

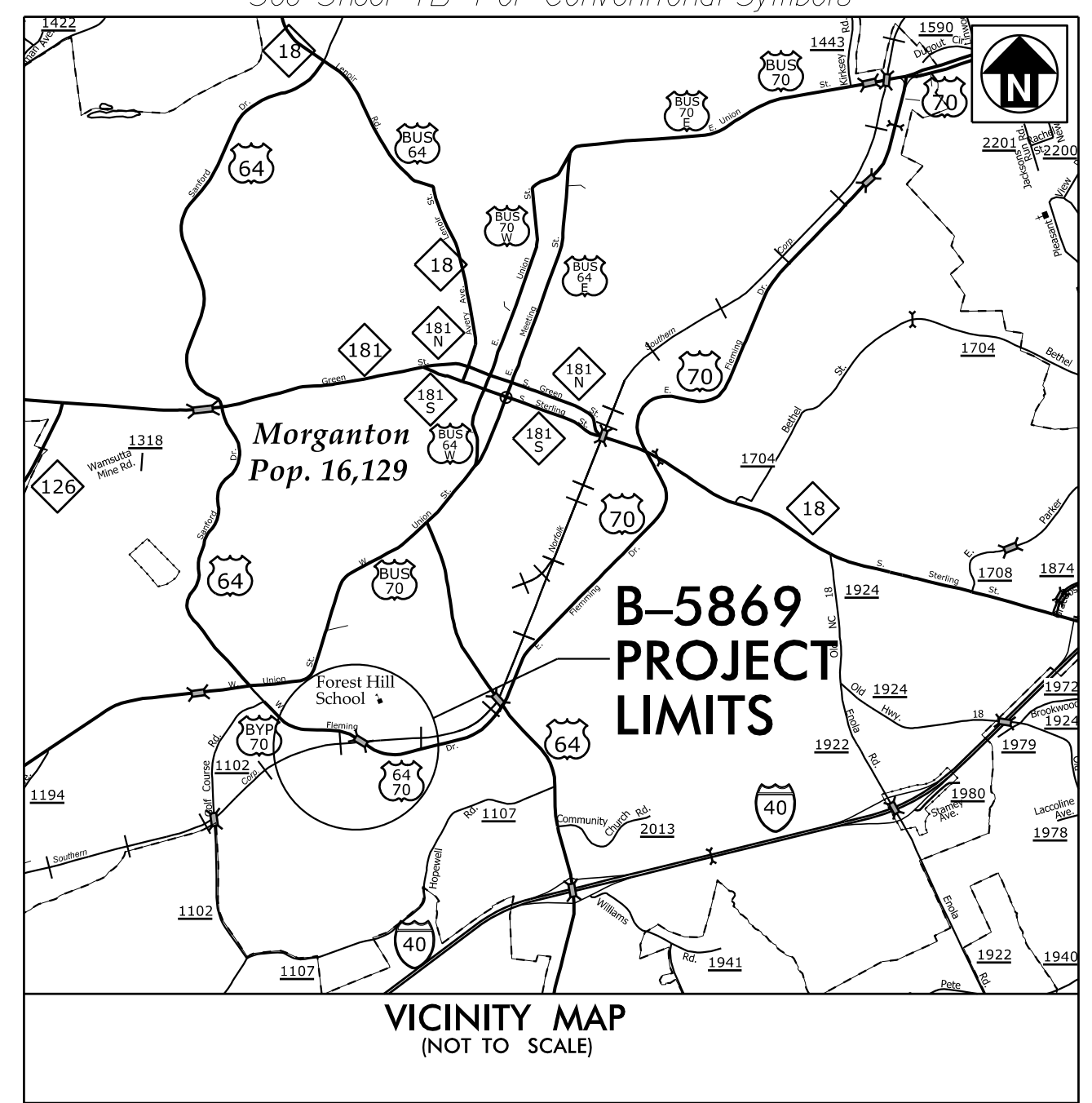
09.08/2019

PROJECT: B-5869

CONTRACT: C204716

I:53:00 PM  
R:\NCRoadway\Proj\B5869\_rdy\_tsh.dgn  
PEK56854

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



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**BURKE COUNTY**

LOCATION: BRIDGE NO. 99 ON US 64/US 70 (FLEMING DRIVE)  
OVER NORFOLK SOUTHERN RAILROAD IN MORGANTON

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5869	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
48063.1.FR1	NHPP-0064(180)	PE	
48063.2.1	NHPP-0064(180)	RW	
48063.2.2	NHPP-0064(180)	UTILITIES	
48063.3.1	NHPP-0064(180)	CONST	

BEGIN TIP PROJECT B-5869  
-L- STA. 10+00.00

4 &  
2B-1

BEGIN DETOUR B-5869  
-DET- POT STA. 9+29.69 =  
-L- PC STA. 15+18.67  
OFFSET 18'

BEGIN BRIDGE  
-DET- STA. 16+55.00 +/-

END TIP PROJECT B-5869  
-L- STA. 36+20.00

BEGIN BRIDGE  
-L- STA. 20+47.70

END BRIDGE  
-DET- STA. 18+72.00 +/-

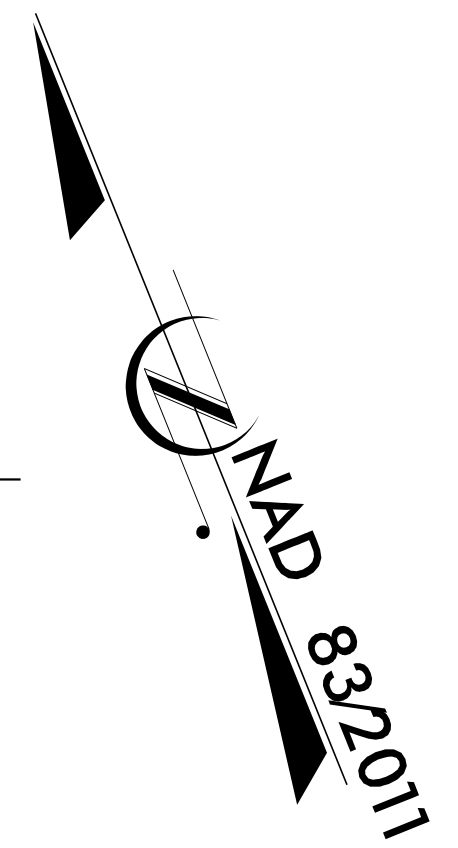
5 &  
2B-2

END BRIDGE  
-L- STA. 23+14.20

END DETOUR B-5869  
-DET- PT STA. 23+43.77 =  
-L- POC STA. 29+22.00  
OFFSET 23.27'

END DRIVEWAY  
-DR- STA. 15+95.00

END DRIVEWAY  
-DRI- STA. 13+00.00

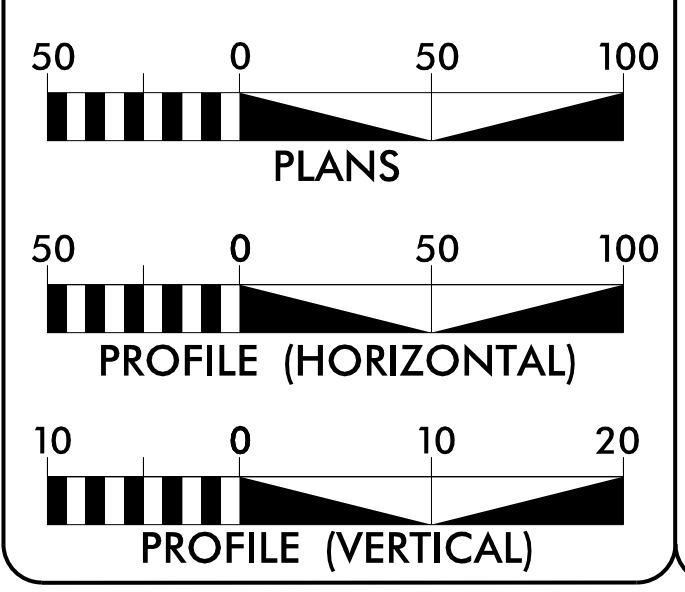


DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:



GRAPHIC SCALES



DESIGN DATA

ADT 2021 = 20,620  
ADT 2040 = 23,200

K = 9 %  
D = 55 %  
T = 5 %\*  
V = 50 MPH

\* TTST = 2% DUAL 3%

URBAN ARTERIAL  
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5869 = 0.446 MILES

LENGTH STRUCTURE TIP PROJECT B-5869 = 0.050 MILES

TOTAL LENGTH TIP PROJECT B-5869 = 0.496 MILES

PLANS PREPARED FOR NCDOT BY:

**M M**  
MOTT  
MACDONALD  
7621 Purfoy Rd., Suite 115  
Fuquay-Varina, NC 27526  
(919) 552-2253  
(919) 552-2254 (Fax)  
www.mottmac.com/americas  
LICENSE NO. F-0669

**SUNGATE DESIGN GROUP, P.A.**  
905 JONES FRANKLIN ROAD  
RALEIGH, NORTH CAROLINA 27608  
TEL: (919) 855-2245  
ENG FIRM LICENSE NO. C-890

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
May 13, 2021

LETTING DATE:  
May 16, 2023

**MICHAEL PEKAREK, PE**  
PROJECT ENGINEER

**JOSH DALTON, PE**  
HYDRAULIC ENGINEER

**DAVID STUTTS, PE**  
NCDOT BRIDGE PROGRAM MANAGER

HYDRAULICS ENGINEER

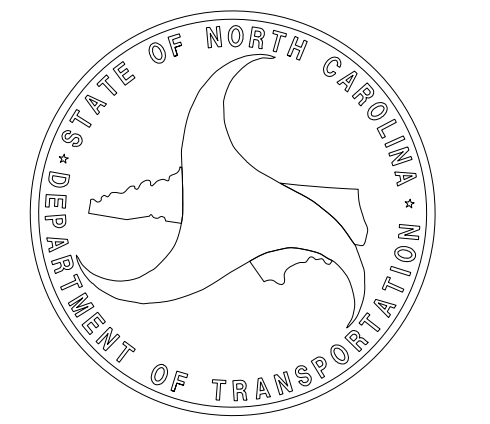
**JOSHUA G. DALTON**  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 26971  
P.E.

SIGNATURE: \_\_\_\_\_

ROADWAY DESIGN ENGINEER

**MICHAEL PEKAREK**  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 27391  
P.E.

SIGNATURE: \_\_\_\_\_



## GENERAL NOTES

GENERAL NOTES: 2018 SPECIFICATIONS  
EFFECTIVE: 01-16-18

**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 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.

**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.

**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 WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

**END BENTS:**

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

**UTILITIES:**

UTILITY OWNERS ON THIS PROJECT ARE CITY OF MORGANTON WATER, CITY OF MORGANTON SEWER, PIEDMONT NATURAL GAS, CITY OF MORGANTON ELECTRIC, DUKE ENERGY TRANSMISSION, AT&T, CONTEERRA, AND CITY OF MORGANTON CATV.

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.

## LIST OF ROADWAY STANDARD DRAWINGS

EFF. 01-16-2018




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
<b>DIVISION 2 - EARTHWORK</b>	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
<b>DIVISION 3 - PIPE CULVERTS</b>	
300.01	Method of Pipe Installation
<b>DIVISION 4 - MAJOR STRUCTURES</b>	
422.01	Bridge Approach Fills - Type I Standard Approach Fill
<b>DIVISION 5 - SUBGRADE, BASES AND SHOULDERS</b>	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
<b>DIVISION 6 - ASPHALT BASES AND PAVEMENTS</b>	
654.01	Pavement Repairs
<b>DIVISION 8 - INCIDENTALS</b>	
815.02	Subsurface Drain
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
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
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
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
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
848.01	Concrete Sidewalk
848.02	Driveway Turnout - Radius Type
848.05	Curb Ramp - Proposed Curb & Gutter
852.01	Concrete Islands
852.06	Method for Placement of Drop Inlets in Concrete Islands
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

## INDEX OF SHEETS

SHEET NUMBER	DESCRIPTION
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1 THRU 2A-3	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1 THRU 2B-3	DETOUR PLAN SHEETS
2C-1	GUARDRAIL INSTALLATION DETAIL
2C-2	GUARDRAIL ANCHOR UNITS DETAIL
2C-3	TYPE III MODIFIED ANCHOR UNITS DETAIL
2C-4	CONVERT EXISTING DI, CB, OTCB, OR GI TO JUNCTION BOX (MANHOLE OPTIONAL) DETAIL
2G-1 THRU 2G-3	GEOTECHNICAL DETAILS (TEMPORARY SHORING)
3B-1 THRU 3B-2	GUARDRAIL, TEMPORARY GUARDRAIL, PAVEMENT REMOVAL, AND EARTHWORK SUMMARIES
3D-1 THRU 3D-3	DRAINAGE SUMMARY
3G-1	GEOTECHNICAL SUMMARY
3P-1	PARCEL INDEX SHEET
4 THRU 7	PLAN AND PROFILE SHEETS
RW01 THRU RW05	RIGHT OF WAY PLANS
TMP-1 THRU TMP-11	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-3	PAVEMENT MARKING PLANS
EC-1 THRU EC-9	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-3	SIGNING PLANS
SIG-1 THRU SIG-6.1	SIGNAL PLANS
UC-1 THRU UC-6	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-3	UTILITIES BY OTHERS PLANS
X-A	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-33	CROSS-SECTIONS
S-1 THRU S-70	STRUCTURE PLANS
SN	STRUCTURE NOTES
W-1 THRU W-8	RETAINING WALL PLANS

PROJECT REFERENCE NO. <i>B-5869</i>	SHEET NO. <i>1A</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
	
MOTT MACDONALD I & E, LLC LICENSE NO. F-0669	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared in the Office of:	
	PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/america
	
905 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27608 TEL: (919) 858-2441 ENG. FIRM LICENSE NO. C-890	

# STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

## CONVENTIONAL PLAN SHEET SYMBOLS

12/2/2016

### BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EIP
Computed Property Corner	-----
Property Monument	□ ECM
Parcel/Sequence Number	①23
Existing Fence Line	-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	○ S
Well	○ W
Small Mine	✕
Foundation	□
Area Outline	□
Cemetery	□
Building	□
School	□
Church	□
Dam	□

### HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	□
Jurisdictional Stream	--- JS ---
Buffer Zone 1	--- BZ 1 ---
Buffer Zone 2	--- BZ 2 ---
Flow Arrow	←
Disappearing Stream	→
Spring	○
Wetland	--- WLB ---
Proposed Lateral, Tail, Head Ditch	--- FLOW ---
False Sump	▽

### RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○ MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

### RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	◆
Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	◆
Exist Permanent Easement Pin and Cap	◇
New Permanent Easement Pin and Cap	◆
Vertical Benchmark	▲
Existing Right of Way Marker	△
Existing Right of Way Line	-----
New Right of Way Line	○ R W
New Right of Way Line with Pin and Cap	○ R W ▲
New Right of Way Line with Concrete or Granite R/W Marker	▲ R W
New Control of Access Line with Concrete C/A Marker	△ R W
Existing Control of Access	△
New Control of Access	△
Existing Easement Line	--- E ---
New Temporary Construction Easement	--- E ---
New Temporary Drainage Easement	--- TDE ---
New Permanent Drainage Easement	--- PDE ---
New Permanent Drainage / Utility Easement	--- DUE ---
New Permanent Utility Easement	--- PUE ---
New Temporary Utility Easement	--- TUE ---
New Aerial Utility Easement	--- AUE ---

### ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	--- C ---
Proposed Slope Stakes Fill	--- F ---
Proposed Curb Ramp	--- CR ---
Existing Metal Guardrail	--- T ---
Proposed Guardrail	--- T ---
Existing Cable Guiderail	--- T ---
Proposed Cable Guiderail	--- T ---
Equality Symbol	⊕
Pavement Removal	▣

### VEGETATION:

Single Tree	☀
Single Shrub	☁

Note: Not to Scale

\*S.U.E. = Subsurface Utility Engineering

Hedge	-----
Woods Line	-----
Orchard	☀ ☀ ☀
Vineyard	□ Vineyard

### EXISTING STRUCTURES:

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

### UTILITIES:

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

### TELEPHONE:

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

### WATER:

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

### TV:

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

### GAS:

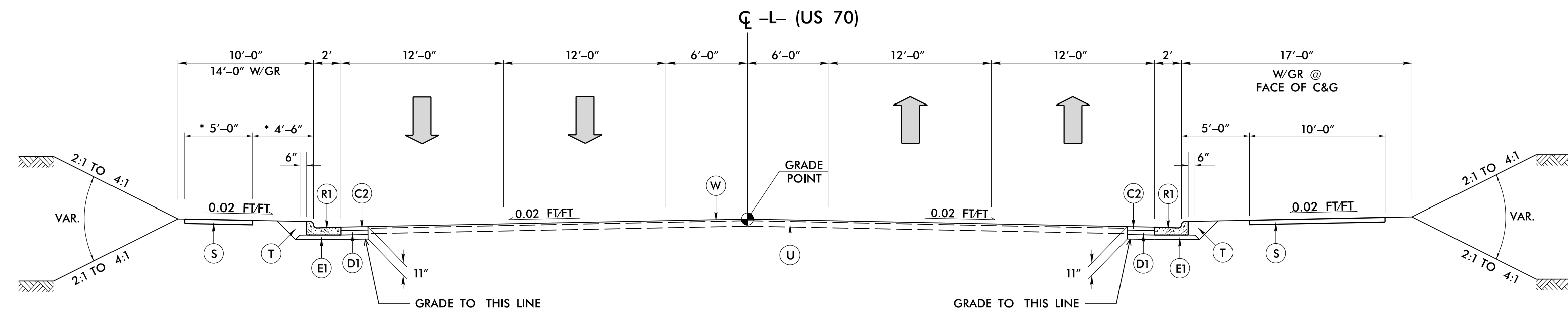
Gas Valve	◇
Gas Meter	⊕
U/G Gas Line LOS B (S.U.E.*)	--- G ---
U/G Gas Line LOS C (S.U.E.*)	--- G ---
U/G Gas Line LOS D (S.U.E.*)	--- G ---
Above Ground Gas Line	--- A/G Gas ---

### SANITARY SEWER:

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

### MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	⊠
Utility Unknown U/G Line LOS B (S.U.E.*)	--- 20UL ---
U/G Tank; Water, Gas, Oil	□
Underground Storage Tank, Approx. Loc.	⊕
A/G Tank; Water, Gas, Oil	□
Geoenvironmental Boring	⊕
U/G Test Hole LOS A (S.U.E.*)	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.



**ROADWAY TYPICAL SECTION NO. 1**

**USE TYPICAL SECTION NO. 1:**

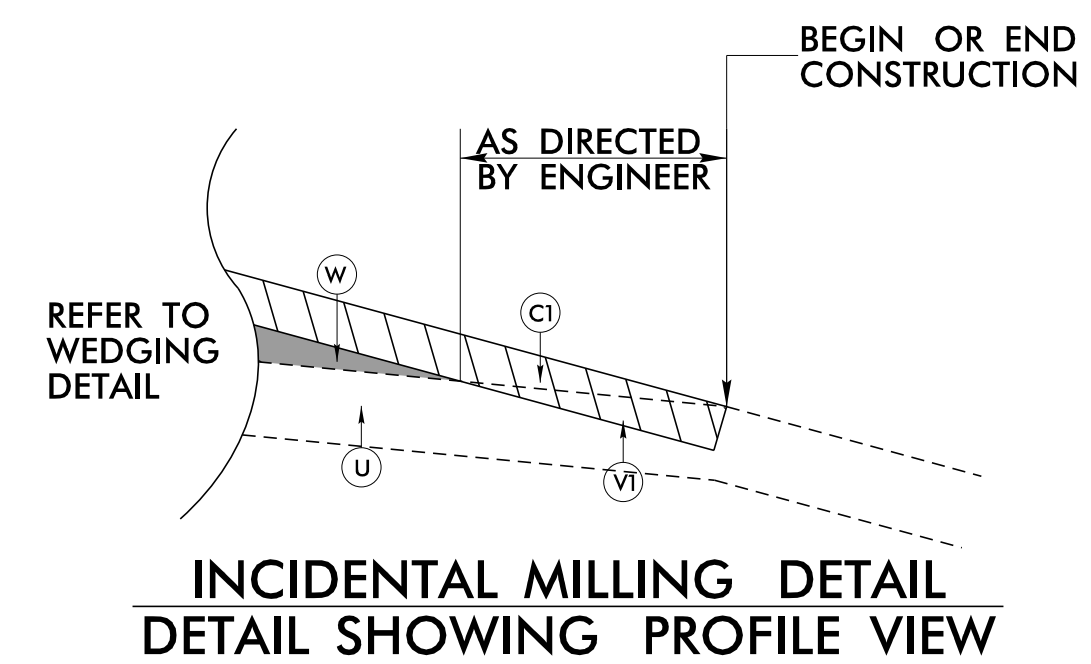
- L- STA 13+00.00 TO 20+47.70 (BEGIN BRIDGE)
- L- STA 23+14.20 (END BRIDGE) TO 35+50.00

**TRANSITION FROM TYPICAL SECTION NO. 1 TO EXISTING:**

- L- STA 35+50.00 TO 36+00.00

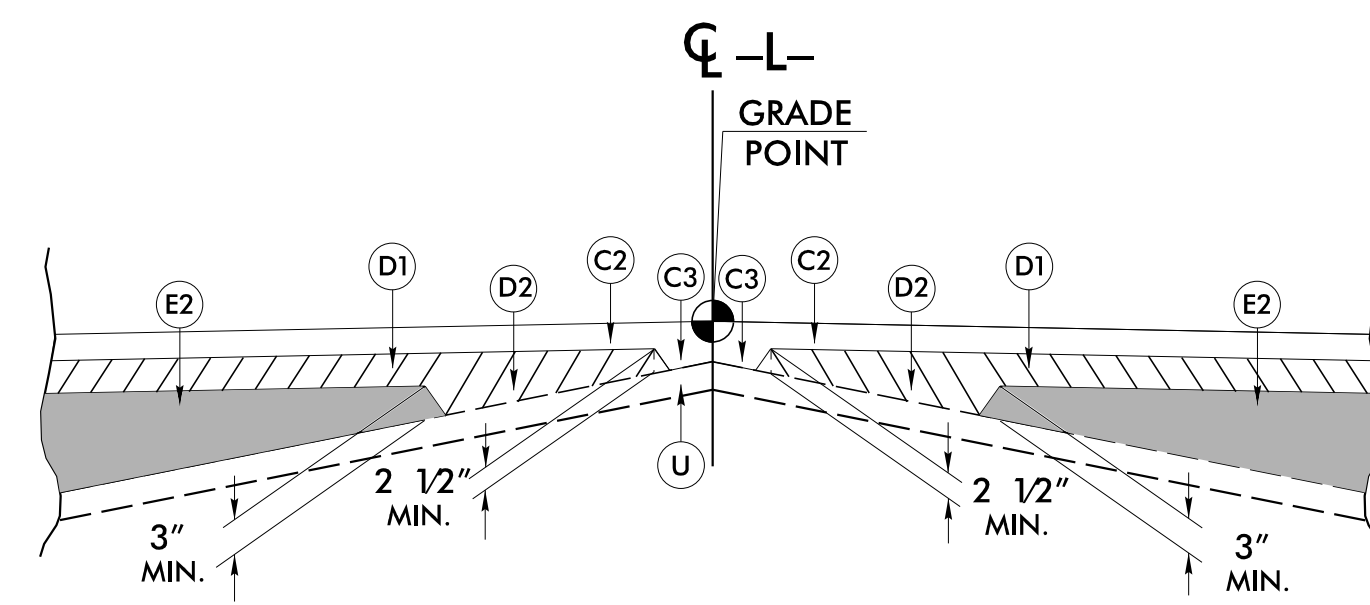
\* SIDEWALK: -L- STA 29+55 TO 36+00 LT

\*NOTE: -L TEMP1- & -L TEMP2- GRADES UTILIZE THE MAINLINE WEDGING PAVEMENT DESIGN.

