

09/08/2019

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

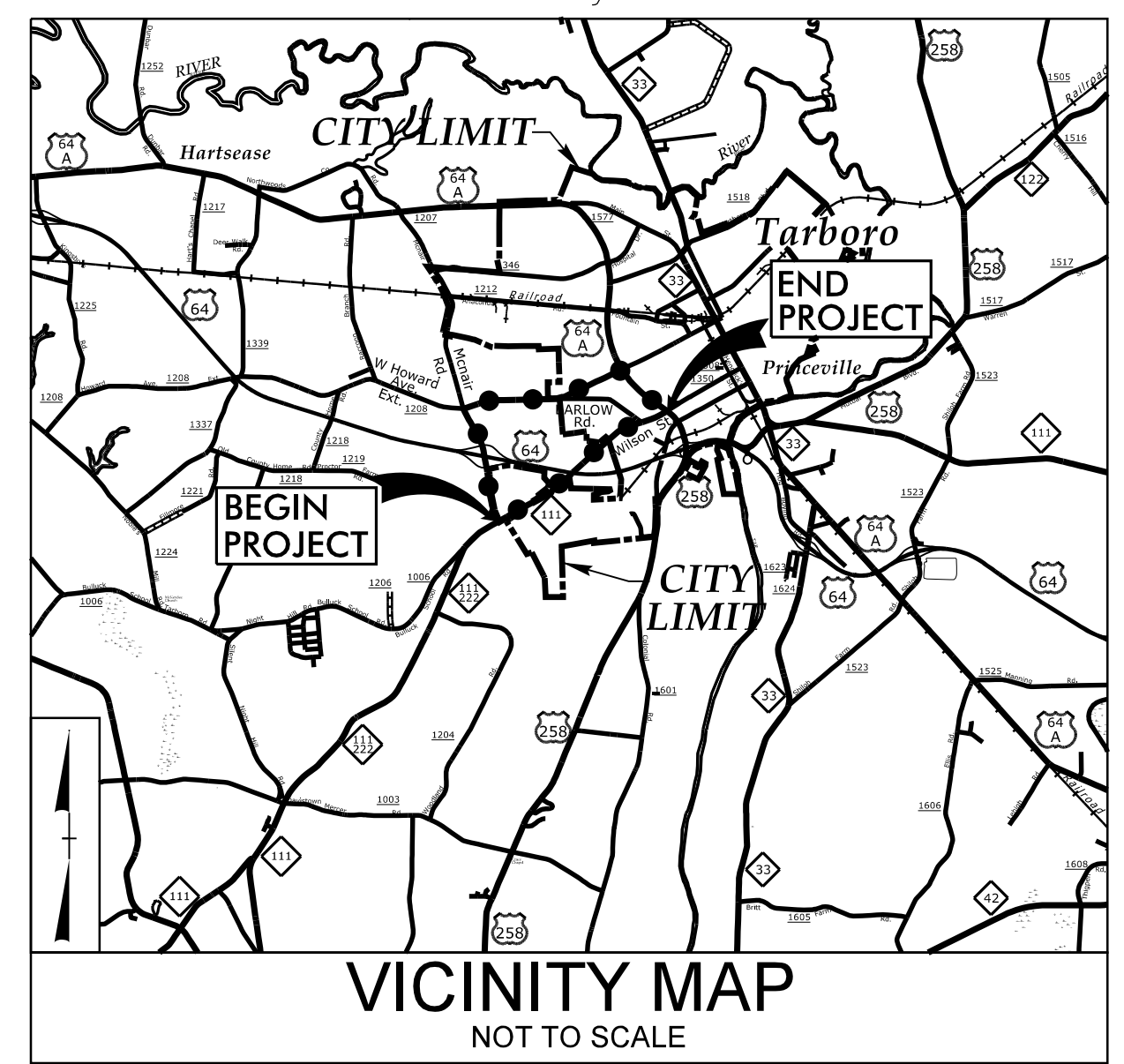
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**EDGECOMBE COUNTY**

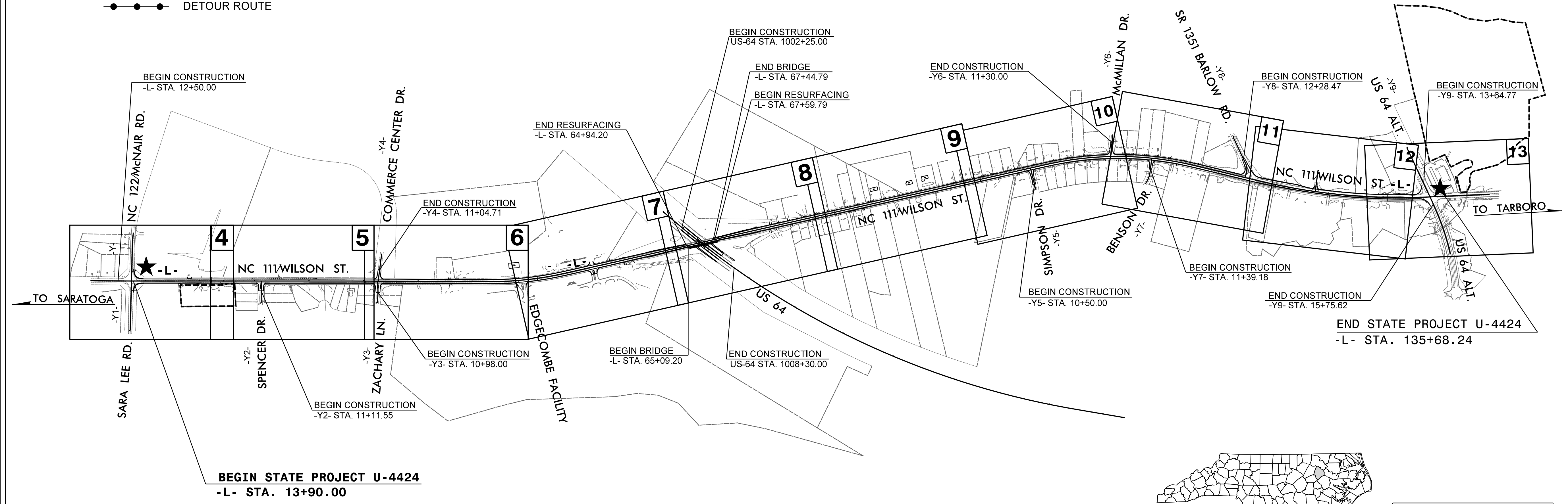
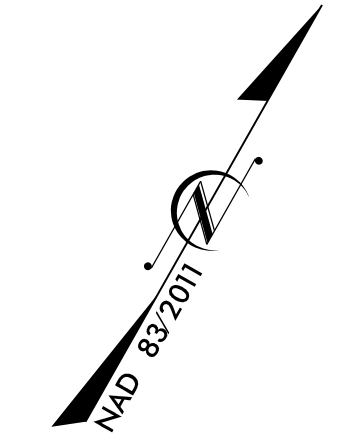
**LOCATION: TARBORO - NC 111 (WILSON STREET) FROM US 64  
ALTERNATE (WESTERN BOULEVARD) TO NC 122 (MCNAIR  
ROAD)**

**TYPE OF WORK: DRAINAGE, GRADING, PAVING, SIGNALS AND  
BRIDGE WIDENING, RETAINING WALL**

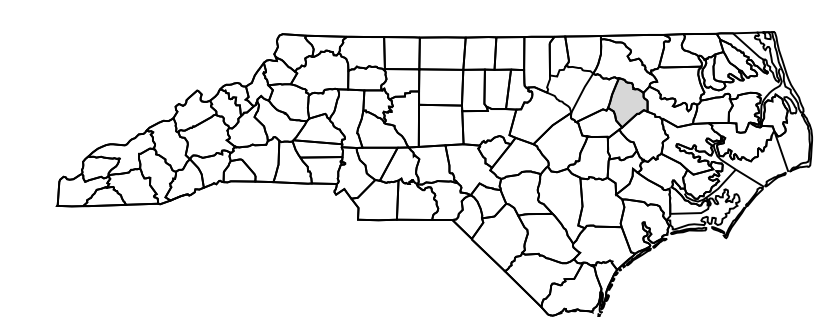
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4424	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
39062.1.2	N/A	PE	
39062.2.2	N/A	RAW & UTILITIES	
39062.3.2	N/A	CONSTRUCTION	



●●●● DETOUR ROUTE



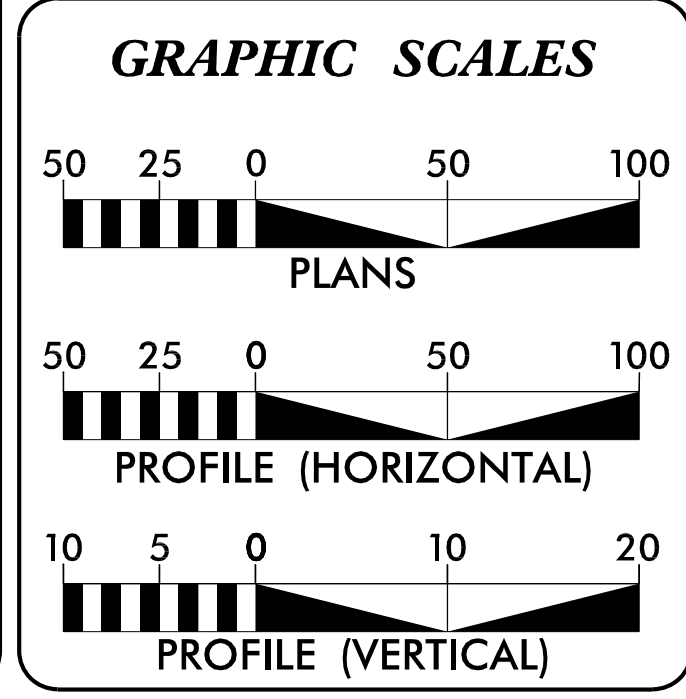
★ UPGRADE EXISTING SIGNAL



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**TIP PROJECT: U-4424**

**CONTRACT: C204838**



**DESIGN DATA**

ADT 2023 =	9,340
ADT 2045 =	10,400
K =	8%
D =	55%
T =	3% *
V =	50 MPH
* TTST = 1% DUAL 2%	
FUNC CLASS = MINOR ARTERIAL	

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT U-4424	=	2.261 MI
LENGTH STRUCTURE TIP PROJECT U-4424	=	0.045 MI
<b>TOTAL LENGTH TIP PROJECT U-4424</b>	<b>=</b>	<b>2.306 MI</b>

PREPARED IN THE OFFICE OF:

WSP USA  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
FAX: 1.919.836.4099  
LICENSE NO. E-0165

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
JUNE 21, 2019

**LETTING DATE:**  
JUNE 20, 2023

**NC DOT CONTACT:** RUSSELL BROADWELL, PE  
DIVISION 4

**RONYELL THIGPEN, PE**  
PROJECT ENGINEER

**ERIC MISAK**  
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

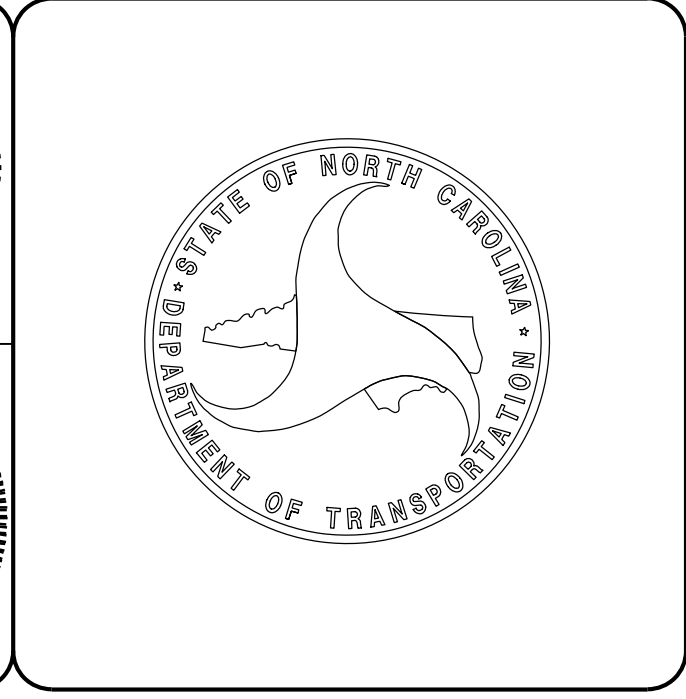
5/3/2023

DocuSigned by:  
Vidya Mohandas  
SIGNATURE:

**ROADWAY DESIGN ENGINEER**

5/2/2023

DocuSigned by:  
Ronyell A. Thigpen  
SIGNATURE:



06-APR-2023 09:22  
N:\Roadway\Proj\U-4424\_Rdy\_Tsh.dgn  
WSP

8/17/99

REVISIONS

02-MAY-2023 09:10:08  
V:\Roadway\ProJ\U4424\_Rdy\_1A.dgn

# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS **INDEX OF SHEETS**

PROJECT REFERENCE NO. <i>U-4424</i>	SHEET NO. <i>1A</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

## INDEX OF SHEETS

SHEET NUMBER	DESCRIPTION
1	TITLE SHEET
1A	INDEX OF SHEETS, STANDARD DRAWINGS, AND GENERAL NOTES
1B	CONVENTIONAL SYMBOLS
2A-1 THRU 2A-4	PAVEMENT SCHEDULE, TYPICAL SECTIONS
2C-1	GUARDRAIL PLACEMENT
2C-2	DETAIL OF WOOD RUB RAIL
2C-3	STEEL BOLLARDS
2C-4	BIKE/PED SAFETY RAIL
2C-5	DETAIL OF SPECIAL CATCH BASIN
2C-6	CURB RAMPS
2C-7	TYPE III ANCHOR UNITS
2C-8	DETAIL OF GUARDRAIL INSTALLATION
2C-9	DETAIL TO CONVERT EXISTING DI, CB, OTCB OR GI TO JUNCTION BOX
2G-1	DETAIL OF TEMPORARY SHORING
3B-1	EARTHWORK SUMMARY, GUARDRAIL SUMMARY, REMOVAL OF EXISTING ASPHALT PAVEMENT, SHOULDER BERM GUTTER SUMMARY
3D-1 THRU 3D-11	DRAINAGE SUMMARY
3G-1	GEOTECHNICAL SUMMARY TABLES
3P-1	PARCEL INDEX
4 THRU 13	PLAN SHEETS
14 THRU 22	PROFILE SHEETS
RW-01 THRU RW-13	SURVEY CONTROL, ALIGNMENT CONTROL, RIGHT OF WAY, EASEMENTS AND PROPERTY TIES
TMP-1 THRU TMP-10	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-13	PAVEMENT MARKING PLANS
EC-1 THRU EC-23	EROSION CONTROL PLANS
RF-1	REFORESTATION DETAIL SHEET
SIGN-1 THRU SIGN-7	SIGNING PLANS
SIG-1.0 THRU SIG-3.2	SIGNAL PLANS
UC-1 THRU UC-16	UTILITY COSTRUCTION PLANS
UBO-1 THRU UBO-11	UTILITIES BY OTHERS PLANS
X-0	CROSS-SECTIONS INDEX OF SHEETS
X-1A THRU X-1B	CROSS-SECTION SUMMARY SHEETS
X-1 THRU X-90	CROSS-SECTIONS
S-1 THRU S-37	STRUCTURE PLANS
SN	STRUCTURE STANDARD NOTES
W-1 THRU W-2	RETAINING WALL PLANS

## GENERAL NOTES

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

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

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

SUPERELEVATION:  
ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04/05 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:  
ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01/02

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.

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.

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".

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

UTILITIES:  
UTILITY OWNERS ON THIS PROJECT ARE POWER - TOWN OF TARBORO ELECTRIC  
COMMUNICATIONS- MCNC ; PHONE- CENTRUY LINK; CATV- SIDDEN LINK  
GAS DISTRIBUTION - PNG  
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 WITH DETAILS IN PLANS.

## ROADWAY ENGLISH STANDARD DRAWINGS

2018 ROADWAY ENGLISH STANDARD DRAWINGS

EFF. 01-16-2018  
REV.

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

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.01	Guide for Grading Subgrade - Interstate and Freeway
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superlevation - Two Lane Pavement
225.05	Method of Obtaining Superlevation - Divided Highways
225.09	Guide for Shoulder and Ditch Transition at Grade Separations
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 4 - MAJOR STRUCTURES	
422.02	Bridge Approach Fills - Type II Modified Approach Fill
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
610.01	Guide for Paving Shoulders Under Bridges - Method I
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
838.22	Reinforced Concrete Endwall - for Double and Triple 54" Pipes 90 Skew
838.52	Reinforced Brick Endwall - for Double and Triple 54" Pipes 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.20	Frames and Wide Slot Flat Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.01	Concrete Sidewalk
848.02	Driveway Turnout - Radius Type
848.04	Street Turnout
848.05	Curb Ramp - Proposed Curb & Gutter
852.01	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
865.01	Cable Guiderail
866.02	Woven Wire Fence - with Wood Post
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

# 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	(123)
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 -----
Potential Contamination Area: Soil	----- S -----
Known Contamination Area: Water	----- W -----
Potential Contamination Area: Water	----- W -----
Contaminated Site: Known or Potential	☠ ?

### BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○
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	----- FLOW -----
False Sump	-----

### RAILROADS:

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

### RIGHT OF WAY & PROJECT CONTROL:

Primary Horiz Control Point	◻
Primary Horiz and Vert Control Point	●
Secondary Horiz and Vert Control Point	◆
Vertical Benchmark	⊠
Existing Right of Way Monument	△
Proposed Right of Way Monument (Rebar and Cap)	▲
Proposed Right of Way Monument (Concrete)	⊙
Existing Permanent Easement Monument	◇
Proposed Permanent Easement Monument (Rebar and Cap)	◆
Existing C/A Monument	△
Proposed C/A Monument (Rebar and Cap)	▲
Proposed C/A Monument (Concrete)	⊙
Existing Right of Way Line	-----
Proposed Right of Way Line	-----
Existing Control of Access Line	-----
Proposed Control of Access Line	-----
Proposed ROW and CA Line	-----
Existing Easement Line	----- E -----
Proposed Temporary Construction Easement	----- E -----
Proposed Temporary Drainage Easement	----- TDE -----
Proposed Permanent Drainage Easement	----- PDE -----
Proposed Permanent Drainage/Utility Easement	----- DUE -----
Proposed Permanent Utility Easement	----- PUE -----
Proposed Temporary Utility Easement	----- TUE -----
Proposed Aerial Utility Easement	----- AUE -----

### ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	----- C -----
Proposed Slope Stakes Fill	----- F -----
Proposed Curb Ramp	----- CR -----
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	-----
VEGETATION:	
Single Tree	○
Single Shrub	○
Hedge	-----

Woods Line	-----
Orchard	-----
Vineyard	-----

### EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	----- CONC -----
Bridge Wing Wall, Head Wall and End Wall	----- CONC WW -----
MINOR:	
Head and End Wall	----- CONC HW -----
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	----- CB -----
Paved Ditch Gutter	-----
Storm Sewer Manhole	----- S -----
Storm Sewer	----- S -----

### UTILITIES:

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

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	⊙
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)*	----- P -----
U/G Power Line (SUE - LOS C)*	----- P -----
U/G Power Line (SUE - LOS D)*	----- P -----

### TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	⊙
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)*	----- T -----
U/G Telephone Cable (SUE - LOS C)*	----- T -----
U/G Telephone Cable (SUE - LOS D)*	----- T -----
U/G Telephone Conduit (SUE - LOS B)*	----- TC -----
U/G Telephone Conduit (SUE - LOS C)*	----- TC -----
U/G Telephone Conduit (SUE - LOS D)*	----- TC -----
U/G Fiber Optics Cable (SUE - LOS B)*	----- T FO -----
U/G Fiber Optics Cable (SUE - LOS C)*	----- T FO -----
U/G Fiber Optics Cable (SUE - LOS D)*	----- T FO -----

### WATER:

Water Manhole	⊙
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	----- A/G Water -----

### 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)*	----- TV -----
U/G TV Cable (SUE - LOS C)*	----- TV -----
U/G TV Cable (SUE - LOS D)*	----- TV -----
U/G Fiber Optic Cable (SUE - LOS B)*	----- TV FO -----
U/G Fiber Optic Cable (SUE - LOS C)*	----- TV FO -----
U/G Fiber Optic Cable (SUE - LOS D)*	----- TV FO -----

### GAS:

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

### SANITARY SEWER:

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

### MISCELLANEOUS:

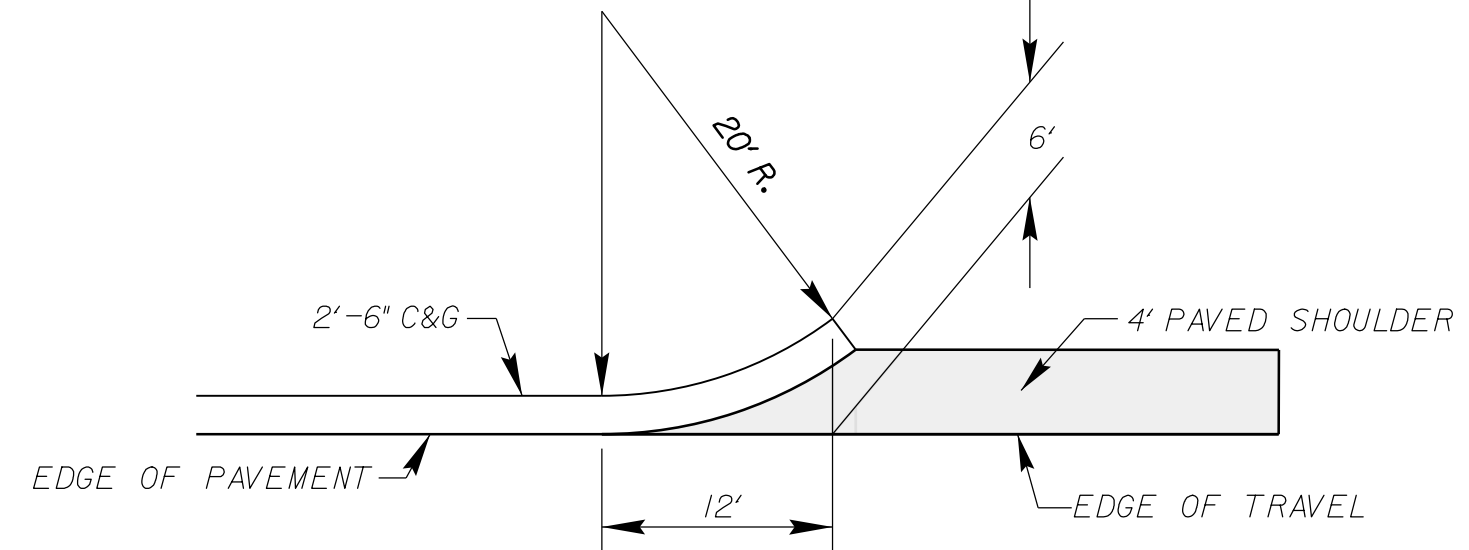
Utility Pole	●
Utility Pole with Base	⊠
Utility Located Object	○
Utility Traffic Signal Box	⊠
Utility Unknown U/G Line (SUE - LOS B)*	----- TUL -----
U/G Tank; Water, Gas, Oil	-----
Underground Storage Tank, Approx. Loc.	----- UST -----
A/G Tank; Water, Gas, Oil	-----
Geoenvironmental Boring	⊙
Abandoned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

6/2/23

FINAL PAVEMENT DESIGN

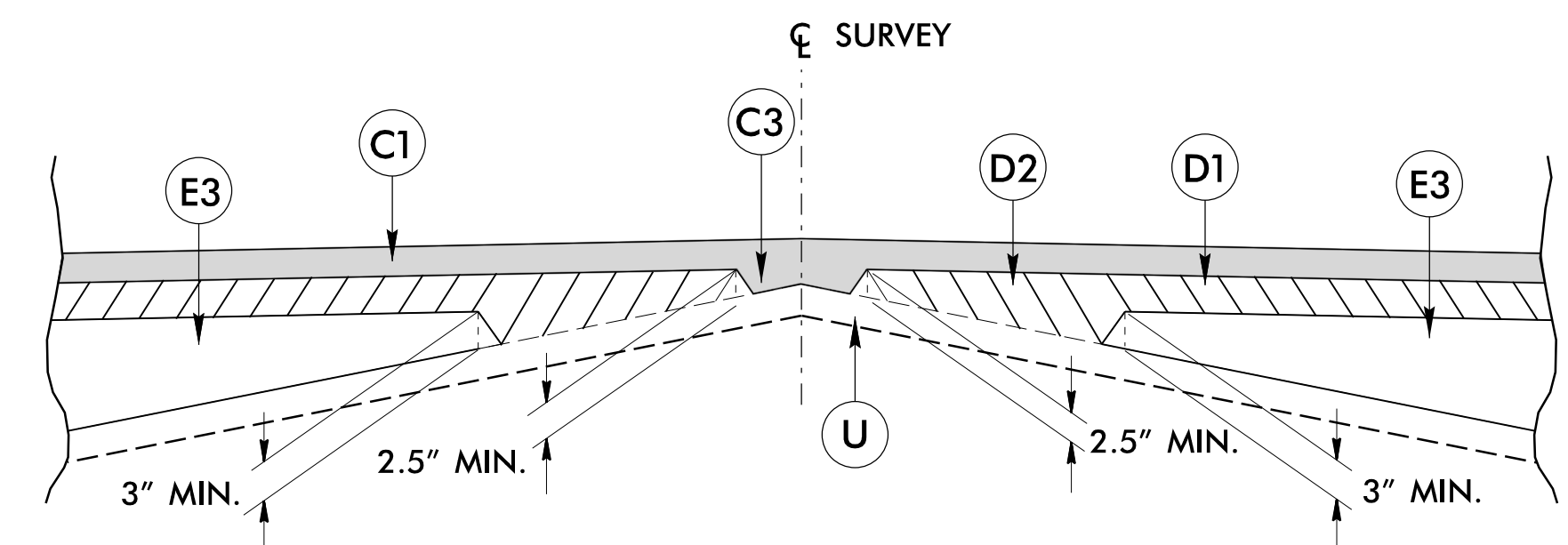
PAVEMENT SCHEDULE FINAL PAVEMENT DESIGN	
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 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. 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" IN DEPTH 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. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	1'-6" CURB & GUTTER
R3	SHOULDER BERM GUTTER
S1	4" CONCRETE SIDEPATH (SEE SPECIAL PROVISION)
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	MILLING EXISTING PAVEMENT 1.5".
V1	MILLING EXISTING PAVEMENT 3".
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL SHEET No. 2A-1)

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

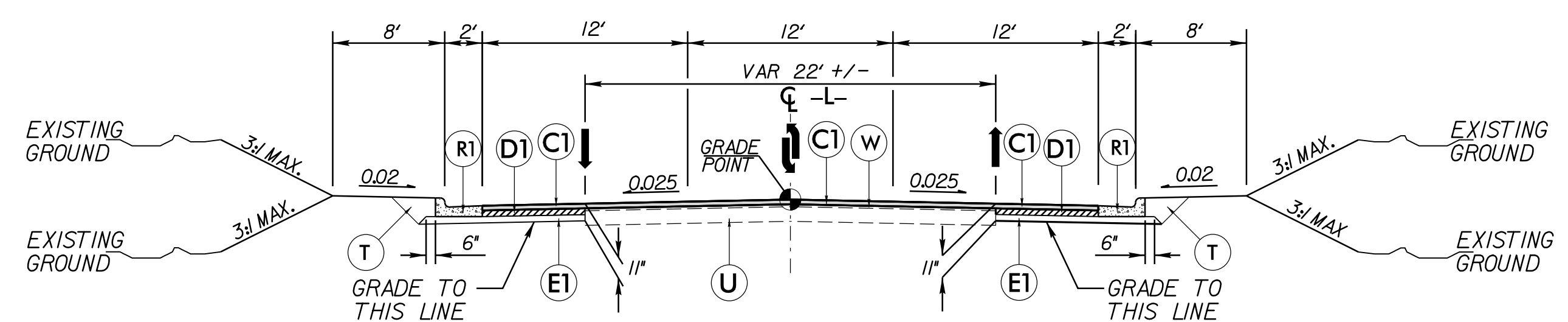


**DETAIL FOR FLARING CURB AND GUTTER**

- BEGIN -L- STA. 14+75.00 RT.
- BEGIN -L- STA. 14+75.00 LT.
- BEGIN -L- STA. 61+13.46 RT.
- BEGIN -L- STA. 61+13.46 LT.
- BEGIN -L- STA. 71+75.00 RT.
- BEGIN -L- STA. 71+75.00 LT.
- BEGIN -Y5- STA. 10+50.00 LT.



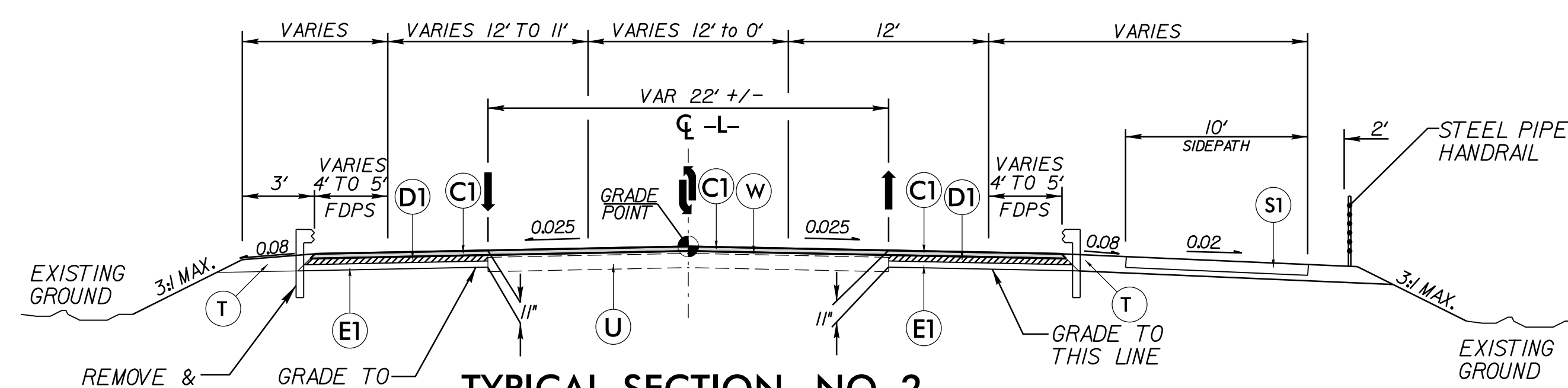
**DETAIL SHOWING METHOD OF WEDGING**



**TYPICAL SECTION NO. 1**

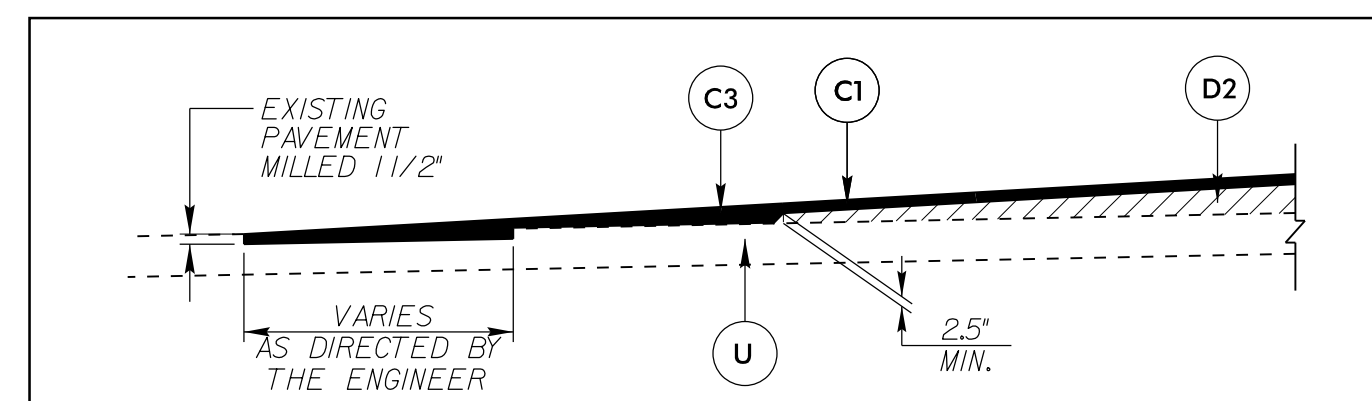
- L- STA. 13+90.00 TO -L- STA. 61+25.46
- L- STA. 71+75.00 TO -L- STA. 121+43.36

NOTE: TRANSITION FROM TYPICAL SECTION NO. 1 TO TYPICAL SECTION NO. 3 FROM -L- STA. 118+43.36 TO -L- STA. 121+43.36



**TYPICAL SECTION NO. 2**

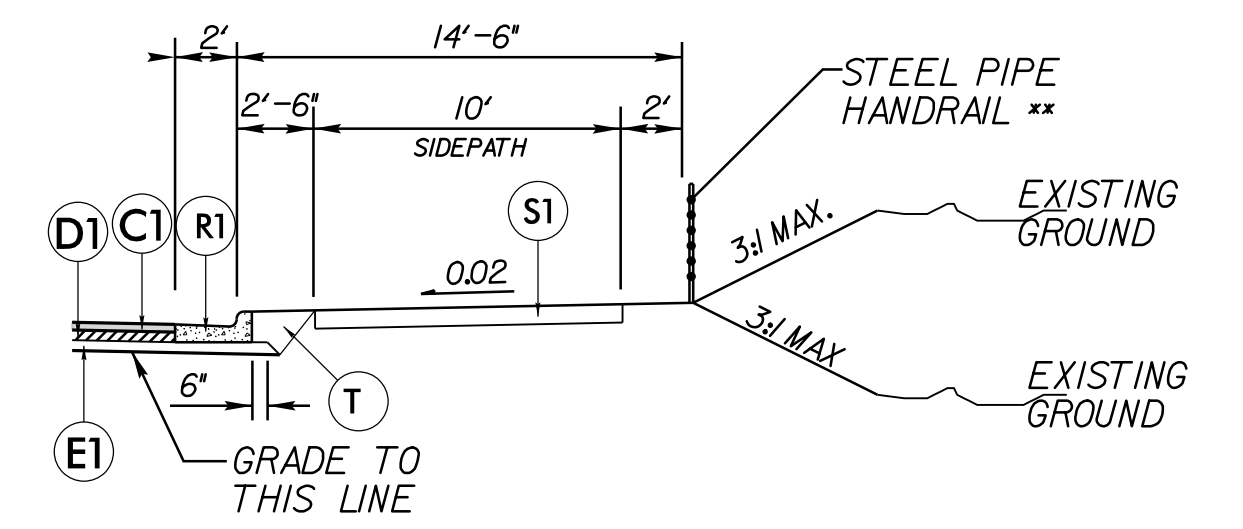
- L- STA. 61+25.46 RT. TO -L- BRIDGE STA. 64+94.20 RT.
- L- STA. 61+25.46 LT. TO -L- BRIDGE STA. 64+94.20 LT.
- L- BRIDGE STA. 67+59.79 LT./RT. TO -L- STA. 71+75.00 LT./RT.



**MILLING DETAIL FOR PROFILE CONNECTIONS**

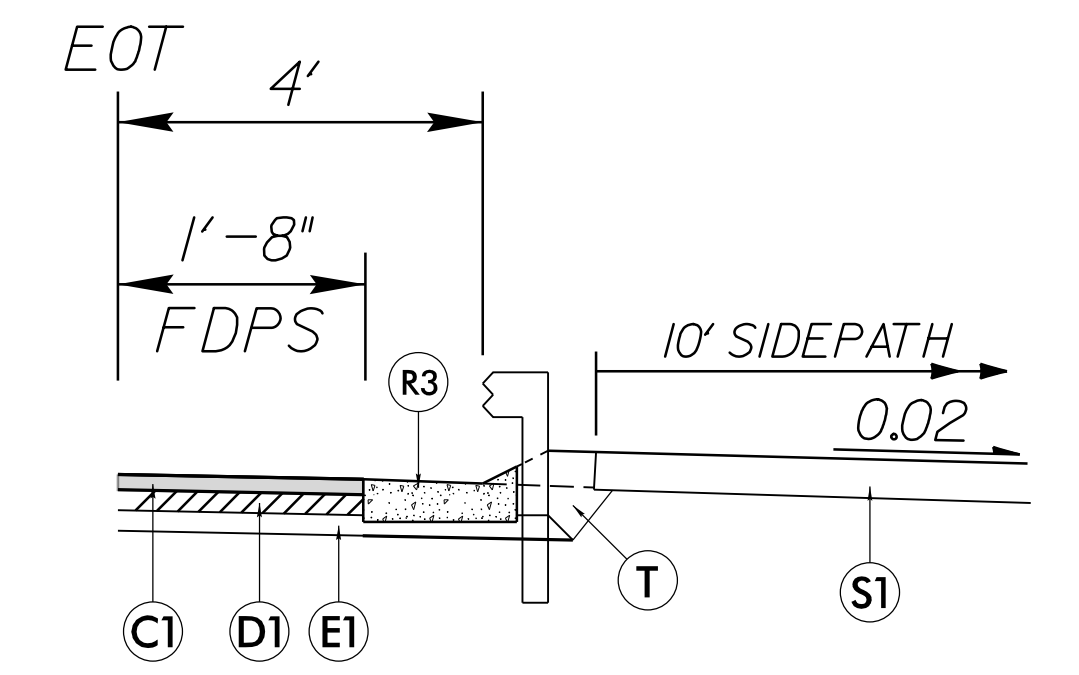
TYING PROPOSED PAVEMENTS TO EXISTING PAVEMENTS

**\*\* ADD STEEL PIPE HANDRAIL FROM:**  
 -L- STA. 59+88.76 RT. TO -L- STA. 61+25.46 RT.  
 -L- STA. 71+75.00 RT. TO -L- STA. 72+61.85 RT.



**DETAIL NO. 1**

USE IN CONJUNCTION WITH TYPICAL NO. 1  
 -L- STA. 25+90.76 RT. TO -L- STA. 61+25.46 RT.  
 -L- STA. 71+75.00 RT. TO -L- STA. 121+43.36 RT.



**DETAIL NO. 2**

USE IN CONJUNCTION WITH TYPICAL NO. 2  
 -L- STA. 64+89.00 RT. TO -L- BRIDGE STA. 64+94.20 RT.  
 -L- BRIDGE STA. 67+59.79 RT. TO -L- STA. 67+98.97 RT.

