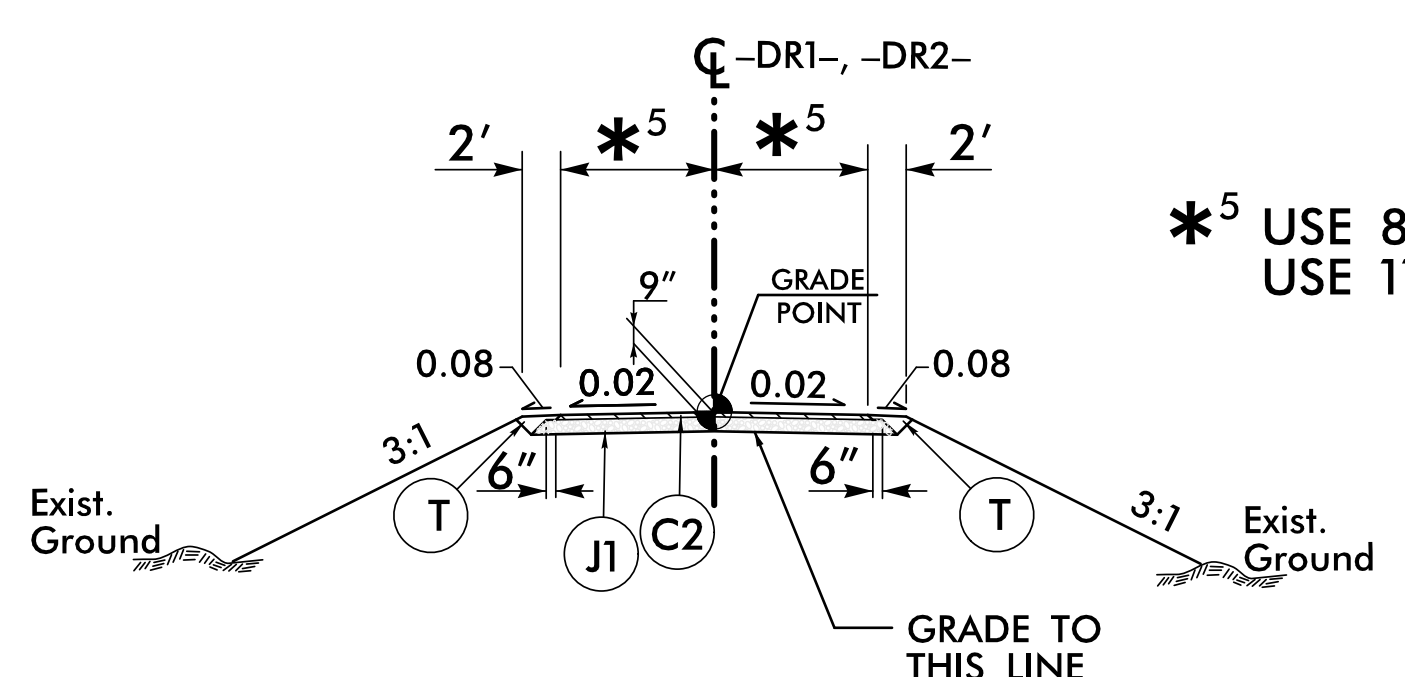


*6 FOR GUARDRAIL WIDEN 3'MIN BEHIND THE FACE OF GUARDRAIL OR USE EXTRA DEPTH POSTS



TYPICAL SECTION NO. 7

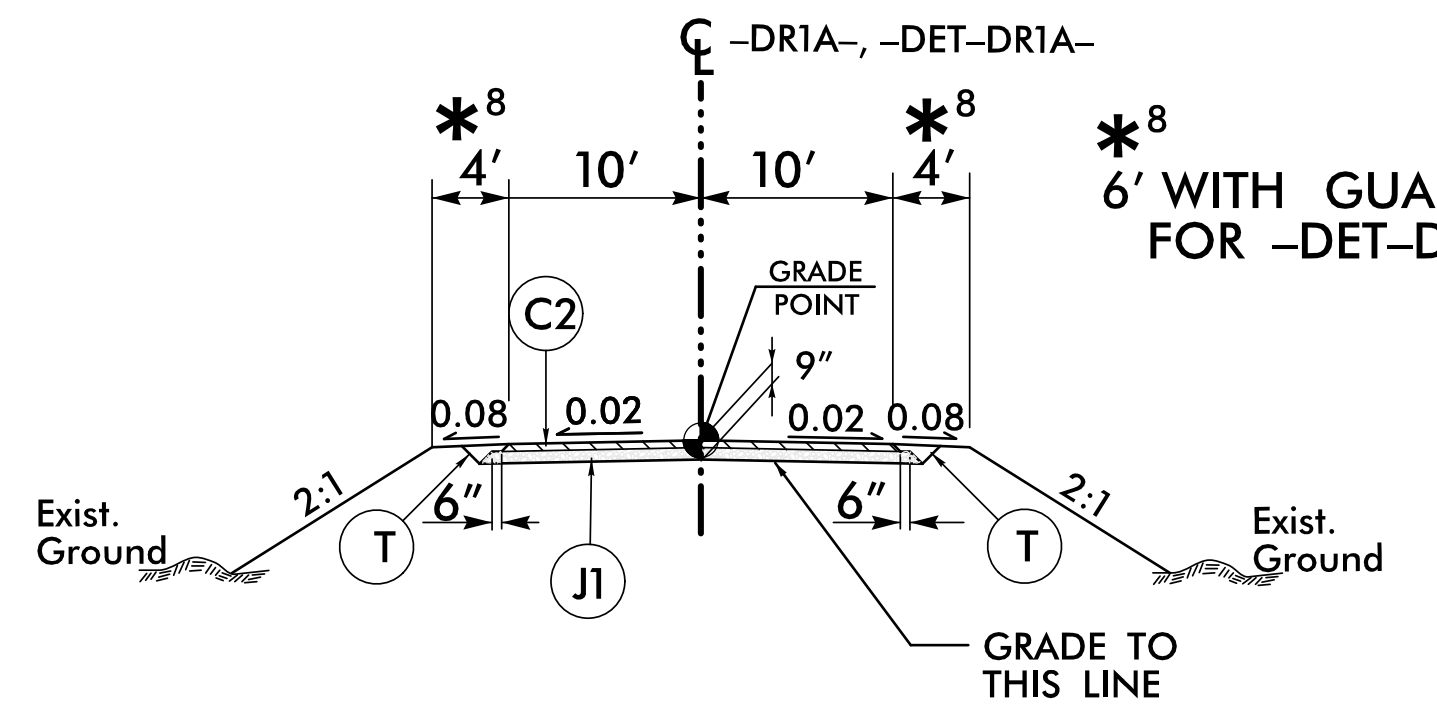
USE TYPICAL SECTION NO. 7
-Y6- STA. 11+05.00 TO -Y6- STA. 12+85.70



TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8
-DR1- STA. 10+20.00 TO -DR1- STA. 11+71.39
-DR2- STA. 10+26.60 TO -DR2- STA. 11+60.00

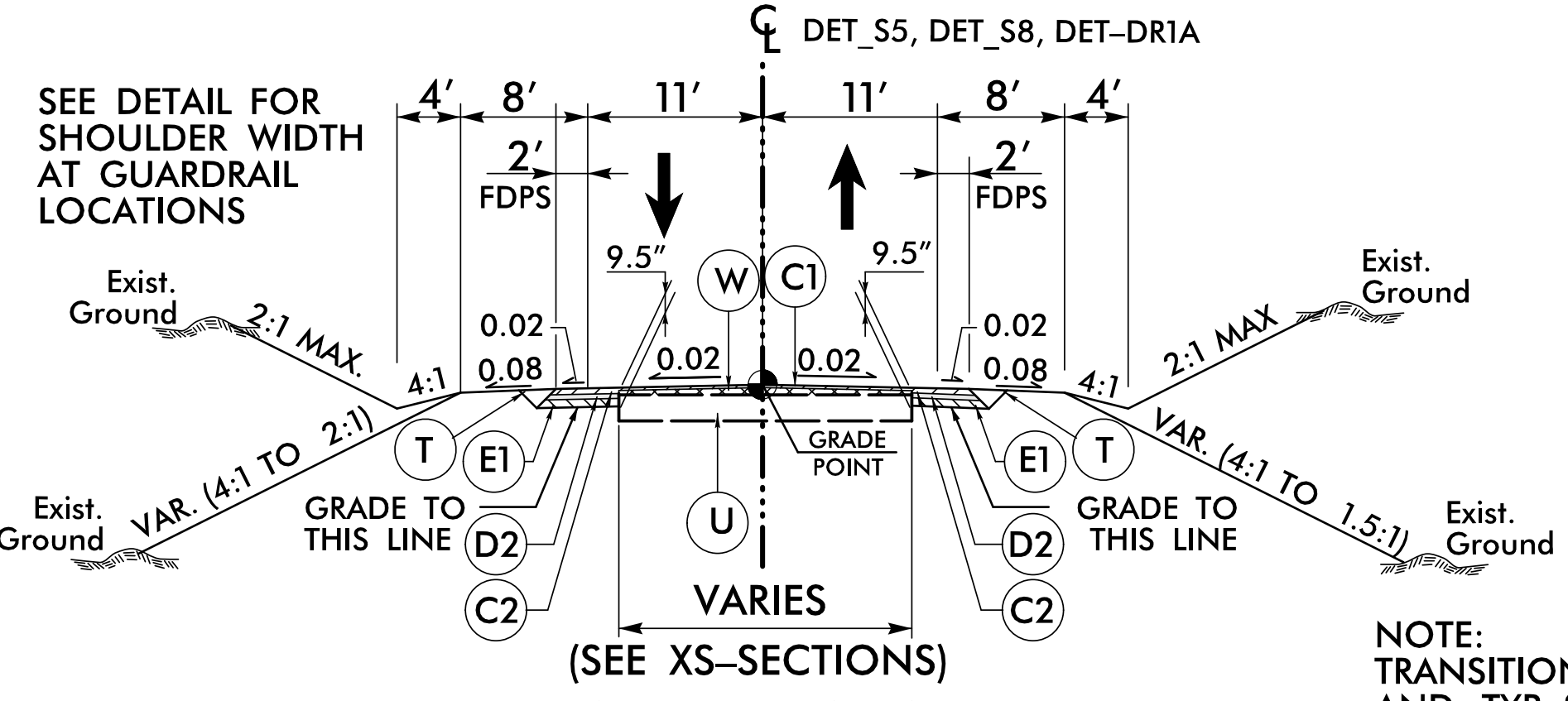
*5 USE 8' FOR -DR1-
USE 11' FOR -DR2-



TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9
-DR1A- STA. 10+05.00 TO -DR1A- STA. 11+07.00
-DET-DR1A- STA. 10+00.00 TO -DET-DR1A- STA. 14+00.15

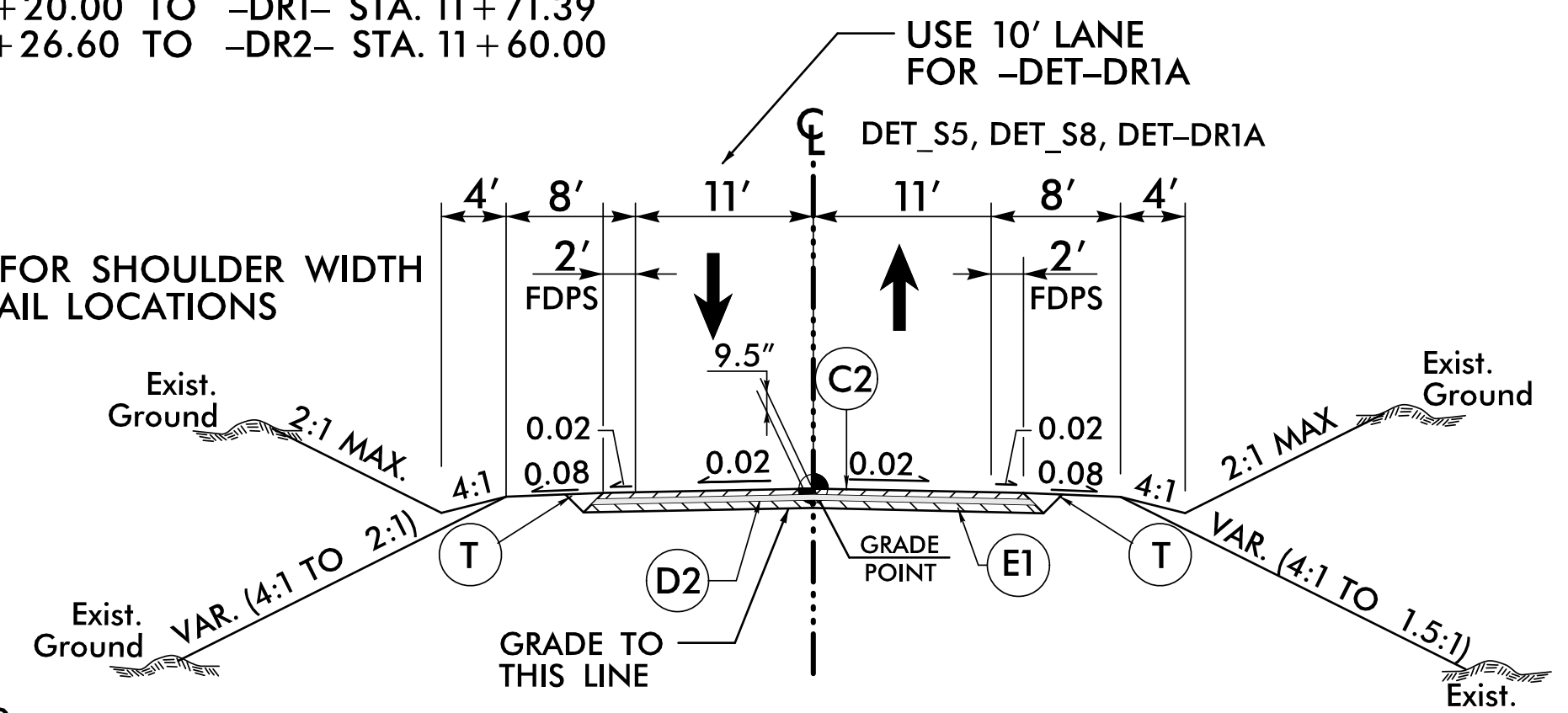
*8 6' WITH GUARDRAIL FOR -DET-DR1A-



TYPICAL SECTION NO. 10

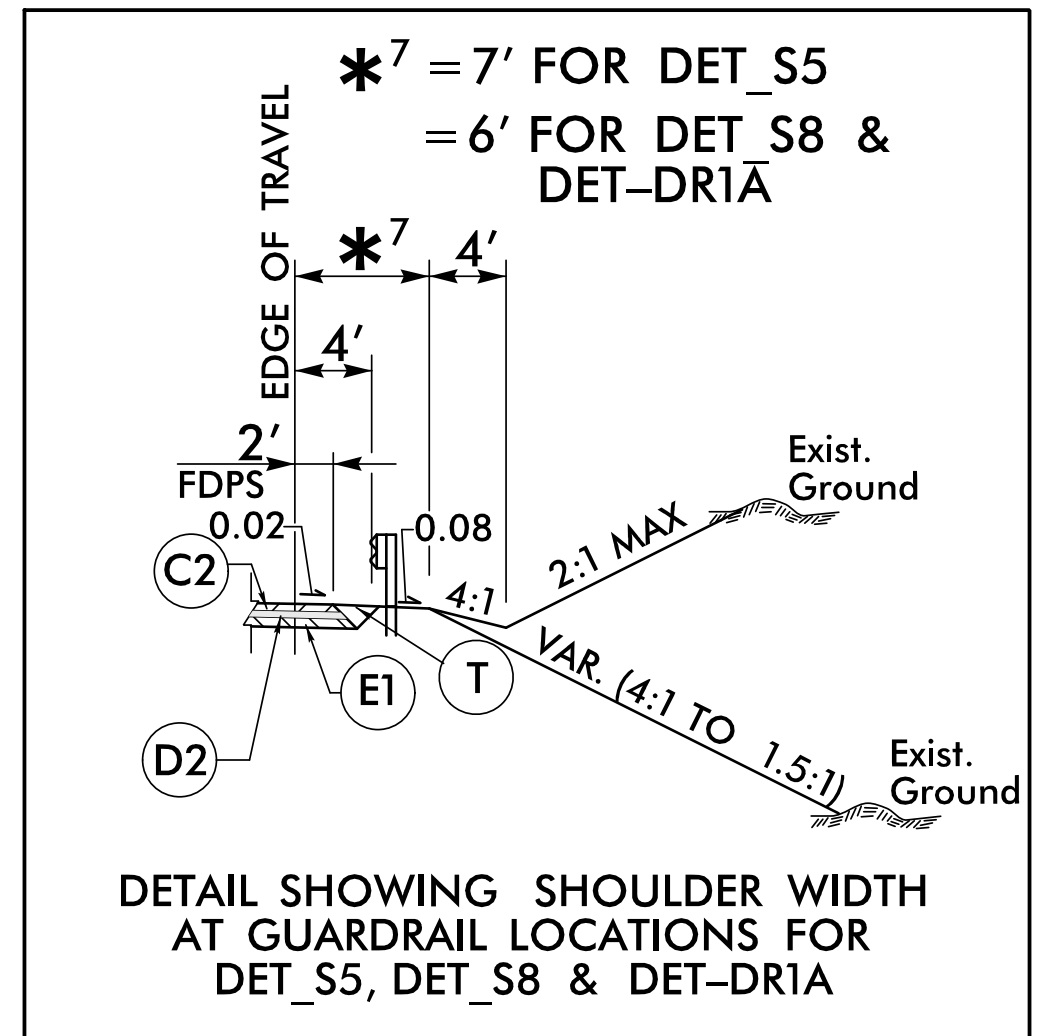
USE TYPICAL SECTION NO. 10
DET_S5 STA. 11+00.00 TO DET_S5 STA. 13+40.66
DET_S5 STA. 20+30.45 TO DET_S5 STA. 22+33.00
DET_S8 STA. 11+00.00 TO DET_S8 STA. 12+99.64
DET_S8 STA. 19+23.61 TO DET_S8 STA. 21+25.00

NOTE:
TRANSITION BETWEEN EXISTING AND TYP. SECT. NO 10 AS FOLLOWS:
DET_S5 STA. 10.00.00 TO DET_S5 STA. 11+00.00
DET_S5 STA. 22+33.00 TO DET_S5 STA. 23+33.00
DET_S8 STA. 10.00.00 TO DET_S8 STA. 11+00.00
DET_S8 STA. 21+25.00 TO DET_S8 STA. 22+25.00



TYPICAL SECTION NO. 11

USE TYPICAL SECTION NO. 11
DET_S5 STA. 13+40.66 TO DET_S5 STA. 20+30.45
DET_S8 STA. 12+99.64 TO DET_S8 STA. 19+23.61



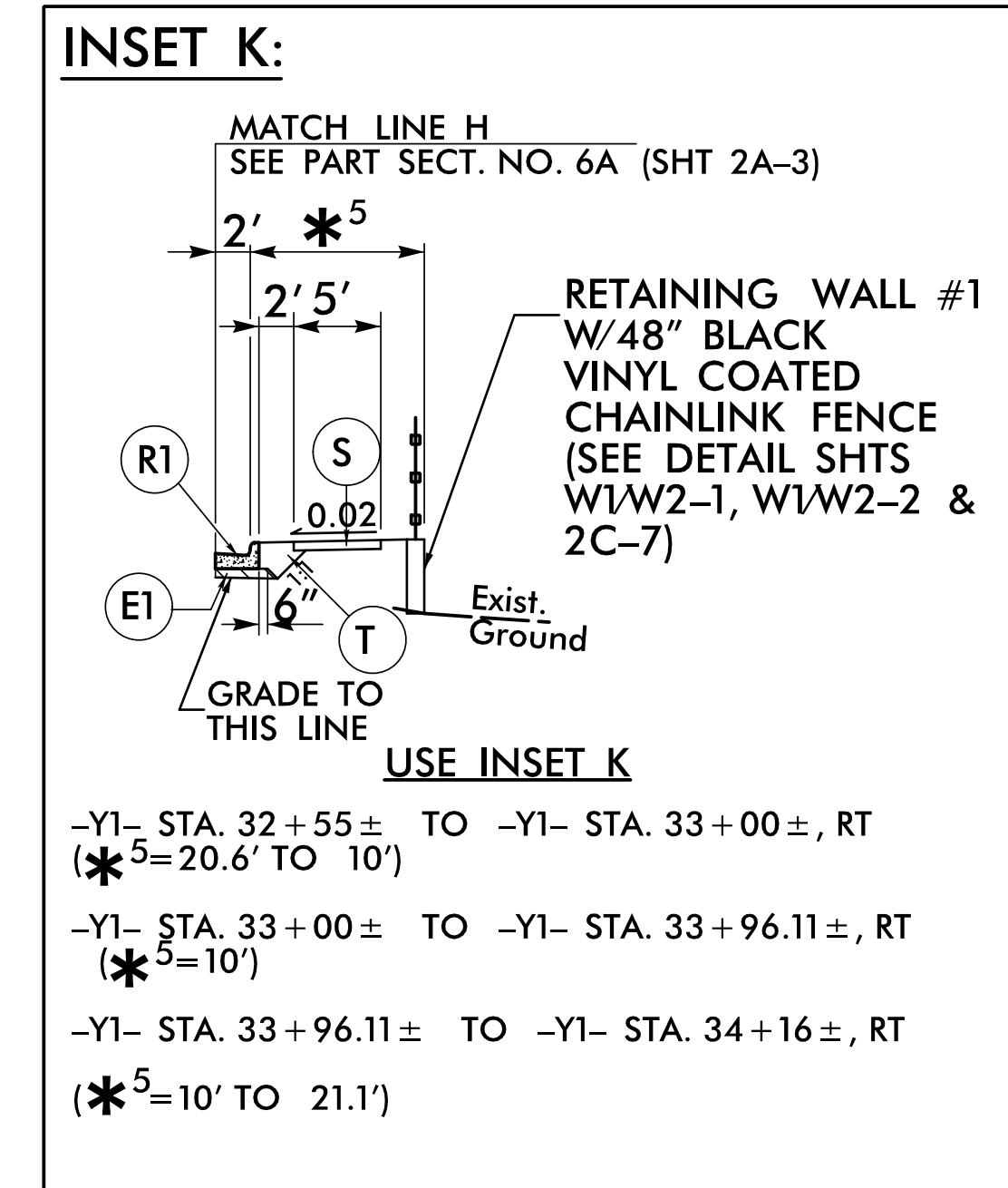
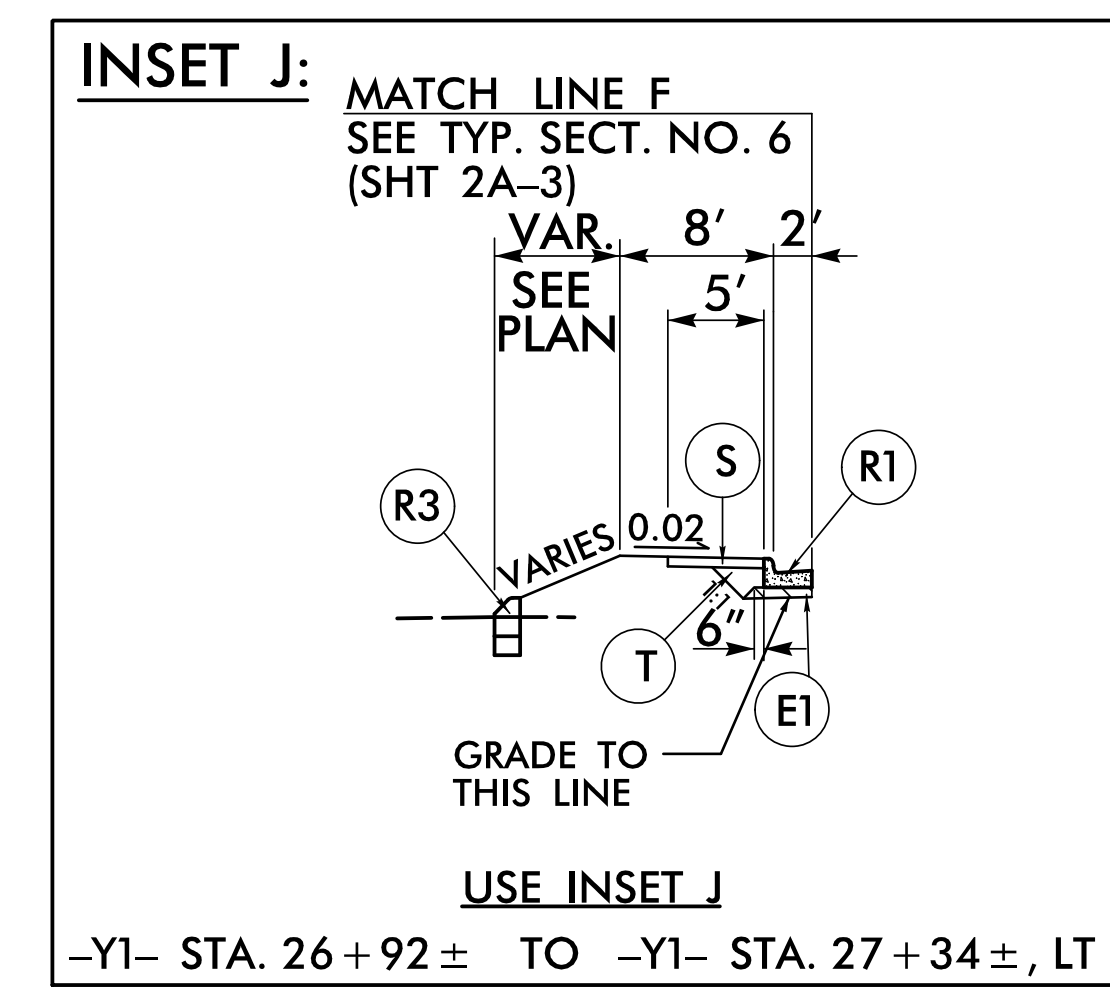
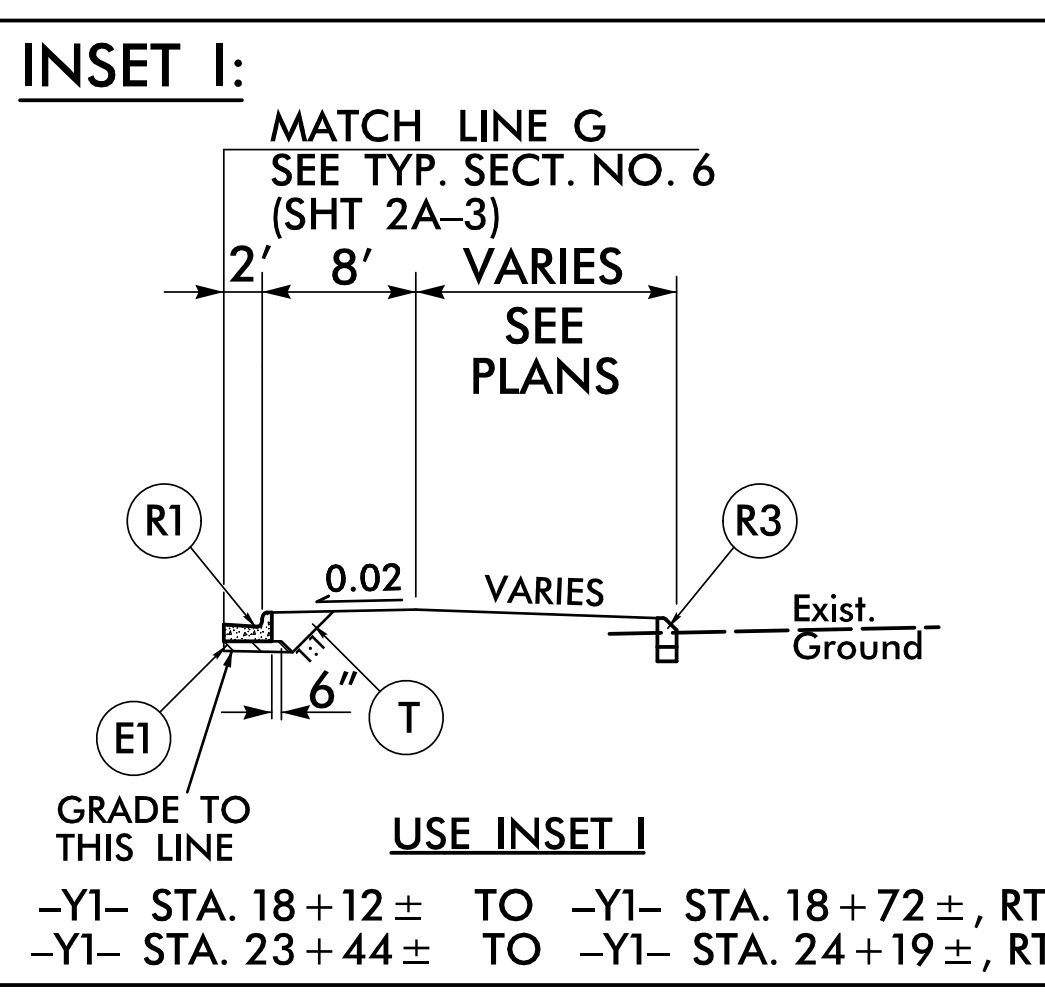
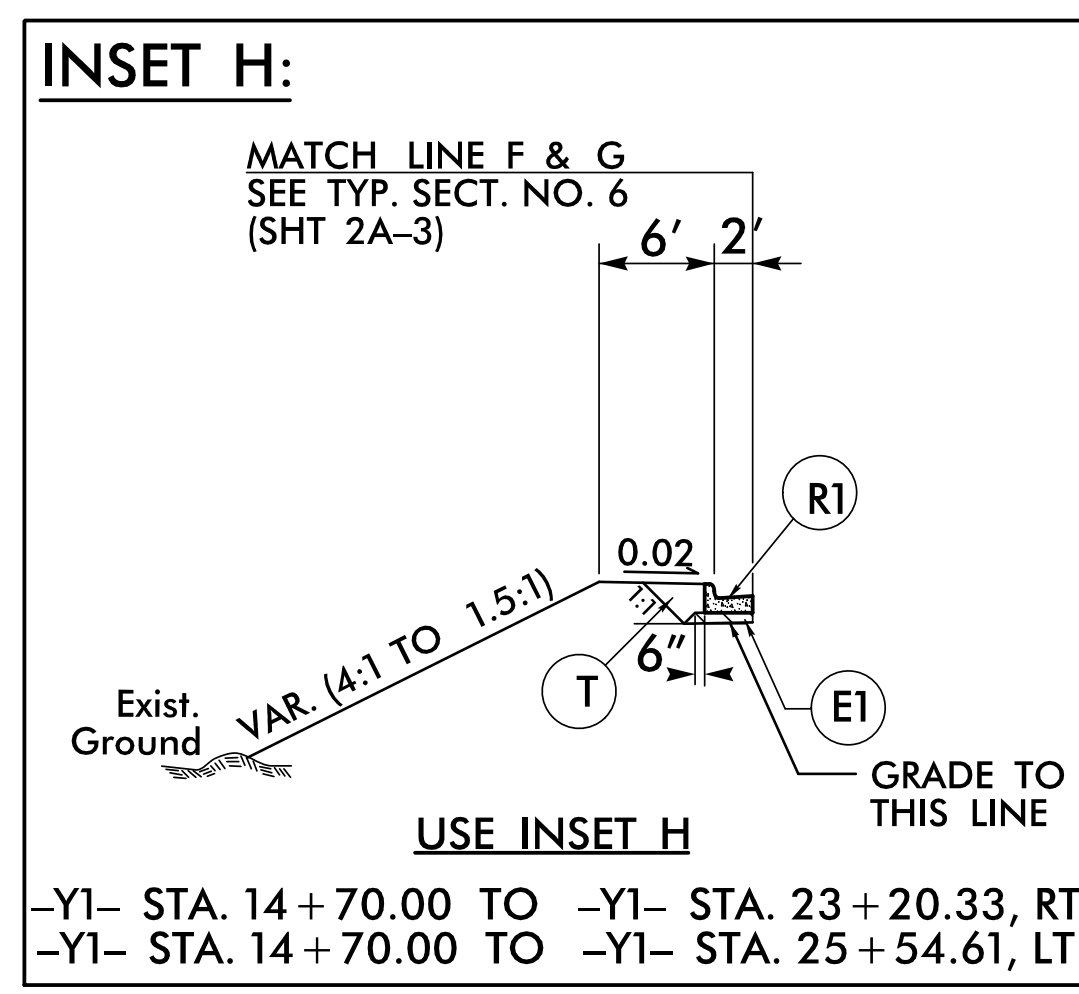
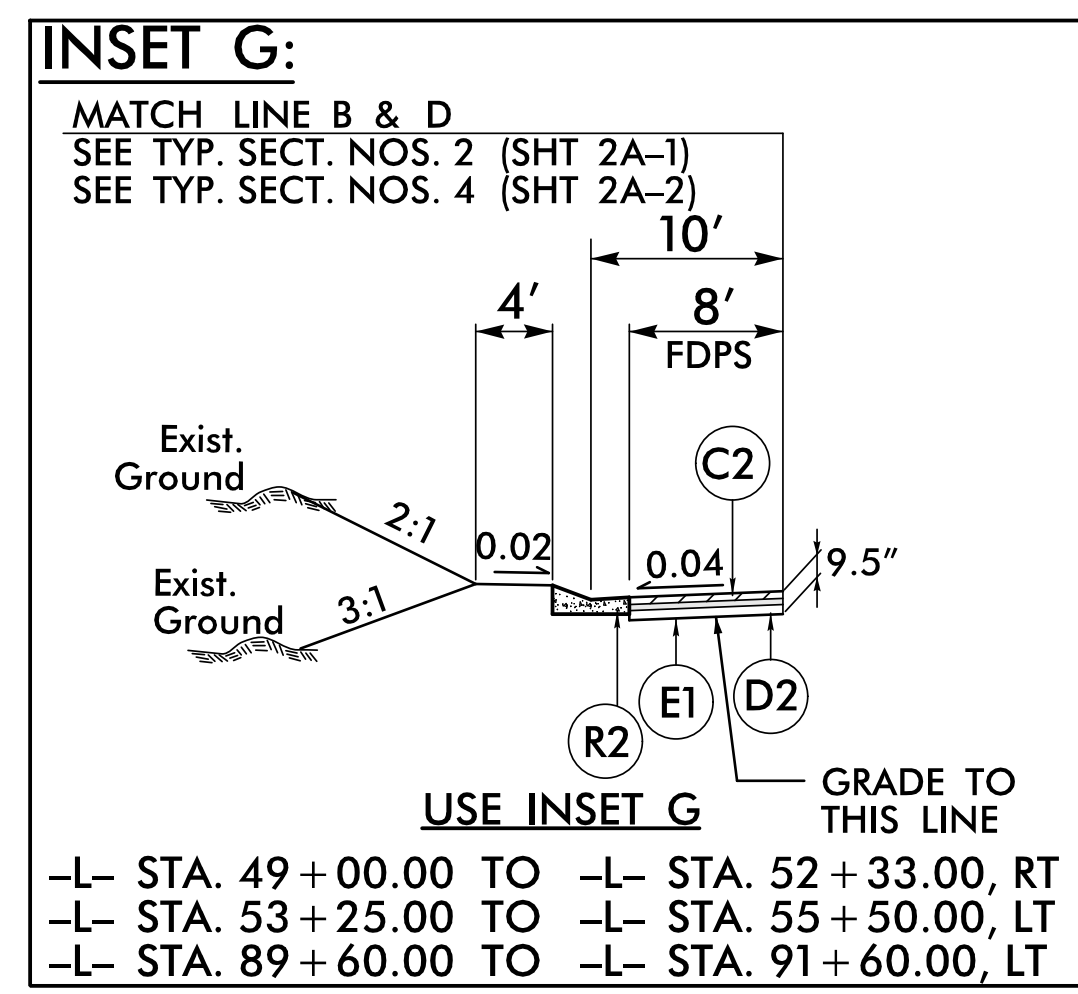
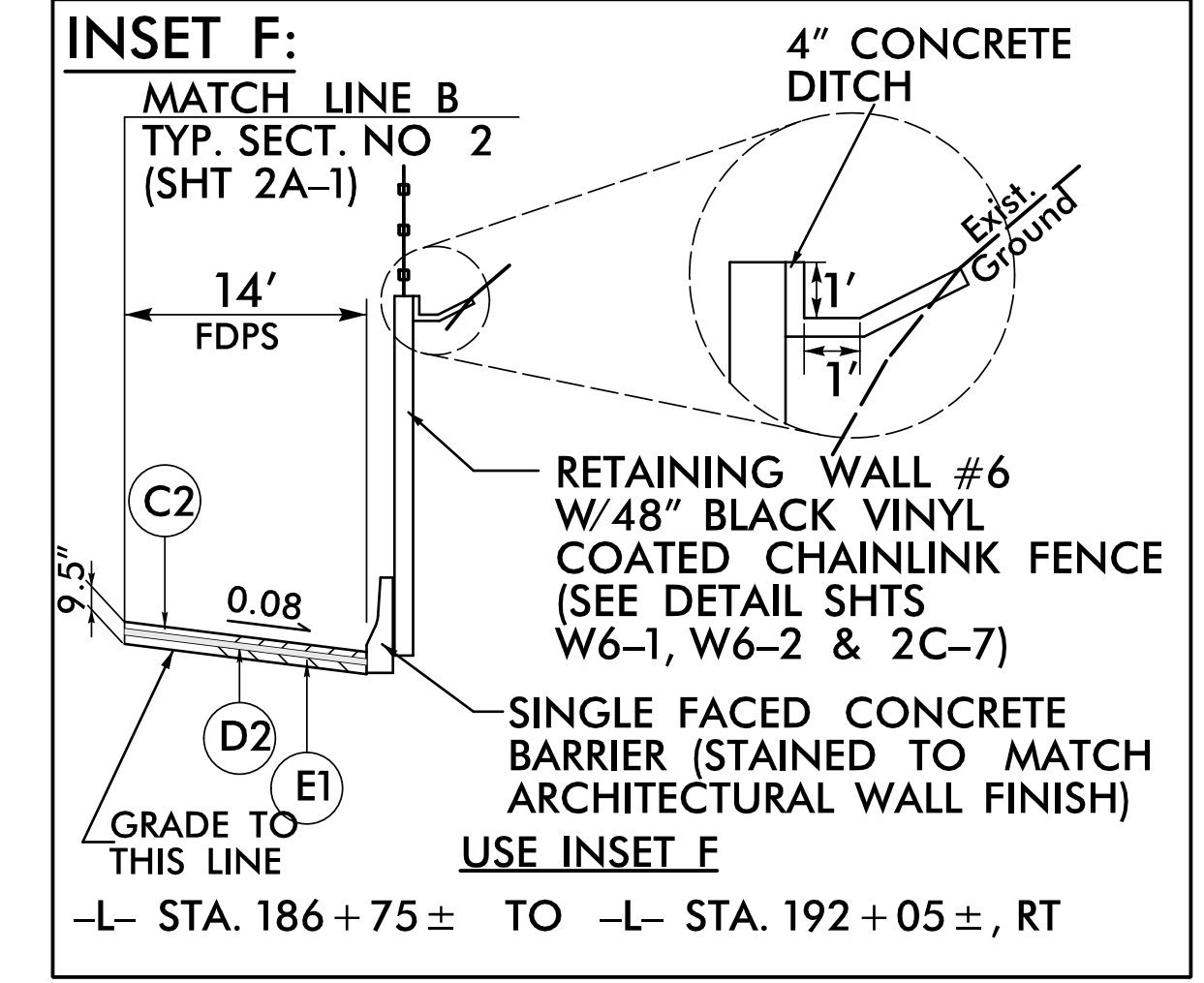
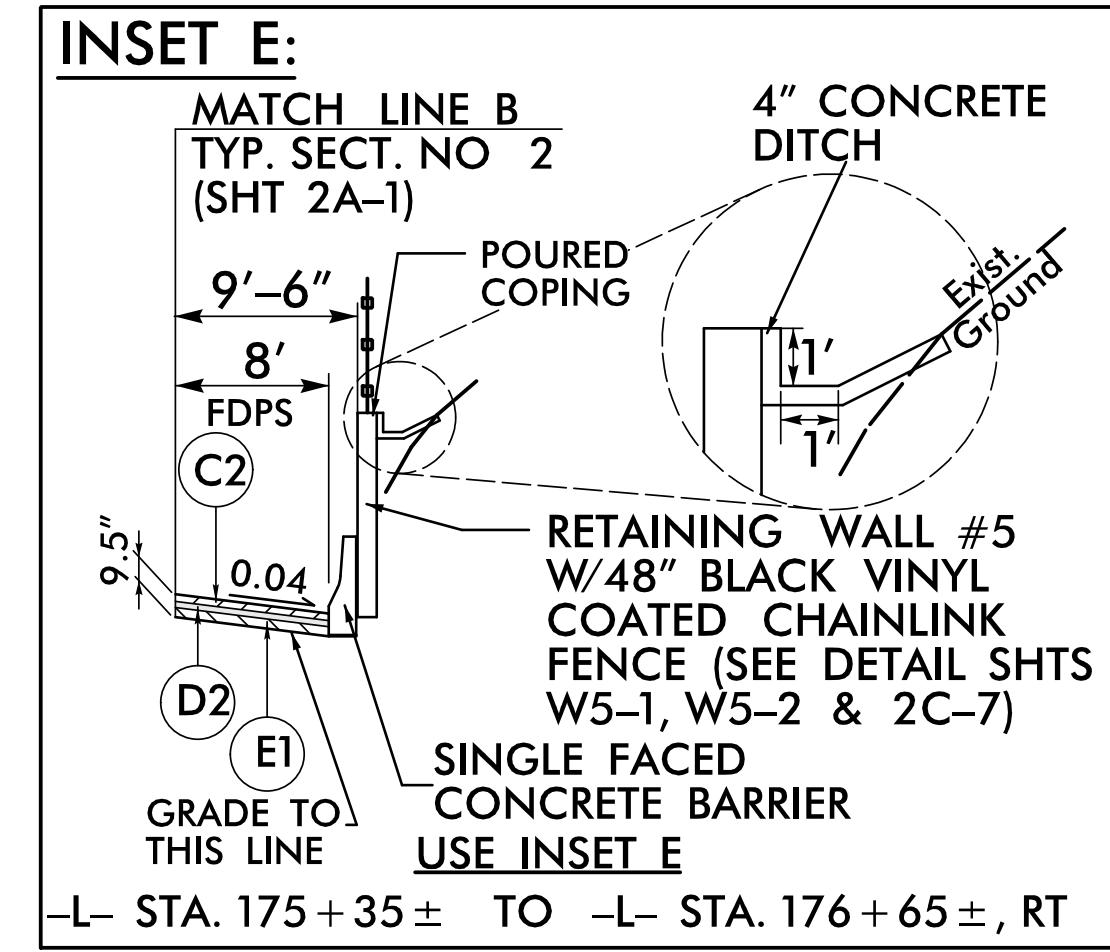
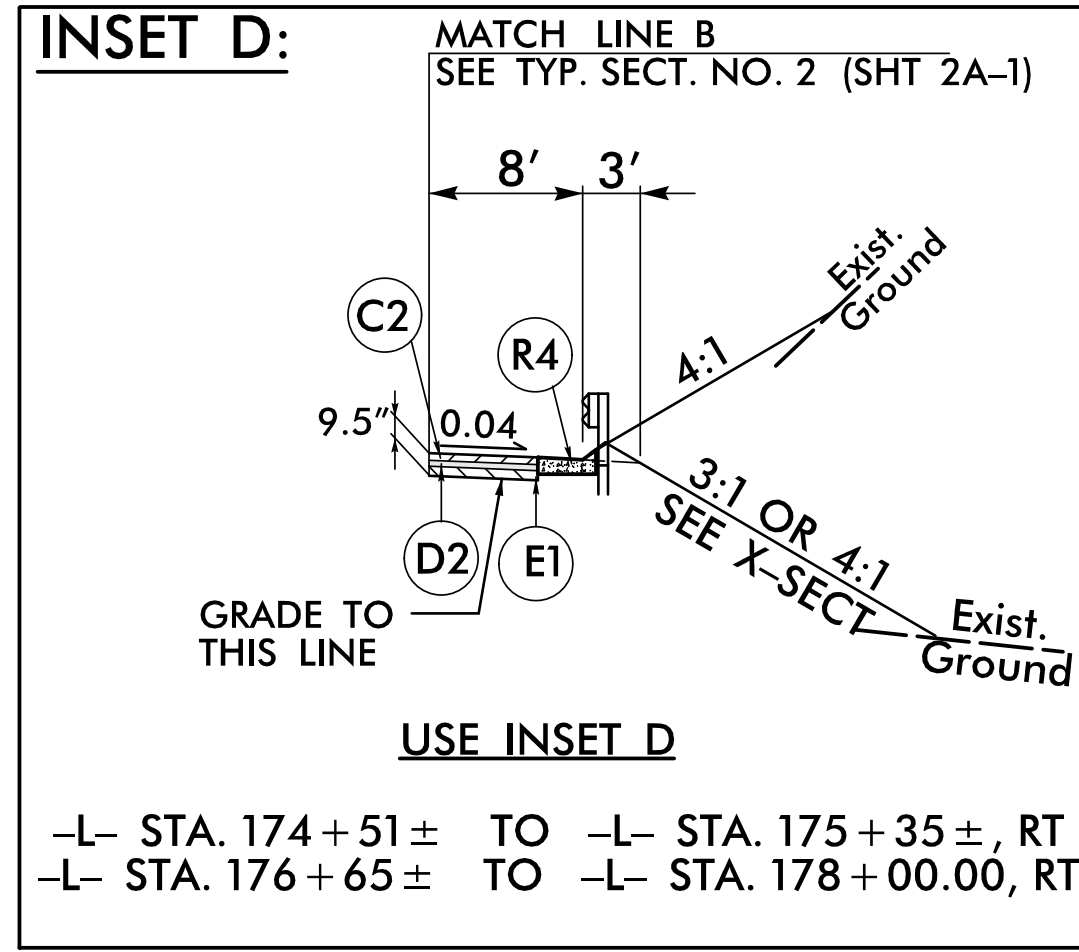
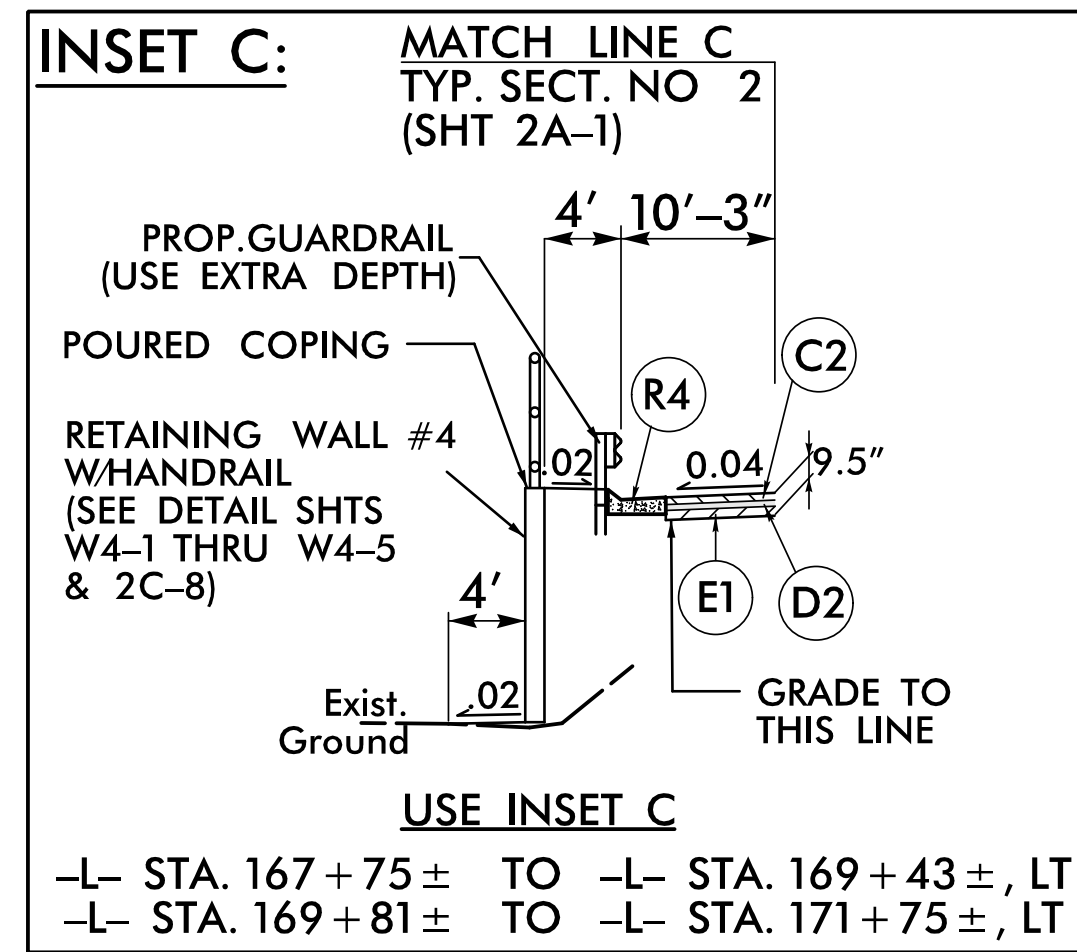
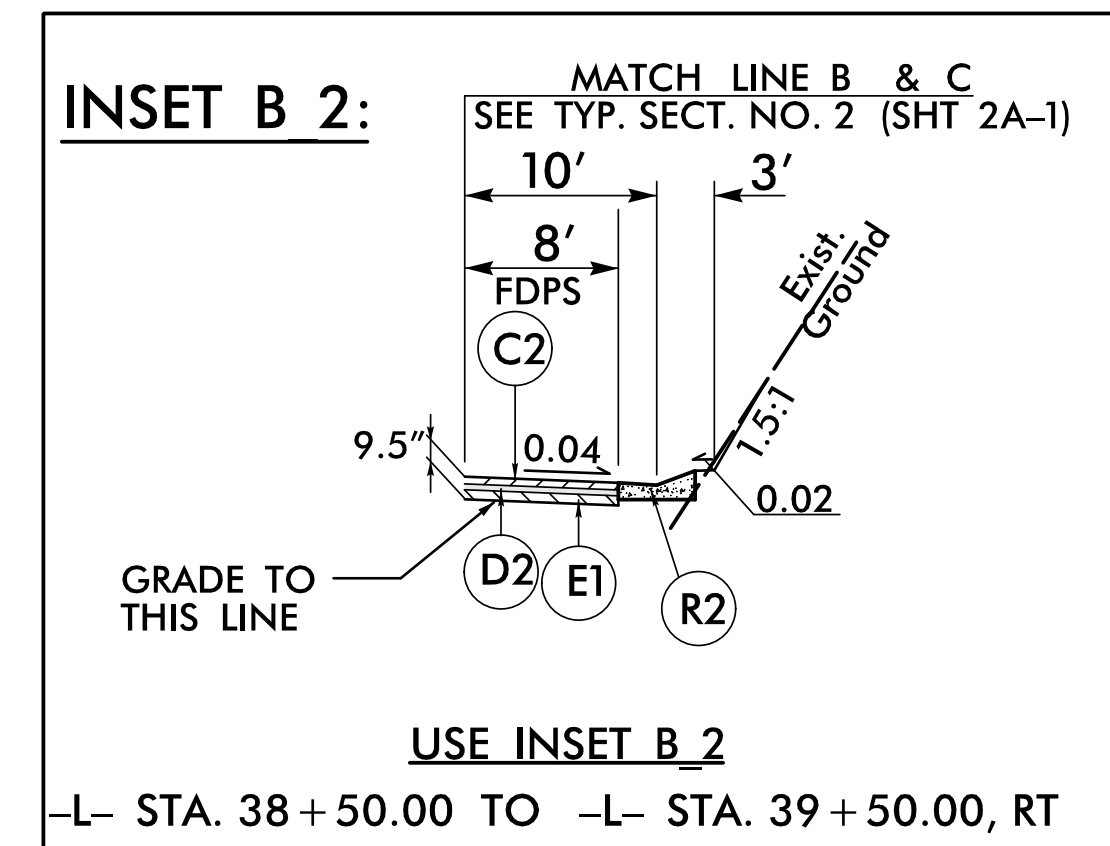
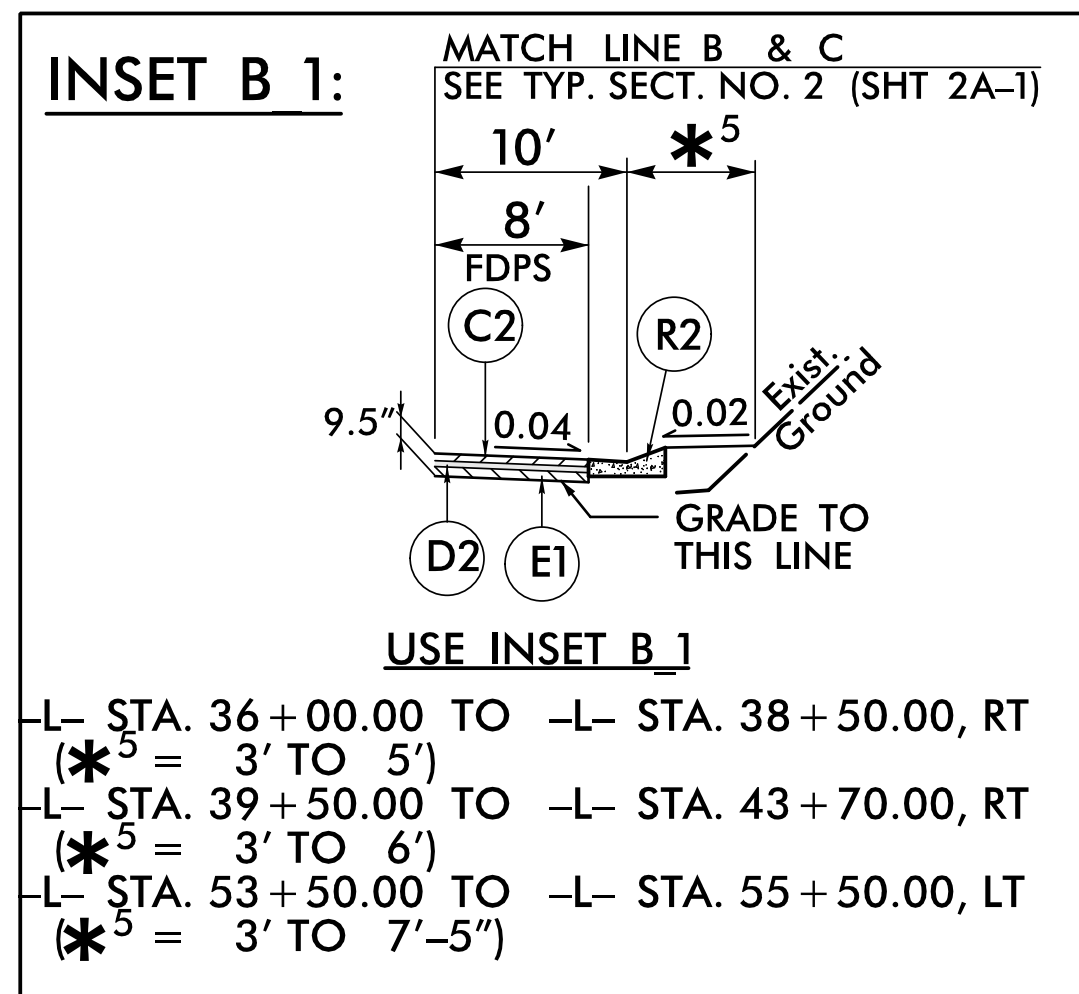
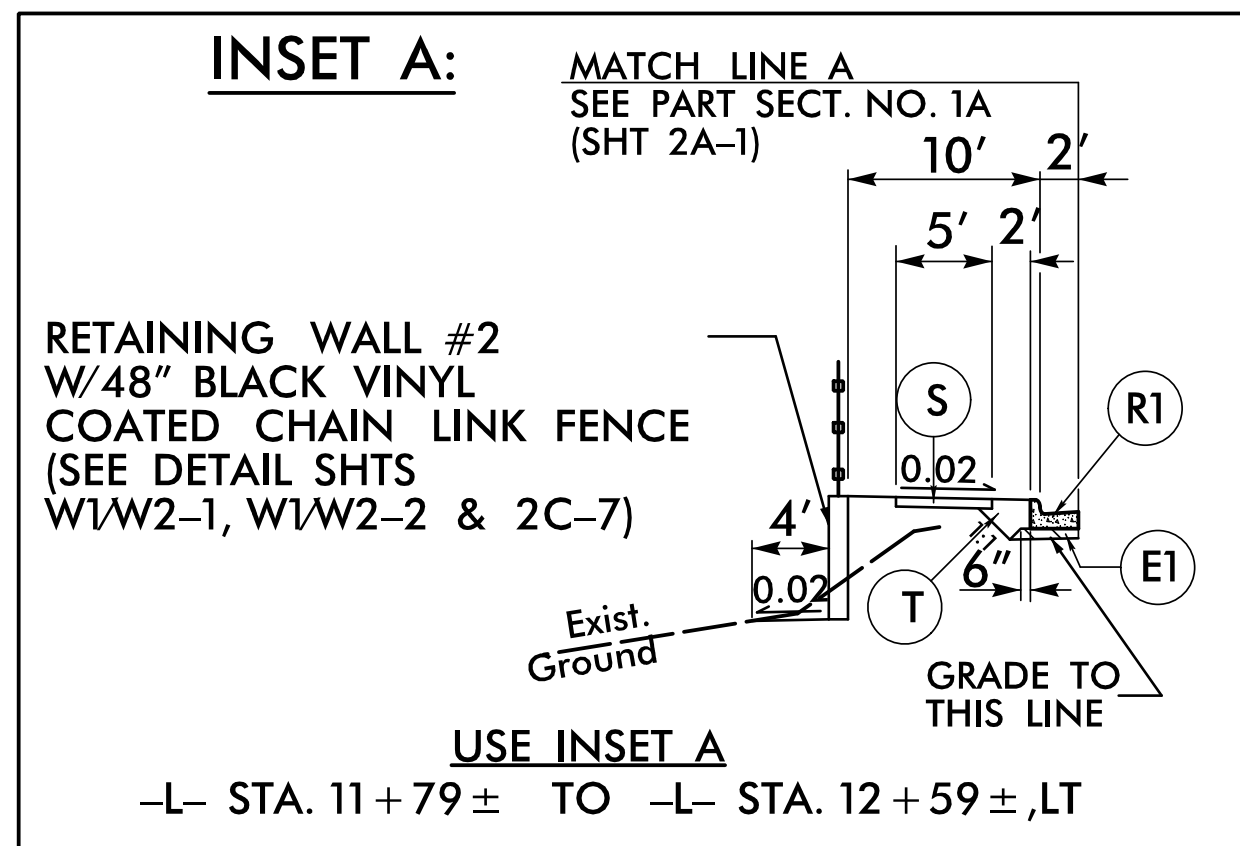
DETAIL SHOWING SHOULDER WIDTH AT GUARDRAIL LOCATIONS FOR DET_S5, DET_S8 & DET-DR1A

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6/2/2019

PAVEMENT SCHEDULE	
C2	3" S9.5C
D2	2 1/2" I19.0C
E1	4" B25.0C
R1	2'-6" C&G
R2	EXPRESSWAY GUTTER
R3	8" X 12" CURB
R4	SHOULDER BERM GUTTER
S	SIDEWALK
T	EARTH MATERIAL

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



PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2A-4
ROADWAY DESIGN ENGINEER JIMMY L. TERRY 35018 ENGINEER JULY 1, 2012	PAVEMENT DESIGN ENGINEER MATTHEW BREWER 041986 ENGINEER JULY 1, 2012
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
TGS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	

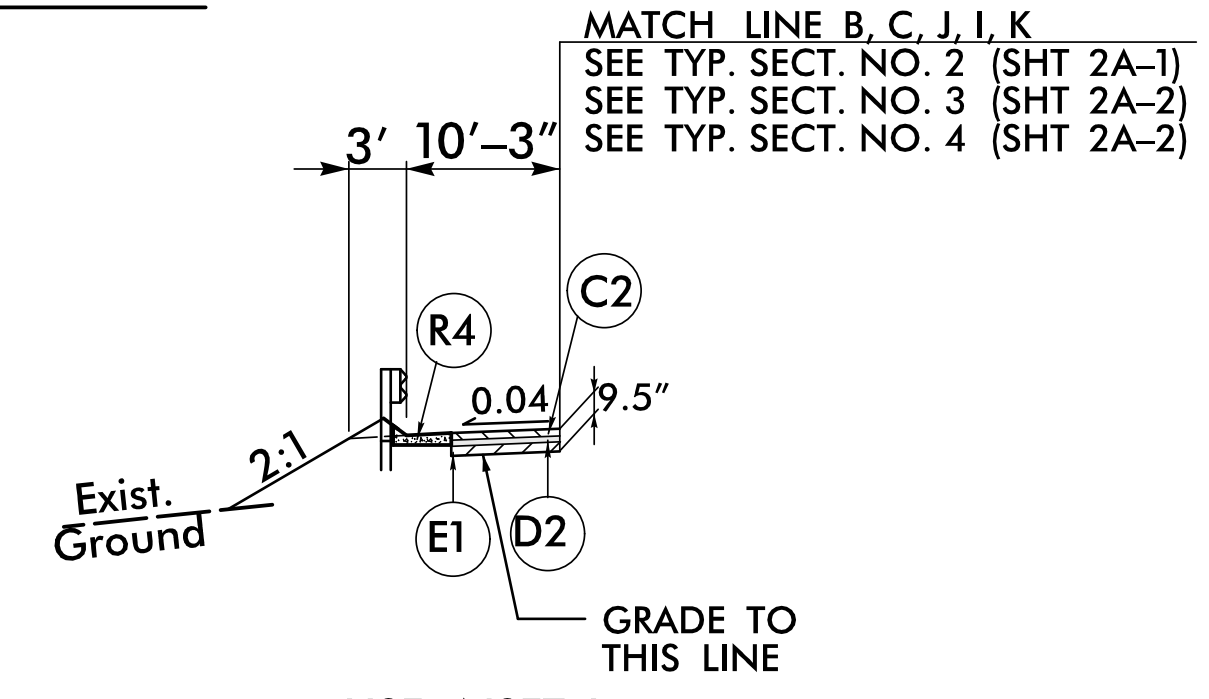
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6/22/2022

PAVEMENT SCHEDULE	
C2	3" S9.5C
D2	2 1/2" I19.0C
E1	4" B25.0C
K	CL IV SUBGRADE STABILIZATION
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
R4	SHOULDER BERM GUTTER

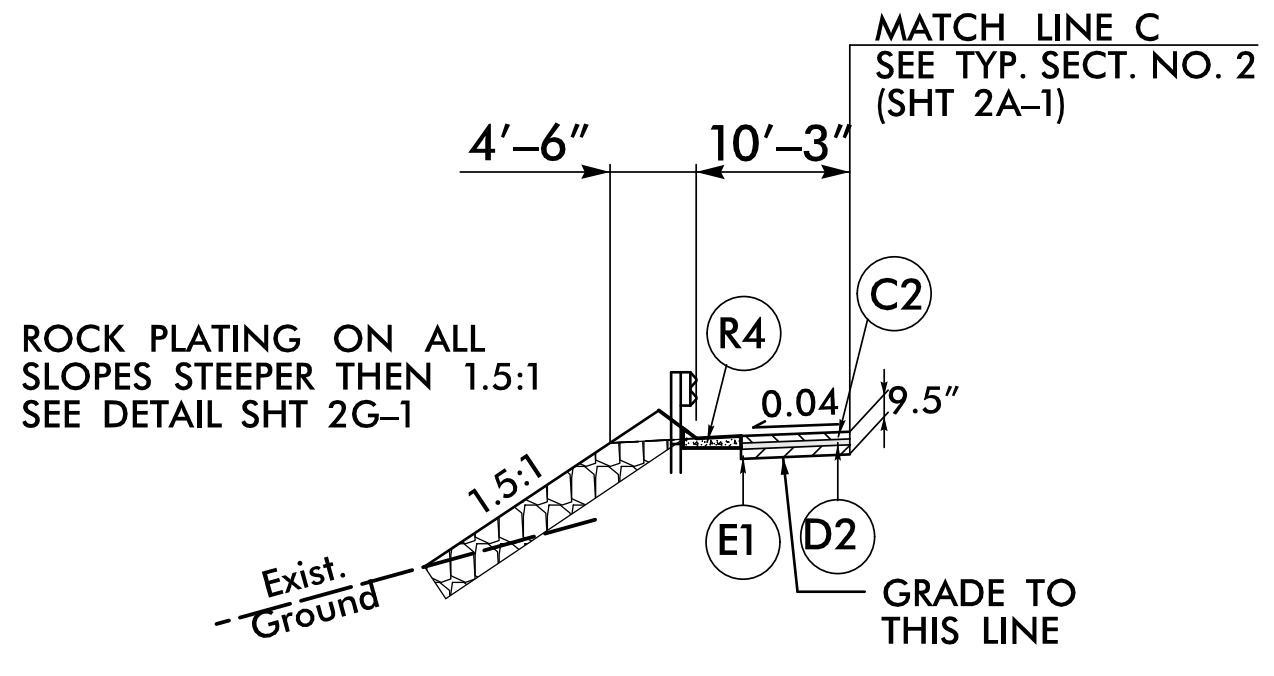
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE. SEE SHEET 2A-1 FOR DETAILED PAVEMENT SCHEDULE.