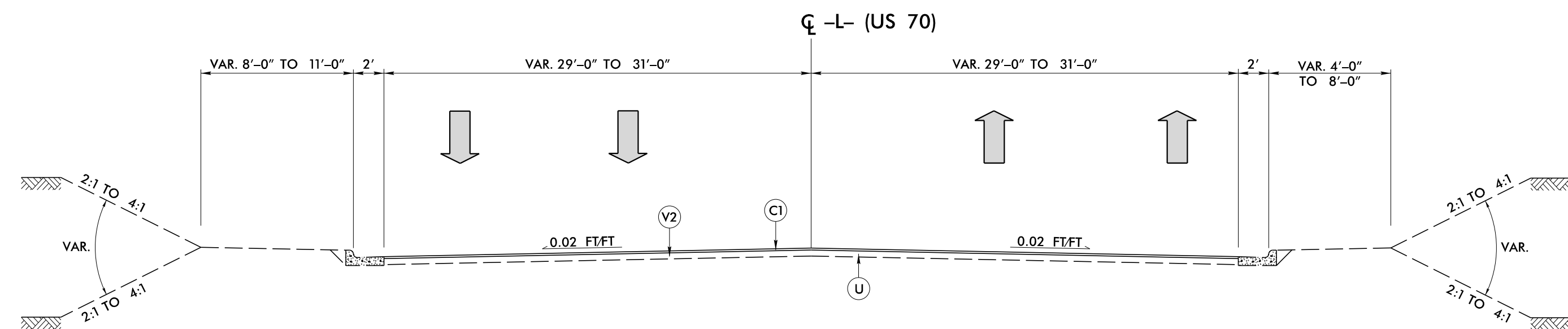


**INCIDENTAL MILLING DETAIL  
DETAIL SHOWING PROFILE VIEW**

- L- STA 12+50.00 TO 13+00.00
- L- STA 35+50.00 TO 36+00.00



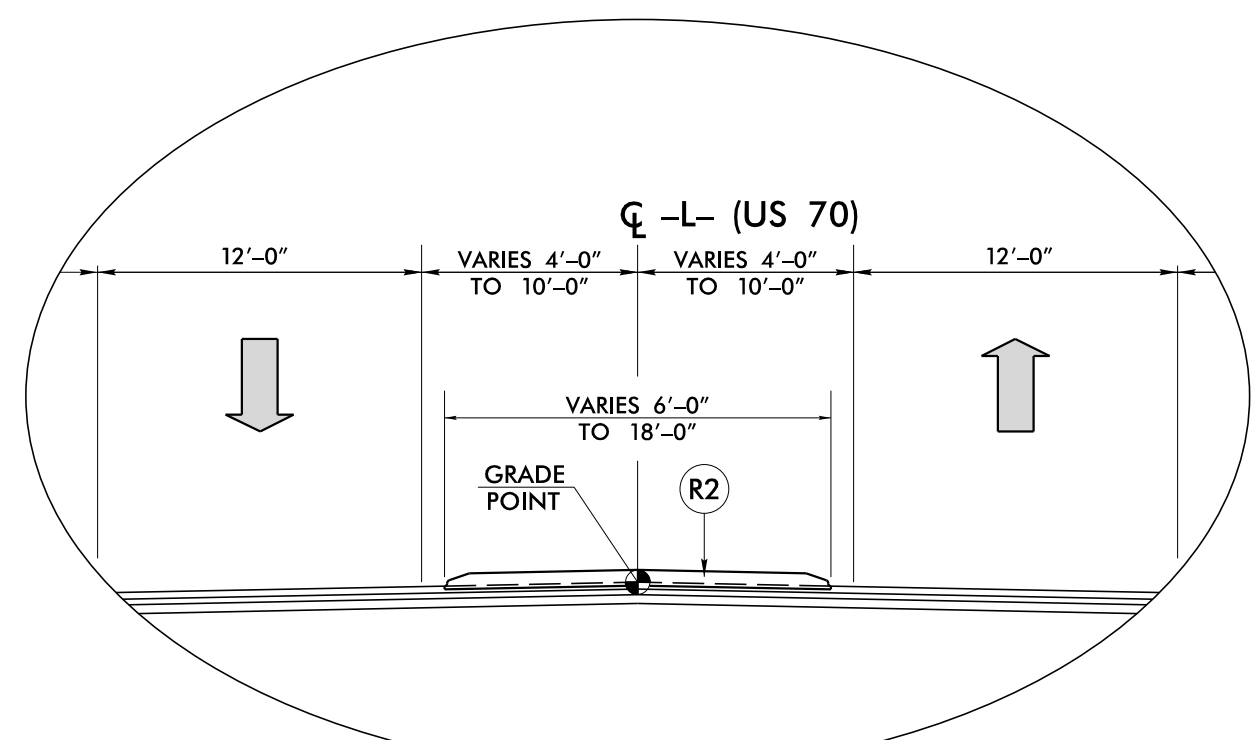
**Detail Showing Method of Wedging**



**ROADWAY TYPICAL SECTION NO. 2**

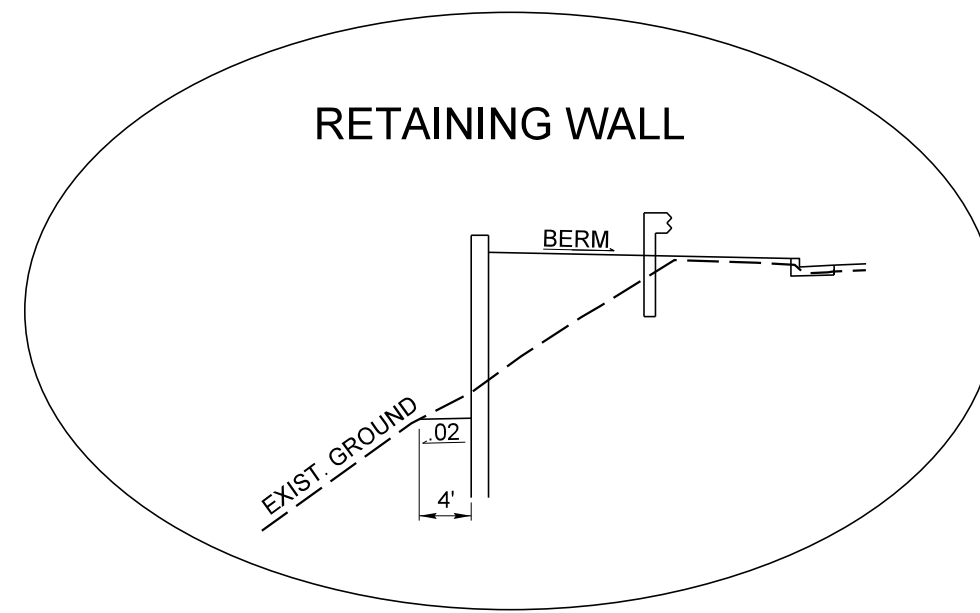
**USE TYPICAL SECTION NO. 2:**

- L- STA 10+00.00 TO 12+50.00



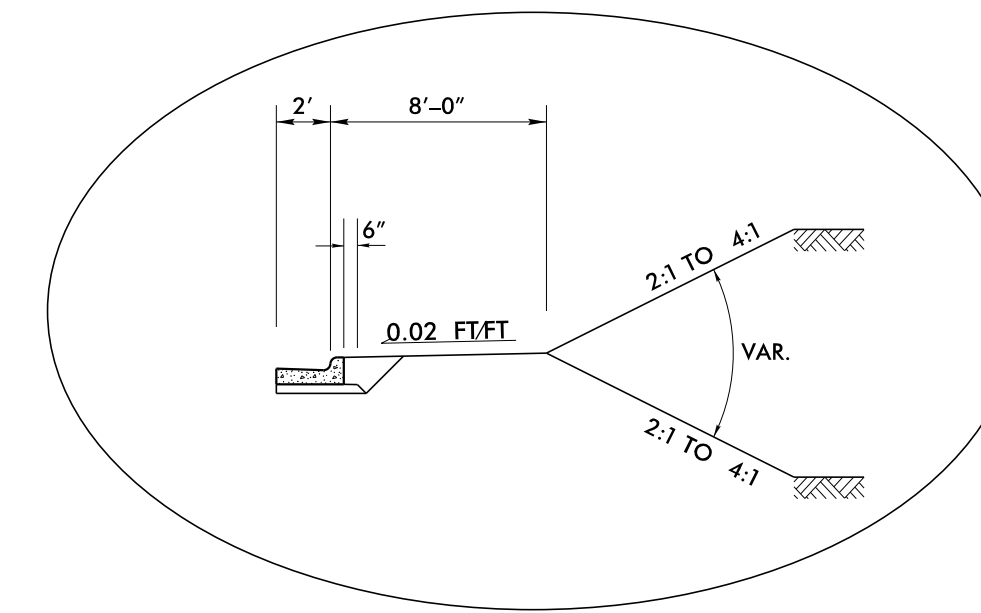
**DETAIL A**

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1  
-L- STA 23+50.00+/- TO 28+67.00+/- CL



**DETAIL B**

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1  
-L- STA 12+50.00 TO 16+61.72 (LT)



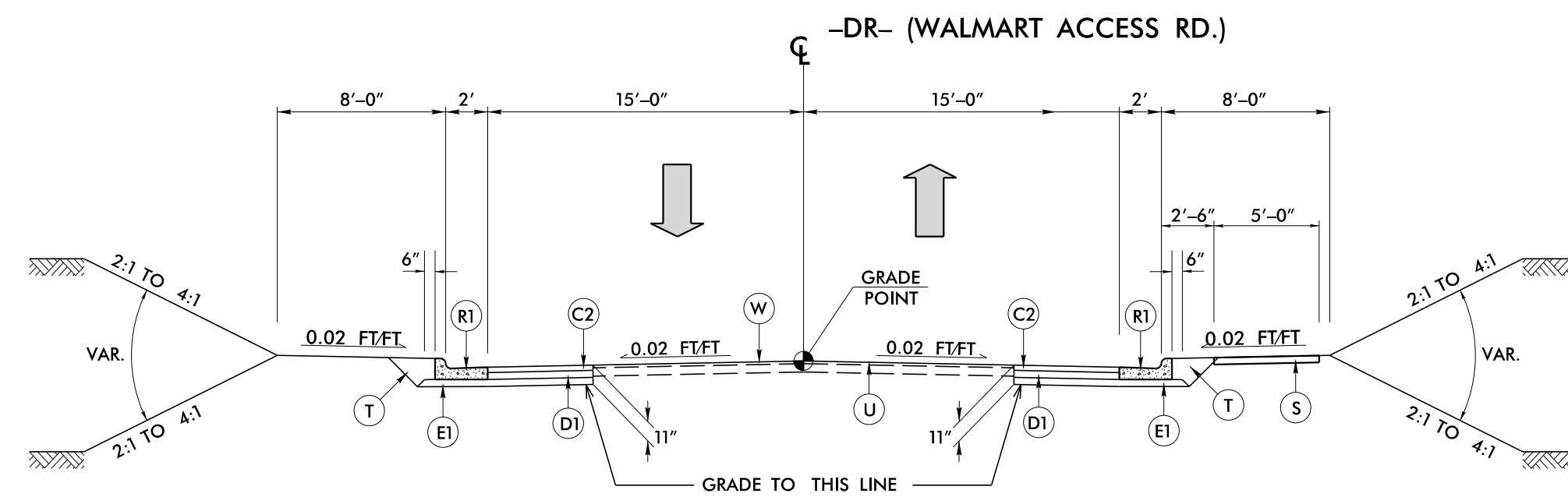
**DETAIL C**

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1  
-L- STA 12+50.00 TO 14+22.00 (RT)

FINAL PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	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
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, 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 BINDER COURSE. TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE BINDER 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. 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.
J	PROP. 8" AGGREGATE BASE COURSE
P	PRIME COAT AT THE RATE OF .35 GAL PER SQ YARD
R1	2'-6" CONCRETE CURB AND GUTTER
R2	5" MONOLITHIC CONCRETE ISLAND (KEYED IN)
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	INCIDENTAL MILLING
V2	1 1/2" MILLING
W	WEDGING (SEE DETAIL SHOWING METHOD OF WEDGING ON THIS SHEET.)

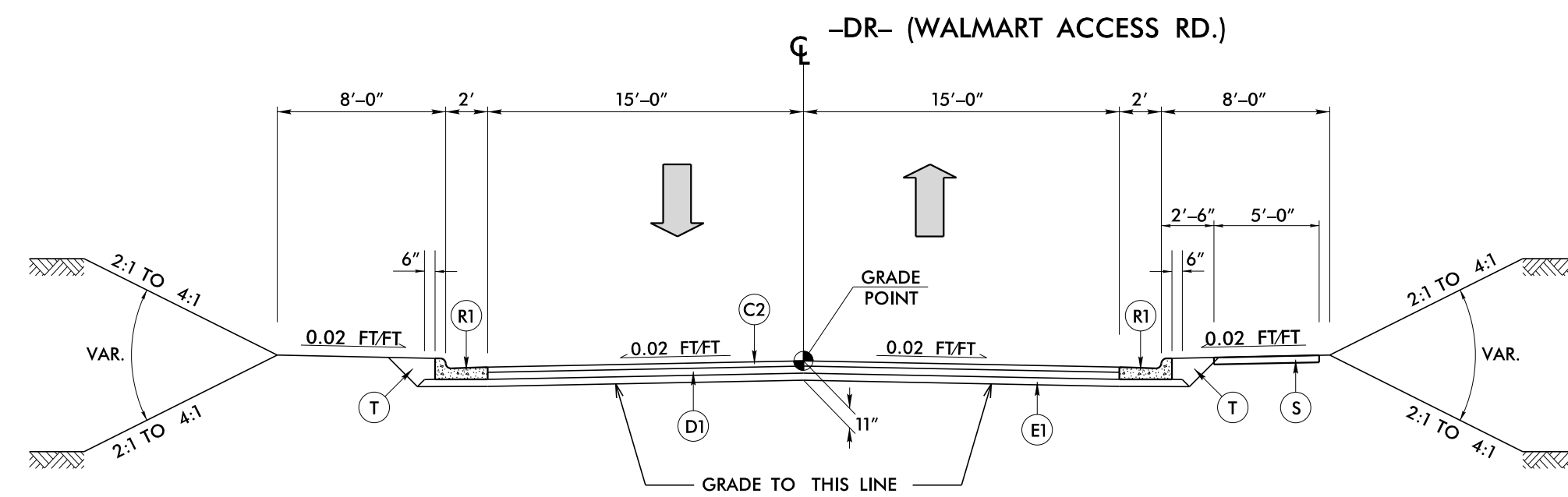
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.





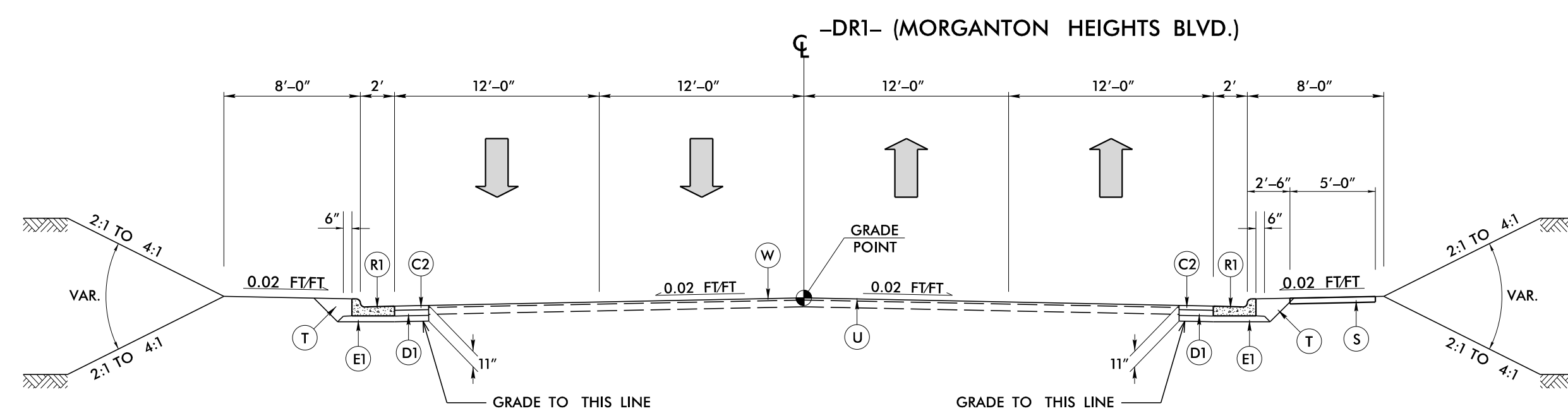
**ROADWAY TYPICAL SECTION NO. 3**

**USE TYPICAL SECTION NO. 3:**  
-DR- STA 12+98.00 TO 14+00.00



**ROADWAY TYPICAL SECTION NO. 4**

**USE TYPICAL SECTION NO. 4:**  
-DR- STA 10+30.35 TO 12+98.00



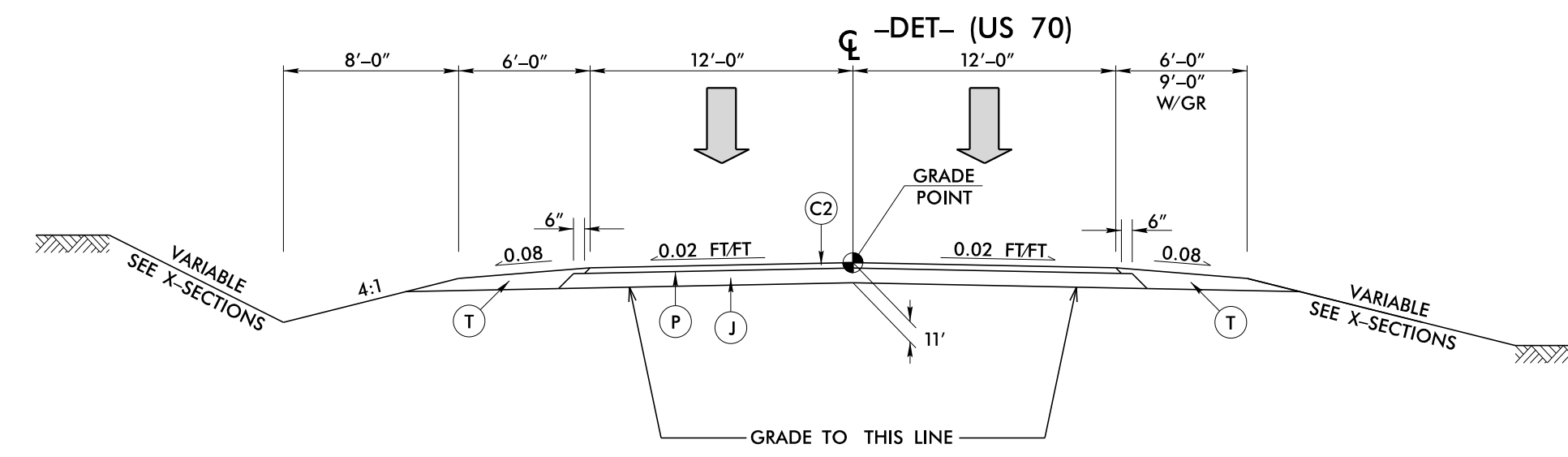
**ROADWAY TYPICAL SECTION NO. 5**

**USE TYPICAL SECTION NO. 5:**  
-DR1- STA 10+48.02 TO 13+00.00

PAVEMENT SCHEDULE	
C1	1.5" S9.5B
C2	3" S9.5B
C3	VAR. DEPTH S9.5B
D1	4" I19.0C
D2	VAR. DEPTH I19.0C
E1	4" B25.0C
E2	VAR. DEPTH B25.0C
J	8" AGGREGATE BASE COURSE
P	PRIME COAT
R1	2'-6" CURB AND GUTTER
R2	MONOLITHIC CONCRETE ISLAND (KEYED IN)
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	INCIDENTAL MILLING
V2	1 1/2" MILLING
W	WEDGING