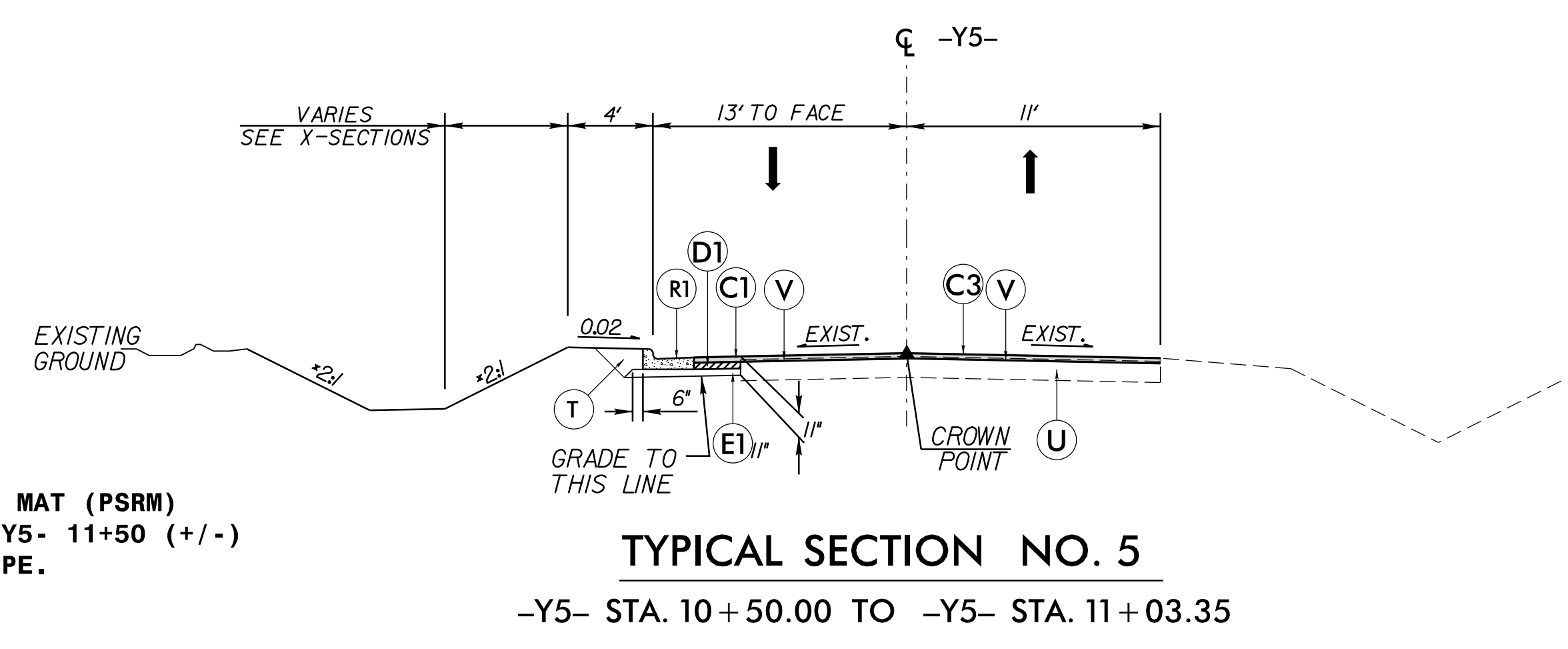
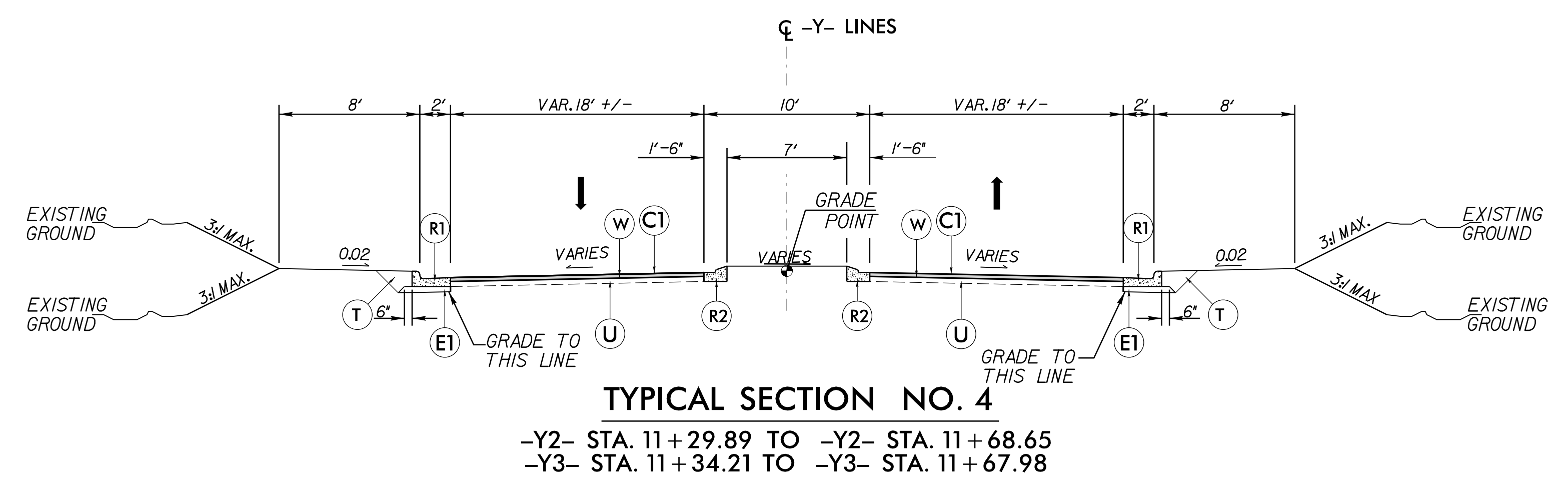
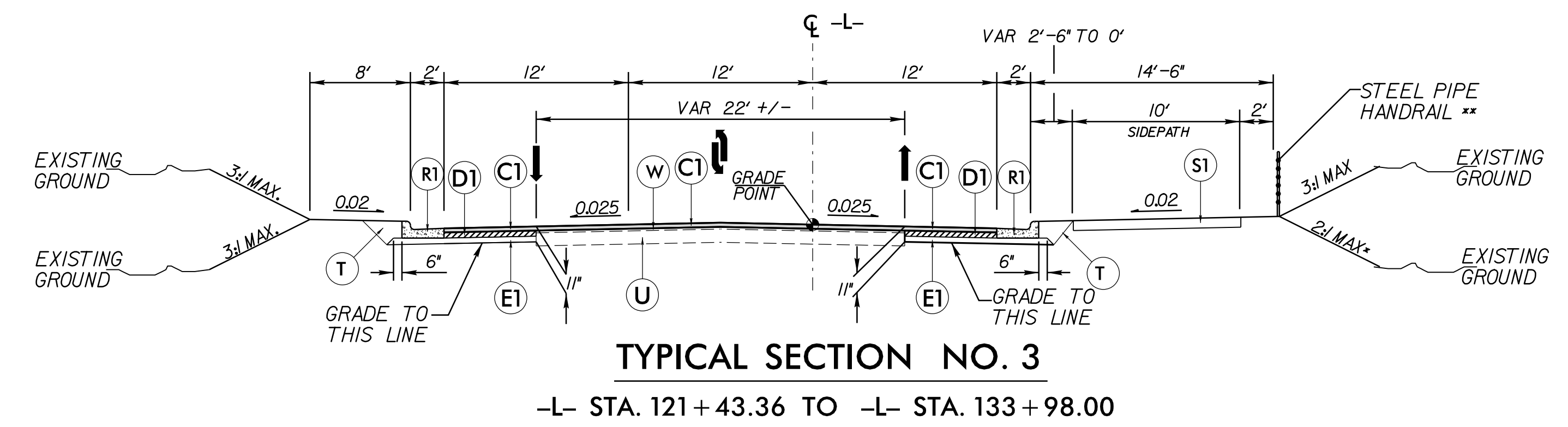
PROJECT REFERENCE NO. U-4424	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER 	PAVEMENT DESIGN ENGINEER 
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
WSP USA 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 TEL: 1.919.836.4040 FAX: 1.919.836.4099 LICENSE NO. F-0165	

19-APR-2023 15:47  
 N:\Roadway\Projects\U4424-Rdwy.tup.dgn

6/2/2023

FINAL PAVEMENT DESIGN

PAVEMENT SCHEDULE FINAL PAVEMENT DESIGN	
C1	3" S9.5B
C2	3" S9.5C
C3	VAR. DEPTH S9.5B
D1	4" I19.0C
D2	VAR. DEPTH I19.0C
E1	4" B25.0C
E2	5.5" B25.0C
E3	VAR. DEPTH B25.0C
R1	2'-6" CURB & GUTTER
R2	1'-6" CURB & GUTTER
R3	SHOULDER BERM GUTTER
S1	4" CONCRETE SIDEWALK (SEE SPECIAL PROVISION)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING 1.5"
V1	MILLING 3"
W	WEDGING



**\*NOTE: USE PERMANENT SOIL REINFORCEMENT MAT (PSRM)  
FROM STA. -Y5- 10+50.00 (+/-) TO STA. -Y5- 11+50 (+/-)  
AND EXTEND PSRM LIMITS TO 2:1 (H:V) SLOPE.**

PROJECT REFERENCE NO. U-4424	SHEET NO. 2A-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
PLANS PREPARED BY: 	
WSP USA 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 TEL: 1.919.836.4040 FAX: 1.919.836.4099 LICENSE NO. F-0165	

**NOTE:**  
**\*USE PERMANENT SOIL REINFORCEMENT MAT (PSRM)  
FROM STA. -L- 130+75 RT (+/-) TO STA. -L- 132+75 RT (+/-)  
AND EXTEND PSRM LIMITS TO 2:1 (H:V) SLOPE.**

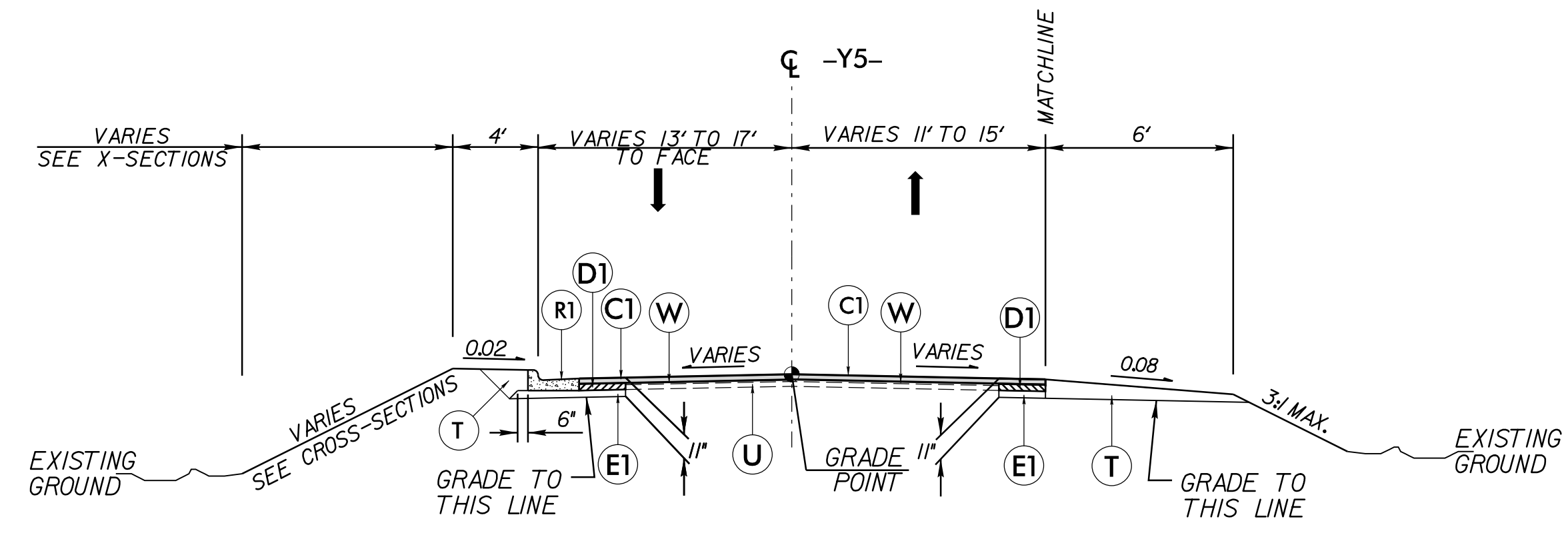
**\*\* ADD STEEL PIPE HANDRAIL FROM -L- STA. 131+50.00 RT.  
TO -L- STA. 133+00.00 RT.**

19-APR-2023 15:44  
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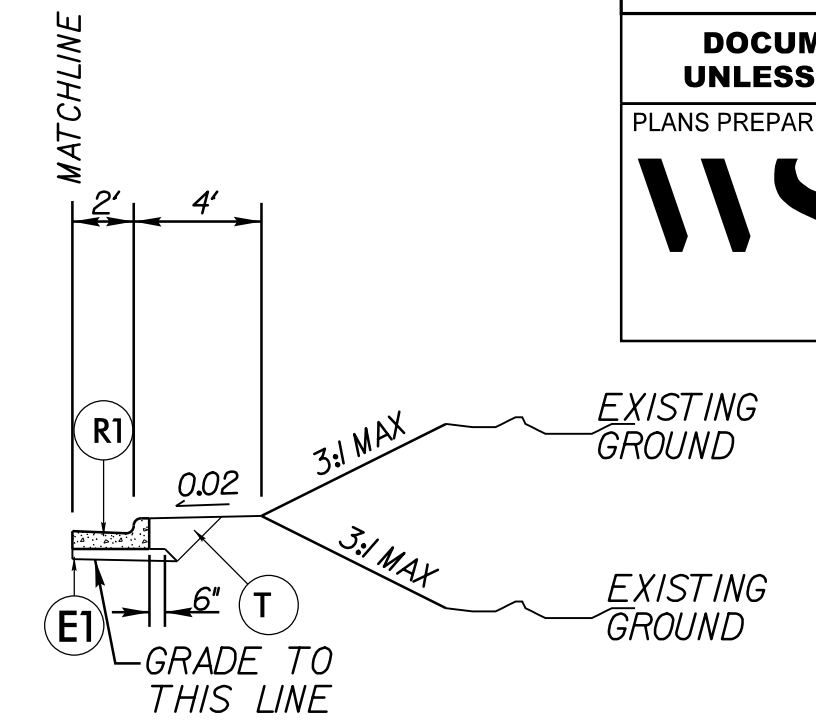
6/2/23

FINAL PAVEMENT DESIGN

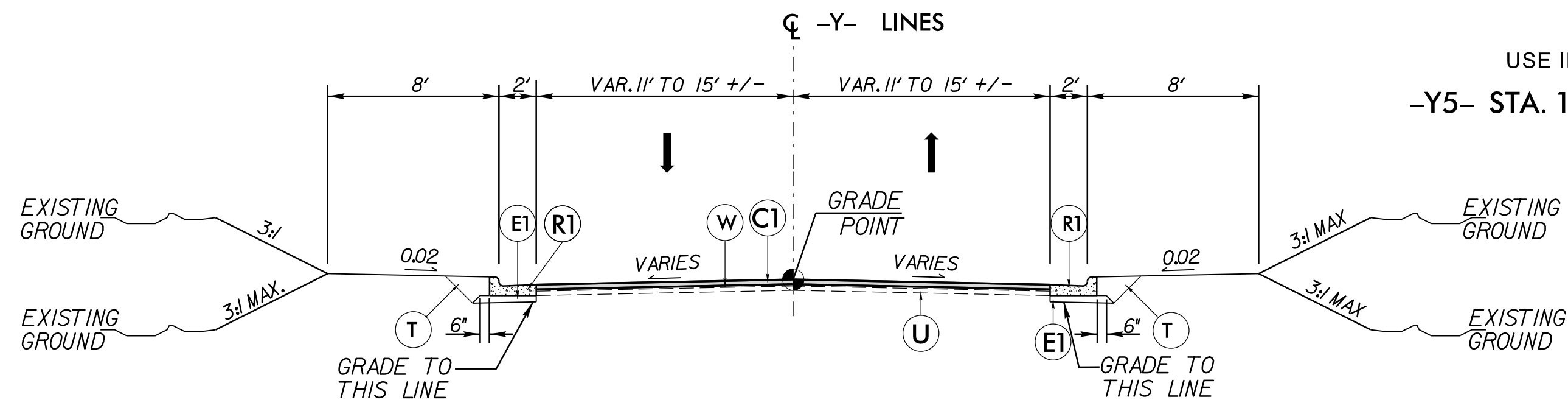
PAVEMENT SCHEDULE FINAL PAVEMENT DESIGN	
C1	3" S9.5B
C2	3" S9.5C
C3	VAR. DEPTH S9.5B
D1	4" I19.0C
D2	VAR. DEPTH I19.0C
E1	4" B25.0C
E2	5.5" B25.0C
E3	VAR. DEPTH B25.0C
R1	2'-6" CURB & GUTTER
R2	1'-6" CURB & GUTTER
R3	SHOULDER BERM GUTTER
S1	4" CONCRETE SIDEPAH (SEE SPECIAL PROVISION)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING 1.5"
V1	MILLING 3"
W	WEDGING



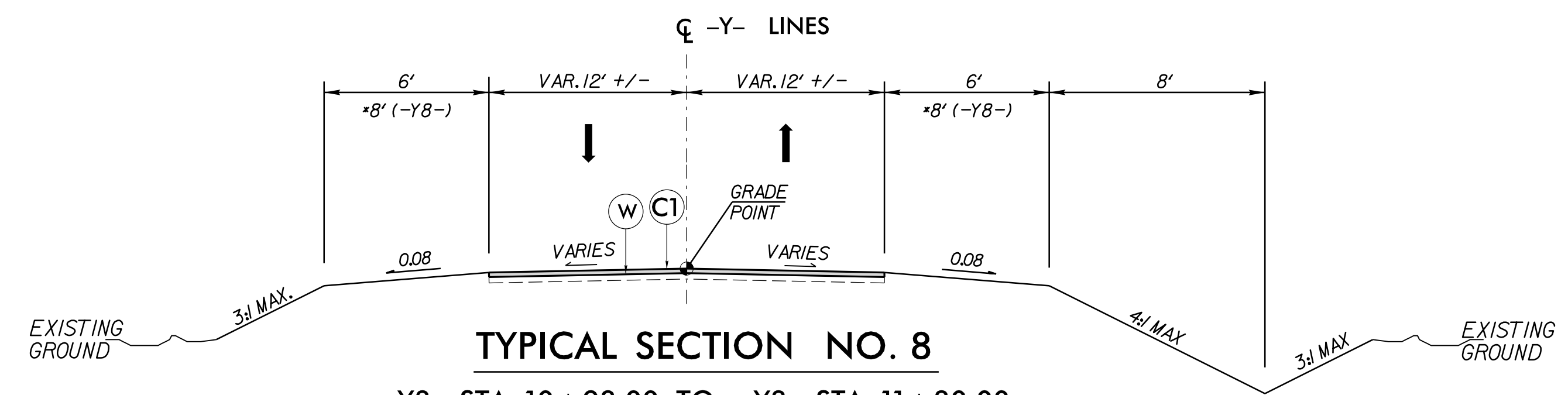
**TYPICAL SECTION NO. 6**  
-Y5- STA. 11+03.35 TO -Y5- STA. 11+85.06



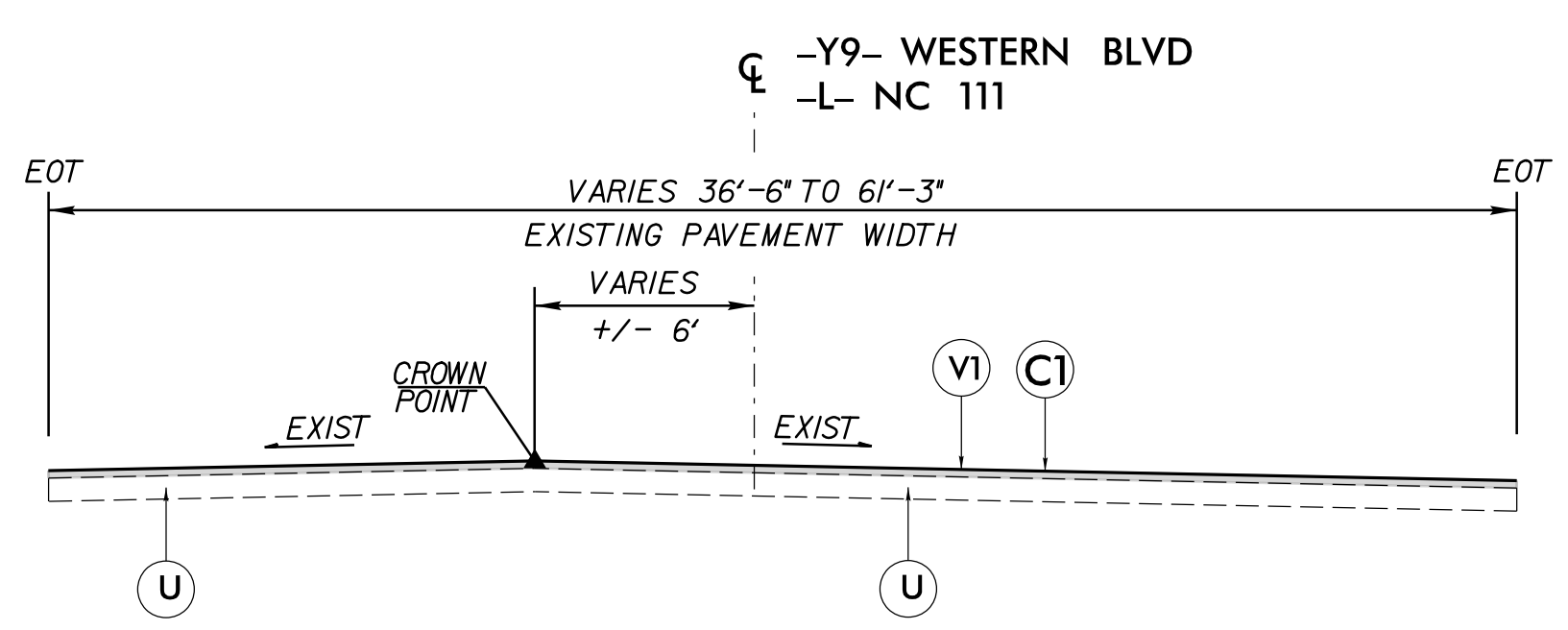
**DETAIL NO. 3**  
USE IN CONJUNCTION WITH TYPICAL NO. 6  
-Y5- STA. 11+53.35 TO STA. 11+85.06 RT



**TYPICAL SECTION NO. 7**  
-Y2- STA. 11+11.55 TO -Y2- STA. 11+29.89  
-Y2- STA. 11+68.65 TO -Y2- STA. 11+83.65  
-Y3- STA. 11+30.00 TO -Y3- STA. 11+34.21  
-Y3- STA. 11+67.98 TO -Y3- STA. 11+82.99  
-Y4- STA. 10+18.14 TO -Y4- STA. 10+55.00  
-Y6- STA. 10+18.14 RT. TO -Y6- STA. 10+54.79 RT.  
-Y6- STA. 10+18.14 LT. TO -Y6- STA. 10+43.17 LT.  
-Y7- STA. 11+89.18 TO -Y7- STA. 12+22.09  
-Y8- STA. 12+78.47 RT. TO -Y8- STA. 13+87.11 RT.  
-Y8- STA. 12+95.00 LT. TO -Y8- STA. 13+87.11 LT.  
-DRI- STA. 11+45.00 TO -DRI- STA. 11+80.96



**TYPICAL SECTION NO. 8**  
-Y3- STA. 10+98.00 TO -Y3- STA. 11+30.00  
-Y4- STA. 10+55.00 TO -Y4- STA. 11+04.71  
-Y6- STA. 10+43.17 LT. TO -Y6- STA. 11+30.00 LT.  
-Y6- STA. 10+54.79 RT. TO -Y6- STA. 11+30.00 RT.  
-Y7- STA. 11+39.18 TO -Y7- STA. 11+89.18  
-Y8- STA. 12+28.47 LT. TO -Y8- STA. 12+95.00 LT.  
-Y8- STA. 12+28.47 RT. TO -Y8- STA. 12+78.47 RT.



**TYPICAL SECTION NO. 9**  
-Y9- STA. 13+64.77 TO -Y9- STA. 14+77.42  
-Y9- STA. 15+25.47 TO -Y9- STA. 15+75.43  
-L- STA. 134+61.23 TO -L- STA. 135+68.24

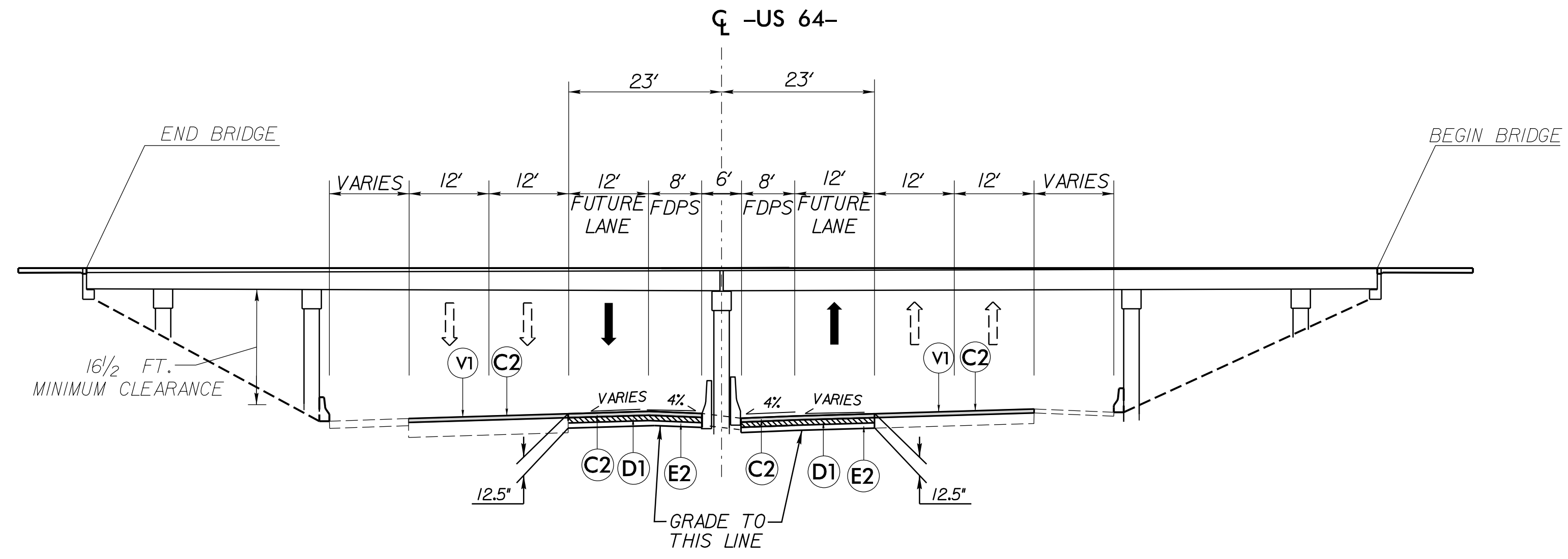
PROJECT REFERENCE NO. U-4424	SHEET NO. 2A-3
ROADWAY DESIGN ENGINEER SEAL 33290 5/2/2023	PAVEMENT DESIGN ENGINEER SEAL 044590 5/2/2023
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
PLANS PREPARED BY: <b>WSP</b>	
WSP USA 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 TEL: 1.919.836.4040 FAX: 1.919.836.4099 LICENSE NO. F-0165	

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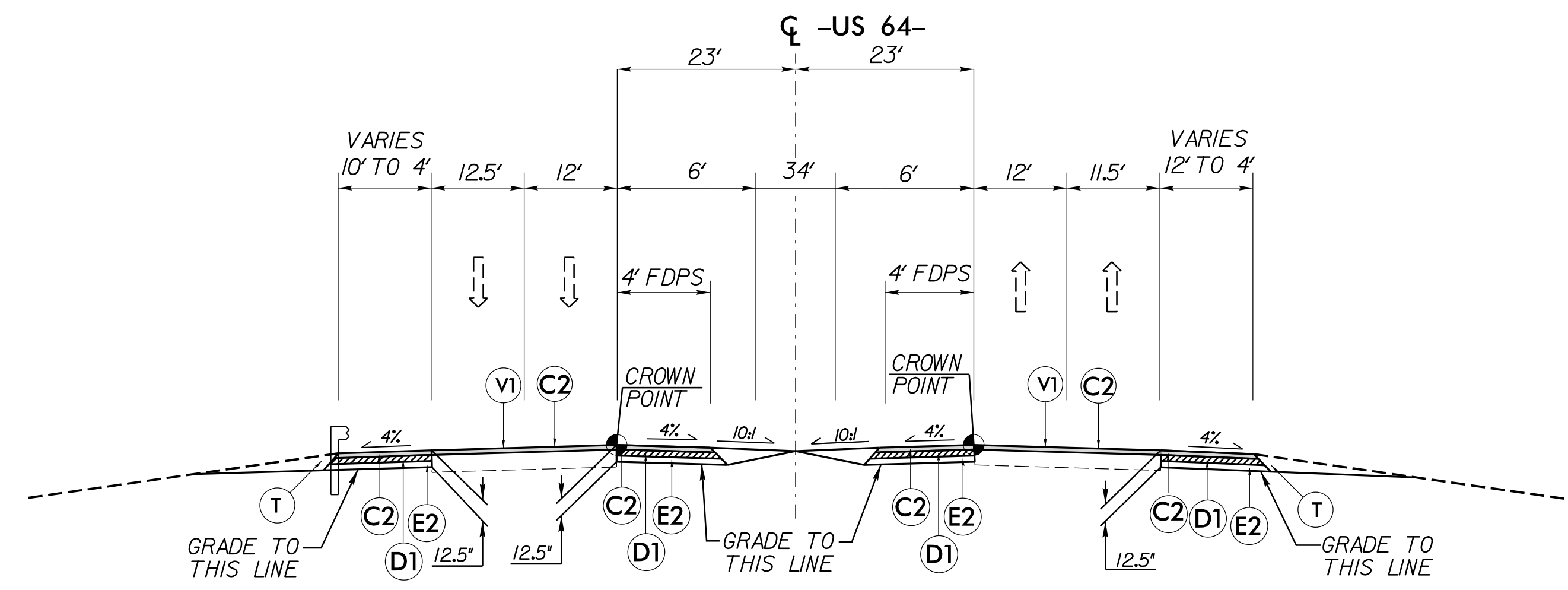
6/2/2023

FINAL PAVEMENT DESIGN

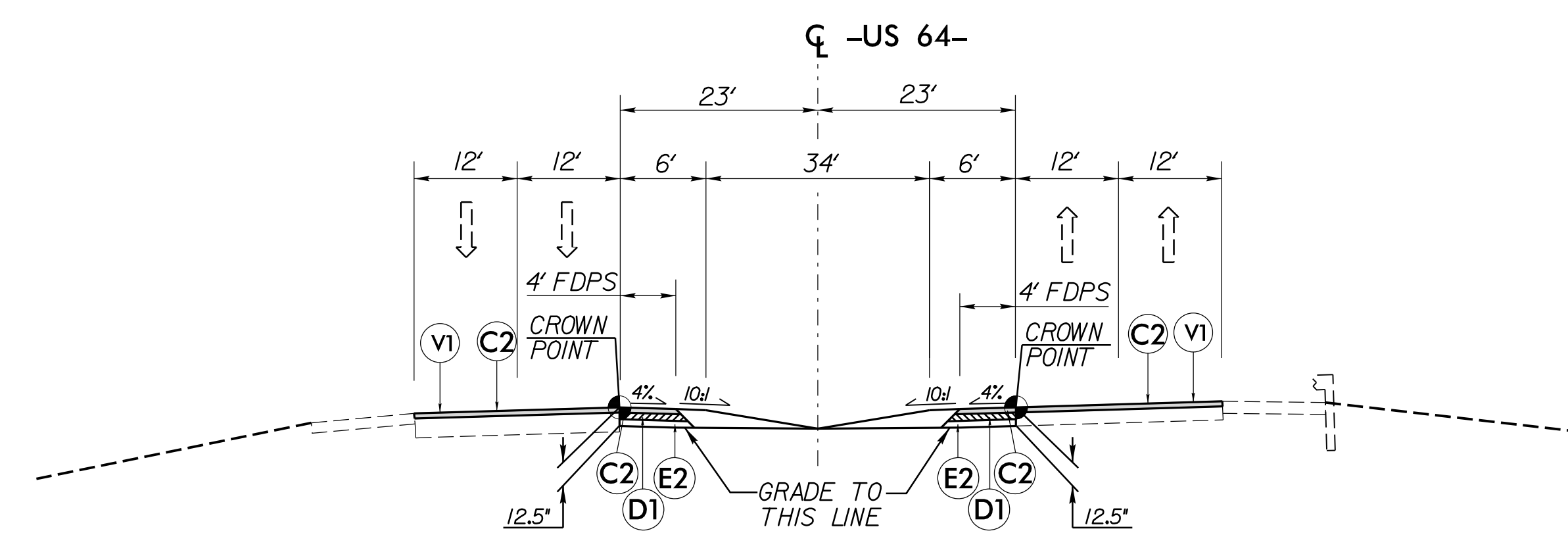
PAVEMENT SCHEDULE FINAL PAVEMENT DESIGN	
C1	3" S9.5B
C2	3" S9.5C
C3	VAR. DEPTH S9.5B
D1	4" I19.0C
D2	VAR. DEPTH I19.0C
E1	4" B25.0C
E2	5.5" B25.0C
E3	VAR. DEPTH B25.0C
R1	2'-6" CURB & GUTTER
R2	1'-6" CURB & GUTTER
R3	SHOULDER BERM GUTTER
S1	4" CONCRETE SIDEWALK (SEE SPECIAL PROVISION)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING 1.5"
V1	MILLING 3"
W	WEDGING



**TYPICAL SECTION NO. 10**  
 -US 64- STA. 1003+99.60 TO -US 64- STA. 1005+05.38  
 TRANSITION FROM TYPICAL NO. 10 TO TYPICALS NO. 11 AND 12



**TYPICAL SECTION NO. 11**  
 -US 64- STA. 1004+06.96 RT TO -US 64- STA. 1006+73.00



**TYPICAL SECTION NO. 12**  
 -US 64- STA. 1002+37.07 TO -US 64- STA. 1003+99.60

PROJECT REFERENCE NO. U-4424	SHEET NO. 2A-4
ROADWAY DESIGN ENGINEER [Signature]	PAVEMENT DESIGN ENGINEER [Signature]
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
WSP USA 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 TEL: 1.919.836.4040 FAX: 1.919.836.4099 LICENSE NO. F-0165	

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 WSP

04-SEP-2018 08:31 S:\Contracts\Special\Details\Howerton\Standard Drawings\Details in Lieu of Standards\Division 8\862D01 Impact Attenuator Sheets 1 and 2.dgn  
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STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

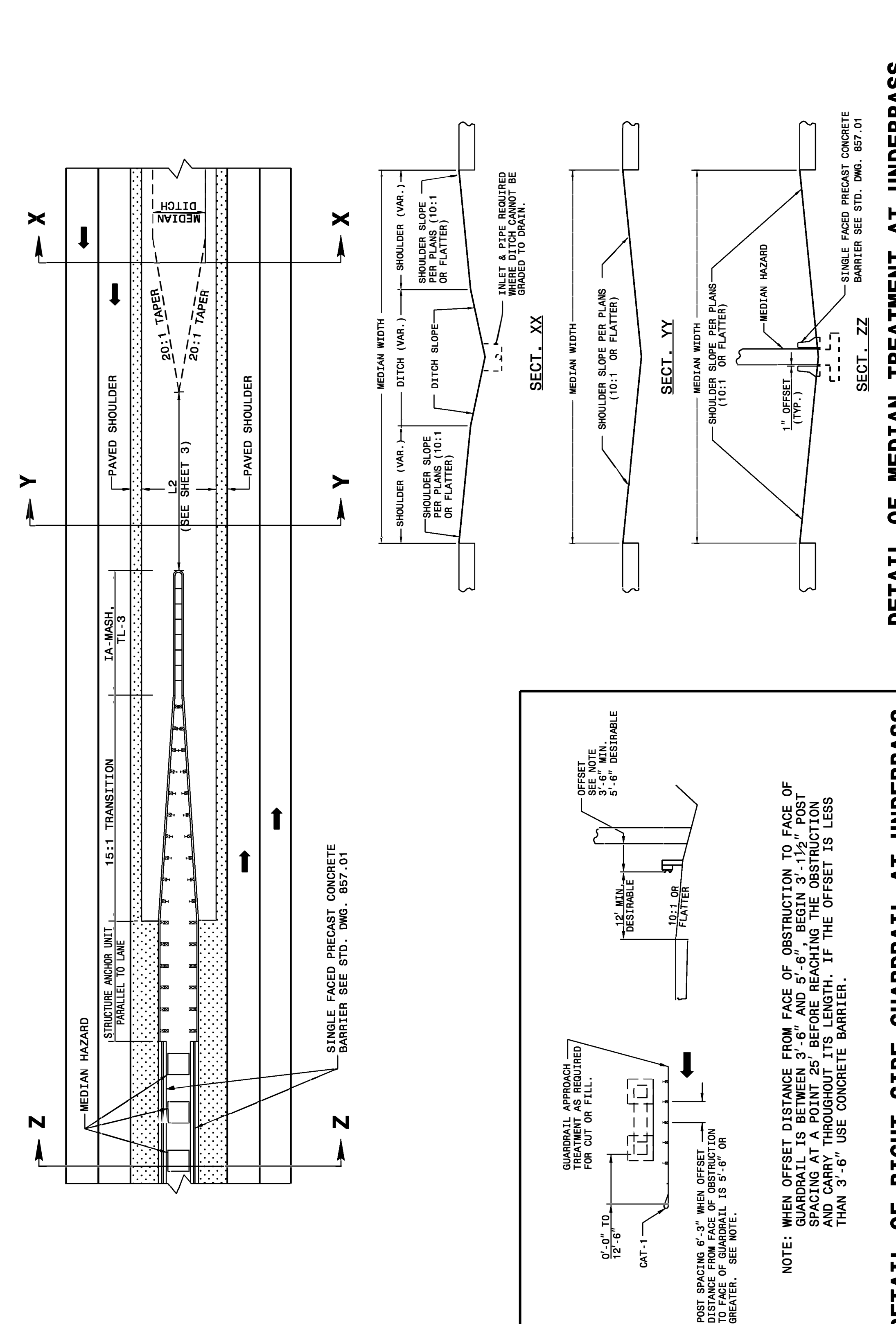
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 1 OF 11  
**862D01**

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

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 1 OF 11  
**862D01**



ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

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

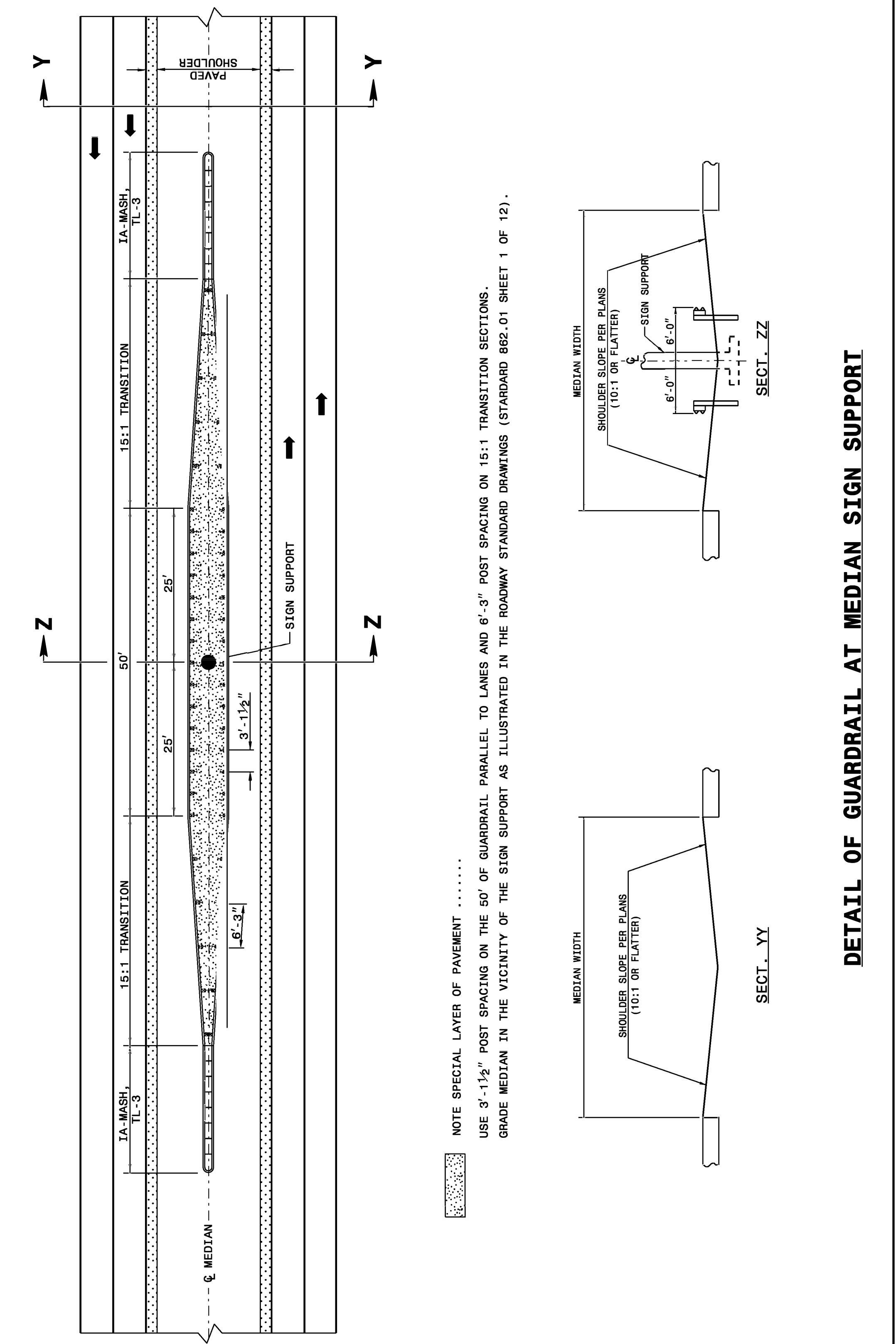
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 2 OF 11  
**862D01**

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

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 2 OF 11  
**862D01**



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

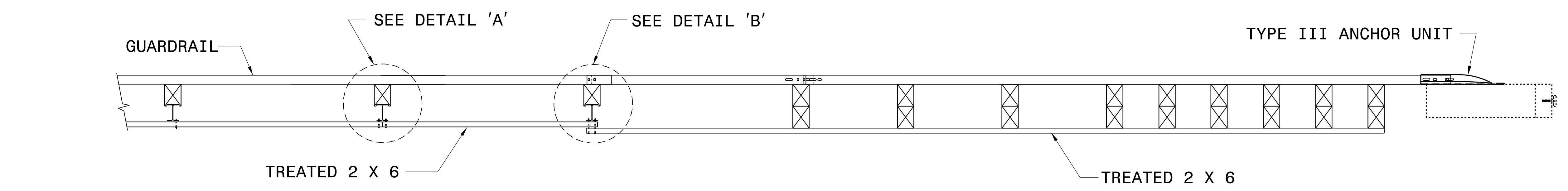
**CONTRACT STANDARDS AND DEVELOPMENT UNIT**  
Office 919-707-6950 FAX 919-250-4119