INSET L:



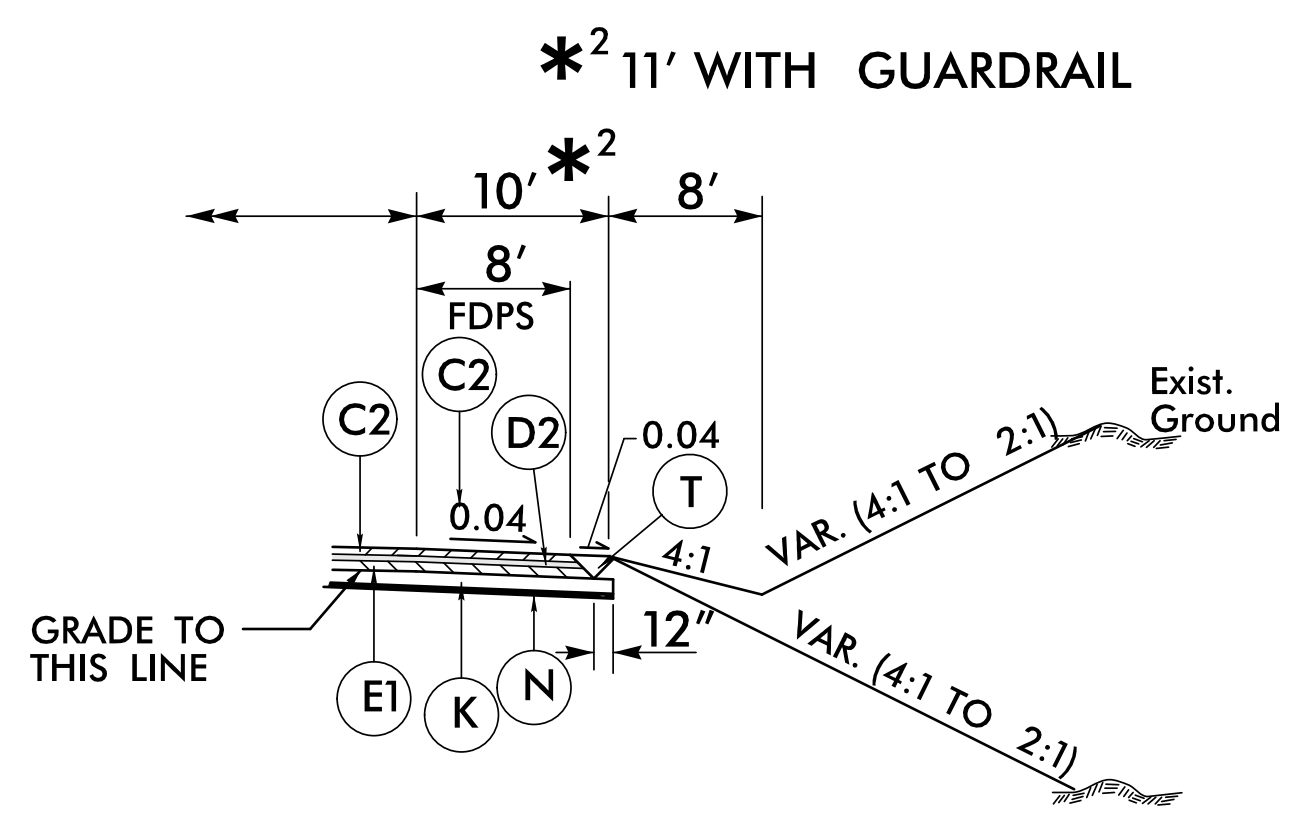
- USE INSET L
- L- STA. 31+50± TO -L- STA. 33+30±, LT
 - L- STA. 34+70± TO -L- STA. 36+76±, LT
 - L- STA. 45+64± TO -L- STA. 47+00±, LT
 - L- STA. 64+50± TO -L- STA. 65+50±, LT
 - L- STA. 66+70± TO -L- STA. 68+24±, LT
 - L- STA. 71+38± TO -L- STA. 72+50±, LT
 - L- STA. 71+38± TO -L- STA. 72+44±, RT
 - L- STA. 79+00± TO -L- STA. 81+40±, RT
 - L- STA. 88+50± TO -L- STA. 91+16±, RT
 - L- STA. 133+90± TO -L- STA. 142+00±, RT
 - L- STA. 137+25± TO -L- STA. 141+50±, LT
 - L- STA. 146+30± TO -L- STA. 149+50±, LT
 - L- STA. 147+40± TO -L- STA. 149+40±, RT
 - L- STA. 159+75± TO -L- STA. 163+85±, LT
 - L- STA. 165+15± TO -L- STA. 167+75±, LT
 - L- STA. 171+75± TO -L- STA. 173+90±, LT
 - L- STA. 194+00± TO -L- STA. 197+83±, RT

INSET M:



- USE INSET M
- L- STA. 42+00± TO -L- STA. 45+64±, LT
 - L- STA. 57+00± TO -L- STA. 59+50±, LT

GEOTEXTILE FOR PAVEMENT STABILIZATION DETAIL



USE GEOTEXTILE FOR PAVEMENT STABILIZATION DETAIL IN CONJUNCTION WITH APPROPRIATE TYPICAL SECTIONS AT LOCATIONS NOTED. GEOTEXTILE FOR SOIL STABILIZATION SHALL NOT BE USED IN LOCATIONS WHERE GEOTEXTILE FOR PAVEMENT STABILIZATION IS RECOMMENDED.

STA TO STA	LOC
-L- STA. 31+50 TO -L- STA. 33+50	LT
-L- STA. 34+50 TO -L- STA. 36+50	LT
-L- STA. 42+50 TO -L- STA. 46+00	LT & RT
-L- STA. 47+00 TO -L- STA. 47+50	LT
-L- STA. 55+00 TO -L- STA. 59+20	LT & RT
-L- STA. 64+50 TO -L- STA. 67+50	LT & RT
-L- STA. 72+00 TO -L- STA. 72+50	LT
-L- STA. 79+00 TO -L- STA. 80+50	RT
-L- STA. 108+50	LT
-L- STA. 114+00 TO -L- STA. 119+50	LT
-L- STA. 135+00 TO -L- STA. 140+00	RT
-L- STA. 150+50 TO -L- STA. 151+50	LT
-L- STA. 157+50 TO -L- STA. 158+00	LT
-L- STA. 162+00 TO -L- STA. 163+50	LT
-L- STA. 165+00 TO -L- STA. 167+50	LT
-L- STA. 172+00 TO -L- STA. 175+50	LT
-L- STA. 177+50 TO -L- STA. 178+50	LT
-L- STA. 180+00	LT
-L- STA. 182+00 TO -L- STA. 187+50	LT
-L- STA. 194+50 TO -L- STA. 195+00	LT

AREAS WILL BE INVESTIGATED DURING CONSTRUCTION

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2A-5
ROADWAY DESIGN ENGINEER 	PAVEMENT DESIGN ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 TGS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	

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 User: jsmel

ONSITE DETOUR DET S5

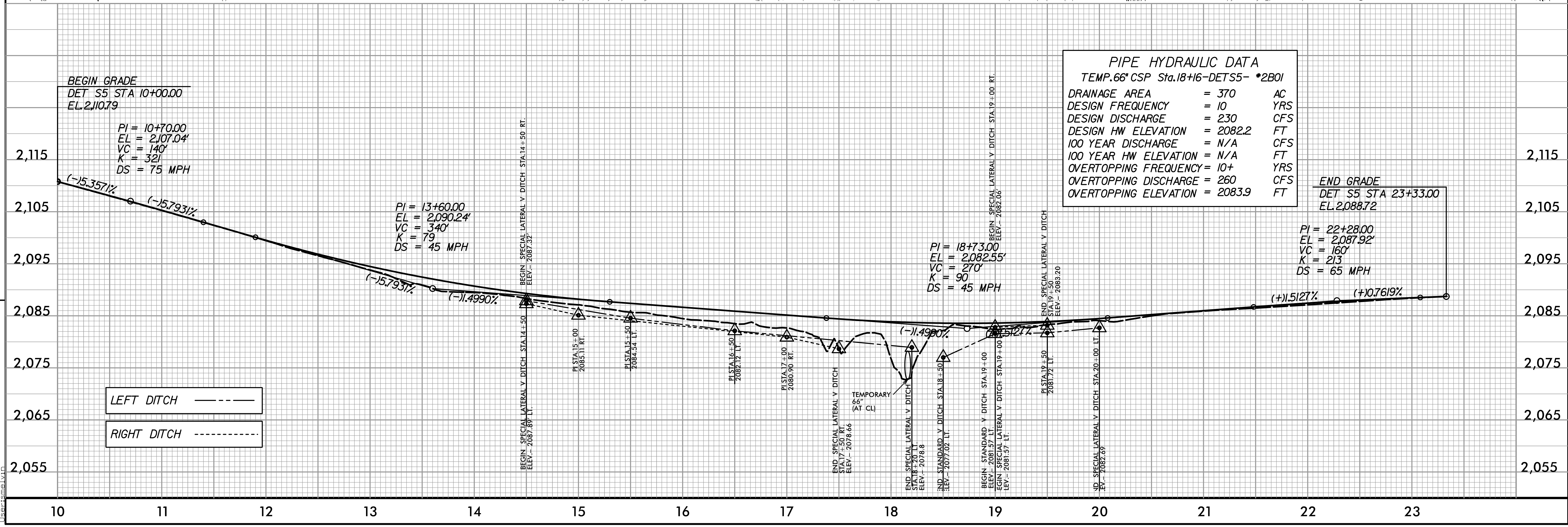
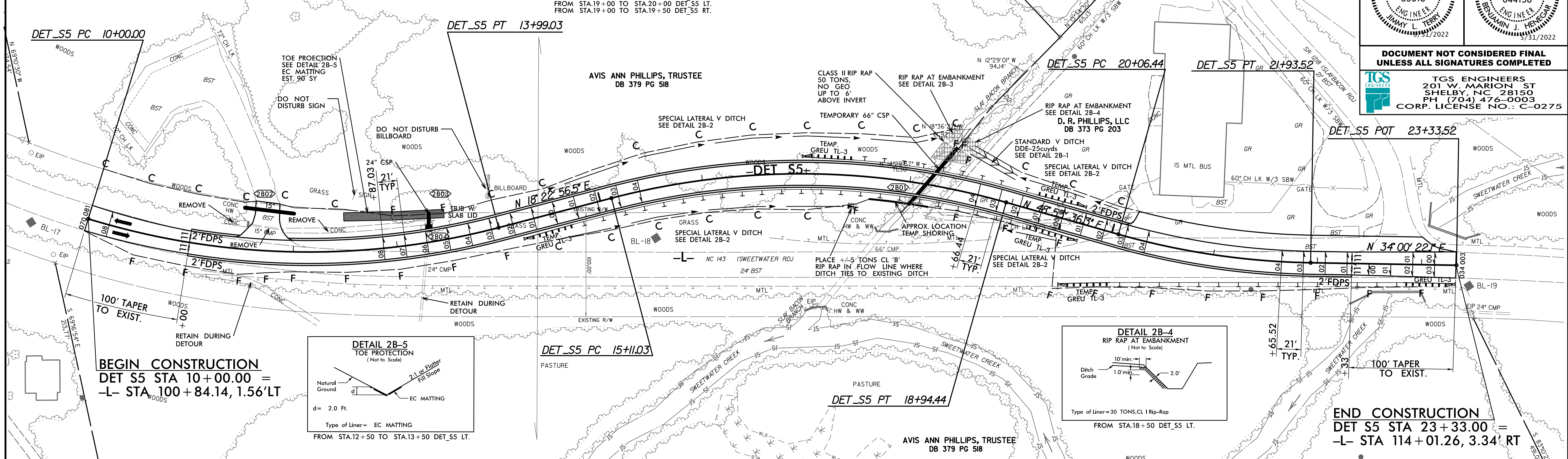
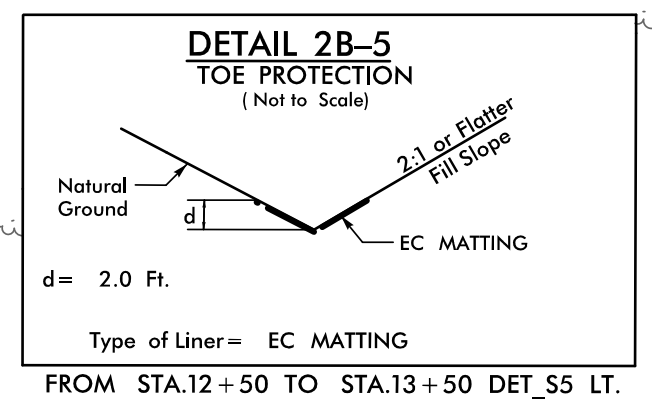
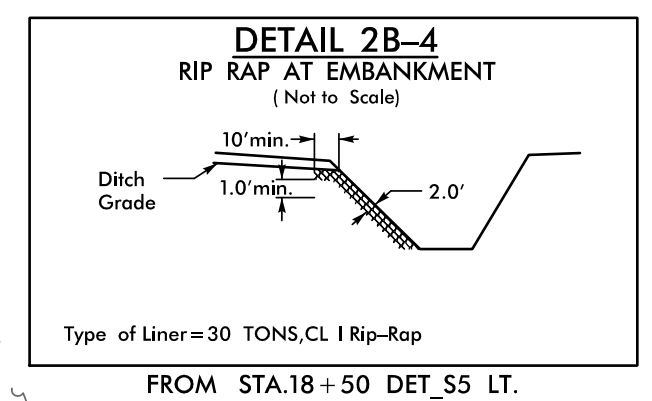
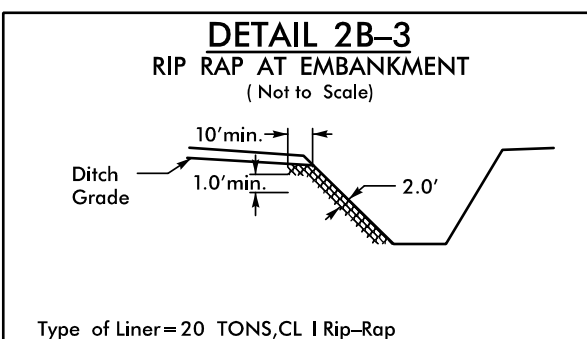
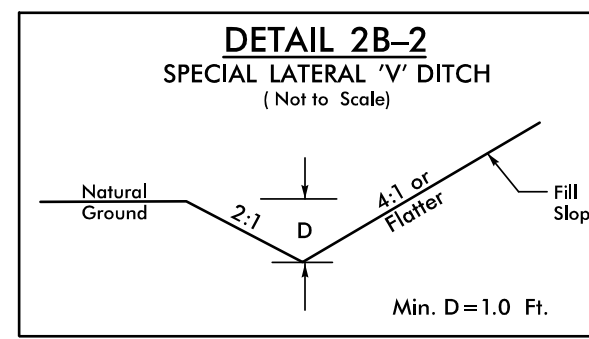
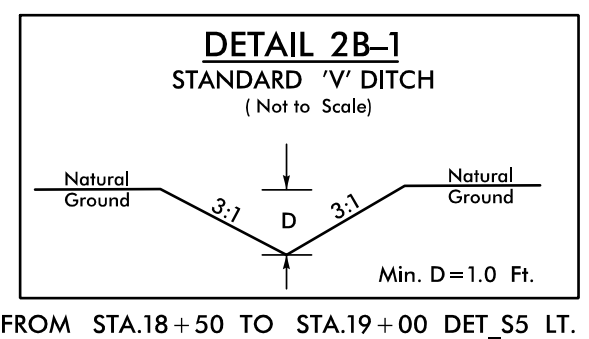
PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2B-1
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 35018 JIMMY TERRY 5/31/2022	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 044158 BENJAMIN J. HENCHER 5/31/2022

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

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

DET S5 CURVE DATA

PI Sta	PI Sta	PI Sta
12+04.78	17+07.40	21+00.51
$\Delta = 31^\circ 45' 12.3" (LT)$	$\Delta = 30^\circ 30' 39.7" (RT)$	$\Delta = 14^\circ 53' 14.2" (LT)$
$D = 7^\circ 57' 27.9"$	$D = 7^\circ 57' 27.9"$	$D = 7^\circ 57' 27.9"$
$L = 399.03'$	$L = 383.41'$	$L = 187.08'$
$T = 204.78'$	$T = 196.37'$	$T = 94.07'$
$R = 720.00'$	$R = 720.00'$	$R = 720.00'$
$SE = .08$	$SE = .04$	$SE = .04$
$DS = 45 MPH$	$DS = 45 MPH$	$DS = 45 MPH$



REVISIONS

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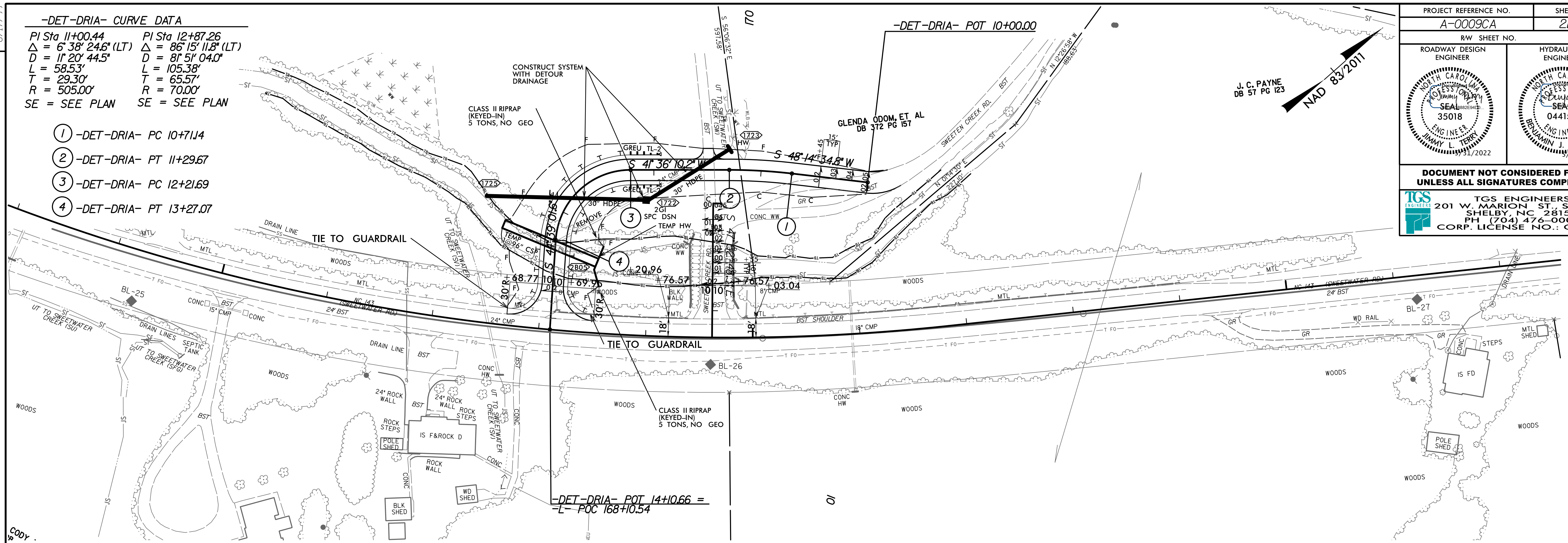
8/17/99

-DET-DR1A- CURVE DATA
 PI Sta 11+00.44 PI Sta 12+87.26
 $\Delta = 6' 38" 24.6" (LT)$ $\Delta = 86' 15" 11.8" (LT)$
 $D = 11' 20" 44.5"$ $D = 81' 51" 04.0"$
 $L = 58.53'$ $L = 105.38'$
 $T = 29.30'$ $T = 65.57'$
 $R = 505.00'$ $R = 70.00'$
 SE = SEE PLAN SE = SEE PLAN

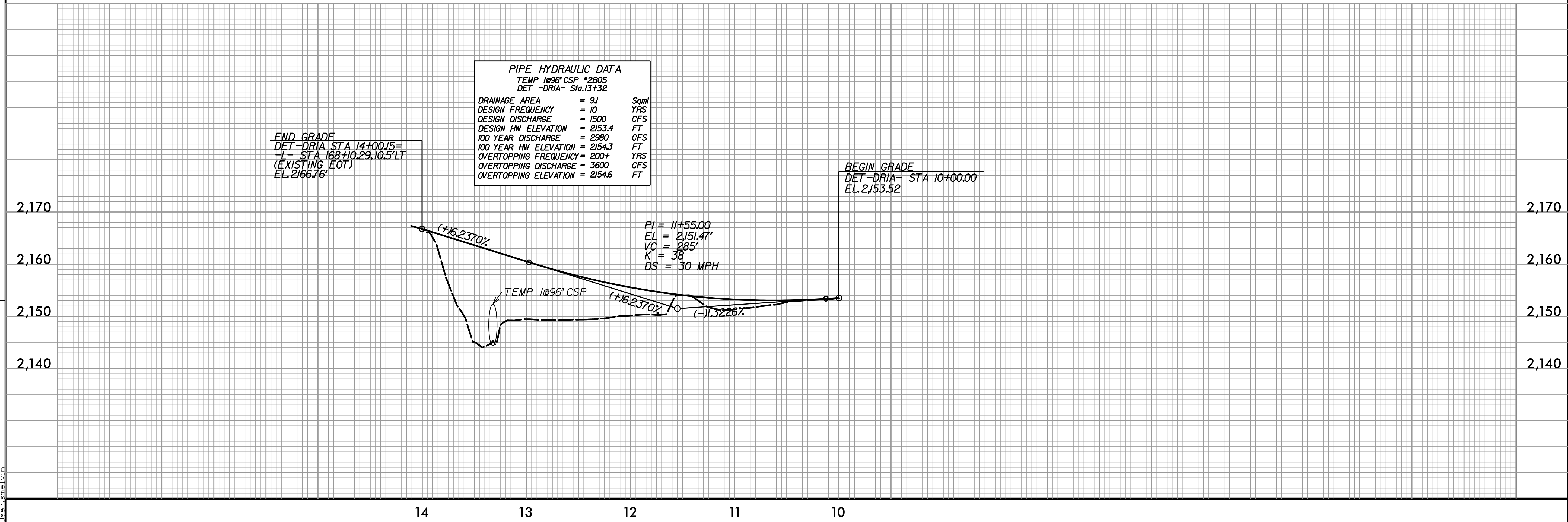
- ① -DET-DR1A- PC 10+71.14
- ② -DET-DR1A- PT 11+29.67
- ③ -DET-DR1A- PC 12+21.69
- ④ -DET-DR1A- PT 13+27.07

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2B-2
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
TGS ENGINEERS 201 W. MARION ST., STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	

J. C. PAYNE
DB 57 PG 123



ONSITE DETOUR DET-DR1A-



REVISIONS

5/10/2022
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 J. C. Payne

ONSITE DETOUR DET_S8

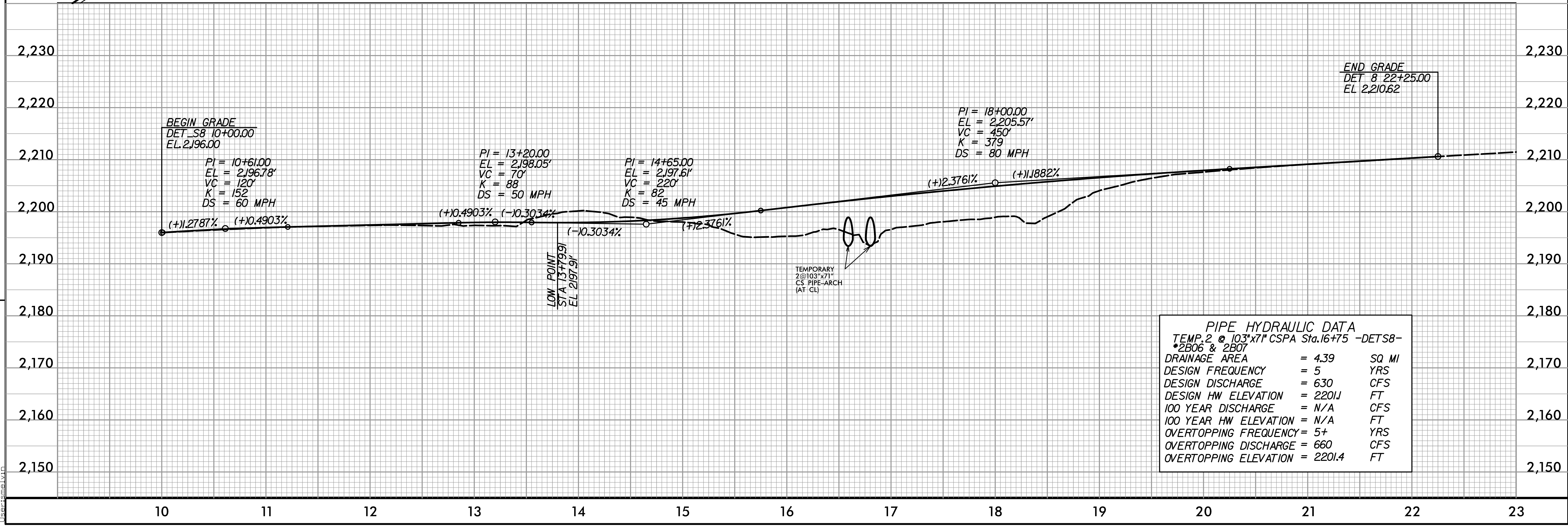
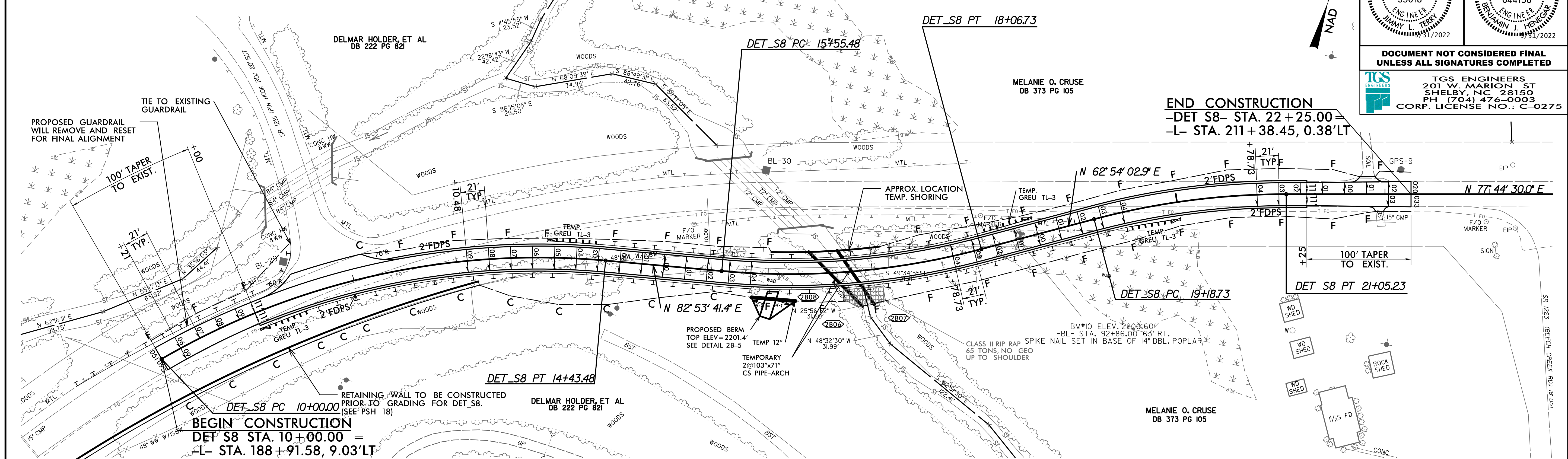
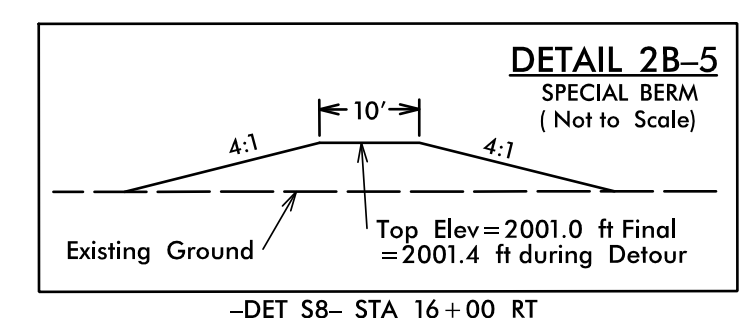
PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2B-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DET S8 CURVE DATA

PI Sta	PI Sta	PI Sta
12+29.03	16+82.39	20+12.50
$\Delta = 35^\circ 17' 26.7''$ (RT)	$\Delta = 19^\circ 59' 38.5''$ (LT)	$\Delta = 14^\circ 50' 27.1''$ (RT)
D = 7' 57" 27.9"	D = 7' 57" 27.9"	D = 7' 57" 27.9"
L = 443.48'	L = 251.25'	L = 186.50'
T = 229.03'	T = 126.92'	T = 93.77'
R = 720.00'	R = 720.00'	R = 720.00'
SE = 0.08	SE = 0.04	SE = 0.04
DS = 45 MPH	DS = 45 MPH	DS = 45 MPH

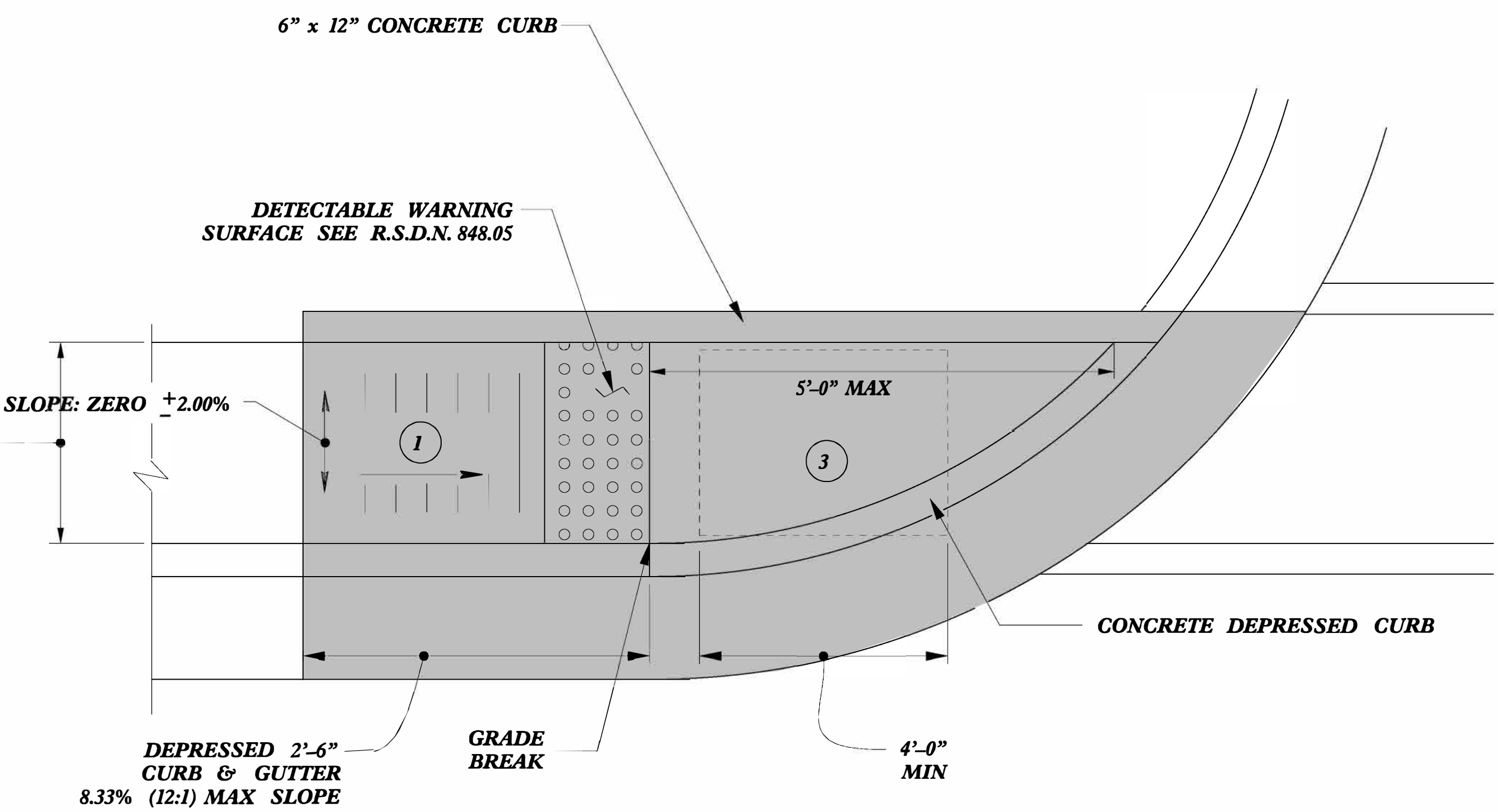
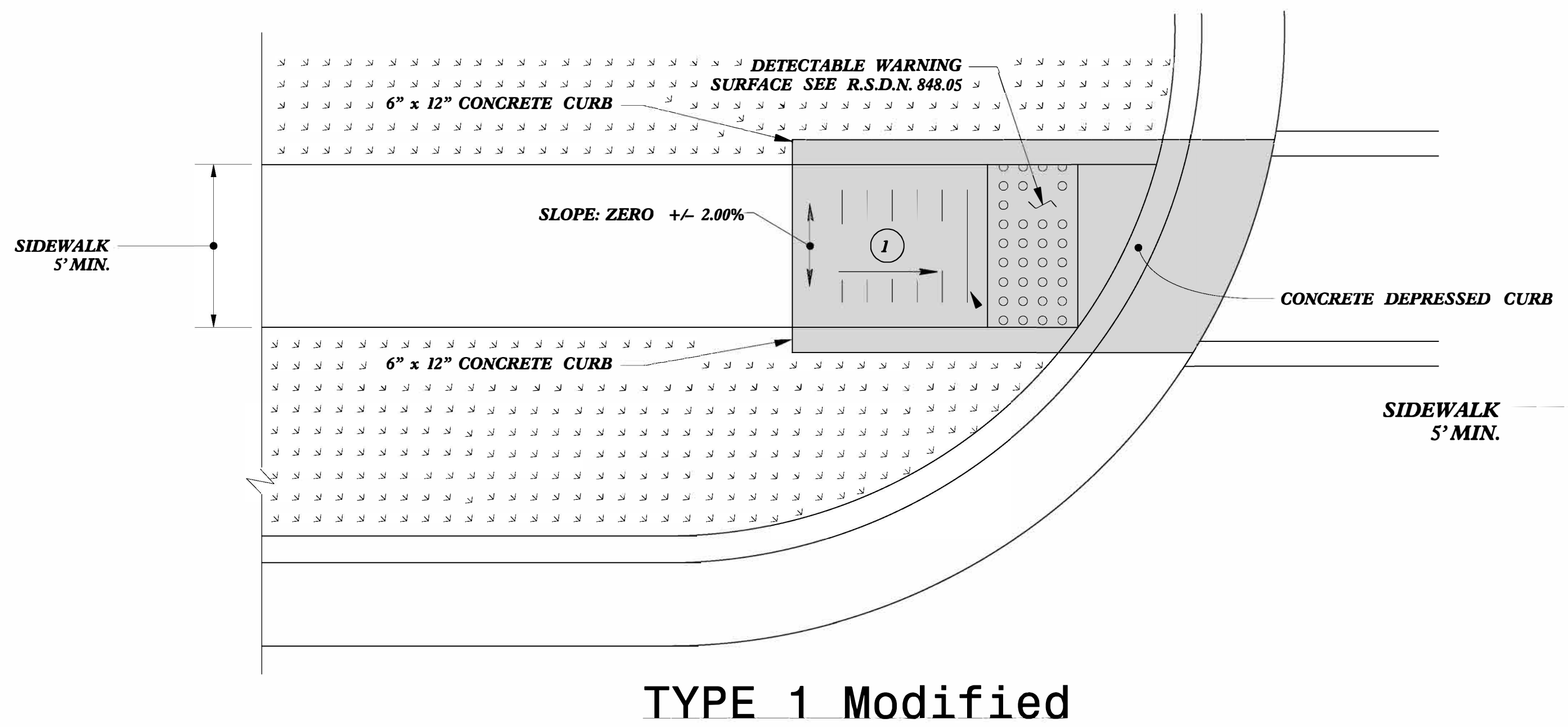
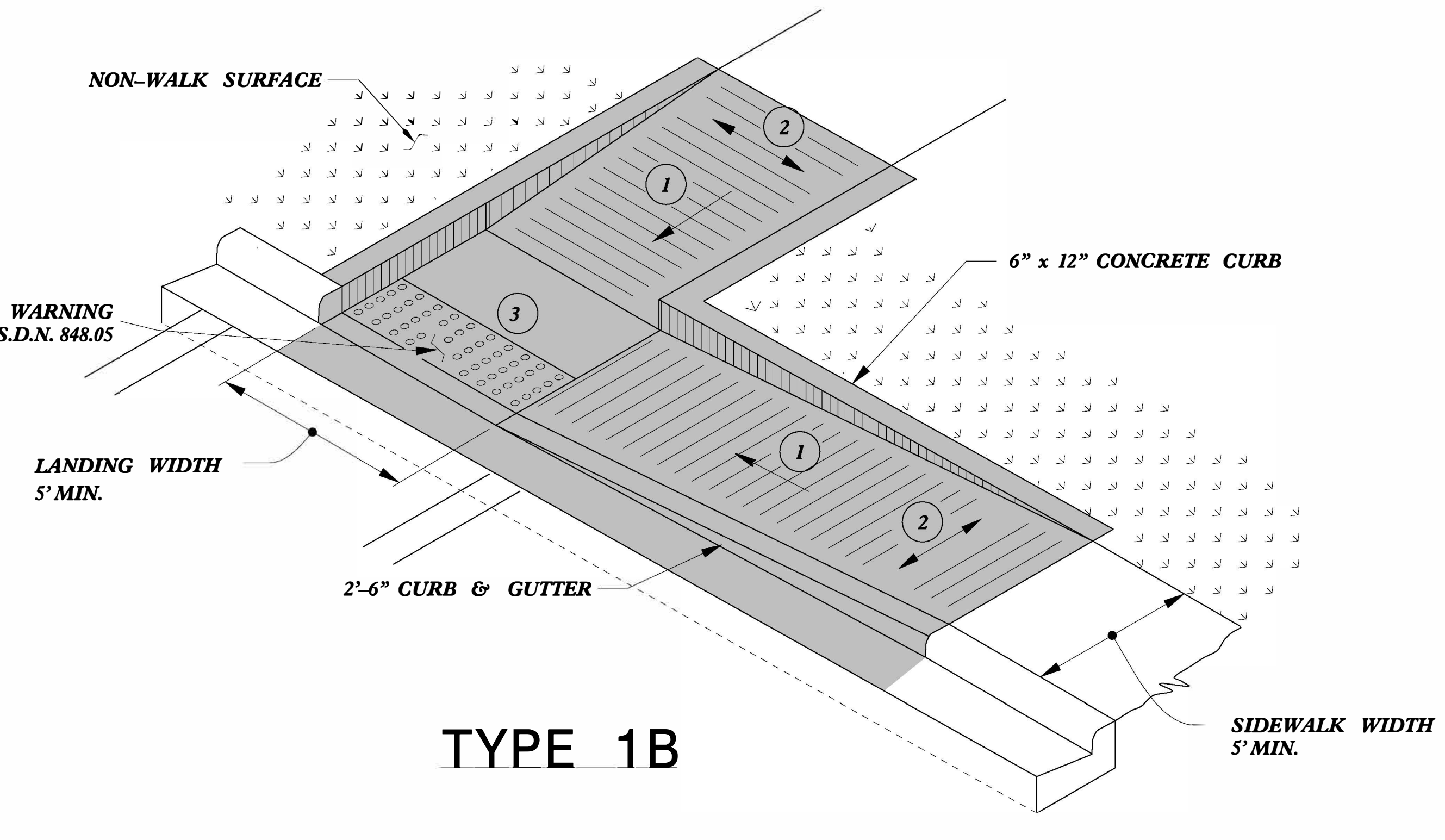
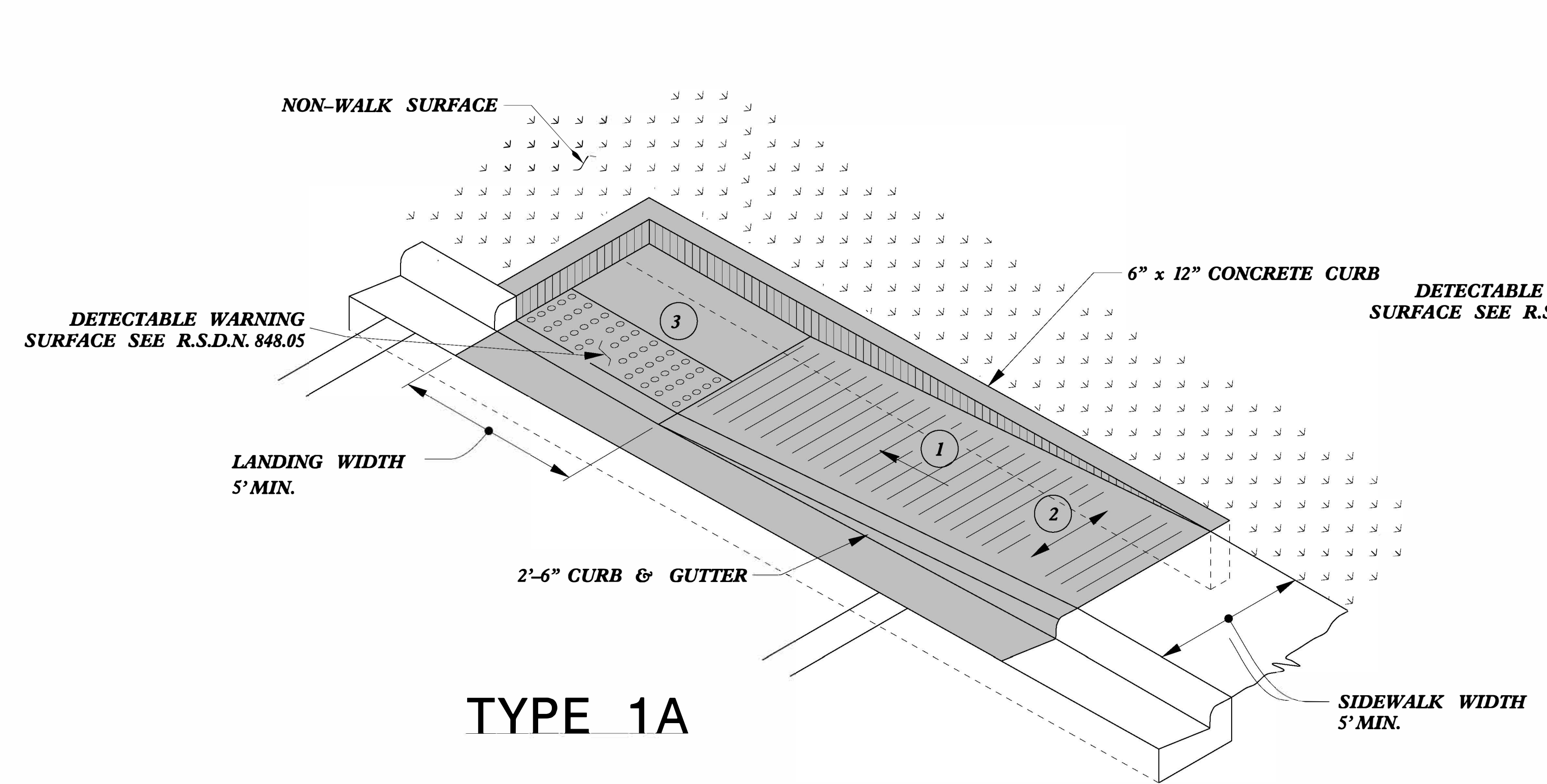


PIPE HYDRAULIC DATA
TEMP. 2 @ 103"x71" CSPA Sta. 16+75 -DETS8-
*2B06 & 2B07

DRAINAGE AREA	= 4.39	SQ MI
DESIGN FREQUENCY	= 5	YRS
DESIGN DISCHARGE	= 630	CFS
DESIGN HW ELEVATION	= 2201.1	FT
100 YEAR DISCHARGE	= N/A	CFS
100 YEAR HW ELEVATION	= N/A	FT
OVERTOPPING FREQUENCY	= 5+	YRS
OVERTOPPING DISCHARGE	= 660	CFS
OVERTOPPING ELEVATION	= 2201.4	FT

REVISIONS

8/17/2022
 5:28:00 PM
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 jld
 License No. 10000



- 1 8.33% (12:1) MAX RAMP SLOPE
- 2 CROSS SLOPE: 2.00%
- 3 CURB RAMPS REQUIRE A (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.

PAY LIMITS FOR 1 CURB RAMP

REFER TO ROADWAY STANDARD DRAWING NUMBER 848.05 SHEET 3 OF 3 FOR ALL RAMP NOTES



5/31/2022

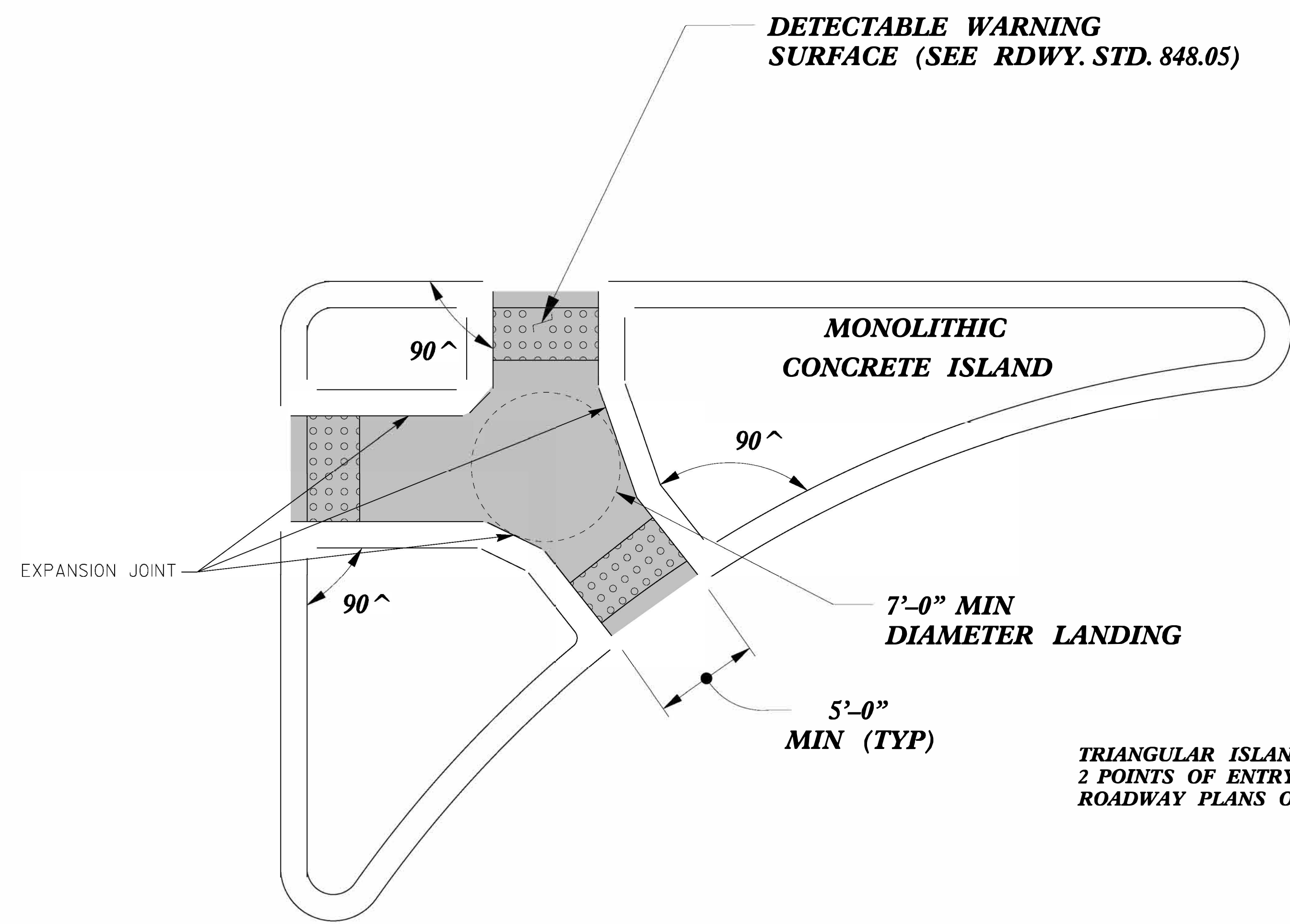
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

CURB RAMPS
Directional Ramps

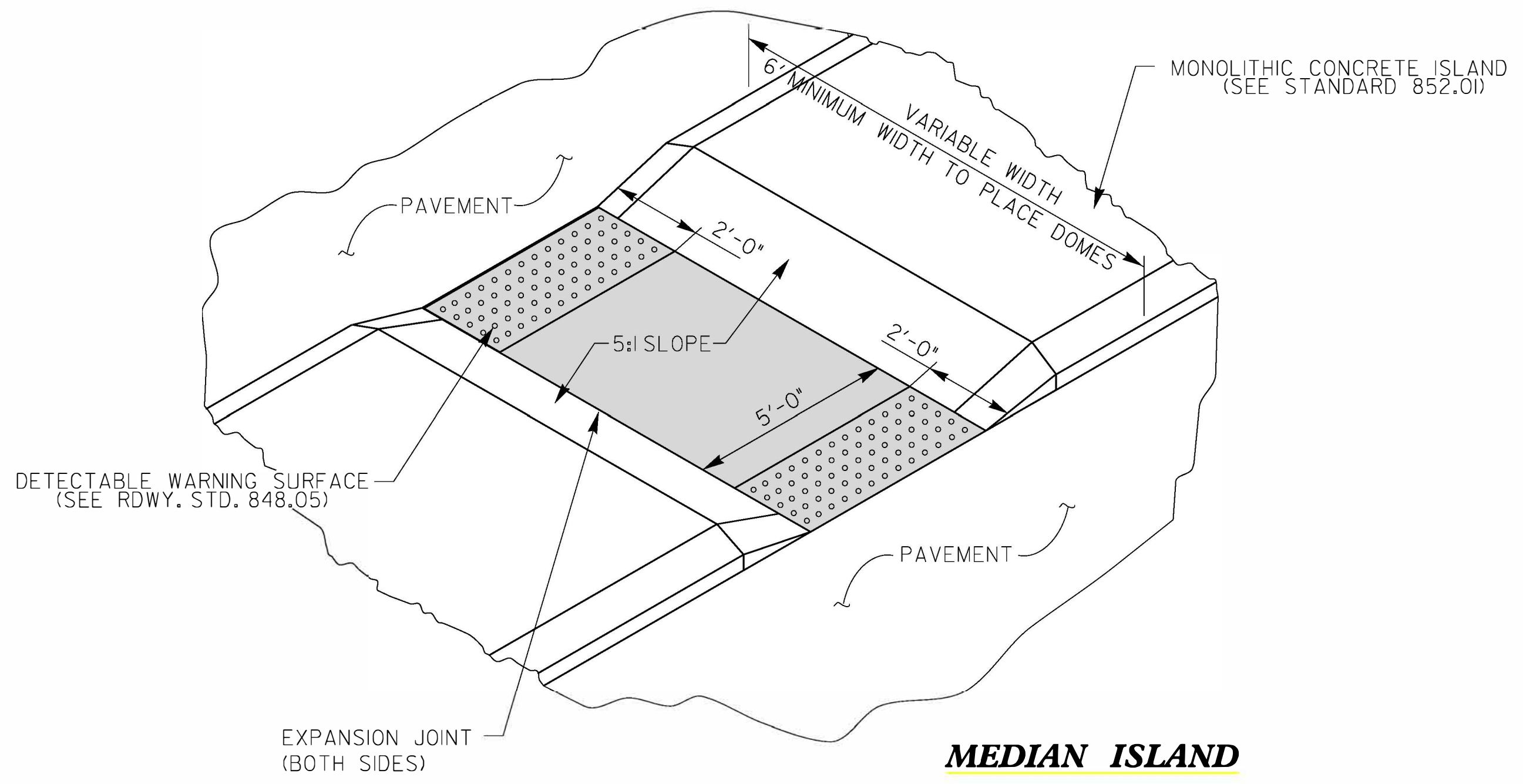
ORIGINAL BY: J.S. HOWERTON DATE: 7/7/11
 MODIFIED BY: DATE:
 CHECKED BY: DATE:
 FILE SPEC: stds/2012CurbRamp/CurbRampDetails.dgn

**PAY LIMITS FOR 2 OR 3 CURB RAMPS
(CALCULATE BASED ON NUMBER OF
SETS OF TRUNCATED DOMES)**

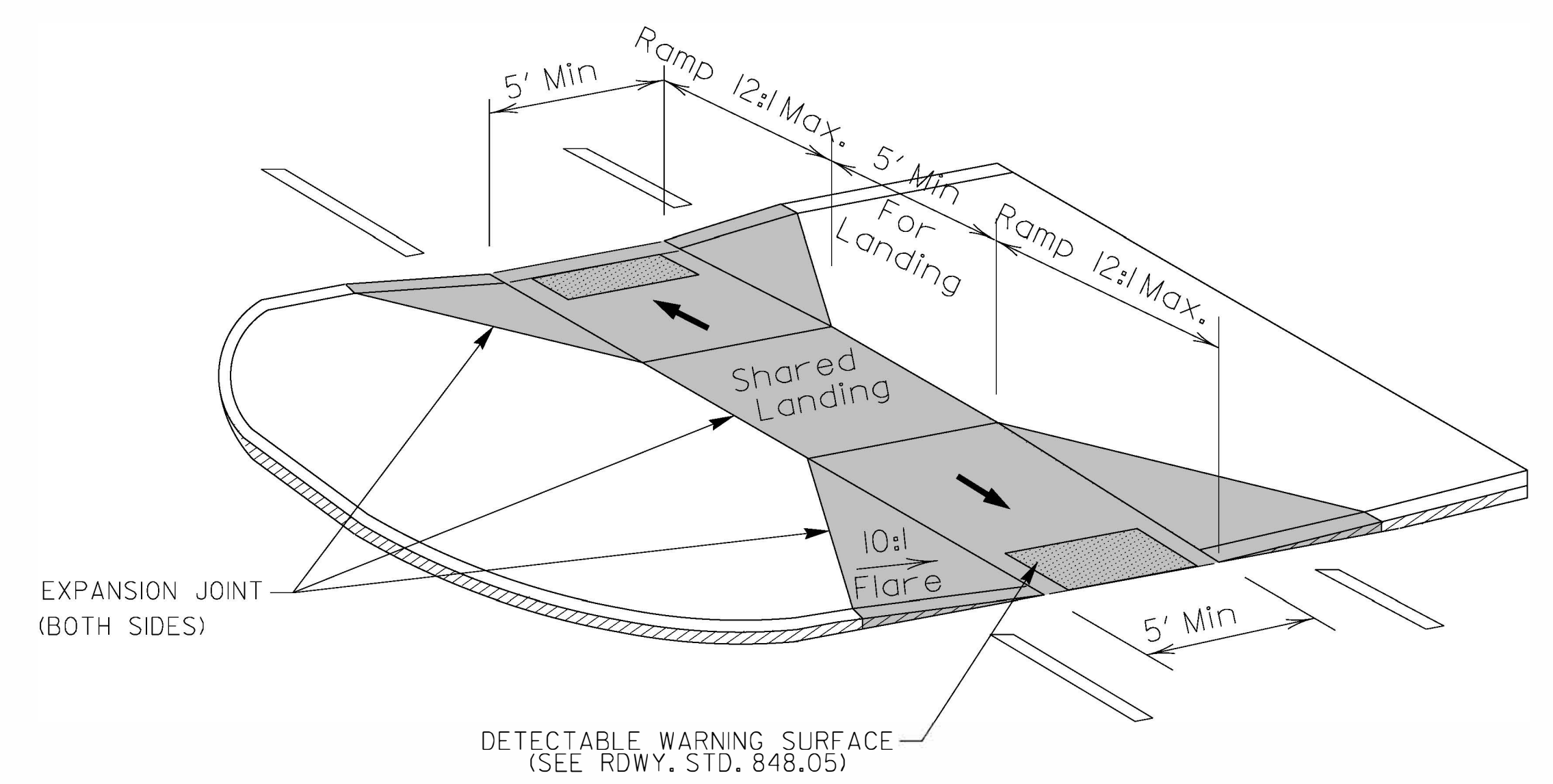


TRIANGULAR ISLANDS MAY BE CONSTRUCTED WITH ONLY 2 POINTS OF ENTRY AND EXIT AS SHOWN IN THE ROADWAY PLANS OR AS DIRECTED BY THE ENGINEER.