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

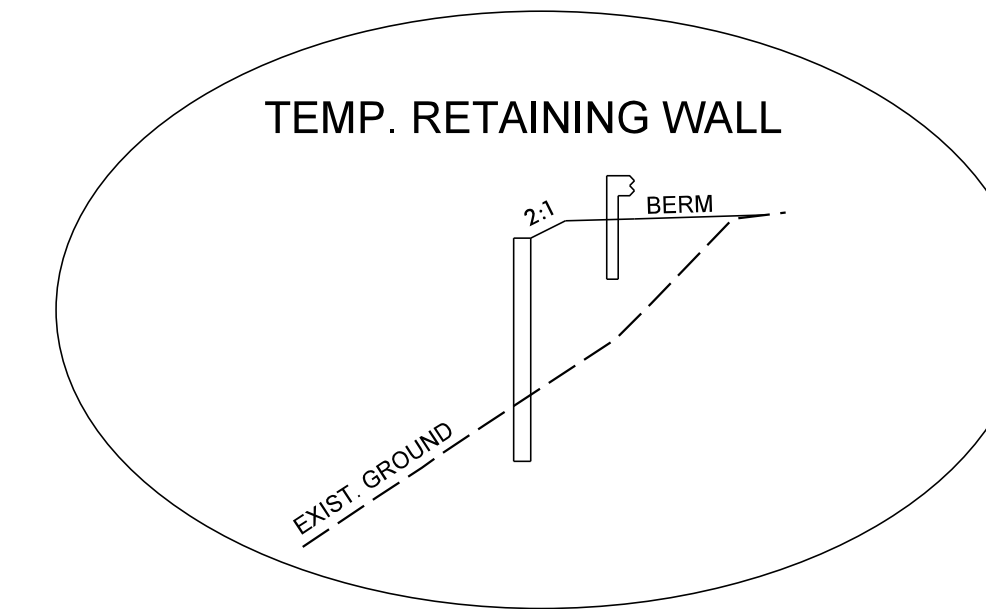
PROJECT REFERENCE NO. B-5869	SHEET NO. 2A-3
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
MOTT MACDONALD I & E, LLC LICENSE NO. F-0669	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared in the Office of:	MOTT MACDONALD 7621 Purfoy Rd., Suite 115 Fuquay-Varina, NC 27526 www.mottmac.com/americas LICENSE NO. F-0669



**ROADWAY TYPICAL SECTION NO. 6**

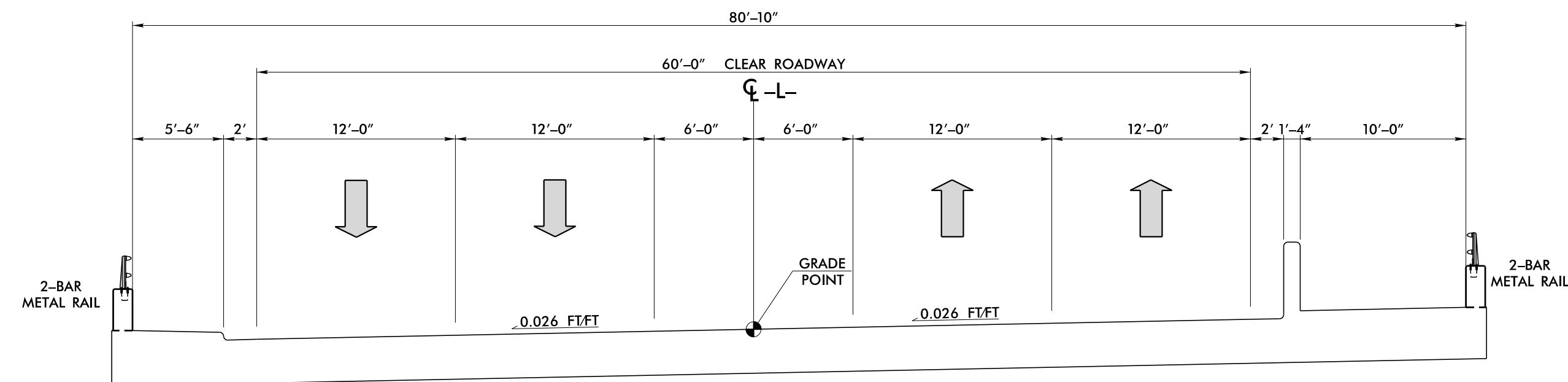
**USE TYPICAL SECTION NO. 6:**

-DET- STA 12+17.72 TO 16+55.00 +/- (BEGIN BRIDGE)  
-DET- STA 18+72.00 +/- (END BRIDGE) TO 21+34.84



**DETAIL D**

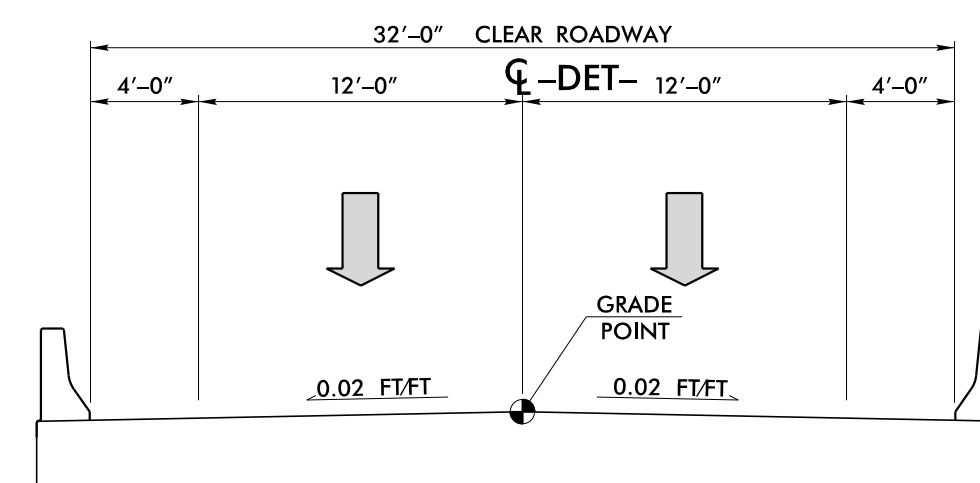
USE IN CONJUNCTION WITH TYPICAL SECTION NO. 6  
-DET- STA. 10+76.72 TO 17+28.00



**ROADWAY TYPICAL SECTION NO. 7**

**USE TYPICAL SECTION NO. 7:**

-L- STA 20+47.70 (BEGIN BRIDGE) TO 23+14.20 (END BRIDGE)



**ROADWAY TYPICAL SECTION NO. 8**

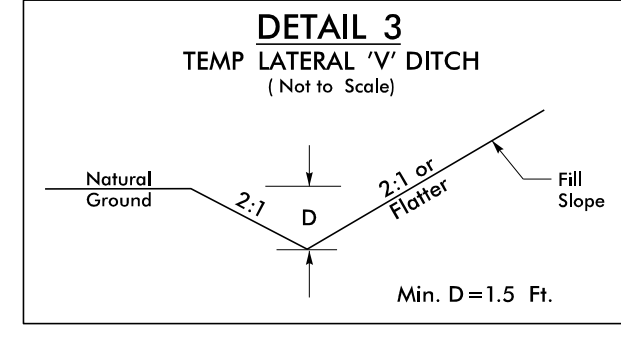
**USE TYPICAL SECTION NO. 8:**

-DET- STA 16+55.00 +/- (BEGIN BRIDGE) TO 18+72.00 +/- (END BRIDGE)

PAVEMENT SCHEDULE	
C1	1.5" S9.5B
C2	3" S9.5B
C3	VAR. DEPTH S9.5B
D1	4" I19.0C
D2	VAR. DEPTH I19.0C
E1	4" B25.0C
E2	VAR. DEPTH B25.0C
J	8" AGGREGATE BASE COURSE
P	PRIME COAT
R1	2'-6" CURB AND GUTTER
R2	MONOLITHIC CONCRETE ISLAND (KEYED IN)
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	INCIDENTAL MILLING
V2	1 1/2" MILLING
W	WEDGING

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

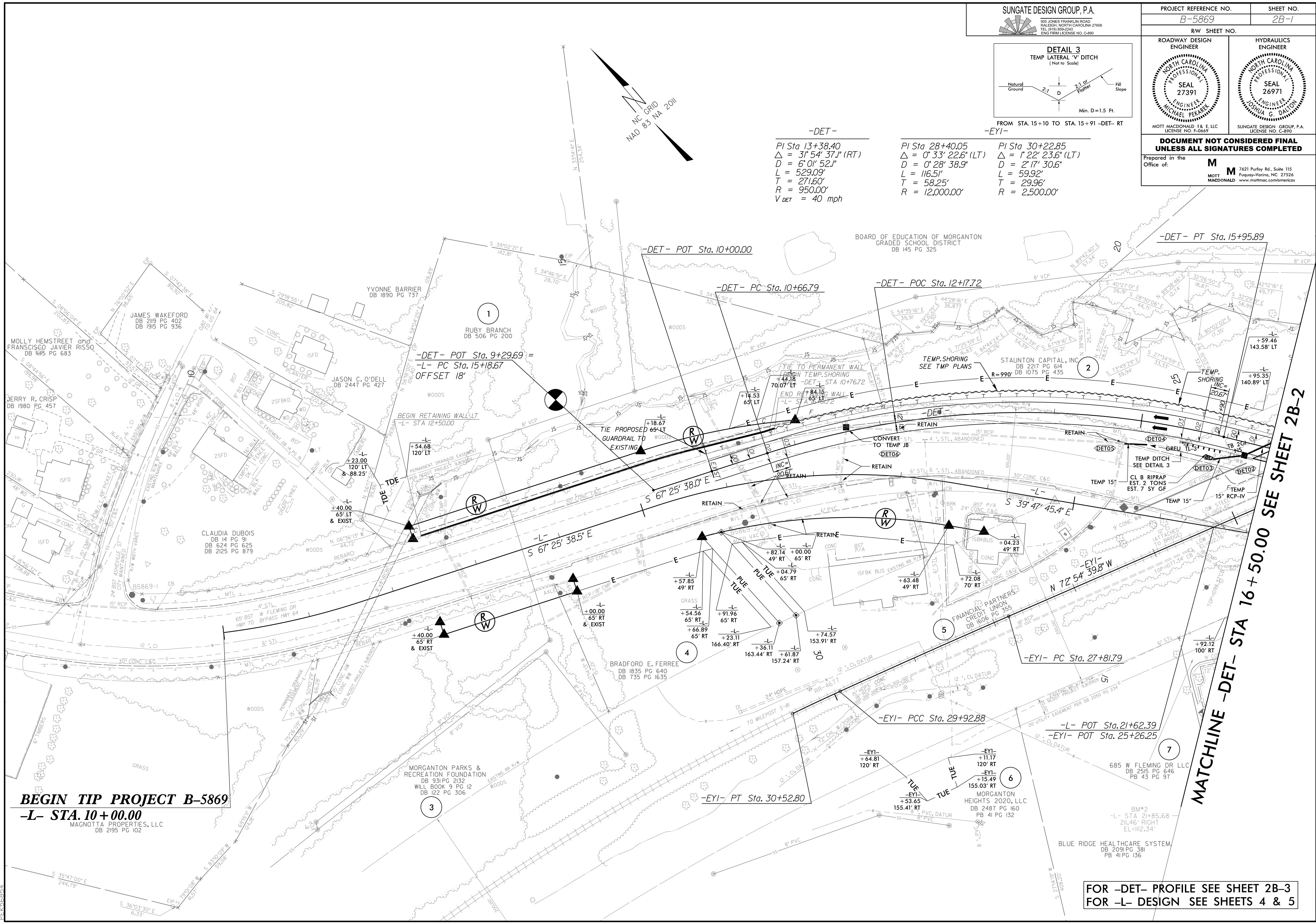
Roadway Design Engineer: **Michael Peakes**, Seal 27391  
 Hydraulics Engineer: **Cynthia G. Dalton**, Seal 26971  
 MOTT MACDONALD 18 E. LLC License No. F-06697  
 SUNGATE DESIGN GROUP, P.A. License No. C-890



Station Range	PI Sta	Delta	D	L	T	R
-DET- RT	13+38.40	3' 54" 37.1" (RT)	6' 0" 52.1"	529.09'	271.60'	950.00'
-EYI-	28+40.05	0' 33" 22.6" (LT)	0' 28" 38.9"	116.51'	58.25'	12,000.00'
-DET- RT	30+22.85	1' 22" 23.6" (LT)	2' 17" 30.6"	59.92'	29.96'	2,500.00'

$V_{DET} = 40$  mph

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**  
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 7621 Purfoy Rd., Suite 115  
 Fuquay-Varina, NC 27526  
 www.mottmac.com/metcos



**BEGIN TIP PROJECT B-5869**  
**-L- STA. 10+00.00**  
 MAGNOTTA PROPERTIES, LLC  
 DB 2195 PG 102

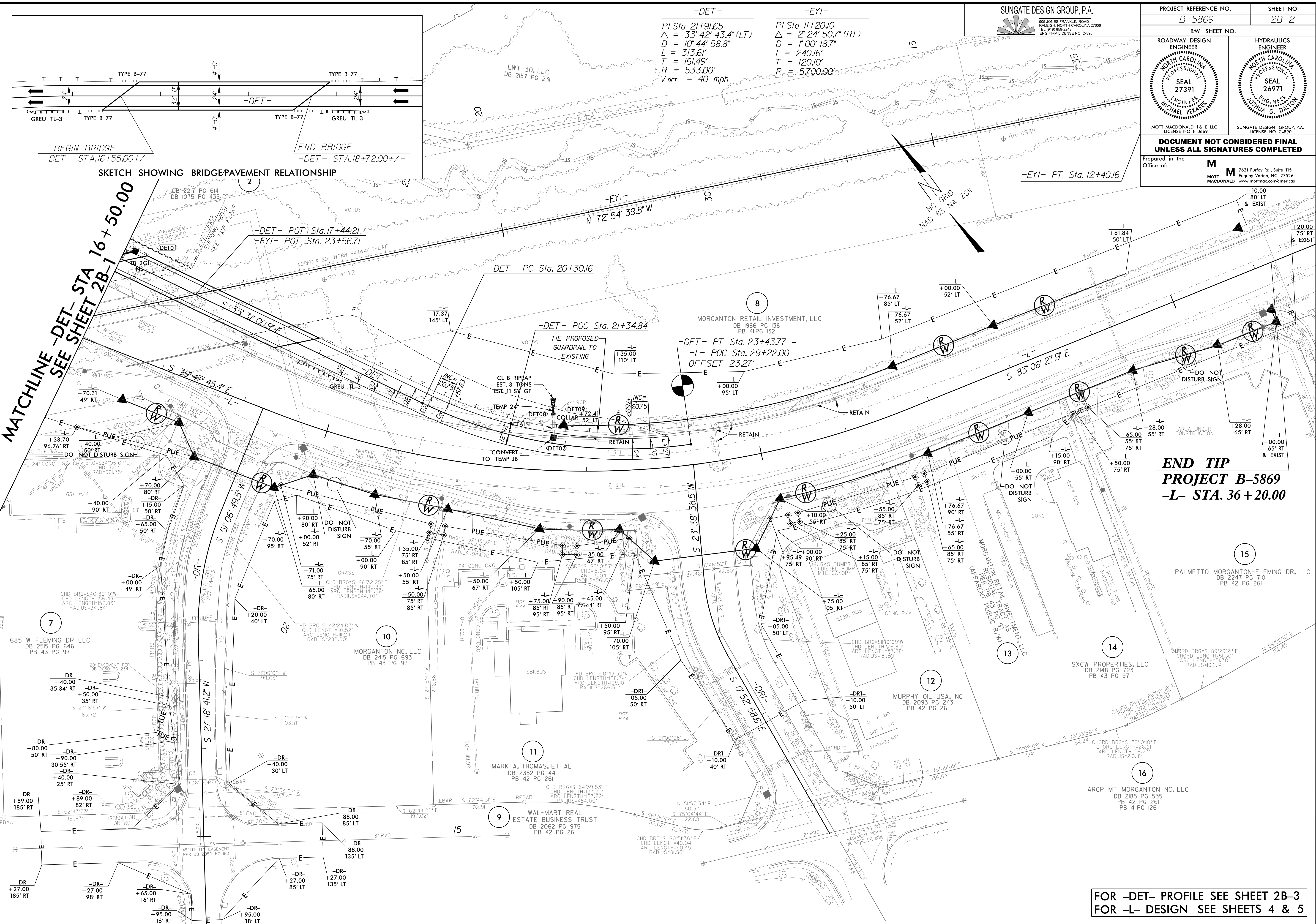
**MATCHLINE -DET- STA 16+50.00 SEE SHEET 2B-2**

**FOR -DET- PROFILE SEE SHEET 2B-3**  
**FOR -L- DESIGN SEE SHEETS 4 & 5**

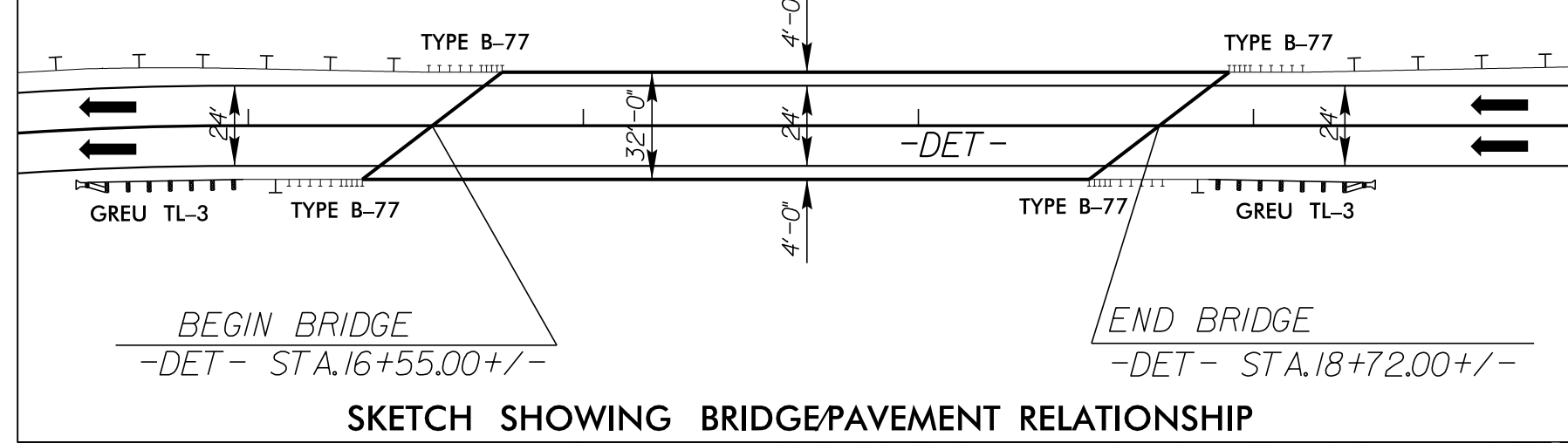
10:39:57 AM  
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 PFK56884



8/17/99  
10/30/17 AM  
C:\Roadway\Proj\B5869.rdw\_psh02B-2.dgn  
PK 56884



MATCHLINE -DET- STA. 16+50.00  
SEE SHEET 2B-1



-DET-  
PI Sta 21+91.65  
Δ = 33° 42' 43.4" (LT)  
D = 10° 44' 58.8"  
L = 313.6'  
T = 161.49'  
R = 533.00'  
V<sub>DET</sub> = 40 mph

-EYI-  
PI Sta 11+20.10  
Δ = 2° 24' 50.7" (RT)  
D = 1° 00' 18.7"  
L = 240.16'  
T = 120.10'  
R = 5700.00'

SUNGATE DESIGN GROUP, P.A.  
805 JONES FRANKLIN ROAD  
RALEIGH, NORTH CAROLINA 27608  
TEL (919) 885-2245  
ENG FIRM LICENSE NO. C-880

PROJECT REFERENCE NO. B-5869		SHEET NO. 2B-2	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		NORTH CAROLINA PROFESSIONAL SEAL 27391	
MOTT MACDONALD 1 & E, LLC LICENSE NO. E-0669		SUNGATE DESIGN GROUP, P.A. LICENSE NO. C-890	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
Prepared in the Office of:		MOTT MACDONALD 1 & E, LLC 7621 Purfoy Rd., Suite 115 Fuquay-Varina, NC 27526 www.mottmac.com/metcos	