**SEE TITLE BLOCK**

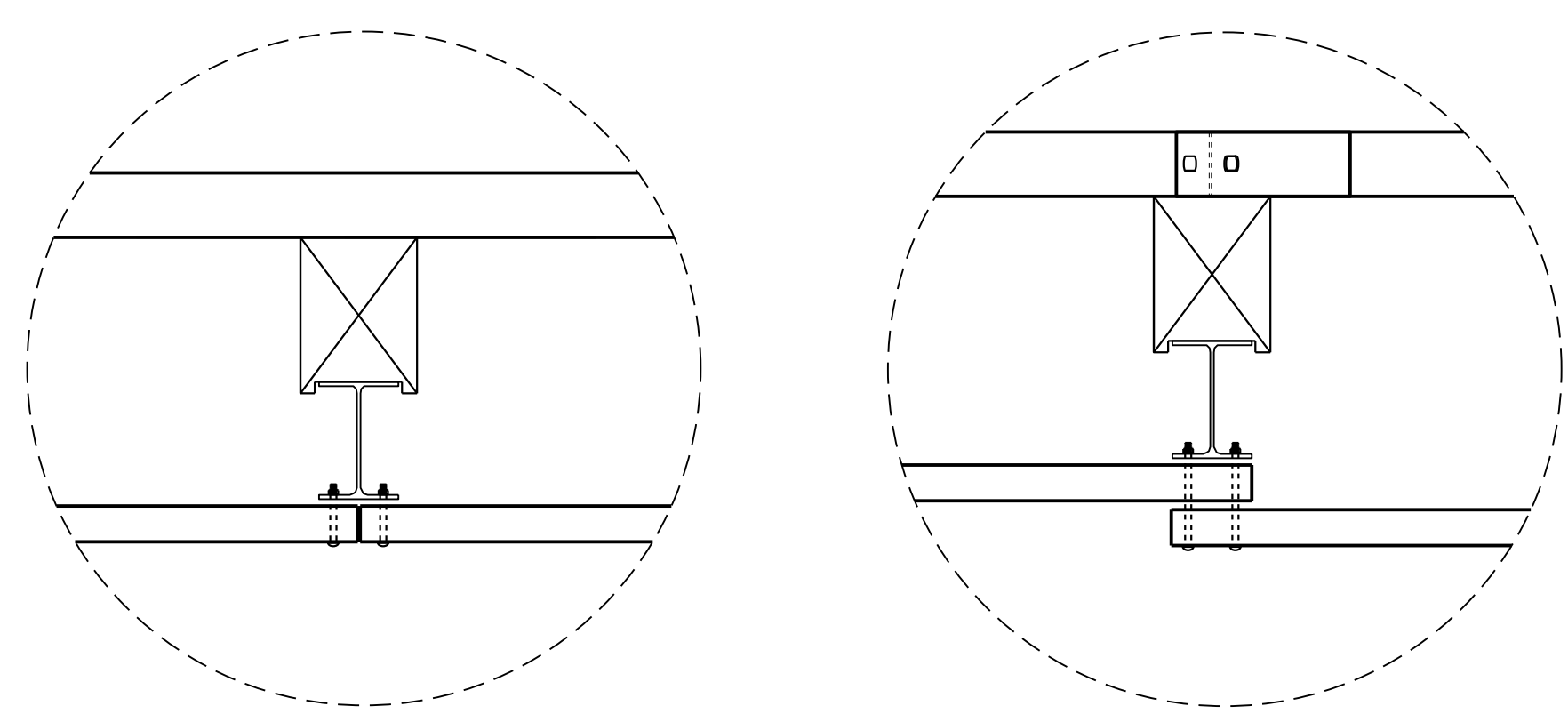
ORIGINAL BY: J. HOWERTON DATE: 08-23-18  
 MODIFIED BY: DATE:  
 CHECKED BY: DATE:  
 FILE SPEC.: DATE:







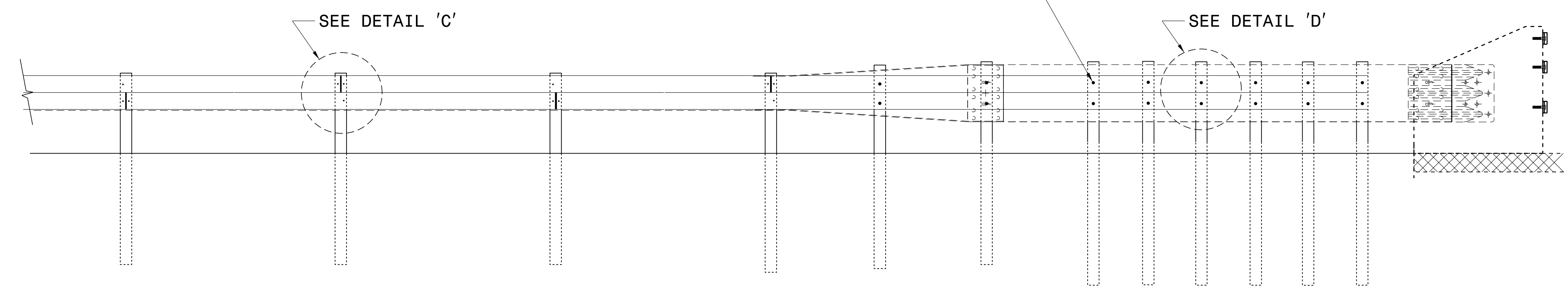
# PLAN



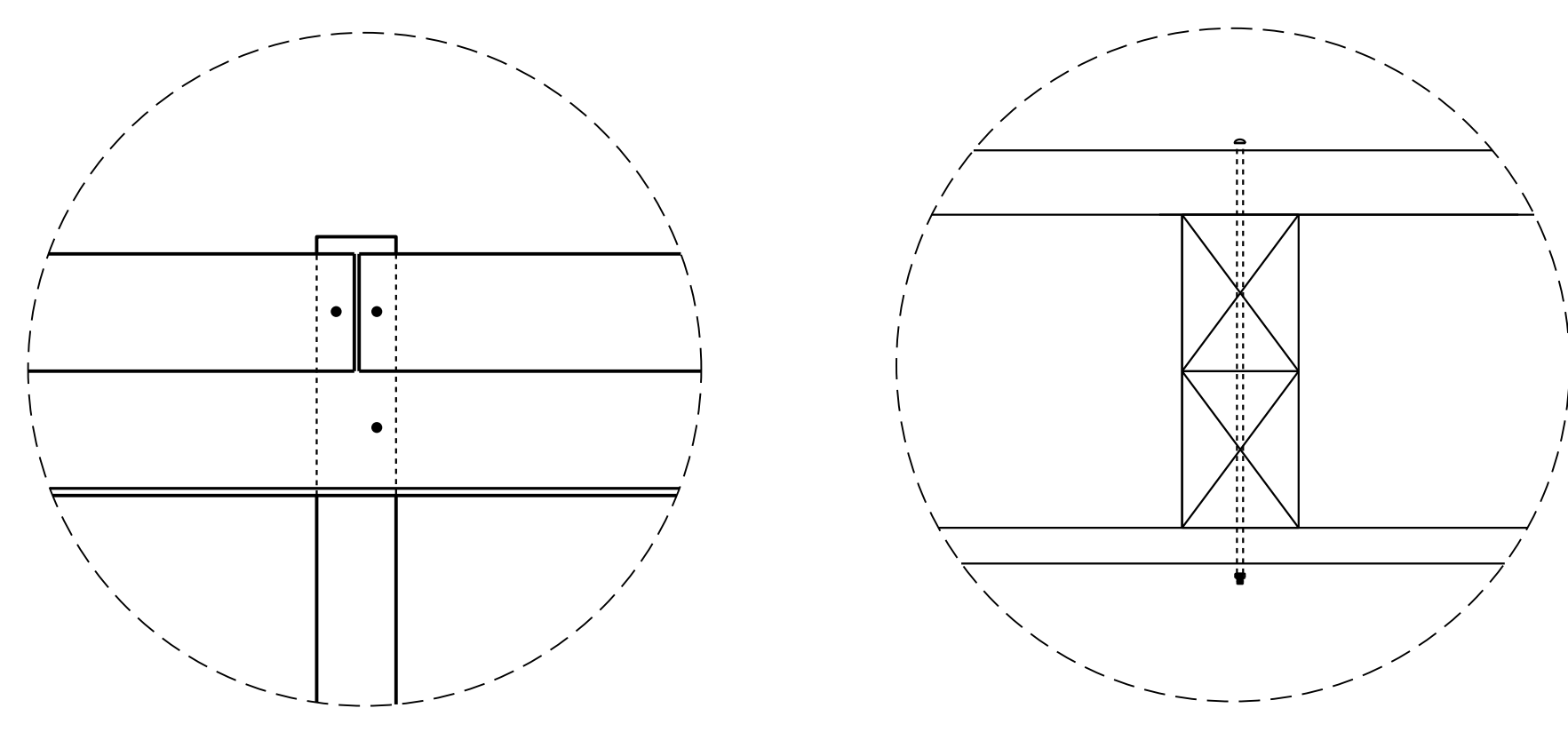
**DETAIL 'A'**

**DETAIL 'B'**

USE BOLTS AND NUTS FROM TYPE III ANCHOR UNIT TO FASTEN 2 X 6 WOOD RAILS TO THE WOOD POSTS - BOLTS MAY NEED TO BE LENGTHENED TO ACCOMMODATE FOR THE 2 X 6 WOOD RAILS.



# ELEVATION



**DETAIL 'C'**

**DETAIL 'D'**

### NOTES:

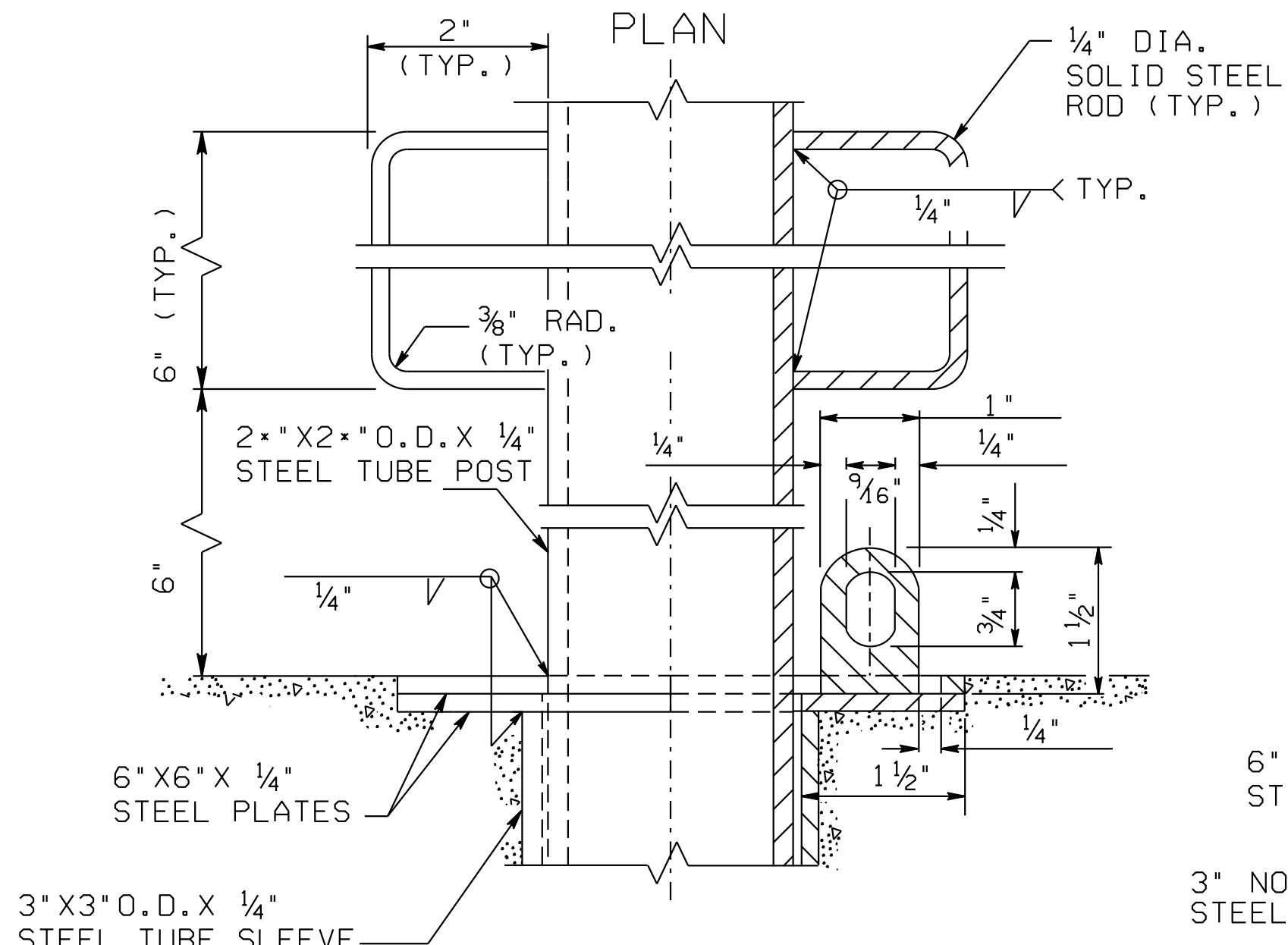
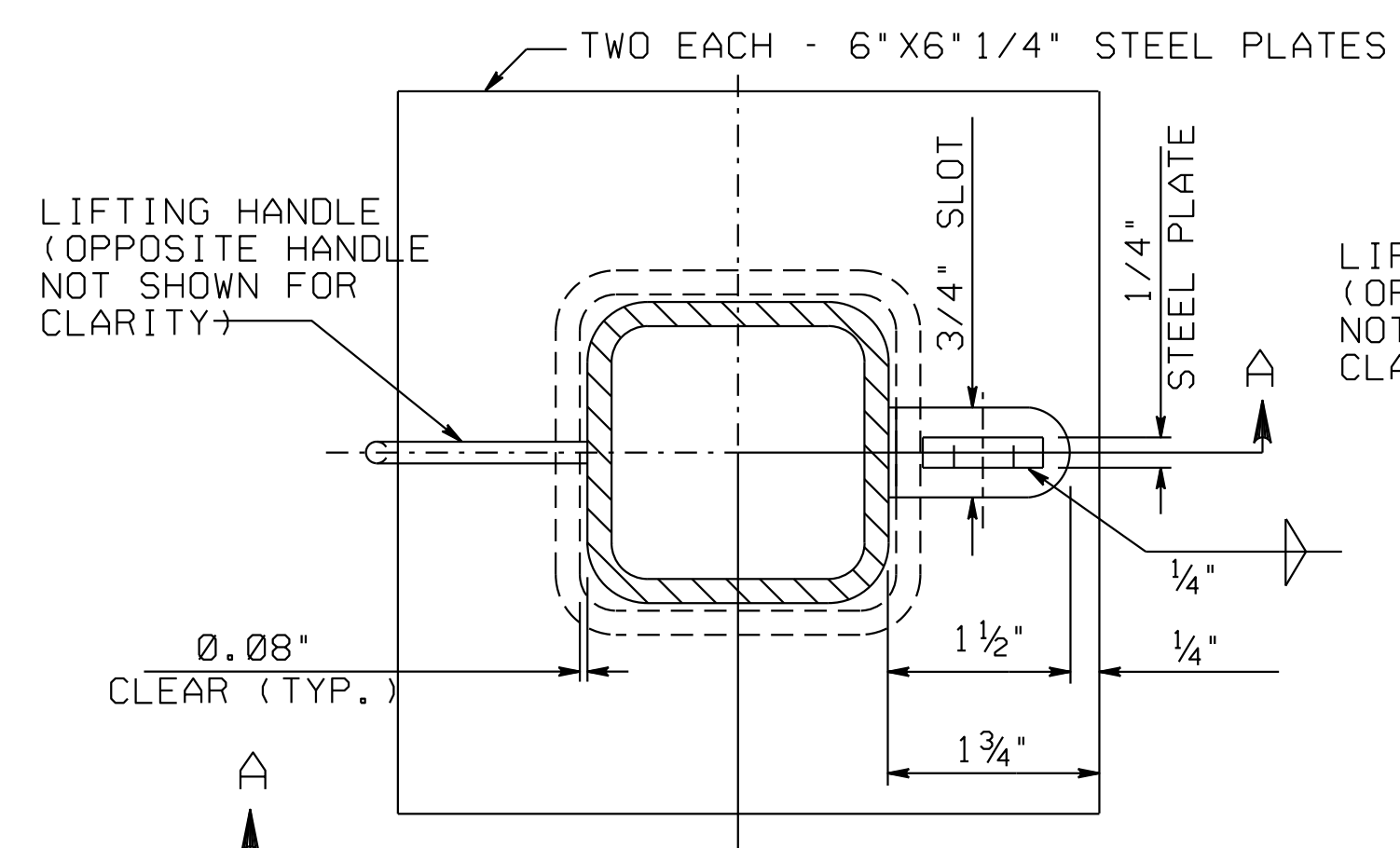
1. USE #2 SYP TREATED 2 X 6 FOR WOOD RAIL.
2. USE GUARDRAIL BOLTS TO FASTEN WOOD RAIL TO GUARDRAIL POSTS. SEE ROADWAY STD.NO.862.02.
3. THE MOUNTING HEIGHT OF THE WOOD RAIL TO BE DETERMINED IN THE FIELD.
4. PLACE THE TREATED 2 X 6 WOOD RAIL AS DIRECTED BY THE ENGINEER.
5. DO NOT PLACE WOOD RAIL WITHIN THE PAY LIMITS OF THE GREU.



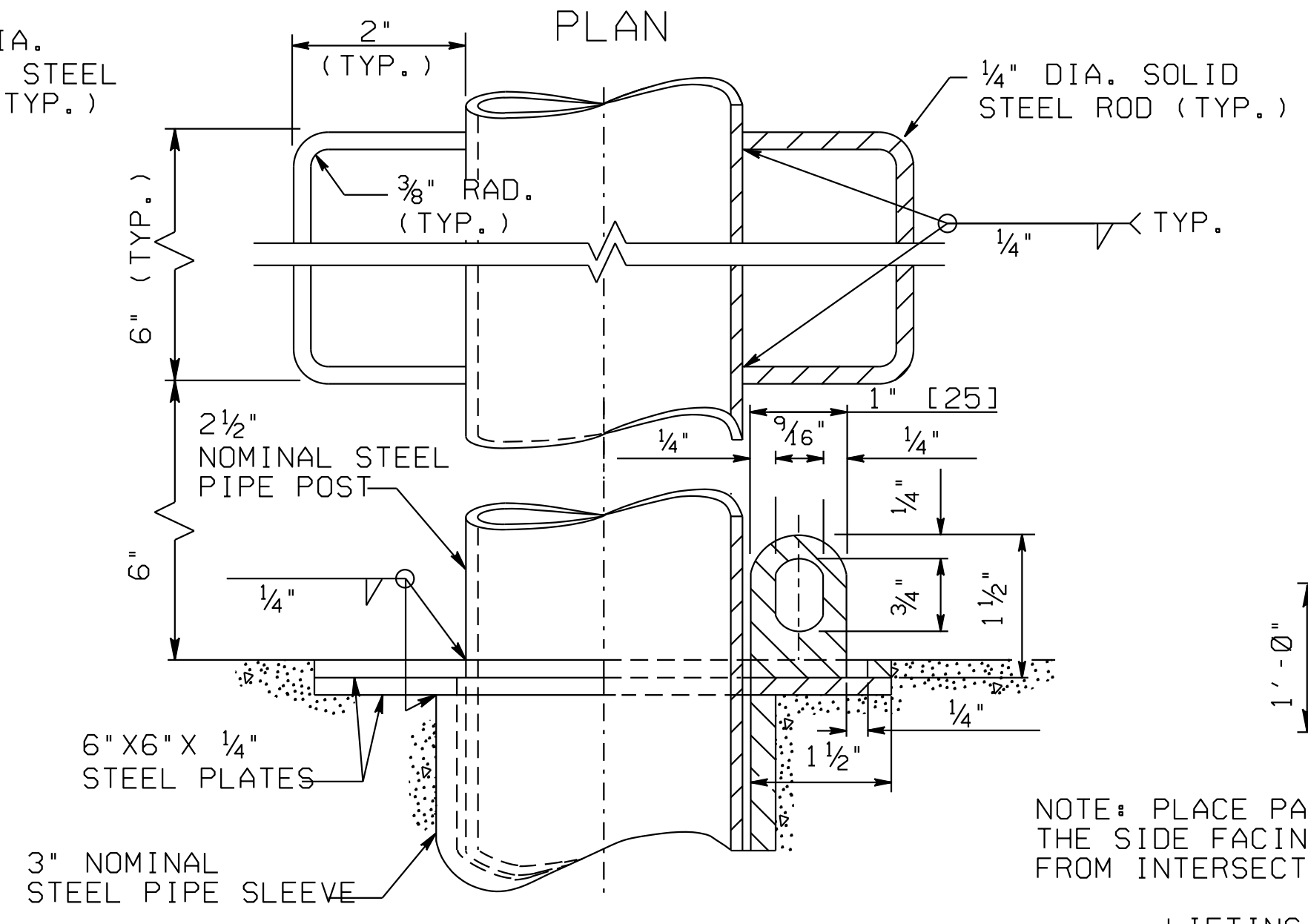
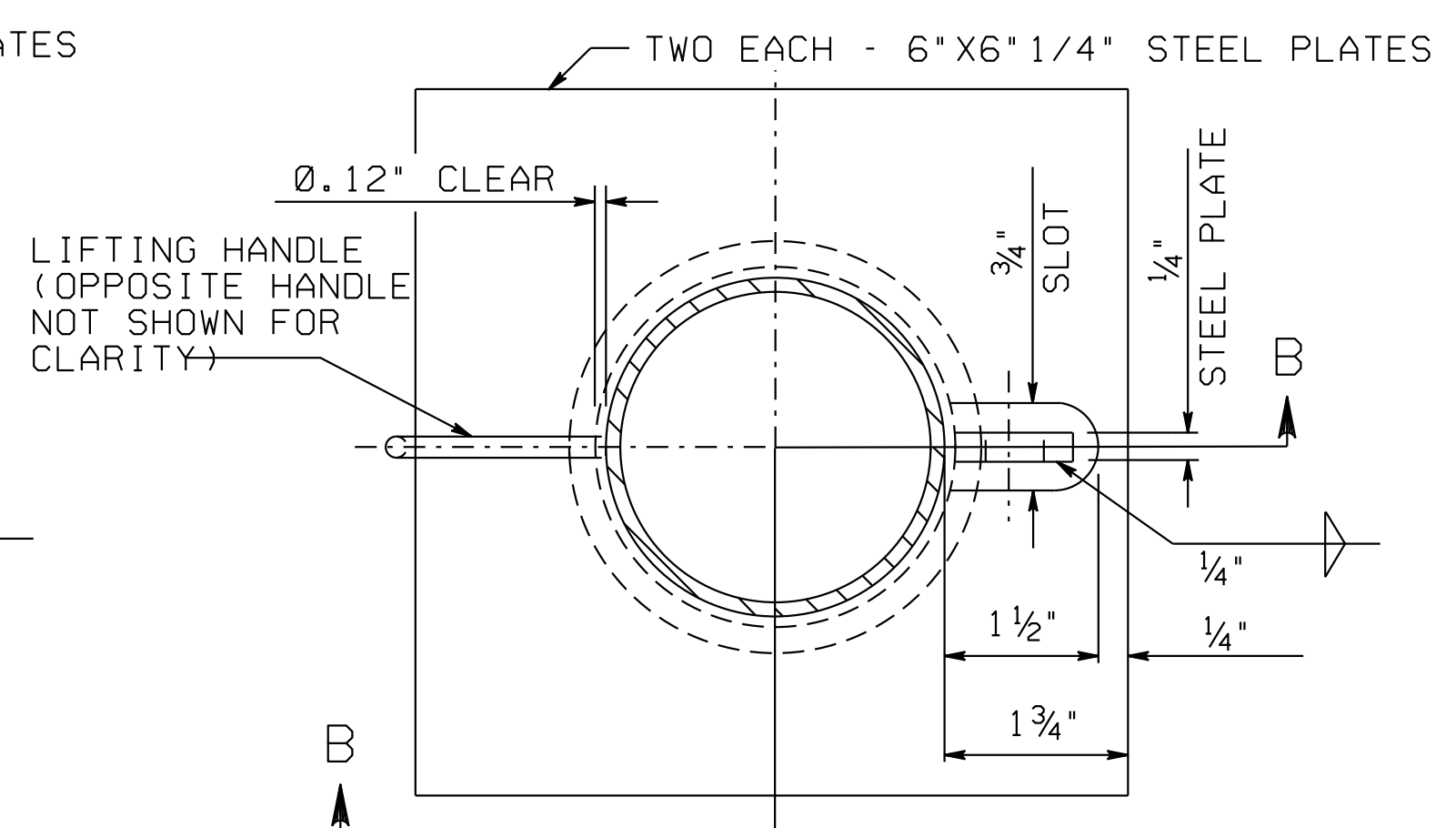
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS AND DEVELOPMENT UNIT PLANS AND STANDARDS SECTION	
Office 919-707-6950	FAX 919-250-4119
<b>DETAIL OF WOOD RUB RAIL</b>	
ORIGINAL BY: STD.862	DATE: 1-25-12
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC.: jhowerton/Wood Rail on Back of Guardrail	

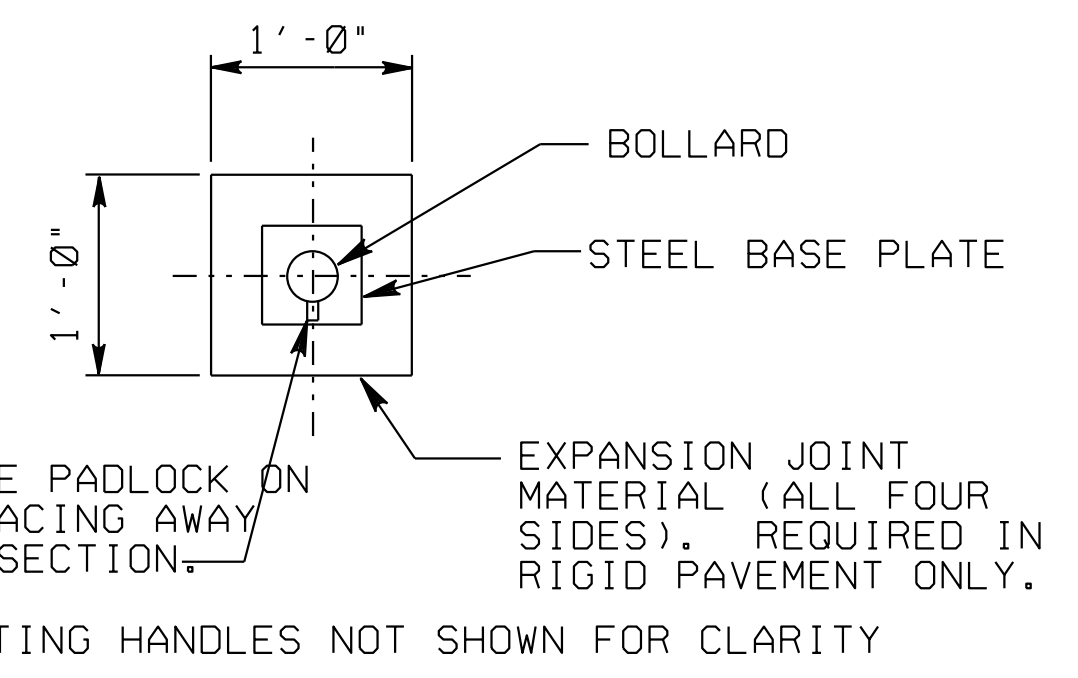
23-AUG-2018 09:52  
S:\Contracts\Contractors\Special Details\jhowerton\Wood Rail on the Back of Guardrail.dgn  
jhowerton AI CS0-212095



SECTION A-A  
REMOVABLE SQUARE BOLLARD



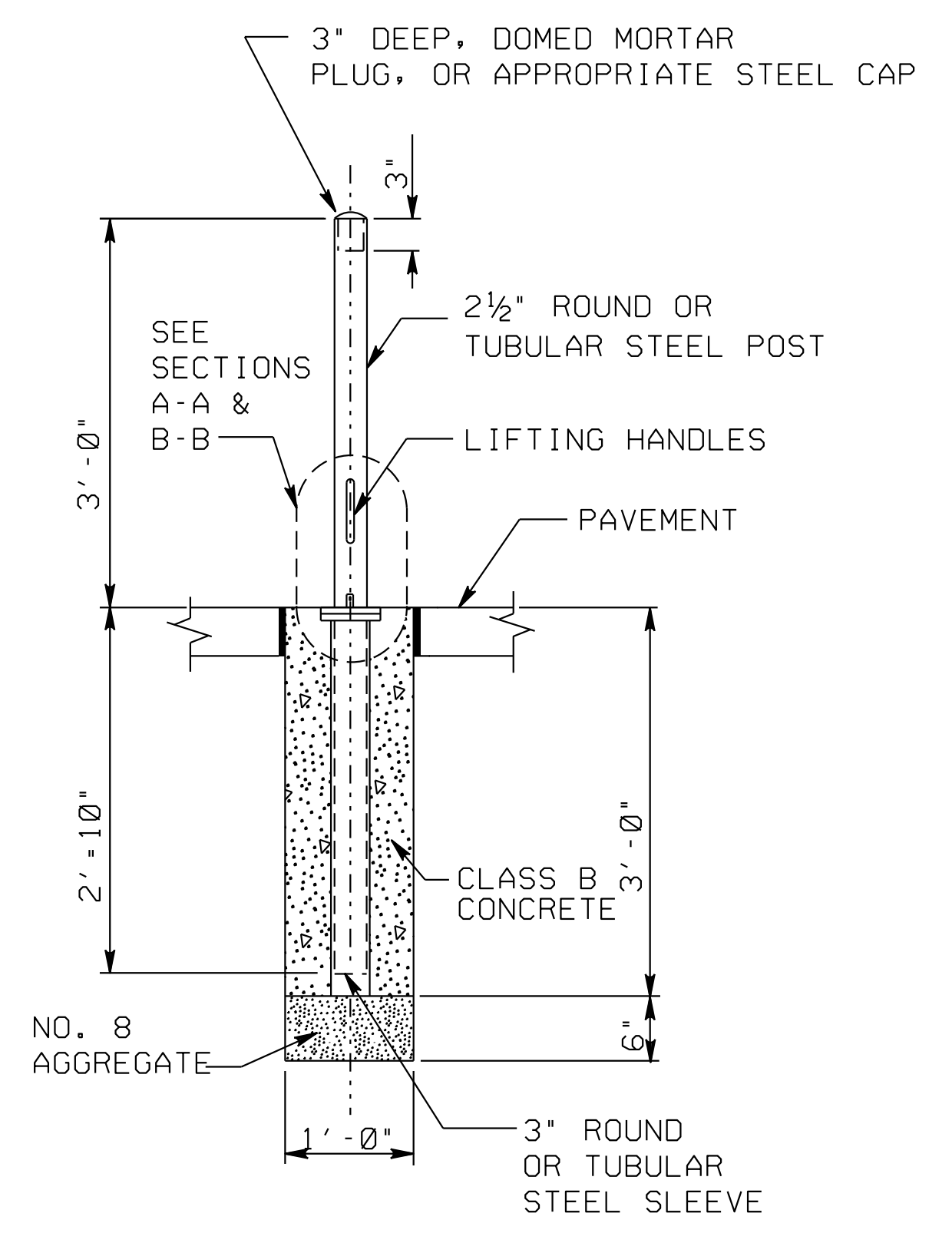
SECTION B-B  
REMOVABLE ROUND BOLLARD



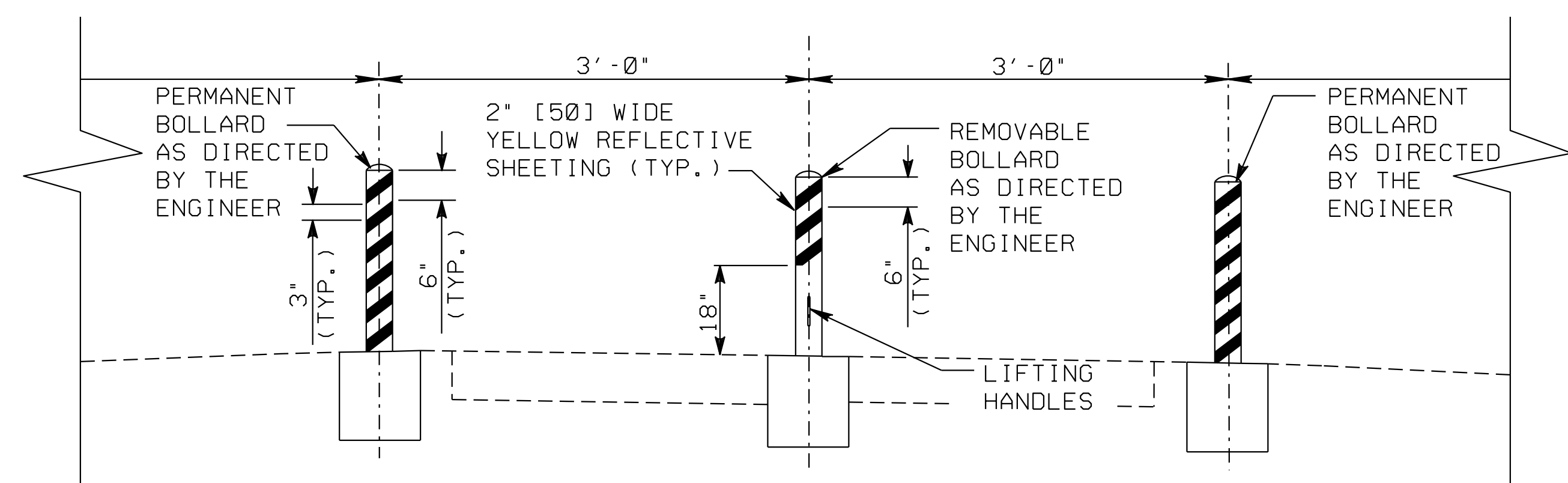
DETAIL "A"  
PLAN VIEW

NOTES

- GENERAL: MOUNT ALL BOLLARD SLEEVES FLUSH WITH THE PAVEMENT.
- CONCRETE ENCASEMENT: SLEEVE ENCASEMENT SHALL BE SQUARE AS SHOWN, IN CONCRETE PAVEMENT, BUT MAY BE SQUARE OR ROUND IN FLEXIBLE PAVEMENT. ROUND ENCASEMENT SHOULD BE 1'-0" DIAMETER.
- PREFORMED EXPANSION JOINT FILLER: IS REQUIRED WHEN BOLLARDS ARE SET IN CONCRETE PAVEMENT.
- STEEL PIPE: ASTM A 53 SCHEDULE 40.
- CONCRETE: USE CLASS B CONCRETE.
- GALVANIZING: AFTER FABRICATING, HOT-DIP GALVANIZE ALL STEEL PARTS, INCLUDING STEEL PIPE, AS SPECIFIED IN ASTM A 123.
- ALUMINUM: ALL STEEL COMPONENTS MAY BE REPLACED BY ALUMINUM COMPONENTS MEETING THE FOLLOWING ASTM SPECIFICATIONS: B 209 (PLATE), B 210 OR B 241 (DRAWN SEAMLESS TUBES & PLATES), B 211 (RODS), AND F 901 (BOLTS).
- PERMANENT BOLLARDS: PERMANENT BOLLARDS SHALL BE THE SAME AS REMOVABLE BOLLARDS, EXCEPT THAT THE STEEL PLATES, SLEEVES AND LIFTING HANDLES SHALL BE OMITTED. ENCASE POSTS DIRECTLY IN CONCRETE.

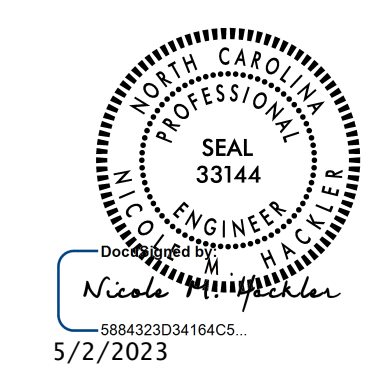


DETAIL "A"  
ELEVATION VIEW  
REMOVABLE BOLLARD



BOLLARD PLACEMENT - ELEVATION VIEW

05-MAR-2019 13:51 S:\Contracts\Special Details\english\misc\bollards steel.dgn ktemp AT CSD-292596

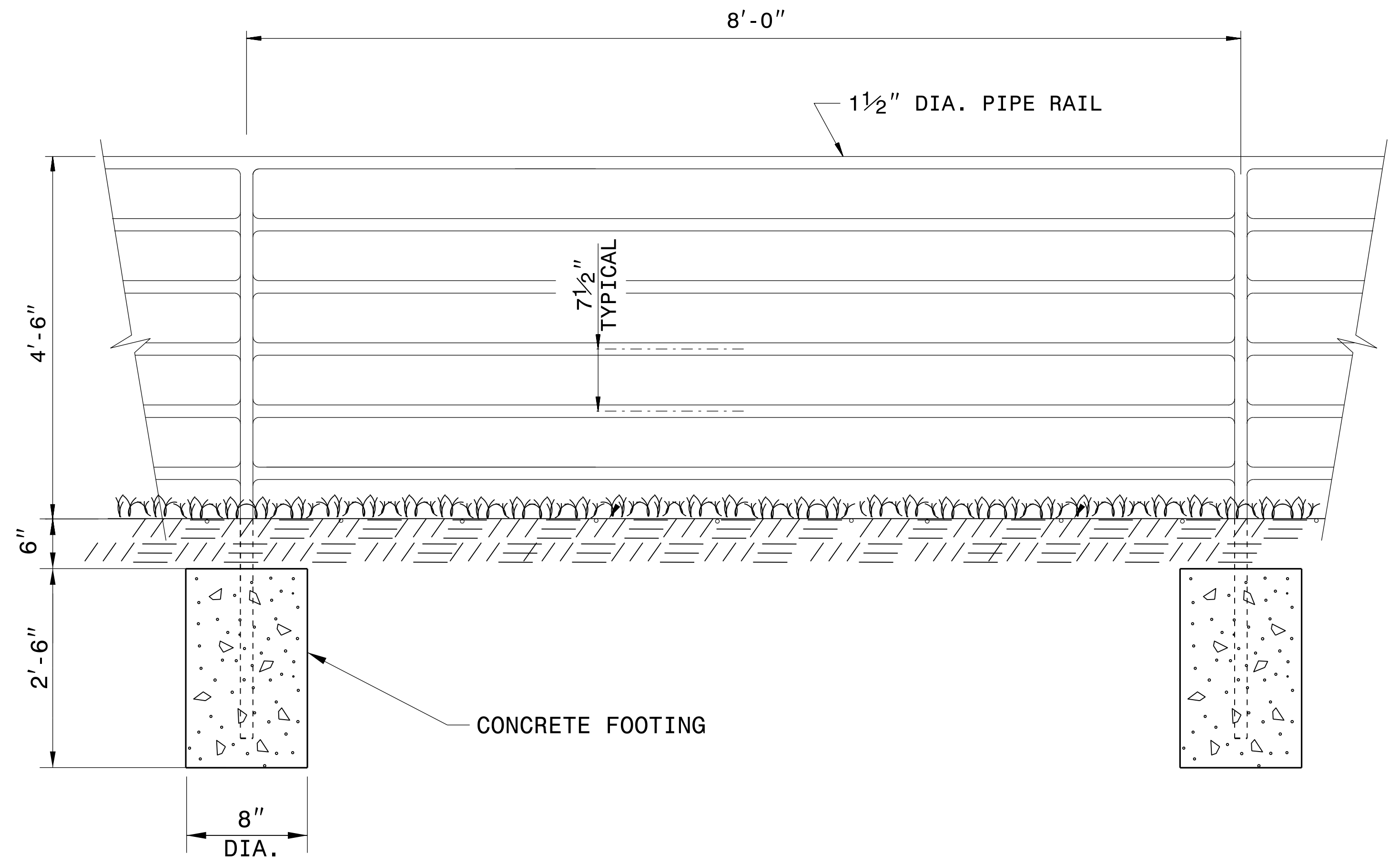


**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

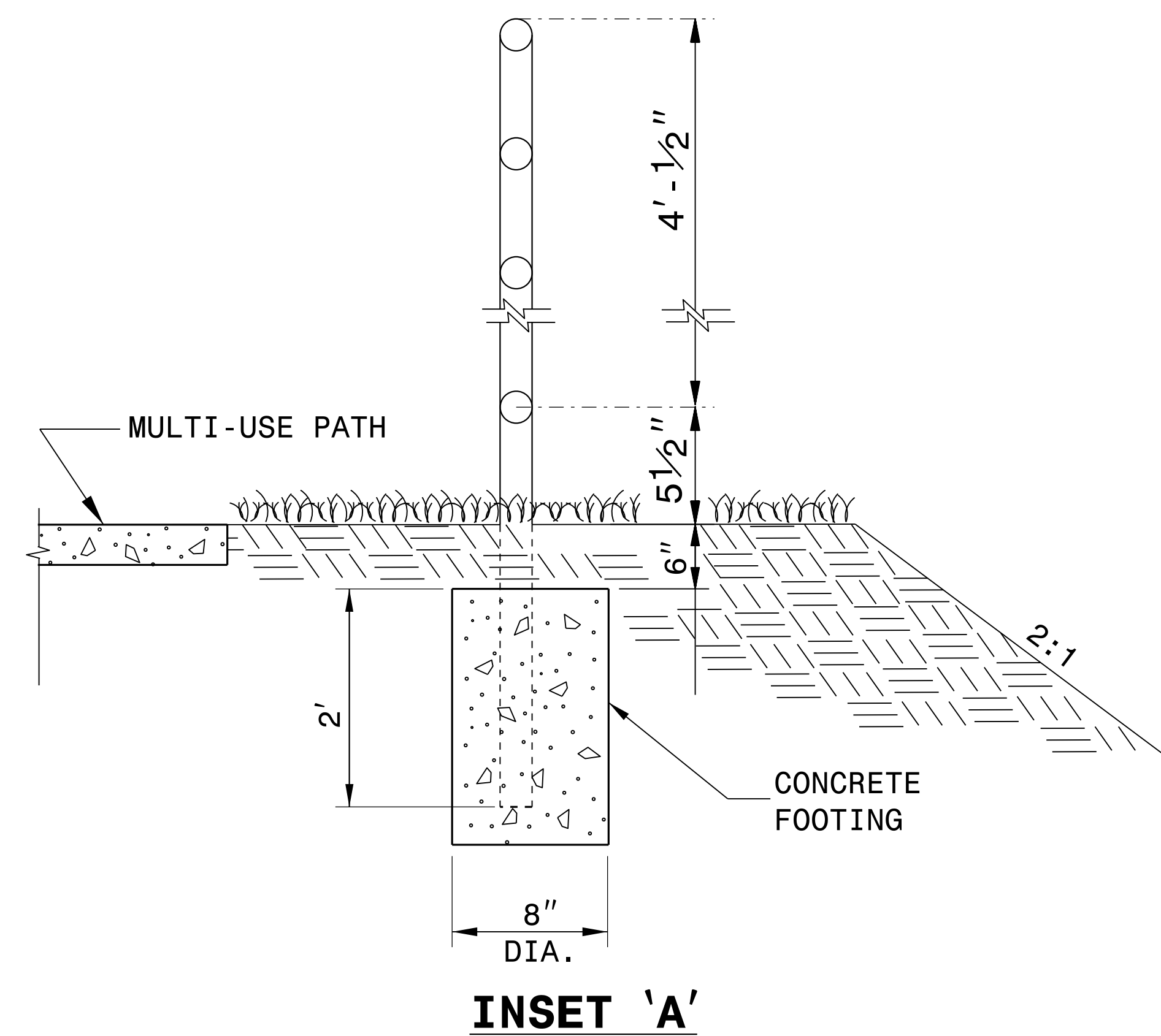
**CONTRACT STANDARDS & DEVELOPMENT UNIT  
STANDARDS AND SPECIAL DESIGN**  
Office 919-707-6950 FAX 919-250-4119

**STEEL BOLLARDS**

ORIGINAL BY: _____	DATE: _____
MODIFIED BY: _____	DATE: _____
CHECKED BY: _____	DATE: _____
FILE SPEC.: nbritt/english/misc/bollards steel.dgn	

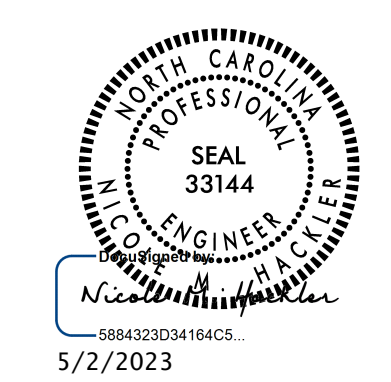


### ELEVATION OF HANDRAIL



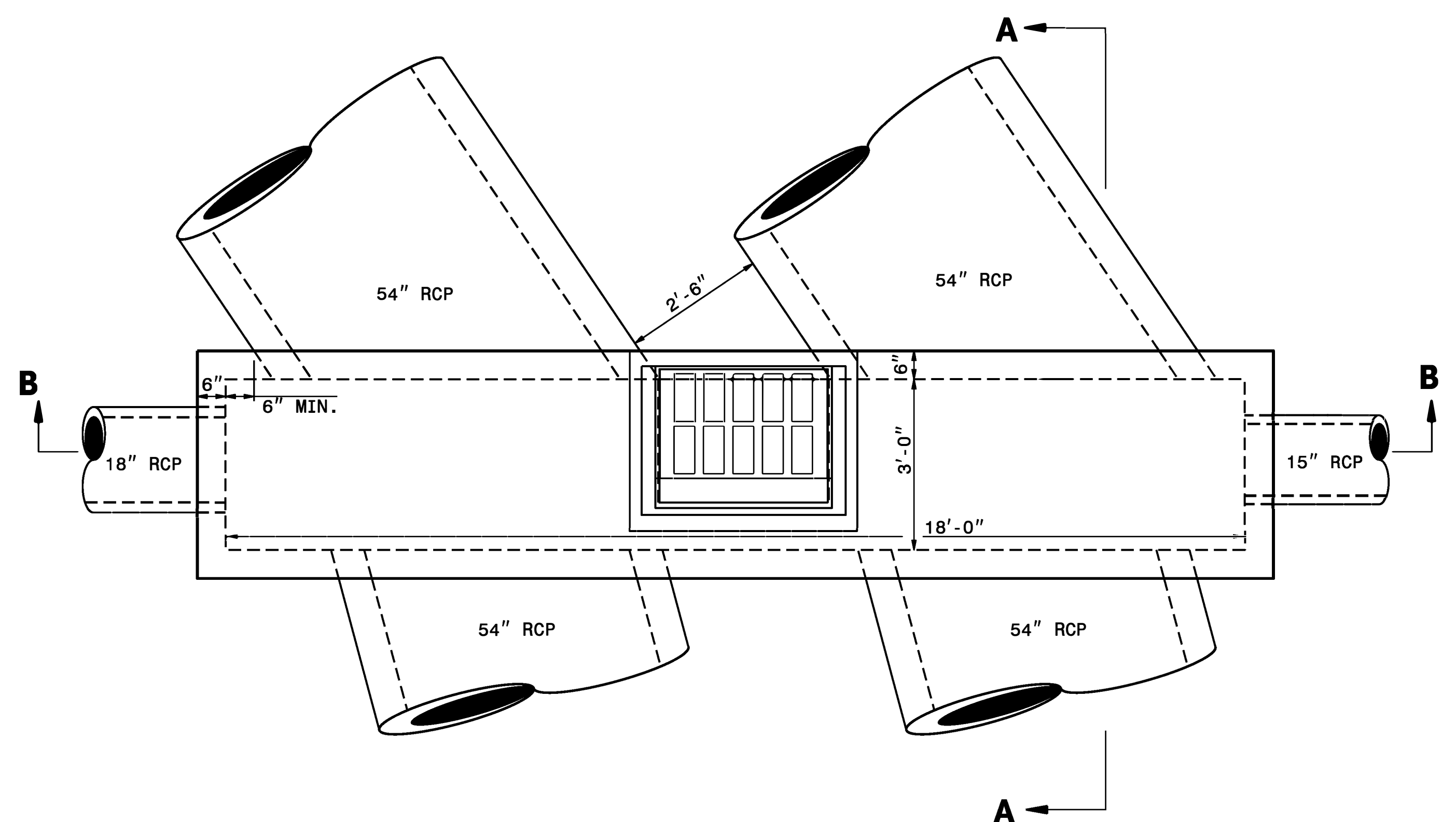
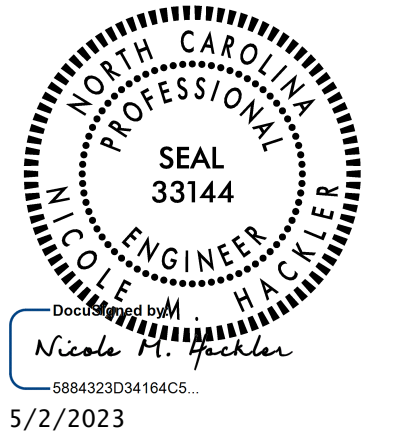
- NOTES:**
- CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1 1/2" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.
  - REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.
  - PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.
  - WELD IN ACCORDANCE WITH ARTICLE 1072-18 OF THE STANDARD SPECIFICATIONS.
  - USE CLASS 'B' CONCRETE FOR HANDRAIL FOOTINGS.
  - PLACEMENT OF HANDRAIL IN RELATION TO SHOULDER BREAK POINT AND PATH MAY BE MODIFIED AS DIRECTED BY THE ENGINEER.

