

09/08/99

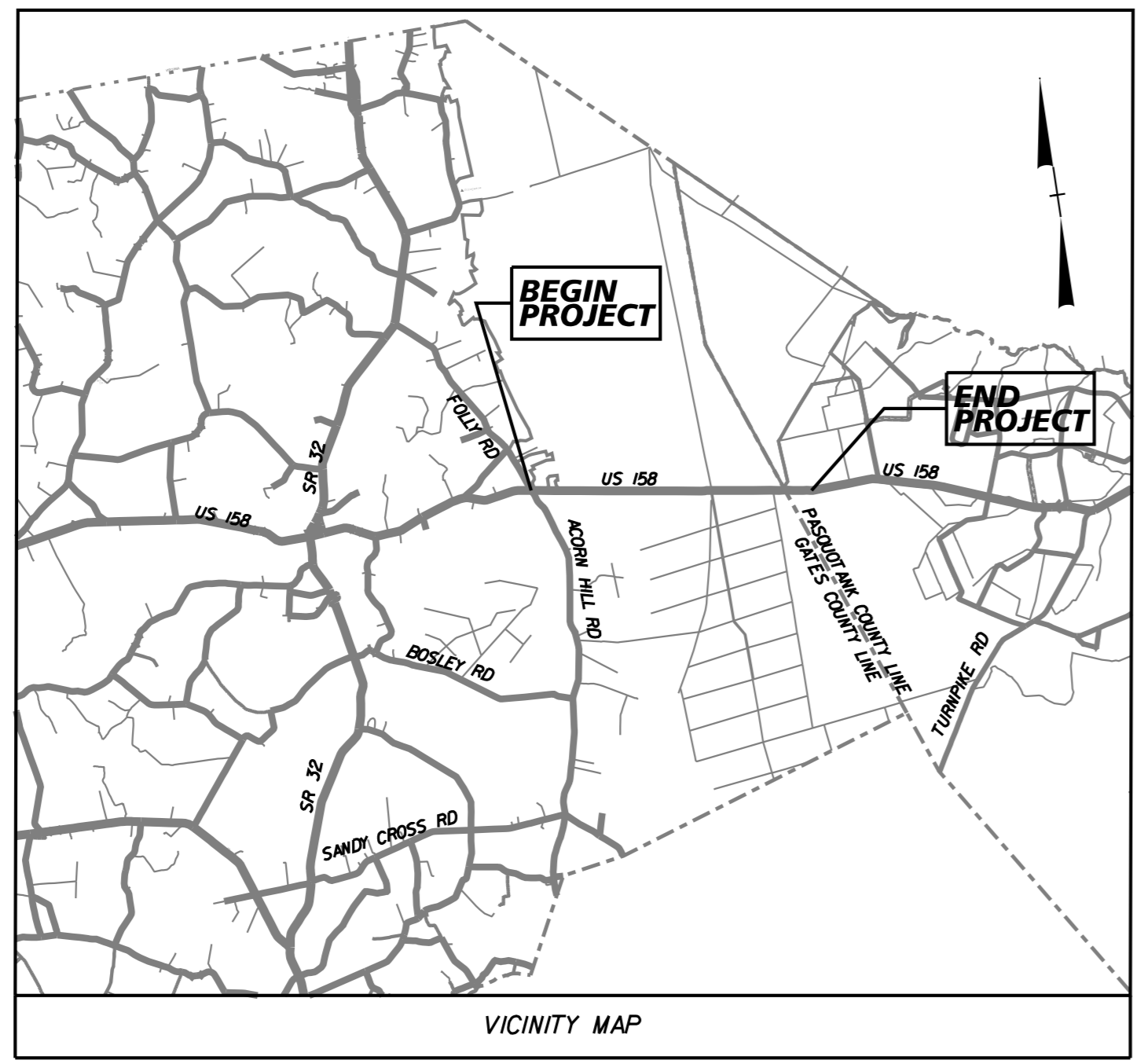
**R-5808**

**TIP PROJECT:**

**CONTRACT: C204854**

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

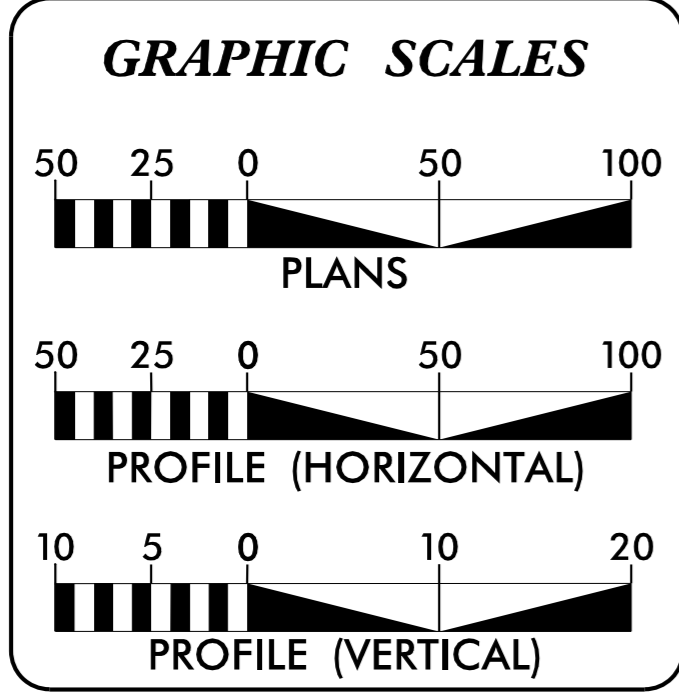
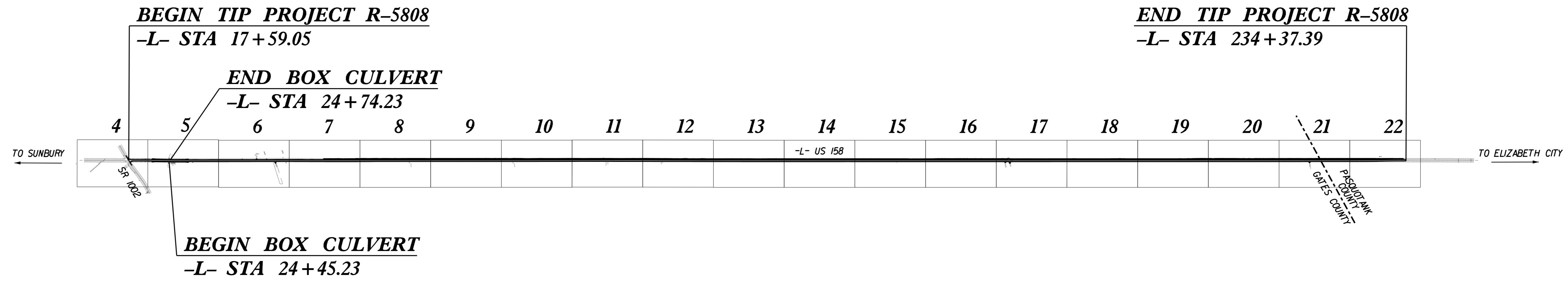
**GATES AND PASQUOTANK COUNTY**



**LOCATION: US 158 FROM THE INTERSECTION OF SR 1002 (ACORN HILL ROAD) AND US 158 TO 0.27 MI. EAST OF THE PASQUOTANK COUNTY LINE**  
**TYPE OF WORK: GRADING, DRAINAGE, PAVING, WIDENING, AND CULVERT**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5808	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
46972.1.2	NHP-0158(076)	PE	
46972.2.1	0158076	R / W	
46972.2.2	0158076	UTIL.	
46972.3.1	0158076	CONSTR.	

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



**DESIGN DATA**

ADT 2023	=	4,300
ADT 2043	=	6,200
K	=	10%
D	=	55%
T	=	12%
V	=	60 MPH

CLASSIFICATION:  
OTHER PRINCIPAL ARTERIAL  
\* 7% TTST 5% DUAL STATEWIDE TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT R-5808	=	4.101 MILES
LENGTH OF STRUCTURE TIP PROJECT R-5808	=	.005 MILES
TOTAL LENGTH TIP PROJECT R-5808	=	4.106 MILES

Prepared in the Office of:

**Kimley » Horn**

2024 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
AUGUST 23, 2022

**LETTING DATE:**  
DECEMBER 17, 2024

**VINCENT RICCIO, PE**  
PROJECT ENGINEER

**BRANDON GREGG**  
PROJECT DESIGN ENGINEER

**RYAN SHOOK**  
PROJECT MANAGER  
NCDOT HIGHWAY DIVISION

**HYDRAULICS ENGINEER**

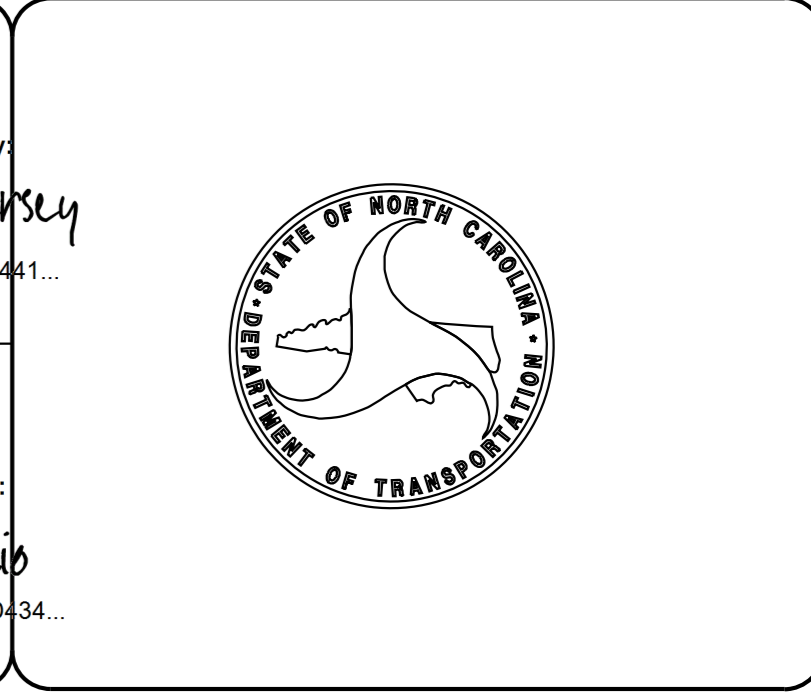
9/6/2024

SIGNATURE: *David Hursey*

**ROADWAY DESIGN ENGINEER**

9/6/2024

SIGNATURE: *Vincent Riccio*



7/17/2024

NAD 83/NSRS 2007

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
R-5808	1A

R-5808  
GATES COUNTY  
SHEET NUMBER  
1  
1A  
1B  
2A-1 THRU 2A-3  
2G-1 THRU 2G-3  
3B-1 THRU 3B-2  
3D-1  
3G-1  
3P-1  
4 THRU 22  
23 THRU 32  
RWO1 THRU RW22  
TMP-1 THRU TMP-7  
PMP-1 THRU PMP-20  
EC-1 THRU EC-41  
CI-1 THRU CI-10  
U001 THRU U020  
X-1A THRU X-1C  
X-2 THRU X-54

INDEX OF SHEETS

SHEET	INDEX OF SHEETS
TITLE SHEET	INDEX OF SHEETS, GENERAL NOTES, LIST OF ROADWAY STANDARD DRAWINGS
CONVENTIONAL SYMBOLS SHEET	CONVENTIONAL SYMBOLS SHEET
PAVEMENT SCHEDULE AND TYPICAL SECTIONS	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
STANDARD TEMPORARY WALL DETAILS	STANDARD TEMPORARY WALL DETAILS
ROADWAY SUMMARIES	ROADWAY SUMMARIES
DRAINAGE SUMMARY	DRAINAGE SUMMARY
GEOTECH SUMMARY	GEOTECH SUMMARY
PARCEL INDEX SHEETS	PARCEL INDEX SHEETS
PLAN SHEETS	PLAN SHEETS
PROFILE SHEETS	PROFILE SHEETS
SURVEY CONTROL, EXISTING CENTERLINES, RIGHT OF WAY, EASEMENT AND PROPERTY TIES	SURVEY CONTROL, EXISTING CENTERLINES, RIGHT OF WAY, EASEMENT AND PROPERTY TIES
TRAFFIC MANAGEMENT PLANS	TRAFFIC MANAGEMENT PLANS
PAVEMENT MARKING PLANS	PAVEMENT MARKING PLANS
EROSION CONTROL PLANS	EROSION CONTROL PLANS
CULVERT PLANS	CULVERT PLANS
UTILITY BY OTHERS PLANS	UTILITY BY OTHERS PLANS
CROSS-SECTION SUMMARY	CROSS-SECTION SUMMARY
CROSS-SECTIONS	CROSS-SECTIONS

GENERAL NOTES: 2024 SPECIFICATIONS  
EFFECTIVE: 01-16-2024  
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

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 MODIFIED METHOD III.

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

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 RADIUS OR RADIUS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

GUARDRAIL:

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

TEMPORARY SHORING:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE ATT

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

2024 ROADWAY ENGLISH STANDARD DRAWINGS  
The following Roadway Standards as appear in "Roadway Standard Drawings" Contracts Standards and Development Unit - N. C. Department of Transportation - Raleigh, N. C., Dated January 16, 2024 are applicable to this project and by reference hereby are considered a part of these plans:

STD. NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Super-elevation - Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
235.01	Embankment Monitoring
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Super-elevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.02	Subsurface Drain
862.01	Guardrail Placement
862.02	Guardrail Installation
876.01	Rip Rap in Channels and Ditches
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

REVISIONS

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

# CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

### BOUNDARIES AND PROPERTY:

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

### BUILDINGS AND OTHER CULTURE:

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

### HYDROLOGY:

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

### RAILROADS:

Standard Gauge	
RR Signal Milepost	
Switch	
RR Abandoned	
RR Dismantled	

### RIGHT OF WAY & PROJECT CONTROL:

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

### ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
Existing Metal Guardrail	
Proposed Guardrail	
Existing Cable Guiderail	
Proposed Cable Guiderail	
Equality Symbol	
Pavement Removal	
<b>VEGETATION:</b>	
Single Tree	
Single Shrub	
Hedge	

Woods Line	
Orchard	
Vineyard	

### EXISTING STRUCTURES:

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

### UTILITIES:

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

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

### TELEPHONE:

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

### WATER:

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

### TV:

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

### GAS:

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

### SANITARY SEWER:

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

### MISCELLANEOUS:

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

REVISIONS

R/10/2021

7/17/2024

5/14/24

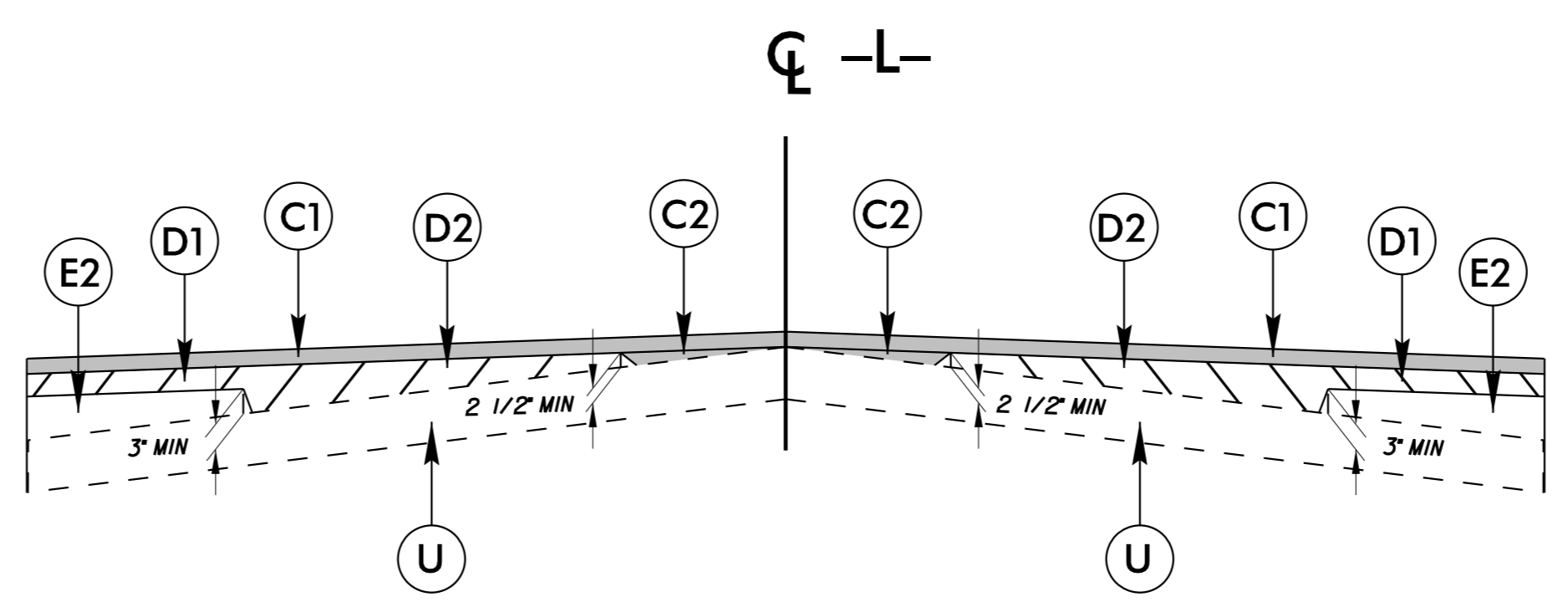
### FINAL PAVEMENT SCHEDULE

C1	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.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 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" DEPTH
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E2	PROPOSED 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" OR GREATER THAN 5.5" IN DEPTH.
J1	PROP. 8" AGGREGATE BASE COURSE
N	PAVEMENT INTERLAYER (COMPOSITE PAVING GRID, TYPE 1)
P	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YD.
T	EARTH MATERIAL.
V	2.5" MILLING.
W	WEDGING.
U	EXISTING PAVEMENT.

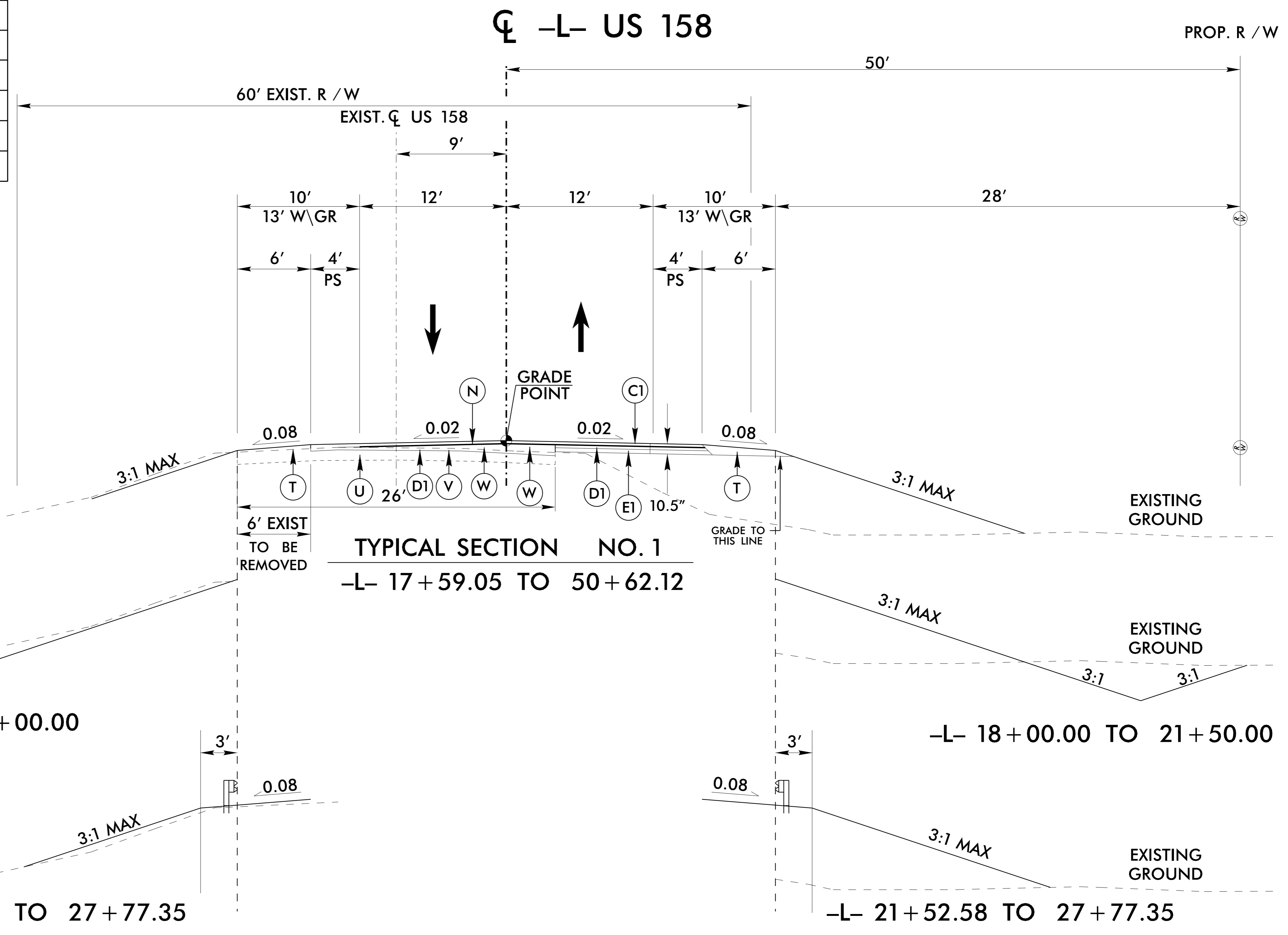
NOTES  
PAVEMENT SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO. R-5808	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
Approved by:  VINCENT E. RICCIO 9/6/2024	Approved by:  ANDREW D. WARGO 9/9/2024



DETAIL SHOWING METHOD OF WEDGING



REVISIONS


7/17/2024

5/14/24

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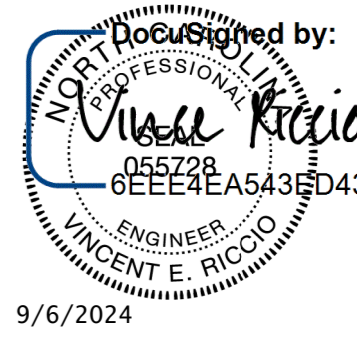
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4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

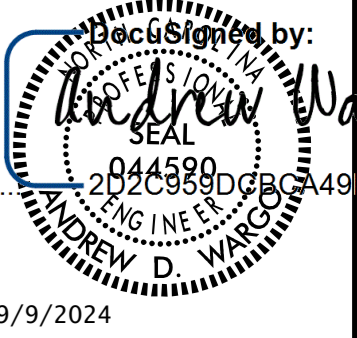
PROJECT REFERENCE NO. R-5808	SHEET NO. 2A-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

