

PROJECT ID: 1204-05-73

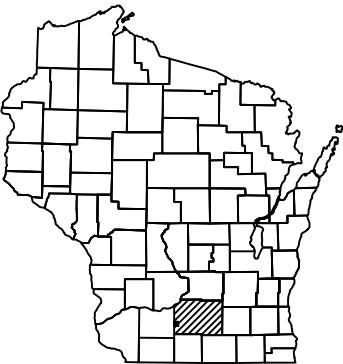
COUNTY: DANE

WITH: 1204-05-76

ORDER OF SHEETS

Section No.	1	Title
Section No.	2	Typical Sections and Details
Section No.	3	Estimate of Quantities
Section No.	3	Miscellaneous Quantities
Section No.	4	Right of Way Plat
Section No.	5	Plan and Profile
Section No.	6	Standard Detail Drawings
Section No.	7	Sign Plates
Section No.	8	Structure Plans
Section No.	9	Computer Earthwork Data
Section No.	9	Cross Sections

TOTAL SHEETS =



DESIGN DESIGNATION

A.A.D.T.	2020	=	23,130
A.A.D.T.	2040	=	30,490
D.H.V.		=	2,400
D.D.		=	50/50
T.		=	15.5%
DESIGN SPEED		=	70 MPH
ESALS		=	11,000,000

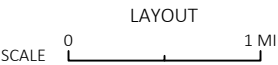
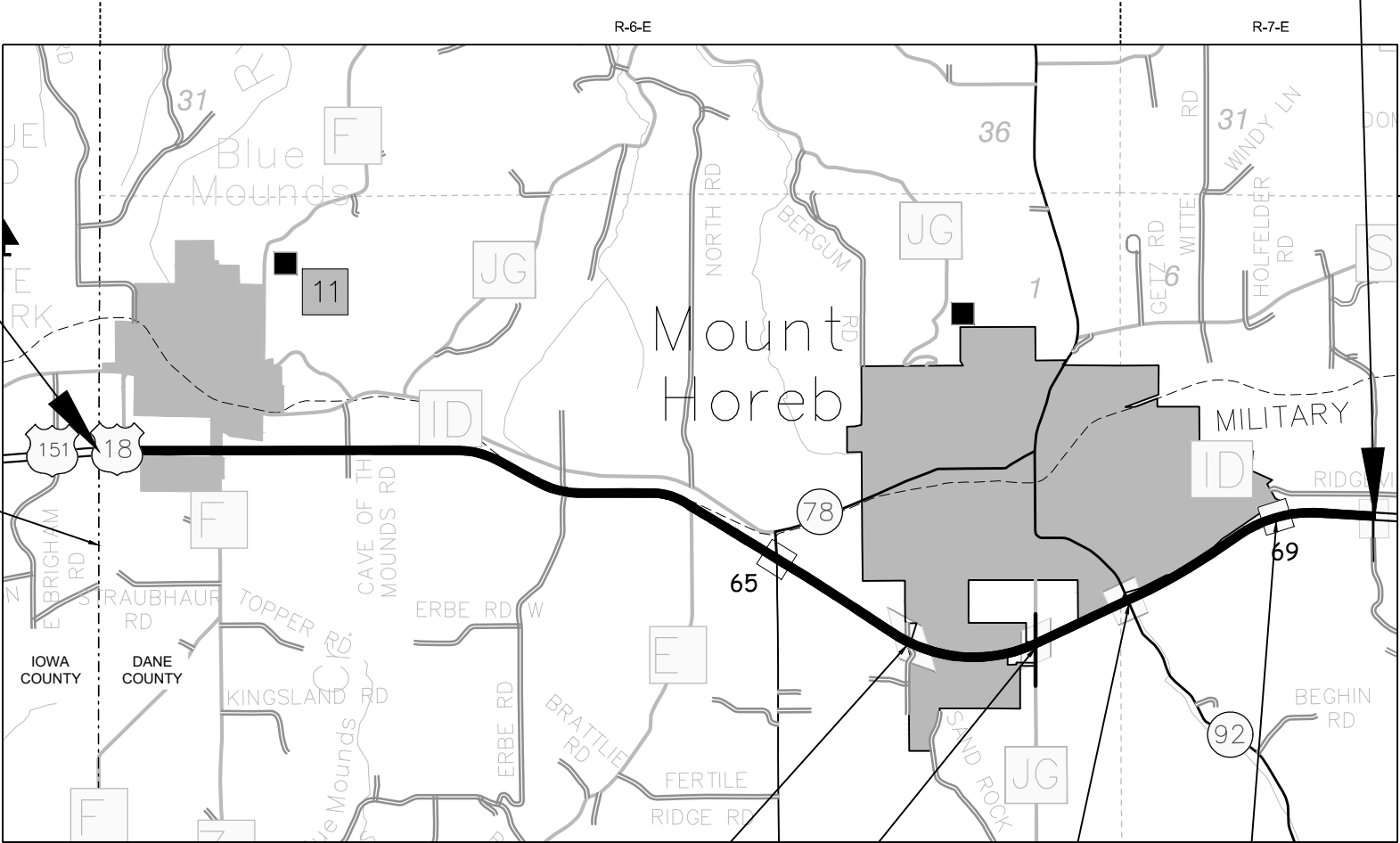
CONVENTIONAL SYMBOLS

PLAN	
CORPORATE LIMITS	
PROPERTY LINE	
LOT LINE	
LIMITED HIGHWAY EASEMENT	
EXISTING RIGHT OF WAY	
PROPOSED OR NEW R/W LINE	
SLOPE INTERCEPT	
REFERENCE LINE	
EXISTING CULVERT	
PROPOSED CULVERT (Box or Pipe)	
COMBUSTIBLE FLUIDS	
MARSH AREA	
WOODED OR SHRUB AREA	

PROFILE	
GRADE LINE	
ORIGINAL GROUND	
MARSH OR ROCK PROFILE (To be noted as such)	
SPECIAL DITCH	
GRADE ELEVATION	
CULVERT (Profile View)	
UTILITIES	
ELECTRIC	
FIBER OPTIC	
GAS	
SANITARY SEWER	
STORM SEWER	
TELEPHONE	
WATER	
UTILITY PEDESTAL	
POWER POLE	
TELEPHONE POLE	

COUNTY LINE

BEGIN PROJECT
STA 1630+49'EB'
X=699,676.96
Y=459,608.74



TOTAL NET LENGTH OF CENTERLINE = 7.969 MI.

HORIZONTAL POSITIONS SHOWN ON THIS PLAN ARE WISCONSIN COORDINATE REFERENCE SYSTEM (WISCRS), DANE COUNTY, NAD83 (2011), IN U.S. SURVEY FEET. POSITIONS SHOWN ARE GRID COORDINATES, GRID BEARINGS, AND GRID DISTANCES. GRID DISTANCES ARE THE SAME AS GROUND DISTANCES. ELEVATIONS ARE REFERENCED TO NAVD 88 (2011). GPS DERIVED ELEVATIONS ARE BASED ON GEOID 12A.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

PLAN OF PROPOSED IMPROVEMENT

DODGEVILLE - MOUNT HOREB

W COUNTY LINE TO TOWN HALL ROAD

USH 18
DANE COUNTY

STATE PROJECT NUMBER
1204-05-73

STATE PROJECT	FEDERAL PROJECT	
	PROJECT	CONTRACT
1204-05-73		

Trans 220: Approved for
Utility Relocation Design

END PROJECT
STA 2051+24.02'EB'

ORIGINAL PLANS PREPARED BY

OES
An Oneida ESC Group Company

DATE: _____
(Professional Engineer Signature)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

PREPARED BY	
Surveyor	ONEIDA ENGINEERING SOLUTIONS
Designer	ONEIDA ENGINEERING SOLUTIONS
Project Manager	MARK VESPERMAN
Regional Examiner	SW REGION
Regional Supervisor	SCOTT SCHOENMANN

APPROVED FOR THE DEPARTMENT

DATE: _____
(Signature)

2

GENERAL NOTES

THE LOCATIONS OF EXISTING UTILITIES AS SHOWN ON THE PLANS ARE APPROXIMATE. THERE MAY BE OTHER UTILITIES WITHIN THE PROJECT AREA THAT ARE NOT SHOWN.

ALL RADII AREA MEASURED TO EDGE OF PAVEMENT UNLESS OTHERWISE SHOWN OR NOTED ON THE PLAN.

RESTORE EXISTING DRIVEWAYS IN KIND AND AT THE LOCATION AND WIDTH DETERMINED BY THE ENGINEER IN THE FIELD.

PRIOR TO THE PLACEMENT OF STEEL PLATE BEAM GUARD OR MGS GUARDRAIL, THE SHOULDERS SHALL BE IN PLACE, SHAPED AND COMPACTED UNLESS SHOWN OTHERWISE.

THE CONTRACTOR'S PAVING OPERATIONS SHALL BE CONSISTENT WITH THE PLAN TYPICAL SECTIONS AND CONSTRUCTED TO PREVENT HMA LONGITUDINAL JOINTS FROM BEING LOCATED WITH THE DRIVING, TURNING, OR PARKING LANE.

PAVING LIMITS AT INTERSECTIONS ARE TO BE DETERMINED IN THE FIELD BY THE ENGINEER.

THE EXACT LOCATIONS AND LIMITS OF PRIVATE ENTRANCES AND FIELD ENTRANCES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.

HMA PAVEMENT WEIGHT CALCULATIONS ARE BASED ON 112 LB/SY/IN.

THE RATE OF APPLICATION FOR TACK COAT IS 0.050 GAL/SY BETWEEN LAYERS, 0.070 GAL/SY ON MILLED SURFACES, OR AS DIRECTED BY THE ENGINEER.

THE LOCATION OF STOP LINES SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.

CONTRACTOR WILL BE RESPONSIBLE FOR RESHAPING AND SEEDING ANY PREVIOUSLY GRASSED AREAS WHICH ARE DISTURBED BY HIS OPERATION OUTSIDE OF THE NORMAL CONSTRUCTION LIMITS.

DISTURBED AREAS WITHIN THE RIGHT OF WAY ARE TO BE TOPSOILED (SALVAGED), FERTILIZED, SEEDED, AND MULCHED OR SODDED AS DIRECTED BY THE ENGINEER.

EROSION CONTROL FEATURES AS SHOWN ON THE PLANS ARE AT SUGGESTED LOCATIONS. THE EXACT LOCATION WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.

THE QUANTITY OF THE ITEMS FOR EROSION PROTECTION INCLUDES AN UNDISTRIBUTED AMOUNT FOR PROTECTION, CONTROL, AND ABATEMENT OF WATER POLLUTION RESULTING FROM SOIL EROSION. THE DISTRIBUTION AND LOCATION OF THESE MATERIALS ARE TO BE DETERMINED BY THE ENGINEER.

ORDER OF SECTION 2 SHEETS

GENERAL NOTES
PROJECT OVERVIEW
TYPICAL SECTIONS
CONSTRUCTION DETAILS
REMOVAL PLAN
INTERSECTION DETAILS
PLAN DETAILS
PAVEMENT MARKING
TRAFFIC CONTROL
STAGE CONSTRUCTION
DETOUR PLAN

DNR LIAISON

ERIC HEGGELUND
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WISCONSIN DEPT. OF NATURAL RESOURCES
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ERIC.HEGGELUND@WISCONSIN.GOV

DESIGN CONTACTS

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(920) 338-6582
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107 PLEASANT VIEW DRIVE
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JEFF BRINDLEY - DPW
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BARNEVELD@MHTC.NET

CHARTER COMMUNICATIONS - COMM
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2701 DANIELS STREET
MADISON, WI 53718
(608) 274-3822
BRANDON.STORM@CHARTER.COM

MG&E COMPANY - GAS/PETROLEUM
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(608) 252-7099
GROSSING@MGE.COM

WISDOT RWIS PROGRAM - COMM
MIKE ADAMS
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VILLAGE OF BARNEVELD - WATER
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BARNEVELD@MHTC.NET

DIGGERSHOTLINE

Dial 811 or (800)242-8511

www.DiggersHotline.com

STANDARD ABBREVIATIONS

AGG	AGGREGATE	P.C.	POINT OF CURVATURE
ASPH.	ASPHALTIC	P.I.	POINT OF INTERSECTION
BM	BENCH MARK	P.T.	POINT OF TANGENCY
C/L	CENTER LINE	R	RADIUS OF CURVE
CMCP	CORRUGATED METAL CULVERT PIPE	R/L	REFERENCE LINE
CMP	CORRUGATED METAL PIPE	REQ'D	REQUIRED
CO.	COUNTY	RT	RIGHT
CTH	COUNTRY TRUCK HIGHWAY	R/W	RIGHT OF WAY
CONC	CONCRETE	SHLD.	SHOULDER(S)
CPRC	CULVERT PIPE REINFORCED CONCRETE	STA.	STATION
CY	CUBIC-YARD	SY	SQUARE YARD
C&G	CURB AND GUTTER	TYP	TYPICAL
DIA.	DIAMETER	V.C.L.	VERTICAL CURVE LENGTH
EB	EASTBOUND	V.P.C.	VERTICAL POINT OF CURVATURE
EL	ELEVATION	V.P.I.	VERTICAL POINT OF INTERSECTION
EXIST	EXISTING	V.P.T.	VERTICAL POINT OF TANGENCY
F.E.	FIELD ENTRANCE	WB	WESTBOUND
HMA	HOT MIX ASPHALT		
INV	INVERT		
LT	LEFT		
M/L	MATCHLINE		
NB	NORTHBOUND		
PAV'T	PAVEMENT		

PROJECT NO: 1204-05-73

HWY: USH 18

COUNTY: DANE

GENERAL NOTES

SHEET 2

E

FILE NAME : P:\2018 PROJECTS\5018041 - WISDOT SWR US 18_151\CIVIL3D\SHEETSPLAN\1204-05-73\020101-GN.DWG

LAYOUT NAME - 020101-gn

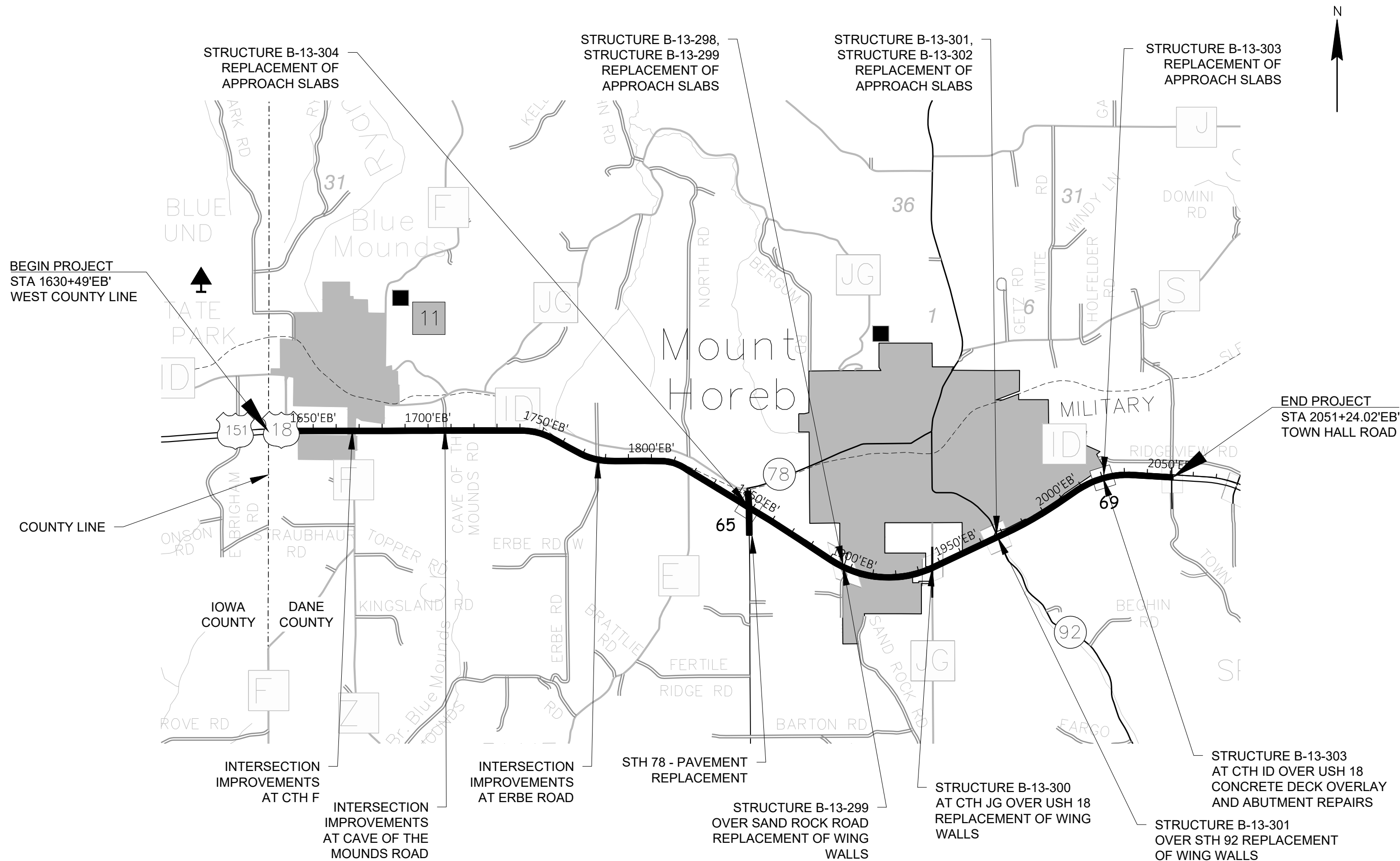
PLOT DATE : 12/5/2019 2:27 PM

PLOT BY : BRETT PETERSON

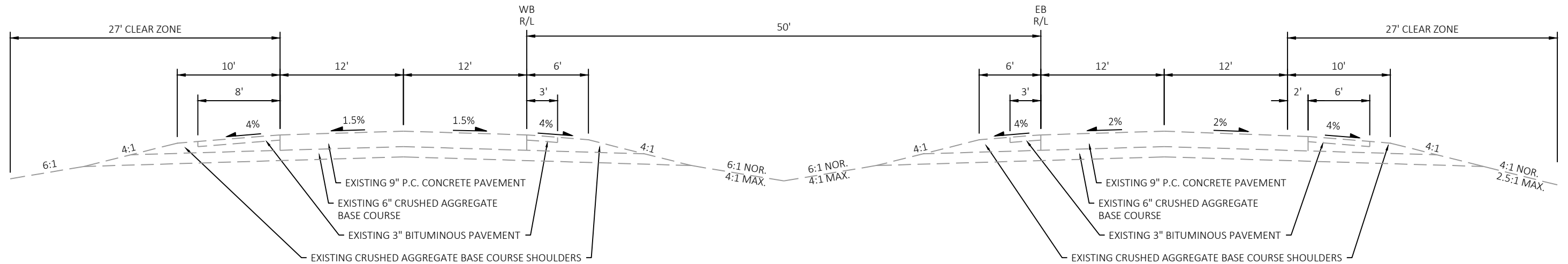
PLOT NAME :

PLOT SCALE : 1 IN:100 FT

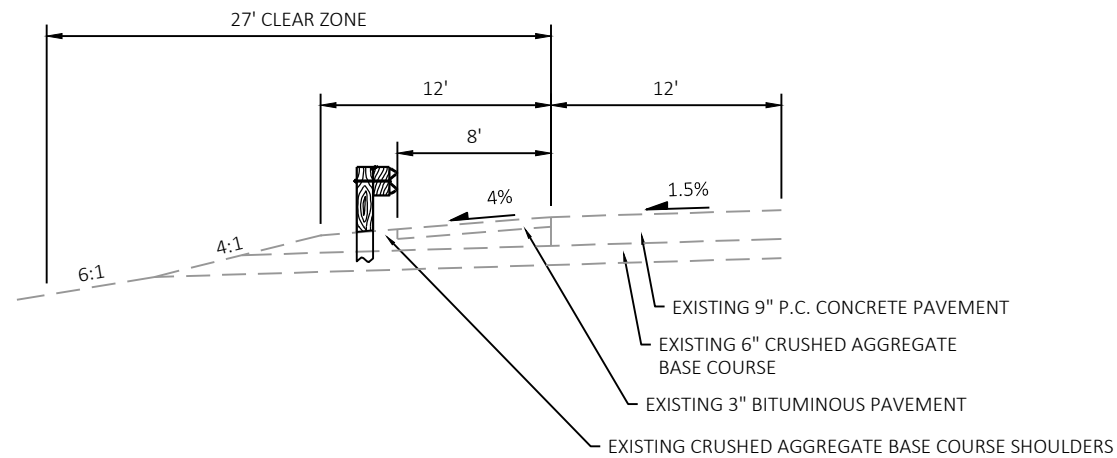
WISDOT/CADDs SHEET 42



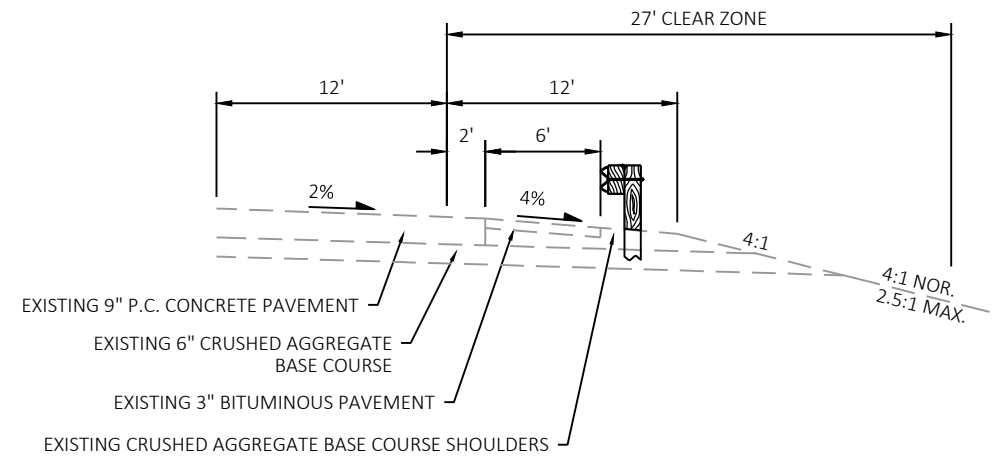
PROJECT NO: 1204-05-73	HWY: USH 18	COUNTY: DANE	PROJECT OVERVIEW	SHEET 3	E
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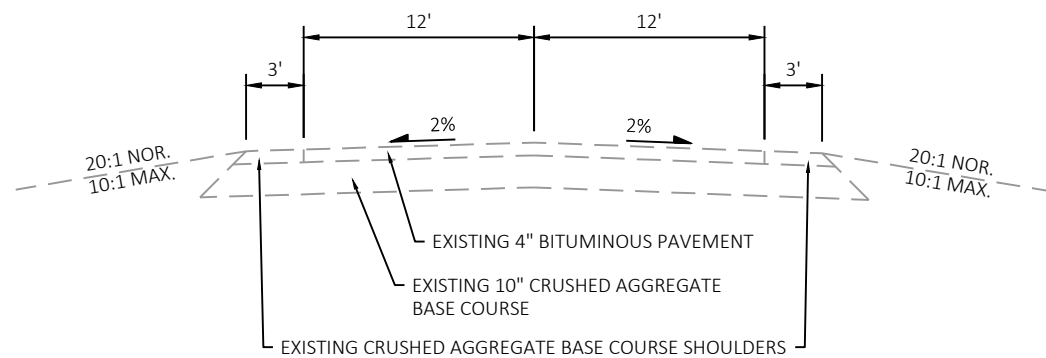
TYPICAL EXISTING SECTION
USH 18
STA. 1630+49'EB' TO STA. 2051+24.02'EB'



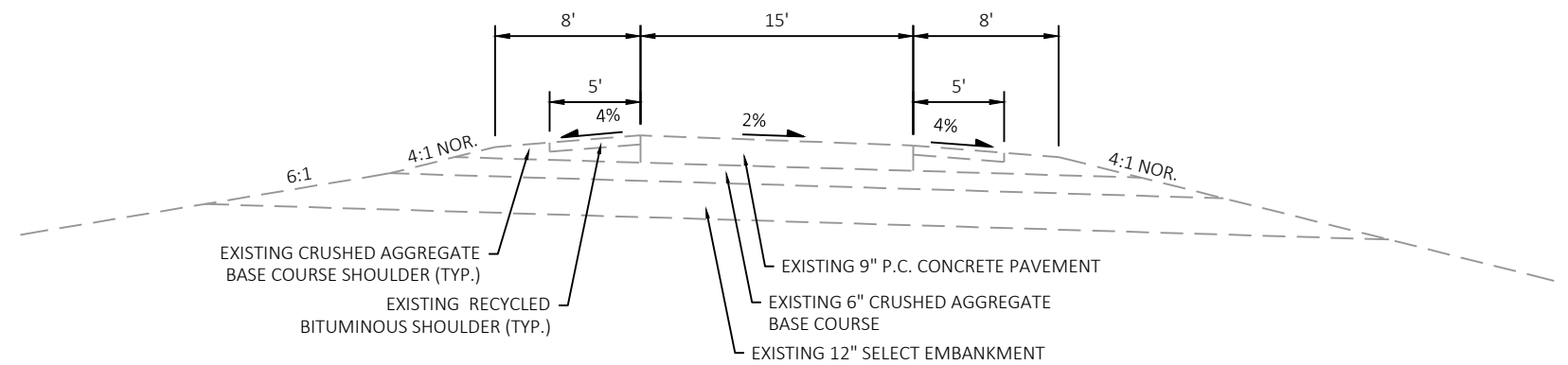
TYPICAL EXISTING SECTION
USH 18 (WB GUARDRAIL LOCATIONS)



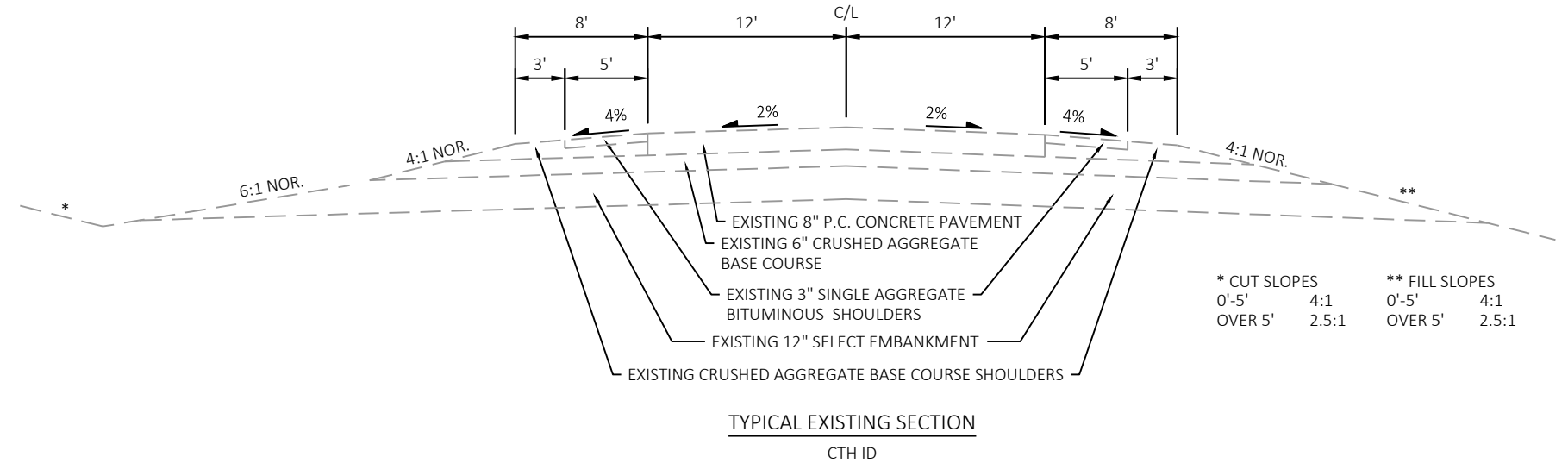
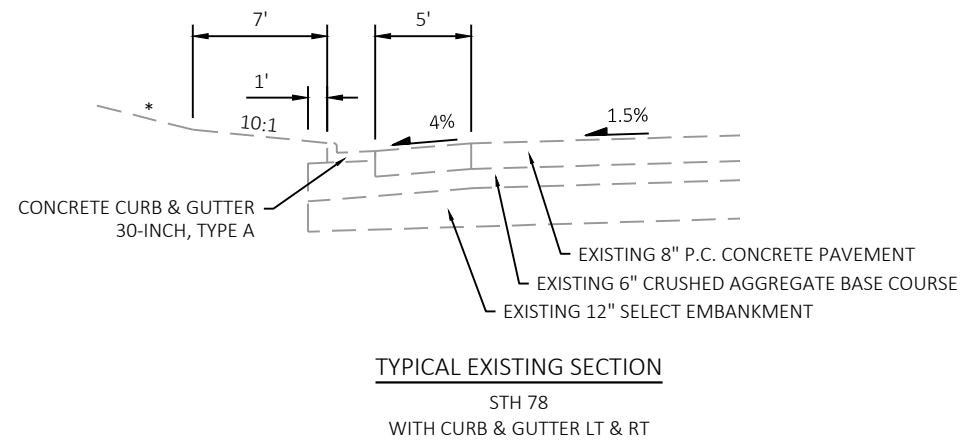
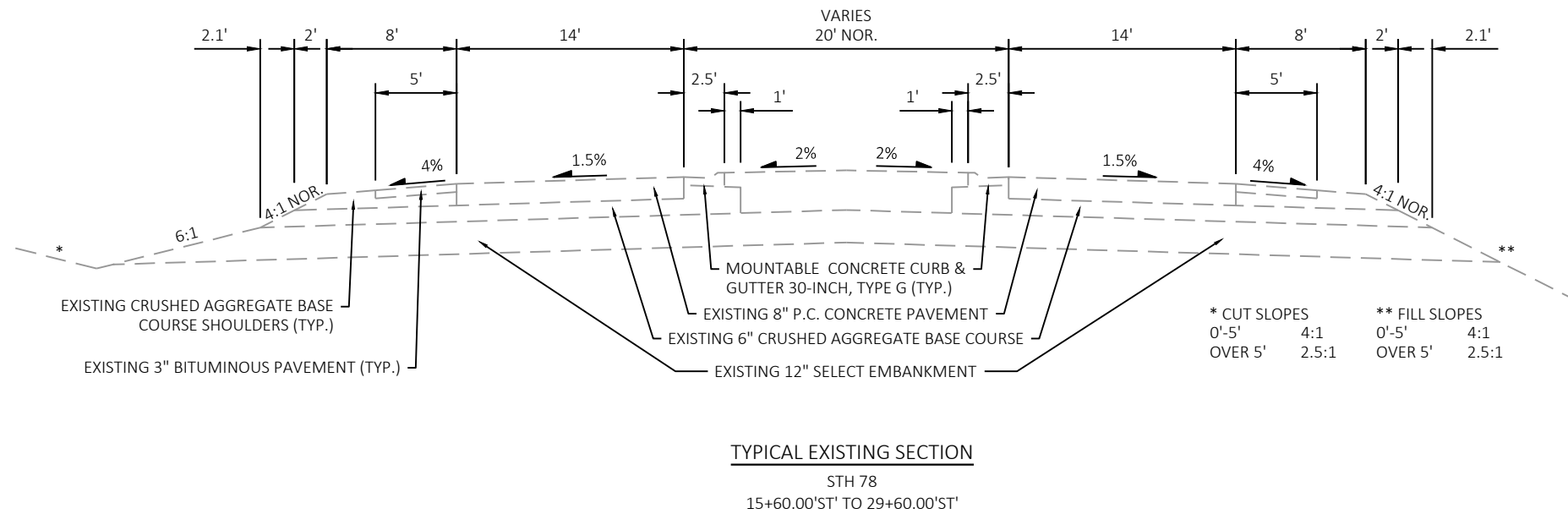
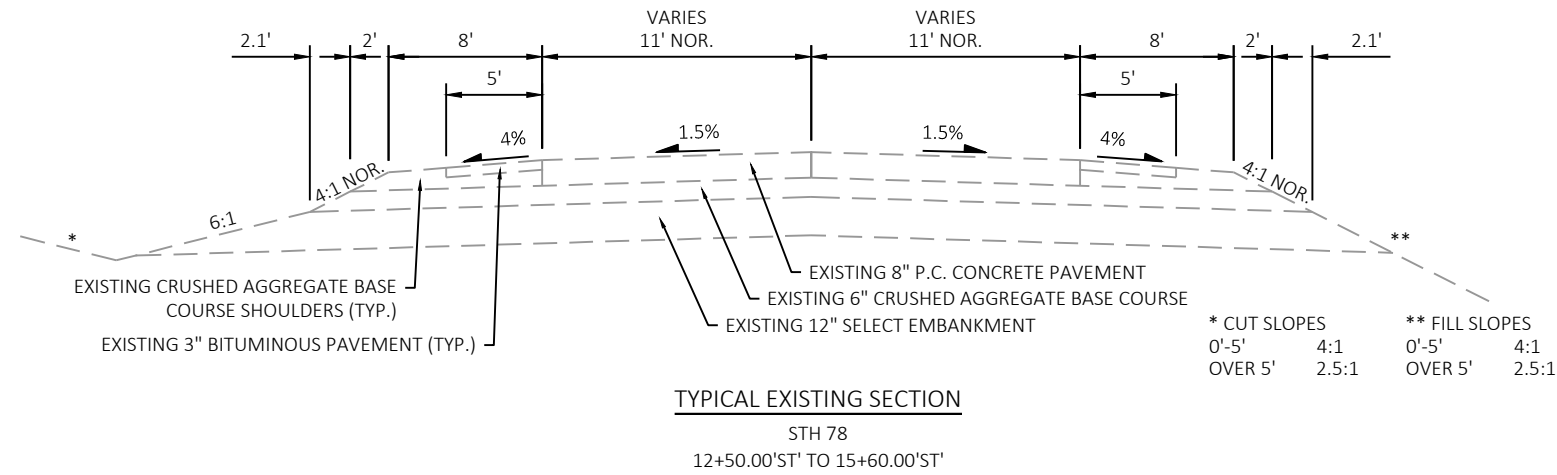
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USH 18 (EB GUARDRAIL LOCATIONS)

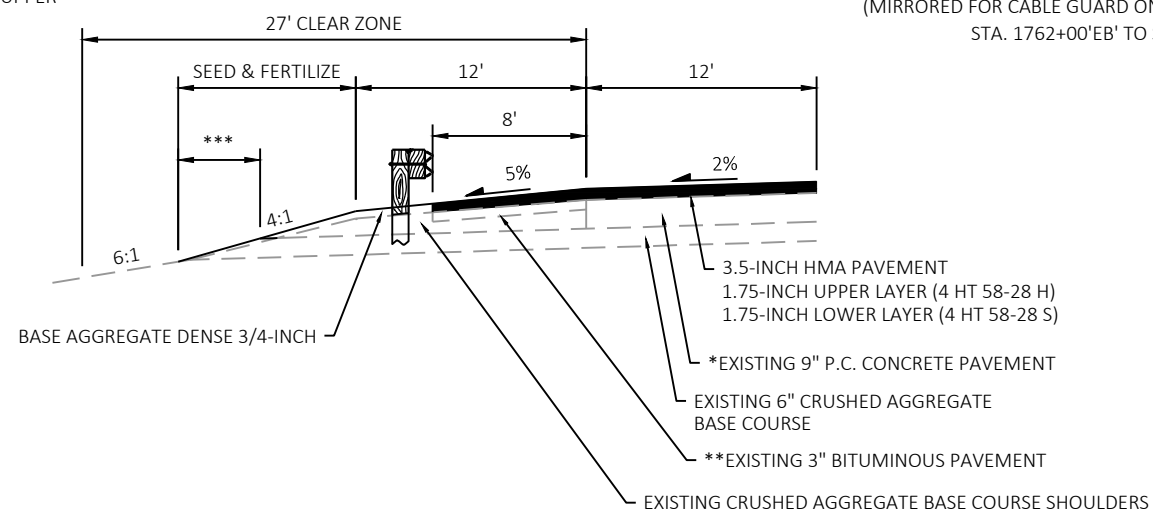
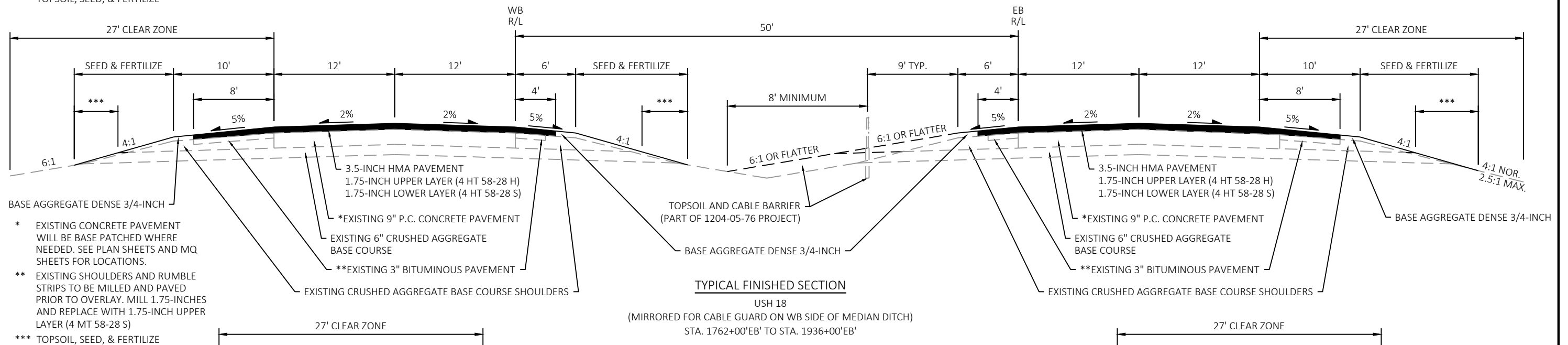
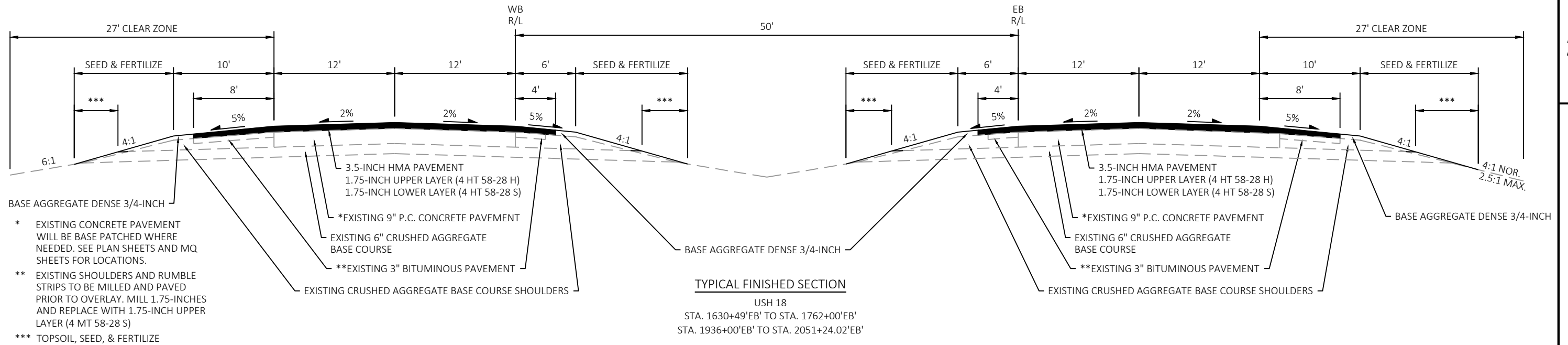


TYPICAL EXISTING SECTION
MAINTENANCE CROSSOVERS



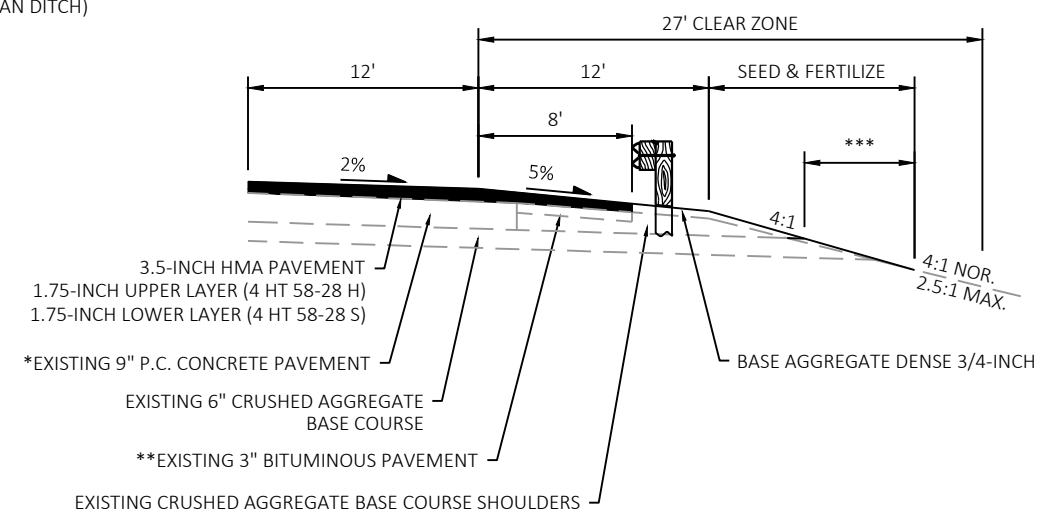
TYPICAL EXISTING SECTION
FOR INTERCHANGE RAMPS FOR STH 78 AND CTH 1D





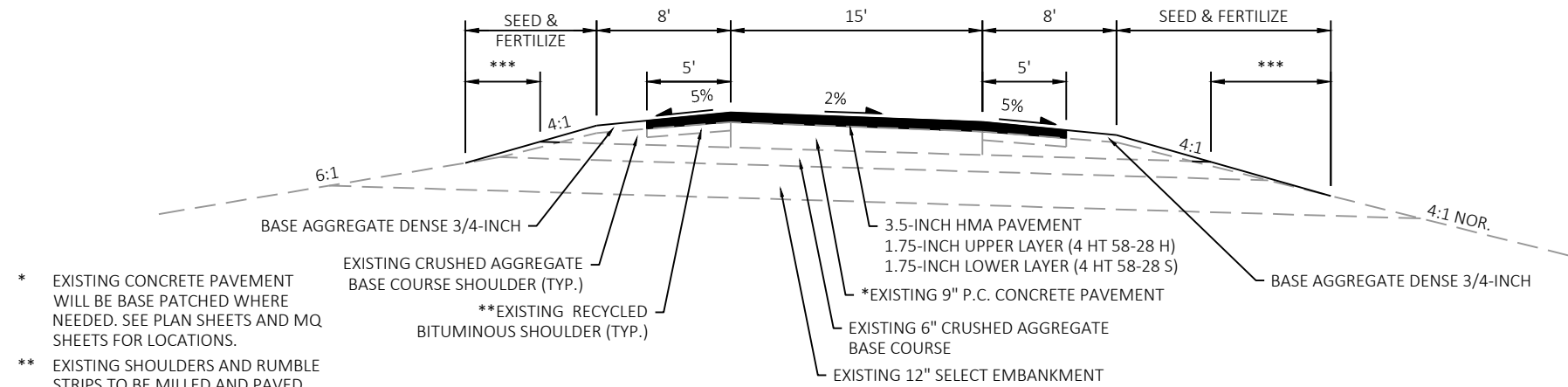
TYPICAL FINISHED SECTION

USH 18 (WB GUARDRAIL LOCATIONS)



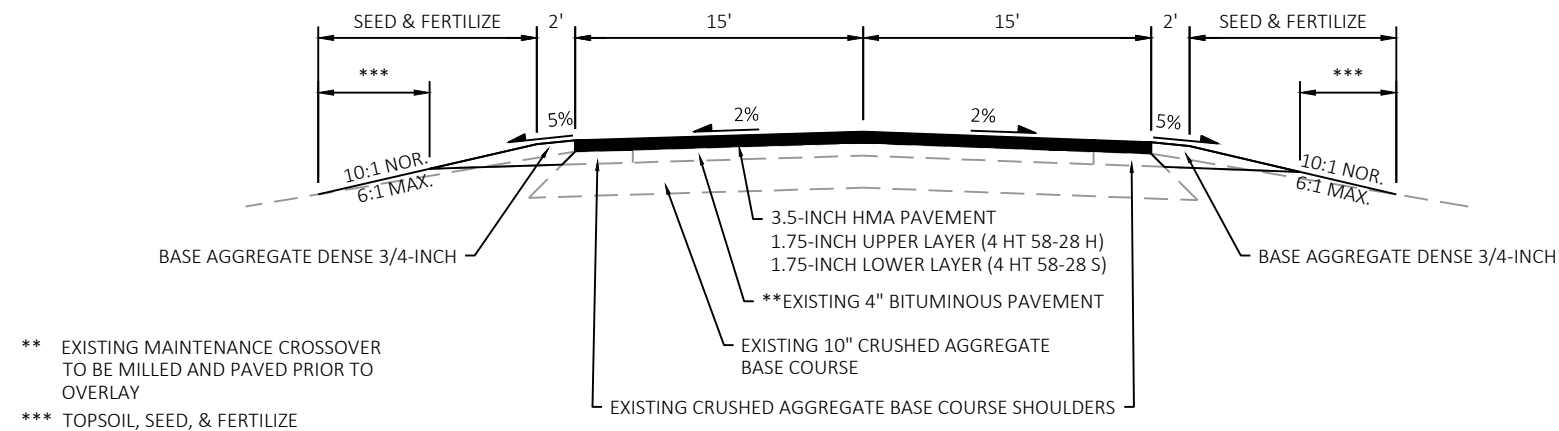
TYPICAL FINISHED SECTION

USH 18 (EB GUARDRAIL LOCATIONS)



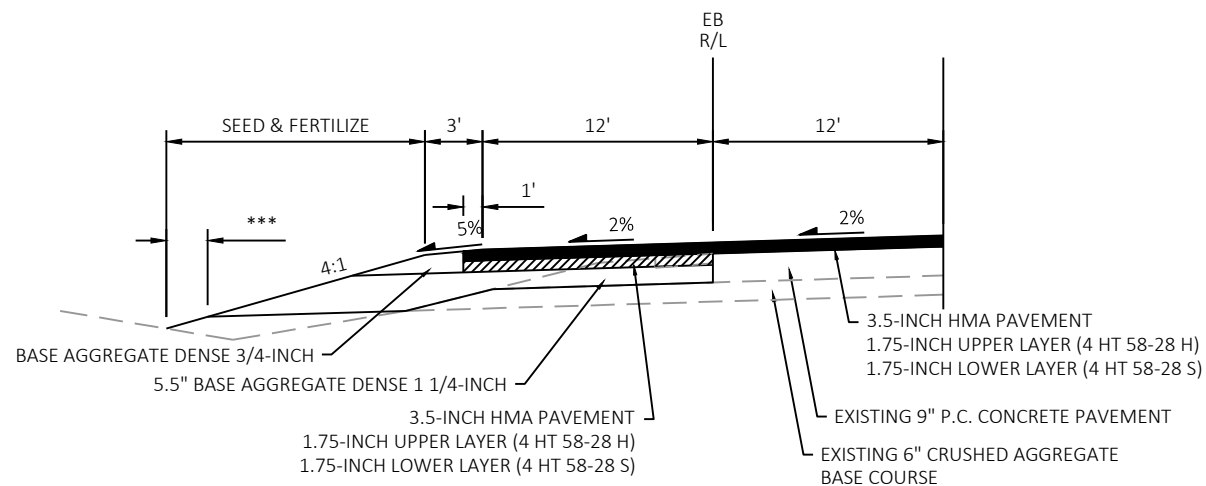
- * EXISTING CONCRETE PAVEMENT
WILL BE BASE PATCHED WHERE
NEEDED. SEE PLAN SHEETS AND MQ
SHEETS FOR LOCATIONS.
- ** EXISTING SHOULDERS AND RUMBLE
STRIPS TO BE MILLED AND PAVED
PRIOR TO OVERLAY. MILL 1.75-INCHES
AND REPLACE WITH 1.75-INCH UPPER
LAYER (4 MT 58-28 S)
- *** TOPSOIL, SEED, & FERTILIZE

TYPICAL FINISHED SECTION
FOR INTERCHANGE RAMP FOR STH 78 AND CTH 1D



- ** EXISTING MAINTENANCE CROSSOVER
TO BE MILLED AND PAVED PRIOR TO
OVERLAY
- *** TOPSOIL, SEED, & FERTILIZE

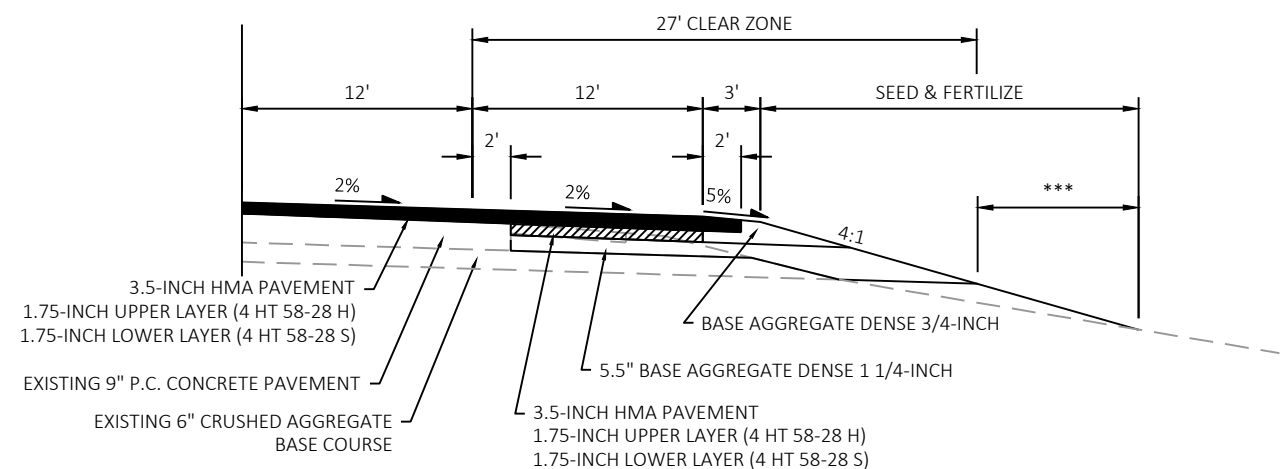
TYPICAL FINISHED SECTION
MAINTENANCE CROSSOVERS



*** TOPSOIL, SEED, & FERTILIZE

TYPICAL FINISHED SECTION

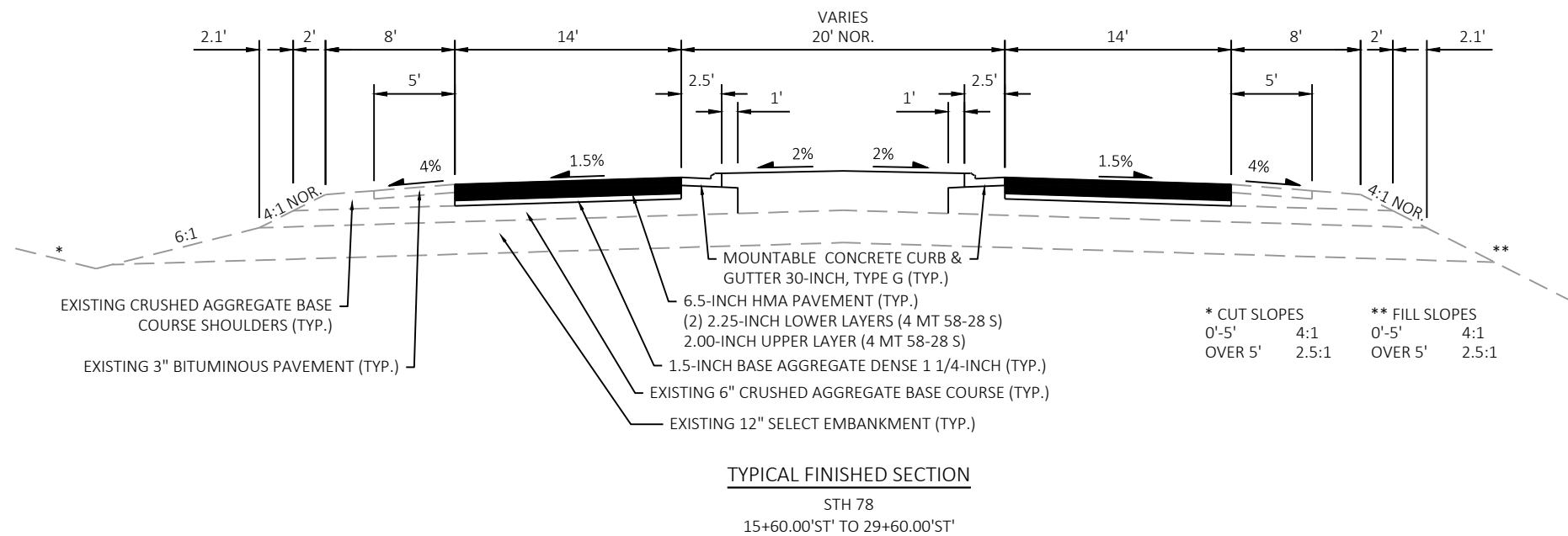
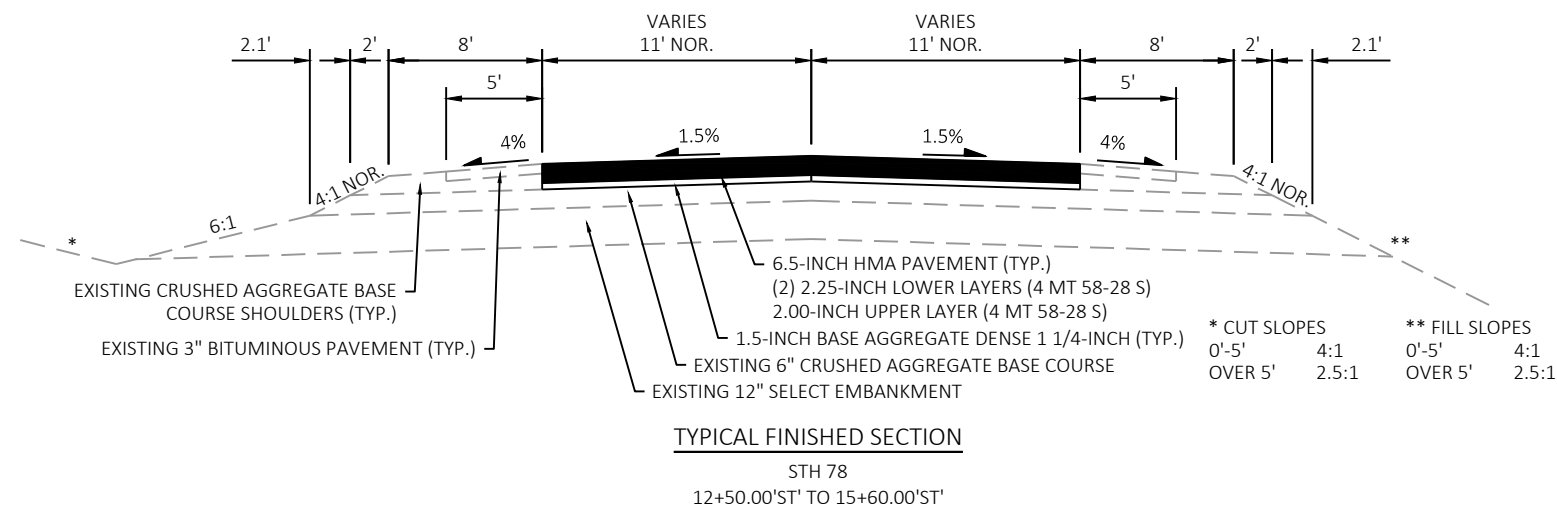
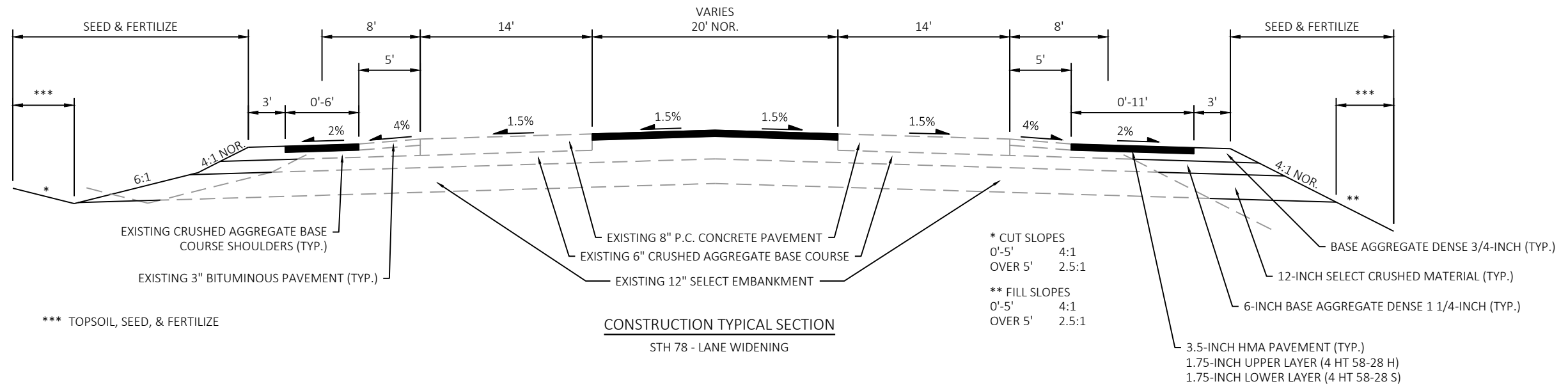
USH 18 - LEFT TURN LANE LENGTHENING
(MIRRORED FOR WB LANES)
STA. 1702+18.37'EB' TO STA. 1704+82.37'EB'
STA. 1708+21.05'WB' TO STA. 1709+74.18'WB'
STA. 1771+42.48'EB' TO STA. 1773+75.29'EB'
STA. 1777+91.07'WB' TO STA. 1781+83.21'WB'

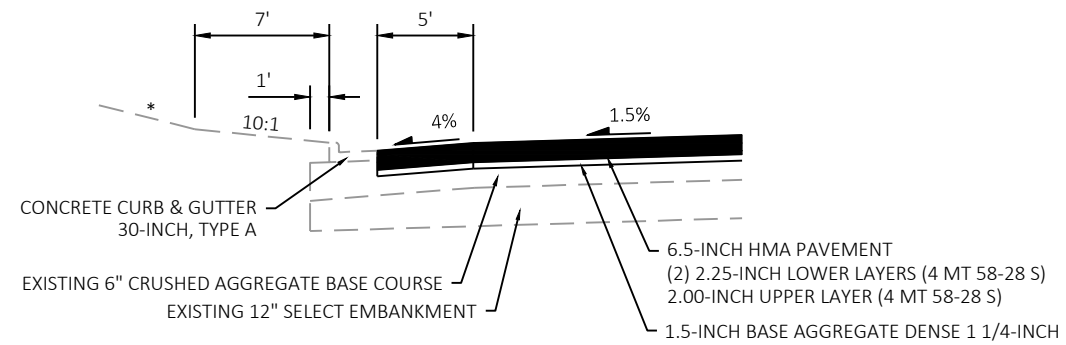


*** TOPSOIL, SEED, & FERTILIZE

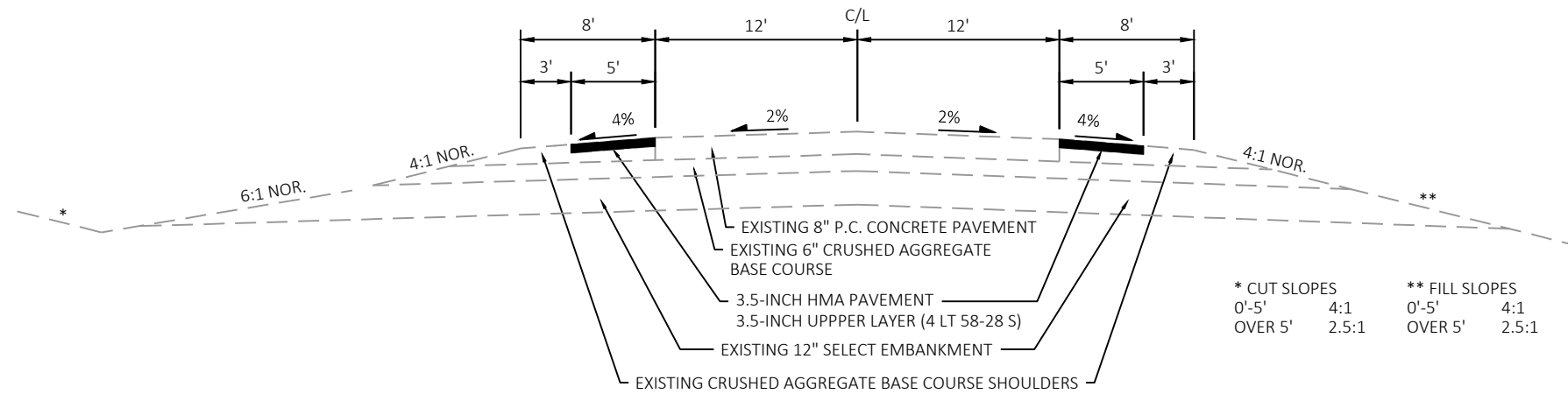
TYPICAL FINISHED SECTION

USH 18 - RIGHT TURN LANE LENGTHENING
(MIRRORED FOR WB LANES)
STA. 1710+71.11'WB' TO STA. 1712+47.85'WB'
STA. 1771+76.39'EB' TO STA. 1775+08.75'EB'
STA. 1778+49.65'WB' TO STA. 1781+78.14'WB'



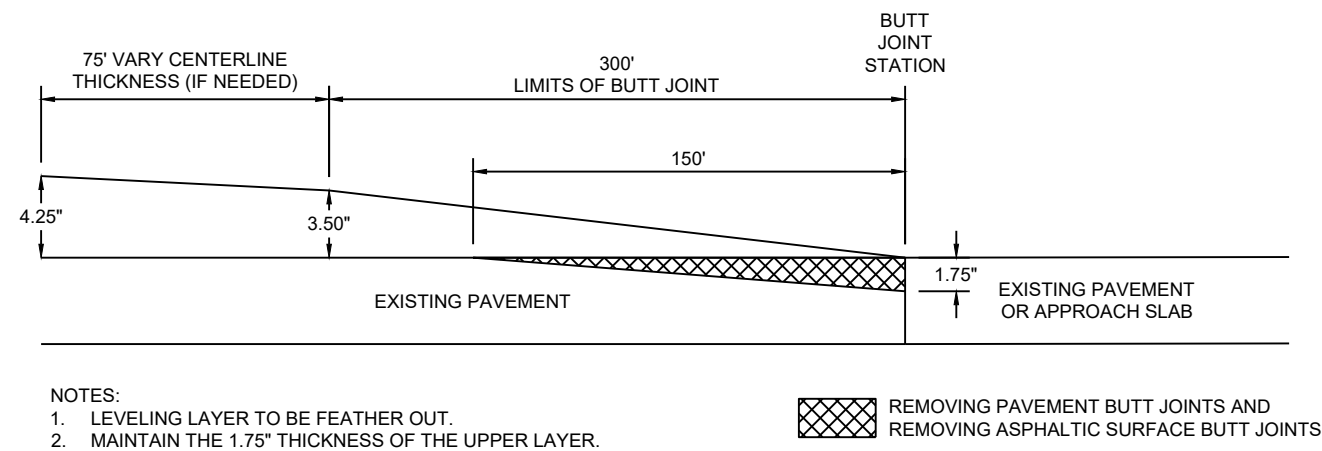


TYPICAL FINISHED SECTION

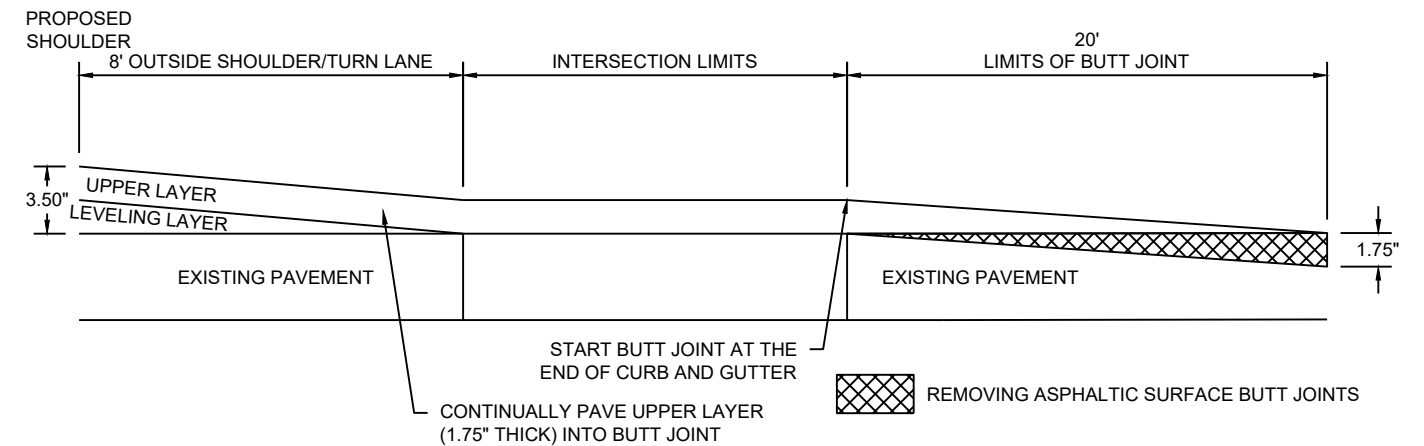
STH 78
WITH CURB & GUTTER LT & RT

TYPICAL FINISHED SECTION

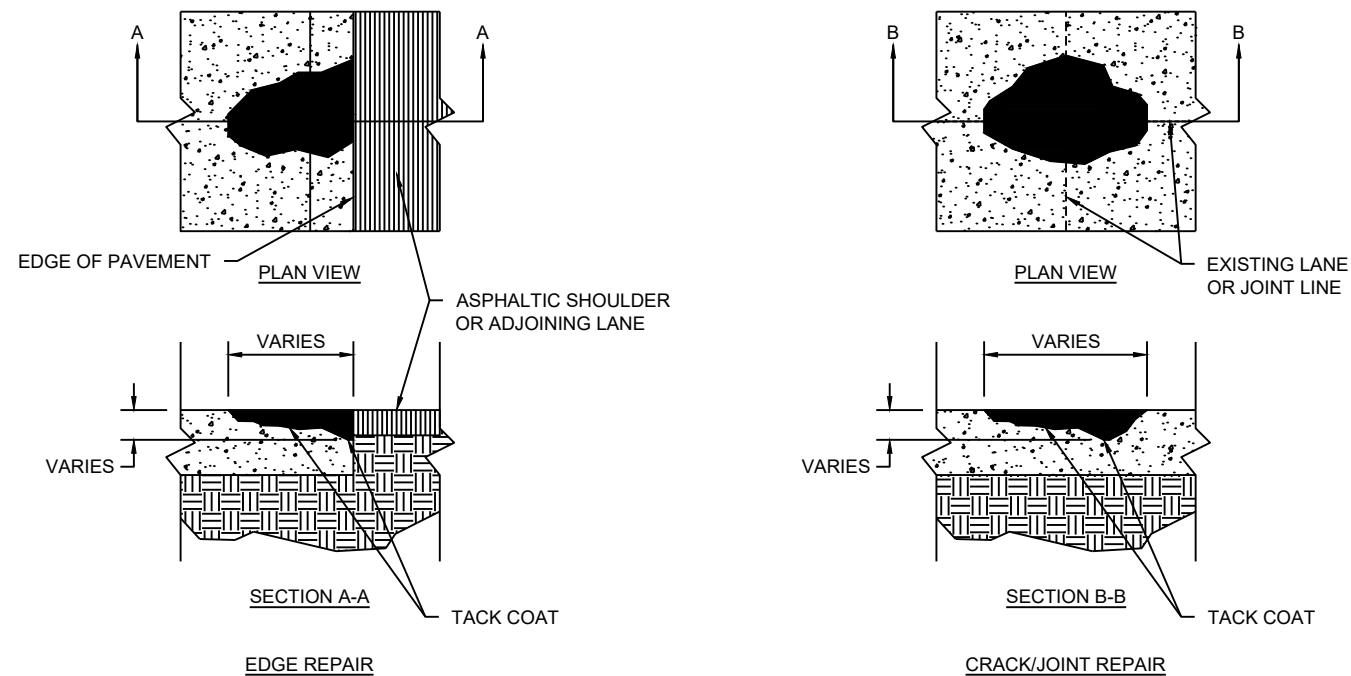
CTH 1D



MAINLINE BUTT JOINT DETAIL

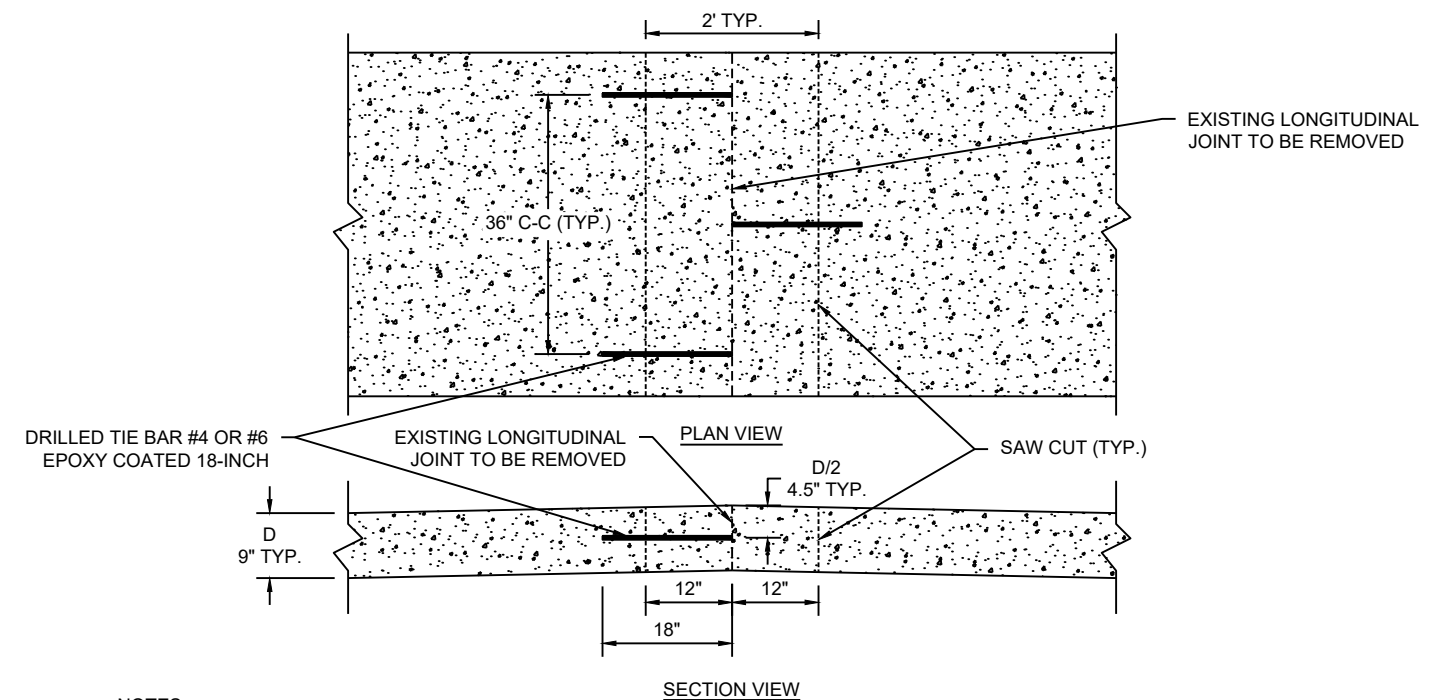


INTERSECTION BUTT JOINT DETAIL



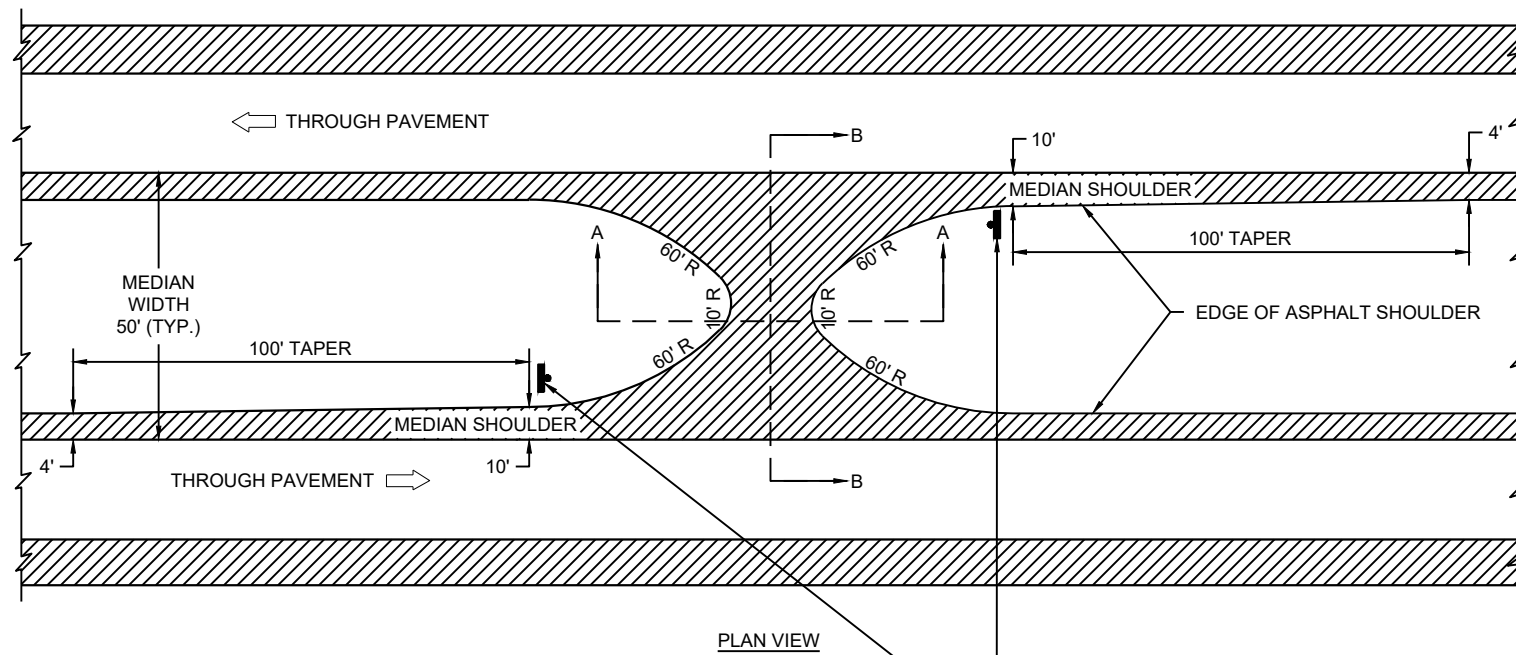
- NOTES:
1. REPAIR THE NARROW JOINT/CRACK DETERIORATION IN THE CONCRETE PAVEMENT WITH THE SPECIAL PROVISION ITEM CONCRETE JOINT AND CRACK CLEANING AND REPAIR.
 2. THIS ITEM INCLUDES THE REMOVAL OF LOOSE CONCRETE, ASPHALT AND/OR CONTAMINANTS FROM THE JOINT OR CRACK.
 3. BLOW OUT REPAIR AREA WITH 80 P.S.I MINIMUM COMPRESS AIR. THE AREA IS THEN CLEANED, TACK COAT APPLIED AND FILLED WITH ASPHALT. ASPHALTIC SURFACE AND TACK COAT ARE INCIDENTAL TO CONCRETE JOINT AND CRACK CLEANING AND REPAIR.
 4. THESE ARE PARTIAL DEPTH REPAIRS.