25-JAN-2018 07:30 S:\Contracts\Projects\Jhowerton\Handrail Adjacent to Sidewalk.dgn Jhowerton AT USD-292595



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

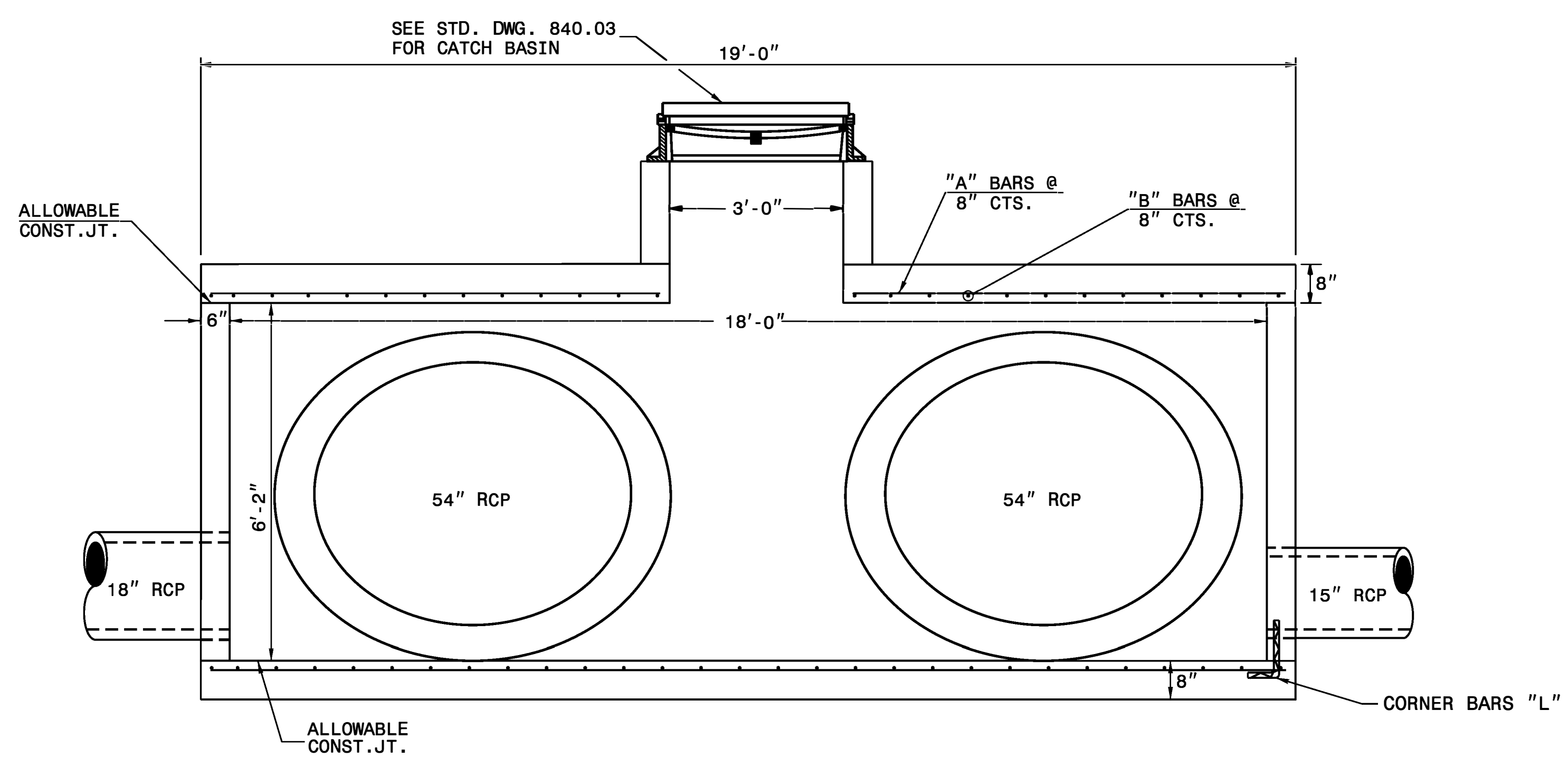
<b>CONTRACT STANDARDS AND DEVELOPMENT UNIT</b>	
Office 919-707-6950 FAX 919-250-4119	
<b>PROPOSED BIKE/PED SAFETY RAIL</b>	
ORIGINAL BY: E.E. WARD	DATE: 12-99
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC.: jhowerton/handrail adjacent to sidewalk.dgn	



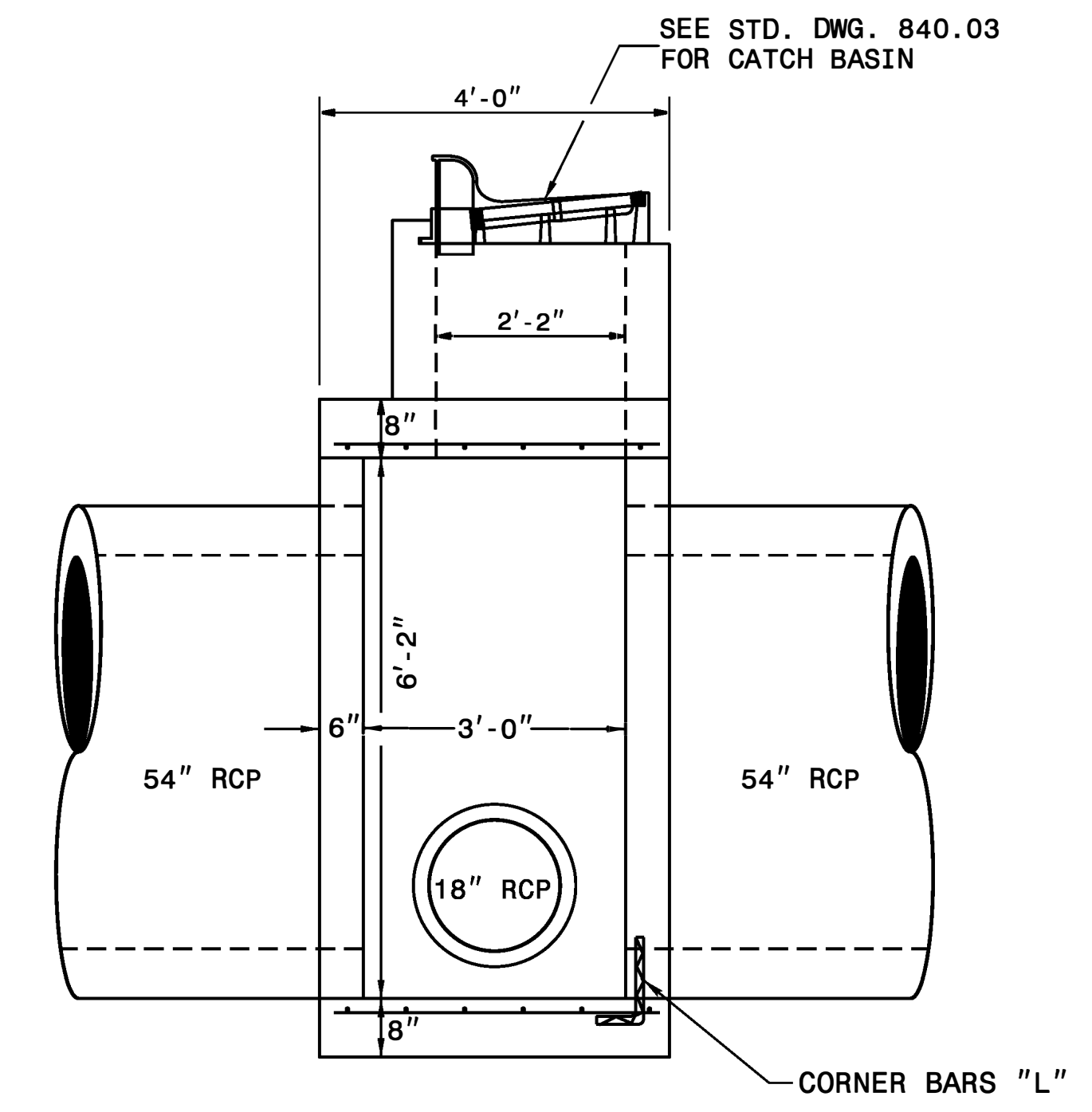
**PLAN**

**GENERAL NOTES:**

1. USE CLASS "B" CONCRETE THROUGHOUT.
2. CONSTRUCT CONCRETE BOX IN ACCORDANCE WITH SECTION 825 OF THE STANDARD SPECIFICATIONS.
3. PROVIDE ALL DRAINAGE STRUCTURES OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
4. OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
5. USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
6. ADJUST LENGTH OF STEEL BARS AS NEEDED TO COMPENSATE FOR PIPES AND FRAME AND GRATE OPENINGS.
7. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 400.
8. CUT OR BEND STEEL BARS AS NEEDED TO PROVIDE 2" CLEARANCE.
9. LOCATE FRAME, GRATE, AND HOOD AS FIELD CONDITIONS DICTATE AND AS DIRECTED BY THE ENGINEER.
10. HEIGHT OF CATCH BASIN INLET MAY BE ADJUSTED IN THE FIELD AS DIRECTED BY THE ENGINEER.



**SECTION B-B**

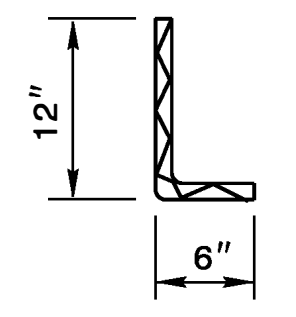


**SECTION A-A**

**BILL OF MATERIALS**

BAR	QTY	SIZE	LENGTH	WEIGHT
A	12	#5	18'-8"	234
B	58	#5	3'-8"	222
TOTAL REINF. STEEL (lbs.)				456
TOTAL CONC. CU. YDS.				9.2

NO DEDUCTIONS HAVE BEEN MADE TO ACCOMMODATE PIPES.

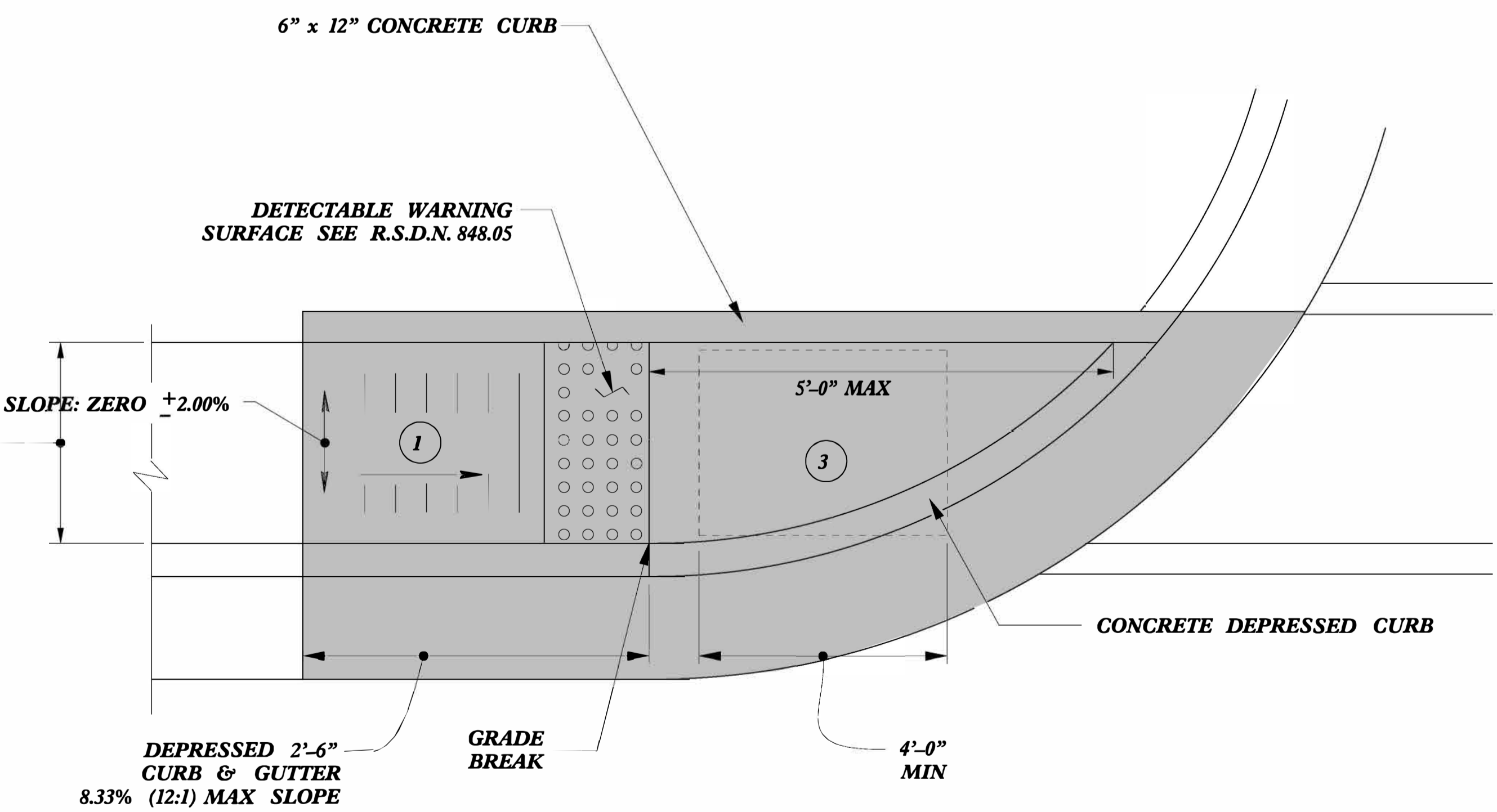
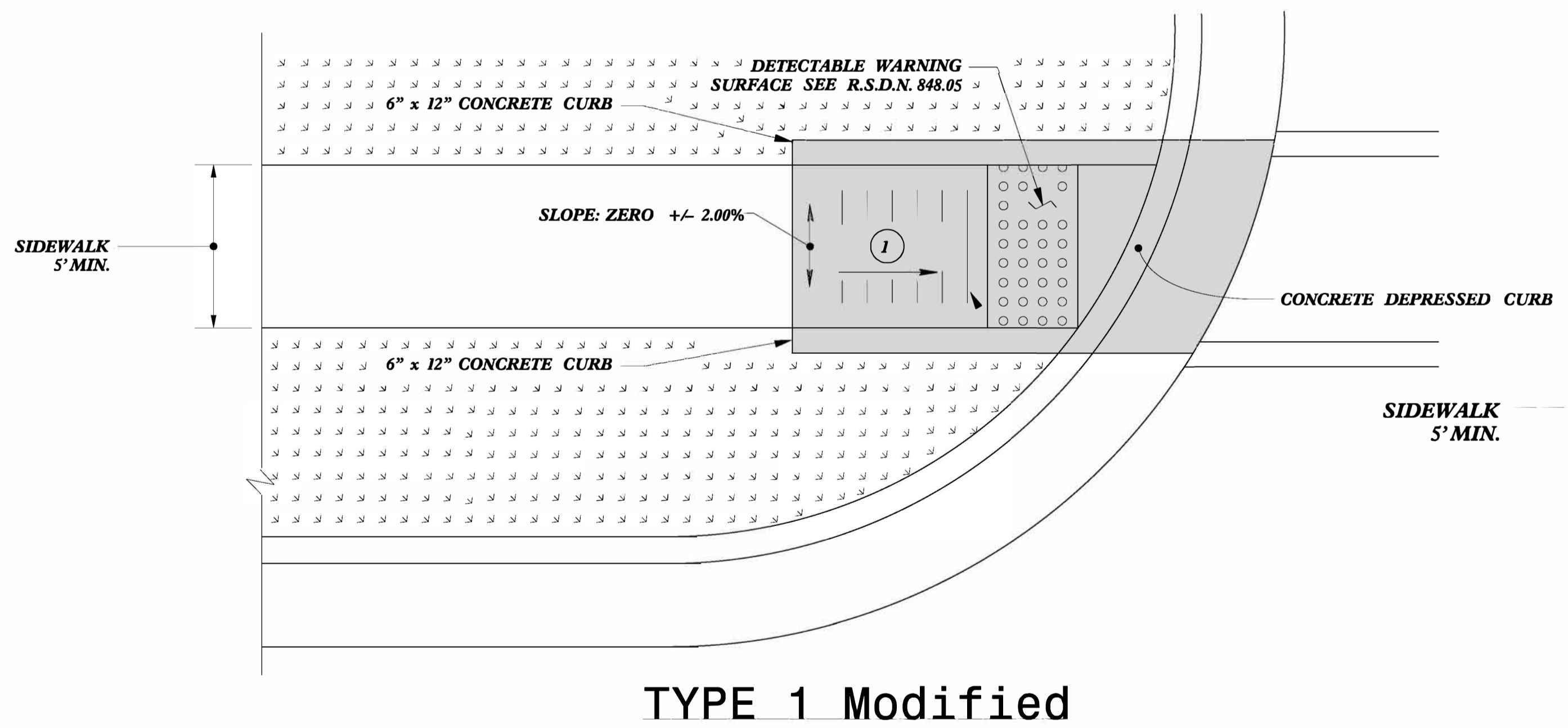
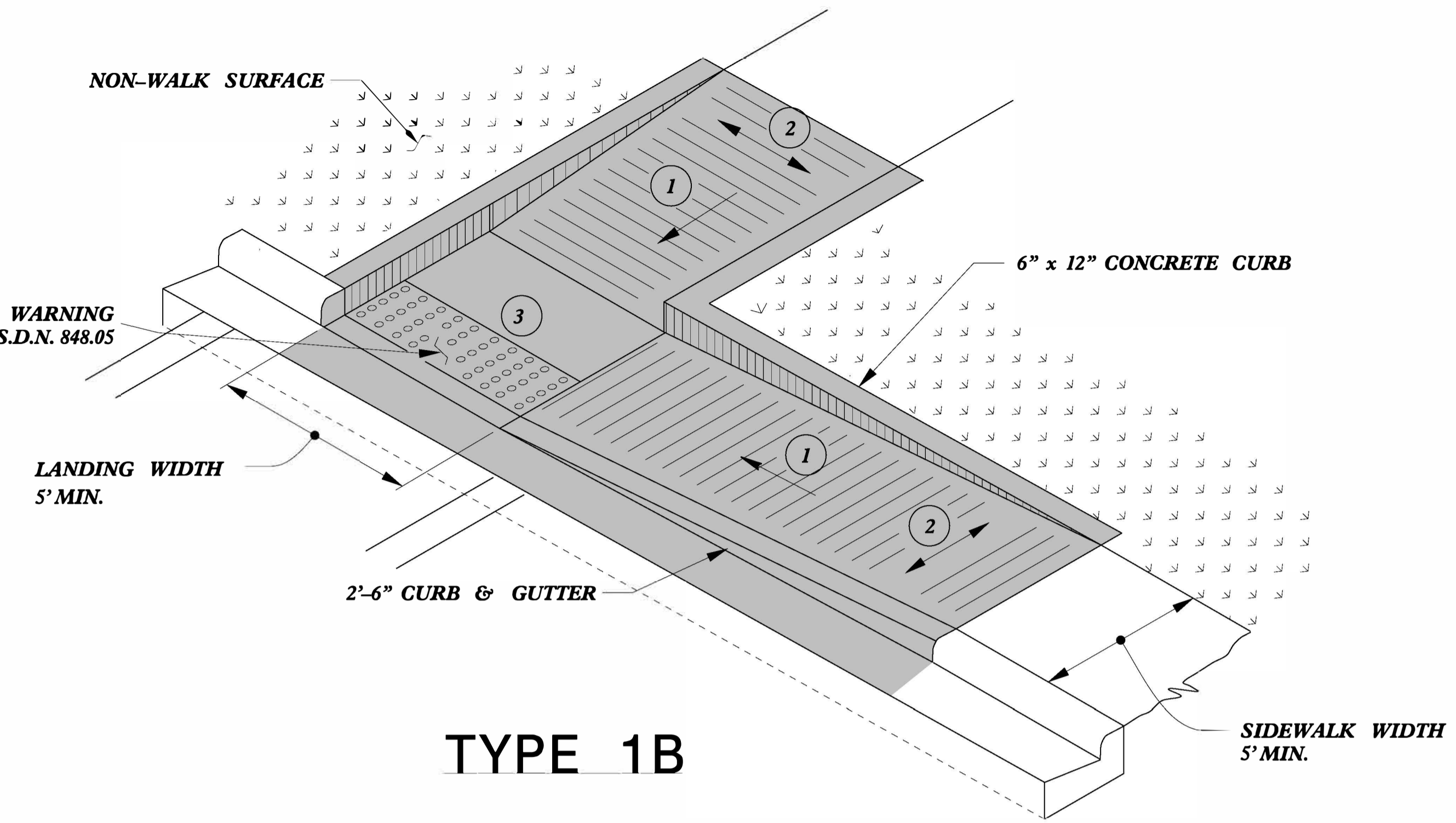
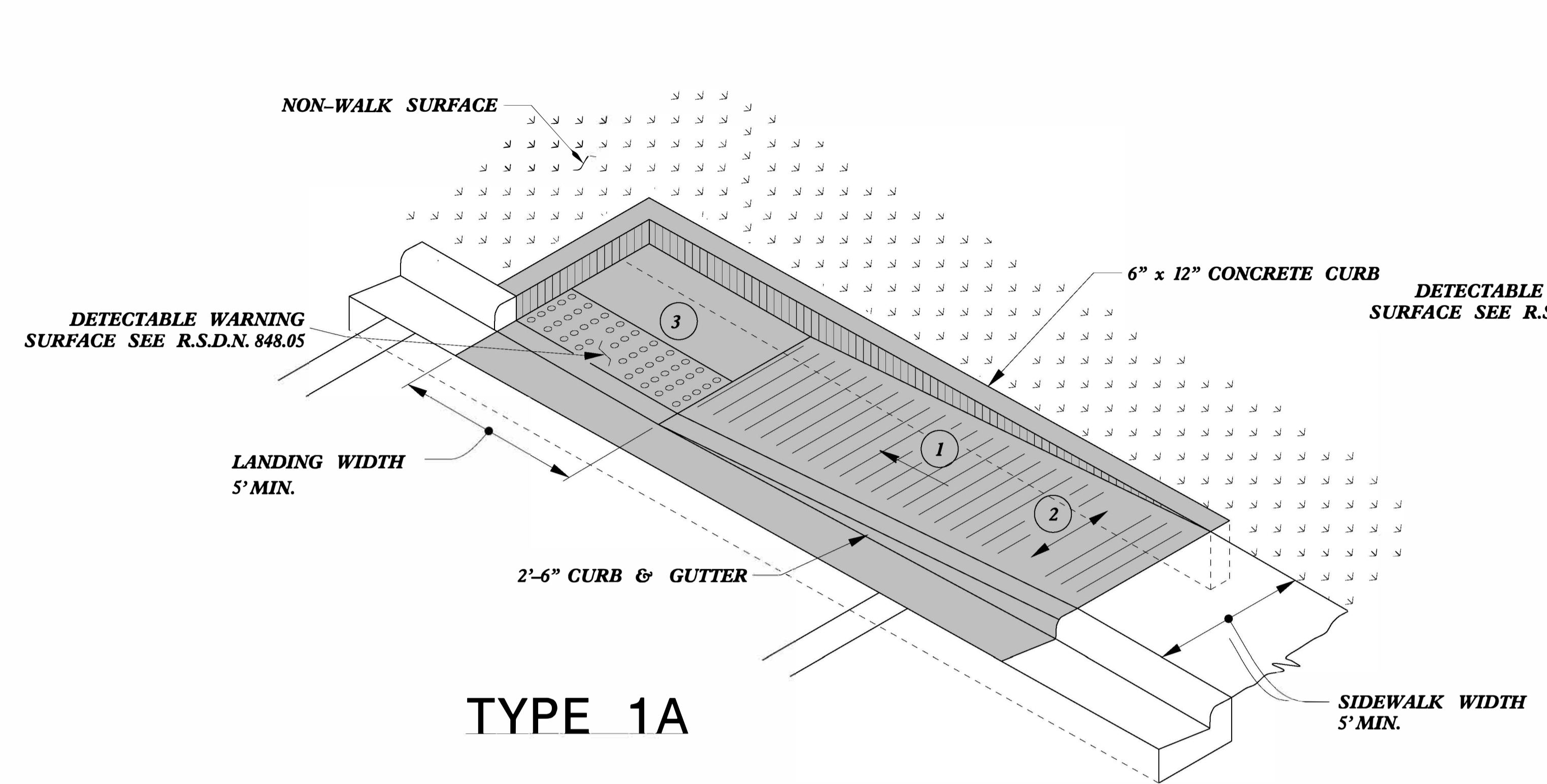


**DOWEL**

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**DETAIL OF SPECIAL  
CATCH BASIN**

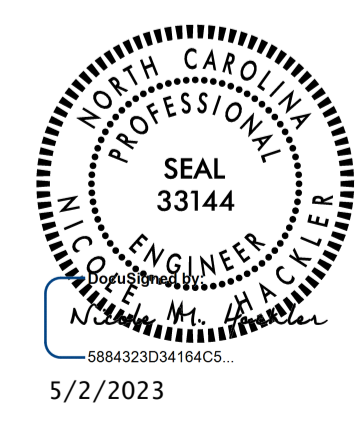
ORIGINAL BY: KYLE KEMPF DATE: JUNE 2019  
 MODIFIED BY: DATE:  
 CHECKED BY: DATE:  
 FILE SPEC.: kkempf/english/U4424 CB 2 x 54.dgn



- 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

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**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

5/14/99



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

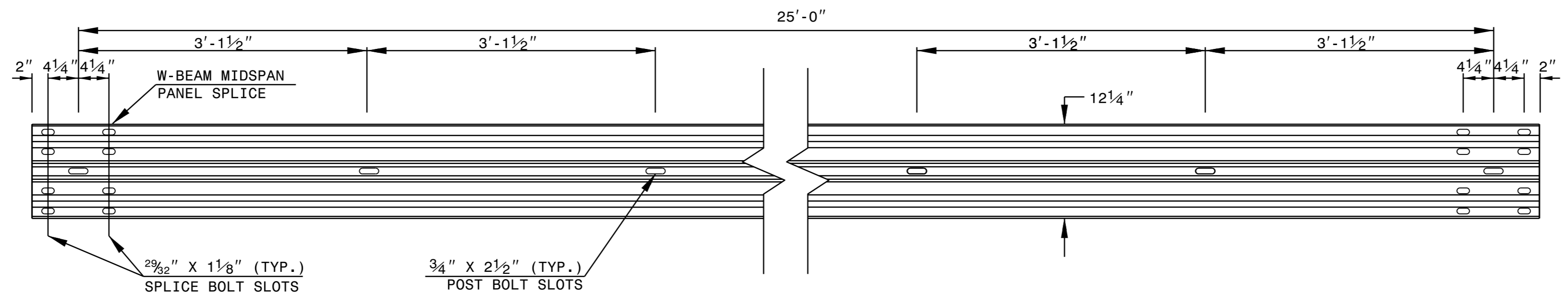
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 6 OF 8  
**862D02**

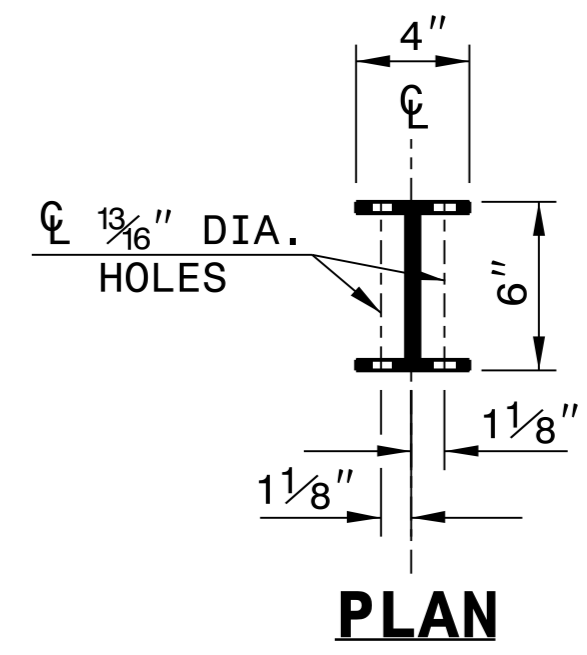
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