Designed by:  
*Vincent Riccio*

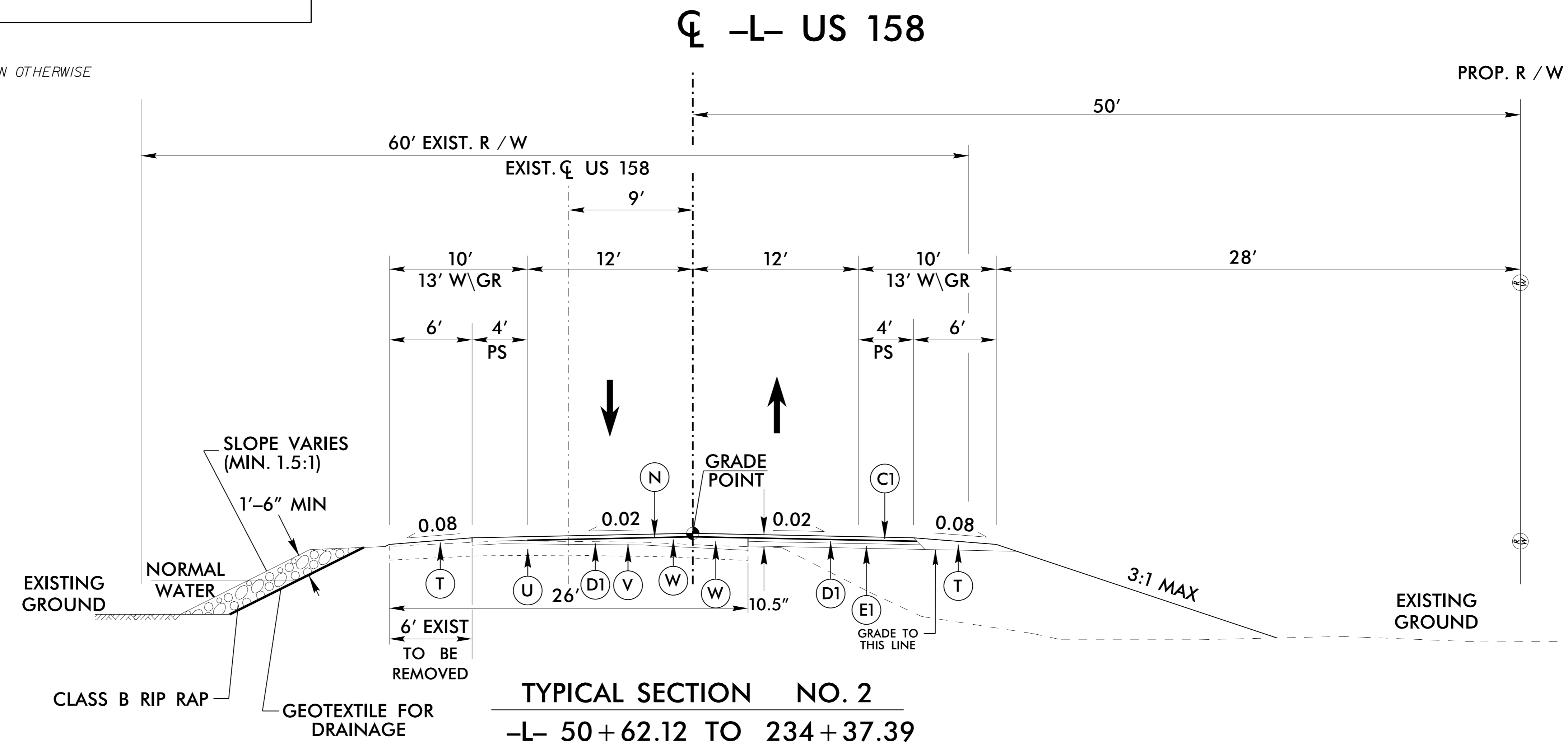
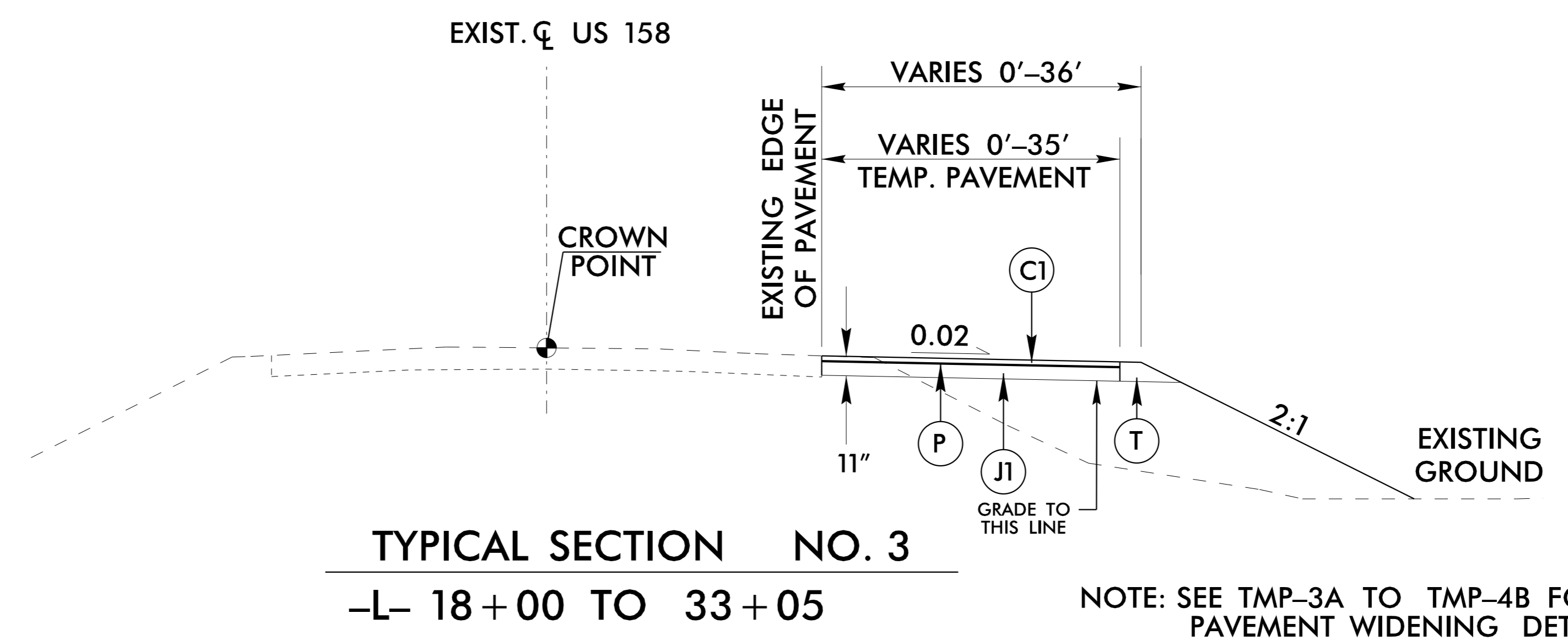


9/6/2024

Designed by:  
*Andrew Wary*




9/9/2024



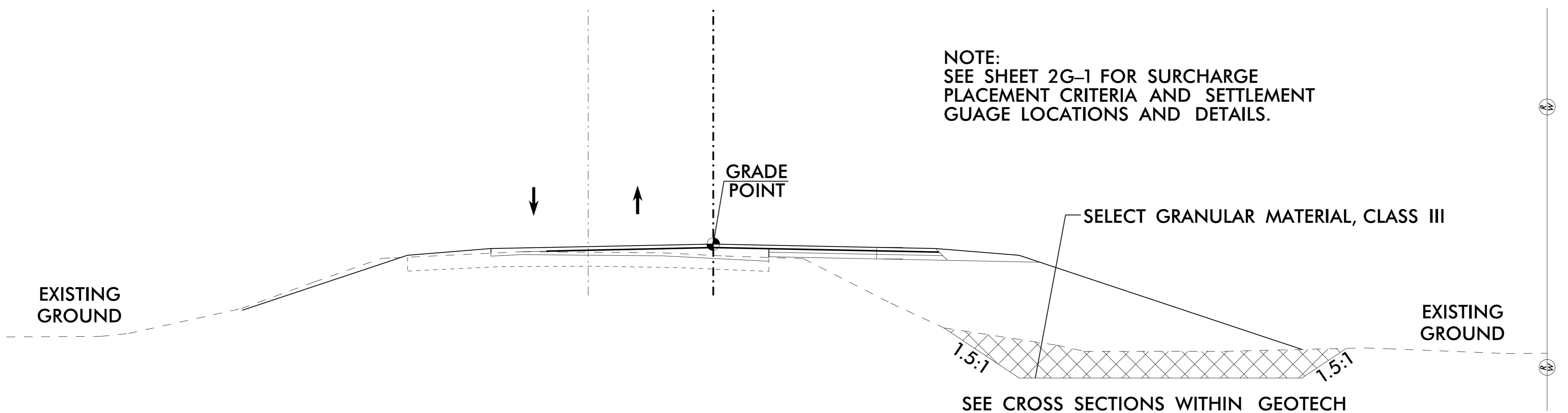
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5/14/99

PROJECT REFERENCE NO. R-5808	SHEET NO. 2A-3
ROADWAY DESIGN ENGINEER	
 VINCENT E. RICCIO ENGINEER 10/1/2024	

### -L- US 158

EXIST.  $\bar{c}$  US 158



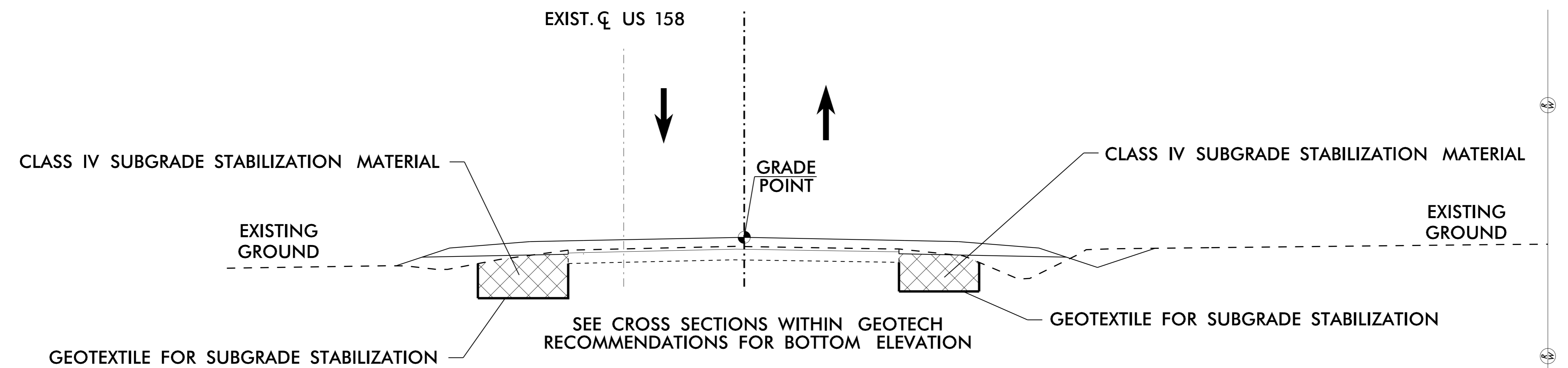
SEE CROSS SECTIONS WITHIN GEOTECH RECOMMENDATIONS FOR BOTTOM ELEVATION

### UNDERCUT RECOMMENDATIONS

- SELECT GRANULAR MATERIAL, CLASS III
- L- STA. 24+86 TO STA. 27+96
  - L- STA. 44+65 TO STA. 64+75
  - L- STA. 65+75 TO STA. 82+75
  - L- STA. 83+25 TO STA. 98+25
  - L- STA. 99+25 TO STA. 166+25
  - L- STA. 167+25 TO STA. 217+75
  - L- STA. 218+25 TO STA. 220+25
  - L- STA. 220+75 TO STA. 234+37

### -L- US 158

EXIST.  $\bar{c}$  US 158



SEE CROSS SECTIONS WITHIN GEOTECH RECOMMENDATIONS FOR BOTTOM ELEVATION

### SHALLOW UNDERCUT FOR SUBGRADE STABILITY RECOMMENDATIONS

- L- STA. 17+59 TO STA. 21+75
- L- STA. 29+25 TO STA. 43+25

10/1/2024

GEOTECHNICAL ENGINEER

ENGINEER



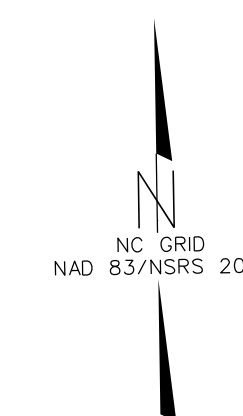
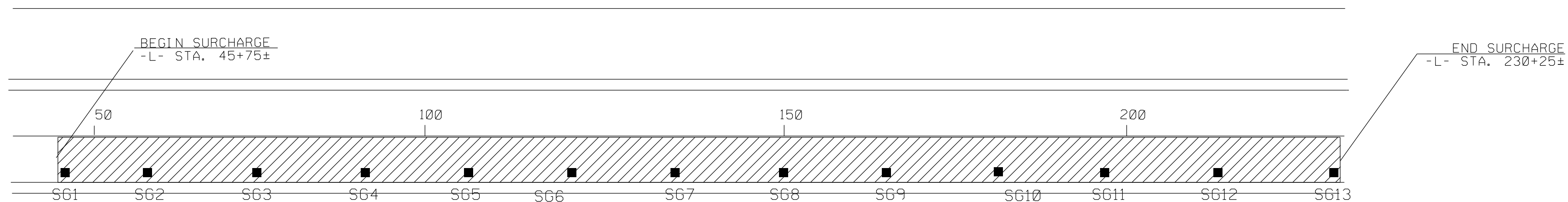
DocuSigned by:  
Yanhui Liu

6/13/2024

SIGNATURE DATE

SIGNATURE DATE

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

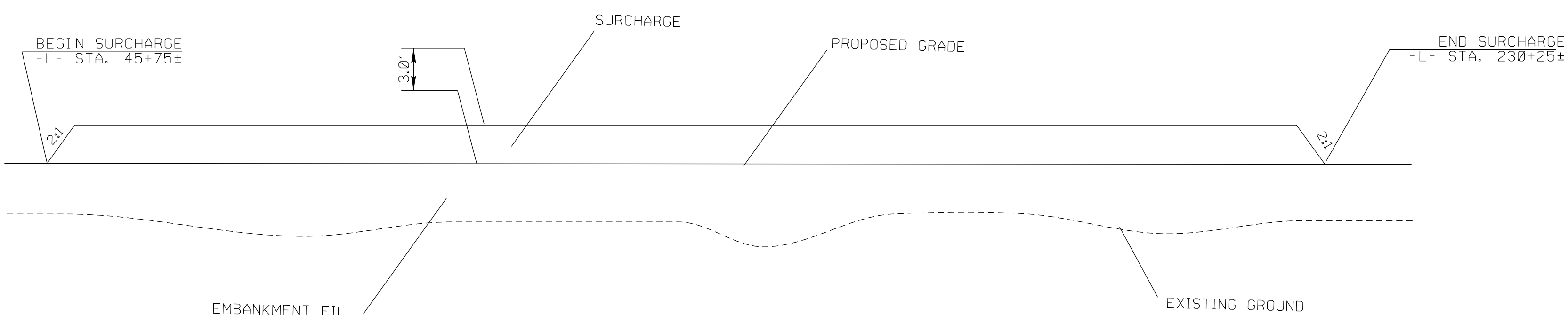


PLAN VIEW FOR SURCHARGE

NOT TO SCALE

■ SETTLEMENT GAUGES (SG)

GAUGE NO.	LINE AND STATION NO.	OFFSET	
		DISTANCE FT	DIRECTION LT/RT
SG1	-L- 47+50	20	RT
SG2	-L- 60+00	20	RT
SG3	-L- 75+00	22	RT
SG4	-L- 90+50	22	RT
SG5	-L- 105+00	20	RT
SG6	-L- 120+00	20	RT
SG7	-L- 135+00	20	RT
SG8	-L- 150+00	20	RT
SG9	-L- 165+00	20	RT
SG10	-L- 180+00	20	RT
SG11	-L- 195+00	20	RT
SG12	-L- 210+00	20	RT
SG13	-L- 225+00	20	RT

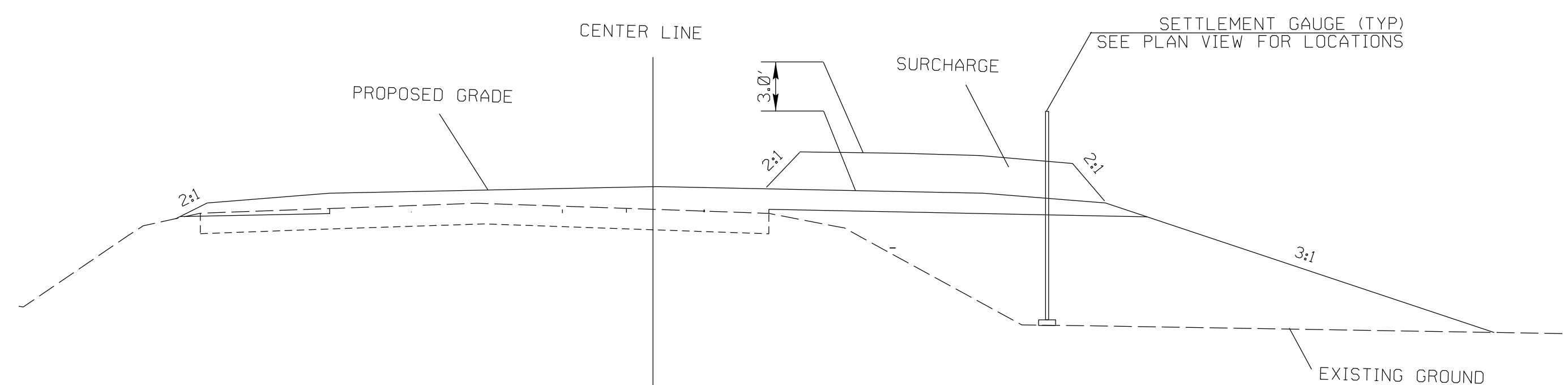


SURCHARGE PROFILE VIEW

NOT TO SCALE

NOTES

- CONSTRUCT 3.0 FT OF SURCHARGE ABOVE THE FINAL GRADE WITH COMMON BORROW FROM -L- STA. 45+75 ± TO -L- STA. 230+25.00.
- OBSERVE A TWO MONTH WAITING PERIOD AFTER CONSTRUCTING THE SURCHARGE FROM -L- STA. 45+75± TO STA. 230+25.00.
- SETTLEMENT GAUGES SHALL BE INSTALLED ON THE EXISTING GROUND OR AS DIRECTED BY THE ENGINEER.
- FOR THE SURCHARGE AND SETTLEMENT GAUGES, SEE SECTION 235 OF THE STANDARD SPECIFICATIONS AND ROADWAY STANDARD DRAWING NO. 235.01.
- BORROW EXCAVATION INCLUDES SURCHARGE AND ADDITIONAL MATERIAL FOR MAINTAINING SURCHARGE ELEVATION.
- UNCLASSIFIED EXCAVATION INCLUDES SURCHARGE AND ADDITIONAL MATERIAL FOR MAINTAINING SURCHARGE ELEVATION.



TYPICAL SECTION FOR SURCHARGE

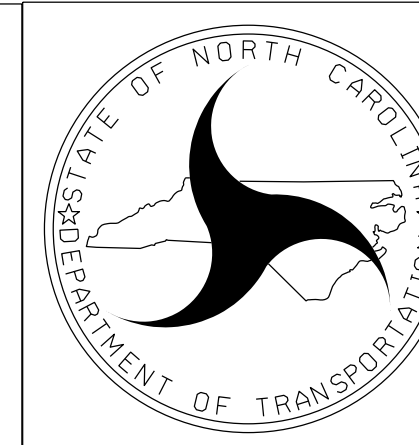
NOT TO SCALE

ESTIMATED QUANTITIES FOR SURCHARGE	
BORROW EXCAVATION	25,600 CY
UNCLASSIFIED EXCAVATION	25,600 CY

PREPARED BY: Yanhui Liu	DATE: 06/24
REVIEWED BY: Ben Lackey	DATE: 06/24

Prepared in the Office of:

**CATLIN**  
Engineers and Scientists  
Wilmington, North Carolina

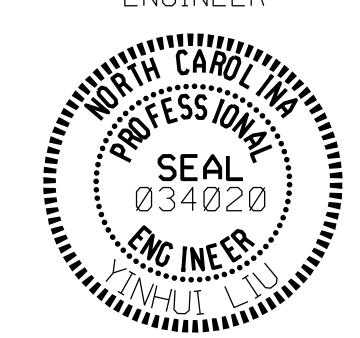


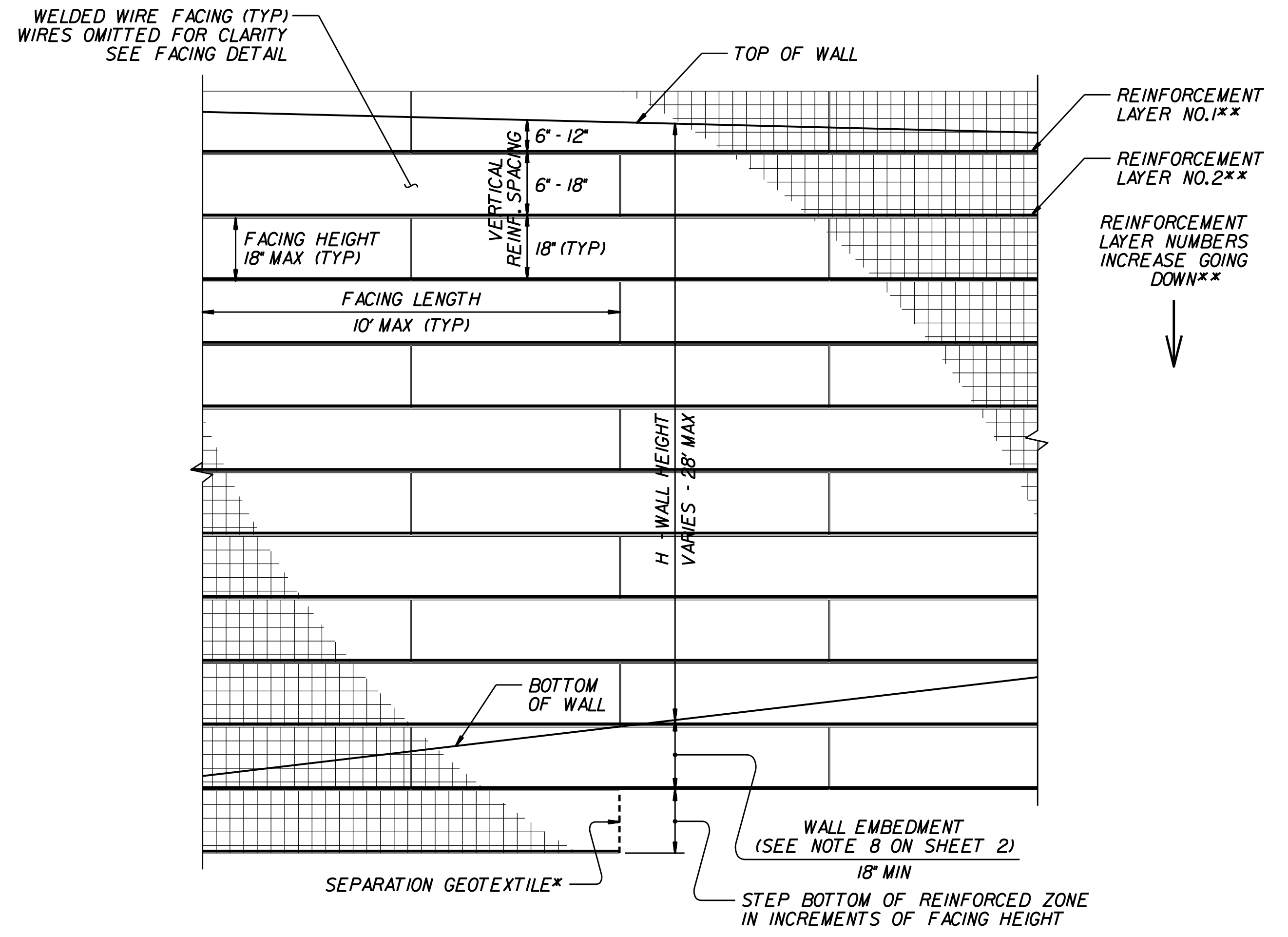
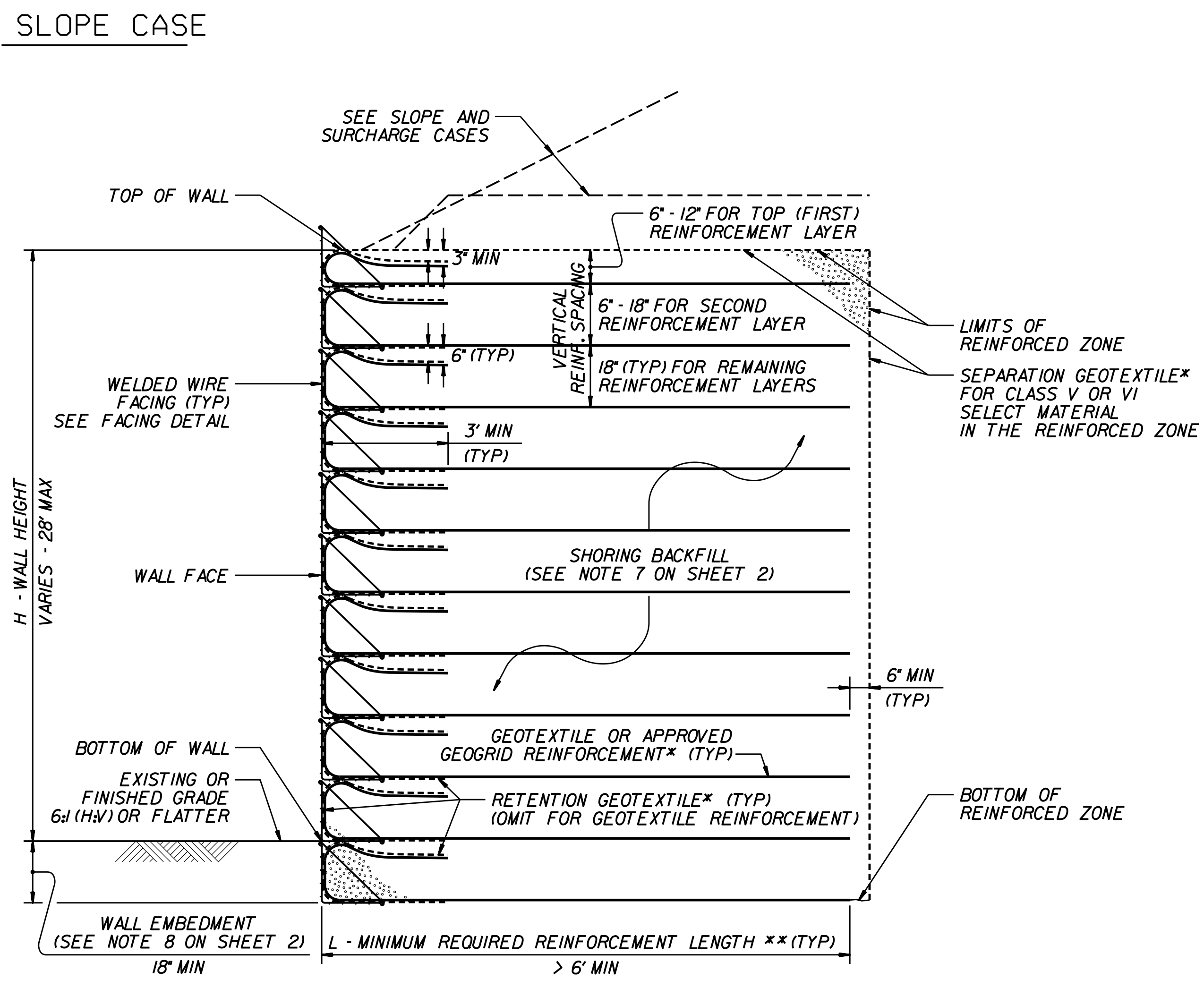
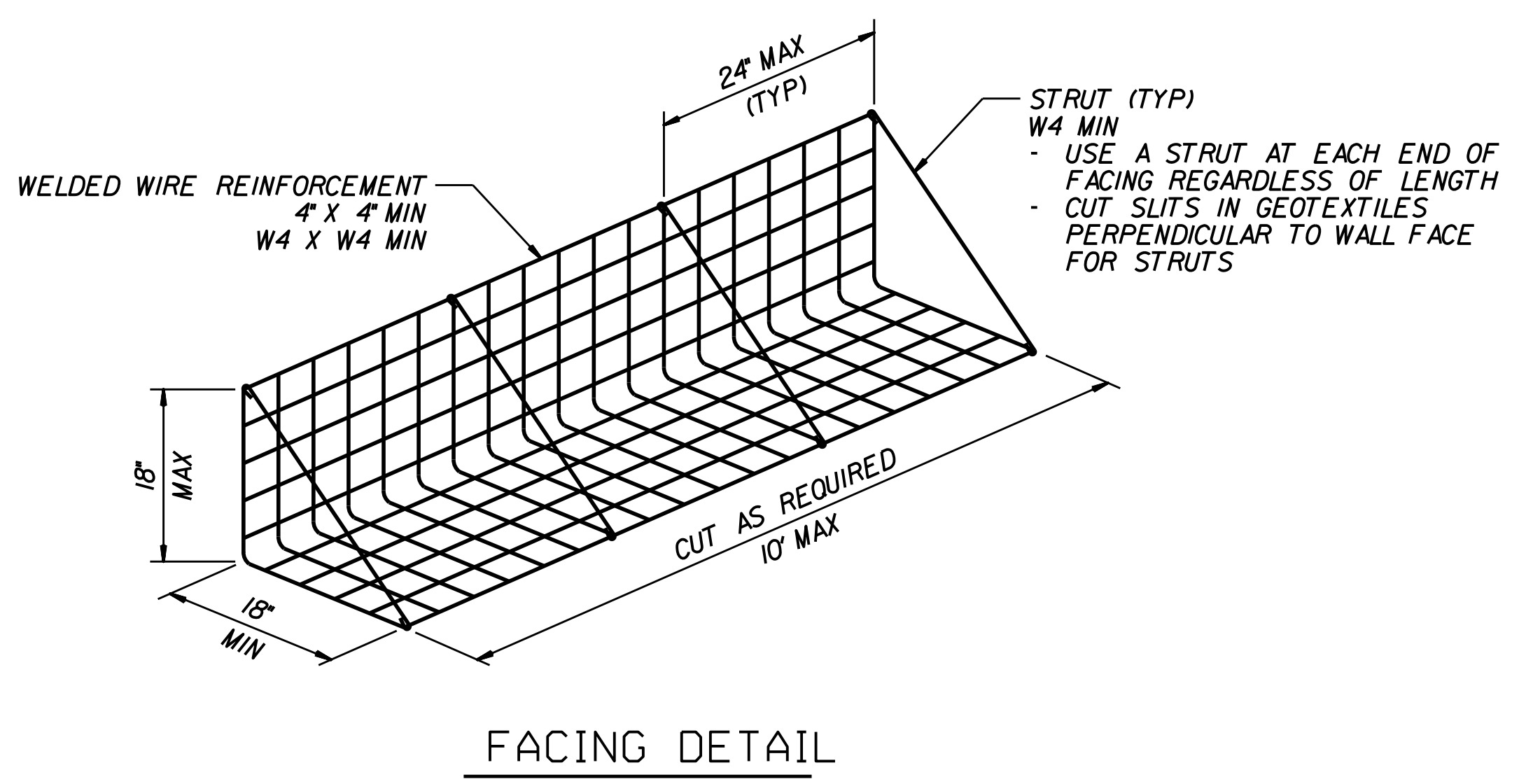
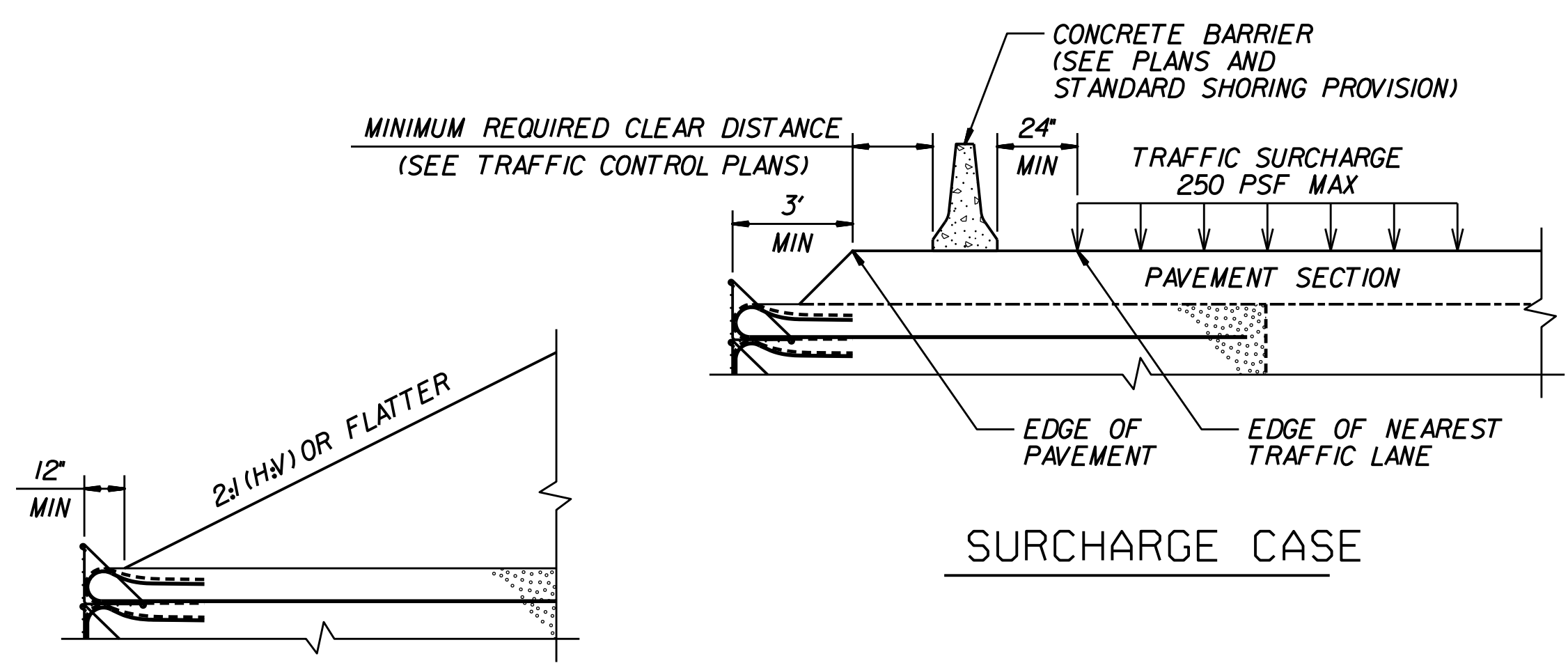
NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