**TRIANGULAR ISLAND WITH CUT THROUGH
TYPE 6**



**MEDIAN ISLAND WITH CUT THROUGH
TYPE 7**



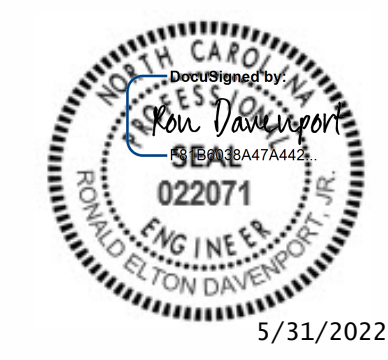
**MEDIAN ISLAND CURB RAMPS
TYPE 8**

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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CURB RAMPS
Median or Turn Lane Islands

ORIGINAL BY: J.S. HOWERTON DATE: 7/7/11
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC: stds/2012CurbRamp/CurbRampDetails.dgn



5/14/99
SYTIME
CONSTRUCTION
SUGGESTION

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

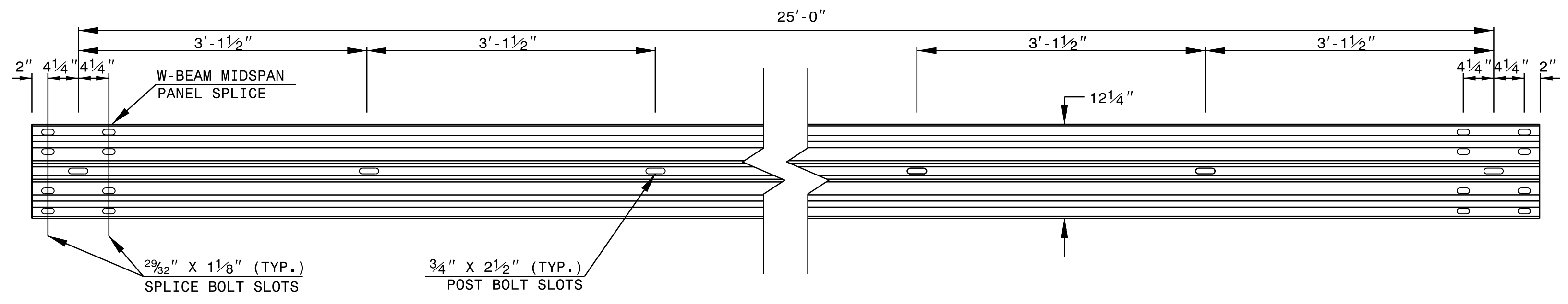
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

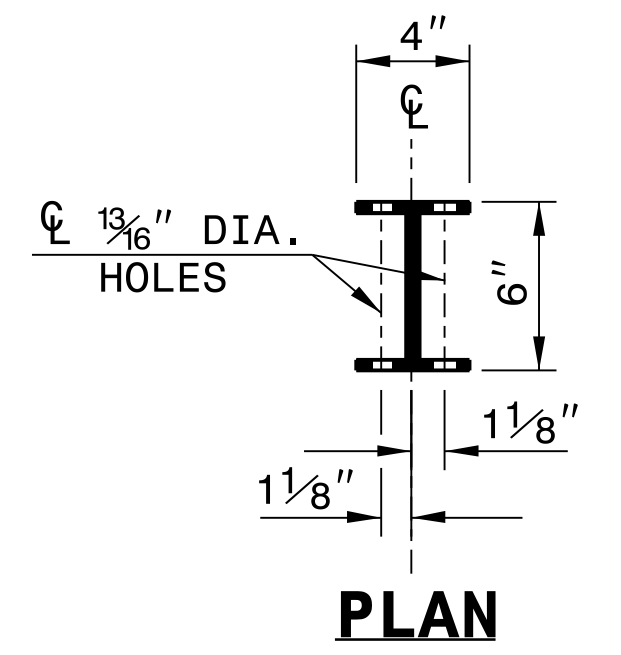
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

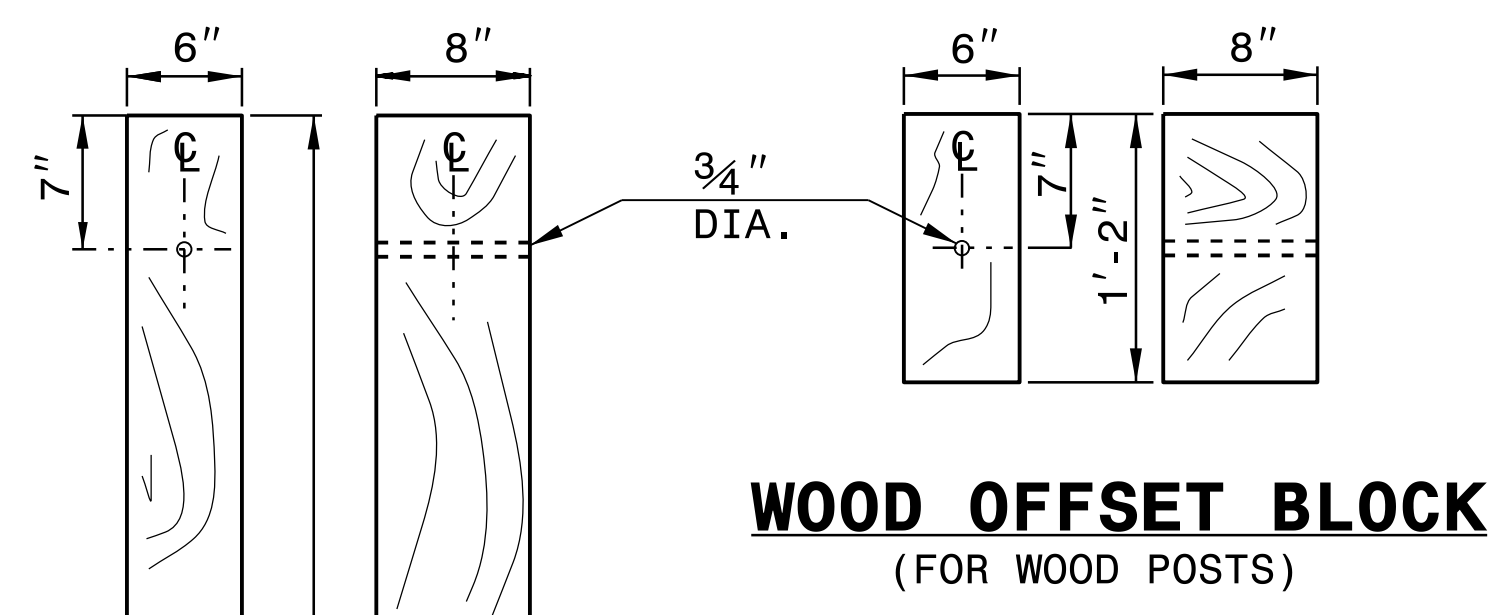
SHEET 6 OF 8
862D02



STANDARD W-BEAM GUARDRAIL



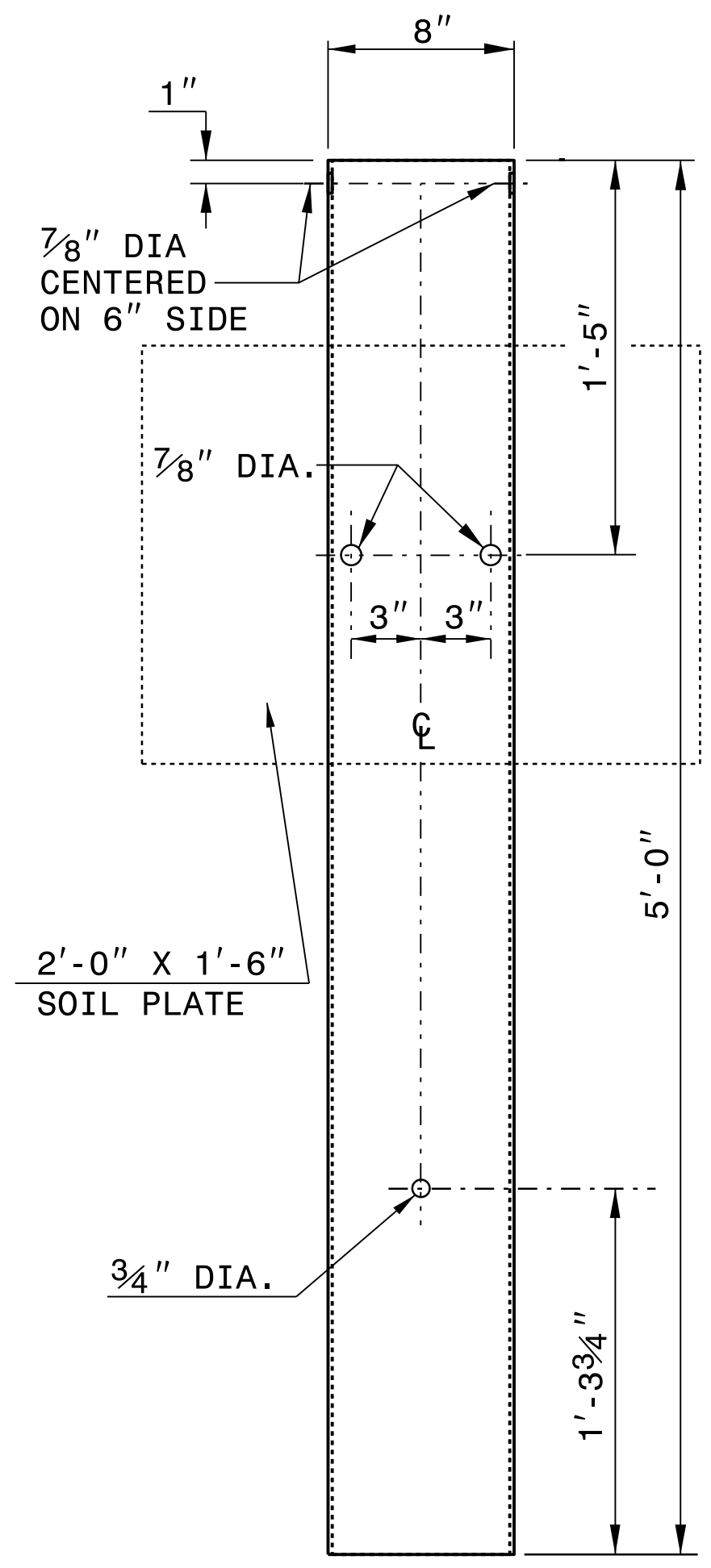
PLAN



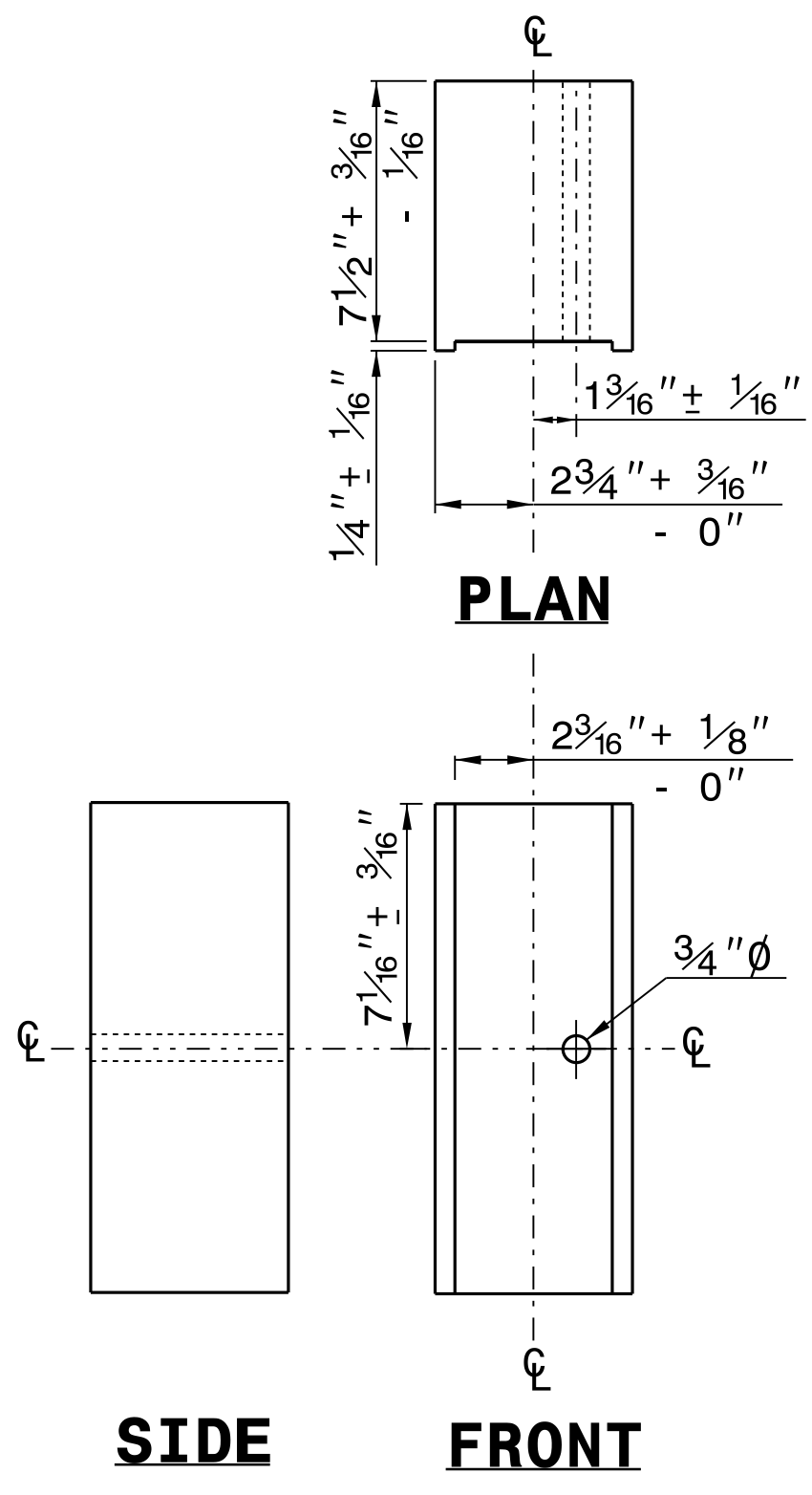
**WOOD OFFSET BLOCK
(FOR WOOD POSTS)**

**STANDARD
LINE POST**

**SHORT WOOD
BREAKAWAY POST**



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

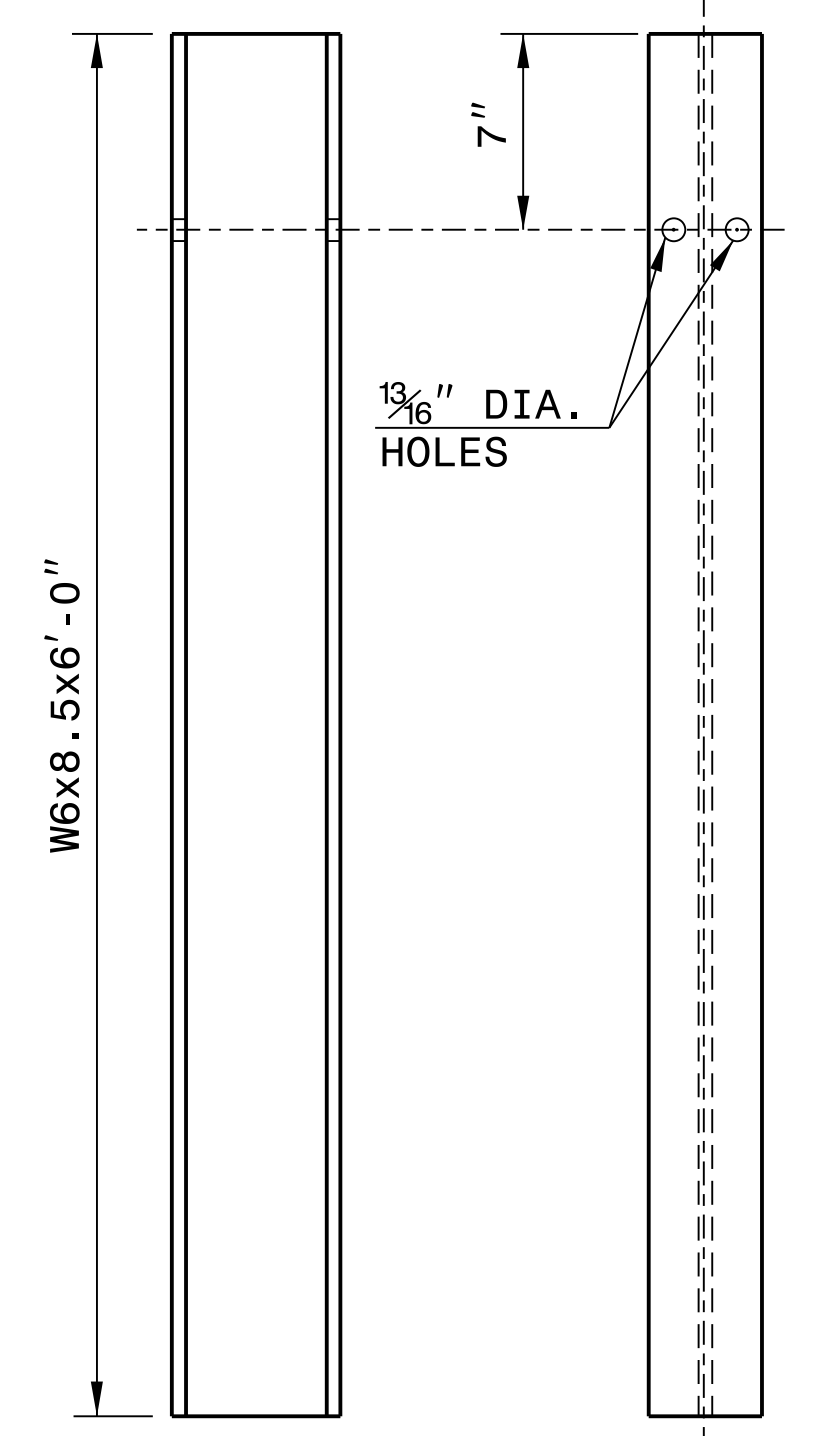


PLAN

SIDE

FRONT

**ROUTED
OFFSET BLOCK**



SIDE

FRONT

"W6" STEEL POST

SYSTEM PARTS

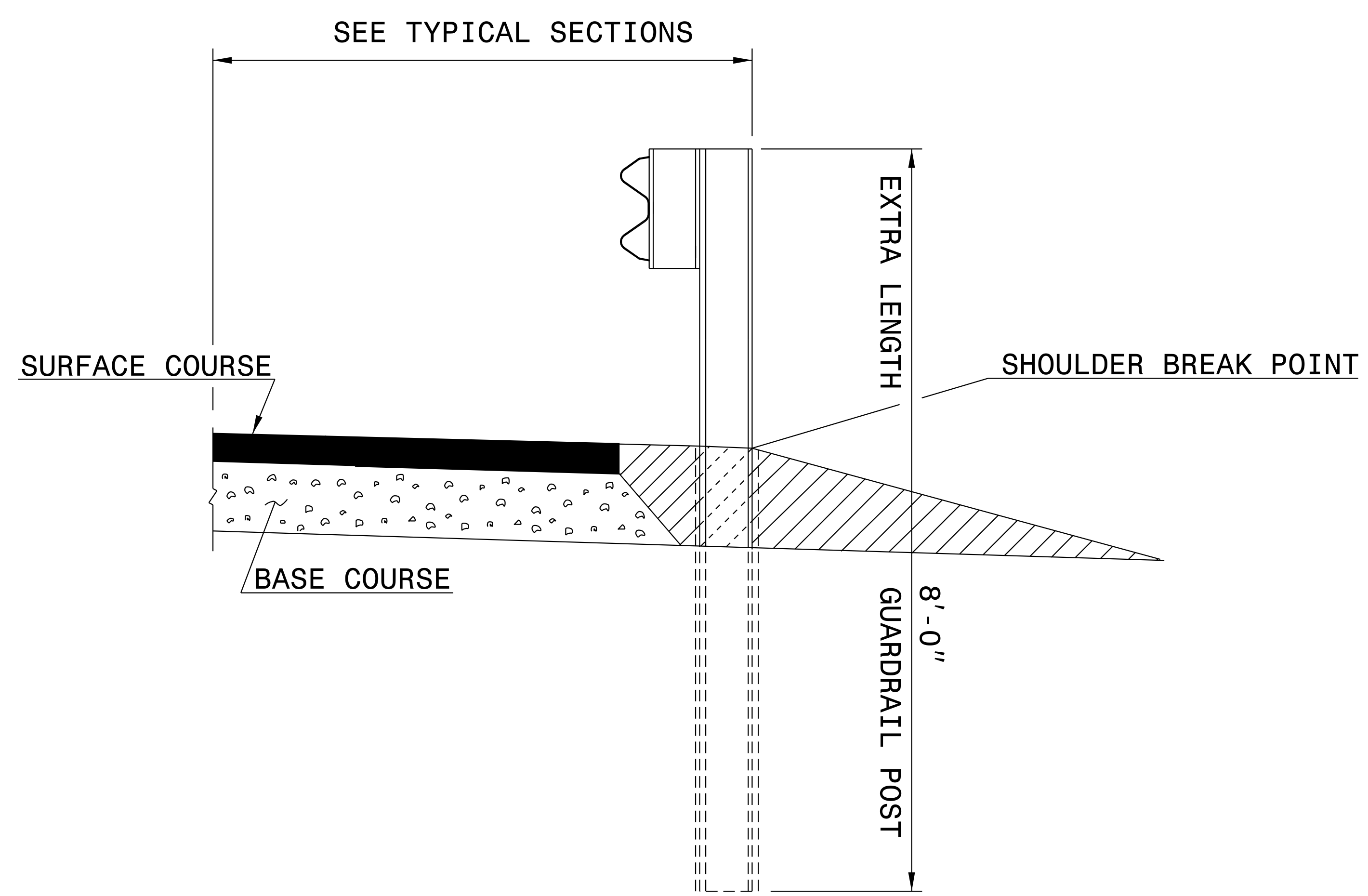


5/31/2022

**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.: _____



09-MAY-2018 14:21
 S:\Contracts\Special Details\hoverton\7'postguardrail.dgn
 Jhoverton AT_CSD-232595

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS AND DEVELOPMENT UNIT	
Office 919-707-6950 FAX 919-250-4119	
8' GUARDRAIL POST	
ORIGINAL BY: <u>L. Robinson</u>	DATE: <u>1995</u>
MODIFIED BY: <u>L. Robinson</u>	DATE: <u>Feb, 1996</u>
CHECKED BY: _____	DATE: _____
FILE SPEC.: s:7'postguardrail.dgn	

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

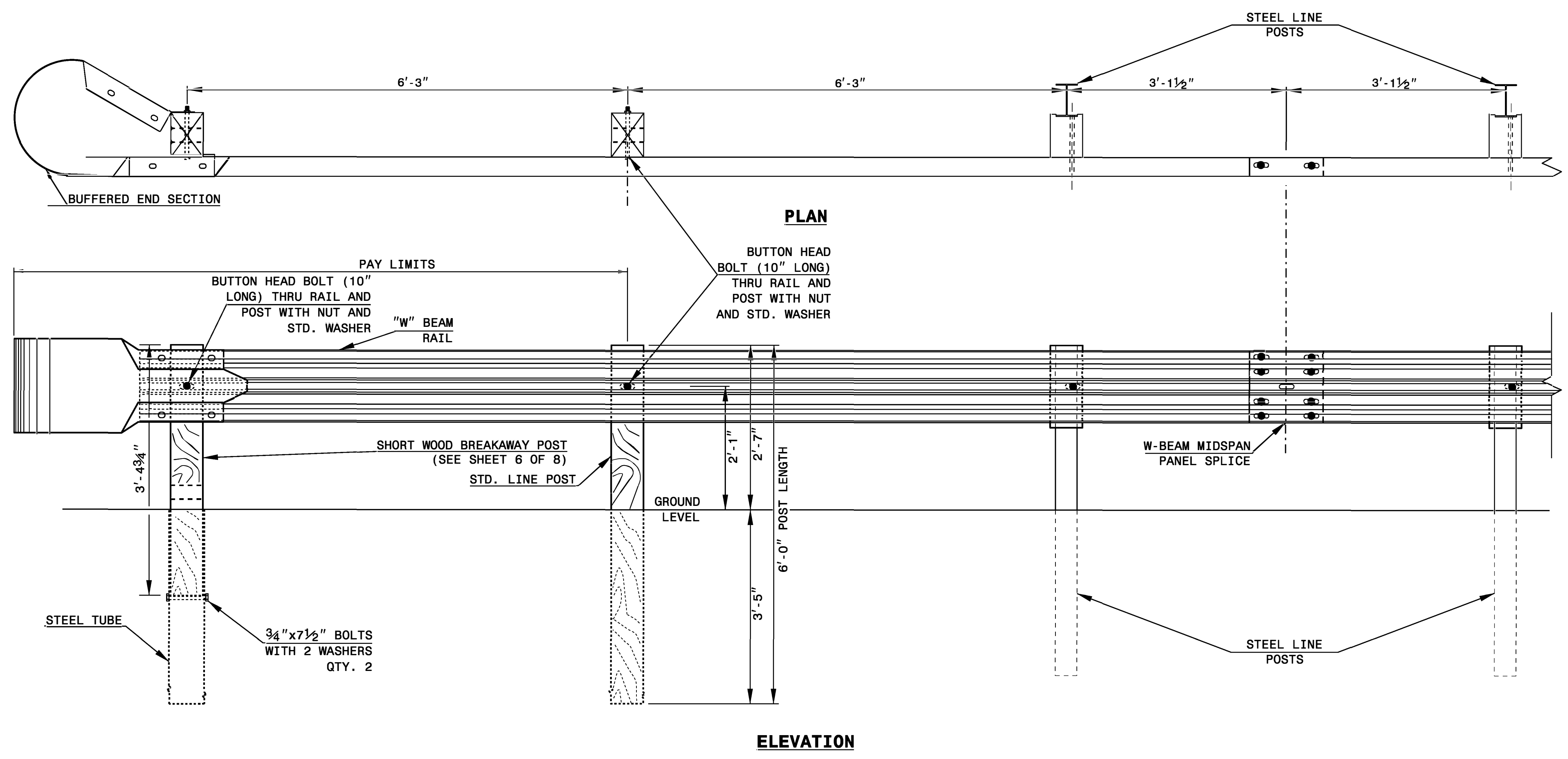
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET OF

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET OF



TRAILING END UNIT ASSEMBLY
A.T. - 1 SYSTEM

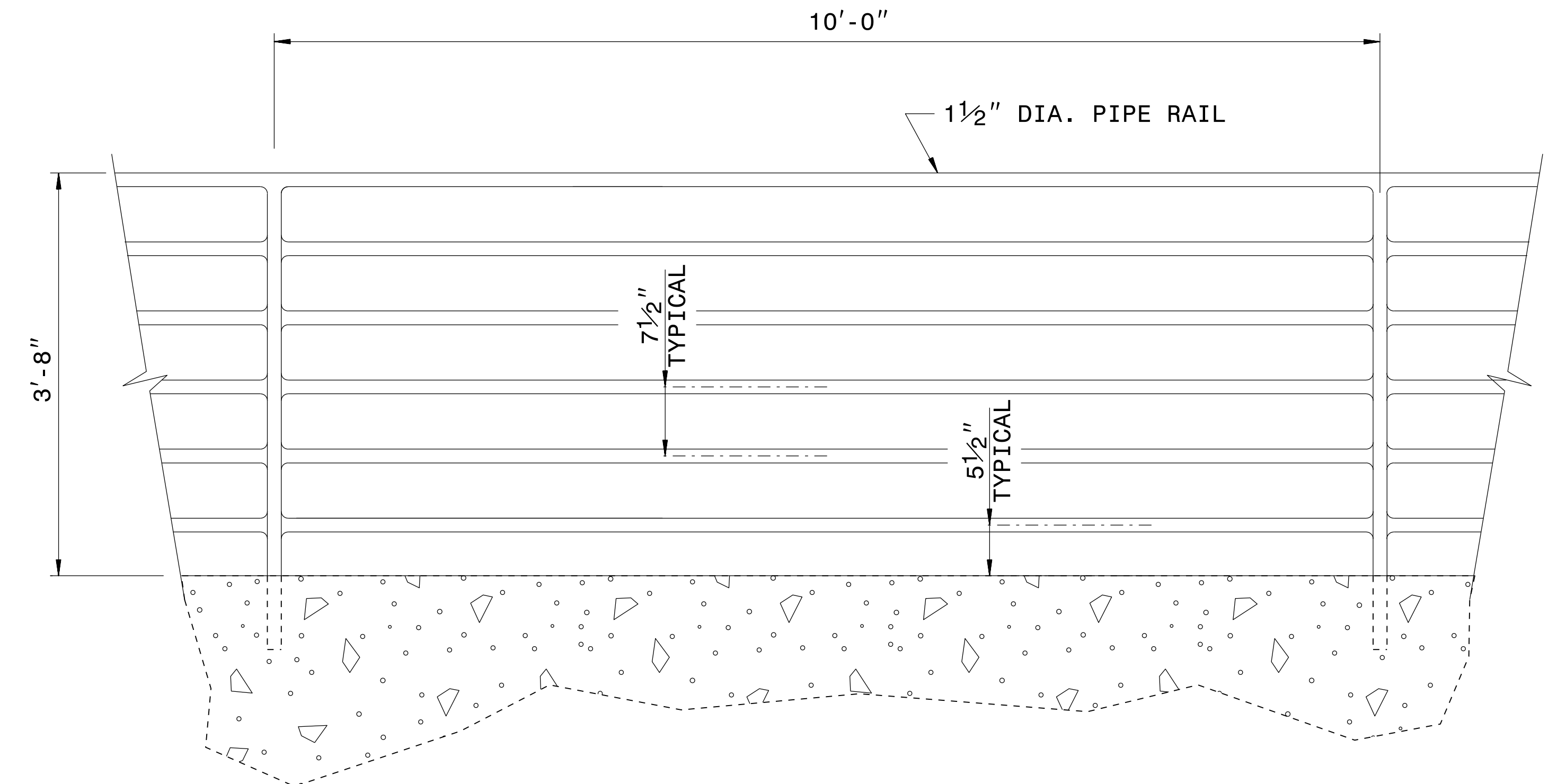


CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

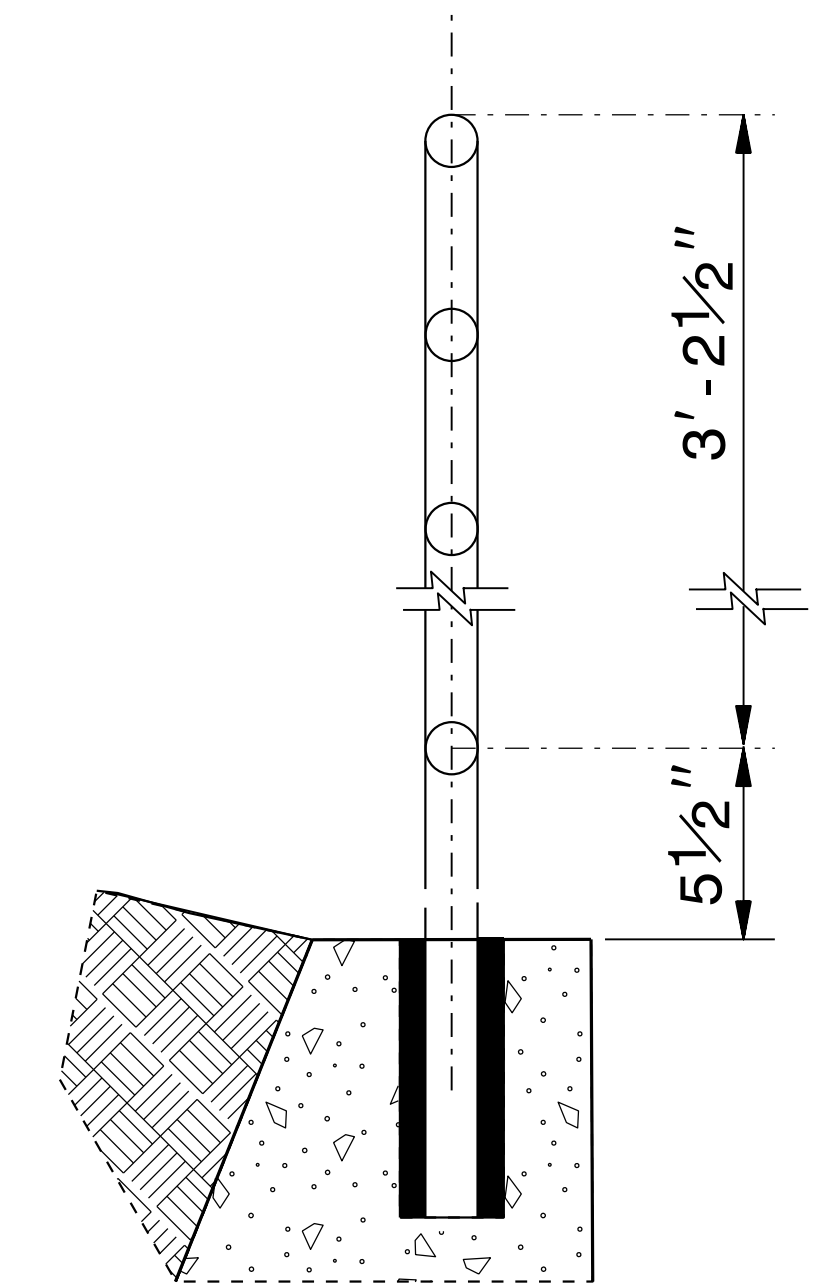
A.T. - 1 SYSTEM

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

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



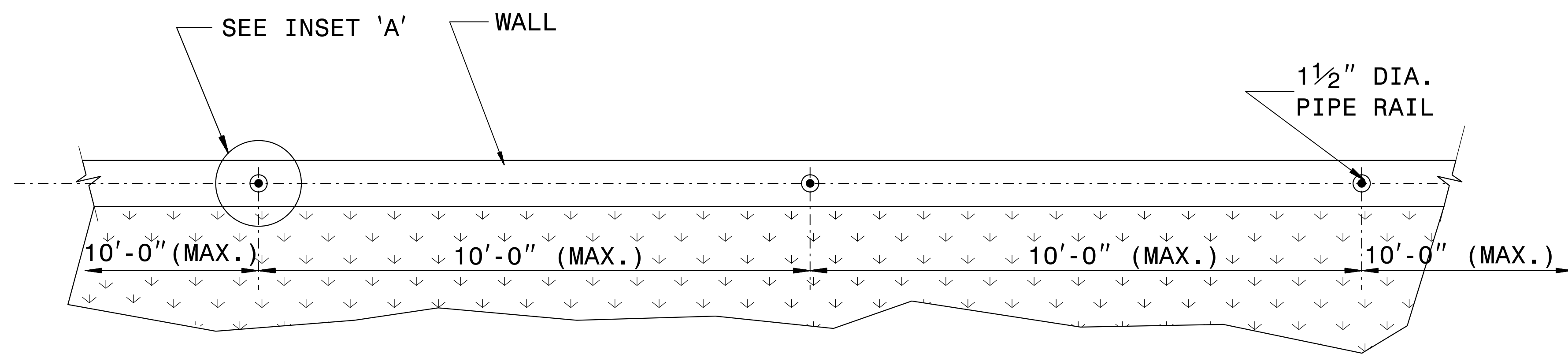
ELEVATION OF HANDRAIL



INSET 'A'

NOTES:

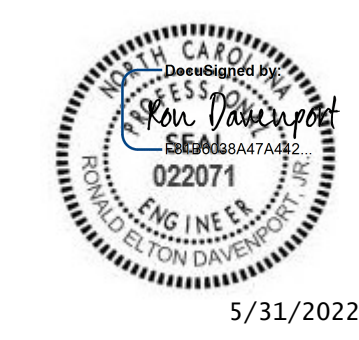
- CONSTRUCT PROPOSED STEEL PIPE RAIL 1 1/2" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.
- EMBED PIPE RAIL INTO PROPOSED WALL WITH CHEMICAL OR CONCRETE GROUT ANCHORING SYSTEM PER THE WALL MANUFACTURER'S RECOMMENDATIONS.
- REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.
- PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.
- CENTER THE PROPOSED RAILING ON TOP OF THE WALL WITH POST SPACING SYMMETRICAL ABOUT THE CENTER-LINE OF THE WALL.
- WELD IN ACCORDANCE WITH ARTICLE 1072-18 OF THE STANDARD SPECIFICATIONS.
- SUBMIT THE ATTACHMENT OF THE HANDRAIL TO THE RETAINING WALL TO THE CONTRACTS AND STANDARDS OFFICE FOR APPROVAL.



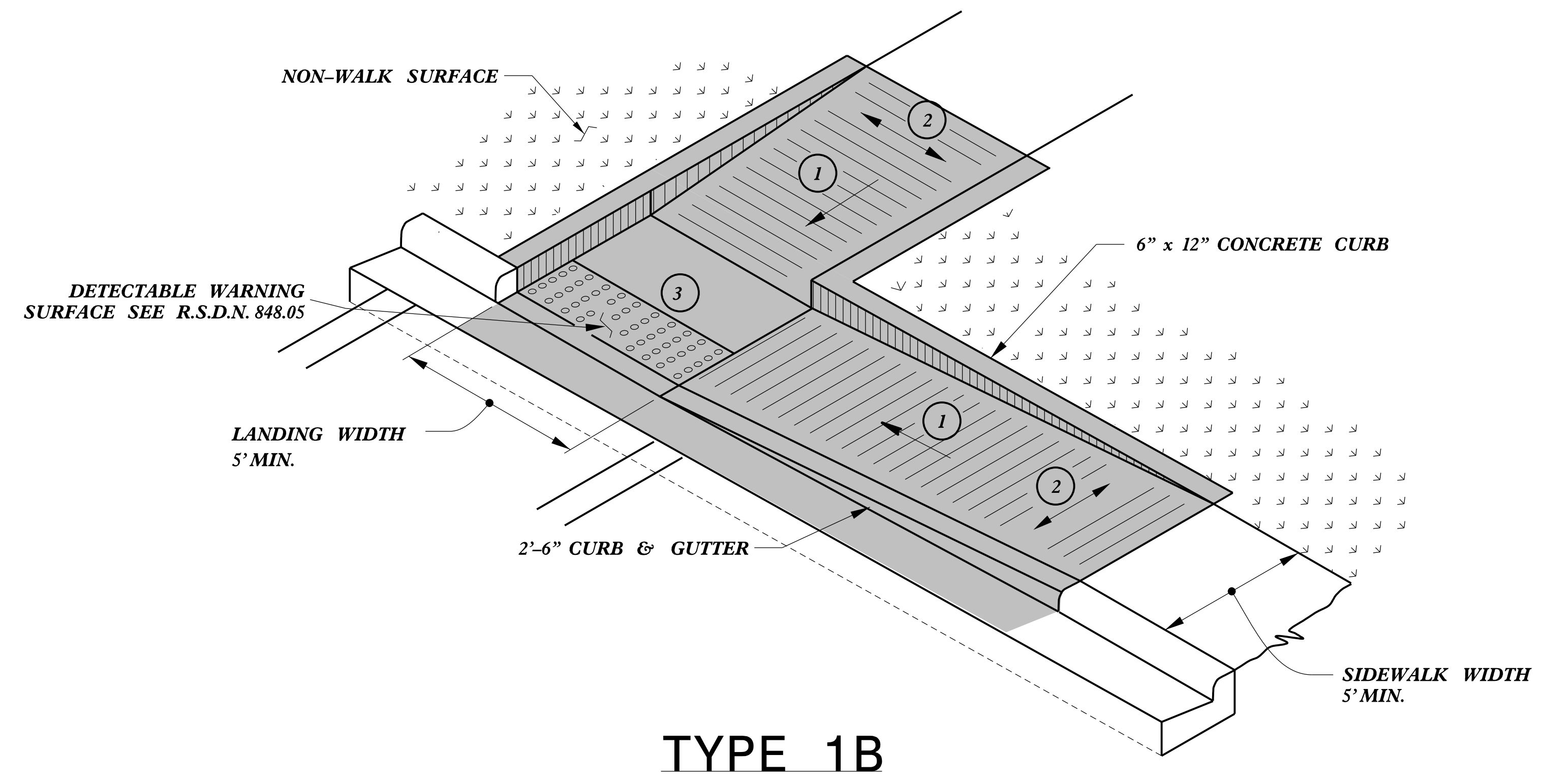
PLAN VIEW

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

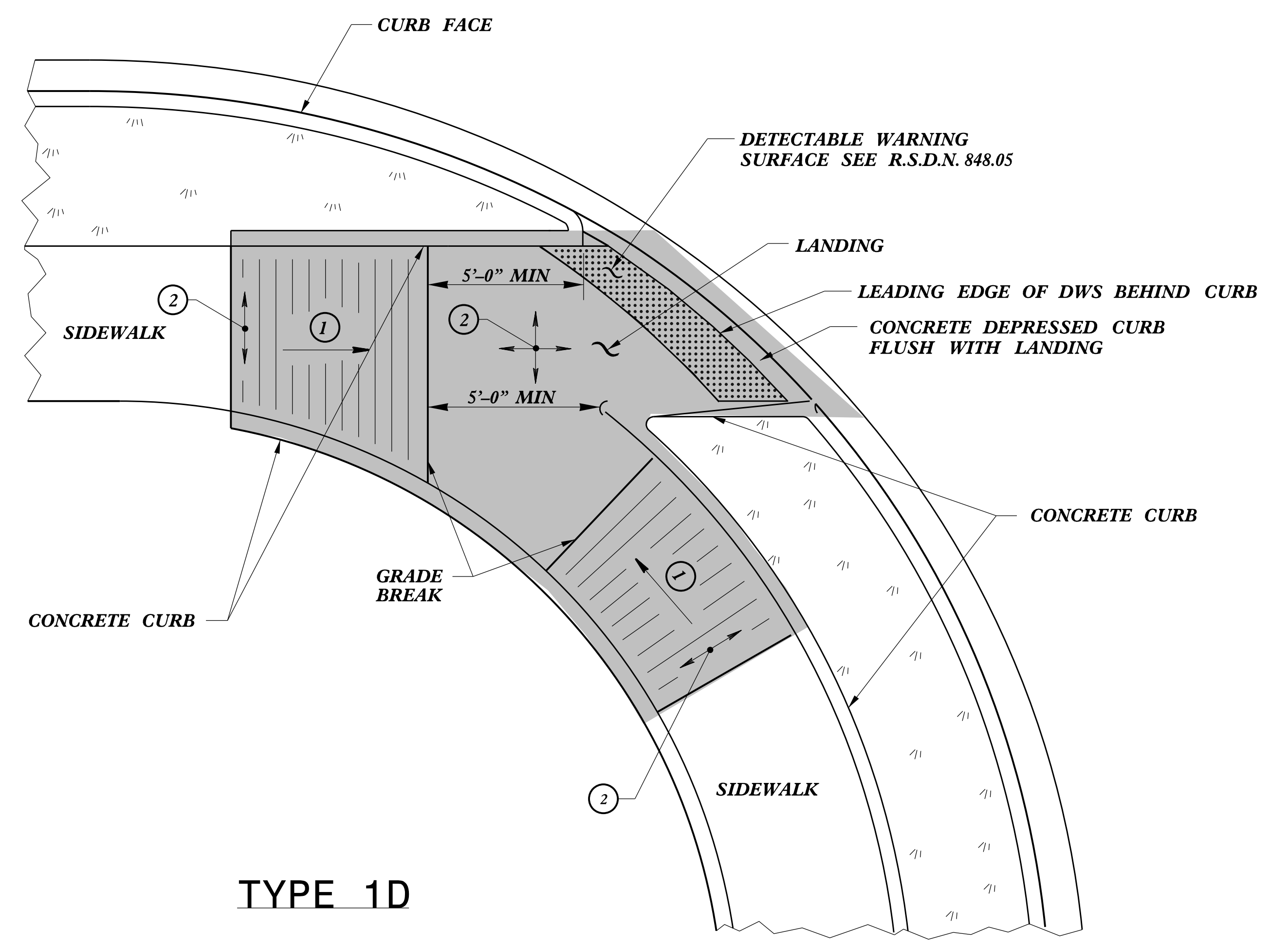
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



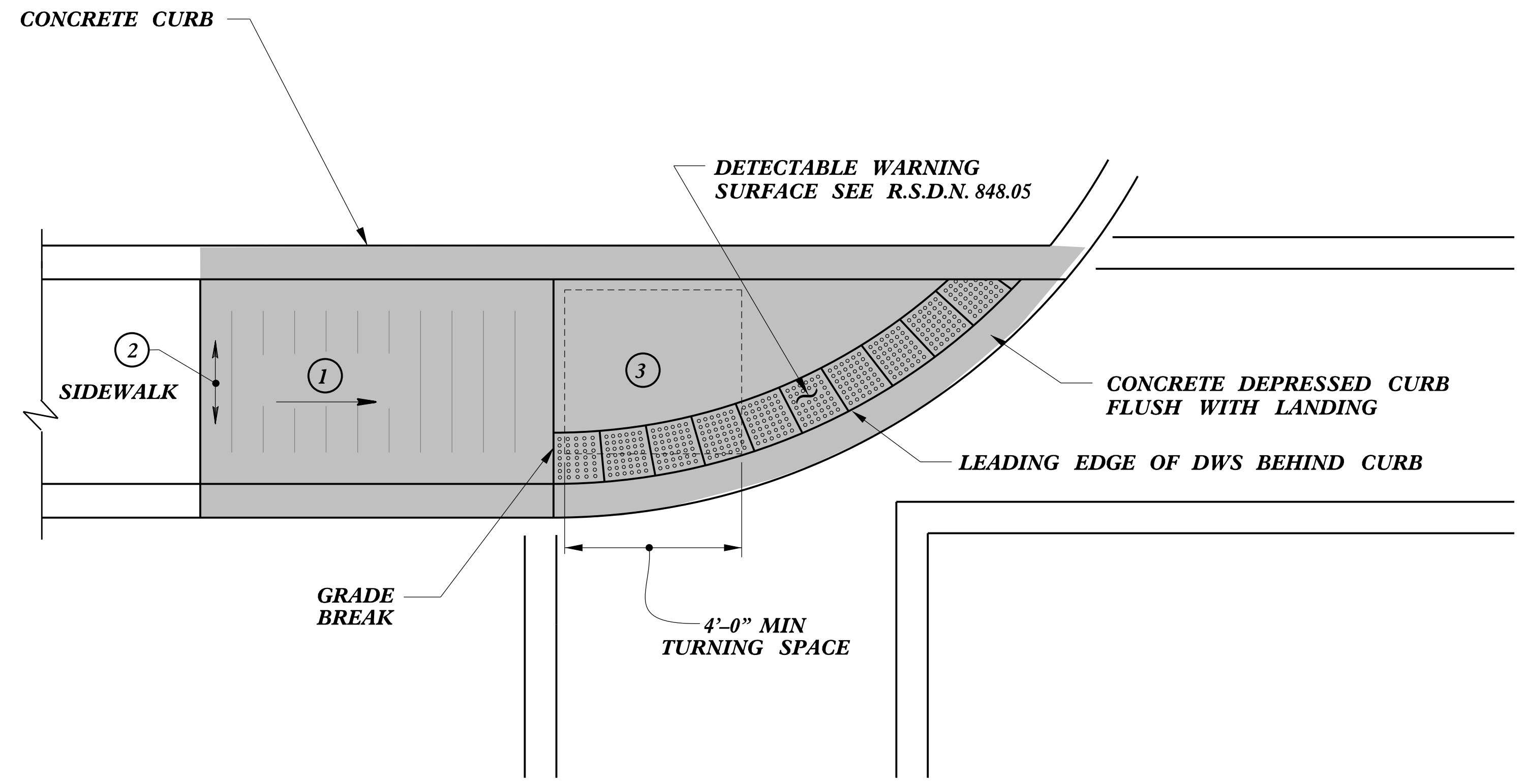
CONTRACT STANDARDS AND DEVELOPMENT UNIT	
Office 919-707-6950 FAX 919-250-4119	
DETAIL OF PIPE HANDRAIL MOUNTED ON A WALL	
ORIGINAL BY: E.E. WARD	DATE: 12-99
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC.: jhowerton/handrail_on_retaining_wall.dgn	



TYPE 1B



TYPE 1D



TYPE 1C

- 1 8.33% (12:1) MAX RAMP SLOPE
- 2 CROSS SLOPE: 2.00%
- 3 CURB RAMPS REQUIRE A (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.