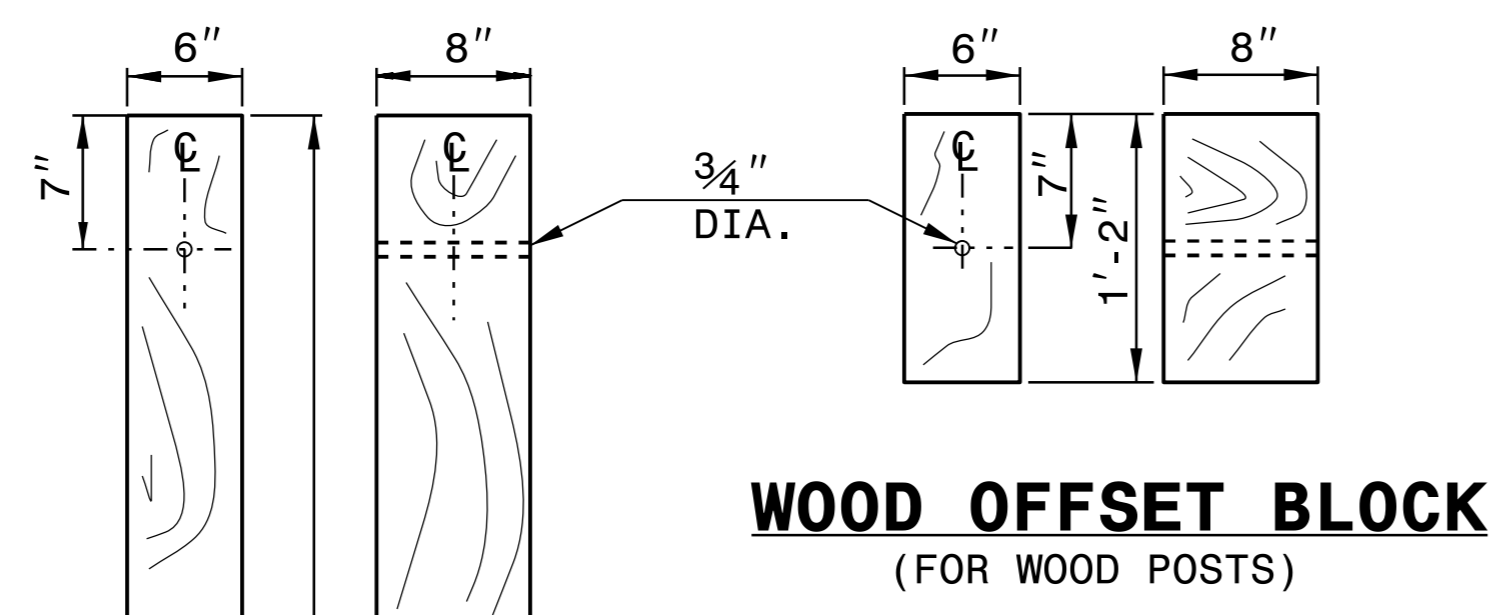
SHEET 6 OF 8  
**862D02**



**STANDARD W-BEAM GUARDRAIL**



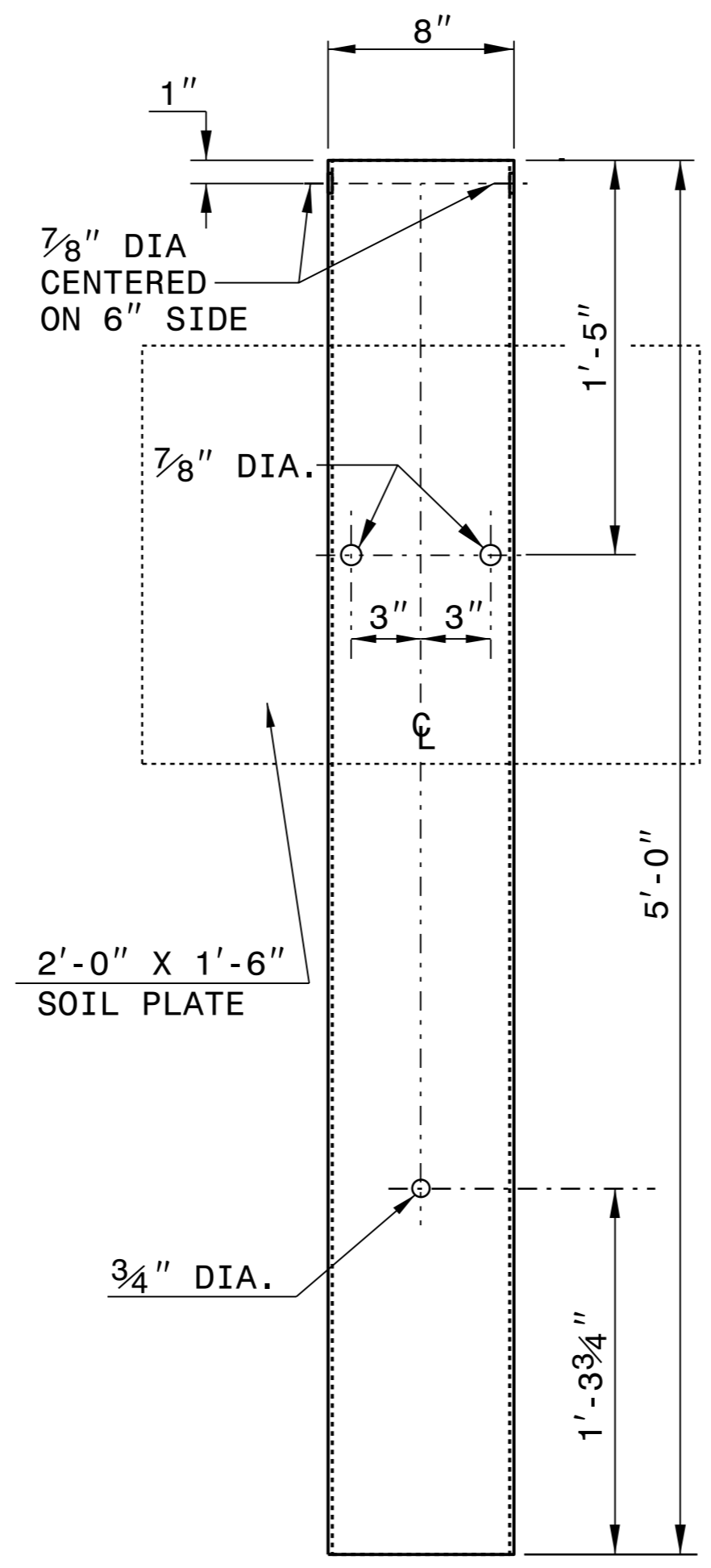
**PLAN**



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

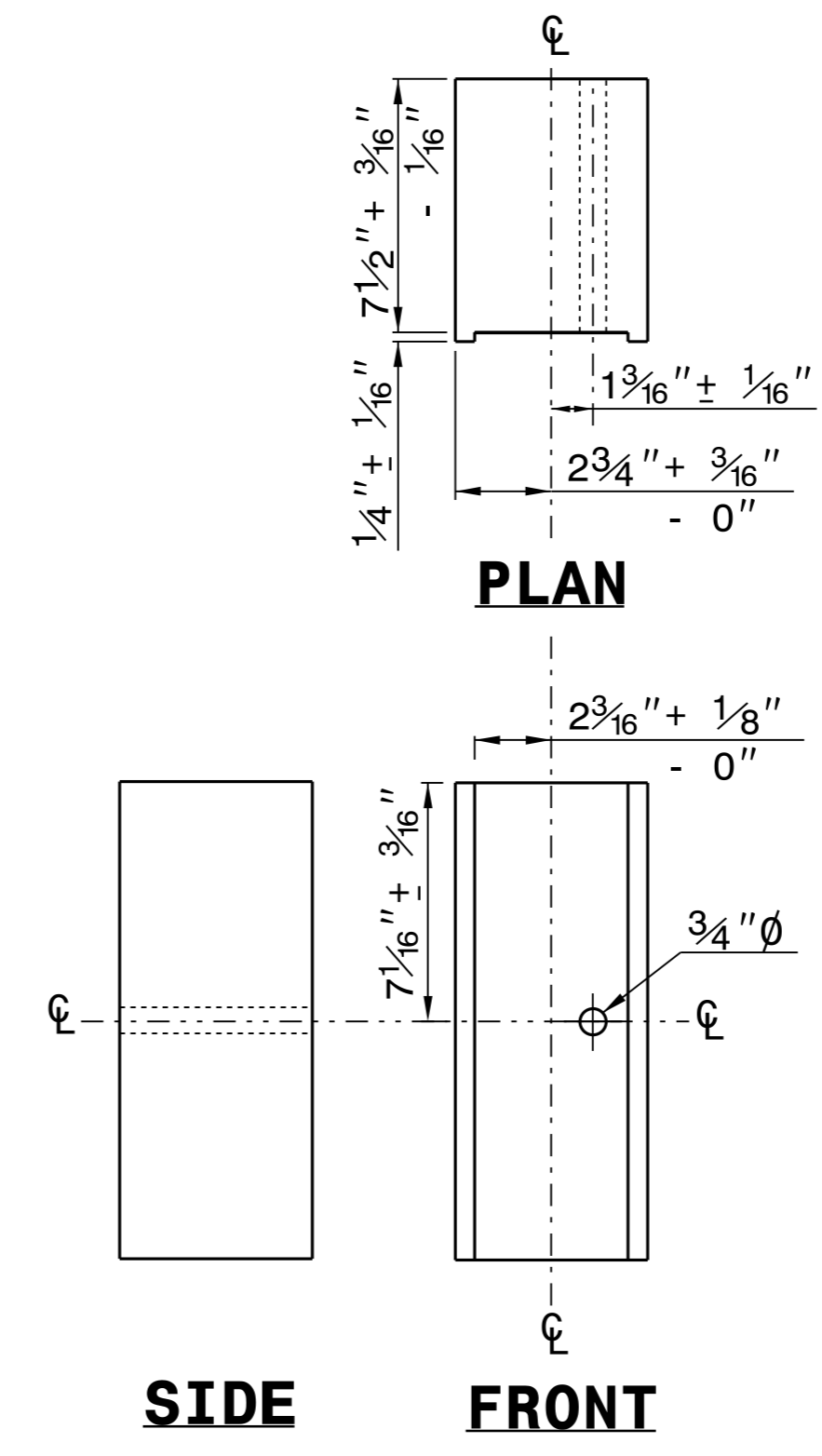
**STANDARD  
LINE POST**

**SHORT WOOD  
BREAKAWAY POST**



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

**SYSTEM PARTS**

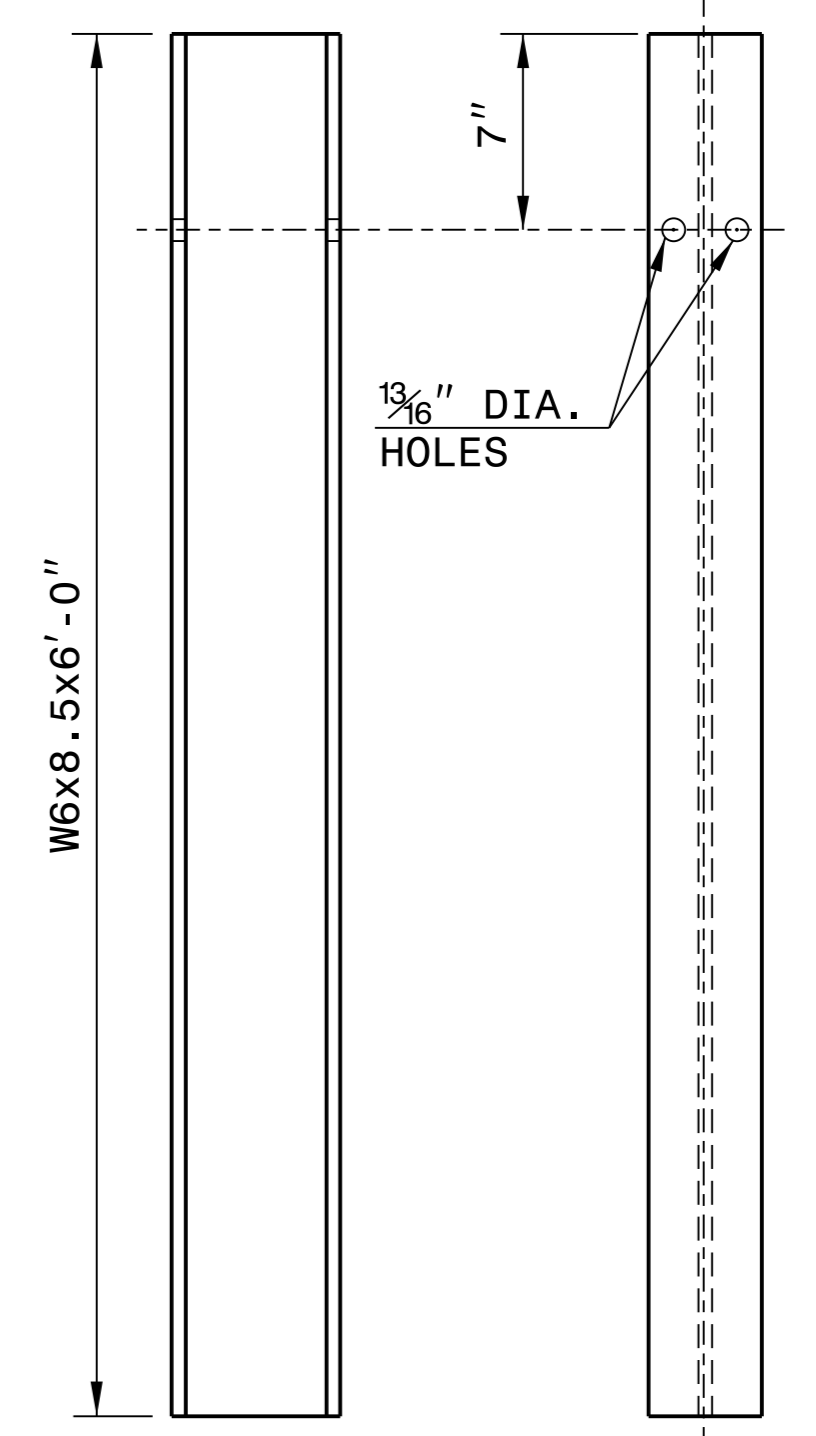


**PLAN**

**SIDE**

**FRONT**

**ROUTED  
OFFSET BLOCK**



**SIDE**

**FRONT**

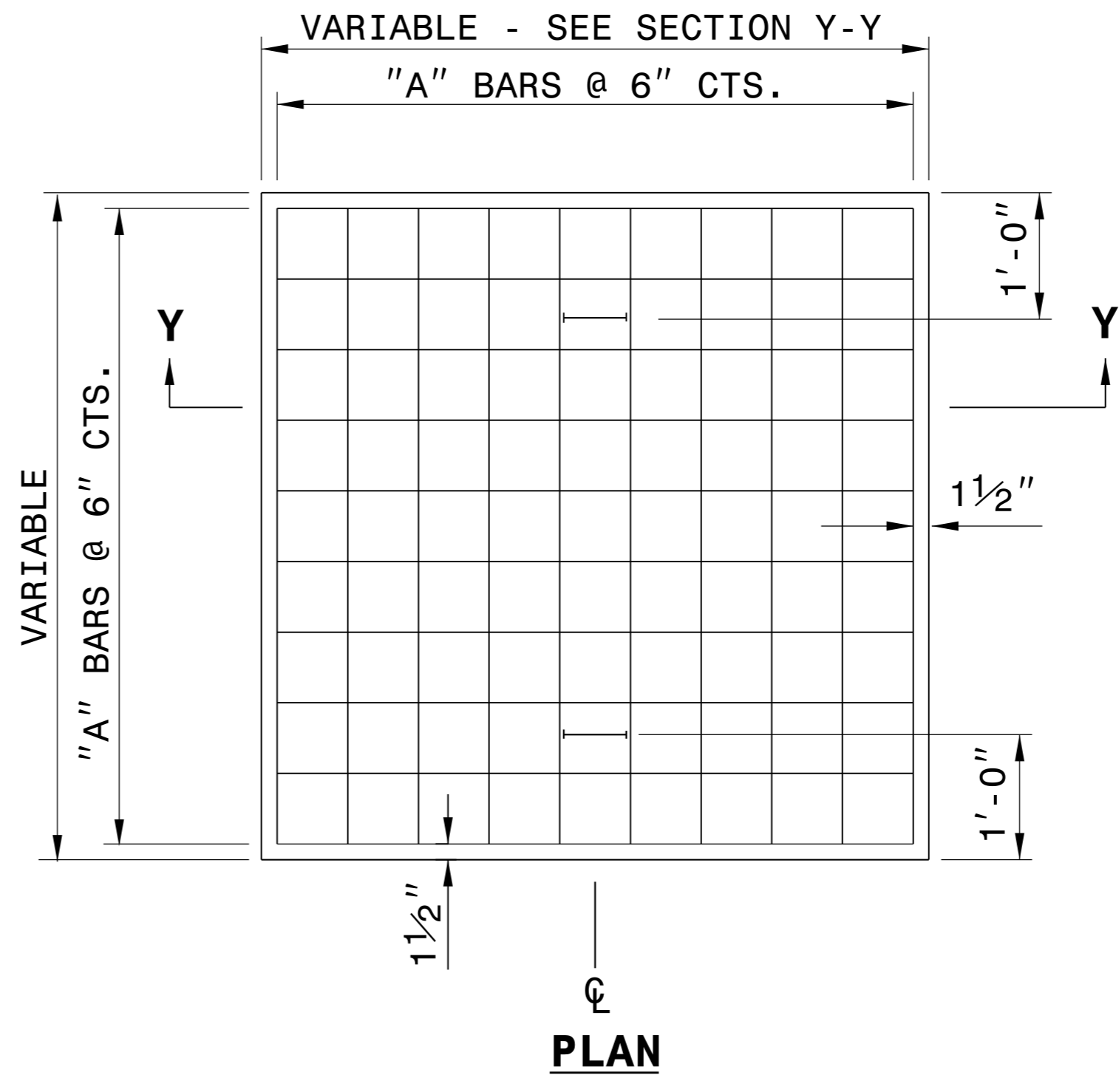
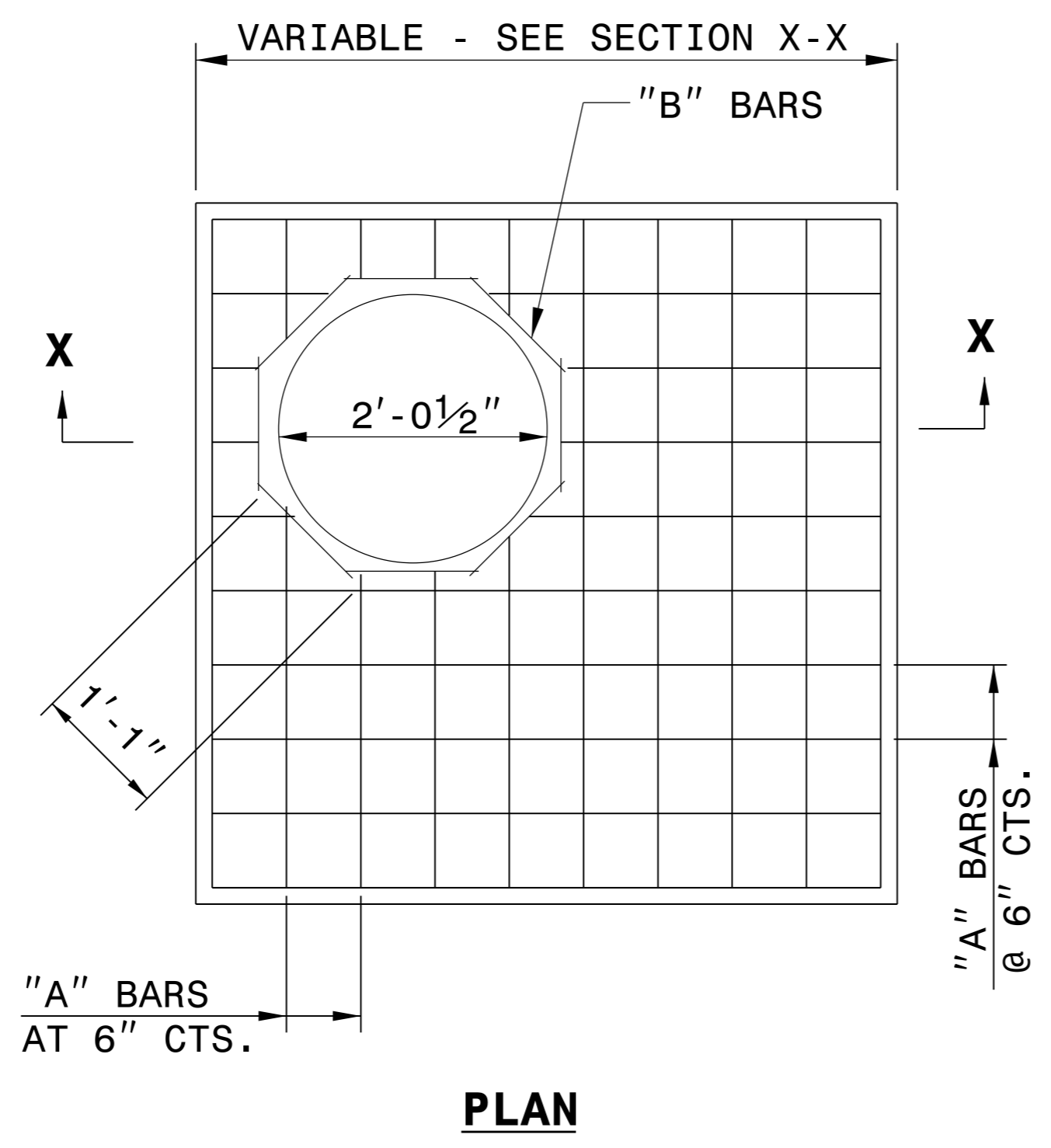
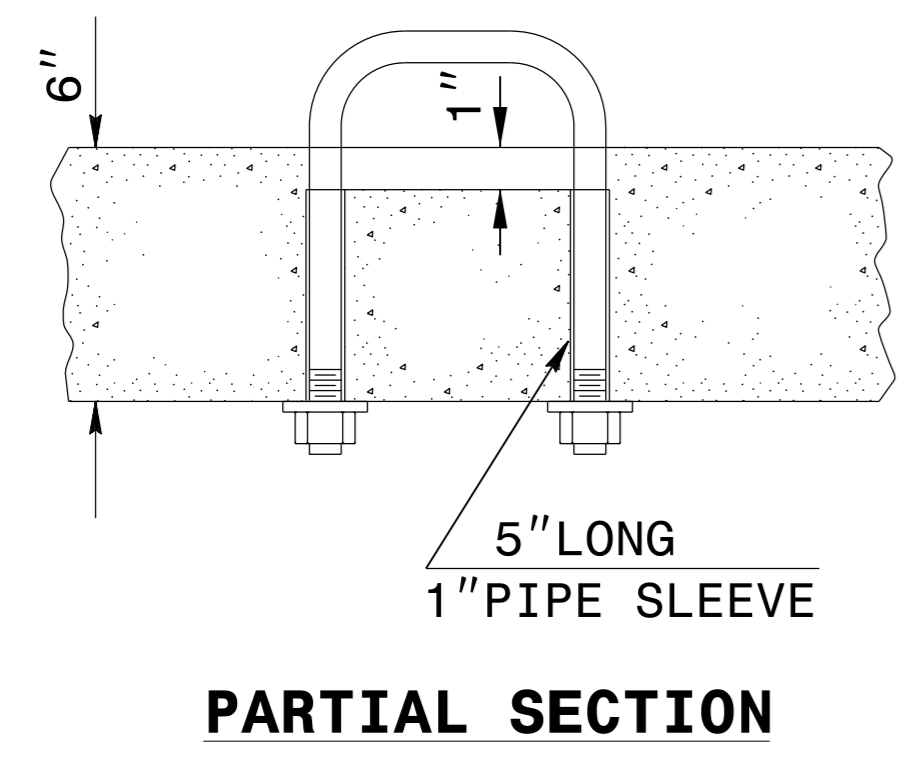
**"W6" STEEL POST**



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**SEE TITLE BLOCK**

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



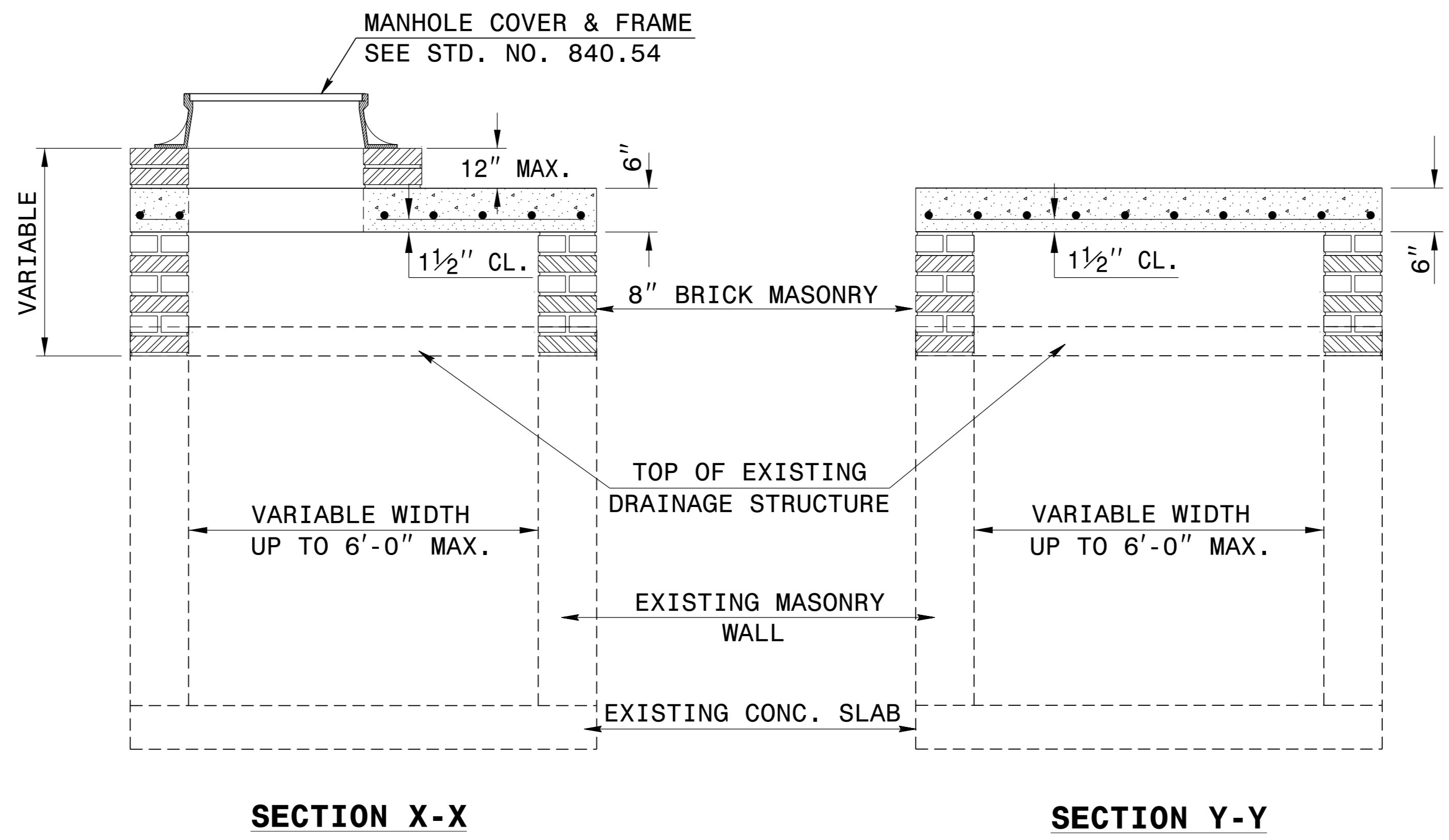
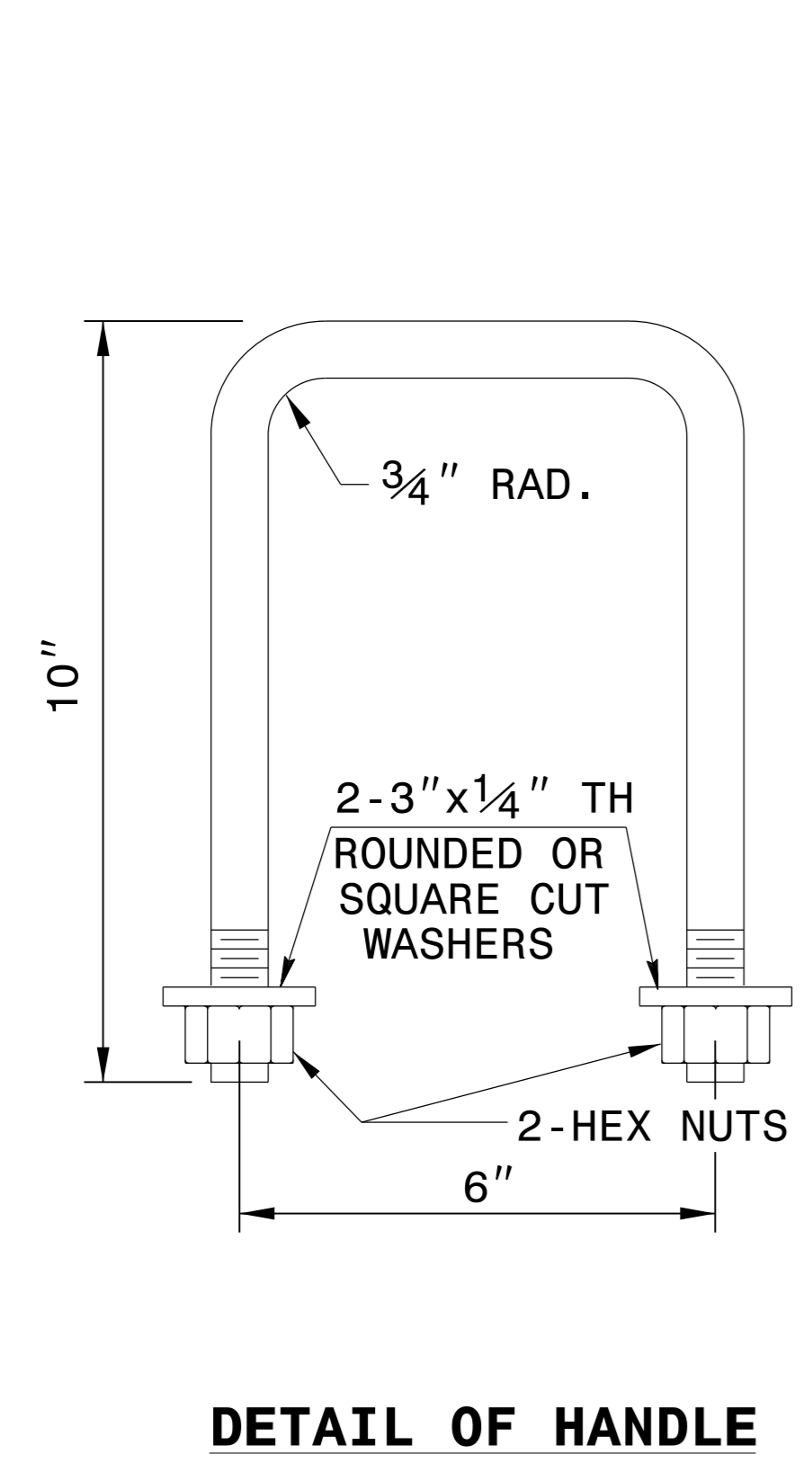
**GENERAL NOTES:**

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

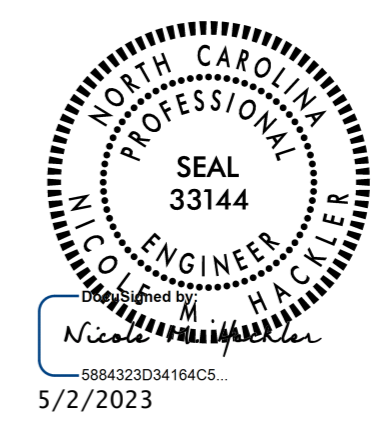
THE DIMENSIONS FOR THE EXISTING BOXES ARE APPROXIMATE AND MAY VARY SLIGHTLY.

DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.

BILL OF MATERIALS				
REINFORCING STEEL				
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4'-6"	60.12
B	#4	8	1'-1"	5.79
TOTAL				65.91 *
MASONRY				CU YDS
TOP SLAB CONCRETE CLASS "B"				.4326 *
BRICK MASONRY PER FT HT (MIN)				.4111



**\* NOTE:**  
QUANTITIES BASED ON 3'-6" X 3'-6" DRAINAGE STRUCTURE. ADJUST QUANTITIES FOR LARGER STRUCTURES AND MANHOLE CONSTRUCTION.



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**DETAIL TO CONVERT EXISTING DI, CB, OTCB or GI TO JUNCTION BOX (MANHOLE OPTIONAL)**

ORIGINAL BY: T.S.S. DATE: NOV. 1997  
MODIFIED BY: T.S.S. DATE: FEB. 2000  
CHECKED BY: DATE:  
FILE SPEC.: ds174:/usr/details/stand/boxtojbe.dgn

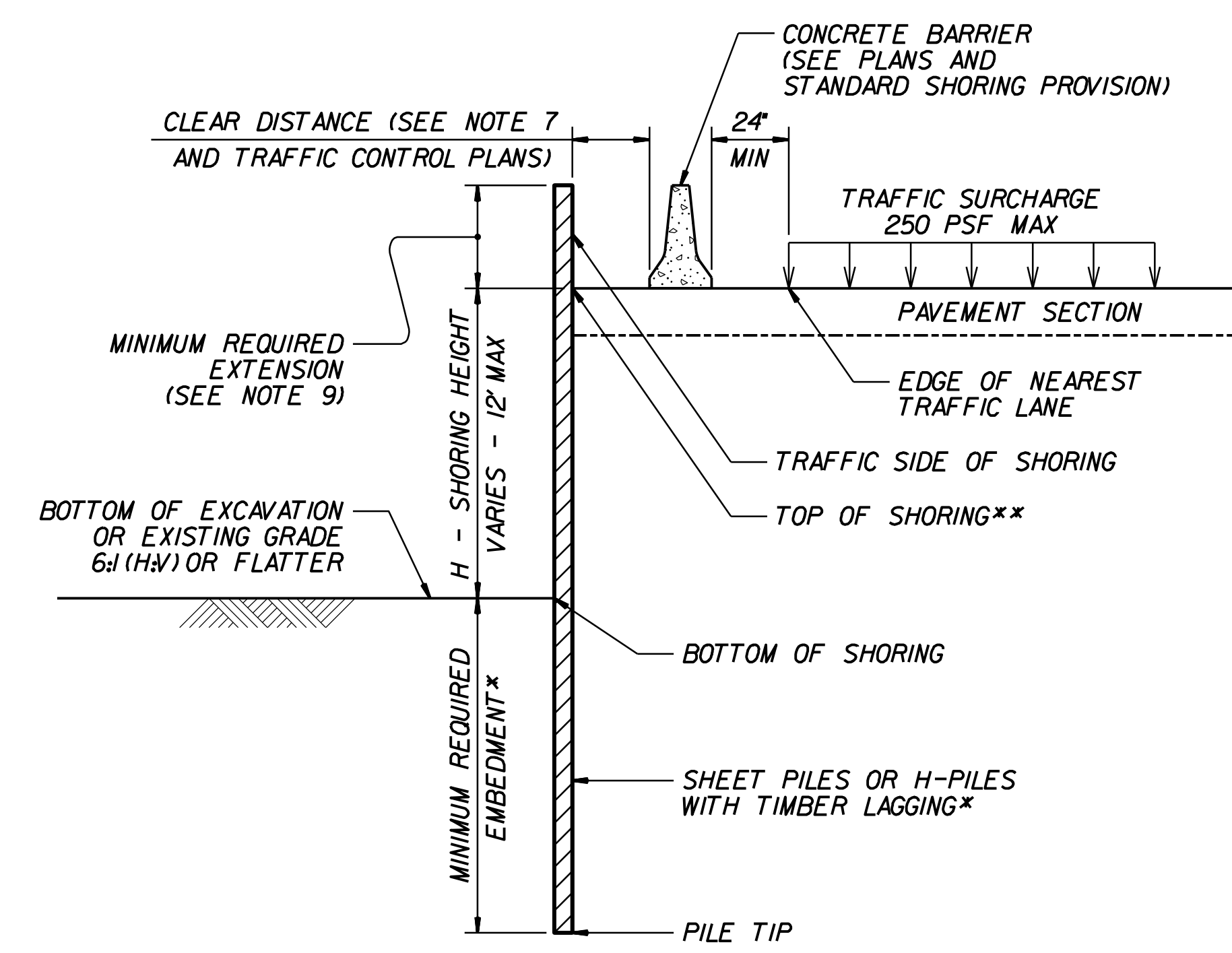


GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /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	

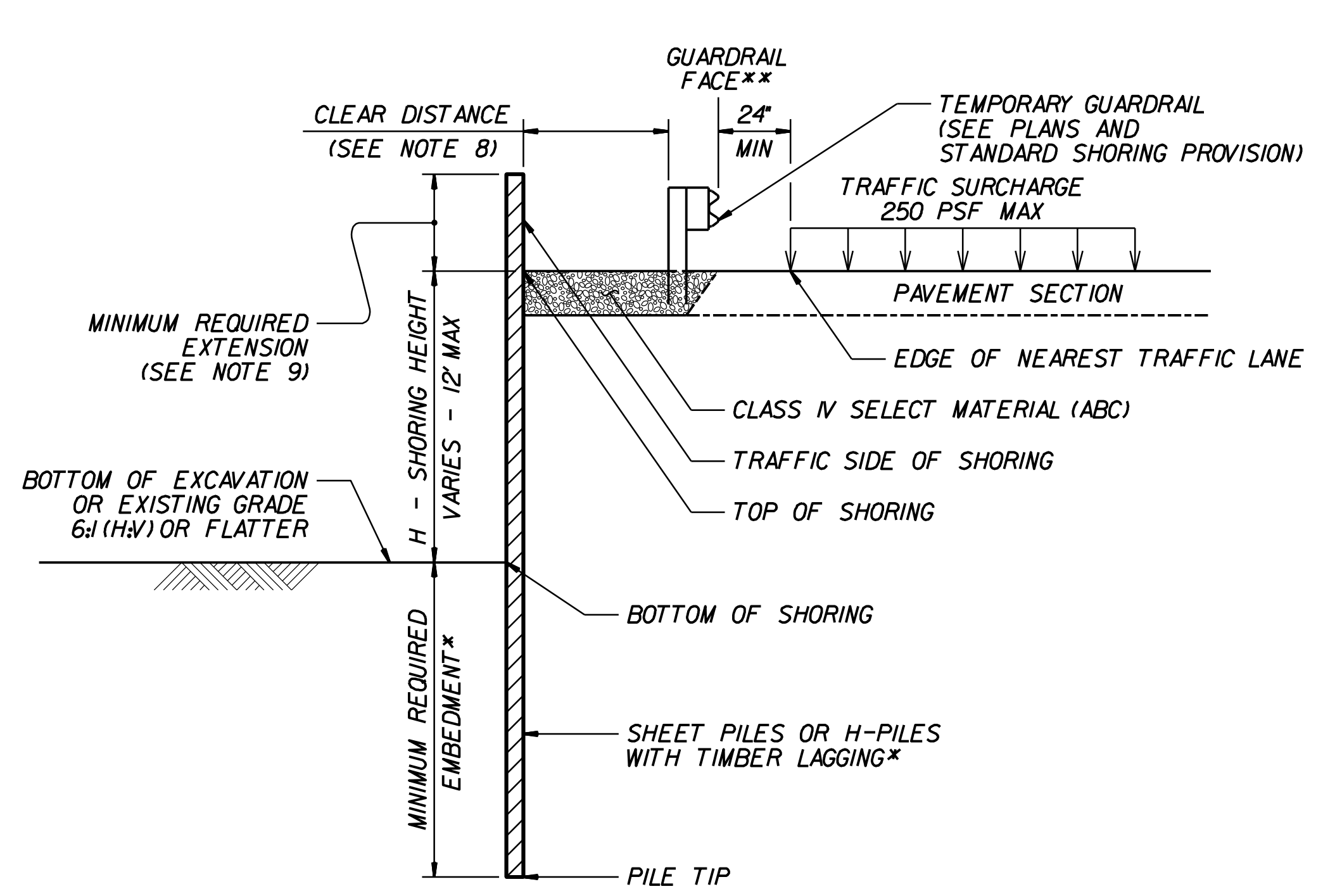
- NOTES:**
- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
  - FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
  - STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
UNIT WEIGHT,  $\gamma = 120$  PCF  
FRICTION ANGLE,  $\phi = 30$  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](http://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**

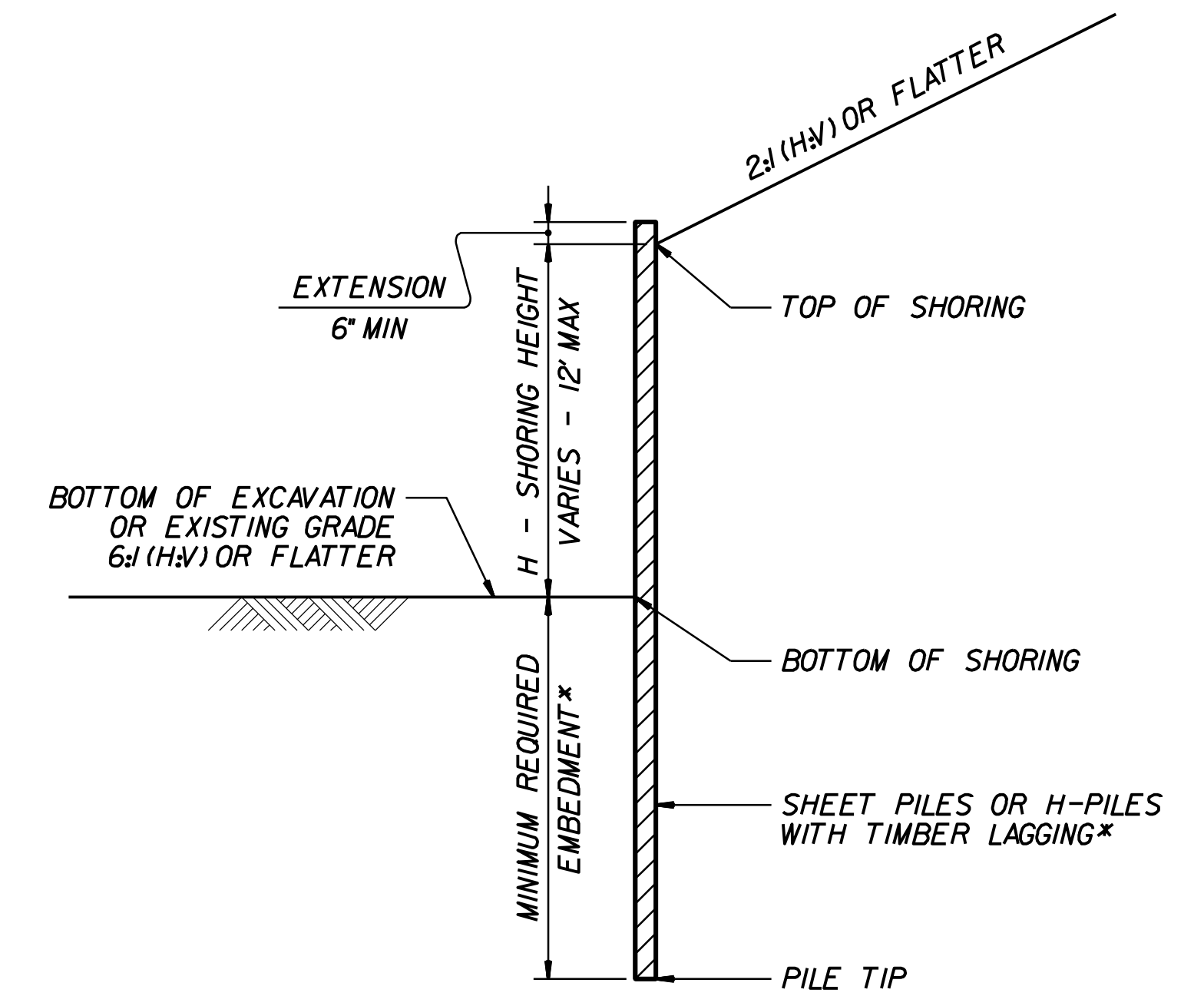
\*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".



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

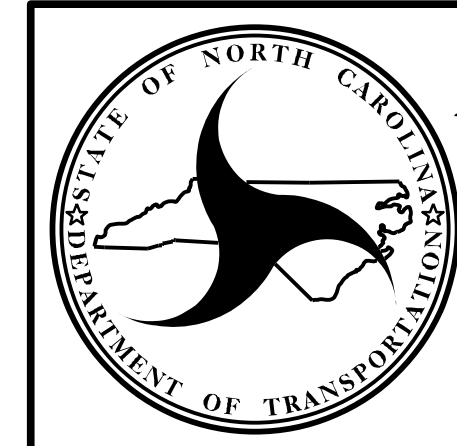


**TEMPORARY GUARDRAIL**  
\*\*GUARDRAIL FACE = EDGE OF PAVEMENT



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

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



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
**GEOTECHNICAL ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

**SUMMARY OF EARTHWORK**

STATION	STATION	UNCL. EXCAV. (CY)	EMBANK. +% (CY)	BORROW (CY)	WASTE (CY)
-L- 13+90	-L- 44+00	815	9,881	9,066	
-Y- 10+00	-Y- 10+96	62	13		49
-Y1- 10+00	-Y1- 14+00	17	6		11
-Y2- 11+25	-Y2- 11+75	12	53	41	
-Y3- 11+00	-Y3- 11+75	30	75	45	
-Y4- 10+25	-Y4- 11+00	55	58	3	
SUBTOTALS:		991	10,086	9,155	60
-L- 44+00	-L- 64+94.20	287	10,032	9,745	
-US64- 1002+50	-US64- 1006+50	563	63		500
SUBTOTALS:		850	10,095	9,735	500
-L- 68+00.00	-L- 98+00.00	391	12,996	12,605	
-Y5- 11+25.00	-Y5- 11+75.00	81	228	147	
SUBTOTALS:		472	13,224	12,752	
-L- 98+00.00	-L- 128+00.00	1,003	5,181	4,178	
-Y6- 10+25.00	-Y6- 11+25.00	28	107	79	
-Y7- 11+50.00	-Y7- 12+00.00	13	22	9	
-Y8- 12+50.00	-Y8- 13+75.00	57	142	85	
-DR1- 11+50.00	-DR1- 11+80.96	22	15		7
SUBTOTALS:		1,123	5,467	4,351	7
-L- 128+00.00	-L- 133+00.00	416	703	287	
SUBTOTALS:		416	703	287	
TOTAL:		3,852	39,575	36,290	567

-L- PAVEMENT STRUCTURE VOLUME = 1,761 CY  
 EST. DDE = 170 CUBIC YARDS  
 CONTINGENCY: EST. SHALLOW UNDERCUT = 750 CY  
 EST. CLASS IV SUBGRADE STABILIZATION = 1,500 TONS  
 EST. UNDERCUT EXCAVATION = 1,000 CY

Earthwork quantities are calculated by the Roadway Designer. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.  
 Unclassified Excavation - Acceptable, but not to be used in top 3' of embankment of backfill from -L- STA. 29+75 to 32+25 LT (100 CY)  
 Approximate quantities only. Unclassified Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for "Grading".