GEOTECHNICAL  
ENGINEERING UNIT

SURCHARGE DETAILS

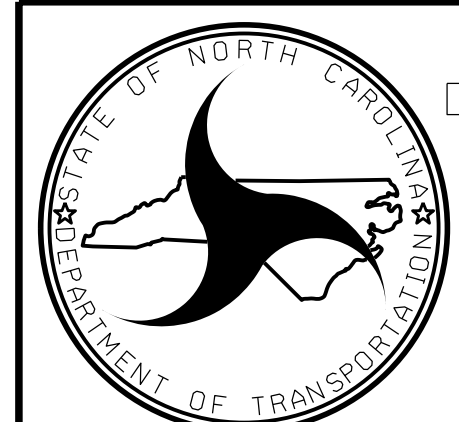
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PROJECT REFERENCE NO. SHEET NO.	
R-5808	2G-2
GEOTECHNICAL ENGINEER  DocuSigned by: Yanhui Lin 6/13/2024 SIGNATURE DATE	ENGINEER SIGNATURE DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	




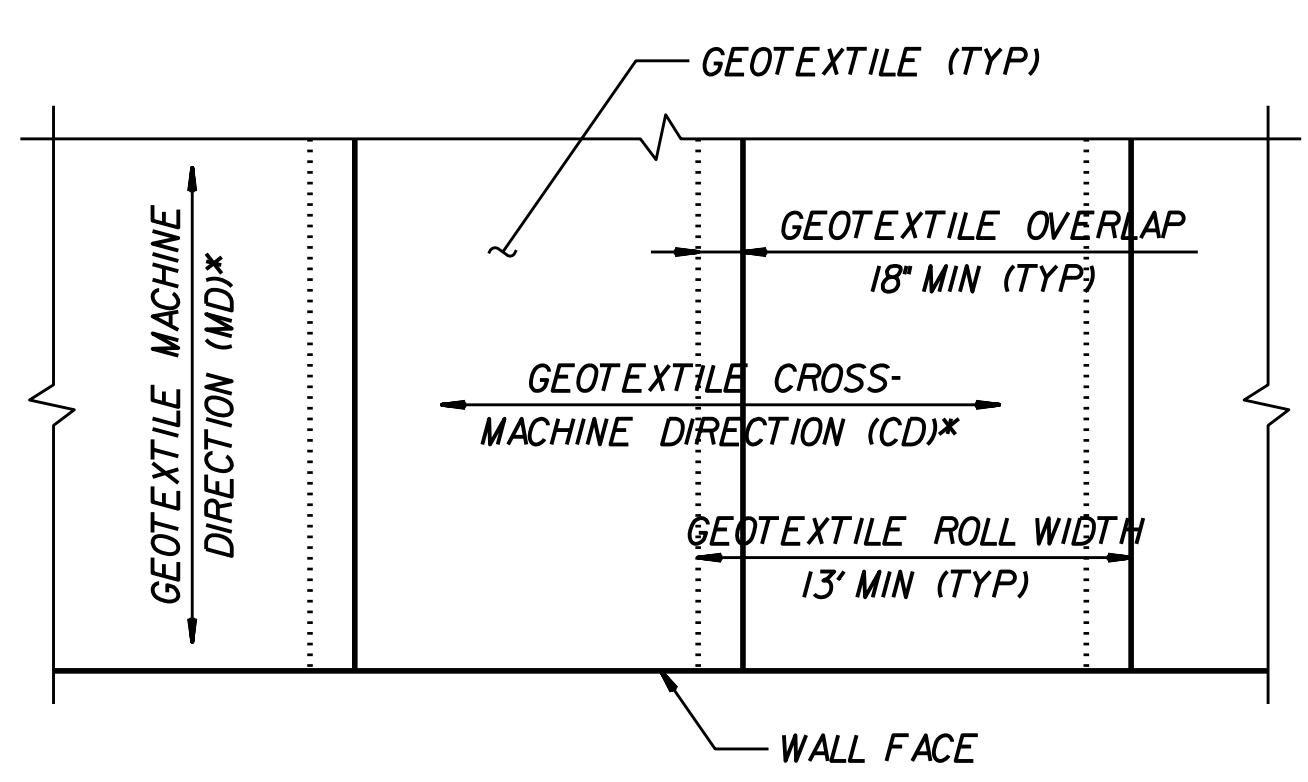
**STANDARD TEMPORARY WALL**  
 (FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)  
 \*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.  
 \*\*SEE REINFORCEMENT TABLES ON SHEET 3.

**STANDARD TEMPORARY WALL - PARTIAL ELEVATION**  
 \*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.  
 \*\*SEE REINFORCEMENT TABLES ON SHEET 3.

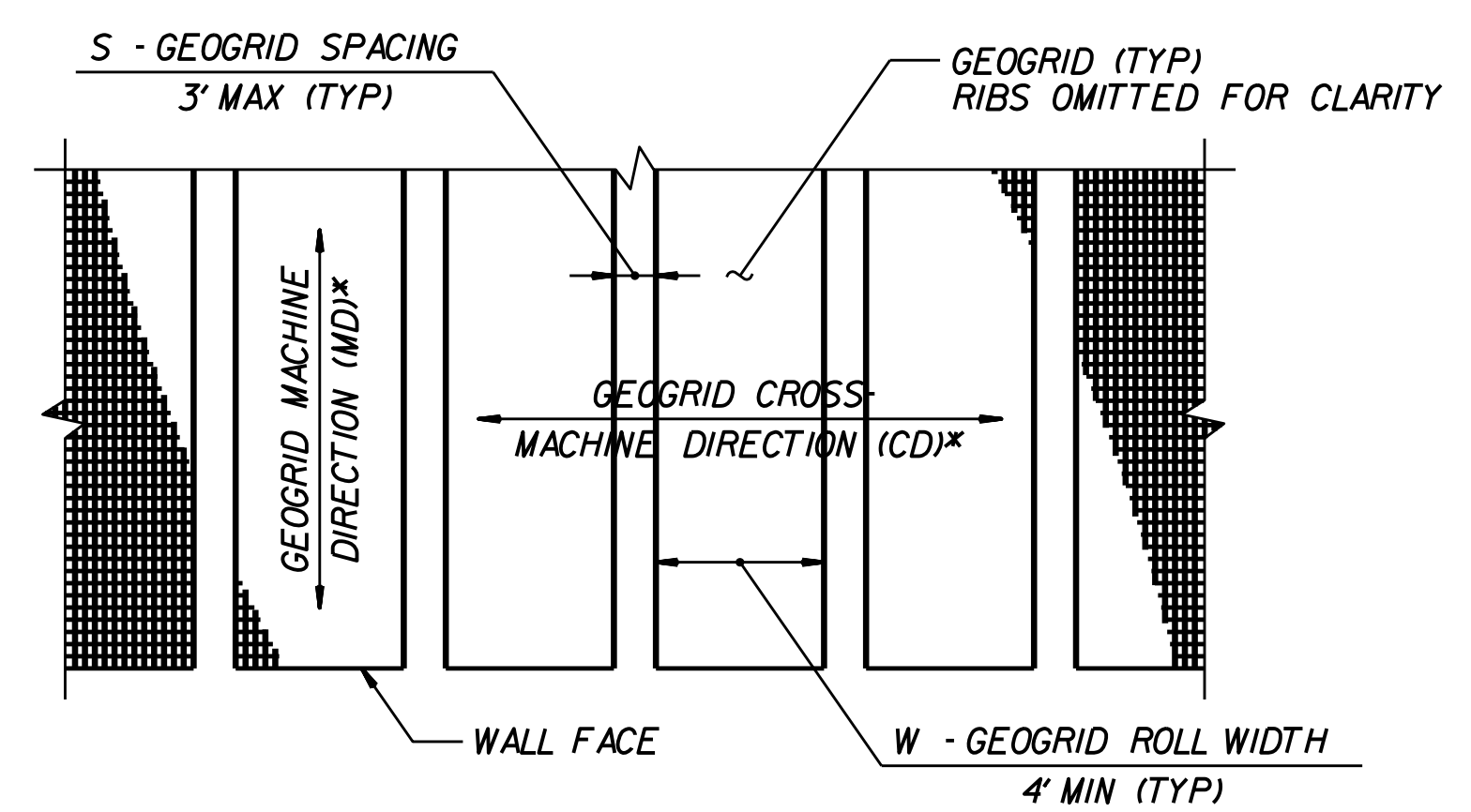
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT	STANDARD DETAIL NO. 1801.02
	STANDARD TEMPORARY WALL SHEET 1 OF 3 DATE: 11-19-13



PROJECT REFERENCE NO. SHEET NO.	
R-5808	2G-3
GEO TECHNICAL ENGINEER	ENGINEER
	
DocuSigned by: Yanhui Lin 6/13/2024	DATE
SIGNATURE	DATE
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

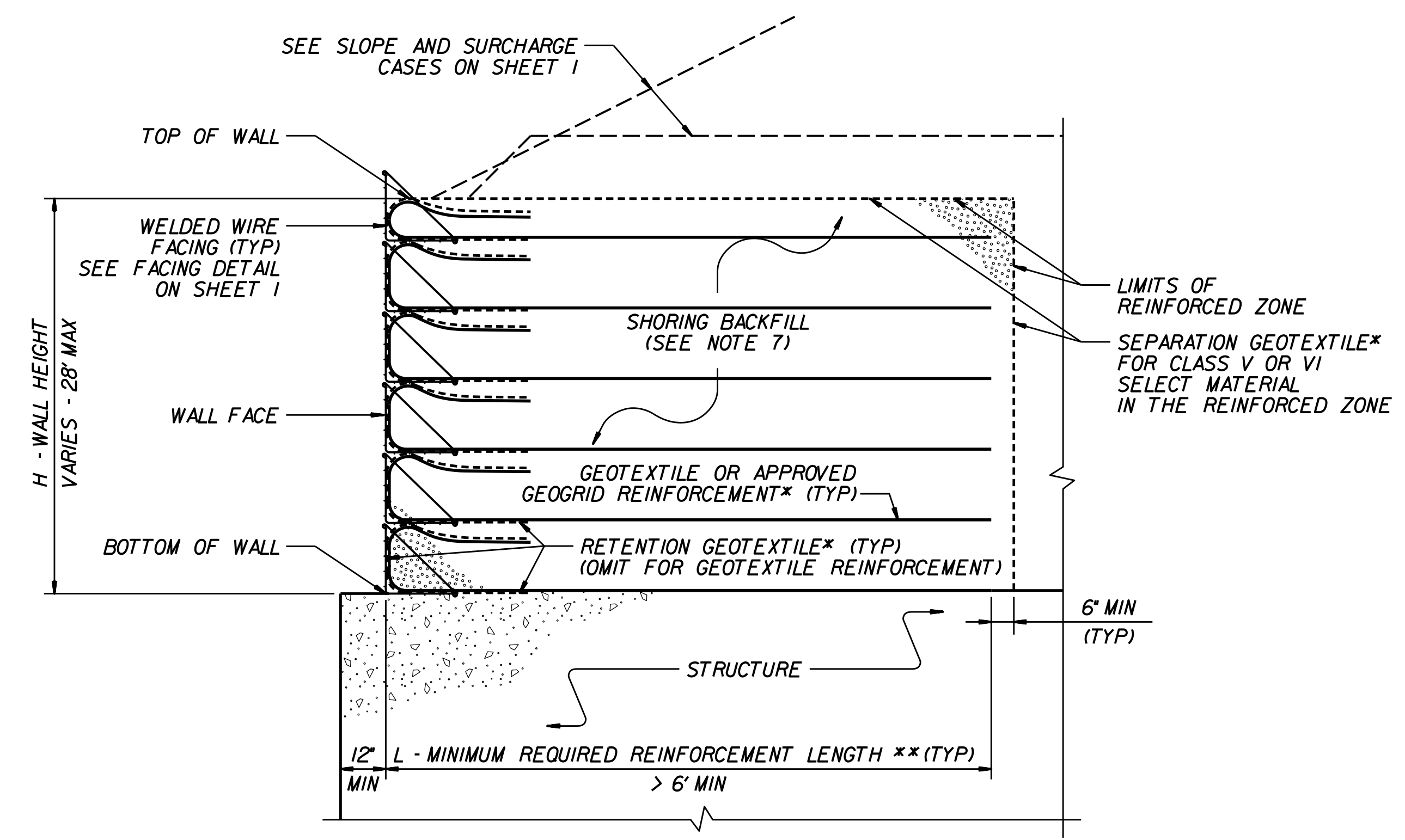


**GEO TEXTILE PLACEMENT**  
(100% COVERAGE MIN FOR  
GEO TEXTILE REINFORCEMENT)



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

**GEO SYNTHETIC PLACEMENT DETAILS**  
(PLAN VIEW)  
\*SEE NOTE 12.



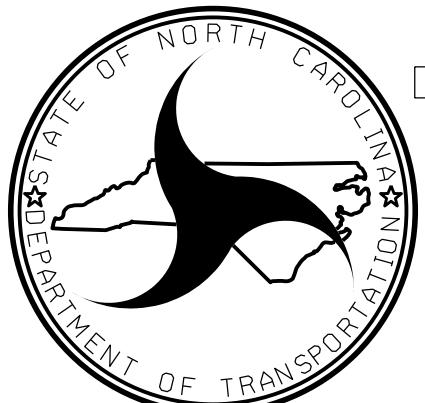
**TEMPORARY WALL ON STRUCTURE DETAIL**  
\*SEE GEOSYNTHETIC PLACEMENT DETAILS.  
\*\*SEE REINFORCEMENT TABLES ON SHEET 3.

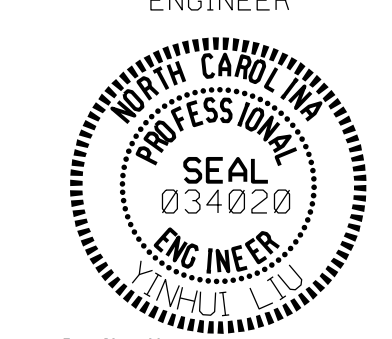
**NOTES:**

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
3. 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
4. DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
6. 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.
7. 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 GEO TEXTILE REINFORCEMENT.
8. WALL EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
9. DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
10. 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

11. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
12. 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)  $\cdot 4.5'$  AND  
- REINFORCEMENT STRENGTH IN CD  $\geq$  MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
13. 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)
14. DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
15. FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
16. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
17. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
18. FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
19. 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.

 <p style="text-align: center;">NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS</p> <p style="text-align: center;">GEO TECHNICAL ENGINEERING UNIT</p>	STANDARD DETAIL NO. 1801.02
	<p style="text-align: center;">STANDARD TEMPORARY WALL SHEET 2 OF 3</p> <p style="text-align: right;">DATE: 10-19-21</p>

PROJECT REFERENCE NO. SHEET NO.	
R-5808	2G-4
 GEOTECHNICAL ENGINEER ENGINEER	ENGINEER  _____ SIGNATURE DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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

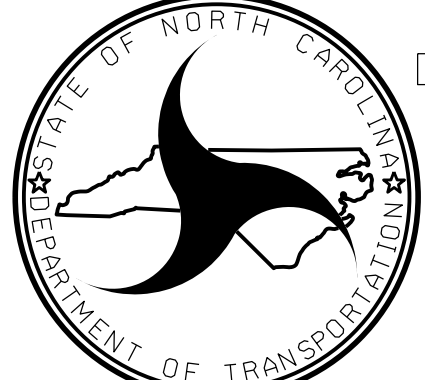
REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400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

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**SUMMARY OF EARTHWORK**  
IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT EXCAVATION	EMBT + %	BORROW	WASTE
-L- 17+59.05 TO 41+00.00	753	1229	5286	4533	1229
-L- 41+00.00 TO 71+00.00	1086	7721	19312	18226	7721
-L- 71+00.00 TO 101+00.00	240	8177	23552	23312	8177
-L- 101+00.00 TO 131+00.00	154	7435	23482	23328	7435
-L- 131+00.00 TO 161+00.00	202	8997	25464	25262	8997
-L- 161+00.00 TO 191+00.00	151	10391	30909	30758	10391
-L- 191+00.00 TO 221+00.00	127	10662	26491	26364	10662
-L- 221+00.00 TO 234+37.39	409	2792	7037	6628	2792
TEMPORARY EARTHWORK (TMP PHASES 1-4)					
-L- 17+99.63 TO 33+04.31	151		1125	974	
DETOUR REMOVAL	866				866
<b>TOTAL</b>	<b>4139</b>	<b>57404</b>	<b>162657</b>	<b>159384</b>	<b>58270</b>
MATERIAL FOR SHOULDER CONSTRUCTION			10855	10855	
UNSUITABLE WASTE MATERIAL	550				550
ADDITIONAL UNDERCUT EXCAVATION		10500	13650	13650	10500
SELECT GRANULAR IN LIEU OF BORROW			-78000	-78000	
SURCHARGE			33280	33280	
SURCHARGE REMOVAL	25600				25600
<b>PROJECT TOTAL</b>	<b>30289</b>	<b>67904</b>	<b>142442</b>	<b>139169</b>	<b>94920</b>
5% FOR REPLACING TOPSOIL				6958	
<b>GRAND TOTAL</b>	<b>30500</b>	<b>68000</b>		<b>146200</b>	

NOTES:

1. EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGNER. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.
2. QUANTITIES ARE APPROXIMATE ONLY. THE RESIDENT ENGINEER WILL USE METHODS INCLUDING BUT NOT LIMITED TO RECROSS SECTIONING, TRUCK MEASUREMENTS, AND AERIAL SURVEYS TO COMPUTE FINAL QUANTITIES WHICH THE CONTRACTOR WILL BE PAID.

REVISIONS

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO. R-5808 SHEET NO. 3B-2



4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

"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 TL-3  
NG = NON-GATING IMPACT ATTENUATOR TYPE TL-3

**GUARDRAIL SUMMARY**

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS					IMPACT ATTENUATOR TYPE TL-3			TERMINAL SECTIONS	REMOVE EXISTING GUARDRAIL	REMOVE AND RESET EXISTING GUARDRAIL	REMARKS				
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	CAT-1	AT-1	TYPE III	GREU TL-2	GREU TL-3	EA	G	NG								
-L-	21+53.00	27+78.00	RT	625'			22+03.00	27+28.00	10'	13'	50'	50'																		
-L-	21+53.00	27+78.00	LT	625'			22+03.00	27+28.00	10'	13'	50'	50'																		
			SUBTOTAL	1250.00'																										
	LESS ANCHOR DEDUCTIONS																													
			GREU TL-3	4 @ 50.00'																										
			PROJ. TOTAL	1050'																										
			SAY	1050'																										
	ADDITIONAL GUARDRAIL POSTS - 5 EA.																													

REVISIONS

REMOVAL OF EXISTING ASPHALT PAVEMENT			
LINE	STATION TO STATION	LOCATION	SQ. YDS.
-L-	17+53 TO 17+96	LT	4.85
-L-	17+87 TO 18+28	RT	16.96
-L-	22+79 TO 39+24	LT	785.75
-L-	39+36 TO 166+78	LT	8715.24
-L-	167+05 TO 231+19	LT	5308.75
TOTAL			14,831.55
SAY			14,840



COMPUTED BY: J.L. Stone, PG DATE: 06/06/24  
 CHECKED BY: Y. Liu P.E. DATE: 06/06/24

(2-3-23)

PROJECT NO.  
R-5808

SHEET NO.  
3G-1

**STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS**

**SUMMARY OF SUBSURFACE DRAINAGE**

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	500
				<b>TOTAL LF:</b>	500

\*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 Subgrade Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
L	17+59	21+75	ASU(1)	12"	150	300	450		
L	29+25	43+25	ASU(1)	12"	250	500	750		
CONTINGENCY			ASU(1)	12"	100	200	300		
					<b>TOTAL CY/TONS/SY:</b>	500	1000**	1500**	

\*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 Subgrade 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.