END TIP  
PROJECT B-5869  
-L- STA. 36+20.00

FOR -DET- PROFILE SEE SHEET 2B-3  
FOR -L- DESIGN SEE SHEETS 4 & 5

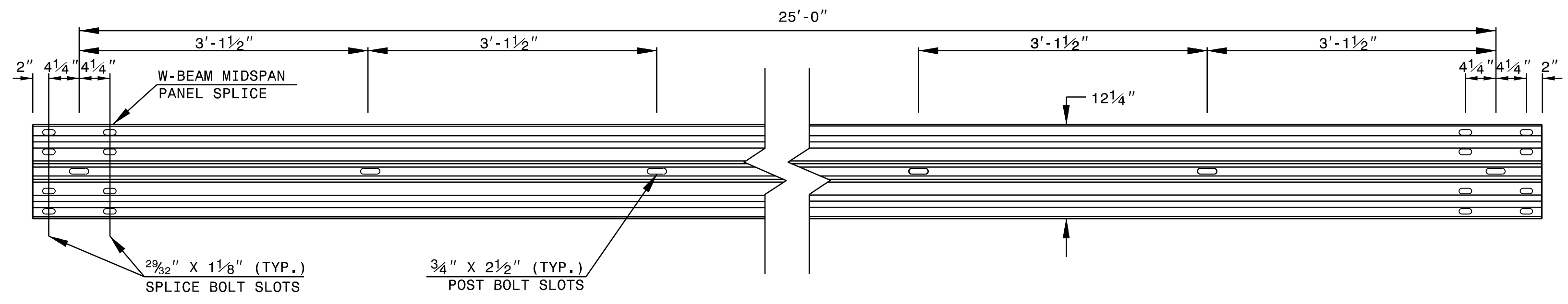




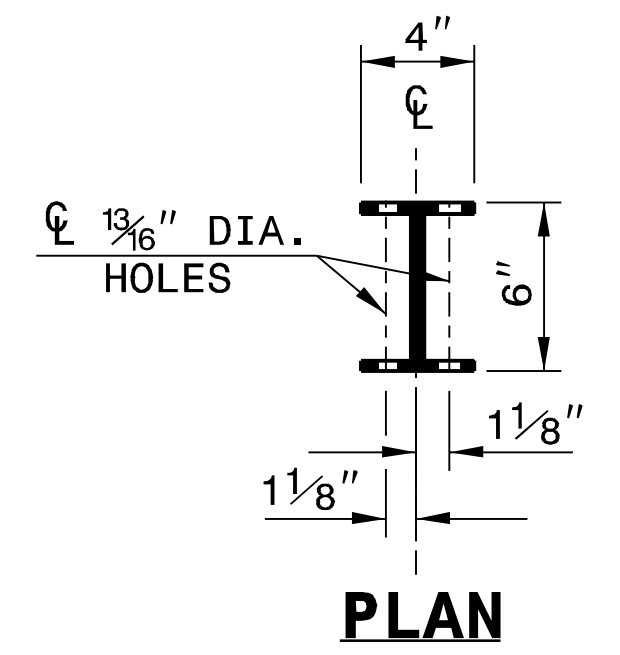
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