CONCRETE JOINT AND CRACK CLEANING AND REPAIR



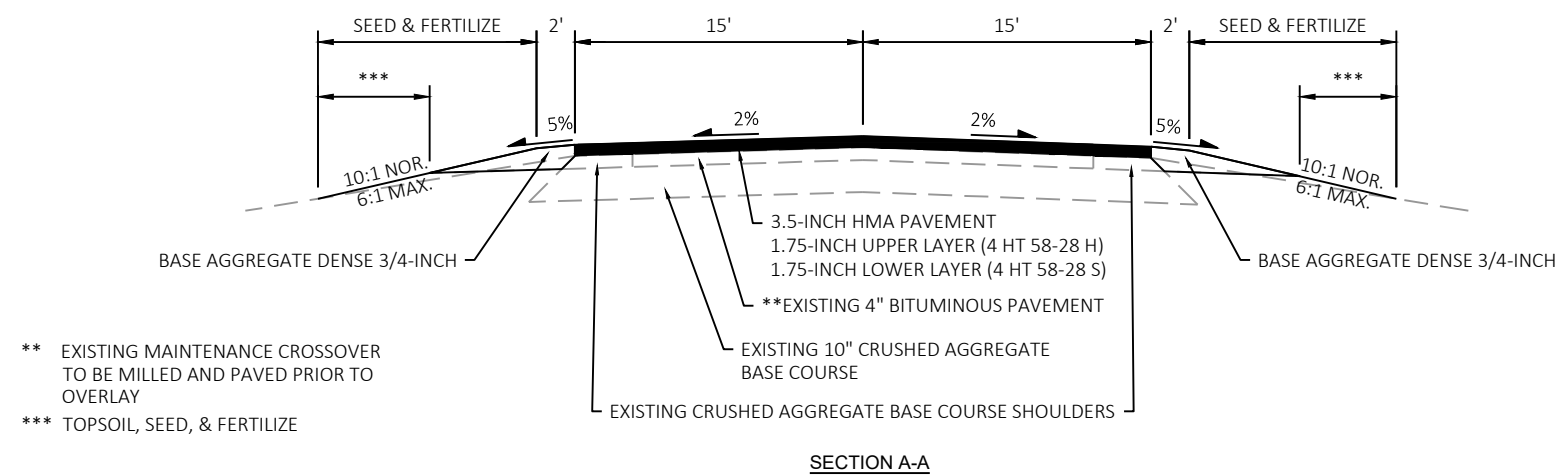
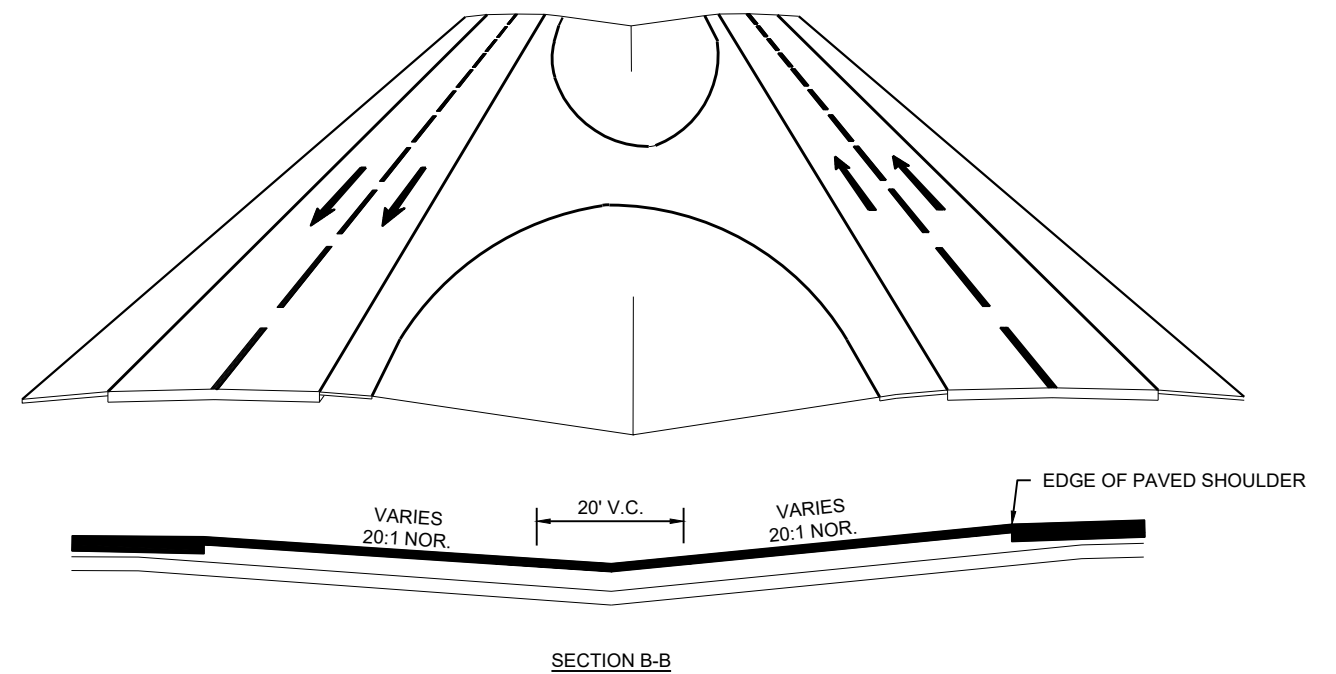
- NOTES:
1. REPAIR LONGITUDINAL JOINT DISTRESS THAT IS WIDE AND APPROACHING FULL DEPTH WITH THE SPECIAL PROVISION ITEM CONCRETE PAVEMENT REPAIR LONGITUDINAL JOINT.
 2. THIS REPAIR IS 2' WIDE AND STRADDLES THE LONGITUDINAL JOINT BETWEEN DRIVING LANES. THESE ARE FULL DEPTH REPAIRS THAT INCLUDE SAWING CONCRETE, DRILLED TIE BARS AND ARE FILLED WITH CONCRETE. SAWING CONCRETE, DRILLED TIE BARS, AND CONCRETE USED TO FILL JOINT ARE INCIDENTAL TO CONCRETE PAVEMENT REPAIR LONGITUDINAL JOINT.
 3. TIE BAR MAY BE DRILLED AT AN ANGLE, THEN BENT PERPENDICULAR TO JOINT AFTER INSTALLATION.

CONCRETE PAVEMENT REPAIR LONGITUDINAL JOINT

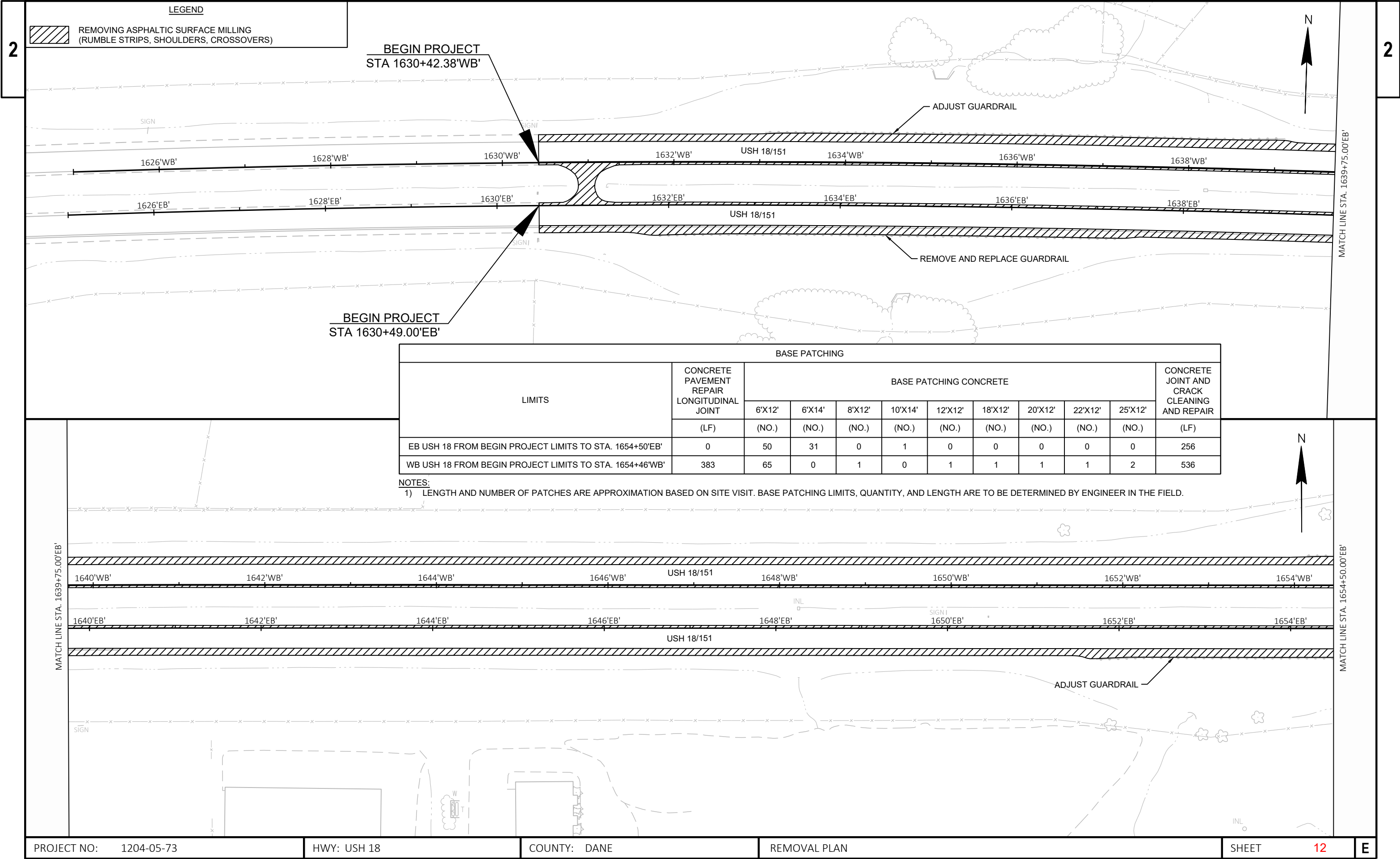


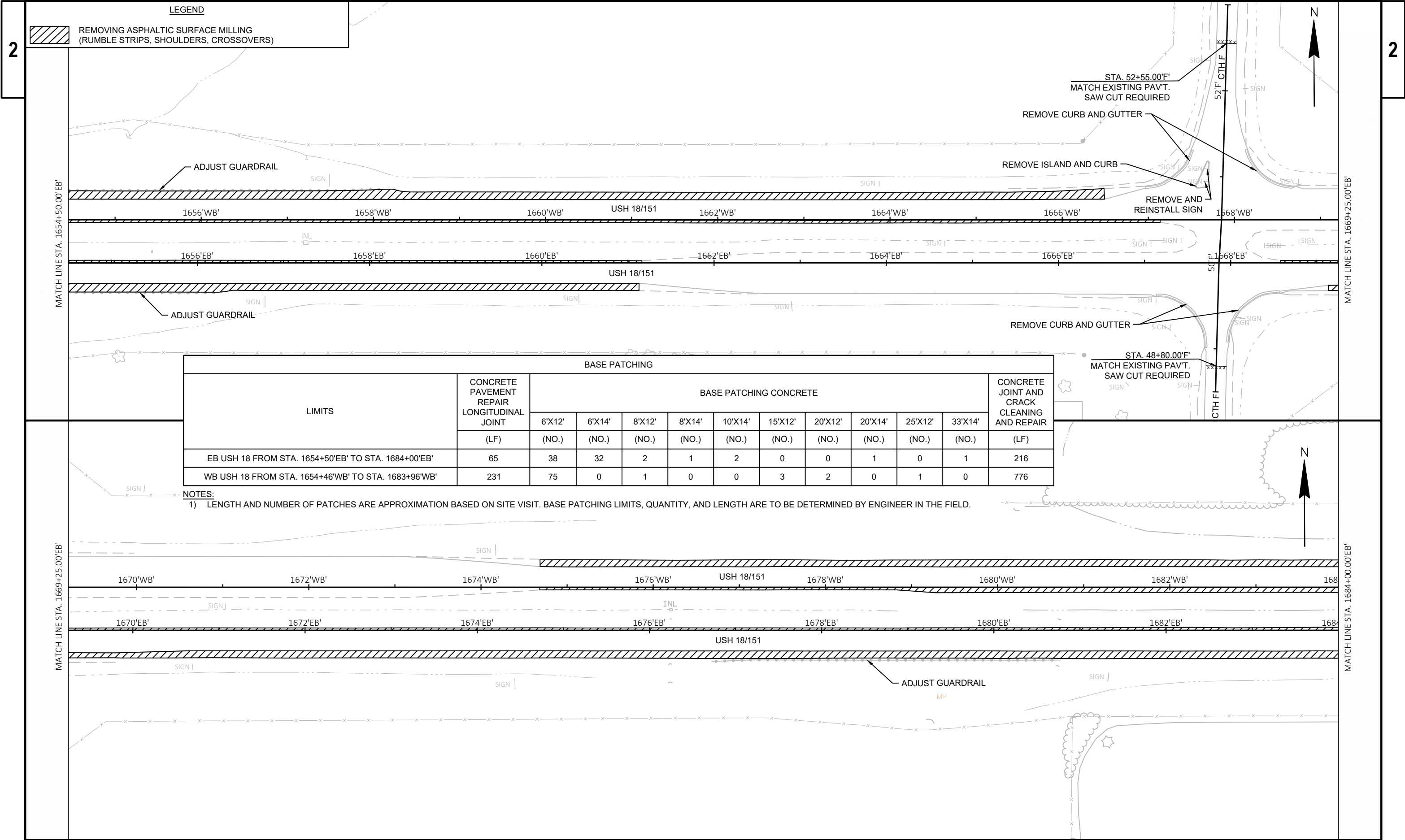
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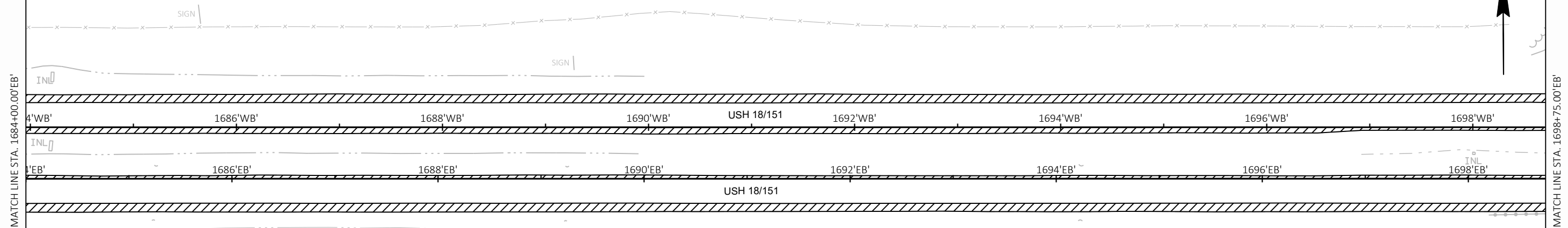
1. DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.



MAINTENANCE CROSSOVER DETAIL

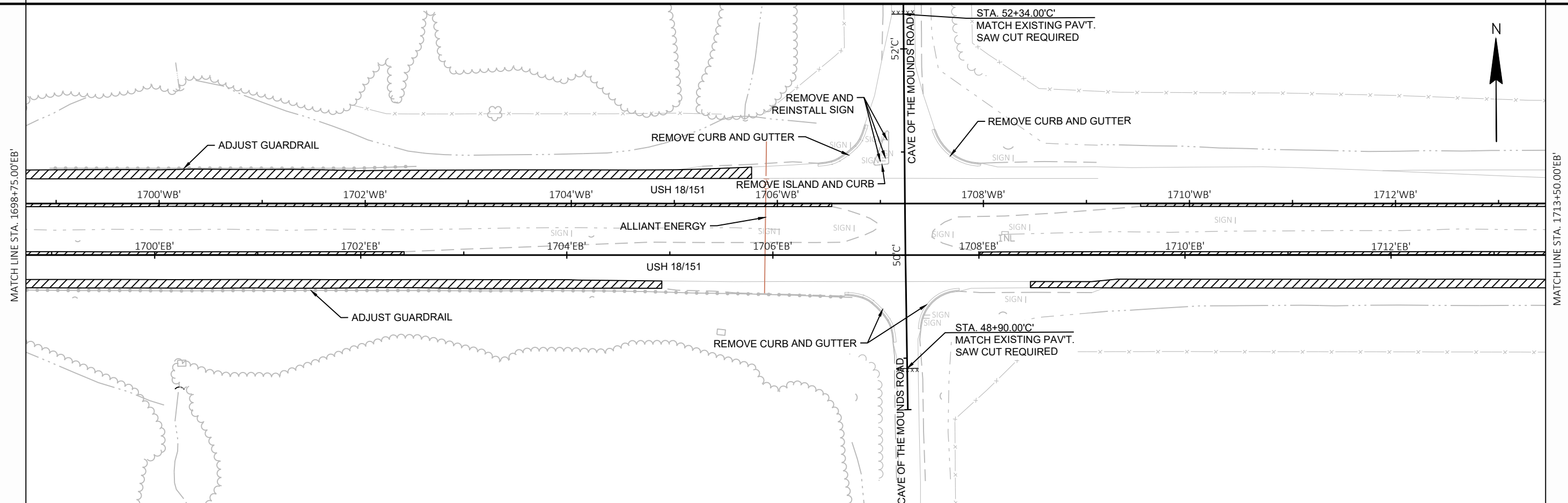


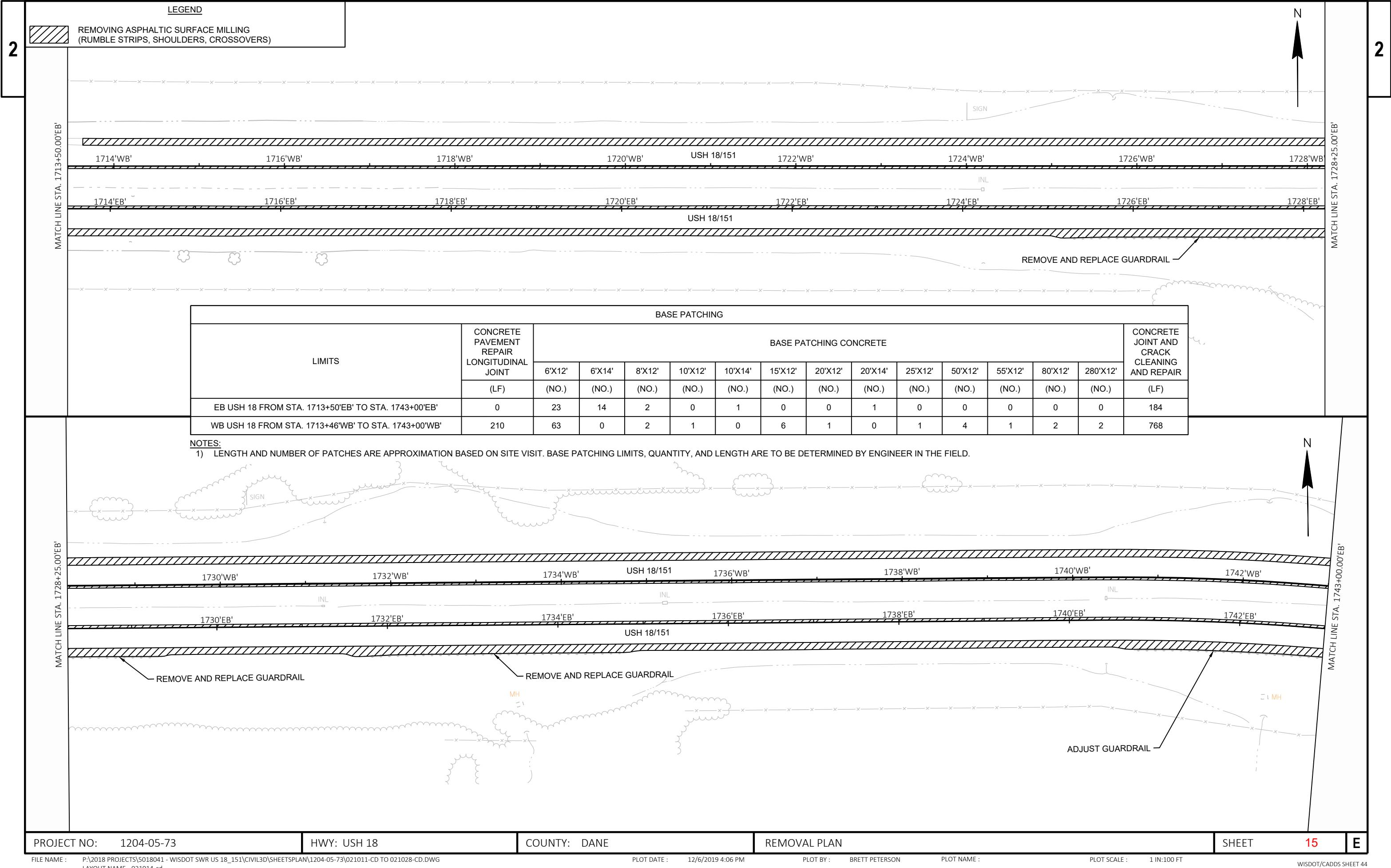


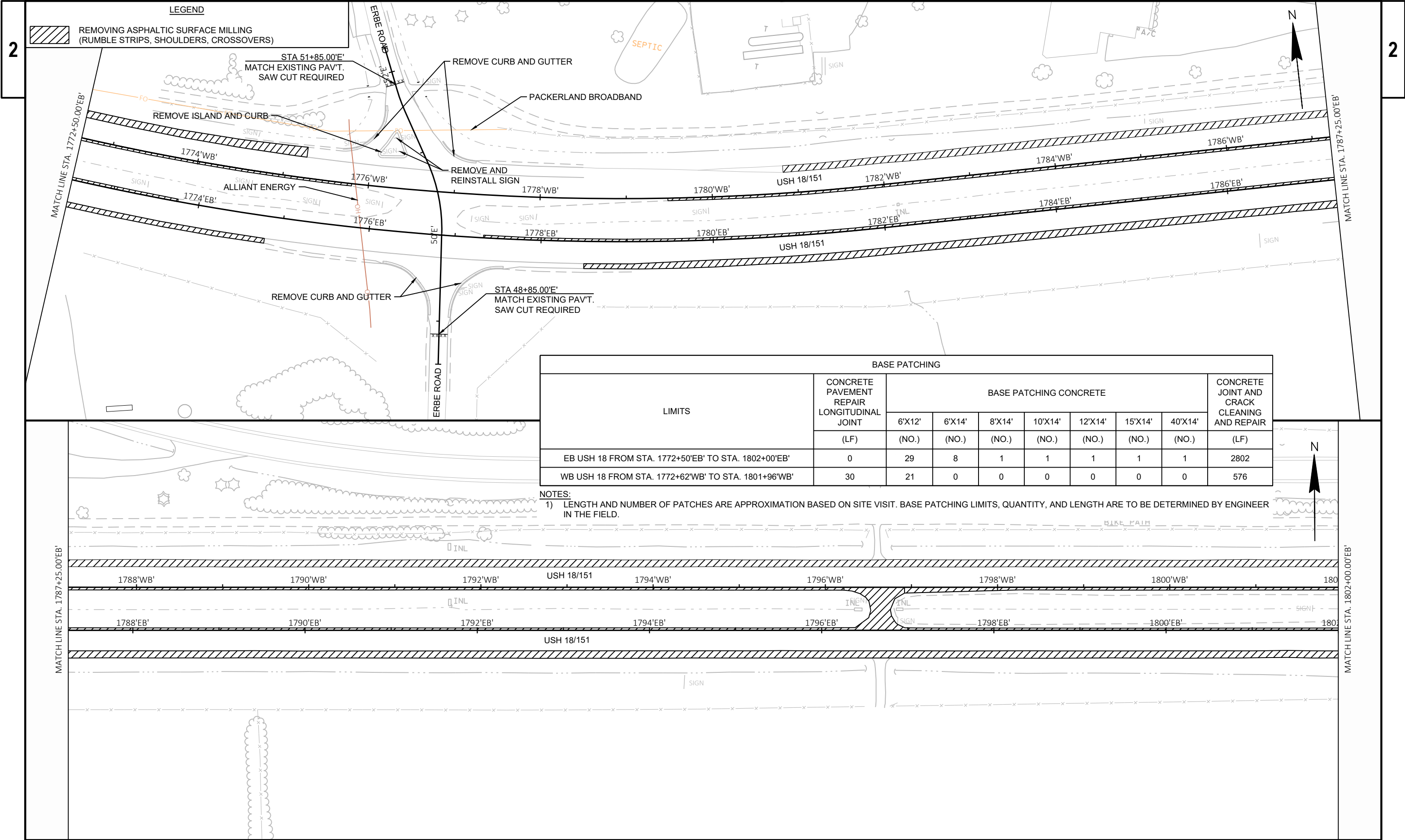
 REMOVING ASPHALTIC SURFACE MILLING
(RUMBLE STRIPS, SHOULDERS, CROSSOVERS)

BASE PATCHING										
LIMITS	CONCRETE PAVEMENT REPAIR LONGITUDINAL JOINT	BASE PATCHING CONCRETE								CONCRETE JOINT AND CRACK CLEANING AND REPAIR
		6'X12'	6'X14'	8'X12'	8'X14'	12'X12'	12'X14'	14'X14'	45'X14'	
	(LF)	(NO.)	(NO.)	(NO.)	(NO.)	(NO.)	(NO.)	(NO.)	(NO.)	(LF)
EB USH 18 FROM STA. 1864+00'EB' TO STA. 1713+50'EB'	160	54	41	1	3	1	1	1	1	336
WB USH 18 FROM STA. 1683+96'WB' TO STA. 1713+46'WB'	520	55	0	2	0	0	0	0	0	1216

1) LENGTH AND NUMBER OF PATCHES ARE APPROXIMATION BASED ON SITE VISIT. BASE PATCHING LIMITS, QUANTITY, AND LENGTH ARE TO BE DETERMINED BY ENGINEER IN THE FIELD.

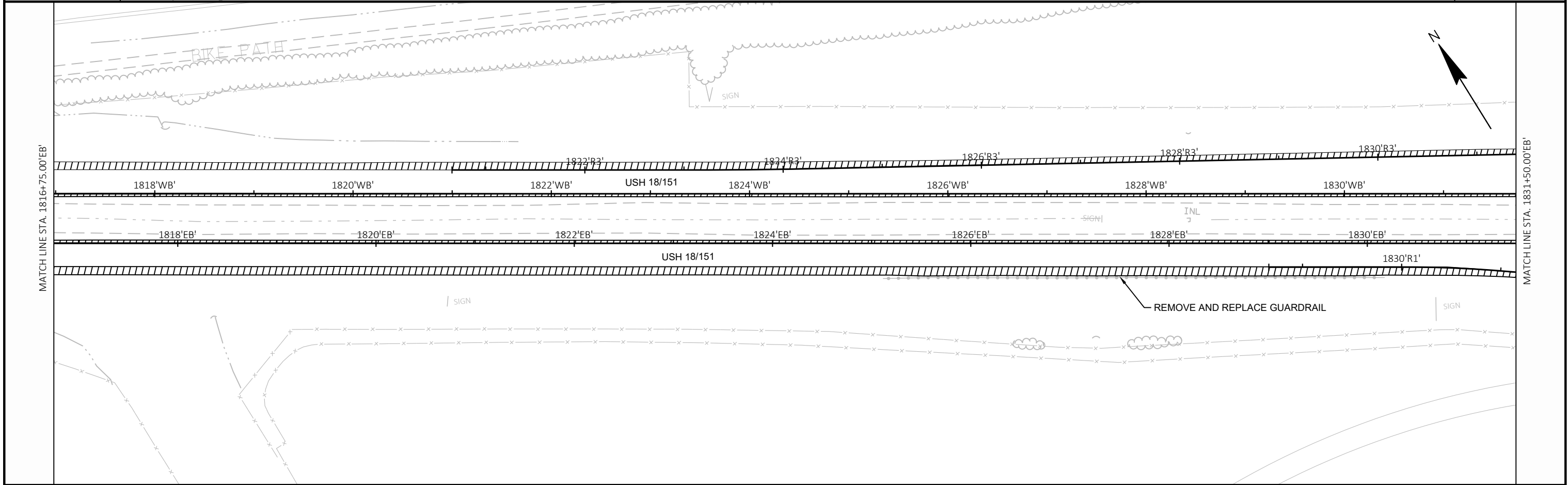
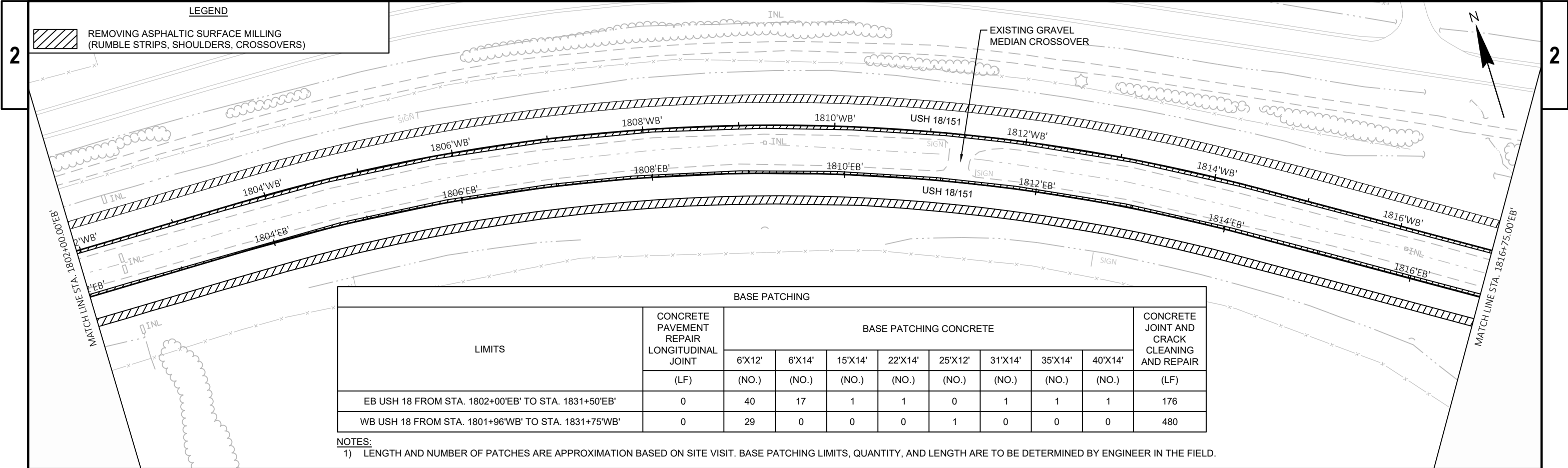


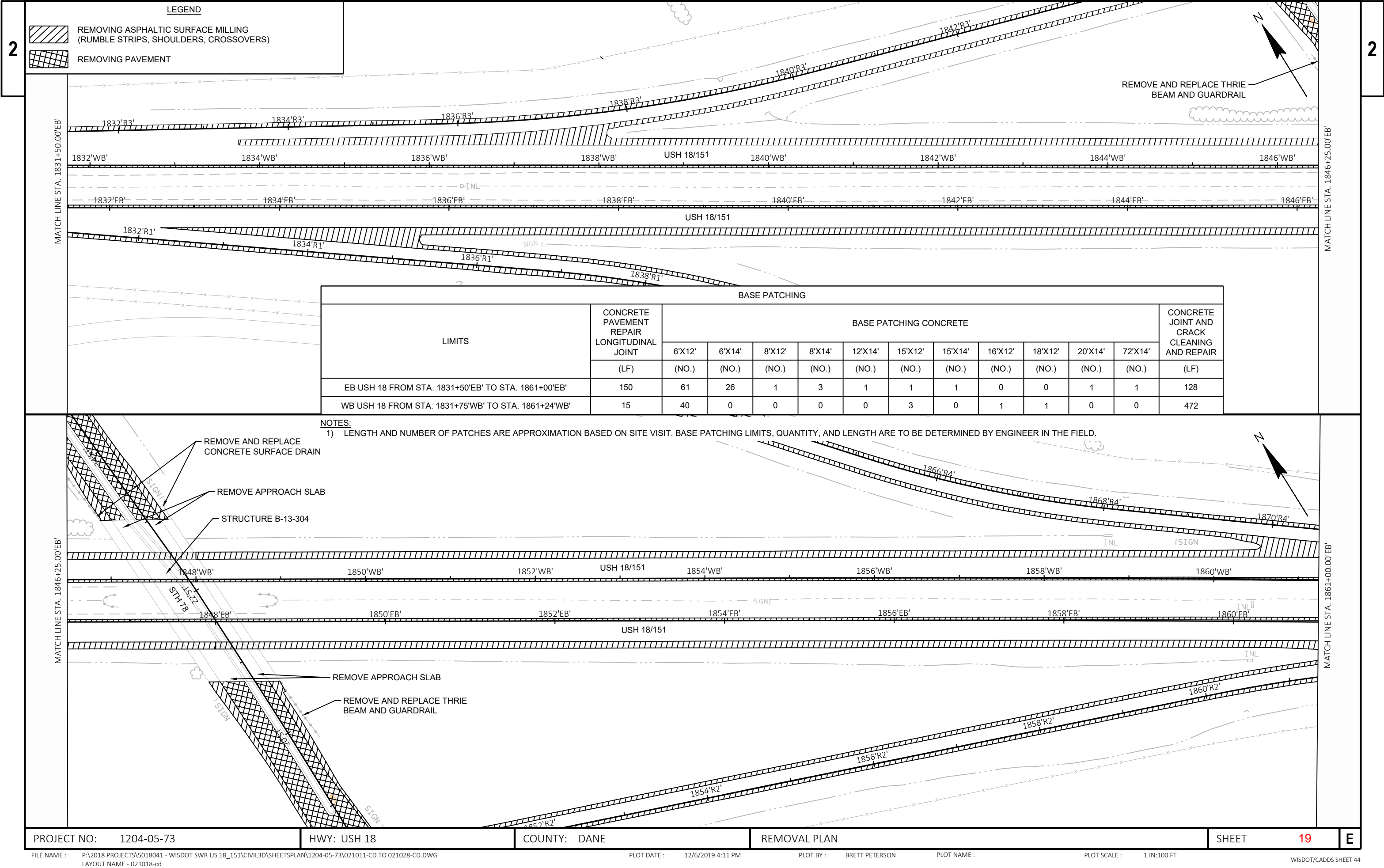


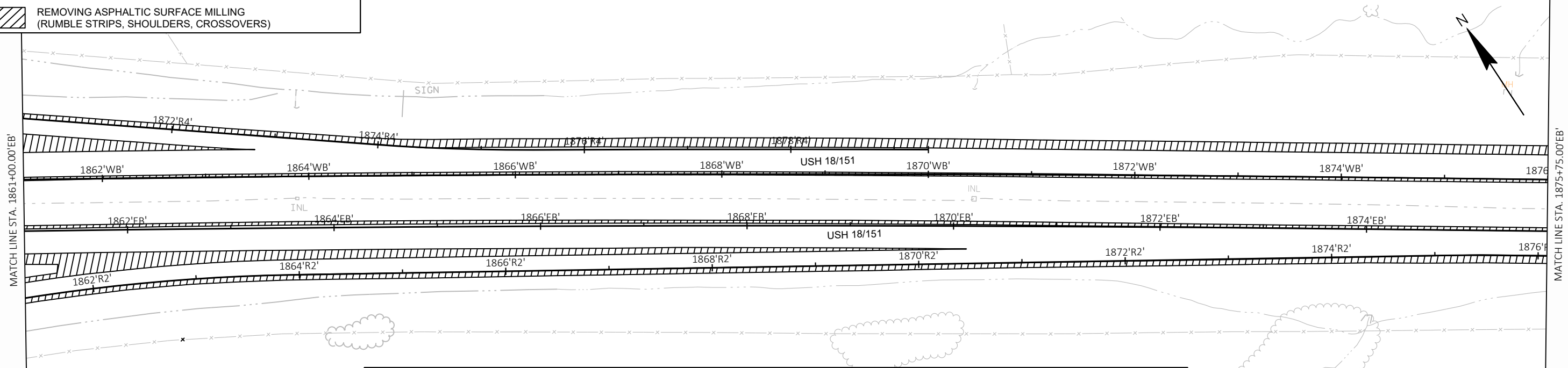


BASE PATCHING									
LIMITS	CONCRETE PAVEMENT REPAIR LONGITUDINAL JOINT (LF)	BASE PATCHING CONCRETE							CONCRETE JOINT AND CRACK CLEANING AND REPAIR (LF)
		6'X12' (NO.)	6'X14' (NO.)	8'X14' (NO.)	10'X14' (NO.)	12'X14' (NO.)	15'X14' (NO.)	40'X14' (NO.)	
EB USH 18 FROM STA. 1772+50'EB' TO STA. 1802+00'EB'	0	29	8	1	1	1	1	1	2802
WB USH 18 FROM STA. 1772+62'WB' TO STA. 1801+96'WB'	30	21	0	0	0	0	0	0	576

NOTES:
1) LENGTH AND NUMBER OF PATCHES ARE APPROXIMATION BASED ON SITE VISIT. BASE PATCHING LIMITS, QUANTITY, AND LENGTH ARE TO BE DETERMINED BY ENGINEER IN THE FIELD.

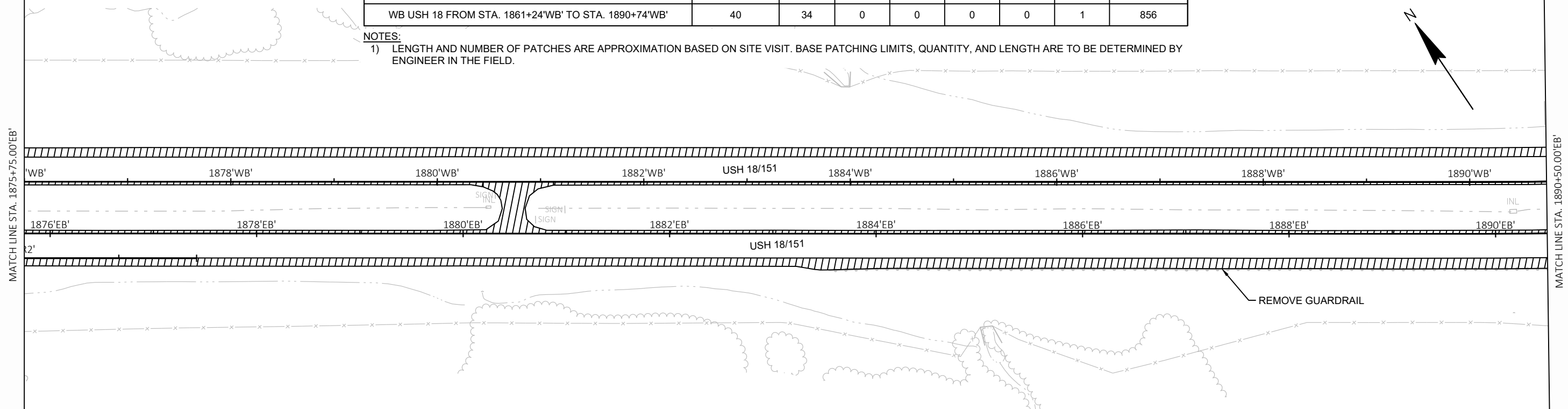


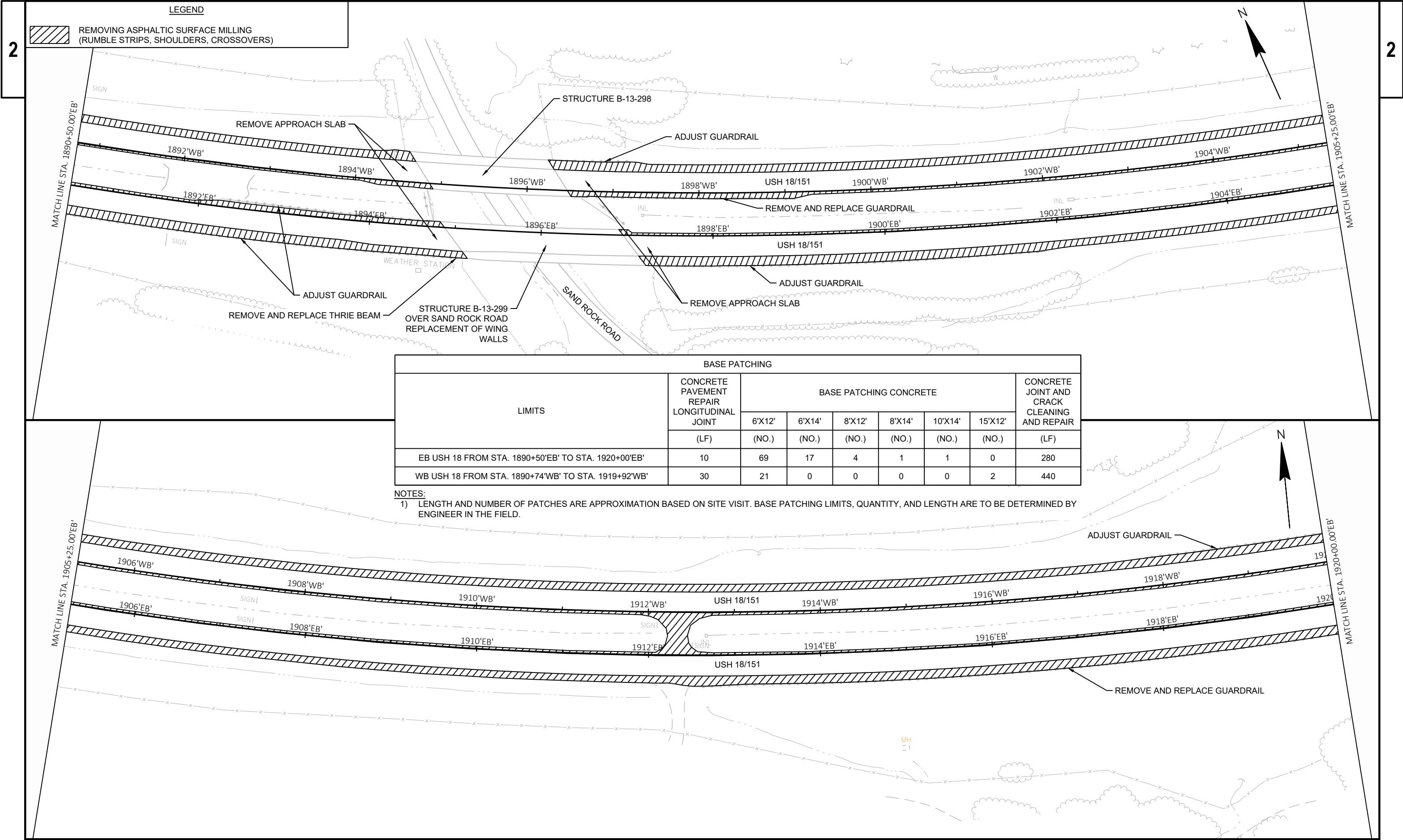


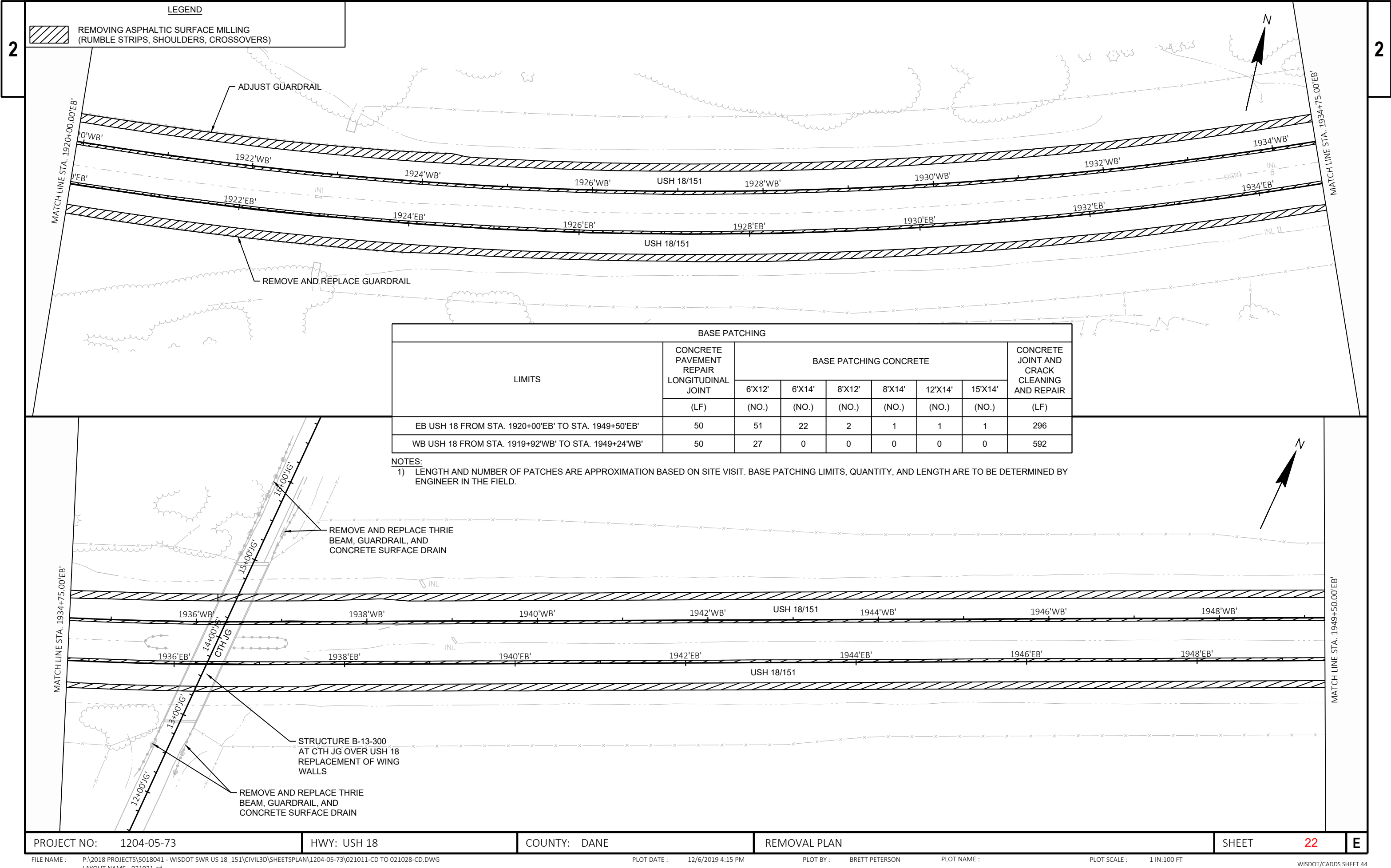
 REMOVING ASPHALTIC SURFACE MILLING
(RUMBLE STRIPS, SHOULDERS, CROSSOVERS)

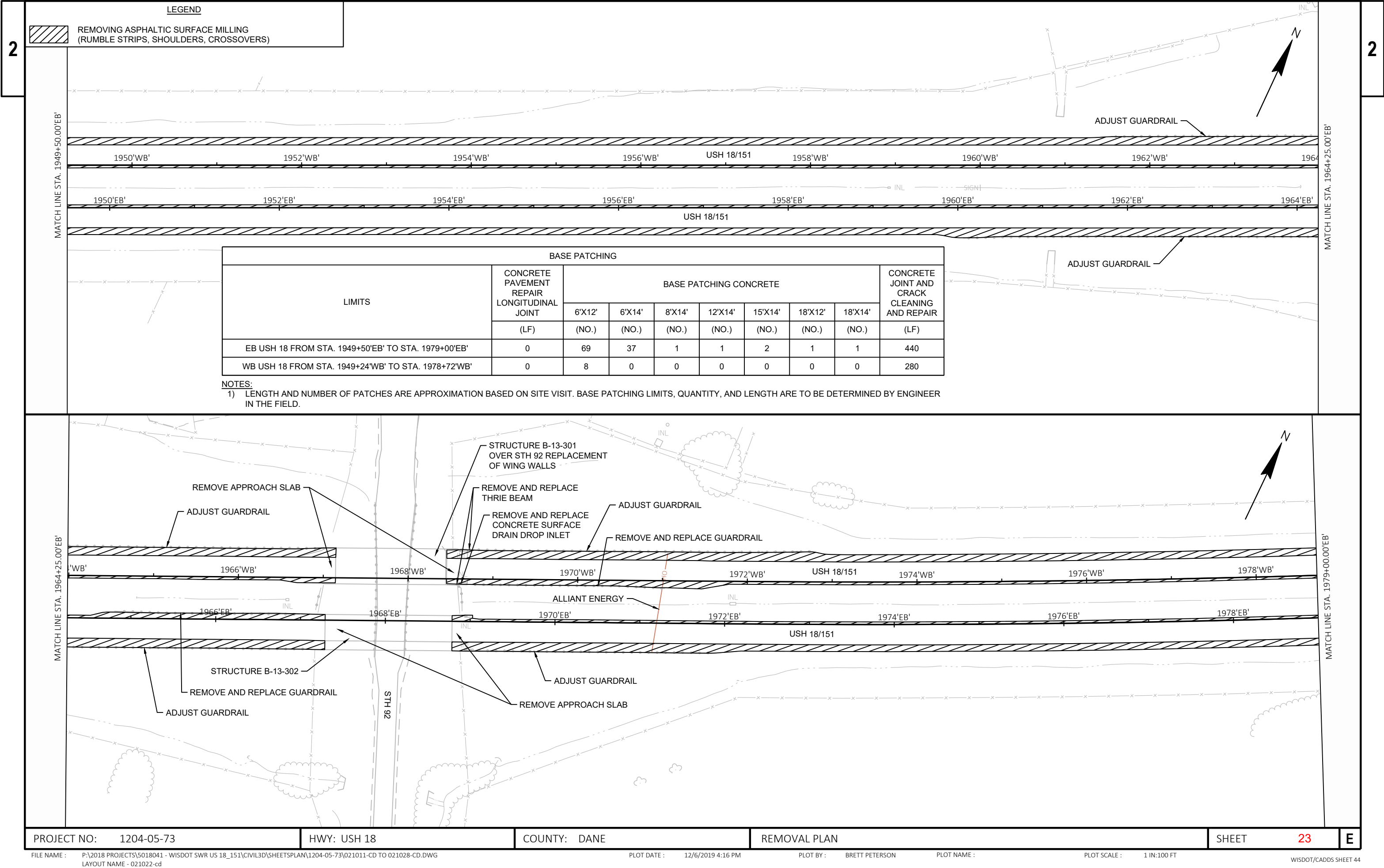
BASE PATCHING								
LIMITS	CONCRETE PAVEMENT REPAIR LONGITUDINAL JOINT	BASE PATCHING CONCRETE						CONCRETE JOINT AND CRACK CLEANING AND REPAIR
		6'X12'	6'X14'	8'X12'	8'X14'	10'X14'	15'X12'	
	(LF)	(NO.)	(NO.)	(NO.)	(NO.)	(NO.)	(NO.)	(LF)
EB USH 18 FROM STA. 1861+00'EB' TO STA. 1890+50'EB'	0	33	20	3	3	1	0	296
WB USH 18 FROM STA. 1861+24'WB' TO STA. 1890+74'WB'	40	34	0	0	0	0	1	856

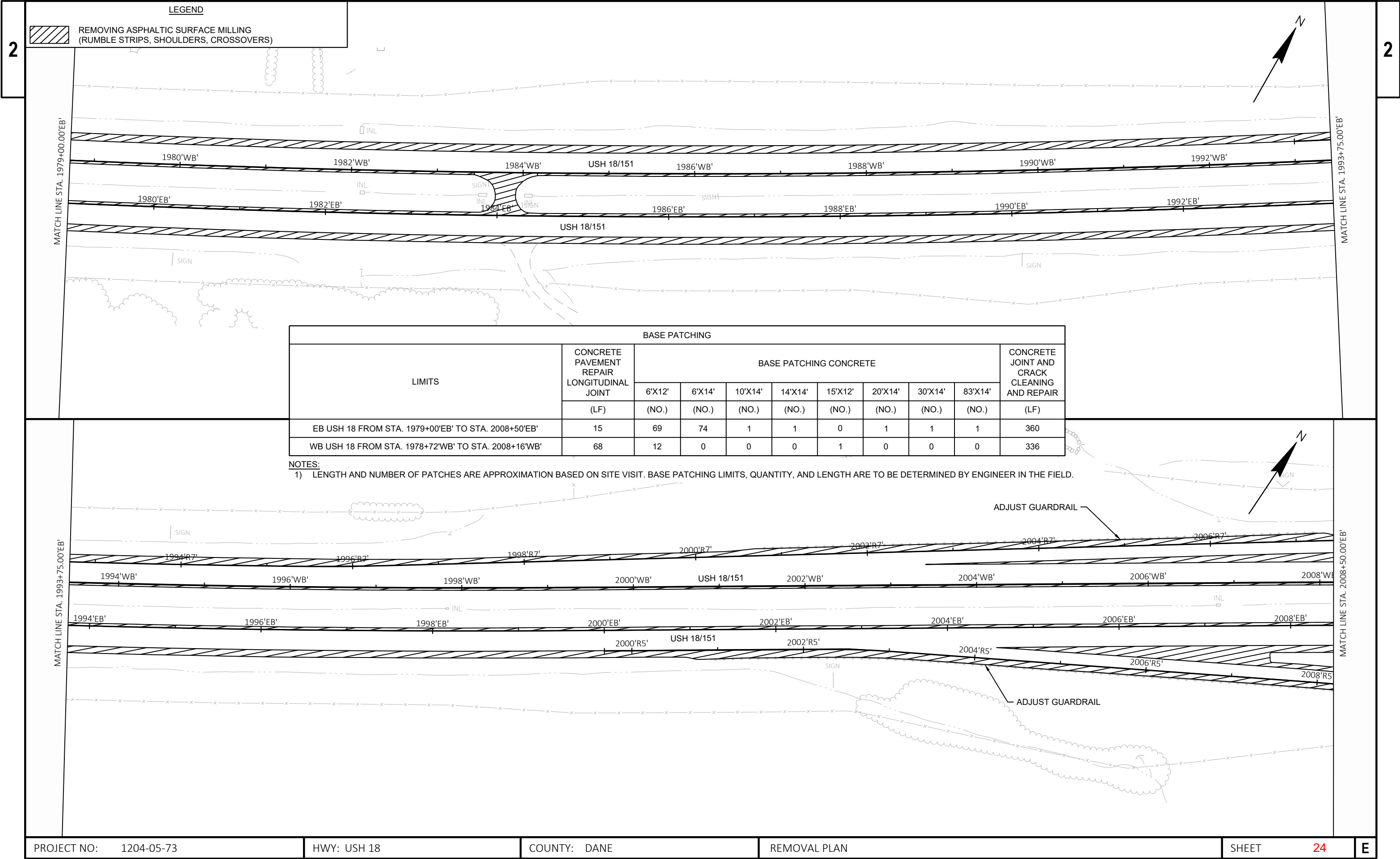
1) LENGTH AND NUMBER OF PATCHES ARE APPROXIMATION BASED ON SITE VISIT. BASE PATCHING LIMITS, QUANTITY, AND LENGTH ARE TO BE DETERMINED BY ENGINEER IN THE FIELD.

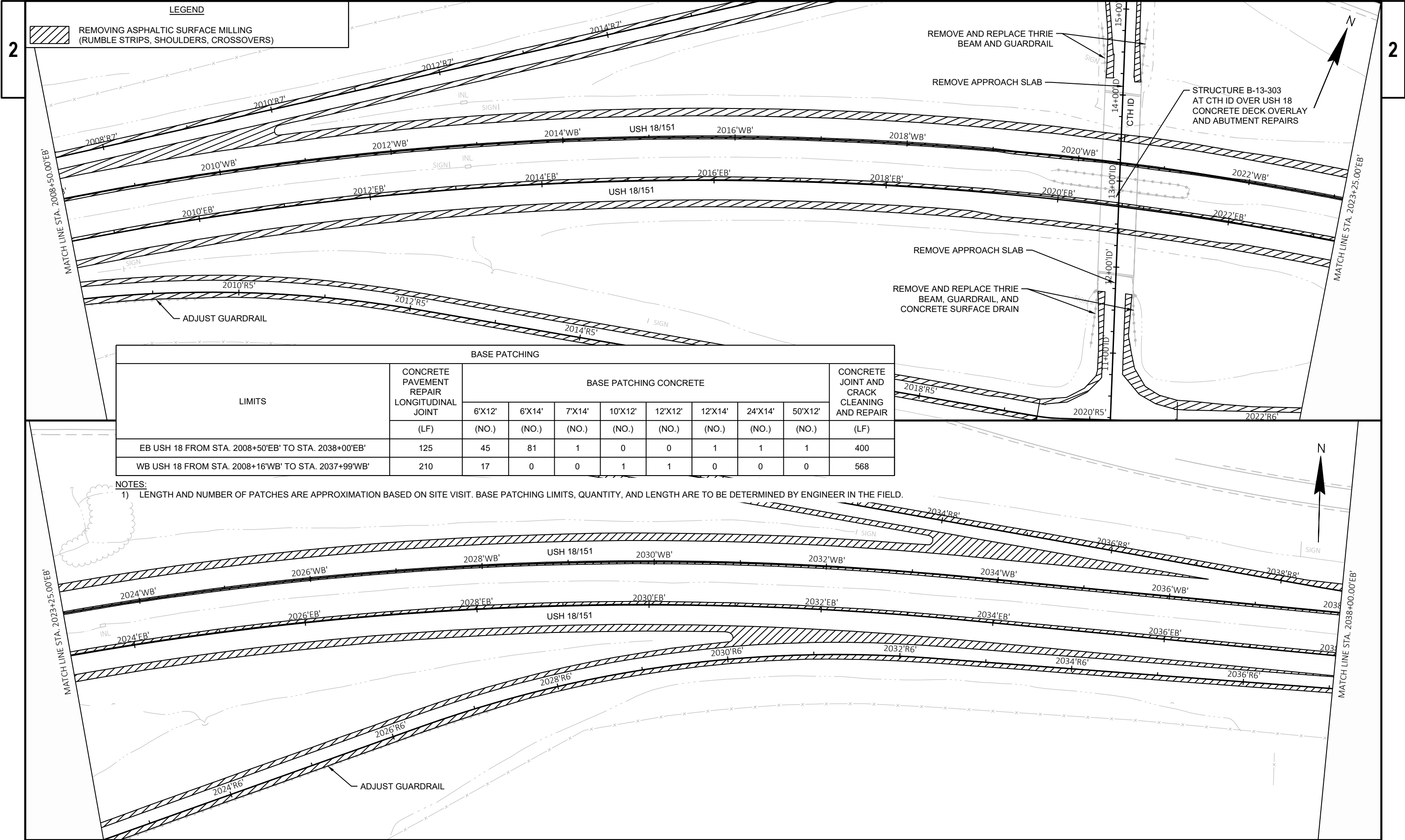












2

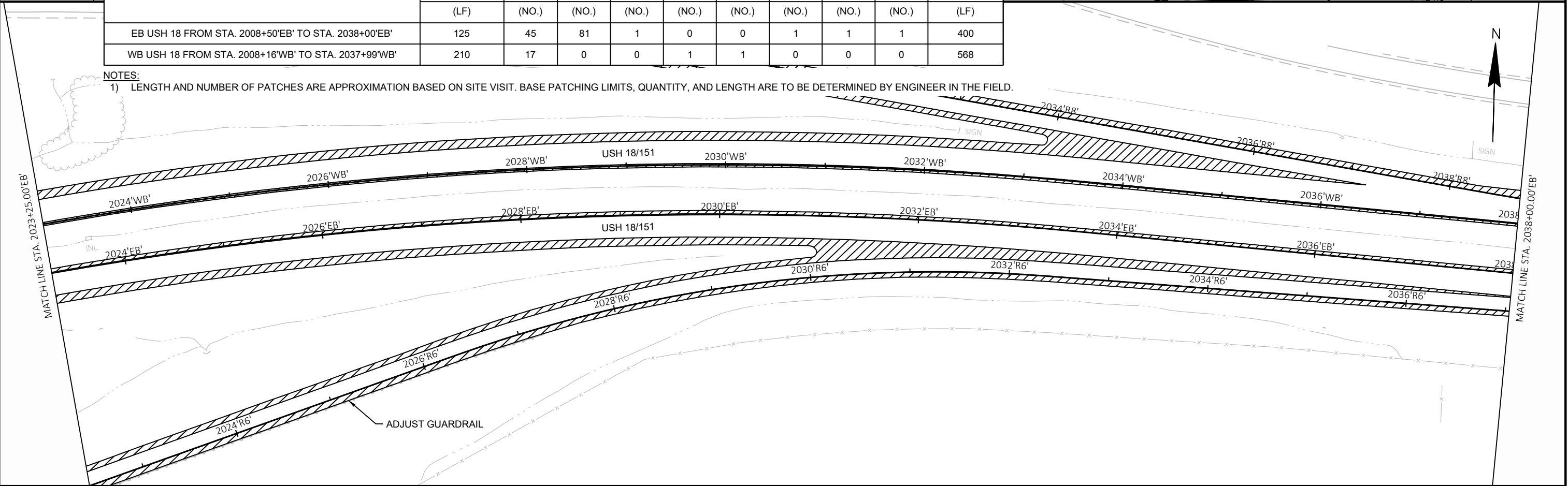
LEGEND

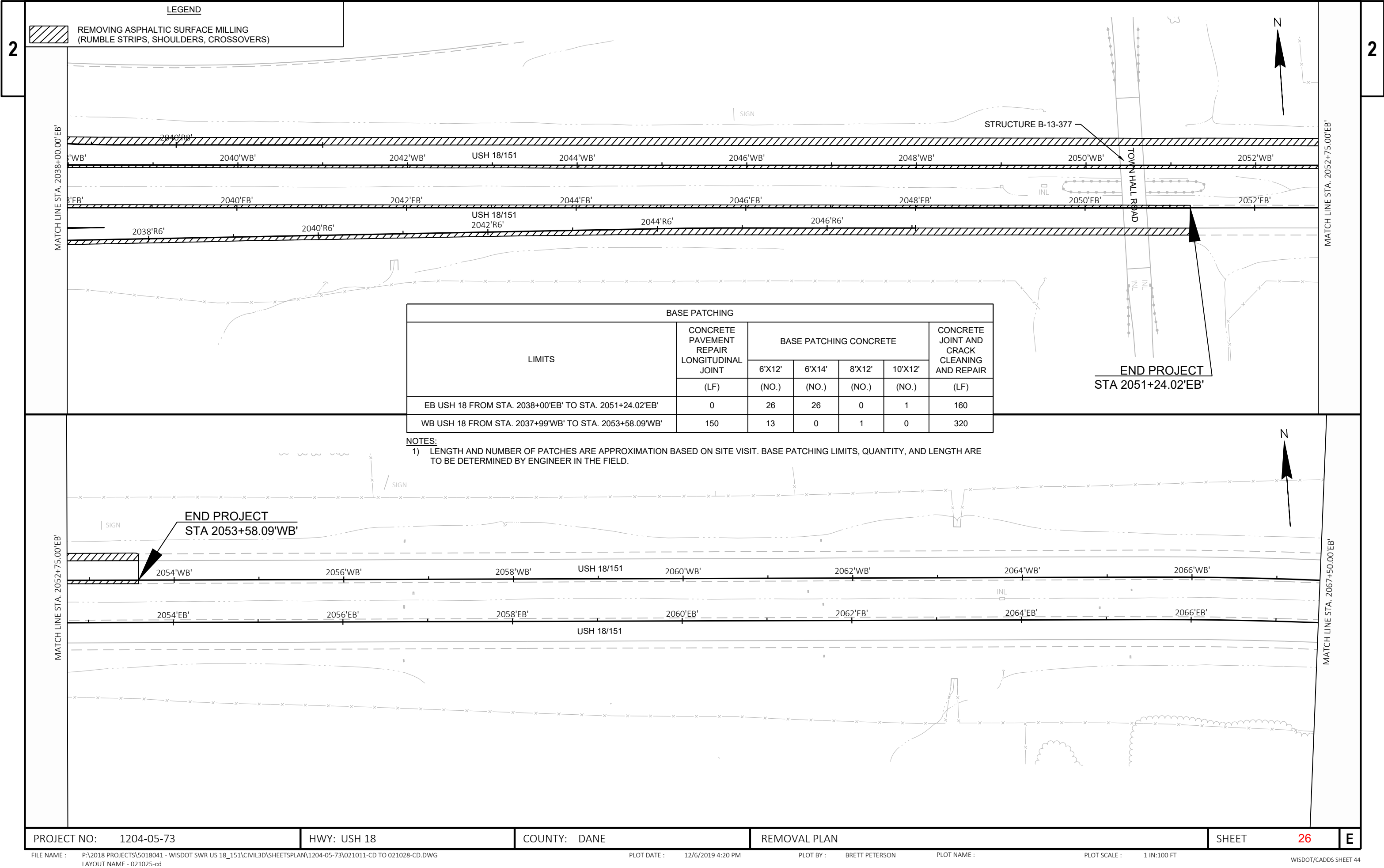
REMOVING ASPHALTIC SURFACE MILLING
(RUMBLE STRIPS, SHOULDERS, CROSSOVERS)

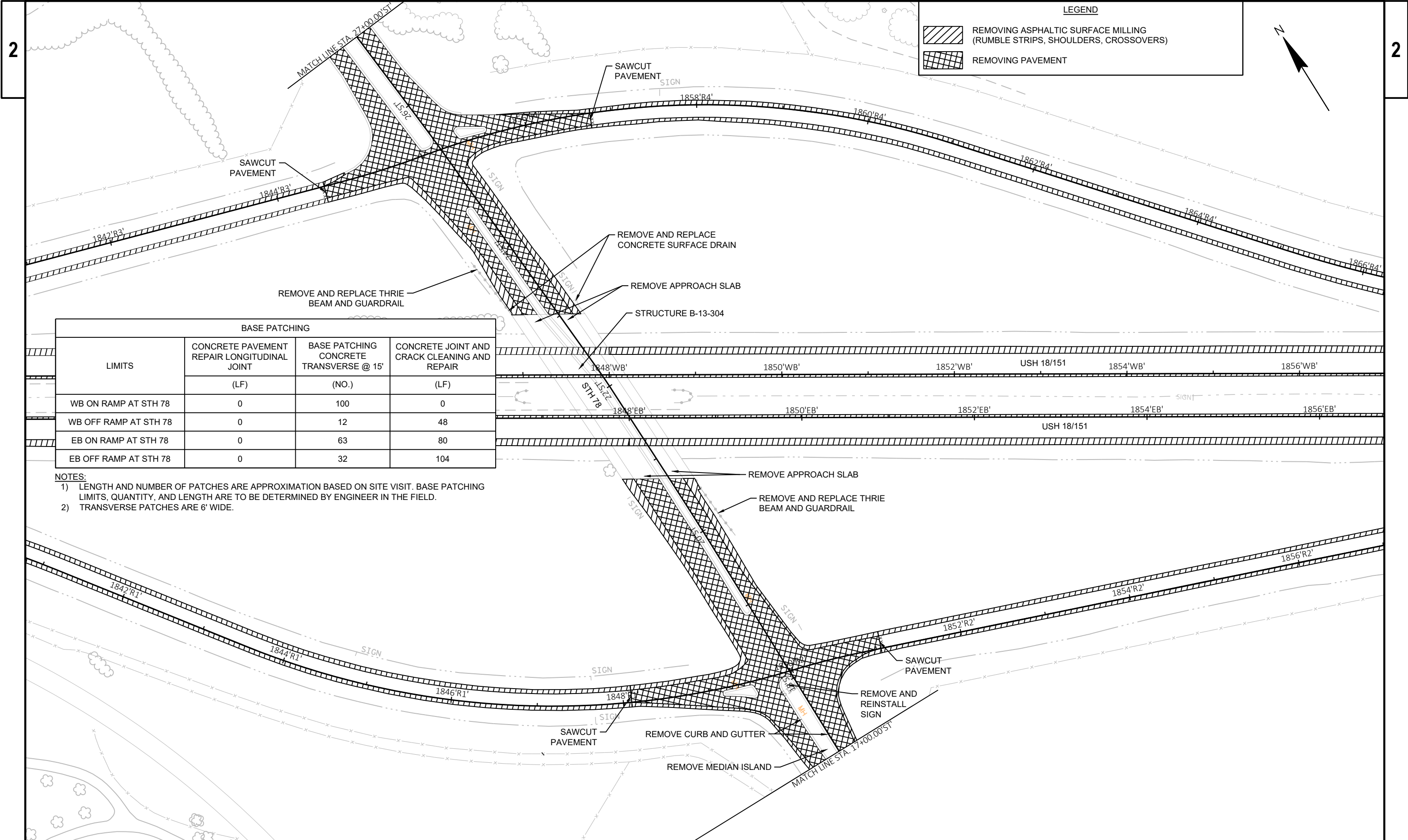
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LIMITS	CONCRETE PAVEMENT REPAIR LONGITUDINAL JOINT (LF)	BASE PATCHING CONCRETE								CONCRETE JOINT AND CRACK CLEANING AND REPAIR (LF)
		6'X12'	6'X14'	7'X14'	10'X12'	12'X12'	12'X14'	24'X14'	50'X12'	
		(NO.)	(NO.)	(NO.)	(NO.)	(NO.)	(NO.)	(NO.)	(NO.)	
EB USH 18 FROM STA. 2008+50'00"EB' TO STA. 2038+00'00"EB'	125	45	81	1	0	0	1	1	1	400
WB USH 18 FROM STA. 2008+16'00"WB' TO STA. 2037+99'00"WB'	210	17	0	0	1	1	0	0	0	568

NOTES:
1) LENGTH AND NUMBER OF PATCHES ARE APPROXIMATION BASED ON SITE VISIT. BASE PATCHING LIMITS, QUANTITY, AND LENGTH ARE TO BE DETERMINED BY ENGINEER IN THE FIELD.