**SUMMARY OF SURCHARGES  
 AND SURCHARGE WAITING PERIODS**

LINE	Station	Station	Surcharge Height FT	MONTHS
-L-	45+75	230+25	3.0	2

**SUMMARY OF SETTLEMENT GAUGES**

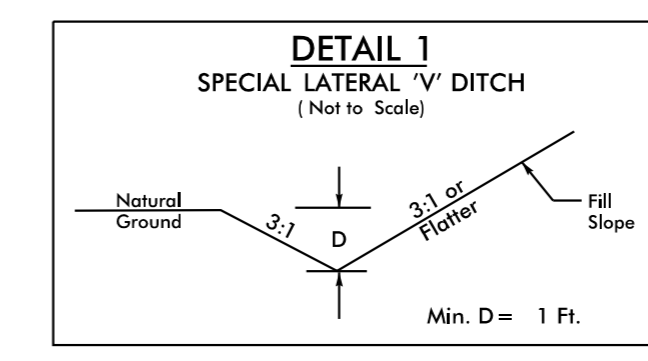
Gauge No.	LINE and Station	Offset	
		Distance FT	Direction LT/RT
SG1	-L- 47+50	20	RT
SG2	-L- 60+00	20	RT
SG3	-L- 75+00	22	RT
SG4	-L- 90+50	22	RT
SG5	-L- 105+00	20	RT
SG6	-L- 120+00	20	RT
SG7	-L- 135+00	20	RT
SG8	-L- 150+00	20	RT
SG9	-L- 165+00	20	RT
SG10	-L- 180+00	20	RT
SG11	-L- 195+00	20	RT
SG12	-L- 210+00	20	RT
SG13	-L- 225+00	20	RT
<b>TOTAL GAUGES (EACH):</b>		13	



5/14/99

-L-

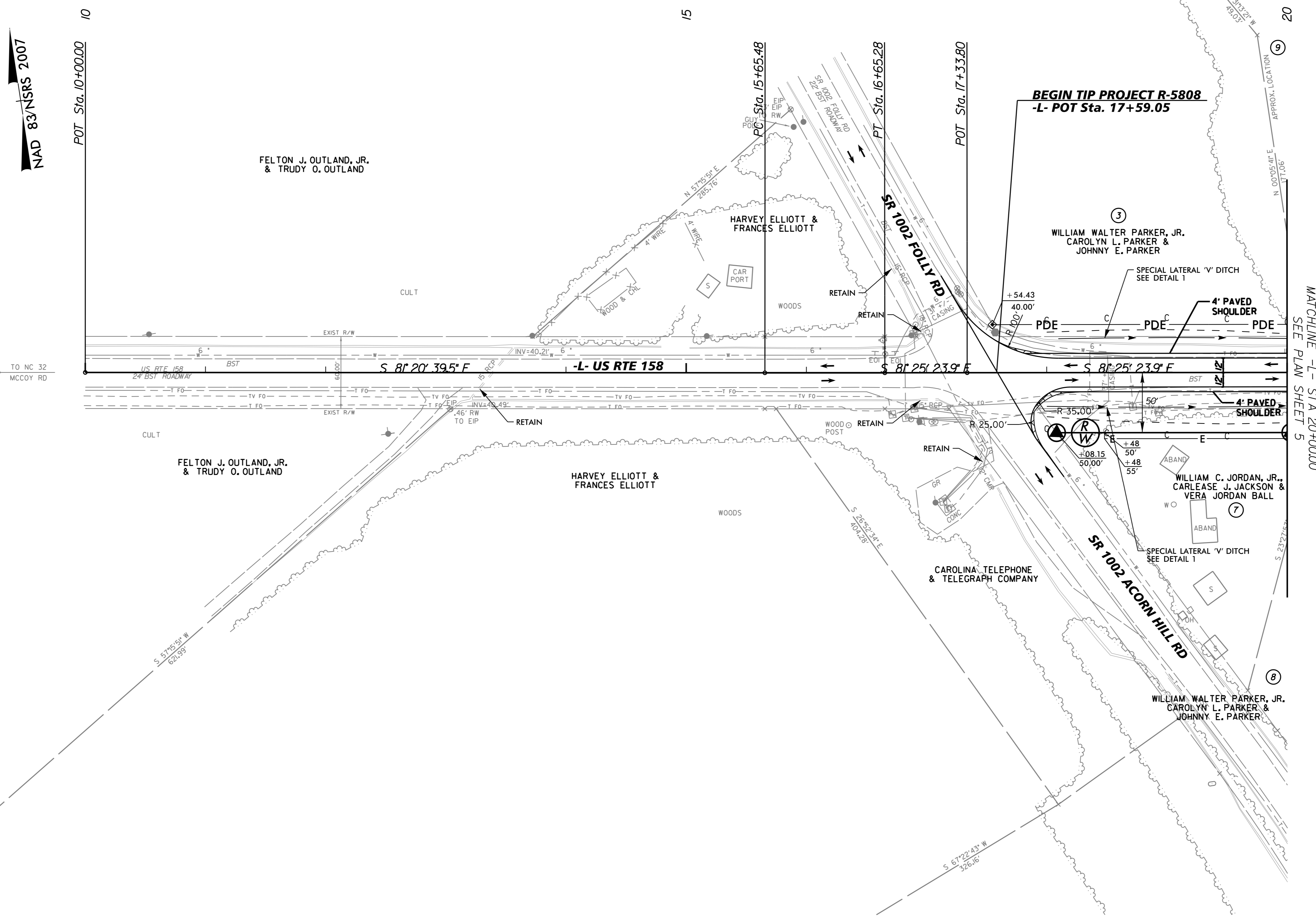
$PI\ Sta\ 16+15.38$   
 $\Delta = 0^{\circ}04'44.4" (LT)$   
 $D = 0^{\circ}04'45.0"$   
 $L = 99.80'$   
 $T = 49.90'$   
 $R = 72,370.32'$



FROM STA. 18+00 TO STA. 21+00 -L- (LT)  
 FROM STA. 18+00 TO STA. 21+50 -L- (RT)

PROJECT REFERENCE NO. <b>R-5808</b>		SHEET NO. <b>4</b>	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
9/6/2024		9/6/2024	

REVISIONS



7/17/2024

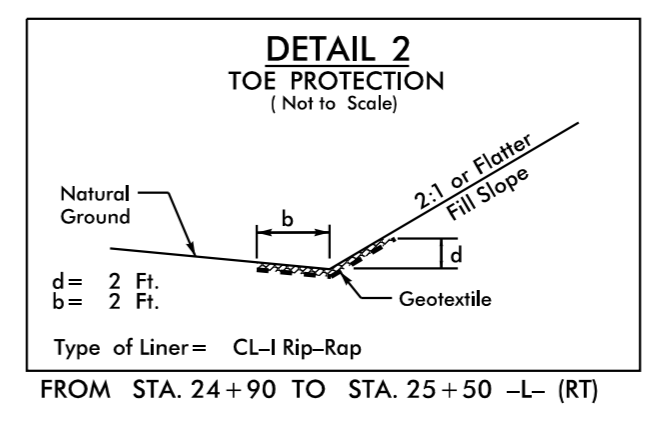
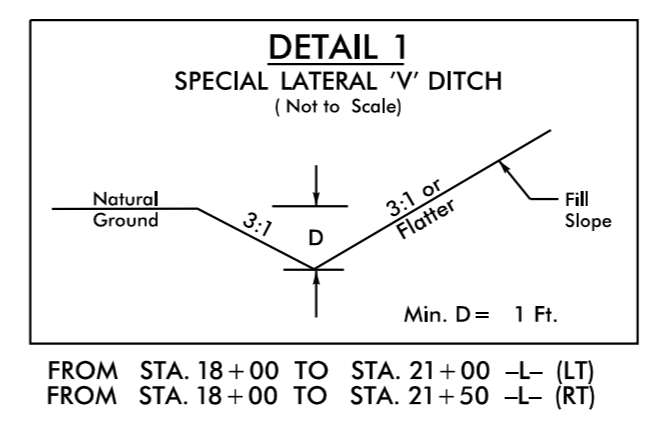
SEE SHEET NO. 23 FOR -L- PROFILE



5/14/99

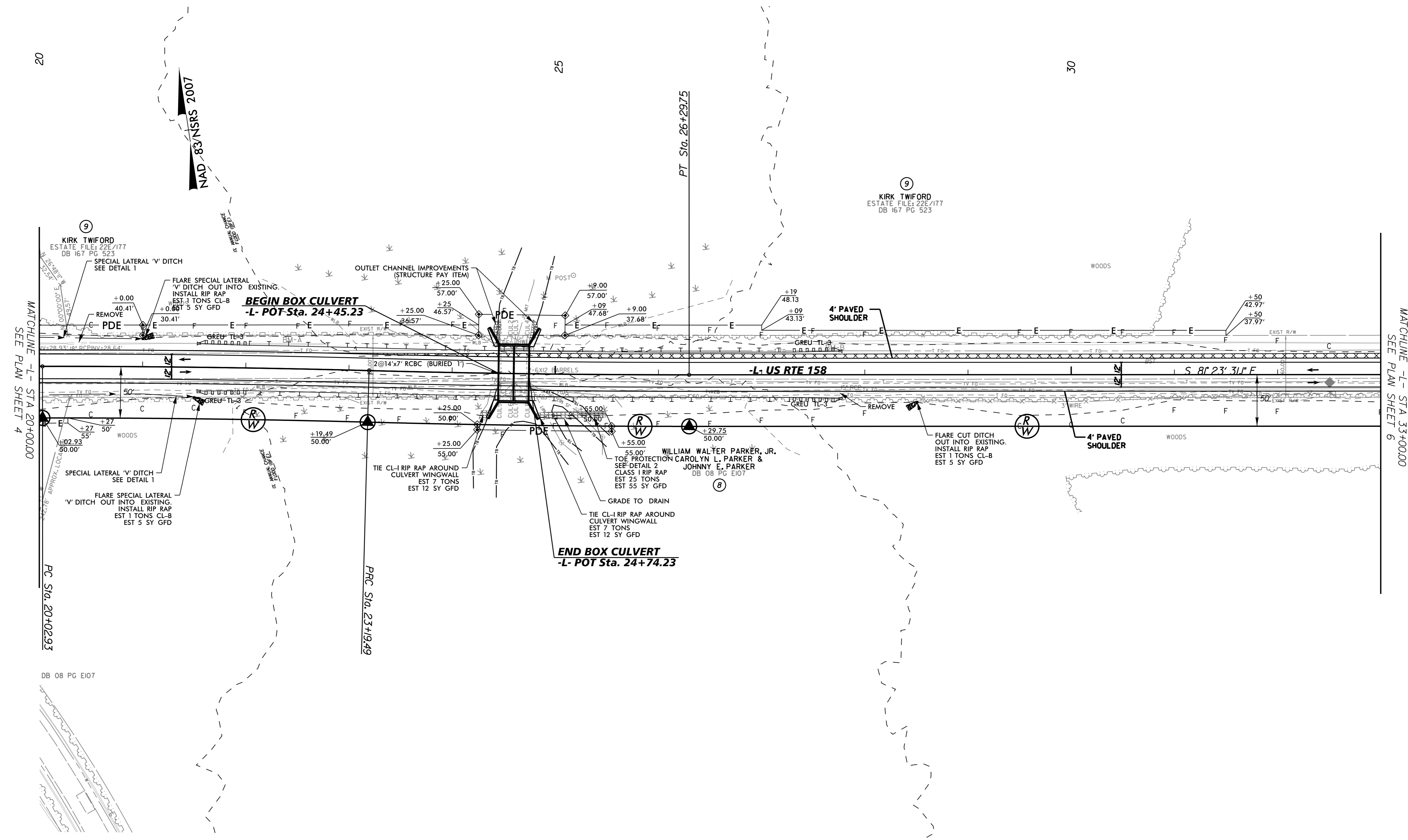
-L-

PI Sta 21+61.22	PI Sta 24+74.63
$\Delta = 1^{\circ} 34' 37.8" (RT)$	$\Delta = 1^{\circ} 32' 44.9" (LT)$
$D = 0^{\circ} 29' 53.6"$	$D = 0^{\circ} 29' 53.6"$
$L = 316.56'$	$L = 310.26'$
$T = 158.29'$	$T = 155.14'$
$R = 11,500.00'$	$R = 11,500.00'$



PROJECT REFERENCE NO. R-5808		SHEET NO. 5	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
4525 MAIN STREET, SUITE 1000 VIRGINIA BEACH, VA 23462			

REVISIONS



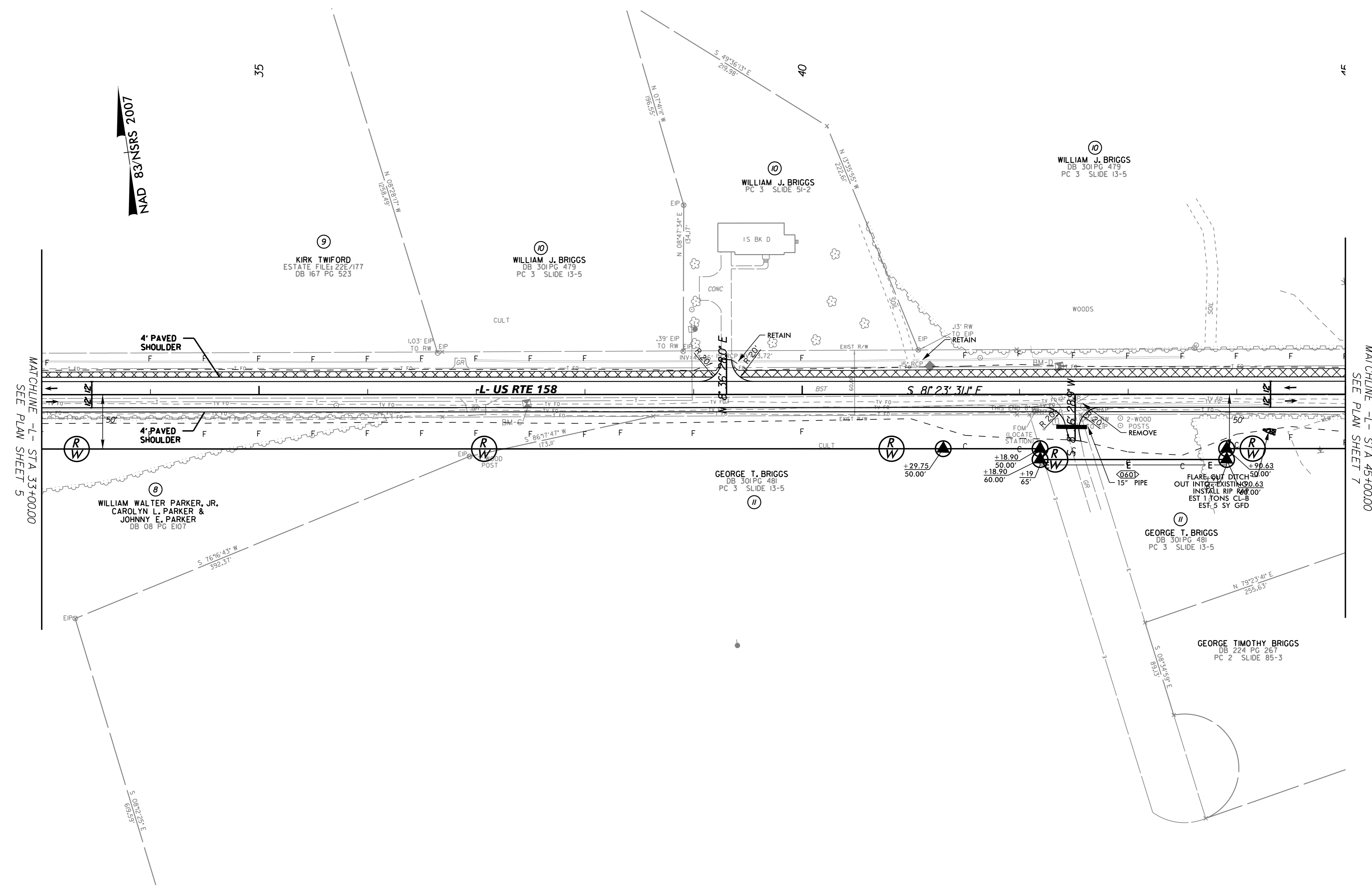
7/17/2024

SEE SHEET NO. 23 FOR -L- PROFILE

5/14/99

PROJECT REFERENCE NO. <i>R-5808</i>		SHEET NO. 6
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
9/6/2024		9/6/2024

REVISIONS



MATCHLINE -L- STA 33+00.00  
SEE PLAN SHEET 5

MATCHLINE -L- STA 45+00.00  
SEE PLAN SHEET 7

SEE SHEET NO. 23 FOR -L- PROFILE

7/17/2024

5/14/99

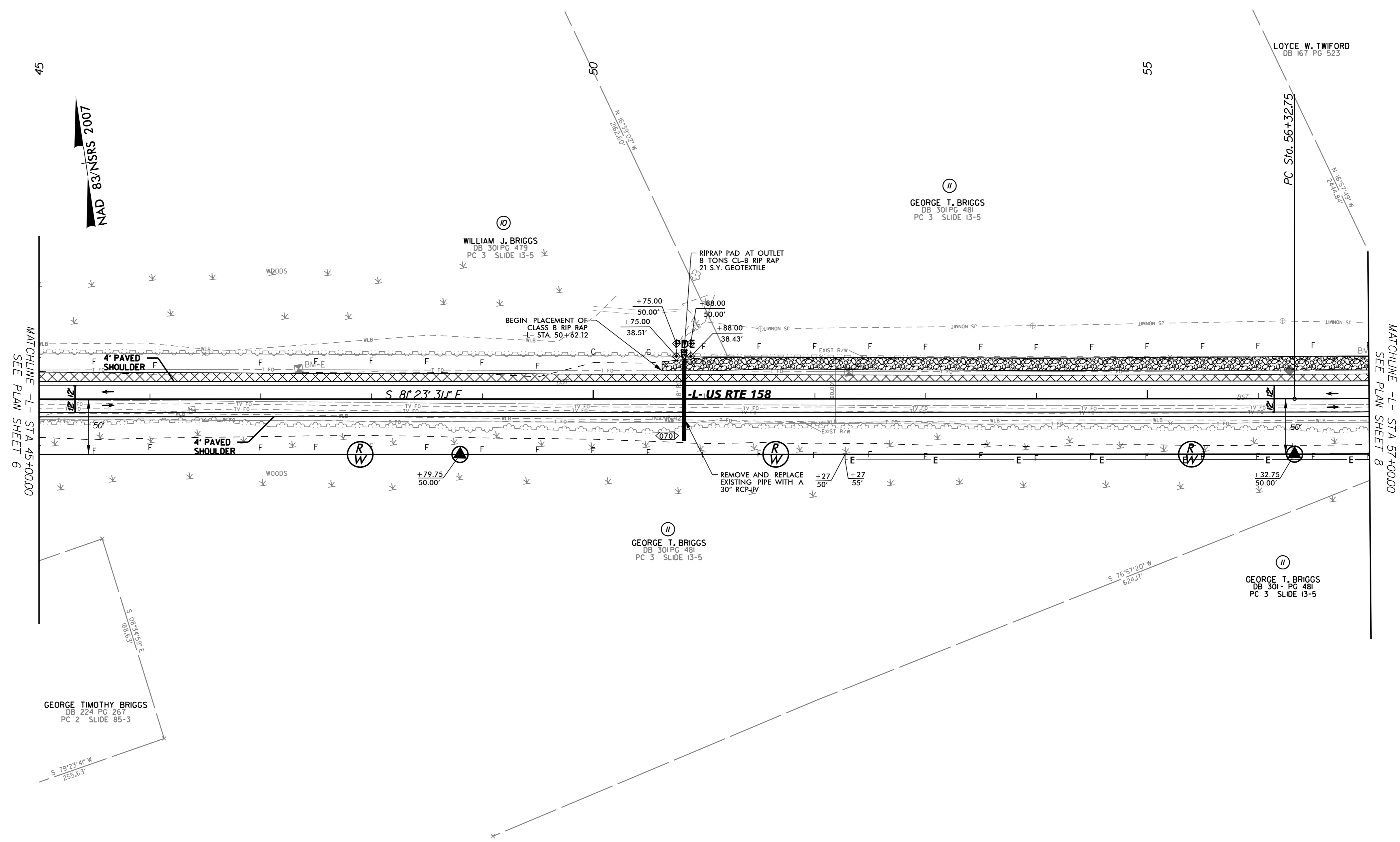
-L-

PI Sta 56+83.31  
 $\Delta = 0^\circ 25' 44.9''$  (LT)  
 $D = 0^\circ 25' 27.9''$   
 $L = 101.1'$   
 $T = 50.56'$   
 $R = 13,500.00'$

**Kimley » Horn**  
 4525 MAIN STREET, SUITE 1000  
 VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO. R-5808	SHEET NO. 7
ROADWAY DESIGN ENGINEER VINCENT E. RICCO DB 301 PG 481 PC 3 SLIDE 13-5 9/6/2024	HYDRAULICS ENGINEER DAVID L. HURSEY DB 301 PG 481 PC 3 SLIDE 13-5 9/6/2024

REVISIONS



7/17/2024

SEE SHEET NO. 23 AND 24 FOR -L- PROFILE

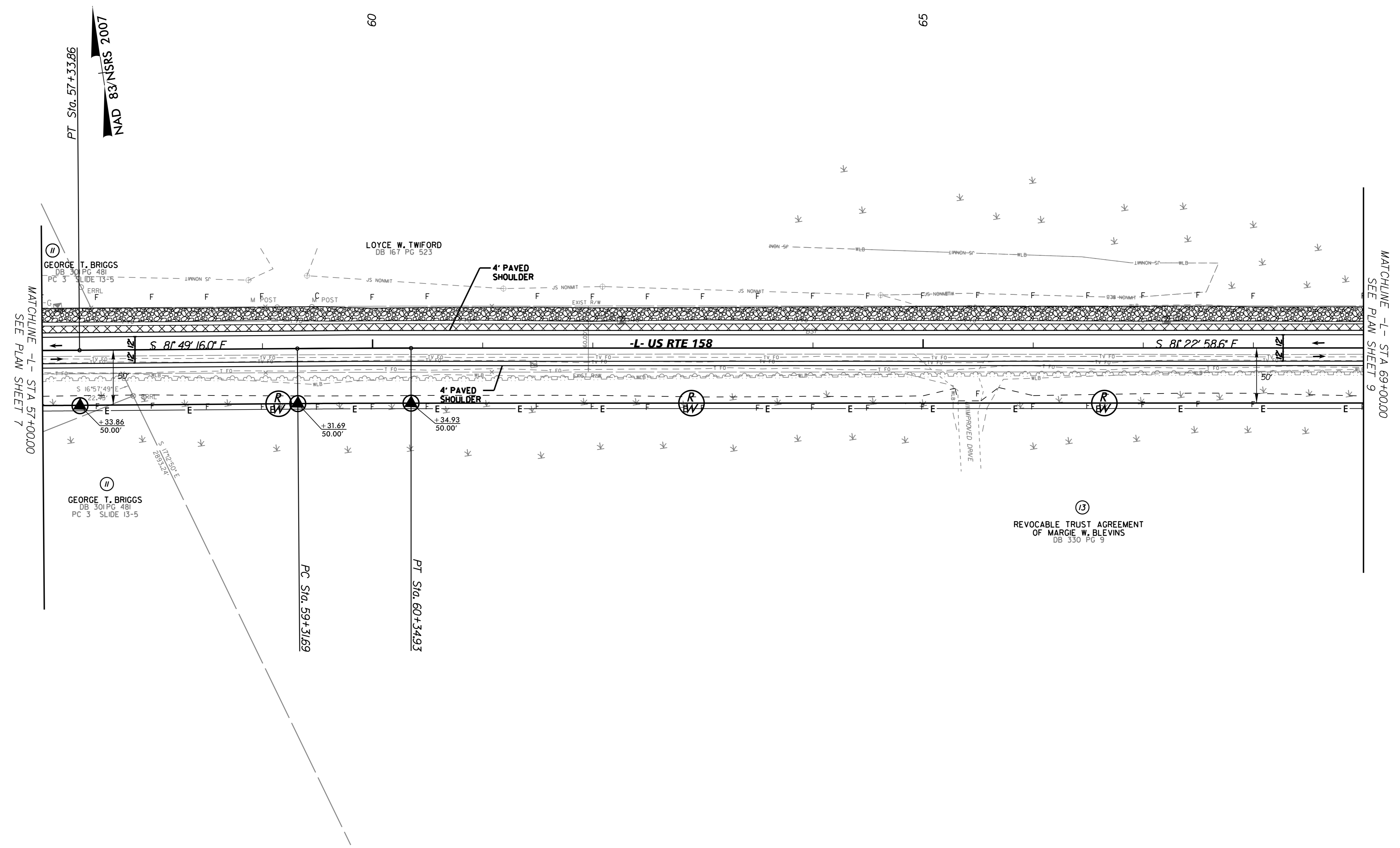
5/14/99

-L-

$PI\ Sta\ 56+83.31$	$PI\ Sta\ 59+83.31$
$\Delta = 0^\circ 25' 44.9" (LT)$	$\Delta = 0^\circ 26' 17.4" (RT)$
$D = 0^\circ 25' 27.9"$	$D = 0^\circ 25' 27.9"$
$L = 101.1'$	$L = 103.24'$
$T = 50.56'$	$T = 51.62'$
$R = 13,500.00'$	$R = 13,500.00'$