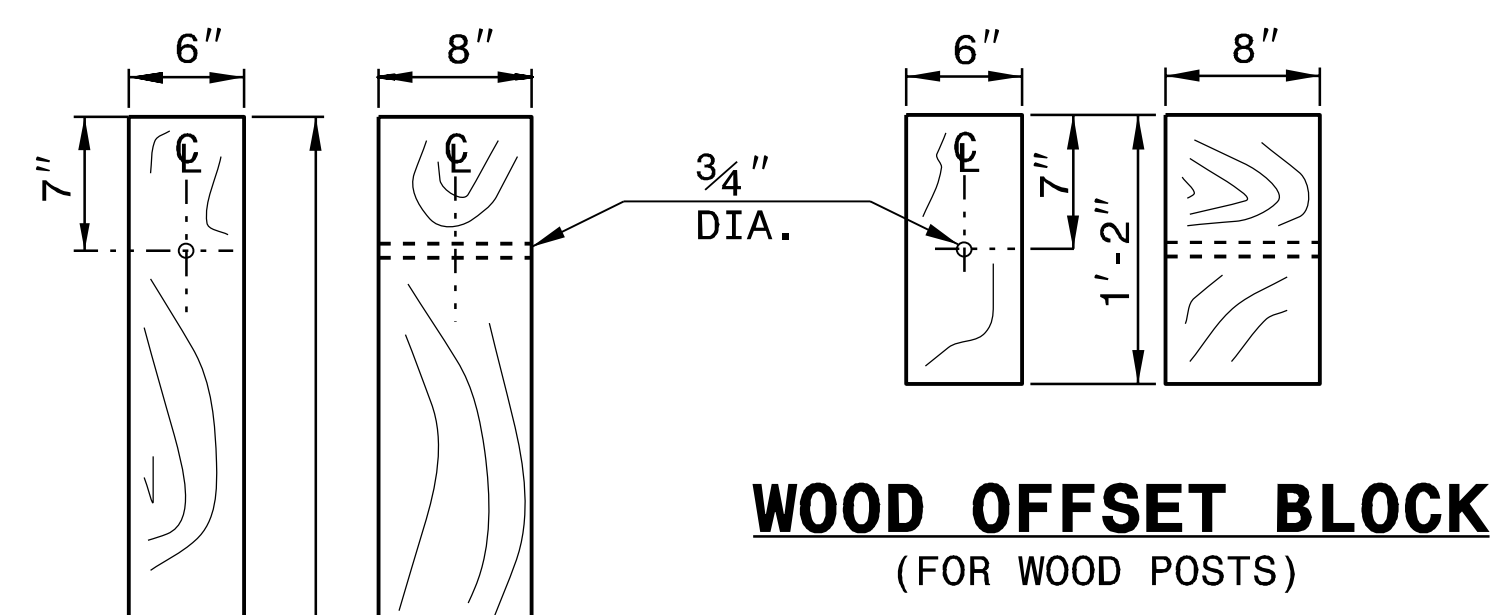
SHEET 6 OF 8  
**862D02**



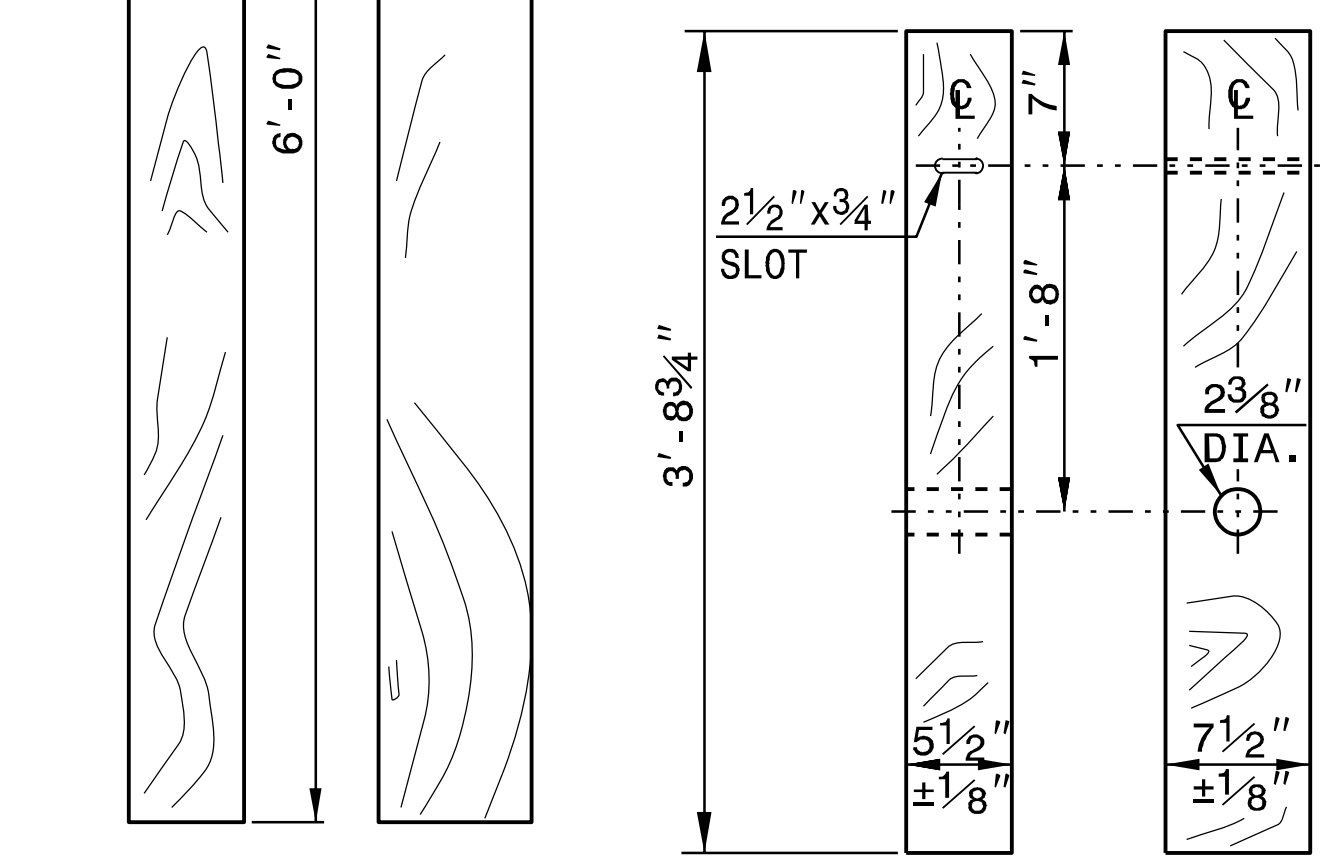
**STANDARD W-BEAM GUARDRAIL**



**PLAN**

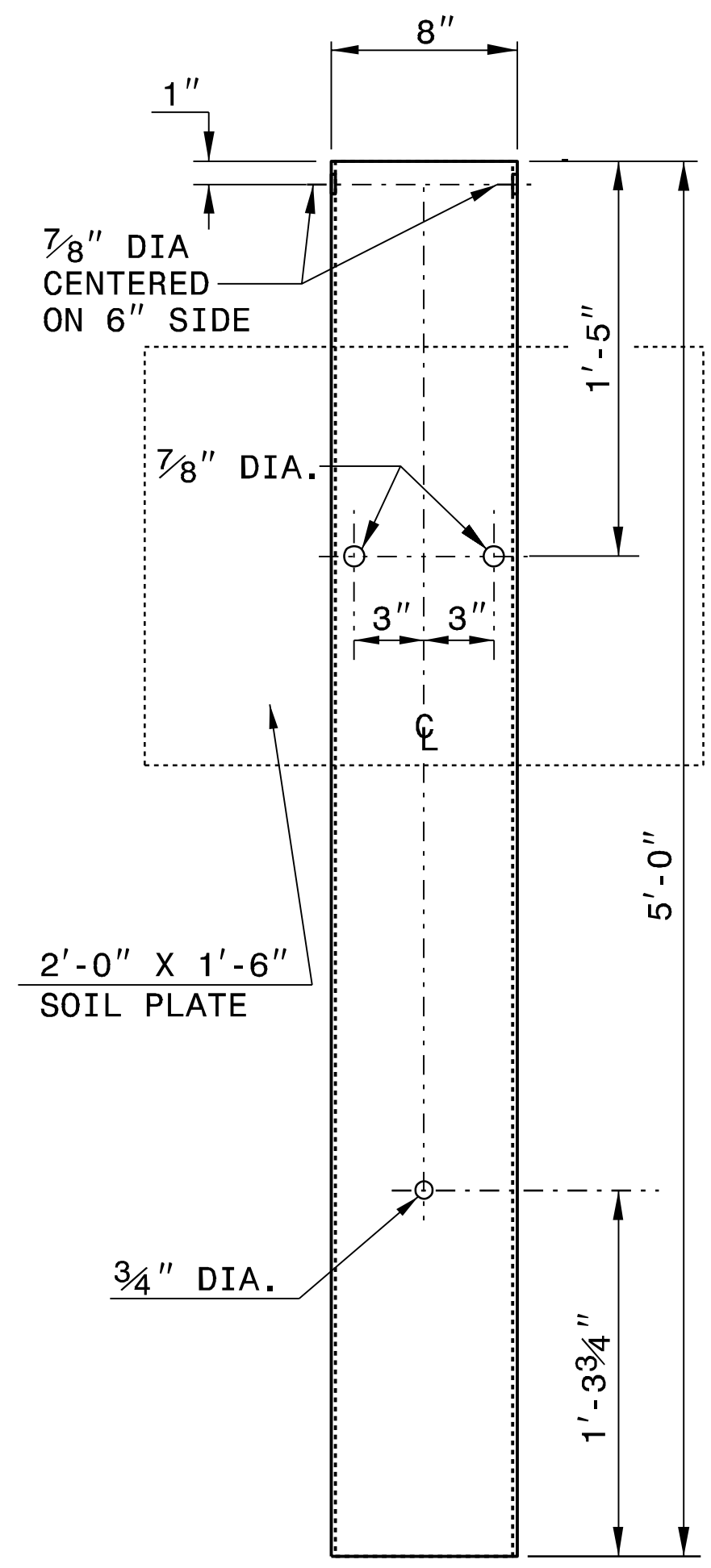


**WOOD OFFSET BLOCK  
(FOR WOOD POSTS)**

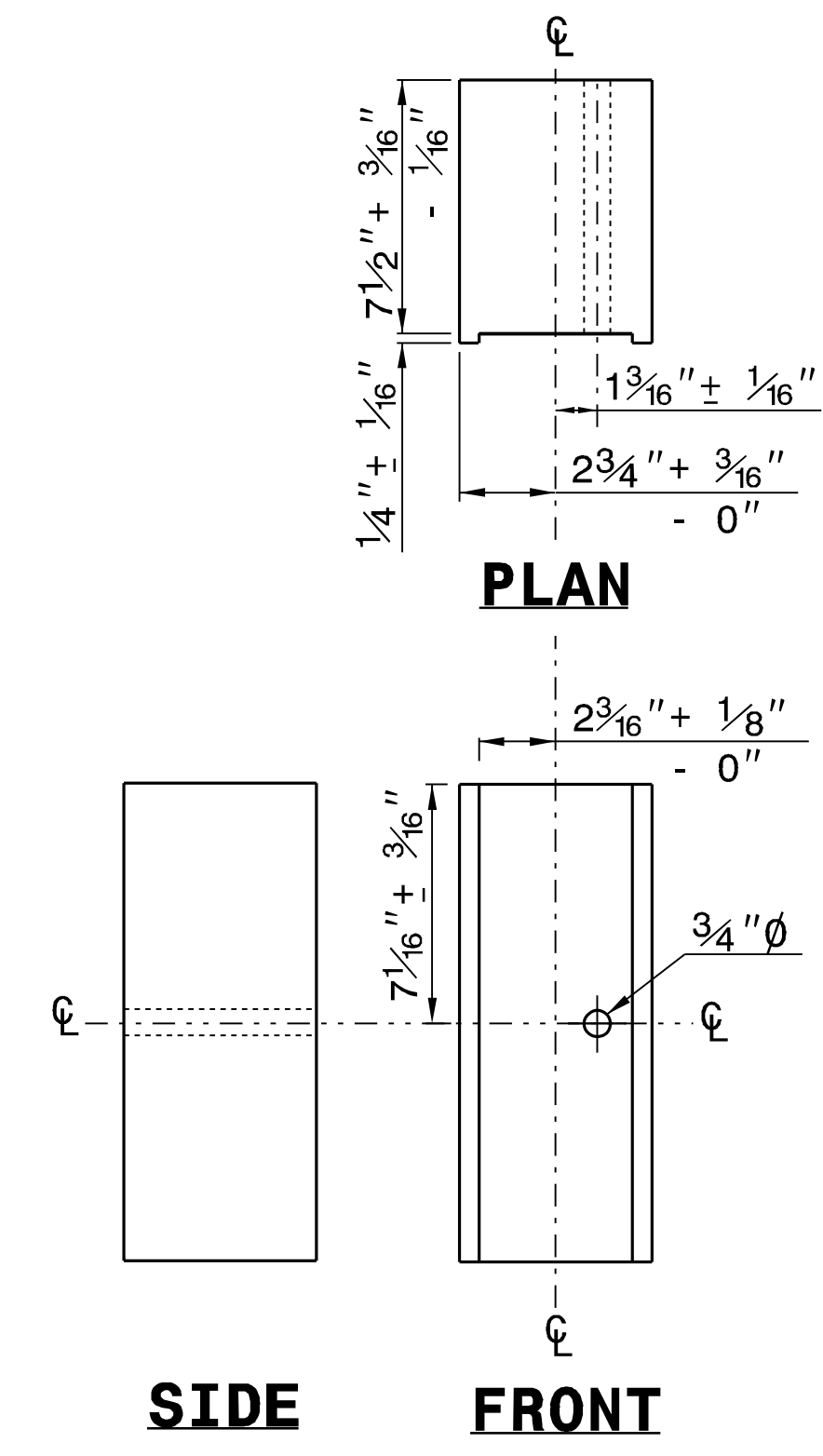


**STANDARD  
LINE POST**

**SHORT WOOD  
BREAKAWAY POST**



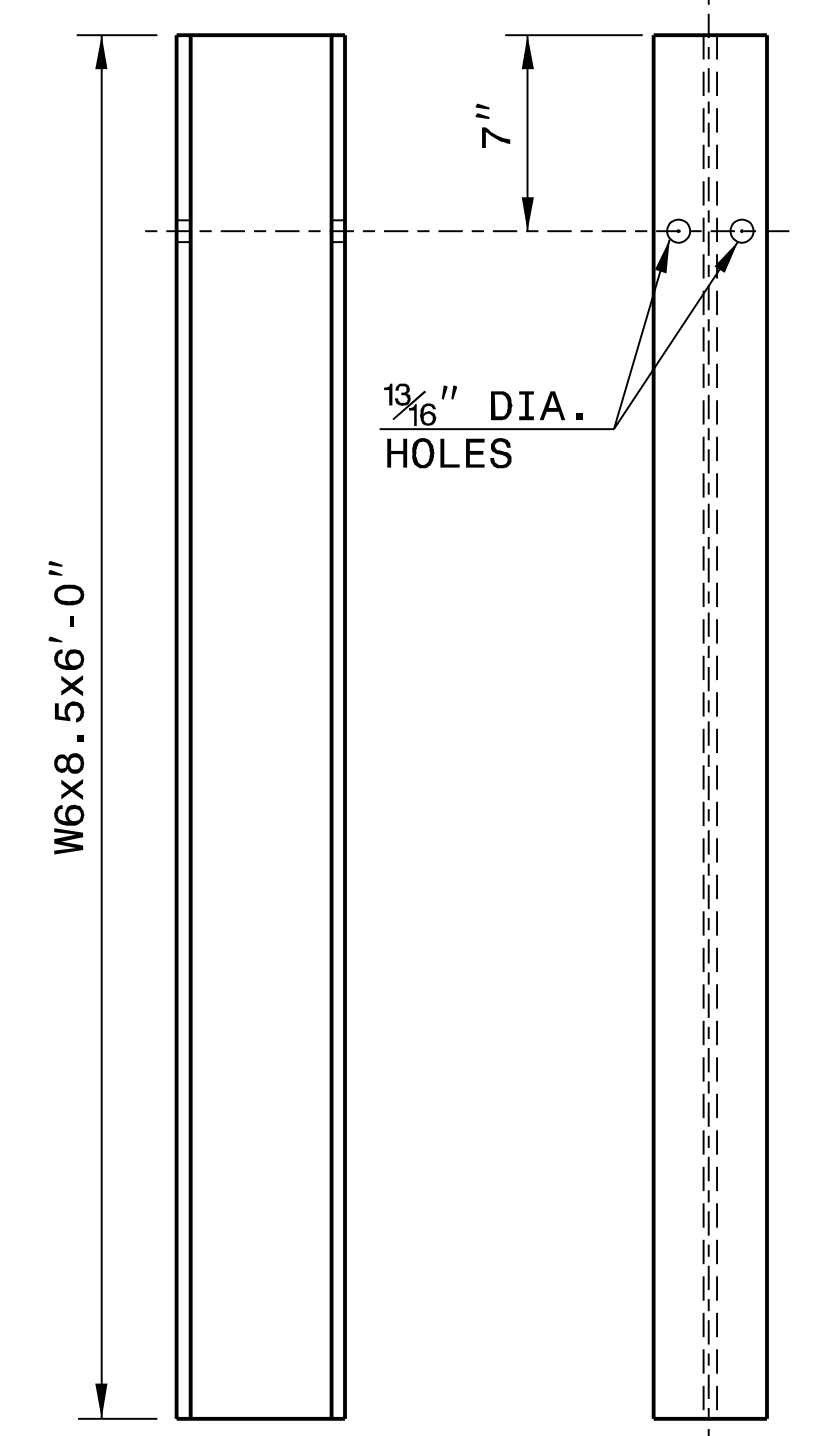
**STEEL TUBE  
TS 6"x8"x0.1875"**



**SIDE**

**FRONT**

**ROUTED  
OFFSET BLOCK**



**SIDE**

**FRONT**

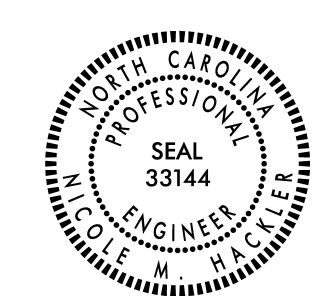
**"W6" STEEL POST**

**SYSTEM PARTS**

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

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 6 OF 8  
**862D02**



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

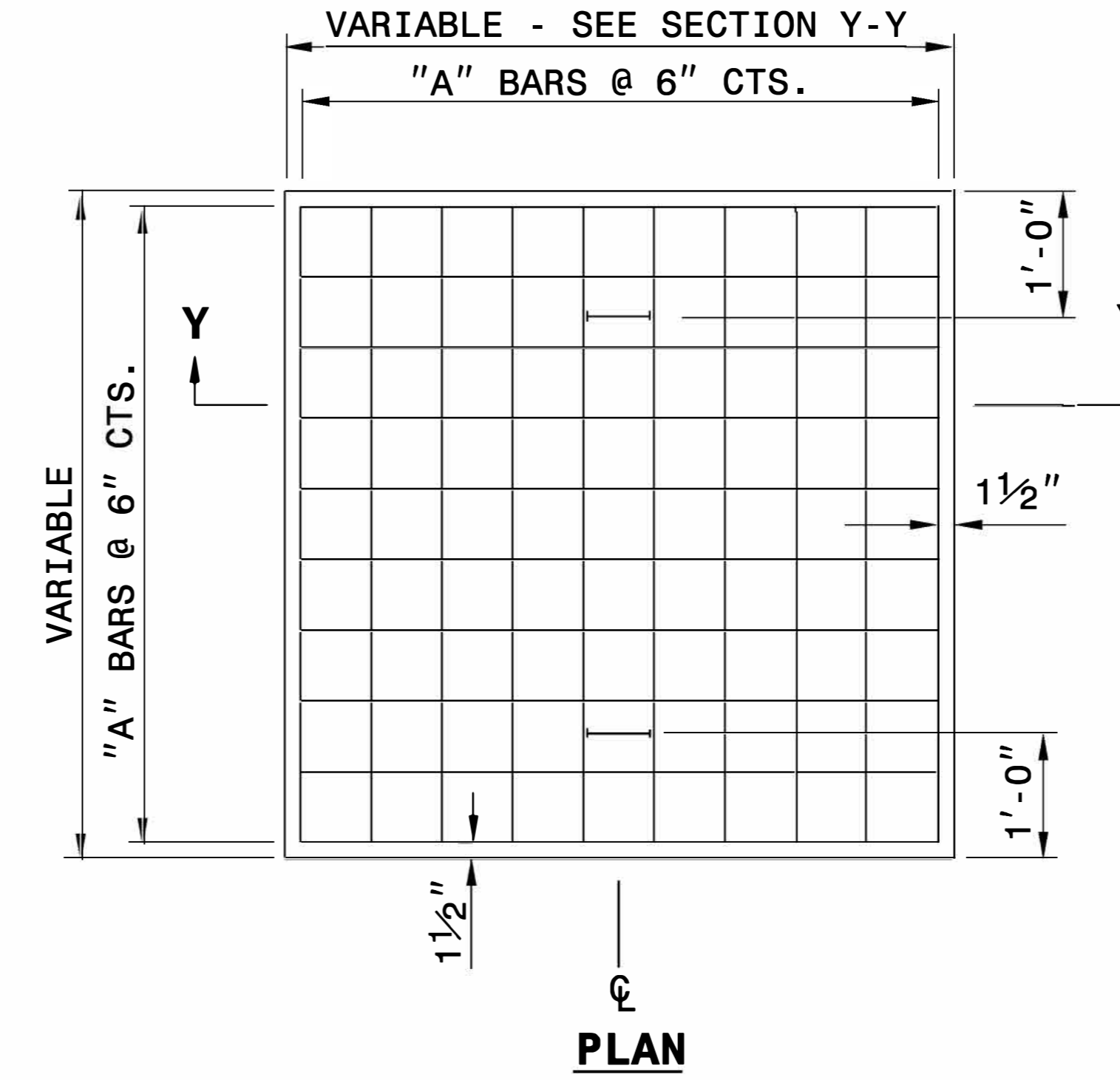
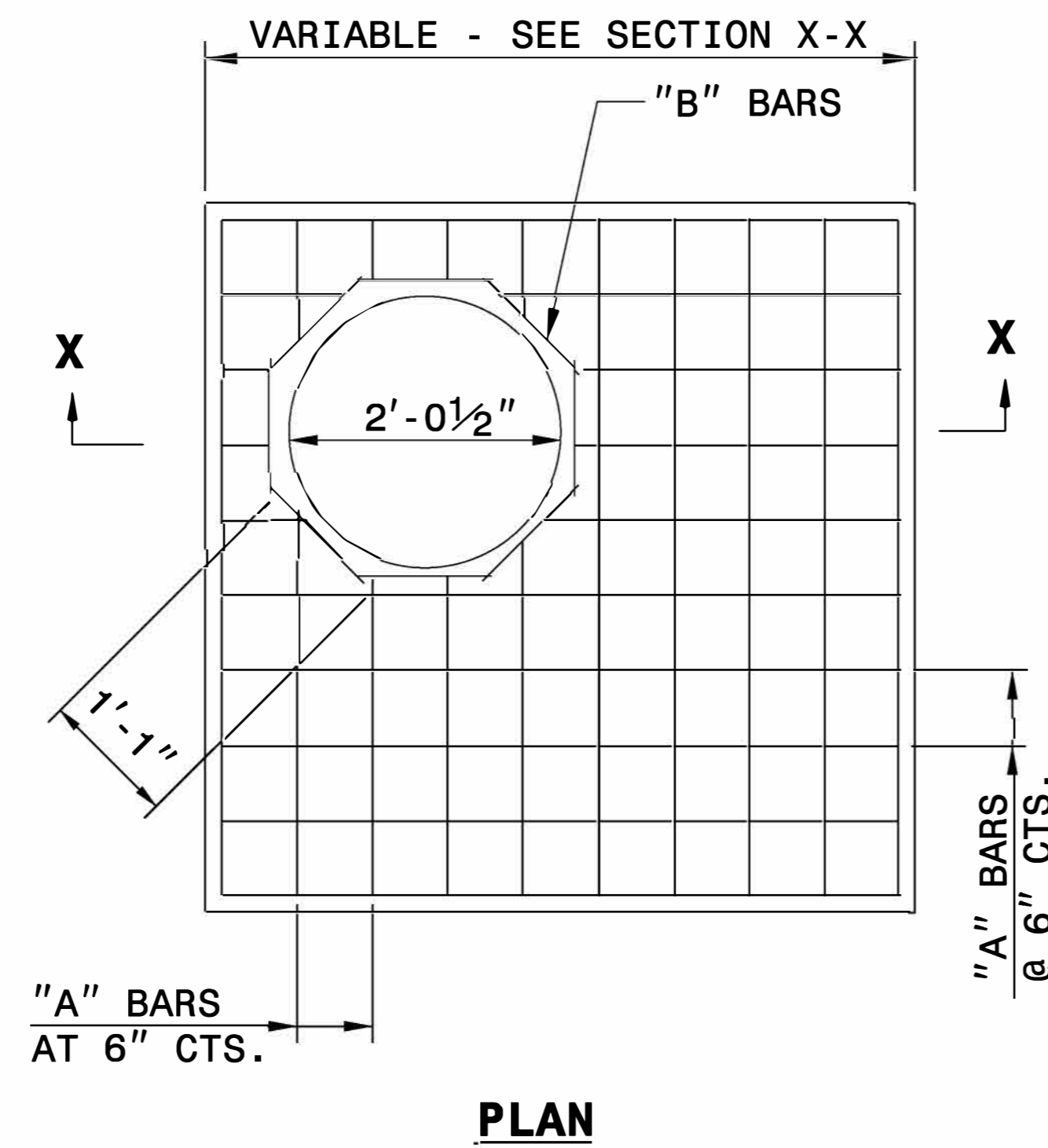
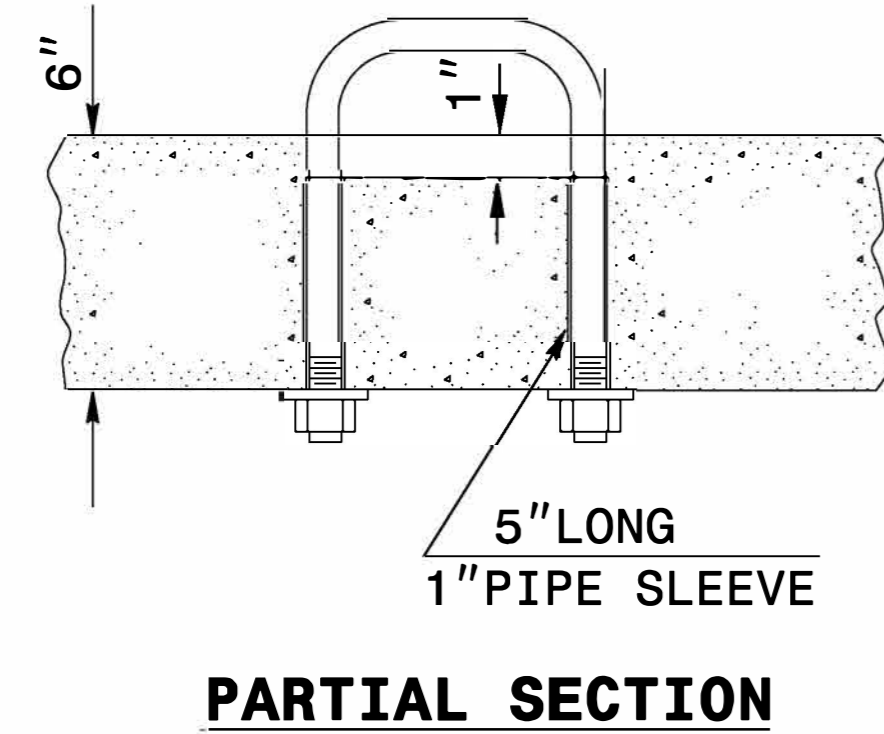
**SEE TITLE BLOCK**

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









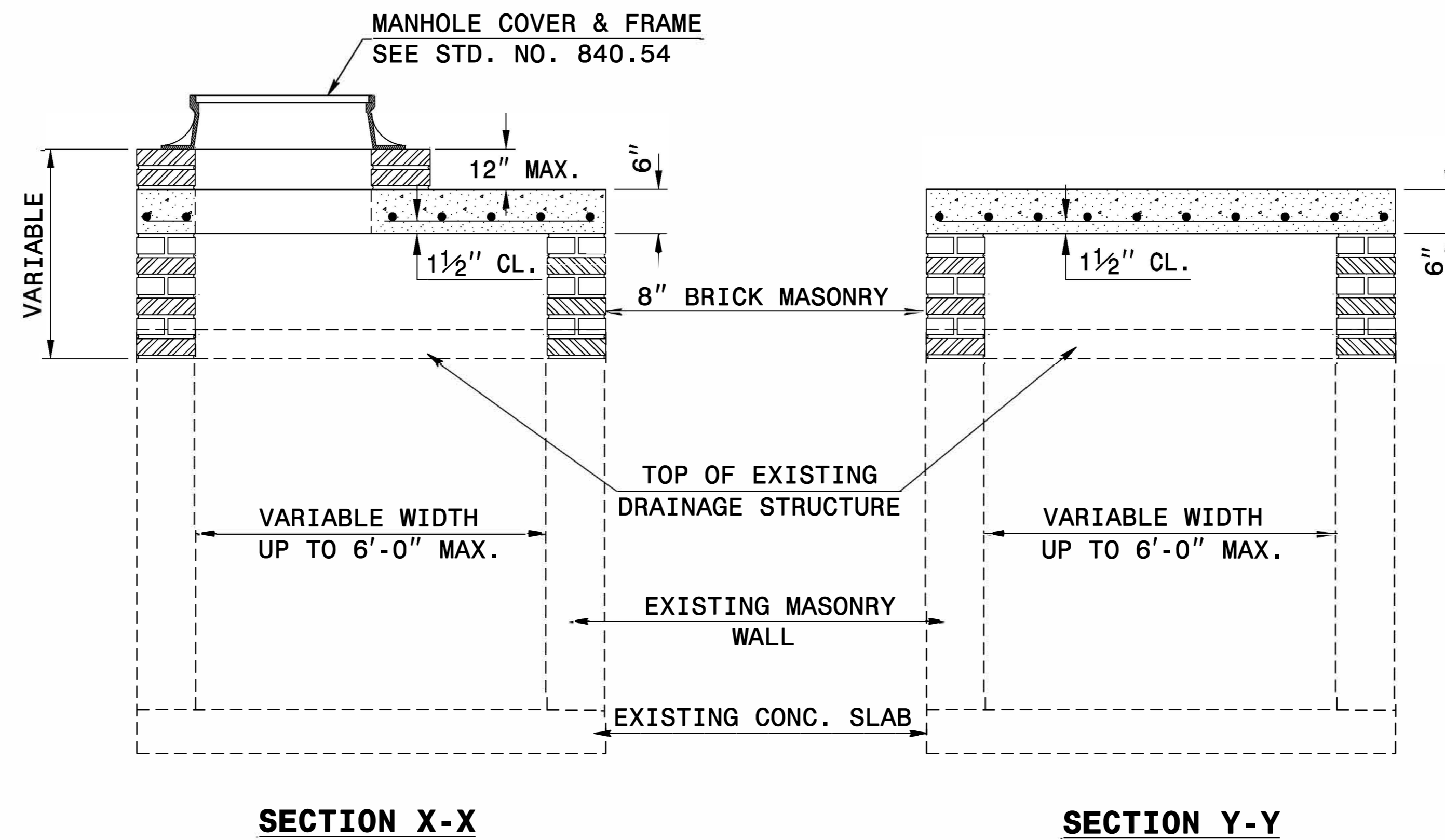
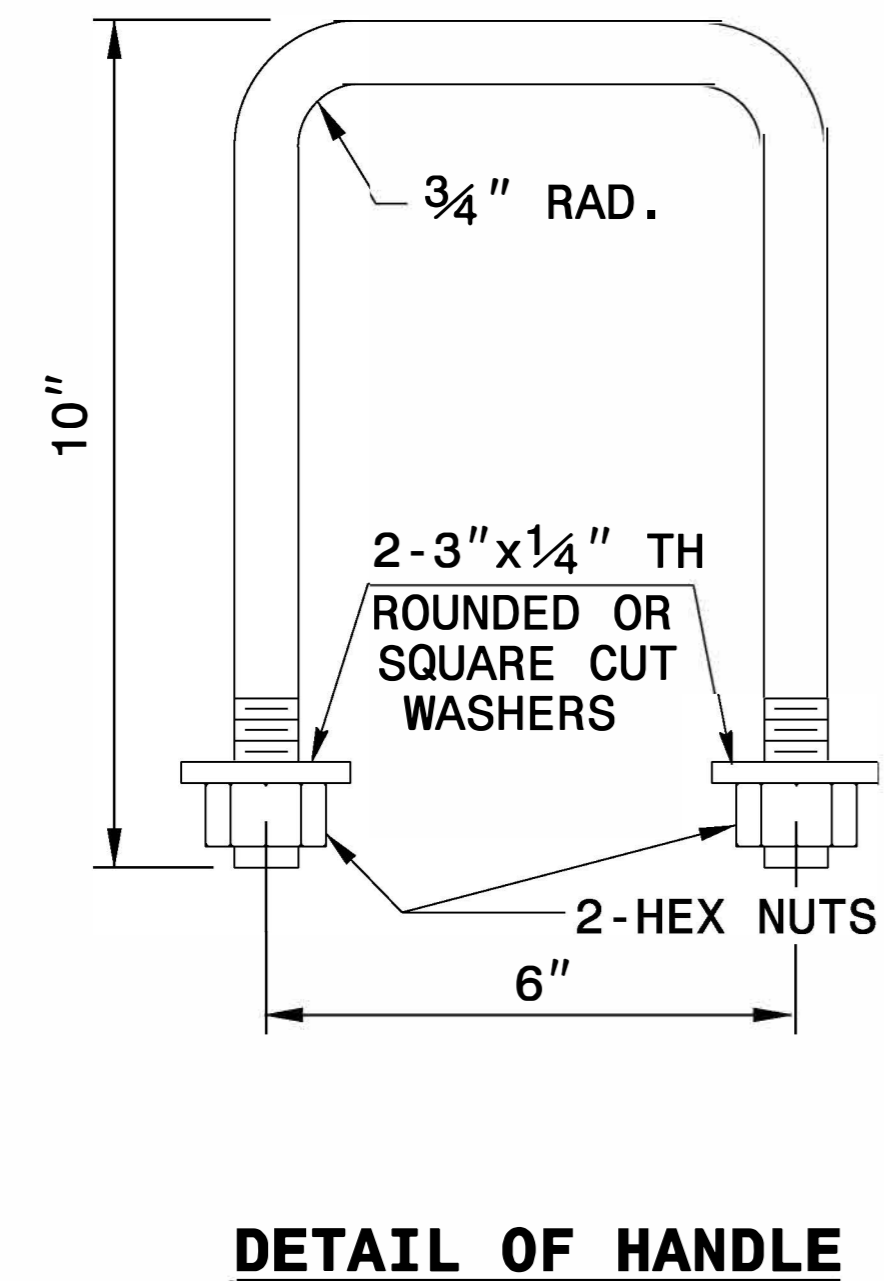
**GENERAL NOTES:**

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

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

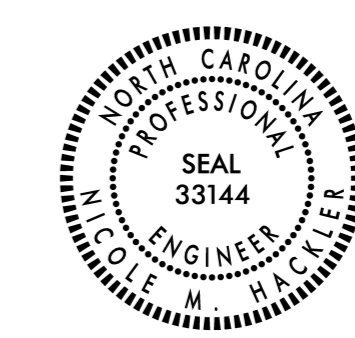
DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.

<b>BILL OF MATERIALS</b>				
<b>REINFORCING STEEL</b>				
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4'-6"	60.12
B	#4	8	1'-1"	5.79
<b>TOTAL</b>				<b>65.91 *</b>
<b>MASONRY</b>				<b>CU YDS</b>
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.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

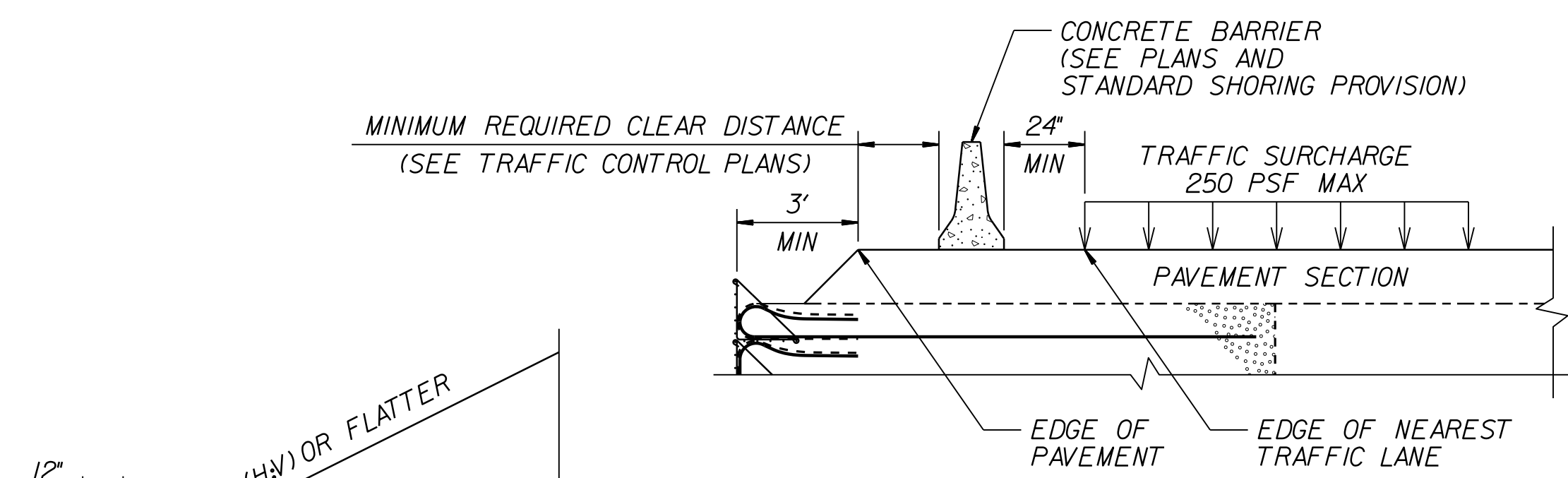


**CONTRACT STANDARDS AND DEVELOPMENT UNIT**  
 Office 919-707-6950 FAX 919-250-4119

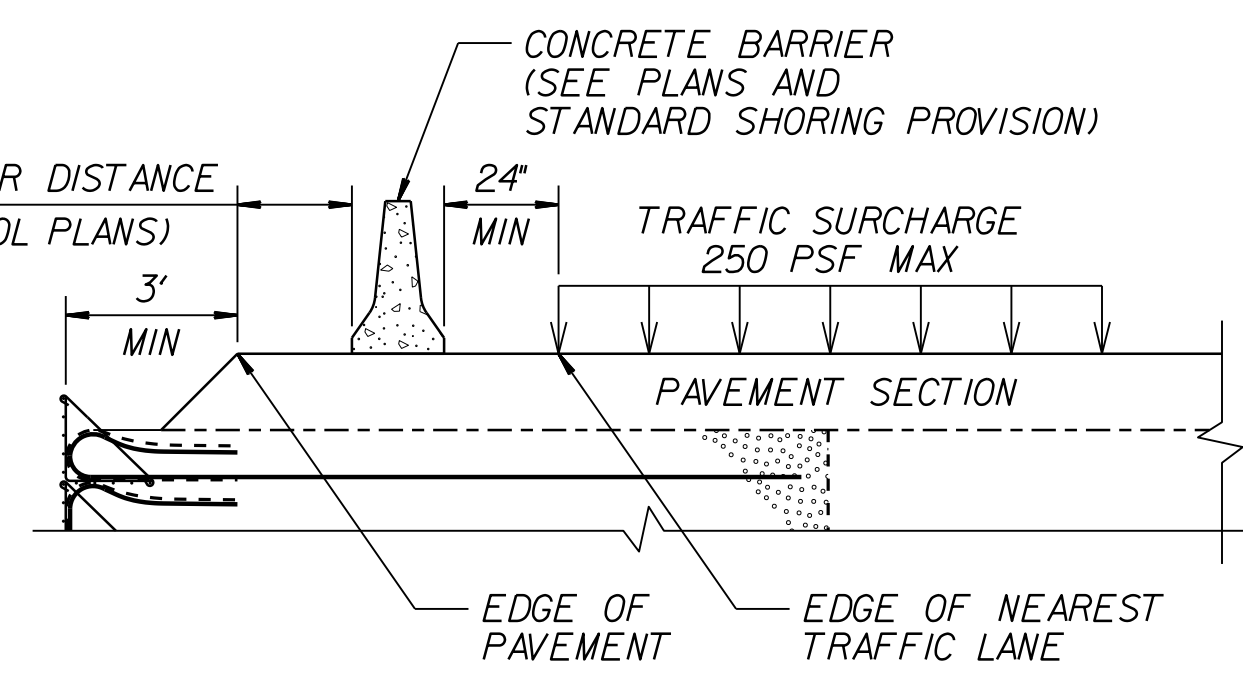
**DETAIL TO CONVERT EXISTING DI, CB, OTCB or GI TO JUNCTION BOX (MANHOLE OPTIONAL)**