PAY LIMITS FOR 1 CURB RAMP

REFER TO ROADWAY STANDARD DRAWING NUMBER 848.05 SHEET 3 OF 3 FOR ALL RAMP NOTES



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

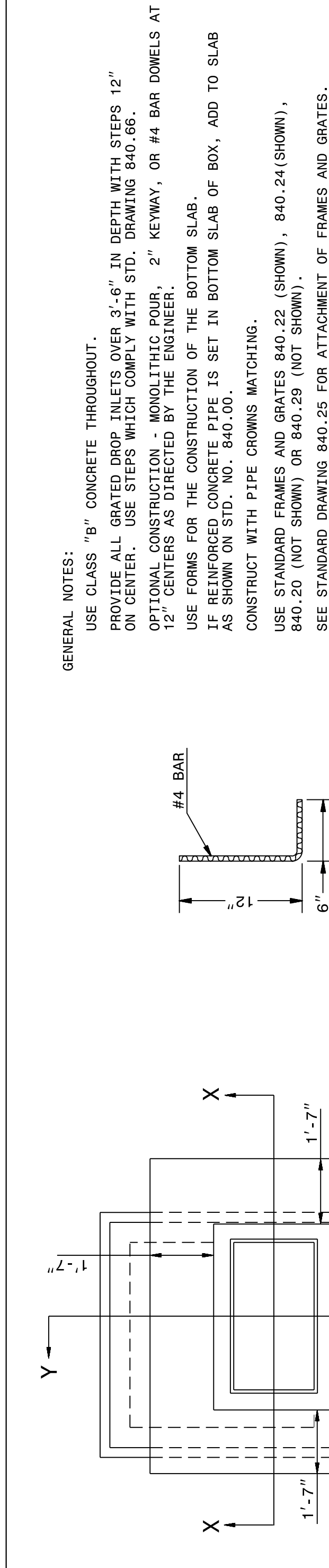
CONTRACT STANDARDS AND DEVELOPMENT UNIT	
Office 919-707-6950	FAX 919-250-4119
CURB RAMPS	
Directional Ramps	
ORIGINAL BY: J.S. HOWERTON	DATE: 7/7/11
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC: s:\stds\2012CurbRamp\CurbRampDetails.dwg	

5/14/99

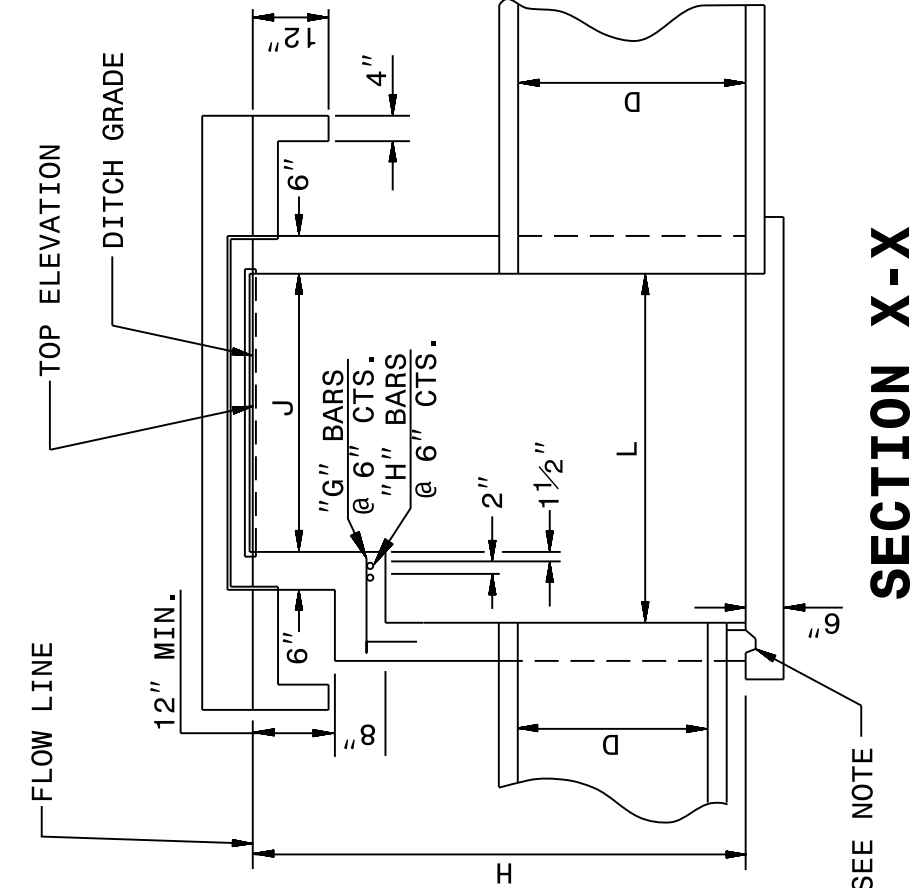
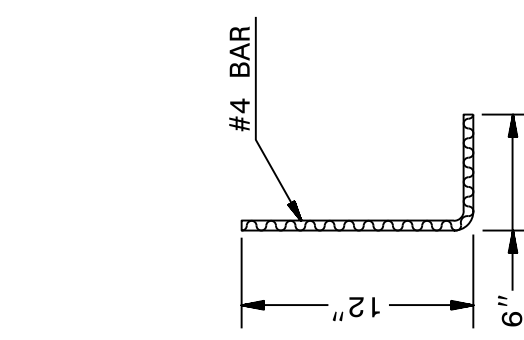
STATE OF
NORTH CAROLINA
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

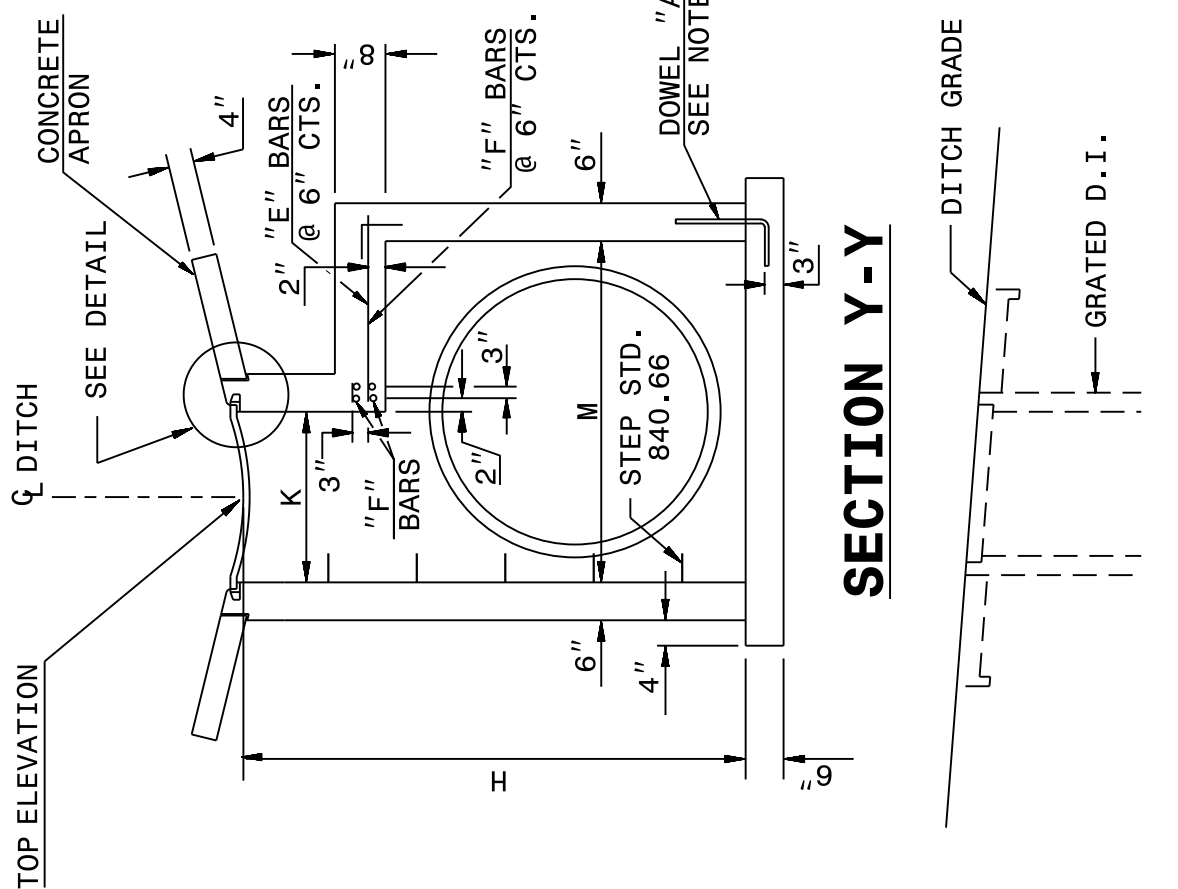
SHEET 1 OF 2
840d17



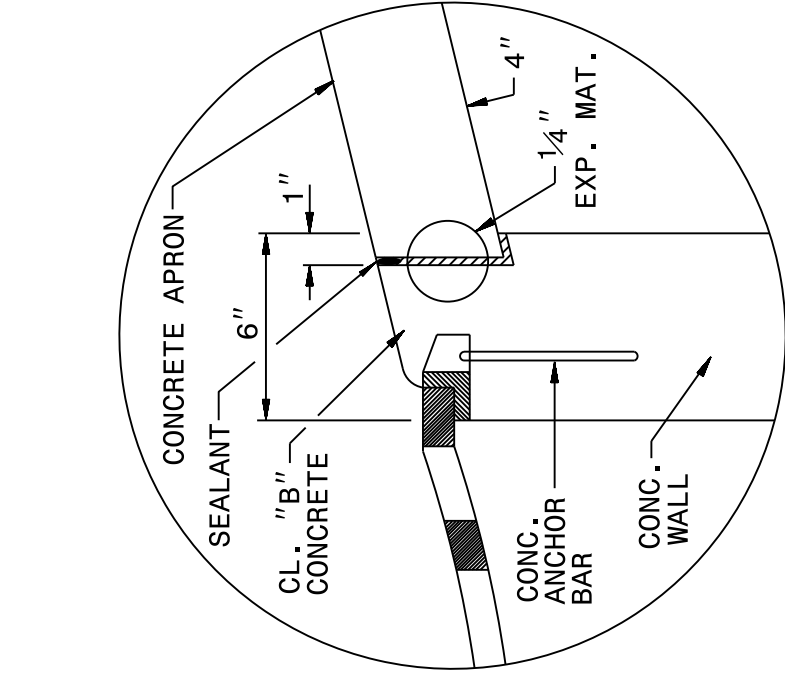
DOWEL - A



SECTION X-X



SECTION Y-Y



DETAIL
(APRON SUPPORT NOTCH)

GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.
PROVIDE ALL GRATED DROP INLETS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
CONSTRUCT WITH PIPE CROWNS MATCHING.
USE STANDARD FRAMES AND GRATES 840.22 (SHOWN), 840.24 (SHOWN), 840.20 (NOT SHOWN) OR 840.29 (NOT SHOWN).
SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12 FEET.

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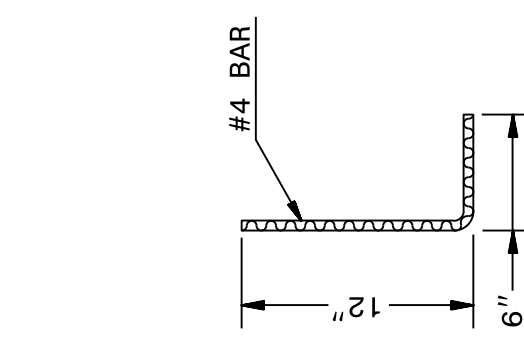
ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

SHEET 1 OF 2
840d17

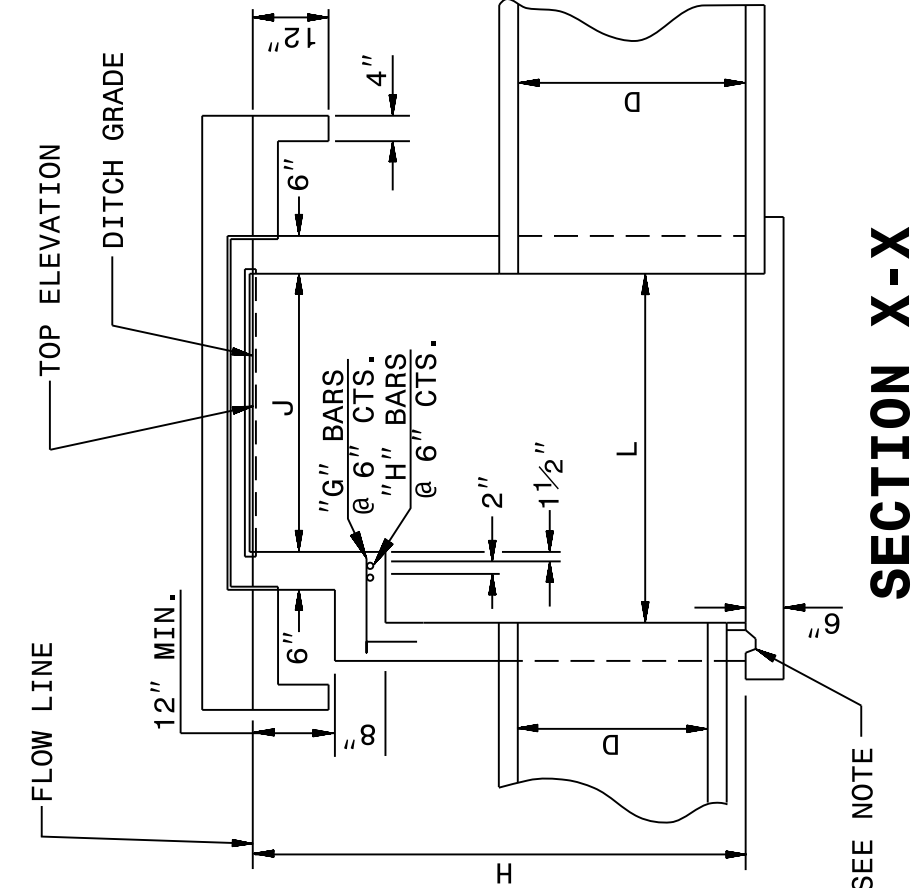
STATE OF
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RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

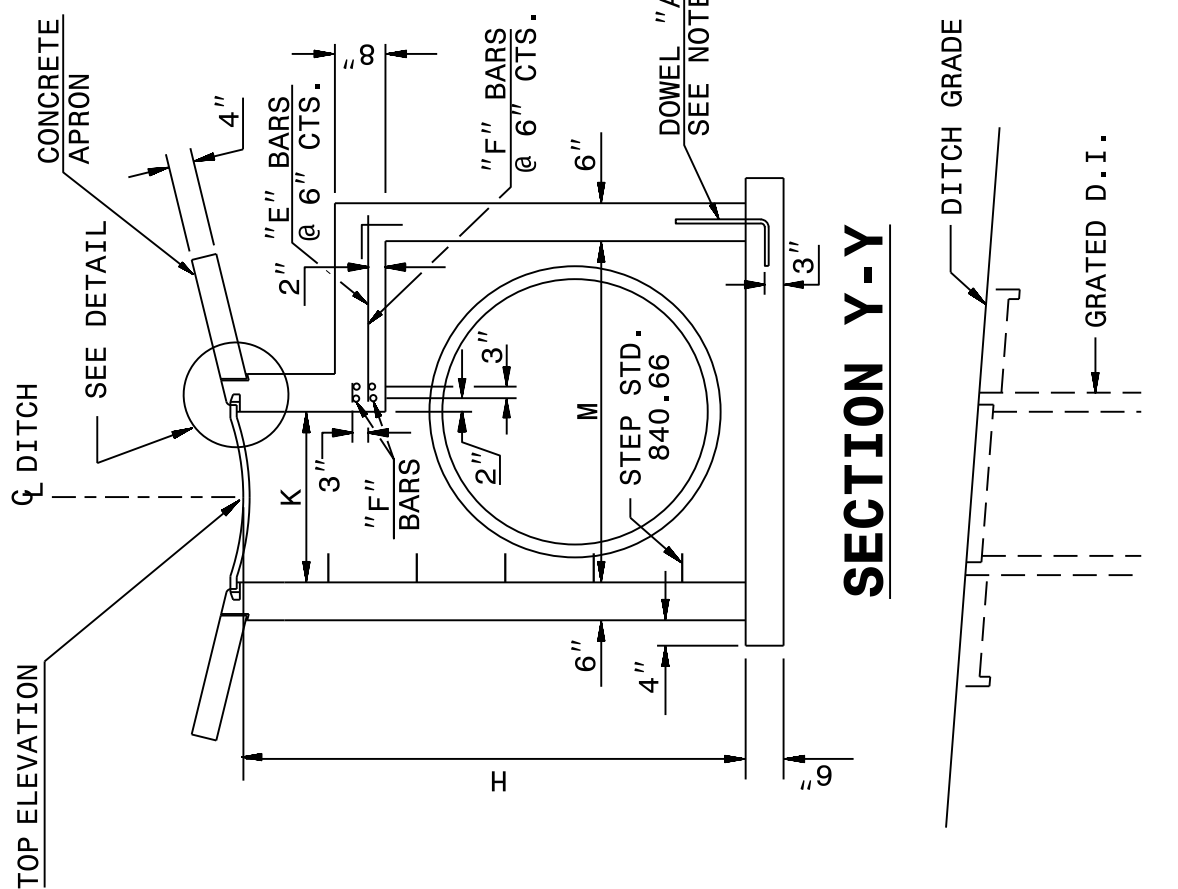
SHEET 2 OF 2
840d17



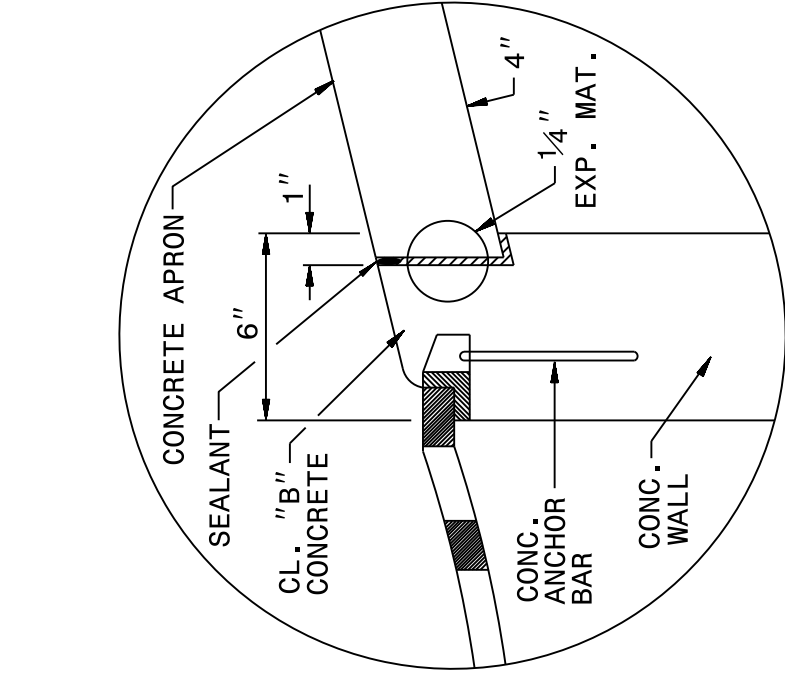
DOWEL - A



SECTION X-X



SECTION Y-Y



DETAIL
(APRON SUPPORT NOTCH)

GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.
PROVIDE ALL GRATED DROP INLETS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
CONSTRUCT WITH PIPE CROWNS MATCHING.
USE STANDARD FRAMES AND GRATES 840.22 (SHOWN), 840.24 (SHOWN), 840.20 (NOT SHOWN) OR 840.29 (NOT SHOWN).
SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12 FEET.

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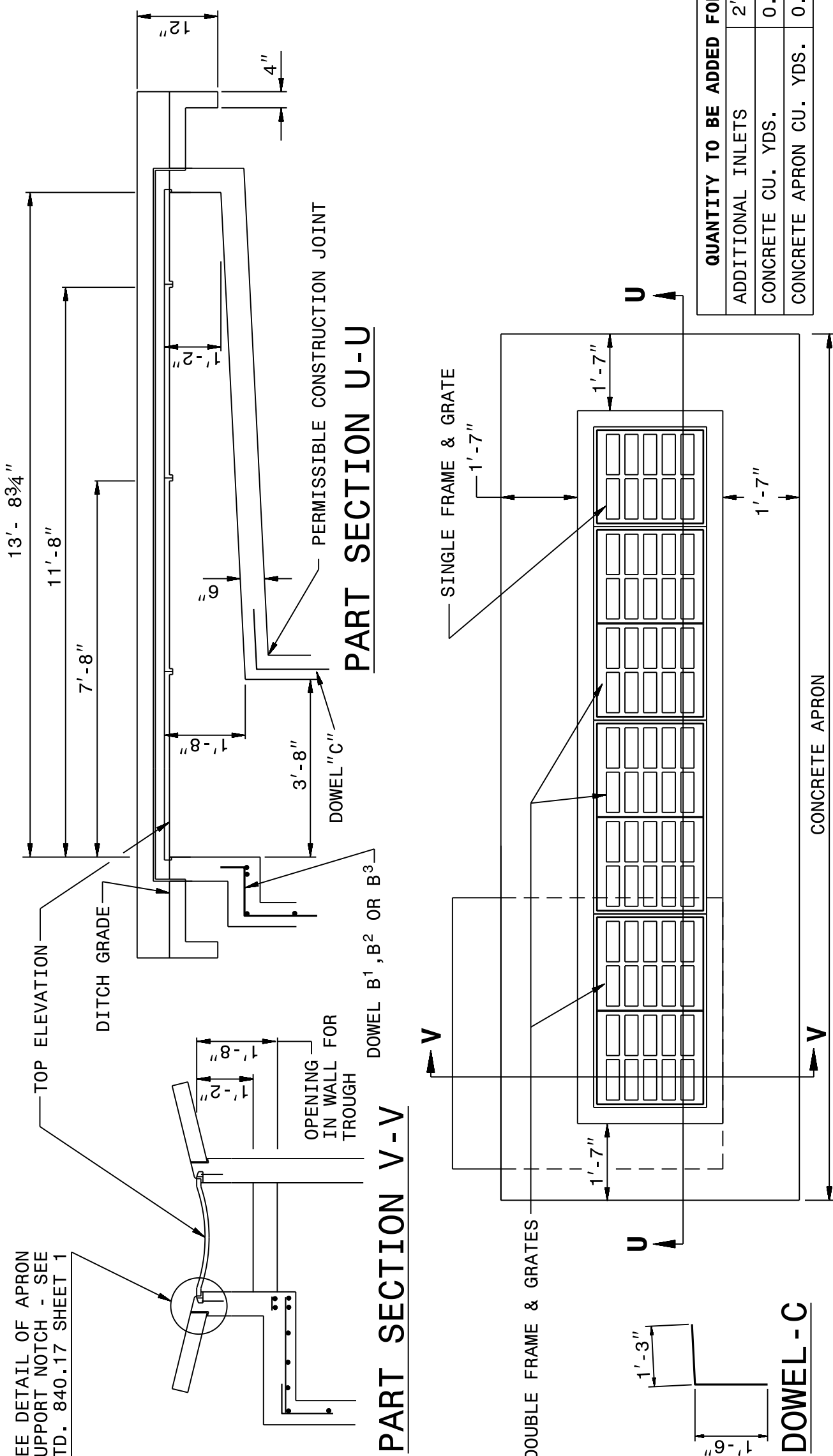
ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

SHEET 1 OF 2
840d17

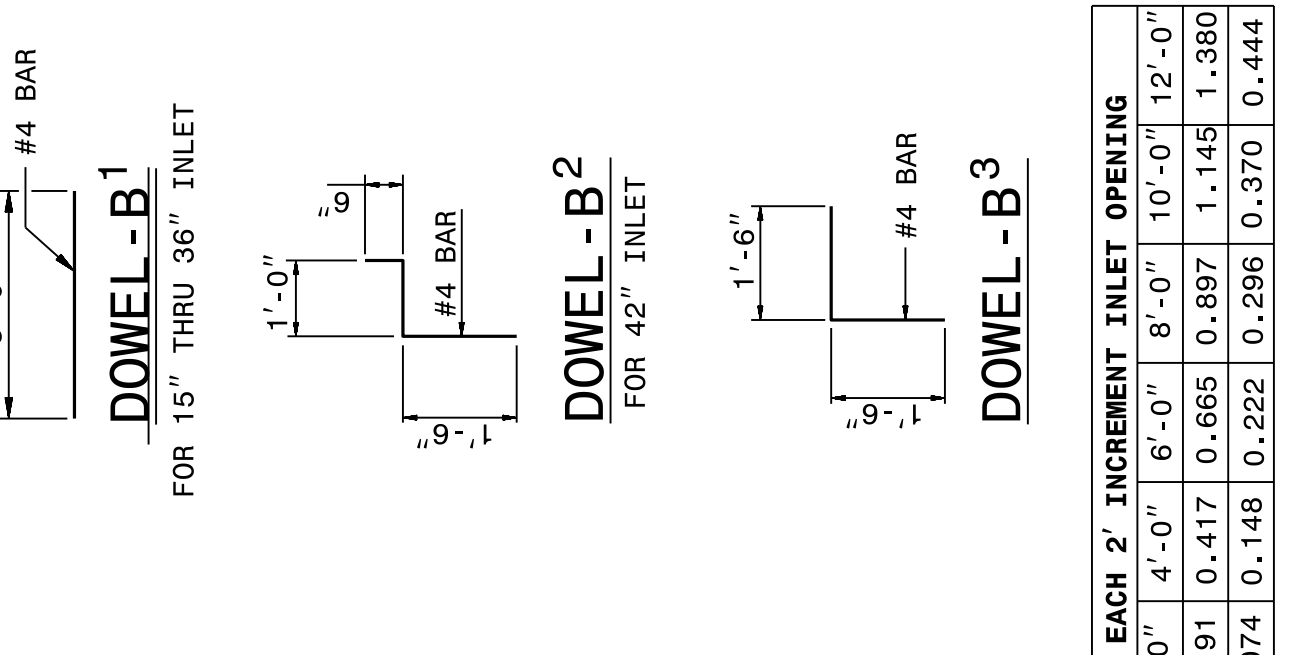
STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

SHEET 2 OF 2
840d17



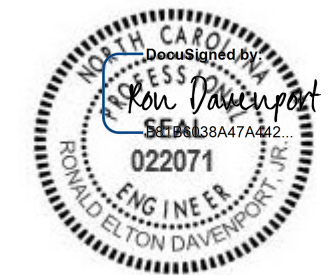
PART SECTION U-U



QUANTITY TO BE ADDED FOR EACH 2' INCREMENT INLET OPENING

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

PIPE	DIMENSIONS OF BOX AND PIPE		REINFORCING STEEL - NO. 4 BARS										DEDUCTIONS FOR ONE PIPE			
	SPAN	WIDTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	APRON	TOTAL
12"	3'-8"	2'-0"	2	2'-3"	—	—	—	—	—	—	—	—	—	—	0.395	1.745
15"	3'-8"	2'-0"	2	2'-5"	—	—	—	—	—	—	—	—	—	—	0.395	1.745
18"	3'-8"	2'-0"	2	2'-8"	—	—	—	—	—	—	—	—	—	—	0.395	1.745
24"	3'-8"	2'-0"	2	3'-3"	8	1'-5"	6	4'-9"	—	—	—	—	—	—	0.395	1.745
30"	3'-8"	2'-0"	2	3'-10"	8	2'-0"	7	4'-9"	—	—	—	—	—	—	0.395	1.745
36"	3'-8"	2'-0"	2	4'-4"	8	2'-5"	8	4'-11"	4	0'-9"	2	4'-11"	47	0.560	1.931	0.321
42"	3'-8"	2'-0"	2	5'-0"	10	3'-1"	9	5'-7"	9	1'-5"	3	5'-7"	67	0.704	2.500	0.370
48"	3'-8"	2'-0"	2	5'-6"	11	3'-7"	10	6'-1"	11	1'-11"	4	6'-1"	87	0.823	3.013	0.407
54"	3'-8"	2'-0"	2	6'-0"	12	4'-1"	11	6'-7"	12	2'-5"	5	6'-7"	107	0.951	3.589	0.444
60"	3'-8"	2'-0"	2	6'-6"	13	4'-9"	12	7'-3"	13	3'-1"	6	7'-3"	135	1.311	4.539	0.494
66"	3'-8"	2'-0"	2	7'-1"	14	5'-4"	14	7'-10"	14	3'-7"	7	7'-10"	168	1.136	5.061	0.537
72"	3'-8"	2'-0"	2	7'-8"	15	5'-11"	15	8'-5"	15	4'-3"	8	8'-5"	199	1.500	5.860	0.580



5/31/2022

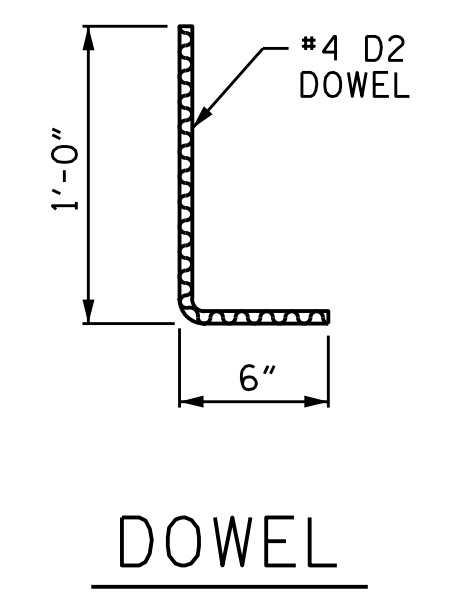
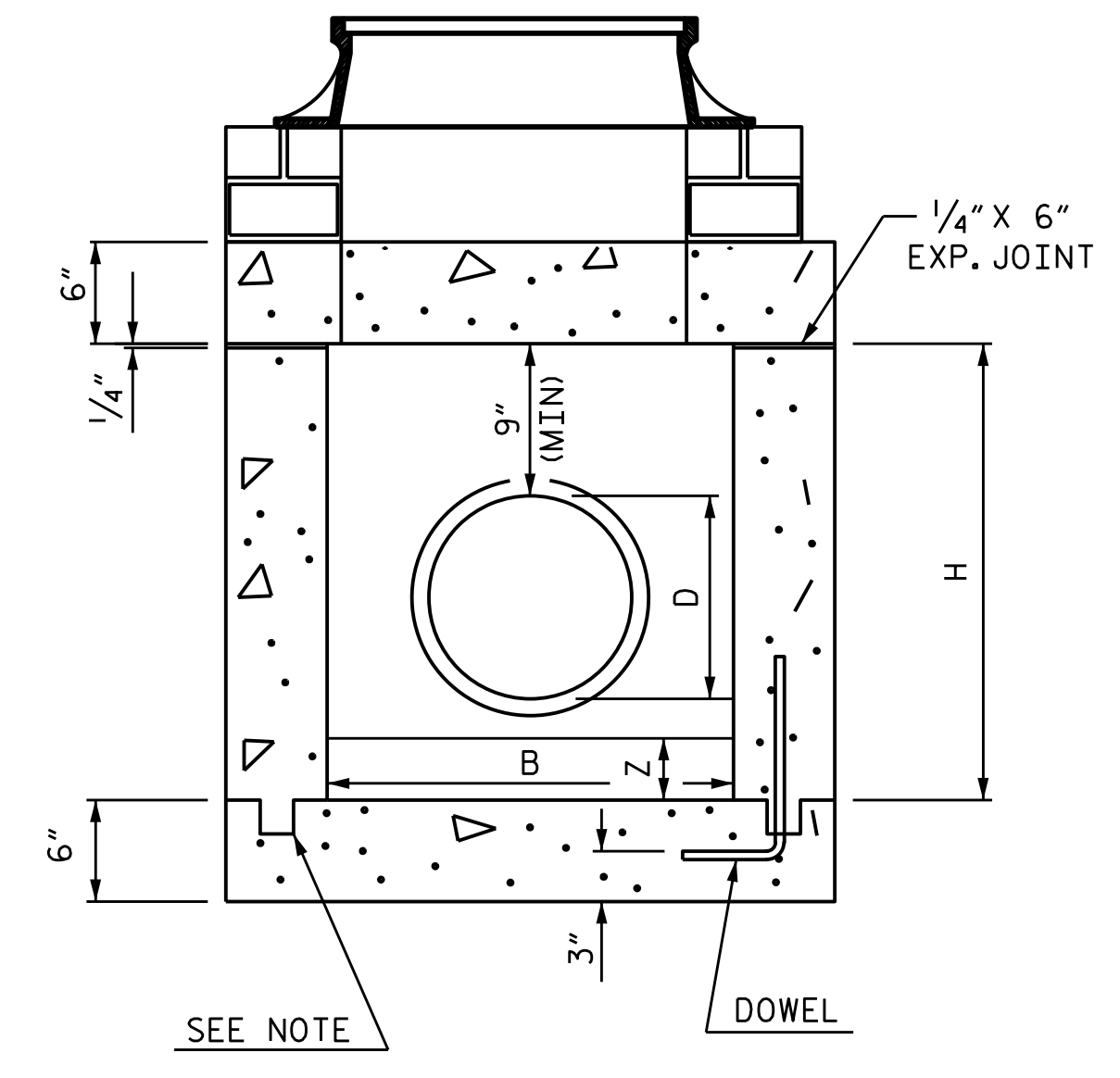
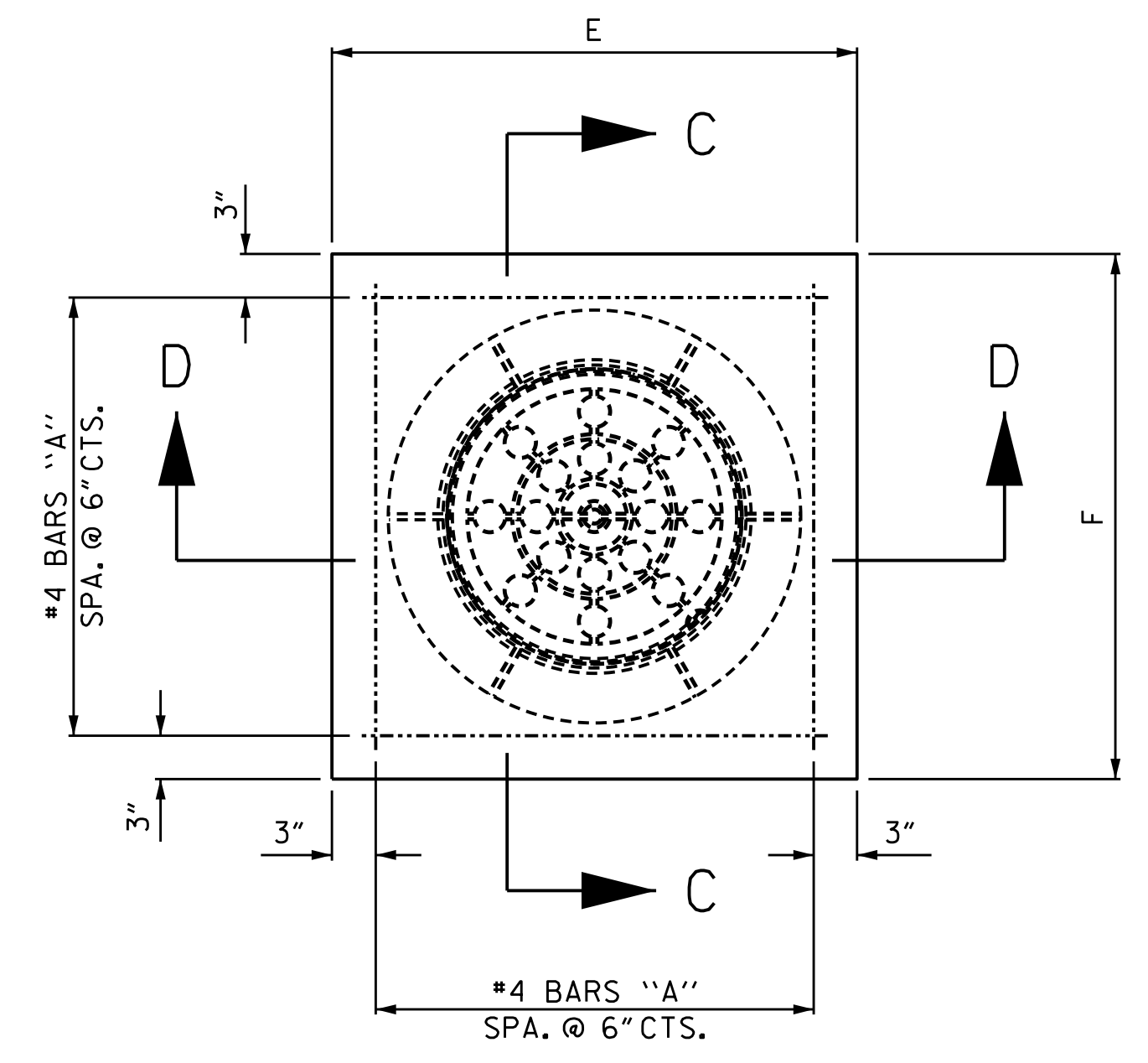
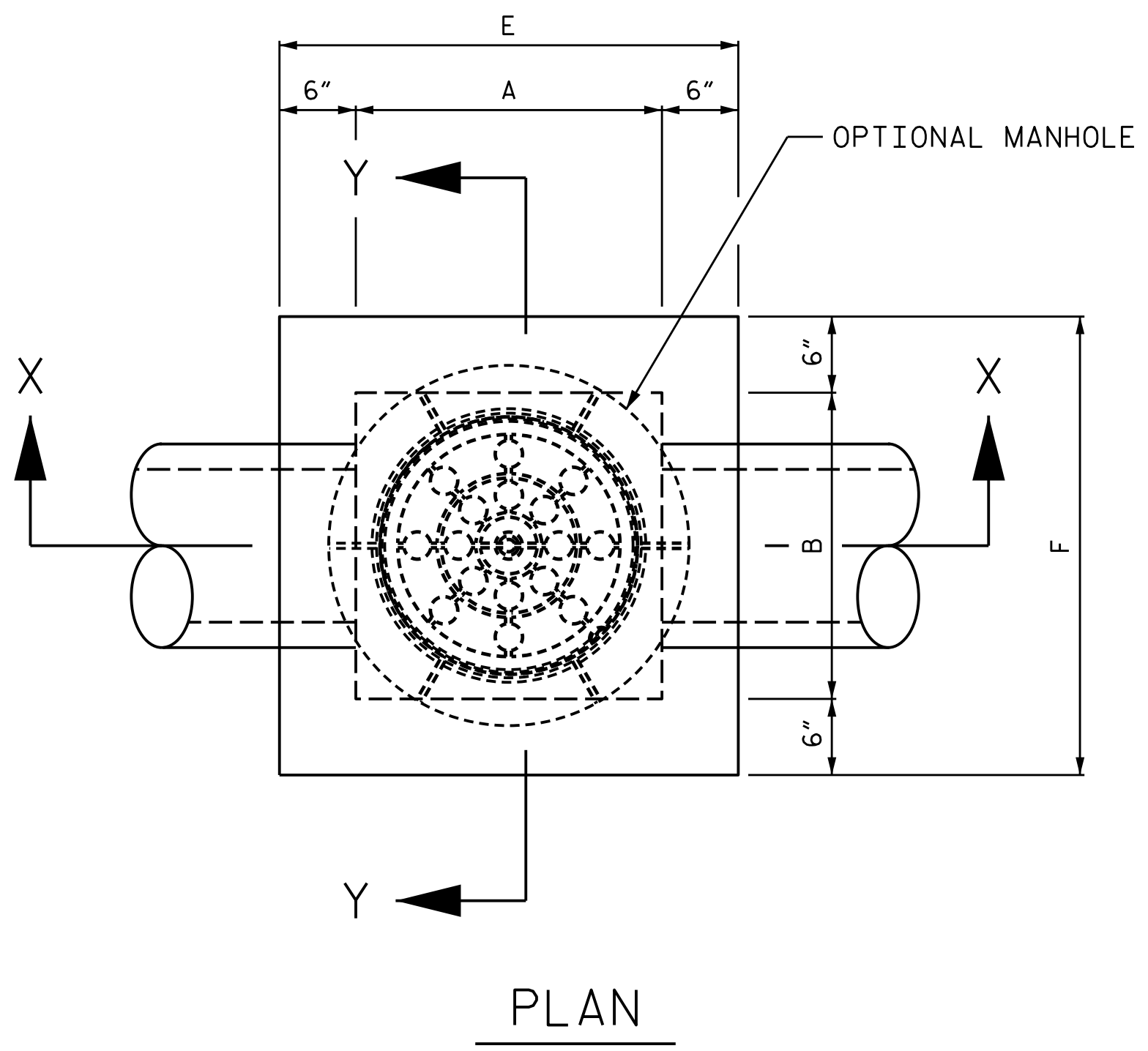
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**CONTRACT STANDARDS
AND DEVELOPMENT UNIT**
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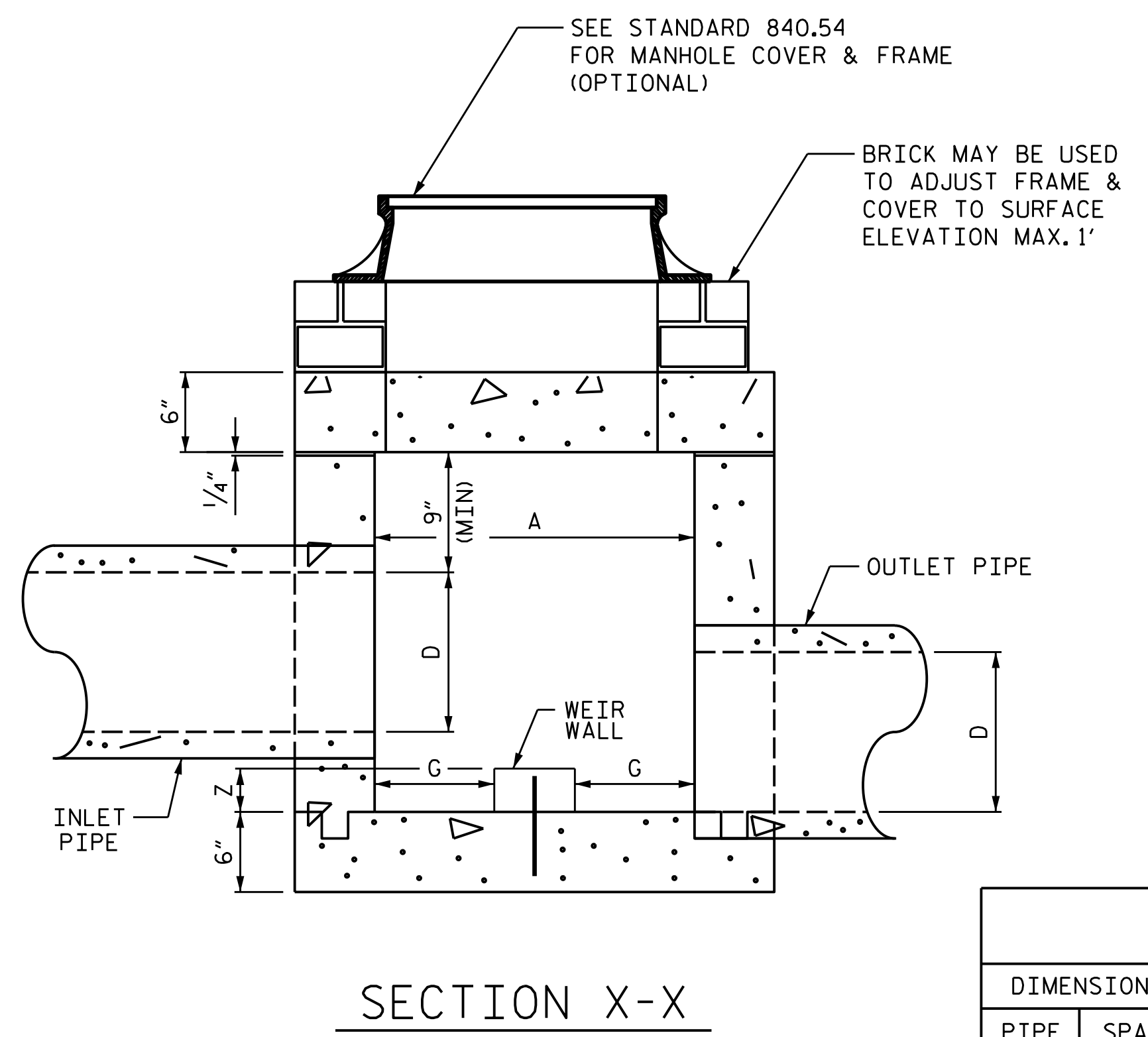
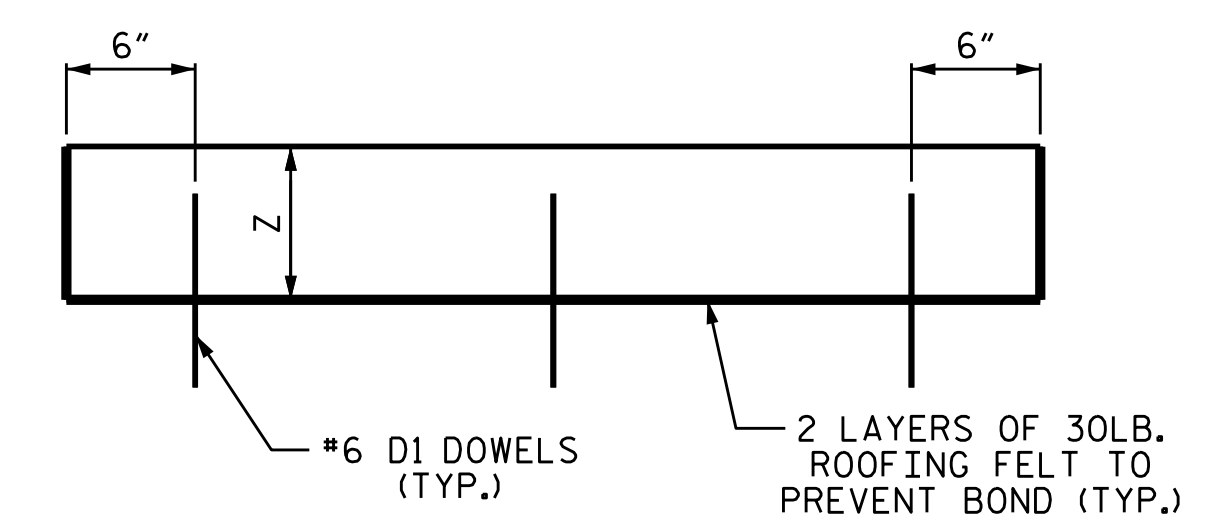
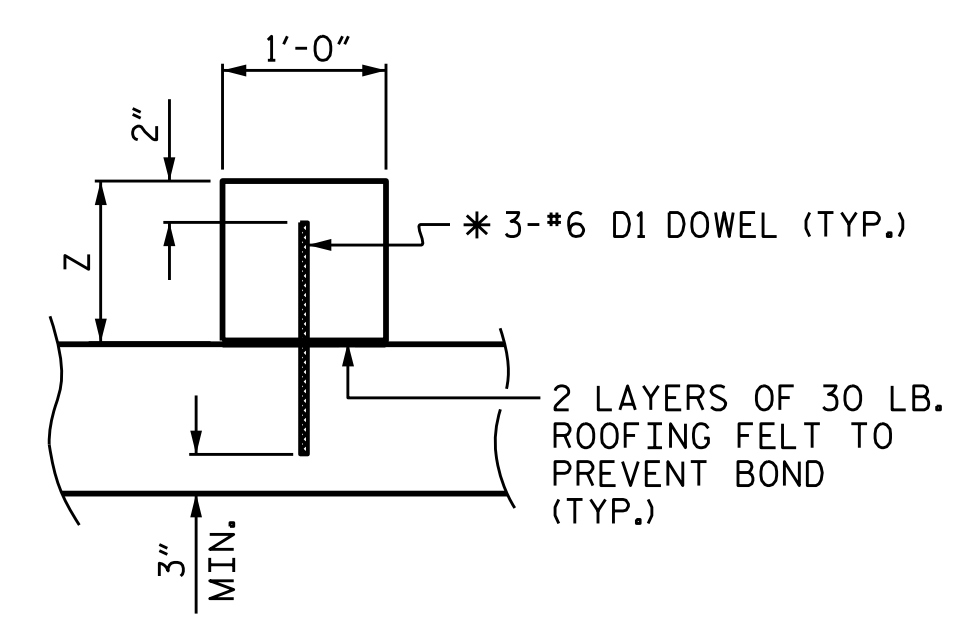
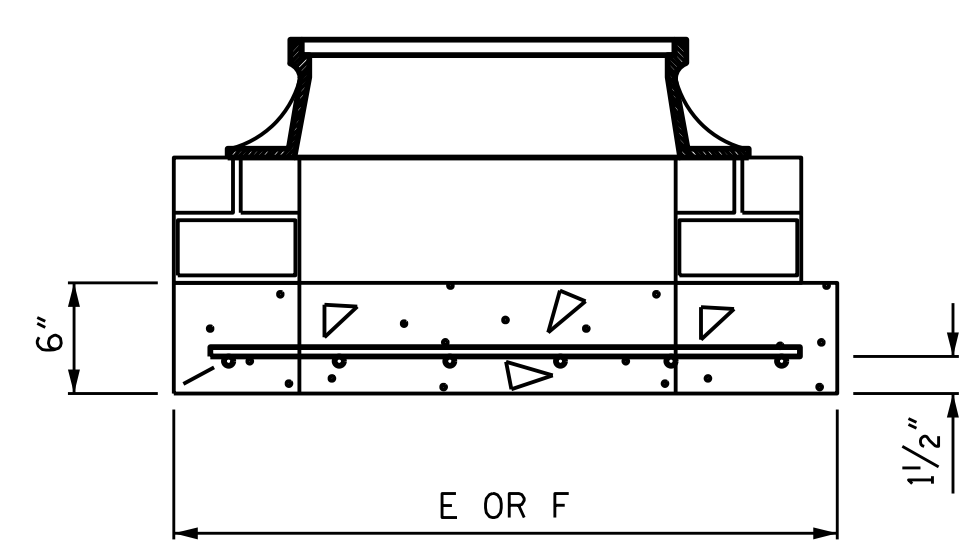
ORIGINAL BY: J. Howerton DATE: 1/22/14
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: jhowerton\minimum depth type A.dgn

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	2D-2
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED TGS ENGINEERS 706 HILLSBOROUGH STREET SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	



GENERAL NOTES:

- CHAMFER ALL EXPOSED CORNERS 1".
- USE CLASS "B" CONCRETE THROUGHOUT.
- OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
- USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
- IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD NO. 840.00.
- PROVIDE ALL JUNCTION BOXES OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTERS IN ACCORDANCE WITH STD. NO. 840.66.
- ADJUST THE STEEL, CONCRETE AND BRICK MASONRY QUANTITIES TO INCLUDE THE ADDITION OF THE MANHOLE (I.E. DIAGONAL BARS SHORTENED AROUND OPENING IN TOP SLAB, ADDITIONAL VARIABLE HEIGHT BRICK MASONRY, OPENING IN TOP SLAB.)



* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

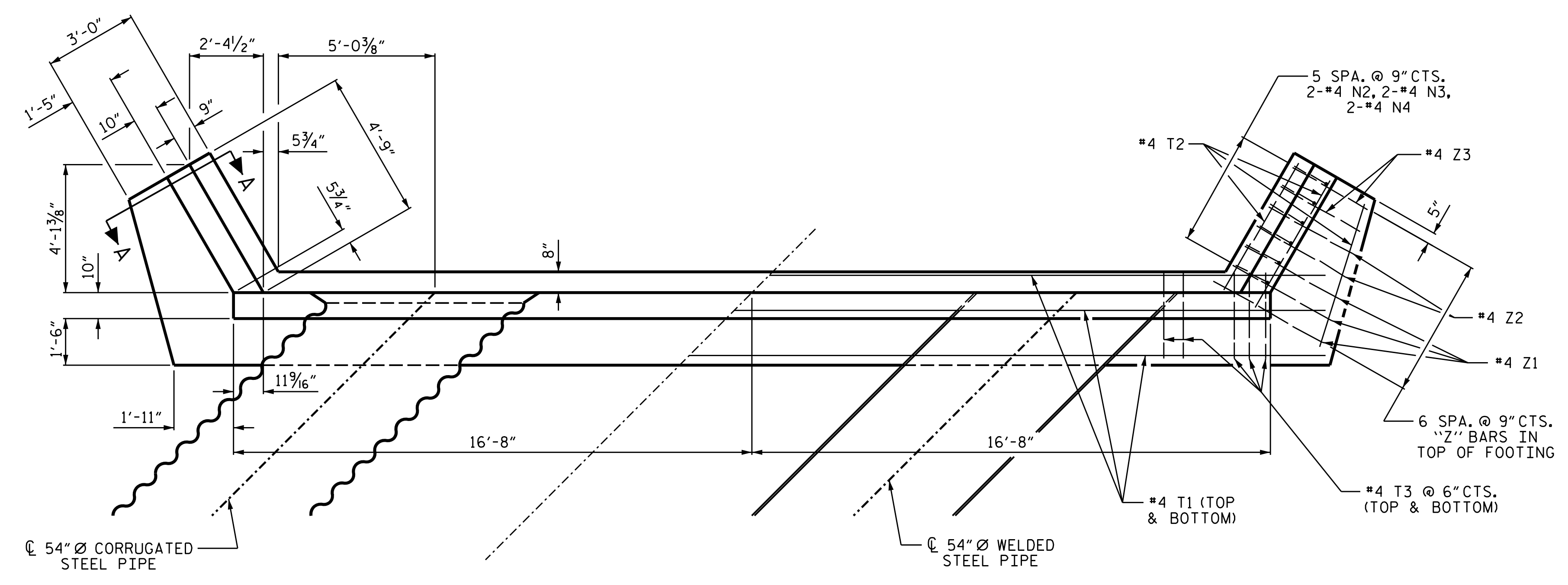
DIMENSIONS AND QUANTITIES FOR CONCRETE JUNCTION BOXES																		
DIMENSIONS OF BOX AND PIPE				WEIR WALL		REINFORCEMENT BARS "A"		TOP SLAB DIMENSIONS		CUBIC YARDS IN BOX				TOTAL QUANTITIES BOX AND SLABS		DEDUCTIONS FOR ONE PIPE (CU. YDS.)		
PIPE	SPAN	WIDTH	HEIGHT	G	Z	NO.	LENGTH	E	F	TOP SLAB	BOTTOM SLAB	WALL/ FT. OF HT.	WEIR WALL	LBS. REINF.	CU. YDS. (MIN. "H")	C.S.	R.C.	
36"	4'-0"	4'-0"	10'-2"	1'-6"	1'-0"	20	4'-9"	5'-0"	5'-0"	0.463	0.463	0.333	0.148	68	4.460	0.132	0.178	
48"	5'-4"	5'-4"	8'-0"	2'-2"	1'-0"	26	6'-1"	6'-4"	6'-4"	0.743	0.743	0.432	0.198	111	5.140	0.235	0.317	
54"	5'-10"	5'-10"	6'-9"	2'-5"	6"	28	6'-7"	6'-10"	6'-10"	0.865	0.865	0.469	0.108	126	5.004	0.297	0.401	
60"	6'-6"	6'-6"	8'-7"	2'-9"	1'-0"	30	7'-3"	7'-6"	7'-6"	1.042	1.042	0.519	0.241	150	6.780	0.367	0.495	

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
CONCRETE JUNCTION BOX
 (WITH OPTIONAL MANHOLE)

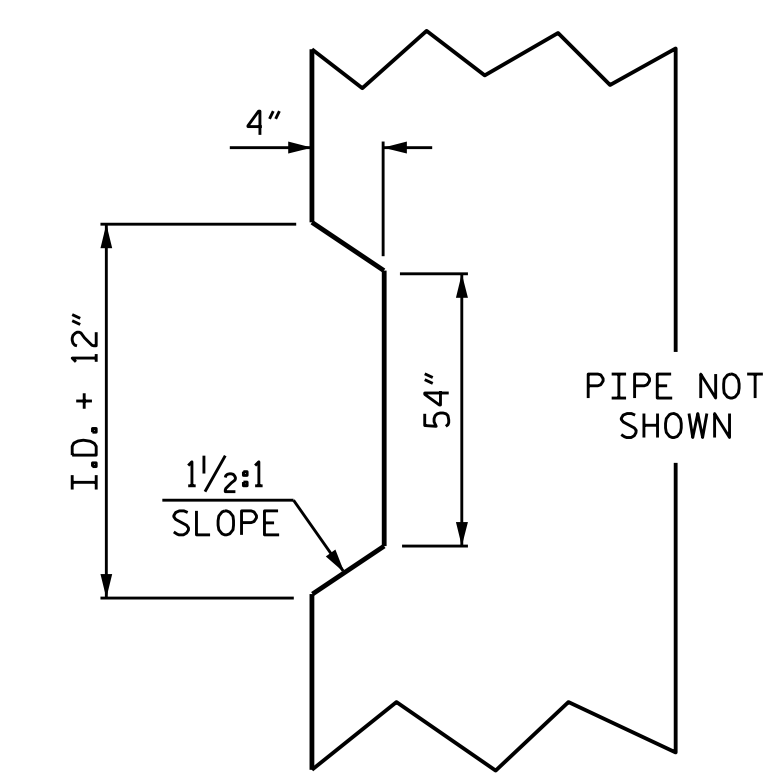


DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

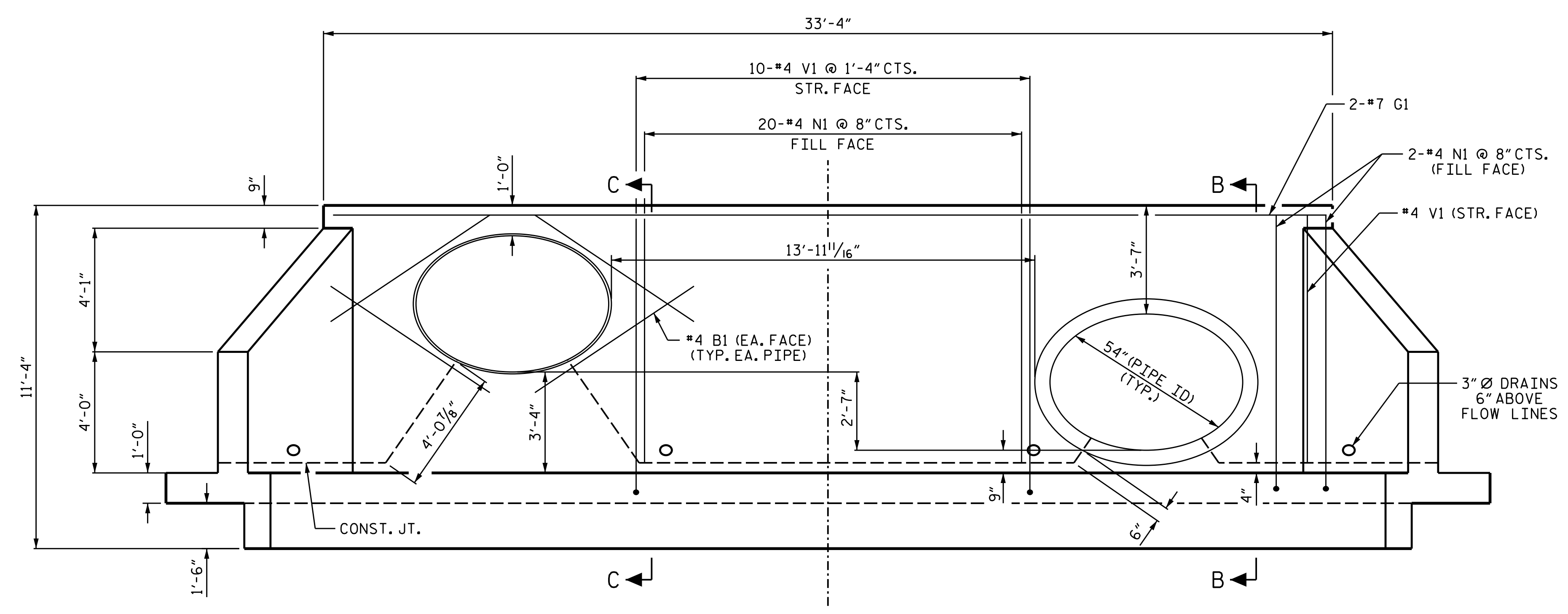
TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275