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

**GUARDRAIL SUMMARY**

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS								WOOD RUB RAIL (SEE SHEET 2C-2)	IMPACT ATTENUATOR MASH-TL3	SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE AND RESET EXISTING GUARDRAIL	REMOVE AND RESET EXISTING GUIDERAIL	REMARKS						
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GREU TL-3	M-350	XIII	CAT-1	B-77	TYPE III													
L	24+72.23	30+72.23	LT	600.00'			28+23.11		2'	50'		1'							1																
L	61+40.37	65+09.12	RT	368.75'			65+09.12 BRIDGE		4'	VARIES	50'		1'					1									401'								
L	67+70.85	71+64.60	RT	393.75'				67+70.85 BRIDGE	4'	VARIES										1							439'								
L	61+36.42	64+98.92	LT	362.50'				64+98.92 BRIDGE	4'	VARIES										1							340'								
L	67+36.21	71+61.21	LT	425.0'			67+36.21 BRIDGE		4'	VARIES	50'		1'					1								463'									
L	85+16.93	86+79.43	LT	162.5'				85+25.50	2'		50'		1'					1																	
L	88+84.40	89+96.90	LT	112.5'				89+09.33	2'		50'		1'					1																	
US64	1003+62.08	1004+22.44	MED	120.75'			1004+22.44		8'	8'	37.5'		2.5'									1										ON US-64 UNDER BRIDGE, MASH-TL3			
US64	1004+82.44	1005+42.79	MED	120.75'				1004+82.44	8'	8'	37.5'		2.5'									1										ON US-64 UNDER BRIDGE, MASH-TL3			
US64	1005+34.20	1007+94.58	LT	260.375'			1005+34.20		10'	14'	50'		1'					1																	
US64	1002+37.07	1003+12.07	MED																													75'	GUIDERAIL ON US-64 MEDIAN		
US64	1005+98.69	1006+73.91	MED																													75'	GUIDERAIL ON US-64 MEDIAN		
US64	1004+18.61	1004+38.45	RT																																
SUBTOTALS				2,926.875																															
LESS DEDUCTIONS																																			
GREU TL-3 (6 x 50)				300'																															
B-77 (5 x 22.875)				114.375'																															
TYPE III (4 x 18.75)				75'																															
CAT-1 (5 x 6.25)				31.25'																															
SUBTOTAL				2,406.25'																															
TOTALS				2,406.25'																															
SAY				2,412.50'																															
																																		ADDITIONAL GUARDRAIL POSTS = 10	
																																		6	5 5 4 662.50' 2 160' 1,643' TOTALS 150'
																																			665' 160' 1,650' SAY 150'

**PAVEMENT REMOVAL SUMMARY**

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD'
-L-	13+90	-Y1- RADIUS	RT	23
-L-	18+37.28	26+38.43	RT	166
-L-	29+98.68	39+00.23	RT	291
-L-	42+14.34	48+80.44	RT	121.50
-L-	50+17.28	65+21.20	RT	329.50
-L-	67+57.09	114+72.00	RT	959.50
-L-	118+57.14	127+75.69	RT	171
-L-	13+93	21+13.58	LT	201
-L-	35+76.44	64+97.26	LT	595.50
-L-	67+33.73	117+10.45	LT	1123
-L-	117+31.61	133+17.45	LT	295.50
-YB-	13+24	13+72	LT	22.58
TOTAL:				4,299.08
SAY:				4,300

**SHOULDER BERM GUTTER SUMMARY**

SURVEY LINE	STATION	STATION	LENGTH
L (RT)	64+89.00	65+07.36	18.4
L (RT)	67+72.74	67+98.92	26.2
TOTAL:			44.5
SAY:			50

COMPUTED BY: Jonathan T. May DATE: 4/5/2023
CHECKED BY: Vidya Mohandas DATE: 4/5/2023

PROJECT NO. U-4424 SHEET NO. 3D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

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

Table with columns for Line & Station, Offset, Structure Number, Top Elevation, Invert Elevation, C.S. Pipe, R.C. Pipe Class IV, R.C. Pipe Class V, Quantities for Drainage Structures, Frame, Grates, and Hood, Concrete Transitional Section, and Remarks. Includes a SHEET TOTALS row at the bottom.

7/14/2023

COMPUTED BY: Jonathan T. May DATE: 4/5/2023  
CHECKED BY: Vidya Mohandas DATE: 4/5/2023

PROJECT NO. U-4424 SHEET NO. 3D-2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

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

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

Table with columns: LINE & STATION, OFFSET, STRUCTURE NUMBER, TOP ELEVATION, INVERT ELEVATION, C.S. PIPE, R.C. PIPE CLASS IV, R.C. PIPE CLASS V, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES, AND HOOD, CONCRETE TRANSITIONAL SECTION, and REMARKS. Includes a SHEET TOTALS row at the bottom.

ABBREVIATIONS table listing items like C.A.A., C.B., C.S., D.I., G.D.I., H.D.P.E., J.B., M.H., N.S., P.V.C., R.C., T.B.D.I., T.B.J.B., W.S. with their corresponding descriptions.

7/14/2023

COMPUTED BY: Jonathan T. May DATE: 4/5/2023
CHECKED BY: Vidya Mohandas DATE: 4/5/2023

PROJECT NO. SHEET NO.
U-4424 3D-3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

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

Table with columns: LINE & STATION, OFFSET, STRUCTURE NUMBER, TOP ELEVATION, INVERT ELEVATION, C. S. PIPE, R. C. PIPE CLASS IV, R. C. PIPE CLASS V, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES, AND HOOD, CONCRETE TRANSITIONAL SECTION, and REMARKS. Includes a SHEET TOTALS row at the bottom.

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



7/10/2023

COMPUTED BY: Jonathan T. May DATE: 4/5/2023  
CHECKED BY: Vidya Mohandas DATE: 4/5/2023

PROJECT NO. U-4424 SHEET NO. 3D-5

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

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

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

Table with columns: LINE & STATION, OFFSET, STRUCTURE NUMBER, TOP ELEVATION, INVERT ELEVATION, MINIMUM REQUIRED SLOPE, C. S. PIPE (12-30), R. C. PIPE CLASS IV (12-48), R. C. PIPE CLASS V (24-48), ENDWALLS, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES, AND HOOD, CONCRETE TRANSITIONAL SECTION, and REMARKS. Includes a SHEET TOTALS row at the bottom.

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

COMPUTED BY: Jonathan T. May DATE: 4/5/2023

CHECKED BY: Vidya Mohandas DATE: 4/5/2023

PROJECT NO. U-4424 SHEET NO. 3D-6

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

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

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

Main data table with columns for Line & Station, Offset, Structure Number, Top/Invert Elevation, C.S. Pipe (12-30), R.C. Pipe Class IV (12-48), R.C. Pipe Class V (24-48), Quantities for Drainage Structures, Frame/Grates/Hood, Concrete Transitional Section, and Pipe Removal. Includes a 'SHEET TOTALS' row at the bottom.

ABBREVIATIONS table listing codes like C.A.A., C.B., C.S., D.I., G.D.I., H.D.P.E., J.B., M.H., N.S., P.V.C., R.C., T.B.D.I., T.B.J.B., W.S. and their corresponding material descriptions.

REMARKS



7/10/2023

COMPUTED BY: Jonathan T. May DATE: 4/5/2023
CHECKED BY: Vidya Mohandas DATE: 4/5/2023

PROJECT NO. U-4424 SHEET NO. 3D-7

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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

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

Table with columns for Line & Station, Offset, Structure Number, Invert Elevation, C.S. Pipe, R.C. Pipe Class IV, R.C. Pipe Class V, Quantities for Drainage Structures, Frame, Grates, and Hood, and Remarks. Includes a SHEET TOTALS row at the bottom.

COMPUTED BY: Jonathan T. May DATE: 4/5/2023  
CHECKED BY: Vidya Mohandas DATE: 4/5/2023

PROJECT NO. SHEET NO.  
U-4424 3D-8

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

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

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

Table with columns for Line & Station, Offset, Structure Number, Top Elevation, Invert Elevation, C.S. Pipe, R.C. Pipe Class IV, R.C. Pipe Class V, Quantities for Drainage Structures, Frame, Grates, and Hood, Concrete Transitional Section, and Remarks. Includes a list of items with their respective quantities and dimensions.

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

SHEET TOTALS

14 0.589 1755

7/14/2023

COMPUTED BY: Jonathan T. May DATE: 4/5/2023  
CHECKED BY: Vidya Mohandas DATE: 4/5/2023

PROJECT NO. U-4424 SHEET NO. 3D-9

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

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

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

Table with columns for LINE & STATION, OFFSET, STRUCTURE NUMBER, C. S. PIPE, R. C. PIPE CLASS IV, R. C. PIPE CLASS V, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES, AND HOOD, and REMARKS. Includes a 'SHEET TOTALS' row at the bottom.

ABBREVIATIONS table listing materials like C.A.A. CORRUGATED ALUMINUM ALLOY, C.B. CATCH BASIN, etc.

SHEET TOTALS

1737





COMPUTED BY: VARIES DATE: 12/5/19  
 CHECKED BY: R. TELLIER, PE DATE: 3/8/23

(12-17-19)

PROJECT NO. U-4424	SHEET NO. 3G-1
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**STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS**

**SUMMARY OF SUBSURFACE DRAINAGE**

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
Varies	Varies	Varies	LT/RT	SD	1500
CONTINGENCY					3500
<b>TOTAL LF:</b>					5000

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

**SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION**

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU(1)	12	750	1500	2250		
			AST	3					500
<b>TOTAL CY/TONS/SY:</b>					750	1500**	2250**	0	500

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



8/17/99

REVISIONS

11-APR-2023 15:17  
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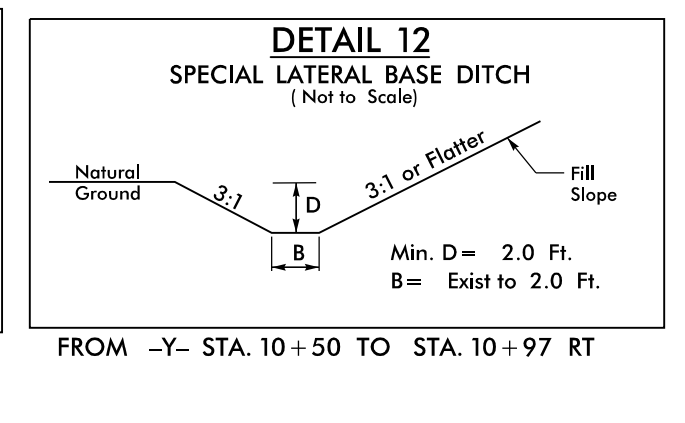
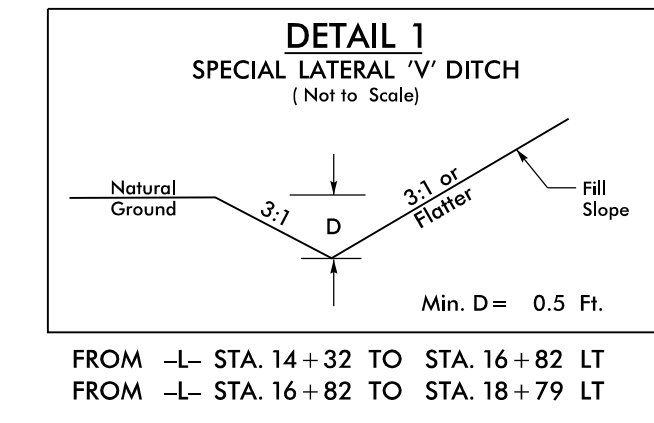
WSP USA  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
FAX: 1.919.836.4099  
LICENSE NO. F-0165

PROJECT REFERENCE NO. U-4424	SHEET NO. 4
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	SEAL 33290
	5/2/2023
	SEAL 043232
	5/3/2023

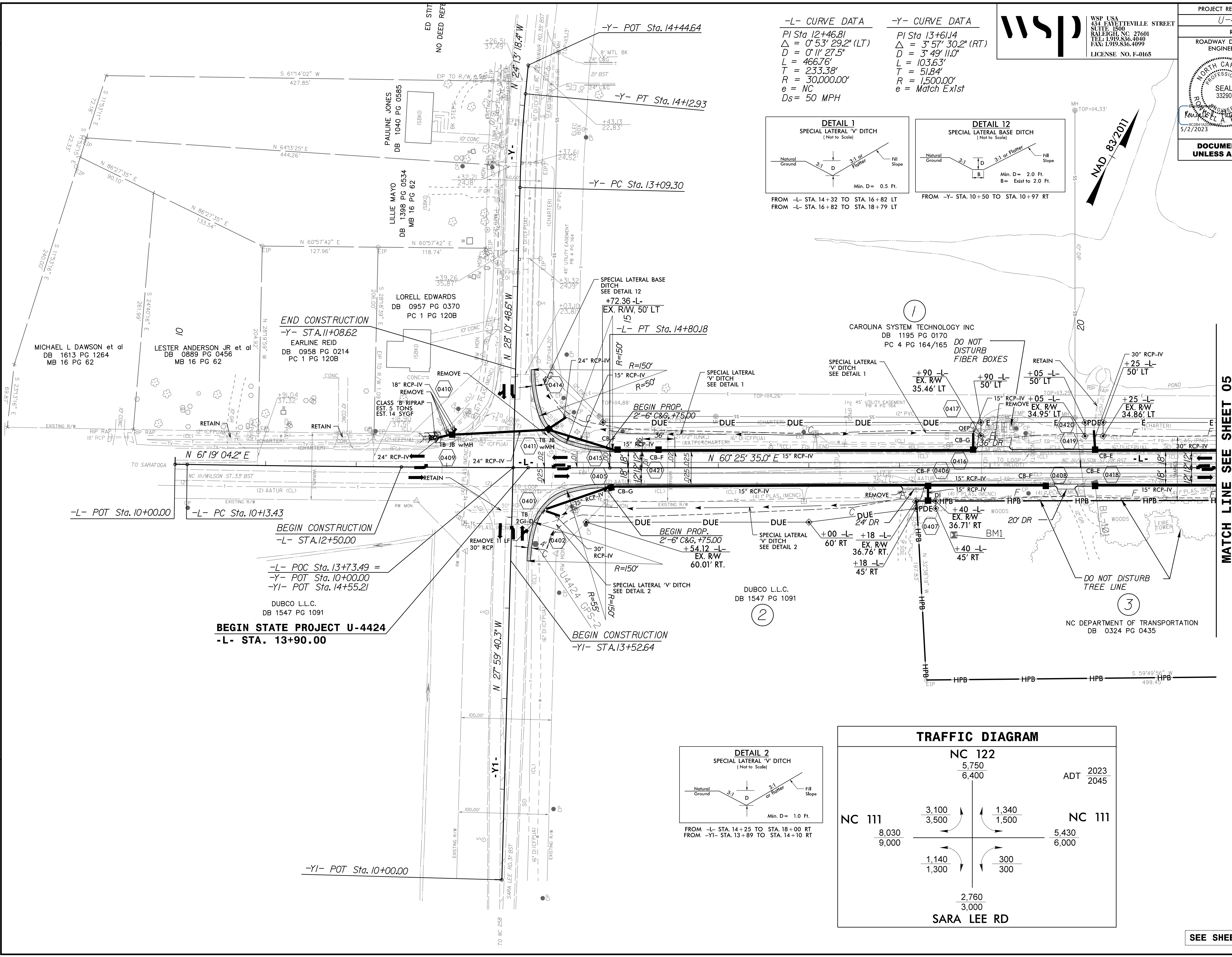
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**-L- CURVE DATA**  
 PI Sta 12+46.81  
 $\Delta = 0^{\circ}53'29.2''$  (LT)  
 $D = 0^{\circ}11'27.5''$   
 $L = 466.76'$   
 $T = 233.38'$   
 $R = 30,000.00'$   
 $e = NC$   
 $D_s = 50$  MPH

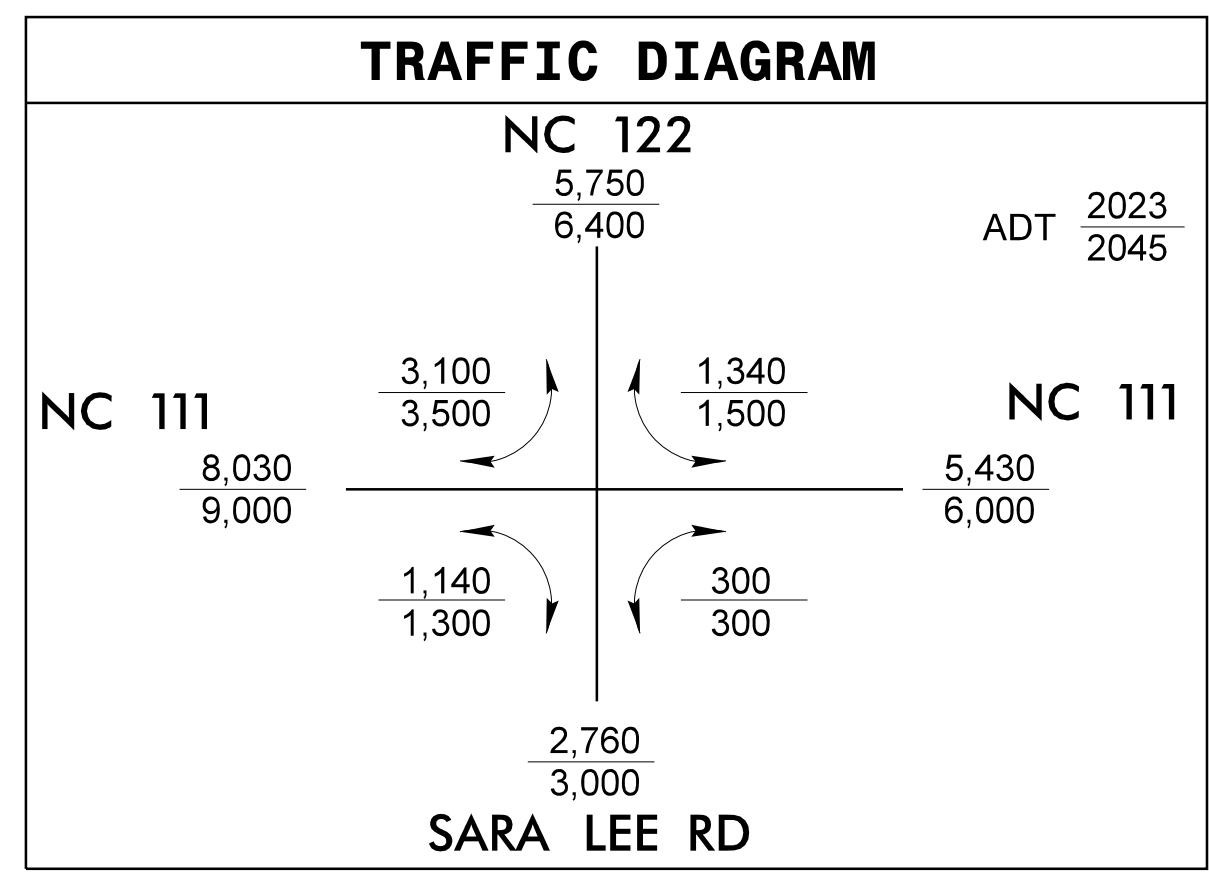
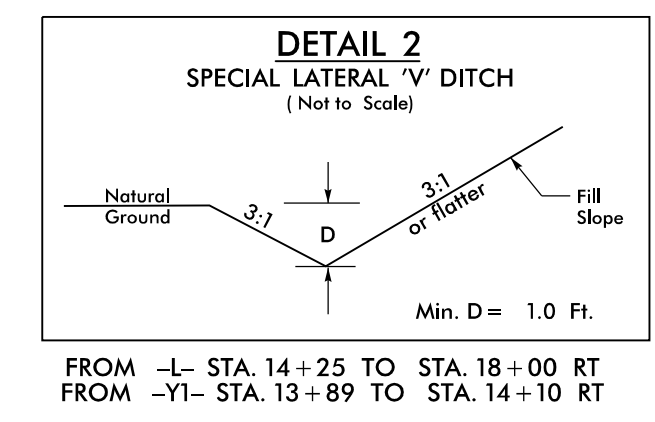
**-Y- CURVE DATA**  
 PI Sta 13+61.14  
 $\Delta = 3^{\circ}57'30.2''$  (RT)  
 $D = 3^{\circ}49'11.0''$   
 $L = 103.63'$   
 $T = 51.84'$   
 $R = 1,500.00'$   
 $e = Match Exist$



NAD 83/2011



MATCH LINE SEE SHEET 05  
-L- STA. 21+50.00




SEE SHEET 14 FOR -L- PROFILE





8/17/99

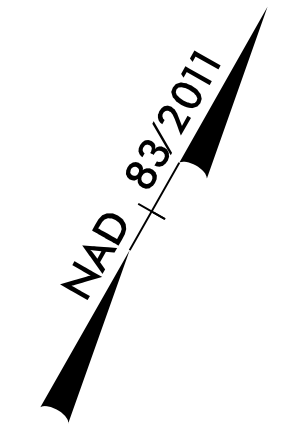
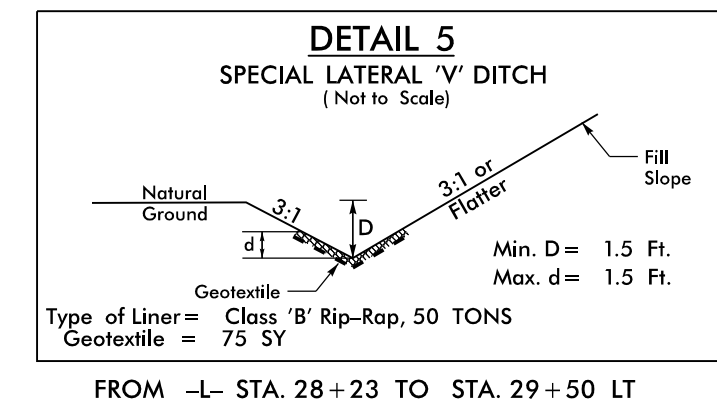
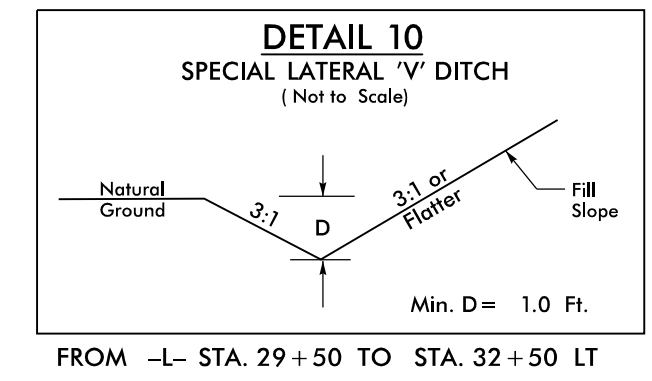
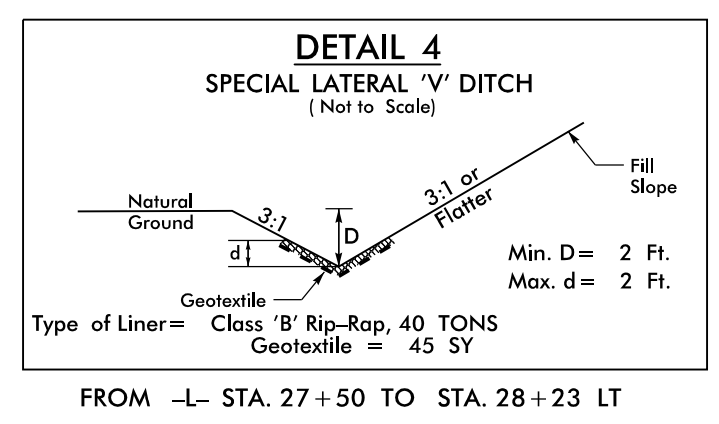
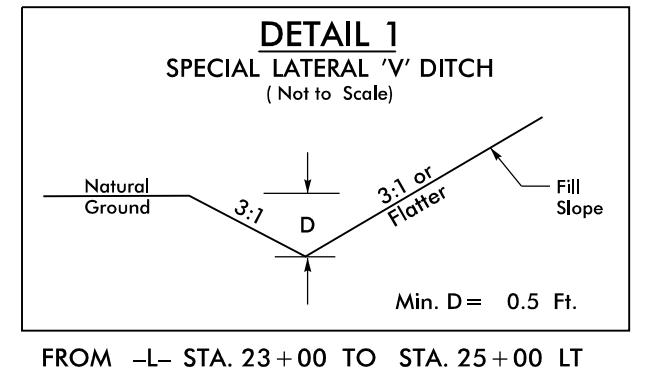
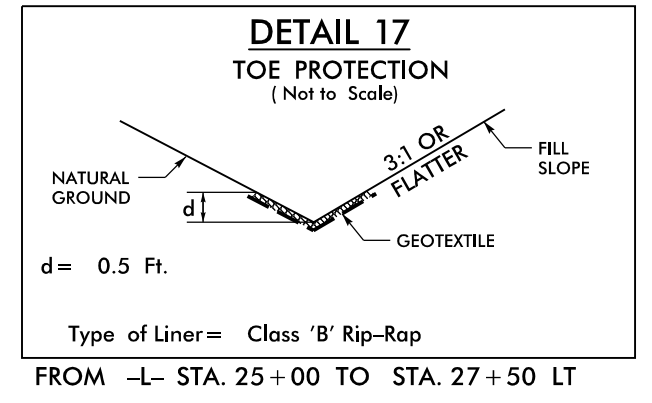
PLANS PREPARED BY:



WSP USA  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
FAX: 1.919.836.4099  
LICENSE NO. F-0165

PROJECT REFERENCE NO. U-4424	SHEET NO. 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

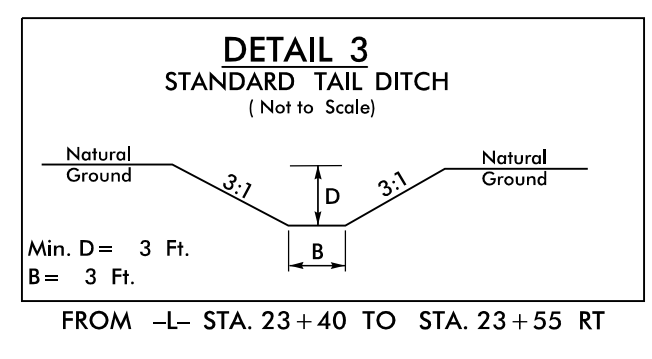
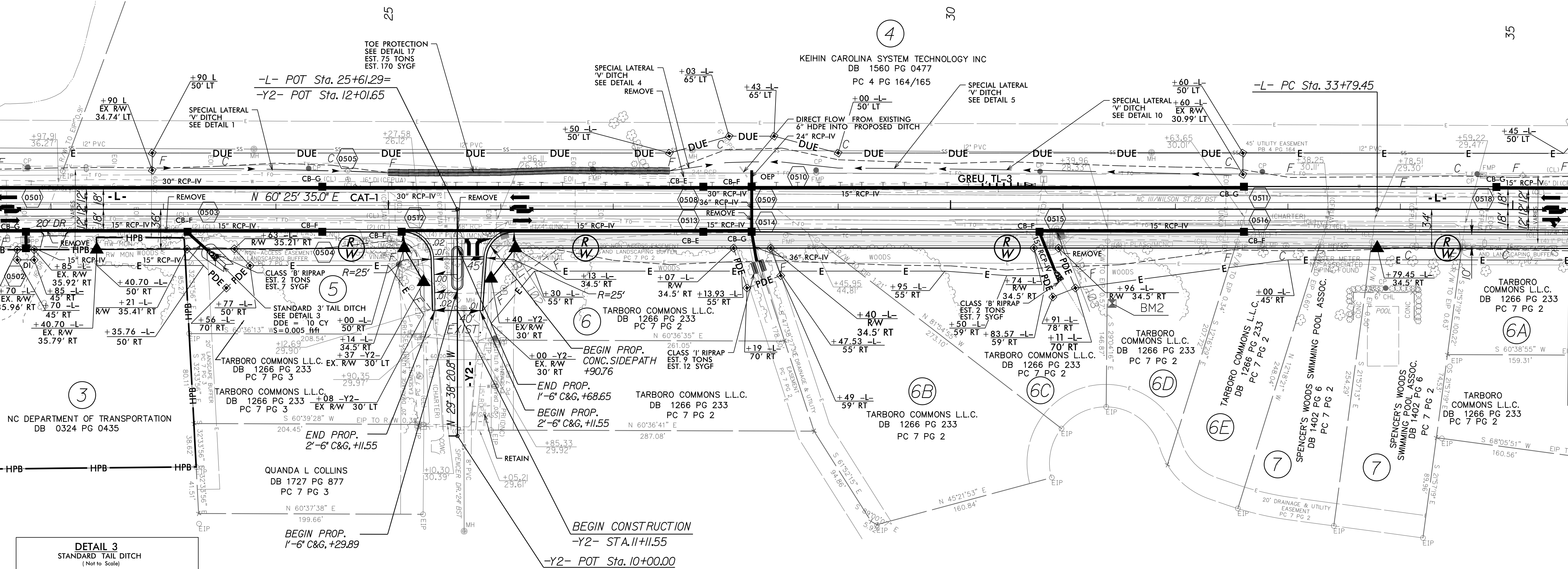
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 PI Sta 34+72.78  
 $\Delta = 0^{\circ}16'02.6''$  (RT)  
 $D = 0^{\circ}08'35.7''$   
 $L = 186.66'$   
 $T = 93.33'$   
 $R = 40,000.00'$   
 $e = NC$   
 $Ds = 50$  MPH



REVISIONS

MATCH LINE SEE SHEET 04  
-L- STA. 21+50.00

MATCH LINE SEE SHEET 06  
-L- STA. 35+50.00




MULTI-USE PATH

SEE SHEET 14 FOR -L- PROFILE  
SEE SHEET 19 FOR -Y2- PROFILE

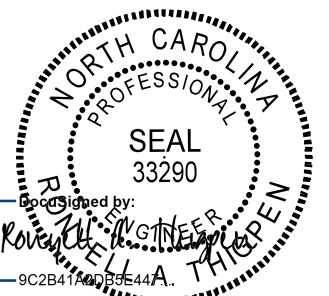
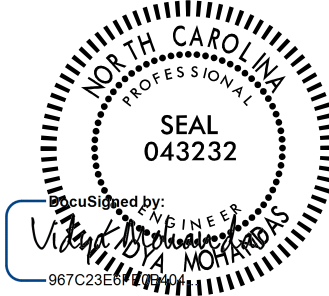
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8/17/99

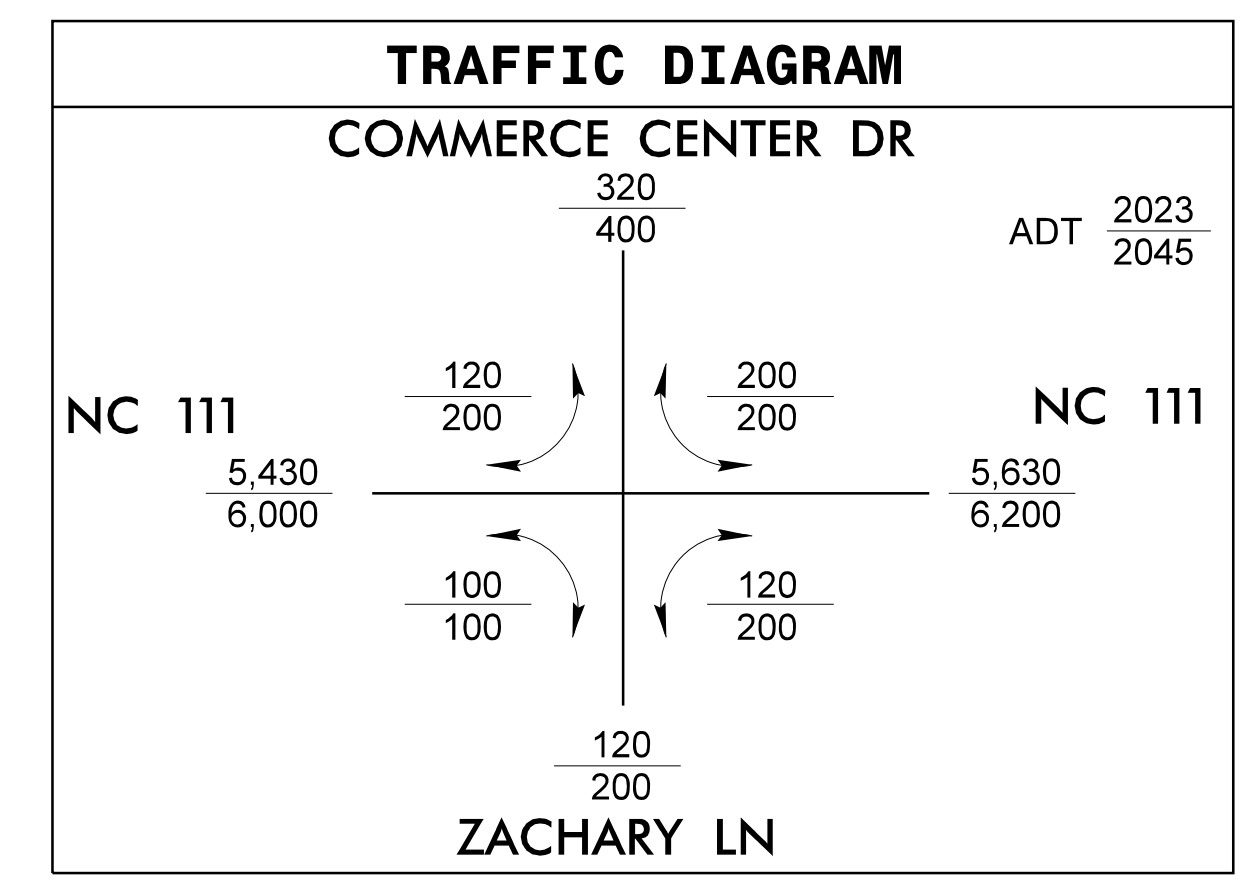
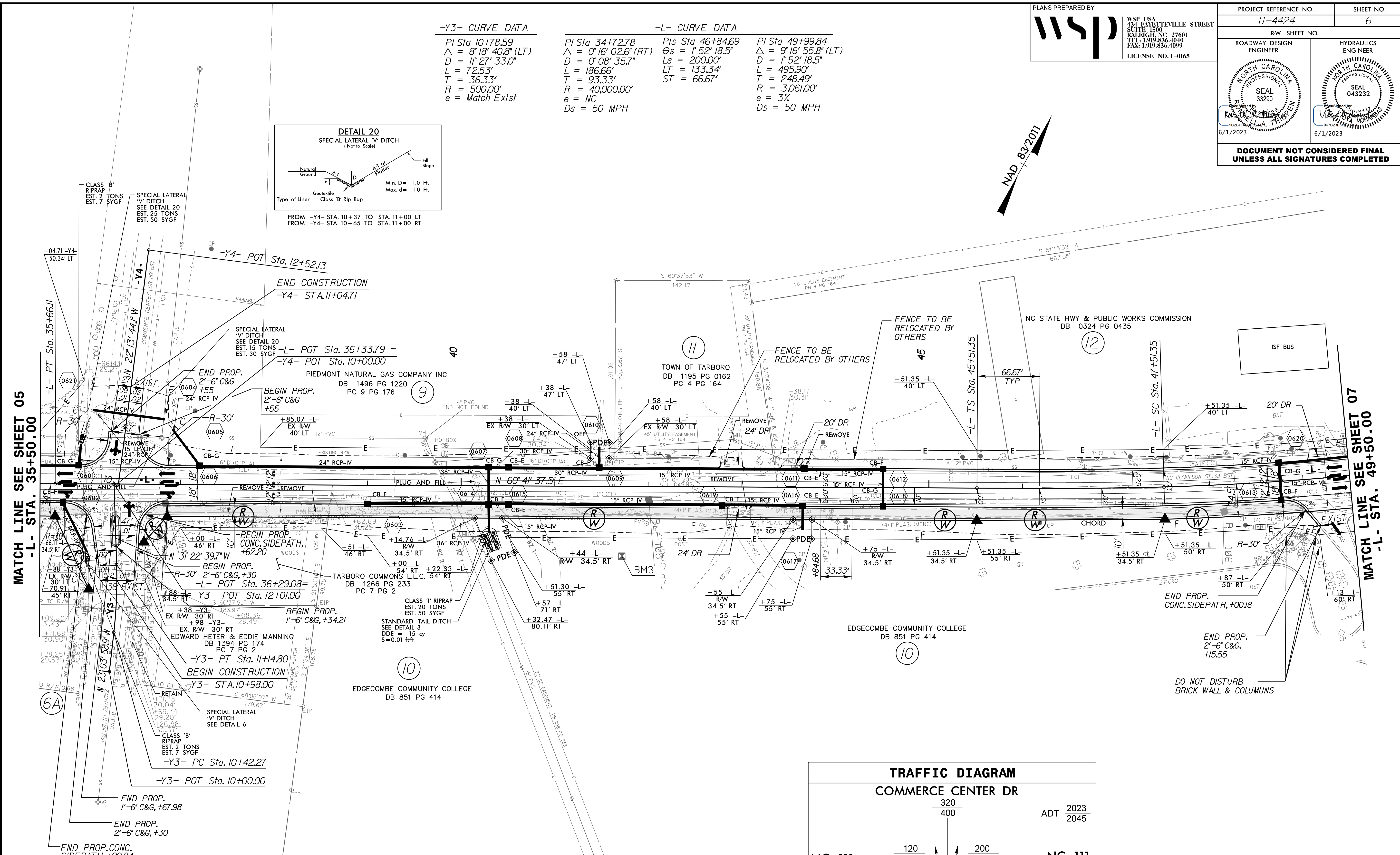
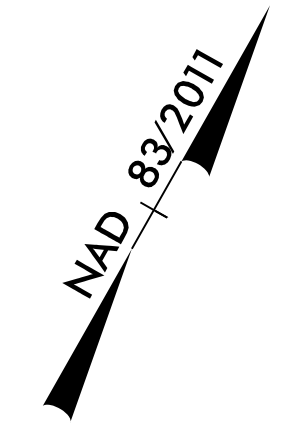
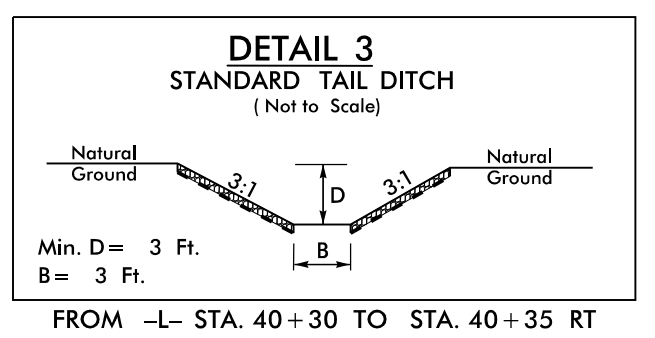
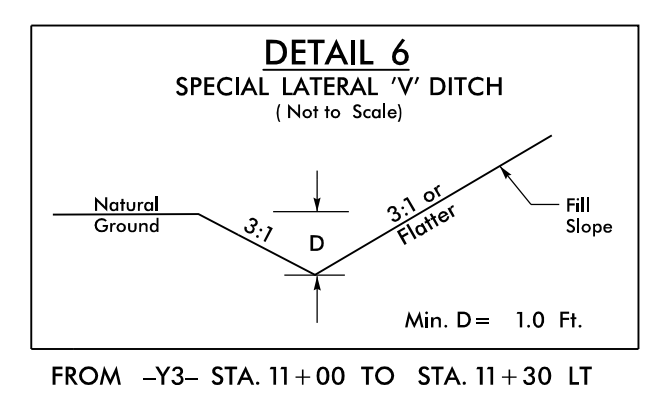
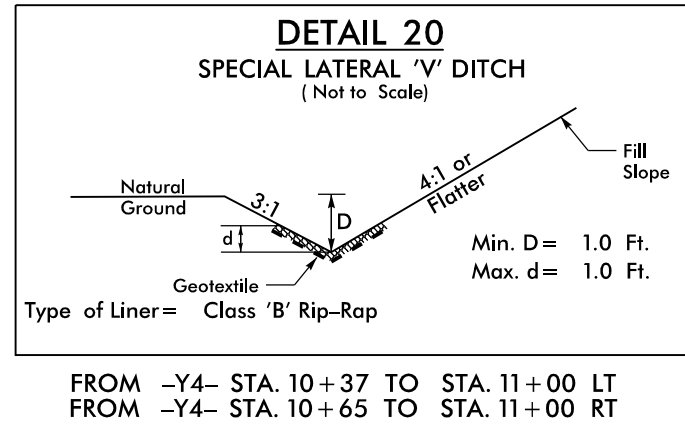
PLANS PREPARED BY:



WSP USA  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
FAX: 1.919.836.4099  
LICENSE NO. F-0165

PROJECT REFERENCE NO. U-4424	SHEET NO. 6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	
6/1/2023	6/1/2023
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

<b>-Y3- CURVE DATA</b>	<b>-L- CURVE DATA</b>
PI Sta 10+78.59 Δ = 8' 18" 40.8" (LT) D = 11' 27" 33.0" L = 72.53' T = 36.33' R = 500.00' e = Match Exlst	PI Sta 34+72.78 Δ = 0' 16" 02.6" (RT) D = 0' 08" 35.7" L = 186.66' T = 93.33' R = 40,000.00' e = NC Ds = 50 MPH
	PIs Sta 46+84.69 Δs = 1' 52" 18.5" Ls = 200.00' LT = 133.34' ST = 66.67'
	PI Sta 49+99.84 Δ = 9' 16" 55.8" (LT) D = 1' 52" 18.5" L = 495.90' T = 248.49' R = 3,061.00' e = 3% Ds = 50 MPH



**MULTI-USE PATH**

SEE SHEETS 14 & 15 FOR -L- PROFILE  
SEE SHEET 19 FOR -Y3- PROFILE  
SEE SHEET 19 FOR -Y4- PROFILE

REVISIONS

MATCH LINE SEE SHEET 05  
-L- STA. 35+50.00

MATCH LINE SEE SHEET 07  
-L- STA. 49+50.00

01-JUN-2023 11:04  
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8/17/99

**-L- CURVE DATA**

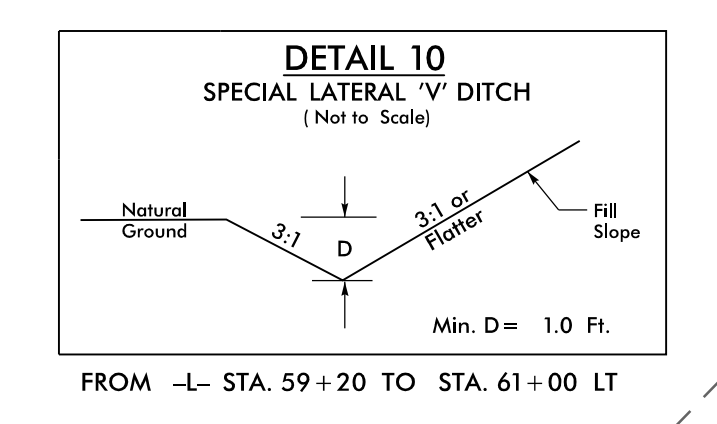
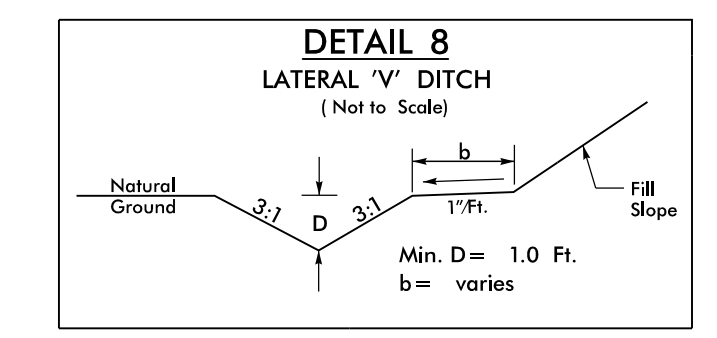
$PI\ Sta\ 49+99.84$	$PIs\ Sta\ 53+13.92$
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$D = 1^{\circ}52'18.5"$	$L_s = 200.00'$
$L = 495.90'$	$LT = 133.34'$
$T = 248.49'$	$ST = 66.67'$
$R = 3,061.00'$	
$e = 3\%$	
$D_s = 50\ MPH$	