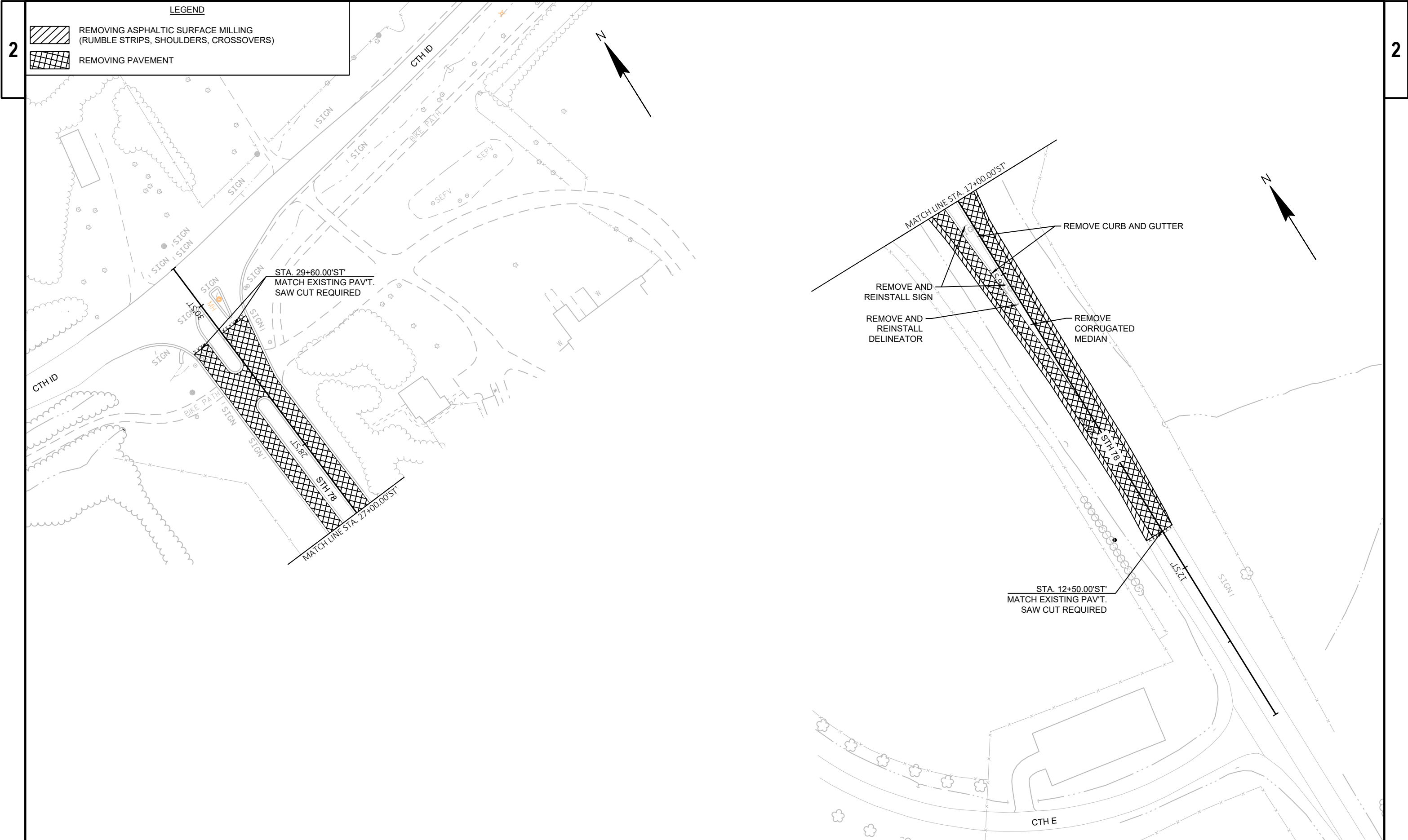


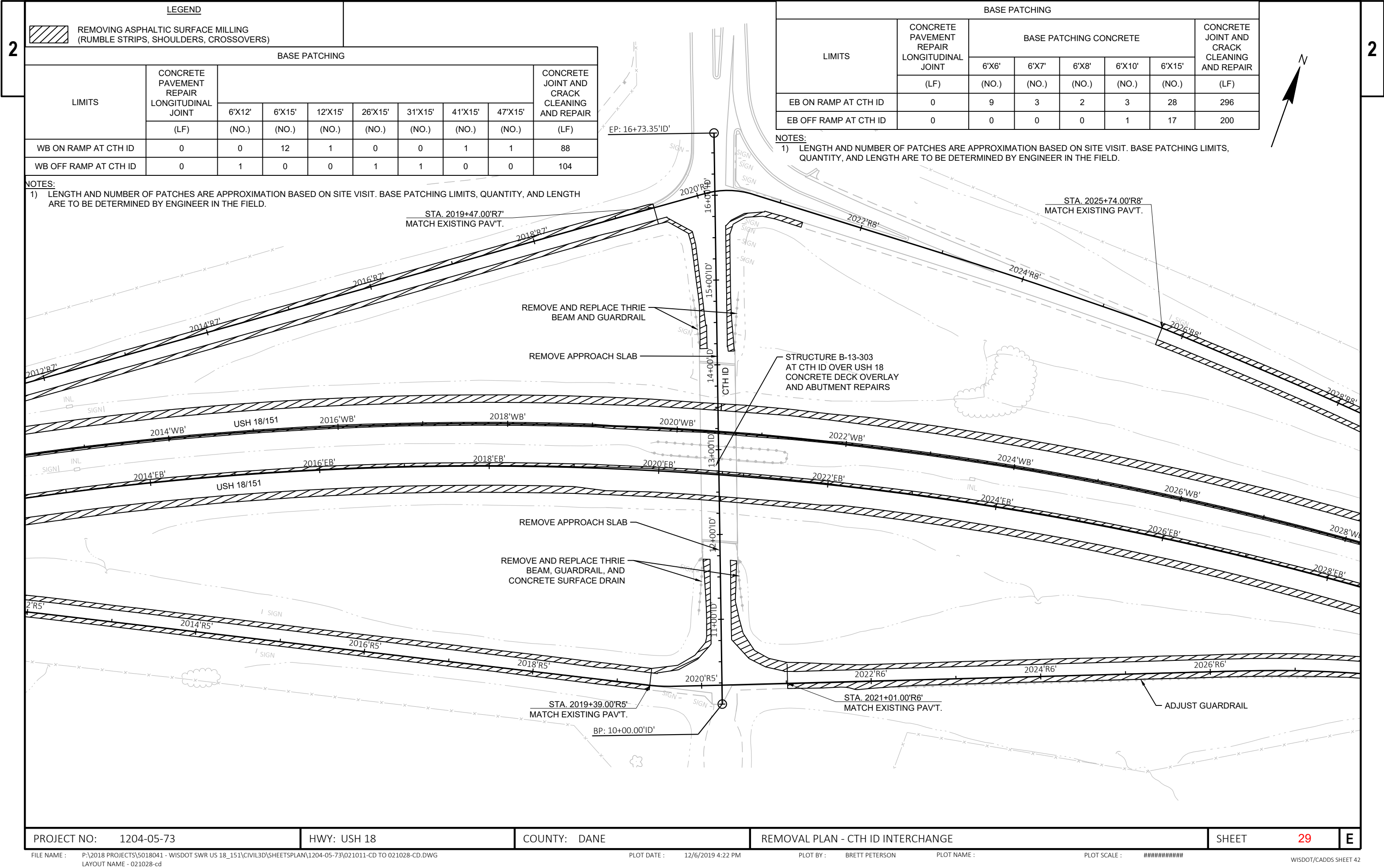


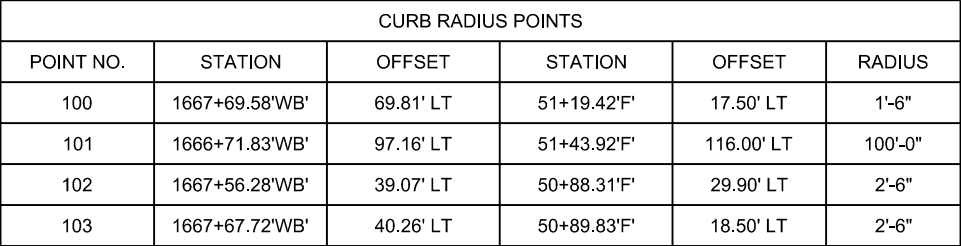


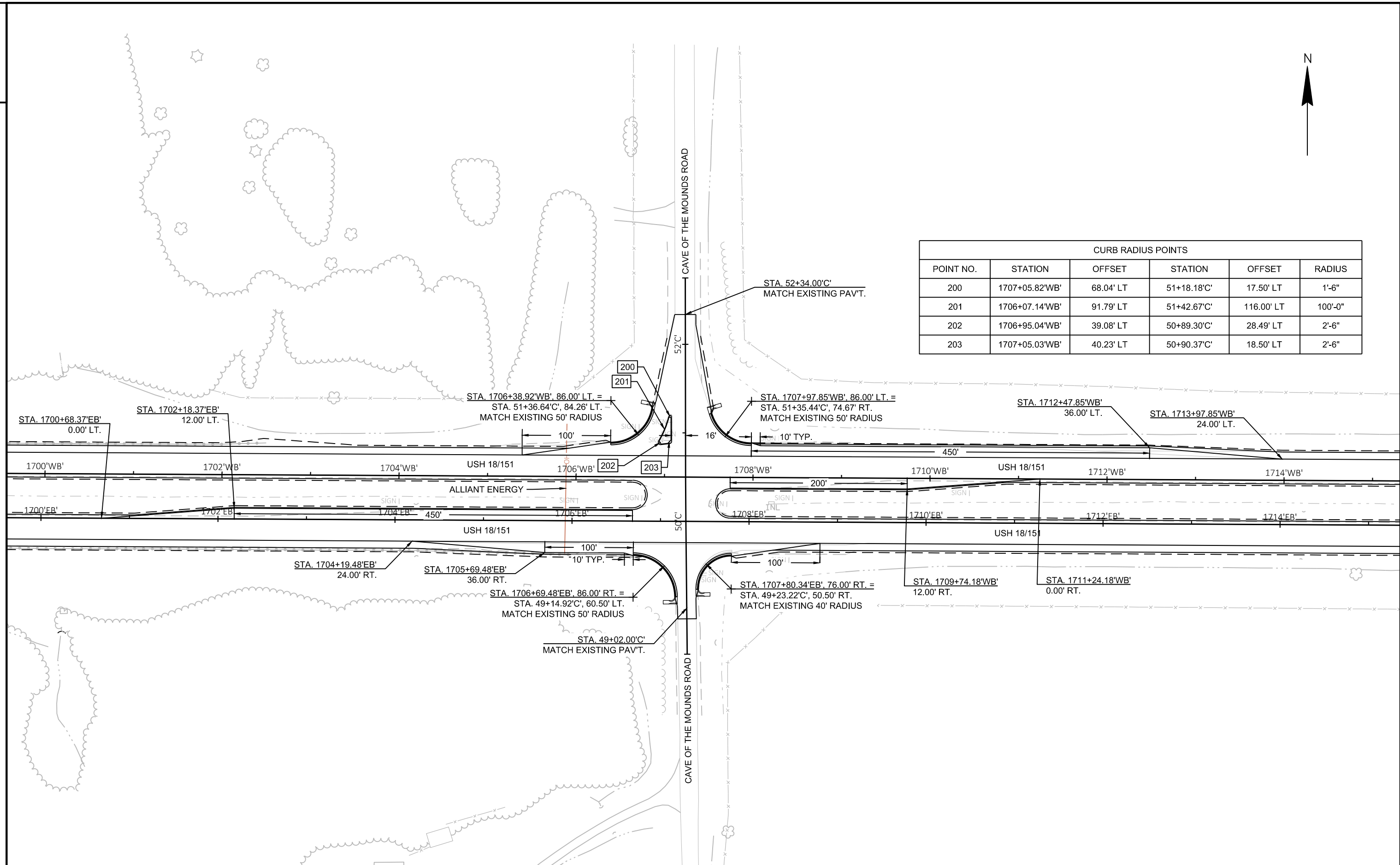
BASE PATCHING			
LIMITS	CONCRETE PAVEMENT REPAIR LONGITUDINAL JOINT	BASE PATCHING CONCRETE TRANSVERSE @ 15'	CONCRETE JOINT AND CRACK CLEANING AND REPAIR
	(LF)	(NO.)	(LF)
WB ON RAMP AT STH 78	0	100	0
WB OFF RAMP AT STH 78	0	12	48
EB ON RAMP AT STH 78	0	63	80
EB OFF RAMP AT STH 78	0	32	104

NOTES:
1) LENGTH AND NUMBER OF PATCHES ARE APPROXIMATION BASED ON SITE VISIT. BASE PATCHING LIMITS, QUANTITY, AND LENGTH ARE TO BE DETERMINED BY ENGINEER IN THE FIELD.
2) TRANSVERSE PATCHES ARE 6' WIDE.



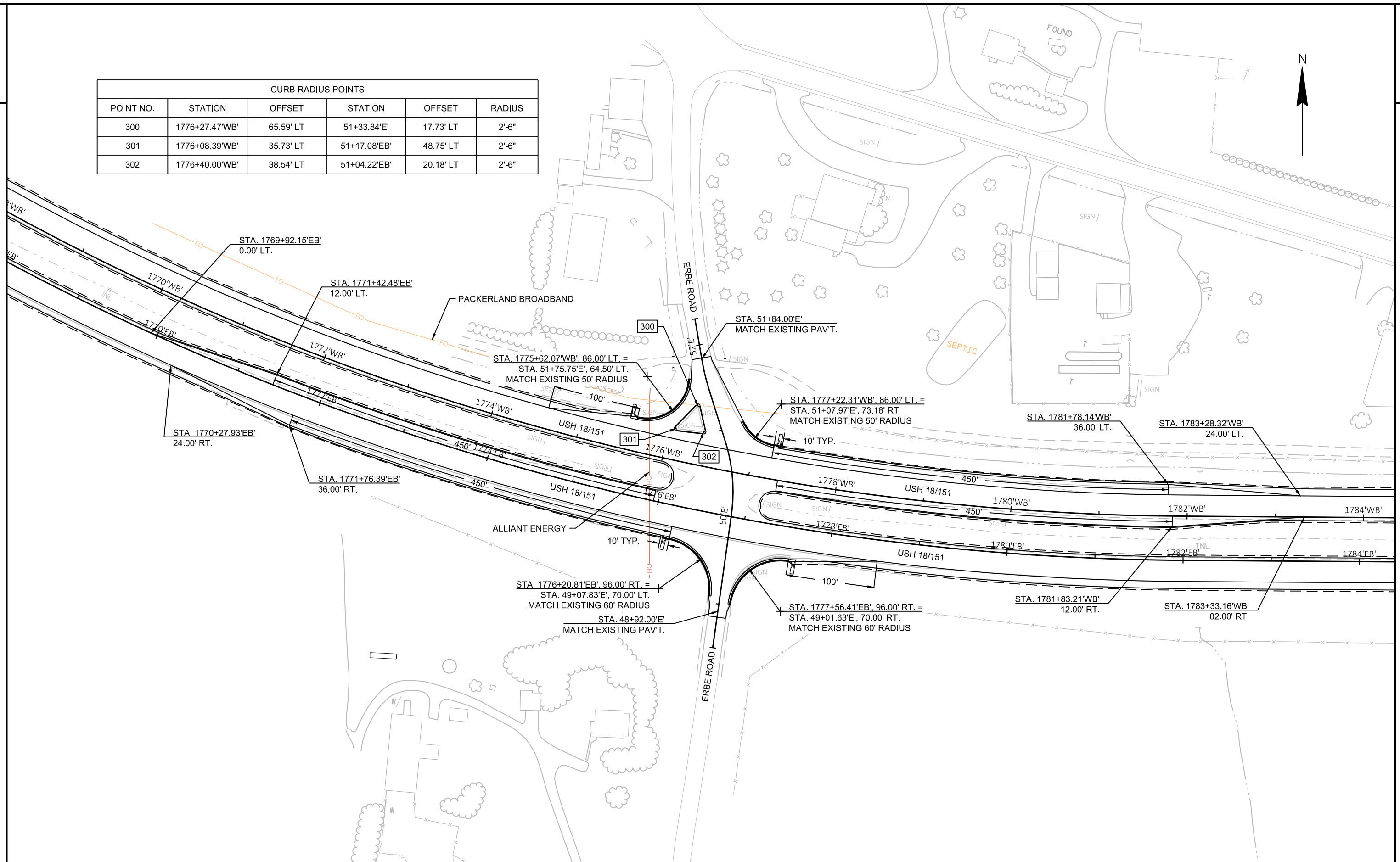


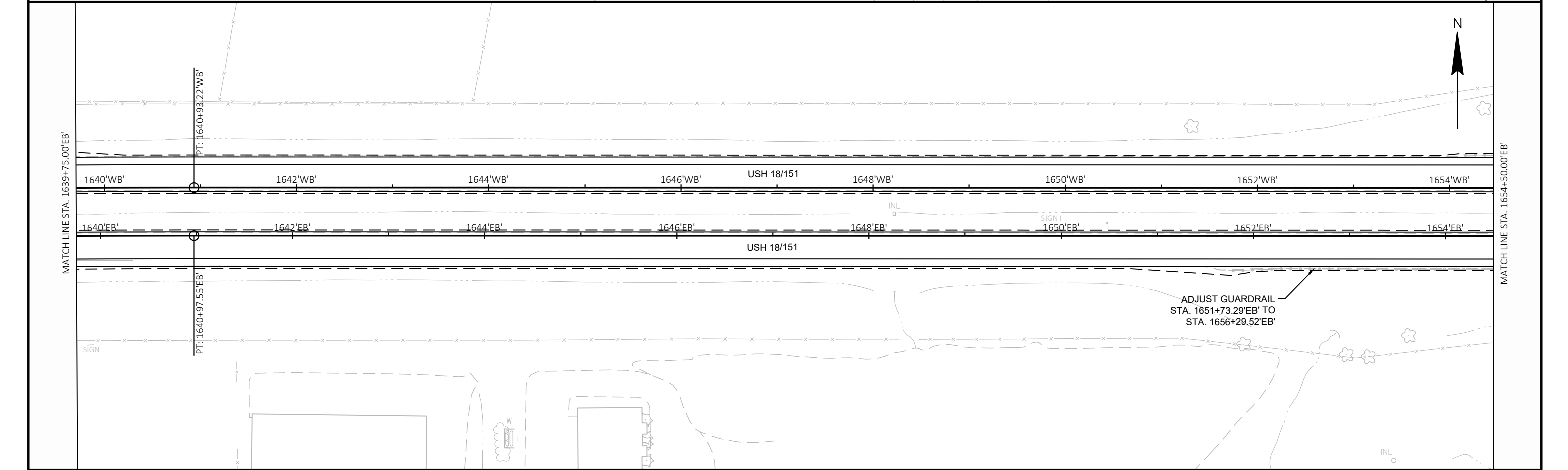
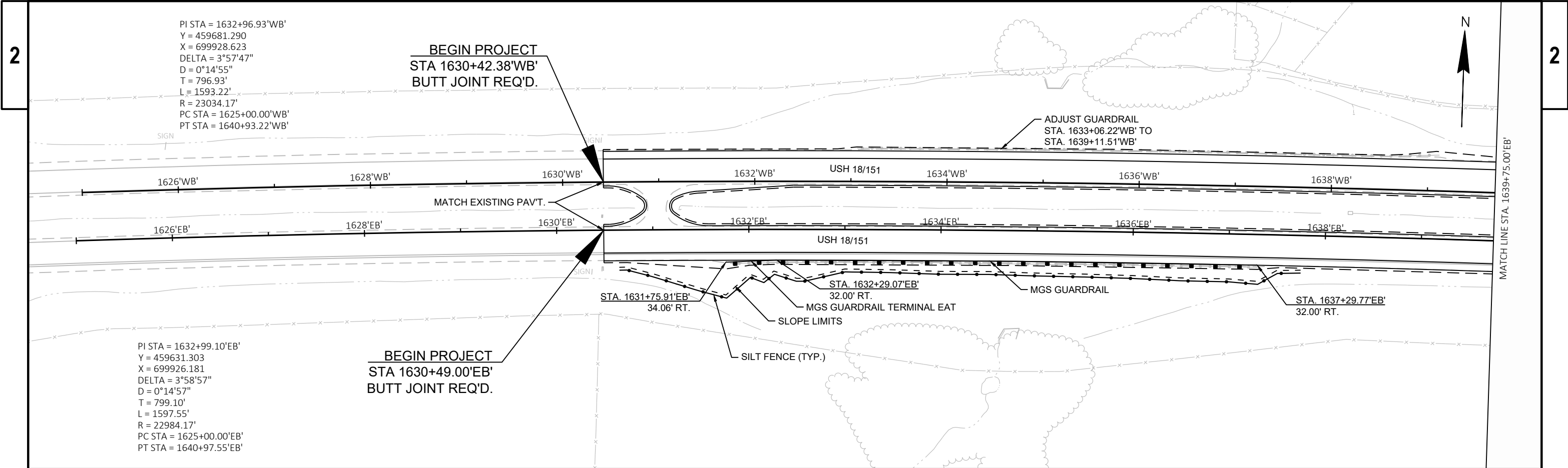


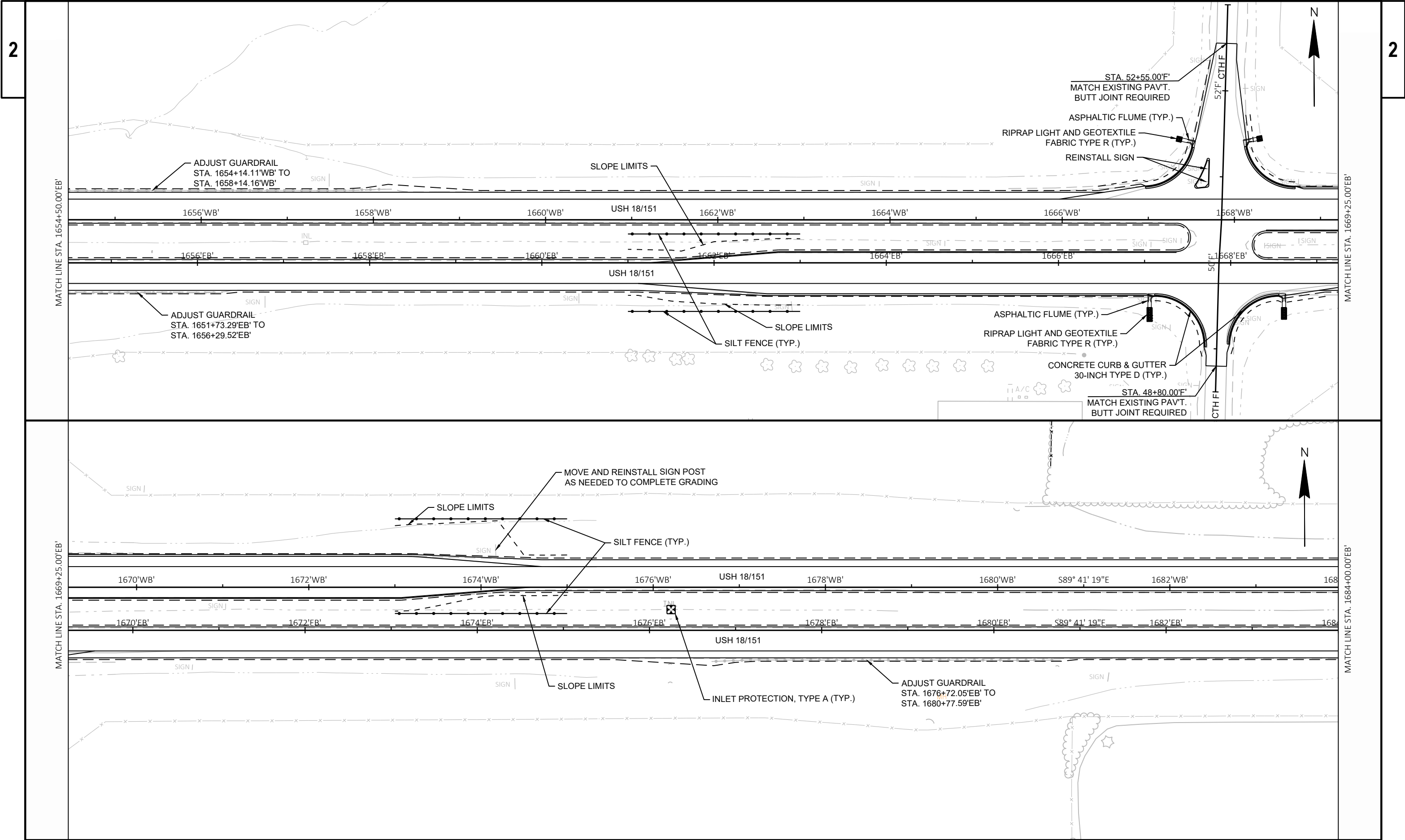


CURB RADIUS POINTS					
POINT NO.	STATION	OFFSET	STATION	OFFSET	RADIUS
200	1707+05.82'WB'	68.04' LT	51+18.18'C'	17.50' LT	1'-6"
201	1706+07.14'WB'	91.79' LT	51+42.67'C'	116.00' LT	100'-0"
202	1706+95.04'WB'	39.08' LT	50+89.30'C'	28.49' LT	2'-6"
203	1707+05.03'WB'	40.23' LT	50+90.37'C'	18.50' LT	2'-6"

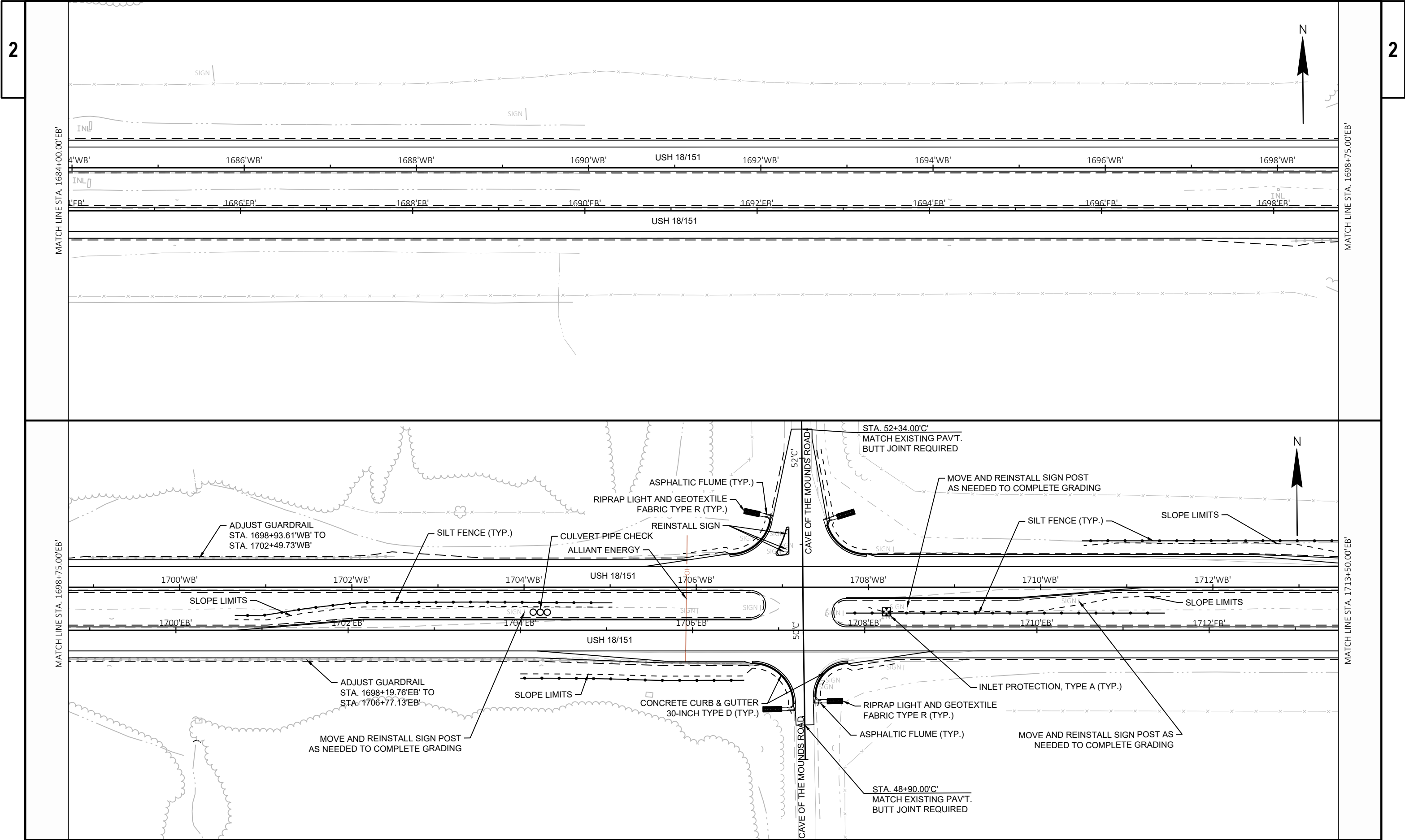
CURB RADIUS POINTS					
POINT NO.	STATION	OFFSET	STATION	OFFSET	RADIUS
300	1776+27.47'WB'	65.59' LT	51+33.84'E'	17.73' LT	2'-6"
301	1776+08.39'WB'	35.73' LT	51+17.08'E'	48.75' LT	2'-6"
302	1776+40.00'WB'	38.54' LT	51+04.22'E'	20.18' LT	2'-6"

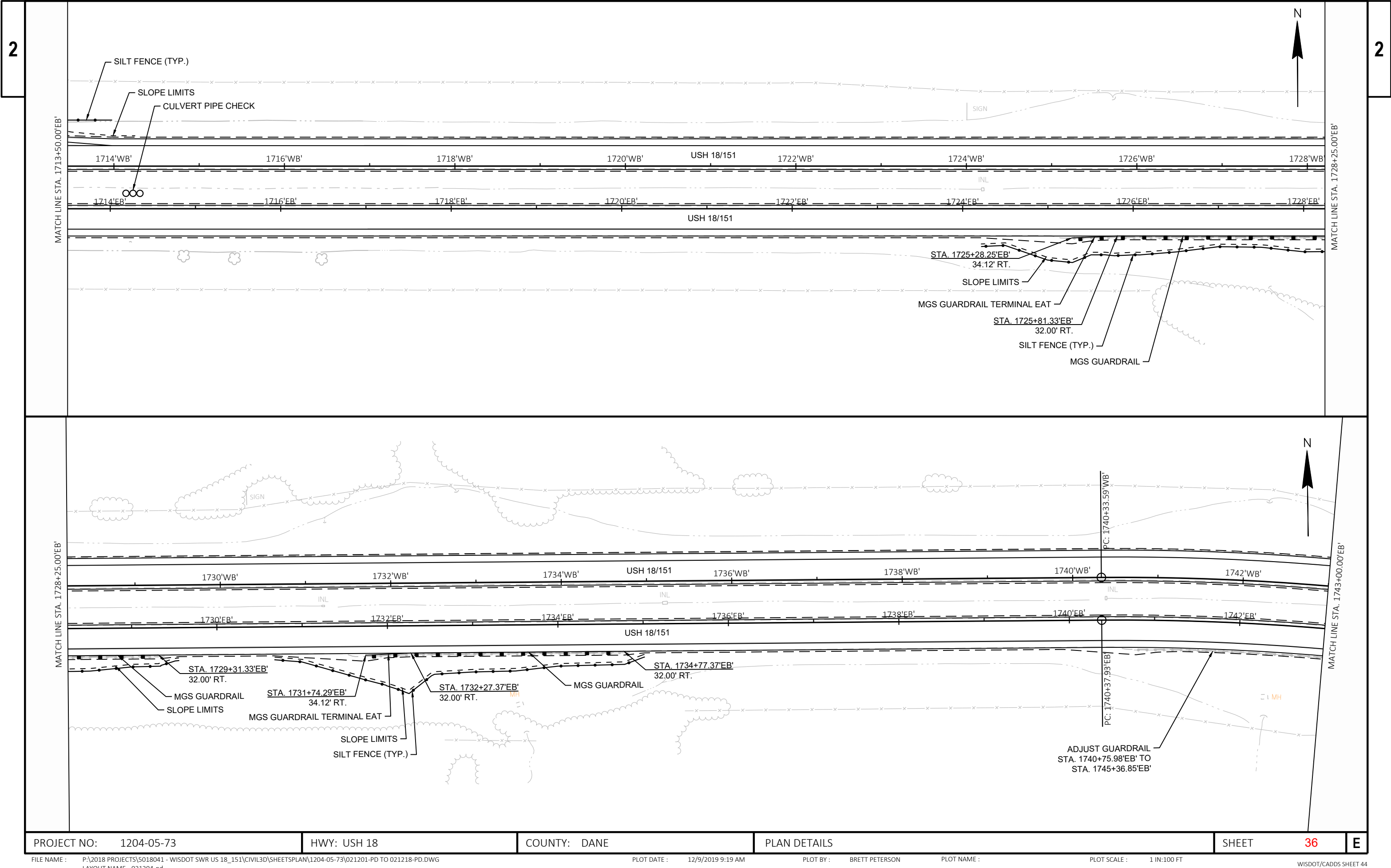






PROJECT NO: 1204-05-73	HWY: USH 18	COUNTY: DANE	PLAN DETAILS	SHEET 34	E
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2

PI STA = 1747+77.61'WB'
 Y = 459618.912
 X = 711409.774
 DELTA = 28°41'02"
 D = 1°58'08"
 T = 744.02'
 L = 1456.83'
 R = 2910.00'
 PC STA = 1740+33.59'WB'
 PT STA = 1754+90.42'WB'

MATCH LINE STA. 1743+00.00'EB'

1744'WB'
 1746'WB'
 1748'WB'
 1744'EB'
 1746'EB'
 1748'EB'

ADJUST GUARDRAIL
 STA. 1740+75.98'EB' TO
 STA. 1745+36.85'EB'

PI STA = 1747+69.16'EB'
 Y = 459568.983
 X = 711396.719
 DELTA = 28°41'02"
 D = 2°00'12"
 T = 731.24'
 L = 1431.80'
 R = 2860.00'
 PC STA = 1740+37.93'EB'
 PT STA = 1754+69.72'EB'

SUPERELEVATION TABLE					
STATION	LT SHOULDER	LT LANE	RT LANE	RT SHOULDER	REMARKS
1737+81.59WB'	-5.00%	-2.00%	-2.00%	-5.00%	NORMAL CROWN
1738+71.59WB'	0.00%	0.00%	-2.00%	-5.00%	LEVEL CROWN
1739+61.59WB'	2.00%	2.00%	-2.00%	-5.00%	REVERSE CROWN
1741+14.59WB'	5.40%	5.40%	-5.40%	-5.40%	BEGIN FULL SUPER
1754+09.43WB'	5.40%	5.40%	-5.40%	-5.40%	END FULL SUPER
1755+62.43WB'	2.00%	2.00%	-2.00%	-5.00%	REVERSE CROWN
1756+52.43WB'	0.00%	0.00%	-2.00%	-5.00%	LEVEL CROWN
1757+42.43WB'	-5.00%	-2.00%	-2.00%	-5.00%	NORMAL CROWN

PI STA = 1747+69.16'EB'	SUPERELEVATION TABLE					
Y = 459568.983	STATION	LT SHOULDER	LT LANE	RT LANE	RT SHOULDER	REMARKS
X = 711396.719	1737+82.40'EB'	-5.00%	-2.00%	-2.00%	-5.00%	NORMAL CROWN
DELTA = 28°41'02"	1738+72.58'EB'	0.00%	0.00%	-2.00%	-5.00%	LEVEL CROWN
D = 2°00'12"	1739+62.77'EB'	2.00%	2.00%	-2.00%	-5.00%	REVERSE CROWN
T = 731.24'	1741+20.58'EB'	5.50%	5.50%	-5.50%	-5.50%	BEGIN FULL SUPER
L = 1431.80'	1753+87.06'EB'	5.50%	5.50%	-5.50%	-5.50%	END FULL SUPER
R = 2860.00'	1755+44.88'EB'	2.00%	2.00%	-2.00%	-5.00%	REVERSE CROWN
PC STA = 1740+37.93'EB'	1756+35.06'EB'	0.00%	0.00%	-2.00%	-5.00%	LEVEL CROWN
PT STA = 1754+69.72'EB'	1757+25.25'EB'	-5.00%	-2.00%	-2.00%	-5.00%	NORMAL CROWN

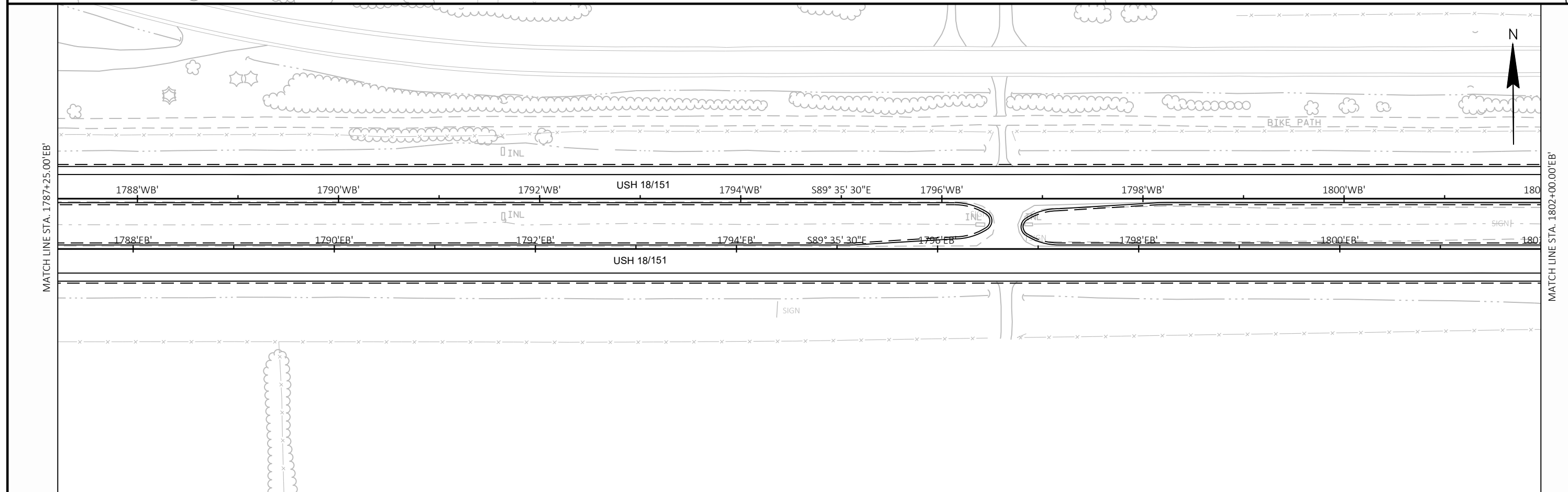
PI STA = 1747+69.16'EB'
Y = 459568.983
X = 711396.719
DELTA = 28°41'02"
D = 2°00'12"
T = 731.24'
L = 1431.80'
R = 2860.00'
PC STA = 1740+37.93'EB'
PT STA = 1754+69.72'EB'

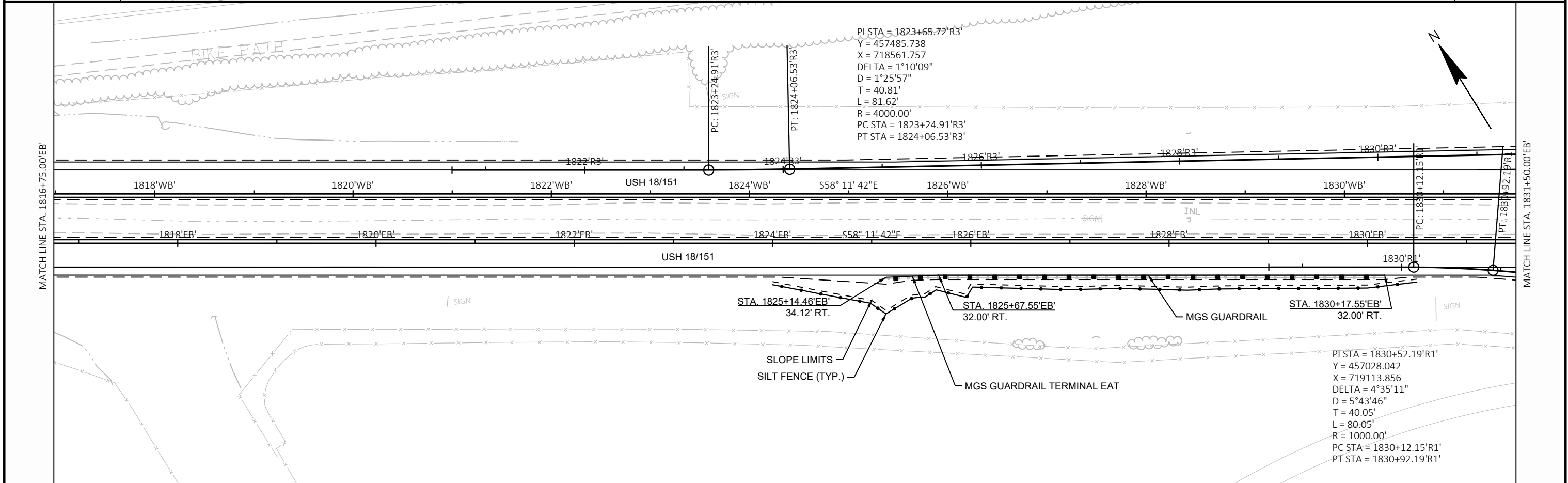
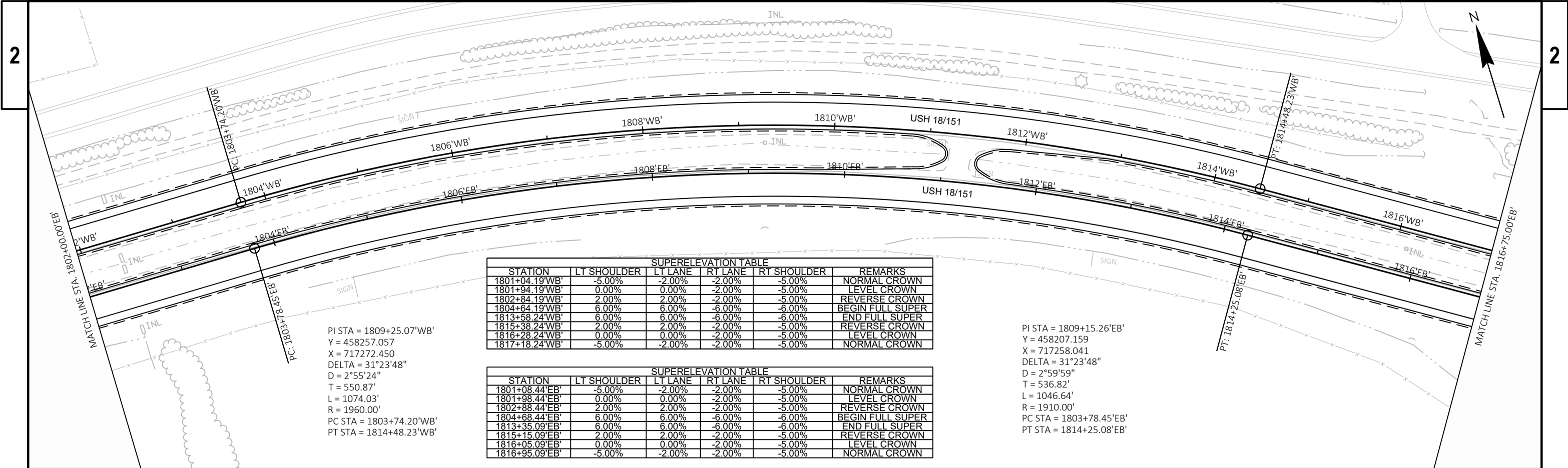
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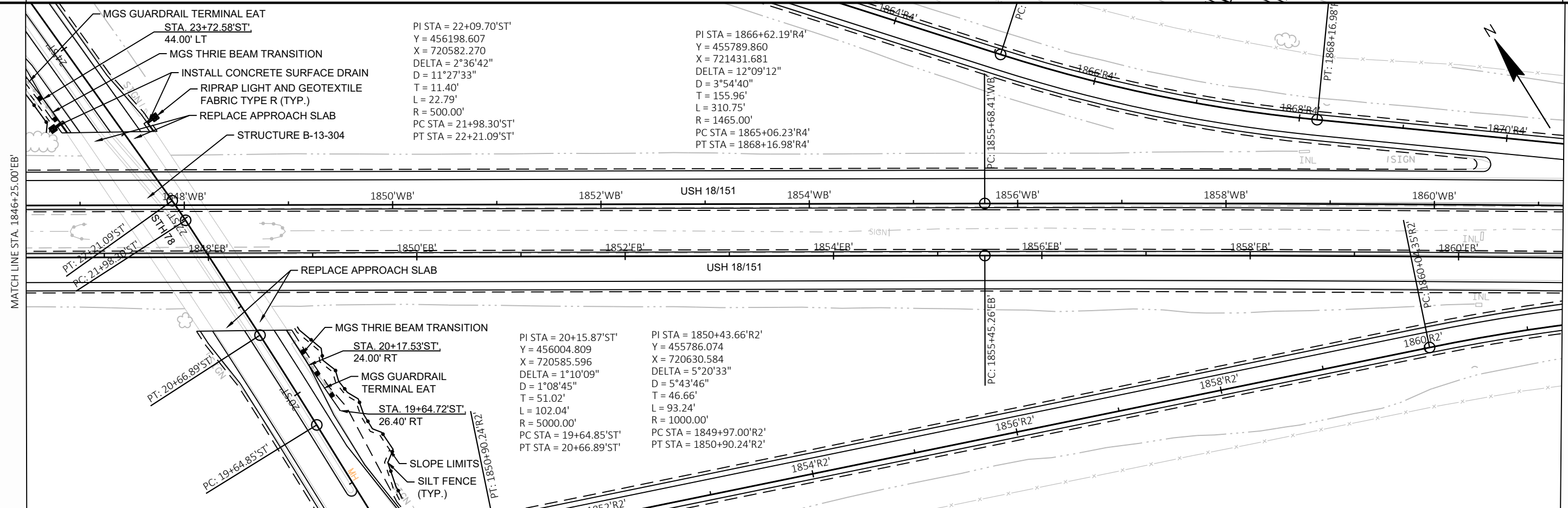
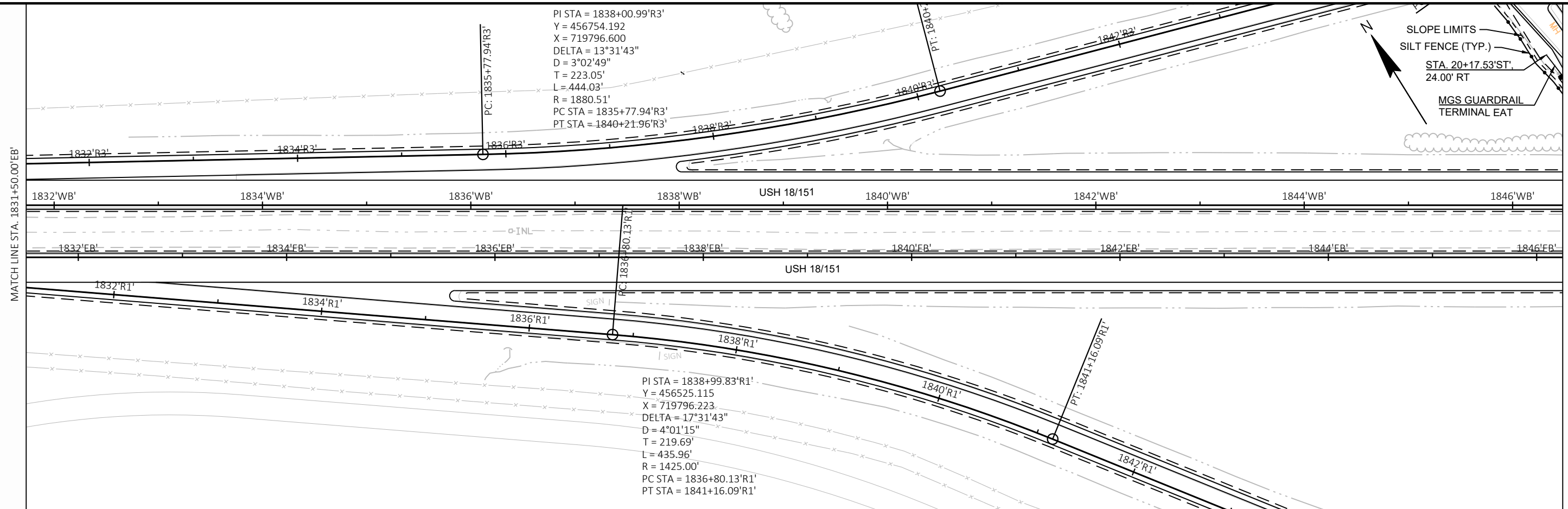
This plan view illustrates a proposed road project with stationing ranging from 1757+75.00' to 1772+50.00'. The road is divided into two main sections: a left-hand section (WB' and EB') and a right-hand section (WB' and EB'). Key features include:

- Stationing and Bearings:** Station markers are provided at regular intervals (e.g., 1758'WB', 1760'WB', 1762'WB', 1764'WB', 1766'WB', 1768'WB', 1770'WB', 1772'WB'). Bearings are specified for the road segments, such as S61°00'17"E.
- Proposed Features:**
 - INLET PROTECTION, TYPE A (TYP.):** Indicated by a cross-hatched symbol.
 - SILT FENCE (TYP.):** Indicated by a line with cross-ticks.
 - SLOPE LIMITS:** Indicated by a line with cross-ticks.
- Other Labels:** "USH 18/151" is labeled along the road, and "FO" (Foot of Overlap) is marked at the right end.
- Match Lines:** The project starts at "MATCH LINE STA. 1757+75.00'EB'" and ends at "MATCH LINE STA. 1772+50.00'EB'".

MATCH LINE STA. 17+25.0







PROJECT NO: 1204-05-73

HWY: USH 18

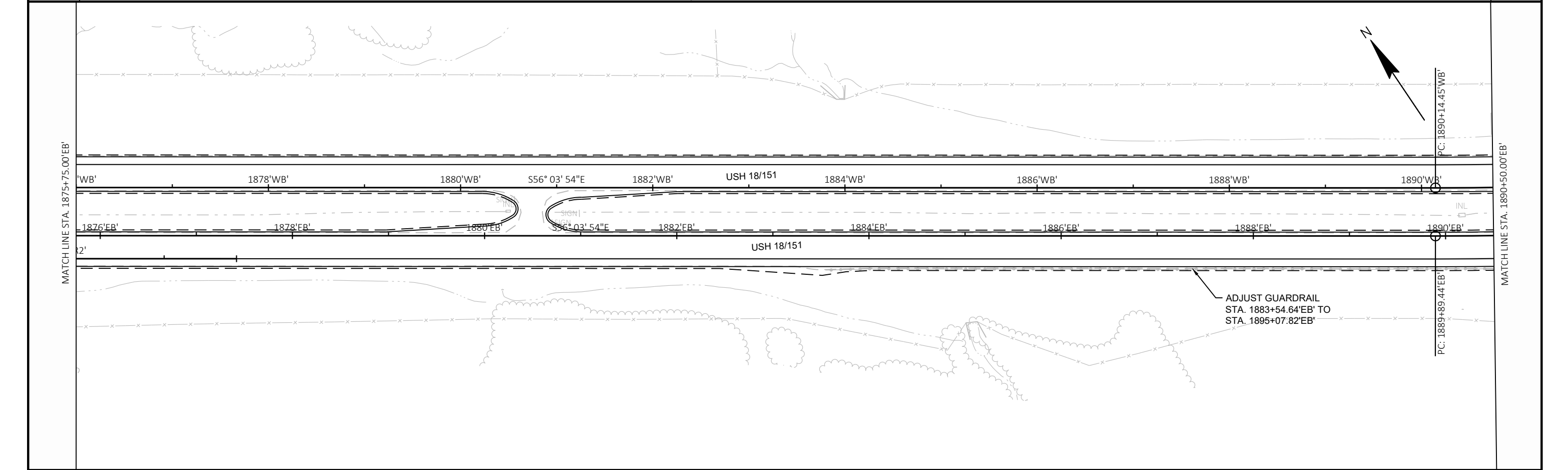
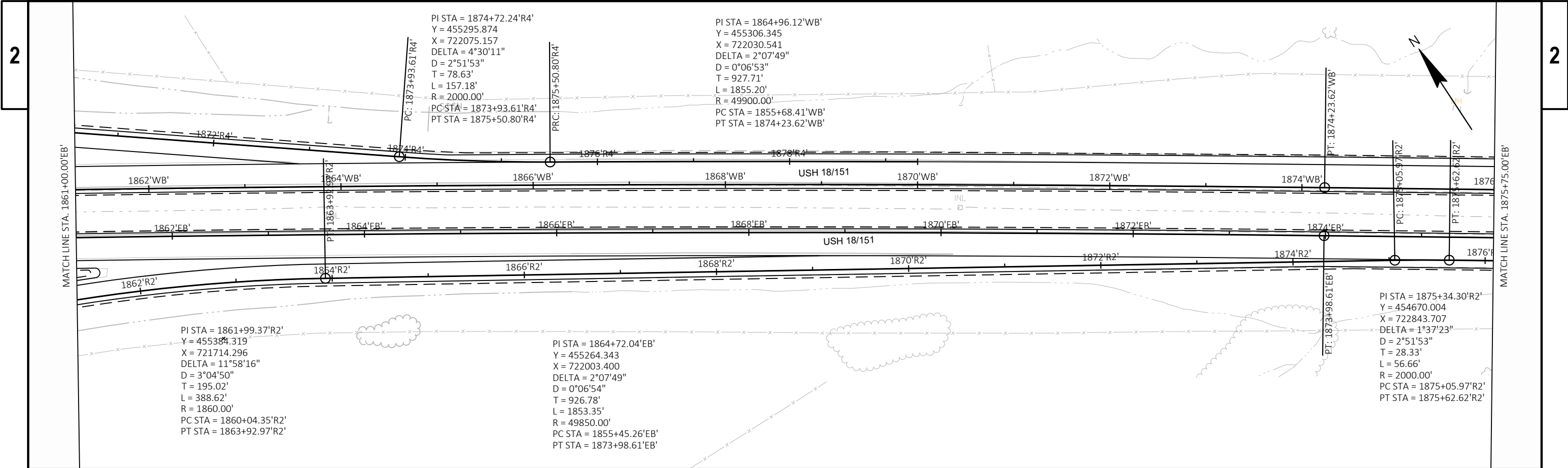
COUNTY: DANE

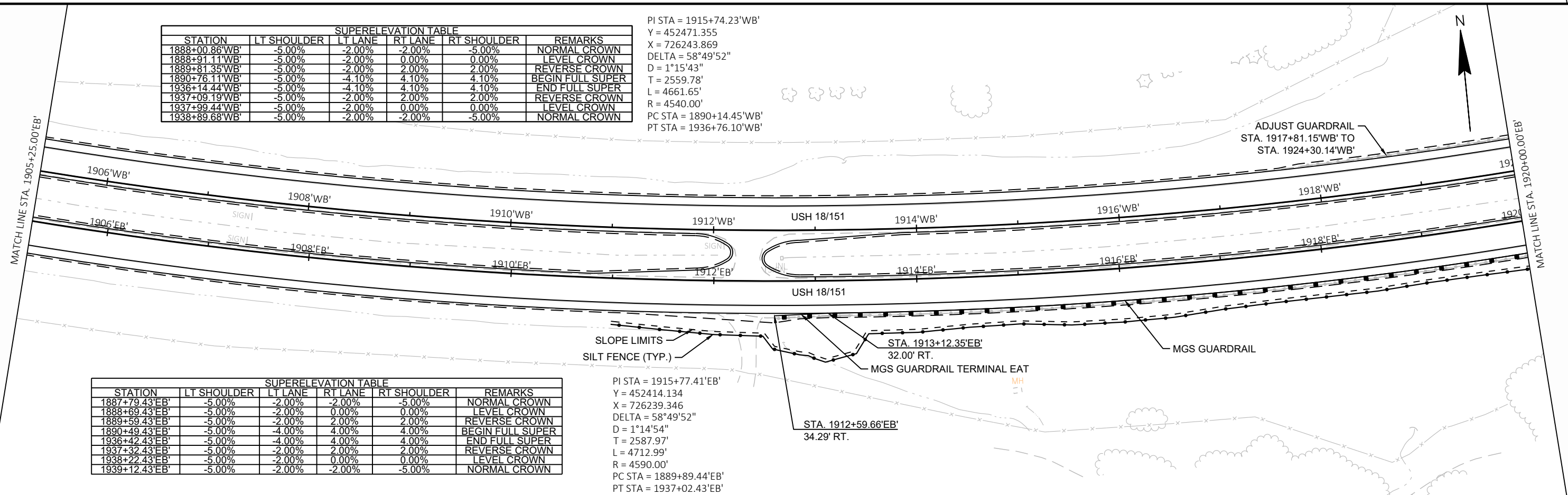
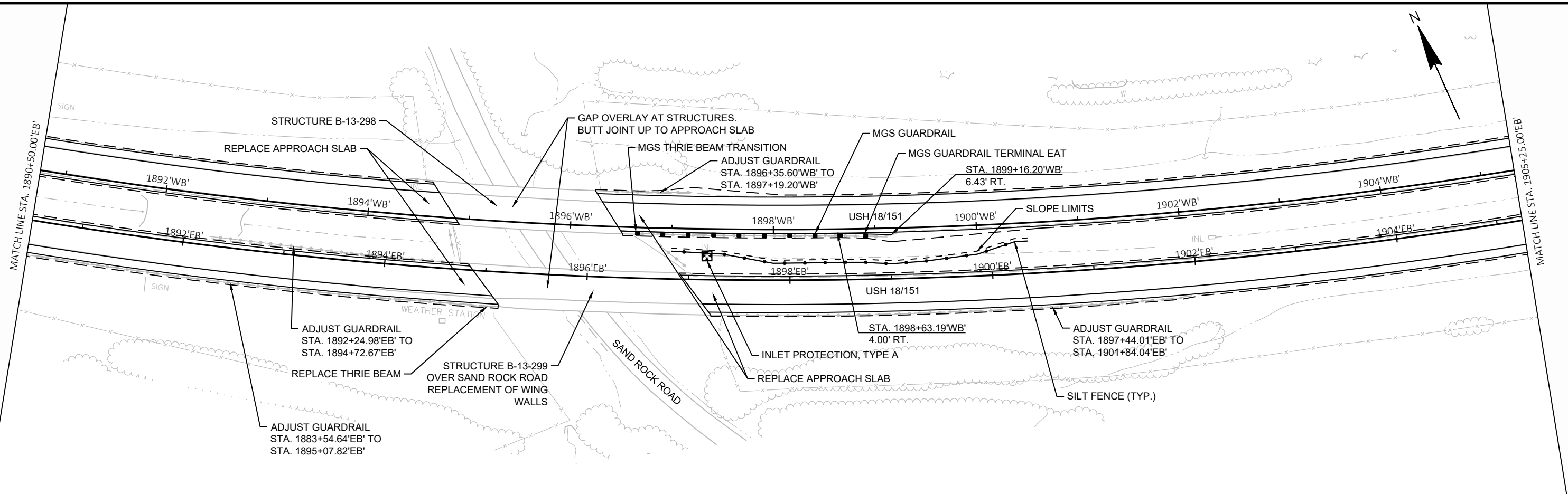
PLAN DETAILS

SHEET

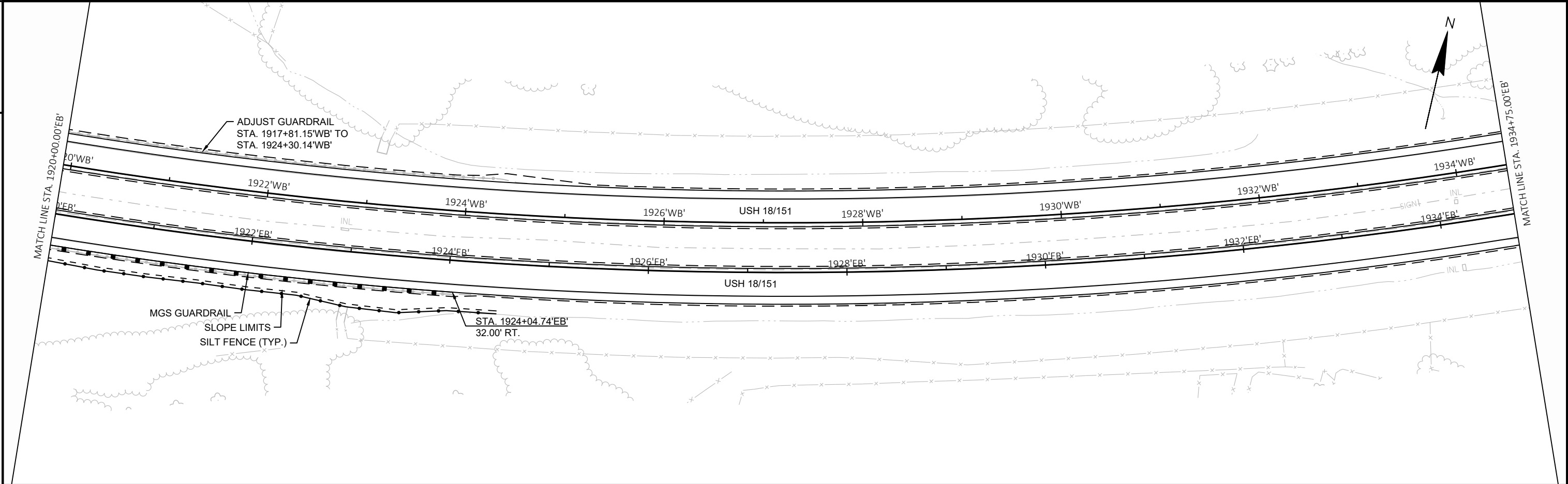
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E

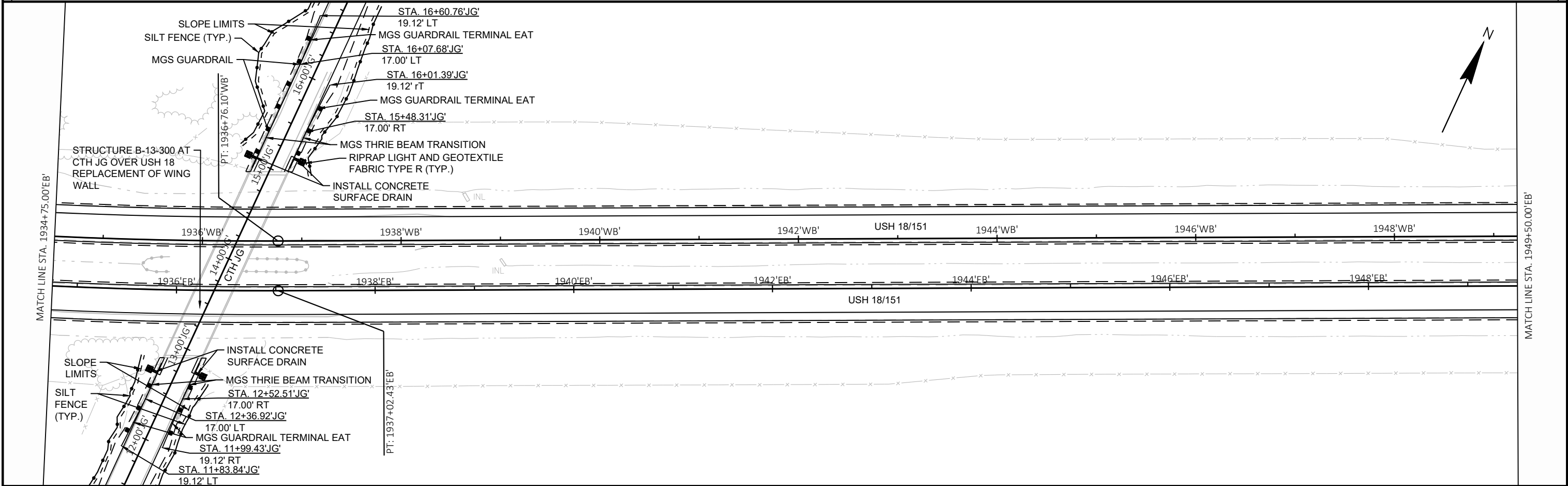




2



2



PROJECT NO:	1204-05-73
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HWY: USH 18

COUNTY: DANE

PLAN DETAILS

SHEET	43	E
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E

FILE NAME : P:\2018 PROJECTS\5018041 - WISDOT SWR US 18_151\CIVIL3D\SHEETSPLAN\1204-05-73\021201-PD TO 021218-PD.DWG
LAYOUT NAME - 021211-pd