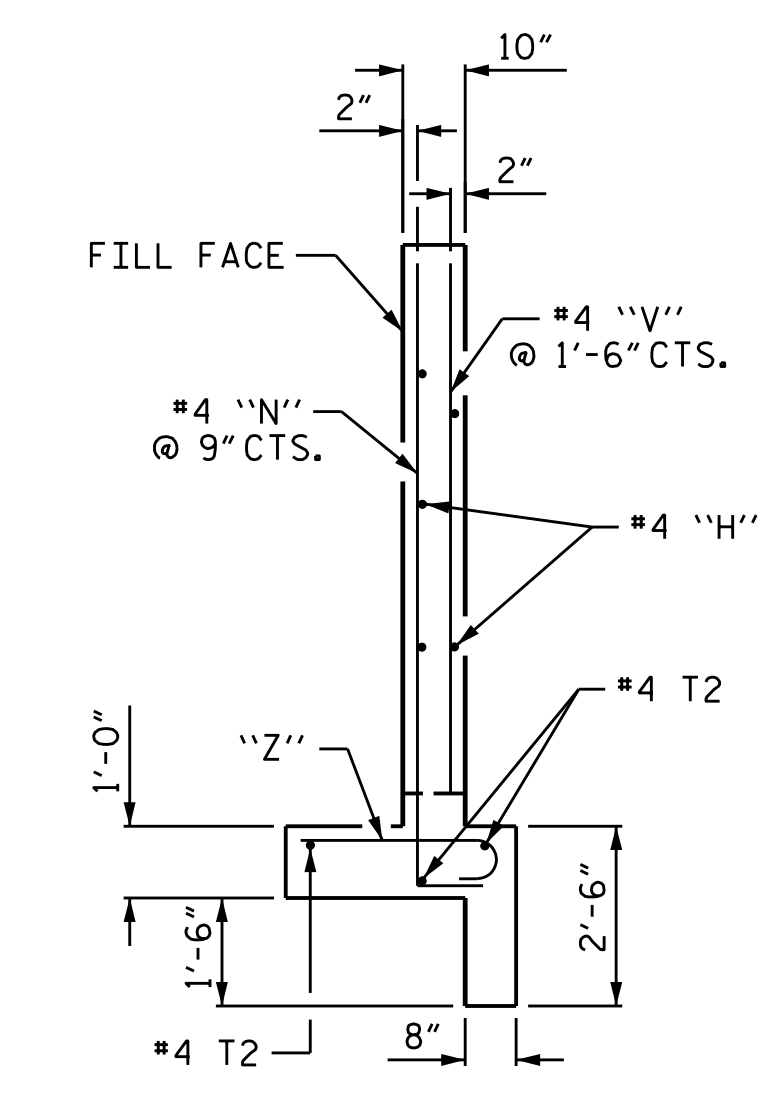
PLAN



TAPER DETAIL
FOR 54" Ø CSP



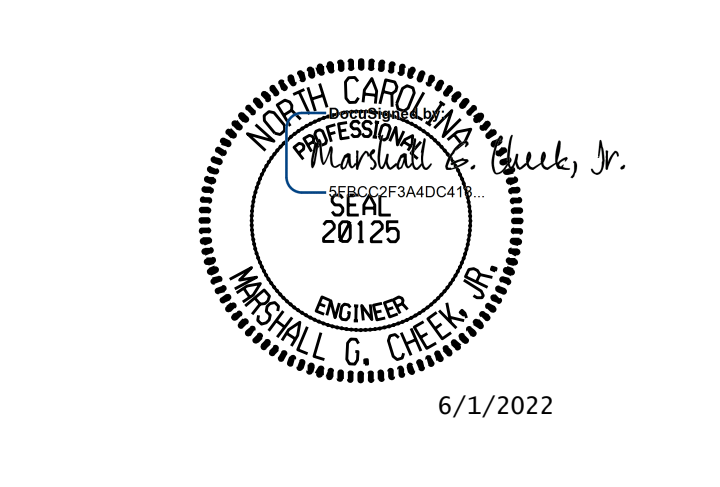
ELEVATION



SECTION A-A
SEE STD. # 838.45 FOR GENERAL NOTES.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**CONCRETE
HEADWALL**



DOCUMENT NOT CONSIDERED FINAL
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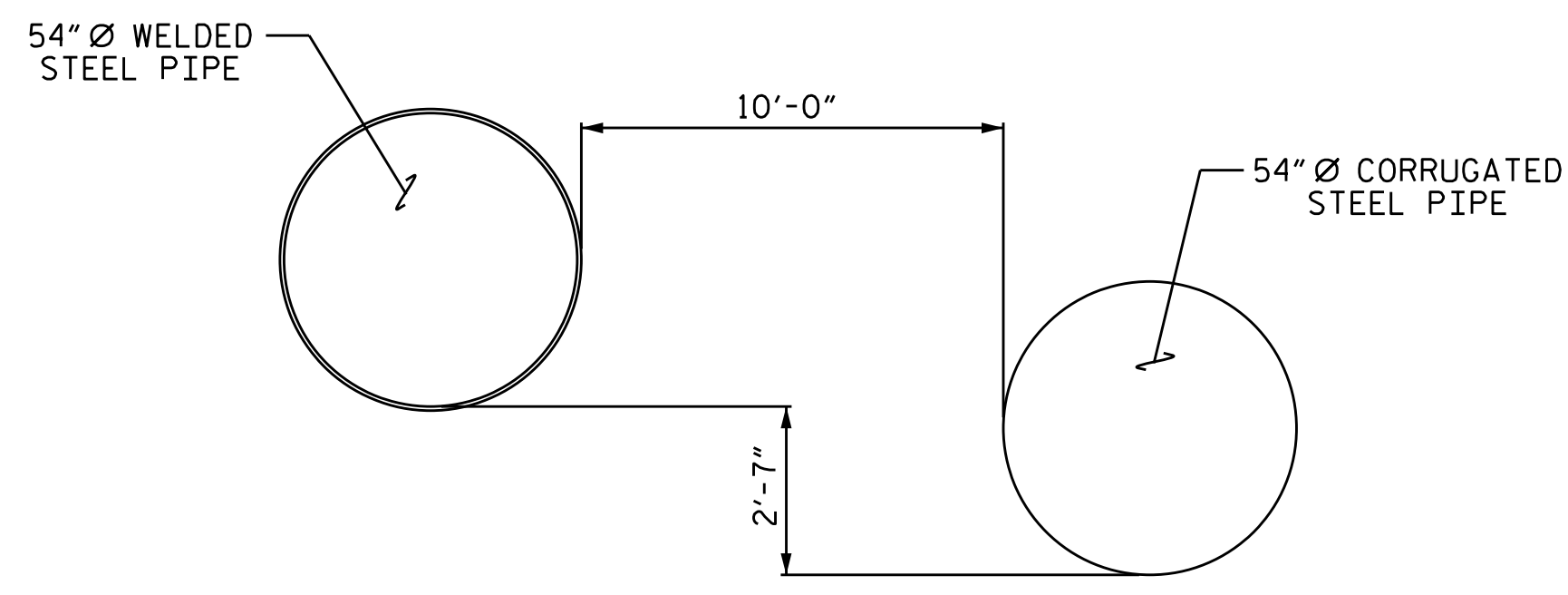
TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

BILL OF MATERIAL FOR ONE HEADWALL

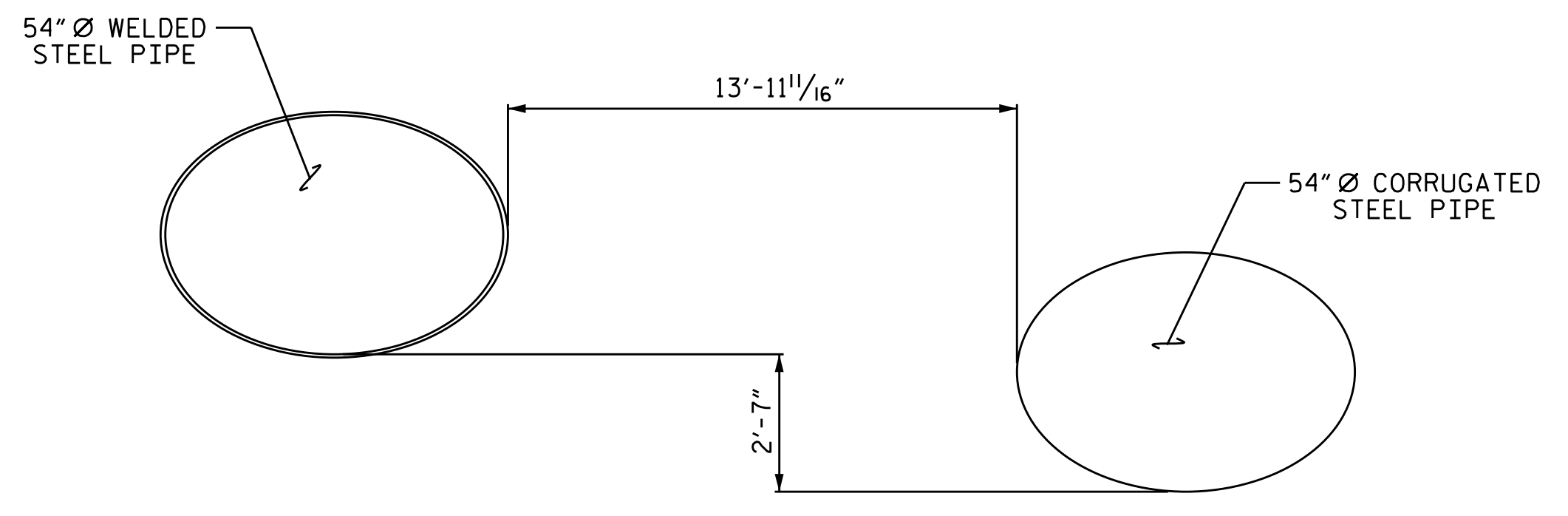
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#4	STR	6'-4"	68
G1	2	#7	STR	33'-0"	135
H1	14	#4	1	5'-6"	51
H2	4	#4	1	3'-6"	9
N1	24	#4	2	10'-1"	162
N2	4	#4	2	8'-8"	23
N3	4	#4	2	7'-4"	20
N4	4	#4	2	6'-1"	16
T1	6	#4	STR	36'-10"	148
T2	6	#4	STR	5'-0"	20
T3	132	#4	STR	2'-6"	220
V1	12	#4	STR	8'-0"	64
V2	2	#4	STR	6'-11"	9
V3	2	#4	STR	5'-6"	7
V4	2	#4	STR	4'-1"	5
Z1	6	#4	3	3'-11"	16
Z2	4	#4	3	3'-6"	9
Z3	4	#4	3	3'-1"	8

REINFORCING STEEL FOR ONE HEADWALL 990 LBS

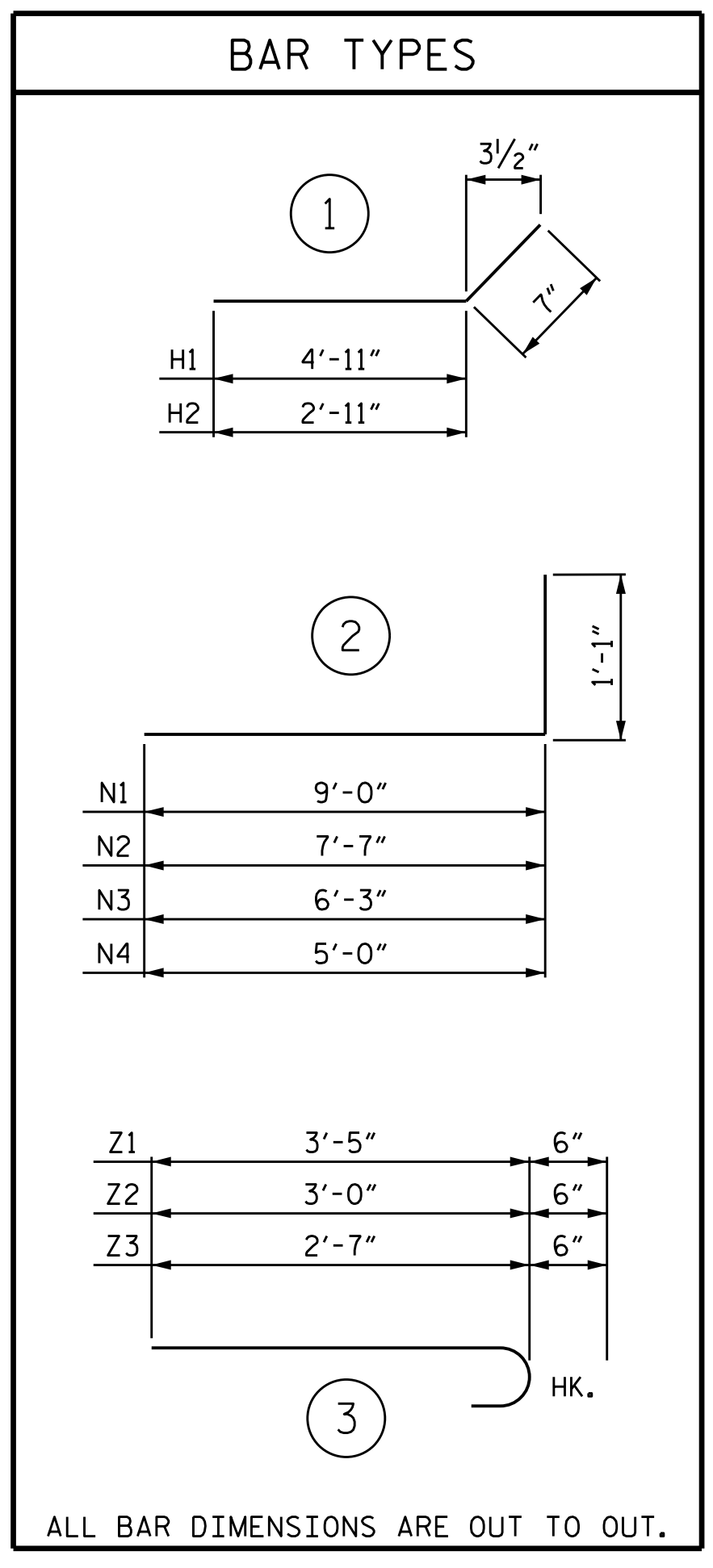
CLASS A CONCRETE FOR ONE HEADWALL 18.2 CY



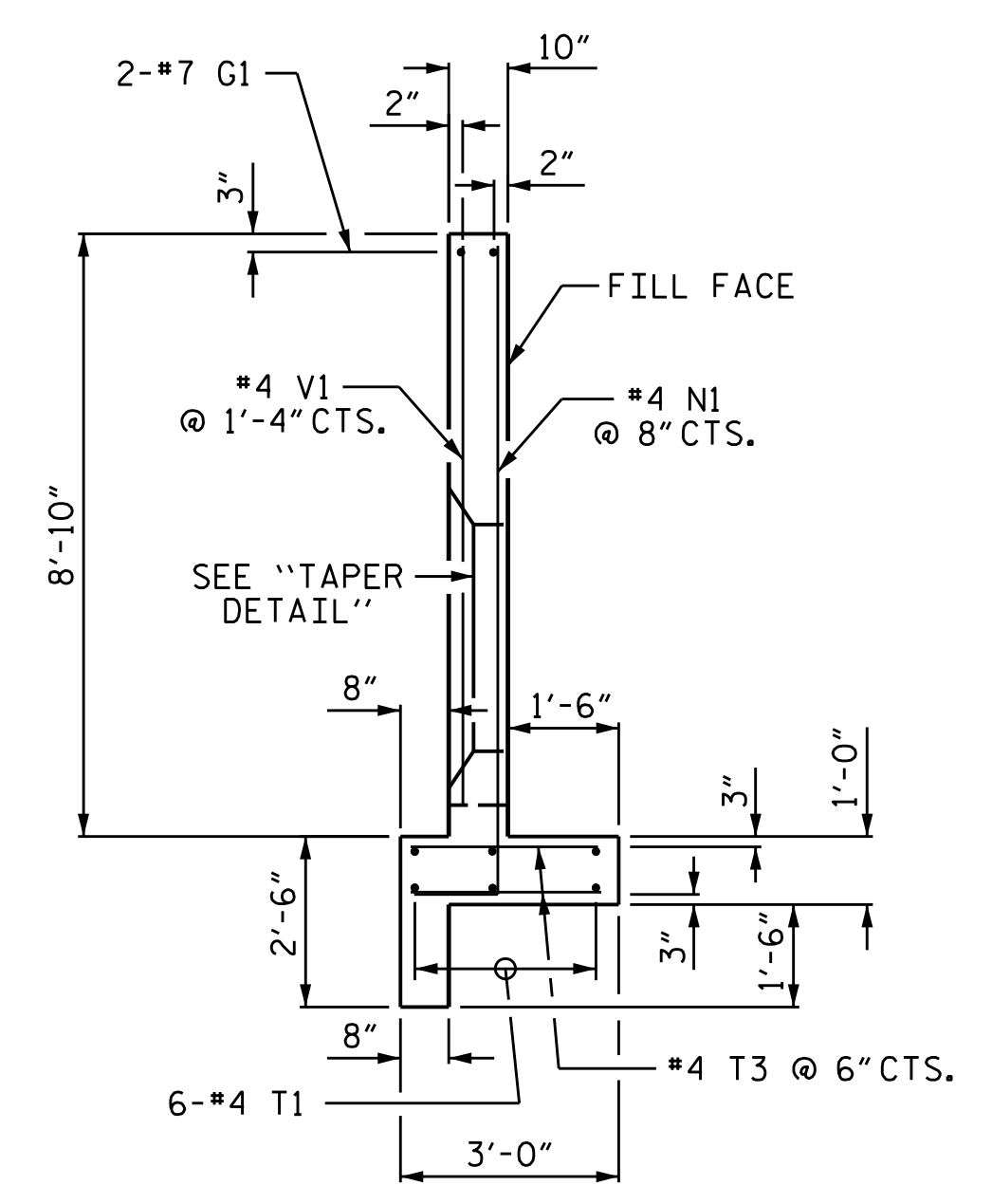
LOOKING DOWNSTREAM
NORMAL TO PIPES



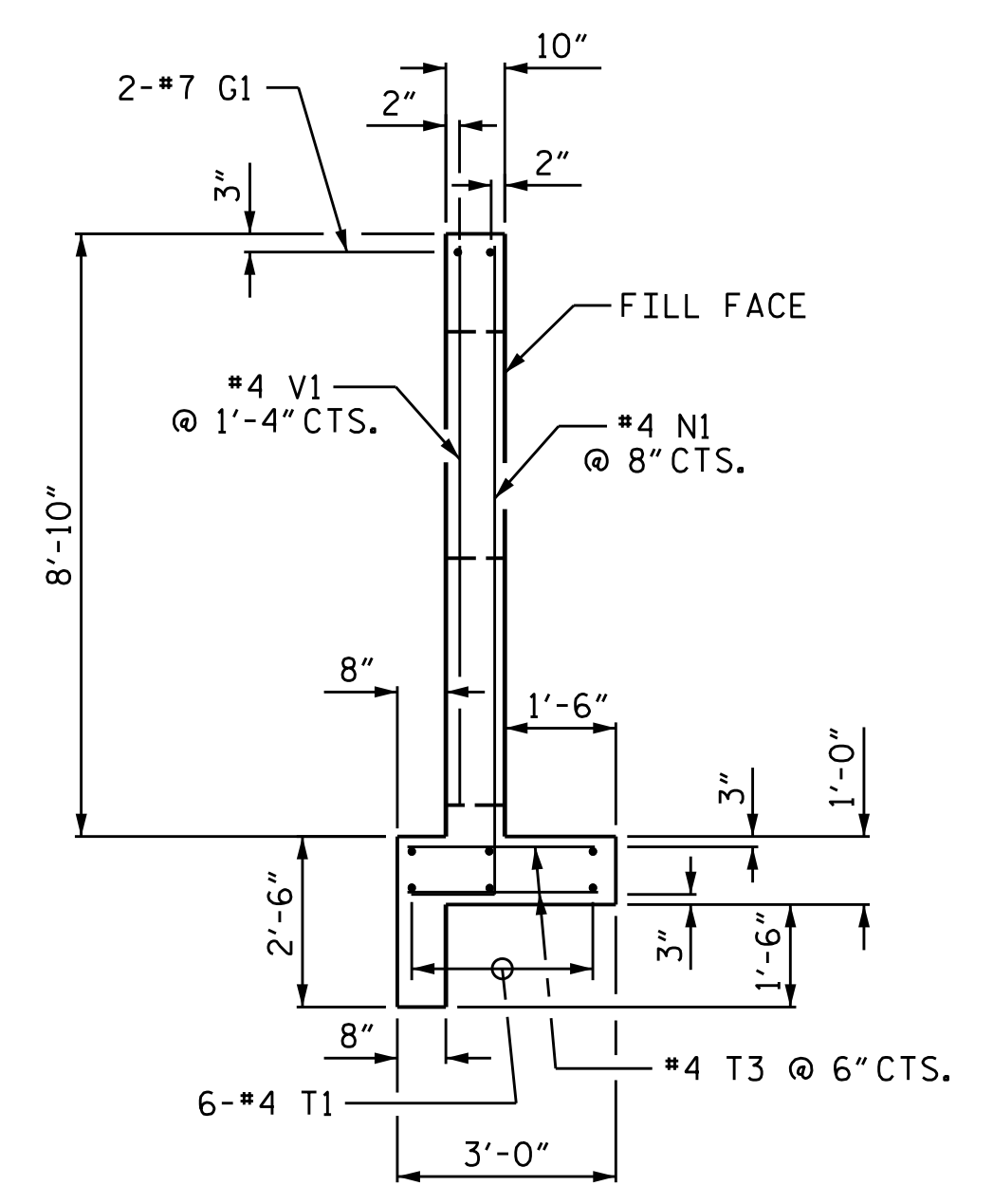
LOOKING DOWNSTREAM
NORMAL TO HEADWALL



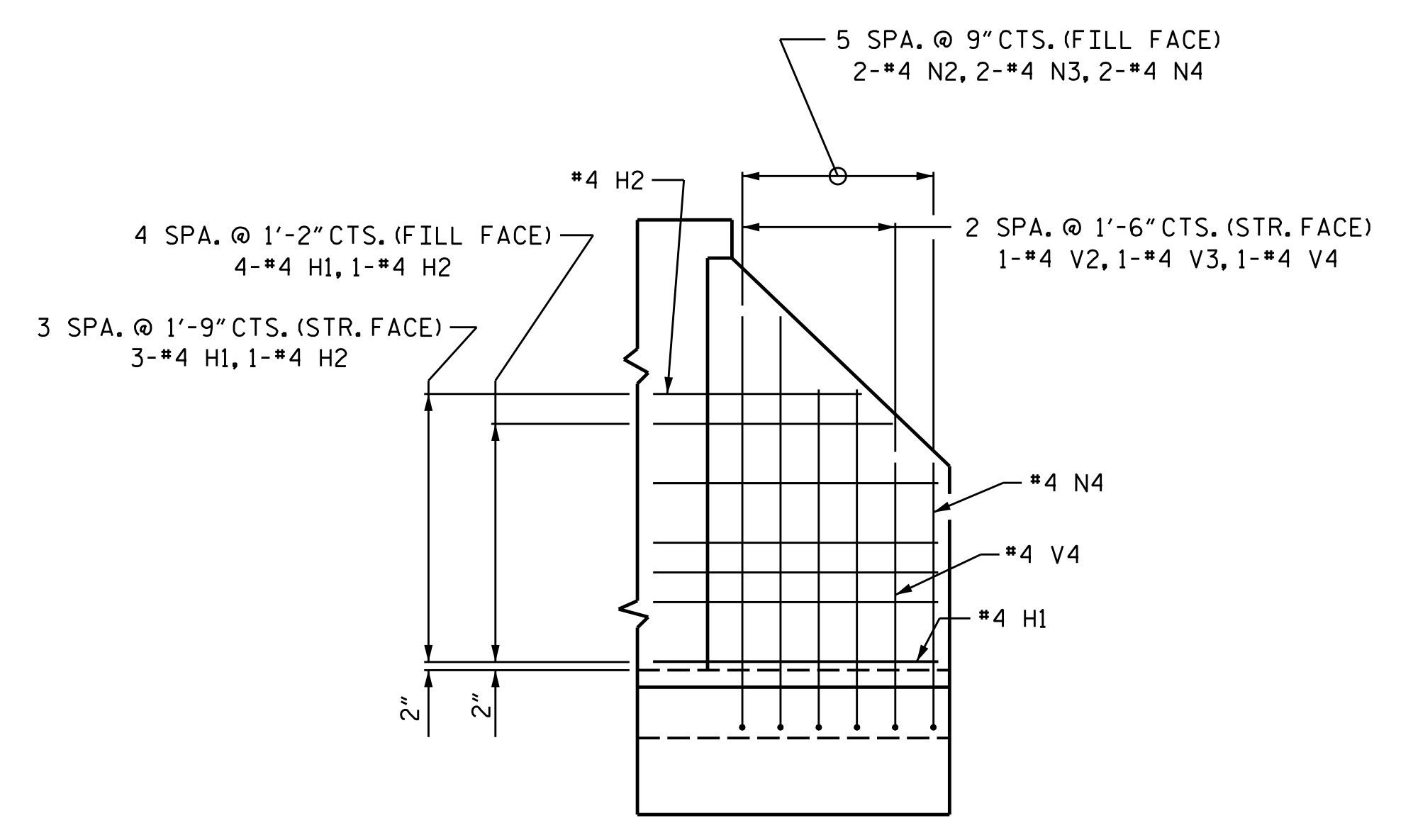
ALL BAR DIMENSIONS ARE OUT TO OUT.



SECTION B-B
FOR 54" Ø CSP



SECTION C-C
FOR 54" Ø WSP



WING ELEVATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE HEADWALL

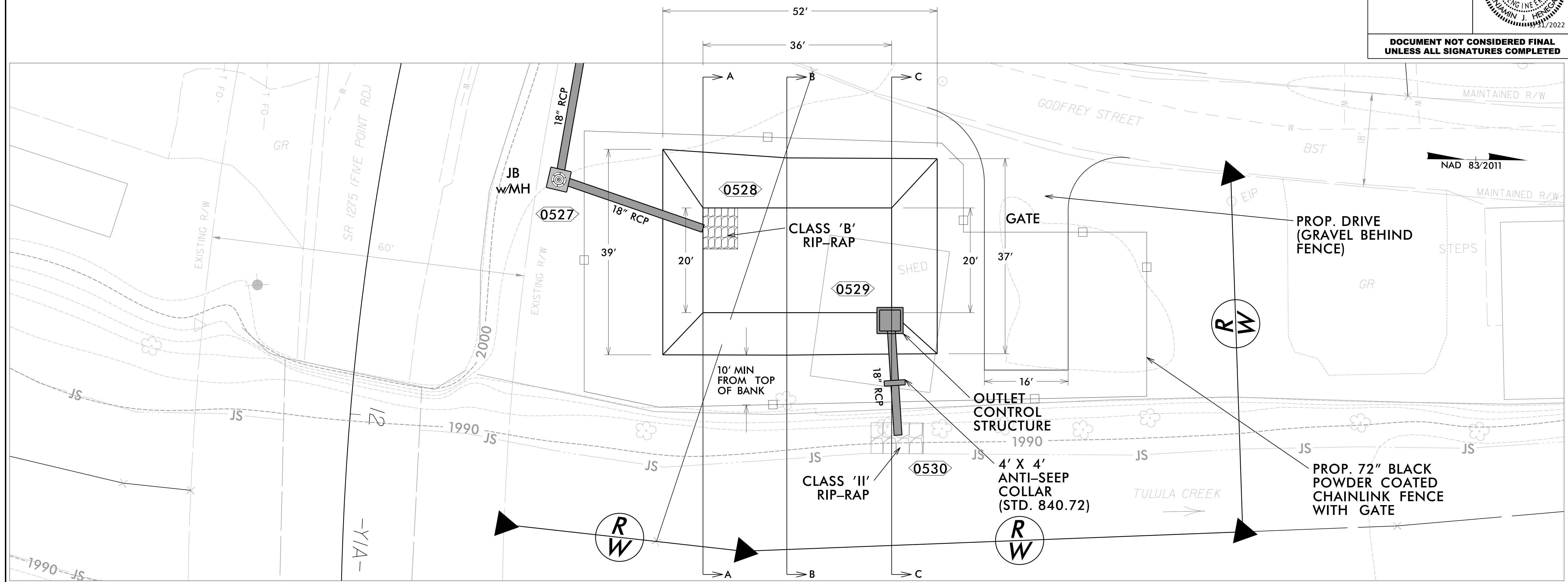
8/17/99

DRY DETENTION BASIN#1

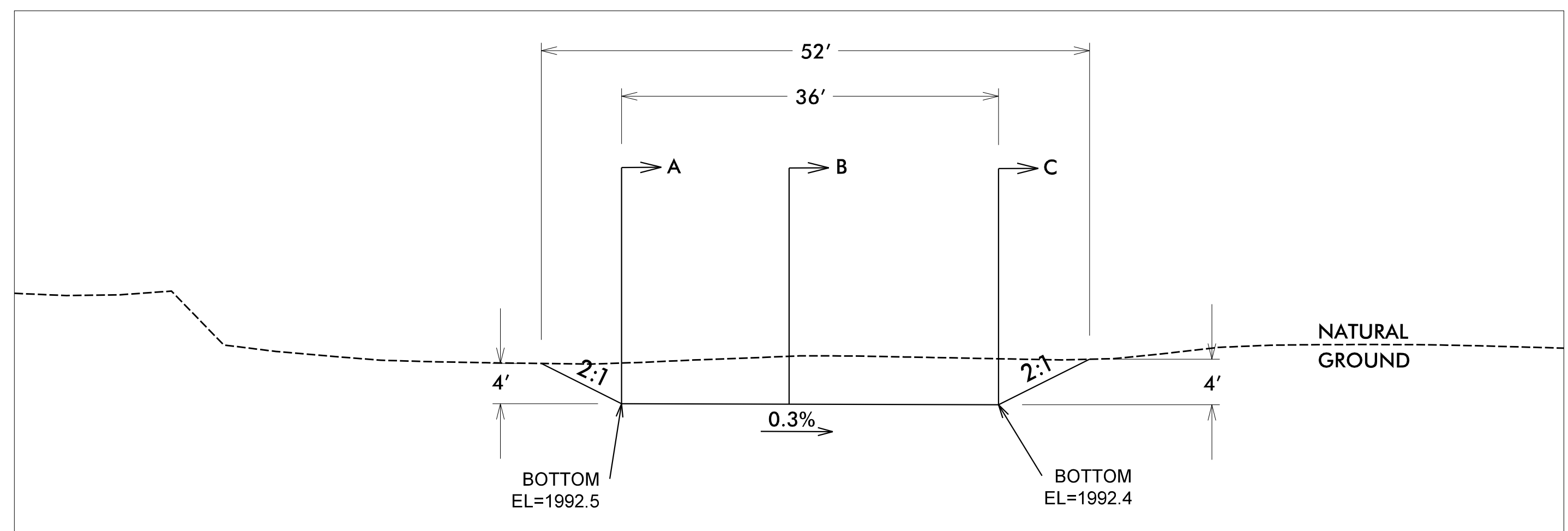
SHEET 1 OF 4

1" = 10'

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2D-5
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



PLAN VIEW



PROFILE VIEW

3/28/2022
X:\Projects\A-0009\Hydraulics\Dry Detention Basin\A-0009CA_DDB1_PSH.dgn
User:henegar

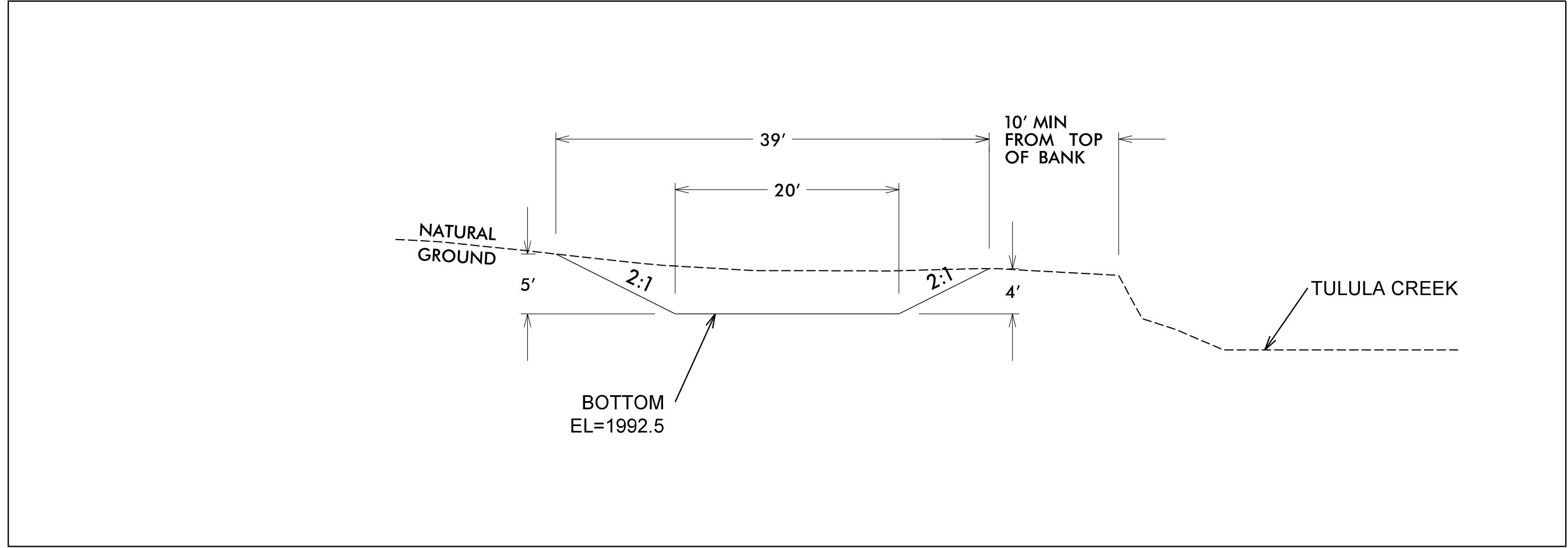
8/17/99

DRY DETENTION BASIN#1

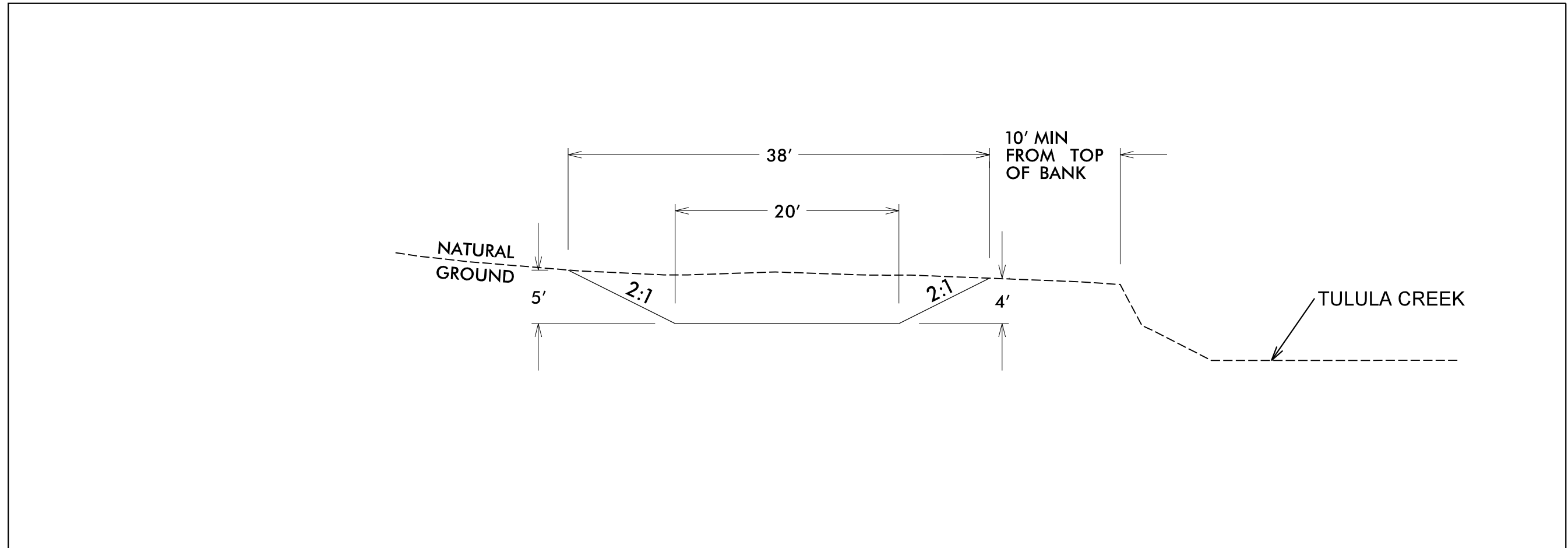
SHEET 2 OF 4

1" = 10'

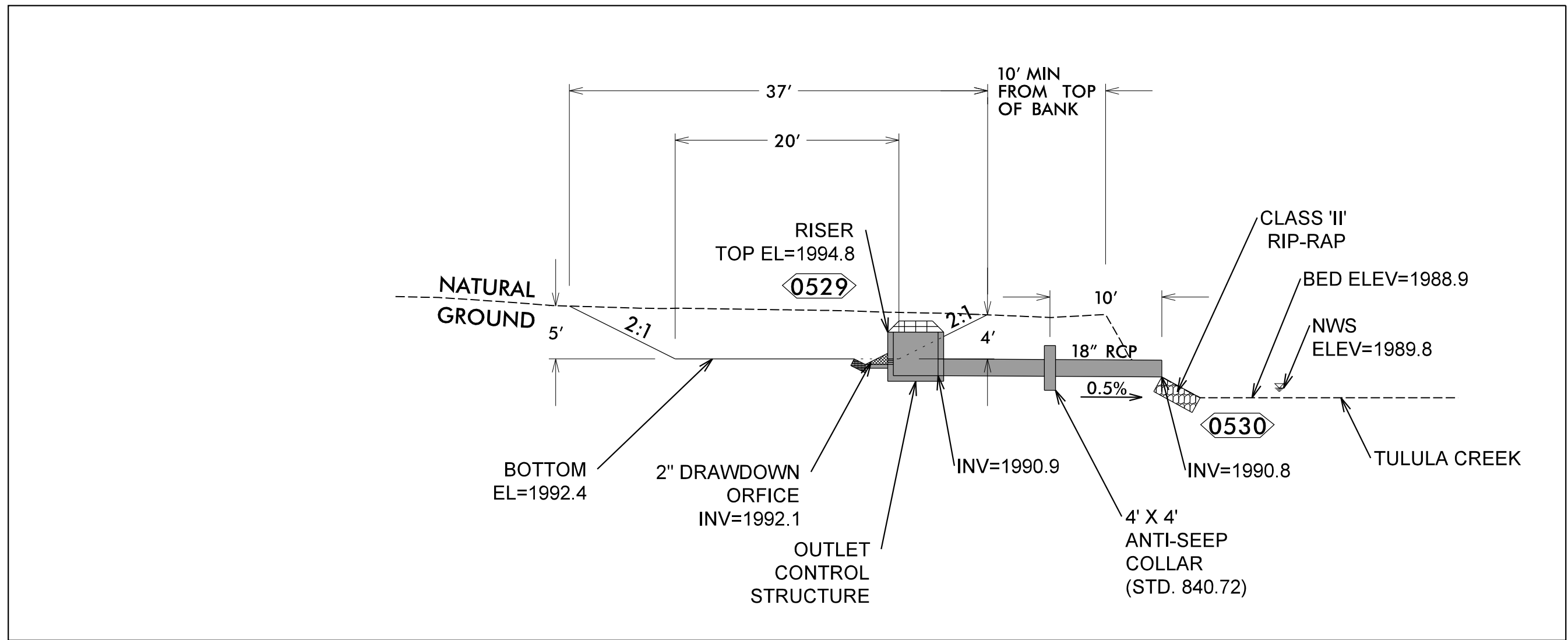
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RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



SECTION A-A



SECTION B-B



SECTION C-C


CROSS SECTIONS

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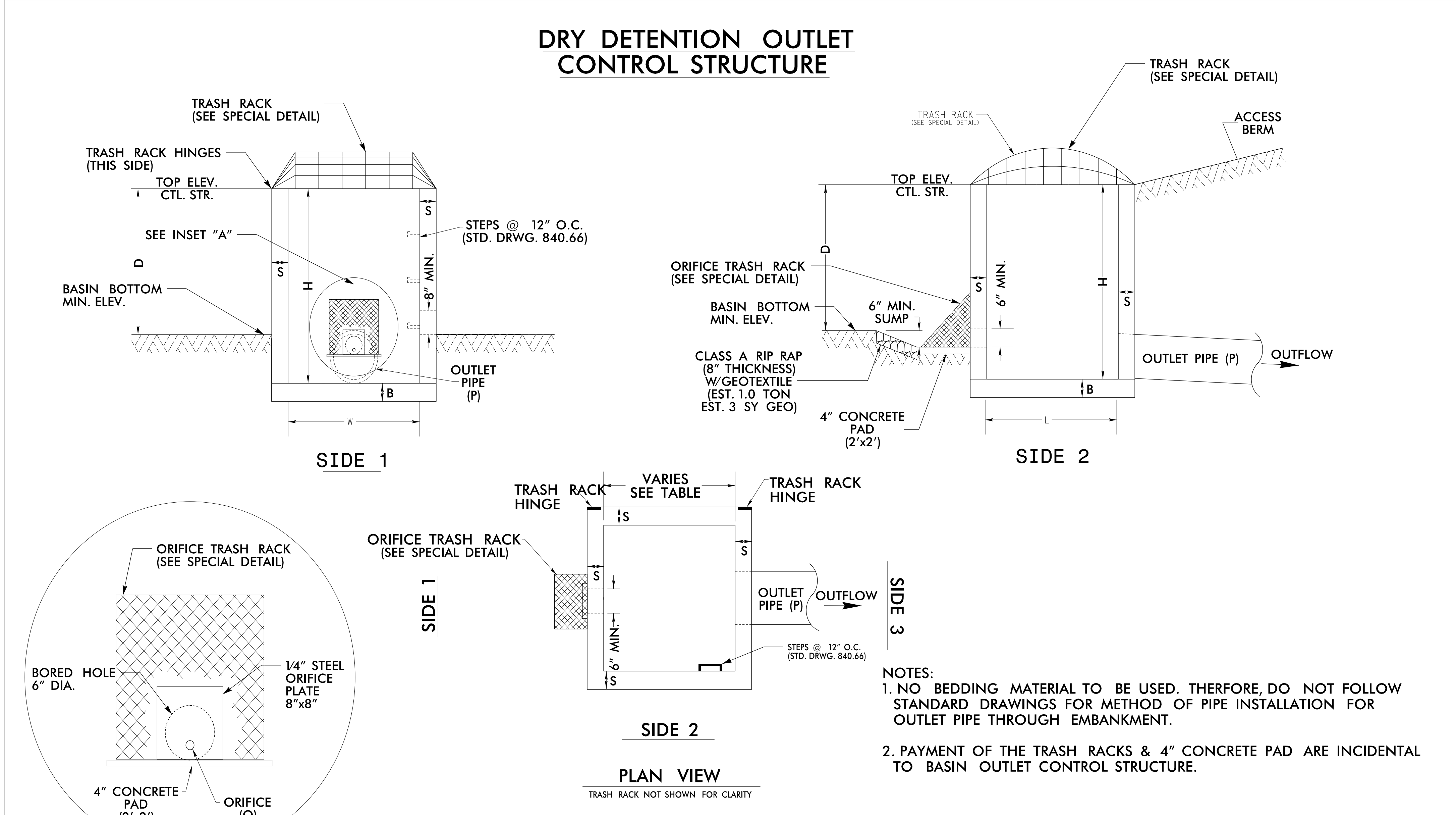
8/17/99

DRY DETENTION BASIN#1

SHEET 3 OF 4

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2D-7
RW SHEET NO.	
HYDRAULICS ENGINEER	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

DRY DETENTION OUTLET CONTROL STRUCTURE



- NOTES:**
1. NO BEDDING MATERIAL TO BE USED. THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
 2. PAYMENT OF THE TRASH RACKS & 4" CONCRETE PAD ARE INCIDENTAL TO BASIN OUTLET CONTROL STRUCTURE.

MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE												
STATION	STRUCTURE NUMBER	S (INCHES)	B (INCHES)	TOP ELEVATION CONTROL STRUCTURE	CTL. STR. DIMENSIONS			ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE INV.	OUTLET PIPE DIAMETER(P) INCHES	OUTLET PIPE MATERIAL
					W	L	H					
-Y1A- 11+ 68 LT	0529	6"	6"	1994.8'	4.0'	4.0'	3.9'	2"	1992.1'	1990.9'	18"	RCP*

*USE CLASS 'III' RCP WITH SEALED JOINTS

NOT TO SCALE

5/27/2022
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 User: bhenegar

DRY DETENTION BASIN#1

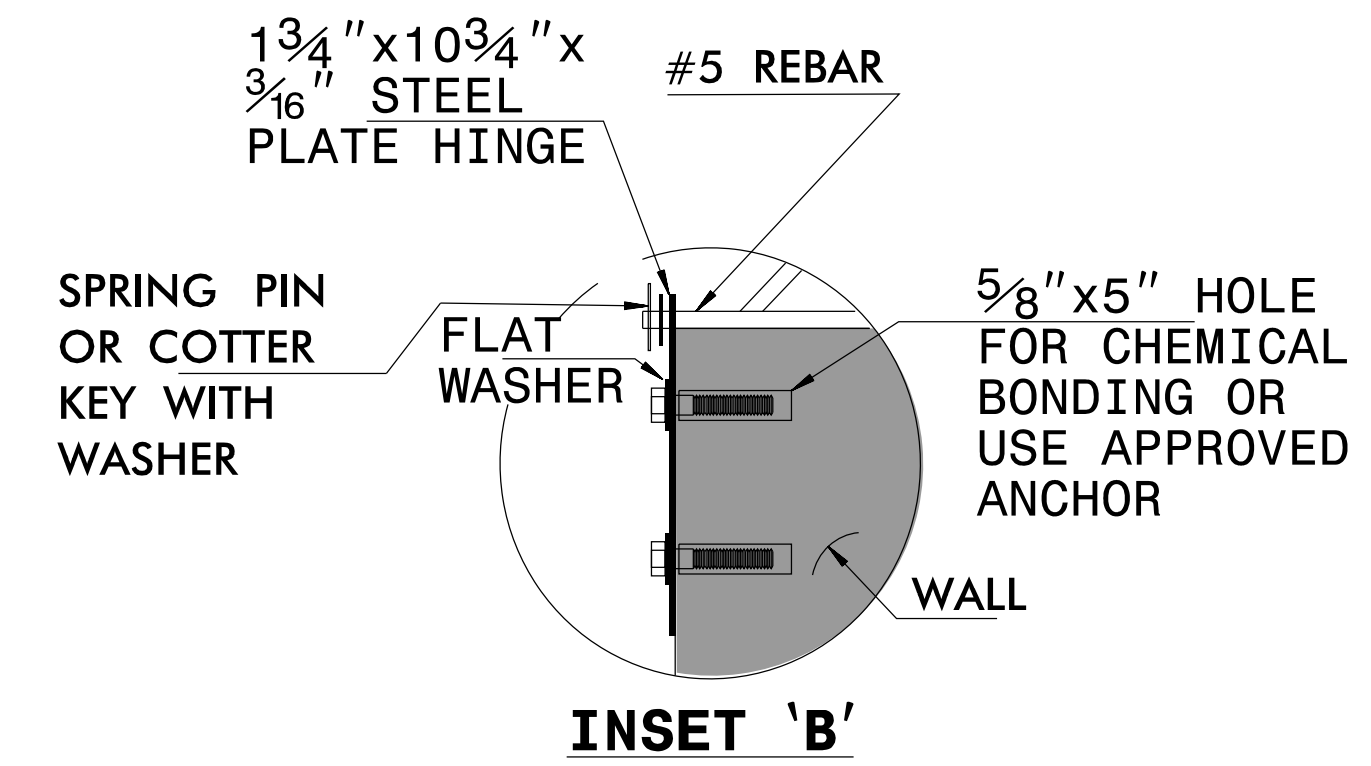
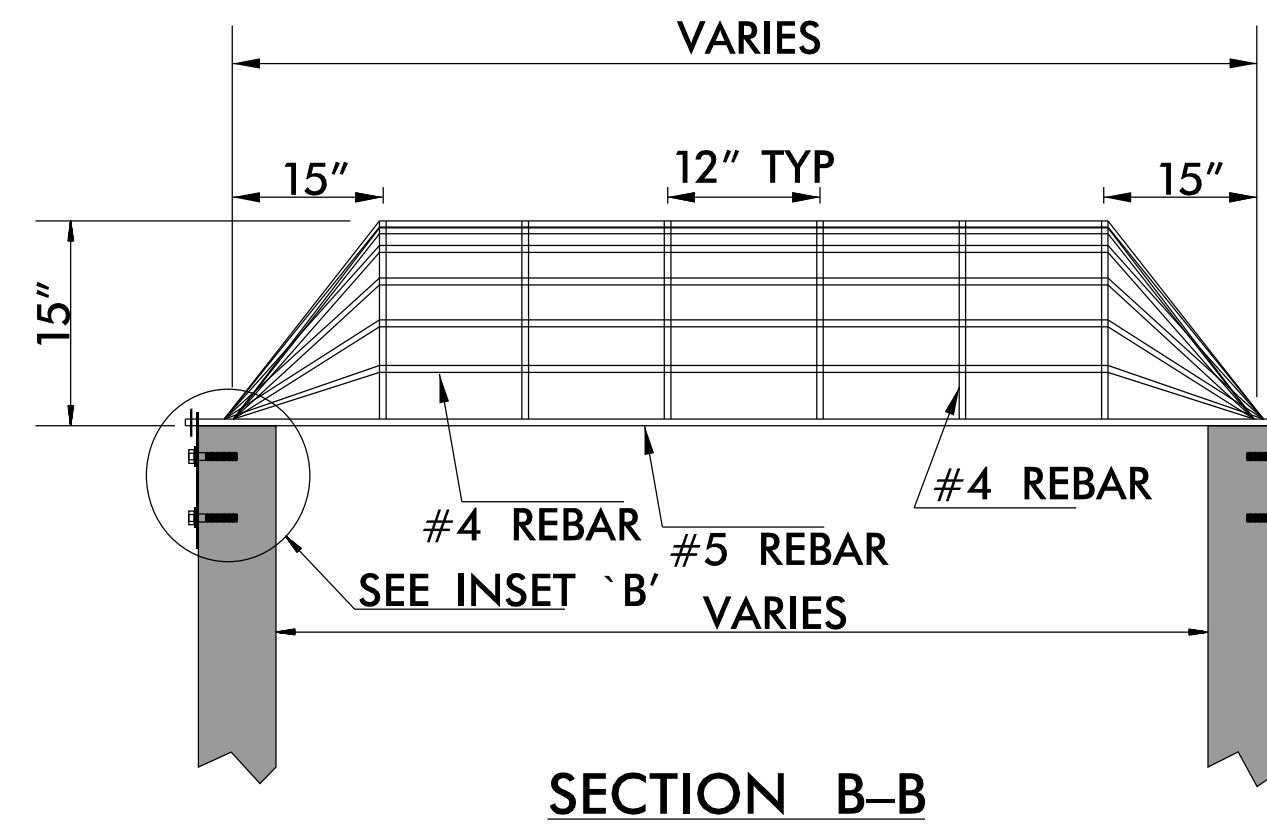
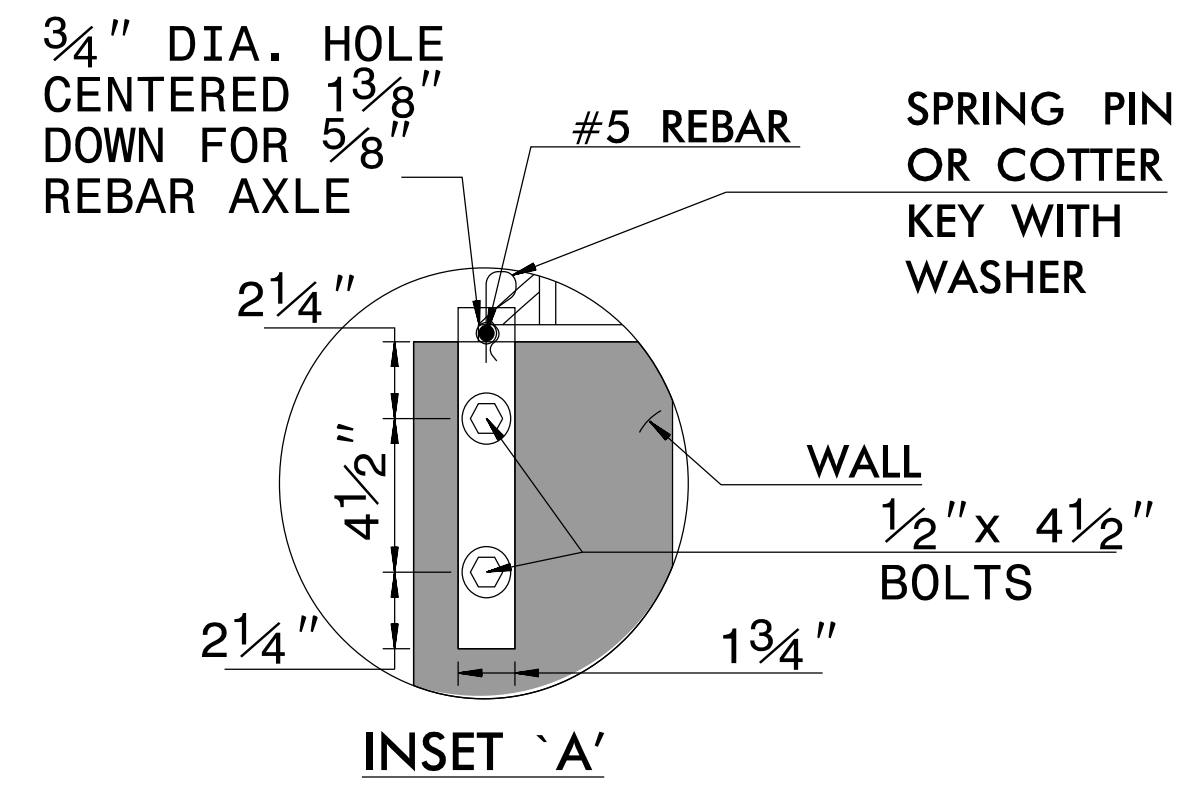
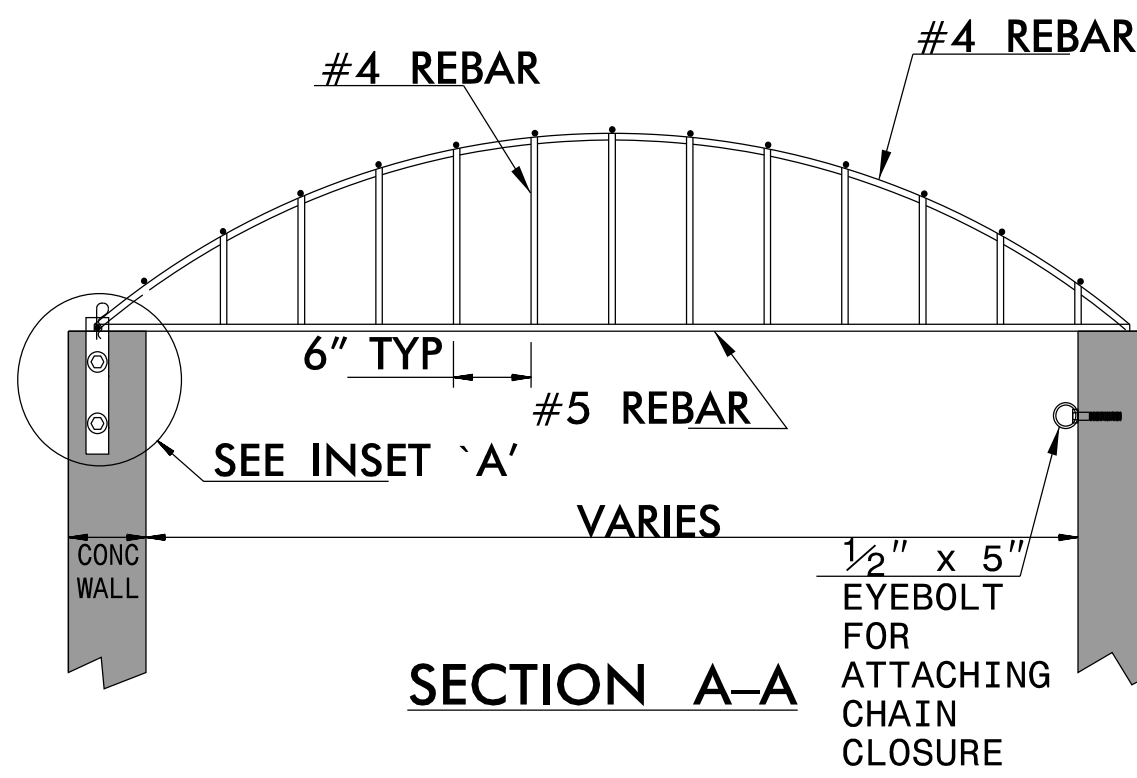
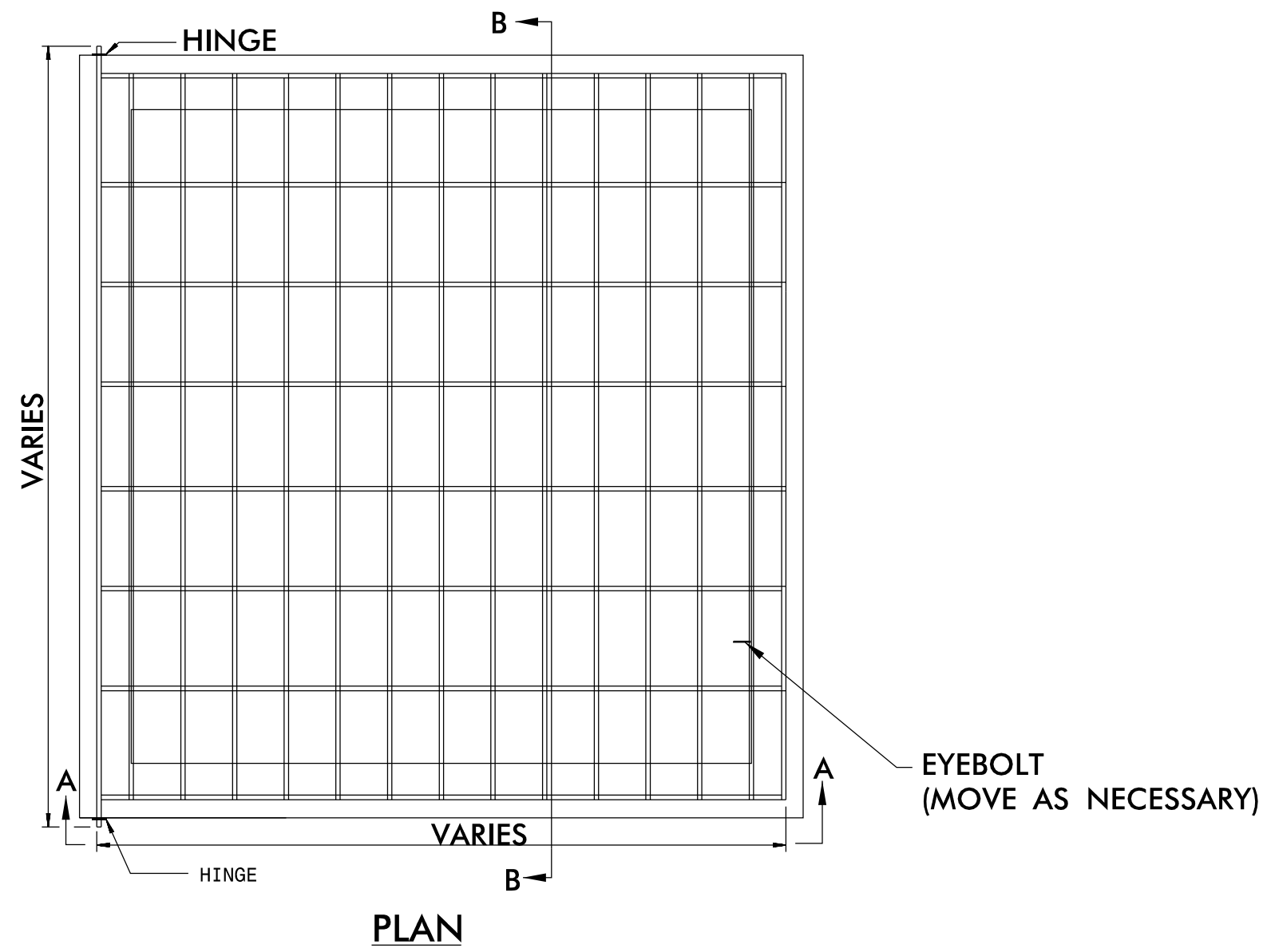
SHEET 4 OF 4

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2D-8
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

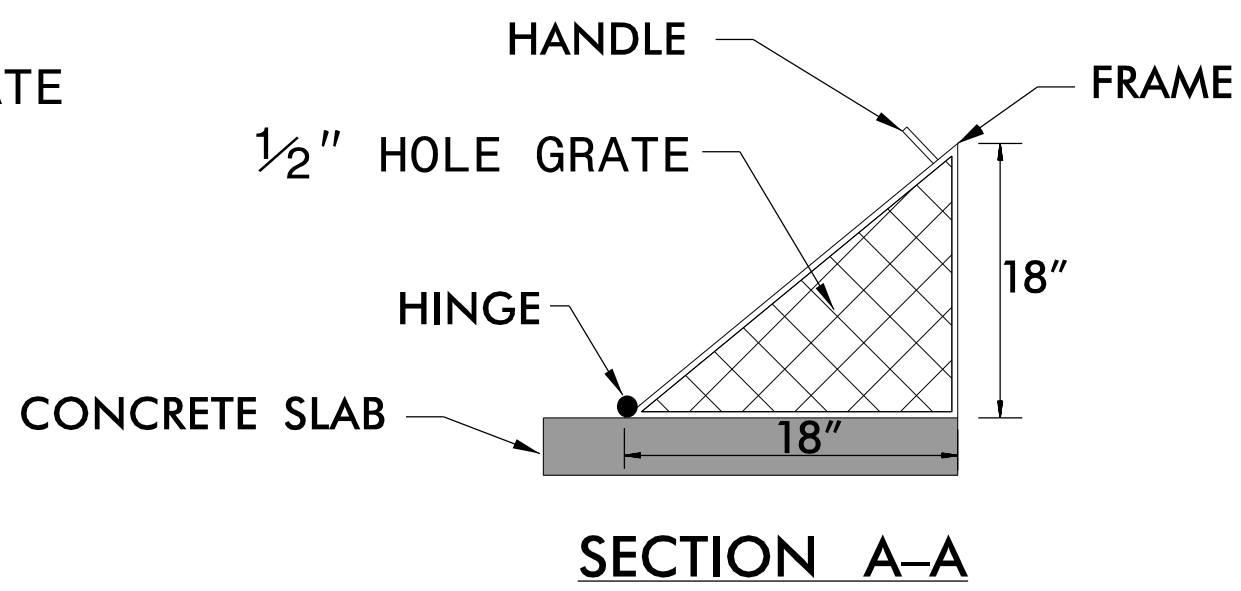
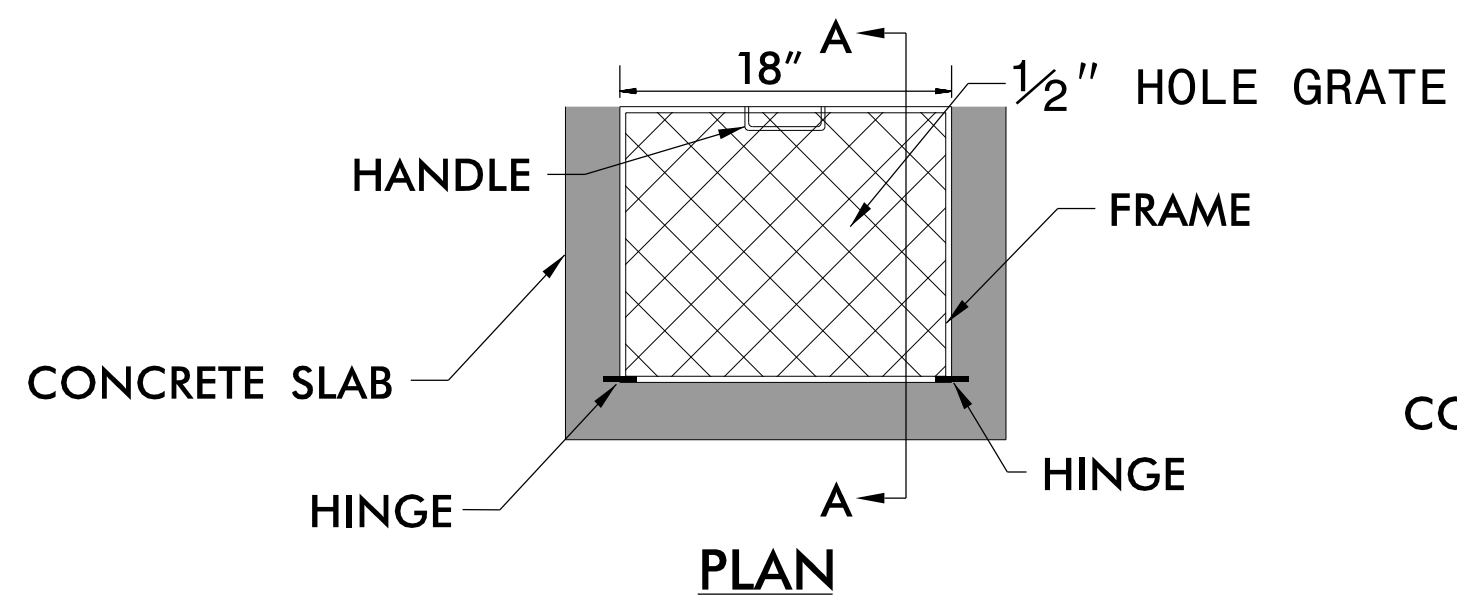
REBAR & ORIFICE TRASH RACKS (N.T.S.)