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/boxtojb.dgn

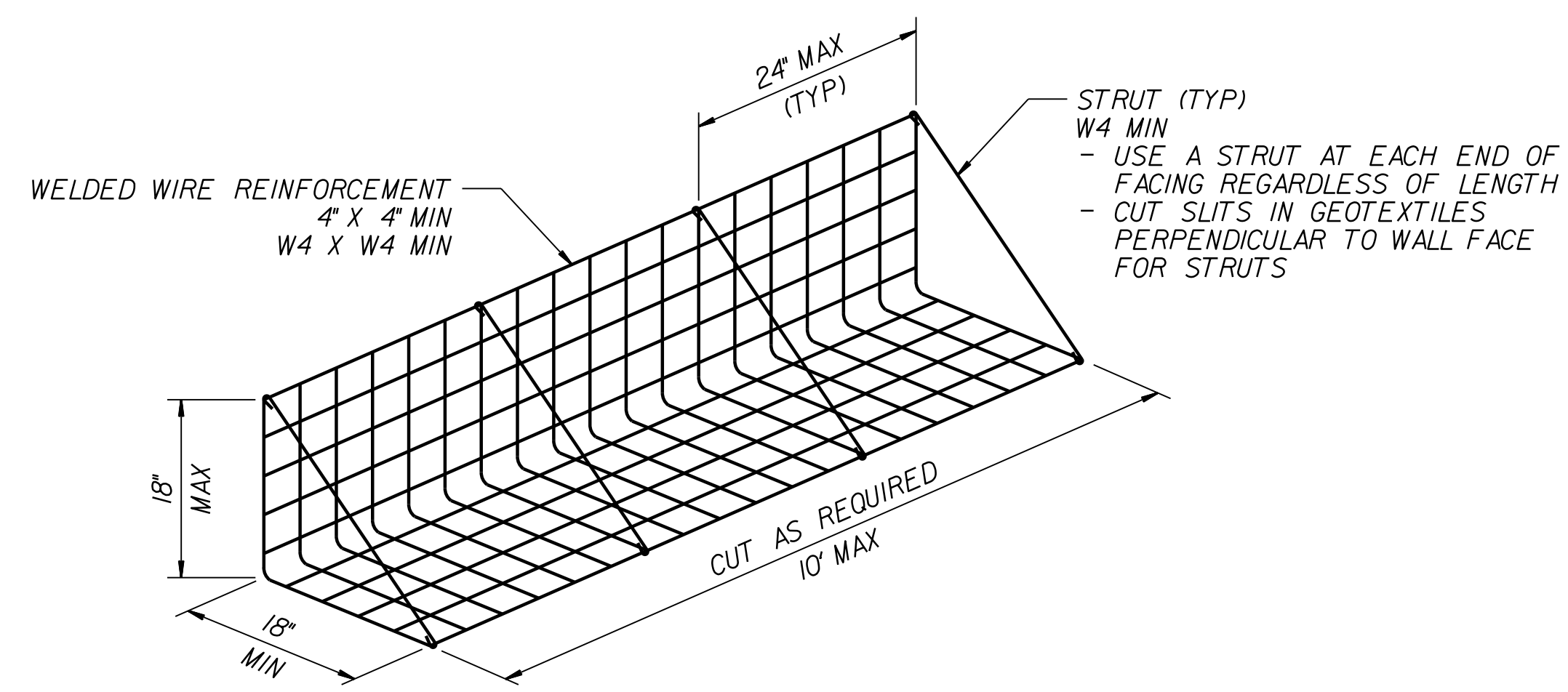
11/20/00 10:00 AM TSS:ds174:/usr/details/stand/boxtojb.dgn



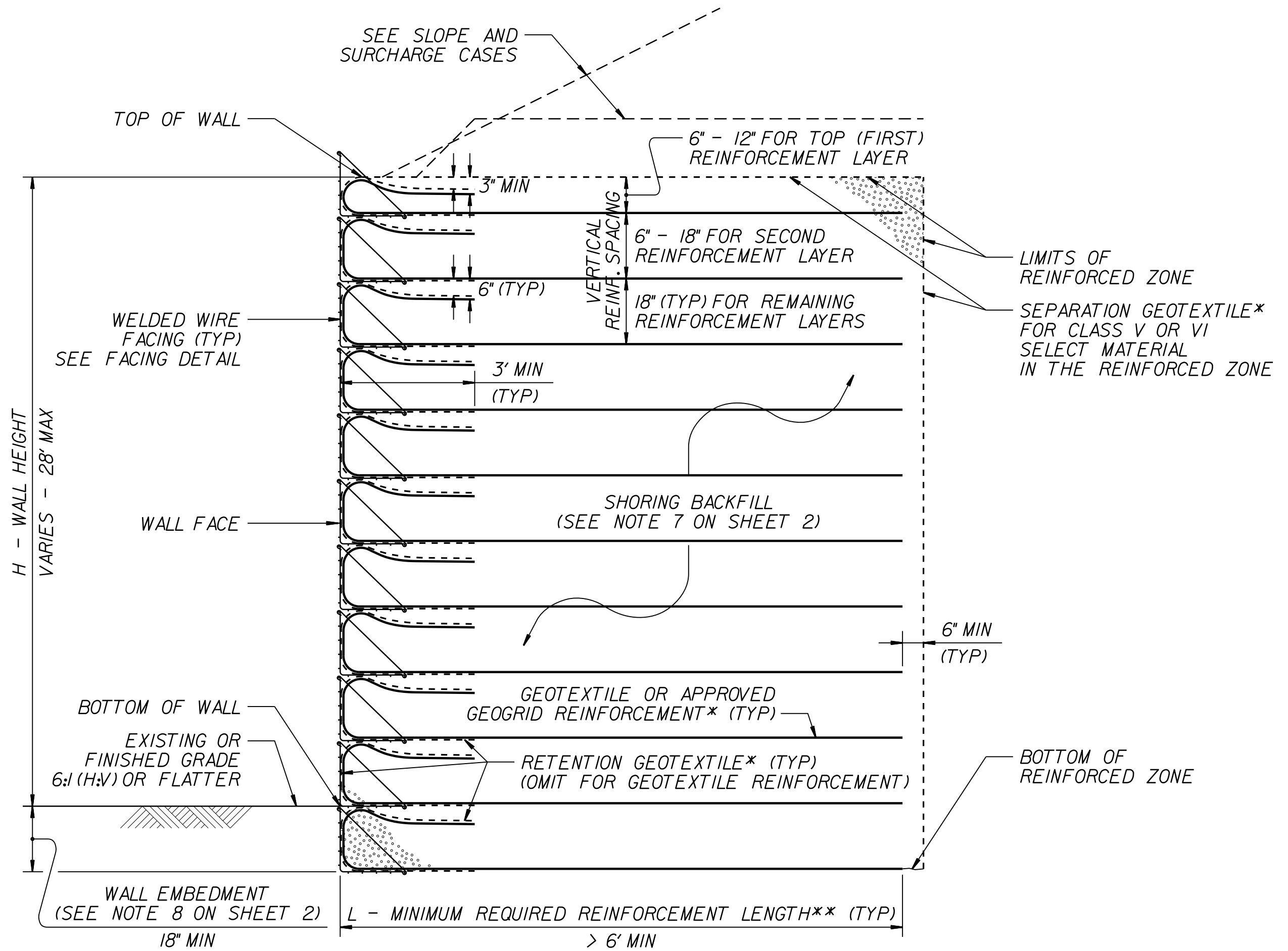
**SLOPE CASE**



**SURCHARGE CASE**

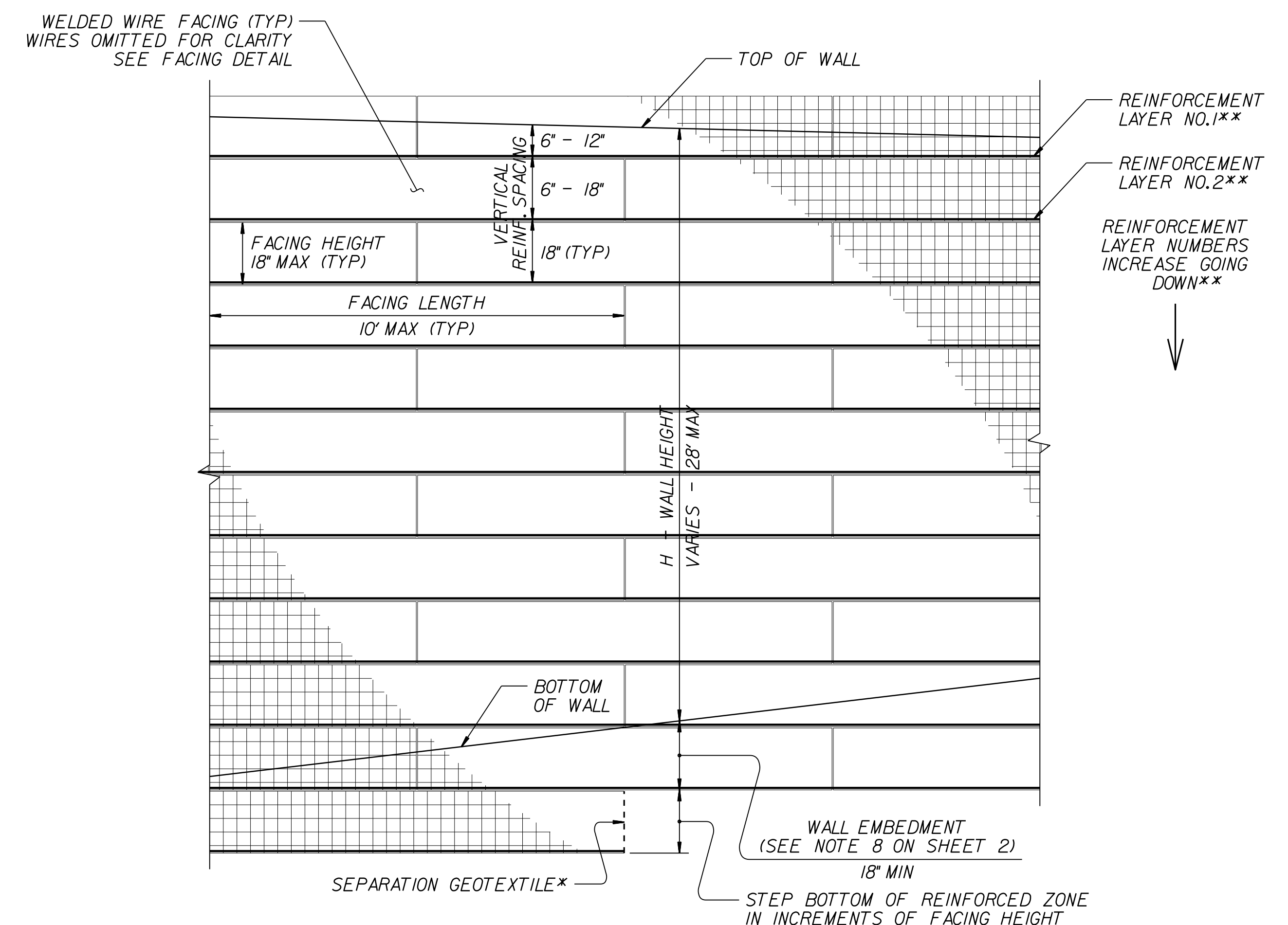


**FACING DETAIL**



**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.

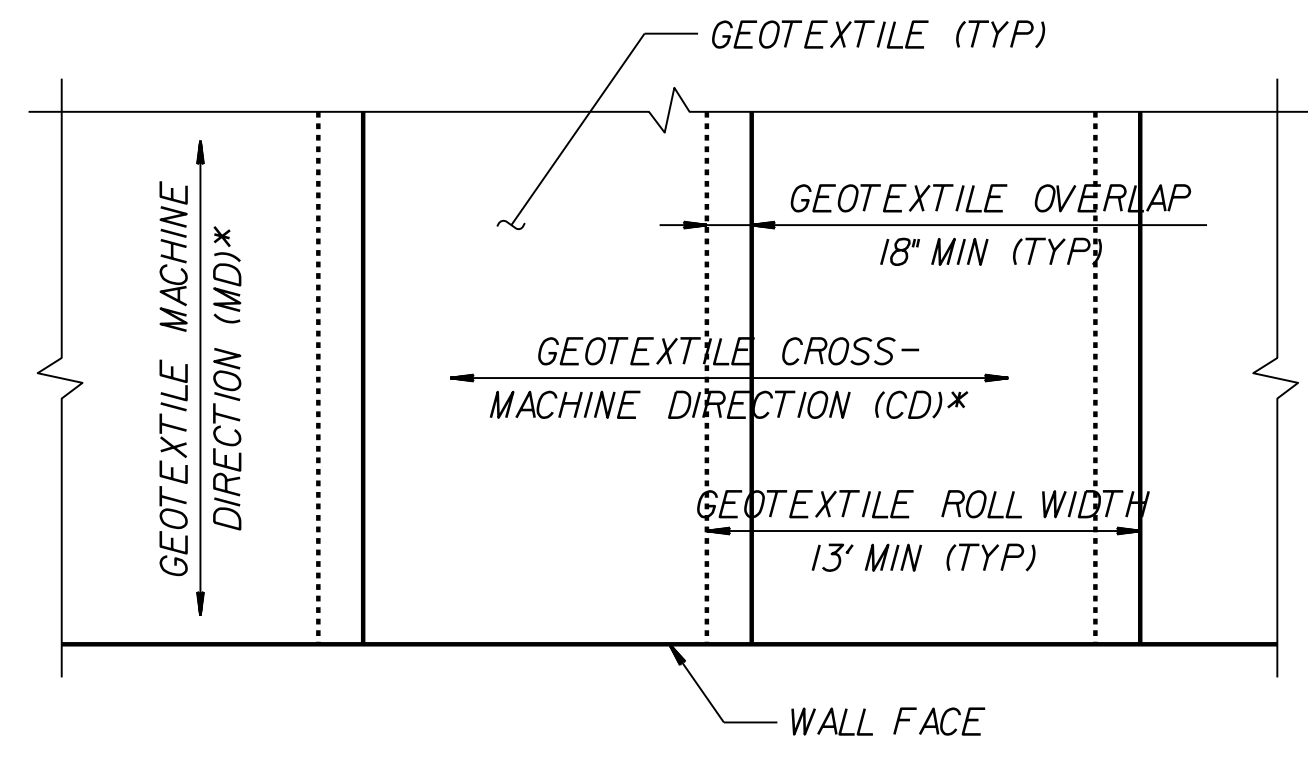


NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
  
**GEOTECHNICAL  
 ENGINEERING UNIT**

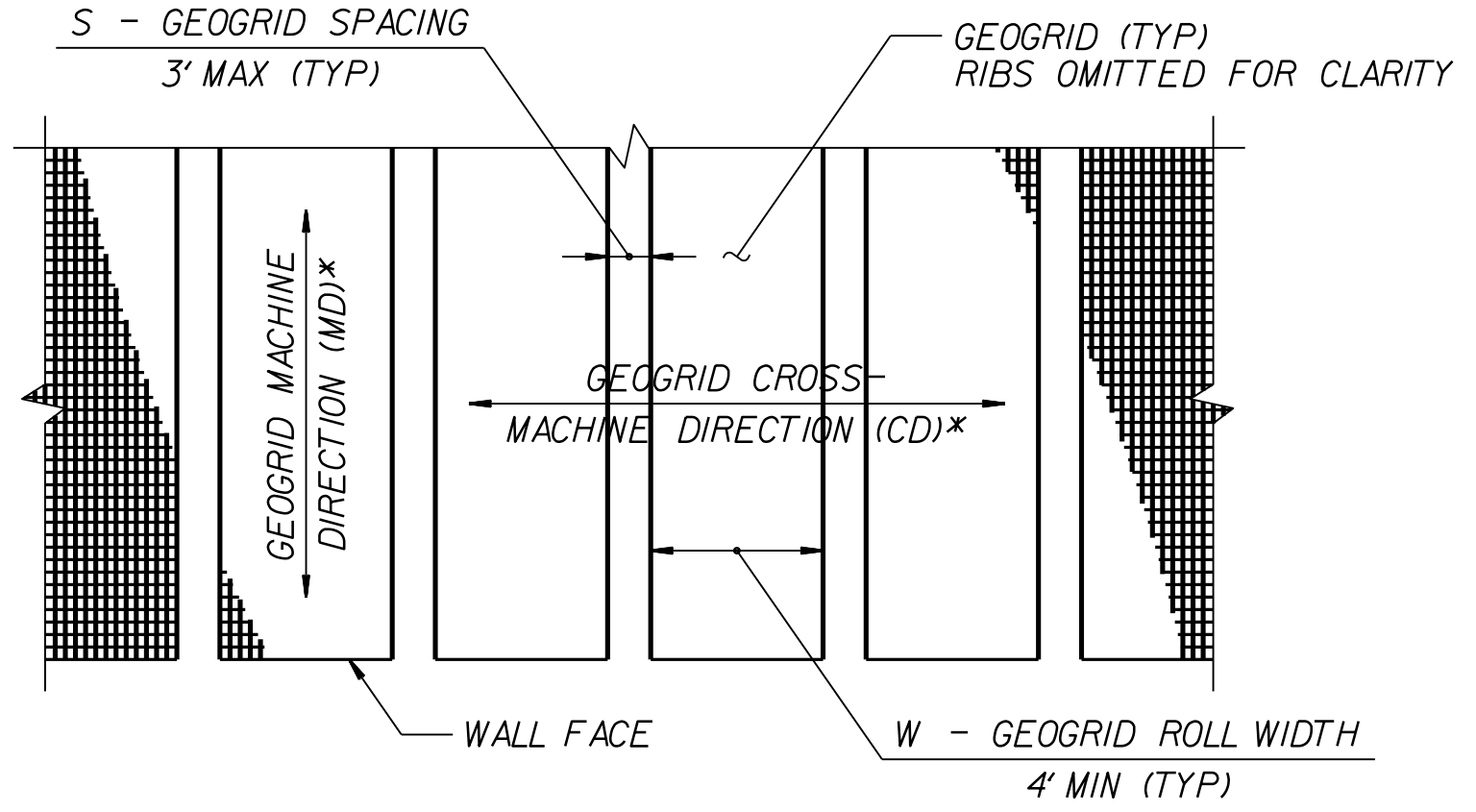
STANDARD DETAIL NO. 1801.02

STANDARD  
 TEMPORARY WALL  
 SHEET 1 OF 3



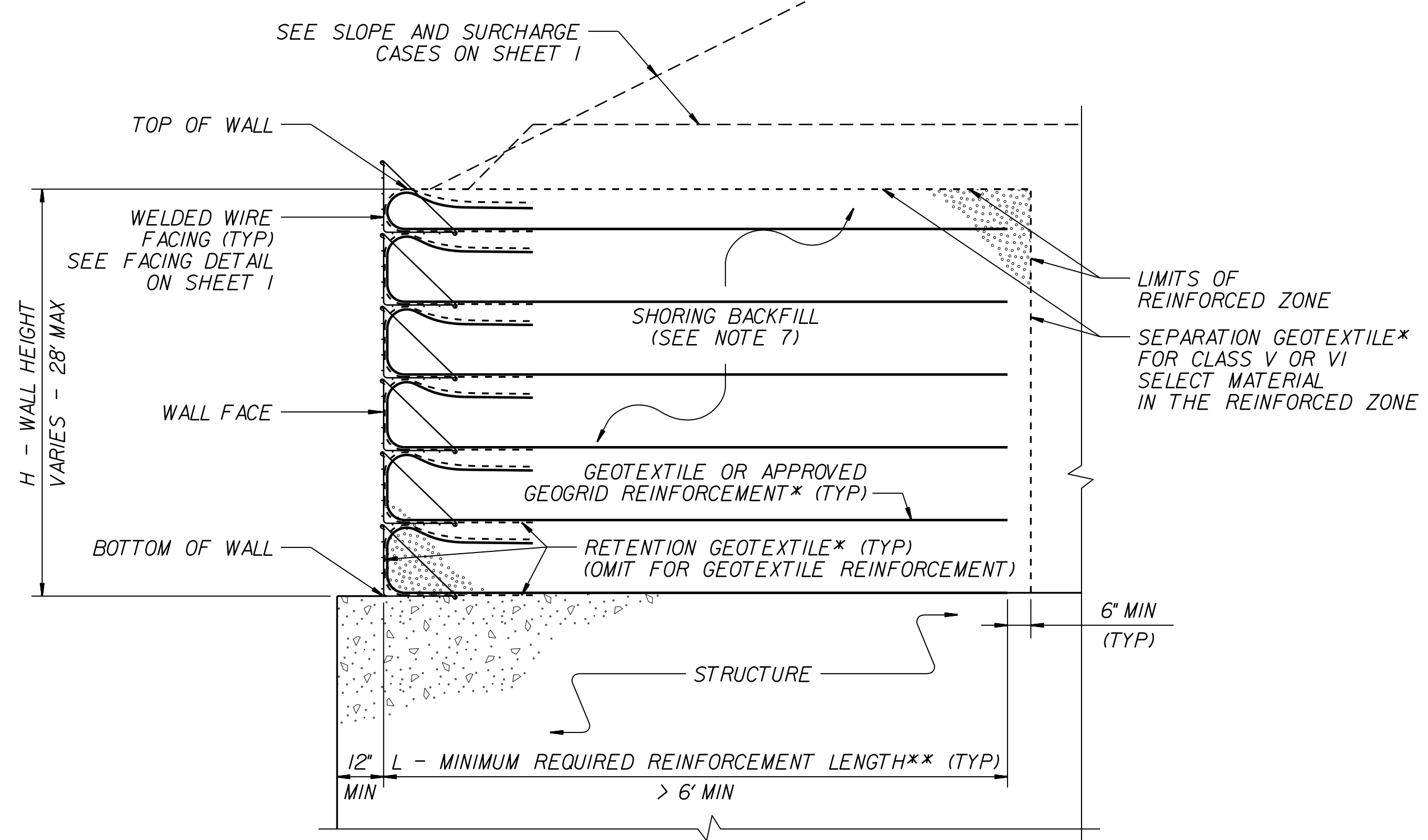


**GEOTEXTILE PLACEMENT**  
(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



**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.



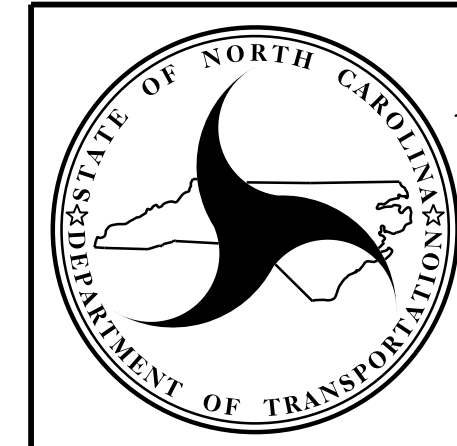
**TEMPORARY WALL ON STRUCTURE DETAIL**  
\*SEE GEOSYNTHETIC PLACEMENT DETAILS.  
\*\*SEE REINFORCEMENT TABLES ON SHEET 3.