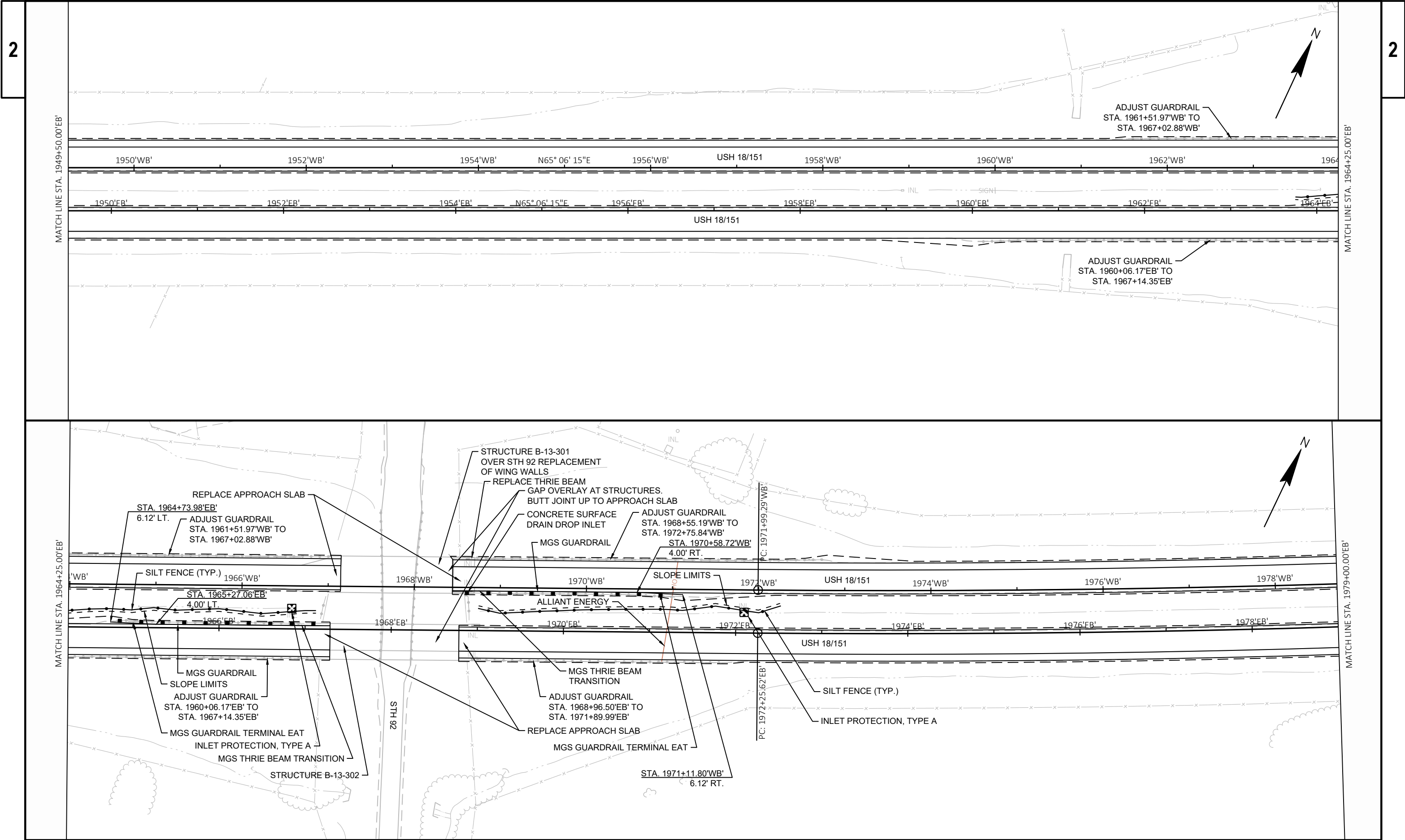
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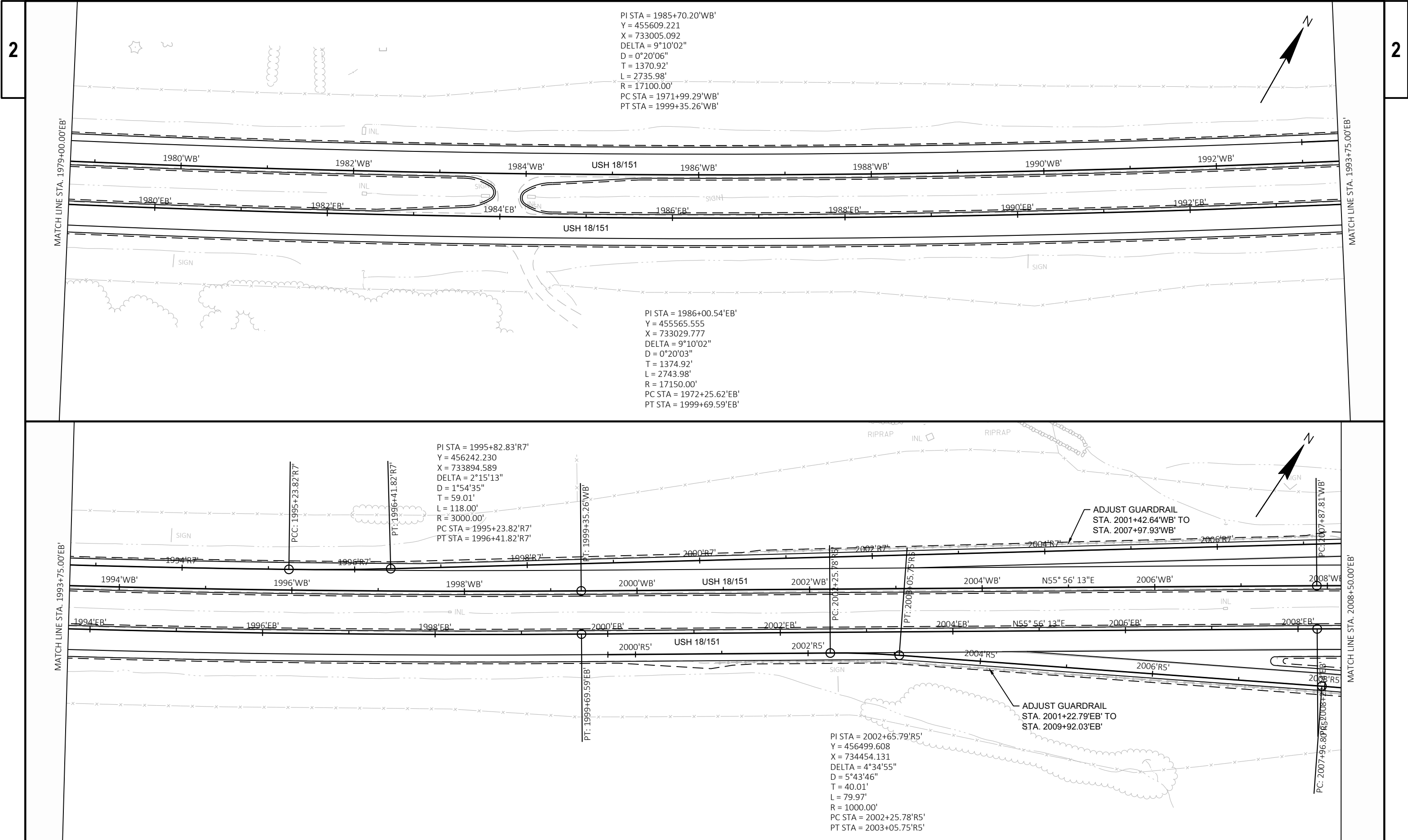
PLOT BY : BRETT PETERSON

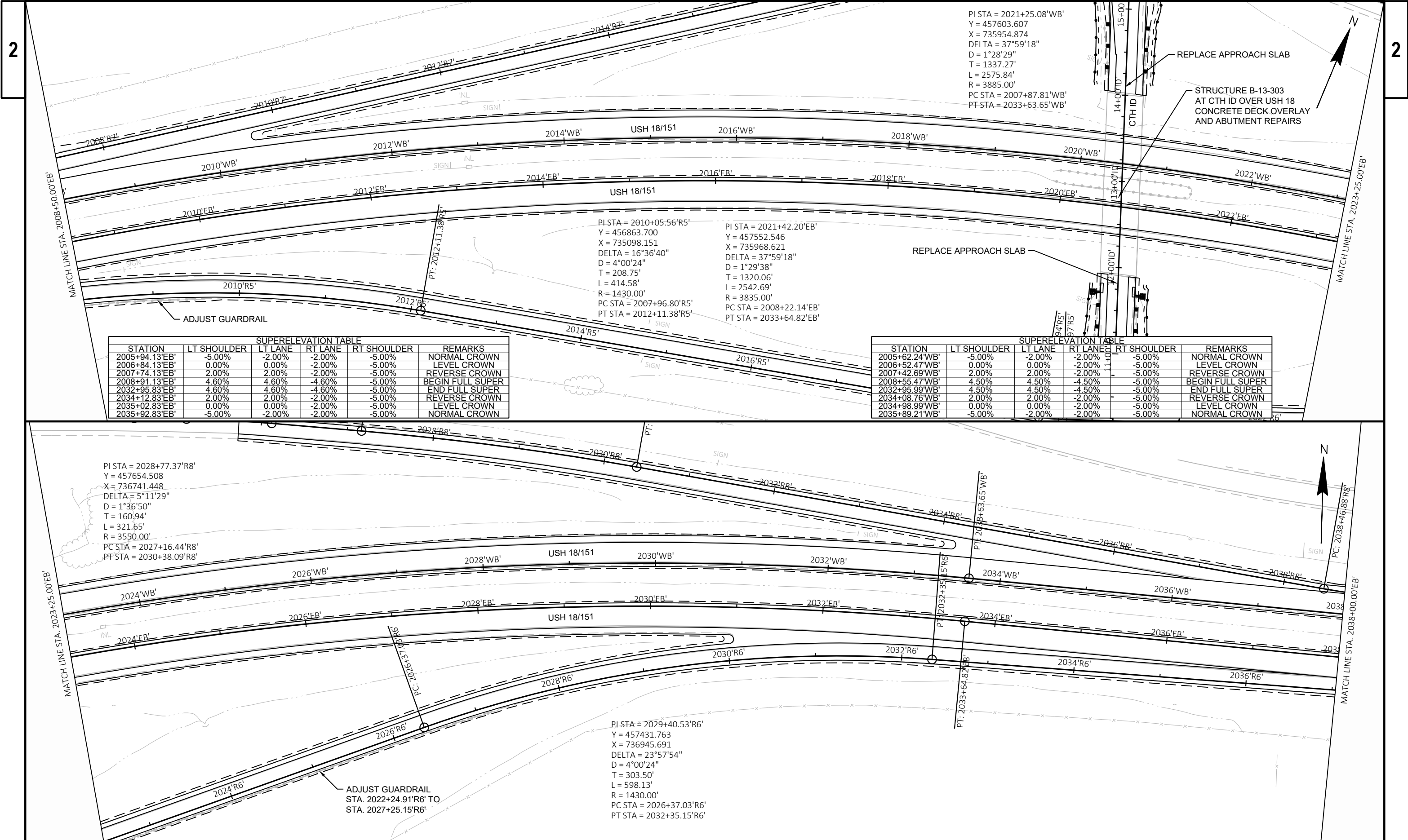
PLOT NAME : PLOT SCALE : 1 IN:100 FT

PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 44

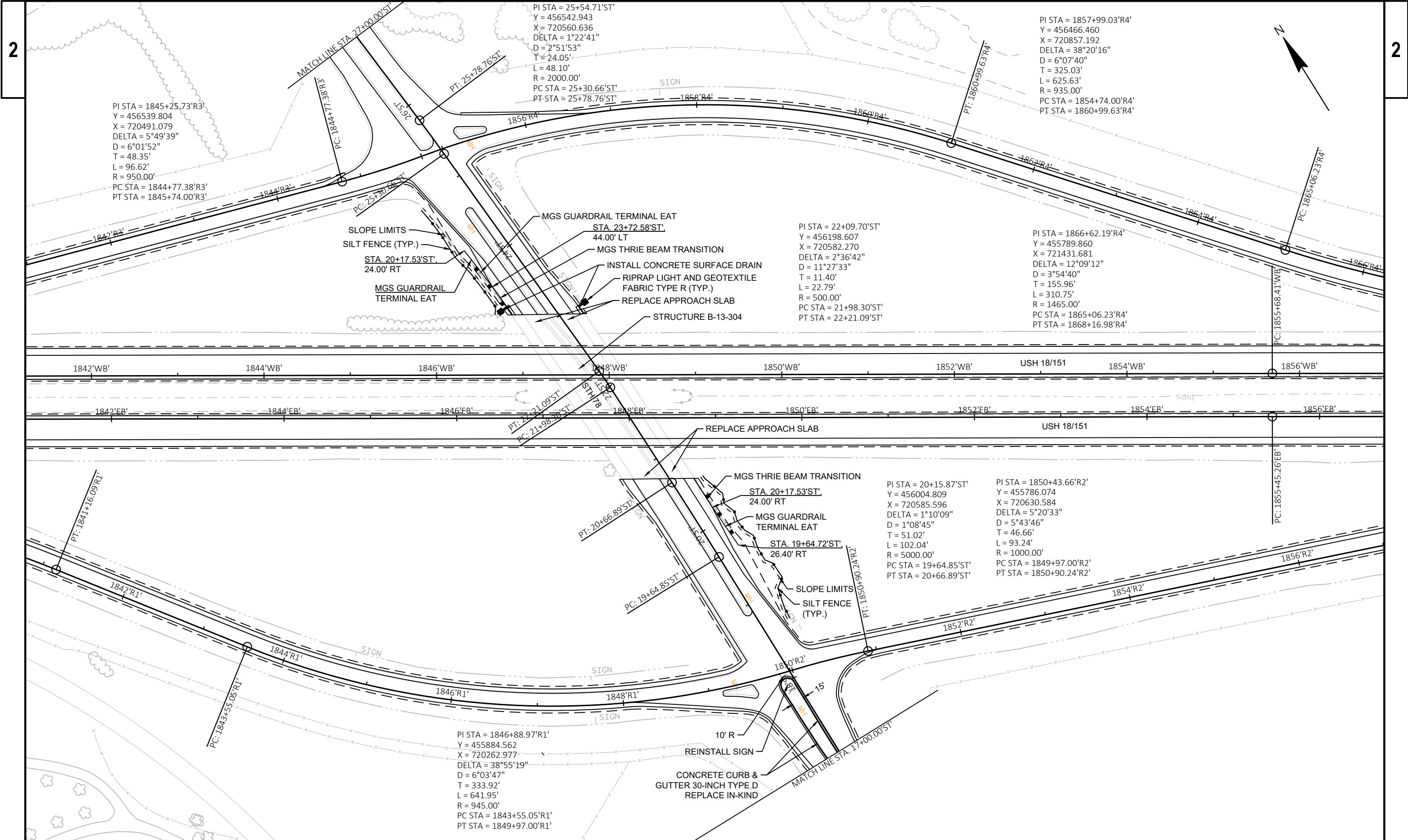


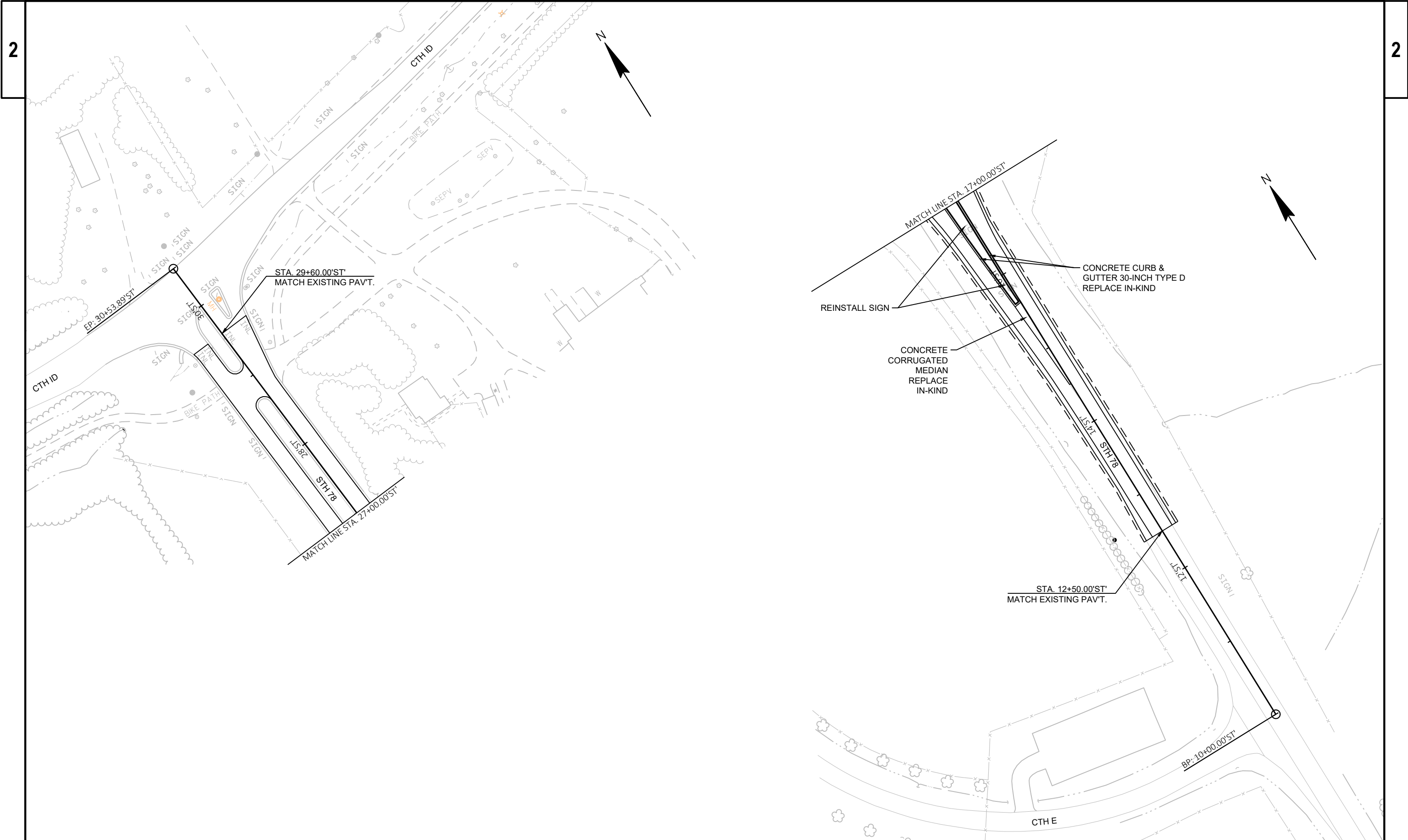


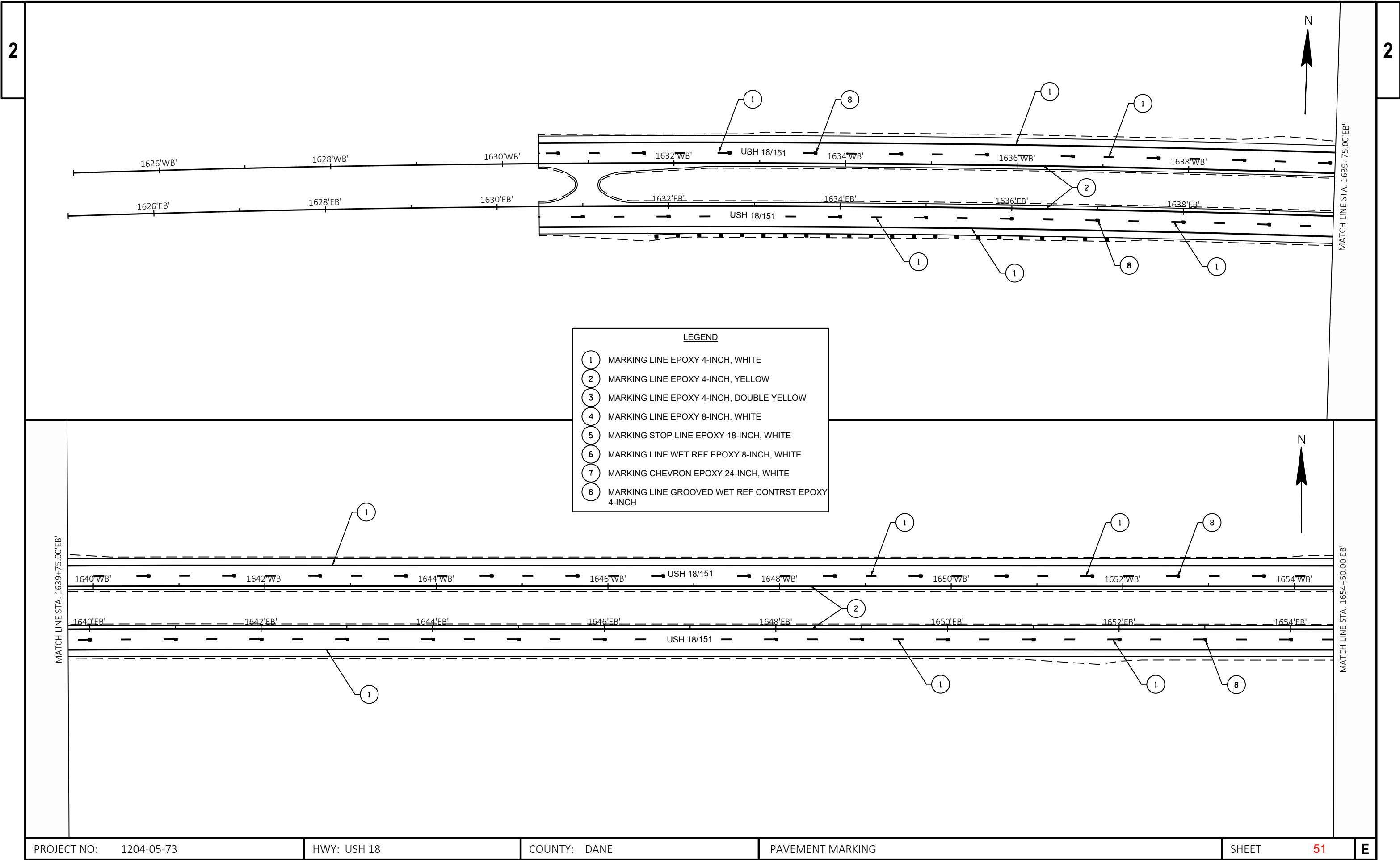


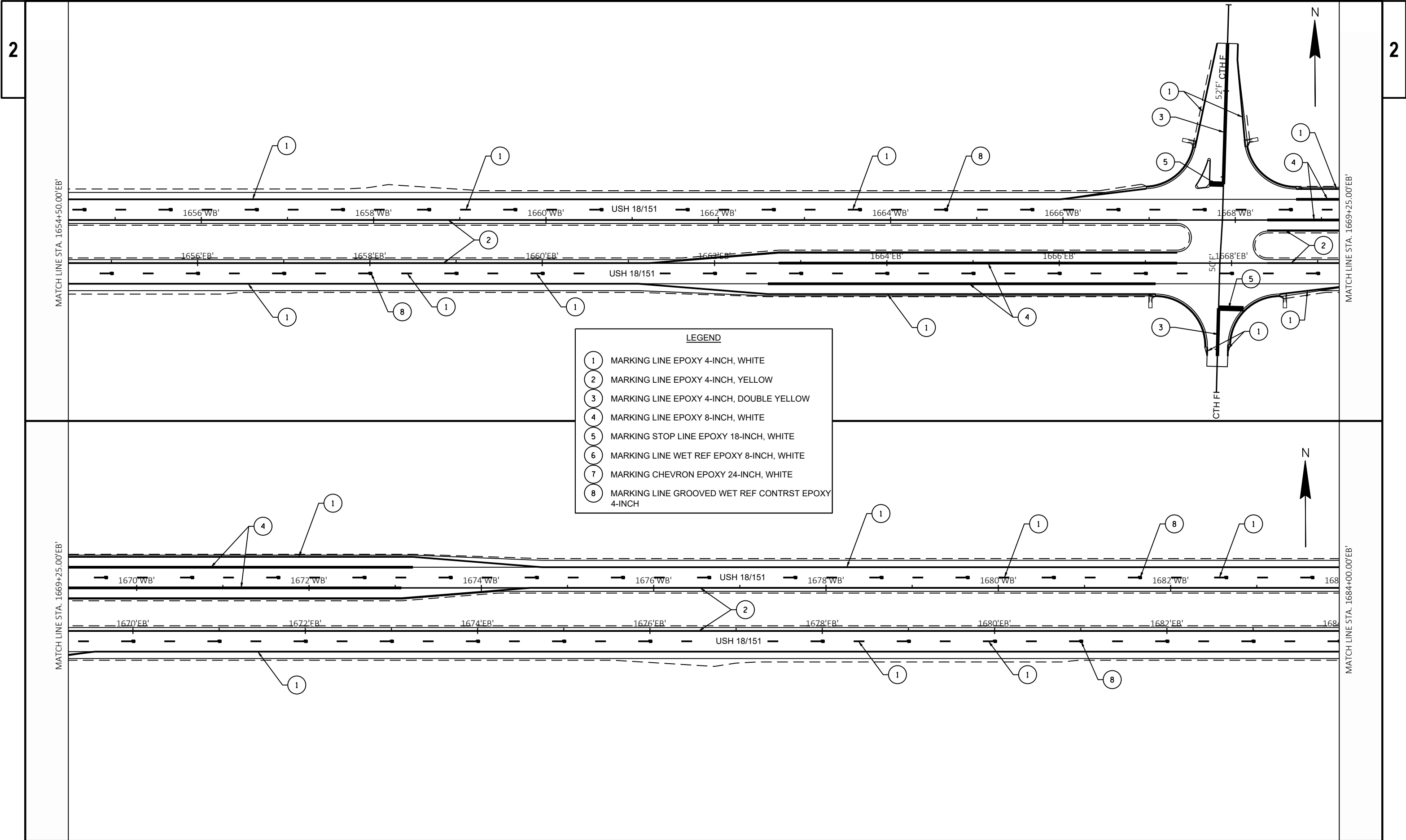
SUPERELEVATION TABLE					
STATION	LT SHOULDER	LT LANE	RT LANE	RT SHOULDER	REMARKS
2005+94.13'EB'	-5.00%	-2.00%	-2.00%	-5.00%	NORMAL CROWN
2006+84.13'EB'	0.00%	0.00%	-2.00%	-5.00%	LEVEL CROWN
2007+74.13'EB'	2.00%	2.00%	-2.00%	-5.00%	REVERSE CROWN
2008+91.13'EB'	4.60%	4.60%	-4.60%	-5.00%	BEGIN FULL SUPER
2032+95.83'EB'	4.60%	4.60%	-4.60%	-5.00%	END FULL SUPER
2034+12.83'EB'	2.00%	2.00%	-2.00%	-5.00%	REVERSE CROWN
2035+02.83'EB'	0.00%	0.00%	-2.00%	-5.00%	LEVEL CROWN
2035+92.83'EB'	-5.00%	-2.00%	-2.00%	-5.00%	NORMAL CROWN

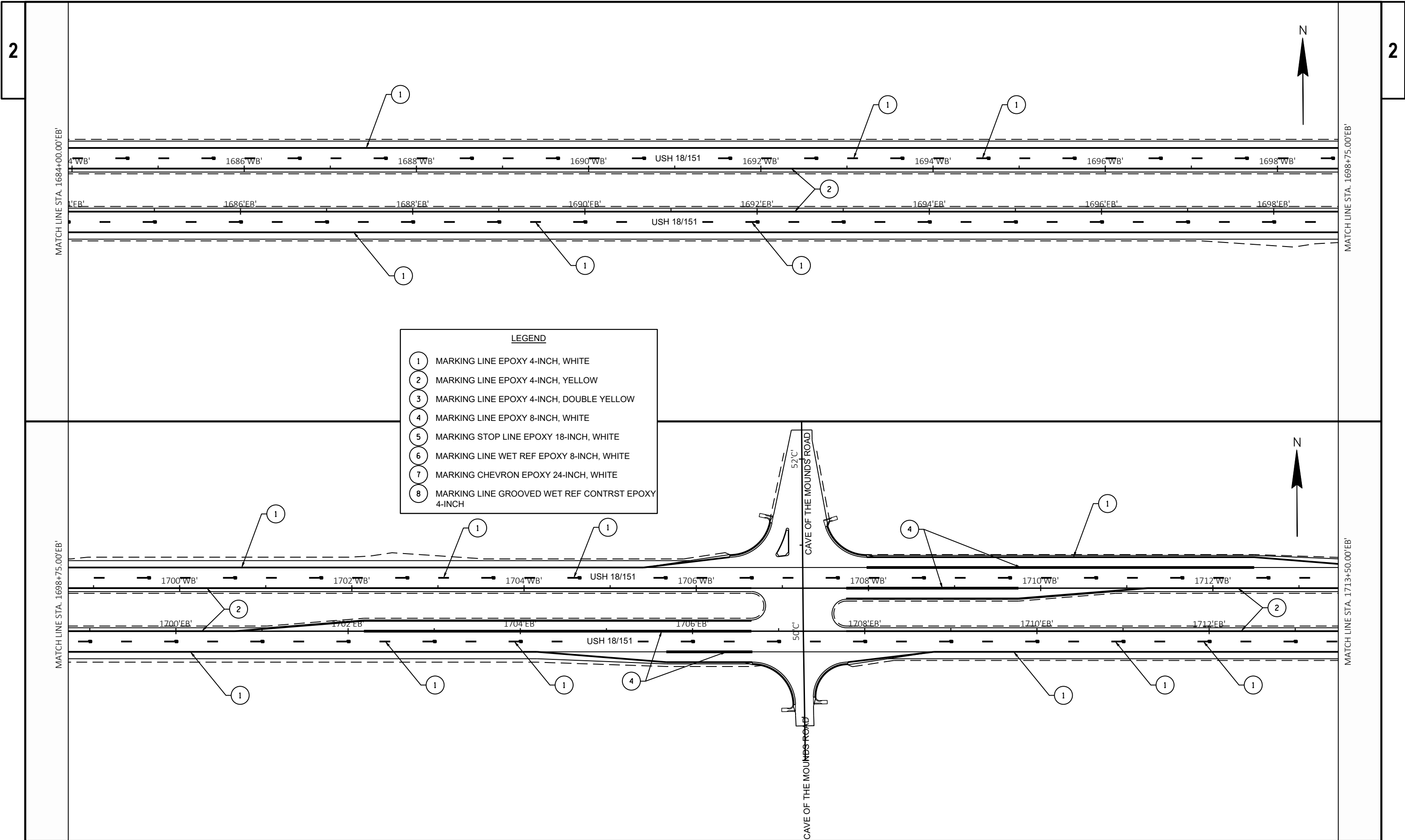
SUPERELEVATION TABLE					
STATION	LT SHOULDER	LT LANE	RT LANE	RT SHOULDER	REMARKS
2005+62.24'WB'	-5.00%	-2.00%	-2.00%	-5.00%	NORMAL CROWN
2006+52.47'WB'	0.00%	0.00%	-2.00%	-5.00%	LEVEL CROWN
2007+42.69'WB'	2.00%	2.00%	-2.00%	-5.00%	REVERSE CROWN
2008+55.47'WB'	4.50%	4.50%	-4.50%	-5.00%	BEGIN FULL SUPER
2032+95.99'WB'	4.50%	4.50%	-4.50%	-5.00%	END FULL SUPER
2034+08.76'WB'	2.00%	2.00%	-2.00%	-5.00%	REVERSE CROWN
2034+98.99'WB'	0.00%	0.00%	-2.00%	-5.00%	LEVEL CROWN
2035+89.21'WB'	-5.00%	-2.00%	-2.00%	-5.00%	NORMAL CROWN

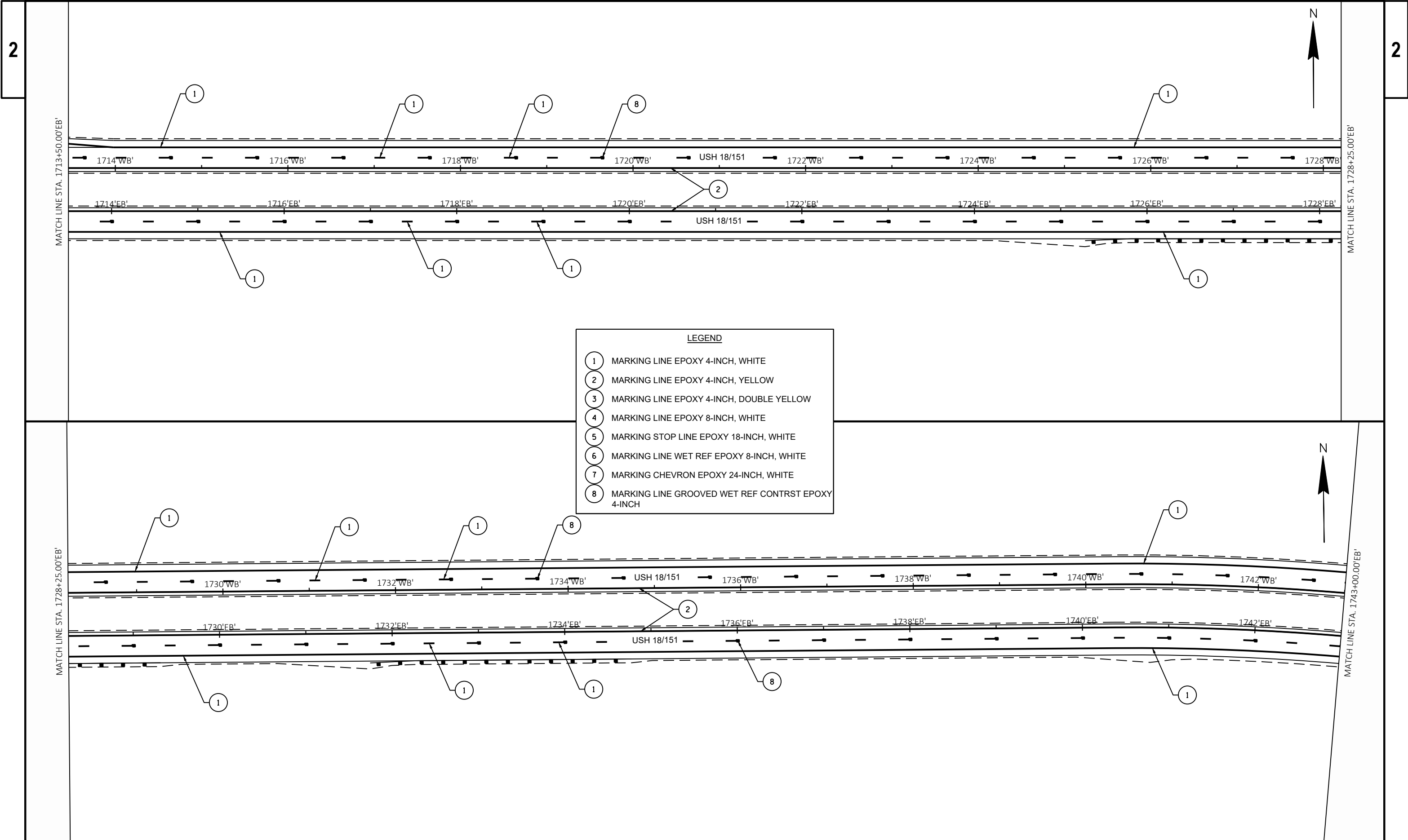


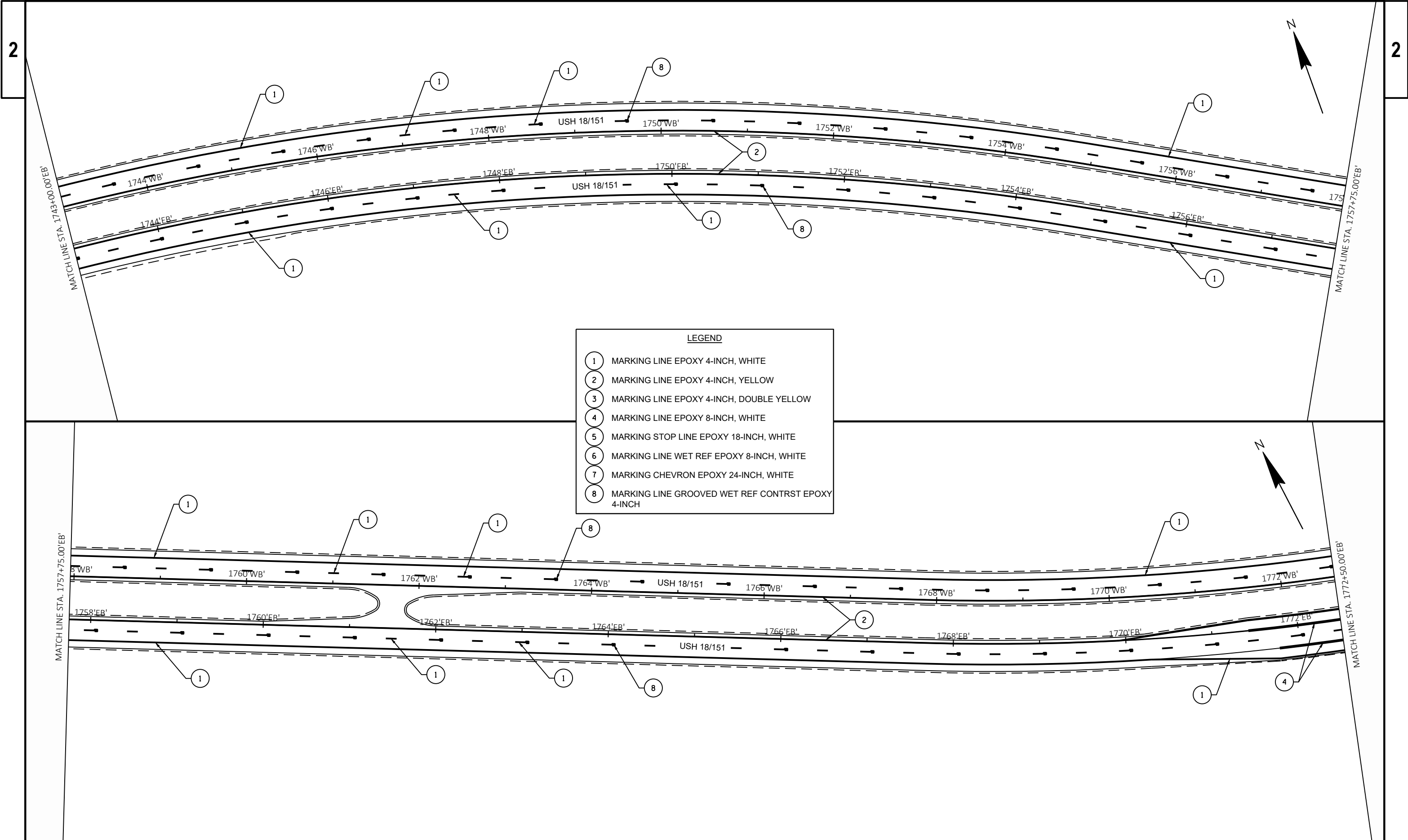


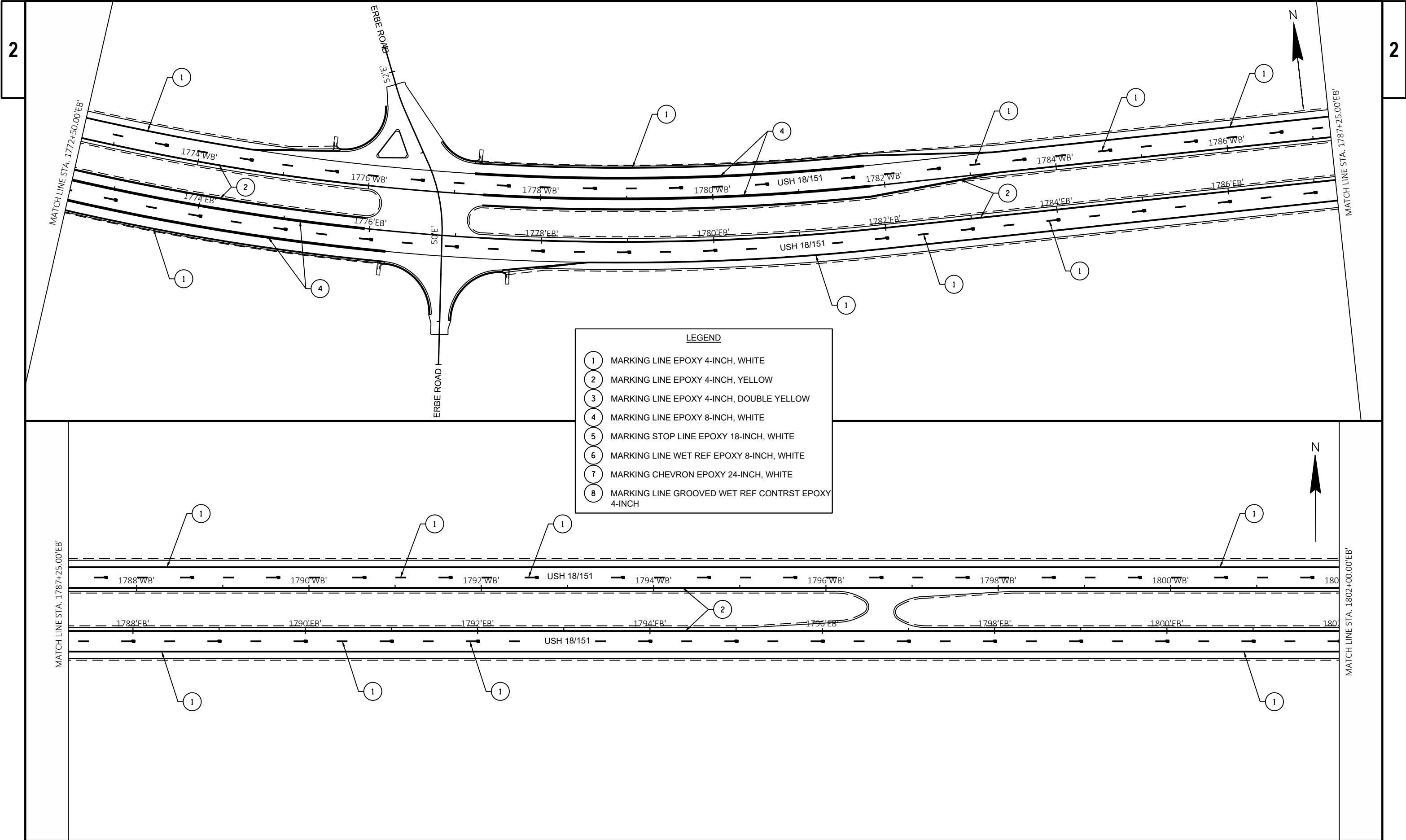


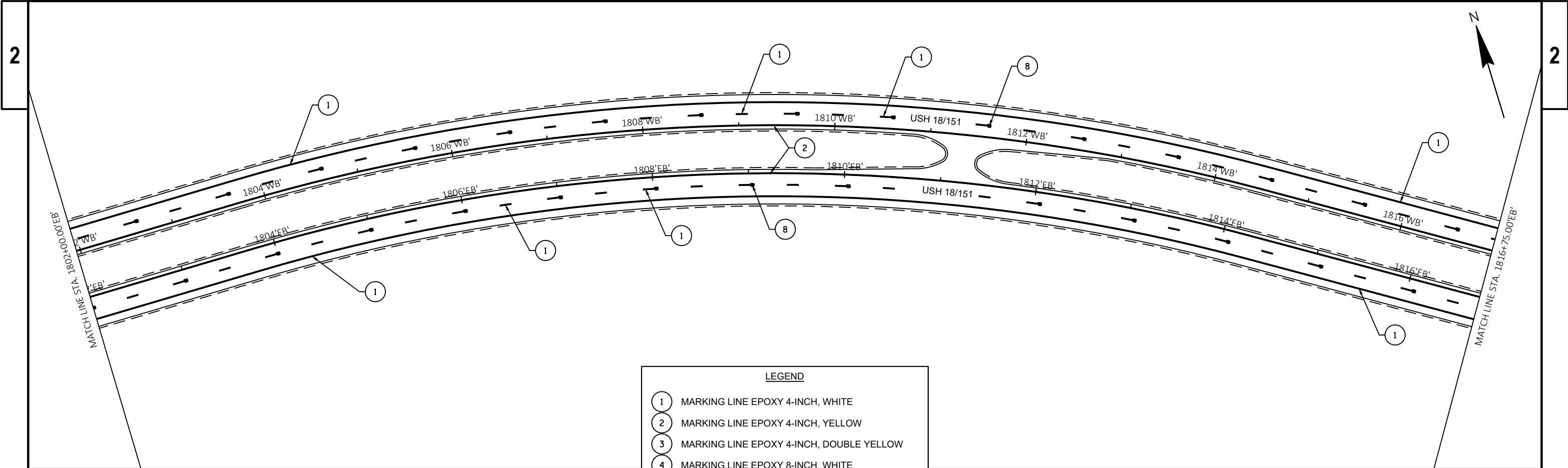




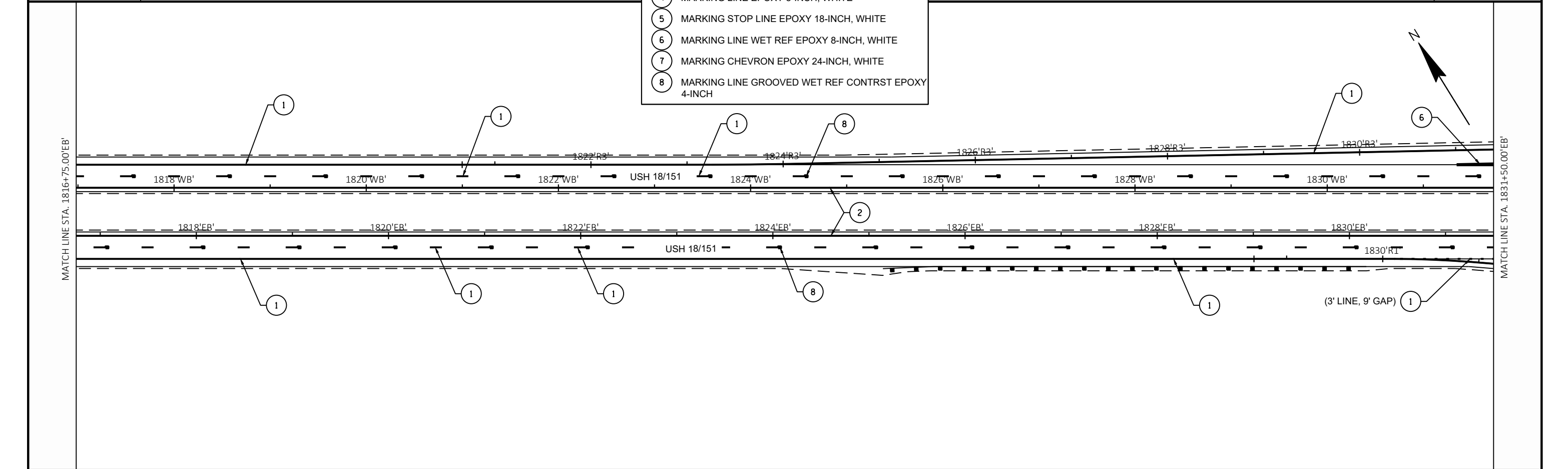


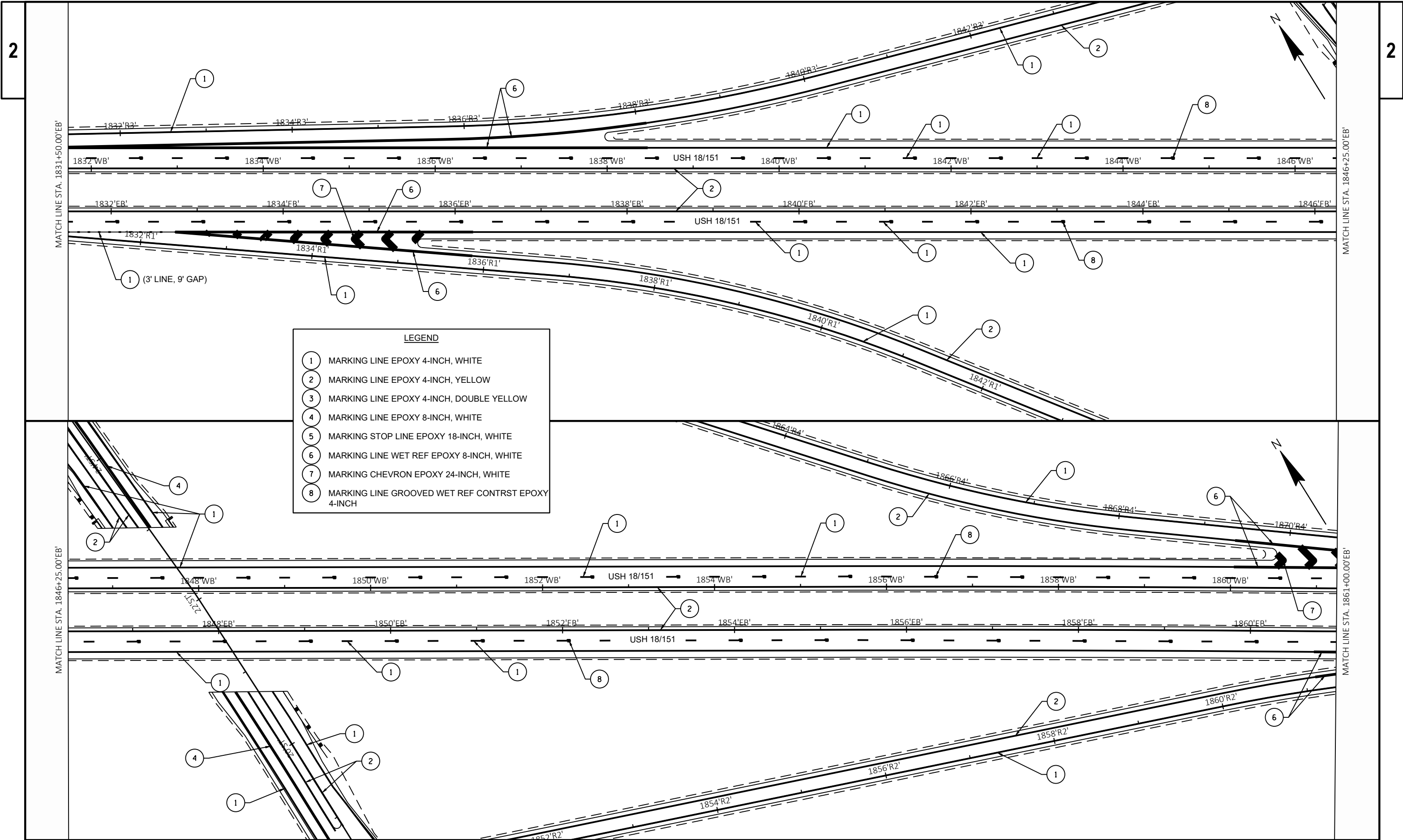




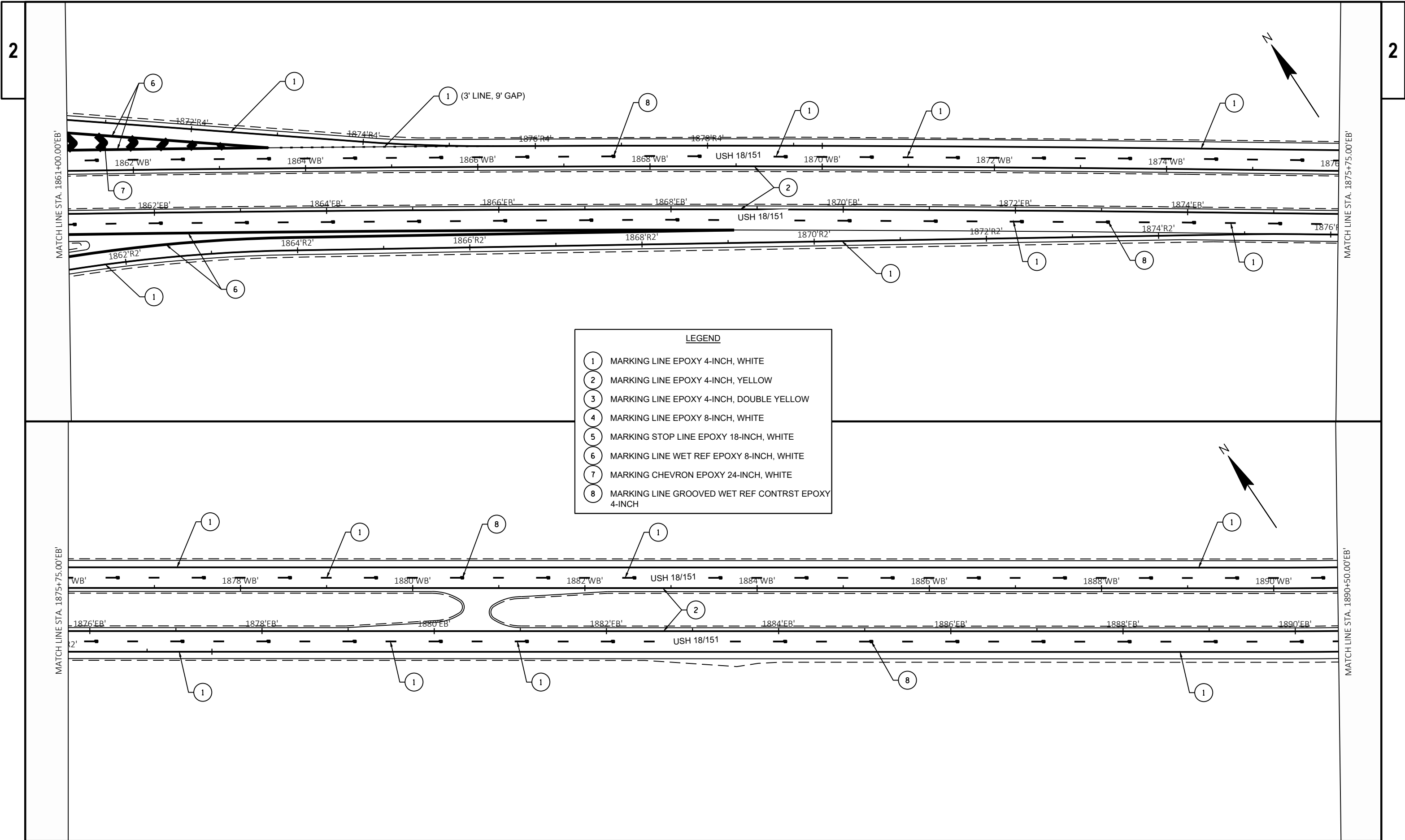


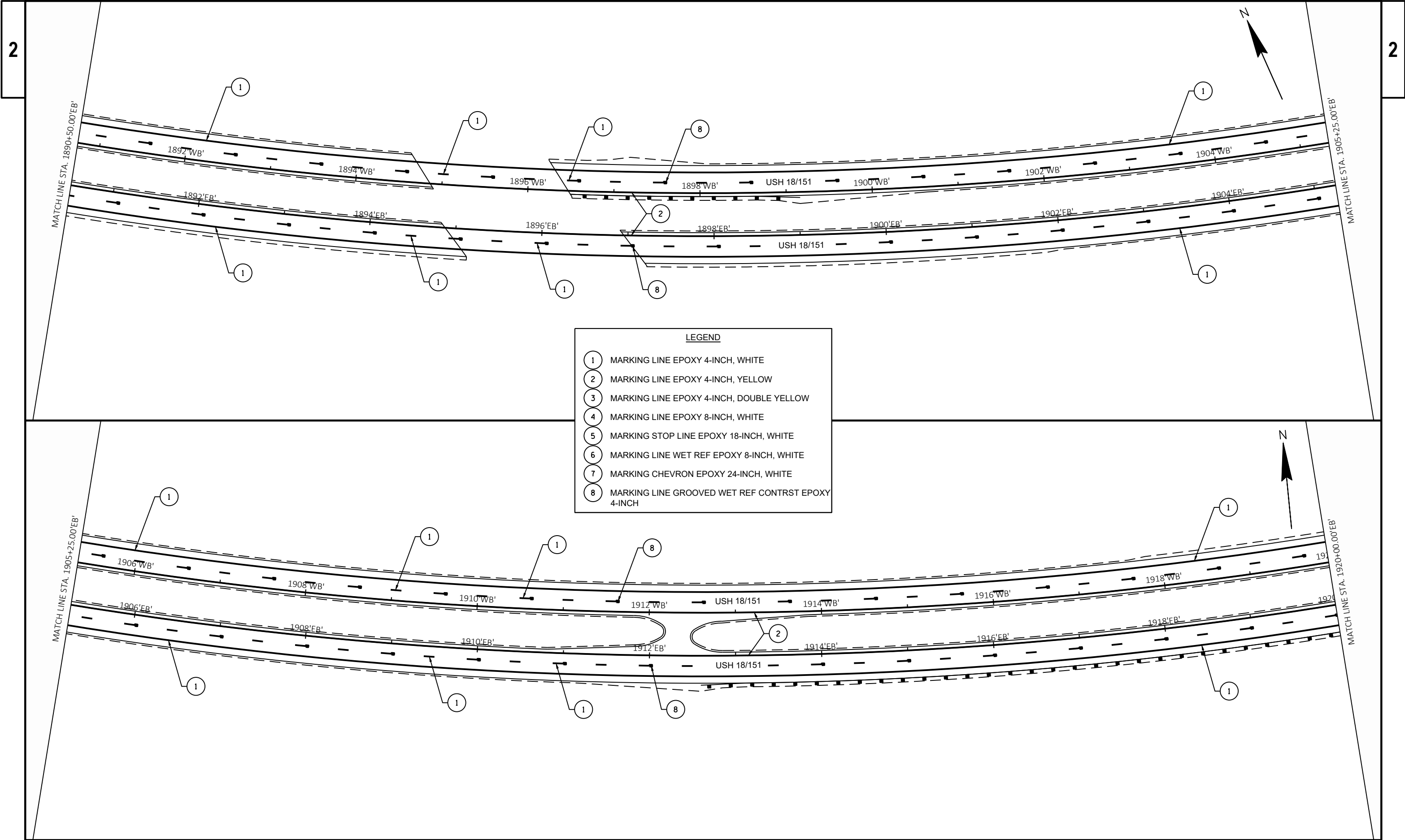
LEGEND	
1	MARKING LINE EPOXY 4-INCH, WHITE
2	MARKING LINE EPOXY 4-INCH, YELLOW
3	MARKING LINE EPOXY 4-INCH, DOUBLE YELLOW
4	MARKING LINE EPOXY 8-INCH, WHITE
5	MARKING STOP LINE EPOXY 18-INCH, WHITE
6	MARKING LINE WET REF EPOXY 8-INCH, WHITE
7	MARKING CHEVRON EPOXY 24-INCH, WHITE
8	MARKING LINE GROOVED WET REF CONTRST EPOXY 4-INCH

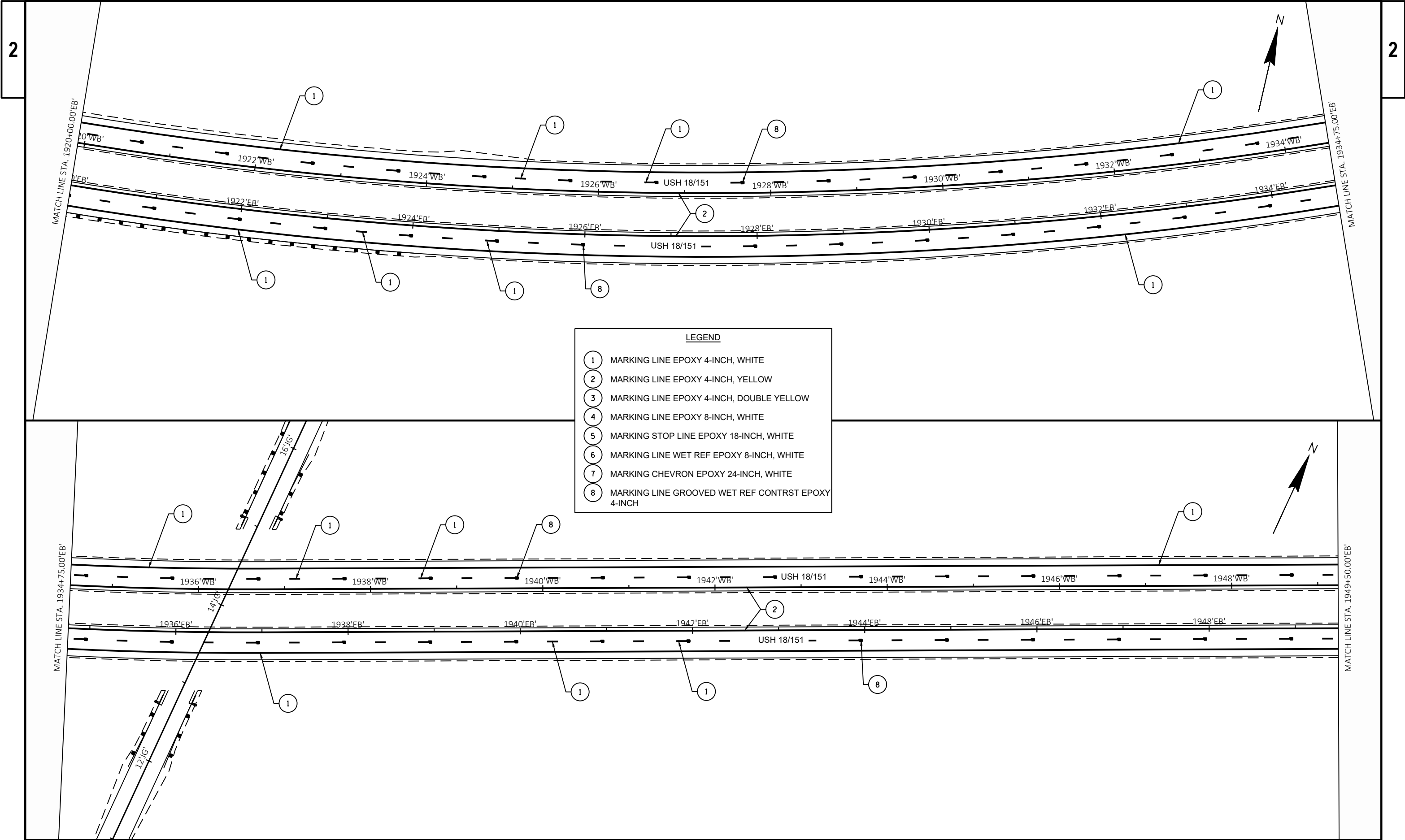


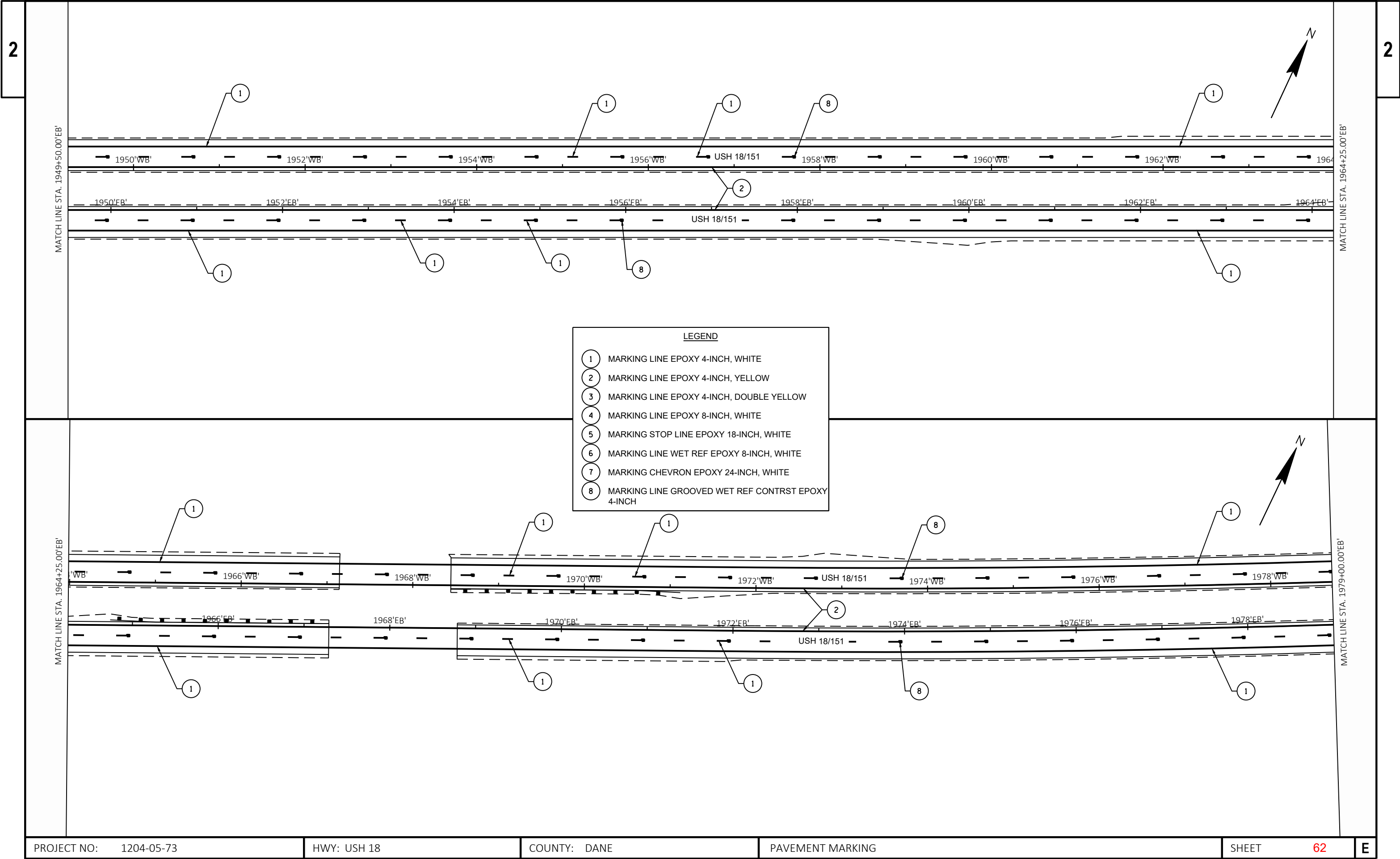


- LEGEND**
- 1 MARKING LINE EPOXY 4-INCH, WHITE
 - 2 MARKING LINE EPOXY 4-INCH, YELLOW
 - 3 MARKING LINE EPOXY 4-INCH, DOUBLE YELLOW
 - 4 MARKING LINE EPOXY 8-INCH, WHITE
 - 5 MARKING STOP LINE EPOXY 18-INCH, WHITE
 - 6 MARKING LINE WET REF EPOXY 8-INCH, WHITE
 - 7 MARKING CHEVRON EPOXY 24-INCH, WHITE
 - 8 MARKING LINE GROOVED WET REF CONTRST EPOXY 4-INCH

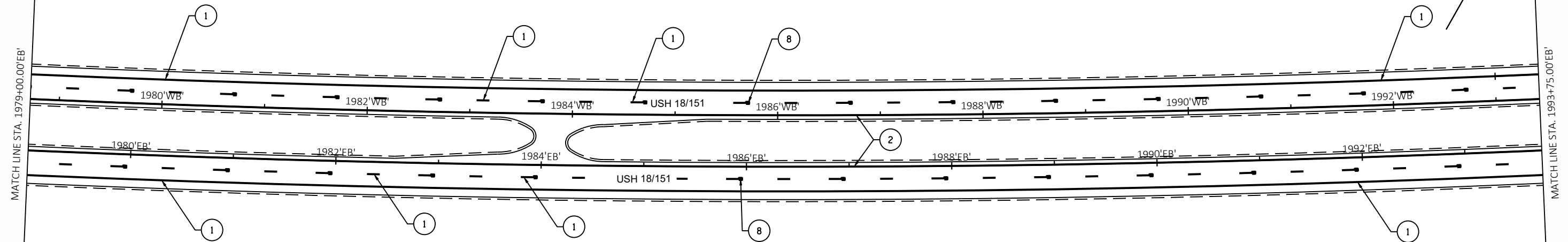






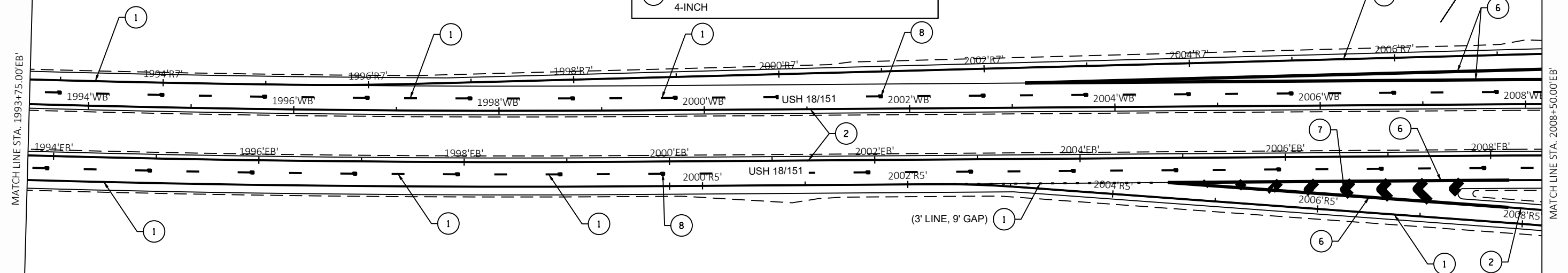


2



LEGEND

- 1 MARKING LINE EPOXY 4-INCH, WHITE
- 2 MARKING LINE EPOXY 4-INCH, YELLOW
- 3 MARKING LINE EPOXY 4-INCH, DOUBLE YELLOW
- 4 MARKING LINE EPOXY 8-INCH, WHITE
- 5 MARKING STOP LINE EPOXY 18-INCH, WHITE
- 6 MARKING LINE WET REF EPOXY 8-INCH, WHITE
- 7 MARKING CHEVRON EPOXY 24-INCH, WHITE
- 8 MARKING LINE GROOVED WET REF CONTRST EPOXY 4-INCH



PROJECT NO:	1204-05-73
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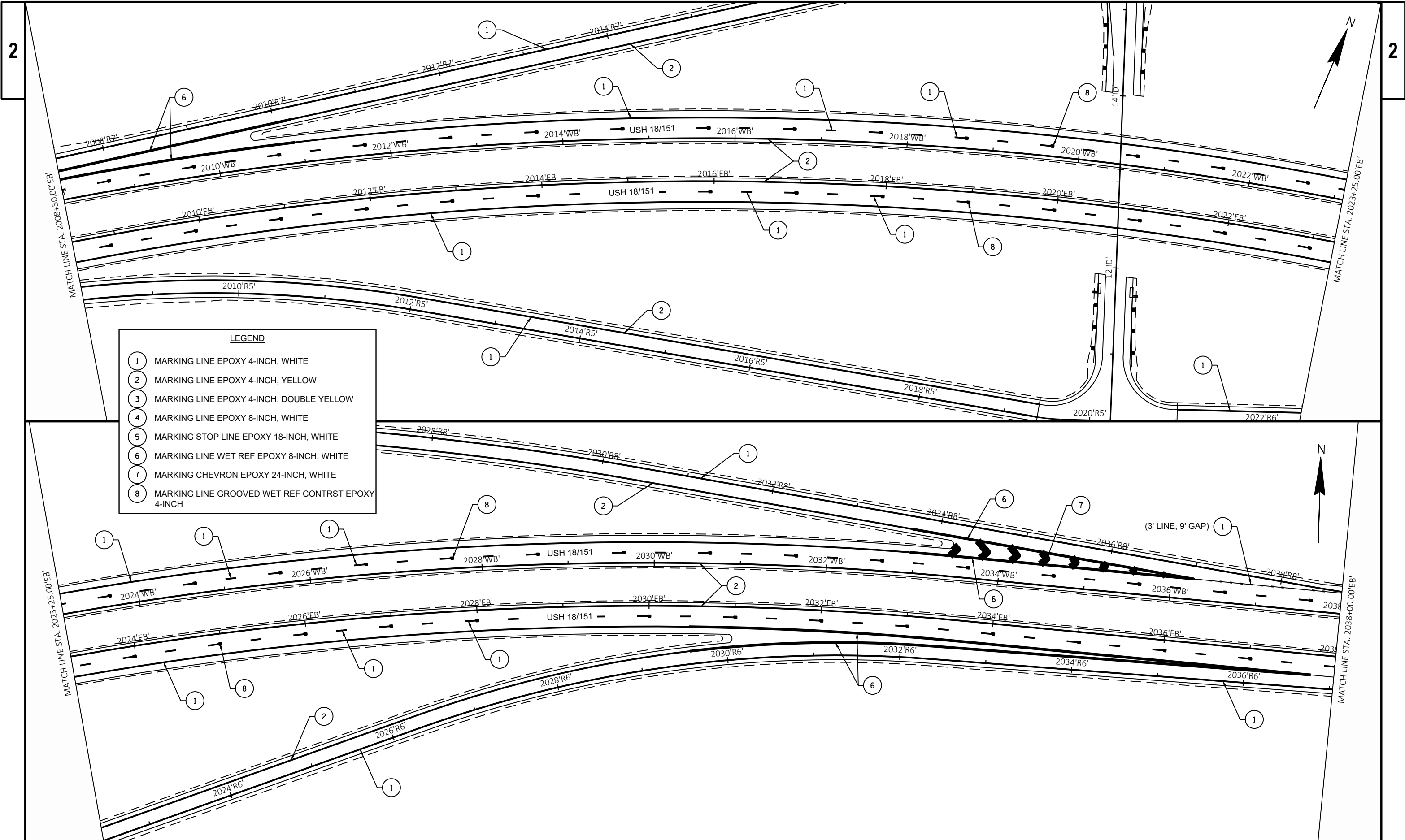
HWY: USH 18