PROJECT REFERENCE NO. R-5808		SHEET NO. 8	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
4525 MAIN STREET, SUITE 1000 VIRGINIA BEACH, VA 23462			

REVISIONS



7/17/2024

SEE SHEET NO. 24 FOR -L- PROFILE

5/14/99

PROJECT REFERENCE NO. <i>R-5808</i>		SHEET NO. 9
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
VINCENT E. RICCIO 9/6/2024		DAVID L. HURSEY 9/6/2024

Kimley » Horn  
4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

NAD 83/NRS 2007

70

75

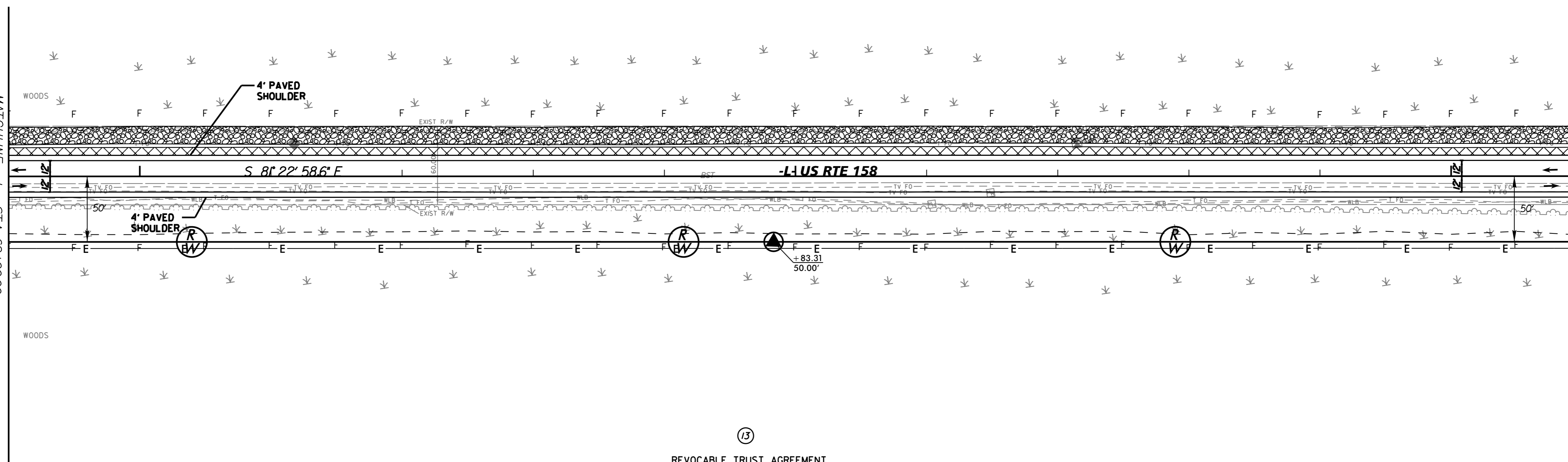
80

LOYCE W. TWIFORD  
DB 167 PG 523

REVISIONS

MATCHLINE -L- STA 69+00.00  
SEE PLAN SHEET 8

MATCHLINE -L- STA 81+00.00  
SEE PLAN SHEET 10



(13)  
REVOCABLE TRUST AGREEMENT  
OF MARGIE W. BLEVINS  
DB 330 PG 9

7/17/2024

SEE SHEET NO. 24 AND 25 FOR -L- PROFILE

5/14/99

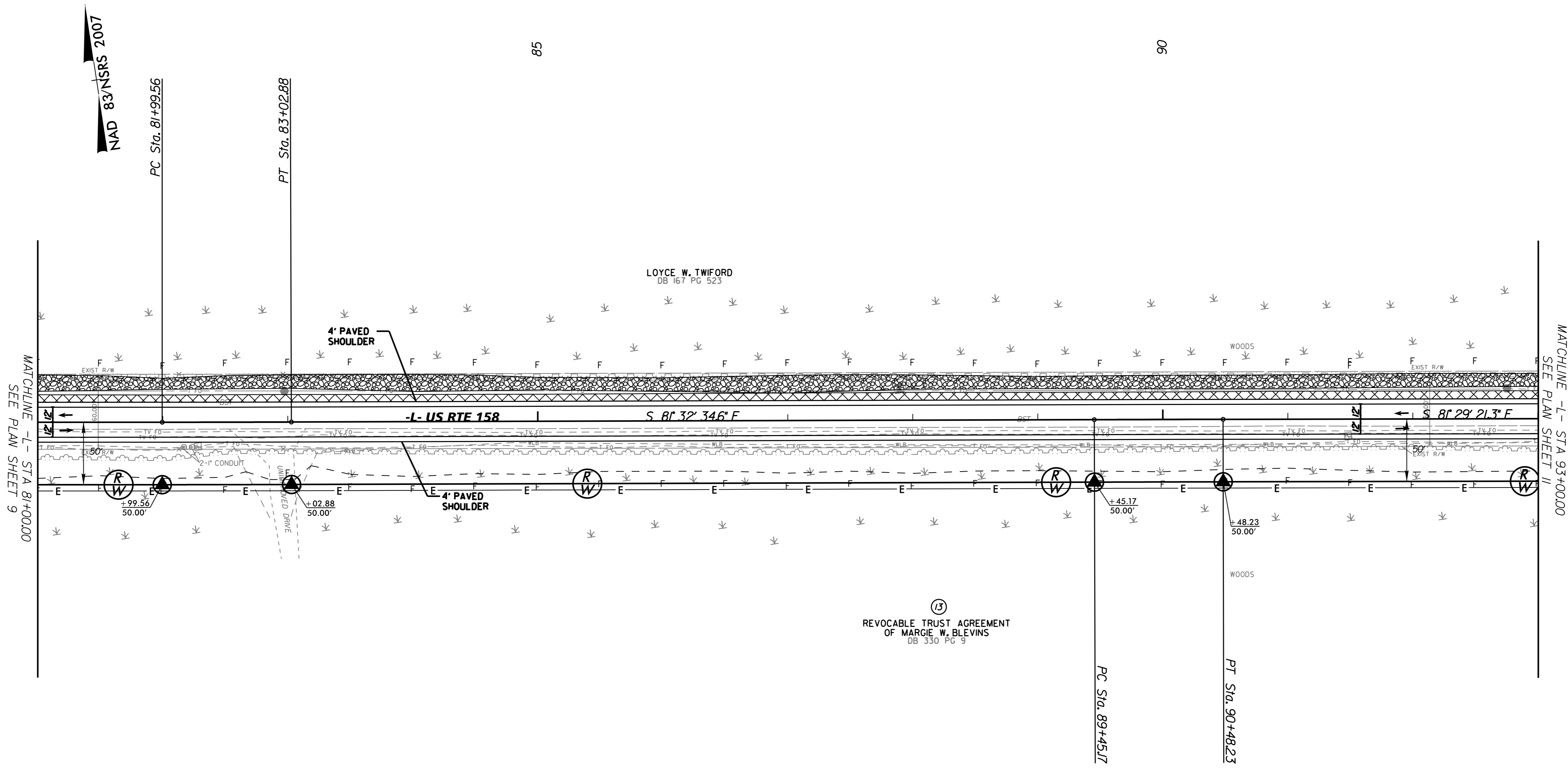
-L-

PI Sta 82+51.22	PI Sta 89+96.70
$\Delta = 0^{\circ} 09' 36.0''$ (LT)	$\Delta = 0^{\circ} 03' 13.2''$ (RT)
$D = 0^{\circ} 09' 17.5''$	$D = 0^{\circ} 03' 07.5''$
$L = 103.32'$	$L = 103.05'$
$T = 51.66'$	$T = 51.53'$
$R = 37,000.00'$	$R = 110,000.00'$

PROJECT REFERENCE NO. R-5808		SHEET NO. 10
ROADWAY DESIGN ENGINEER VINCENT E. RICCO		HYDRAULICS ENGINEER DAVID L. HURSEY
9/6/2024		9/6/2024

Kimley & Horn  
4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

REVISIONS



7/17/2024

SEE SHEET NO. 25 FOR -L- PROFILE

5/14/99

PROJECT REFERENCE NO. R-5808		SHEET NO. 11
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER

-L-

PI Sta 94+91.90	PI Sta 103+03.52
$\Delta = 0' 07' 12.6''$ (RT)	$\Delta = 0' 08' 23.7''$ (RT)
$D = 0' 06' 52.5''$	$D = 0' 07' 59.7''$
$L = 104.87'$	$L = 105.00'$
$T = 52.44'$	$T = 52.50'$
$R = 50,000.00'$	$R = 43,000.00'$

NAD 83/NSRS 2007

95

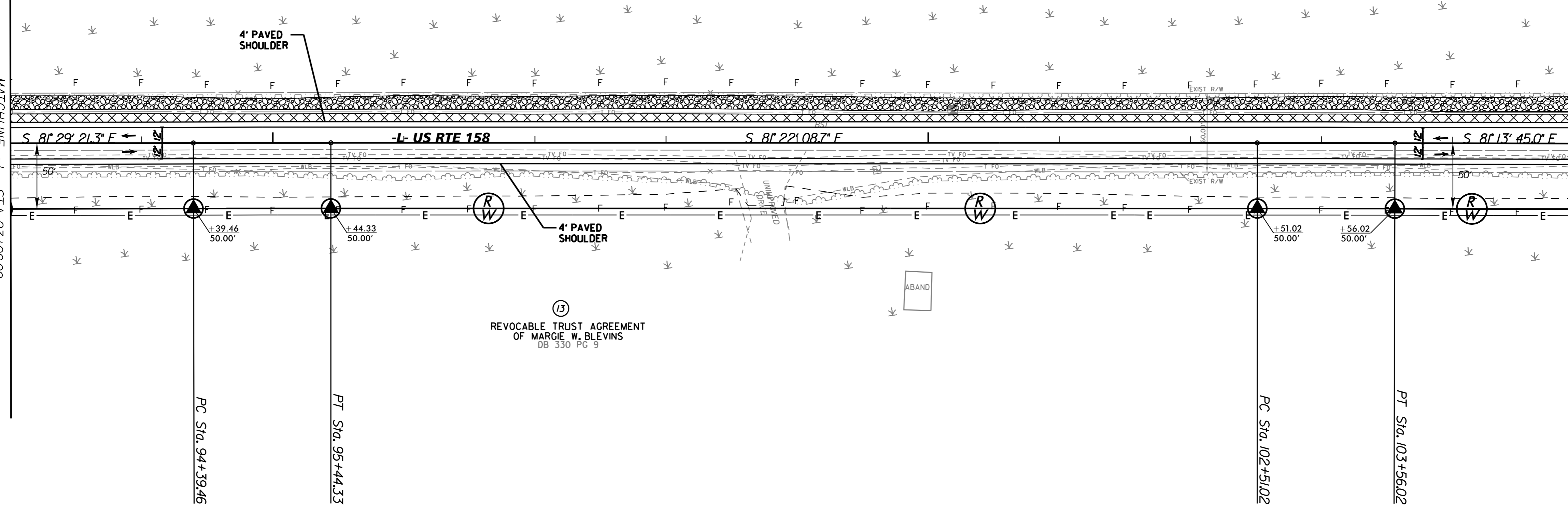
100

105

LOYCE W. TWIFORD  
DB 167 PG 523

MATCHLINE -L- STA 93+00.00  
SEE PLAN SHEET 10

MATCHLINE -L- STA 105+00.00  
SEE PLAN SHEET 12



REVISIONS

7/17/2024

SEE SHEET NO. 25 AND 26 FOR -L- PROFILE

5/14/99

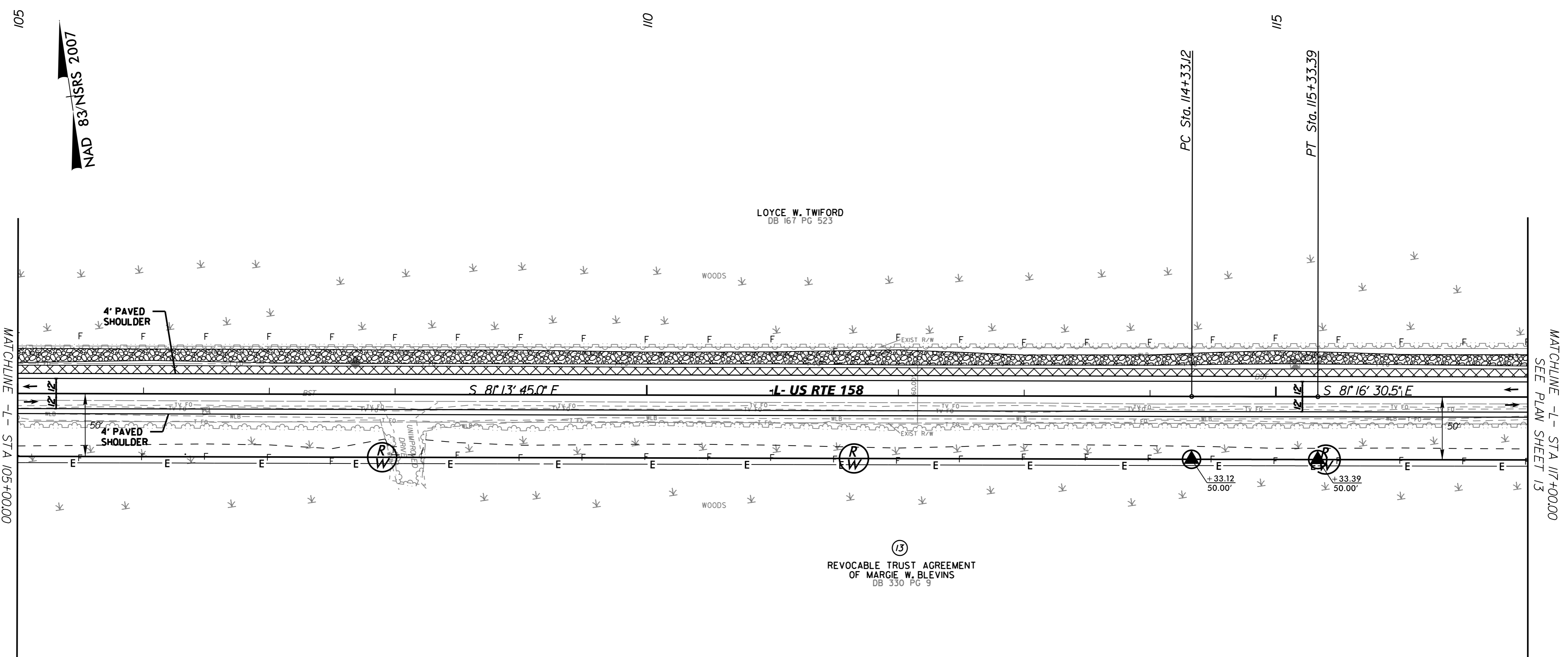
-L-

PI Sta 114+83.26  
Δ = 0° 02' 45.5" (LT)  
D = 0° 02' 45.0"  
L = 100.27'  
T = 50.13'  
R = 125,000.00'

PROJECT REFERENCE NO. R-5808		SHEET NO. 12	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
VINCENT E. RICCIO 9/6/2024		DAVID L. HURSEY 9/6/2024	

Kimley » Horn  
4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

REVISIONS



7/17/2024

SEE SHEET NO. 26 FOR -L- PROFILE



5/14/99

-L-

PI Sta. 119+83.31  
 $\Delta = 0^{\circ} 07' 00.6" (LT)$   
 $D = 0^{\circ} 06' 52.5"$   
 $L = 101.95'$   
 $T = 50.97'$   
 $R = 50,000.00'$

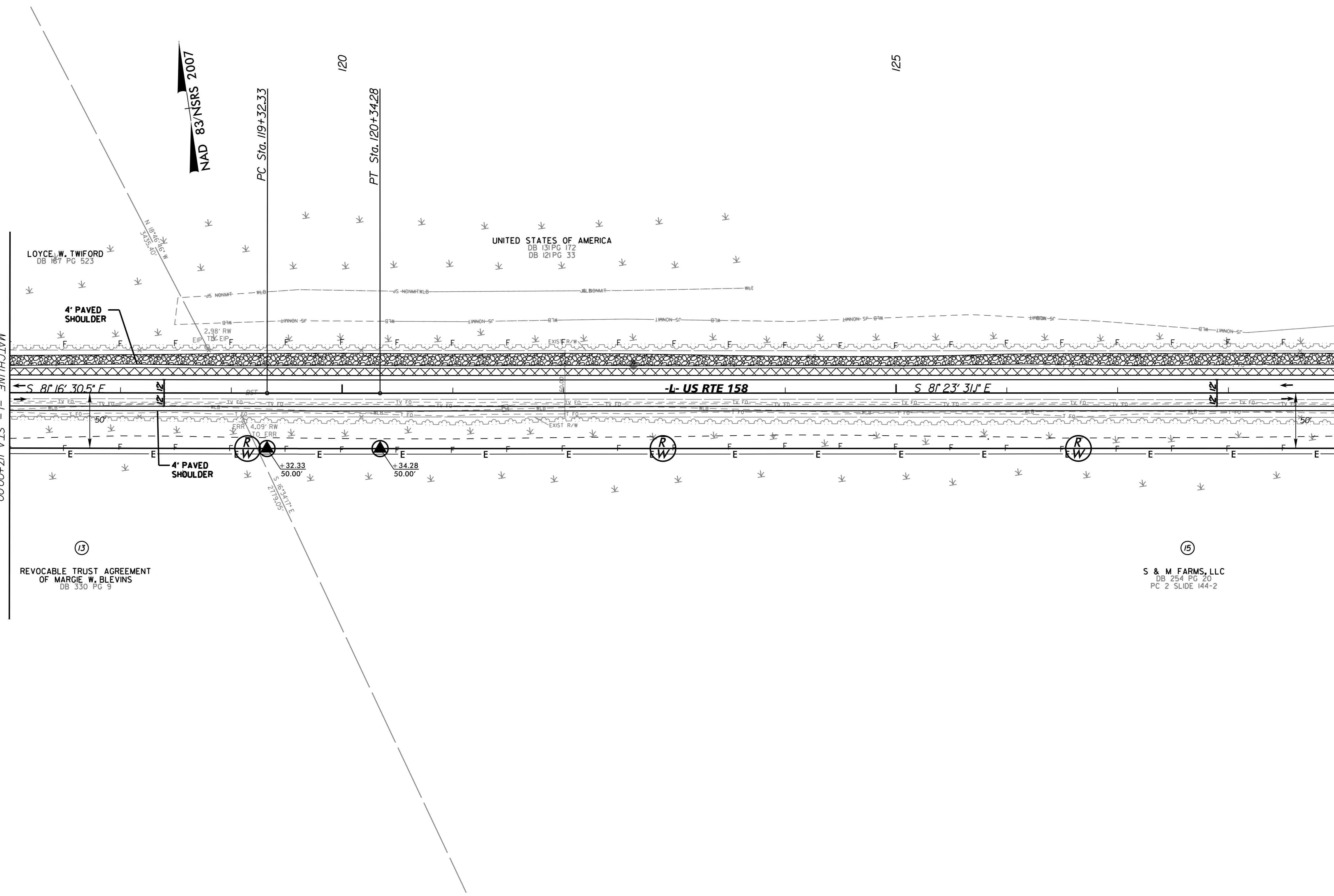
PROJECT REFERENCE NO. R-5808		SHEET NO. 13	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
VINCENT E. RICCIO 9/6/2024		DAVID L. HURSEY 9/6/2024	

Kimley » Horn  
 4525 MAIN STREET, SUITE 1000  
 VIRGINIA BEACH, VA 23462

REVISIONS

MATCHLINE -L- STA 117+00.00  
SEE PLAN SHEET 12

MATCHLINE -L- STA 129+00.00  
SEE PLAN SHEET 14



7/17/2024

SEE SHEET NO. 26 AND 27 FOR -L- PROFILE

5/14/99

PROJECT REFERENCE NO. R-5808		SHEET NO. 14	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
VINCENT E. RICCIO ENGINEER 9/6/2024		DAVID L. HURSEY ENGINEER 9/6/2024	

**Kimley » Horn**  
4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

NAD 83 NSRS 2007

130

135

140

UNITED STATES OF AMERICA  
DB 131 PG 172  
DB 121 PG 33

WOODS

4' PAVED SHOULDER

4' PAVED SHOULDER

S 81° 23' 31" E - to US RTE 158

WOODS

(B)  
S & M FARMS, LLC  
DB 254 PG 20  
PC 2 SLIDE 144-2

MATCHLINE -L- STA 129+00.00  
SEE PLAN SHEET 13

MATCHLINE -L- STA 141+00.00  
SEE PLAN SHEET 15

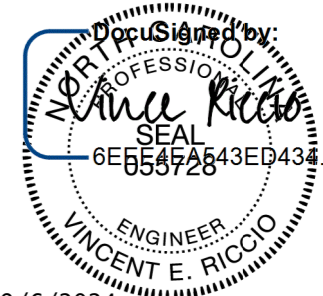
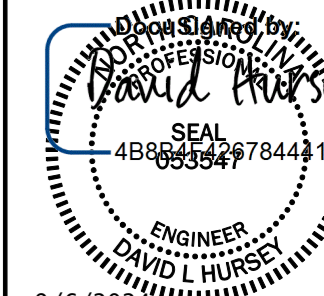
REVISIONS

7/17/2024

SEE SHEET NO. 27 FOR -L- PROFILE

5/14/99

**Kimley » Horn**  
4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5808	15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	
9/6/2024	9/6/2024

NAD 83 NSRS 2007

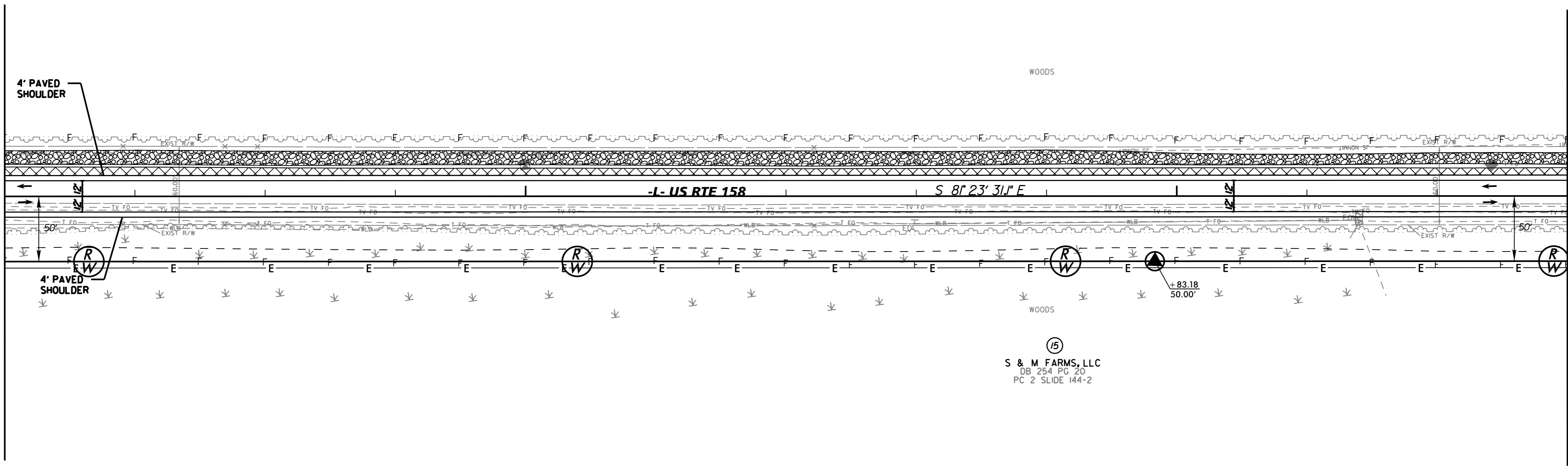
145

150

UNITED STATES OF AMERICA  
DB 131 PG 172  
DB 121 PG 33

REVISIONS

MATCHLINE - L - STA 141+00.00  
SEE PLAN SHEET 14



MATCHLINE - L - STA 153+00.00  
SEE PLAN SHEET 16

(5)  
S & M FARMS, LLC  
DB 254 PG 20  
PC 2 SLIDE 144-2

SEE SHEET NO. 27 FOR -L- PROFILE

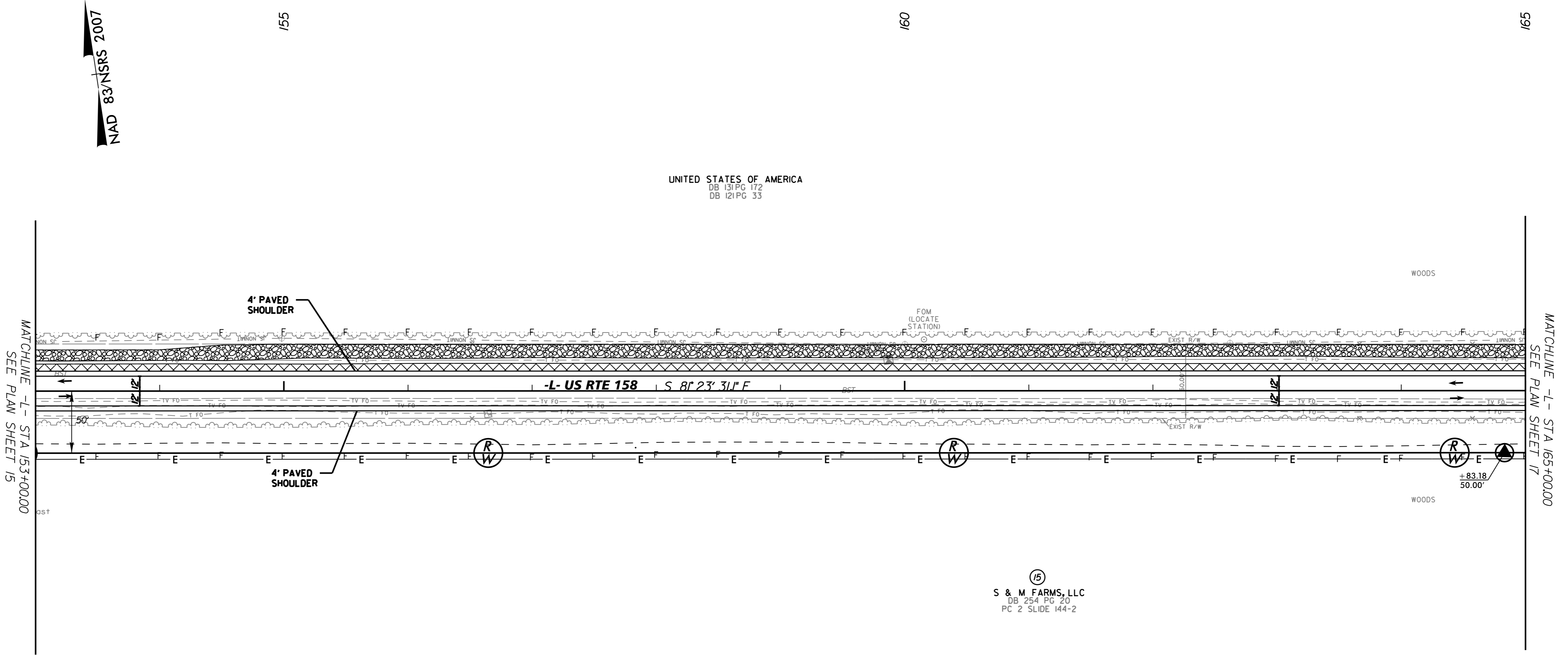
7/17/2024

5/14/99

**Kimley » Horn**  
 4525 MAIN STREET, SUITE 1000  
 VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5808	16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
9/6/2024	9/6/2024