**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](http://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](http://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.

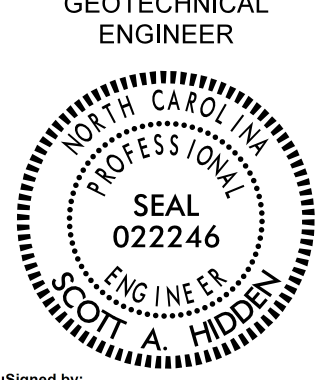


NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
  
GEOTECHNICAL  
ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD  
TEMPORARY WALL  
SHEET 2 OF 3



<b>PROJECT REFERENCE NO.</b> B-5869	<b>SHEET NO.</b> 2G-3
GEOTECHNICAL ENGINEER  ENGINEER	ENGINEER
DocsSigned by: Scott A. Hadden F760CAE89FC4D3	03/21/2023 DATE
SIGNATURE	DATE
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

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.

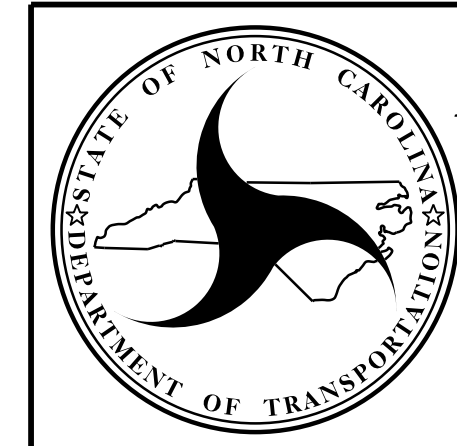
REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	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

**SUMMARY OF EARTHWORK  
 IN CUBIC YARDS**

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
DET 10+00.00 to 16+55.00	257		10,751	10,494	
DET 18+72.00 to 23+18.52	112		5,878	5,766	
<b>SUBTOTAL</b>	<b>369</b>		<b>16,629</b>	<b>16,260</b>	
L 12+50.00 to 21+12.20	231		8,516	8,285	
<b>SUBTOTAL</b>	<b>231</b>		<b>8,516</b>	<b>8,285</b>	
L 22+38.20 to 36+00.00	79		9,144	9,065	
DR 10+30.00 to 14+00.00	61		3,220	3,159	
DR1 10+36.00 to 13+00.00	48		347	299	
<b>SUBTOTAL</b>	<b>188</b>		<b>12,711</b>	<b>12,523</b>	
DETOUR REMOVAL	13,687				13,687
<b>SUBTOTAL</b>	<b>13,687</b>				<b>13,687</b>
<b>PROJECT SUBTOTAL</b>	<b>14,475</b>		<b>37,856</b>	<b>37,068</b>	<b>13,687</b>
WASTE IN LIEU OF BORROW					
LOSS DUE TO CLEARING & GRUBBING	-120			120	
<b>PROJECT TOTAL</b>	<b>14,355</b>		<b>37,856</b>	<b>37,188</b>	<b>13,687</b>
5% TO REPLACE BORROW				1,860	
<b>GRAND TOTAL</b>	<b>14,355</b>		<b>37,856</b>	<b>39,048</b>	<b>13,687</b>
<b>SAY</b>	<b>15,100</b>			<b>41,100</b>	

Contingency Undercut = 550 CY  
 Contingency Select Granular Material = 1,000 CY  
 Estimated DDE = 1,650 CY

**NOTE:** Approximate quantities only. Unclassified Excavation, Fine Grading, Clearing and Grubbing, Breaking of Existing Asphalt Pavement, and Removal of Existing Asphalt Pavement will be paid for at the contract Lump Sum price for "Grading".

**SUMMARY OF EXISTING  
 ASPHALT PAVEMENT REMOVAL**

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SQUARE YARDS
-L-	12+50.00	21+68.34	LT	2,278.57
-L-	22+77.04	36+00.00	LT	874.25
-DET-	10+00.00	16+70.57	CL	1,212.25
-DET-	18+56.24	22+99.72	CL	726.15
<b>B-5869 TOTAL</b>				<b>5,091.22</b>
<b>B-5869 SAY</b>				<b>5,350</b>

**SUMMARY OF EXISTING  
 ASPHALT PAVEMENT BREAKING**

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SQUARE YARDS
-DR-	10+29.40	12+98.00	CL	1,301.85
<b>TOTAL</b>				<b>1,301.85</b>
<b>SAY</b>				<b>1,370</b>



COMPUTED BY: HDC DATE: 10/16/2019  
 CHECKED BY: PJ DATE: 4/23/2020

DIVISION OF HIGHWAYS  
 STATE OF NORTH CAROLINA

PROJECT NO. B-5869 SHEET NO. 3B-2

GUARDRAIL SUMMARY

SURVEY LINE	BEGIN STATION	END STATION	LOCATION	LENGTH (LF)			WARRANT POINT		"N" DIST. FROM E.O.L	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS				IMPACT ATTENUATOR TYPE 350		REMARKS	
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU, TL-3	TYPE III	CAT-1	TYPE III Mod	NO.	PERMITTED		
																				G		NG
-L-	12+50.00	13+78.00	RT	125.00			12+50.00	13+78.00	2'	21'							2				EXISTING GUARDRAIL REMOVAL = 2070 LF	
-L-	12+50.00	12+56.25	RT	6.25			12+50.00	12+56.25	2'	21'							1					
-L-	12+50.00	21+05.19	LT	881.25			21+05.19	12+50.00	14'	25' Berm						1						
-L-	23+71.69	32+30.00	LT	831.25			32+30.00	23+71.69	12'	17' Berm					1							
-L-	17+51.91	19+75.47	RT	218.75			19+75.47		2'	19' Berm					1				1		ANCHOR TIES TO PROTECTION BARRIER - NOT BRIDGE RAIL	
SUBTOTAL				2,062.50																		
LESS ANCHOR DEDUCTIONS																						
CAT-1	3	X	6.25	18.75																		
GREU, TL-3	2	X	50	100.00																		
TYPE III	2	X	18.75	37.50																		
TYPE III Mod	1	X	18.75	18.75																		
TOTAL				1,887.50			ADDITIONAL GUARDRAIL POST			5					2	2	3	1				

TEMPORARY GUARDRAIL SUMMARY

SURVEY LINE	BEGIN STATION	END STATION	LOCATION	LENGTH (LF)			WARRANT POINT		"N" DIST. FROM E.O.L	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS				IMPACT ATTENUATOR TYPE 350		REMARKS	
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU, TL-3	B-77	CAT-1	AT-1	NO.	PERMITTED		
																				G		NG
-DET-	10+00.00	16+75.79	LT	685.38				16+75.79	6'								1					
-DET-	15+47.72	16+34.01	RT	85.38			16+34.01		4'								1	1				
-DET-	18+92.79	22+36.32	LT	335.38					6'								1	1				
-DET-	18+51.01	19+36.39	RT	85.38				18+51.01	4'								1	1				
SUBTOTAL				1,191.50																		
LESS ANCHOR DEDUCTIONS																						
CAT-1		X	6.25																			
GREU, TL-3	2	X	50	100.00																		
B-77	4	X	22.875	91.50																		
AT-1		X	6.25																			
TOTAL				1,000.00																		
SAY							ADDITIONAL GUARDRAIL POST			5					2	4						









STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	300
				<b>TOTAL LF:</b>	300

\*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	300	600	1100		
					<b>TOTAL CY/TONS/SY:</b>	300	600**	1100**	0

\*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.





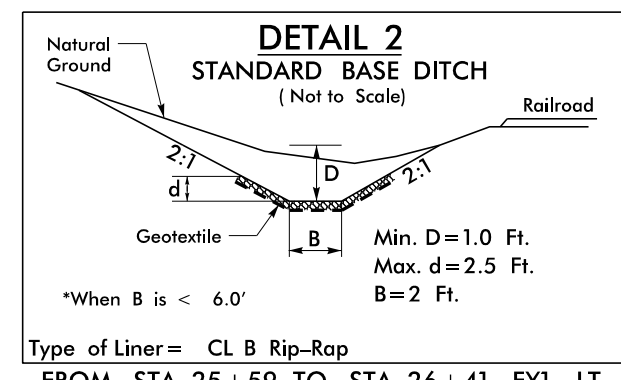
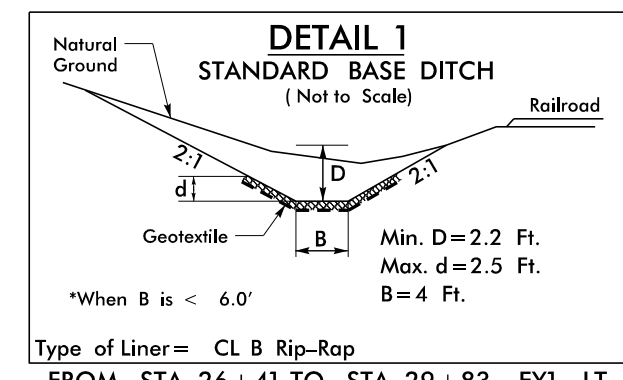
RW SHEET NO.

ROADWAY DESIGN ENGINEER  
 NORTH CAROLINA PROFESSIONAL SEAL 27391  
 MICHAEL PEARES

HYDRAULICS ENGINEER  
 NORTH CAROLINA PROFESSIONAL SEAL 26971  
 JONATHAN S. DALTON

MOTT MACDONALD 1 & E, LLC  
 LICENSE NO. E-06669

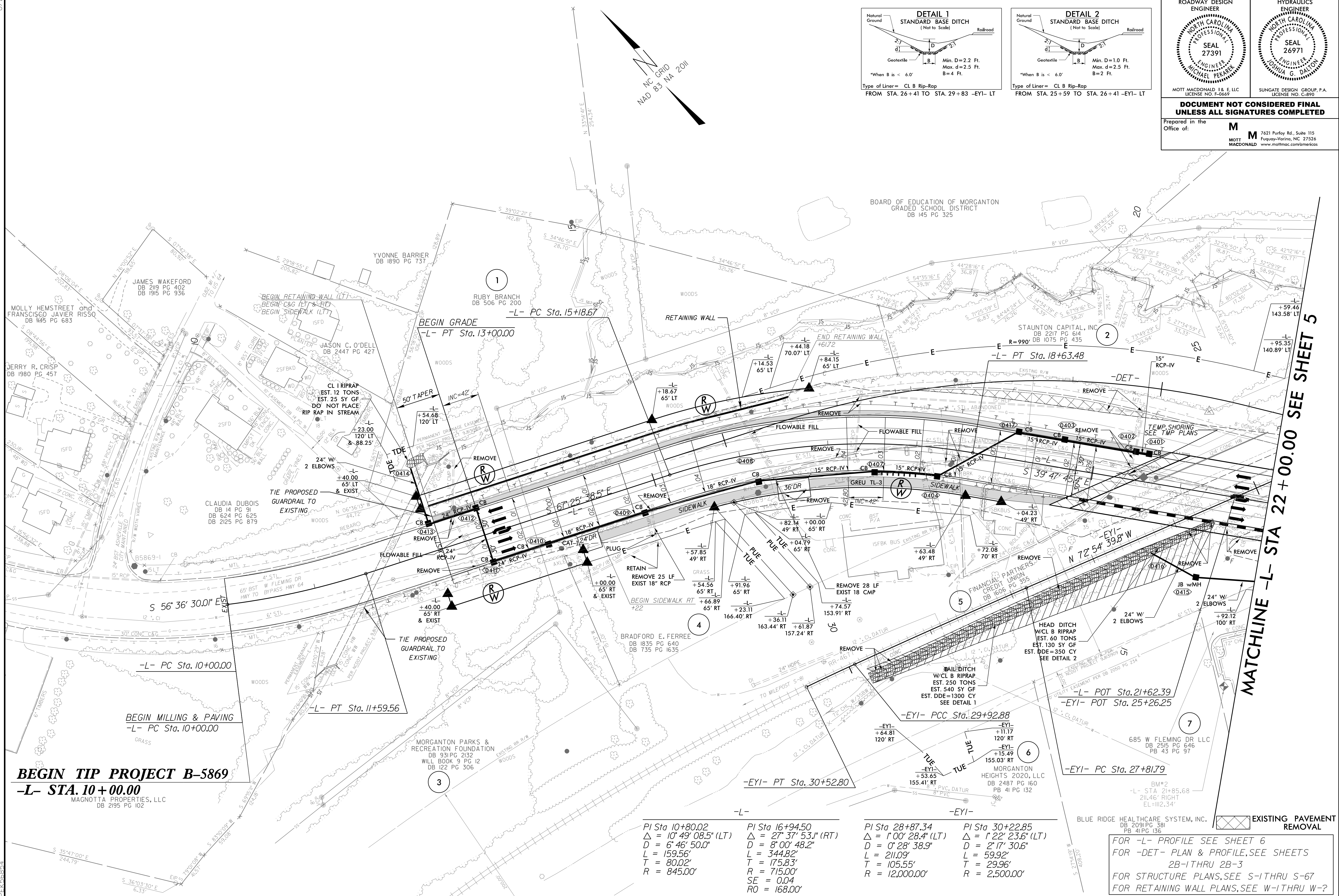
SUNGATE DESIGN GROUP, P.A.  
 LICENSE NO. C-890



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

Prepared in the Office of: **M**  
 MOTT MACDONALD 7621 Purfoy Rd., Suite 115 Fuquay-Varina, NC 27526  
 LICENSE NO. E-06669 www.mottmac.com/memco

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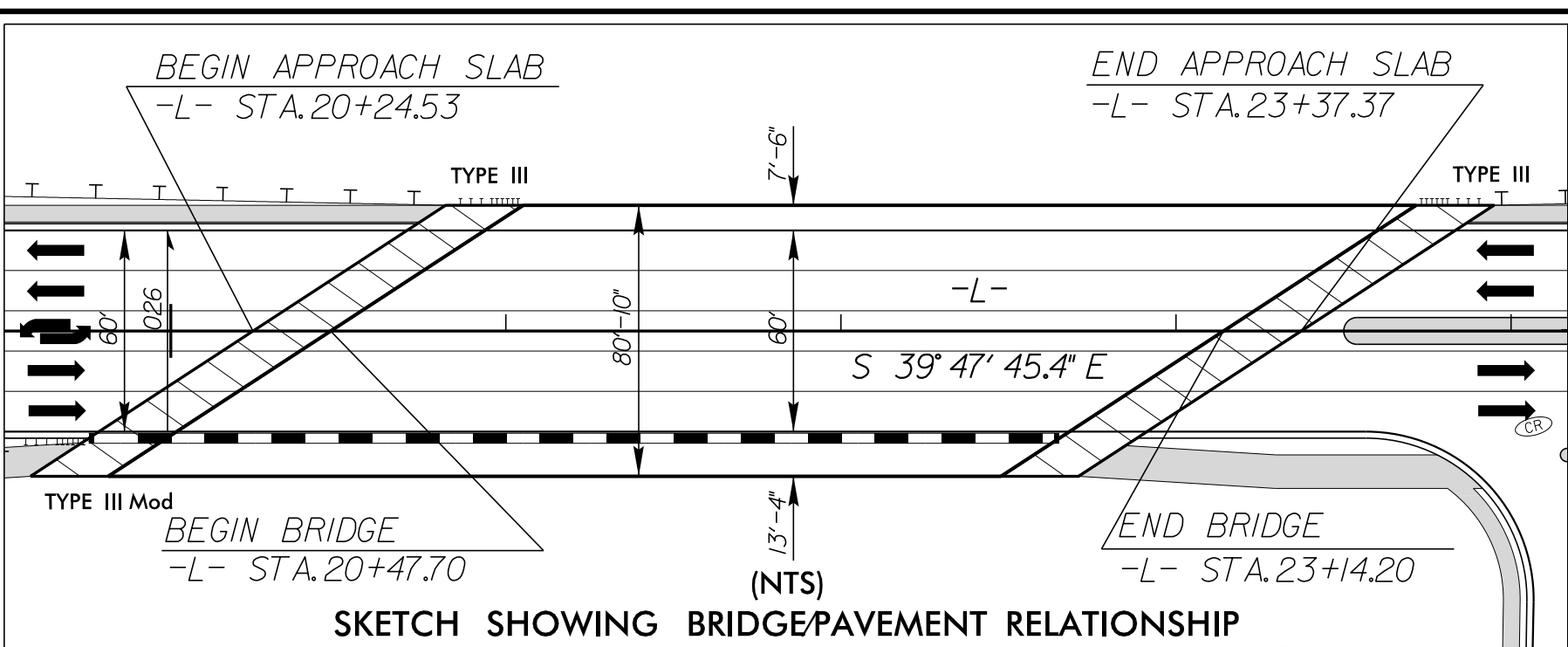
**BEGIN TIP PROJECT B-5869**  
**-L- STA. 10+00.00**  
 MAGNOTTA PROPERTIES, LLC  
 DB 2195 PG 102

PI Sta 10+80.02 $\Delta = 10' 49" 08.5" (LT)$ $D = 6' 46" 50.0"$ $L = 159.56'$ $T = 80.02'$ $R = 845.00'$	PI Sta 16+94.50 $\Delta = 27' 37" 53" (RT)$ $D = 8' 00" 48.2"$ $L = 344.82'$ $T = 175.83'$ $R = 715.00'$ $SE = 0.04$ $RO = 168.00'$	PI Sta 28+87.34 $\Delta = 1' 00" 28.4" (LT)$ $D = 0' 28" 38.9"$ $L = 211.09'$ $T = 105.55'$ $R = 12,000.00'$	PI Sta 30+22.85 $\Delta = 1' 22" 23.6" (LT)$ $D = 2' 17" 30.6"$ $L = 59.92'$ $T = 29.96'$ $R = 2,500.00'$
--	--	---	--

FOR -L- PROFILE SEE SHEET 6  
 FOR -DET- PLAN & PROFILE, SEE SHEETS 2B-1 THRU 2B-3  
 FOR STRUCTURE PLANS, SEE S-1 THRU S-67  
 FOR RETAINING WALL PLANS, SEE W-1 THRU W-?