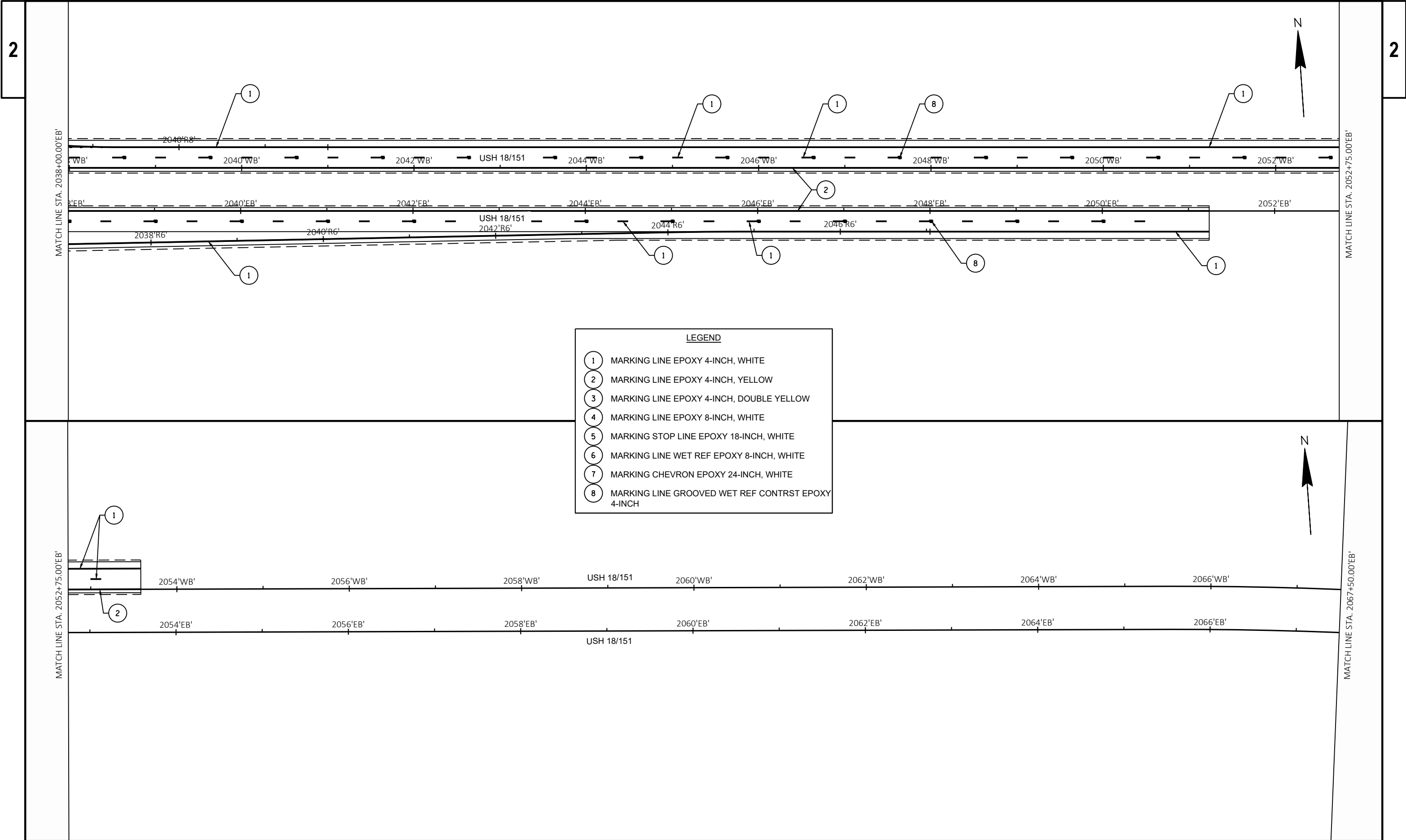
COUNTY: DANE

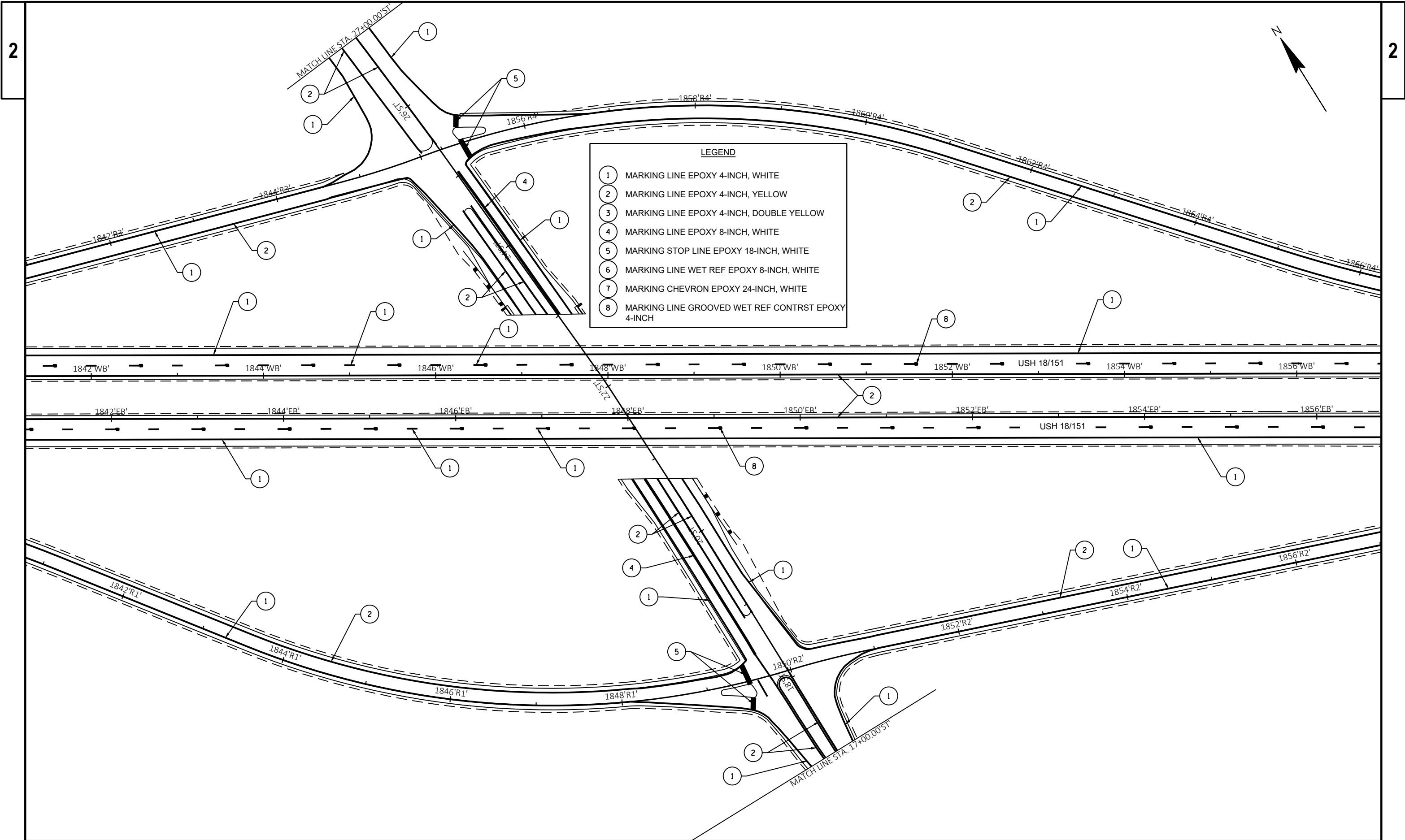
PAVEMENT MARKING

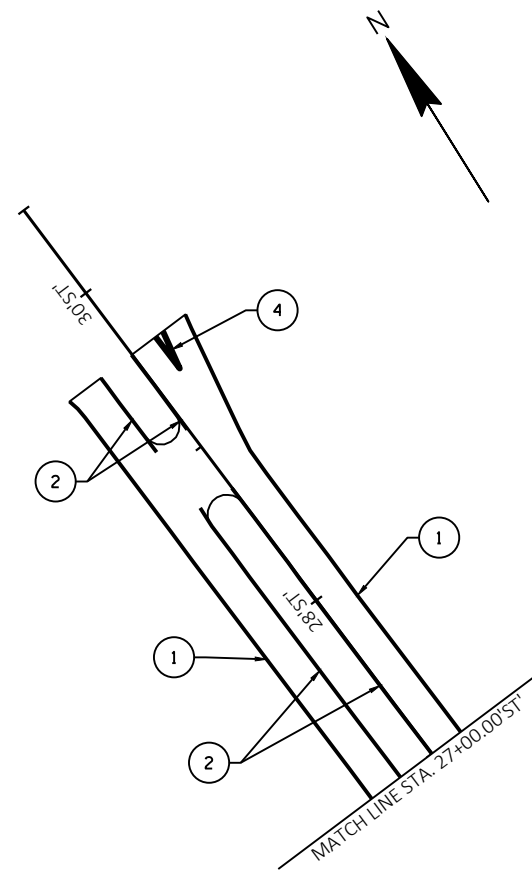
SHEET 63

11

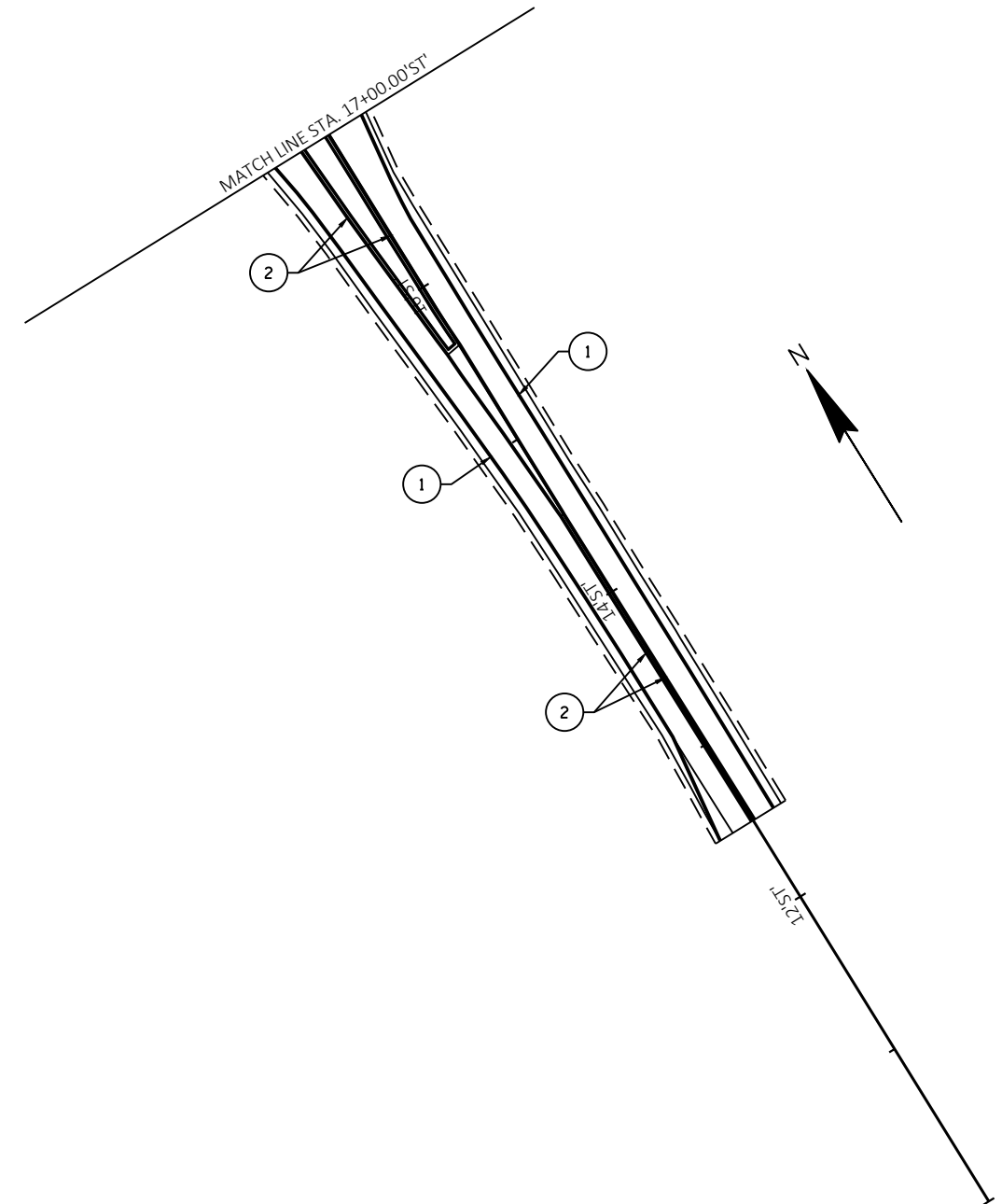






**LEGEND**

- 1 MARKING LINE EPOXY 4-INCH, WHITE
- 2 MARKING LINE EPOXY 4-INCH, YELLOW
- 3 MARKING LINE EPOXY 4-INCH, DOUBLE YELLOW
- 4 MARKING LINE EPOXY 8-INCH, WHITE
- 5 MARKING STOP LINE EPOXY 18-INCH, WHITE
- 6 MARKING LINE WET REF EPOXY 8-INCH, WHITE
- 7 MARKING CHEVRON EPOXY 24-INCH, WHITE
- 8 MARKING LINE GROOVED WET REF CONTRST EPOXY 4-INCH



LEGEND

1

MARKING LINE EPOXY 4-INCH, WHITE

2

MARKING LINE EPOXY 4-INCH, YELLOW

3

MARKING LINE EPOXY 4-INCH, DOUBLE YELLOW

4

MARKING LINE EPOXY 8-INCH, WHITE

5

MARKING STOP LINE EPOXY 18-INCH, WHITE

6

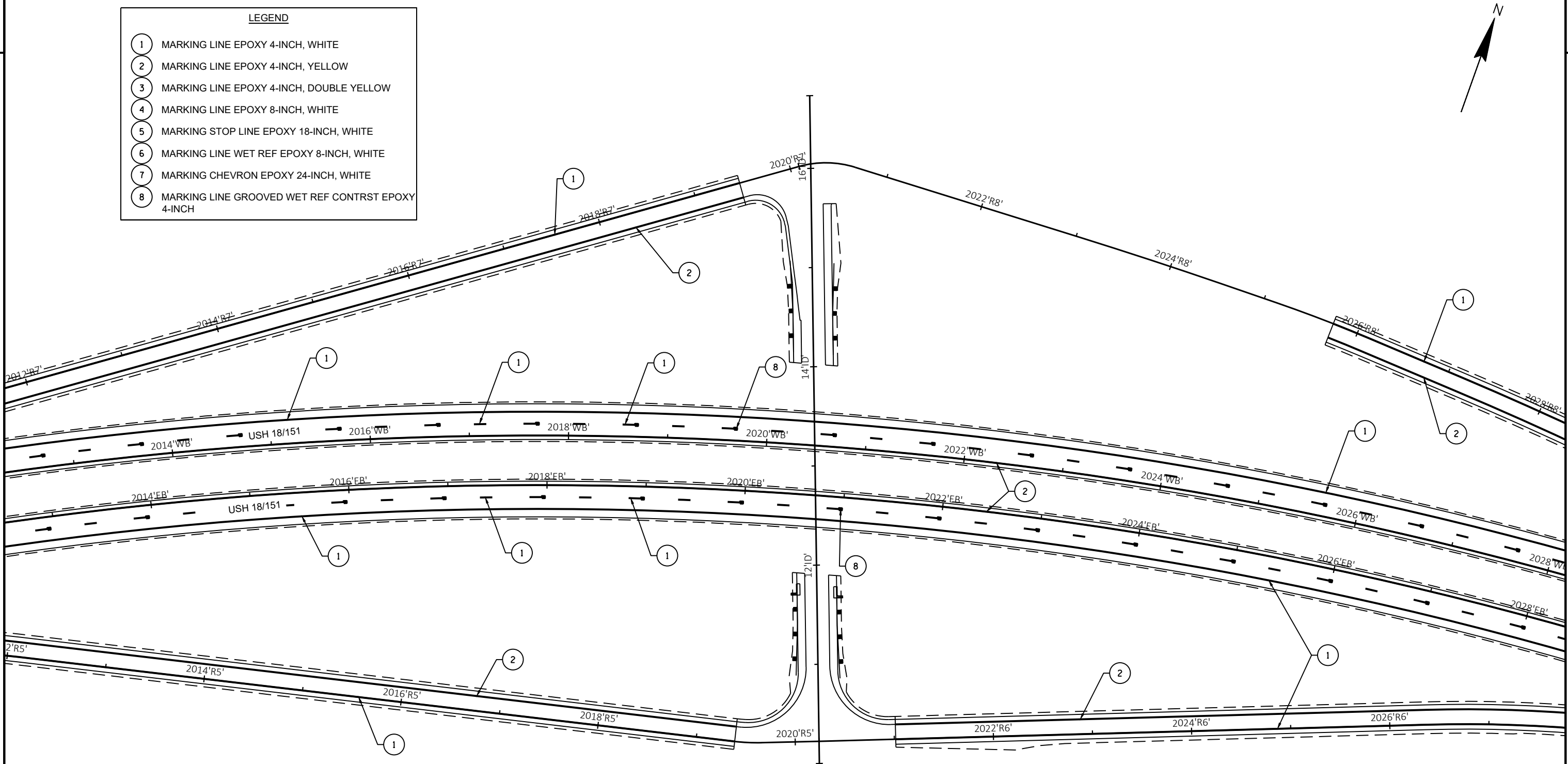
MARKING LINE WET REF EPOXY 8-INCH, WHITE

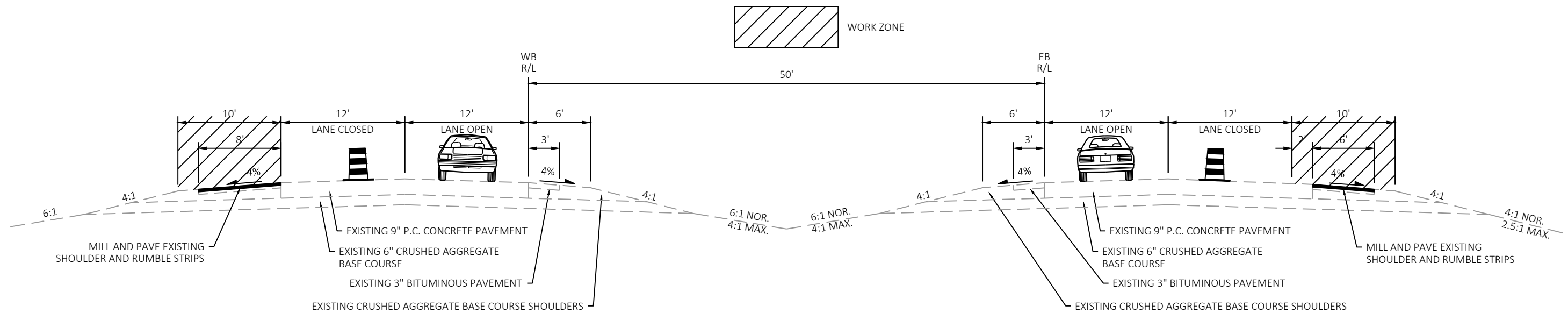
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MARKING CHEVRON EPOXY 24-INCH, WHITE

8

MARKING LINE GROOVED WET REF CONTRST EPOXY 4-INCH





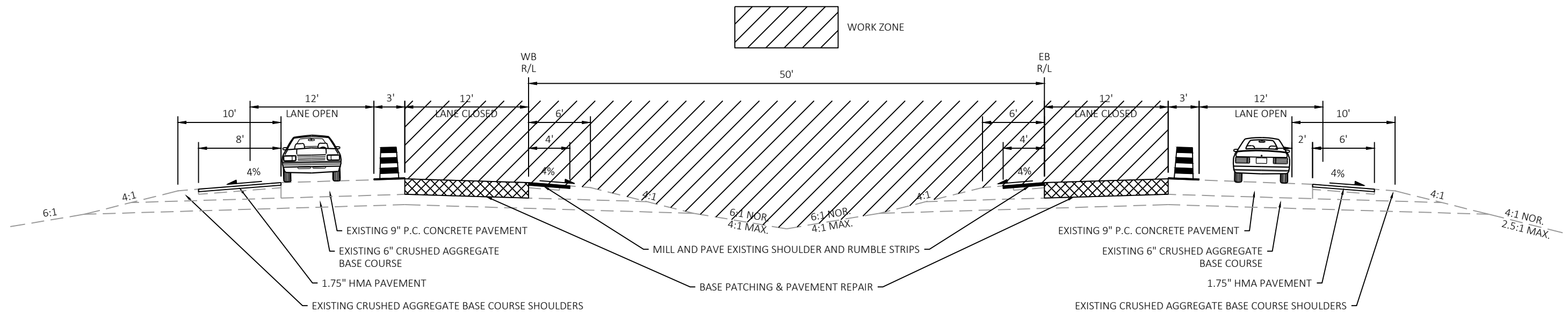
CONSTRUCTION STAGE 1 TYPICAL SECTION

STA. 1630+49'EB' TO STA. 2051+24.02'EB'

OUTSIDE LANES AND SHOULDERS CLOSED

MILLING OPERATION TO MILL SHOULDERS AND REMOVE EXISTING OUTSIDE SHOULDER RUMBLE STRIPS

MILLING AND PAVING 1.75" SHOULDER HMA 4 MT 58-28 S (6' WIDTH EB SIDE, 8' WIDTH WB SIDE)



CONSTRUCTION STAGE 2 TYPICAL SECTION

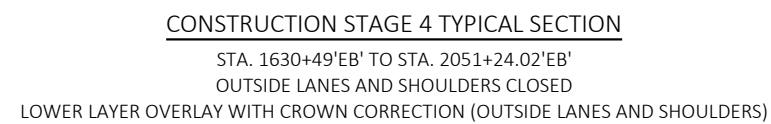
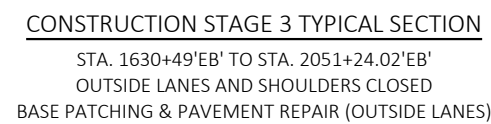
STA. 1630+49'EB' TO STA. 2051+24.02'EB'

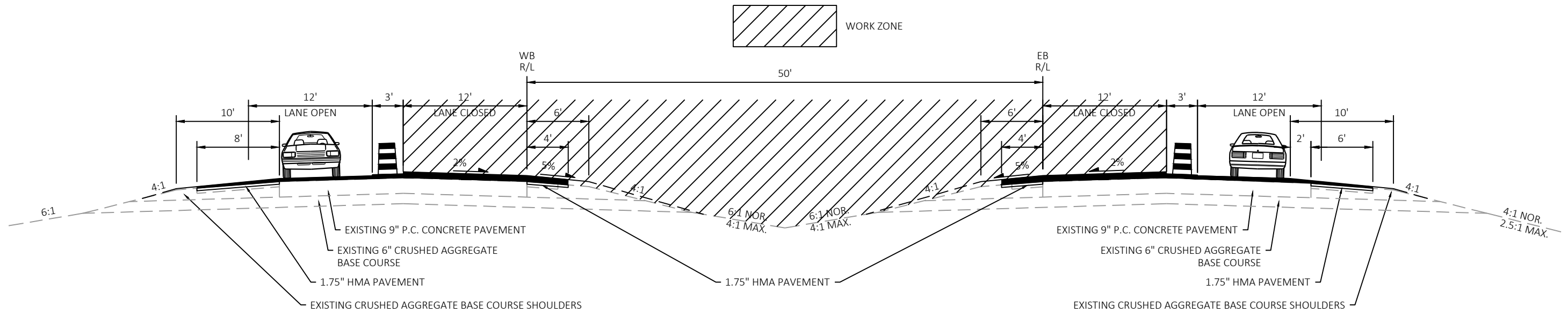
MEDIAN LANES AND SHOULDERS CLOSED

MILLING SHOULDERS, BASE PATCHING, & PAVEMENT REPAIR (MEDIAN LANES)

MILLING AND PAVING 1.75" SHOULDERS HMA 4 MT 58-28 S (4' WIDTH)

2



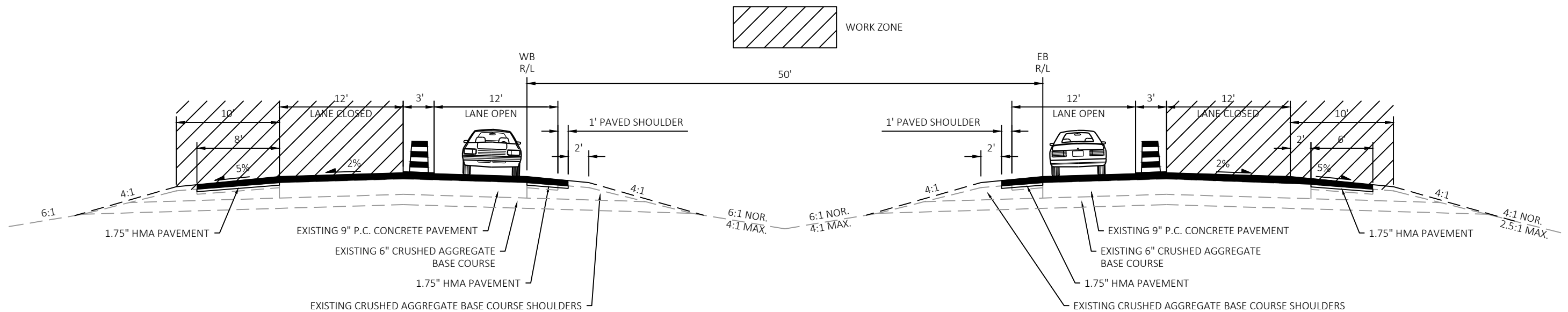


CONSTRUCTION STAGE 5 TYPICAL SECTION

STA. 1630+49'EB' TO STA. 2051+24.02'EB'

MEDIAN LANES AND SHOULDERS CLOSED

LOWER LAYER OVERLAY WITH CROWN CORRECTION AND UPPER LAYER OVERLAY (MEDIAN LANES AND SHOULDERS)
GRAVEL MEDIAN SHOULDER, MEDIAN GRADING WORK, GUARDRAIL INSTALLATION



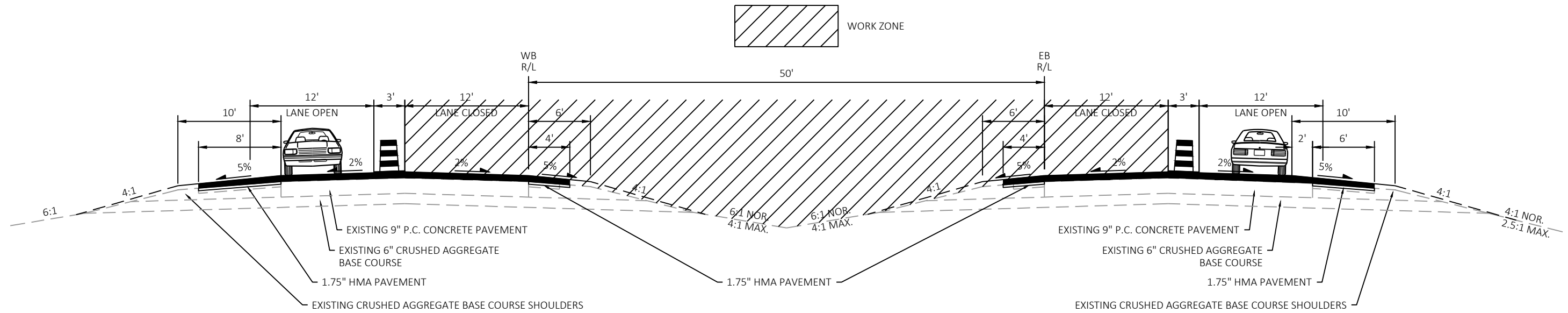
CONSTRUCTION STAGE 6 TYPICAL SECTION

STA. 1630+49'EB' TO STA. 2051+24.02'EB'

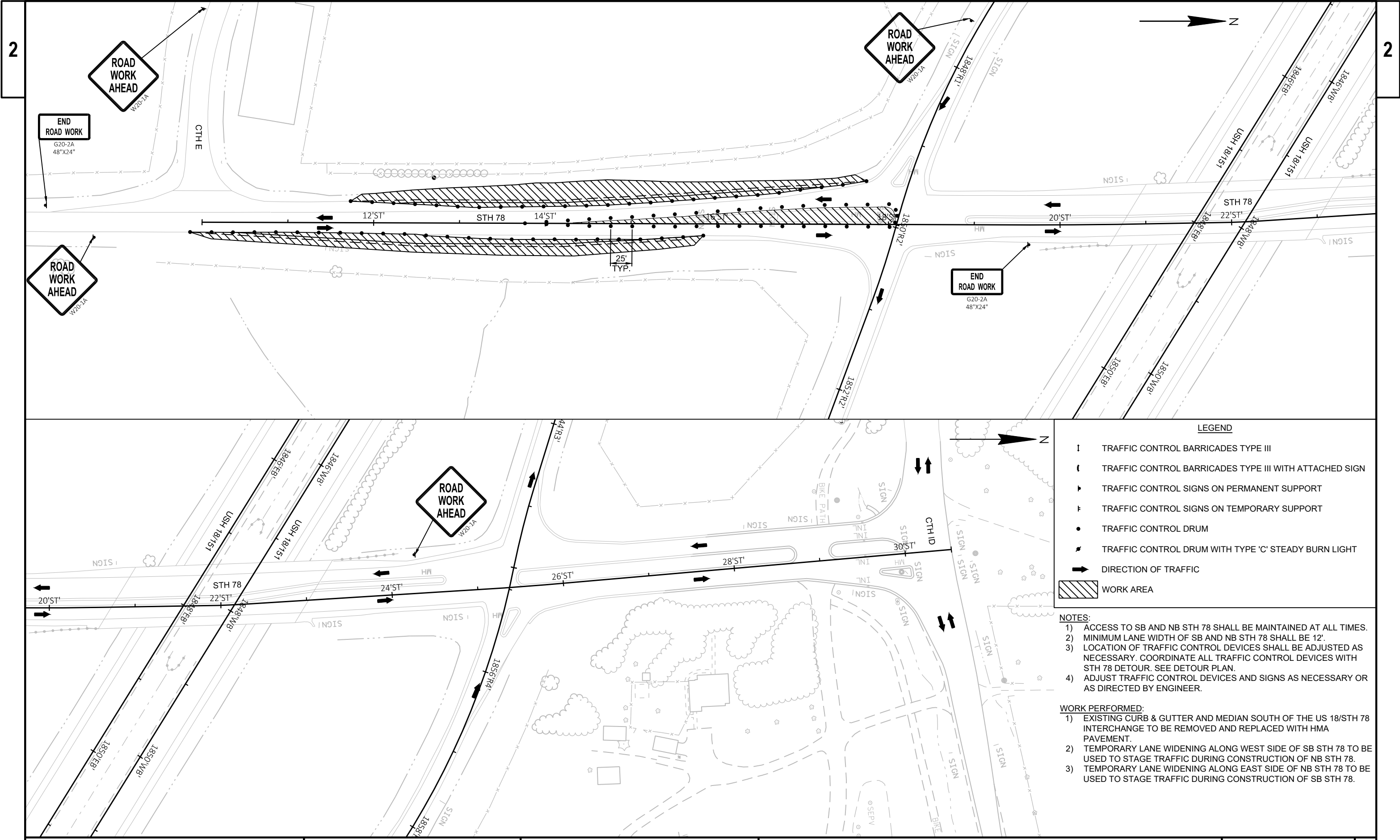
OUTSIDE LANES AND SHOULDERS CLOSED

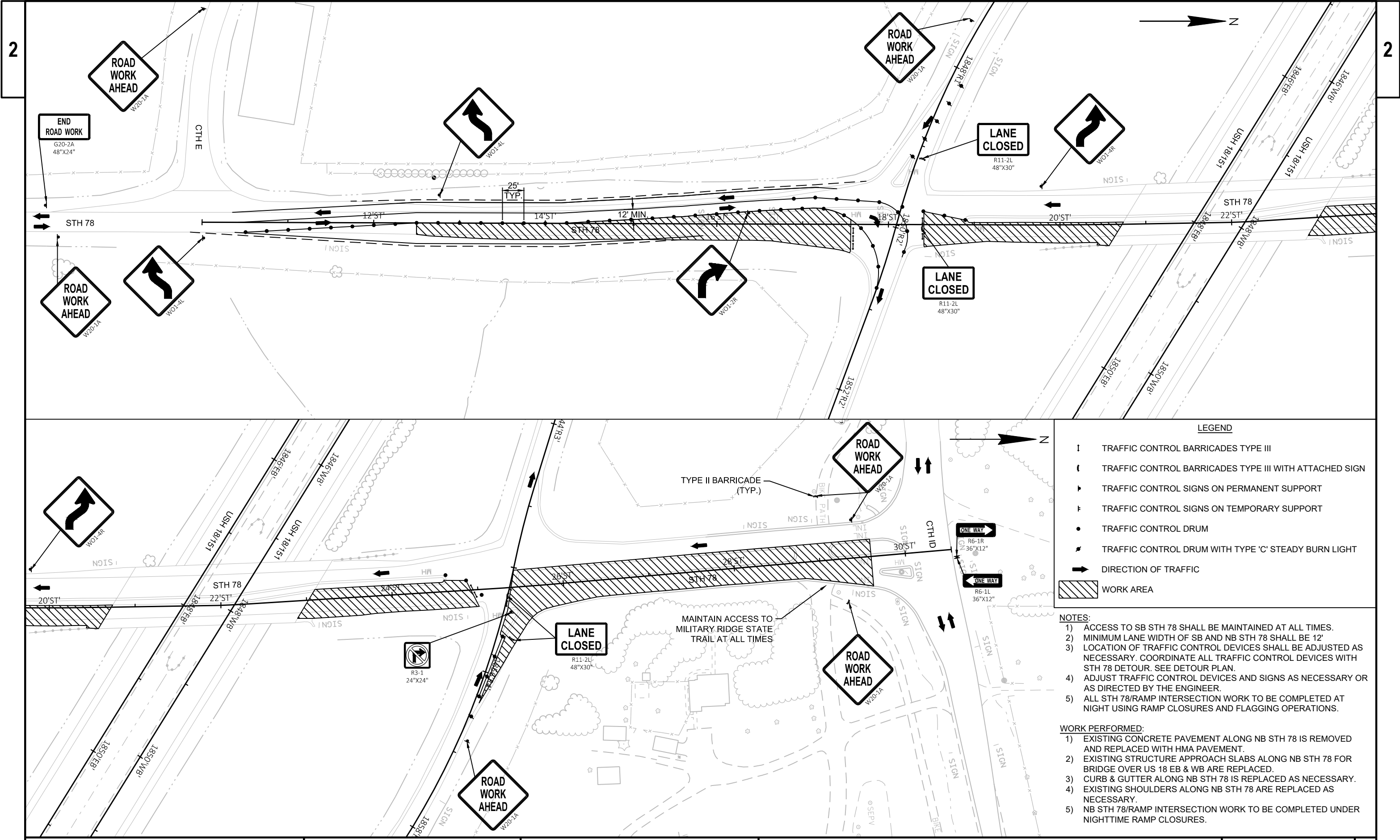
UPPER LAYER OVERLAY (OUTSIDE LANES AND SHOULDERS)

GRAVEL OUTSIDE SHOULDER, OUTSIDE GRADING WORK, GUARDRAIL INSTALLATION, OUTSIDE RUMBLE STRIPS, OUTSIDE LANE AND CENTERLINE PAVEMENT MARKING



CONSTRUCTION STAGE 7 TYPICAL SECTION
STA. 1630+49'EB' TO STA. 2051+24.02'EB'
MEDIAN LANES AND SHOULDERS CLOSED
MEDIAN RUMBLE STRIPS, MEDIAN LANE PAVEMENT MARKING





LEGEND

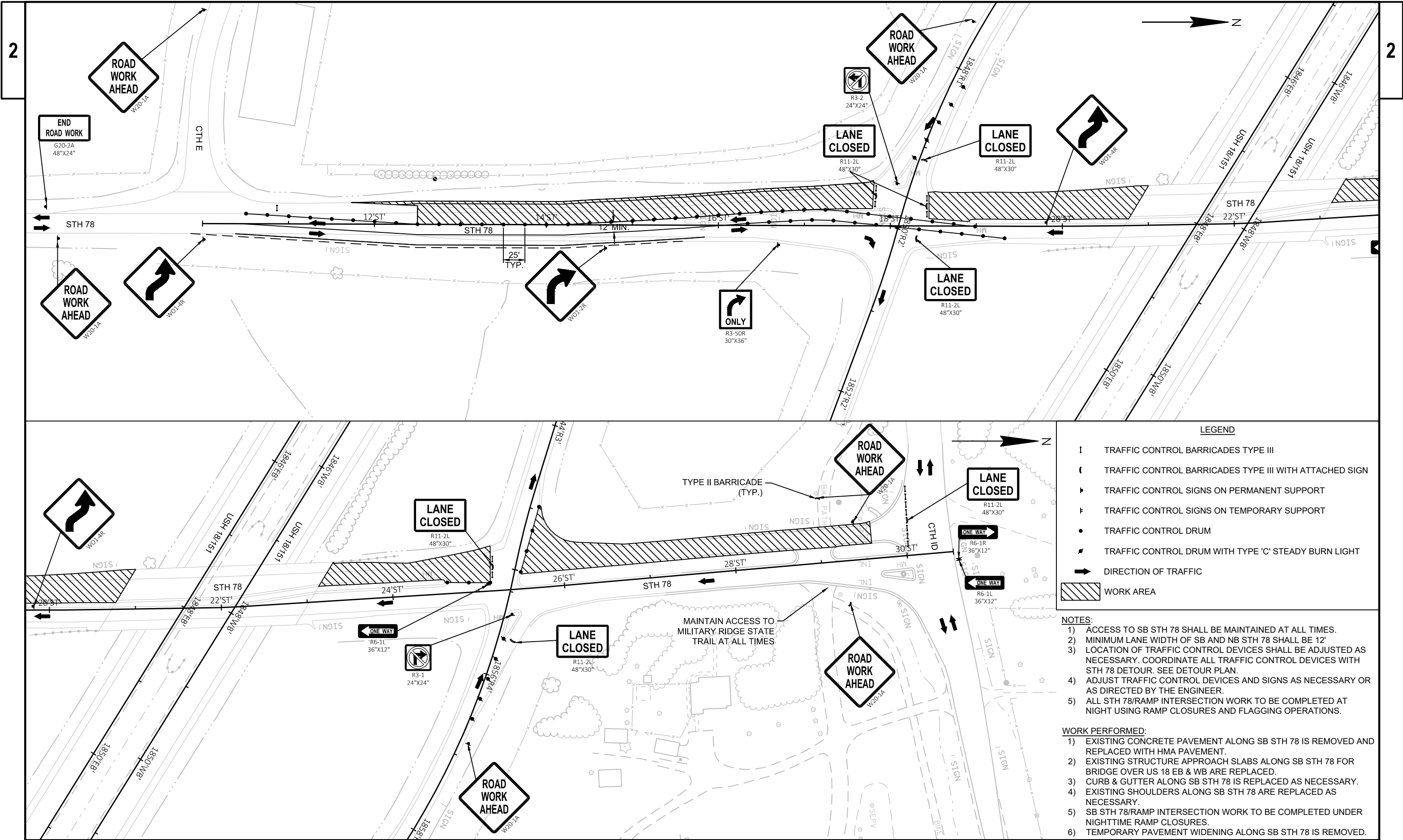
- TRAFFIC CONTROL BARRICADES TYPE III
- TRAFFIC CONTROL BARRICADES TYPE III WITH ATTACHED SIGN
- TRAFFIC CONTROL SIGNS ON PERMANENT SUPPORT
- TRAFFIC CONTROL SIGNS ON TEMPORARY SUPPORT
- TRAFFIC CONTROL DRUM
- TRAFFIC CONTROL DRUM WITH TYPE 'C' STEADY BURN LIGHT
- DIRECTION OF TRAFFIC
- WORK AREA

NOTES:

- ACCESS TO SB STH 78 SHALL BE MAINTAINED AT ALL TIMES.
- MINIMUM LANE WIDTH OF SB AND NB STH 78 SHALL BE 12'.
- LOCATION OF TRAFFIC CONTROL DEVICES SHALL BE ADJUSTED AS NECESSARY. COORDINATE ALL TRAFFIC CONTROL DEVICES WITH STH 78 DETOUR. SEE DETOUR PLAN.
- ADJUST TRAFFIC CONTROL DEVICES AND SIGNS AS NECESSARY OR AS DIRECTED BY THE ENGINEER.
- ALL STH 78/RAMP INTERSECTION WORK TO BE COMPLETED AT NIGHT USING RAMP CLOSURES AND FLAGGING OPERATIONS.

WORK PERFORMED:

- EXISTING CONCRETE PAVEMENT ALONG NB STH 78 IS REMOVED AND REPLACED WITH HMA PAVEMENT.
- EXISTING STRUCTURE APPROACH SLABS ALONG NB STH 78 FOR BRIDGE OVER US 18 EB & WB ARE REPLACED.
- CURB & GUTTER ALONG NB STH 78 IS REPLACED AS NECESSARY.
- EXISTING SHOULDERS ALONG NB STH 78 ARE REPLACED AS NECESSARY.
- NB STH 78/RAMP INTERSECTION WORK TO BE COMPLETED UNDER NIGHTTIME RAMP CLOSURES.



PROJECT NO: 1204-05-73

HWY: USH 18

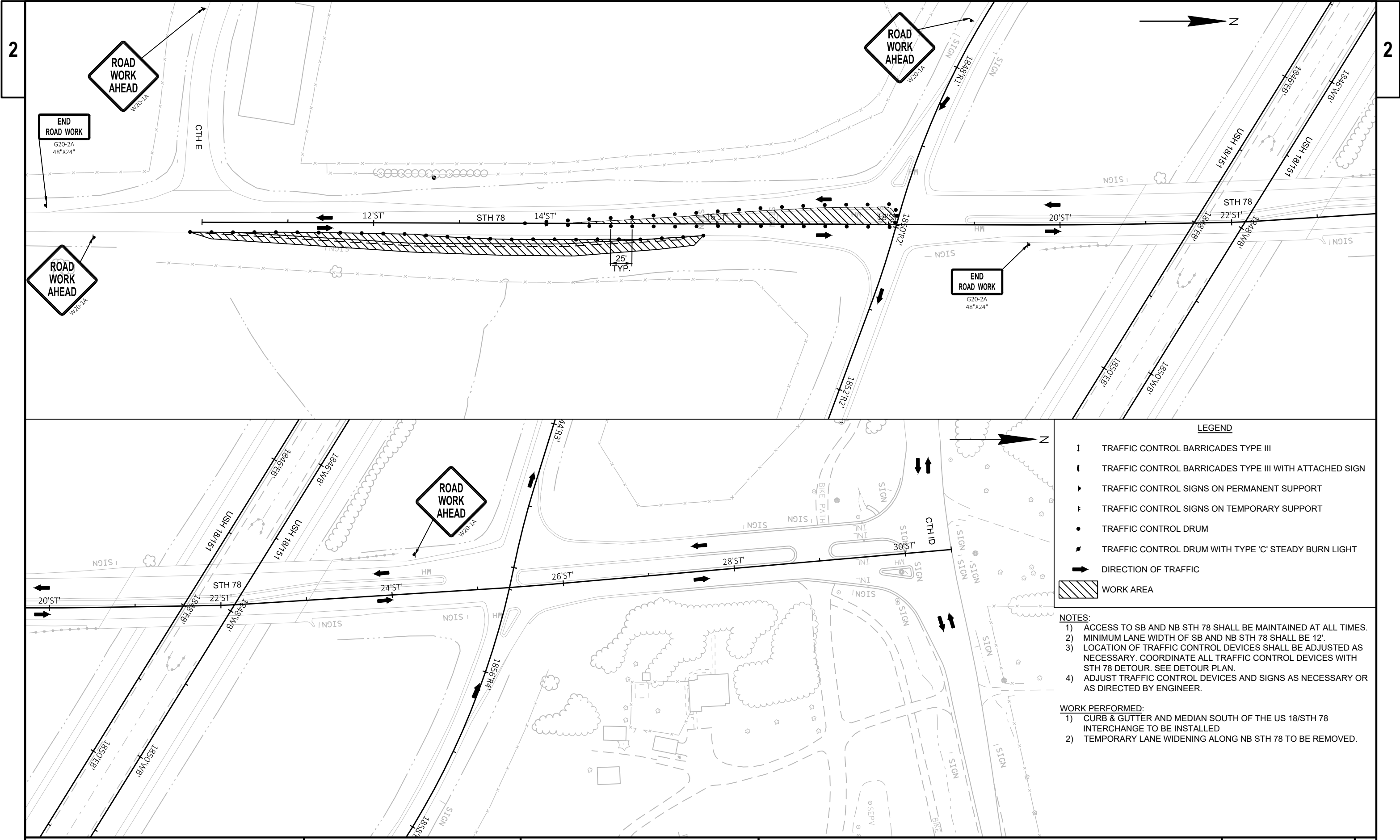
COUNTY: DANE

STAGE CONSTRUCTION - STH 78 - STAGE 3

SHEET

75

E



LEGEND

TRAFFIC CONTROL BARRICADES TYPE III

TRAFFIC CONTROL BARRICADES TYPE III WITH ATTACHED SIGN

TRAFFIC CONTROL SIGNS ON PERMANENT SUPPORT

TRAFFIC CONTROL SIGNS ON TEMPORARY SUPPORT

TRAFFIC CONTROL DRUM

TRAFFIC CONTROL DRUM WITH TYPE 'C' STEADY BURN LIGHT

DIRECTION OF TRAFFIC

WORK AREA

- NOTES:
- ACCESS TO SB AND NB STH 78 SHALL BE MAINTAINED AT ALL TIMES.

MINIMUM LANE WIDTH OF SB AND NB STH 78 SHALL BE 12'.

LOCATION OF TRAFFIC CONTROL DEVICES SHALL BE ADJUSTED AS NECESSARY. COORDINATE ALL TRAFFIC CONTROL DEVICES WITH STH 78 DETOUR. SEE DETOUR PLAN.

ADJUST TRAFFIC CONTROL DEVICES AND SIGNS AS NECESSARY OR AS DIRECTED BY ENGINEER.
- WORK PERFORMED:
- CURB & GUTTER AND MEDIAN SOUTH OF THE US 18/STH 78 INTERCHANGE TO BE INSTALLED

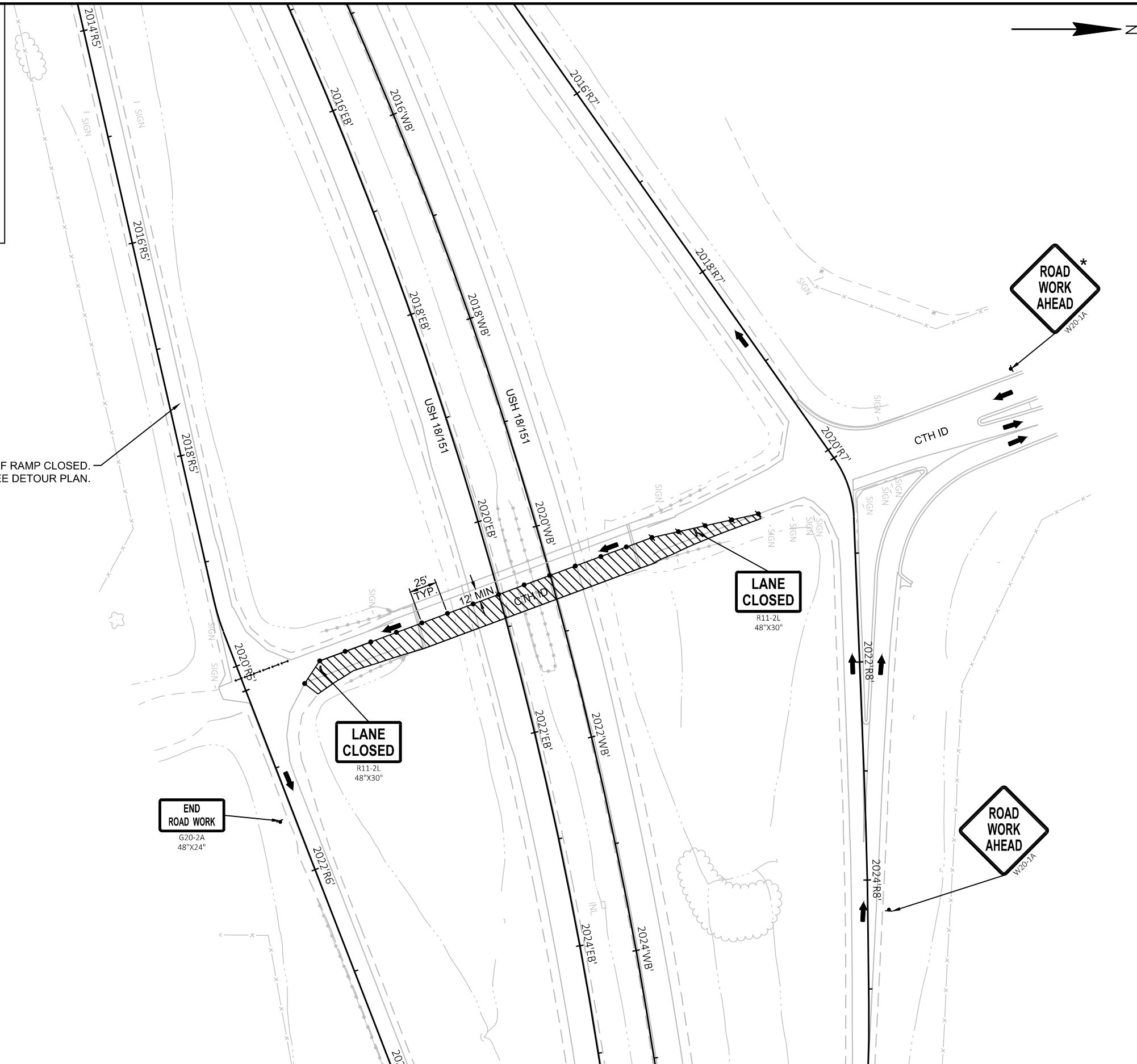
TEMPORARY LANE WIDENING ALONG NB STH 78 TO BE REMOVED.

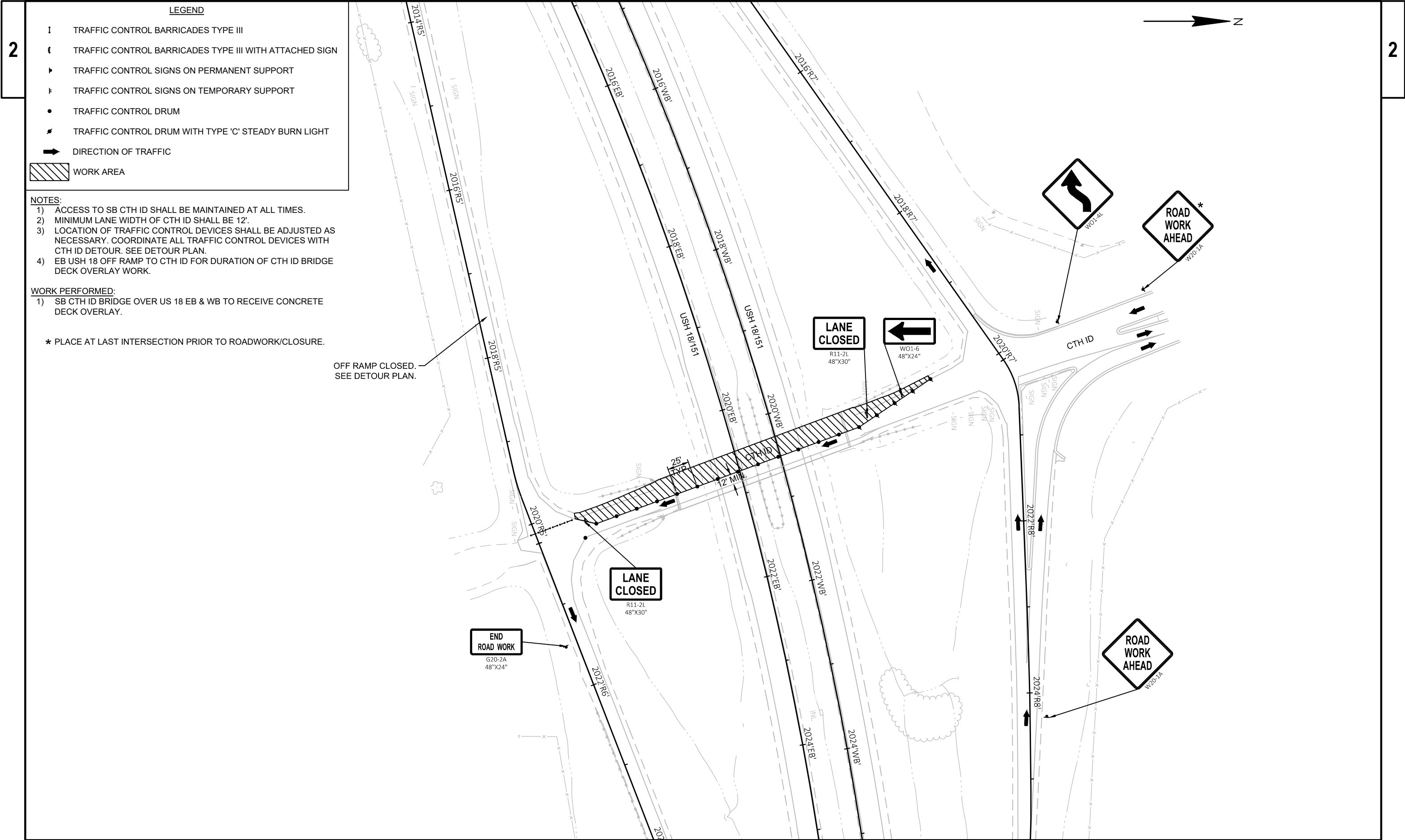
	TRAFFIC CONTROL BARRICADES TYPE III
	TRAFFIC CONTROL BARRICADES TYPE III WITH ATTACHED SIGN
	TRAFFIC CONTROL SIGNS ON PERMANENT SUPPORT
	TRAFFIC CONTROL SIGNS ON TEMPORARY SUPPORT
	TRAFFIC CONTROL DRUM
	TRAFFIC CONTROL DRUM WITH TYPE 'C' STEADY BURN LIGHT
	DIRECTION OF TRAFFIC
	WORK AREA

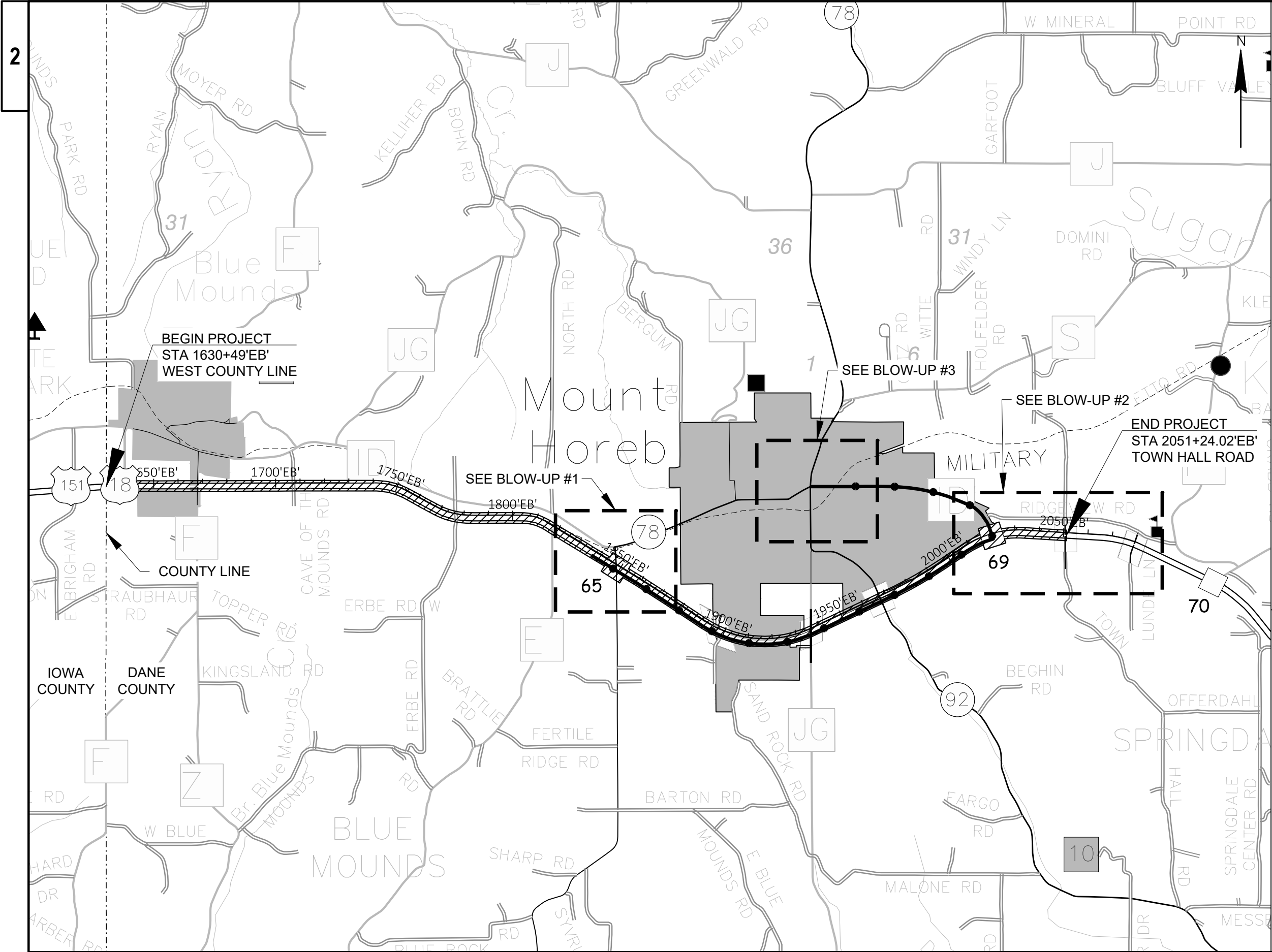
- 1) ACCESS TO SB CTH ID SHALL BE MAINTAINED AT ALL TIMES.
- 2) MINIMUM LANE WIDTH OF CTH ID SHALL BE 12'.
- 3) LOCATION OF TRAFFIC CONTROL DEVICES SHALL BE ADJUSTED AS NECESSARY. COORDINATE ALL TRAFFIC CONTROL DEVICES WITH CTH ID DETOUR. SEE DETOUR PLAN.
- 4) EB USH 18 OFF RAMP TO CTH ID FOR DURATION OF CTH ID BRIDGE DECK OVERLAY WORK.

1) NB CTH ID BRIDGE OVER US 18 EB & WB TO RECEIVE CONCRETE DECK OVERLAY.

* PLACE AT LAST INTERSECTION PRIOR TO ROADWORK/CLOSURE.







DETOUR GENERAL NOTES

THE STH 78 DETOUR AND CTH ID DETOUR SHALL NOT OCCUR AT THE SAME TIME.

SB STH 78 ACCESS SHALL BE MAINTAINED AT ALL TIMES WHILE STH 78 DETOUR IS IN EFFECT. ALL RAMPS TO THE US18/US151/STH 78 INTERCHANGE AND THE US18/US151/CTH ID INTERCHANGE SHALL REMAIN OPEN AT ALL TIMES DURING STH 78 DETOUR.

THE EXACT LOCATION AND SPACING OF ALL SIGNS AND DEVICES SHALL BE ADJUSTED TO FIT FIELD CONDITIONS AS APPROVED BY THE ENGINEER.

ALL SIGNS INAPPROPRIATE TO THE STATUS OF THE TRAFFIC CONTROL PLAN, INCLUDING PRE-EXISTING SIGNING IN THE VICINITY, SHALL BE COVERED OR REMOVED AS SPECIFIED IN THE PLANS AND/OR AS DIRECTED BY THE ENGINEER.

ALL "W" AND "WO" SIGNS SHALL BE 48" X48" UNLESS OTHERWISE NOTED AND SHALL HAVE REFLECTIVE FLUORESCENT DIAMOND GRADE SHEETING.

"WO" SIGNS ARE THE SAME AS "W" SIGNS EXCEPT THAT THE BACKGROUND IS ORANGE.

ALL M3 SERIES SIGNS (NORTH, EAST, SOUTH, WEST) WHICH ARE PART OF ANY DETOUR ROUTE MARKER SIGNING ASSEMBLY OR ATTACHED TO ANY WARNING SIGN SHALL BE BLACK LETTERING ON A WHITE BACKGROUND.

ALL M05 AND M06 ARROW SIGNS SHALL BE THE SAME AS "M" SIGNS EXCEPT THAT THE BACKGROUND IS ORANGE.

SIGNS SHALL BE PLACED A MINIMUM OF 10 CALENDAR DAYS PRIOR TO CONSTRUCTION AND COVERED UNTIL NEEDED. COVERED SIGNS ARE INCIDENTAL TO ITEM DETOUR SIGNS PAID AS COVERING SIGNS TYPE 1/TYPE 2.

PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) SHALL BE PLACED A MINIMUM OF 10 DAYS PRIOR TO CONSTRUCTION. CONTACT SW REGION TRAFFIC TEAM LEADER FOR MESSAGES.

SEE S.D.D TRAFFIC CONTROL, GUIDANCE SIGNING FOR ON-RAMP CLOSURES & TRAFFIC CONTROL, GUIDANCE SIGNING FOR OFF-RAMP CLOSURES.

LEGEND

- STH 78 DETOUR ROUTE
- ▨ WORK ZONE

PROJECT NO: 1204-05-73

HWY: USH 18

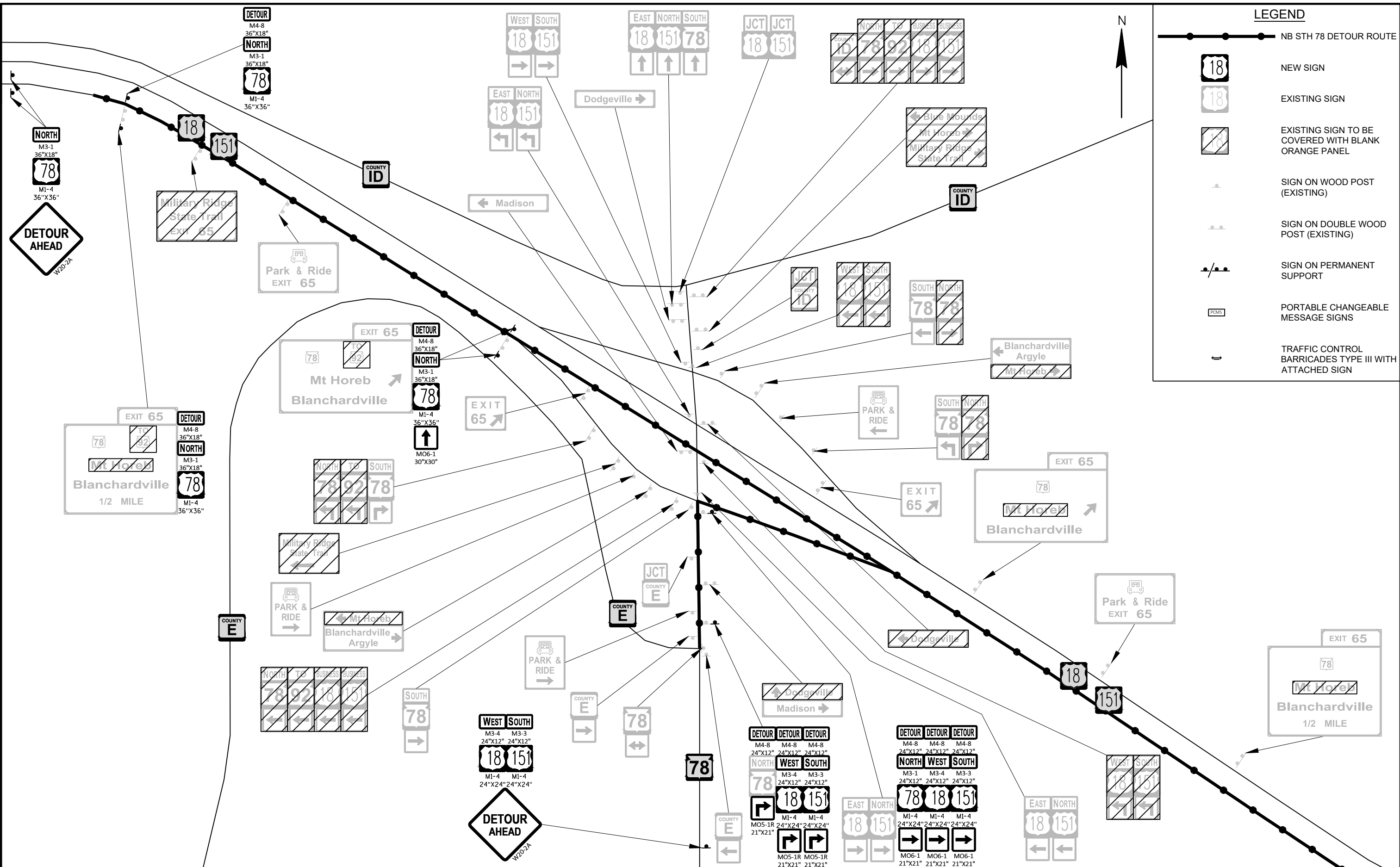
COUNTY: DANE

DETOUR PLAN - STH 78 DETOUR OVERVIEW

SHEET

79

E



PROJECT NO:	1204-05-73
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HWY: USH 18

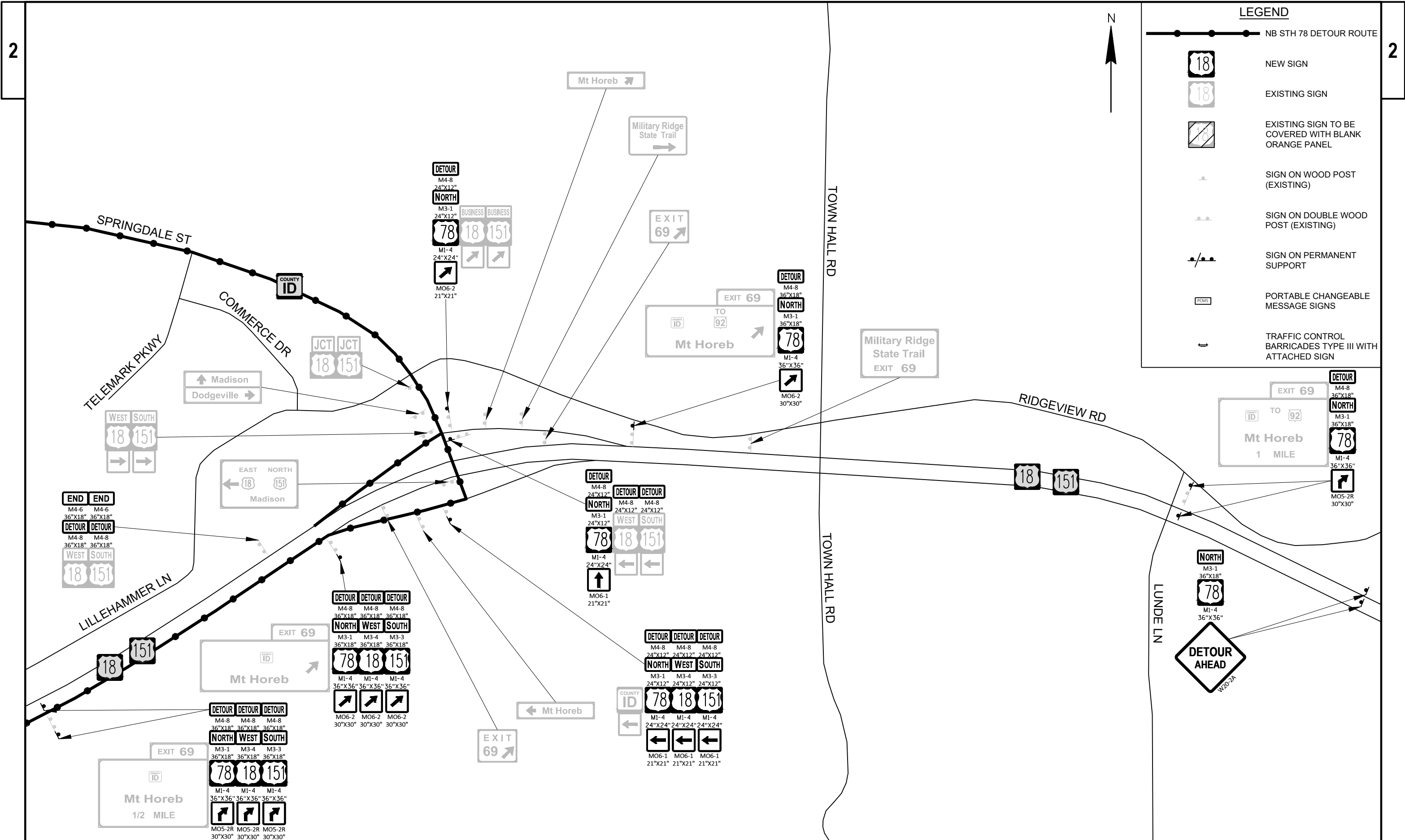
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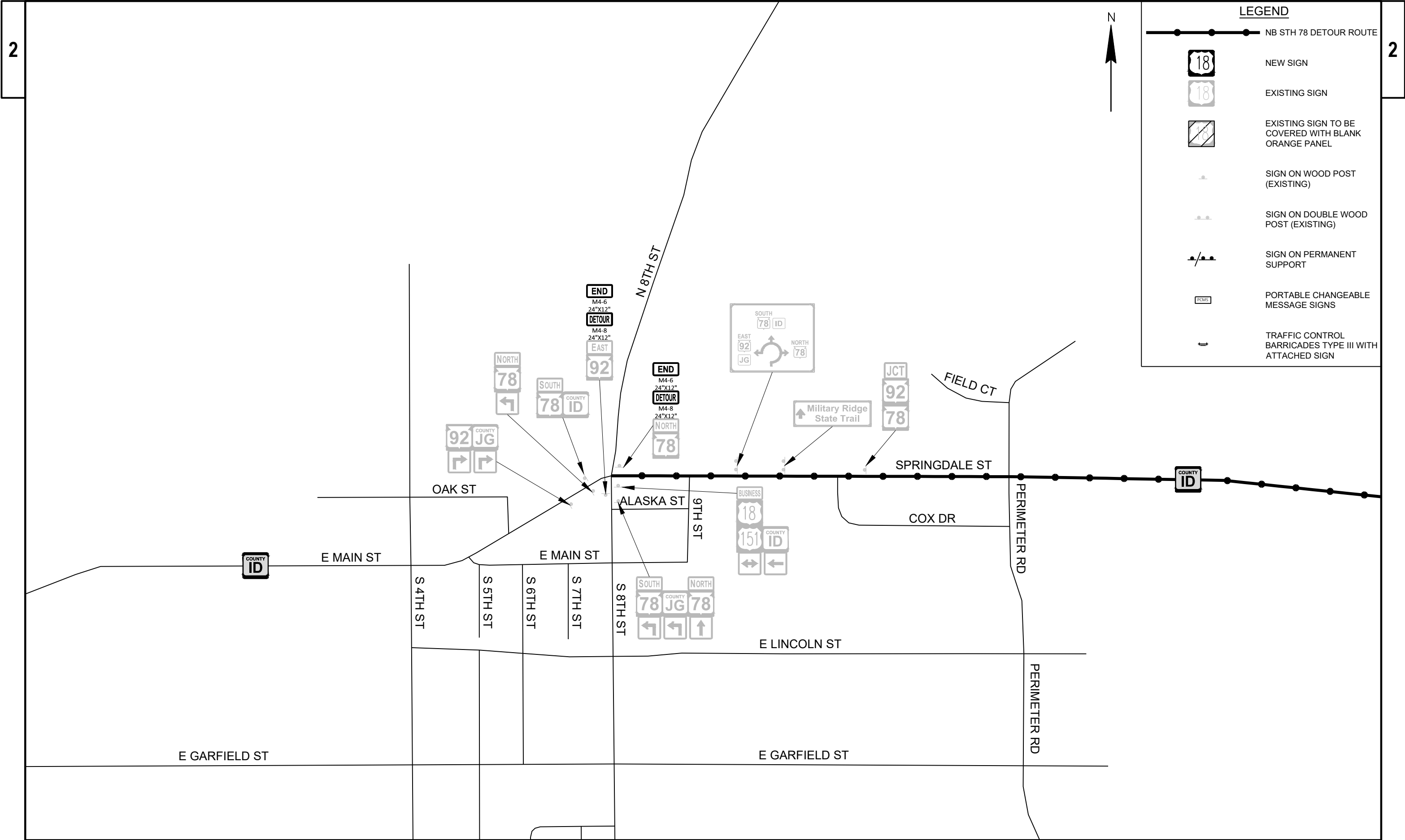
DETOUR PLAN - BLOW-UP #1 DETAIL

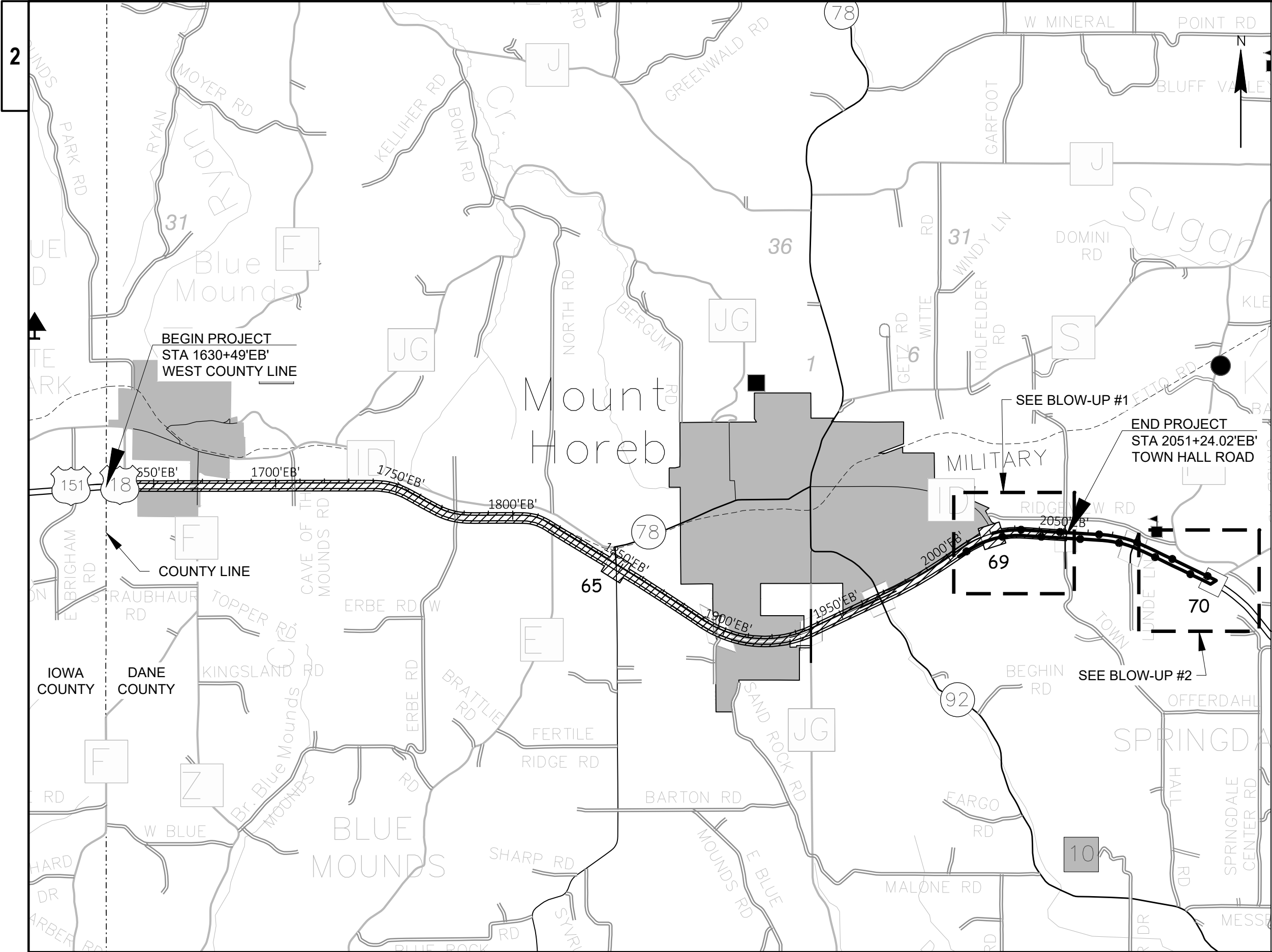
SHEET

80

T







DETOUR GENERAL NOTES

THE STH 78 DETOUR AND CTH ID DETOUR SHALL NOT OCCUR AT THE SAME TIME.