RISER TRASH RACK NOTES:

1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.



REBAR TRASH RACK
NOT TO SCALE



ORIFICE TRASH RACK
NOT TO SCALE

ORIFICE TRASH RACK NOTES:

1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A-153.

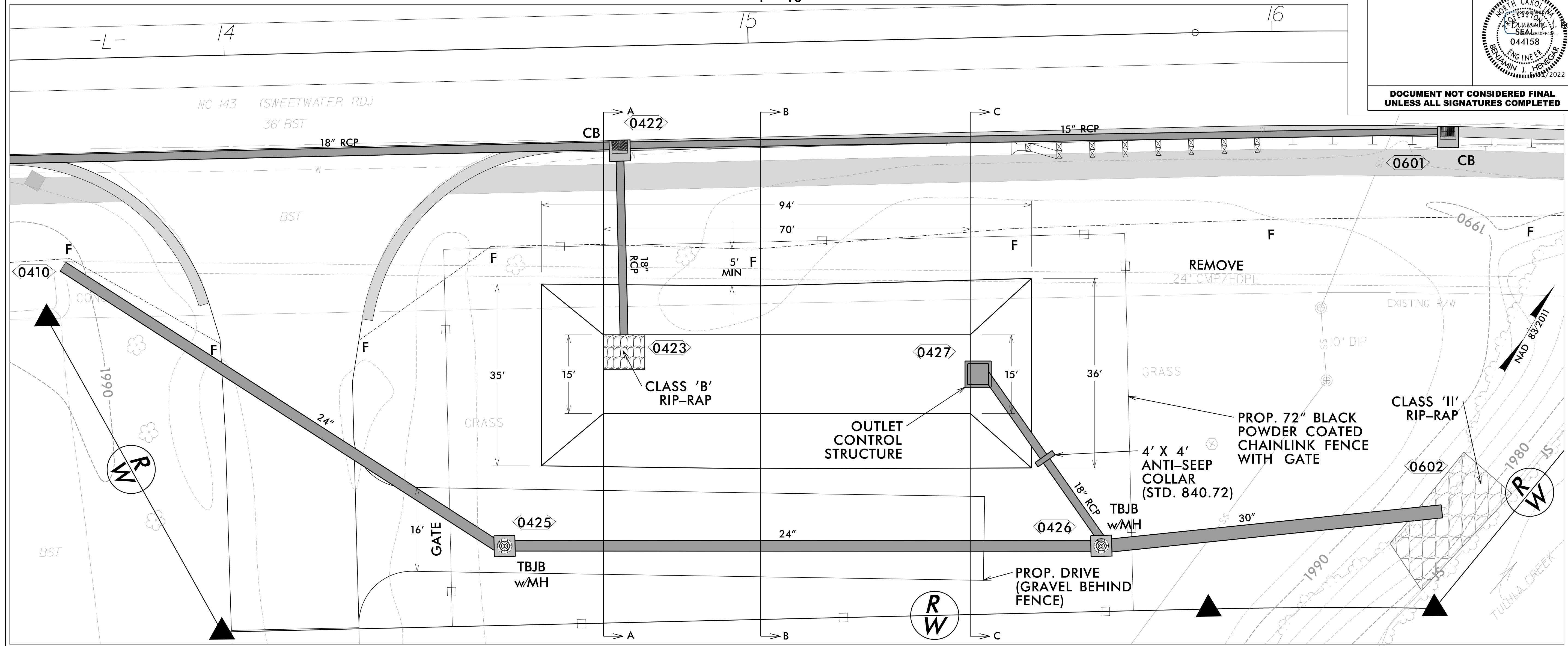
8/17/99

DRY DETENTION BASIN#2

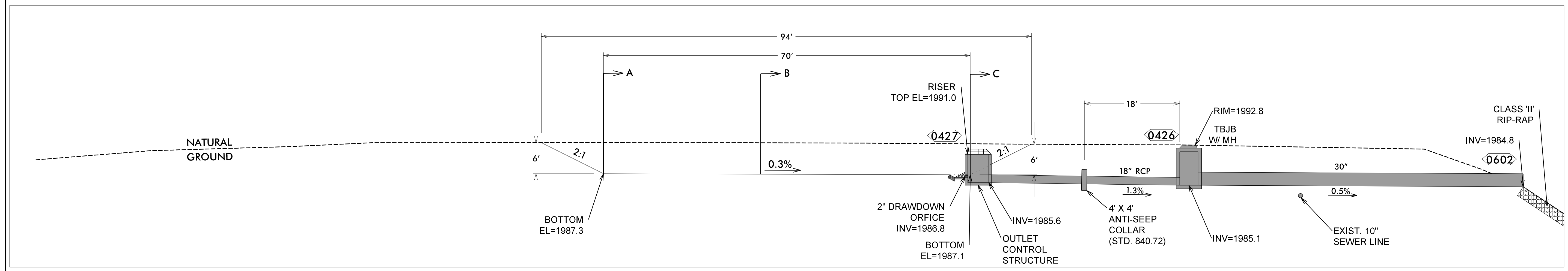
SHEET 1 OF 4

1" = 10'

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2D-9
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



PLAN VIEW



PROFILE VIEW

3/28/2022 X:\projects\A-0009\Hydraulics\Dry Detention Basin\A-0009CA_DDB2_PSH.dgn

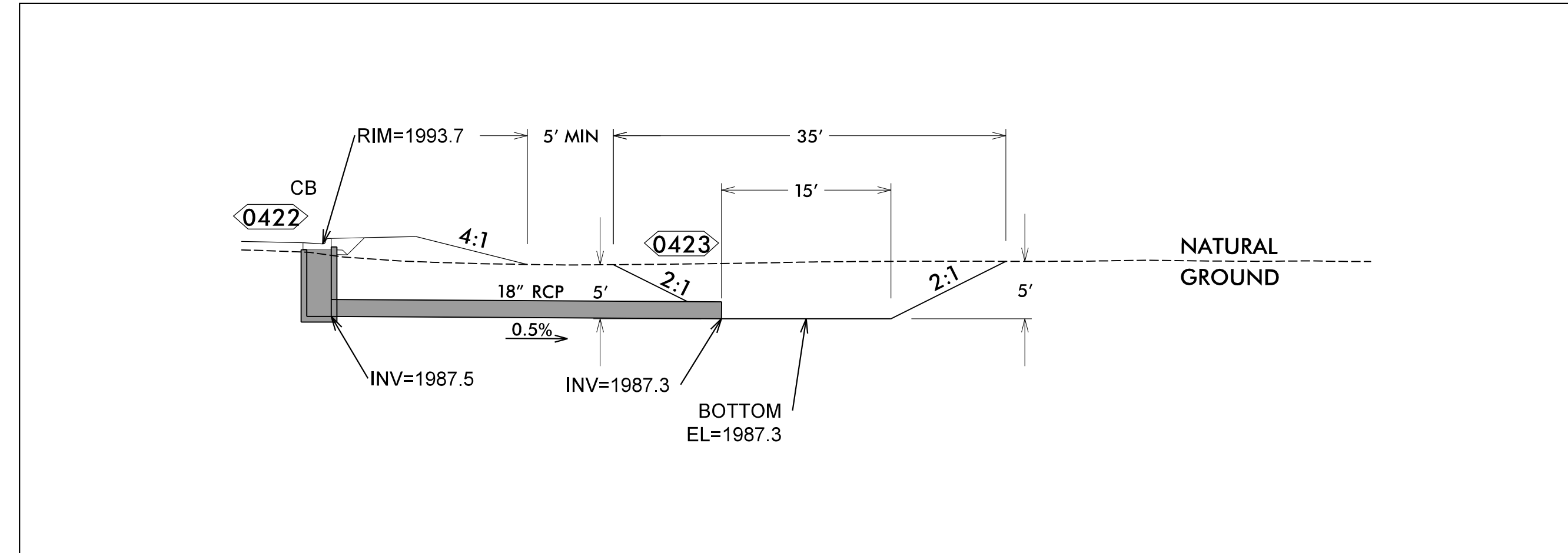
8/17/99

DRY DETENTION BASIN#2

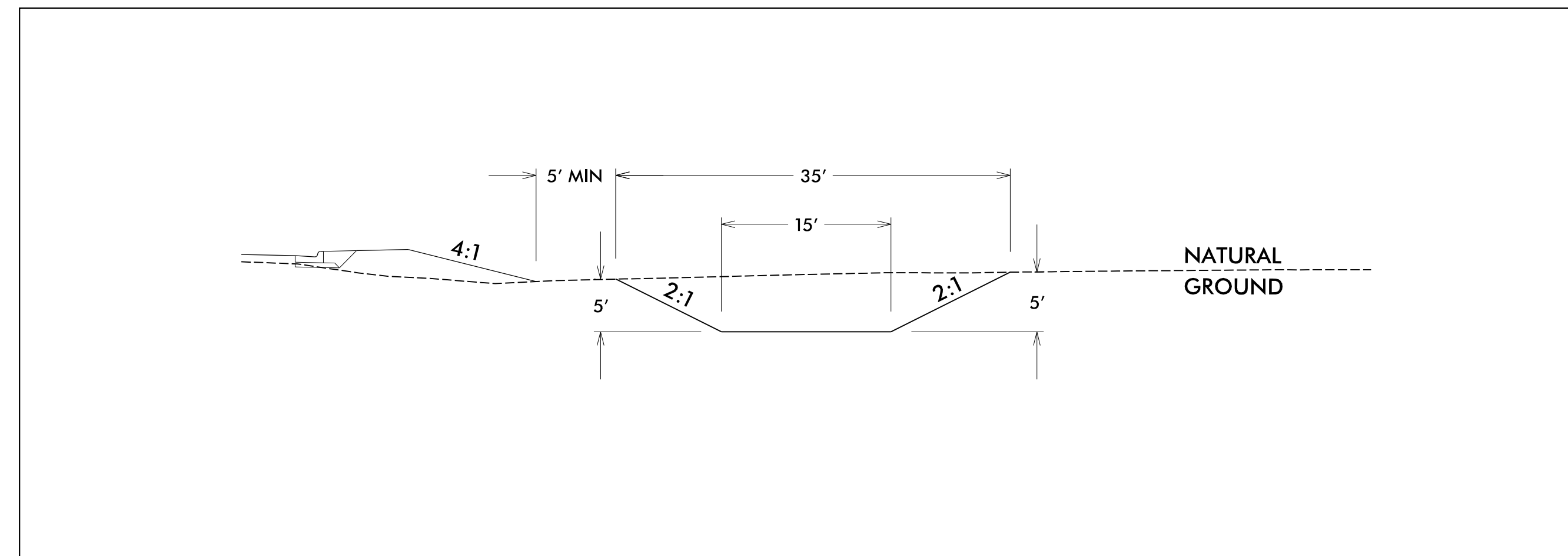
SHEET 2 OF 4

1" = 10'

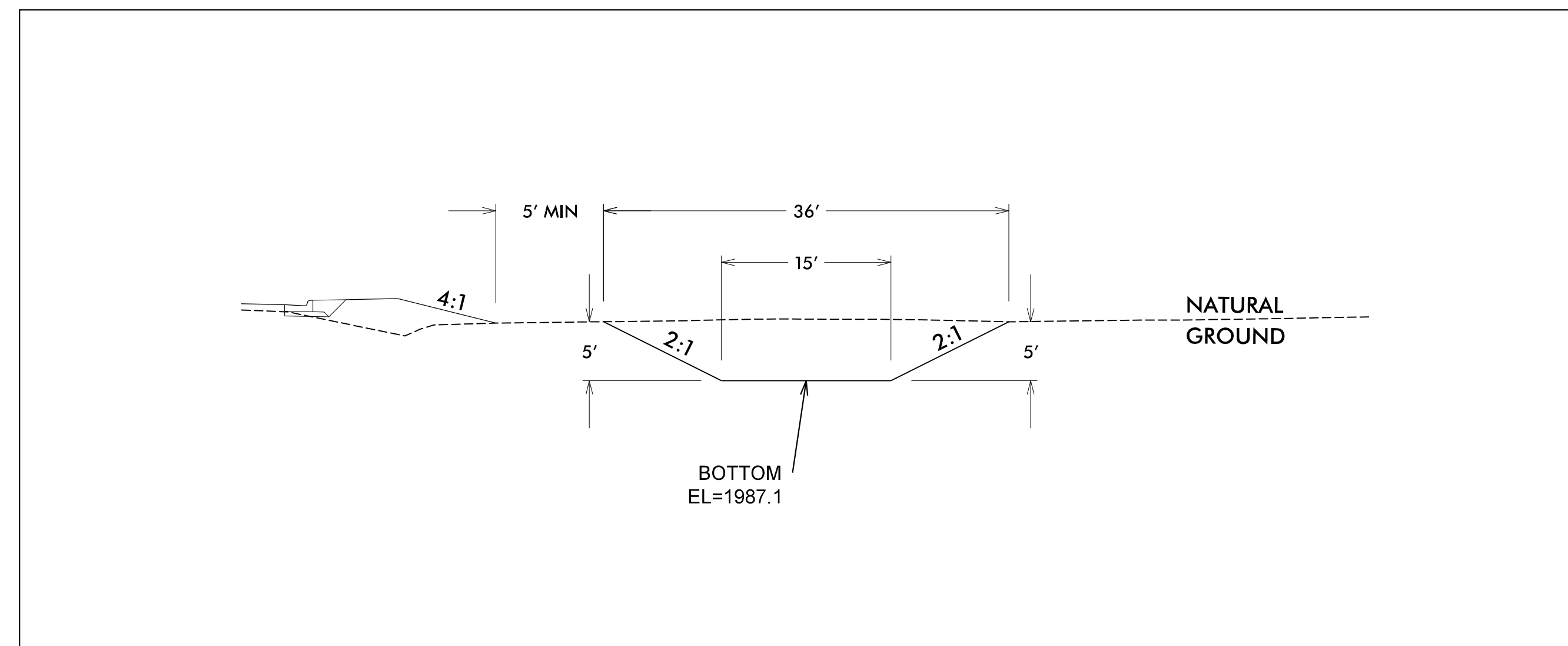
PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2D-10
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



SECTION A-A



SECTION B-B



SECTION C-C


CROSS SECTIONS

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3/28/2012

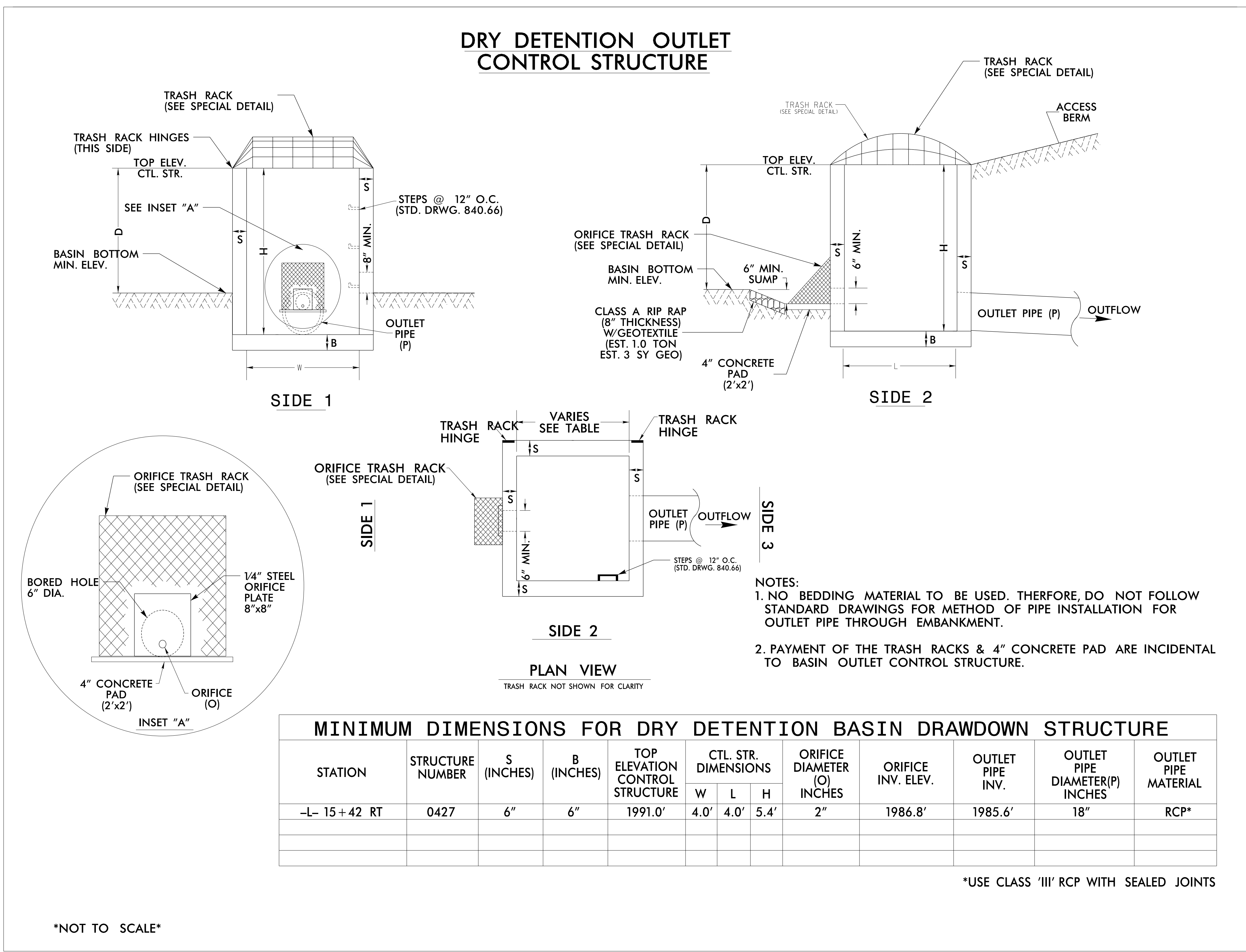
8/17/99

DRY DETENTION BASIN#2

SHEET 3 OF 4

PROJECT REFERENCE NO. <i>A-0009CA</i>	SHEET NO. <i>2D-11</i>
RW SHEET NO.	
HYDRAULICS ENGINEER	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

DRY DETENTION OUTLET CONTROL STRUCTURE



MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE												
STATION	STRUCTURE NUMBER	S (INCHES)	B (INCHES)	TOP ELEVATION CONTROL STRUCTURE	CTL. STR. DIMENSIONS			ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE INV.	OUTLET PIPE DIAMETER(P) INCHES	OUTLET PIPE MATERIAL
					W	L	H					
-L- 15+42 RT	0427	6"	6"	1991.0'	4.0'	4.0'	5.4'	2"	1986.8'	1985.6'	18"	RCP*

*USE CLASS 'III' RCP WITH SEALED JOINTS

NOT TO SCALE

5/27/2022 X:\Projects\A-0009\Hydraulics\Dry Detention Basin\A-0009CA_DDB2_PSH.dgn

DRY DETENTION BASIN#2

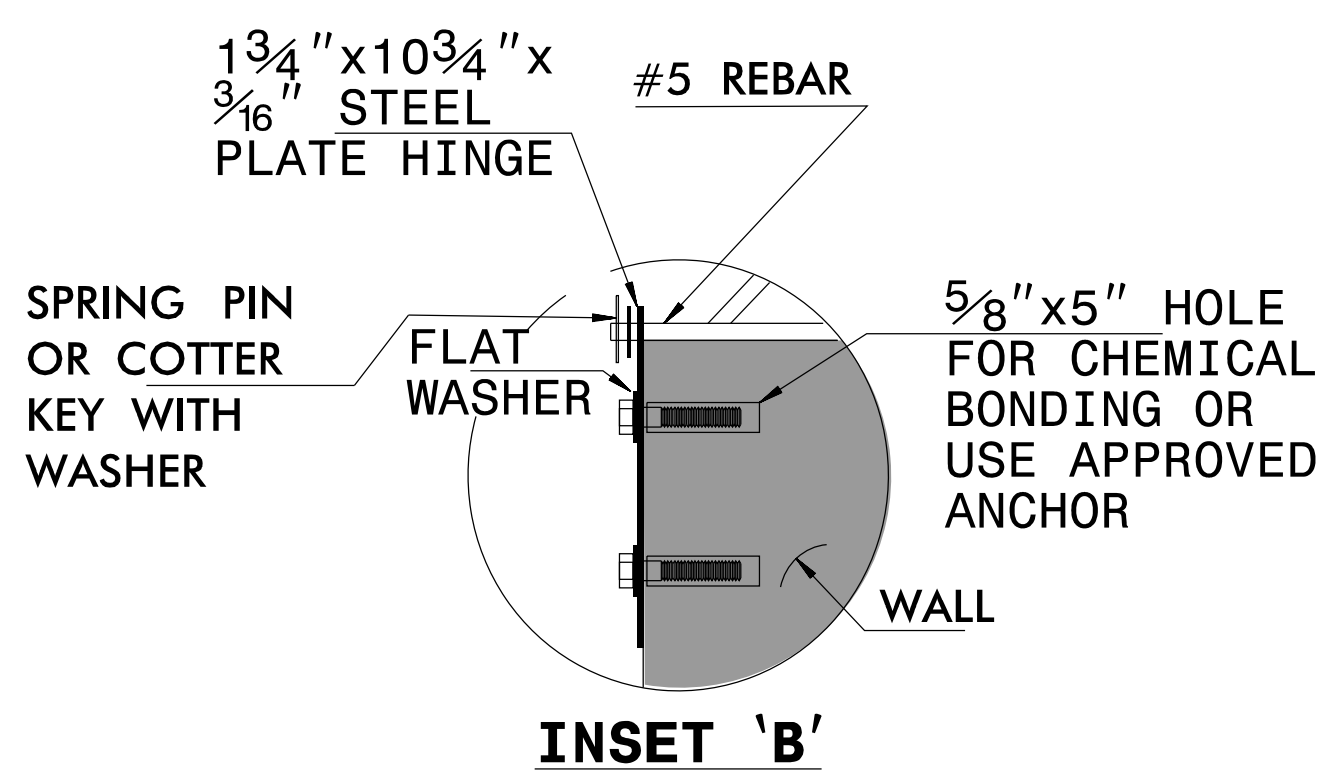
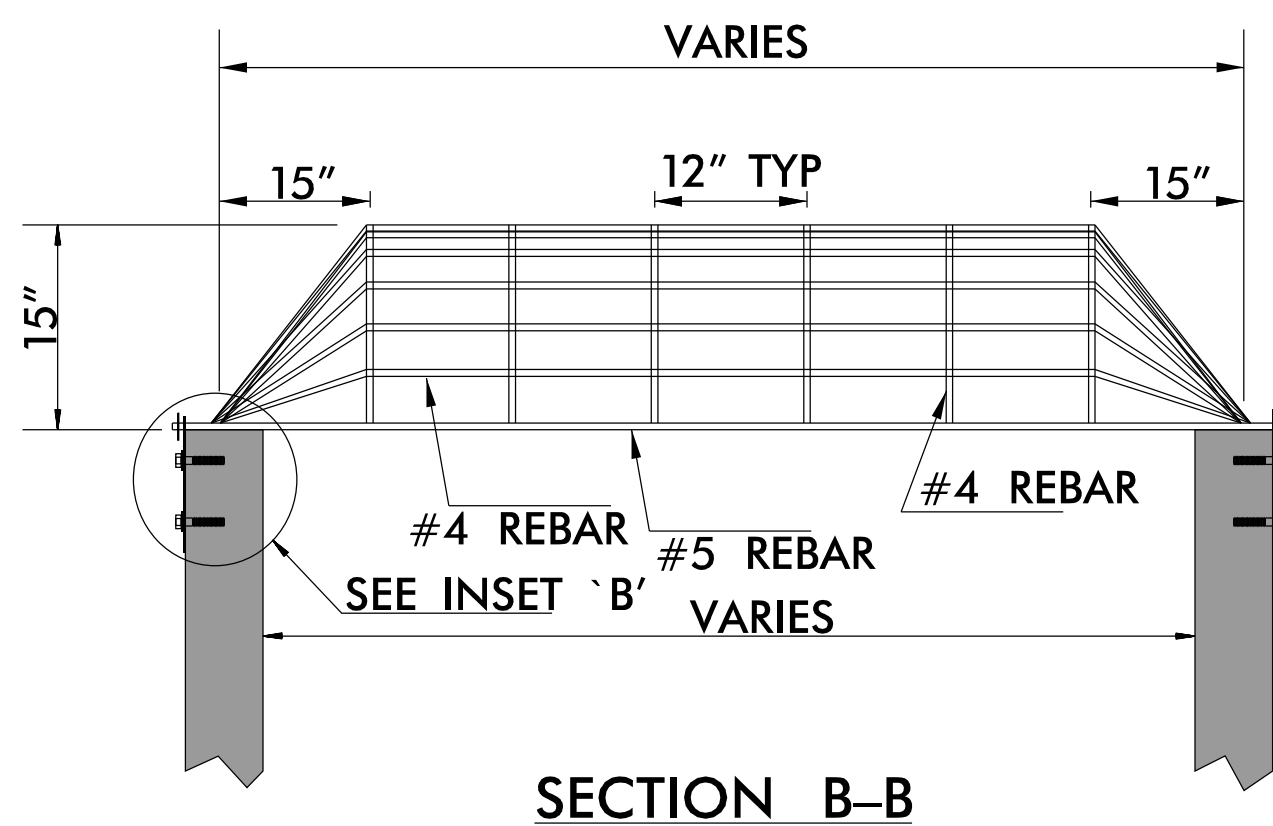
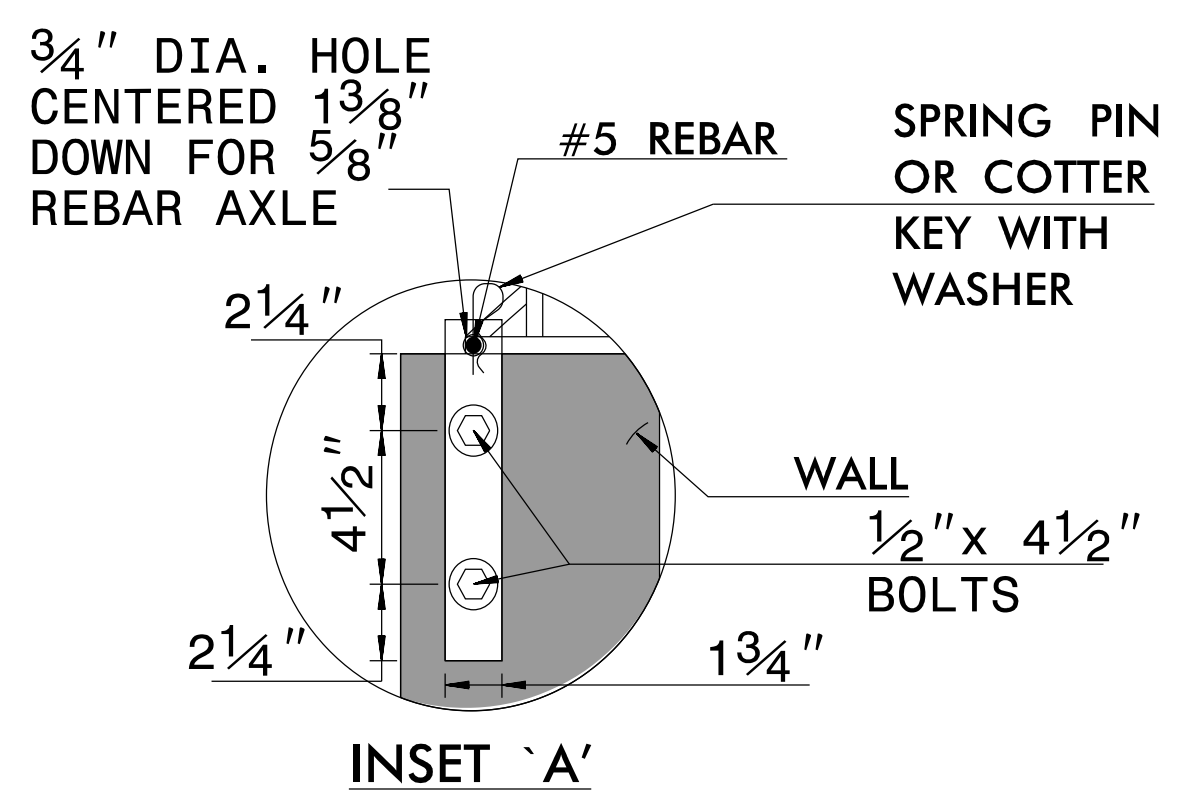
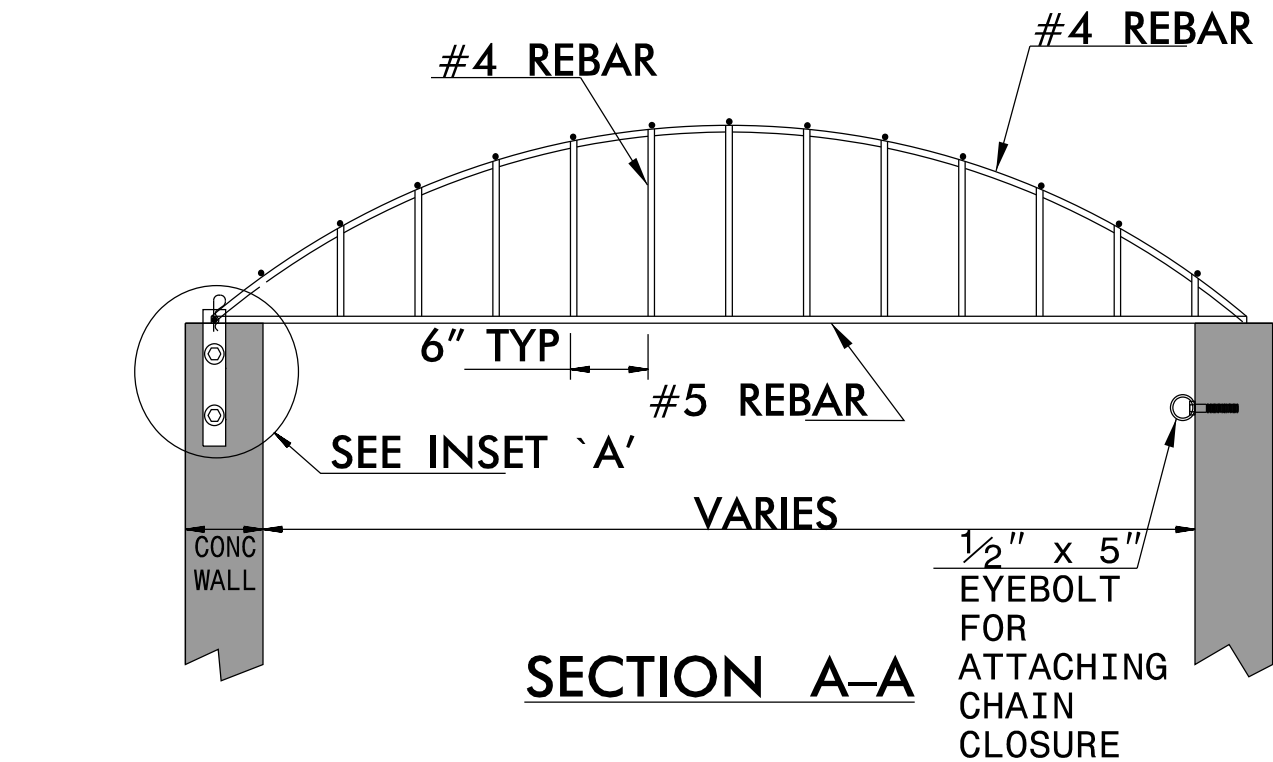
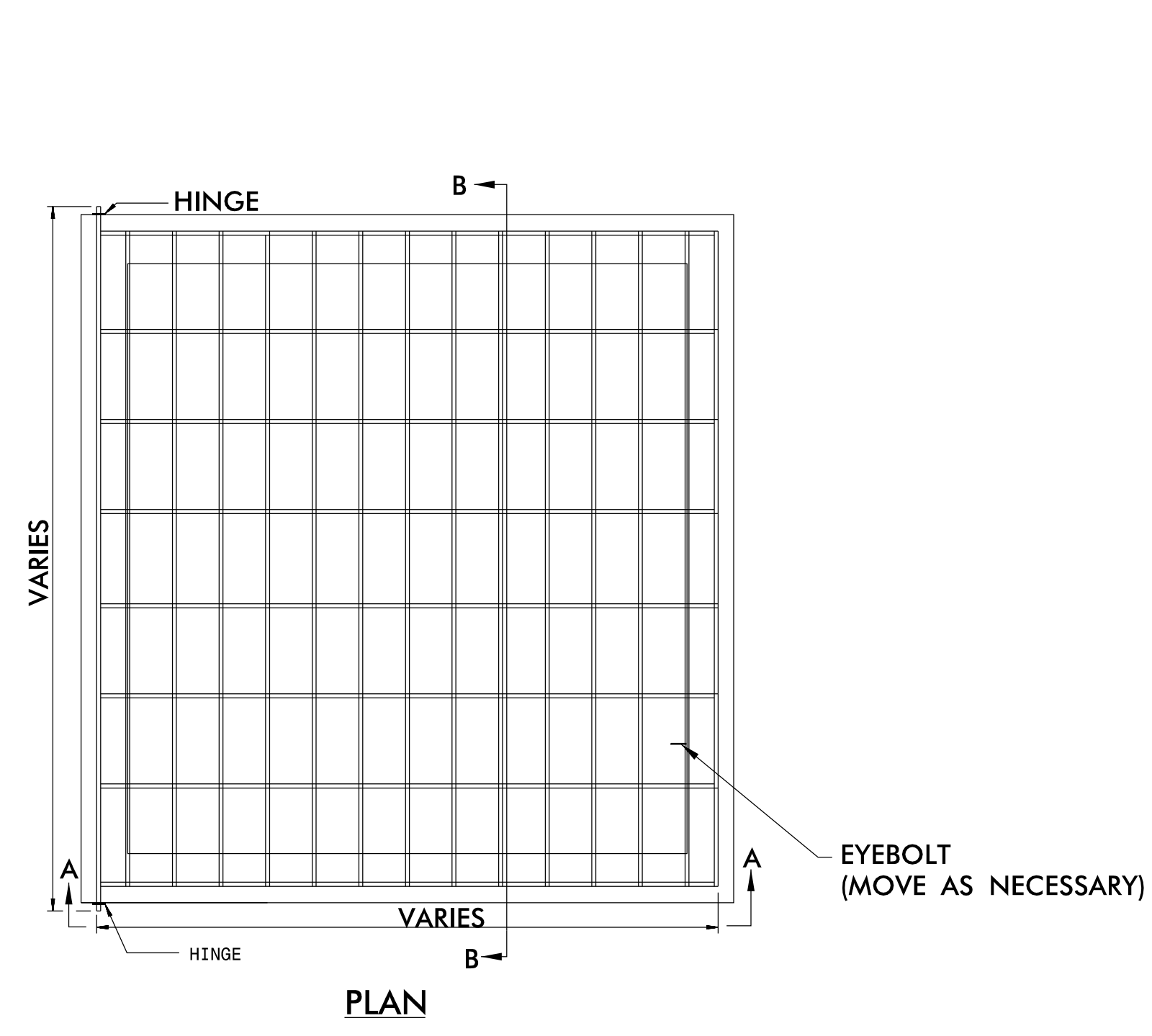
SHEET 4 OF 4

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2D-12
RW SHEET NO.	
HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

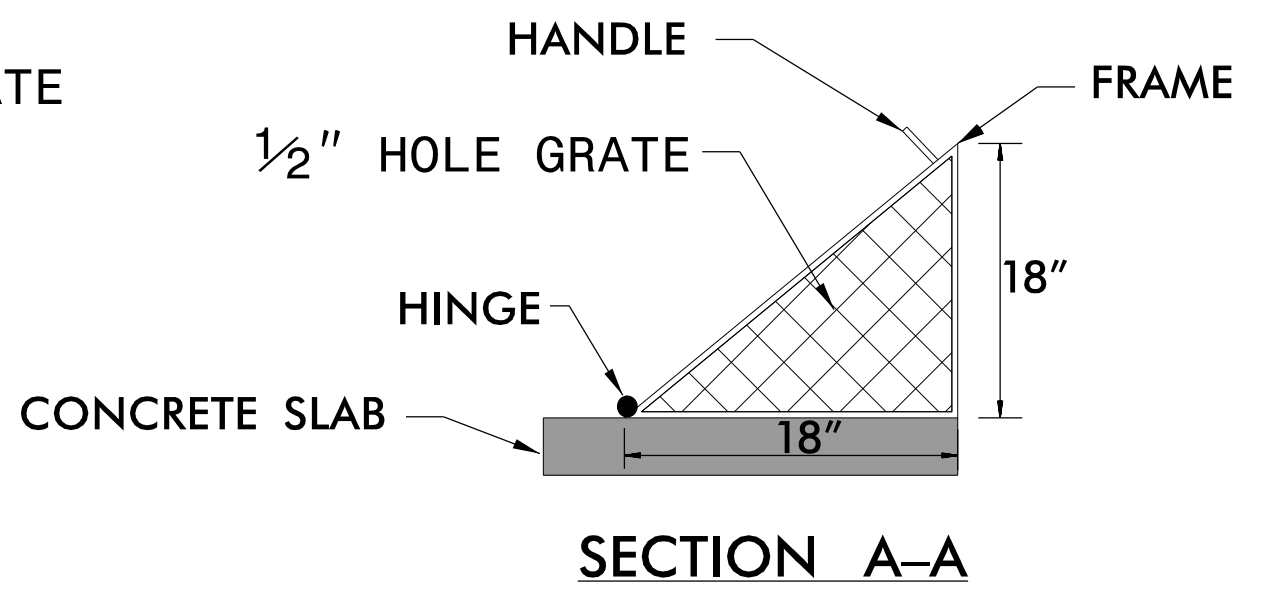
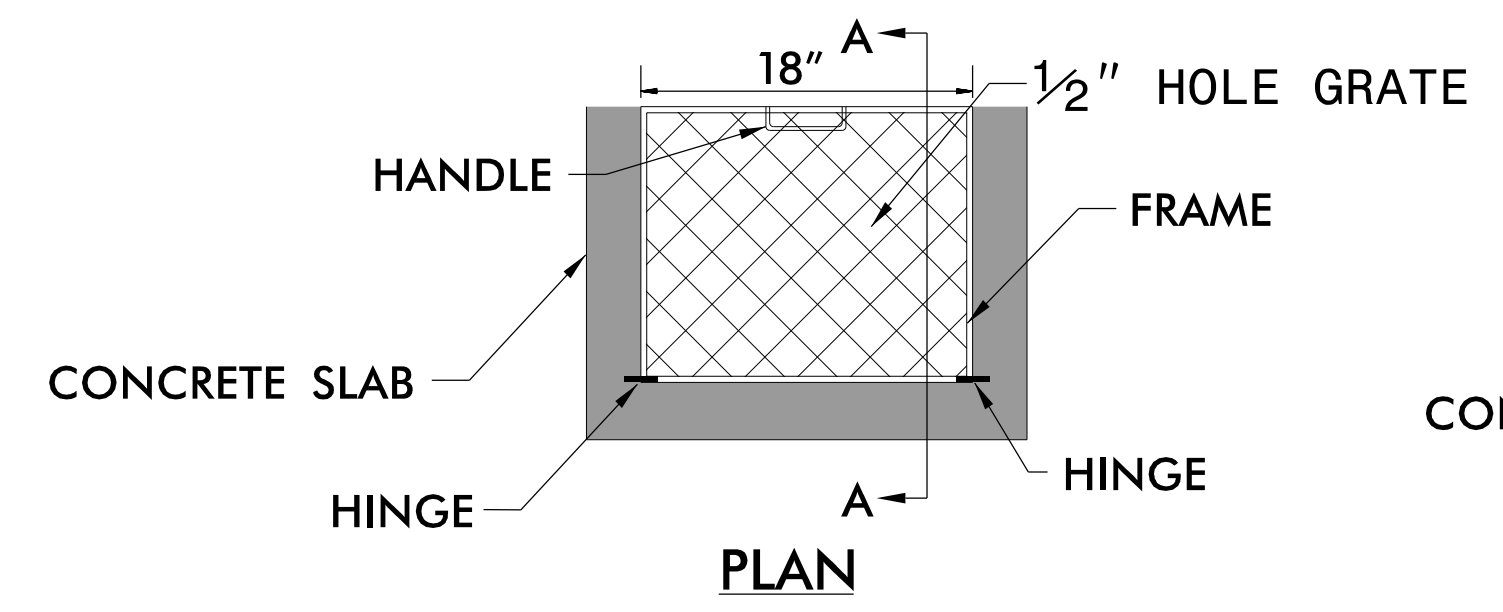
REBAR & ORIFICE TRASH RACKS (N.T.S.)

RISER TRASH RACK NOTES:

1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.



REBAR TRASH RACK NOT TO SCALE



ORIFICE TRASH RACK NOT TO SCALE

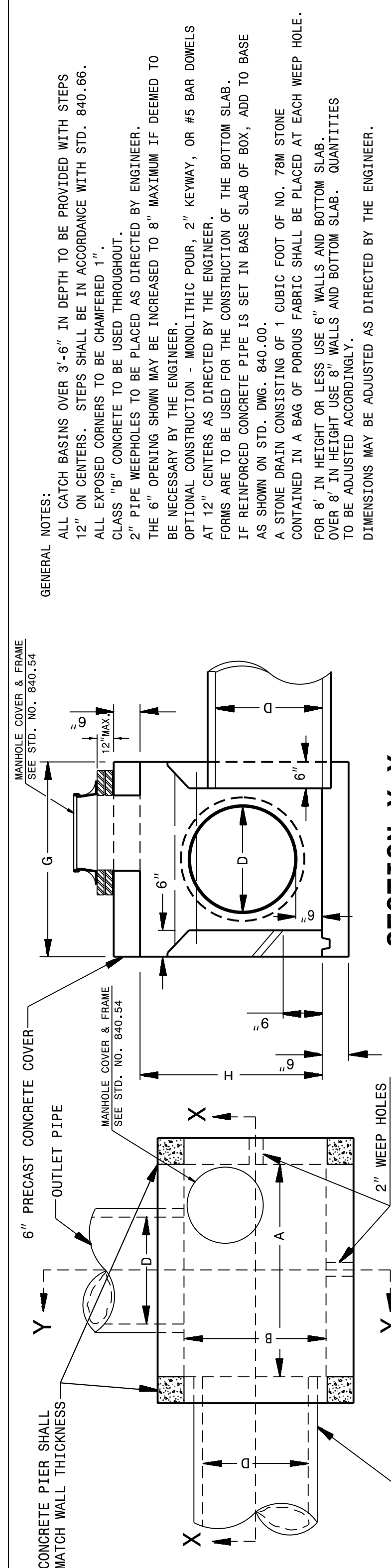
ORIFICE TRASH RACK NOTES:

1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A-153.