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PK 5869

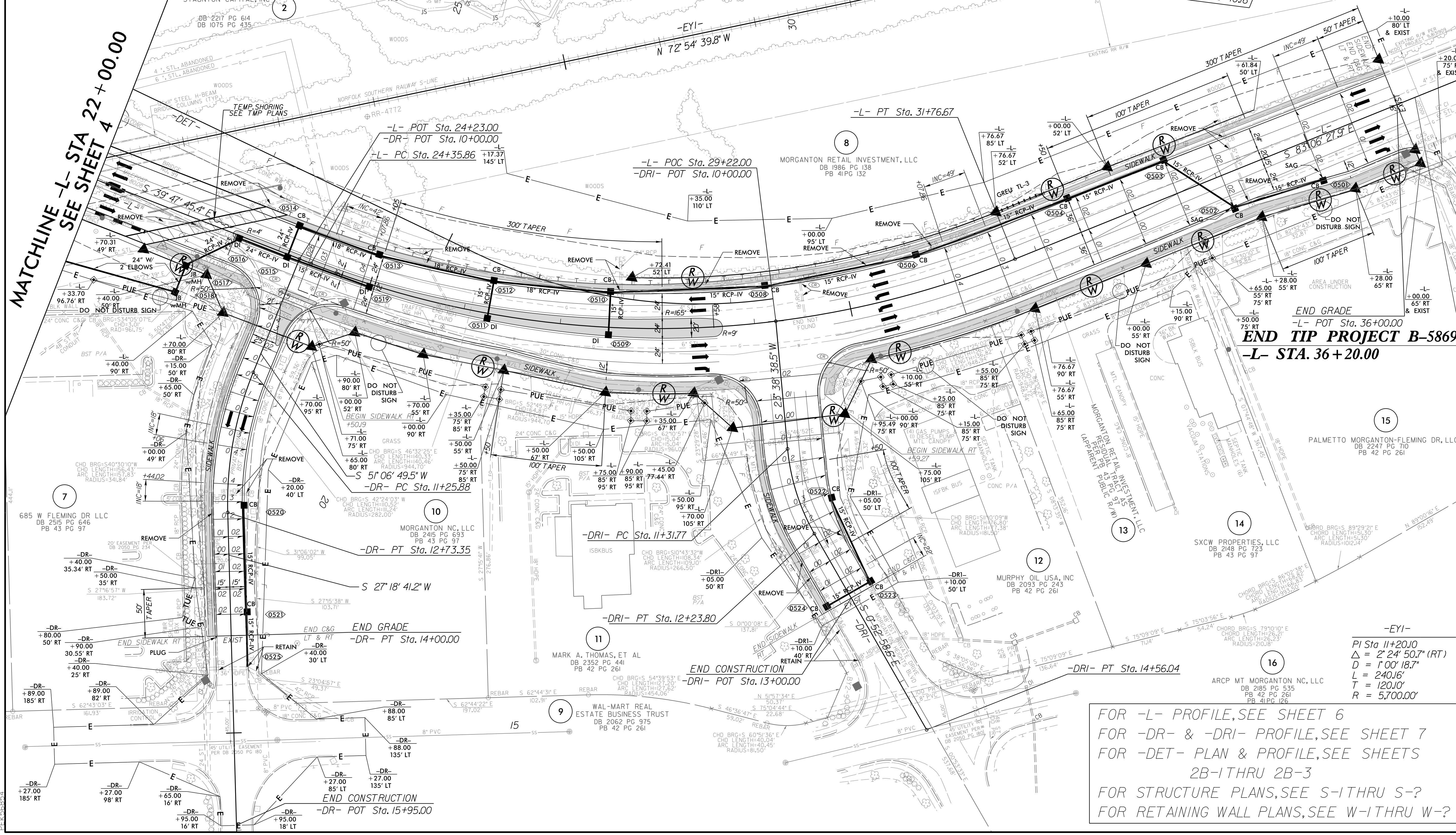


-L-	-DR-	-DRI-
PI Sta 28+24.97	PI Sta 12+00.69	PI Sta 11+78.50
$\Delta = 43^\circ 18' 42.4''$ (LT)	$\Delta = 23^\circ 48' 08.3''$ (LT)	$\Delta = 24^\circ 31' 37.1''$ (LT)
$D = 5^\circ 50' 47.4''$	$D = 16^\circ 08' 22.8''$	$D = 26^\circ 38' 57.1''$
$L = 740.81'$	$L = 147.48'$	$L = 92.04'$
$T = 389.12'$	$T = 74.82'$	$T = 46.73'$
$R = 980.00'$	$R = 355.00'$	$R = 215.00'$
$SE = 0.04$	$SE = 0.04$	$SE = 0.03$
$RO = 168.00'$	$RO = 72.00'$	$RO = 66.00'$

Prepared in the Office of:  
**M**  
MOTT MACDONALD  
7621 Purfoy Rd., Suite 115  
Fuquay-Varina, NC 27526  
www.mottmac.com/americas


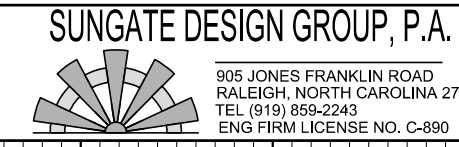
**SUNGATE DESIGN GROUP, P.A.**  
805 JONES FRANKLIN ROAD  
RALEIGH, NORTH CAROLINA 27608  
TEL (919) 850-2243  
FAX (919) 850-2243  
ENG. FIRM LICENSE NO. C-880

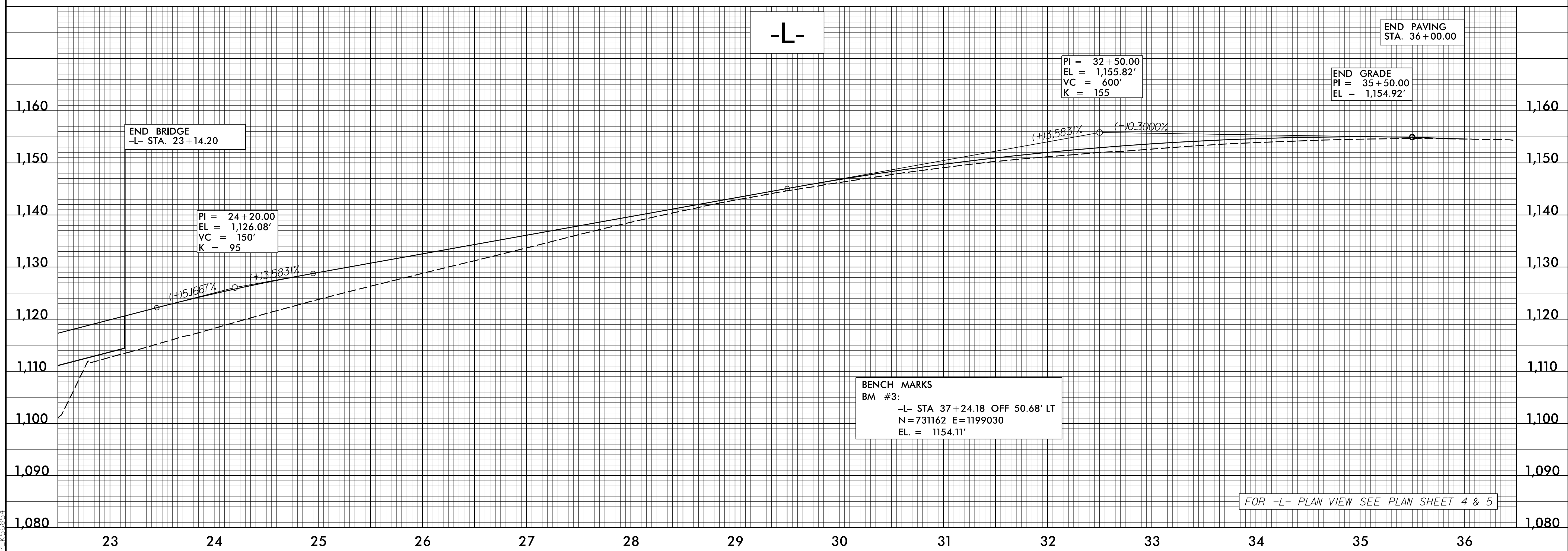
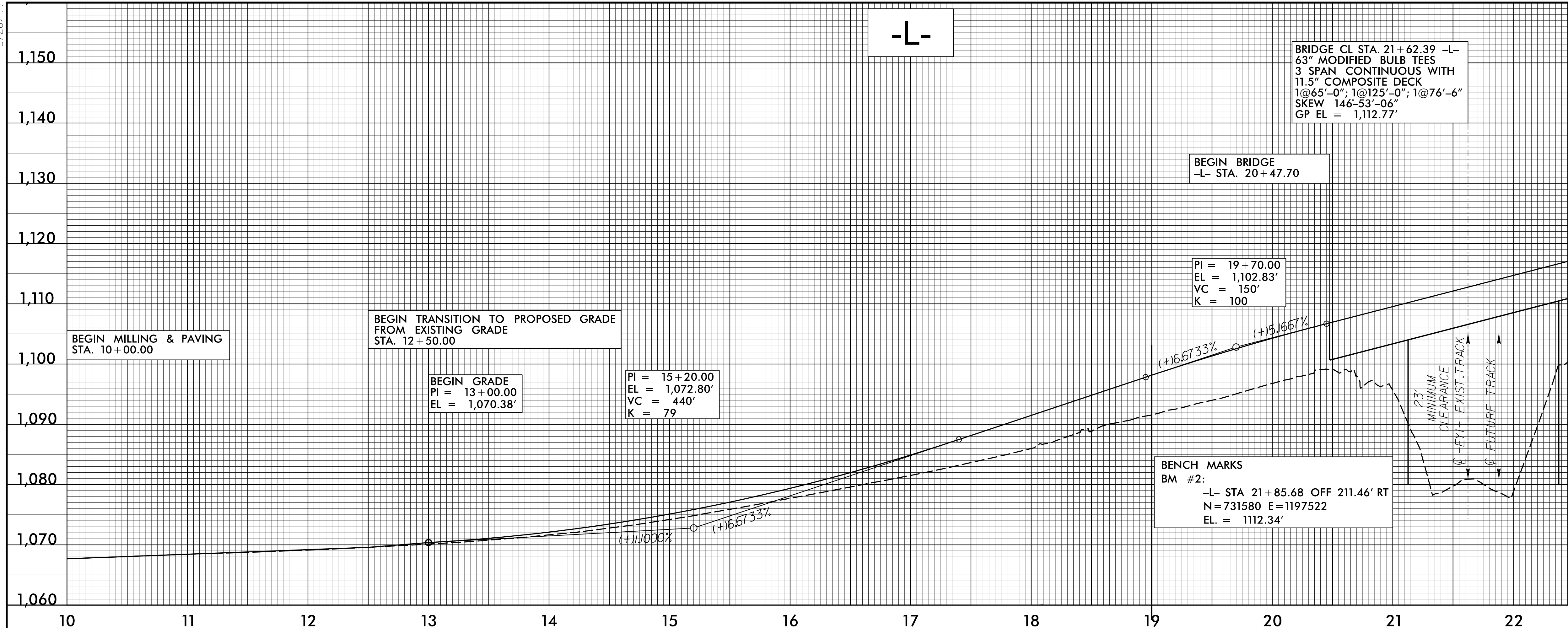
PROJECT REFERENCE NO. <b>B-5869</b>	SHEET NO. <b>5</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER <b>MOTT MACDONALD</b> SEAL 27391	HYDRAULICS ENGINEER <b>OPPIA G. DAITON</b> SEAL 26971
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



FOR -L- PROFILE, SEE SHEET 6  
FOR -DR- & -DRI- PROFILE, SEE SHEET 7  
FOR -DET- PLAN & PROFILE, SEE SHEETS 2B-1 THRU 2B-3  
FOR STRUCTURE PLANS, SEE S-1 THRU S-?  
FOR RETAINING WALL PLANS, SEE W-1 THRU W-?

5/28/99

PROJECT REFERENCE NO. <i>B-5869</i>	SHEET NO. <b>6</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
MOTT MACDONALD I & E, LLC LICENSE NO. F-0669	SUNGATE DESIGN GROUP, P.A. LICENSE NO. C-890
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared in the Office of:	
 	


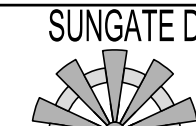


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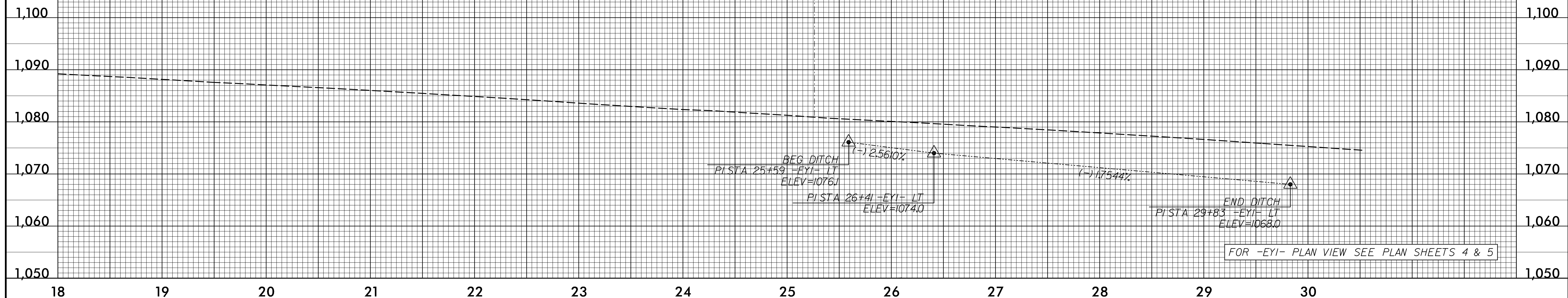
5/28/99

# -EY1- NORFOLK SOUTHERN RAILROAD

PROJECT REFERENCE NO. <i>B-5869</i>	SHEET NO. <i>7</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
MOTT MACDONALD I & E, LLC LICENSE NO. F-0669	SUNGATE DESIGN GROUP, P.A. LICENSE NO. C-890
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared in the Office of:	
 	
7621 Purfoy Rd., Suite 115 Fuquay-Varina, NC 27526 MOTT MACDONALD www.mottmac.com/americas SUNGATE DESIGN GROUP, P.A. 805 JONES FRANKLIN ROAD RALEIGH NORTH CAROLINA 27609 TEL (919) 858-2443 ENG. PERM. LICENSE NO. C-890	

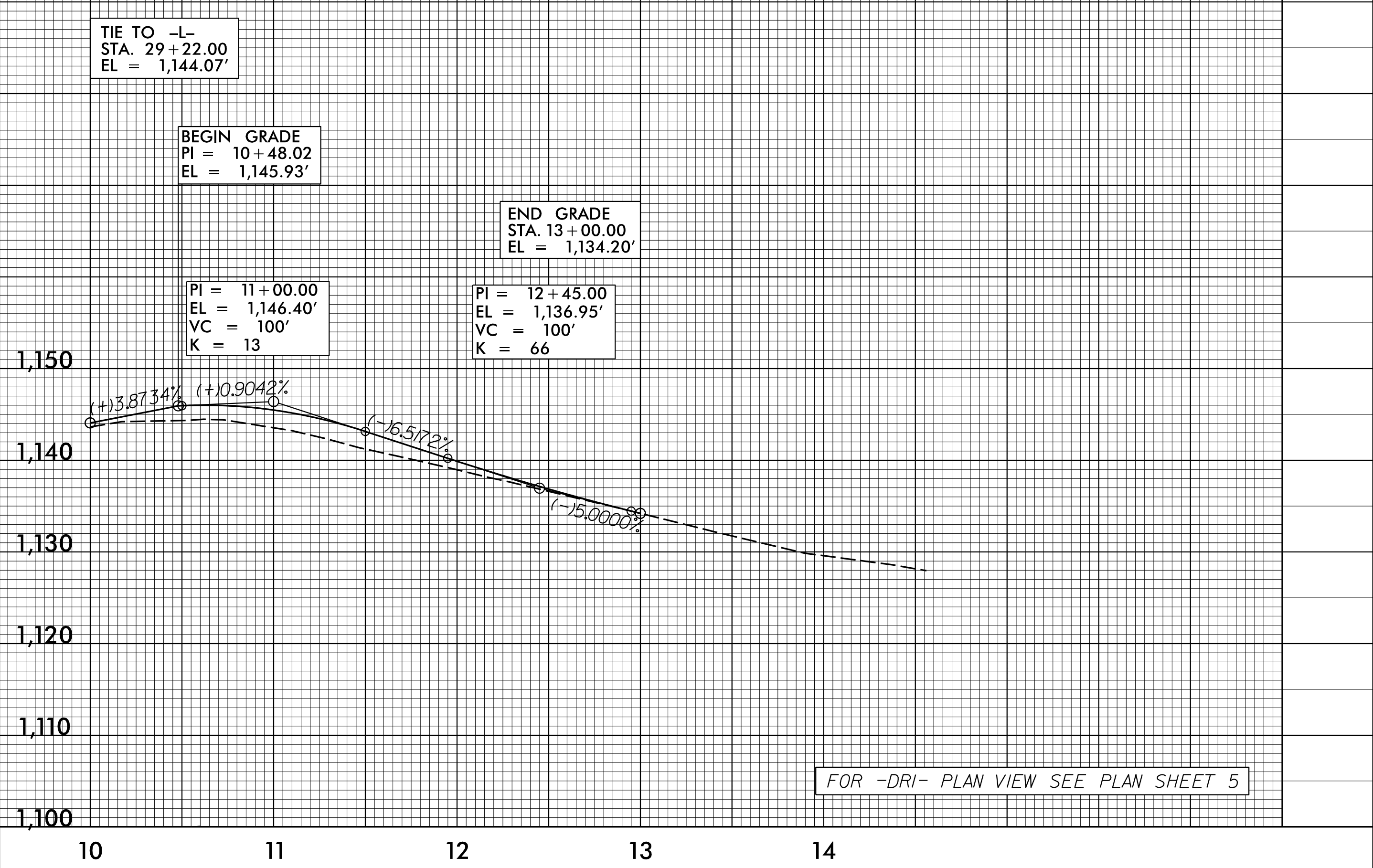
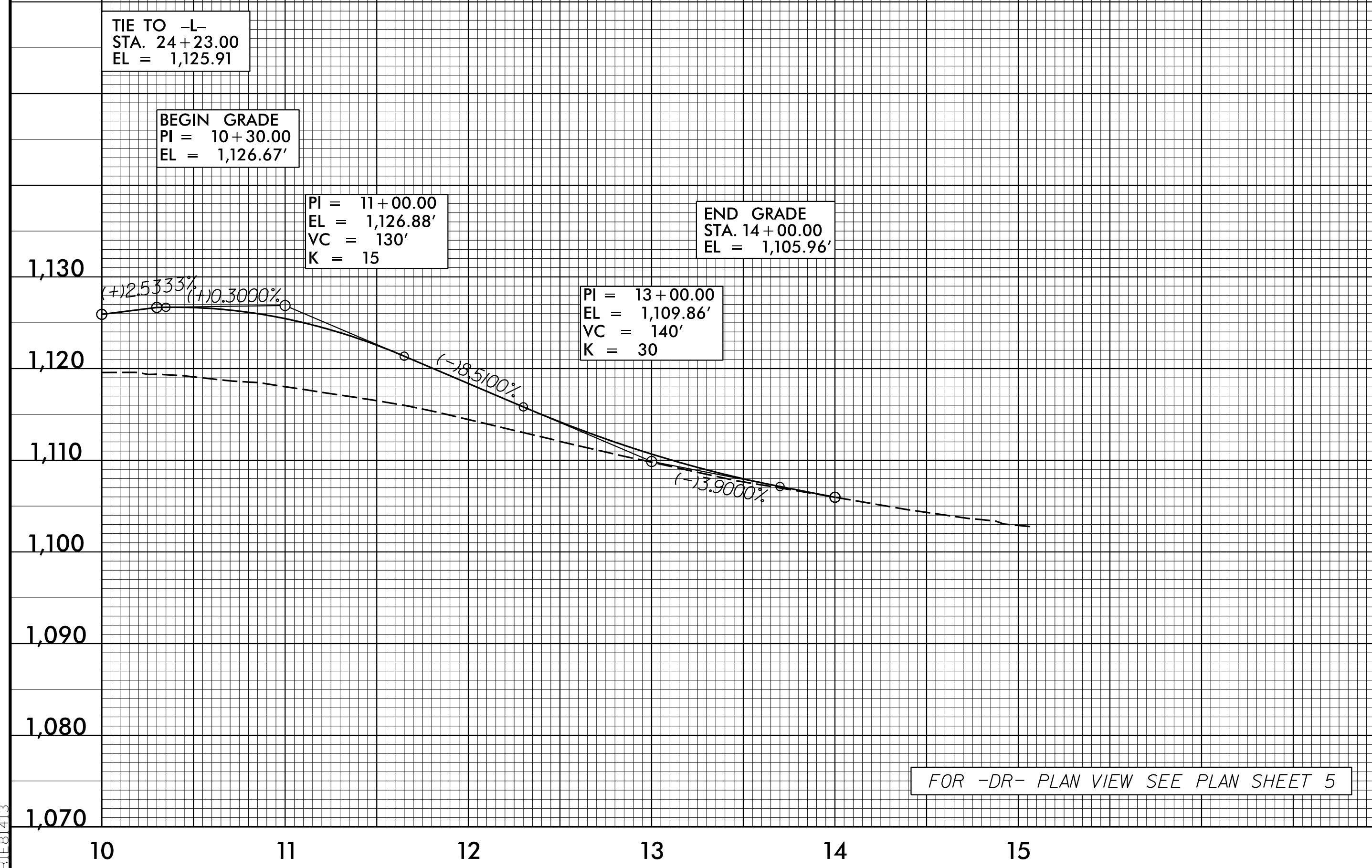
BRIDGE -L- STA. 21+62.39 =  
 -EY1- STA. 25+26.25  
 GP EL = 1,112.77'

APPROXIMATE LOCATION  
 OF PROPOSED BRIDGE



# -DR-

# -DR1-



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