SB CTH ID ACCESS SHALL BE MAINTAINED AT ALL TIMES WHILE CTH ID DETOUR IS IN EFFECT. THE EB US 18/US 151 OFF RAMP TO THE US 18/US 151/CTH ID INTERCHANGE SHALL REMAIN CLOSED DURING CTH ID DETOUR. ALL REMAINING RAMPS TO THE US18/US151/CTH ID INTERCHANGE SHALL REMAIN OPEN AT ALL TIMES DURING CTH ID DETOUR.

THE EXACT LOCATION AND SPACING OF ALL SIGNS AND DEVICES SHALL BE ADJUSTED TO FIT FIELD CONDITIONS AS APPROVED BY THE ENGINEER.

ALL SIGNS INAPPROPRIATE TO THE STATUS OF THE TRAFFIC CONTROL PLAN, INCLUDING PRE-EXISTING SIGNING IN THE VICINITY, SHALL BE COVERED OR REMOVED AS SPECIFIED IN THE PLANS AND/OR AS DIRECTED BY THE ENGINEER.

ALL "W" AND "WO" SIGNS SHALL BE 48" X48" UNLESS OTHERWISE NOTED AND SHALL HAVE REFLECTIVE FLUORESCENT DIAMOND GRADE SHEETING.

"WO" SIGNS ARE THE SAME AS "W" SIGNS EXCEPT THAT THE BACKGROUND IS ORANGE.

ALL M3 SERIES SIGNS (NORTH, EAST, SOUTH, WEST) WHICH ARE PART OF ANY DETOUR ROUTE MARKER SIGNING ASSEMBLY OR ATTACHED TO ANY WARNING SIGN SHALL BE BLACK LETTERING ON A WHITE BACKGROUND.

ALL MO5 AND MO6 ARROW SIGNS SHALL BE THE SAME AS "M" SIGNS EXCEPT THAT THE BACKGROUND IS ORANGE.

SIGNS SHALL BE PLACED A MINIMUM OF 10 CALENDAR DAYS PRIOR TO CONSTRUCTION AND COVERED UNTIL NEEDED. COVERED SIGNS ARE INCIDENTAL TO ITEM DETOUR SIGNS PAID AS COVERING SIGNS TYPE 1/TYPE 2.

PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) SHALL BE PLACED A MINIMUM OF 10 DAYS PRIOR TO CONSTRUCTION. CONTACT SW REGION TRAFFIC TEAM LEADER FOR MESSAGES.

SEE S.D.D TRAFFIC CONTROL, GUIDANCE SIGNING FOR ON-RAMP CLOSURES & TRAFFIC CONTROL, GUIDANCE SIGNING FOR OFF-RAMP CLOSURES.

LEGEND

- CTH ID DETOUR ROUTE
- WORK ZONE

PROJECT NO: 1204-05-73

HWY: USH 18

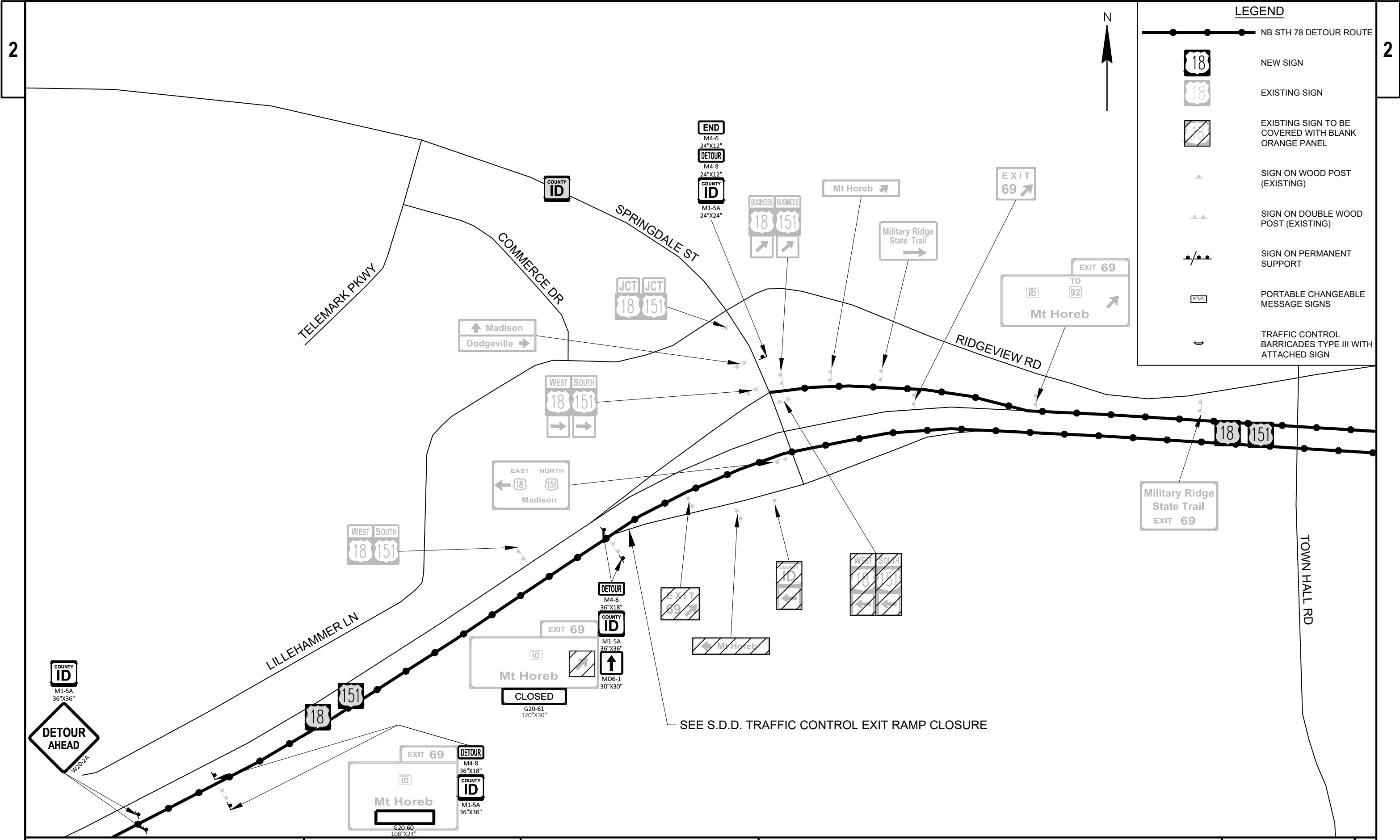
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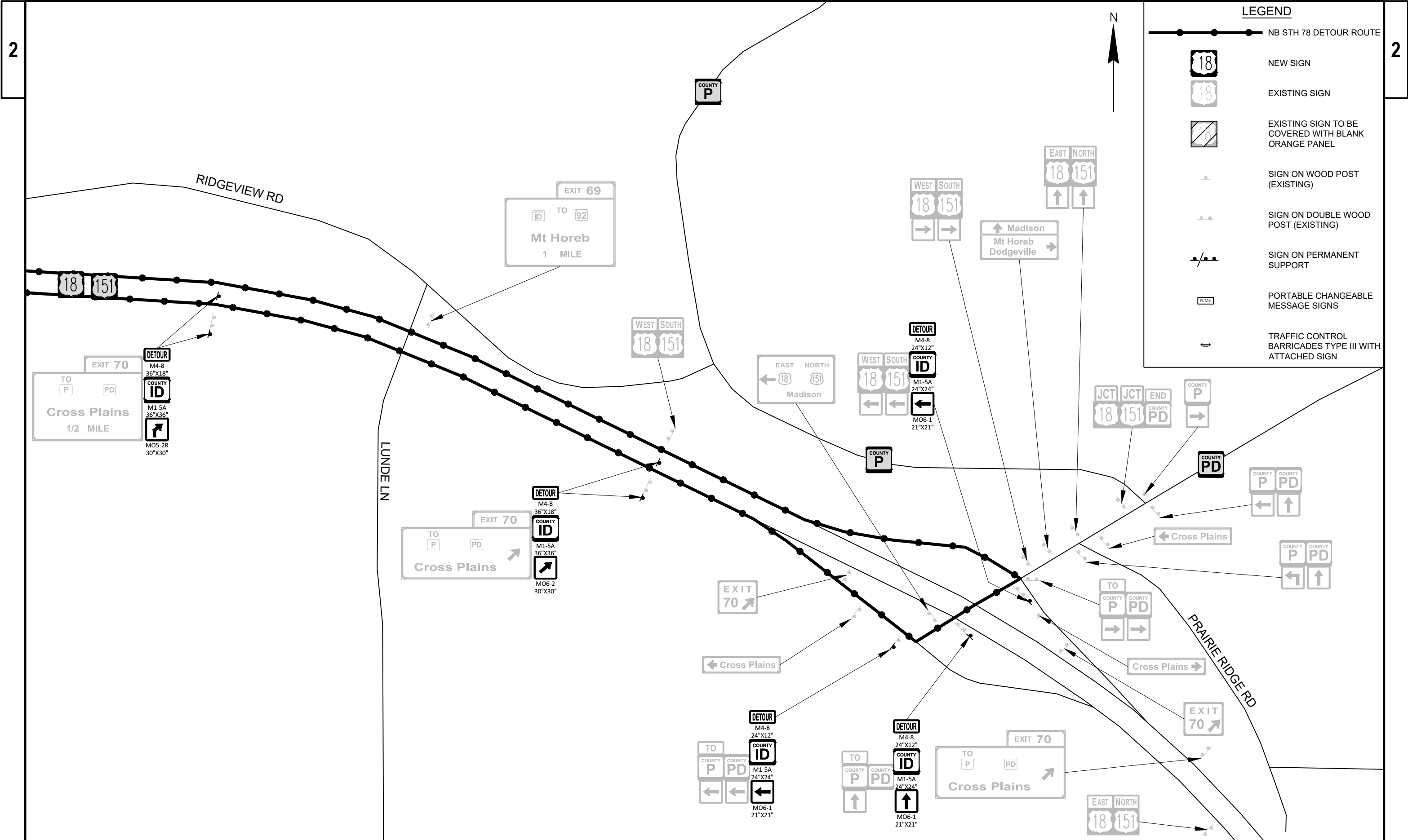
DETOUR PLAN - CTH ID DETOUR OVERVIEW

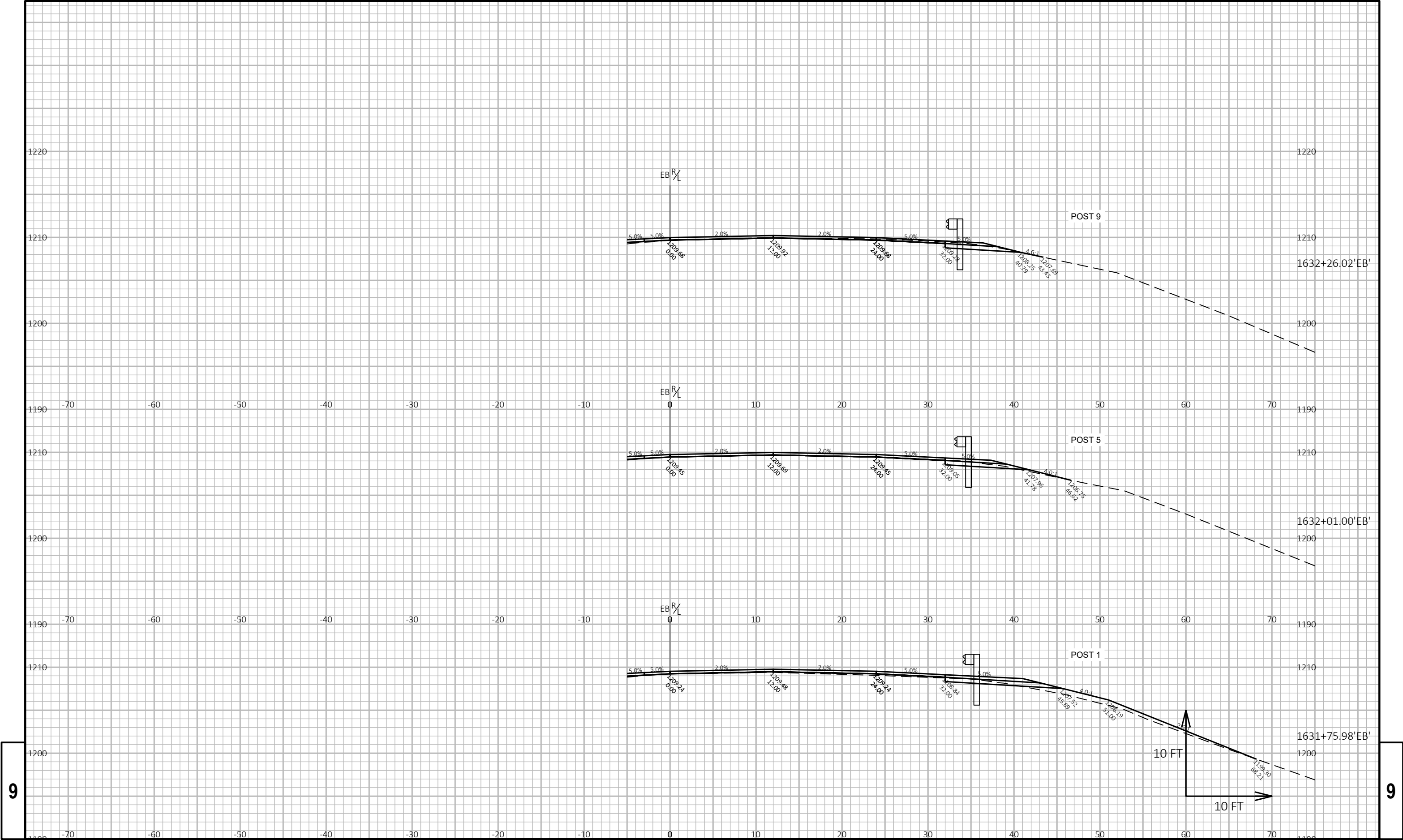
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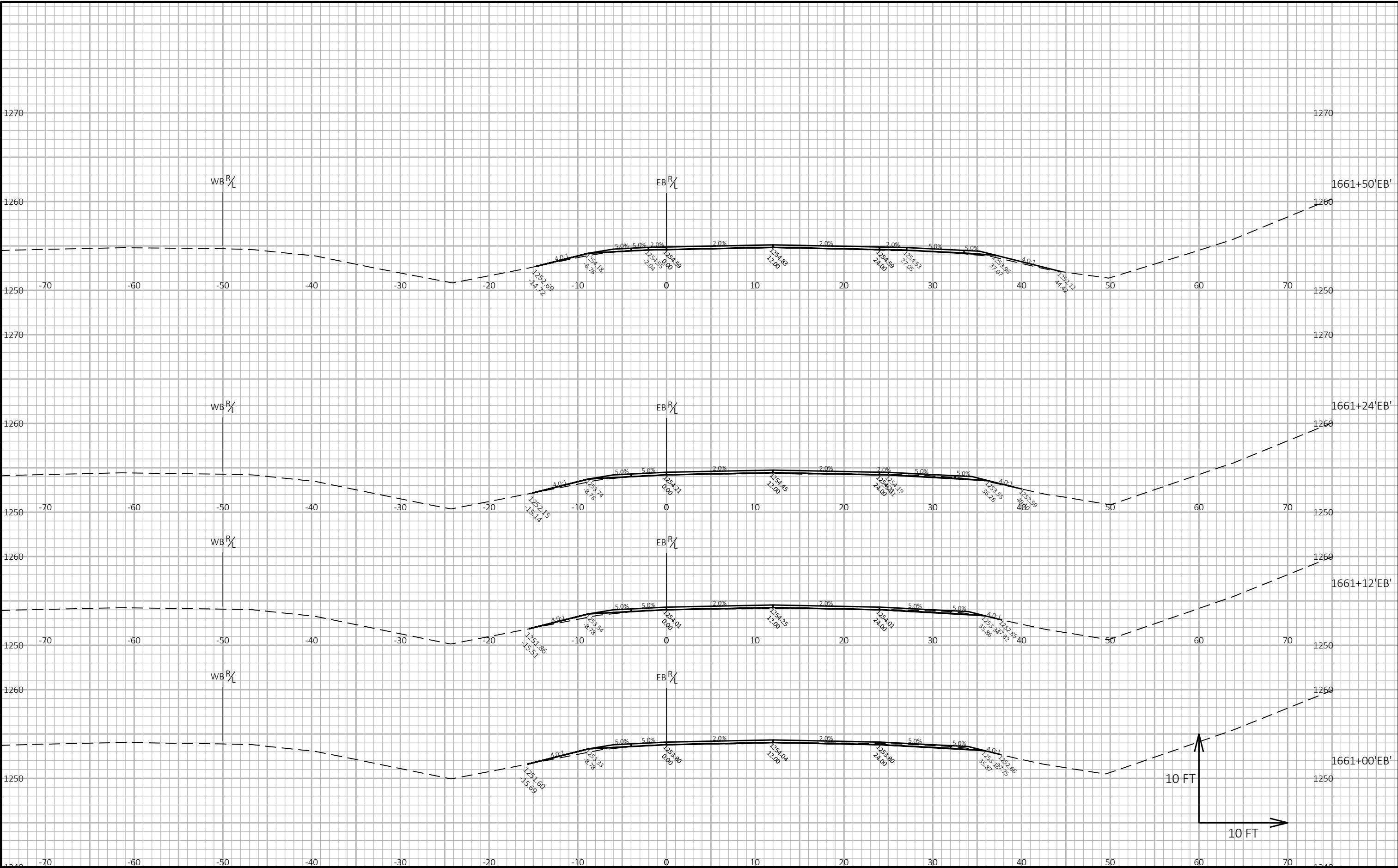
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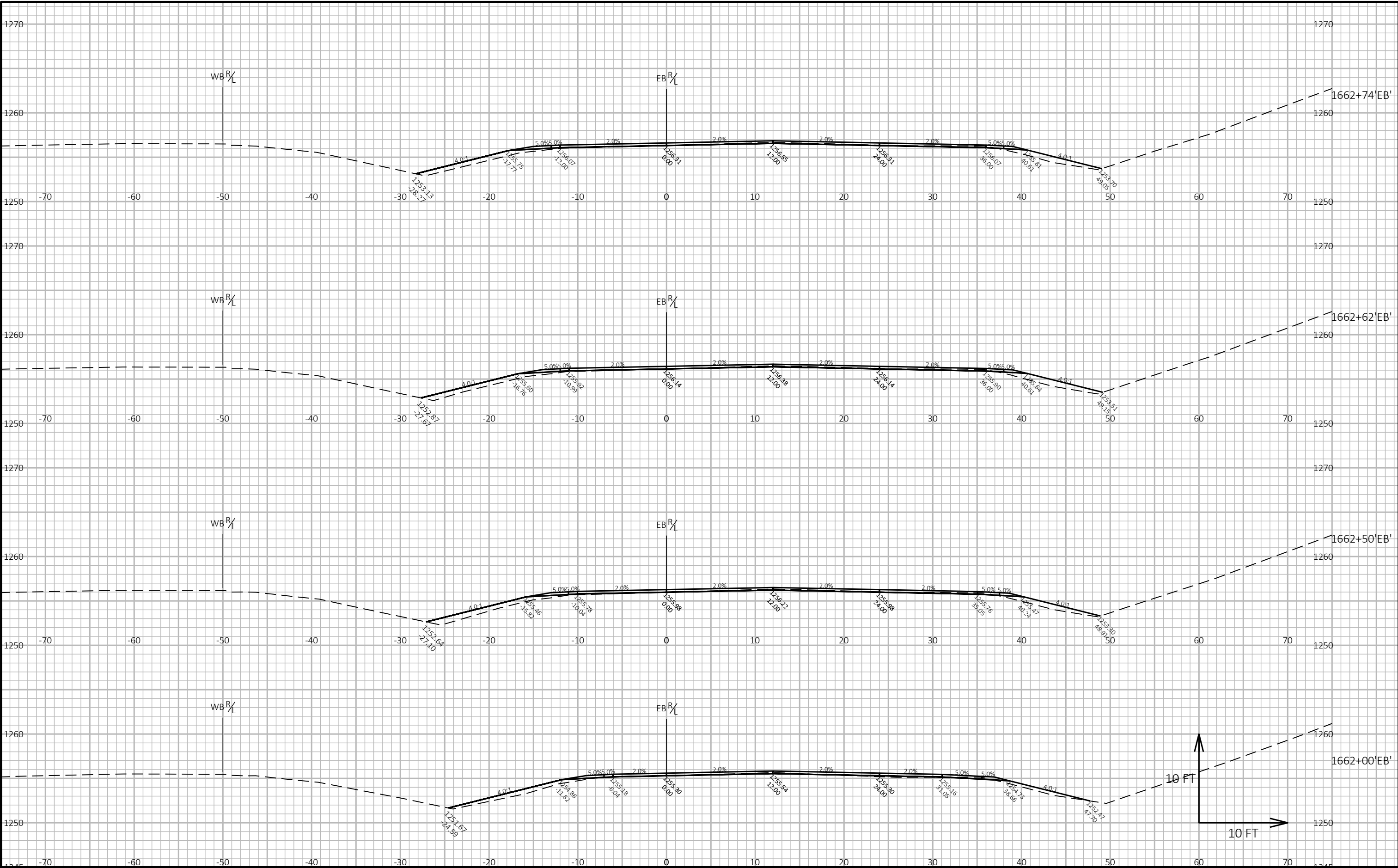
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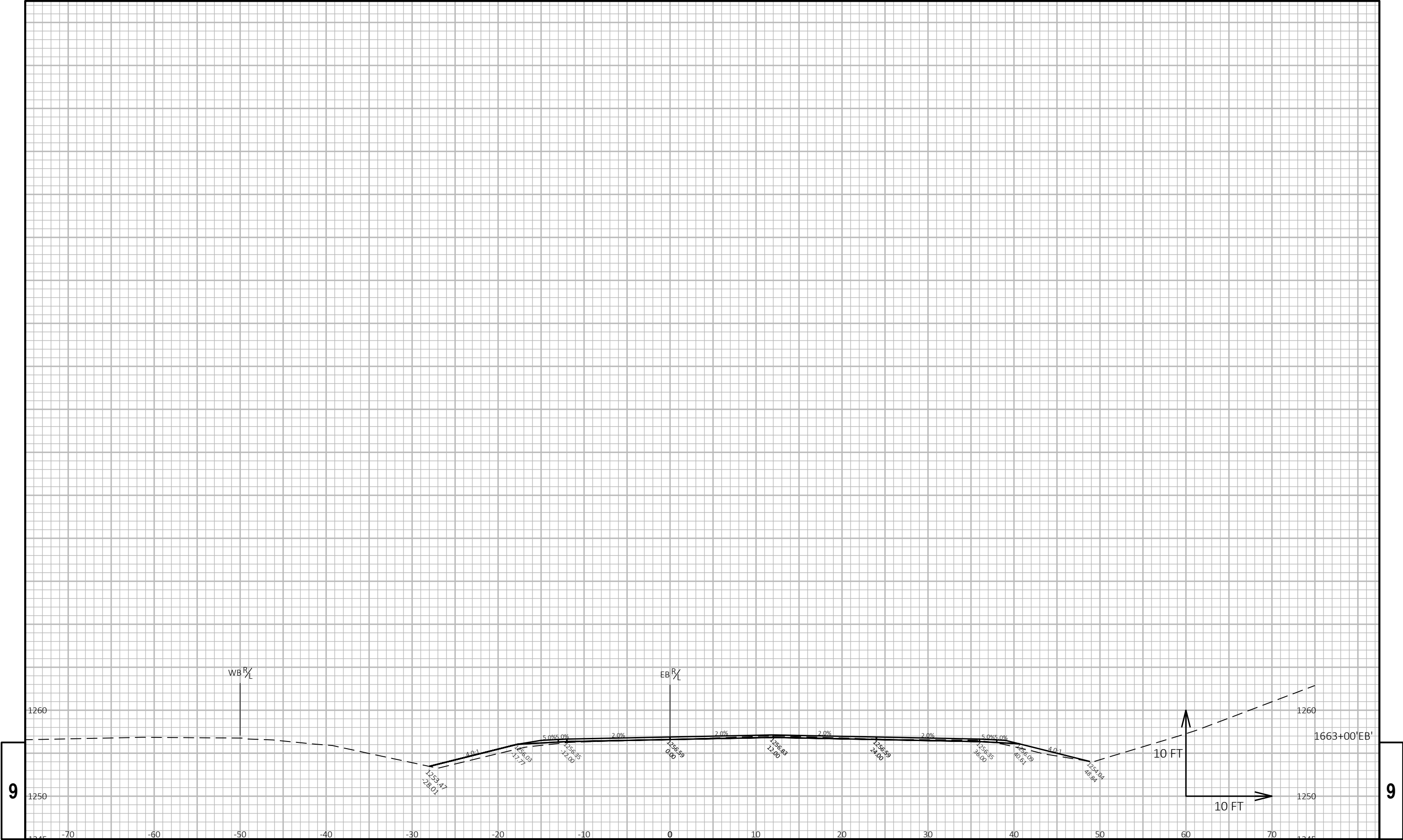


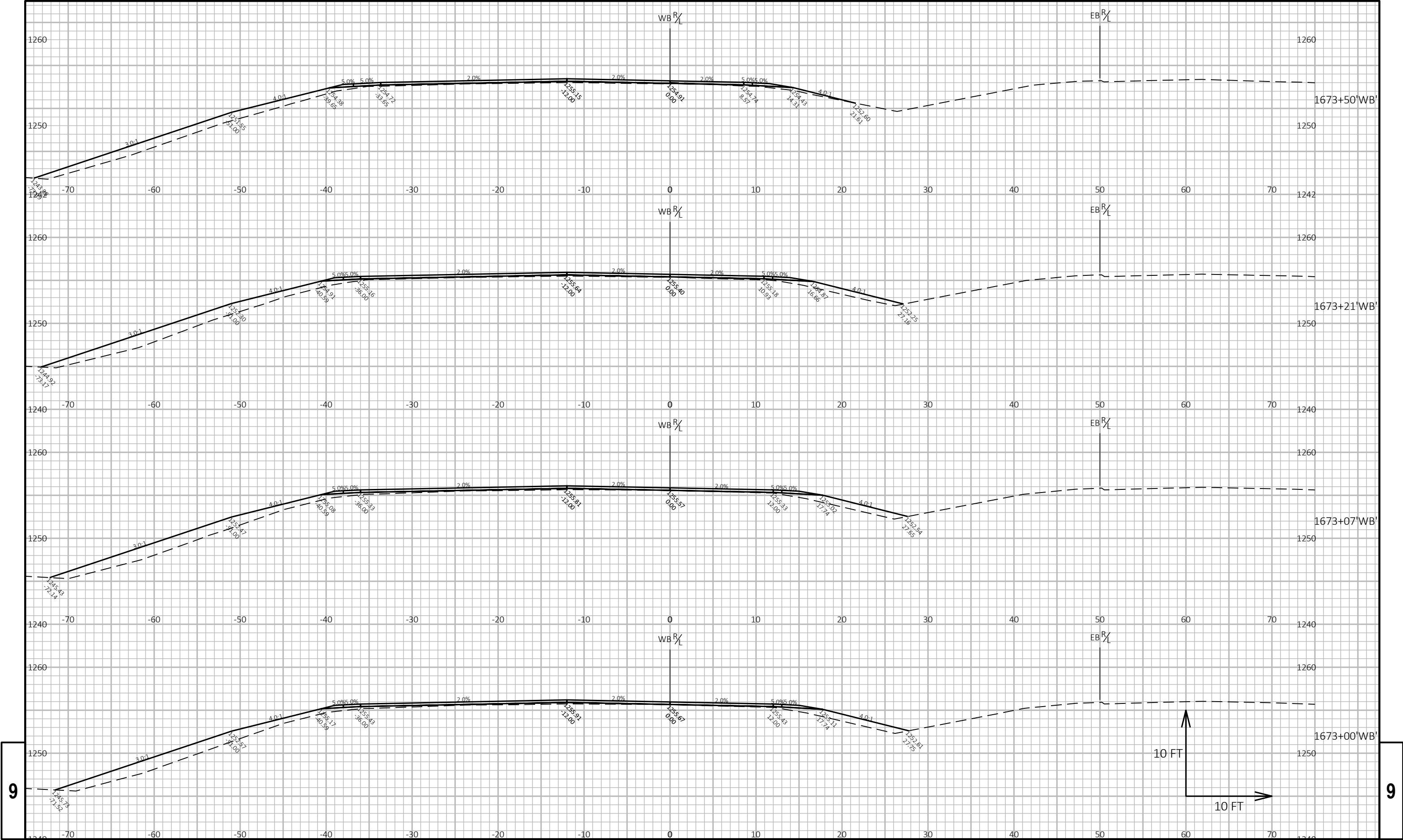


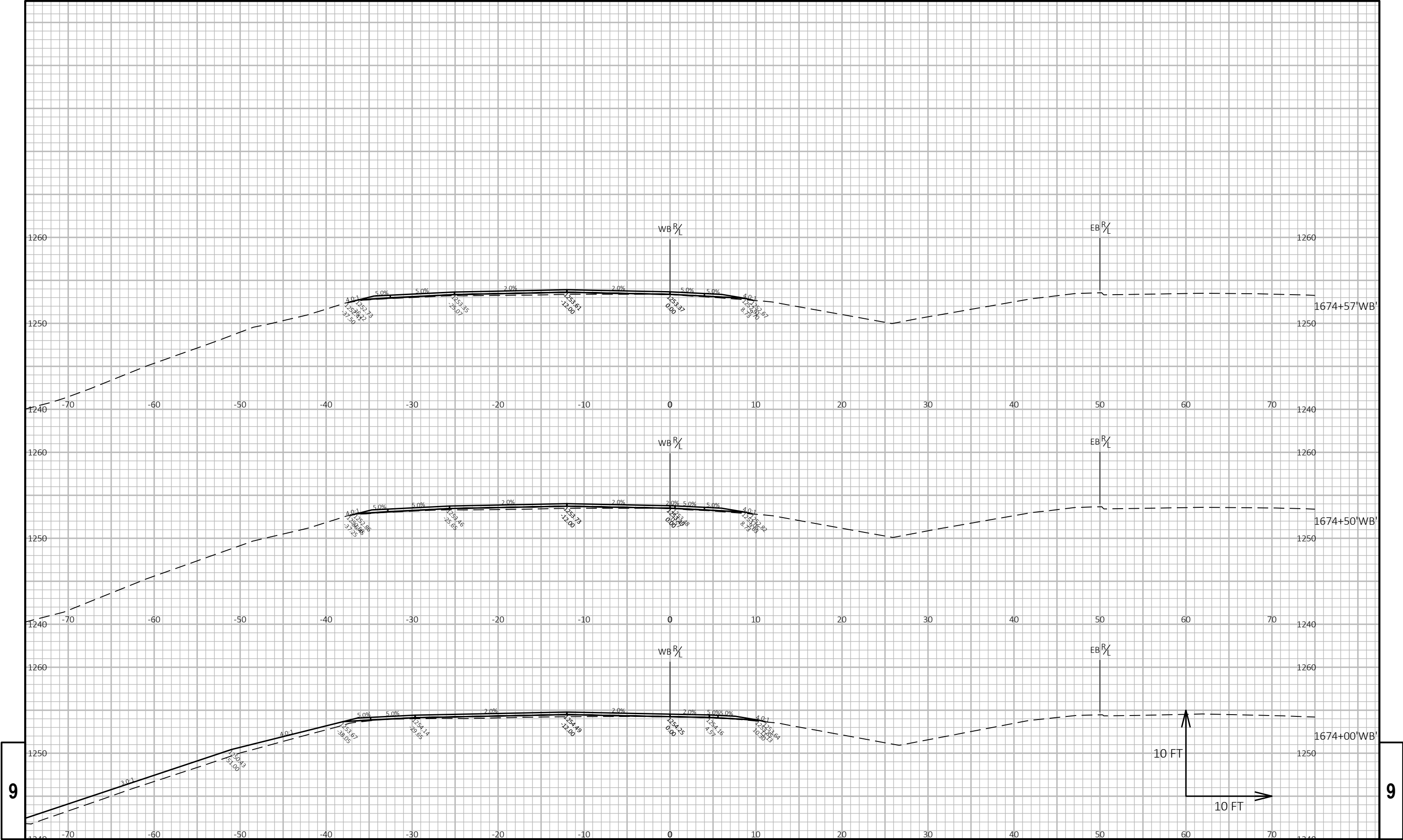
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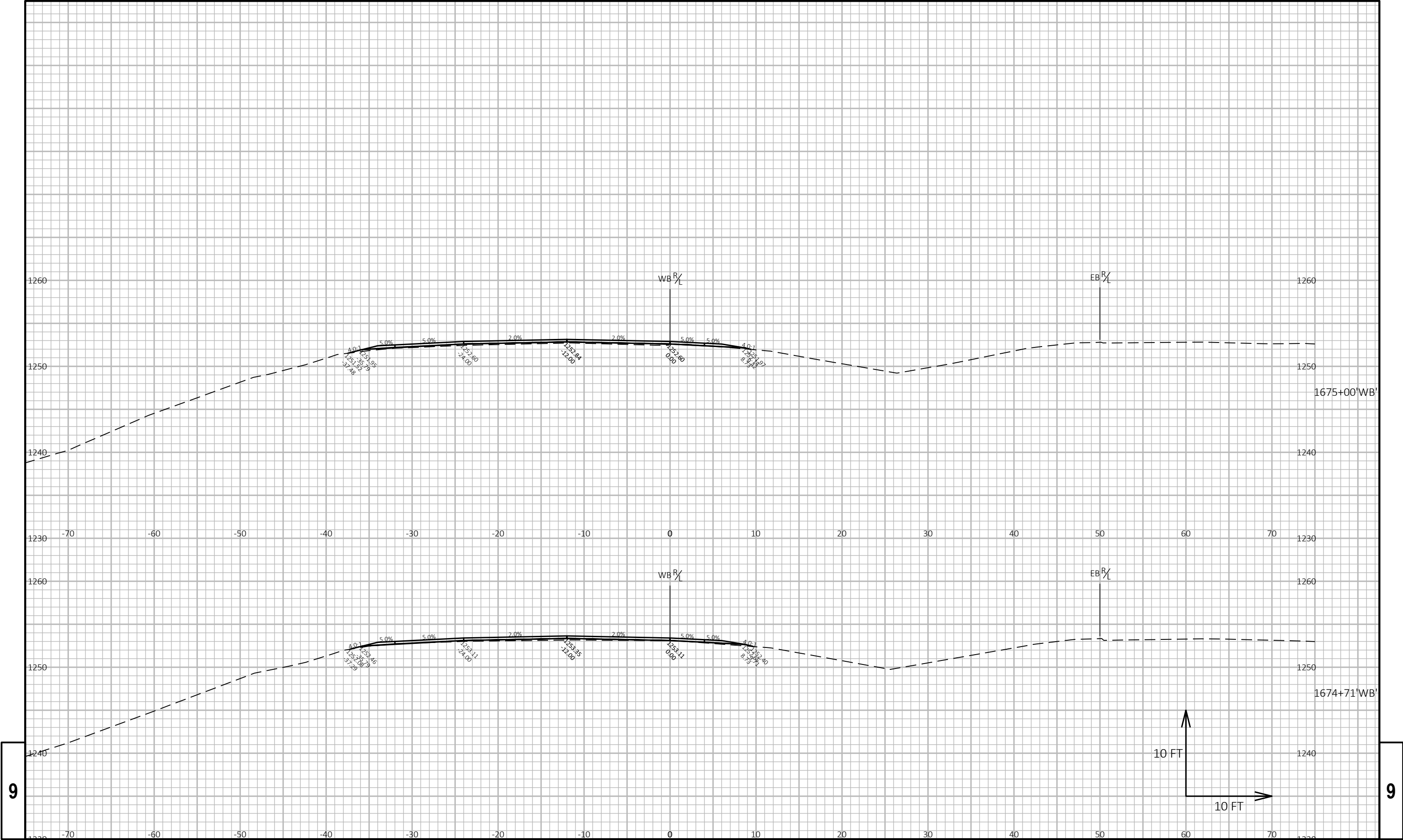
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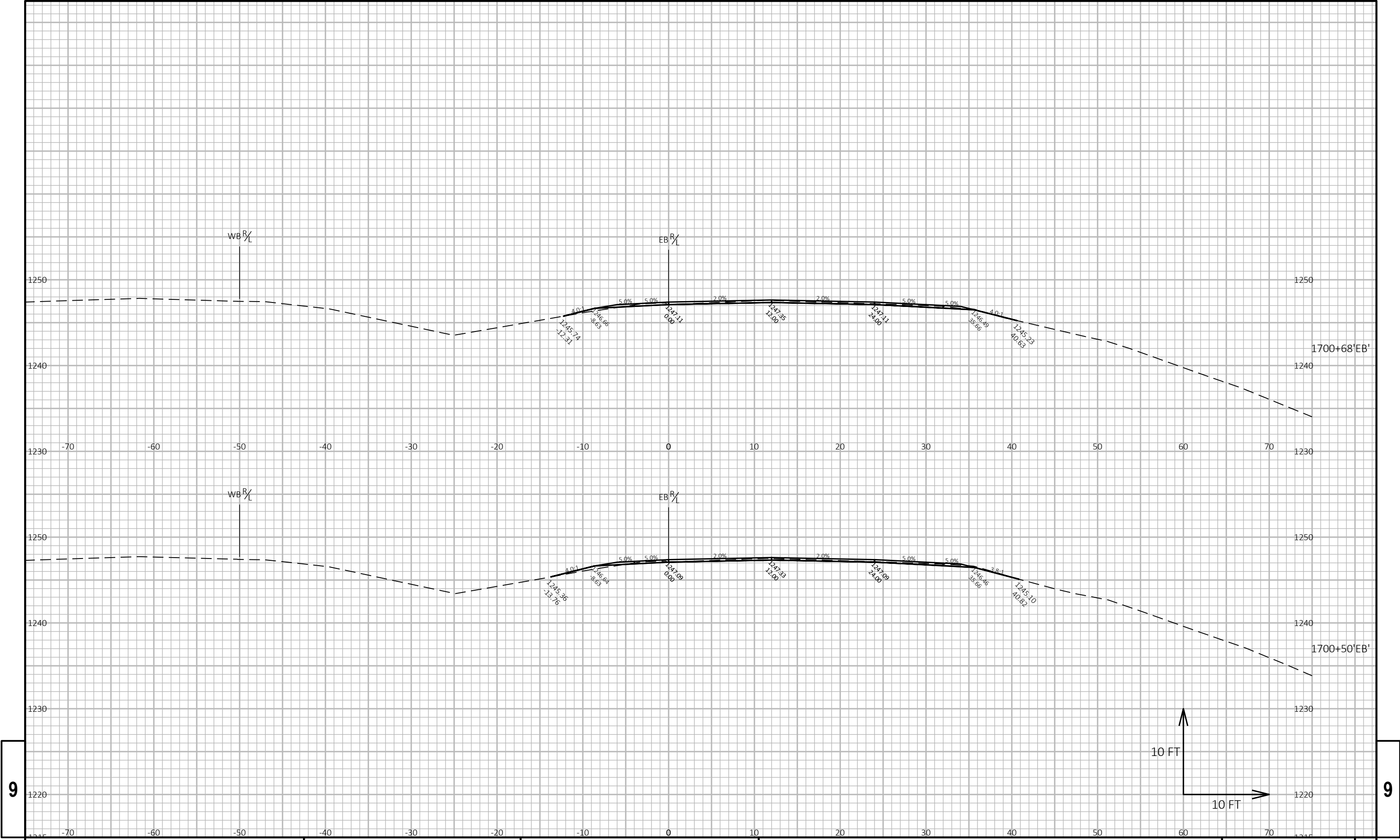
PROJECT NO: 1204-05-73	HWY: USH 18	COUNTY: DANE	CROSS SECTIONS: USH 18	SHEET 88	E
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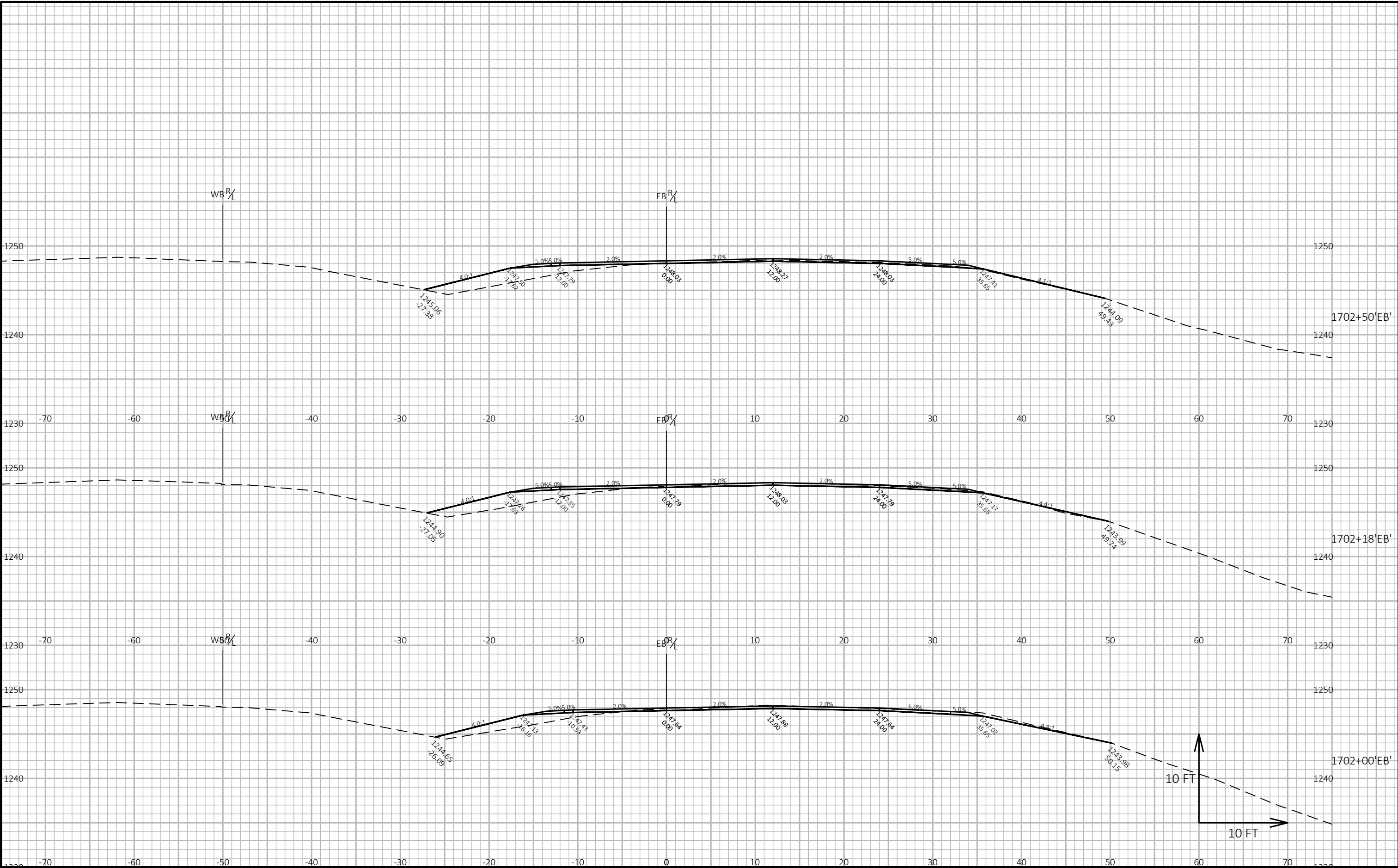


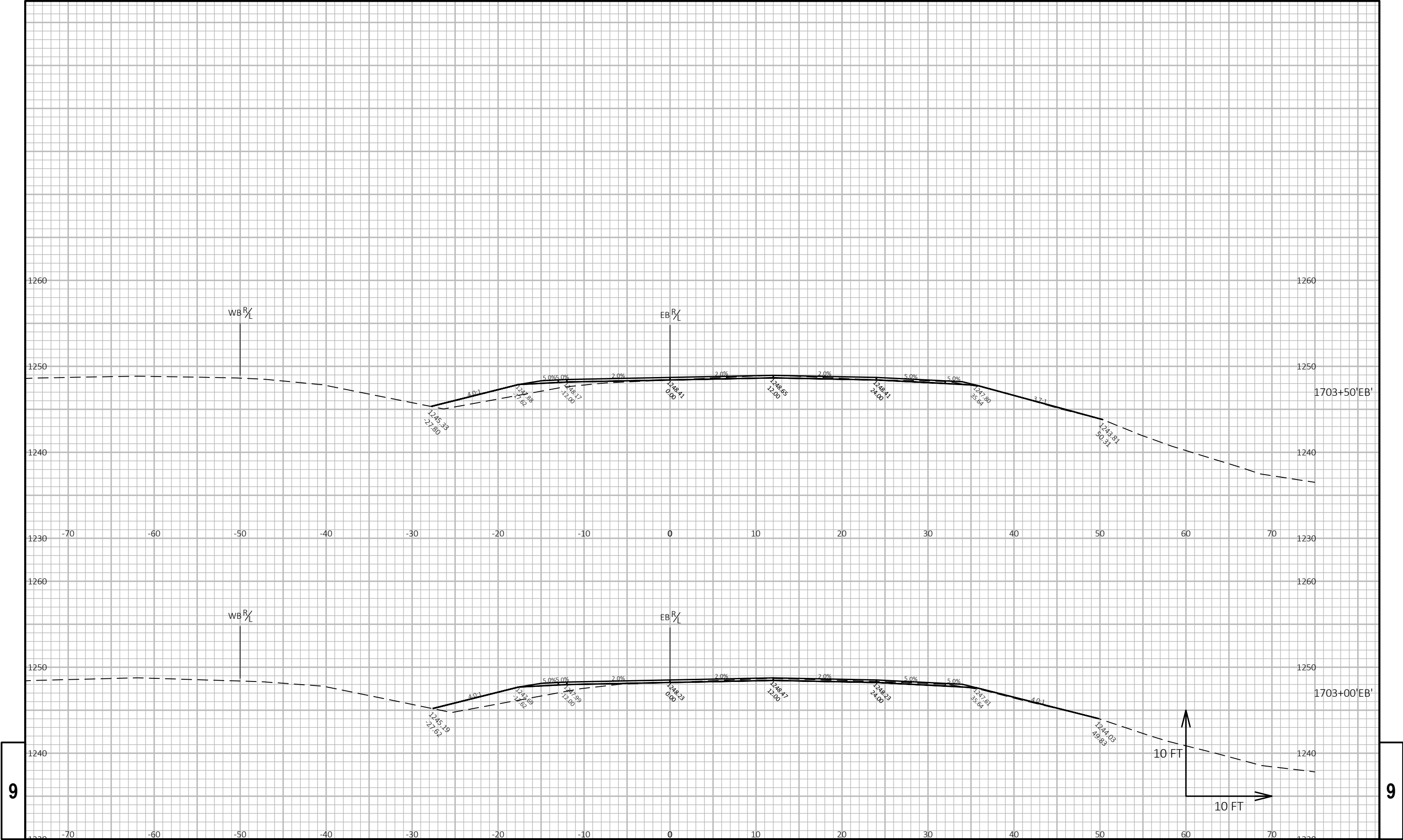


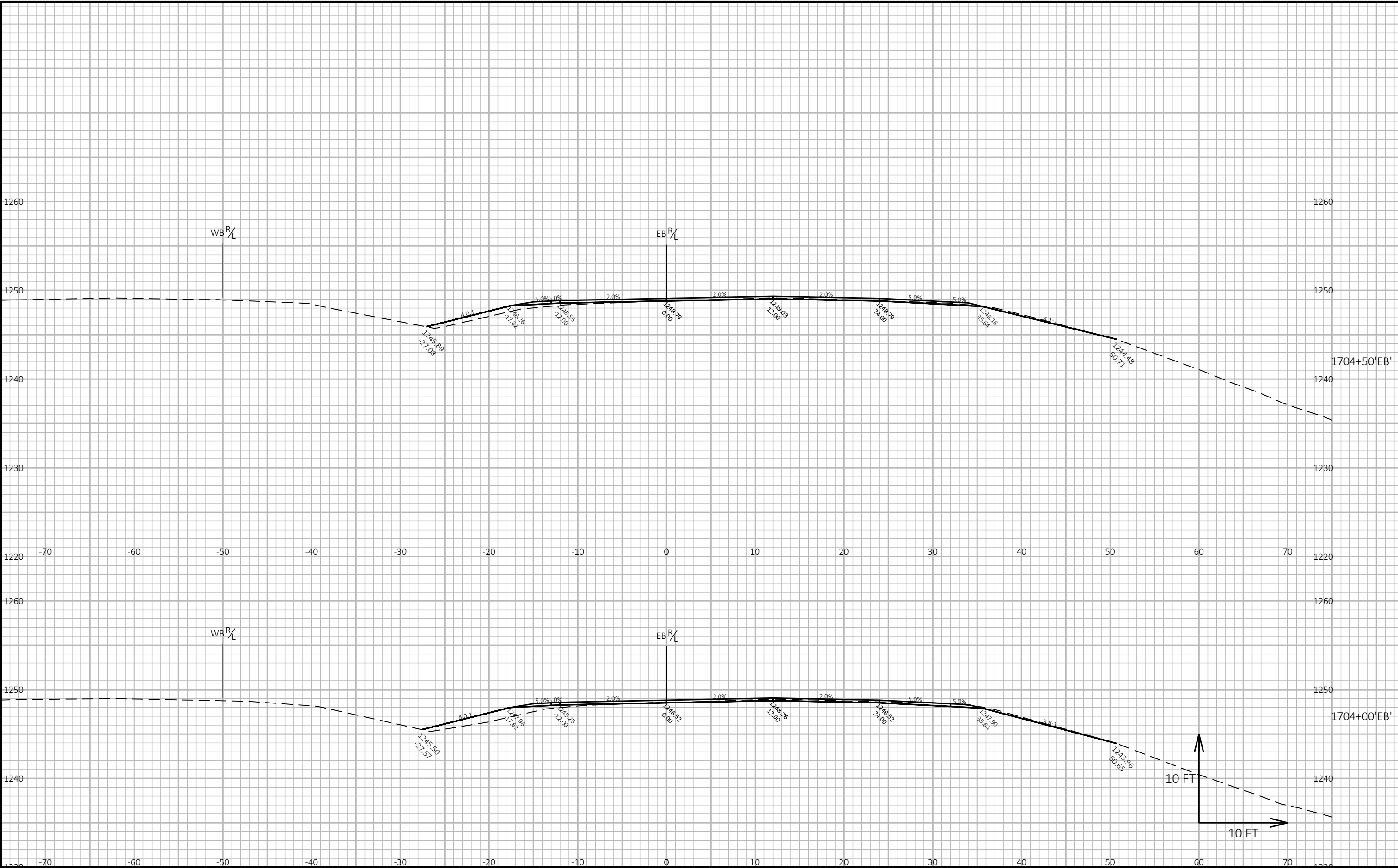


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9



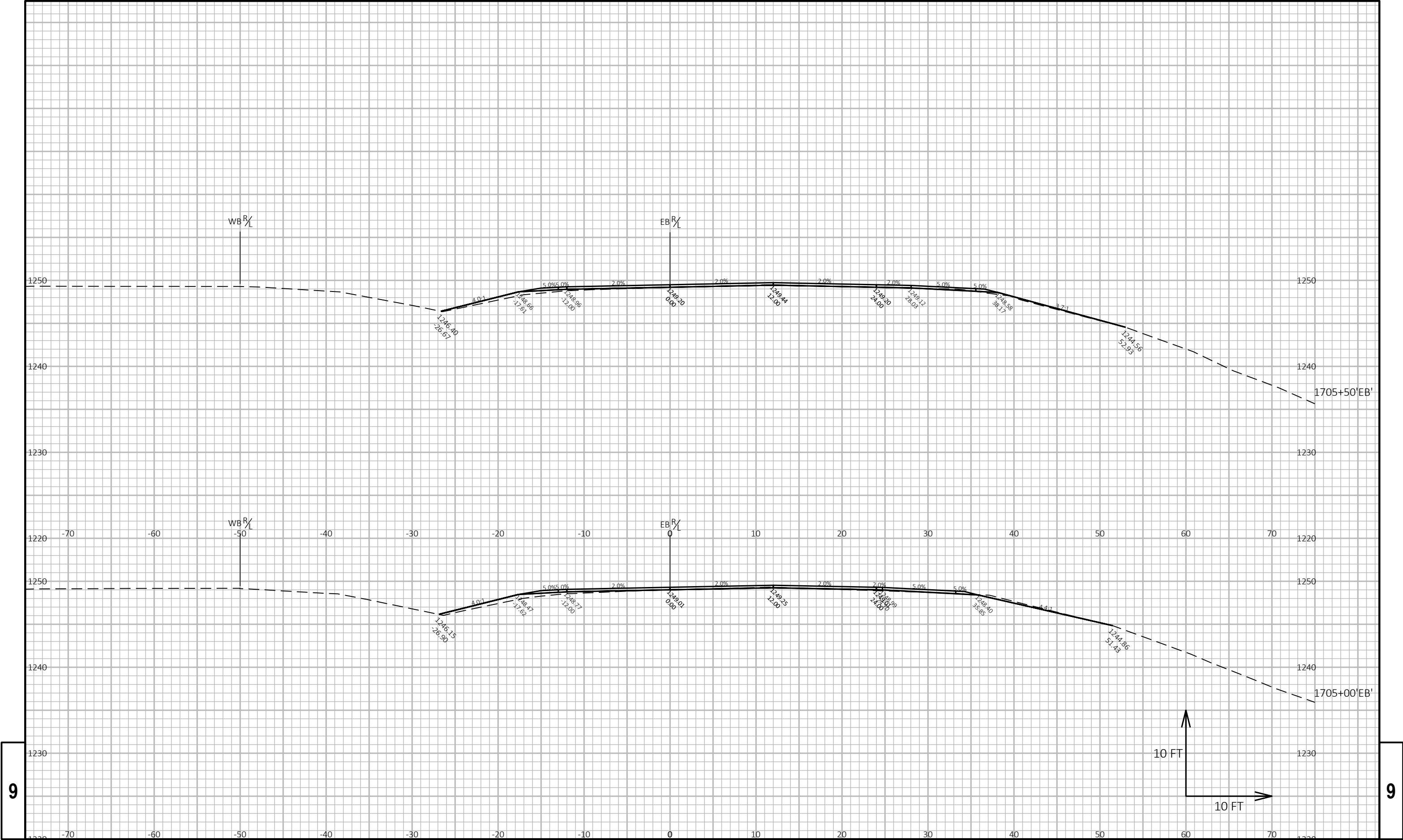


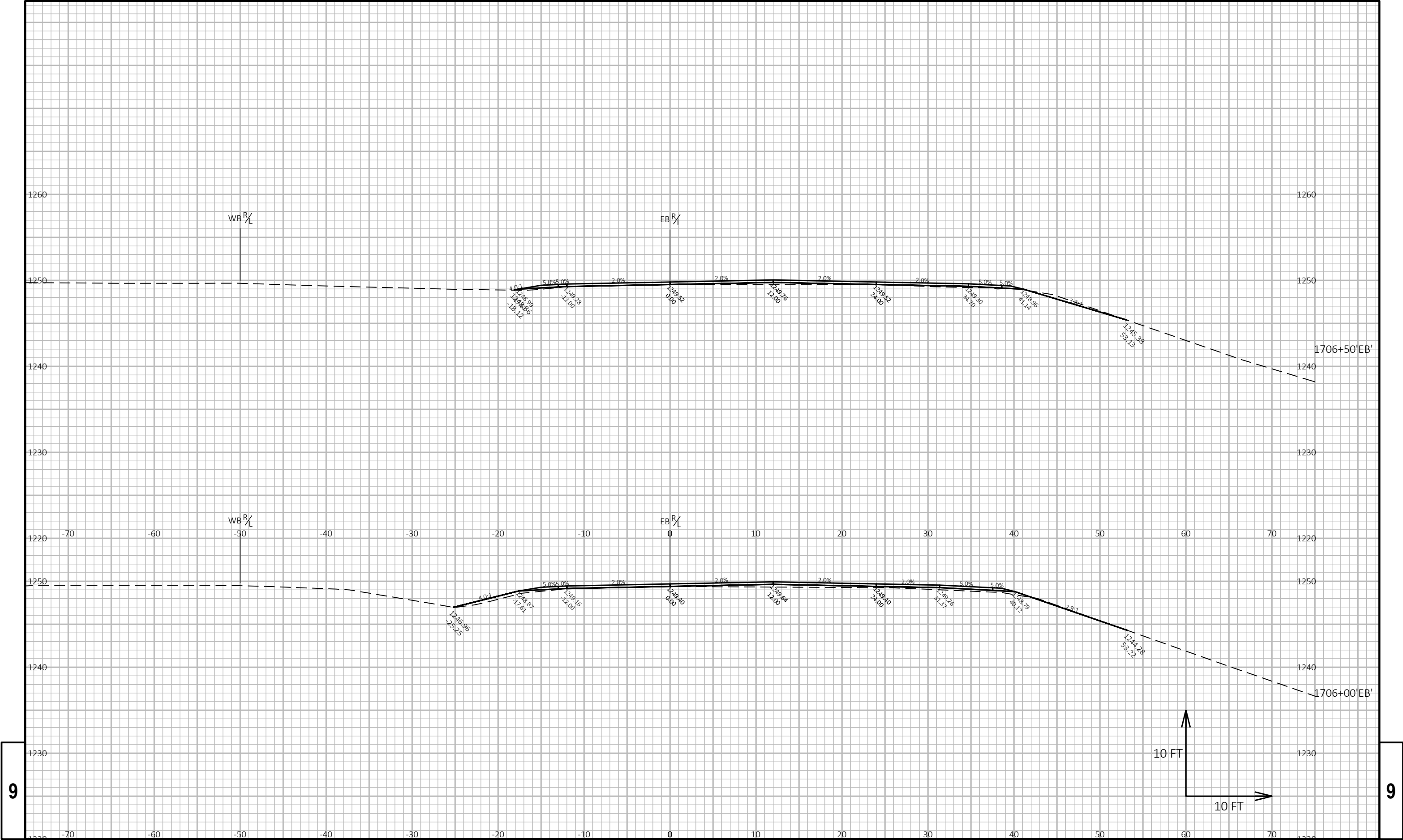


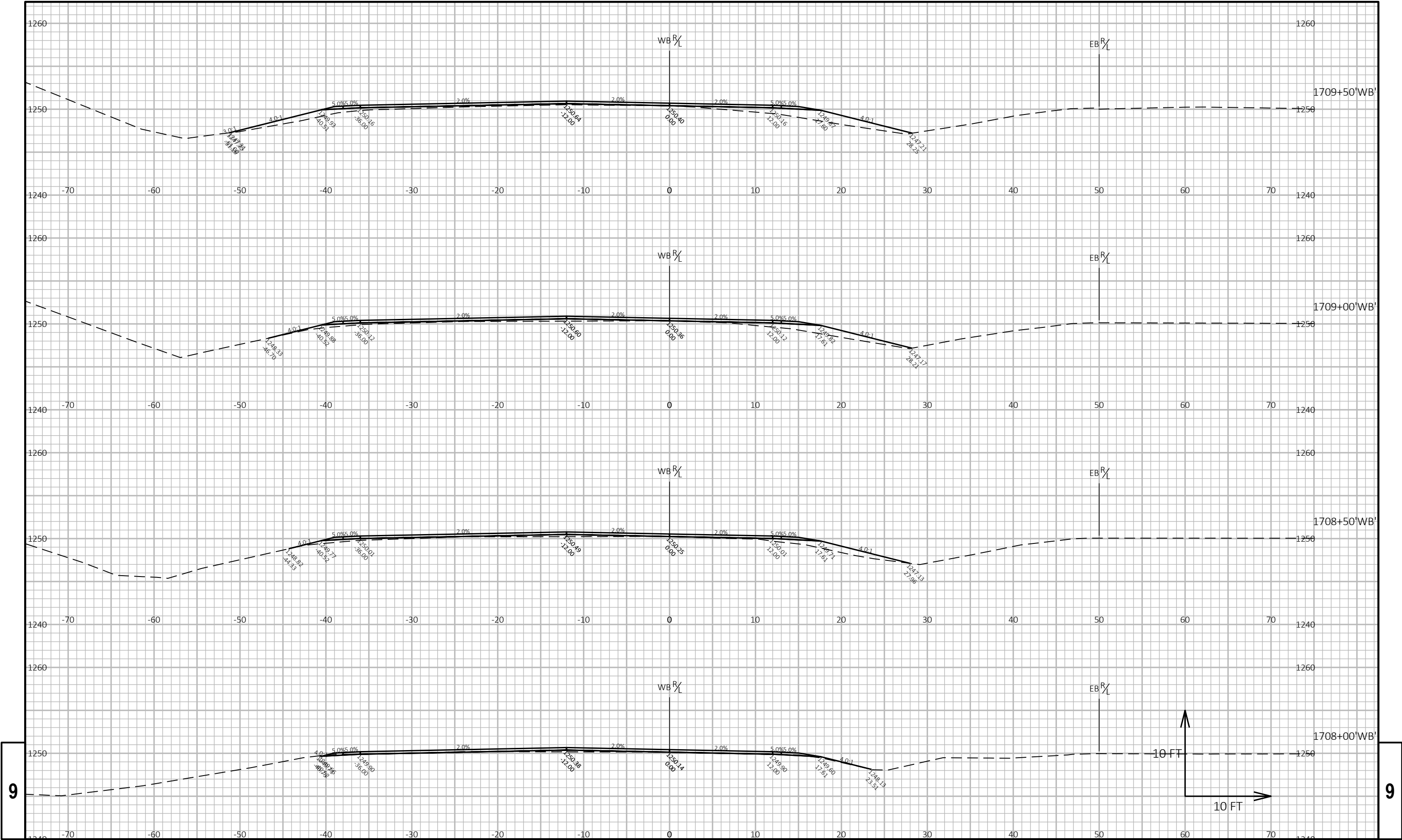
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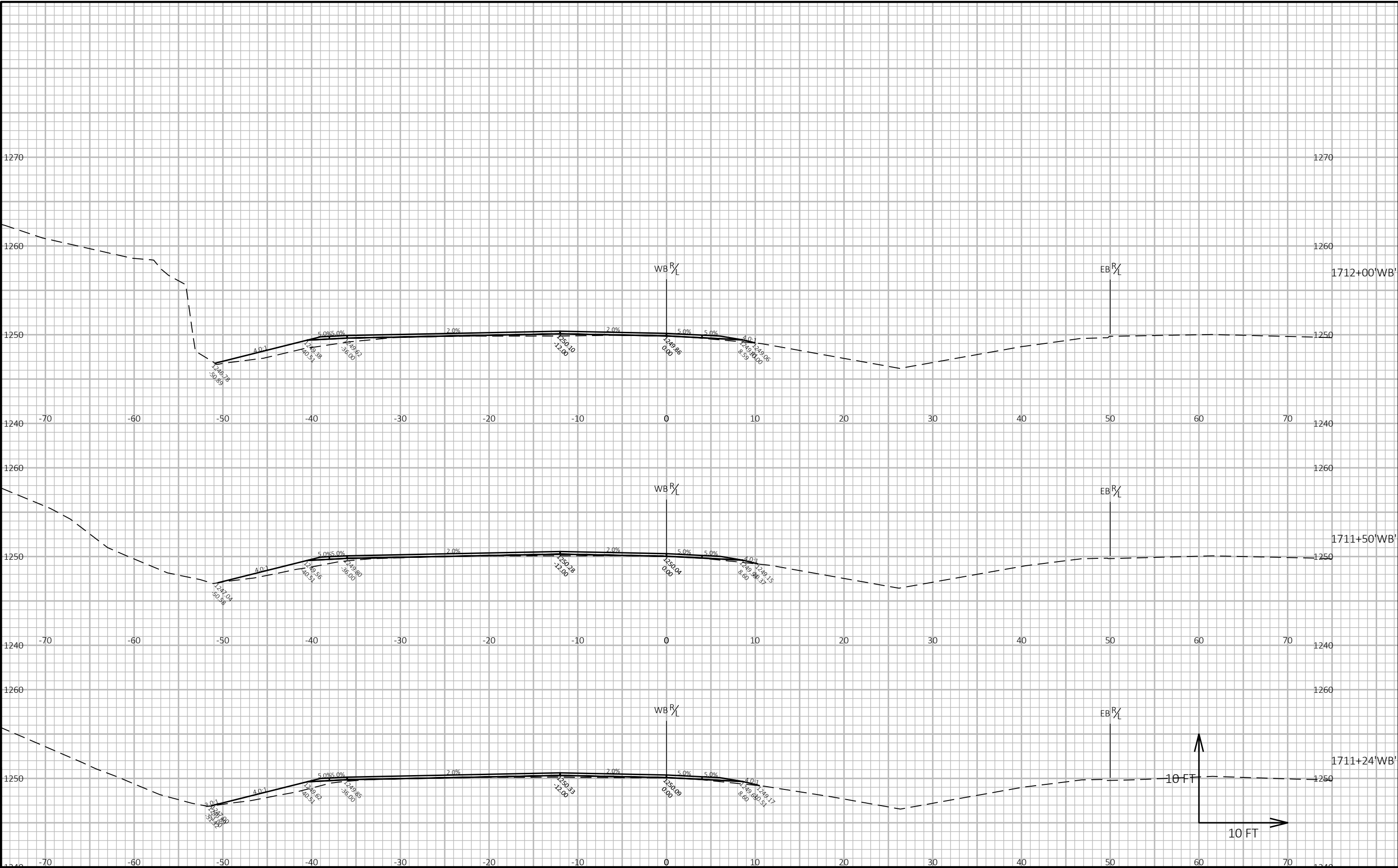
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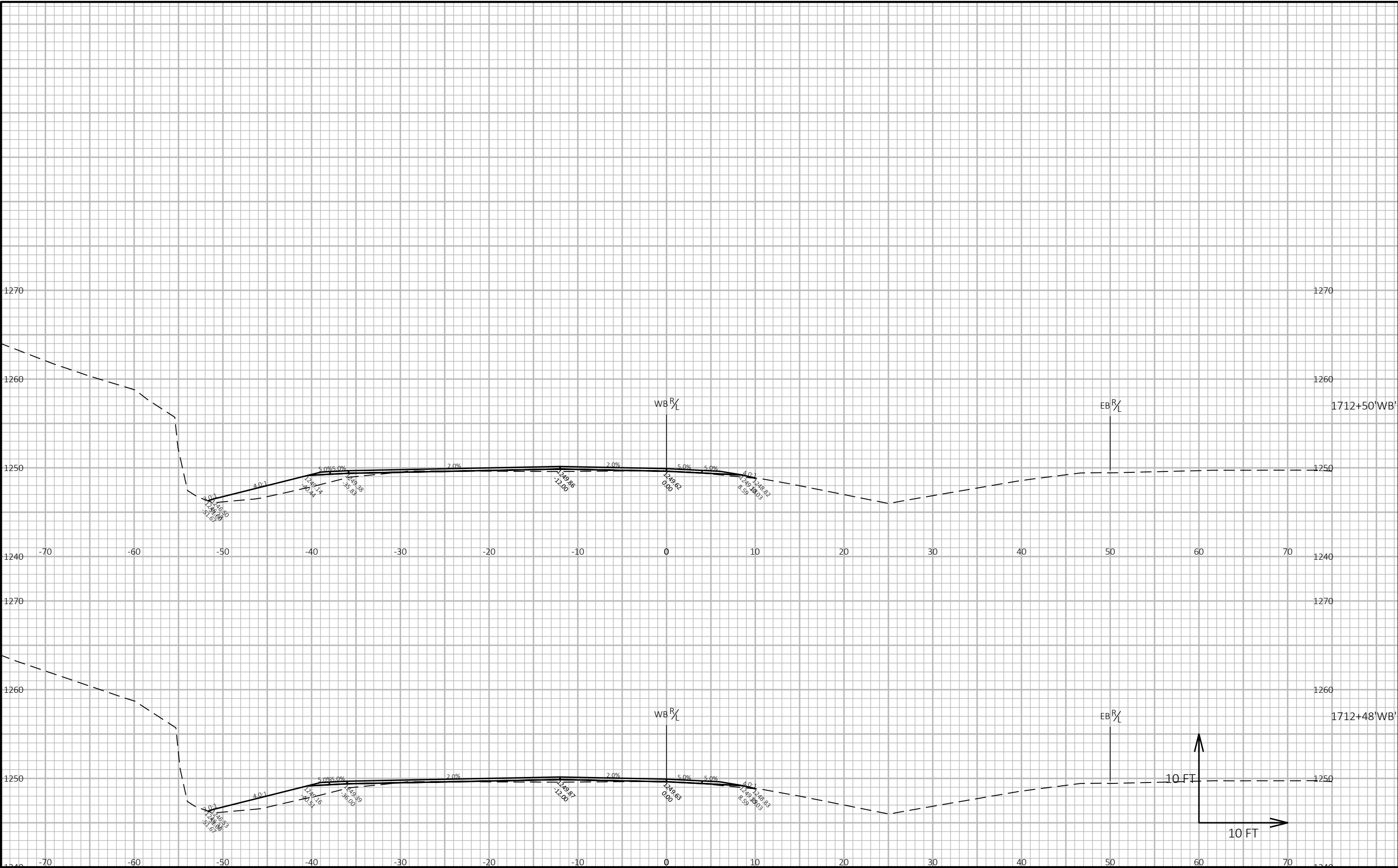
PROJECT NO: 1204-05-73	HWY: USH 18	COUNTY: DANE	CROSS SECTIONS: USH 18	SHEET 97	E
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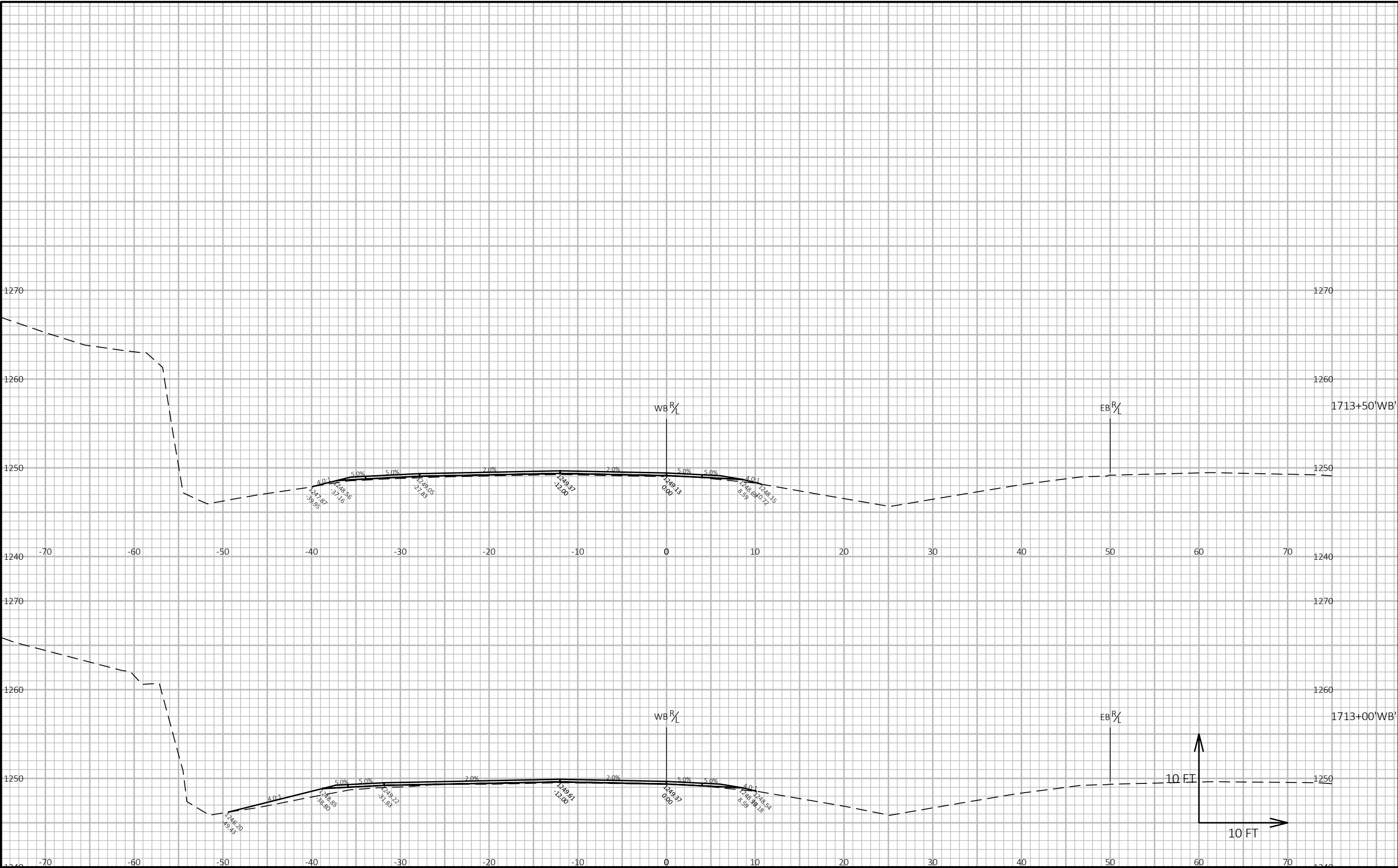