24-APR-2019 07:24
 S:\Contracts\Special Details\jhover-ton\840d04 3 or 4 side OTCB.dgn
 jhover-ton AT CSD-292595

5/14/99

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

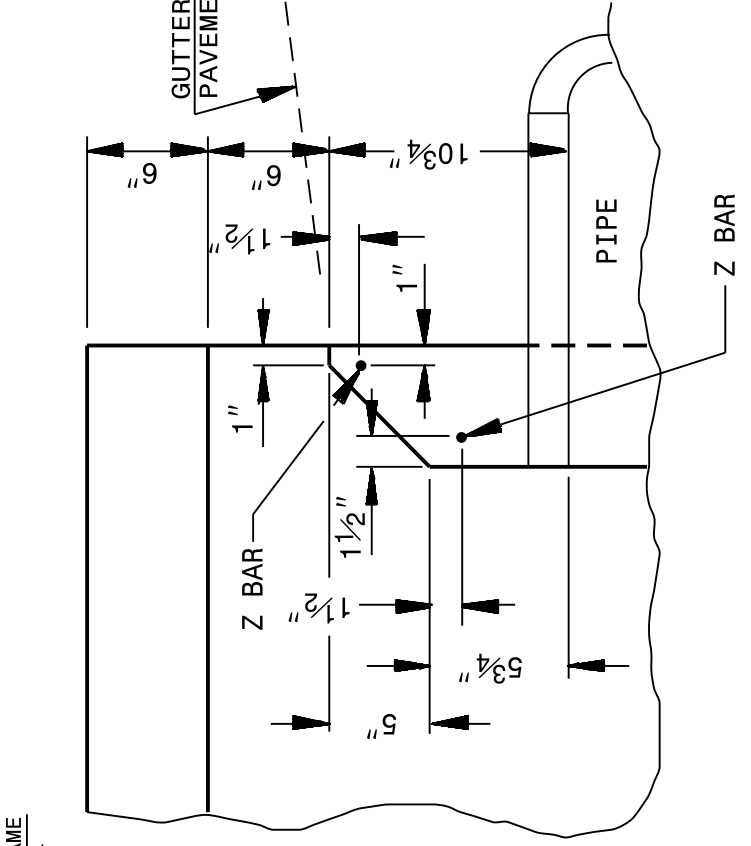


STATE OF
 NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

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

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

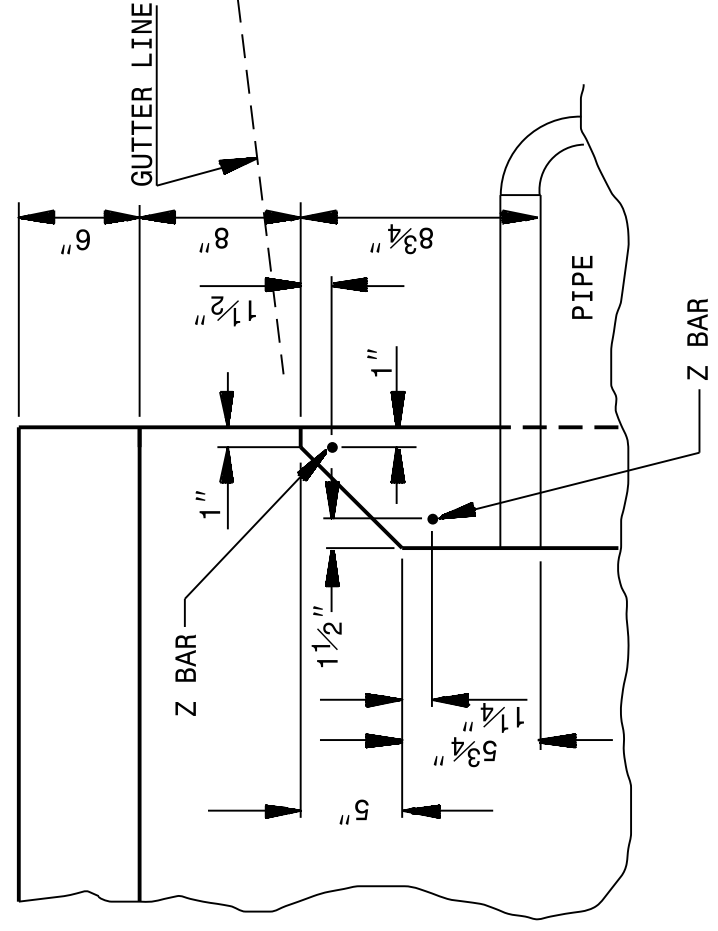
SECTION Y-Y



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

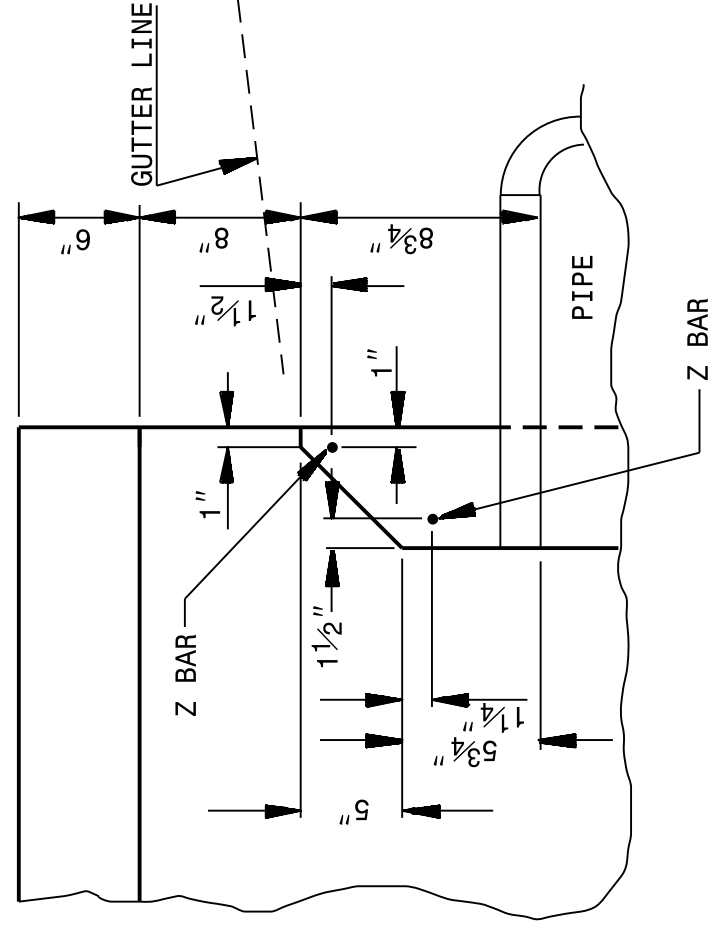
PART SECTION Y-Y

SHOWING METHOD OF
 CONSTRUCTION FOR 6" OPENING



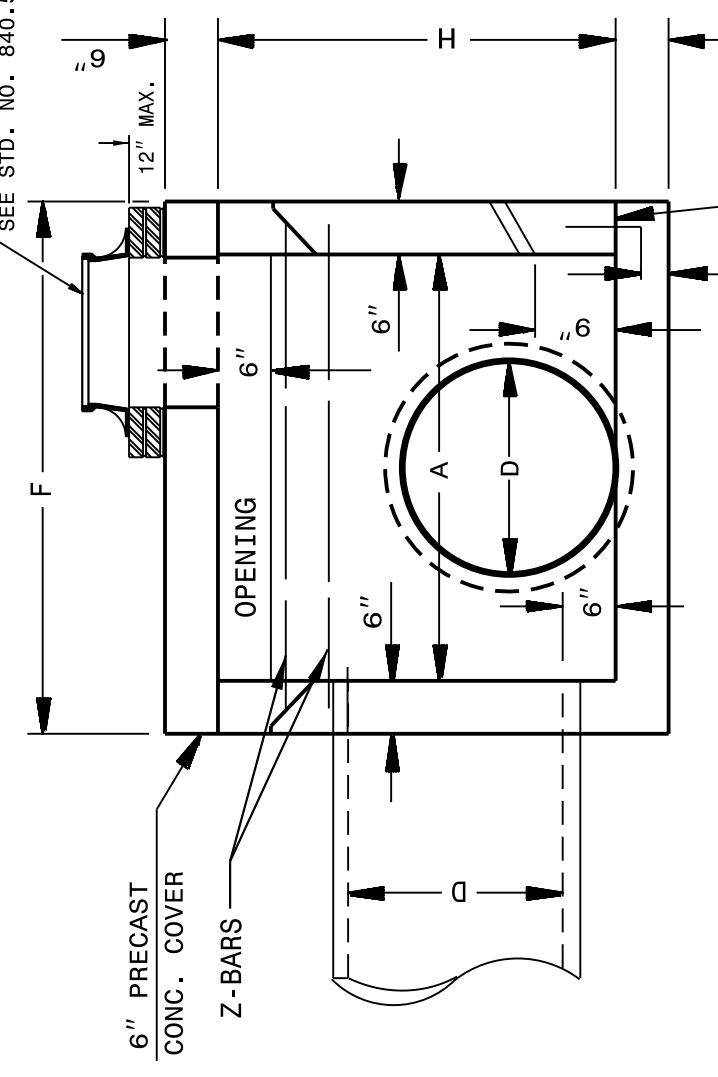
PART SECTION Y-Y

SHOWING METHOD OF CONSTRUCTION
 IF INCREASED OPENING IS USED



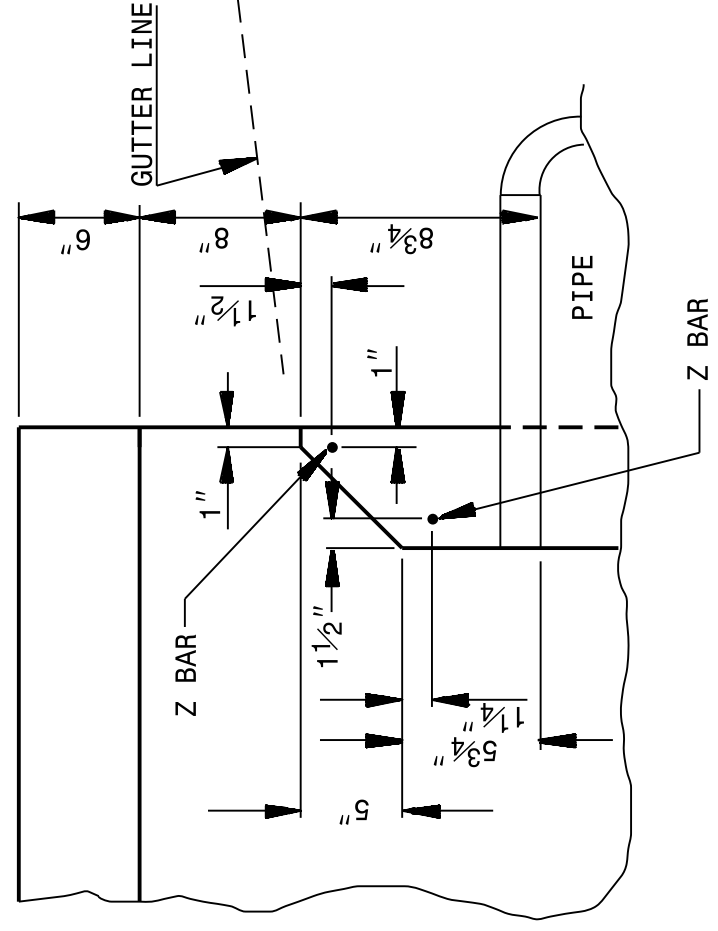
SECTION X-X

SEE NOTE



PART SECTION Y-Y

SHOWING METHOD OF CONSTRUCTION
 IF INCREASED OPENING IS USED

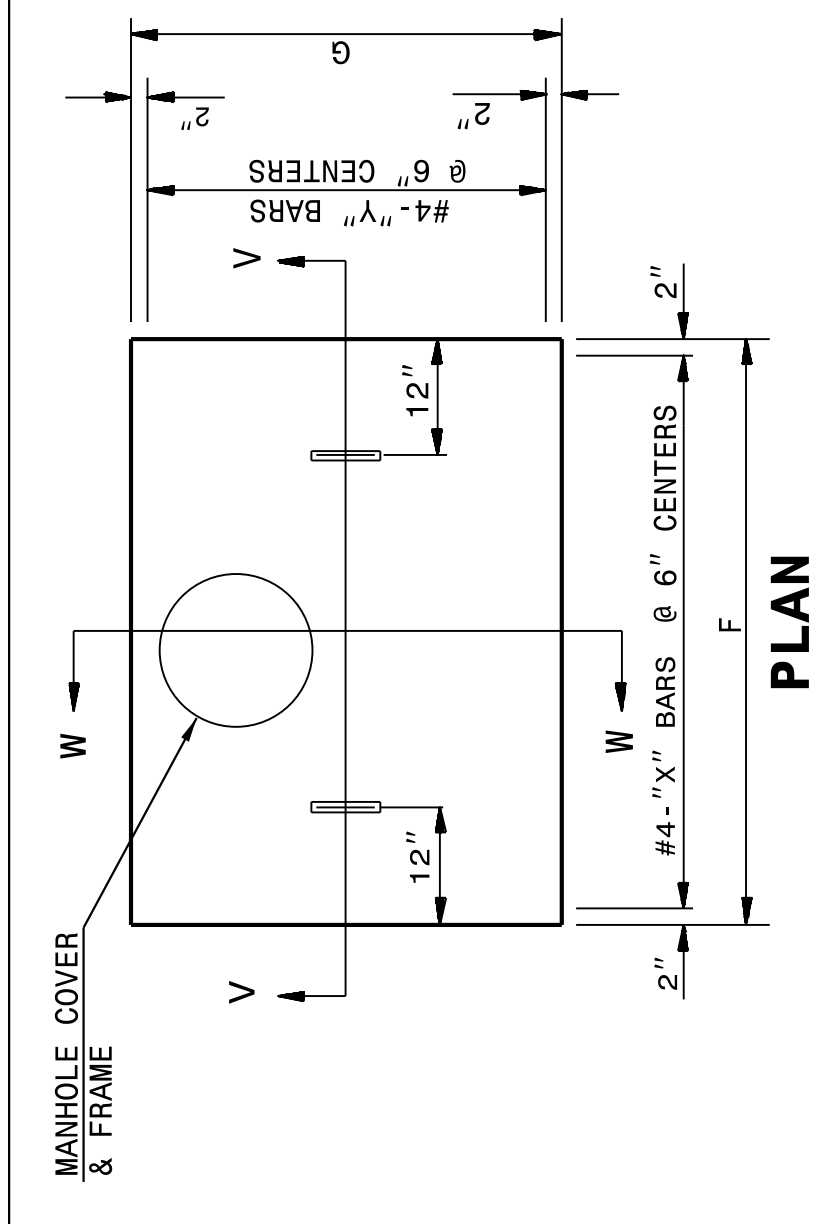


PIPE D	DIM'S OF BOX & PIPE		REINFORCING		MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN (BASED ON MIN. HEIGHT, H)		TOTAL QUANTITIES		DEDUCTION		DED ONE 6" THROAT OPENING YD ³		
	SPAN	WIDTH	NO.	LENGTH	NO.	LENGTH	BOX & SLABS	ONE PIPE	R. C.	R. C.			
12"	3'-6"	2'-3"	1'-10"	4	3'-0"	6	4'-3"	4'-6"	27	1.046	0.015	0.032	0.046
15"	3'-6"	2'-3"	2'-1"	4	3'-0"	6	4'-3"	4'-6"	27	1.046	0.015	0.032	0.046
18"	4'-0"	2'-8"	2'-4"	5	3'-5"	7	4'-9"	5'-0"	35	1.379	0.033	0.049	0.063
24"	4'-0"	2'-8"	2'-10"	5	3'-5"	7	4'-9"	5'-0"	35	1.379	0.033	0.049	0.063
30"	4'-0"	3'-6"	3'-4"	5	4'-3"	9	4'-9"	5'-0"	43	1.916	0.092	0.127	0.053
36"	4'-0"	4'-6"	4'-4"	5	5'-3"	12	5'-9"	6'-0"	64	2.914	0.180	0.243	0.066
42"	5'-0"	4'-6"	4'-4"	5	5'-3"	12	5'-9"	6'-0"	68	3.298	0.235	0.317	0.066
48"	5'-0"	5'-0"	4'-10"	5	5'-9"	13	5'-9"	6'-0"	68	3.298	0.235	0.317	0.066

SHEET 1 OF 2
840D04

SHEET 1 OF 2
840D04

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

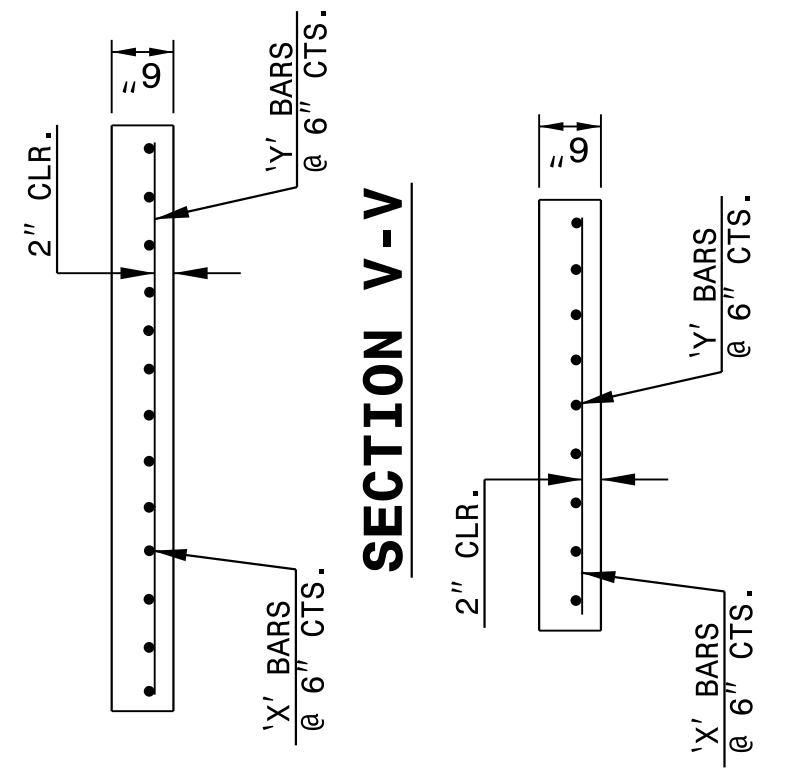


STATE OF
 NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

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

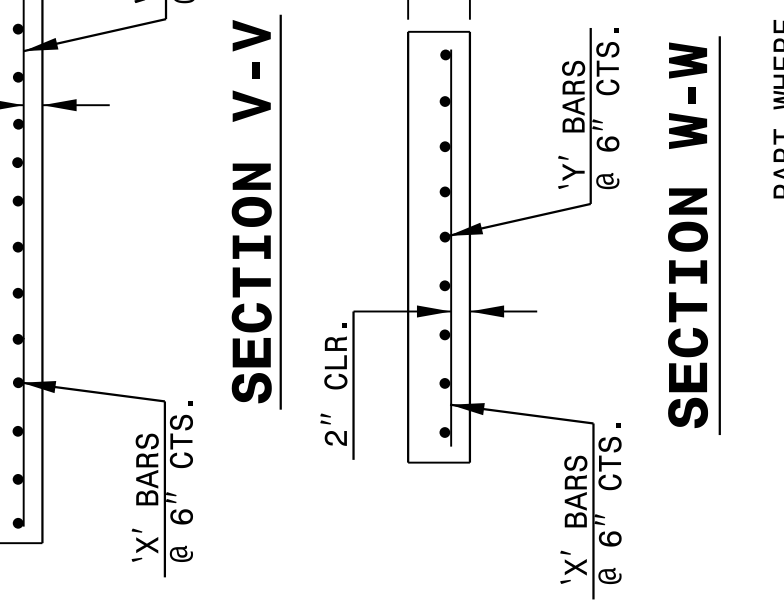
SECTION V-V

2" CLR.



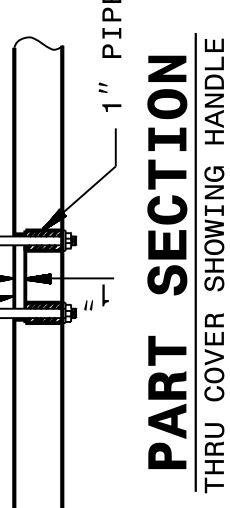
SECTION W-W

2" CLR.



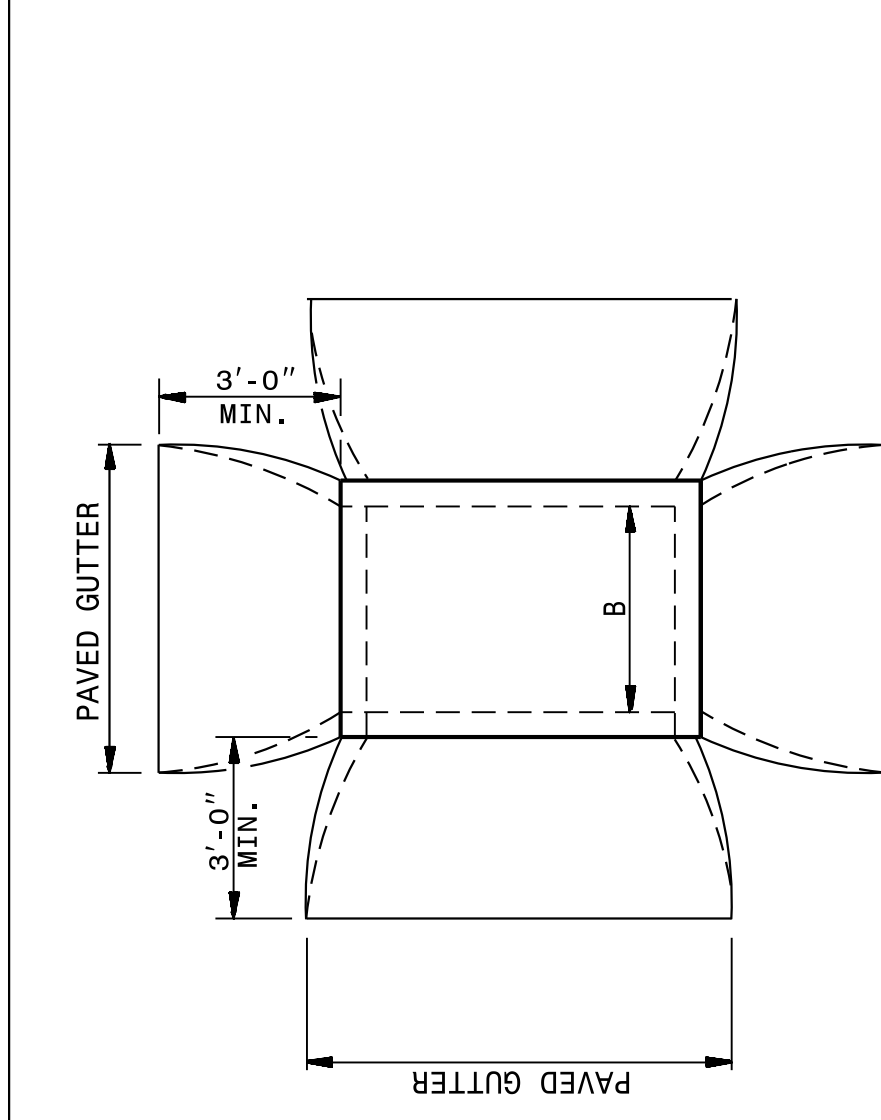
PART WHERE HANDLE IS LOCATED SHALL
 BE COUNTERSUNK 1" AND HANDLE
 SHALL BE FREE TO MOVE UP AND DOWN.

**PART SECTION
 THRU COVER SHOWING HANDLE**

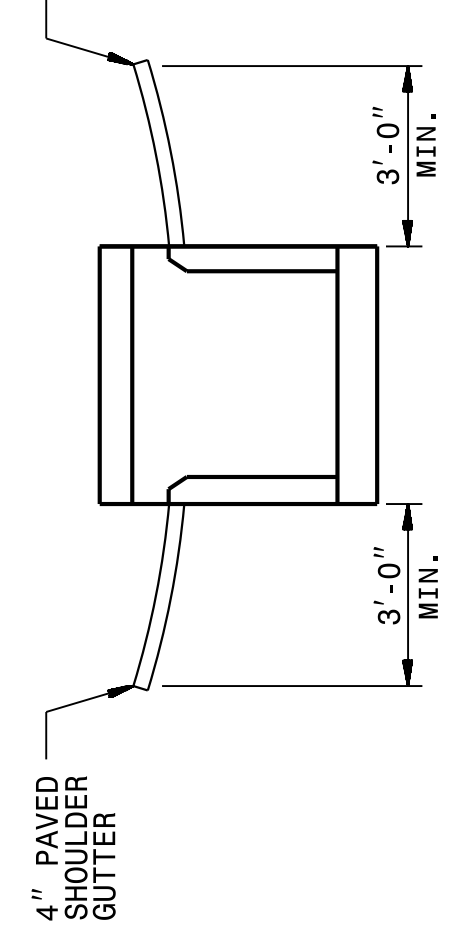


SHEET 2 OF 2
840D04

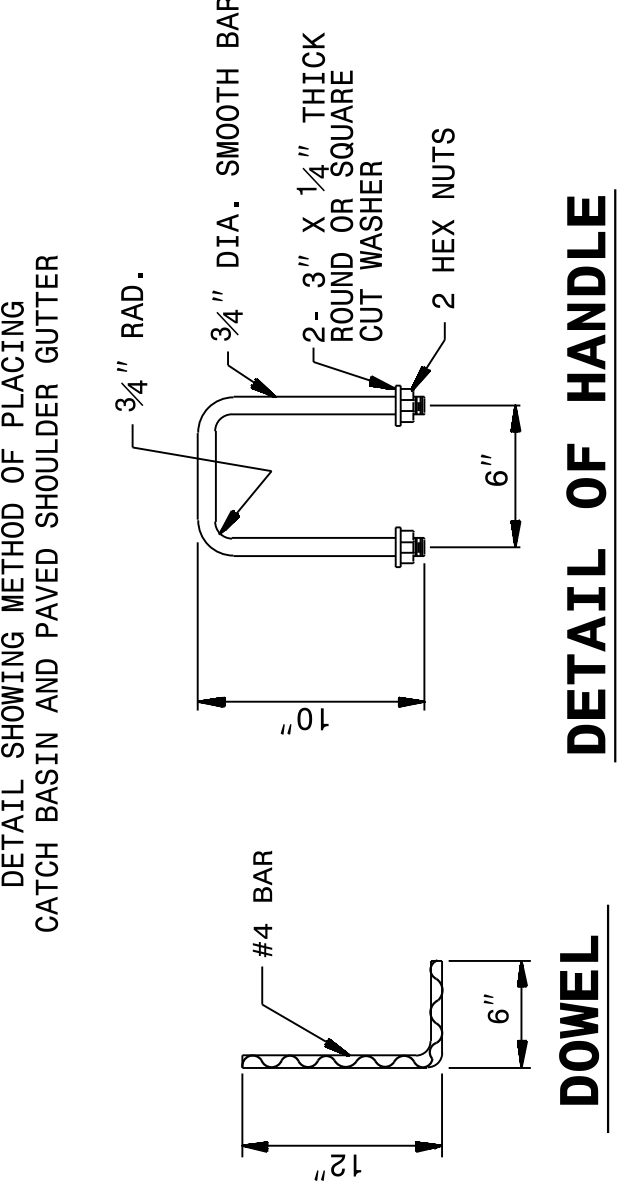
SHEET 2 OF 2
840D04



SECTION OF CATCH BASIN MEDIAN STRIP



**DETAIL SHOWING METHOD OF PLACING
 CATCH BASIN AND PAVED SHOULDER GUTTER**



SHEET 2 OF 2
840D04

SHEET 2 OF 2
840D04

ORIGINAL BY: _____ DATE: _____
 MODIFIED BY: rnbritt DATE: 07-03-2014
 CHECKED BY: _____ DATE: _____
 FILE SPEC.: details/rnbritt/english/hydro/840d04.dgn

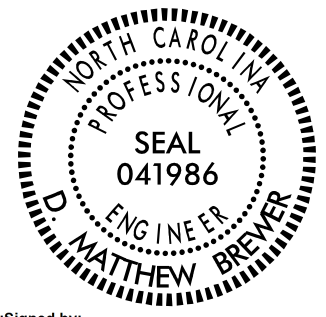
SEE PLATE FOR TITLE

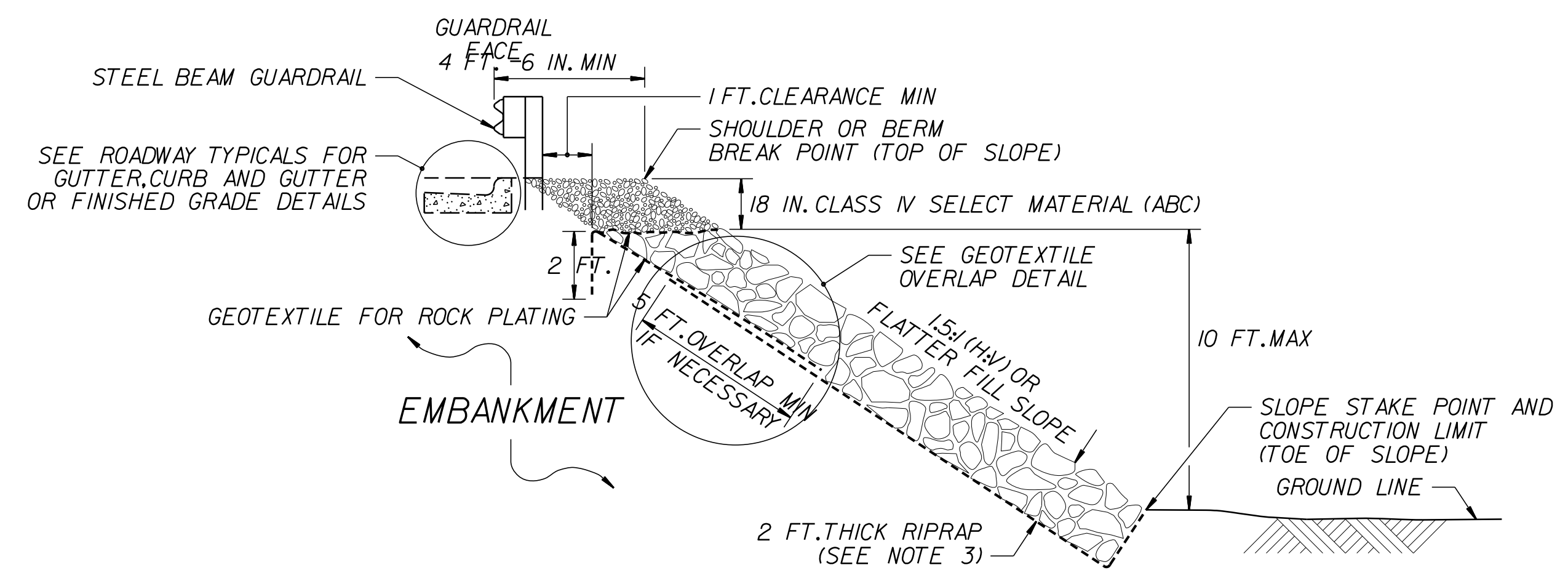
CONTRACT STANDARDS
 AND DEVELOPMENT UNIT
 Office 919-707-6950 FAX 919-250-4119

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

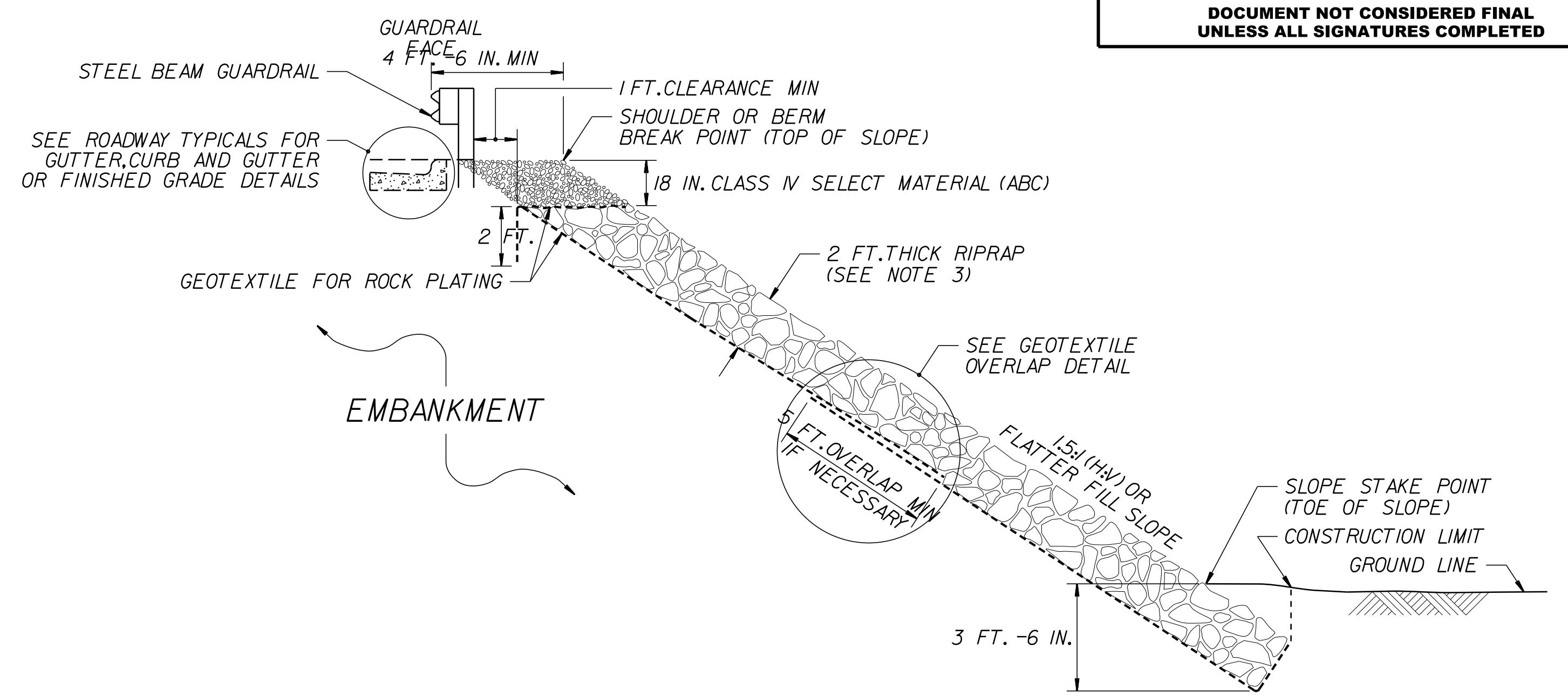


5/31/2022

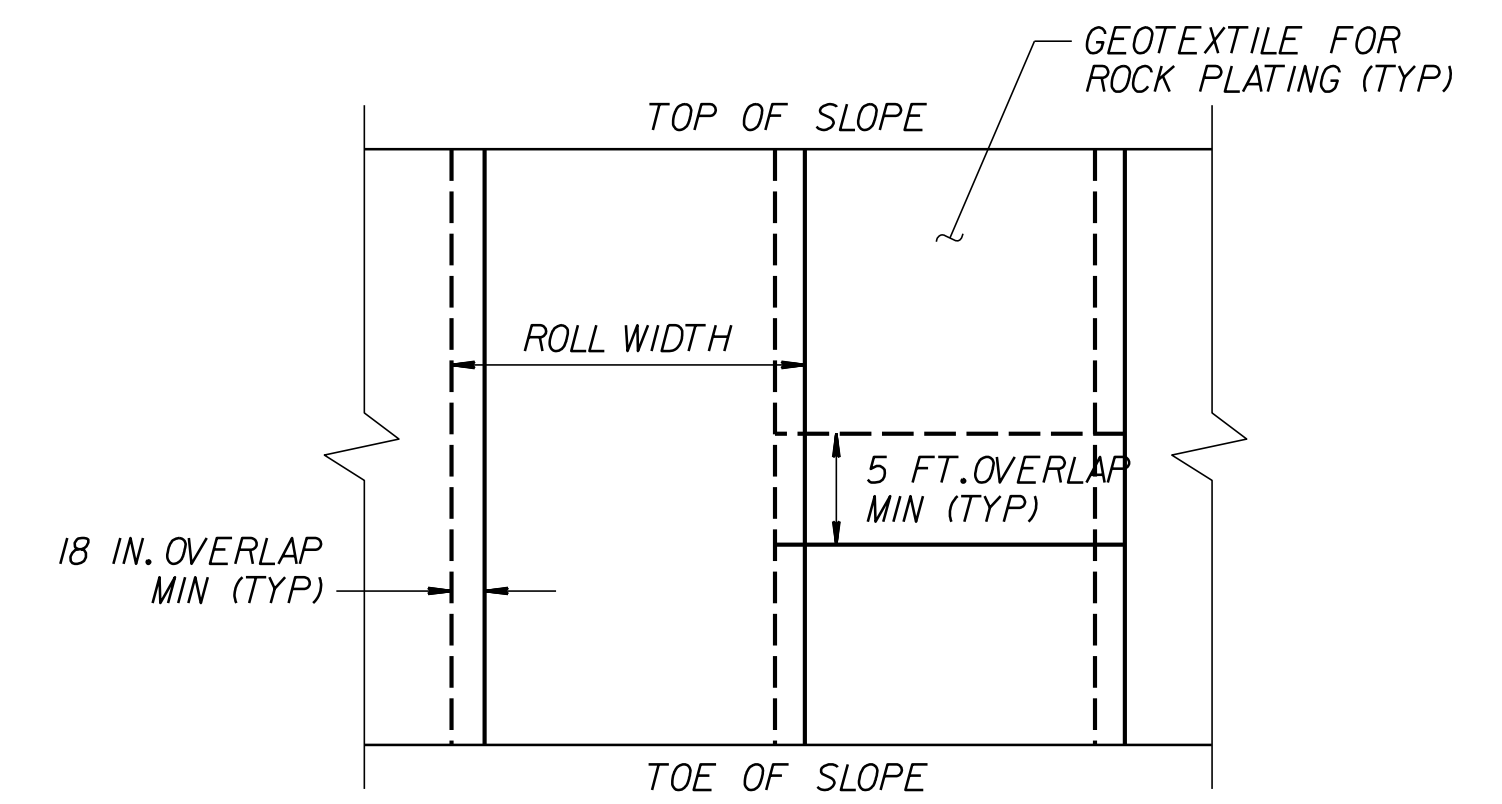
PROJECT REFERENCE NO. A-0009CA		SHEET NO. 2G-1	
GEOTECHNICAL ENGINEER  D. Matthew Brewer 4/28/2022 SIGNATURE DATE		ENGINEER _____ SIGNATURE DATE	
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ROCK PLATING DETAIL NO. 1 – TYPICAL SECTION



ROCK PLATING DETAIL NO. 2 – TYPICAL SECTION



GEOTEXTILE OVERLAP DETAIL

ROCK PLATING
 FOR ROCK PLATING, SEE SECTION 275 OF THE STANDARD SPECIFICATIONS
 USE ROCK PLATING AT THE FOLLOWING LOCATIONS:

LINE	BEGINNING SLOPE	APPROX. STATION	ENDING SLOPE	APPROX. STATION	LOCATION LT/RT	ROCK PLATING DETAIL NO. 1/2	RIPRAP CLASS* 1/2B	SY
-L-	1.5:1	42+00	1.5:1	45+64	LT	2	*	1430
-L-	1.5:1	44+50	1.5:1	45+00	RT	2	*	180
-L-	1.5:1	47+14	1.75:1	48+00	RT	2	*	410
-L-	1.5:1	56+00	1.5:1	58+00	RT	2	*	1110
-L-	1.5:1	57+00	1.5:1	59+50	LT	2	*	1110

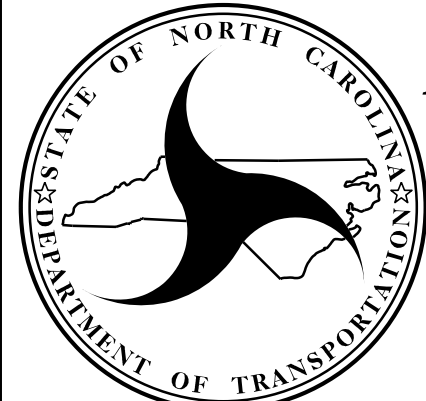
*USE CLASS 1, 2 OR B RIPRAP UNLESS REQUIRED OTHERWISE IN THE ROADWAY SUMMARY SHEETS.

PREPARED BY: D. MATTHEW BREWER, P.E. DATE: 4/27/22
 REVIEWED BY: ROBERT E. KRAL, P.E. DATE: 4/27/22

Prepared in the Office of:



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 SUITE 800
 CHARLOTTE, NC 28227
 (980) 339-8684




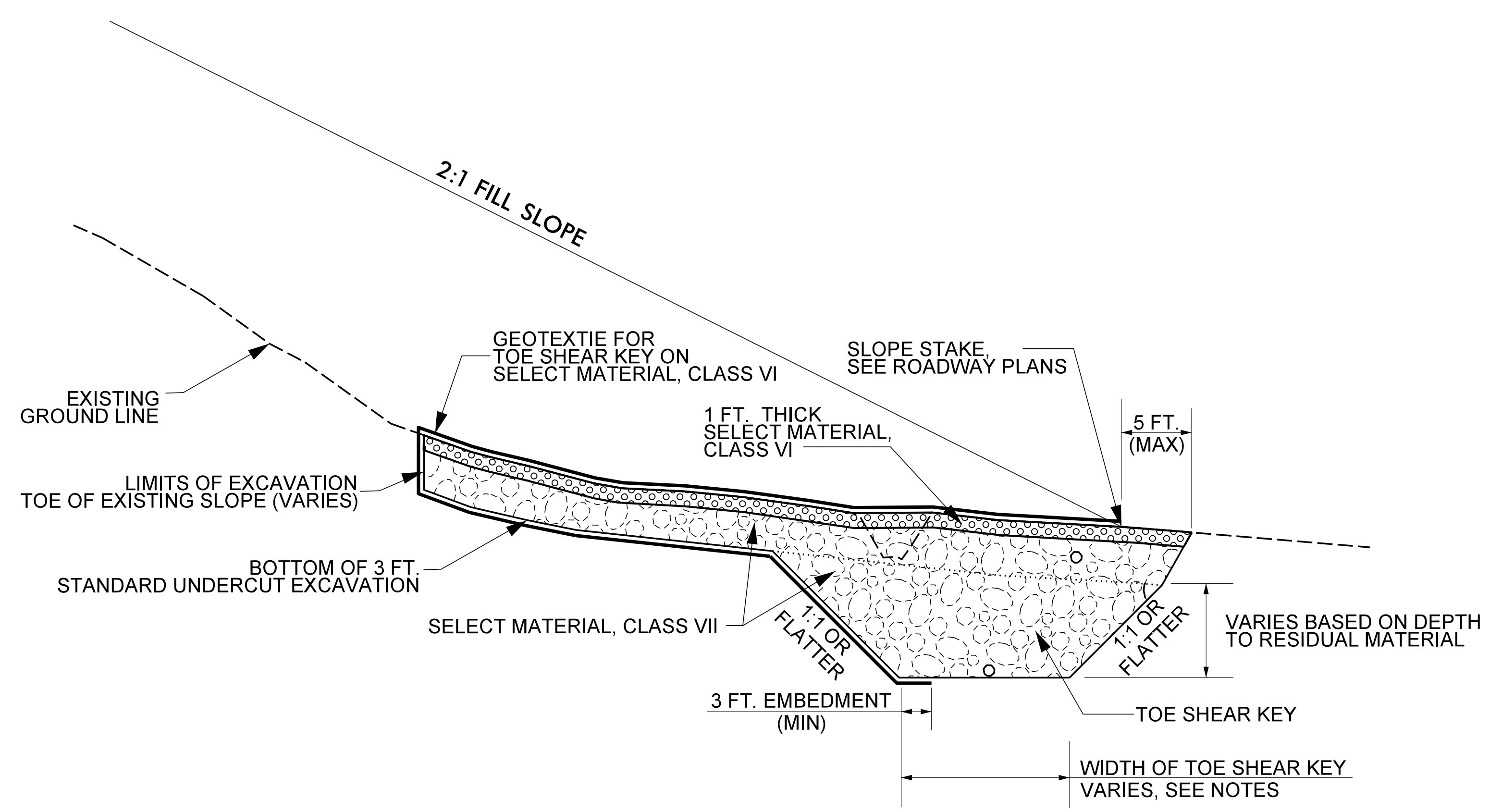
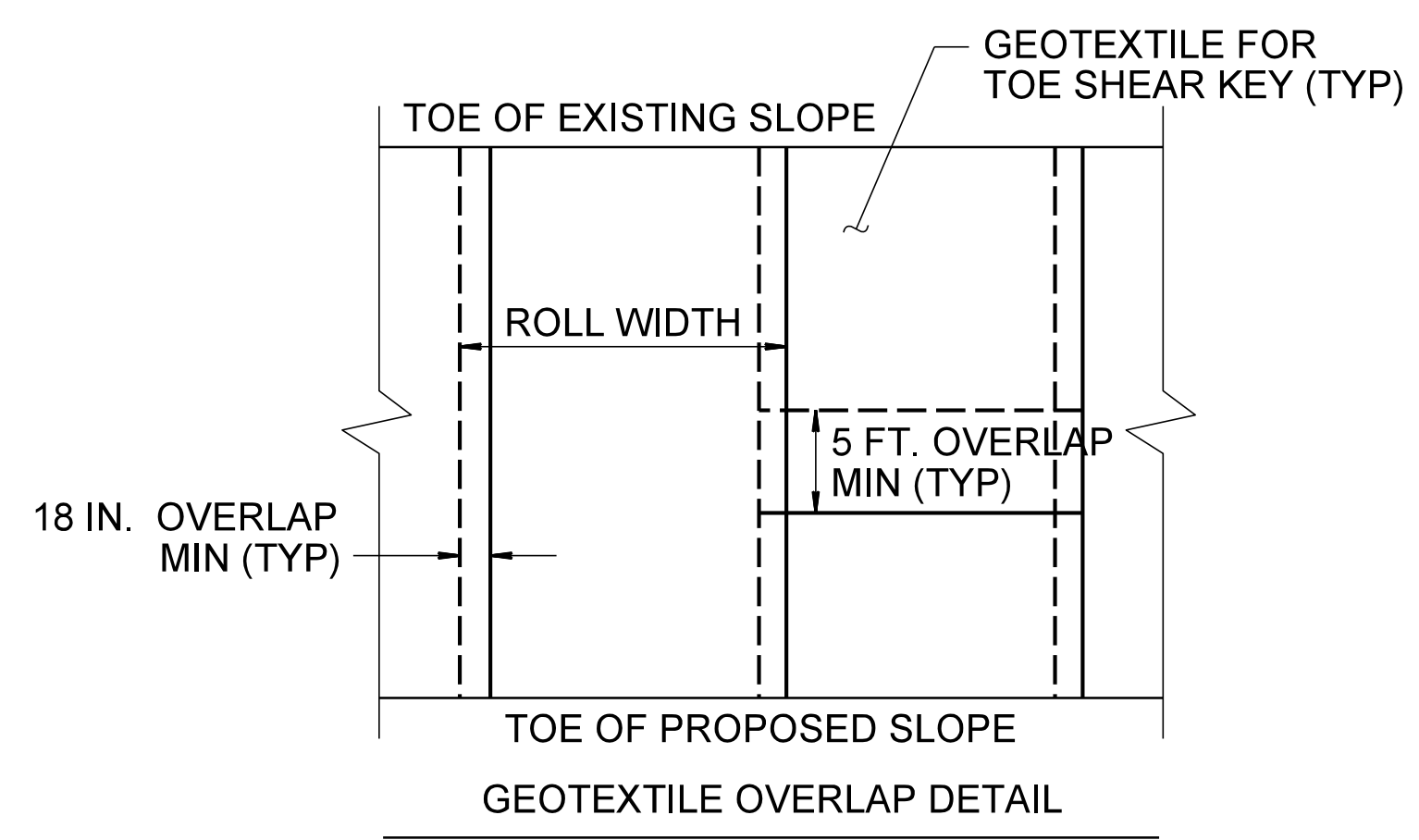
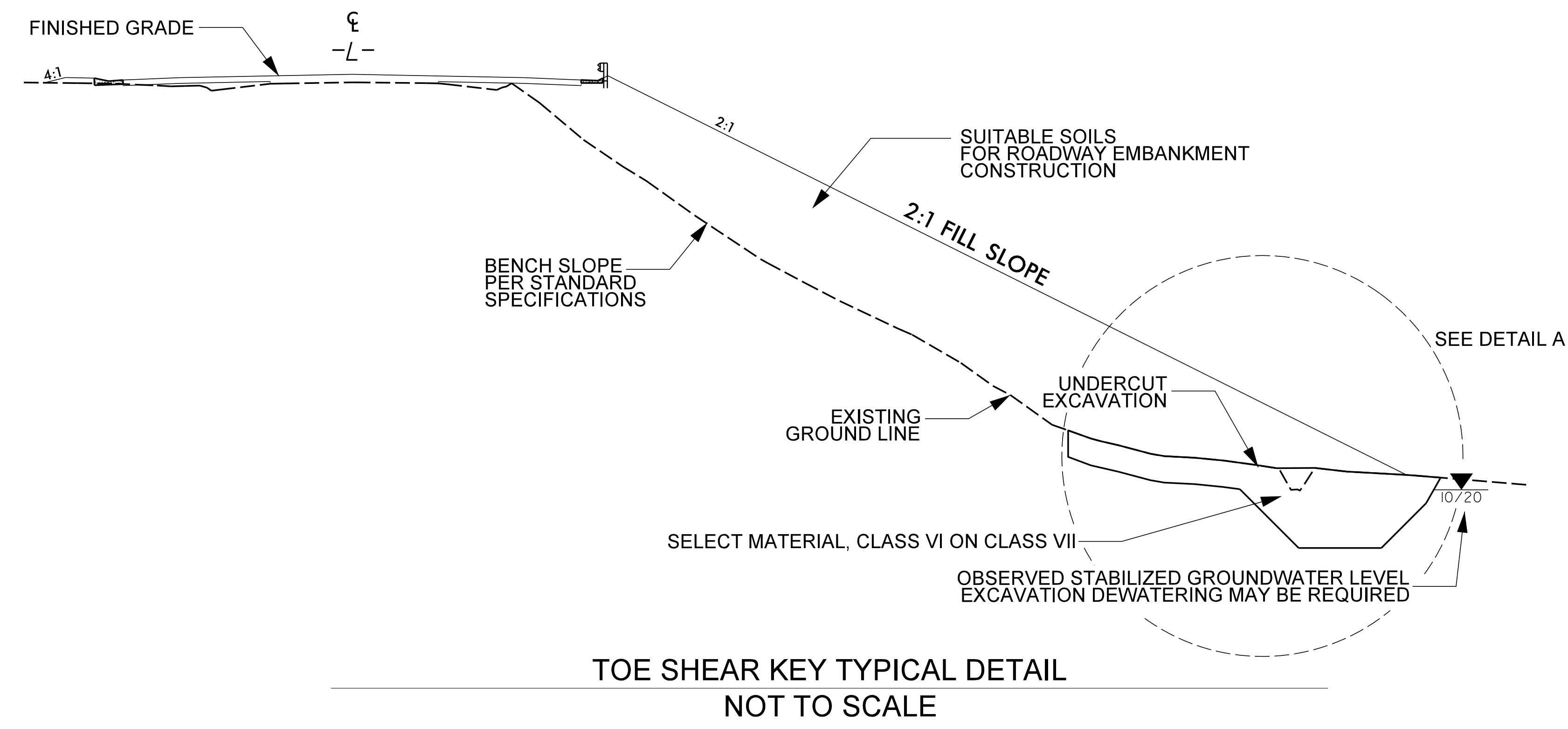
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL CONSTRUCTION DETAILS - ROCK PLATING NOTES & DETAILS

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

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2G-2
GEOTECHNICAL ENGINEER  D. Matthew Brewer 4/28/2022	ENGINEER
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FOR USE IN THE FOLLOWING LOCATIONS, OR AS DIRECTED BY THE ENGINEER
 STATION: -L-, 71+25 TO 72+75 LT & RT
 -L-, 89+50 TO 91+00 RT

NOTES:
 FOR TOE SHEAR KEY, SEE TOE SHEAR KEY SPECIAL PROVISION
 PERFORM UNDERCUT EXCAVATION IN THE AREAS NOTED. UNDERCUT SHOULD EXTEND FROM TOE OF EXISTING SLOPE TO FIVE FEET BEYOND TOE OF PROPOSED SLOPE. UNDERCUT EXCAVATION SHOULD EXTEND TO A DEPTH OF 3 FEET BELOW EXISTING GRADE.
 FOR SELECT MATERIAL, CLASS VII, SEE TOE SHEAR KEY SPECIAL PROVISION.
 FOR SELECT MATERIAL, CLASS VI, SEE TOE SHEAR KEY SPECIAL PROVISION.
 FOR GEOTEXTILE FOR TOE SHEAR KEY AND SELECT MATERIAL, CLASS VI, SEE TOE SHEAR KEY SPECIAL PROVISION
 WIDTH OF TOE SHEAR KEY AT -L-, 71+25 TO 72+75 LT & RT IS 5 FT.
 WIDTH OF TOE SHEAR KEY AT -L-, 89+50 TO 91+00 RT IS 10 FT.

ESTIMATED QUANTITIES TOE SHEAR KEY	
SELECT MATERIAL, CLASS VII	6,250 TON
SELECT MATERIAL, CLASS VI	900 TON
GEOTEXTILE	2,450 SY
UNDERCUT EXCAVATION	3,600 CY

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 4/27/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 4/27/22


Prepared in the Office of:

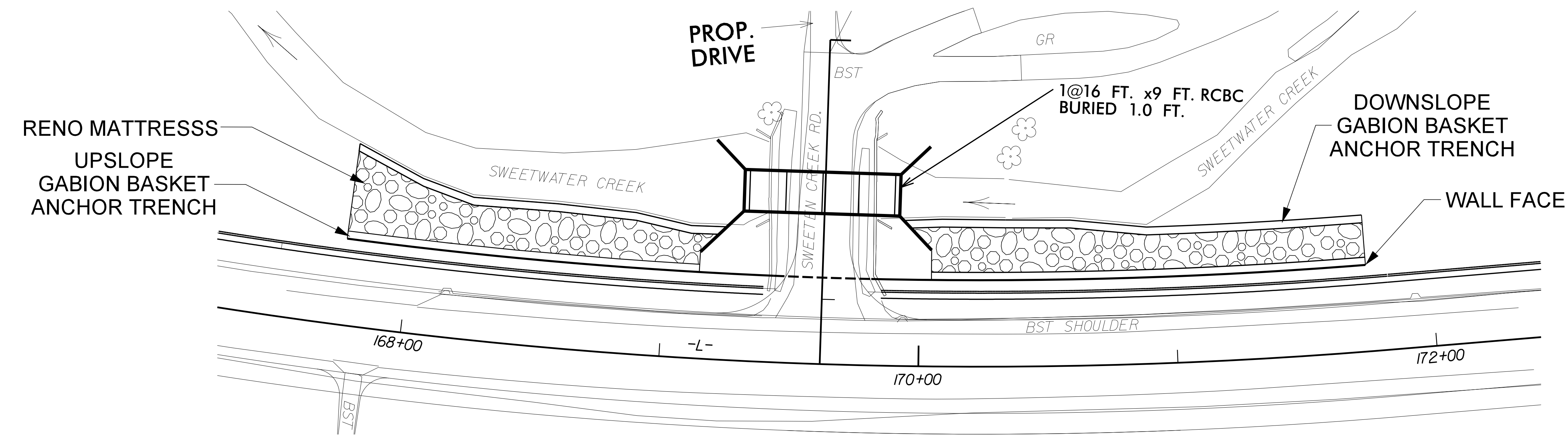


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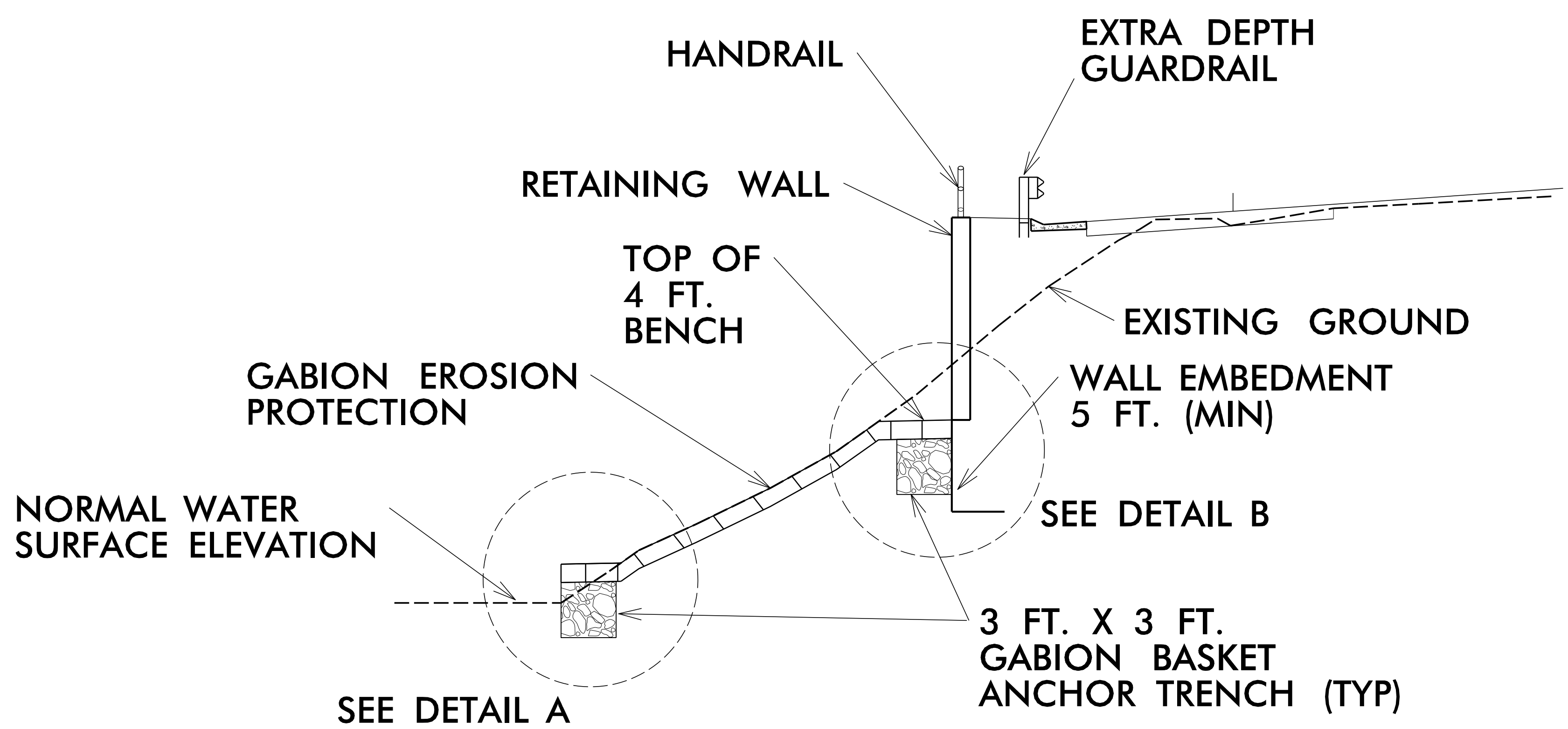
**GEOTECHNICAL
CONSTRUCTION DETAILS -
TOE SHEAR KEY**

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

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2G-3
GEOTECHNICAL ENGINEER  D. Matthew Brewer 4/28/2022	ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



CONSTRUCT GABION EROSION PROTECTION IN FRONT OF RETAINING WALL #4
 -L- STATION 168+75 TO 171+75, LT
GABION EROSION PROTECTION PLAN VIEW
 NOT TO SCALE



GABION EROSION PROTECTION TYPICAL DETAIL
 NOT TO SCALE

FOR USE IN THE FOLLOWING LOCATIONS, OR AS DIRECTED BY THE ENGINEER
 STATION: -L-, 168+75 TO 171+75 LEFT.