REVISIONS


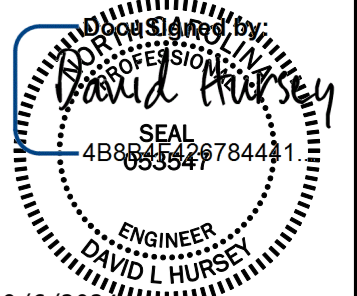


7/17/2024

SEE SHEET NO. 27 AND 28 FOR -L- PROFILE

5/14/99

**Kimley » Horn**  
4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.		SHEET NO.
R-5808		17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
		
9/6/2024	9/6/2024	

165  
NAD 83 NSRS 2007

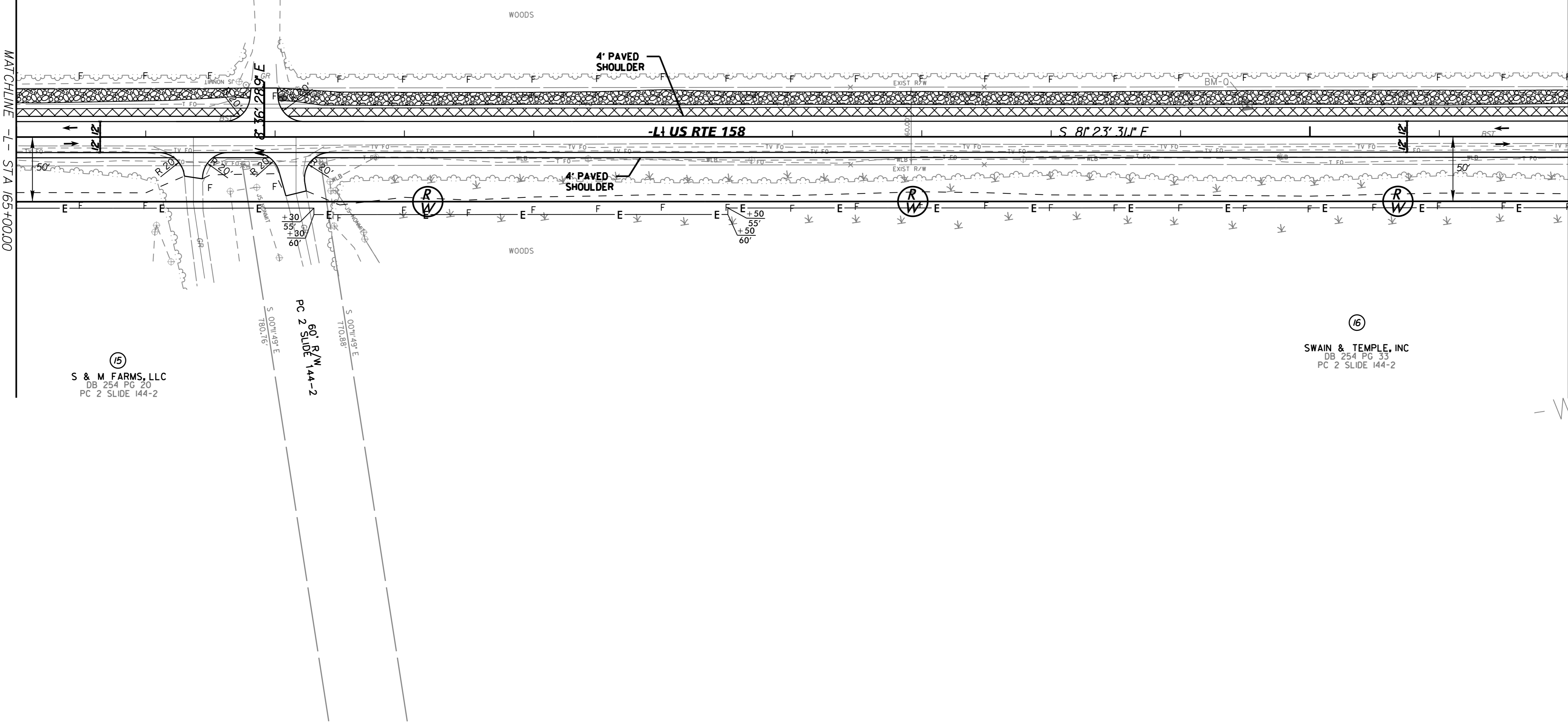
170

175

UNITED STATES OF AMERICA  
DB 131 PG 172  
DB 121 PG 33

MATCHLINE -L- STA 165+00.00  
SEE PLAN SHEET 16

MATCHLINE -L- STA 177+00.00  
SEE PLAN SHEET 18



15  
S & M FARMS, LLC  
DB 254 PG 20  
PC 2 SLIDE 144-2

16  
SWAIN & TEMPLE, INC  
DB 254 PG 33  
PC 2 SLIDE 144-2

REVISIONS

7/17/2024

SEE SHEET NO. 28 FOR -L- PROFILE

5/14/99

PROJECT REFERENCE NO. R-5808		SHEET NO. 18
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
VINCENT E. RICCIO 9/6/2024		DAVID L. HURSEY 9/6/2024

**Kimley » Horn**  
 4525 MAIN STREET, SUITE 1000  
 VIRGINIA BEACH, VA 23462

NAD 83/NSRS 2007

180

185

UNITED STATES OF AMERICA  
 DB 131 PG 172  
 DB 121 PG 33

WOODS

WOODS

4' PAVED SHOULDER

4' PAVED SHOULDER

-L- US RTE 158

S 81° 23' 31" E

MATCHLINE -L- STA 177+00.00  
 SEE PLAN SHEET 17

MATCHLINE -L- STA 189+00.00  
 SEE PLAN SHEET 19

(R/W)

(R/W)

(R/W)

+83.18  
50.00'

+00  
55'  
+00  
60'

(16)  
 SWAIN & TEMPLE, INC  
 DB 254 PG 33  
 PC 2 SLIDE 144-2

REVISIONS

7/17/2024

SEE SHEET NO. 28 AND 29 FOR -L- PROFILE

5/14/99

# Kimley » Horn

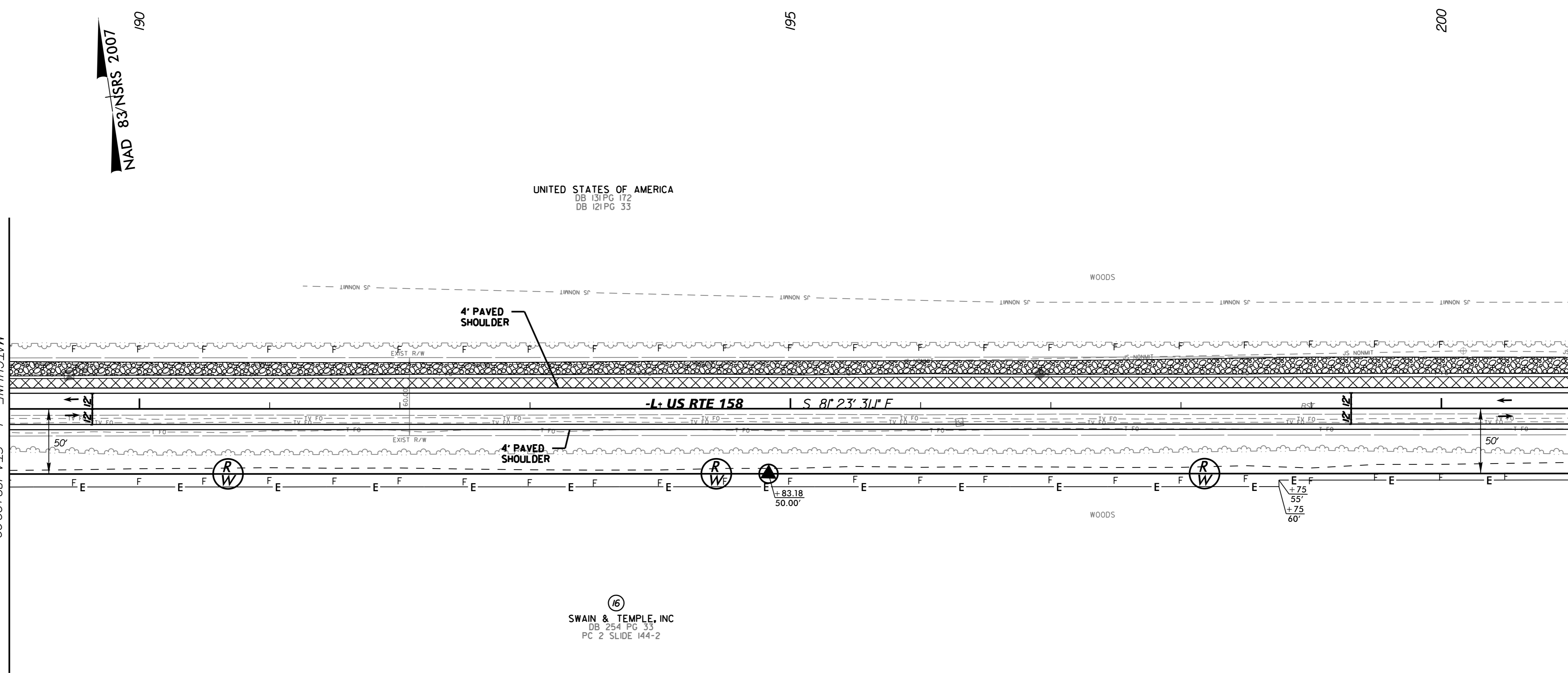
4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5808	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
9/6/2024	9/6/2024

REVISIONS

MATCHLINE -L- STA 189+00.00  
SEE PLAN SHEET 18

MATCHLINE -L- STA 201+00.00  
SEE PLAN SHEET 20



7/17/2024

SEE SHEET NO. 29 FOR -L- PROFILE

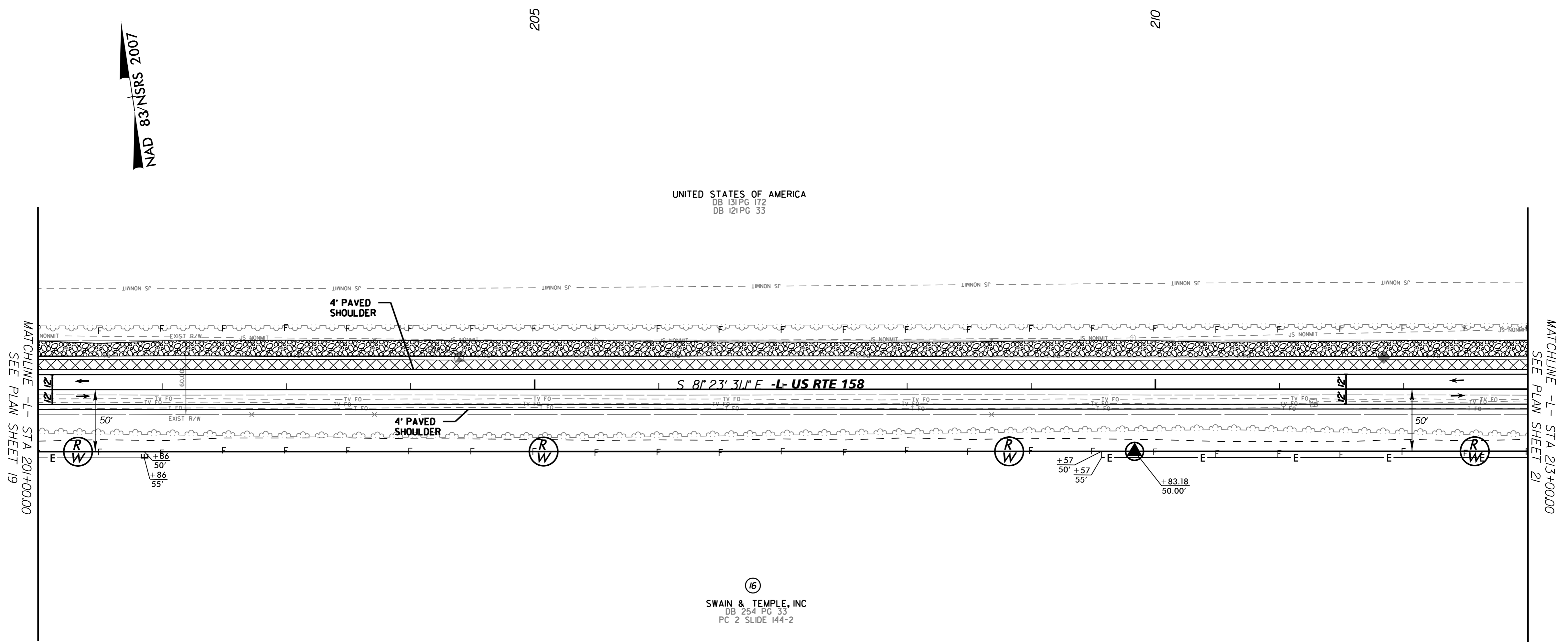
5/14/99

REVISIONS

7/17/2024

PROJECT REFERENCE NO. <i>R-5808</i>		SHEET NO. <i>20</i>	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	

4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462



(16)  
SWAIN & TEMPLE, INC  
DB 254 PG 33  
PC 2 SLIDE 144-2

SEE SHEET NO. 29 AND 30 FOR -L- PROFILE



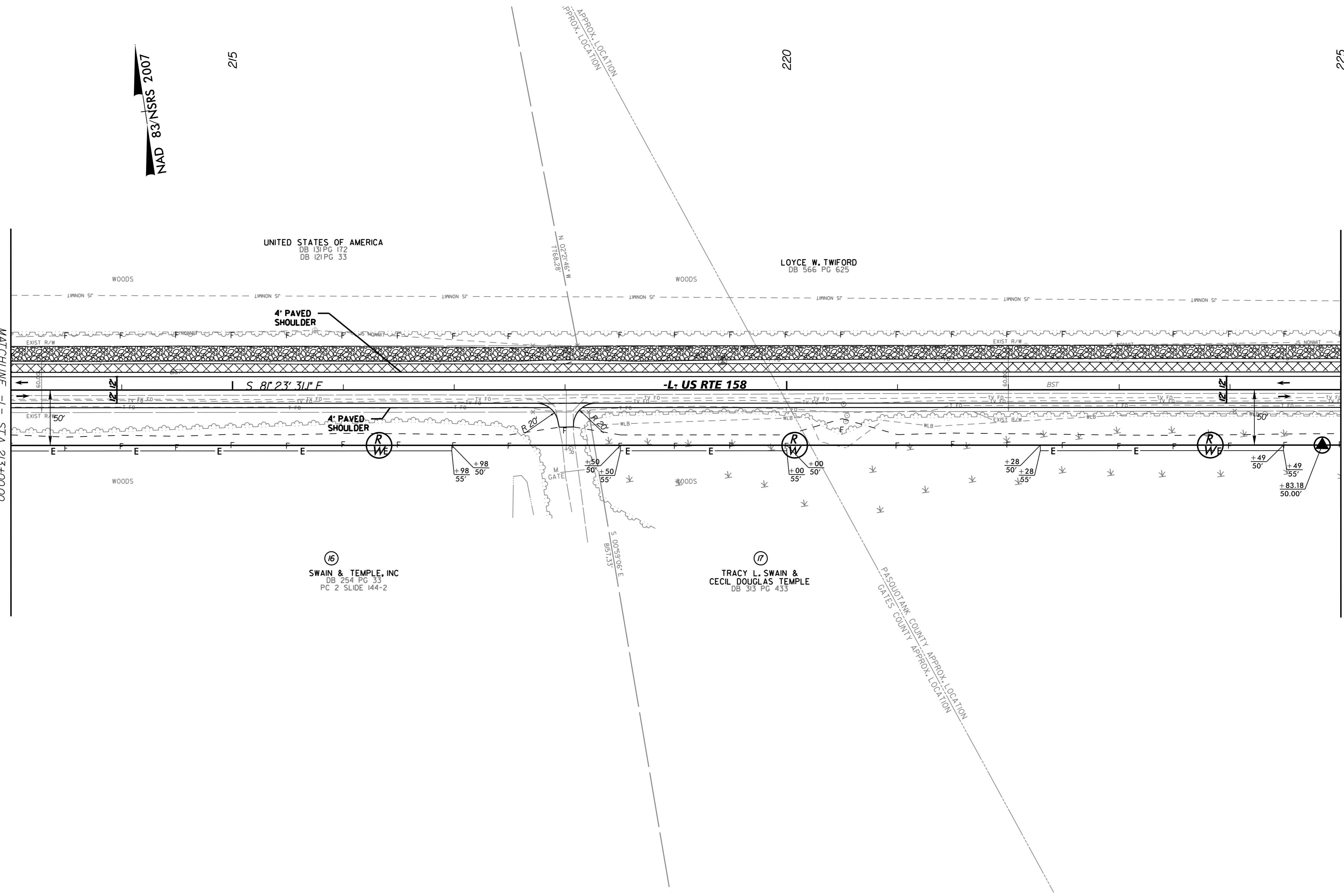
5/14/99

PROJECT REFERENCE NO. R-5808		SHEET NO. 21
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER

REVISIONS

MATCHLINE - STA 213+00.00  
SEE PLAN SHEET 20

MATCHLINE - STA 225+00.00  
SEE PLAN SHEET 22



7/17/2024

SEE SHEET NO. 30 FOR -L- PROFILE

5/14/99

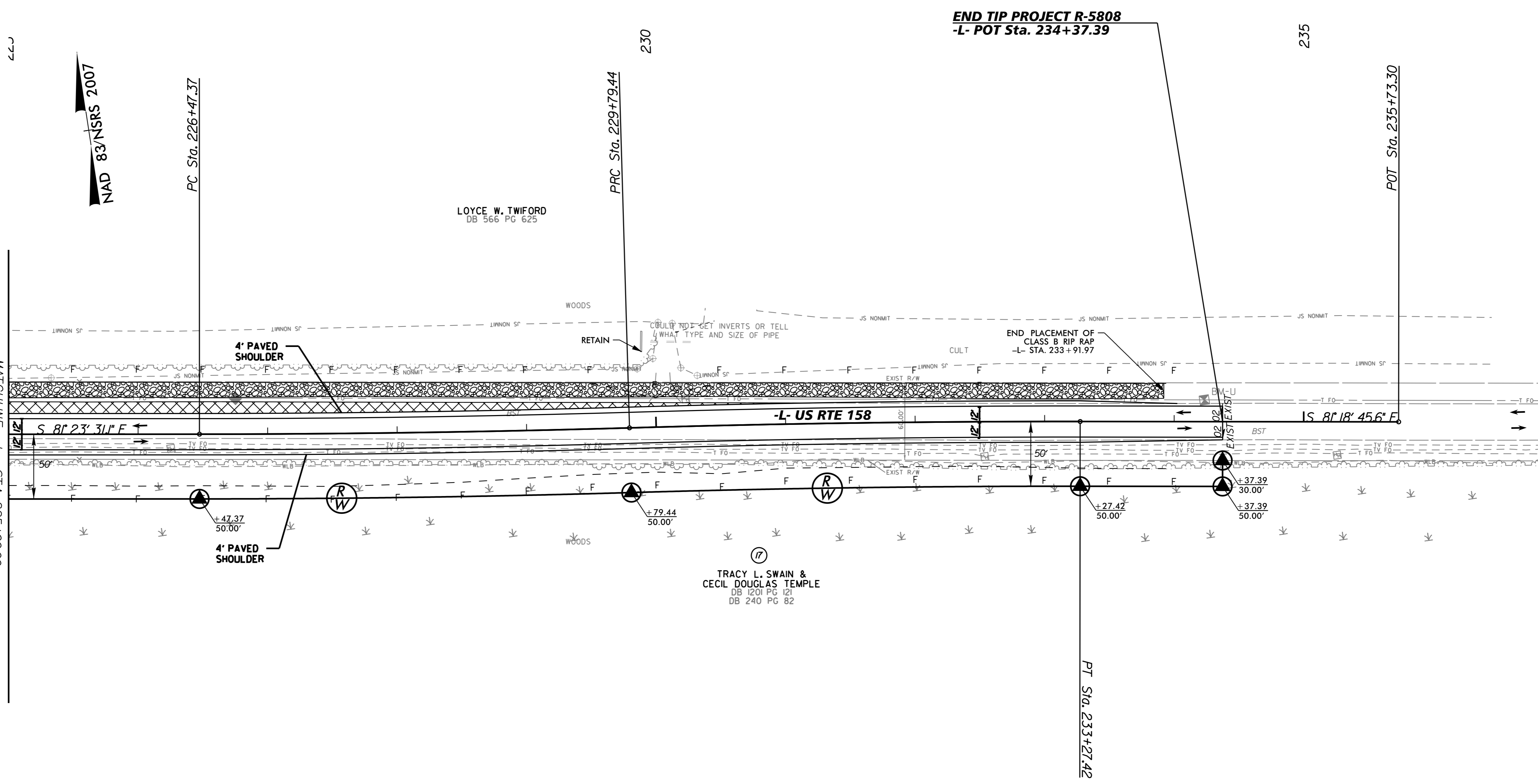
-L-

PI Sta 228+13.41	PI Sta 231+53.44
$\Delta = 1^{\circ} 39' 16.0" (LT)$	$\Delta = 1^{\circ} 44' 01.4" (RT)$
$D = 0^{\circ} 29' 53.6"$	$D = 0^{\circ} 29' 53.6"$
$L = 332.07'$	$L = 347.98'$
$T = 166.04'$	$T = 174.00'$
$R = 11,500.00'$	$R = 11,500.00'$

PROJECT REFERENCE NO. R-5808		SHEET NO. 22	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
4525 MAIN STREET, SUITE 1000 VIRGINIA BEACH, VA 23462			
9/6/2024		9/6/2024	