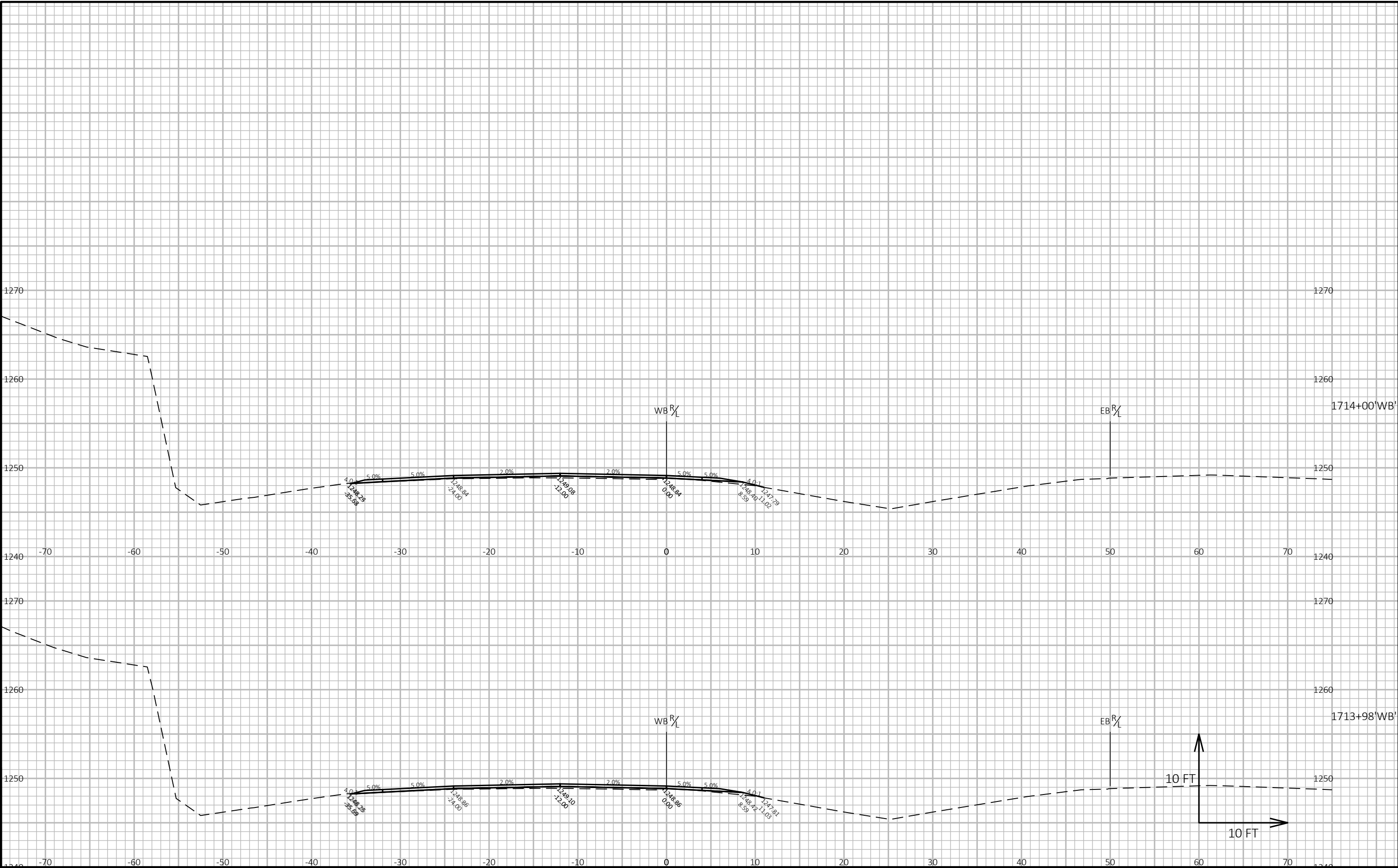


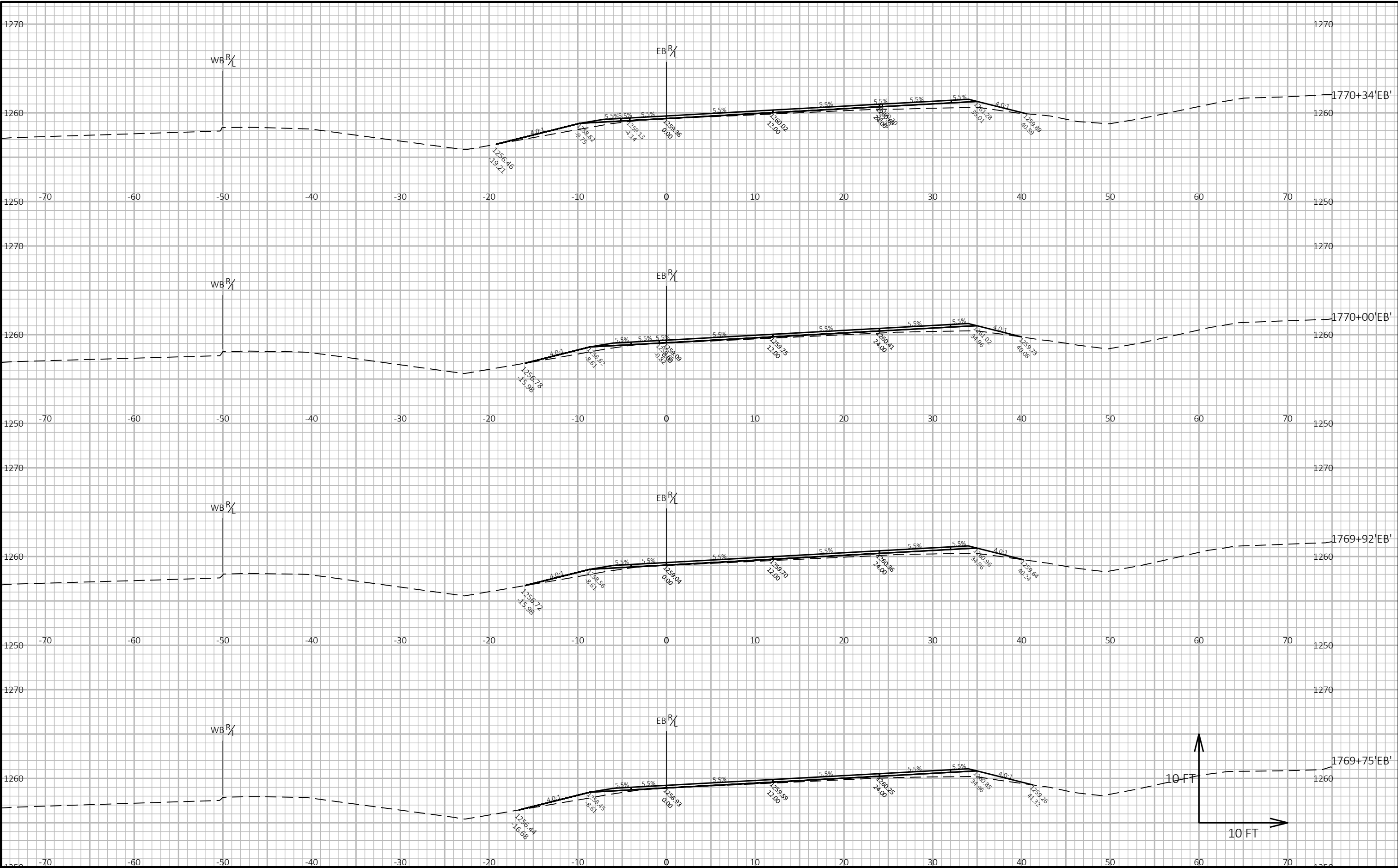


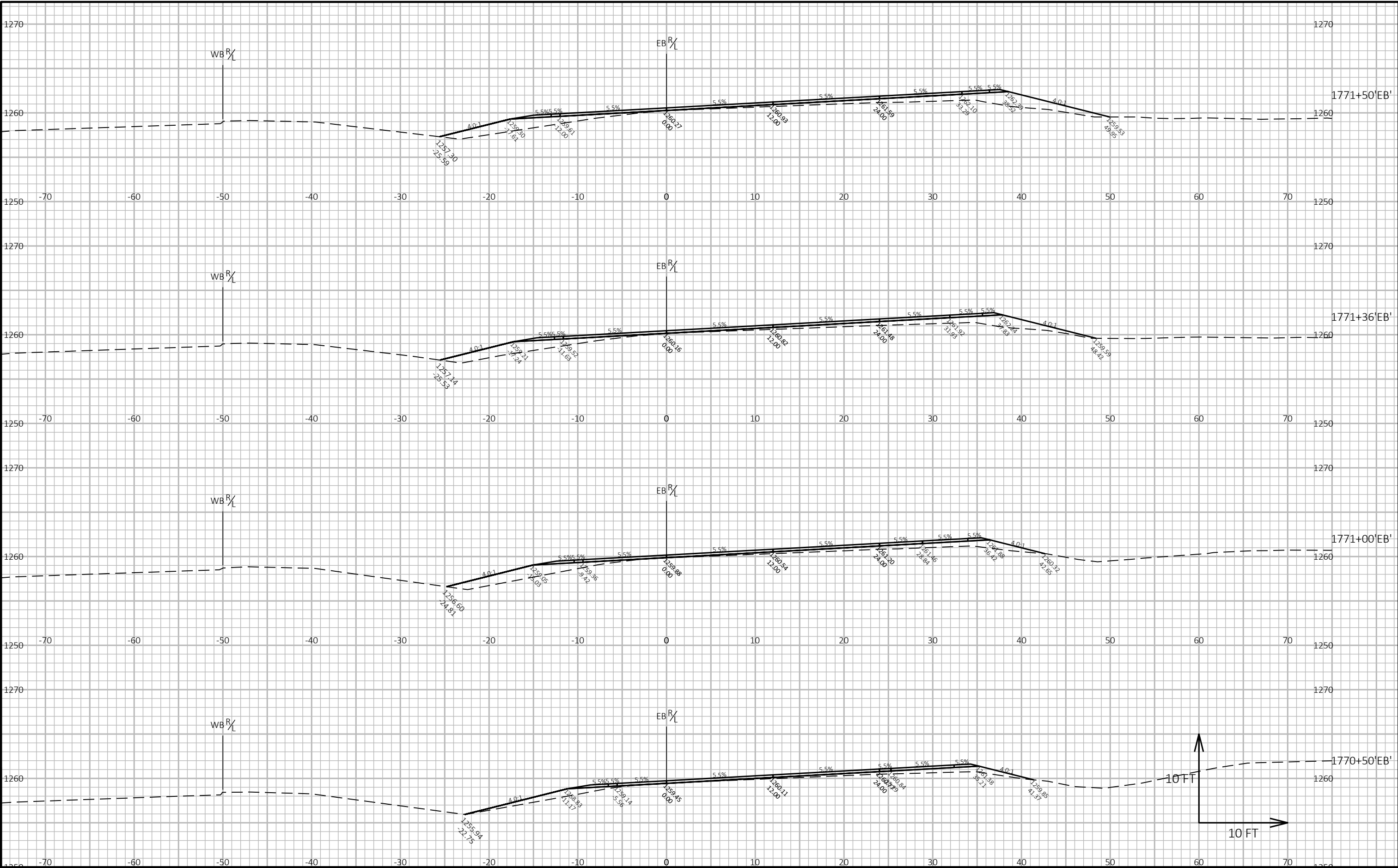


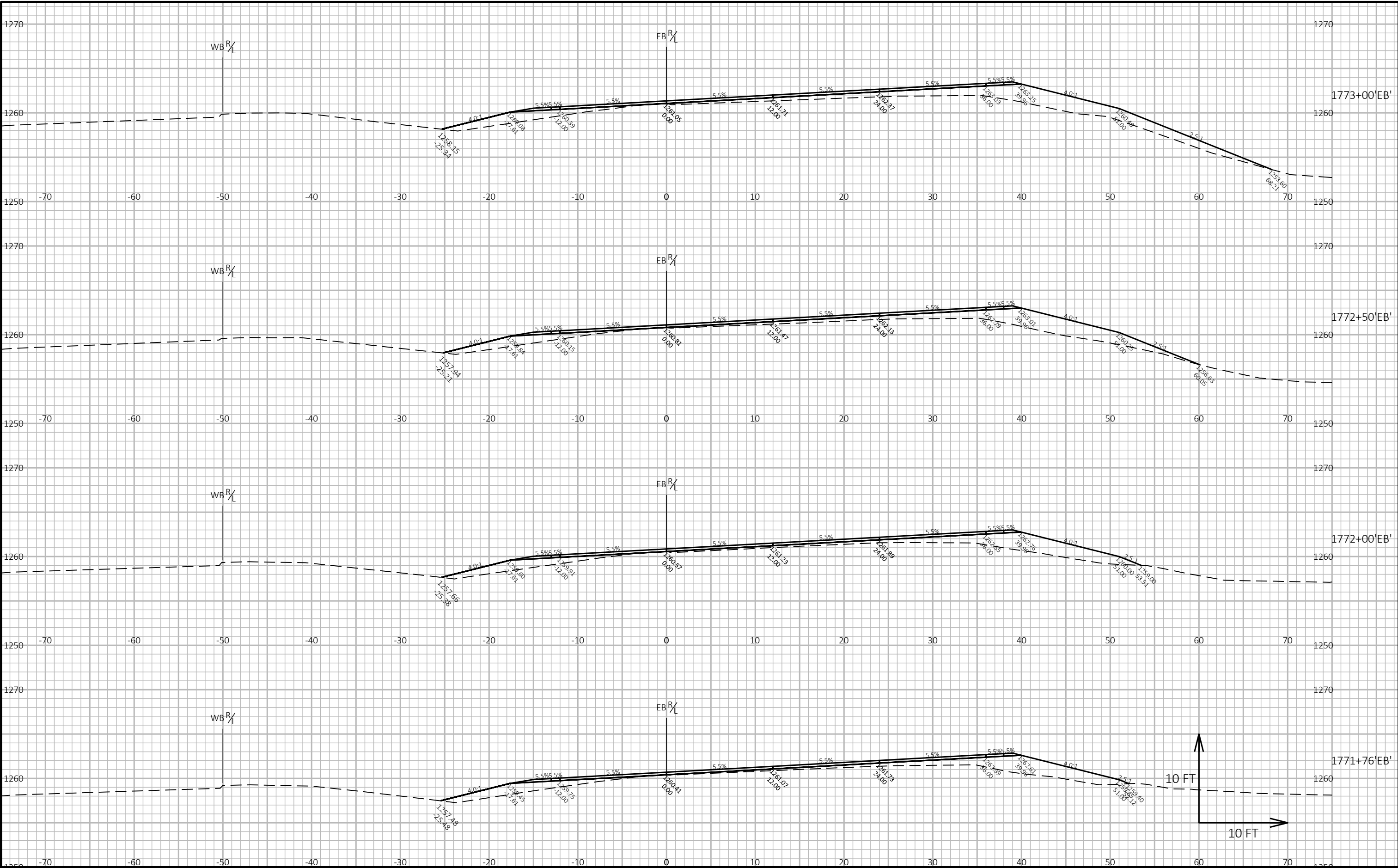


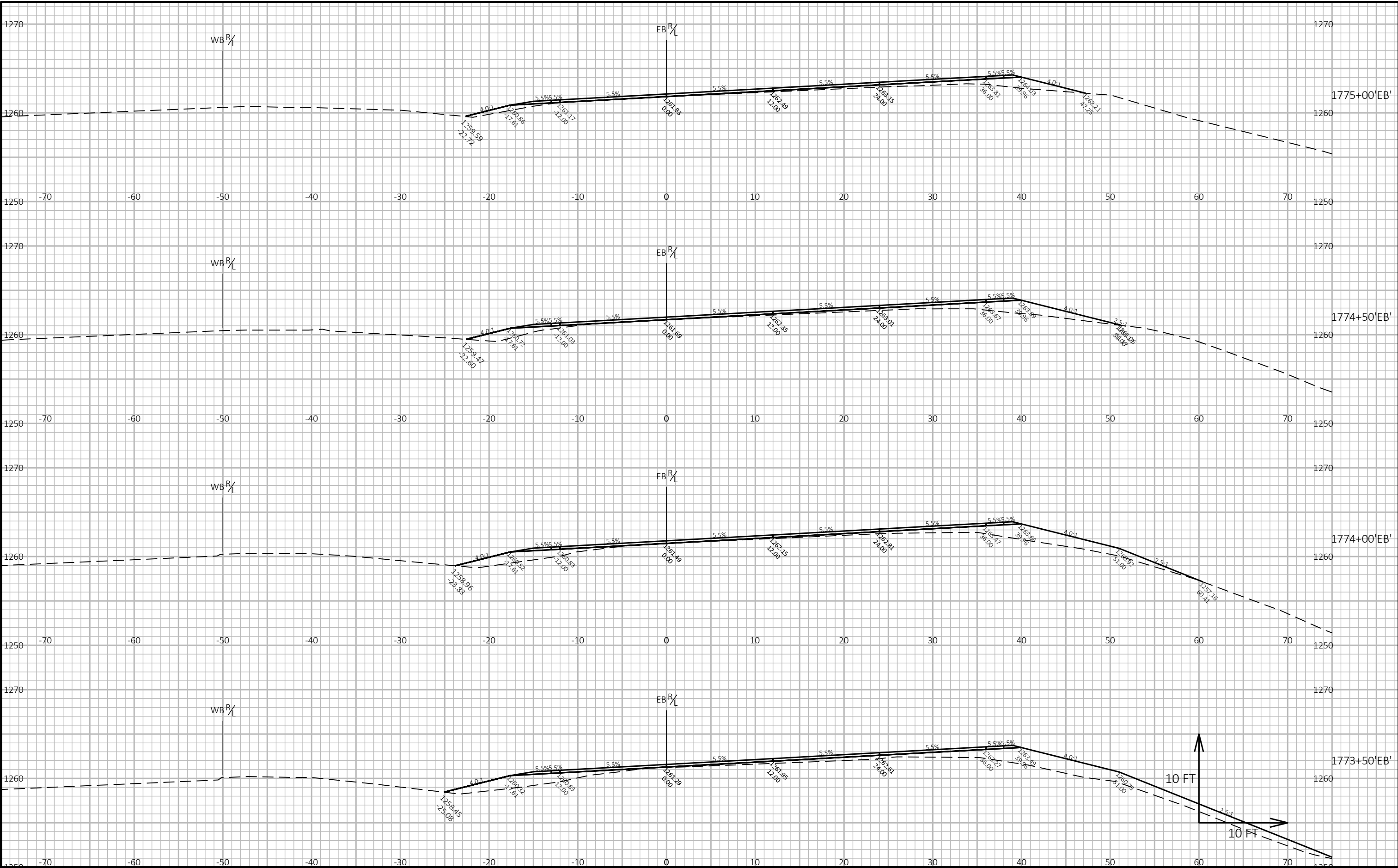
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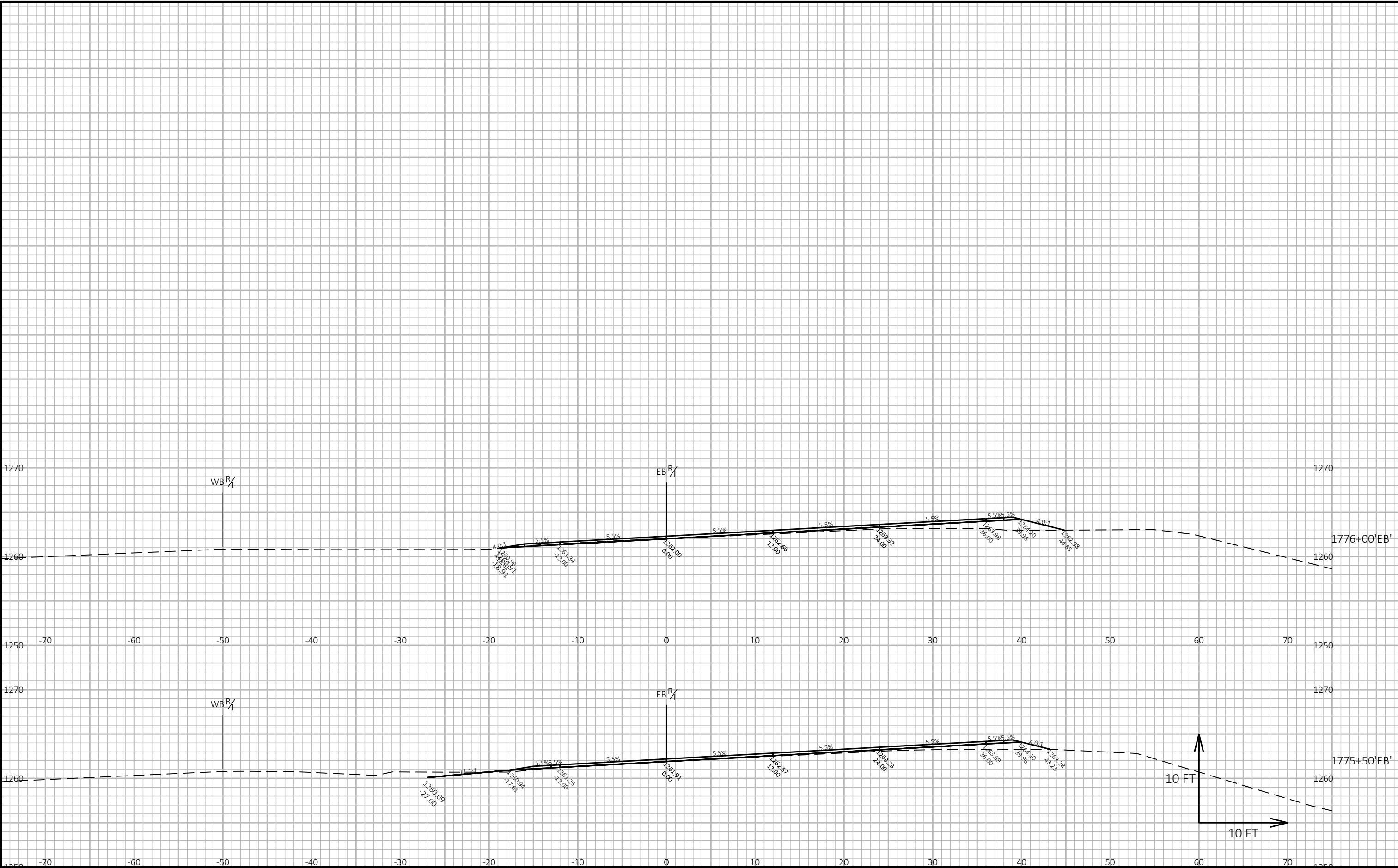


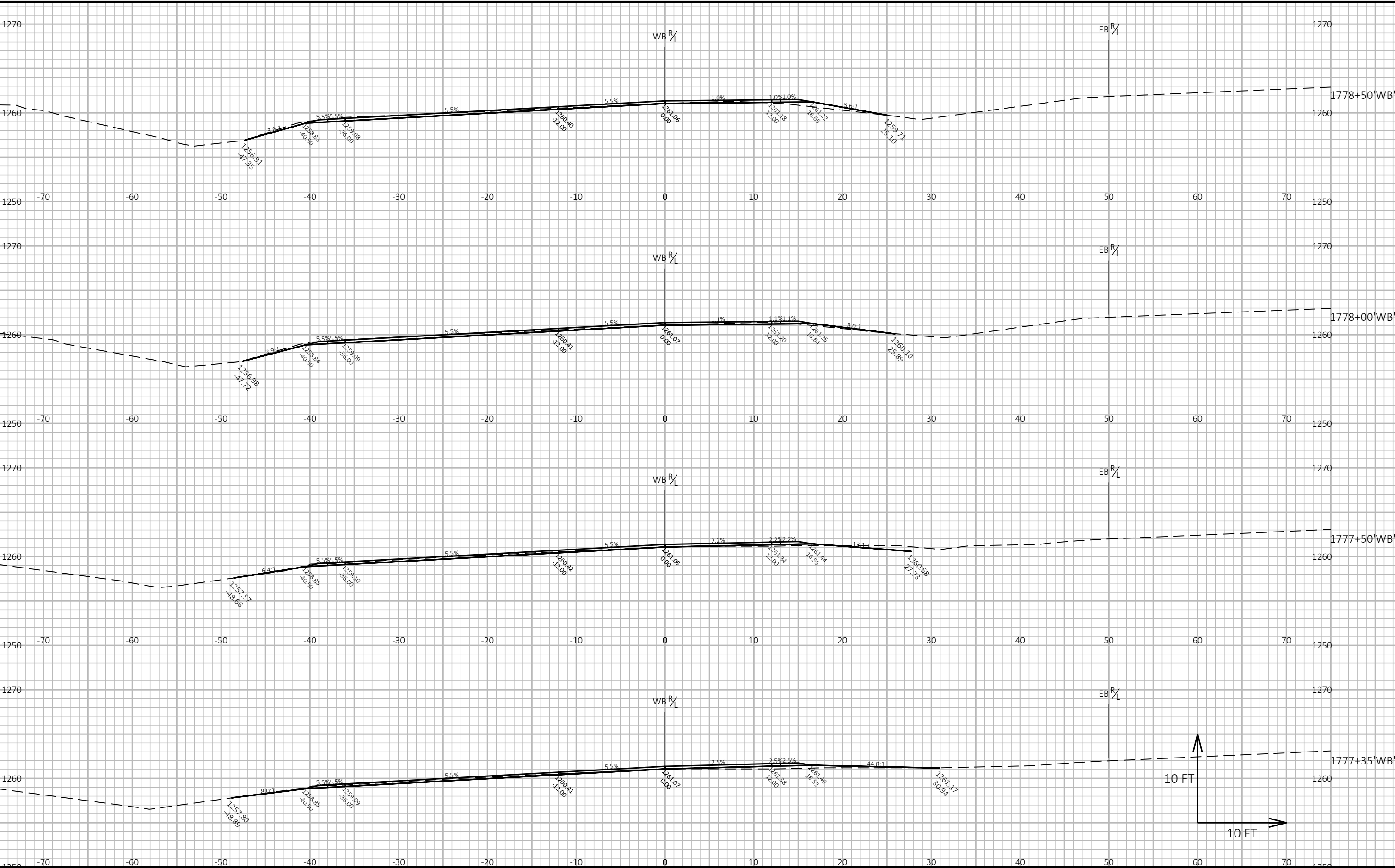


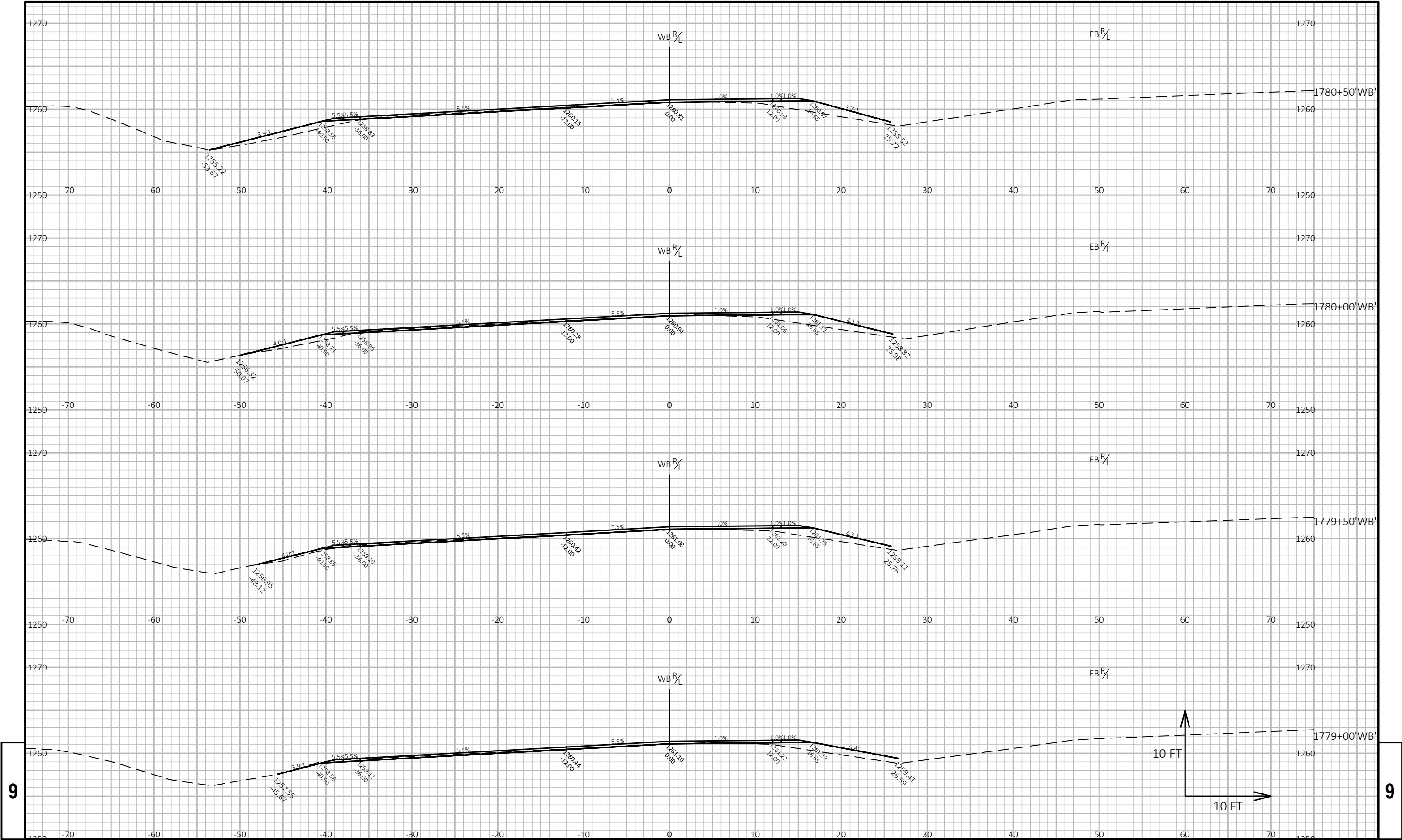


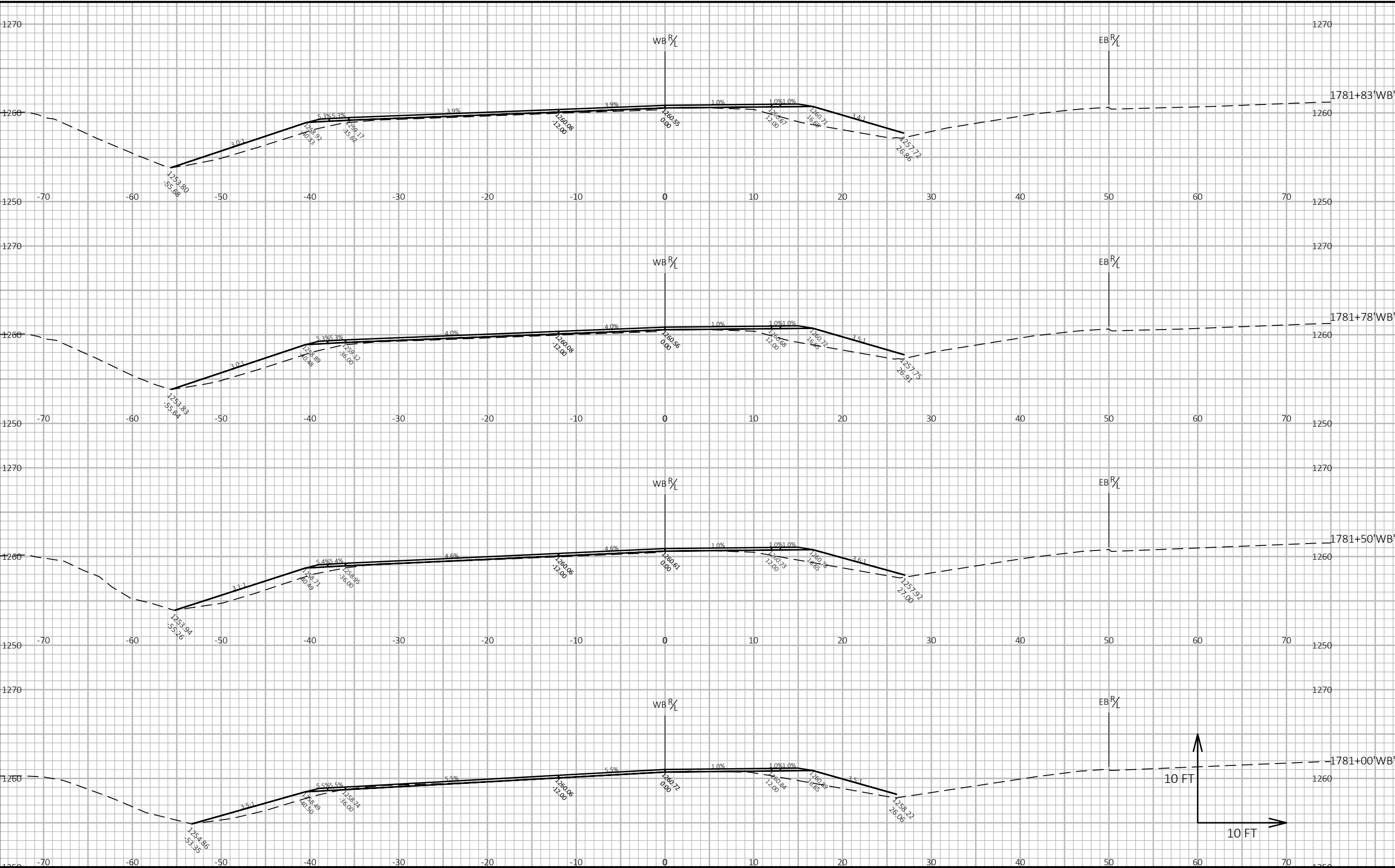


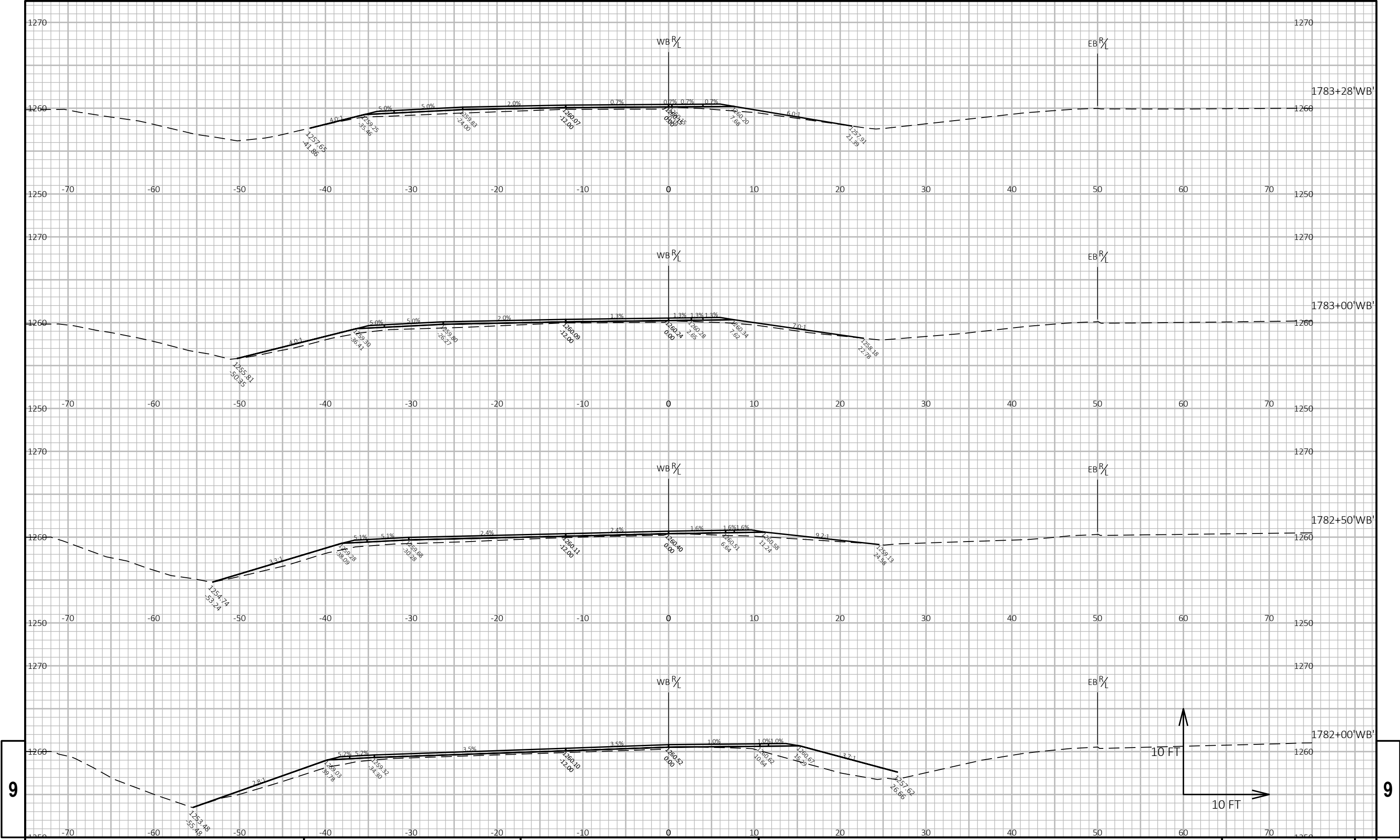


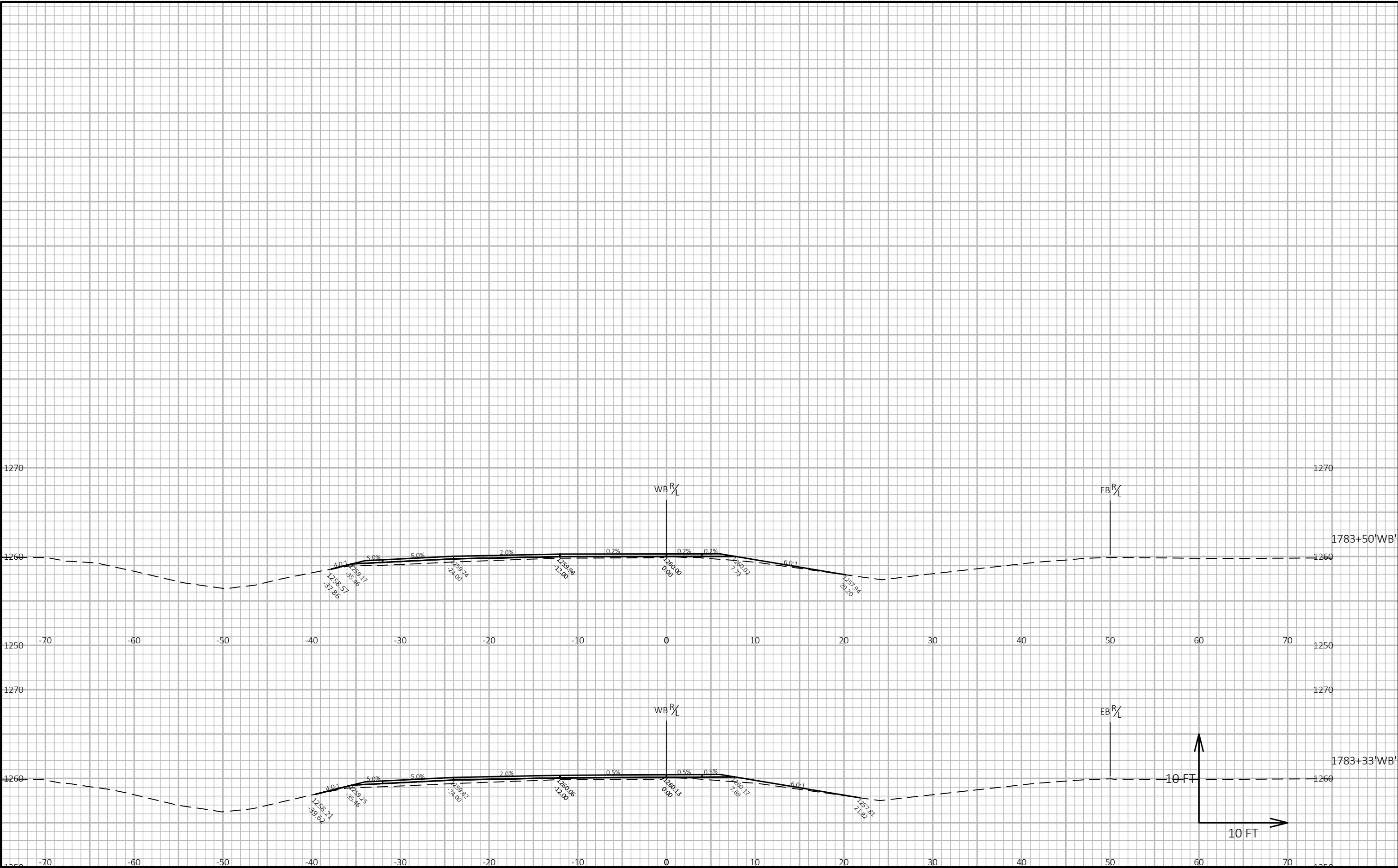


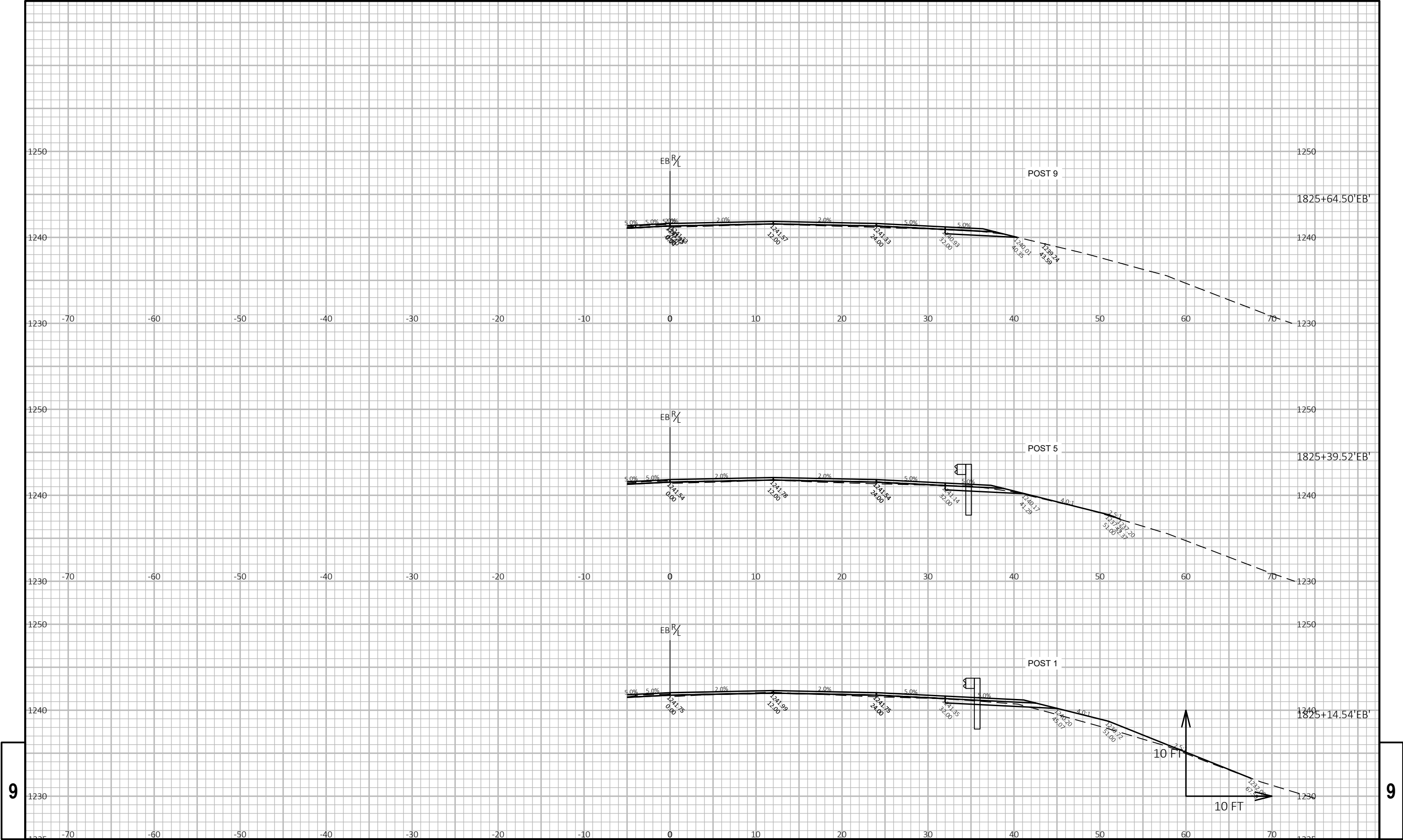








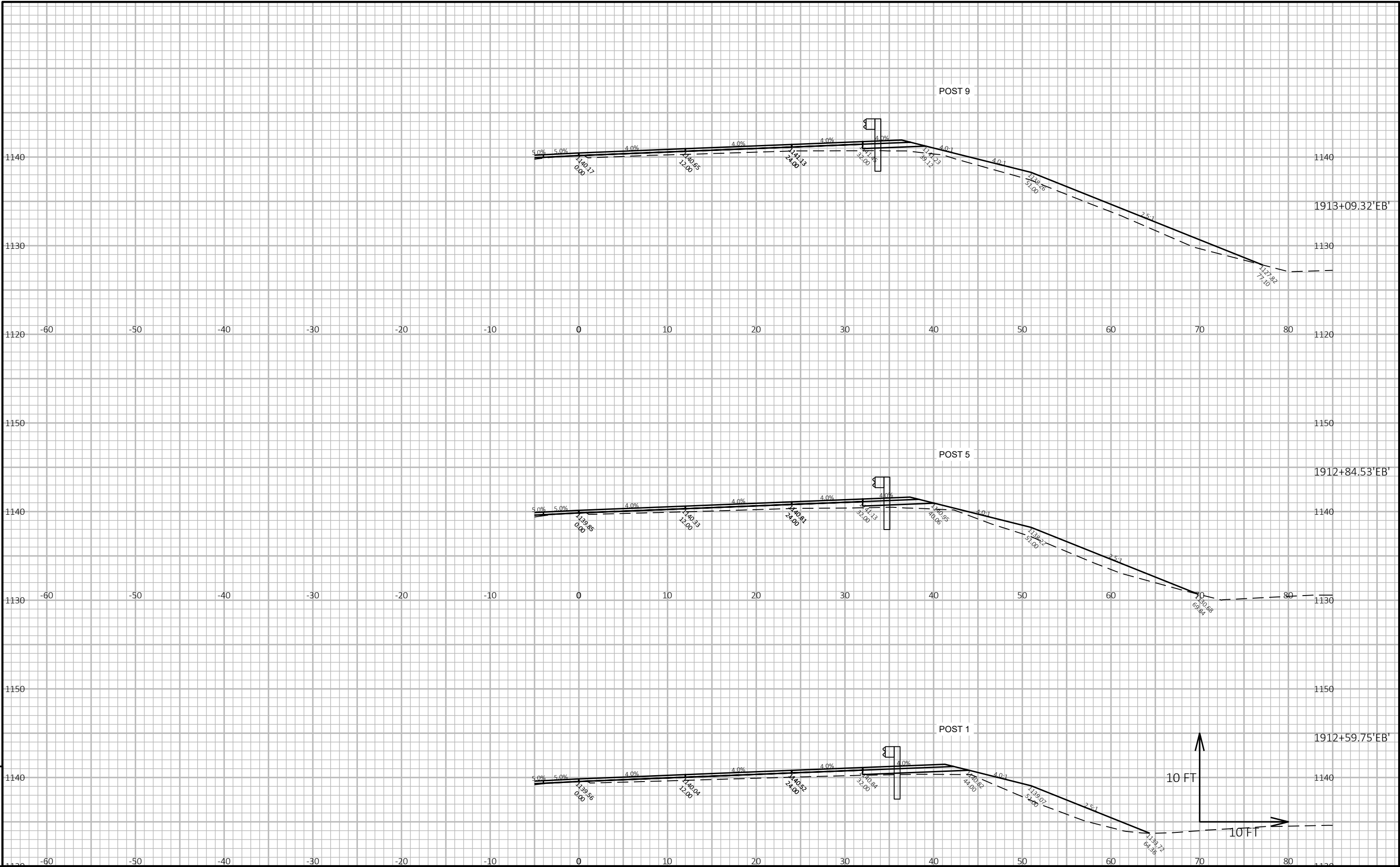


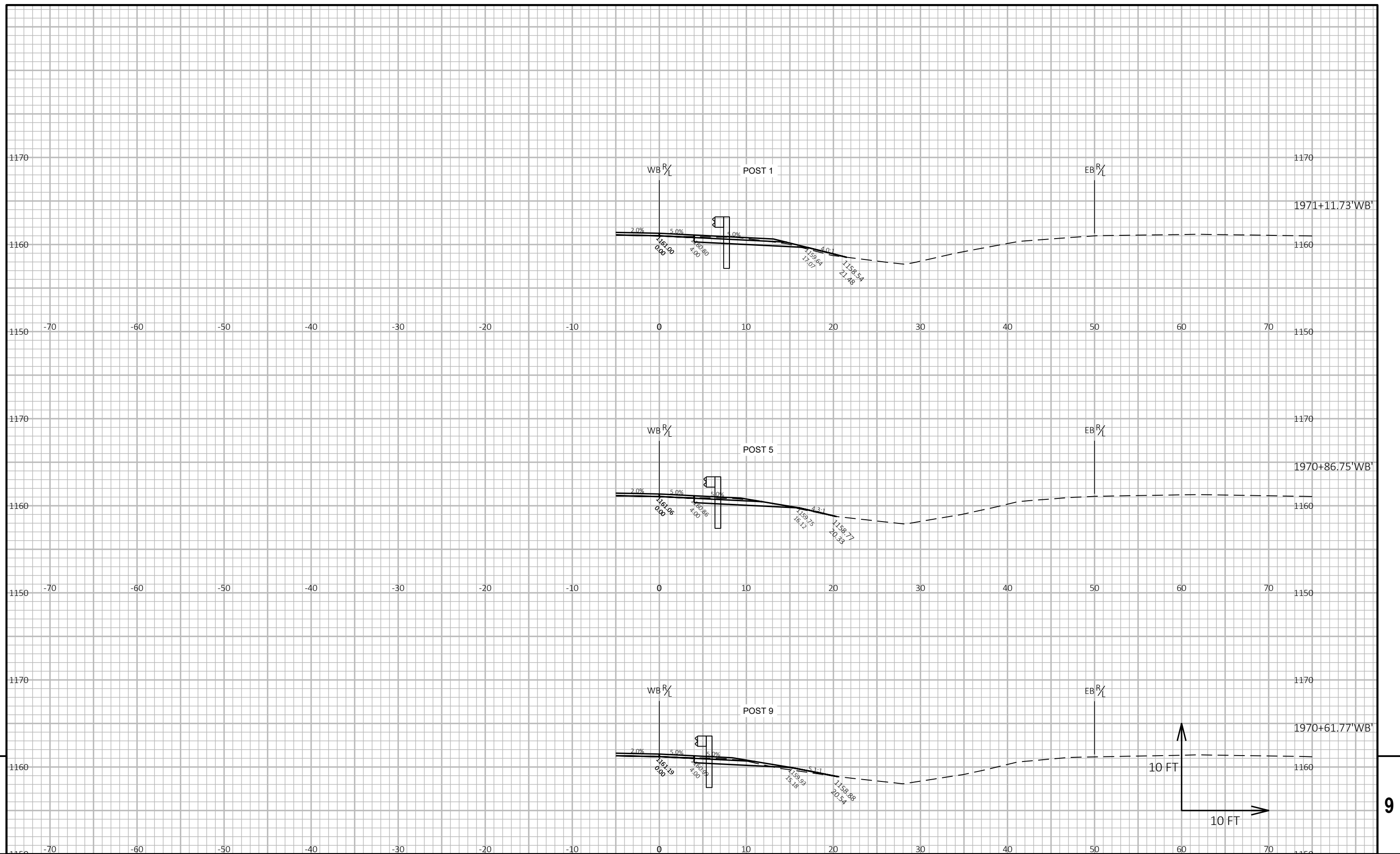


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PROJECT NO:	1204-05-73	HWY:	USH 18	COUNTY:	DANE	CROSS SECTIONS:	USH 18	SHEET	119	E
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PROJECT NO:	1204-05-73
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HWY: USH 18

COUNTY: DANE

CROSS SECTIONS: USH 18

SHEET 123

I

FILE NAME : P:\2018 PROJECTS\5018041 - WISDOT SWR US 18_151\CIVIL3D\SHEETSP\PLAN\1204-05-73\090201-XS.DWG
LAYOUT NAME - 38

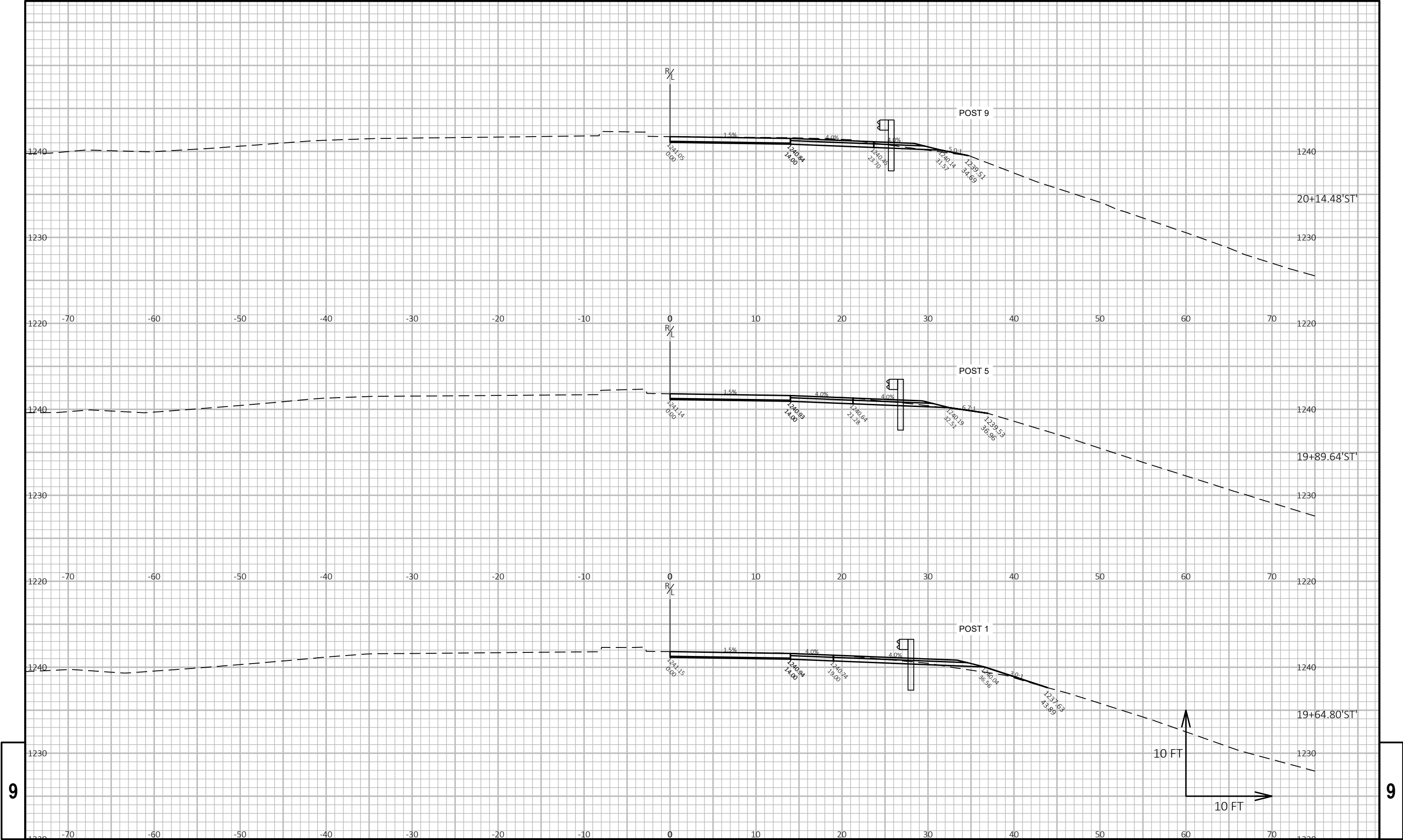
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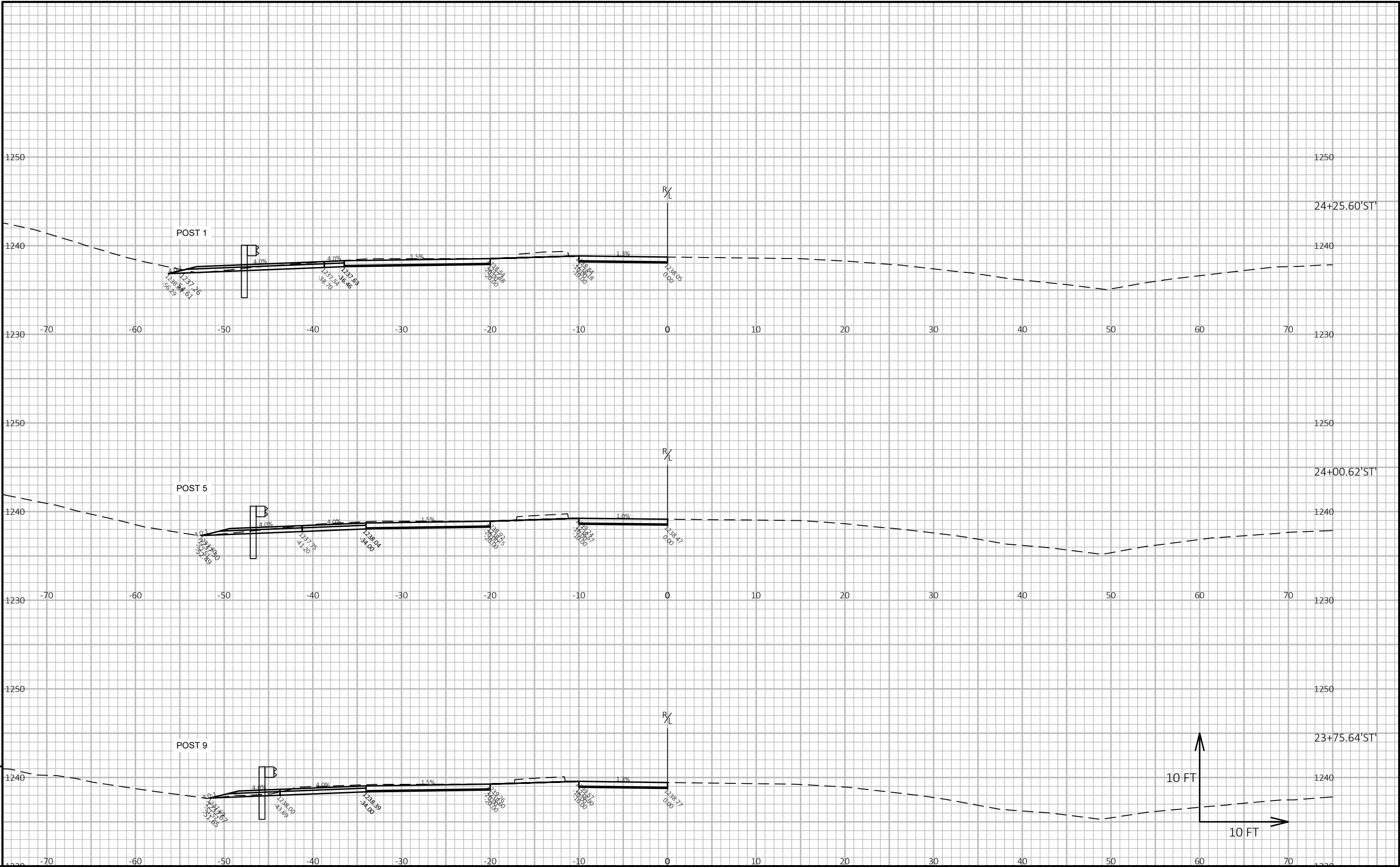
PLOT BY : BRETT PETERSON