PLANS PREPARED BY:

**WSP**

WSP USA  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
FAX: 1.919.836.4099  
LICENSE NO. F-0165

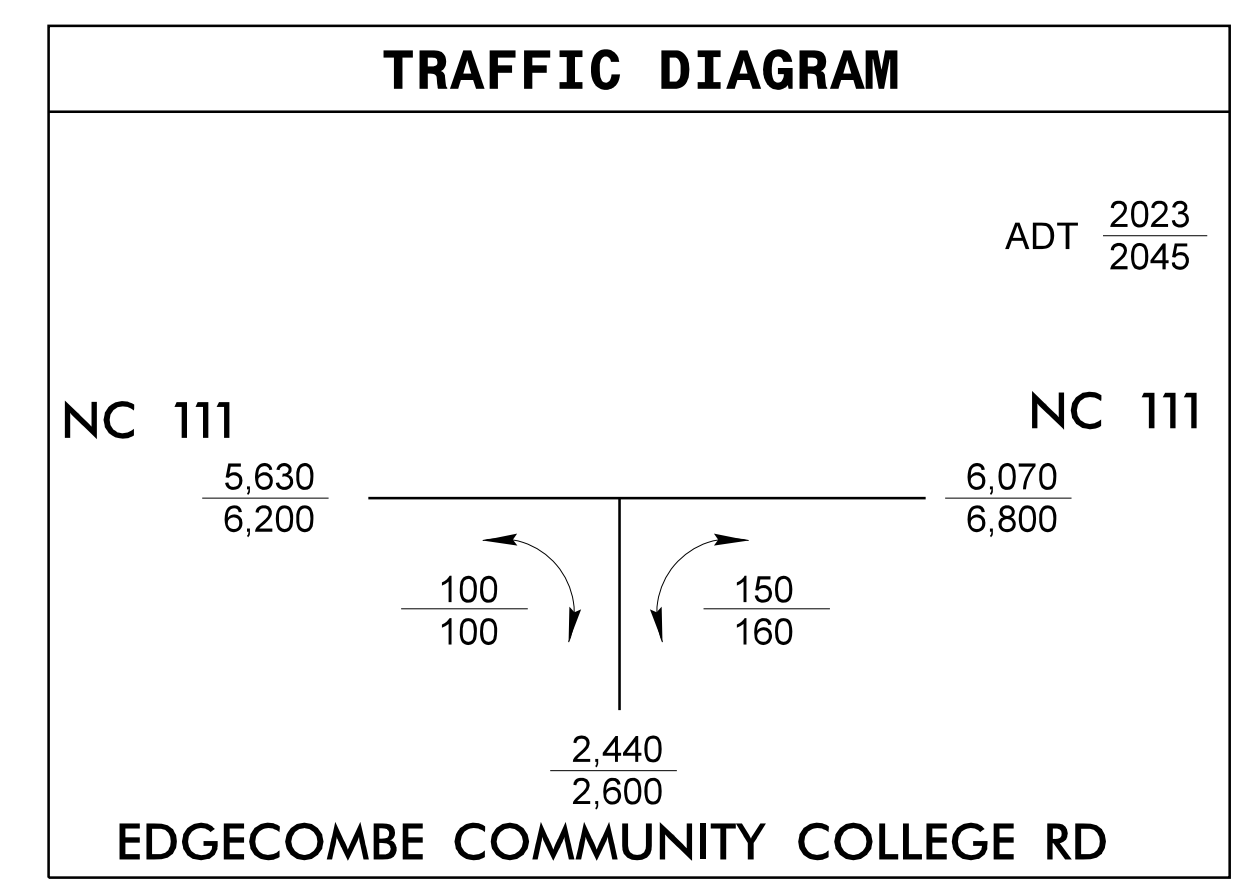
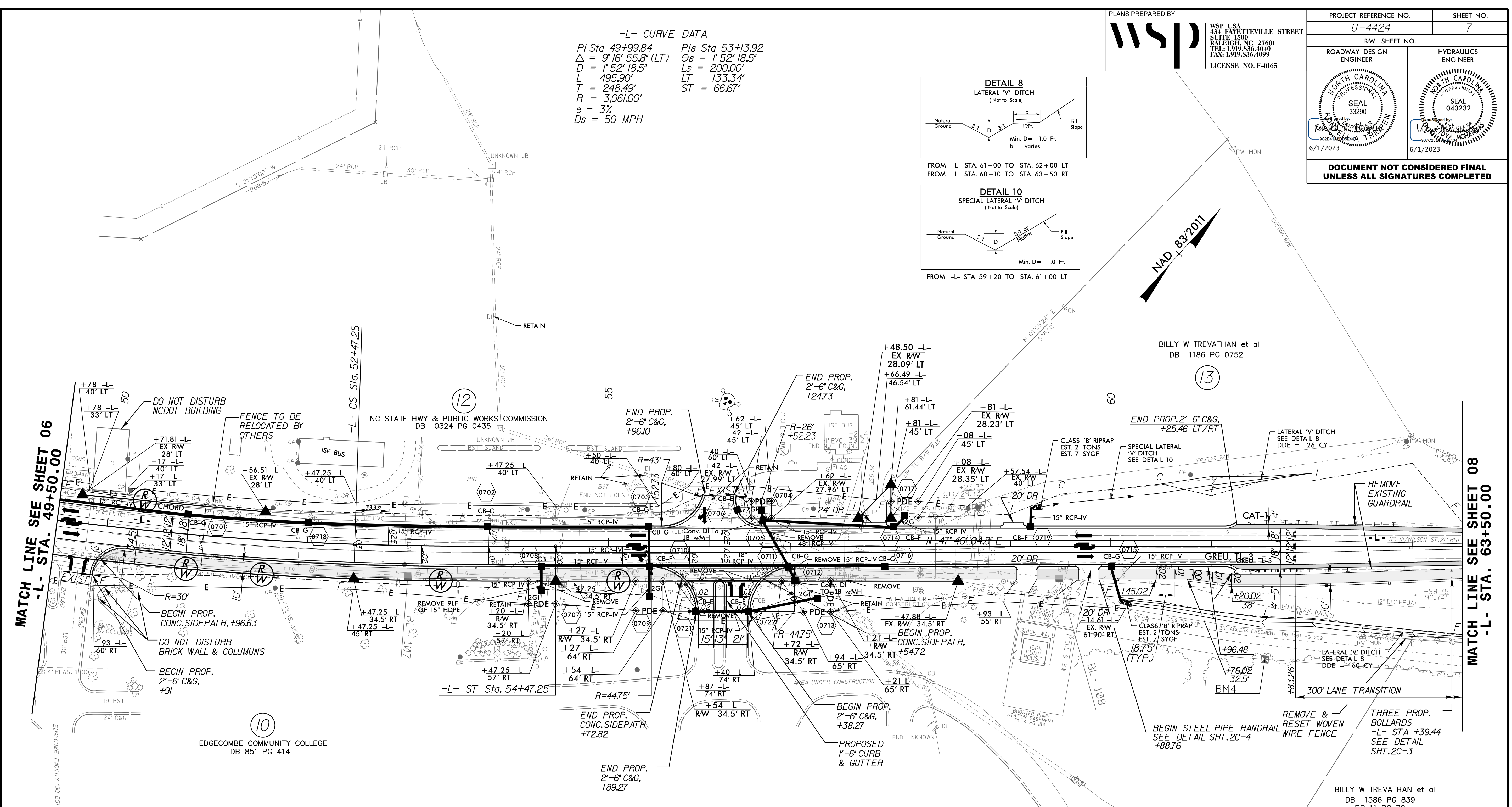
PROJECT REFERENCE NO. U-4424	SHEET NO. 7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	



REVISIONS

MATCH LINE SEE SHEET 06  
-L- STA. 49+50.00

MATCH LINE SEE SHEET 08  
-L- STA. 63+50.00




**MULTI-USE PATH**

SEE SHEET 15 FOR -L- PROFILE

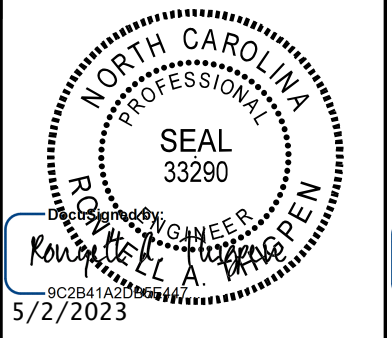
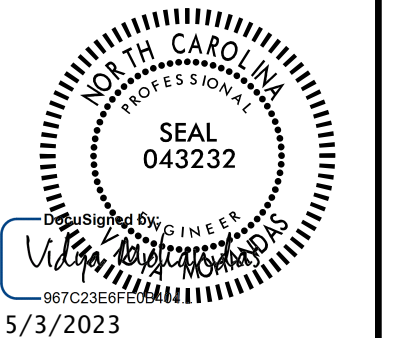
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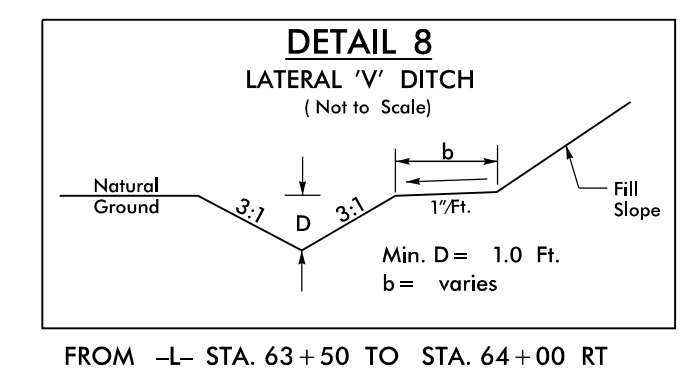
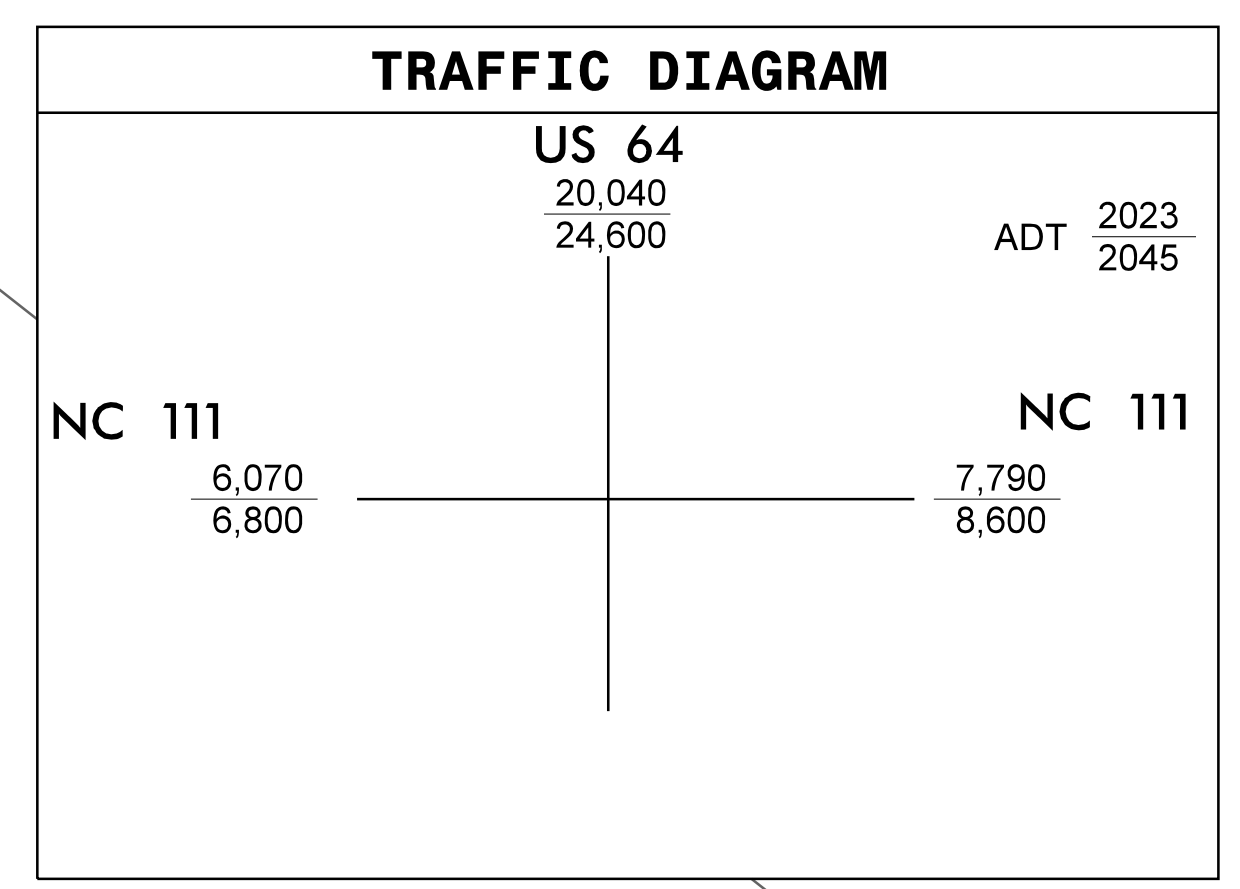
8/17/99

PLANS PREPARED BY:

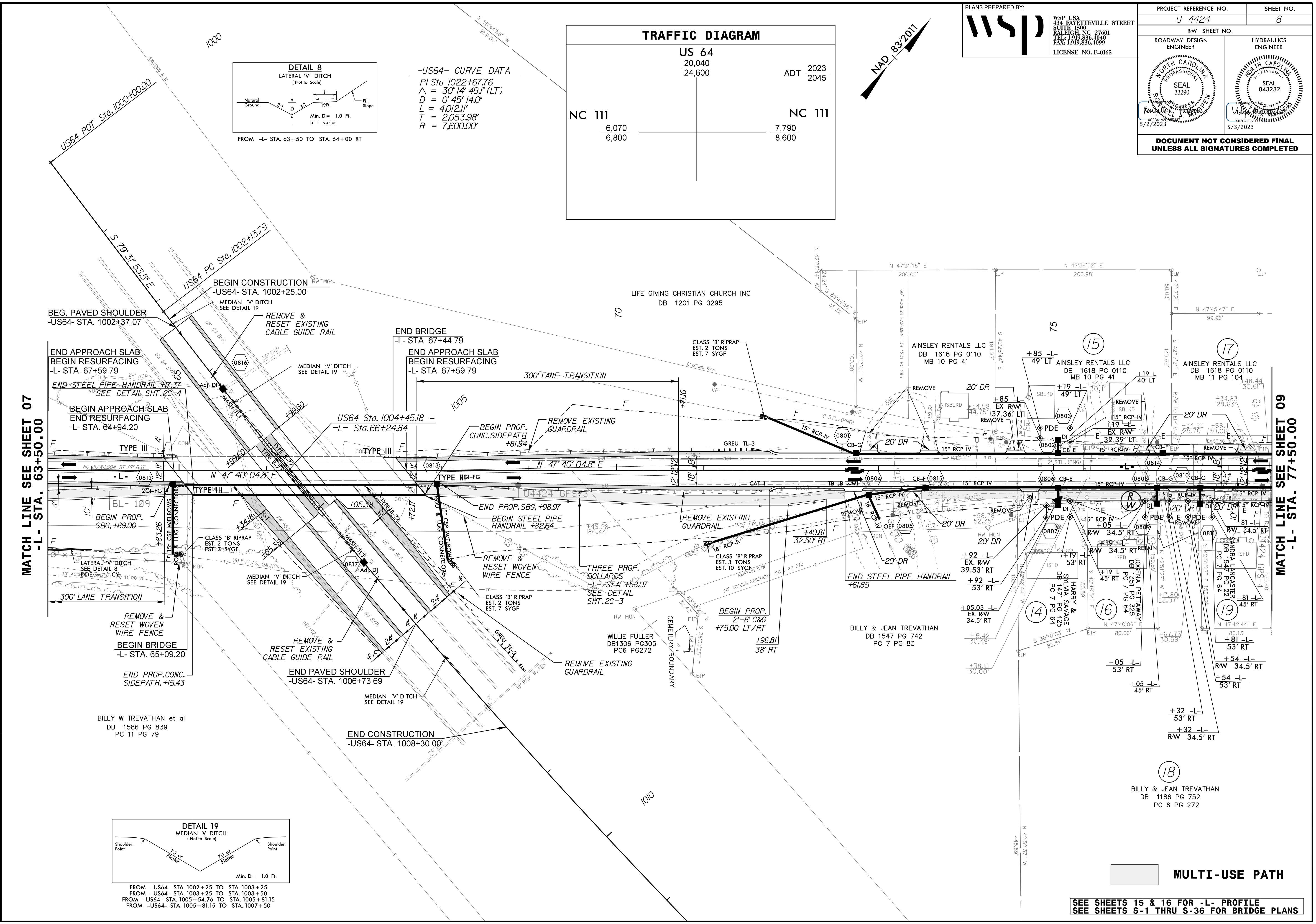


WSP USA  
434 EYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
FAX: 1.919.836.4099  
LICENSE NO. F-0165

PROJECT REFERENCE NO. U-4424	SHEET NO. 8
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	SEAL 33290
	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

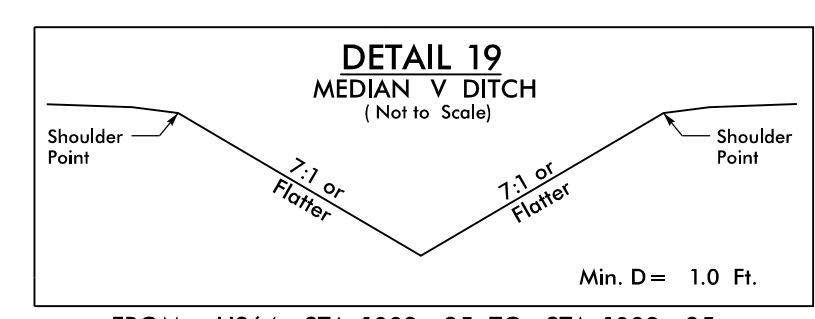


**-US64- CURVE DATA**  
 PI Sta 1022+67.76  
 $\Delta = 30^\circ 14' 49.1''$  (LT)  
 $D = 0^\circ 45' 14.0''$   
 $L = 4,012.11'$   
 $T = 2,053.98'$   
 $R = 7,600.00'$



MATCH LINE SEE SHEET 07  
-L- STA. 63+50.00

MATCH LINE SEE SHEET 09  
-L- STA. 77+50.00



FROM -US64- STA. 1002+25 TO STA. 1003+25  
 FROM -US64- STA. 1003+25 TO STA. 1003+50  
 FROM -US64- STA. 1005+54.76 TO STA. 1005+81.15  
 FROM -US64- STA. 1005+81.15 TO STA. 1007+50

**MULTI-USE PATH**


SEE SHEETS 15 & 16 FOR -L- PROFILE  
 SEE SHEETS S-1 THRU S-36 FOR BRIDGE PLANS

REVISIONS

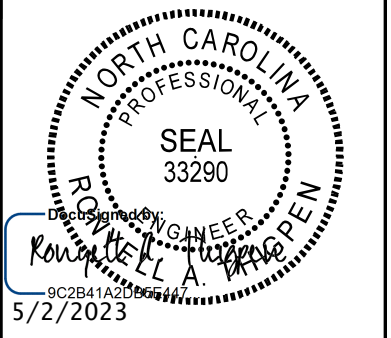
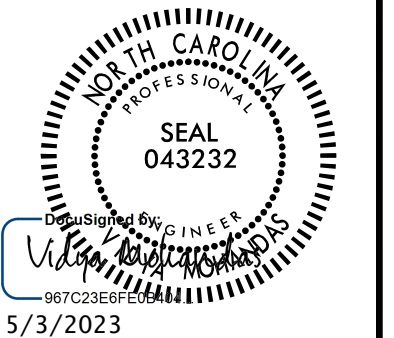
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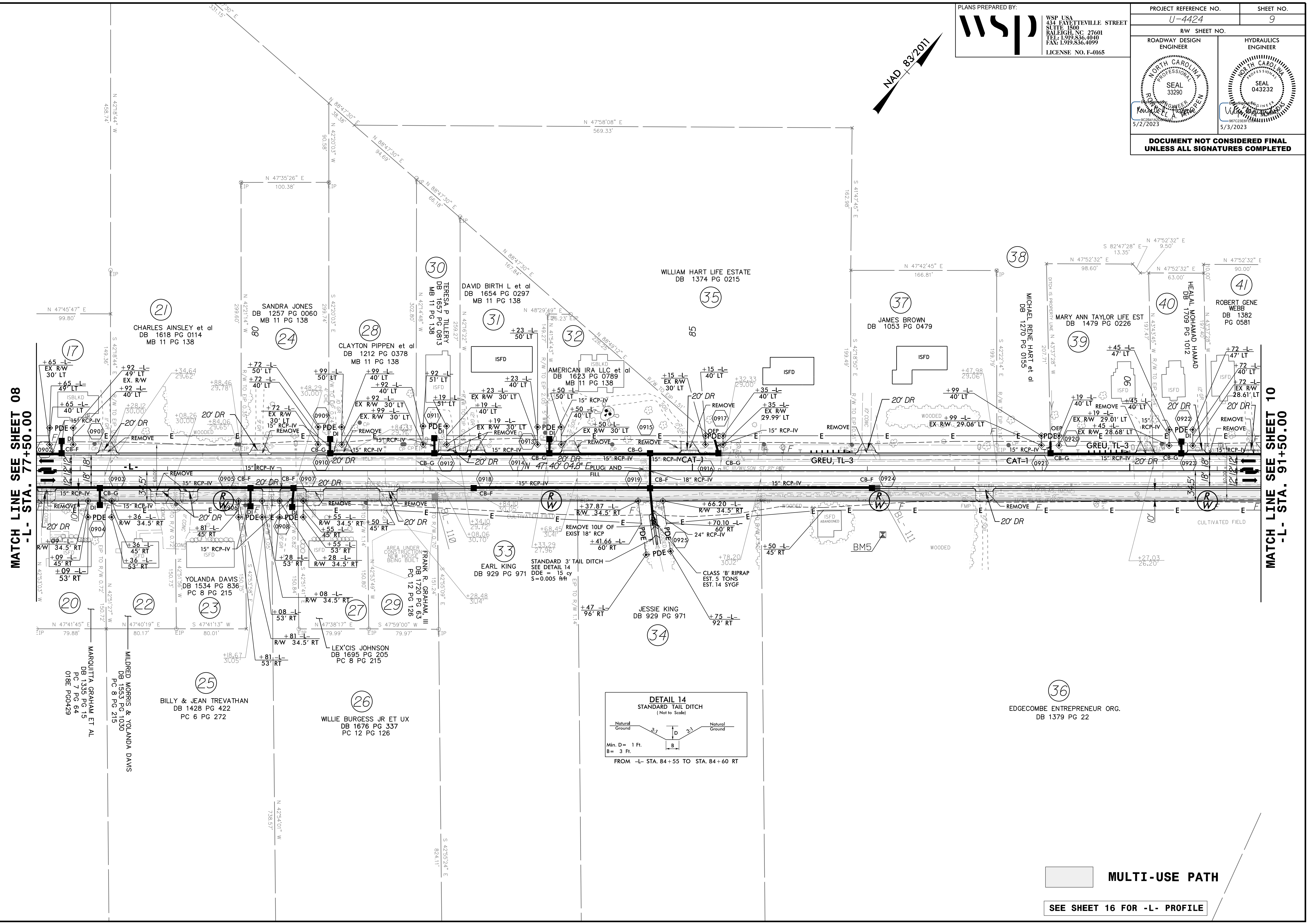
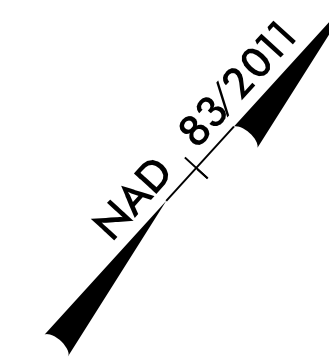
8/17/99

PLANS PREPARED BY:



WSP USA  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
FAX: 1.919.836.4099  
LICENSE NO. F-0165

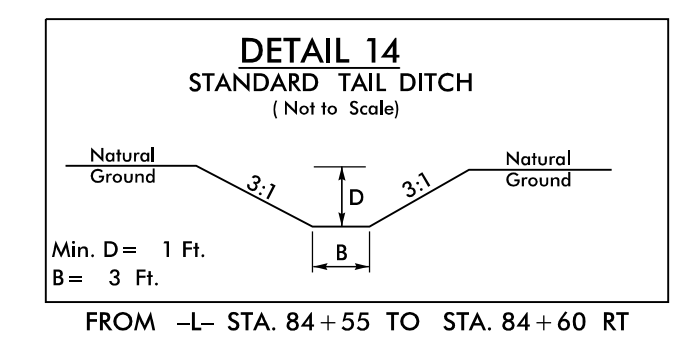
PROJECT REFERENCE NO. U-4424	SHEET NO. 9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

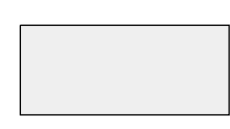



MATCH LINE SEE SHEET 08  
-L- STA. 77+50.00

MATCH LINE SEE SHEET 10  
-L- STA. 91+50.00

REVISIONS



 MULTI-USE PATH

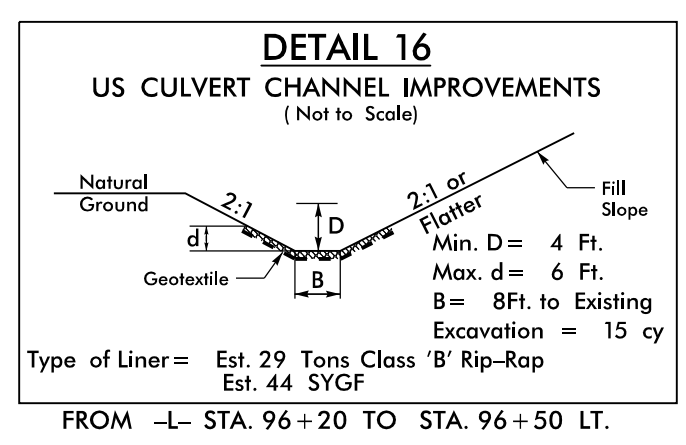
 SEE SHEET 16 FOR -L- PROFILE

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8/17/99

**-Y5- CURVE DATA**  
 PI Sta 10+62.33  
 $\Delta = 3' 28'' 00.0''$  (LT)  
 $D = 5' 43'' 46.5''$   
 $L = 60.50'$   
 $T = 30.26'$   
 $R = 1,000.00'$   
 $e = \text{MATCH EXIST.}$

**-L- CURVE DATA**  
 PIs Sta 99+09.06 PI Sta 105+64.93  
 $\Delta = 1' 55'' 33.3''$   $\Delta = 22' 24'' 19.9''$  (RT)  
 $Ls = 200.00'$   $D = 1' 55'' 33.3''$   
 $LT = 133.34'$   $L = 1,163.37'$   
 $ST = 66.67'$   $T = 589.21'$   
 $R = 2,975.00'$   
 $e = 3\%$   
 $Ds = 50 \text{ MPH}$



-L- POT Sta. 97+24.94 =  
 -Y5- POT Sta. 12+03.06

-L- TS Sta. 97+75.72

-L- SC Sta. 99+75.72

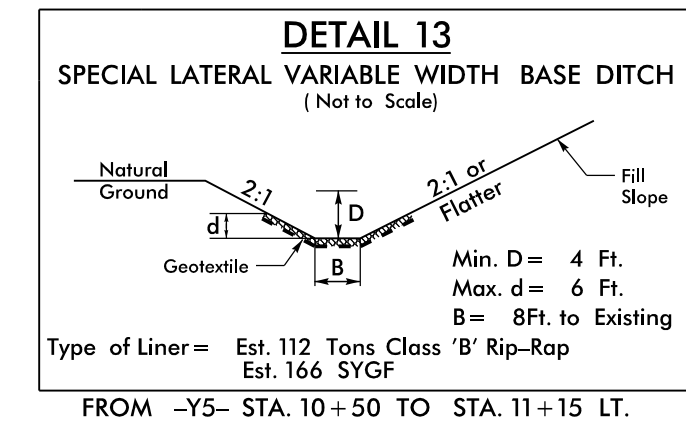
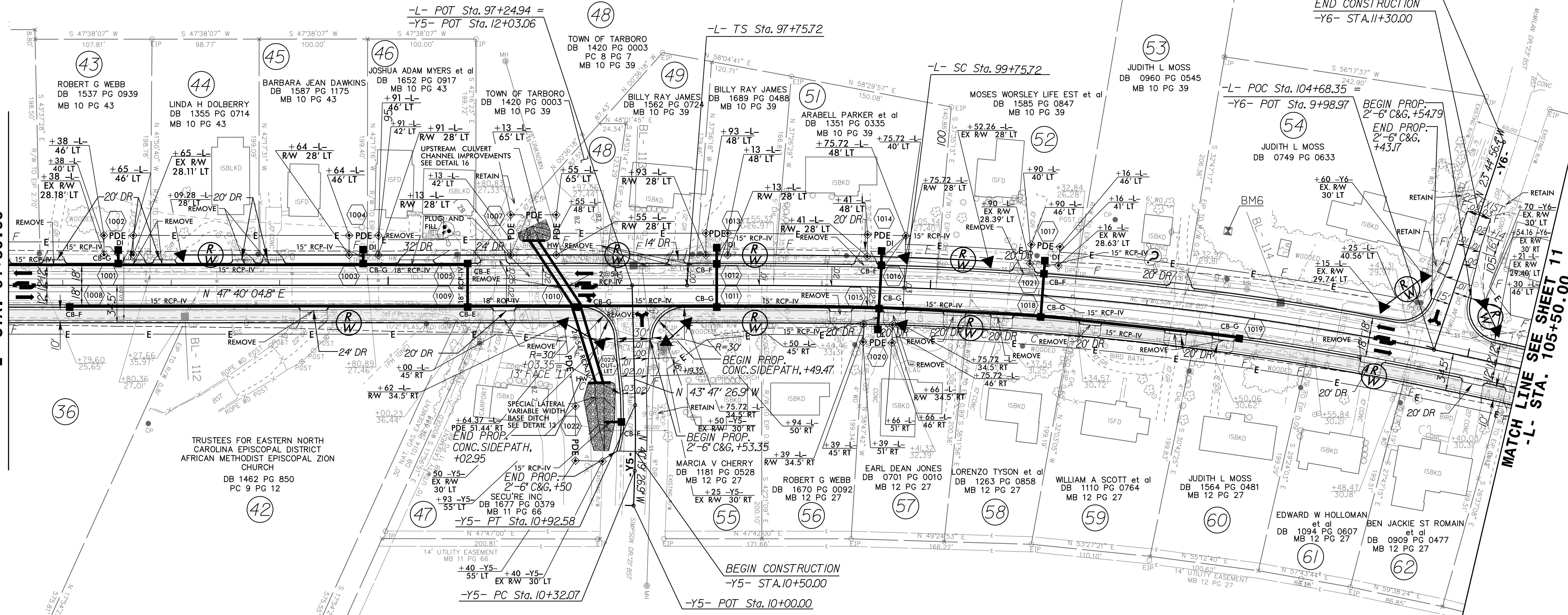
-Y6- POT Sta. 12+00.86  
 END CONSTRUCTION  
 -Y6- STA. 11+30.00

-L- POC Sta. 104+68.35 =  
 -Y6- POT Sta. 9+98.97

BEGIN PROP.  
 2'-6" C&G, +54.79  
 END PROP.  
 2'-6" C&G, +43.17

MATCH LINE SEE SHEET 09  
 -L- STA. 91+50.00

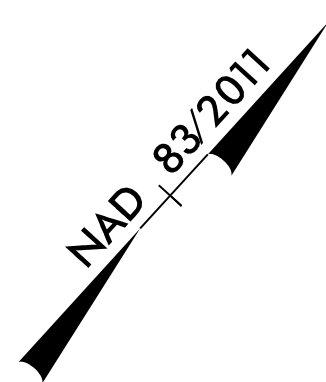
MATCH LINE SEE SHEET 11  
 -L- STA. 105+50.00



NOTE: USE PERMANENT SOIL REINFORCEMENT MAT (PSRM)  
 FROM STA. -Y5- 10+50 LT (+/-) TO STA. -Y6- 11+15 LT (+/-)  
 AND EXTEND PSRM LIMITS TO 2:1(H:V) SLOPE.

PLANS PREPARED BY:  
**WSP**  
 WSP USA  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 TEL: 1.919.836.4040  
 FAX: 1.919.836.4099  
 LICENSE NO. F-0165

PROJECT REFERENCE NO. U-4424	SHEET NO. 10
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	SEAL 043232
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



REVISIONS

11-APR-2023, 15:17  
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MULTI-USE PATH

SEE SHEETS 16 & 17 FOR -L- PROFILE  
 SEE SHEET 20 FOR -Y5- PROFILE  
 SEE SHEET 20 FOR -Y6- PROFILE

8/17/99

**-Y7- CURVE DATA**

PI Sta 10+64.20  
Δ = 2° 31' 09.1" (LT)  
D = 23' 52" 23.7"  
L = 102.71'  
T = 52.15'  
R = 240.00'  
e = Match Exlst.

**-Y8- CURVE DATA**


PI Sta 13+13.53  
Δ = 38° 37' 58.0" (RT)  
D = 57' 17" 44.8"  
L = 67.43'  
T = 35.05'  
R = 100.00'  
e = 2%

**-L- CURVE DATA**

PI Sta 105+64.93  
Δ = 22° 24' 19.9" (RT)  
D = 1° 55' 33.3"  
L = 1,163.37'  
T = 589.21'  
R = 2,975.00'  
e = 3%  
Ds = 50 MPH

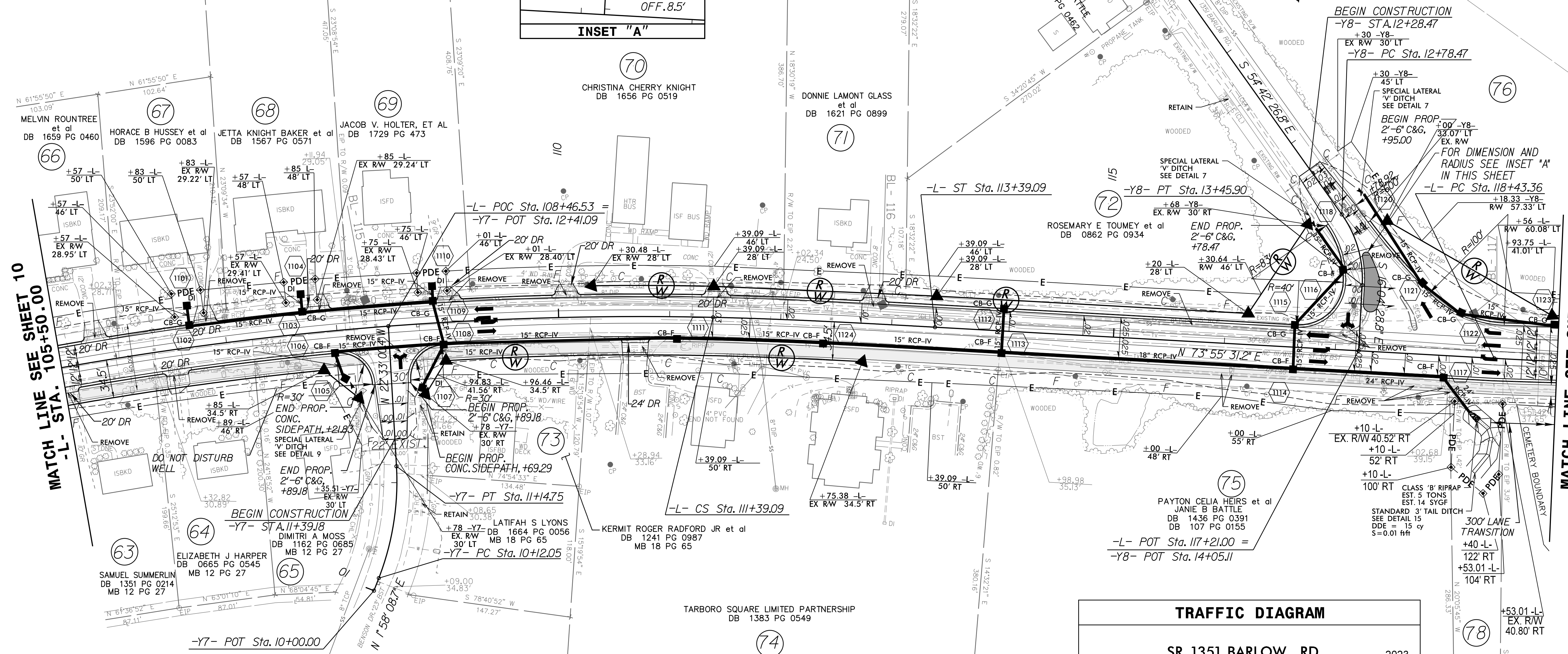
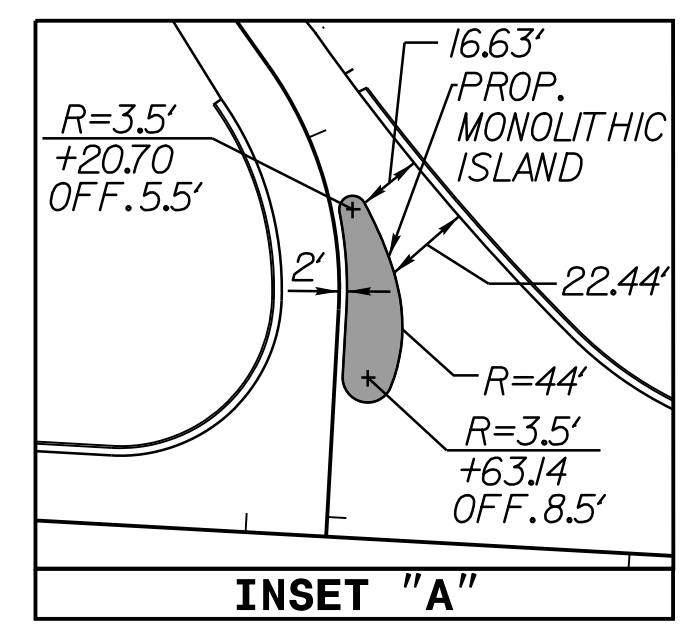
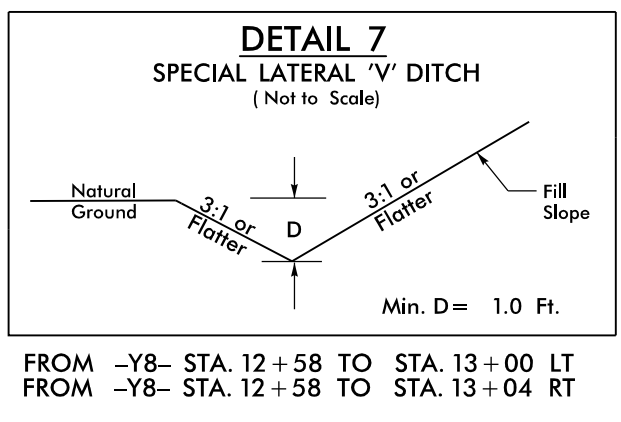
PIs Sta 112+05.76  
Δ = 15° 58' 30.1" (LT)  
D = 1° 01' 20.0"  
L = 1,562.77'  
T = 786.49'  
R = 5,605.00'  
e = 2.5%  
RunOff = 75'  
Ds = 50 MPH

PLANS PREPARED BY:



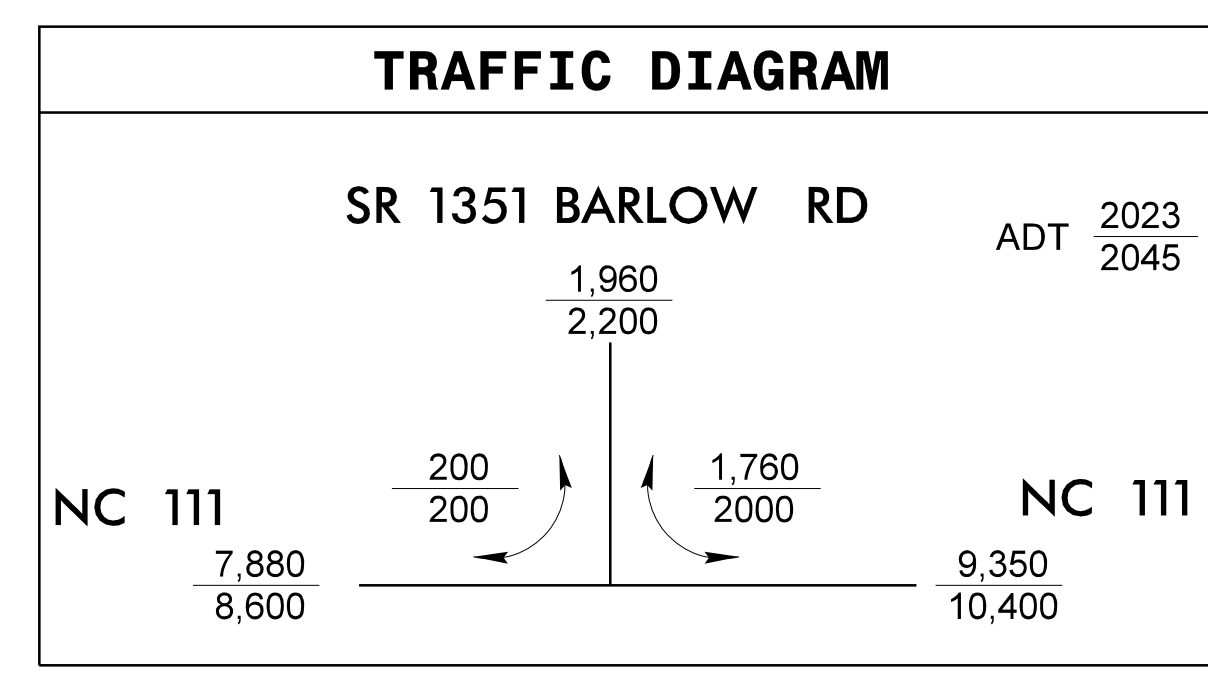
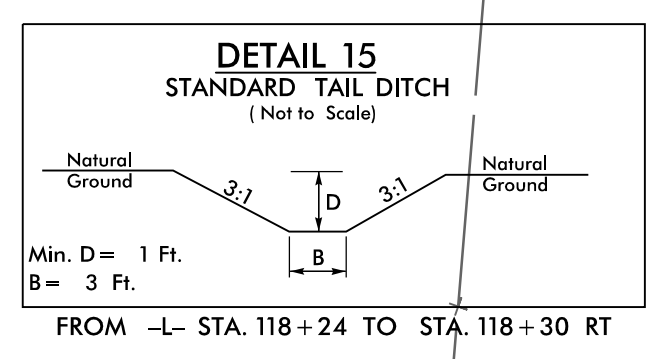
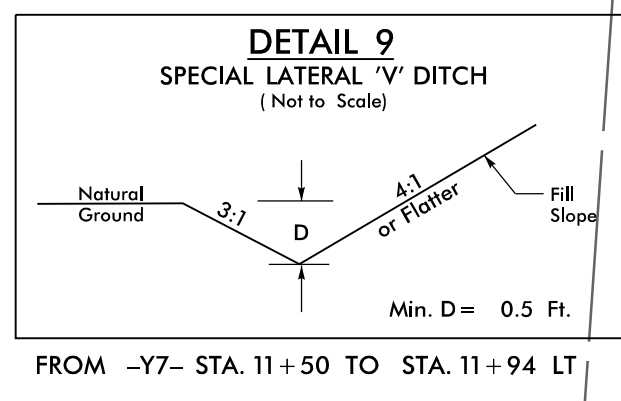
WSP USA  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
FAX: 1.919.836.4099  
LICENSE NO. F-0165

PROJECT REFERENCE NO. U-4424	SHEET NO. 11
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 33290 5/2/2023	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 043232 5/3/2023
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	



MATCH LINE SEE SHEET 10  
-L- STA. 105+50.00

MATCH LINE SEE SHEET 12  
-L- STA. 119+00.00



**MULTI-USE PATH**

SEE SHEET 17 FOR -L- PROFILE  
SEE SHEET 20 FOR -Y7- PROFILE  
SEE SHEET 20 FOR -Y8- PROFILE

REVISIONS

11-APR-2023 15:17  
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8/17/99

REVISIONS

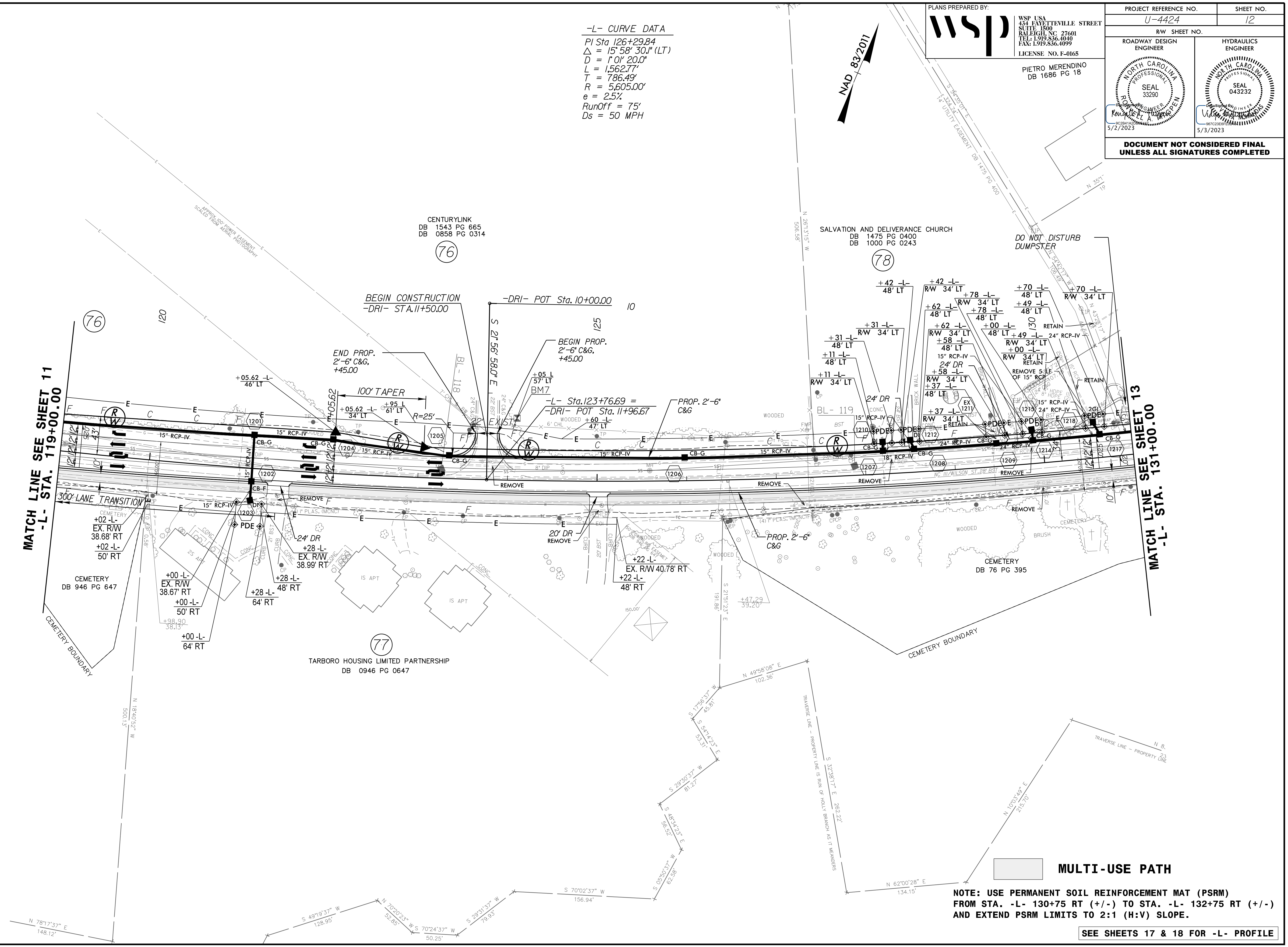
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**-L- CURVE DATA**  
 PI Sta 126+29.84  
 $\Delta = 15^{\circ}58'30.0''$  (LT)  
 $D = 1^{\circ}01'20.0''$   
 $L = 1,562.77'$   
 $T = 786.49'$   
 $R = 5,605.00'$   
 $e = 2.5\%$   
 RunOff = 75'  
 $D_s = 50$  MPH

PLANS PREPARED BY:  
**WSP**  
 WSP USA  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 TEL: 1.919.836.4040  
 FAX: 1.919.836.4099  
 LICENSE NO. F-0165

PROJECT REFERENCE NO. U-4424	SHEET NO. 12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PIETRO MERENDINO DB 1686 PG 18	SEAL 043232
SEAL 33290	SEAL 043232
5/2/2023	5/3/2023

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UNLESS ALL SIGNATURES COMPLETED**



**MATCH LINE SEE SHEET 11  
-L- STA. 119+00.00**

**MATCH LINE SEE SHEET 13  
-L- STA. 131+00.00**

**MULTI-USE PATH**

**NOTE: USE PERMANENT SOIL REINFORCEMENT MAT (PSRM)  
FROM STA. -L- 130+75 RT (+/-) TO STA. -L- 132+75 RT (+/-)  
AND EXTEND PSRM LIMITS TO 2:1 (H:V) SLOPE.**

**SEE SHEETS 17 & 18 FOR -L- PROFILE**




8/17/99

REVISIONS

19-APR-2023 15:49  
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PLANS PREPARED BY:

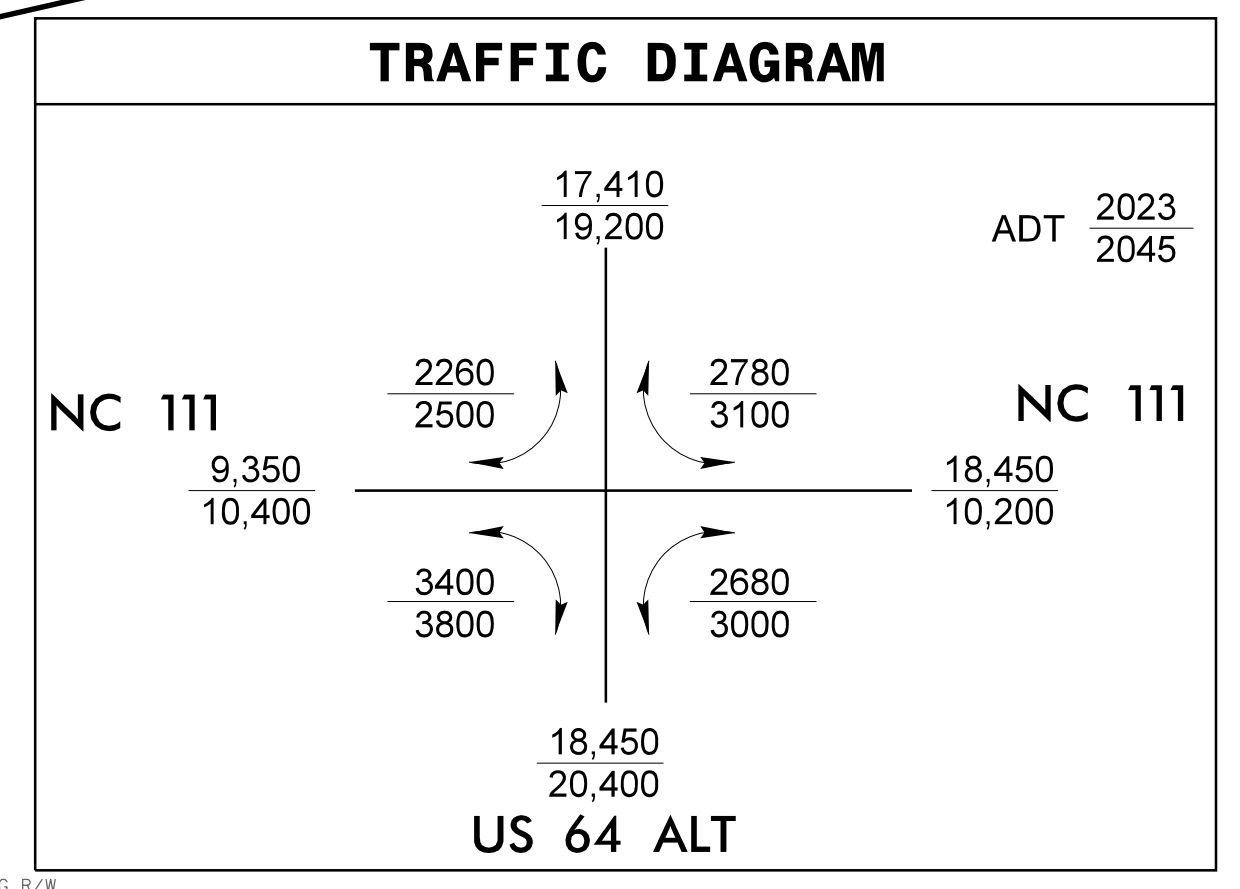
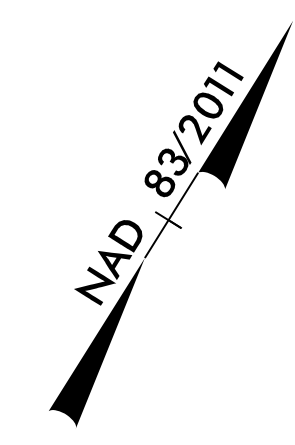


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SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
FAX: 1.919.836.4099  
LICENSE NO. F-0165

PROJECT REFERENCE NO. U-4424	SHEET NO. 13
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	SEAL 33290
	5/2/2023
	SEAL 043232
	5/3/2023

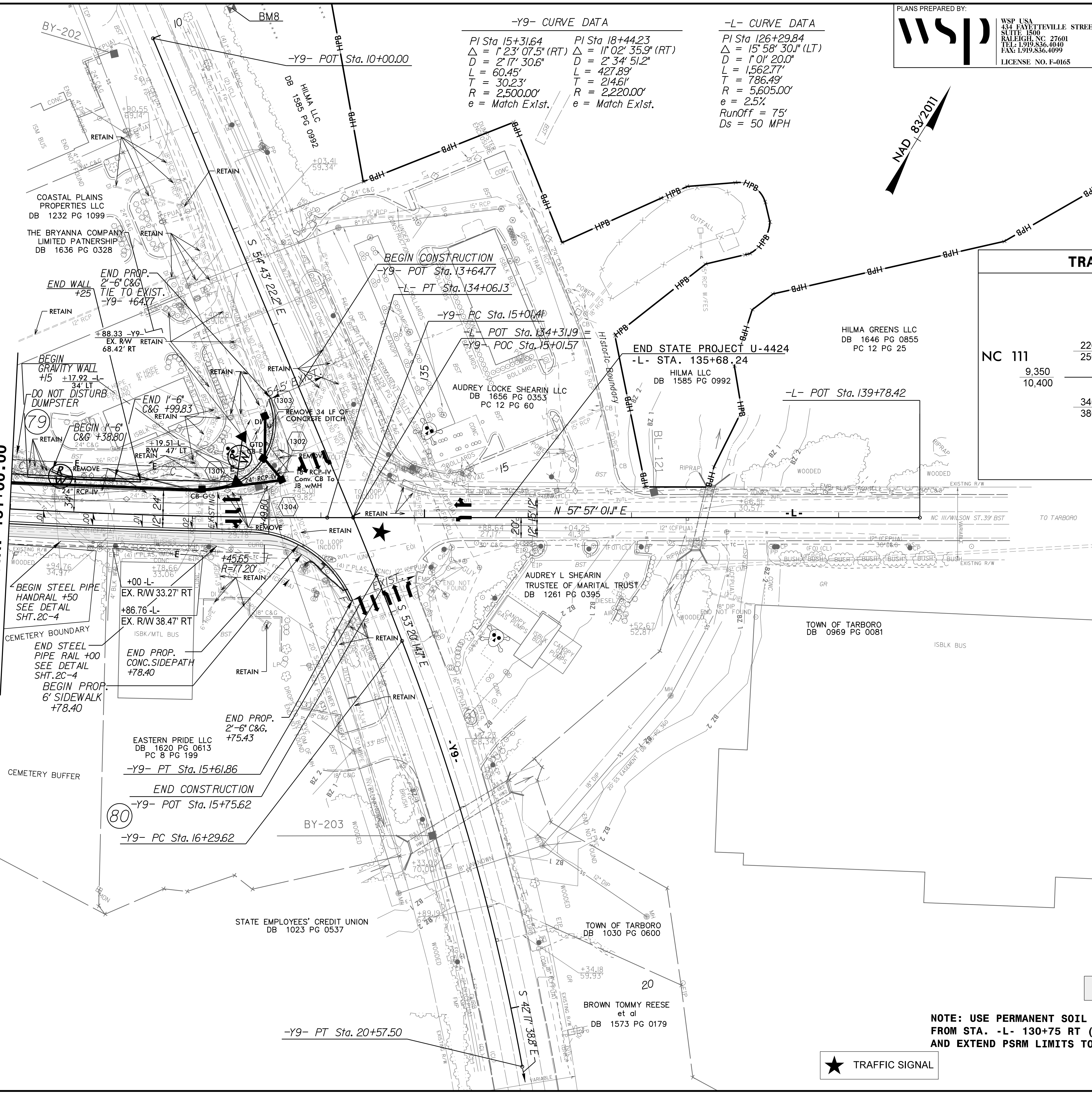
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

-Y9- CURVE DATA		-L- CURVE DATA
PI Sta 15+31.64	PI Sta 18+44.23	PI Sta 126+29.84
$\Delta = 1' 23' 07.5''$ (RT)	$\Delta = 11' 02' 35.9''$ (RT)	$\Delta = 15' 58' 30.1''$ (LT)
D = 2' 17' 30.6"	D = 2' 34' 51.2"	D = 1' 04' 20.0"
L = 60.45'	L = 427.89'	L = 1562.77'
T = 30.23'	T = 214.61'	T = 786.49'
R = 2,500.00'	R = 2,220.00'	R = 5,605.00'
e = Match Ex1st.	e = Match Ex1st.	e = 2.5%
		RunOff = 75'
		Ds = 50 MPH



MATCH LINE SEE SHEET 12  
-L- STA. 131+00.00

80



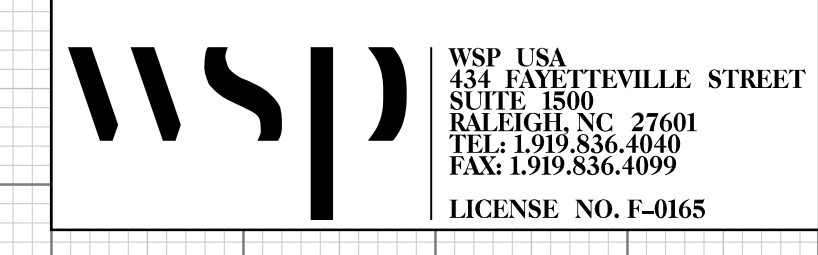
MULTI-USE PATH

★ TRAFFIC SIGNAL

NOTE: USE PERMANENT SOIL REINFORCEMENT MAT (PSRM)  
FROM STA. -L- 130+75 RT (+/-) TO STA. -L- 132+75 RT (+/-)  
AND EXTEND PSRM LIMITS TO 2:1 (H:V) SLOPE.

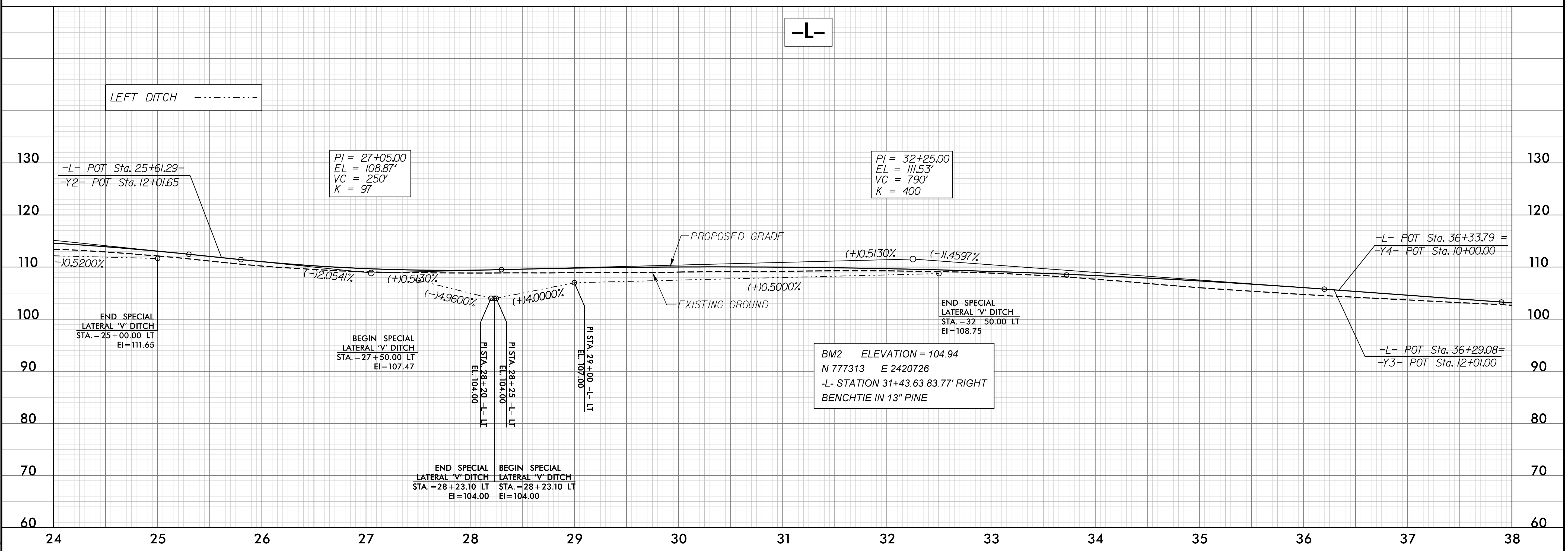
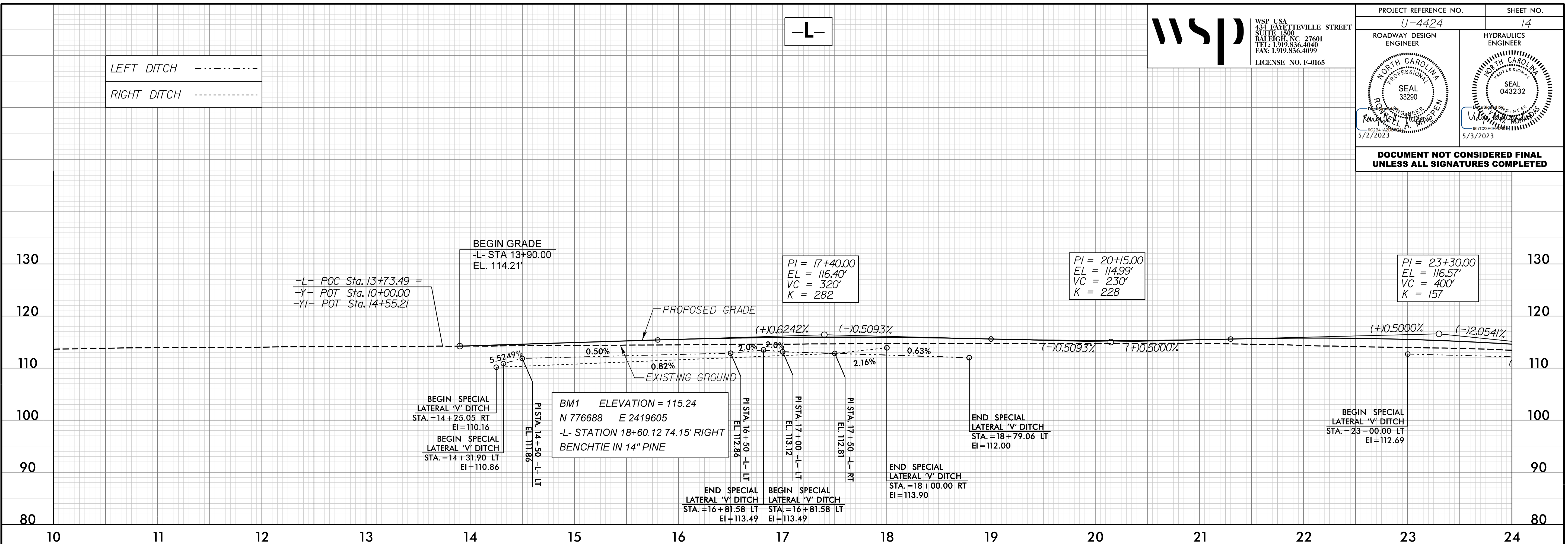
SEE SHEET 18 FOR -L- PROFILE

5/28/23



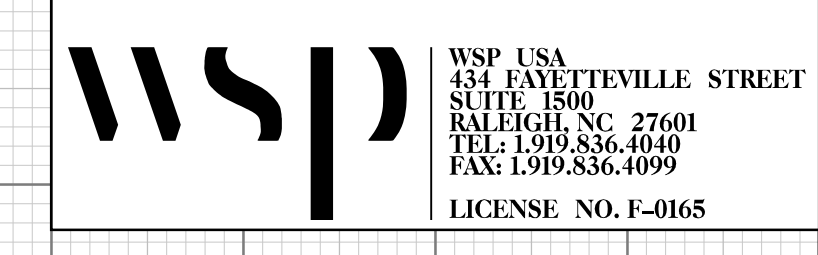
PROJECT REFERENCE NO. U-4424		SHEET NO. 14	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	

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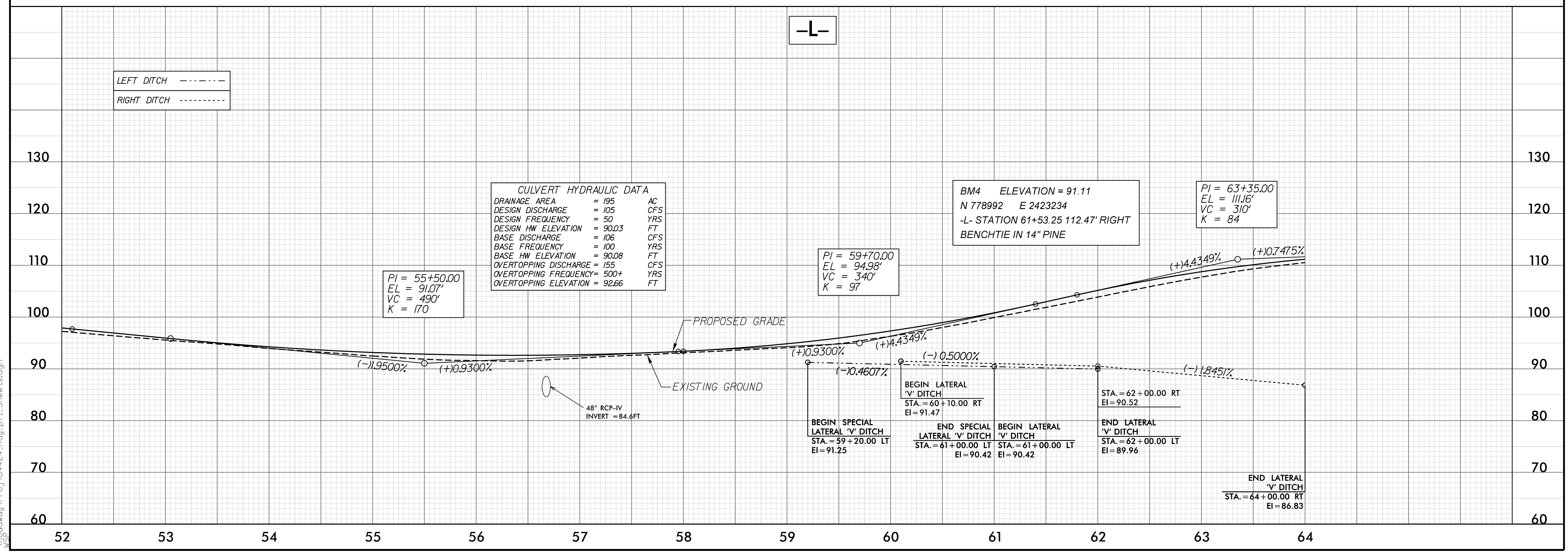
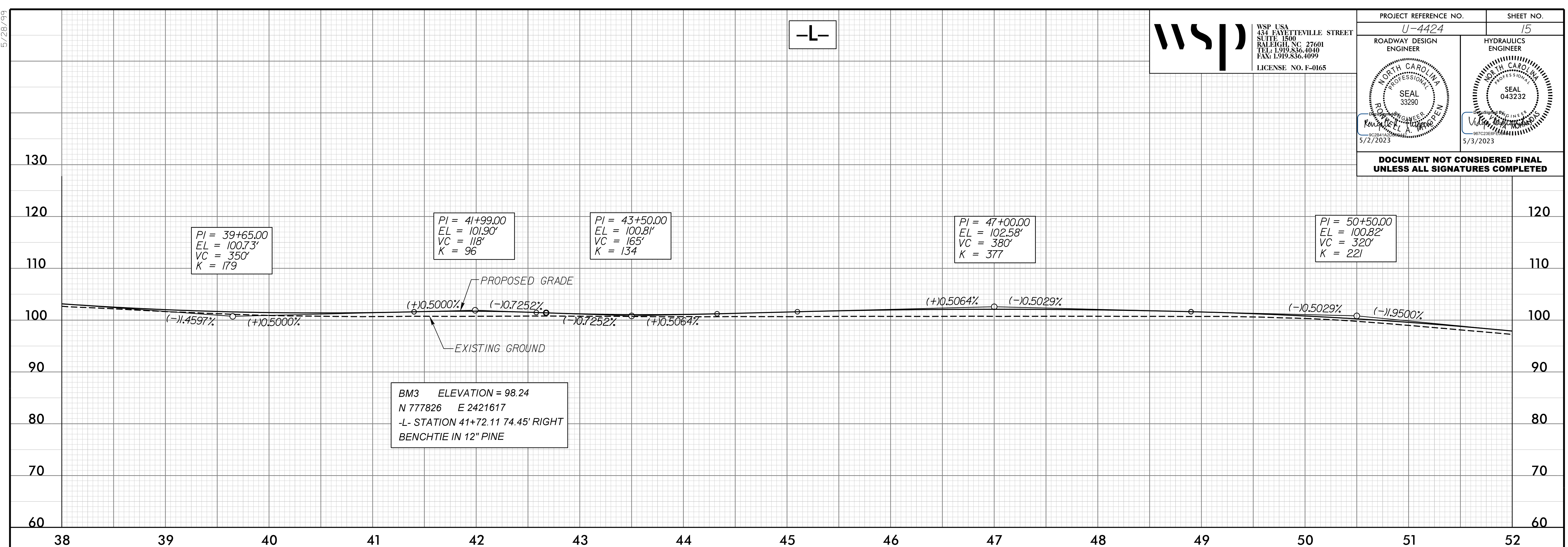
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5/28/23



PROJECT REFERENCE NO. U-4424	SHEET NO. 15
ROADWAY DESIGN ENGINEER SEAL 33290 5/2/2023	HYDRAULICS ENGINEER SEAL 043232 5/3/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



**CULVERT HYDRAULIC DATA**

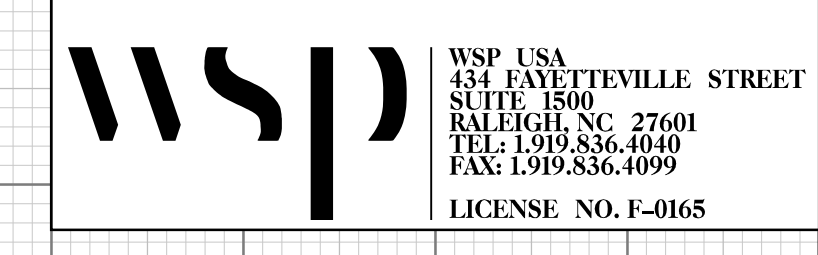
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DESIGN DISCHARGE	= 105	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 90.03	FT
BASE DISCHARGE	= 106	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 90.08	FT
OVERTOPPING DISCHARGE	= 155	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 92.66	FT

LEFT DITCH - - - - -

RIGHT DITCH - - - - -

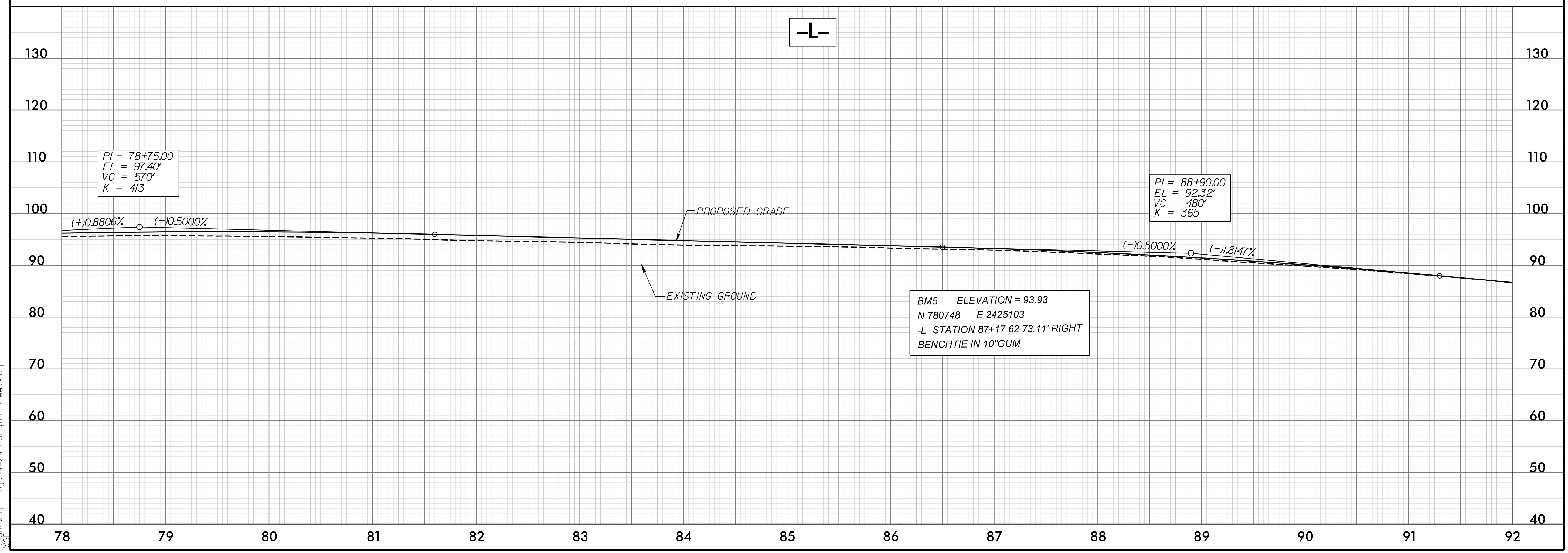
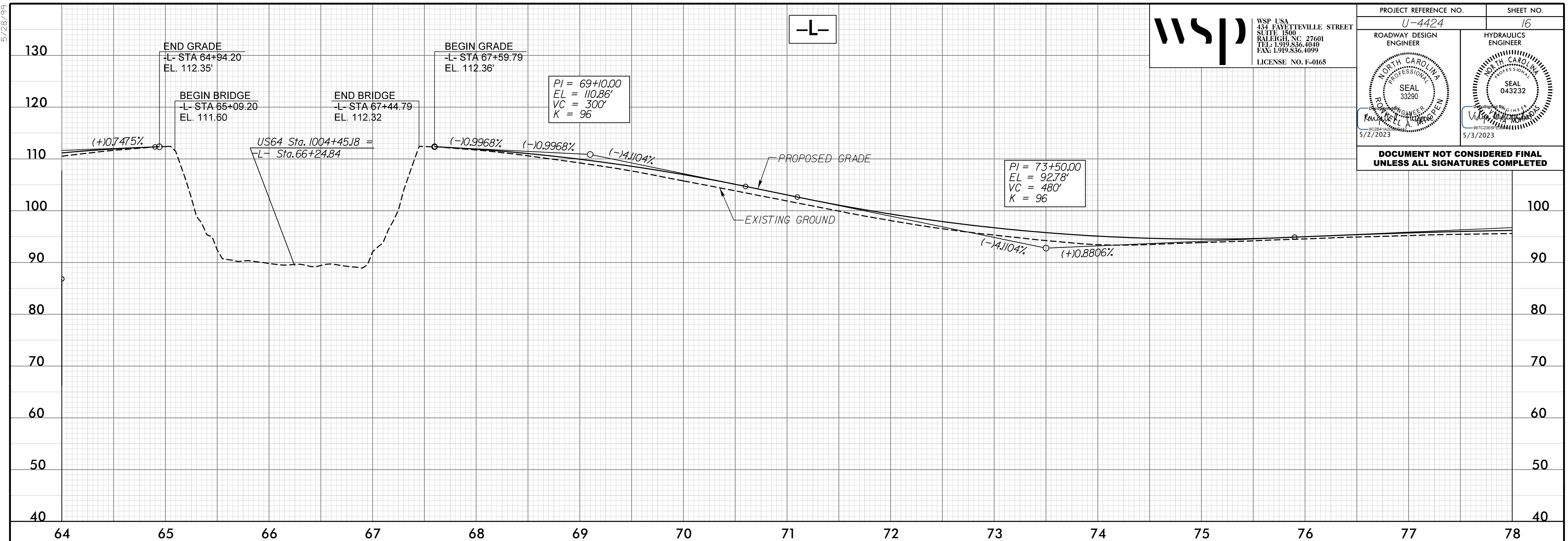
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5/28/23



PROJECT REFERENCE NO. U-4424	SHEET NO. 16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



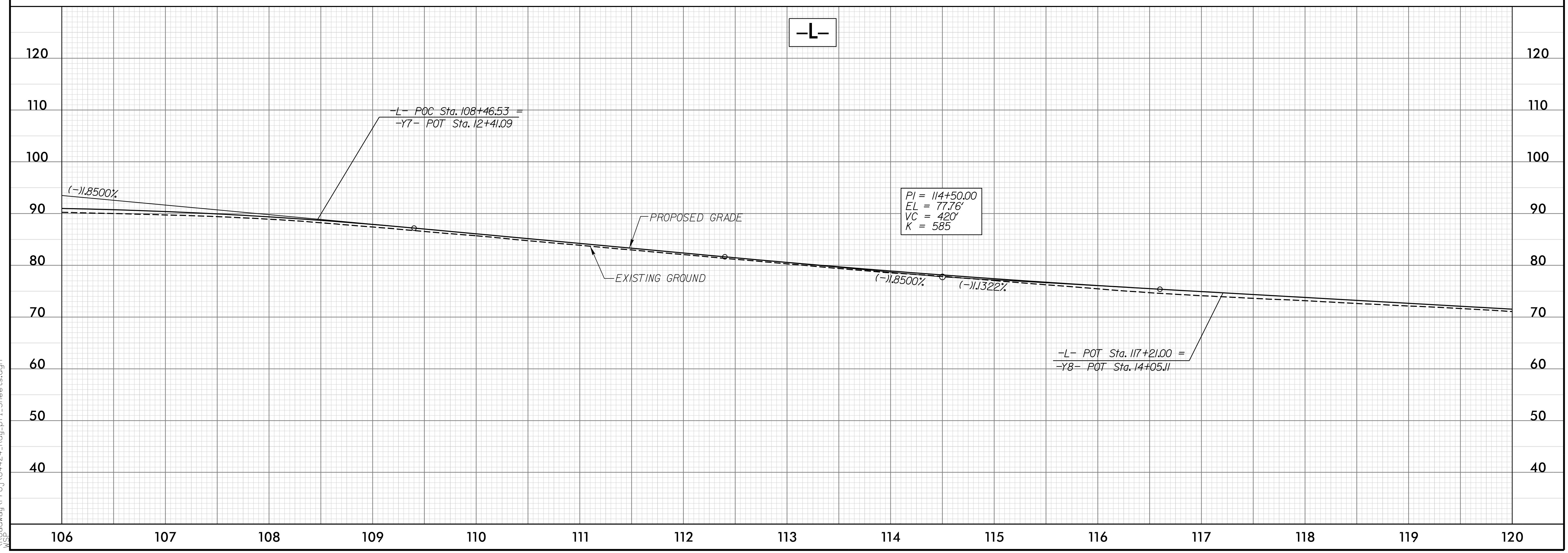
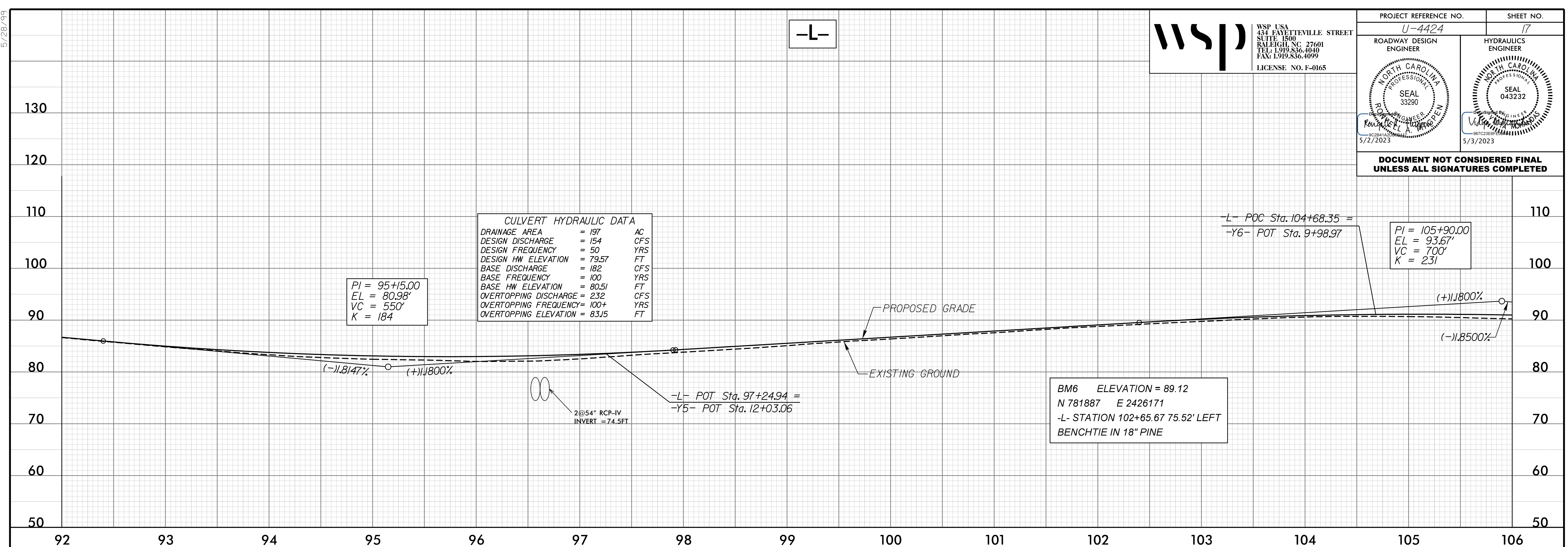
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WSE

5/28/23



PROJECT REFERENCE NO. U-4424	SHEET NO. 17
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



09-MAR-2023 17:30  
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