REVISIONS

MATCHLINE -L- STA 225+00.00  
SEE PLAN SHEET 21



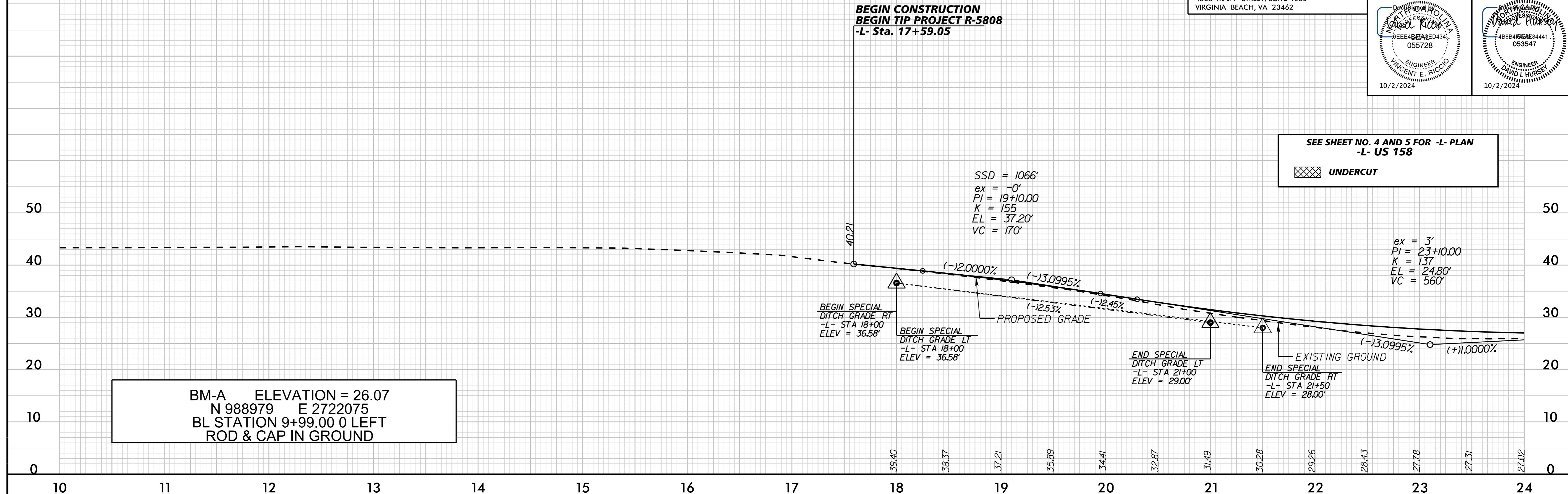
7/17/2024

SEE SHEET NO. 30 FOR -L- PROFILE

5/14/99

**Kimley Horn**  
 4525 MAIN STREET, SUITE 1000  
 VIRGINIA BEACH, VA 23462

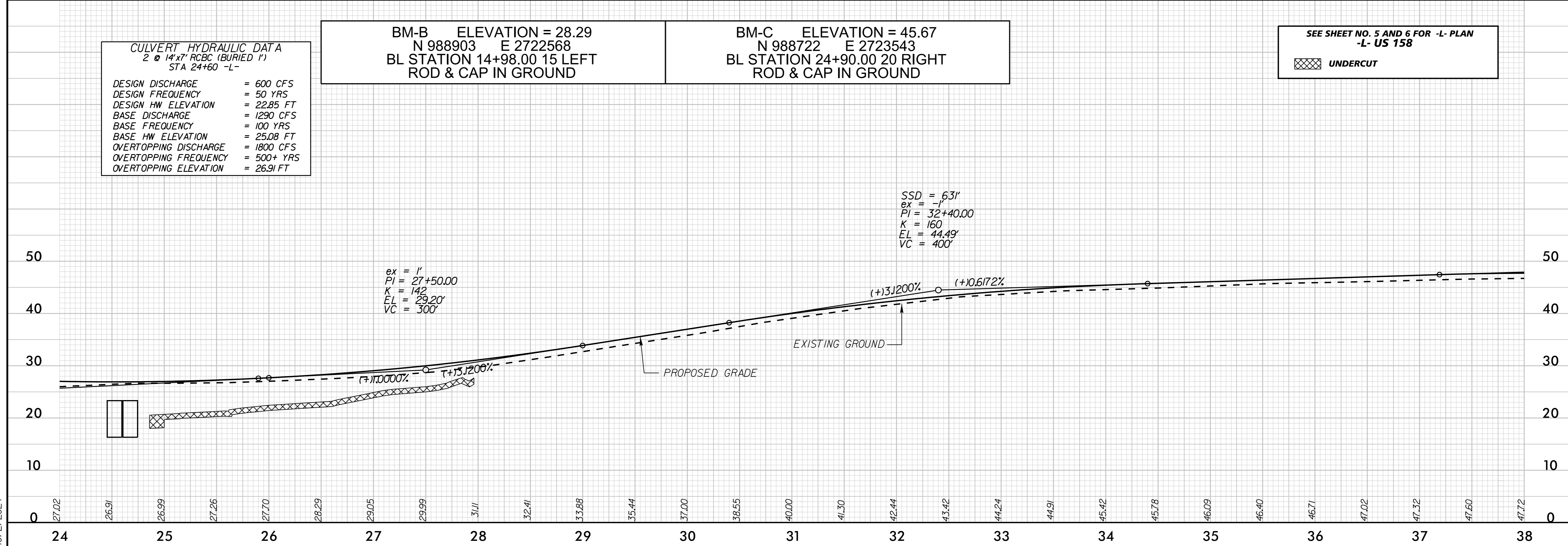
PROJECT REFERENCE NO. R-5808	SHEET NO. 23
ROADWAY DESIGN ENGINEER VINCENT E. PICCO 055728 10/2/2024	HYDRAULICS ENGINEER DAVID L. HURSEY 053547 10/2/2024



**BM-A ELEVATION = 26.07**  
 N 988979 E 2722075  
 BL STATION 9+99.00 0 LEFT  
 ROD & CAP IN GROUND

SEE SHEET NO. 4 AND 5 FOR -L- PLAN  
 -L- US 158

UNDERCUT



**BM-B ELEVATION = 28.29**  
 N 988903 E 2722568  
 BL STATION 14+98.00 15 LEFT  
 ROD & CAP IN GROUND

**BM-C ELEVATION = 45.67**  
 N 988722 E 2723543  
 BL STATION 24+90.00 20 RIGHT  
 ROD & CAP IN GROUND

SEE SHEET NO. 5 AND 6 FOR -L- PLAN  
 -L- US 158

UNDERCUT

10/2/2024

5/14/99

PROJECT REFERENCE NO. R-5808	SHEET NO. 24
ROADWAY DESIGN ENGINEER VINCENT E. RICCIO 055728 10/2/2024	HYDRAULICS ENGINEER DAVID L. HURSEY 053547 10/2/2024

SSD = 567'  
ex = -3'  
PI = 40+00.00  
K = 149  
EL = 49.18'  
VC = 562'

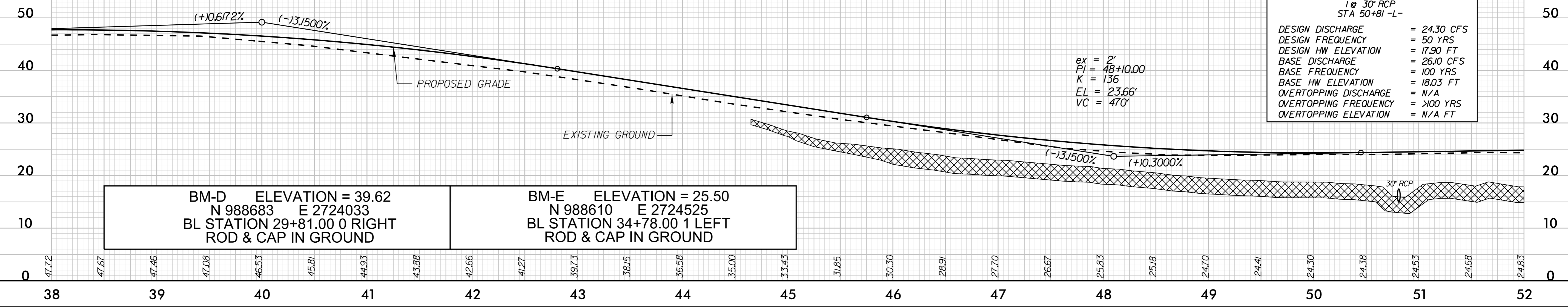
ex = 2'  
PI = 48+10.00  
K = 136  
EL = 23.66'  
VC = 470'

SEE SHEET NO. 6 AND 7 FOR -L- PLAN  
-L- US 158

UNDERCUT

PIPE HYDRAULIC DATA  
1 x 30" RCP  
STA 50+81 -L-

DESIGN DISCHARGE	= 24.30 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 17.90 FT
BASE DISCHARGE	= 26.10 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 18.03 FT
OVERTOPPING DISCHARGE	= N/A
OVERTOPPING FREQUENCY	= >100 YRS
OVERTOPPING ELEVATION	= N/A FT



BM-D ELEVATION = 39.62  
N 988683 E 2724033  
BL STATION 29+81.00 0 RIGHT  
ROD & CAP IN GROUND

BM-E ELEVATION = 25.50  
N 988610 E 2724525  
BL STATION 34+78.00 1 LEFT  
ROD & CAP IN GROUND

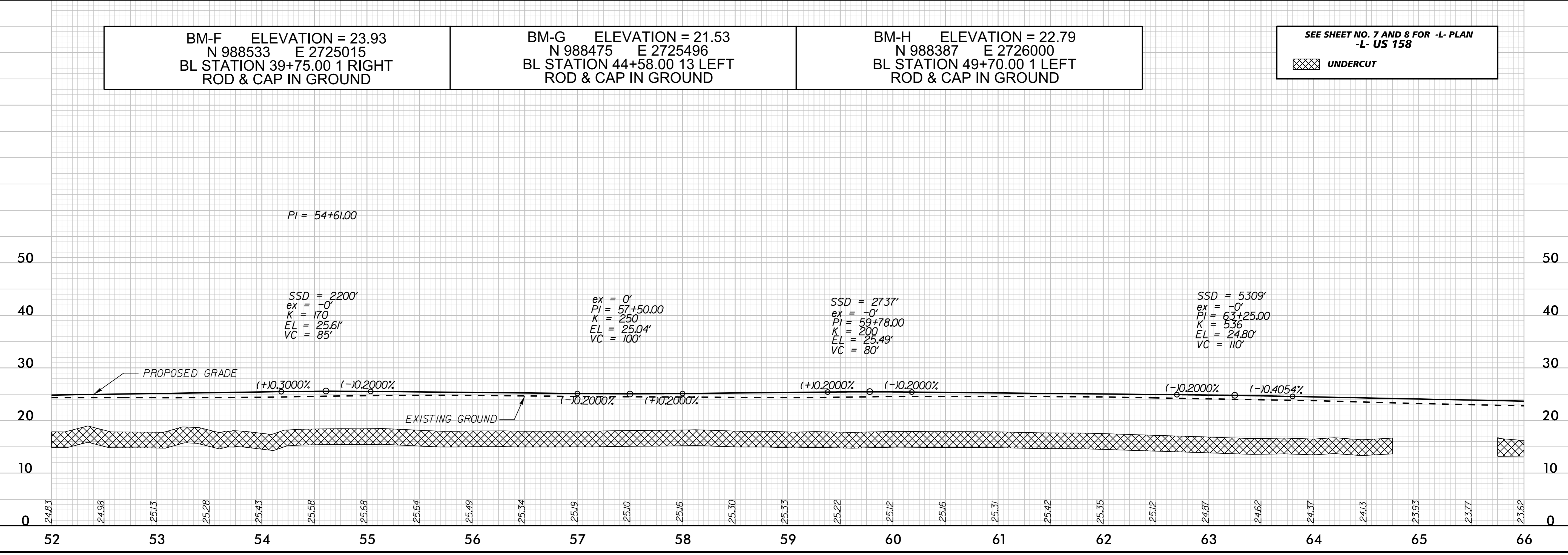
BM-F ELEVATION = 23.93  
N 988533 E 2725015  
BL STATION 39+75.00 1 RIGHT  
ROD & CAP IN GROUND

BM-G ELEVATION = 21.53  
N 988475 E 2725496  
BL STATION 44+58.00 13 LEFT  
ROD & CAP IN GROUND

BM-H ELEVATION = 22.79  
N 988387 E 2726000  
BL STATION 49+70.00 1 LEFT  
ROD & CAP IN GROUND

SEE SHEET NO. 7 AND 8 FOR -L- PLAN  
-L- US 158

UNDERCUT



10/2/2024

5/14/99

BM-I ELEVATION = 20.63  
 N 988313 E 2726489  
 BL STATION 54+65.00 1 LEFT  
 ROD & CAP IN GROUND

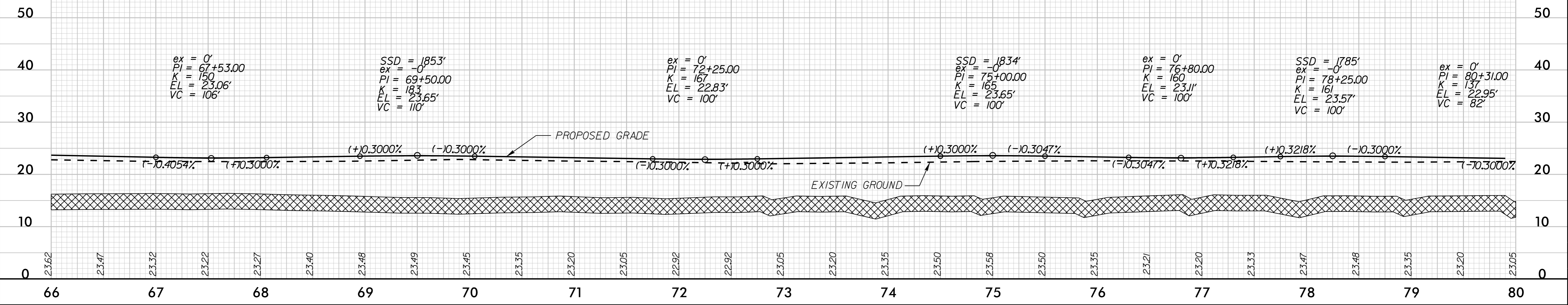
BM-J ELEVATION = 21.55  
 N 988164 E 2727472  
 BL STATION 64+59.00 0 LEFT  
 ROD & CAP IN GROUND



PROJECT REFERENCE NO. R-5808	SHEET NO. 25
ROADWAY DESIGN ENGINEER VINCENT E. RICCO 055728 10/2/2024	HYDRAULICS ENGINEER DAVID L. HURSEY 053547 10/2/2024

SEE SHEET NO. 8 AND 9 FOR -L- PLAN  
 -L- US 158

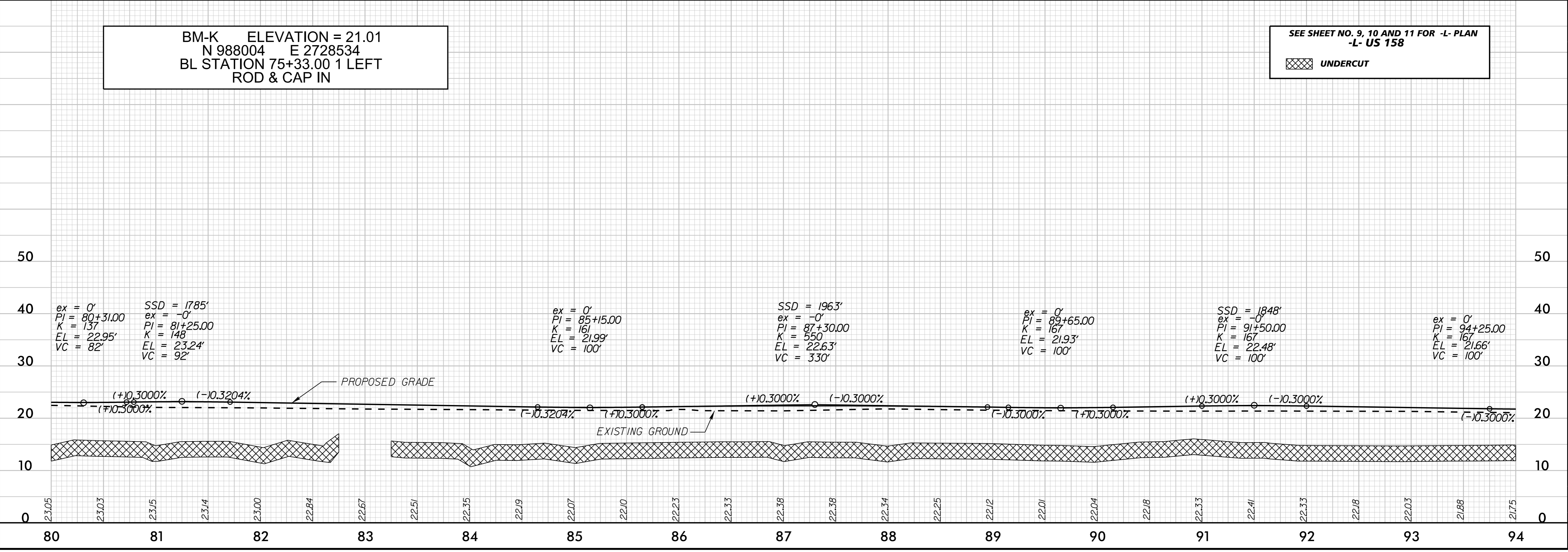
UNDERCUT



BM-K ELEVATION = 21.01  
 N 988004 E 2728534  
 BL STATION 75+33.00 1 LEFT  
 ROD & CAP IN

SEE SHEET NO. 9, 10 AND 11 FOR -L- PLAN  
 -L- US 158

UNDERCUT



10/2/2024

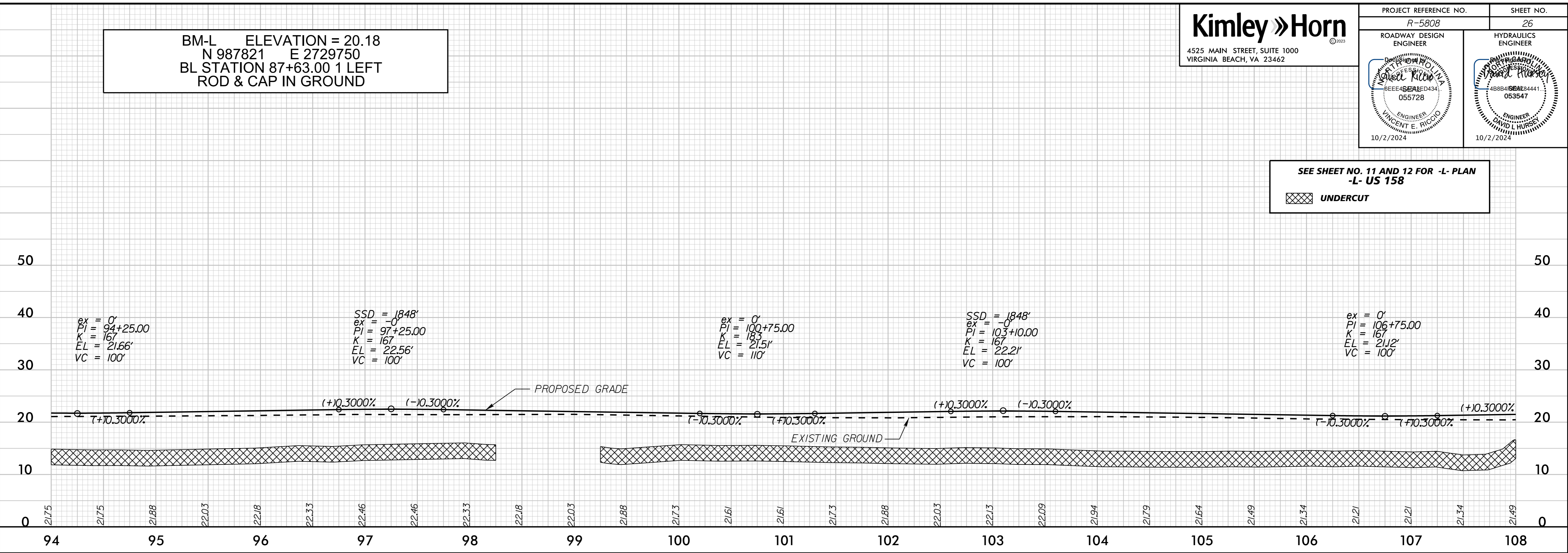
5/14/99

BM-L ELEVATION = 20.18  
N 987821 E 2729750  
BL STATION 87+63.00 1 LEFT  
ROD & CAP IN GROUND

**Kimley Horn**  
4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

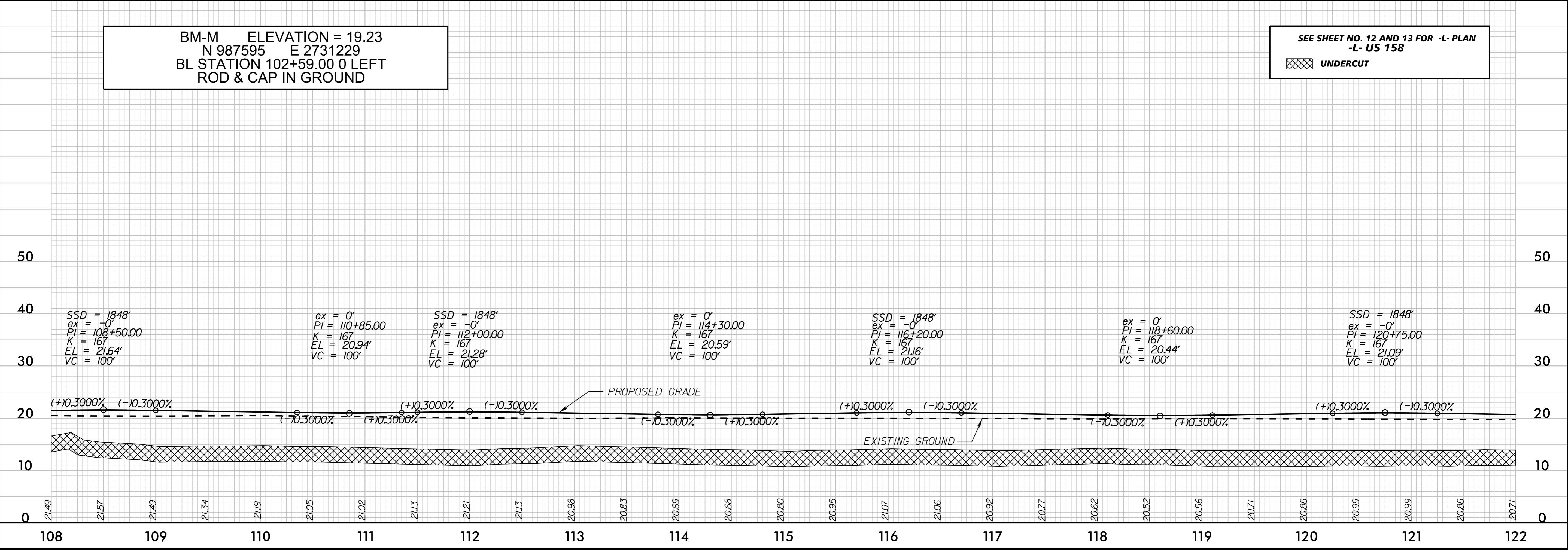
PROJECT REFERENCE NO. R-5808	SHEET NO. 26
ROADWAY DESIGN ENGINEER VINCENT E. PICCO 055728 10/2/2024	HYDRAULICS ENGINEER DAVID L. HURSEY 053547 10/2/2024

SEE SHEET NO. 11 AND 12 FOR -L- PLAN  
-L- US 158  
UNDERCUT



BM-M ELEVATION = 19.23  
N 987595 E 2731229  
BL STATION 102+59.00 0 LEFT  
ROD & CAP IN GROUND

SEE SHEET NO. 12 AND 13 FOR -L- PLAN  
-L- US 158  
UNDERCUT



10/2/2024

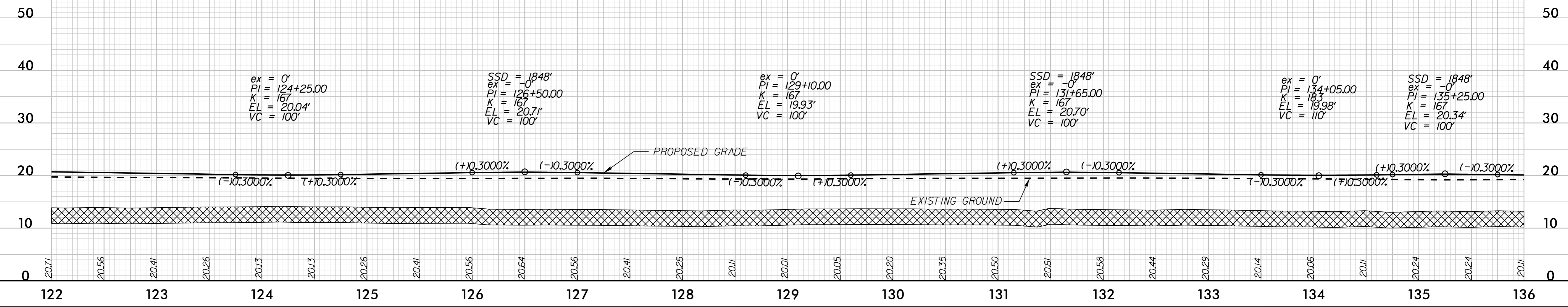
5/14/99

BM-N ELEVATION = 18.56  
N 987369 E 2732706  
BL STATION 117+53.00 1 RIGHT  
ROD & CAP IN GROUND

**Kimley Horn**  
4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

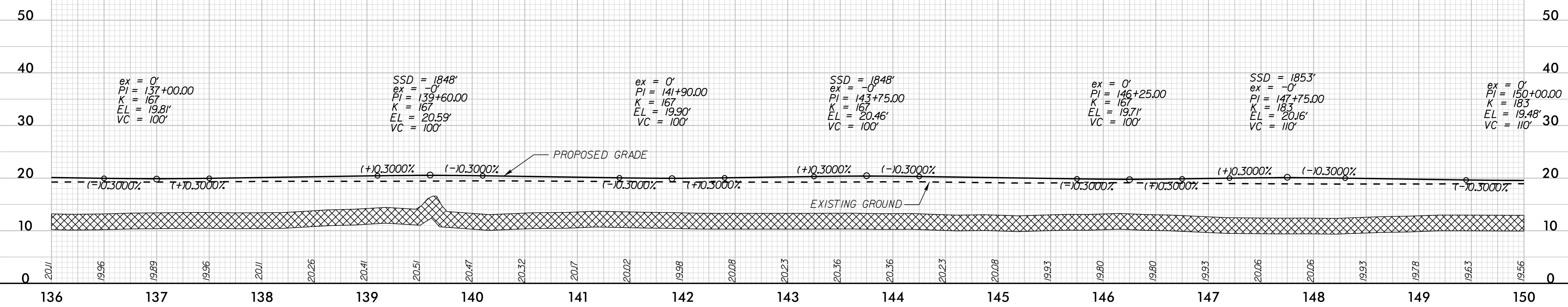
PROJECT REFERENCE NO. R-5808	SHEET NO. 27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