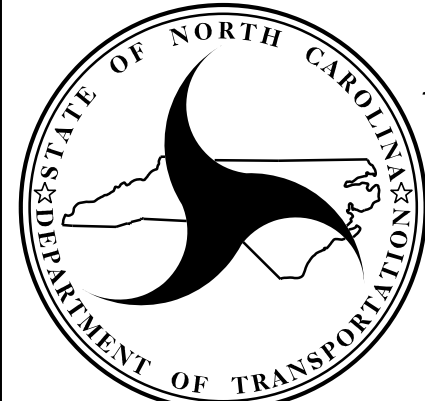
ESTIMATED QUANTITIES GABION EROSION PROTECTION	
GABION BASKETS (FACE AREA)	2,400 SF
RENO MATTRESS (SLOPE AREA)	14,000 SF
RIP RAP, CLASS A OR CLASS B (8 IN. MAX SIZE)	1,700 TON
GEOTEXTILE, TYPE 2	1,600 SY

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 4/27/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 4/27/22

Prepared in the Office of:




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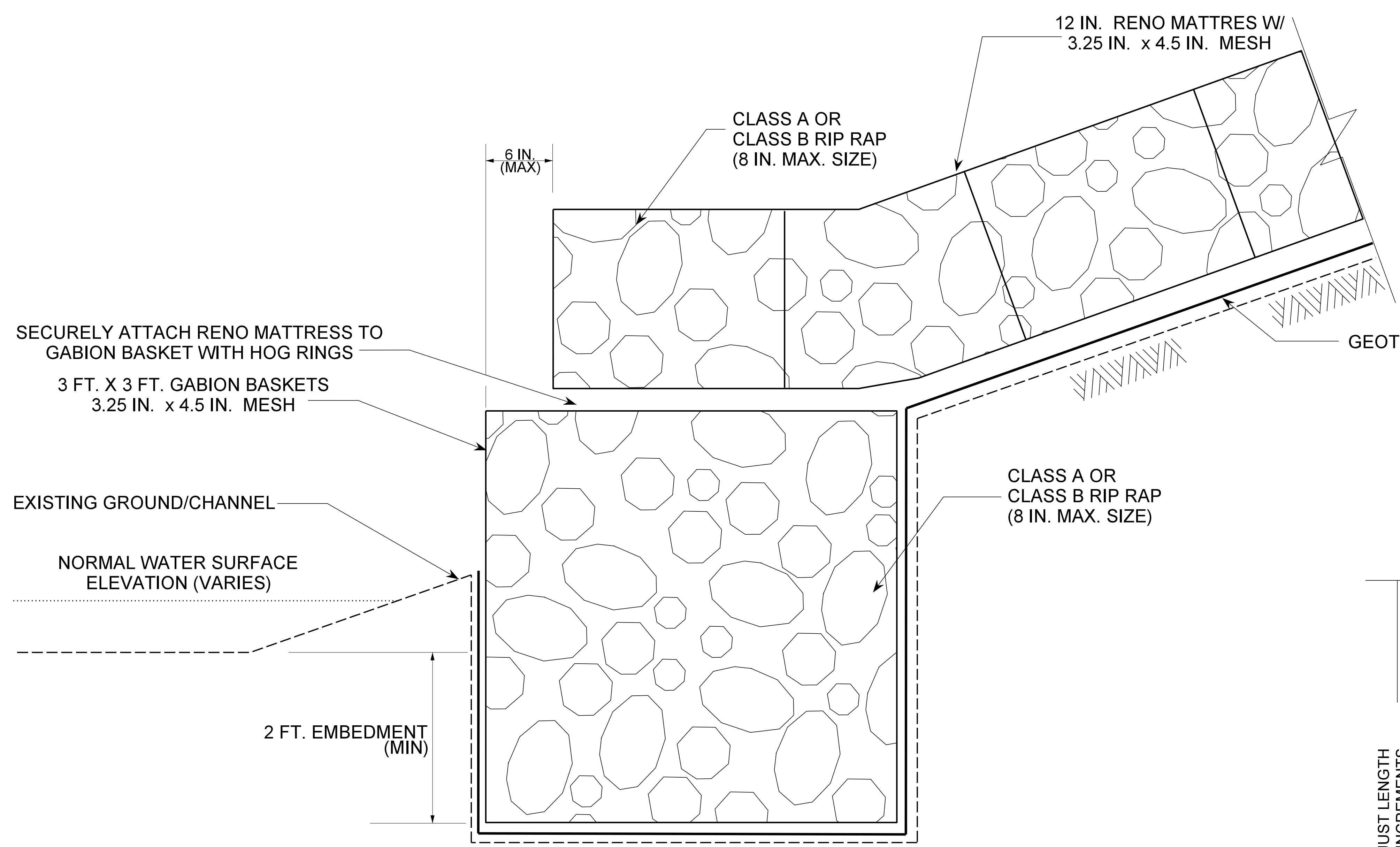


NORTH CAROLINA
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**GEOTECHNICAL
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GEOTECHNICAL CONSTRUCTION DETAILS - GABION EROSION PROTECTION (SHEET 1 OF 3)					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2G-4
GEOTECHNICAL ENGINEER  D. Matthew Brewer 4/28/2022	ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



SECURELY ATTACH RENO MATTRESS TO GABION BASKET WITH HOG RINGS

3 FT. X 3 FT. GABION BASKETS
3.25 IN. x 4.5 IN. MESH

EXISTING GROUND/CHANNEL

NORMAL WATER SURFACE ELEVATION (VARIES)

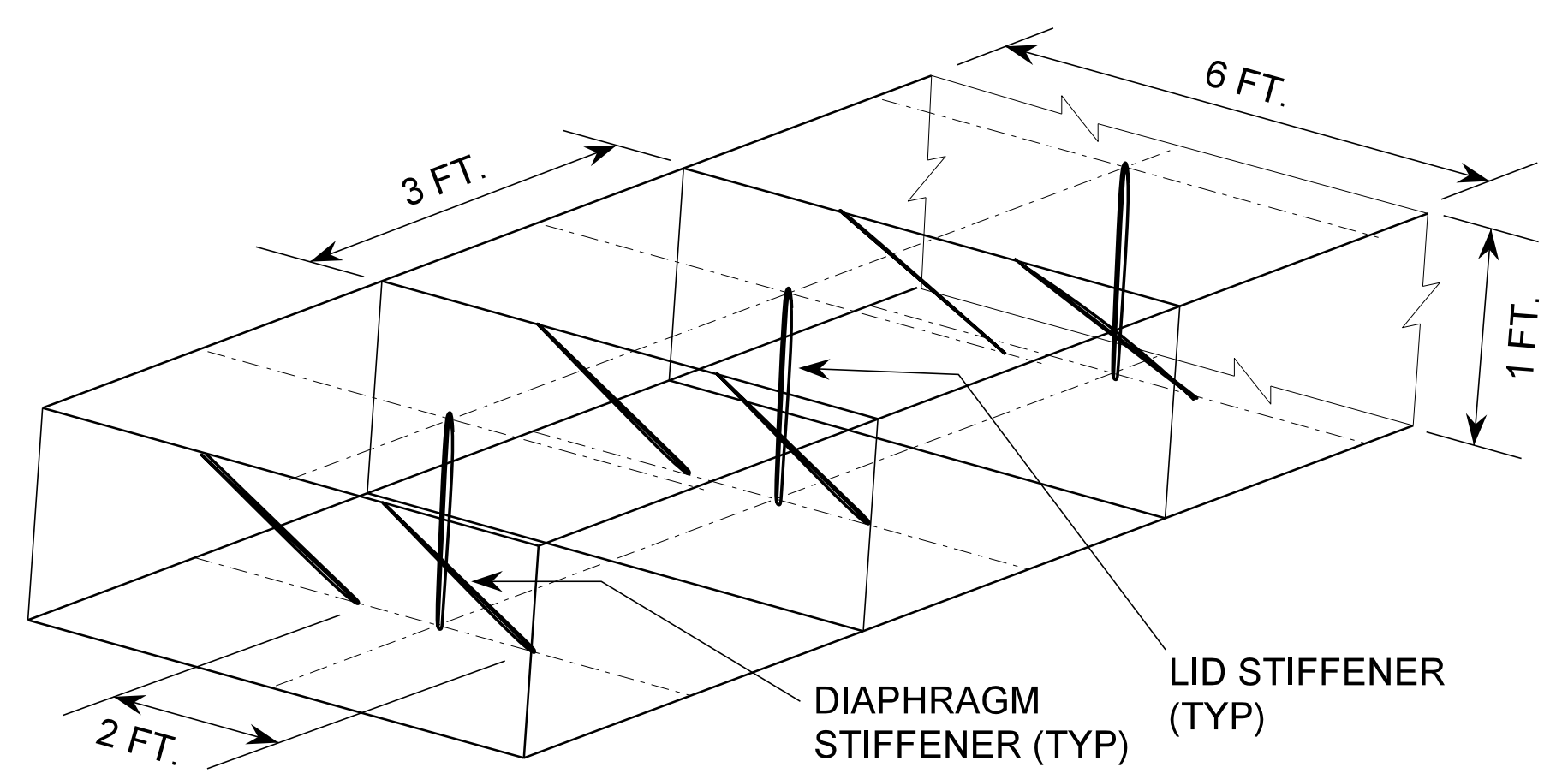
2 FT. EMBEDMENT (MIN)

CLASS A OR CLASS B RIP RAP (8 IN. MAX. SIZE)

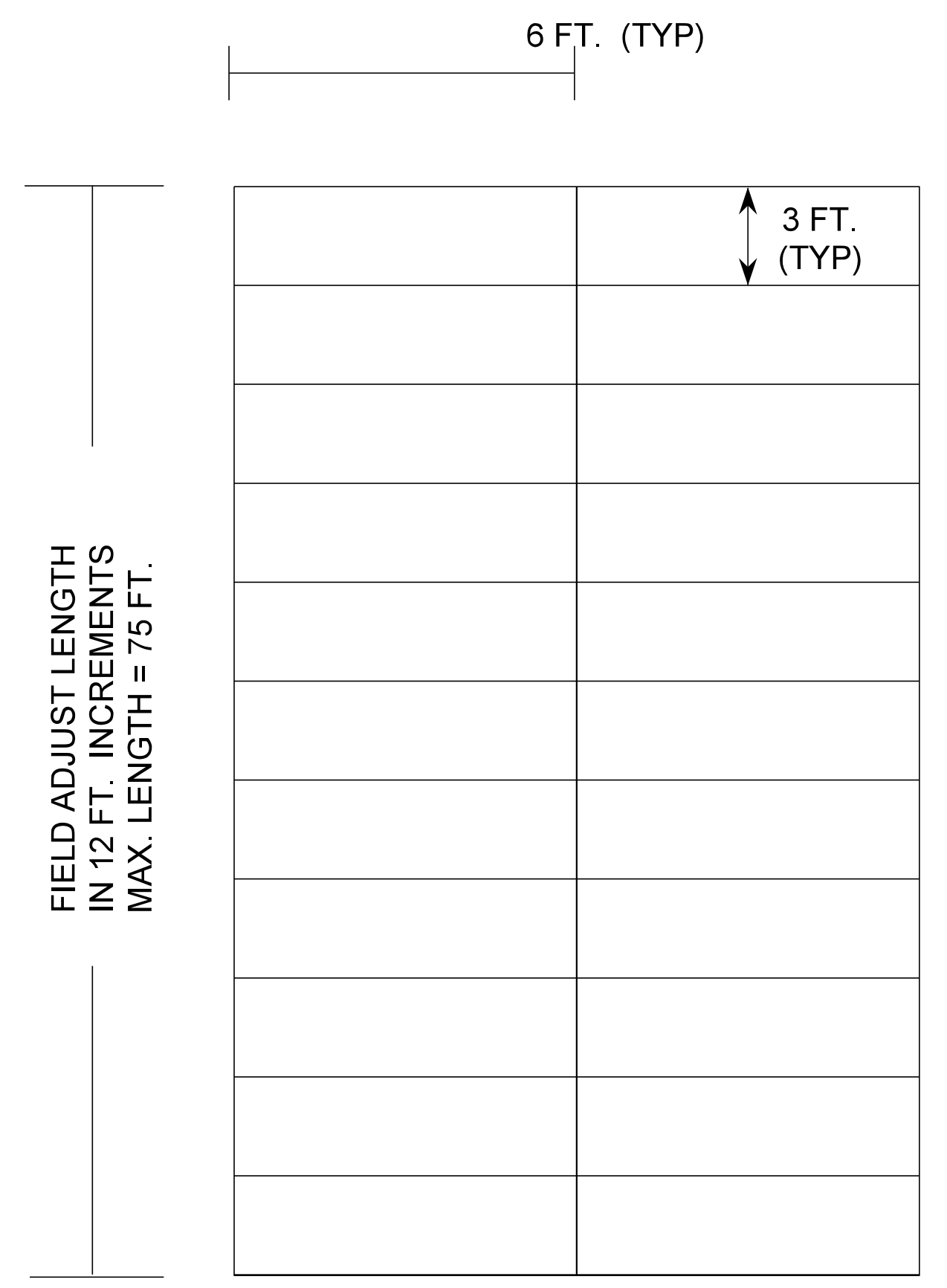
CLASS A OR CLASS B RIP RAP (8 IN. MAX. SIZE)

GEOTEXTILE, TYPE 2

DETAIL A
NOT TO SCALE



STIFFENER DETAIL
NOT TO SCALE



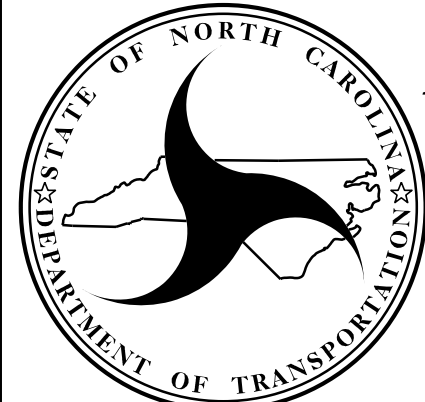
PLAN VIEW - RENO MATTRESS
NOT TO SCALE

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 4/27/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 4/27/22

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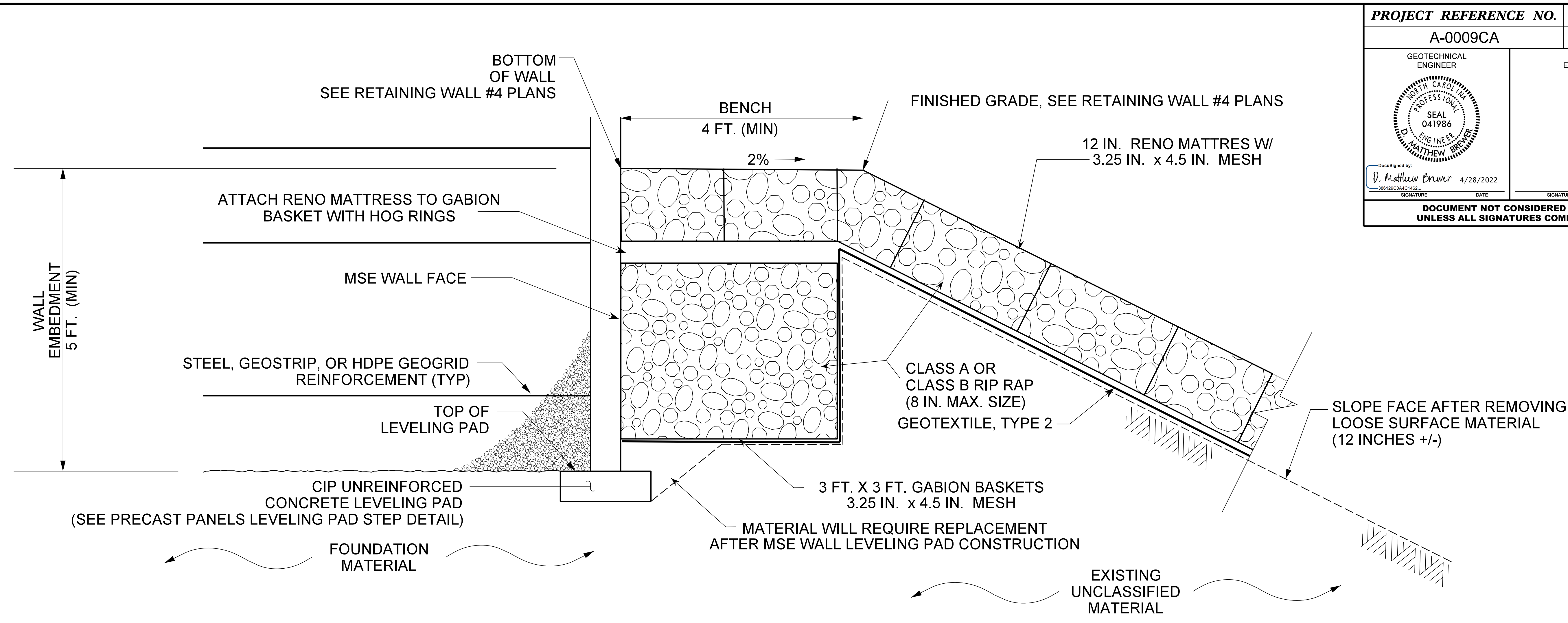
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL CONSTRUCTION DETAILS - GABION EROSION PROTECTION (SHEET 2 OF 3)

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

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2G-5
GEOTECHNICAL ENGINEER  D. Matthew Brewer 4/28/2022 SIGNATURE DATE	ENGINEER SIGNATURE DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



DETAIL B
NOT TO SCALE

NOTES:

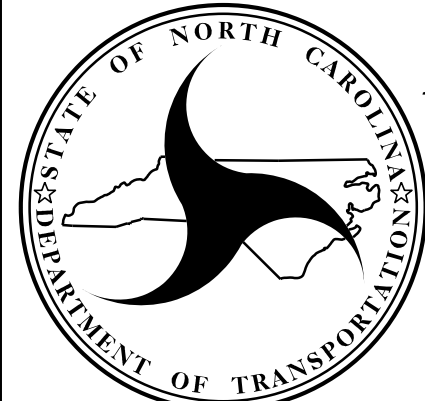
- FOR GABION EROSION PROTECTION, SEE SPECIAL PROVISION.
- EXCAVATE A MINIMUM OF 2 FT. BELOW THE STREAM BED ELEVATION AND INSTALL 3 FT. X 3 FT. GABION BASKETS AND FILL WITH CLASS A OR CLASS B RIP RAP.
- AT RETAINING WALL #4 FRONT BENCH, EXCAVATE 3 FT. DEEP AND 3 FT. IN FRONT OF WALL FACE TO INSTALL UPSLOPE GABION BASKET ANCHOR TRENCH. UPSLOPE GABION BASKET WILL BE FULLY EMBEDDED BELOW GRADE IN FRONT OF RETAINING WALL #4.
- CLEAN SLOPE OF LOOSE MATERIAL BEFORE INSTALLING GEOTEXTILE.

PREPARED BY: D. MATTHEW BREWER, P.E.	DATE: 4/27/22
REVIEWED BY: ROBERT E. KRAL, P.E.	DATE: 4/27/22

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**GEOTECHNICAL
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**GEOTECHNICAL
CONSTRUCTION DETAILS -
GABION EROSION PROTECTION
(SHEET 3 OF 3)**

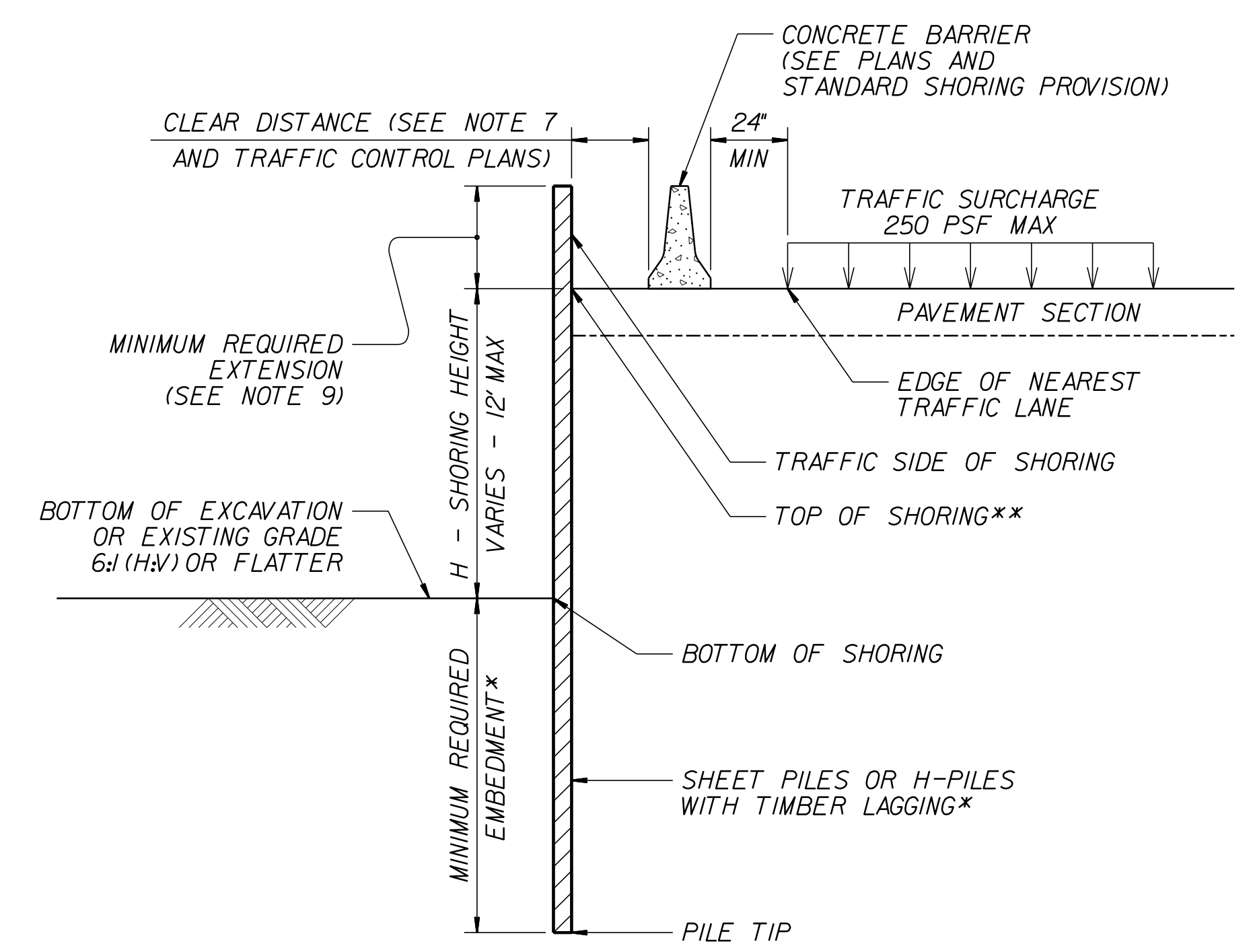
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2G-6
GEOTECHNICAL ENGINEER  D. Matthew Brewer 5/24/2022 3881262046166 SIGNATURE DATE SIGNATURE DATE	ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

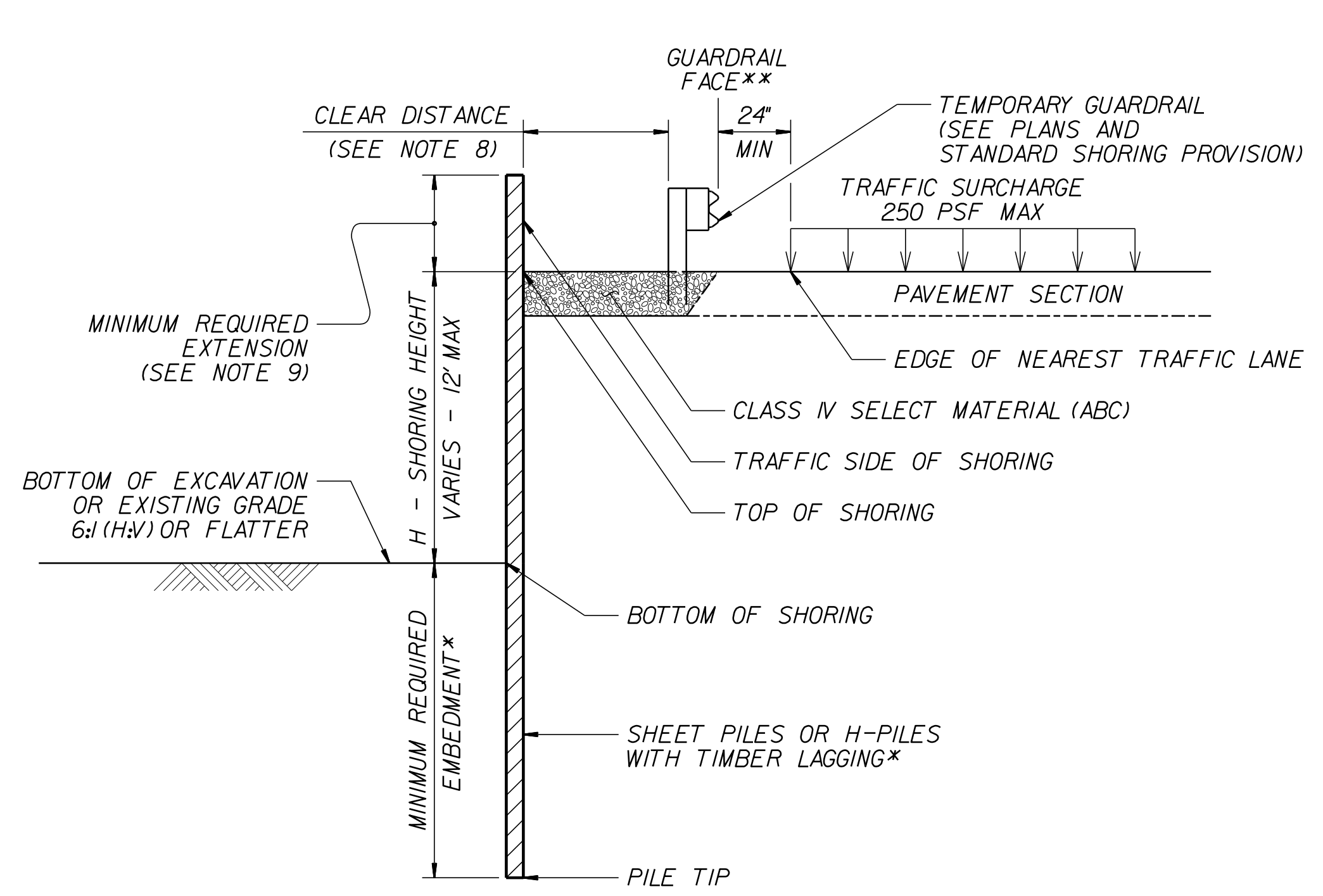
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS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

- 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.

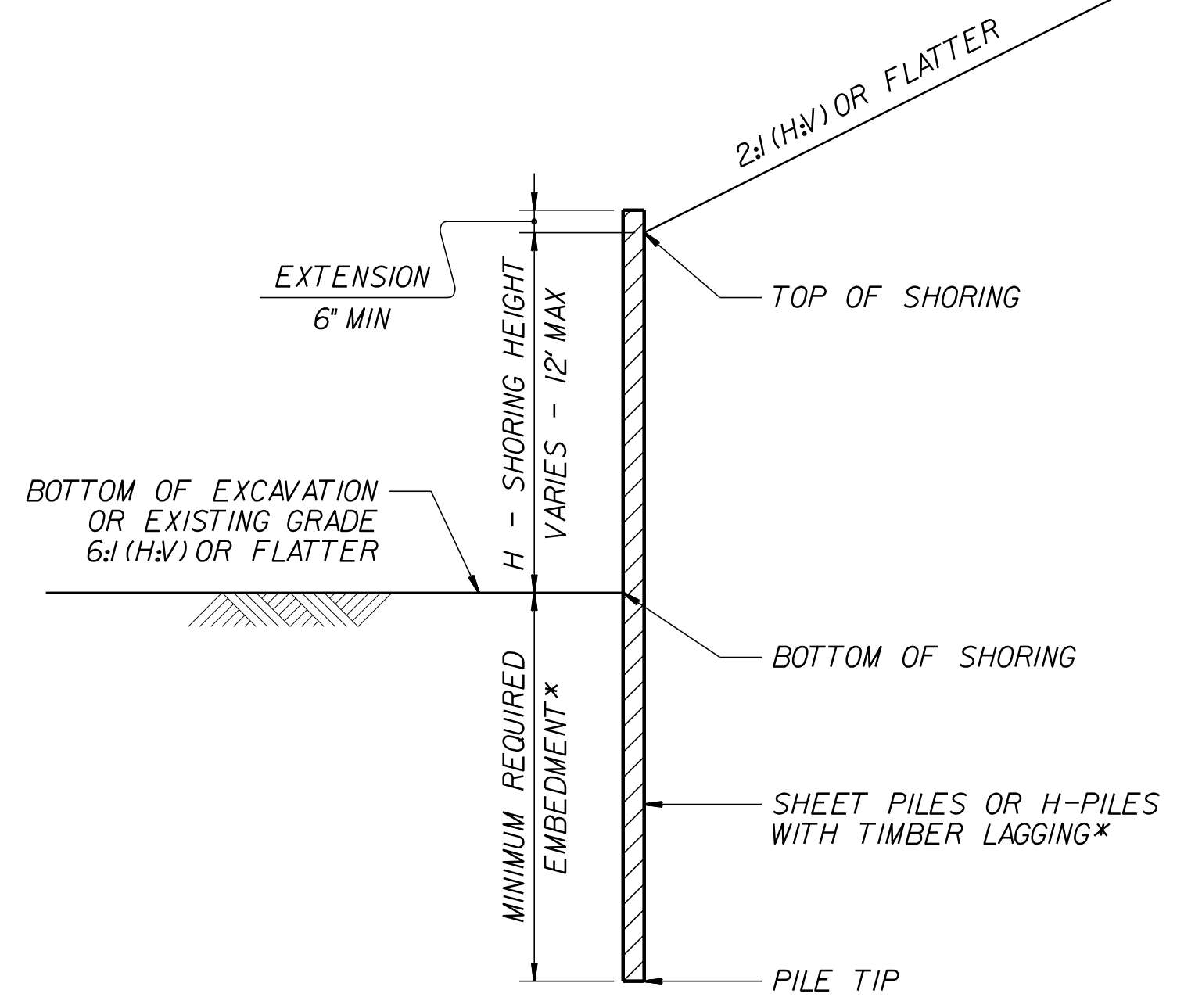
MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS
***DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".**



CONCRETE BARRIER
****TOP OF SHORING = EDGE OF PAVEMENT**

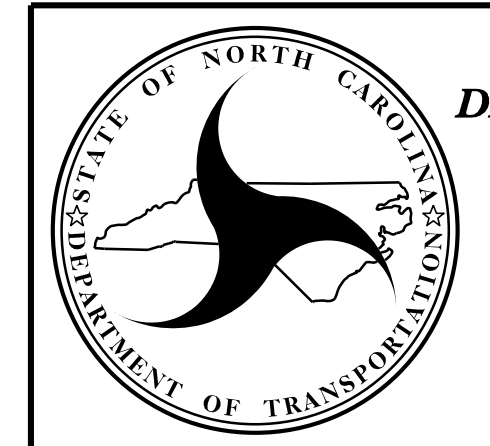


TEMPORARY GUARDRAIL
****GUARDRAIL FACE = EDGE OF PAVEMENT**




STANDARD TEMPORARY SHORING (SLOPE CASE)
***SEE TABLE ABOVE.**

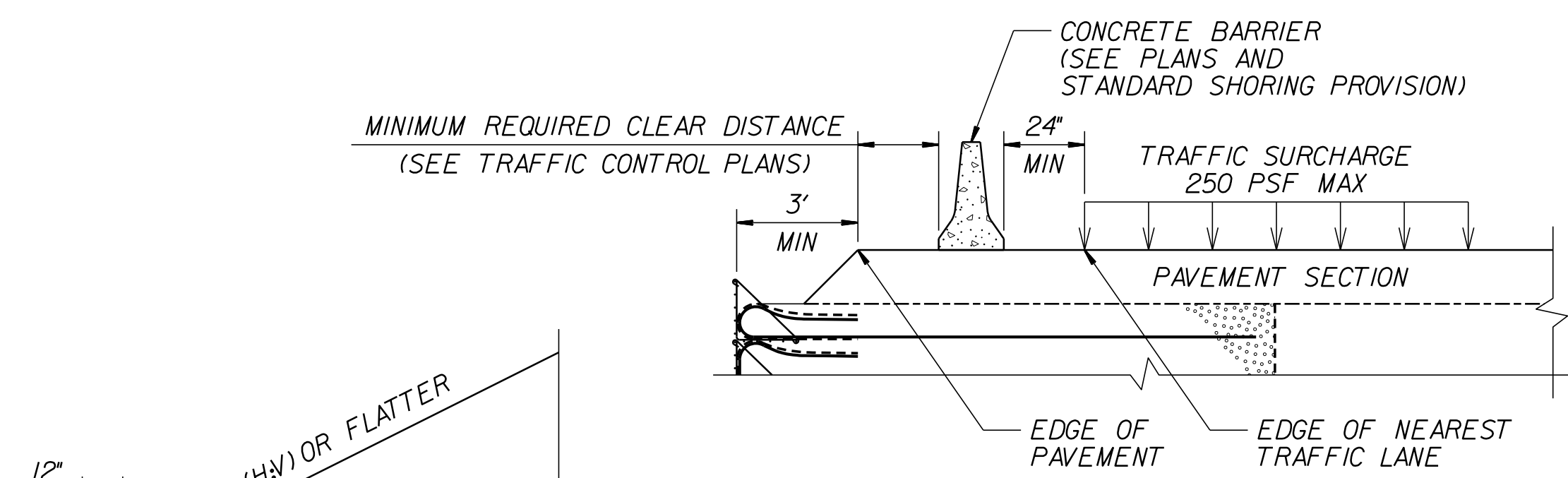
STANDARD TEMPORARY SHORING (SURCHARGE CASE)
***SEE TABLE ABOVE.**



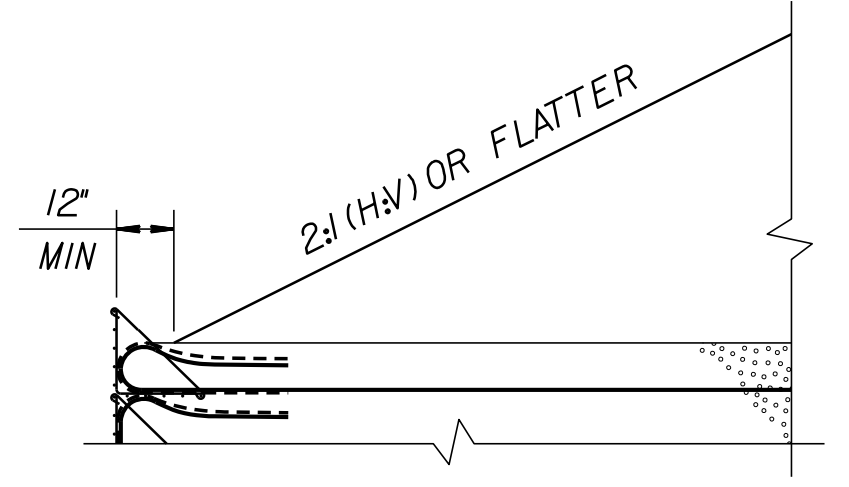
NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
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GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.01
STANDARD TEMPORARY SHORING
 DATE: 11-19-13

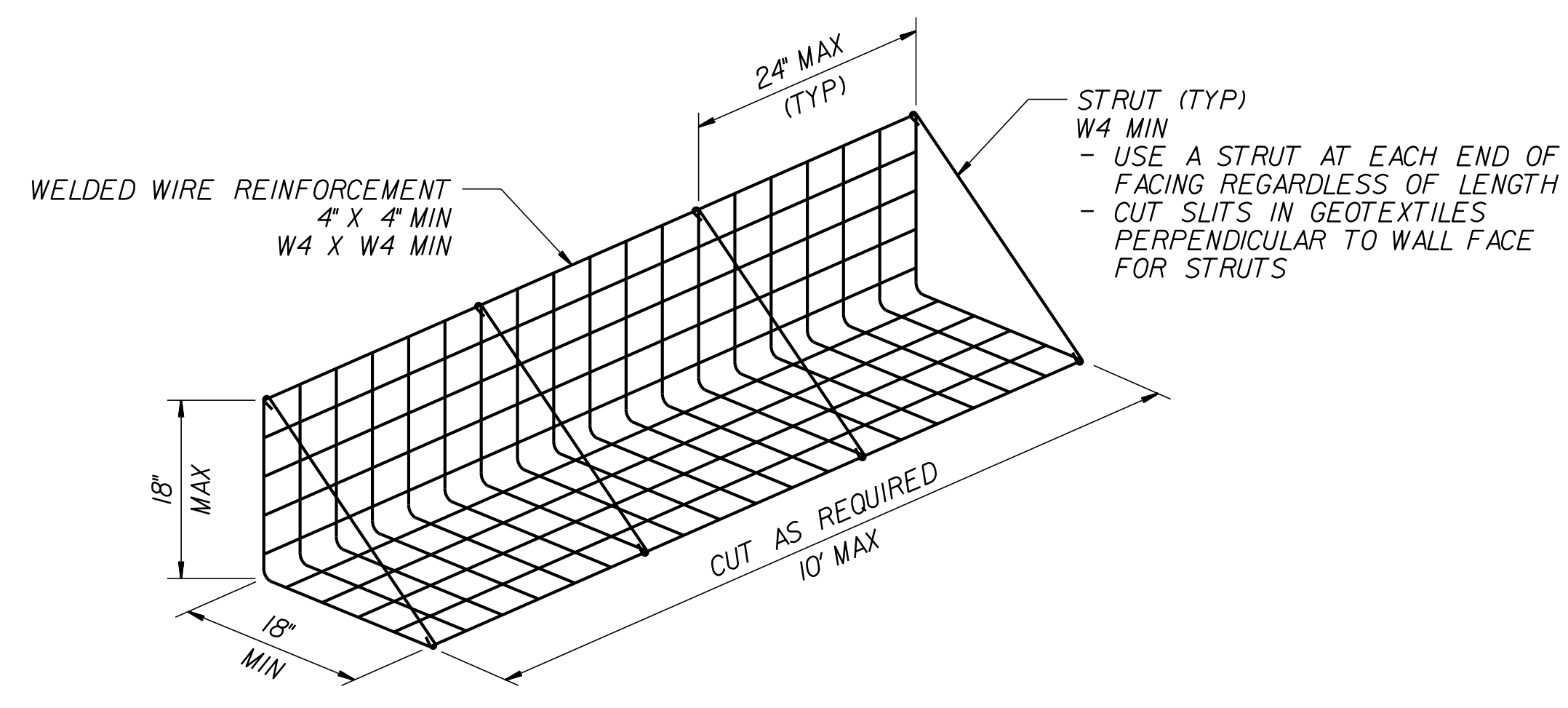
PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2G-7
GEOTECHNICAL ENGINEER  D. Matthew Brewer 5/24/2022 3881262046166 SIGNATURE DATE	ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



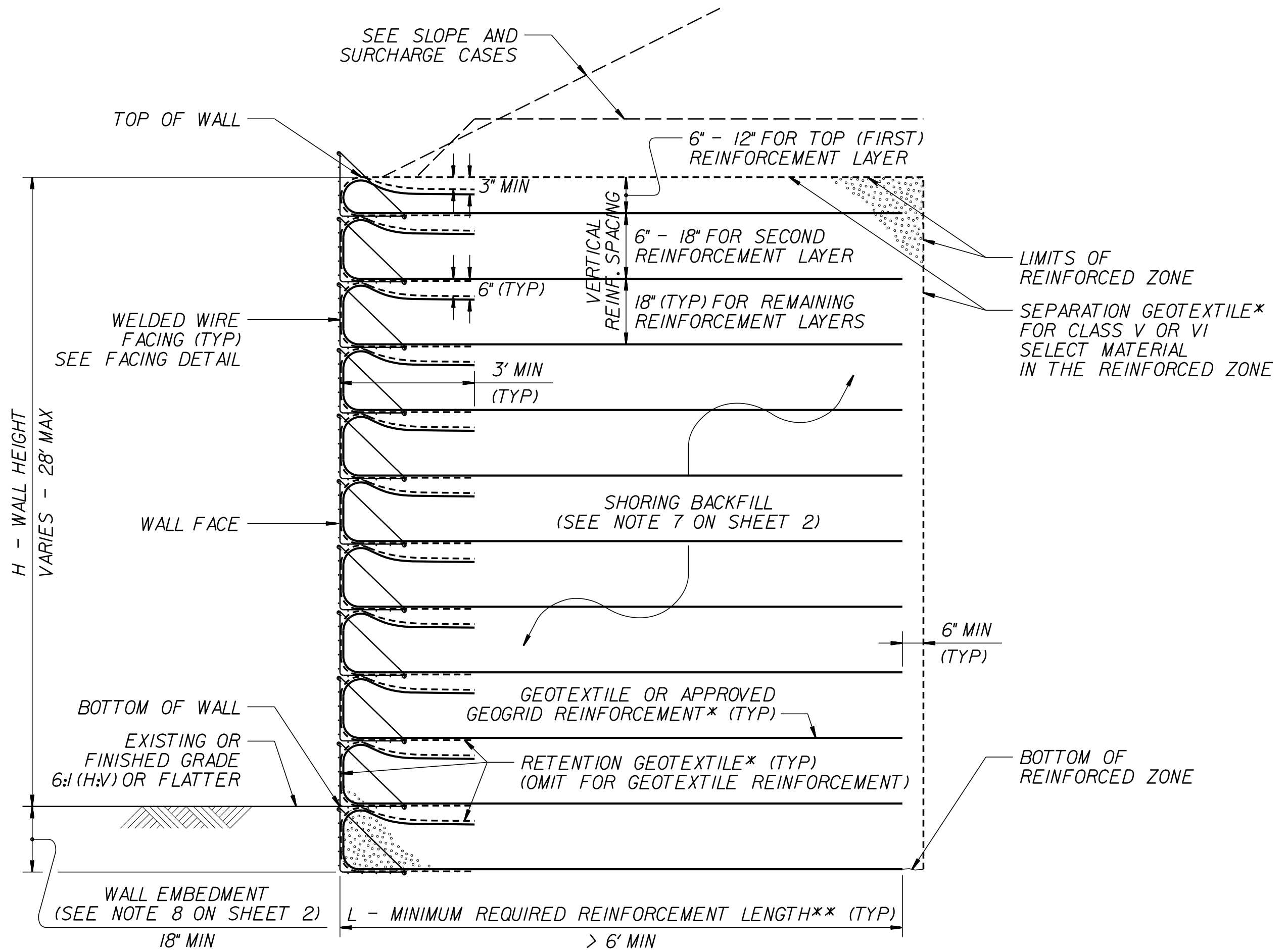
SURCHARGE CASE



SLOPE CASE

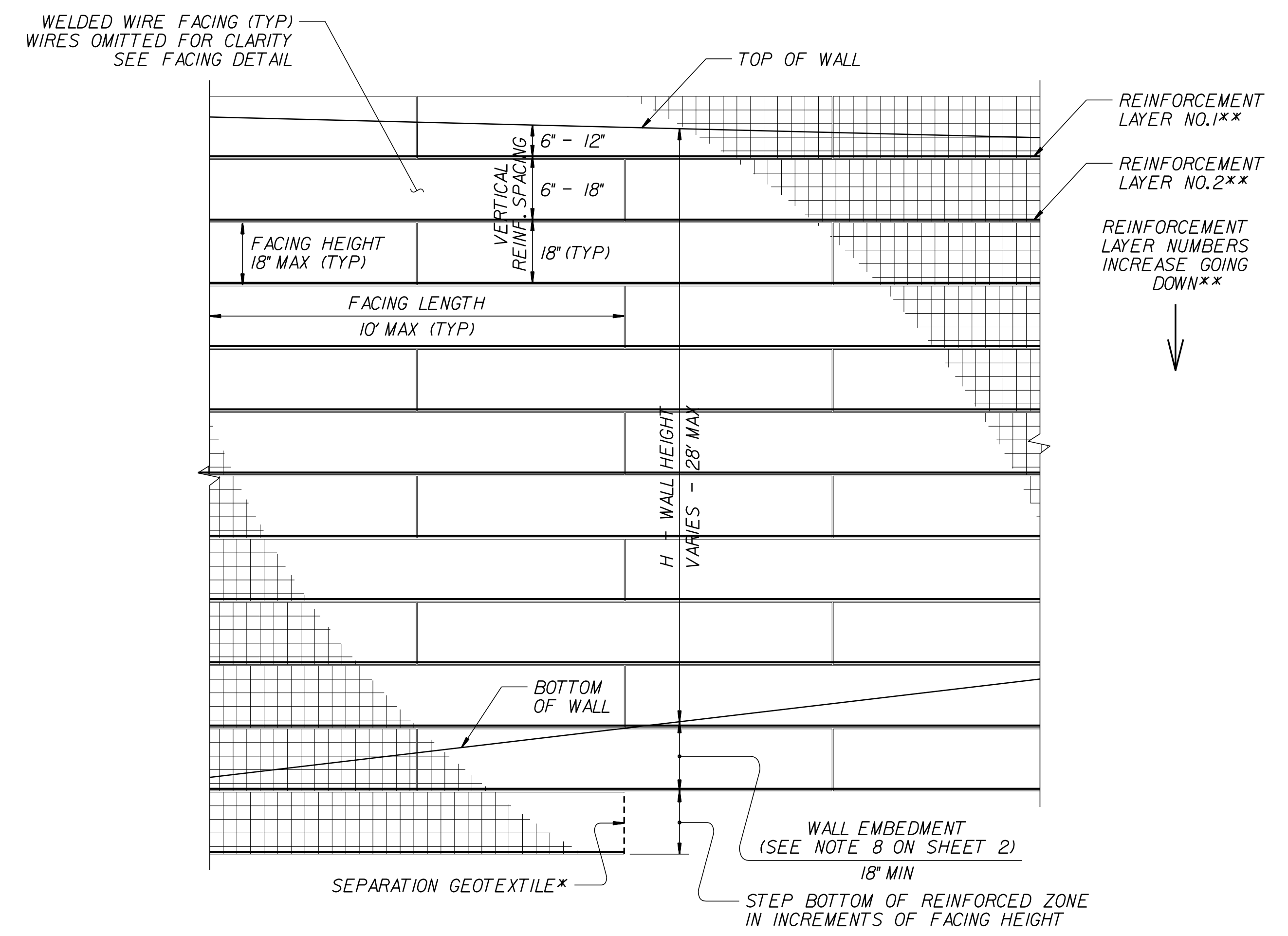


FACING DETAIL



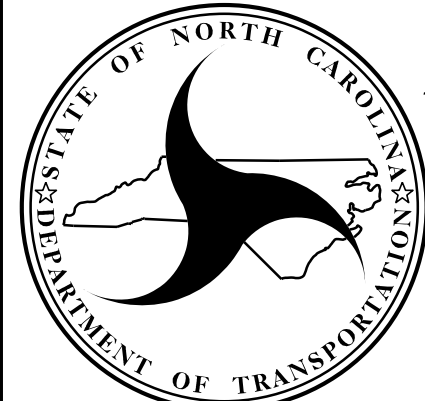
STANDARD TEMPORARY WALL

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



STANDARD TEMPORARY WALL – PARTIAL ELEVATION

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




NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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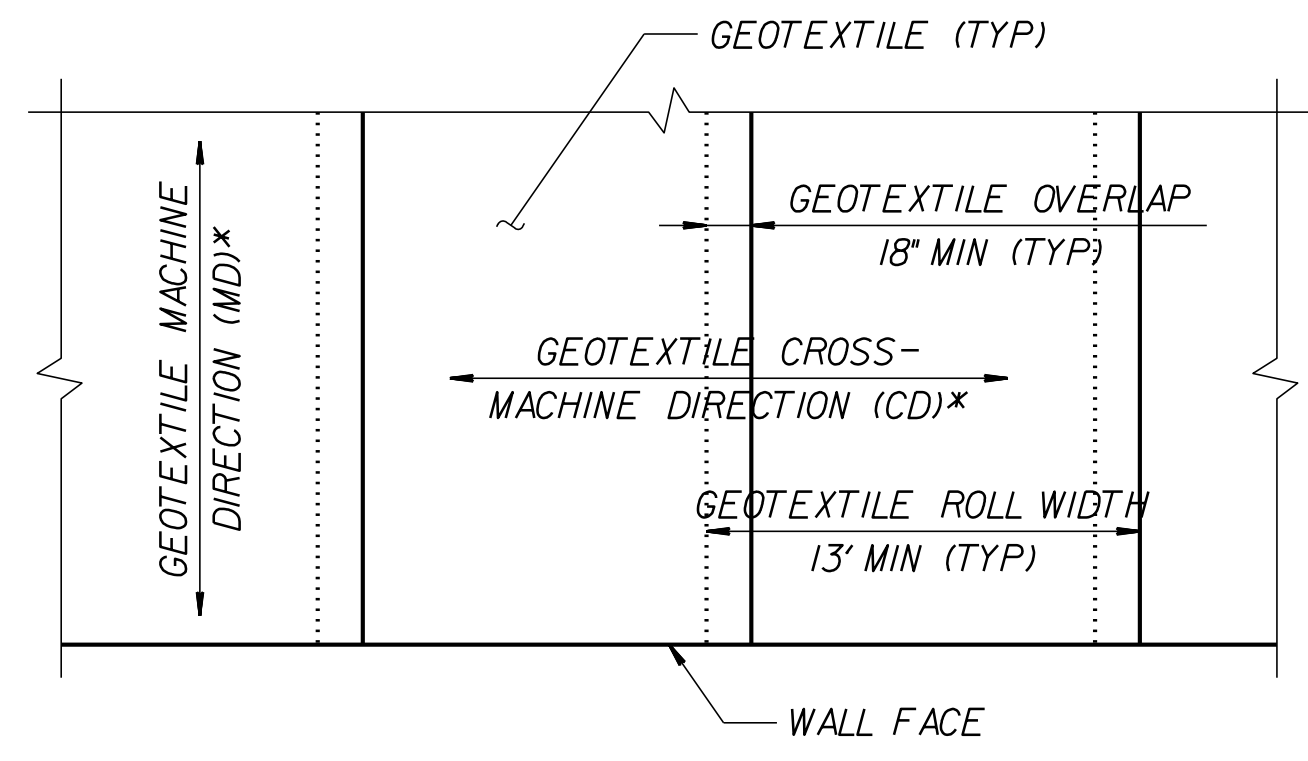
GEOTECHNICAL
ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

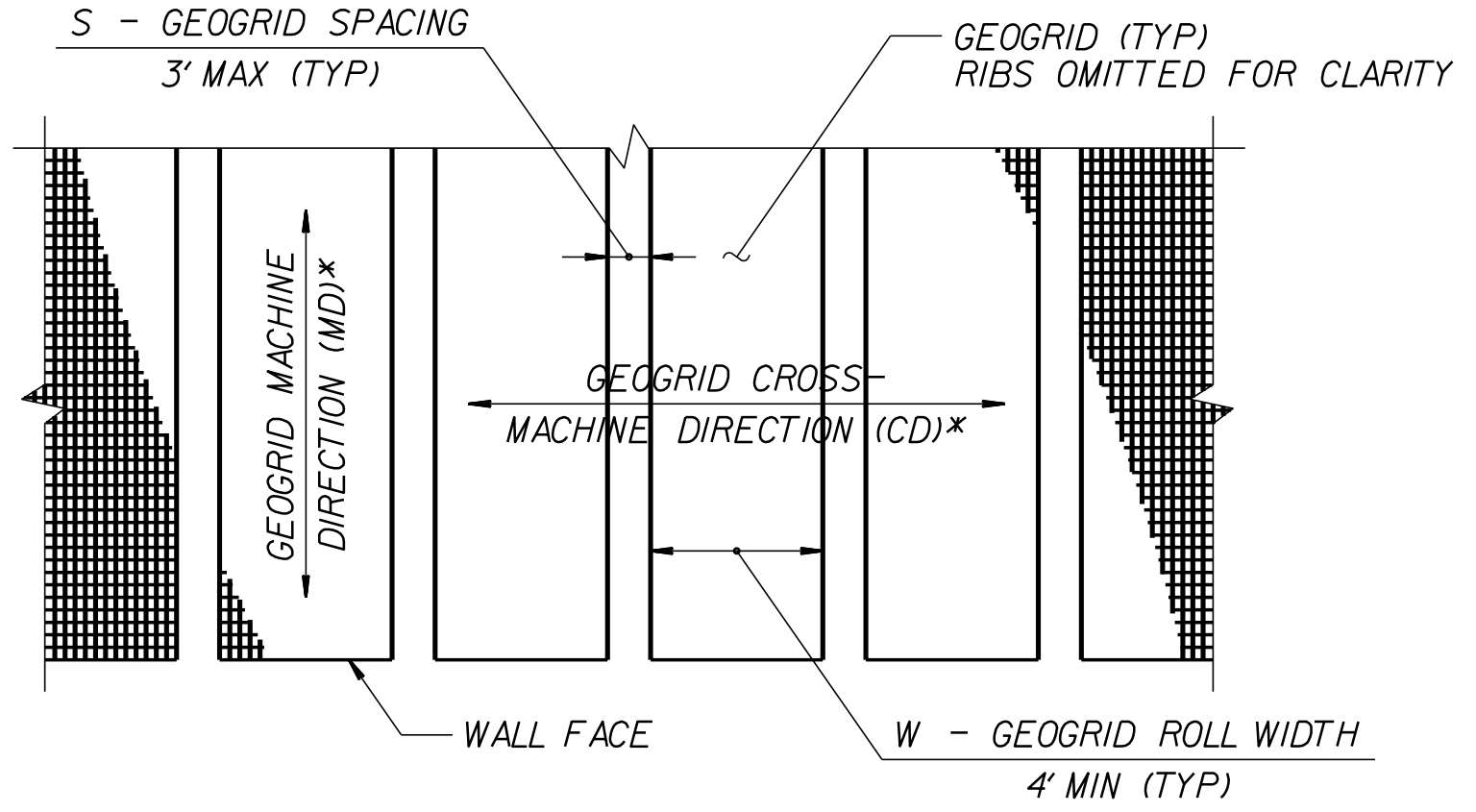
STANDARD
TEMPORARY WALL
SHEET 1 OF 3

 DATE: 11-19-13

PROJECT REFERENCE NO. A-0009CA		SHEET NO. 2G-8
GEOTECHNICAL ENGINEER  D. Matthew Brewer 5/24/2022 38812620461663		ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

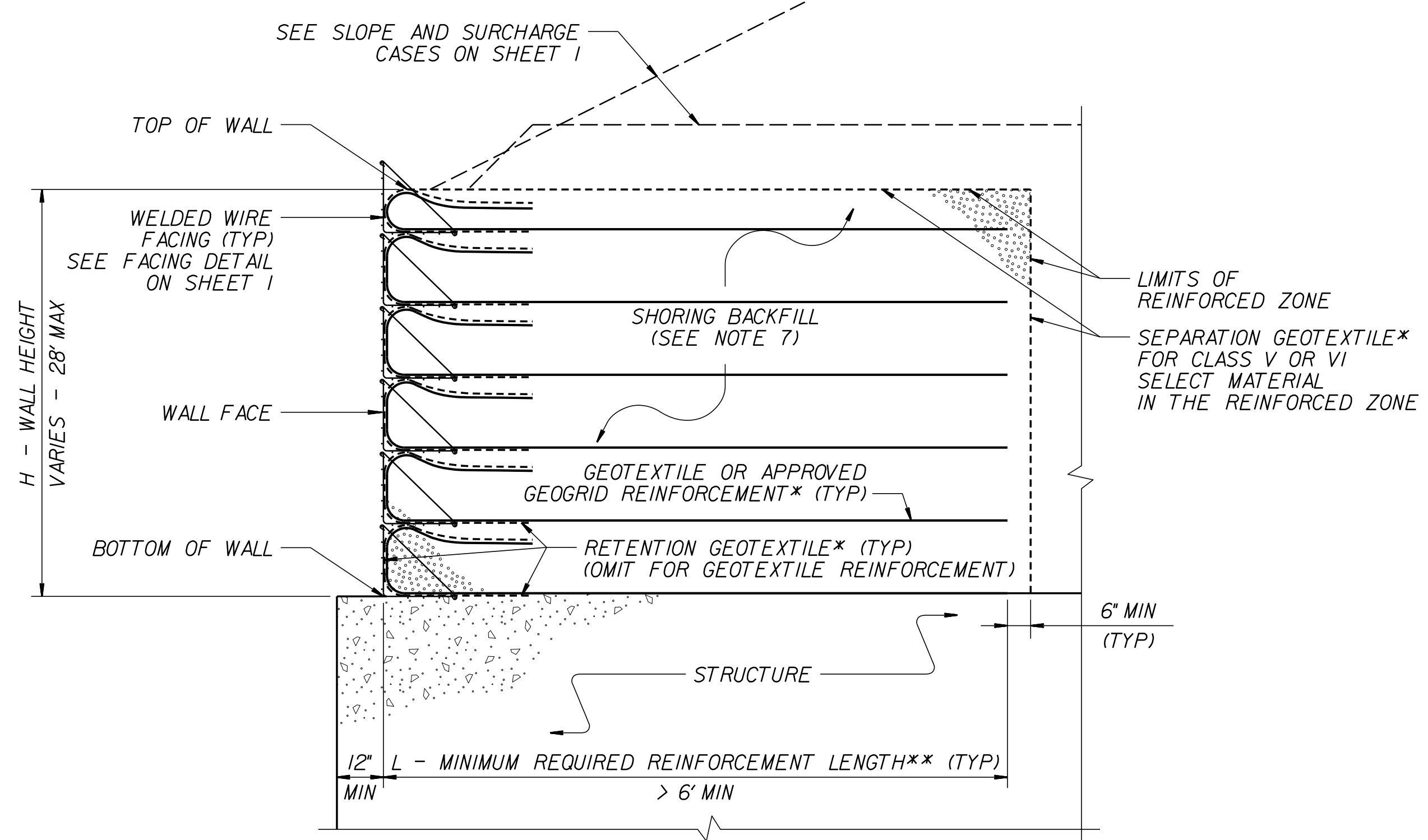


GEOTEXTILE PLACEMENT
(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



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

GEOSYNTHETIC PLACEMENT DETAILS
(PLAN VIEW)
*SEE NOTE 12.



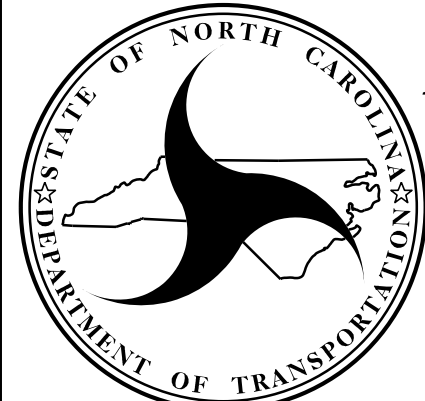
TEMPORARY WALL ON STRUCTURE DETAIL
*SEE GEOSYNTHETIC PLACEMENT DETAILS.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NOTES:

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

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

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




NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 2 OF 3

DATE: 10-19-21

PROJECT REFERENCE NO. A-0009CA	SHEET NO. 2G-9
 GEOTECHNICAL ENGINEER	ENGINEER
Documented by: D. Matthew Brewer 5/24/2022 <small>3881262046166 SIGNATURE DATE</small>	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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

L - MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)
(FOR ALL REINFORCEMENT TYPES)

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

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

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

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

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

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

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD
(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.02
STANDARD TEMPORARY WALL SHEET 3 OF 3
DATE: 11-19-13

COMPUTED BY: SGM DATE: 4/25/2022
 CHECKED BY: JLT DATE: 4/29/2022

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

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Undercut	Embank. +%	Borrow	Waste
Onsite Detour						
DET_S5 10+00.00	DET_S5 23+33.00	682		2,425	1,743	
DET_S8 10+00.00	DET_S8 22+25.00	4,047		3,663		384
DET_DR1A 10+00.00	DET_DR1A 14+00.15	92		4,939	4,847	
SUBTOTAL 1		4,821		11,027	6,590	384
Detour Removal						
Removal of Detour DET_S5		94		1,251	1,157	
Removal of Detour DET_S8		38		3,405	3,367	
Removal of Detour DET_DR1A		4,295		83		4,212
SUBTOTAL 2		4,427		4,739	4,524	4,212
-L- 10+20.02	-L- 40+00.00	2,560		5,801	3,241	
-L- 35+25.00	-L- 36+75.00		400			400
Dry Detention Basin #2						
-Y1- 13+70.00		629		2,132	1,503	
Dry Detention Basin #1						
-DR2- 10+26.00	-DR2- 11+60.00	329		1		328
SUBTOTAL 3		4,128	400	7,934	4,744	1,338
-L- 40+00.00	-L- 70+50.00	8,572		13,231	4,659	
-L- 42+25.00	-L- 45+75.00		550			550
-L- 56+25.00	-L- 59+75.00		740			740
-Y6- 11+05.00	-Y6- 12+85.70	7		15	8	
SUBTOTAL 4		8,579	1,290	13,246	4,667	1,290
-L- 70+50.00	-L- 100+00.00	44,928		35,294		9,634
-L- 71+25.00	-L- 72+75.00		690			690
SUBTOTAL 5		44,928	690	35,294	3,755	10,324
-L- 100+00.00	-L- 129+00.00	4,819		8,574	3,755	
-L- 108+25.00	-L- 108+75.00		140			140
-L- 113+75.00	-L- 119+25.00		1,460			1,460
SUBTOTAL 6		4,819	1,600	8,574	3,755	1,600
-L- 129+00.00	-L- 158+00.00	8,868		13,953	5,085	
-L- 133+25.00	-L- 139+25.00		1,870			1,870
-L- 149+25.00	-L- 150+75.00		250			250
SUBTOTAL 7		8,868	2,120	13,953	5,085	2,120
-L- 158+00.00	-L- 185+00.00	1,052		16,544	15,492	
-L- 157+25.00	-L- 160+75.00		560			560
-L- 162+75.00	-L- 164+75.00		380			380
-L- 171+75.00	-L- 175+25.00		970			970
-L- 179+25.00	-L- 185+00.00		1,454			1,454
-DR1A- 10+05.00	-DR1A- 11+07.00	13		851	838	
-DR1- 10+20.00	-DR1- 11+71.39	1		553	552	
SUBTOTAL 8		1,066	3,364	17,948	16,882	3,364
-L- 185+00.00	-L- 208+00.00	3734		6707	2,973	
-L- 185+00.00	-L- 187+75.00		696			696
-L- 205+25.00	-L- 208+00.00		490			490
SUBTOTAL 9		3,734	1,186	6,707	2,973	1,186
TOTALS:		85,370	10,650	119,422	49,220	25,818
LOSS DUE TO CLEARING & GRUBBING		-2,500			2,500	
ADDITIONAL UNDERCUT (EMBANKMENT & SUBGRADE STABILITY)			1,850			1,850
WASTE IN LIEU OF BORROW					-14,268	-14,268
PROJECT TOTALS:		82,870	12,500	119,422	37,452	13,400
EDT. 5% TO REPLACE TOP SOIL IN BORROW PIT					2,053	
GRAND TOTALS:		82,870	12,500	119,422	39,505	13,400
SAY		84,000	12,500		44,000	

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
-L-	10+70	23+62	LT	229.31			
-L-	10+53	16+78	RT	67.83			
-L-	21+88	26+12	RT	82.10			
-L-	27+11	29+35	RT	40.84			
-L-	30+32	32+29	RT	29.68			
-L-	56+98	56+67	LT	78.55			
-L-	75+81	80+39	LT	547.03			
-L-	98+72	116+94	RT	556.38			
-L-	131+99	151+95	LT	1,121.70			
-L-	180+34	186+35	RT	107.63			
-L-	188+28	190+43	LT	97.14			
-L-	190+89	194+15	LT	177.31			
-Y1-	15+00	17+12	LT	11.95			
-Y1-	19+70	24+90	LT	377.64			
-Y1-	27+83	29+33	LT	38.15			
-Y1-	31+00	33+67	LT	39.20			
DET_S5	13+62	20+15	CL	1,896.52			
DET_S8	13+44	19+44	CL	1,750.41			
DET-DR1A	10+00	13+82	CL	779.91			
TOTAL:				8,029.28			
SAY:				8,030			

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

EST. DDE = 1,370 CUBIC YARDS
 SELECT GRANULAR MATERIAL, CLASS III = 13,500 CY
 EST. SHALLOW UNDERCUT = 1000 CY
 PER GEOTECH RECOMMENDATION, ESTIMATED 3,850 CUBIC YARDS OF UNDERCUT FOR TOE SHEAR KEY.
 PAVEMENT STRUCTURE VOLUME = 1,103 CY

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