SEE SHEET NO. 13 AND 14 FOR -L- PLAN  
-L- US 158



BM-O ELEVATION = 18.62  
N 987145 E 2734180  
BL STATION 132+44.00 1 RIGHT  
ROD & CAP IN GROUND

SEE SHEET NO. 14 AND 15 FOR -L- PLAN  
-L- US 158



10/2/2024

5/14/99

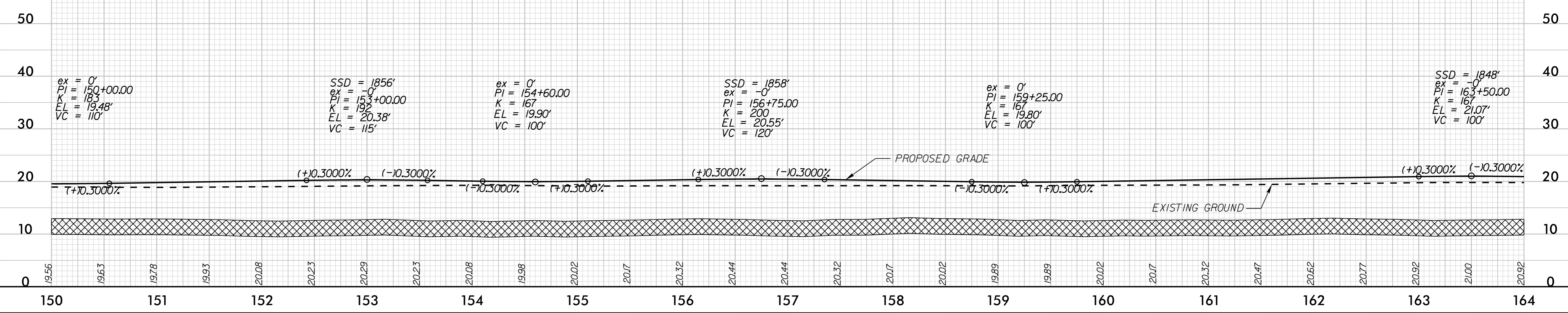
BM-P ELEVATION = 19.02  
N 986923 E 2735651  
BL STATION 147+31.00 2 RIGHT  
ROD & CAP IN GROUND



PROJECT REFERENCE NO. R-5808	SHEET NO. 28
ROADWAY DESIGN ENGINEER VINCENT E. PICCO 055728 10/2/2024	HYDRAULICS ENGINEER DAVID L. HURSEY 053547 10/2/2024

SEE SHEET NO. 15 AND 16 FOR -L- PLAN  
-L- US 158

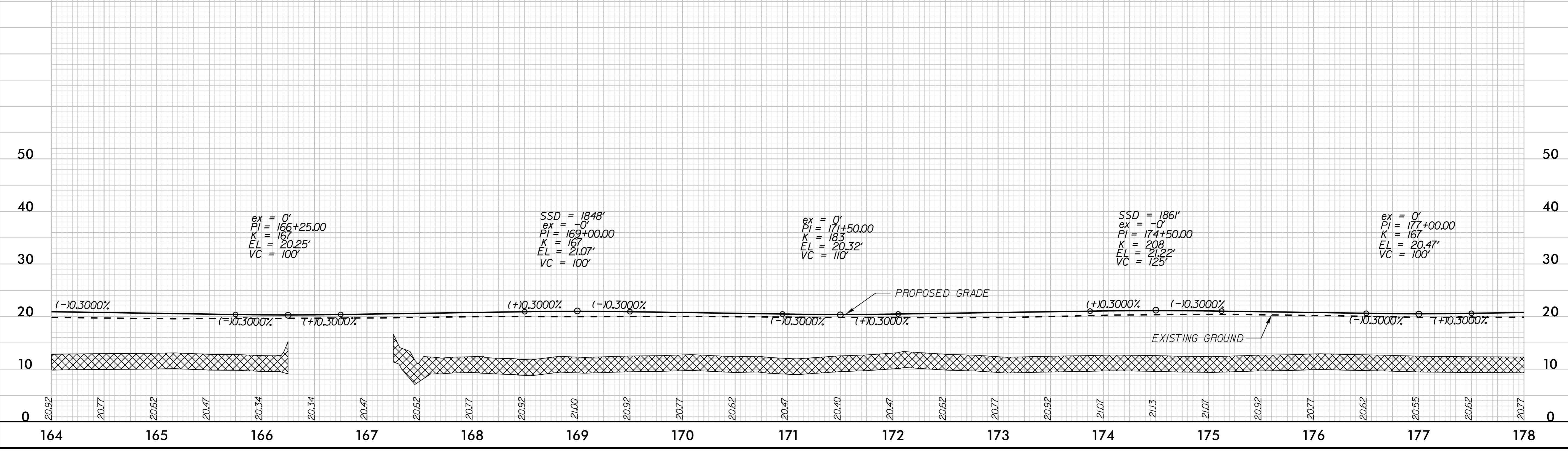
UNDERCUT



BM-Q ELEVATION = 19.90  
N 986703 E 2737099  
BL STATION 161+96.00 4 RIGHT  
ROD & CAP IN GROUND

SEE SHEET NO. 16, 17 AND 18 FOR -L- PLAN  
-L- US 158

UNDERCUT



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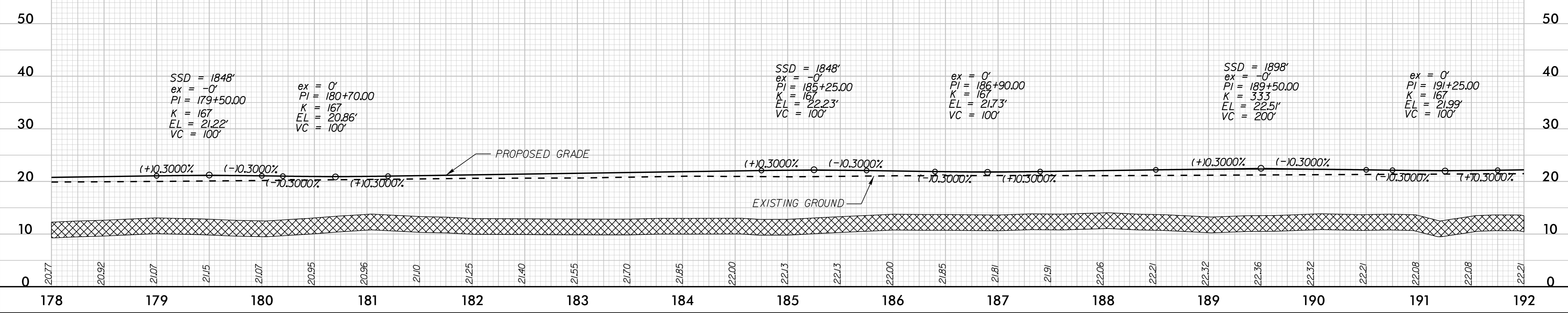


5/14/99

BM-R ELEVATION = 20.53  
N 986481 E 2738576  
BL STATION 176+90.00 0 RIGHT  
ROD & CAP IN GROUND

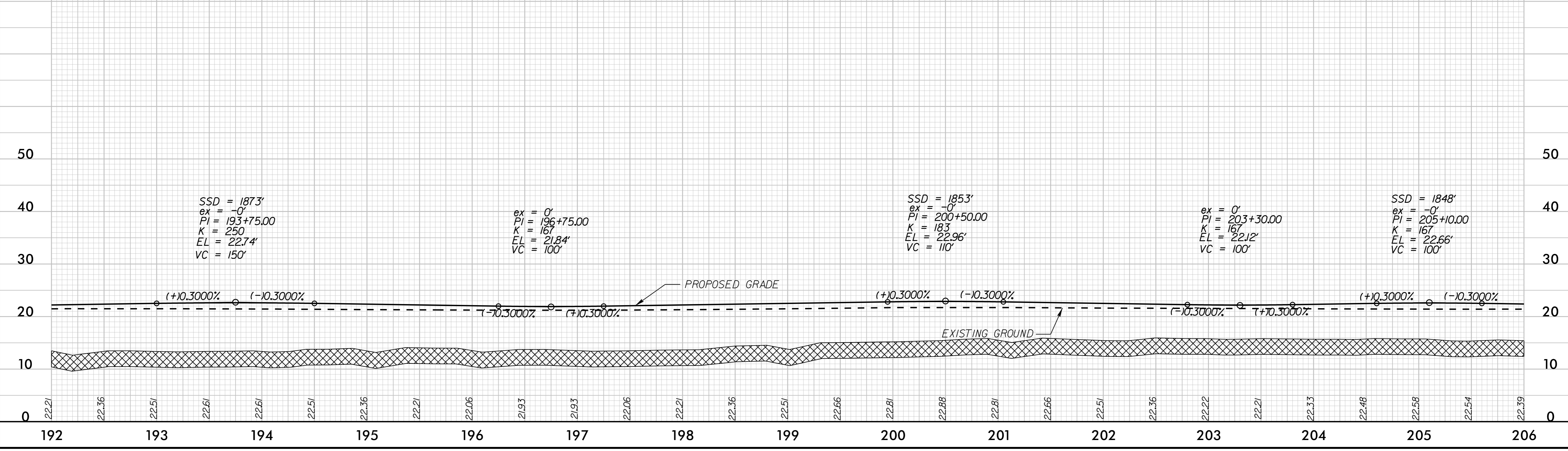
PROJECT REFERENCE NO. R-5808		SHEET NO. 29
ROADWAY DESIGN ENGINEER VINCENT E. PICCO 4525 MAIN STREET, SUITE 1000 VIRGINIA BEACH, VA 23462 055728		HYDRAULICS ENGINEER DANIEL L. HURSEY 4888 S. BRADSHAW BLVD VIRGINIA BEACH, VA 23462 053547
10/2/2024		10/2/2024

SEE SHEET NO. 18 AND 19 FOR -L- PLAN  
-L- US 158



BM-S ELEVATION = 21.18  
N 986258 E 2740053  
BL STATION 191+83.00 0 RIGHT  
ROD & CAP IN GROUND

SEE SHEET NO. 19 AND 20 FOR -L- PLAN  
-L- US 158



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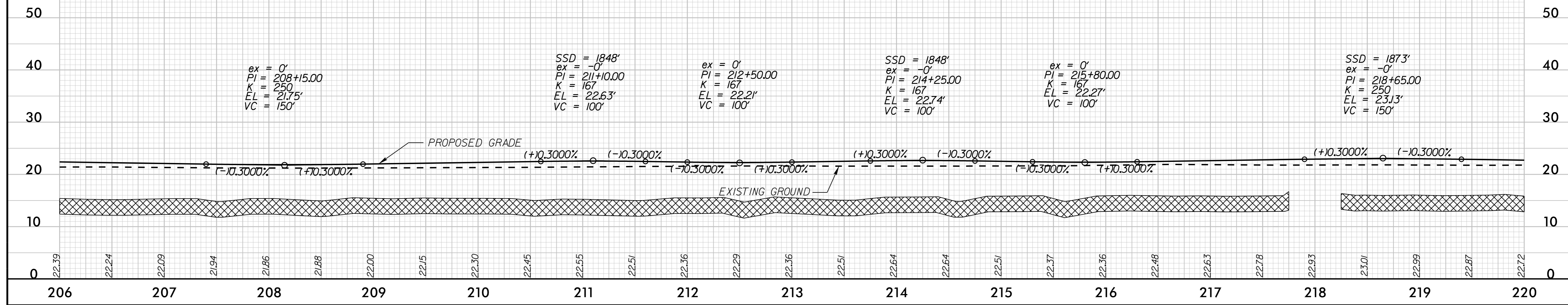
5/14/99

BM-T ELEVATION = 21.33  
N 986033 E 2741539  
BL STATION 206+86.00 0 RIGHT  
ROD & CAP IN GROUND

**Kimley Horn**  
4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO. R-5808	SHEET NO. 30
ROADWAY DESIGN ENGINEER VINCENT E. PICCO 055728 10/2/2024	HYDRAULICS ENGINEER DANIEL L. HURSEY 053547 10/2/2024

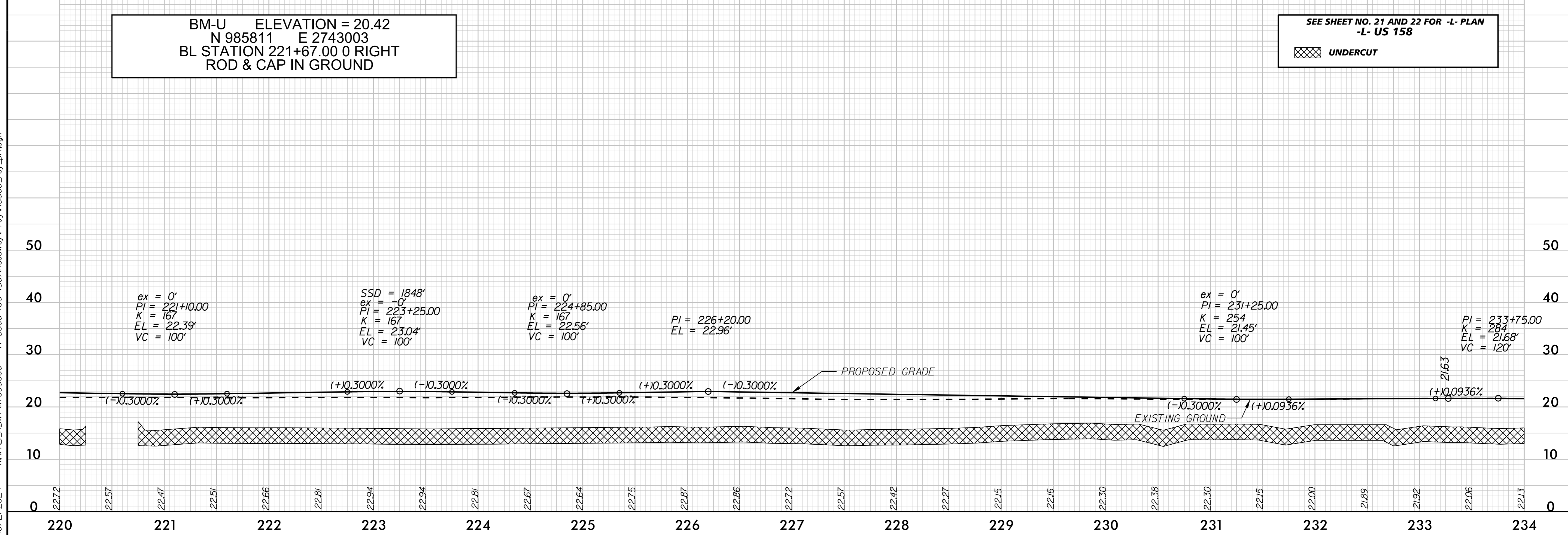
SEE SHEET NO. 20 AND 21 FOR -L- PLAN  
-L- US 158  
UNDERCUT



BM-U ELEVATION = 20.42  
N 985811 E 2743003  
BL STATION 221+67.00 0 RIGHT  
ROD & CAP IN GROUND

SEE SHEET NO. 21 AND 22 FOR -L- PLAN  
-L- US 158  
UNDERCUT

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5/14/99

# Kimley » Horn

4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5808	31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
10/2/2024	10/2/2024

**END CONSTRUCTION  
END TIP PROJECT R-5808  
-L- Sta. 234+37.39**

**END GRADE  
US 158 Sta. 234+37.39  
ELEV = 21.26'**

50

40

30

20

10

0

234

235

50

40

30

20

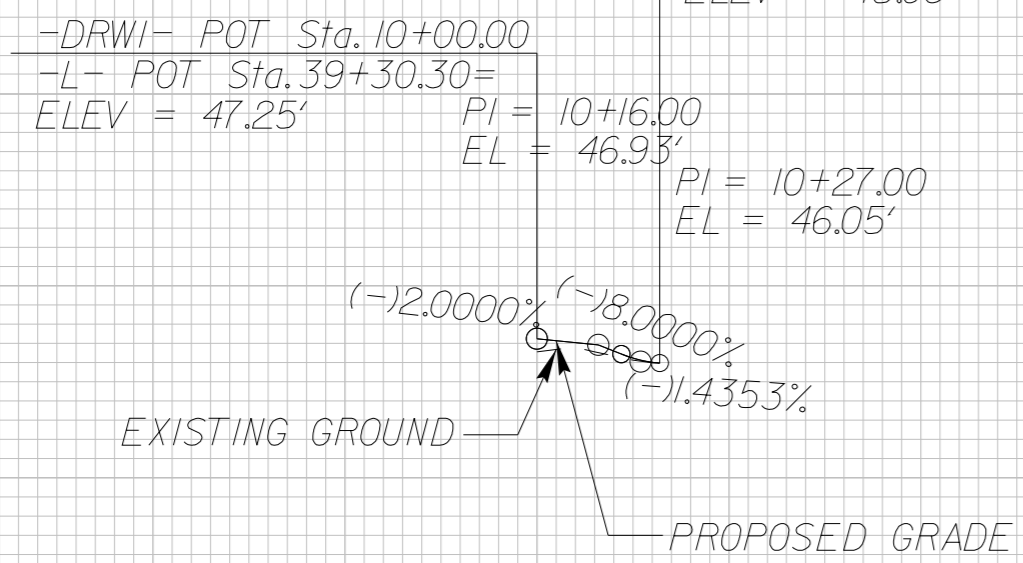
10

0

**SEE SHEET NO. 22 FOR -L- PLAN  
-L- US 158**

**UNDERCUT**

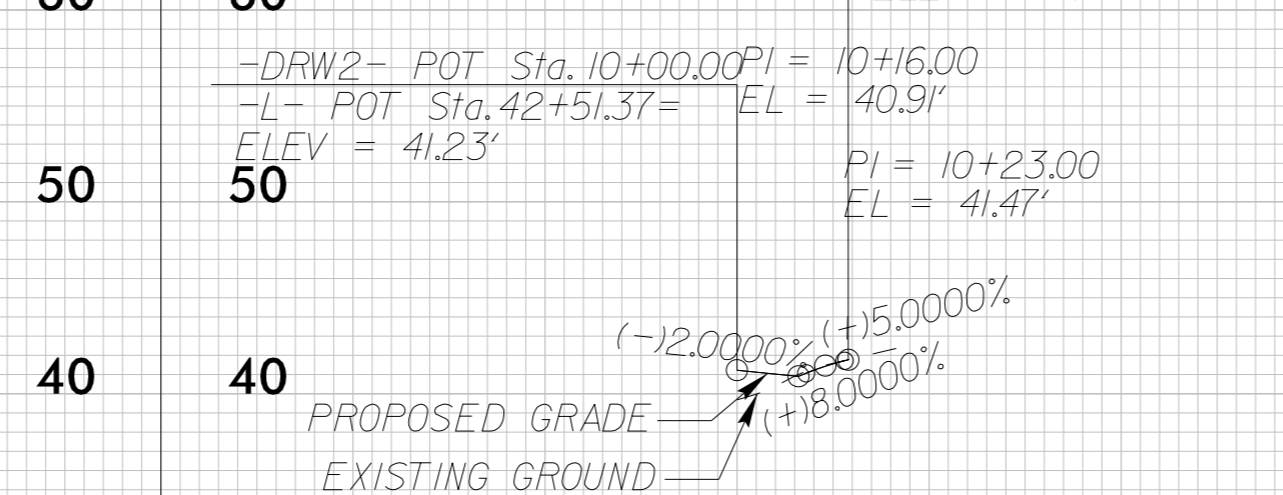
**END CONSTRUCTION  
END GRADE  
-DRW1- Sta. 10+32.00  
ELEV = 45.98'**



**SEE SHEET NO. 6 FOR -DRW1- PLAN**

**-DRW1-**

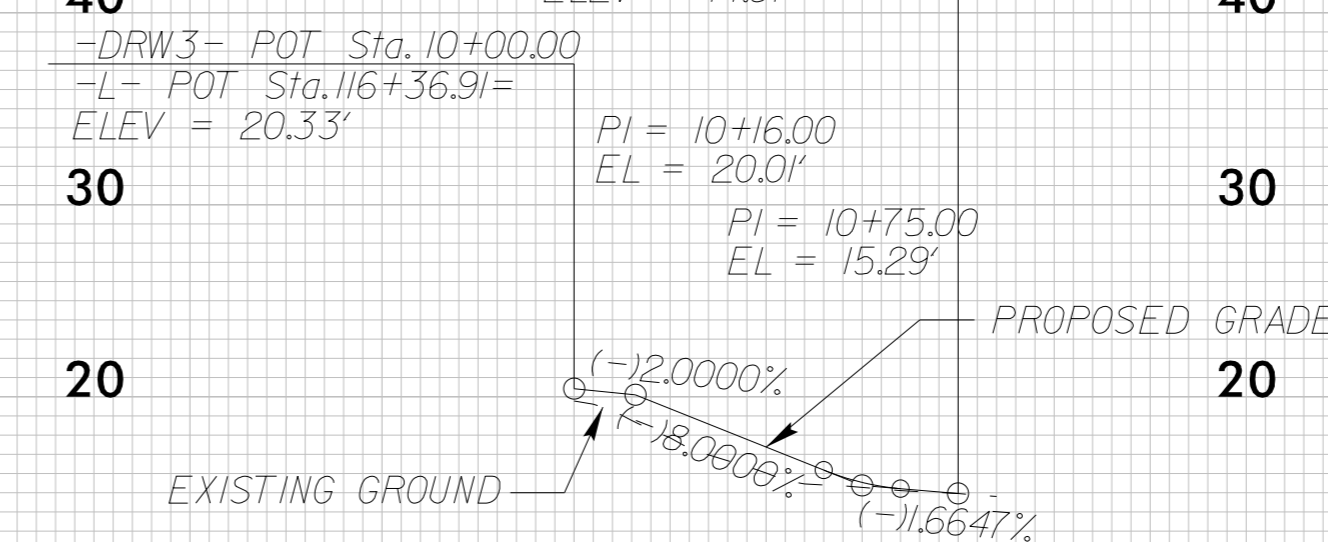
**END CONSTRUCTION  
END GRADE  
-DRW2- Sta. 10+29.00  
ELEV = 41.77'**



**SEE SHEET NO. 6 FOR -DRW2- PLAN**

**-DRW2-**

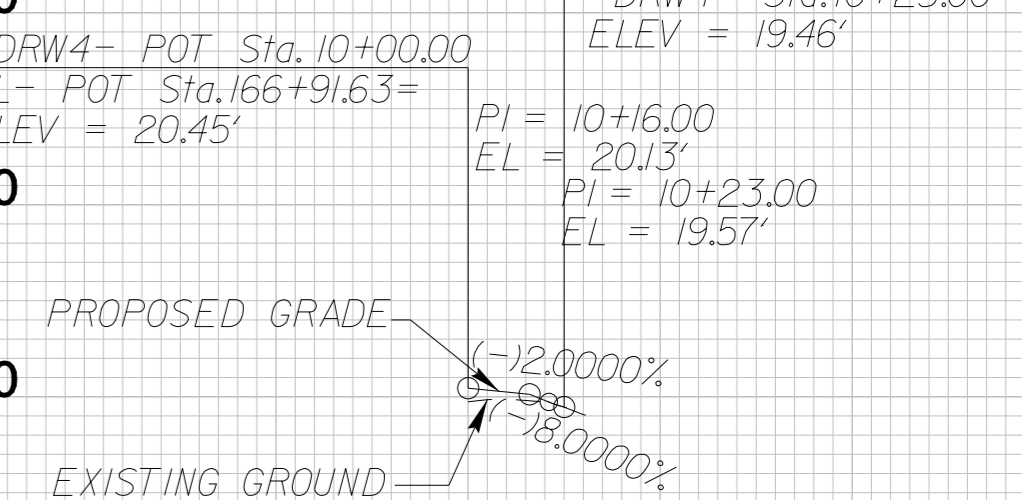
**END CONSTRUCTION  
END GRADE  
-DRW3- Sta. 11+00.00  
ELEV = 14.87'**



**SEE SHEET NO. 17 FOR -DRW3- PLAN**

**-DRW3-**

**END CONSTRUCTION  
END GRADE  
-DRW4- Sta. 10+25.00  
ELEV = 19.46'**



**SEE SHEET NO. 17 FOR -DRW4- PLAN**

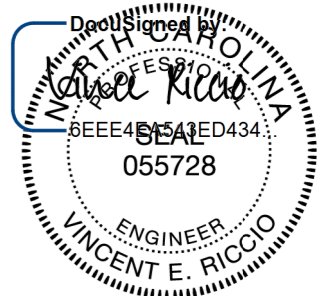
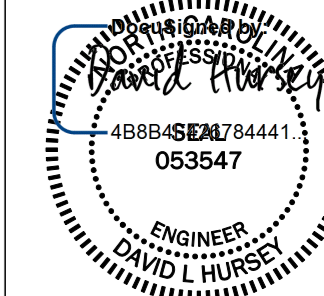
**-DRW4-**

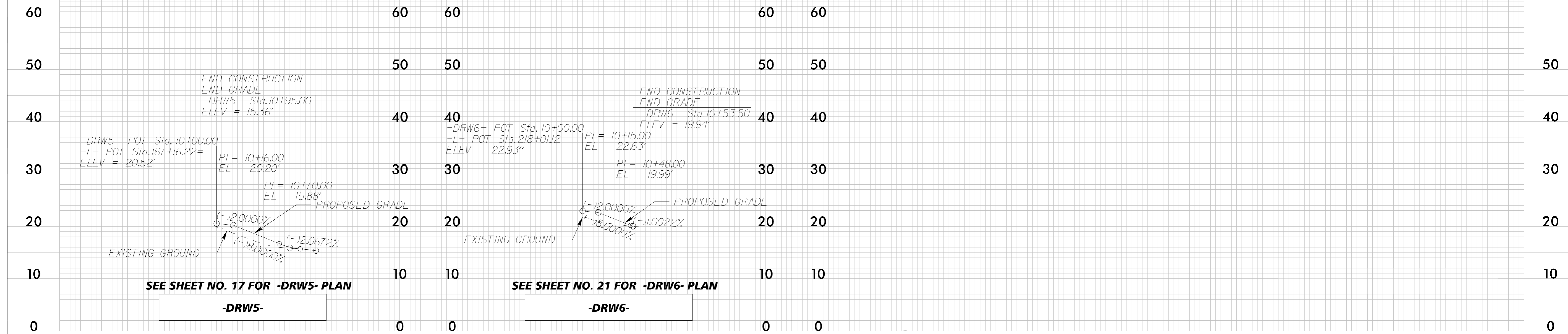
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5/14/99

# Kimley » Horn

4525 MAIN STREET, SUITE 1000  
VIRGINIA BEACH, VA 23462

PROJECT REFERENCE NO.	SHEET NO.
R-5808	32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	
10/2/2024	10/2/2024



SEE SHEET NO. 17 FOR -DRW5- PLAN

SEE SHEET NO. 21 FOR -DRW6- PLAN

-DRW5-

-DRW6-

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