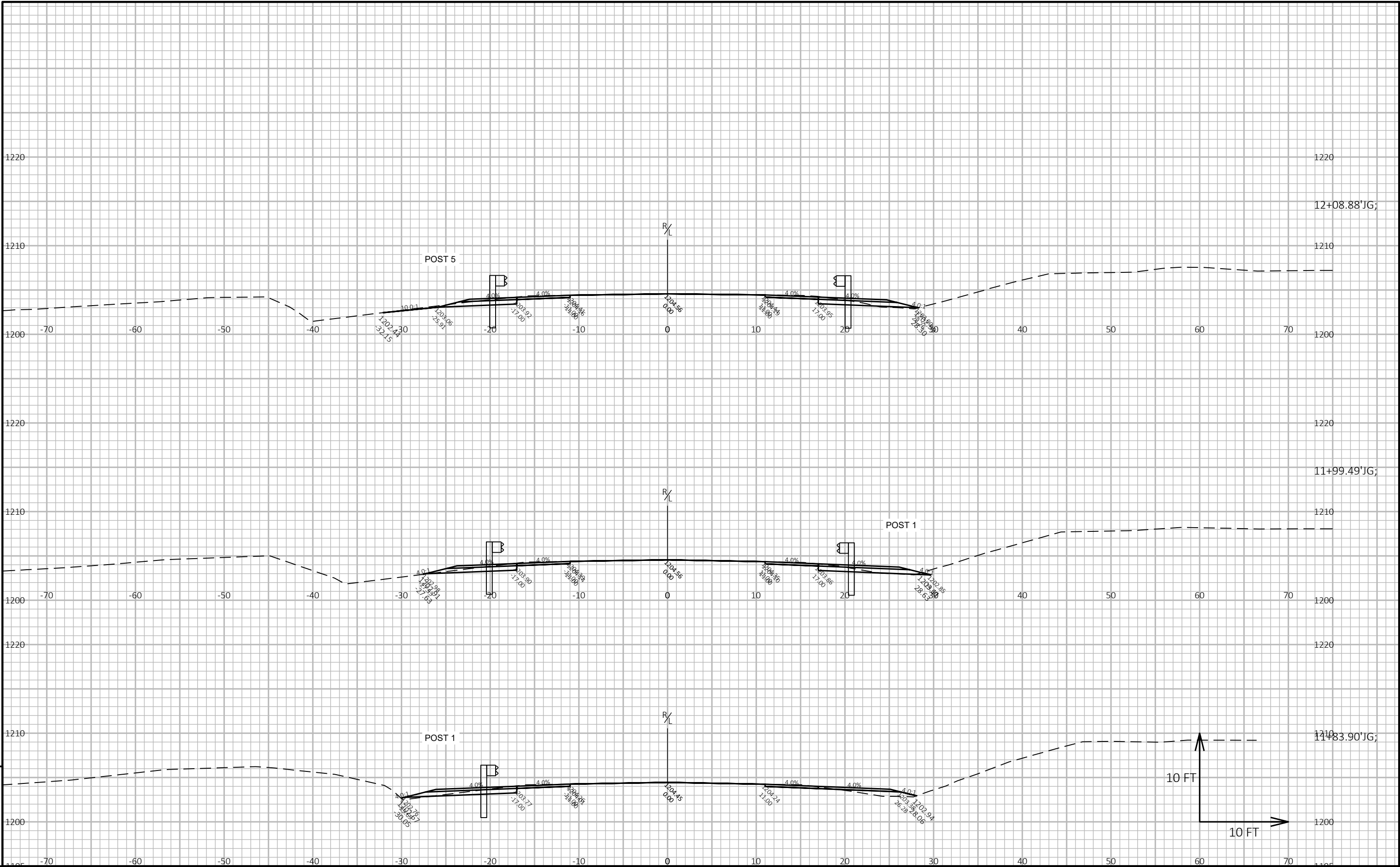
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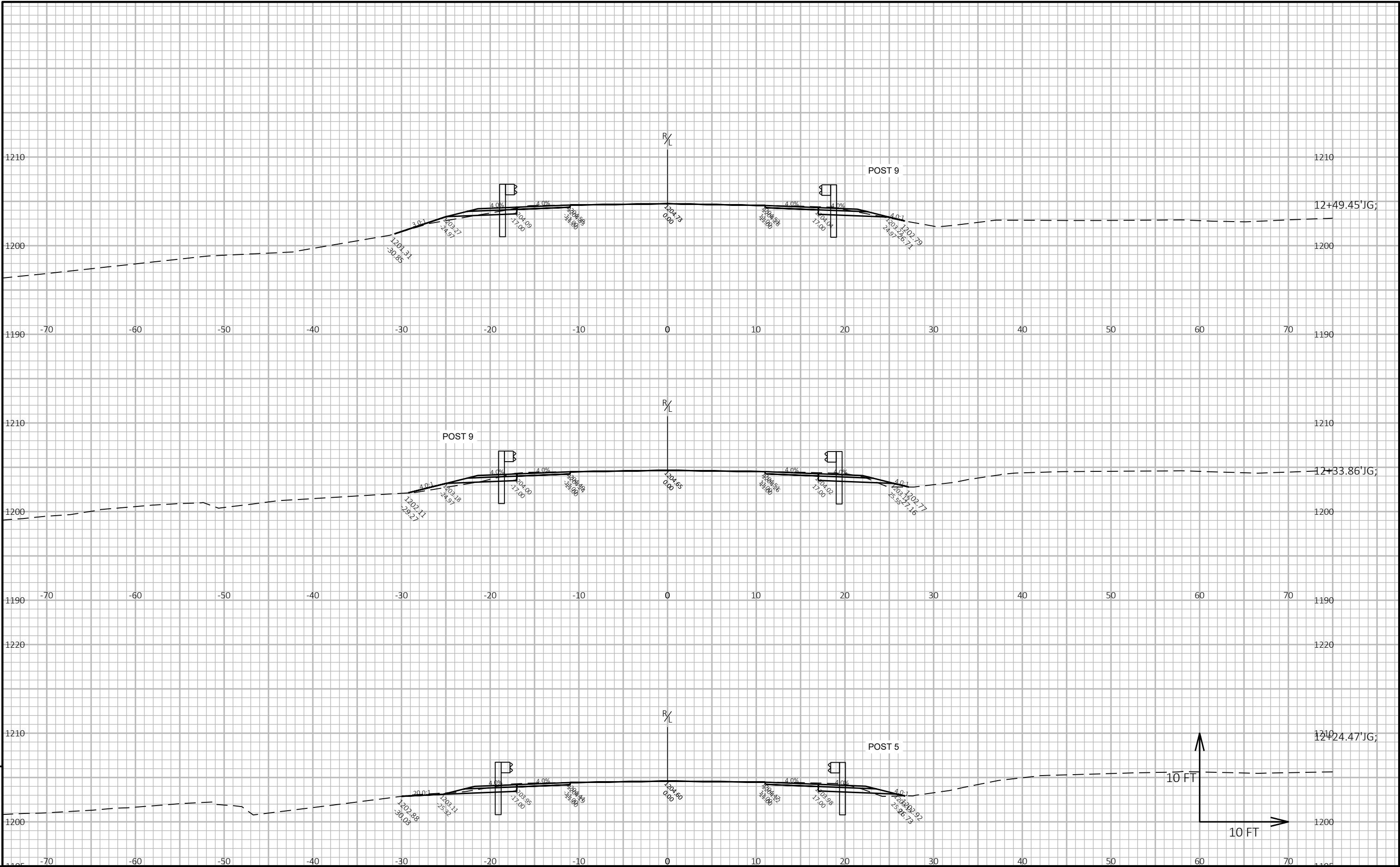
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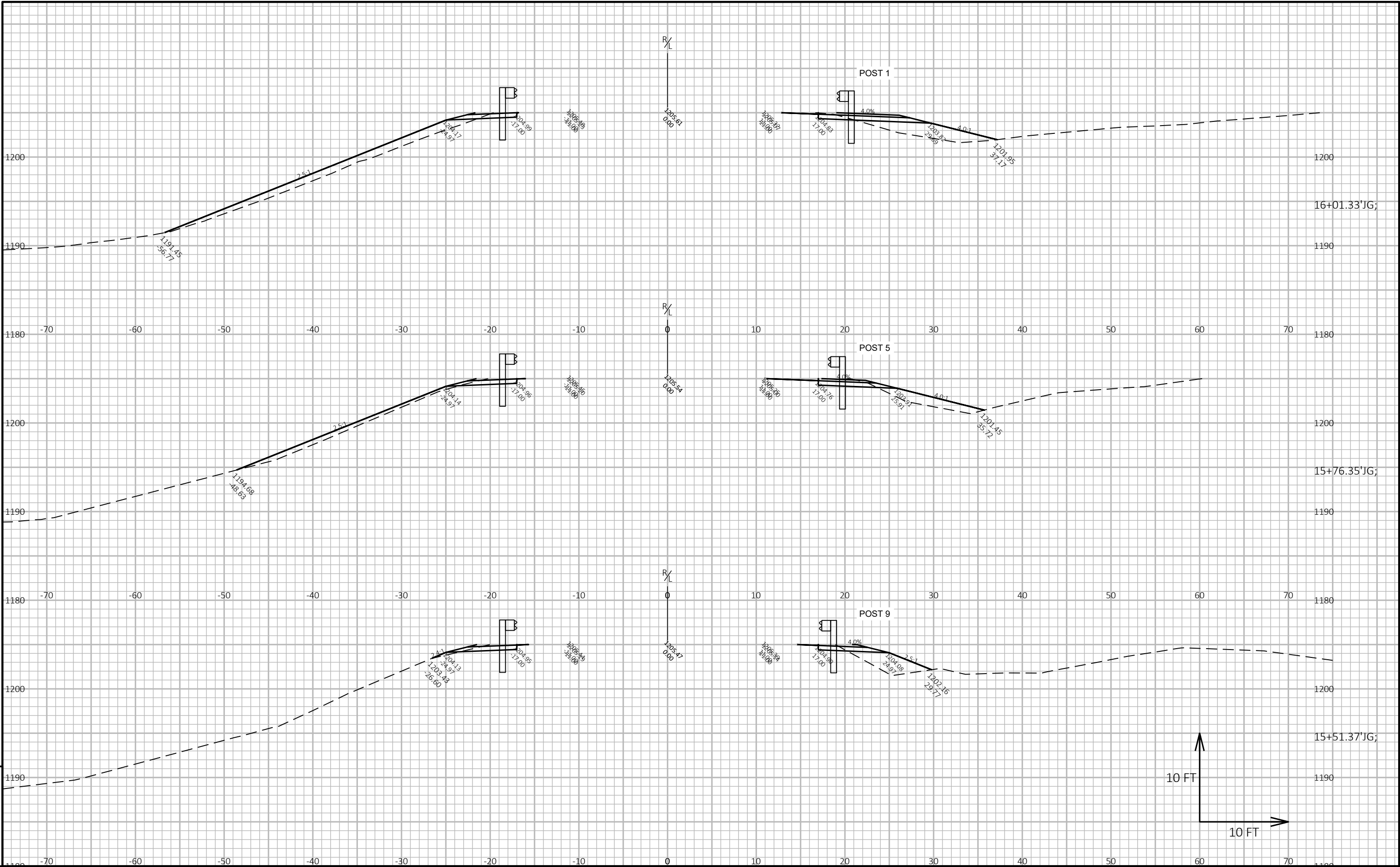
WISDOT/CADDS SHEET 49

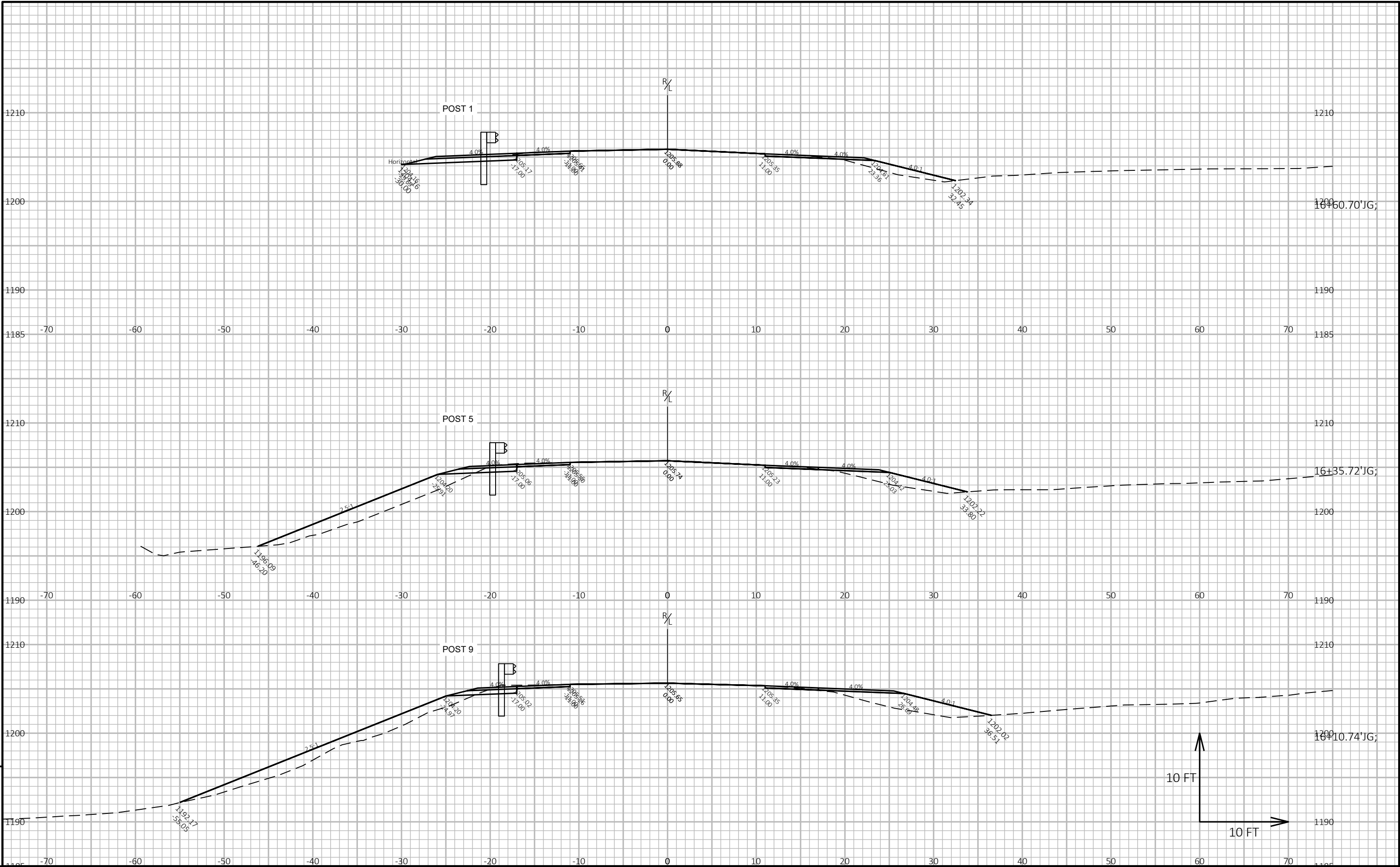


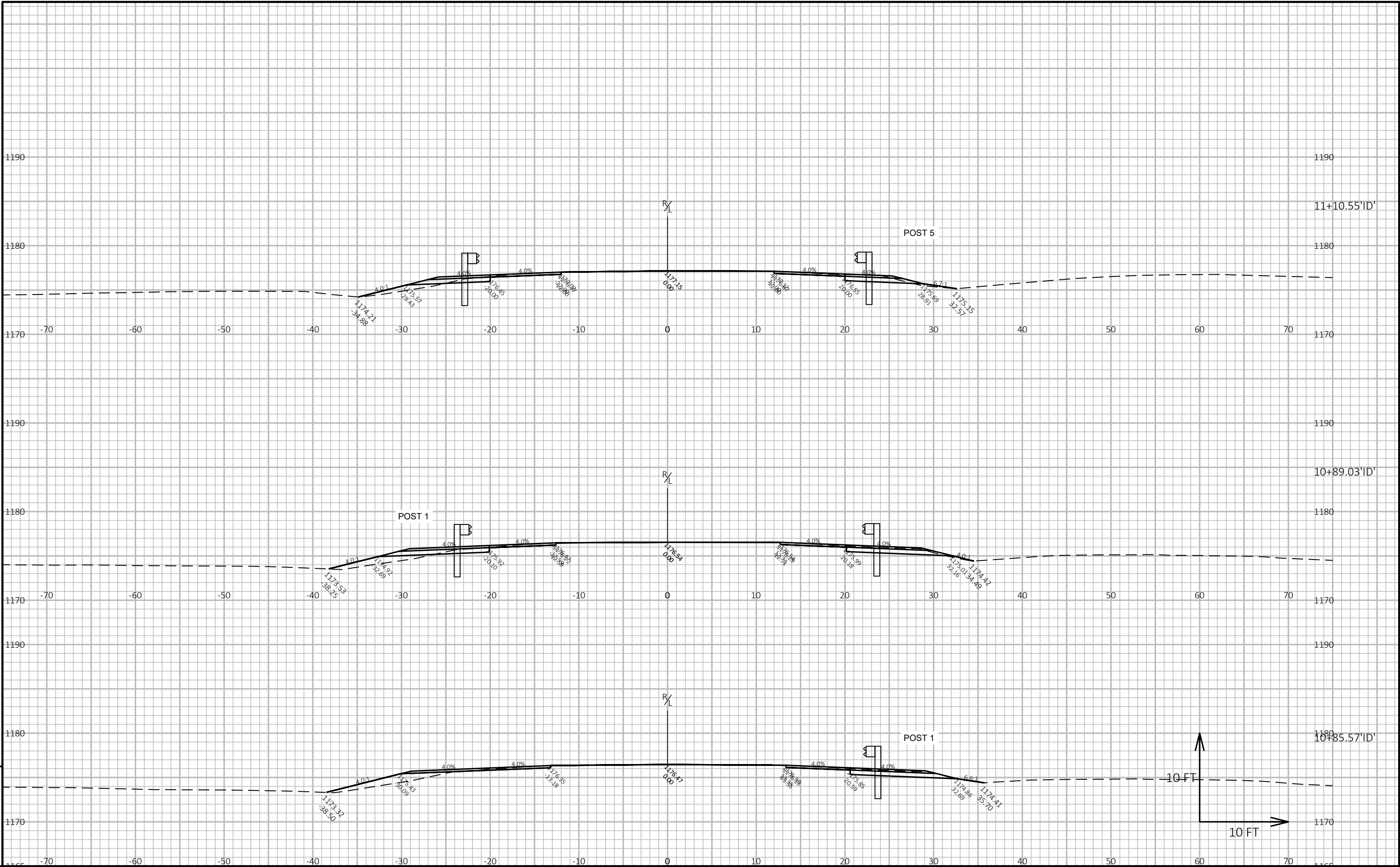


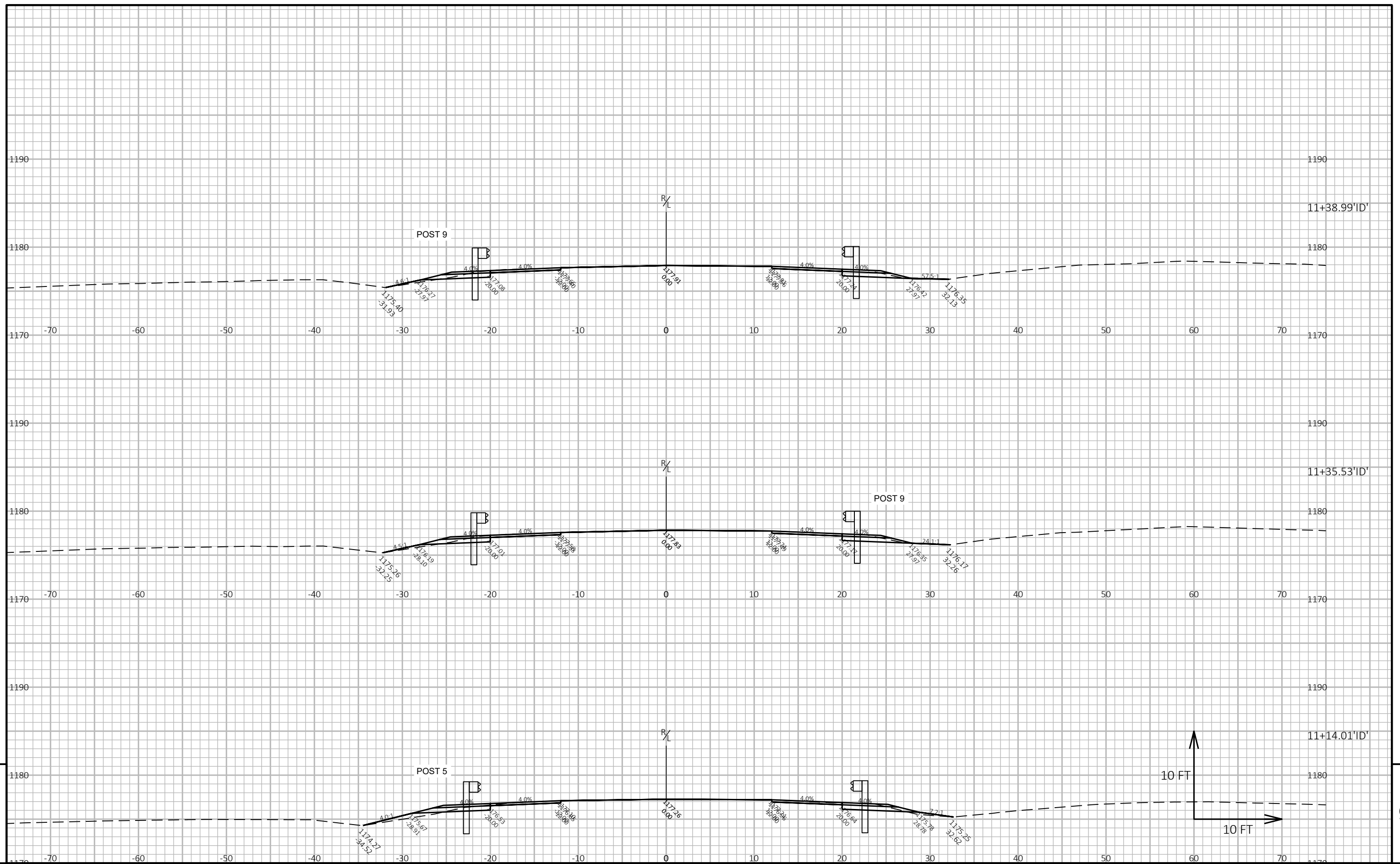












PROJECT NO:	1204-05-73
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HWY: USH 18

COUNTY: DANE

CROSS SECTIONS:	CTH ID
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SHEET 131

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FILE NAME : P:\2018 PROJECTS\5018041 - WISDOT SWR US 18_151\CIVIL3D\SHEETSP\PLAN\1204-05-73\090202-XS.DWG
LAYOUT NAME - 8

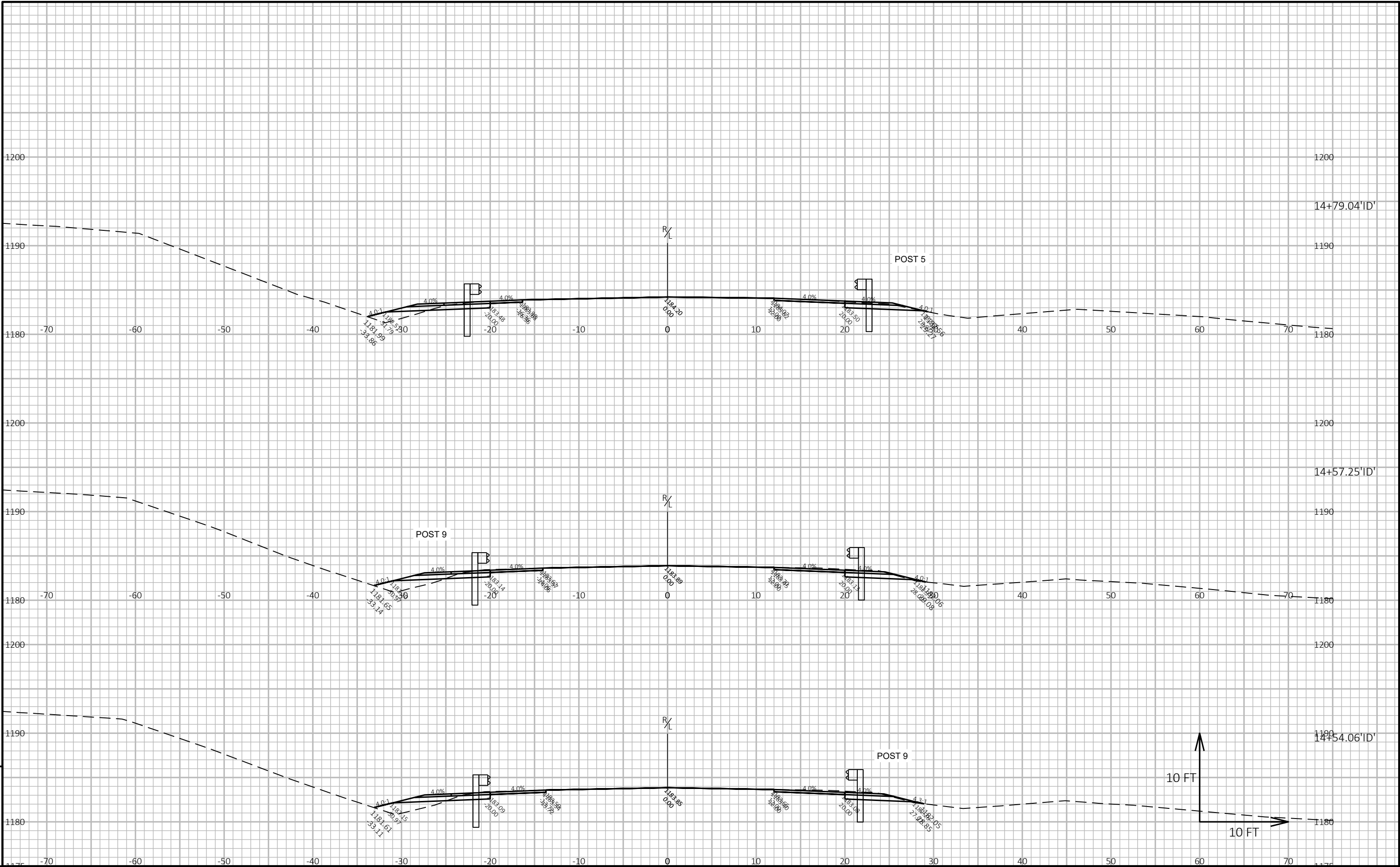
PLOT DATE : 12/9/2019 2:41 PM

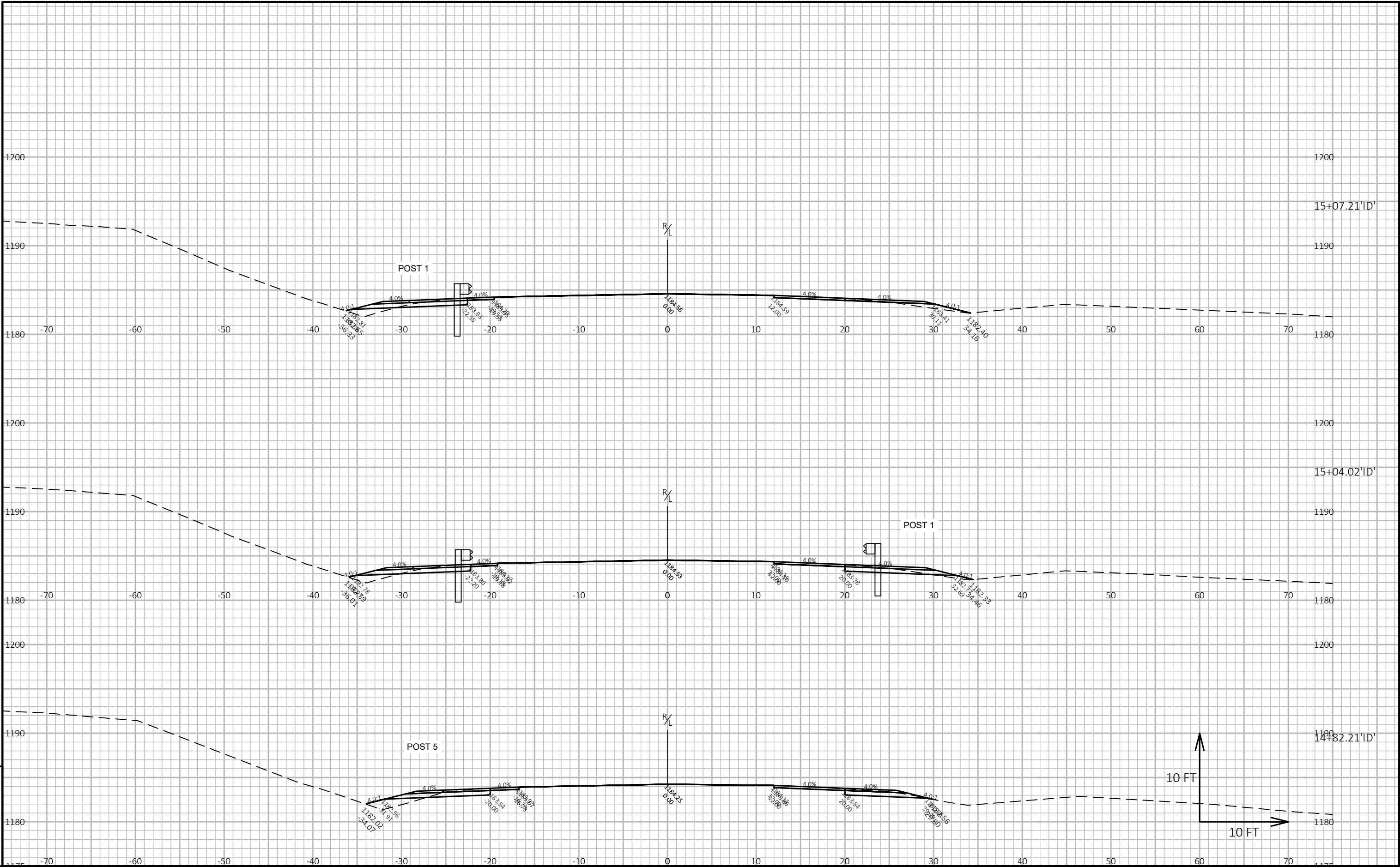
PLOT BY : BRETT PETERSON

PLOT NAME :

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:10 FT VERT.

WISDOT/CADDS SHEET 49





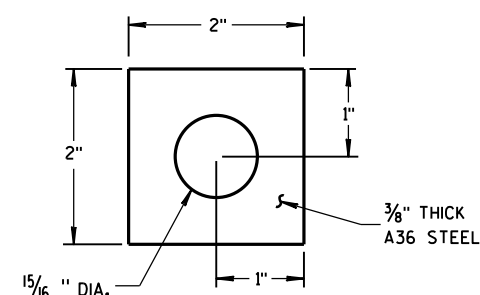
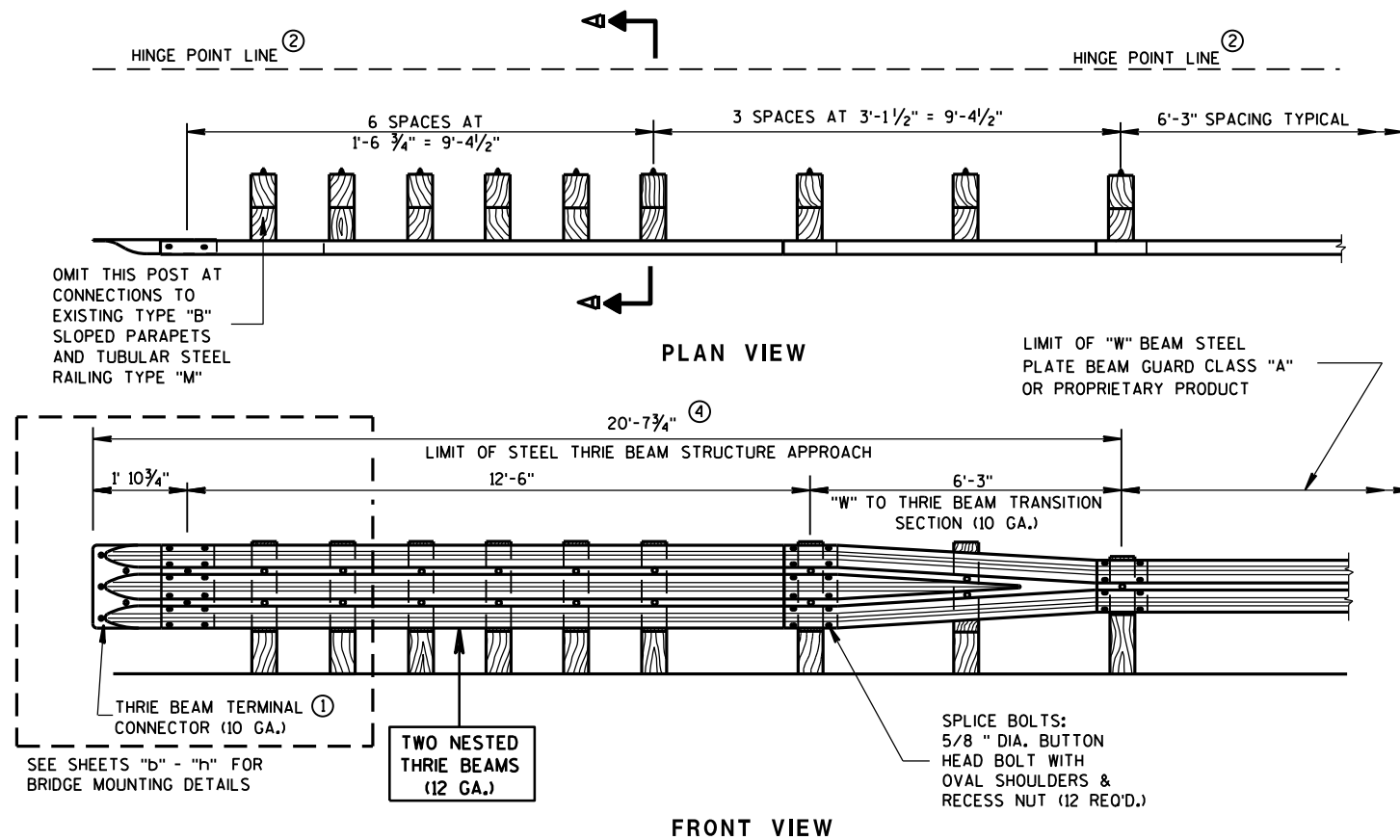


PLATE WASHER DETAIL

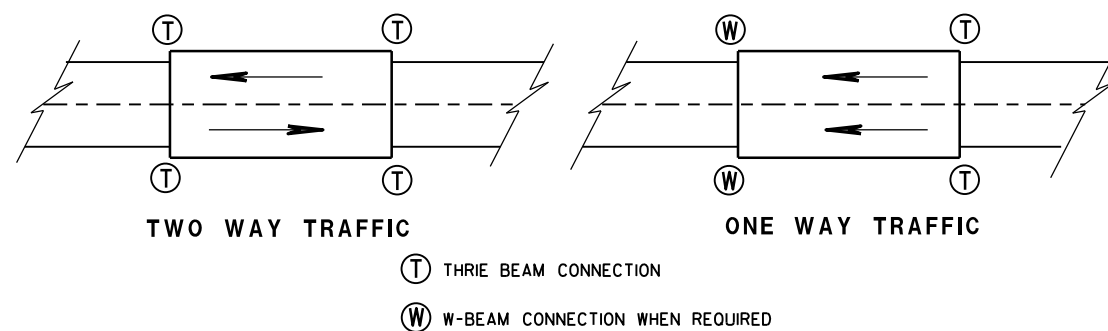
GENERAL NOTES

BOLT THE THRIE BEAM TO ALL POSTS AND BLOCKOUTS. DRILL OR PUNCH BOLT HOLES IN THE BEAM IF THE POST SPACING IS LESS THAN 6'-3".

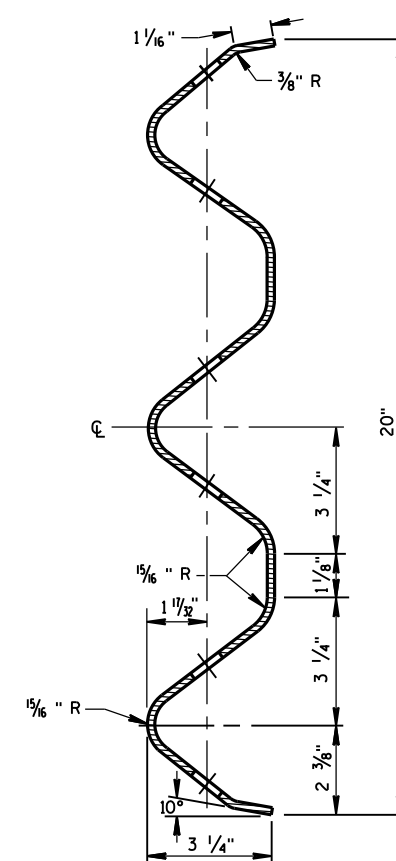
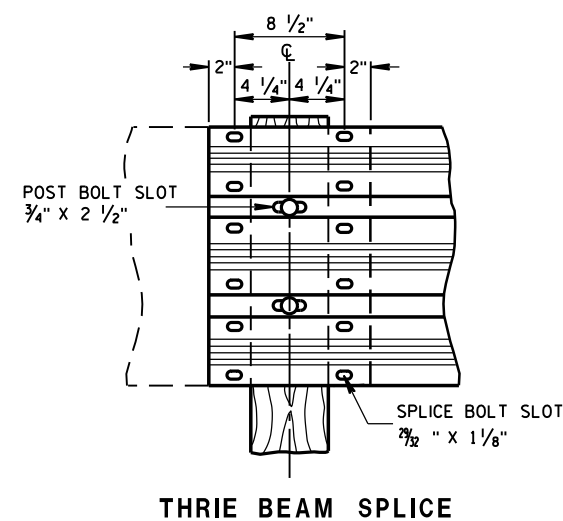
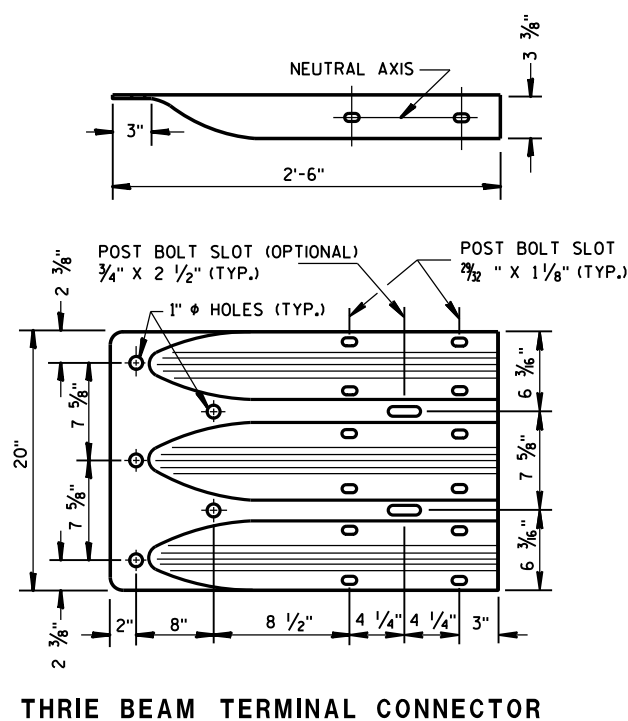
DO NOT USE STEEL POSTS AND NOTCHED PLASTIC BLOCKOUTS IN THE STEEL THRIE BEAM STRUCTURAL APPROACH AND THE TRANSITION SECTION OF STEEL PLATE BEAM GUARD, CLASS "A" INSTALLATIONS.

IF ROCK IS ENCOUNTERED, REMOVE ROCK TO FULL DEPTH OF POST PLUS 2½", AND 12" DIAMETER AROUND POST. SEE 14B15 FOR MORE DETAILS.

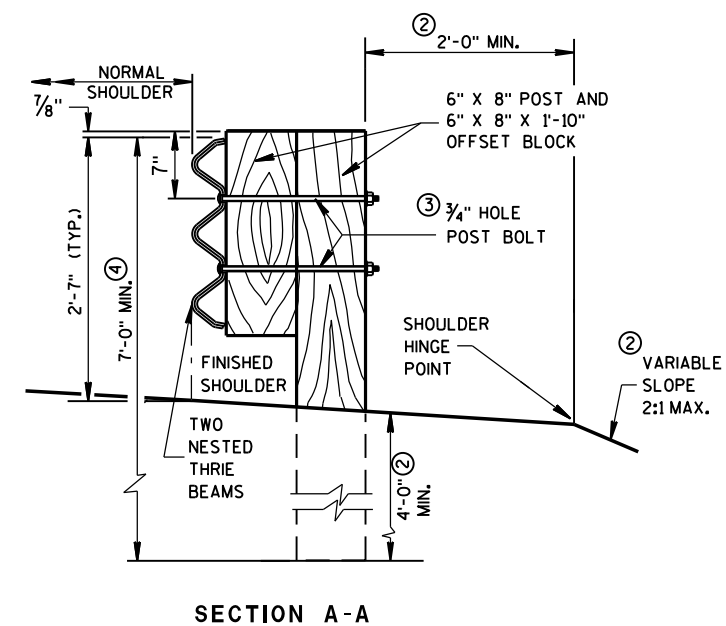
- ① BRIDGE RAILING TYPE "W" DOES NOT REQUIRE A TERMINAL CONNECTOR.
- ② MINIMUM EMBEDMENT SHALL BE 4'-0". WHERE EXISTING CONDITIONS DO NOT PERMIT THE APPROPRIATE EARTHWORK SHOWN ON THE PLAN TYPICAL SECTIONS OR DETAILS, THE ENGINEER MAY ALLOW THE REDUCTION OR ELIMINATION OF THE 2 FOOT DISTANCE TO THE HINGE POINT. OTHERWISE BUILD AS THE PLAN SHOWS OR AS THE ENGINEER DIRECTS. IF THE 2 FOOT DISTANCE TO THE HINGE POINT IS REDUCED OR ELIMINATED, INCREASE THE POST EMBEDMENT DEPTH TO 4'-6" OR MORE.
- ③ POST BOLTS ARE $\frac{5}{8}$ " DIAMETER ASTM A307 BUTTON HEAD BOLT. A POST BOLT REQUIRES A $\frac{5}{8}$ " DIAMETER A563A DOUBLE RECESSED (DR) HEAVY HEX AND A $\frac{5}{8}$ " DIAMETER F844 FLAT WASHER. LENGTH OF POST BOLT MAY VARY.
- ④ ALL WOOD POSTS MUST BE 6" X 8" AND AT LEAST 7'-0" LONG.



TYPICAL LOCATIONS OF THRIE BEAM
AND W-BEAM CONNECTIONS TO BRIDGE



SECTION THRU THRIE
BEAM RAIL ELEMENT



SECTION A-A

STEEL THRIE BEAM STRUCTURE APPROACH

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

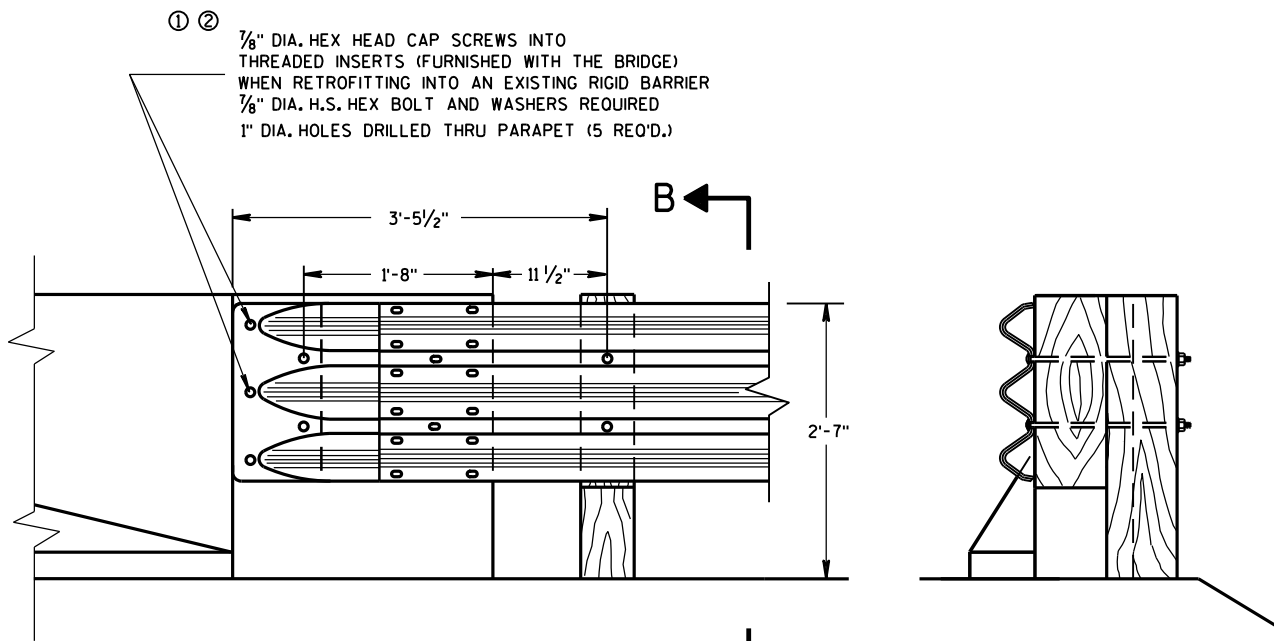
APPROVED
8-31-2012
DATE

/S/ Jerry H. Zogg
ROADWAY STANDARDS DEVELOPMENT
ENGINEER

FHWA



SDD 14b20-b Steel Thrie Beam Structure Approach, Connection to Square End Parapets



FRONT VIEW

SECTION B-B

THRIE BEAM CONNECTION TO BRIDGE
PARAPET WITH SQUARE ENDS

GENERAL NOTES

THESE ARE TYPICAL CONNECTION DETAILS. ADJUST THE POSITION OF CONNECTIONS TO EXISTING BRIDGES TO FIT THE ACTUAL BRIDGE AND SITE DIMENSIONS.

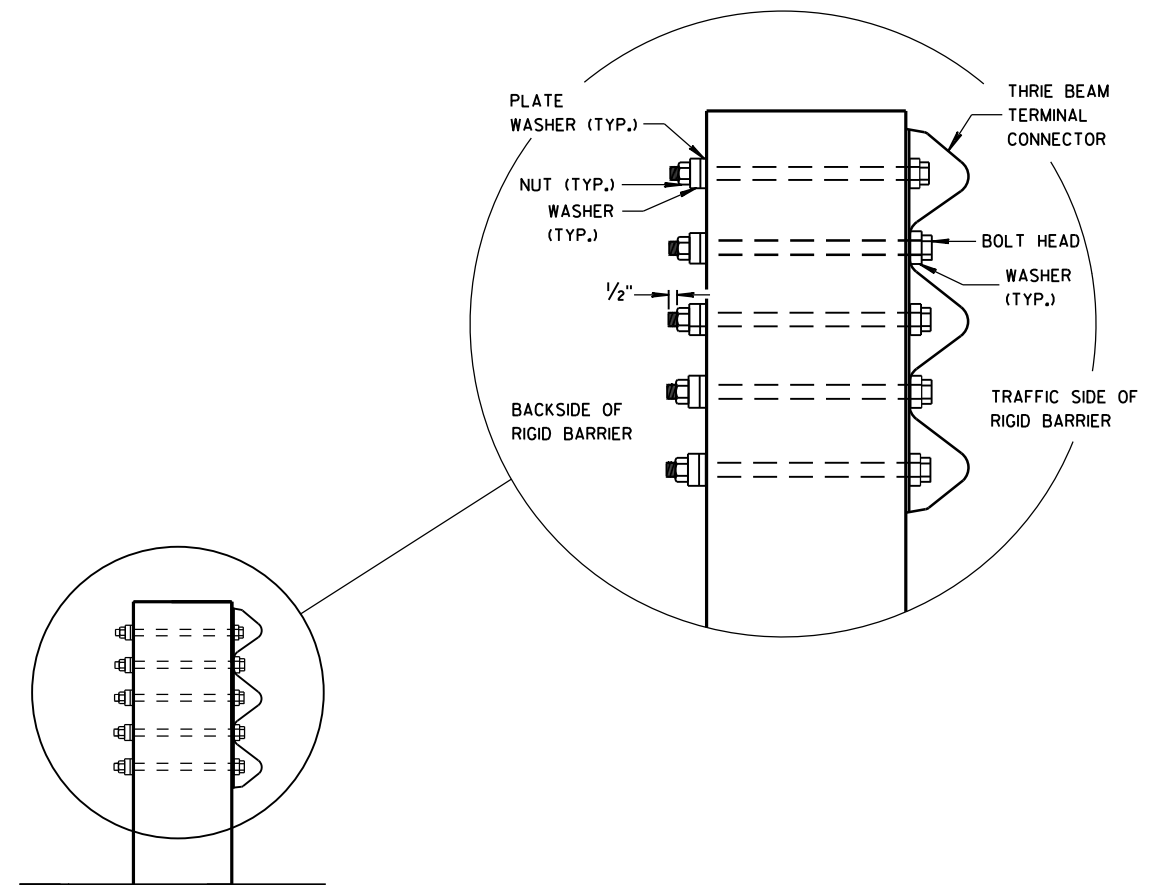
BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A325, A449 AND GALVANIZED PER STANDARD SPECIFICATIONS 614.

- ① DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.
- ② BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM TERMINAL CONNECTOR. BOLTS THAT EXTEND THROUGH THE PARAPET AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 2" O.D. X 5/8" THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.

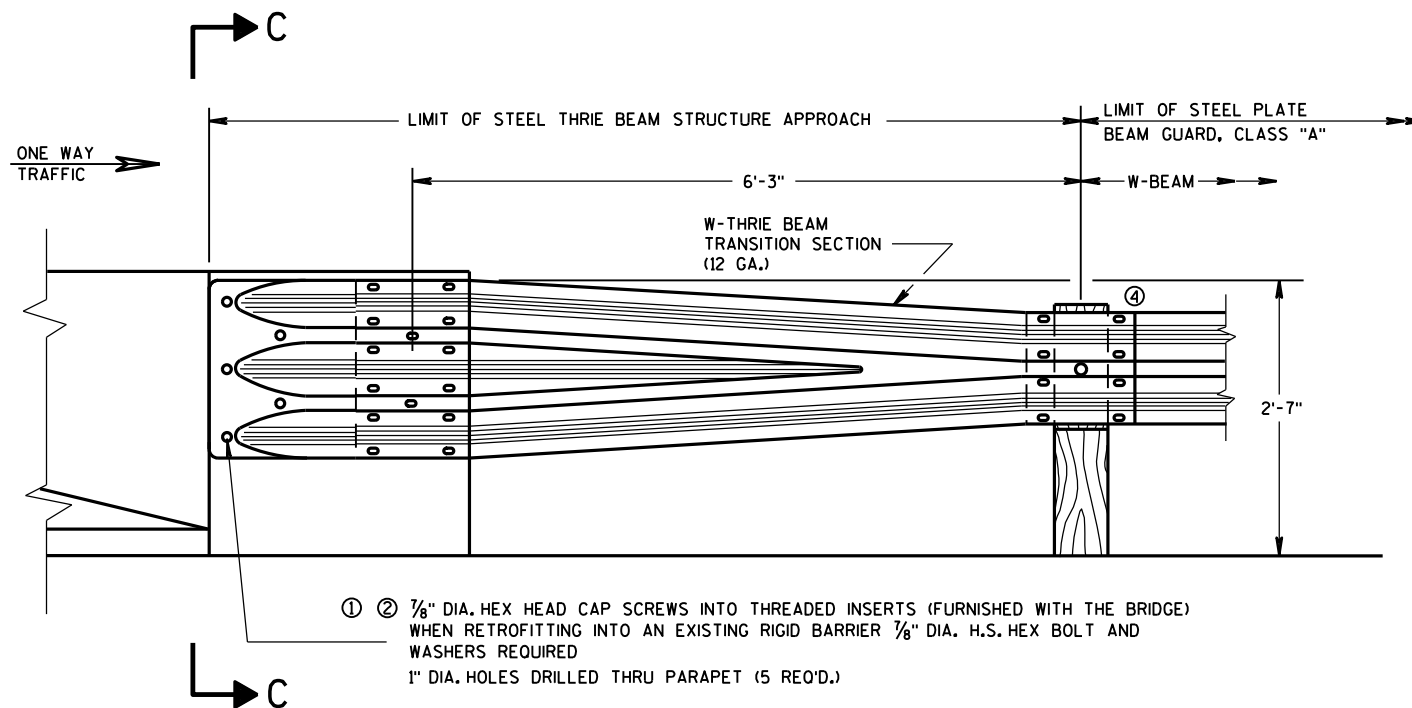
- ③ THE RECESS FOR A W-BEAM CONNECTION, WHICH EXISTS ON SOME PARAPETS OF THIS TYPE, SHALL BE FILLED WITH A TREATED TIMBER BLOCKOUT. BLOCKOUT SIZE IS 1'-6" X 2'-0" X 3 1/2".

- ④ W6 X 9 OR W6 X 8.5 STEEL POSTS AND NOTCHED PLASTIC BLOCKOUTS ARE ACCEPTABLE ALTERNATIVES FOR 6" X 8" WOOD POST WITH WOOD OR PLASTIC BLOCKOUTS. USE APPROVED NOTCHED PLASTIC BLOCKOUTS WITH STEEL POSTS.

DO NOT USE STEEL POSTS AND NOTCHED PLASTIC BLOCKOUTS IN THE STEEL THRIE BEAM STRUCTURAL APPROACH AND THE TRANSITION SECTION OF STEEL PLATE BEAM GUARD, CLASS "A" INSTALLATIONS.



SECTION C-C



FRONT VIEW

W BEAM TRANSITION AND CONNECTION TO
BRIDGE PARAPETS WITH SQUARE ENDS
(USE ONLY ON THE TRAFFIC EXIT END OF ONE WAY BRIDGES)

STEEL THRIE BEAM STRUCTURE
APPROACH, CONNECTION TO
SQUARE END PARAPETS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED

8/31/2012
DATE

FHWA

/S/ Jerry H. Zogg
ROADWAY STANDARDS DEVELOPMENT
ENGINEER



SDD 14b20-c Steel Thrie Beam Structure Approach, Connection to Vertical Faced Parapets

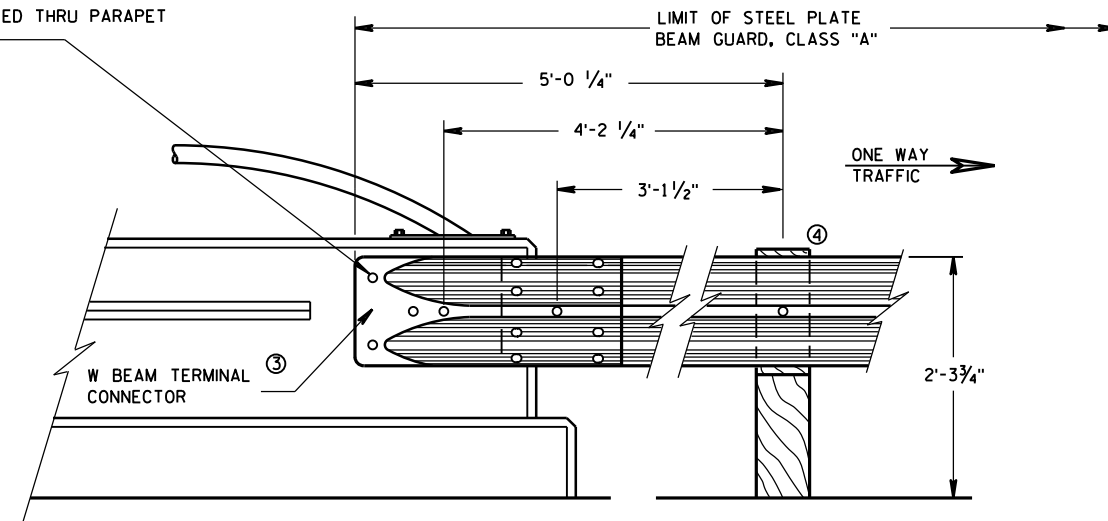
GENERAL NOTES

THESE ARE TYPICAL CONNECTION DETAILS. ADJUST THE POSITION OF CONNECTIONS TO EXISTING BRIDGES TO FIT THE ACTUAL BRIDGE AND SITE DIMENSIONS.

BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A325, A449 AND GALVANIZED PER STANDARD SPECIFICATIONS 614.

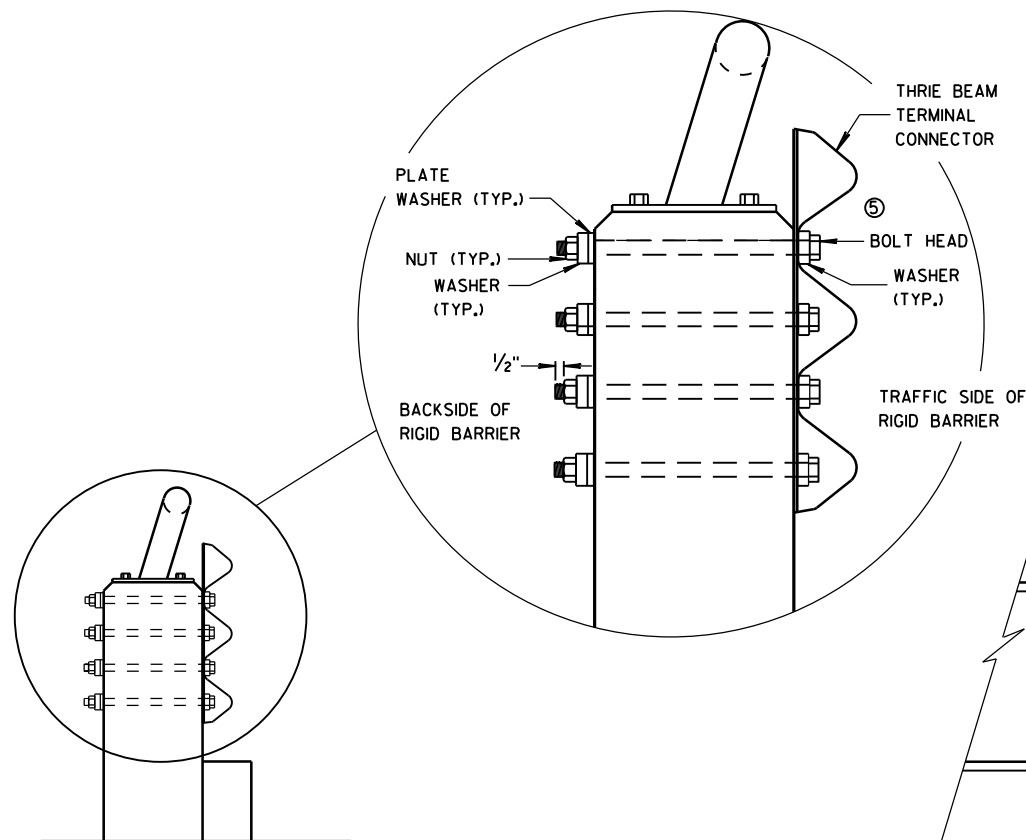
- ① DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.
 - ② BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM TERMINAL CONNECTOR. BOLTS THAT EXTEND THROUGH THE PARAPET AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 2" O.D. X $\frac{5}{8}$ " THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.
 - ③ THE RECESS FOR A W-BEAM CONNECTION, WHICH EXISTS ON SOME PARAPETS OF THIS TYPE, SHALL BE FILLED WITH A TREATED TIMBER BLOCKOUT. BLOCKOUT SIZE IS 1'-6" X 2'-0" X 3 $\frac{1}{2}$ ".
 - ④ W6 X 9 OR W6 X 8.5 STEEL POSTS AND NOTCHED PLASTIC BLOCKOUTS ARE ACCEPTABLE ALTERNATIVES FOR 6" X 8" WOOD POST WITH WOOD OR PLASTIC BLOCKOUTS. USE APPROVED NOTCHED PLASTIC BLOCKOUTS WITH STEEL POSTS.
 - ⑤ BOLT, NUT AND WASHERS NOT REQUIRED FOR THIS LOCATION WHEN RETROFITTING AN EXISTING PARAPET AND THE HOLE IS EITHER ABOVE PARAPET OR WITHIN 4 INCHES OF THE EDGE OF PARAPET.
- DO NOT USE STEEL POSTS AND NOTCHED PLASTIC BLOCKOUTS IN THE STEEL THRIE BEAM STRUCTURAL APPROACH AND THE TRANSITION SECTION OF STEEL PLATE BEAM GUARD, CLASS "A" INSTALLATIONS.

- ① ② $\frac{7}{8}$ " DIA. HEX HEAD CAP SCREWS INTO THREADED INSERTS (FURNISHED WITH THE BRIDGE) WHEN RETROFITTING INTO AN EXISTING RIGID BARRIER $\frac{7}{8}$ " DIA. H.S. HEX BOLT AND WASHERS REQUIRED
- 1" DIA. HOLES DRILLED THRU PARAPET (4 REQ'D.)

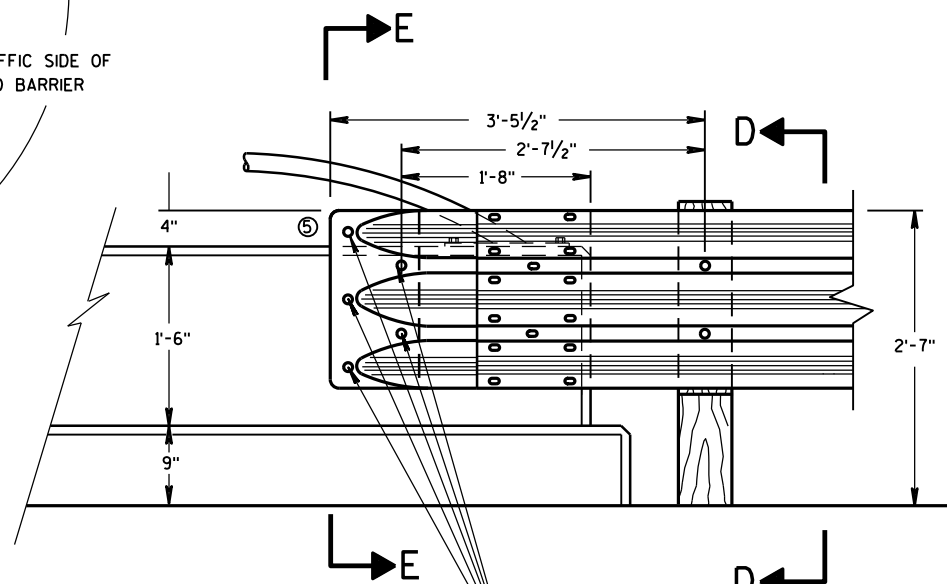


FRONT VIEW

W BEAM CONNECTION TO VERTICAL FACE PARAPET
(USE ONLY ON THE TRAFFIC EXIT END OF ONE WAY BRIDGES)



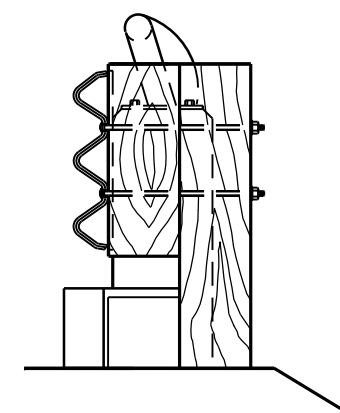
SECTION E-E



FRONT VIEW

- ① ② $\frac{7}{8}$ " DIA. HEX HEAD CAP SCREWS INTO THREADED INSERTS (FURNISHED WITH THE BRIDGE) WHEN RETROFITTING INTO AN EXISTING RIGID BARRIER $\frac{7}{8}$ " DIA. H.S. HEX BOLT AND WASHERS REQUIRED
- 1" DIA. HOLES DRILLED THRU PARAPET (4 REQ'D.)

THRIE BEAM CONNECTION TO VERTICAL FACED PARAPETS



SECTION D-D

STEEL THRIE BEAM STRUCTURE
APPROACH, CONNECTION TO
VERTICAL FACED PARAPETS

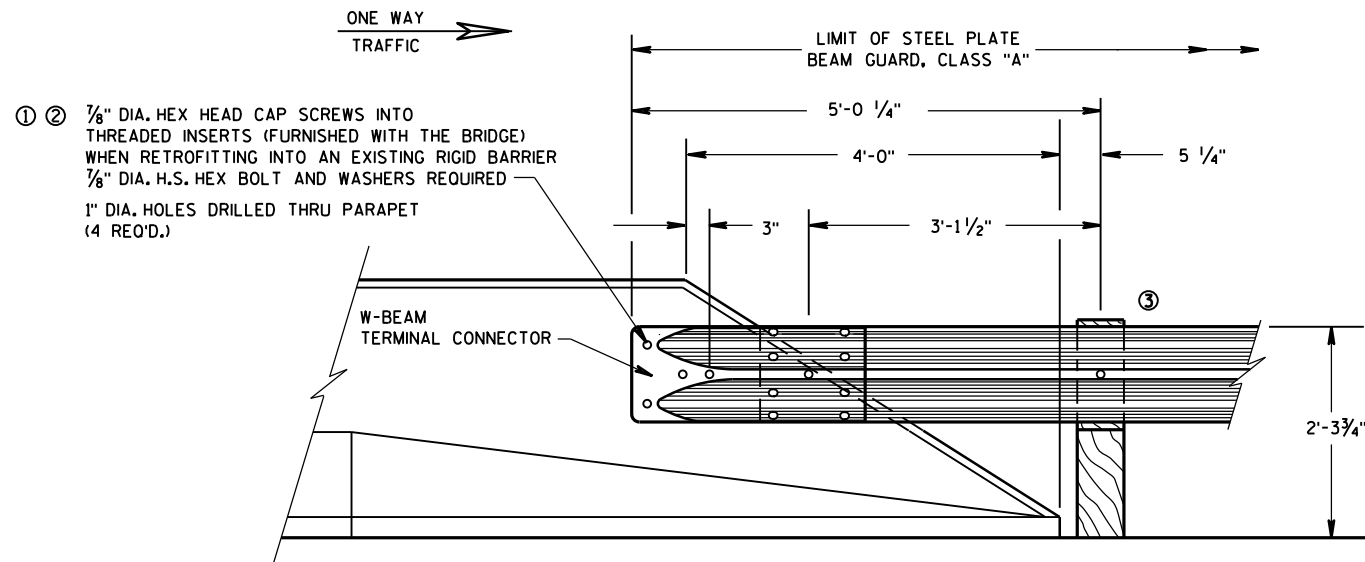
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
8/31/2012
DATE
FHWA

/S/ Jerry H. Zoog
ROADWAY STANDARDS DEVELOPMENT
ENGINEER



SDD 14b20-d Steel Thrie Beam Structure Approach, Connection to Sloped End Parapets



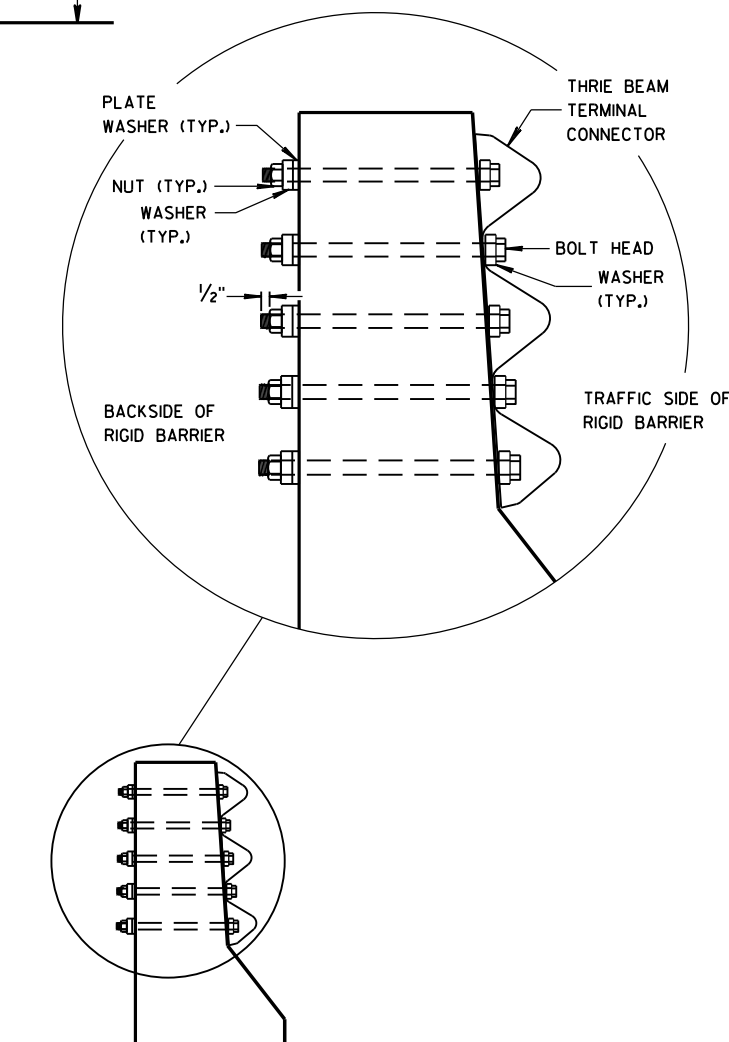
FRONT VIEW
W BEAM CONNECTION TO
PARAPETS WITH SLOPED ENDS
(USE ONLY AT TRAFFIC EXIT END OF ONE WAY BRIDGE)

GENERAL NOTES

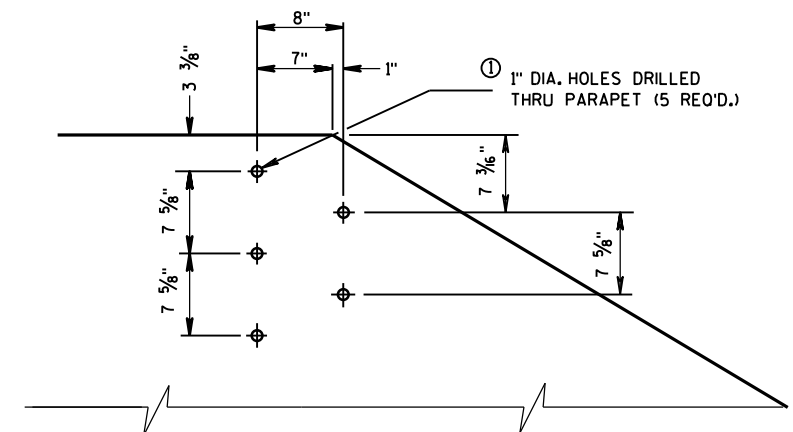
THESE ARE TYPICAL CONNECTION DETAILS. ADJUST THE POSITION OF CONNECTIONS TO EXISTING BRIDGES TO FIT THE ACTUAL BRIDGE AND SITE DIMENSIONS.

BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A325, A449 AND GALVANIZED PER STANDARD SPECIFICATIONS 614.

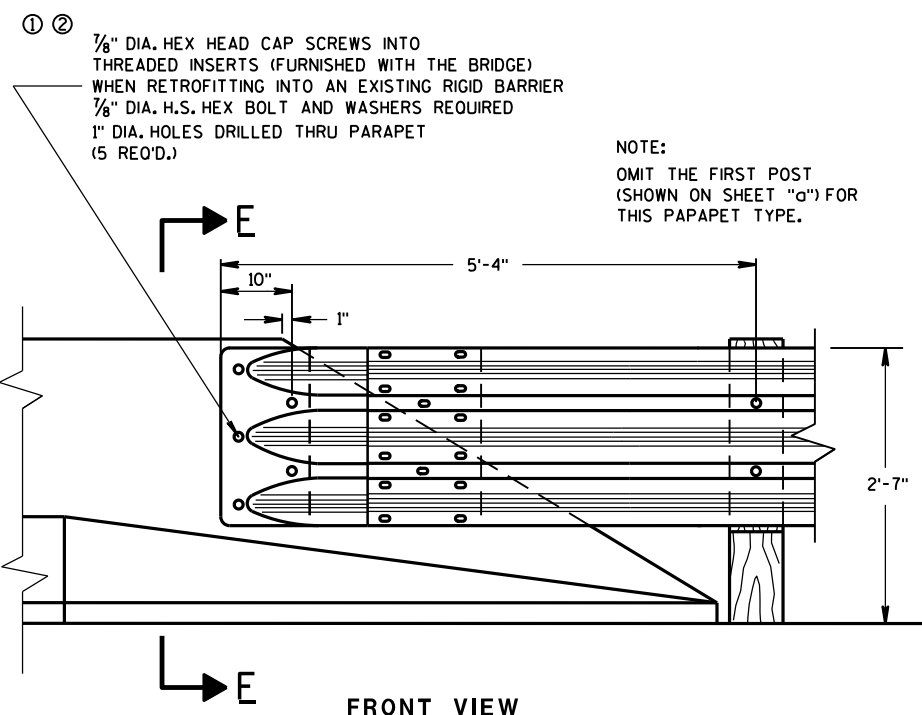
- ① DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.
- ② BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM TERMINAL CONNECTOR. BOLTS THAT EXTEND THROUGH THE PARAPET AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 2" O.D. X 5/8" THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.
- ③ W6 X 9 OR W6 X 8.5 STEEL POSTS AND NOTCHED PLASTIC BLOCKOUTS ARE ACCEPTABLE ALTERNATIVES FOR 6" X 8" WOOD POST WITH WOOD OR PLASTIC BLOCKOUTS. USE APPROVED NOTCHED PLASTIC BLOCKOUTS WITH STEEL POSTS. DO NOT USE STEEL POSTS AND NOTCHED PLASTIC BLOCKOUTS IN THE STEEL THRIE BEAM STRUCTURAL APPROACH AND THE TRANSITION SECTION OF STEEL PLATE BEAM GUARD, CLASS "A" INSTALLATIONS.



SECTION F-F



DRILL HOLE LOCATION AND PATTERN
FOR THRIE BEAM CONNECTION



FRONT VIEW
THRIE BEAM CONNECTION TO BRIDGE
PARAPETS WITH SLOPED ENDS

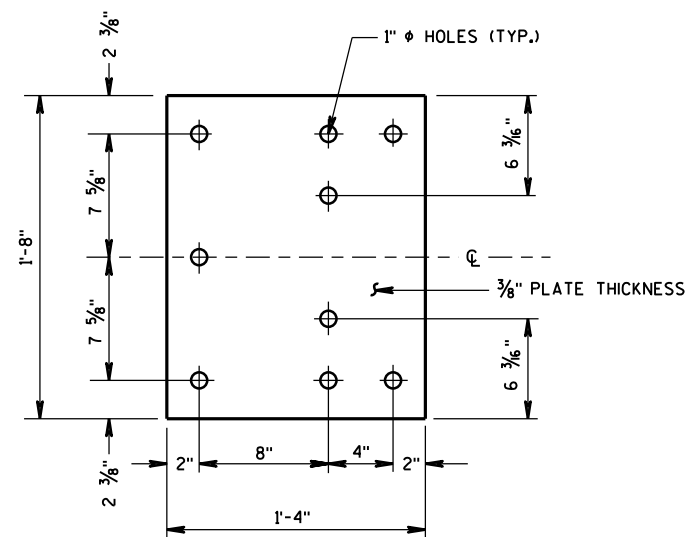
STEEL THRIE BEAM STRUCTURE
APPROACH, CONNECTION TO
SLOPED END PARAPETS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

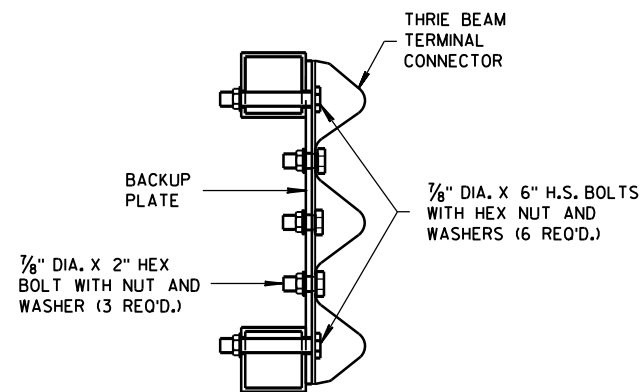
APPROVED
8/31/2012
DATE
/S/ Jerry H. Zogg
ROADWAY STANDARDS DEVELOPMENT
ENGINEER
FHWA



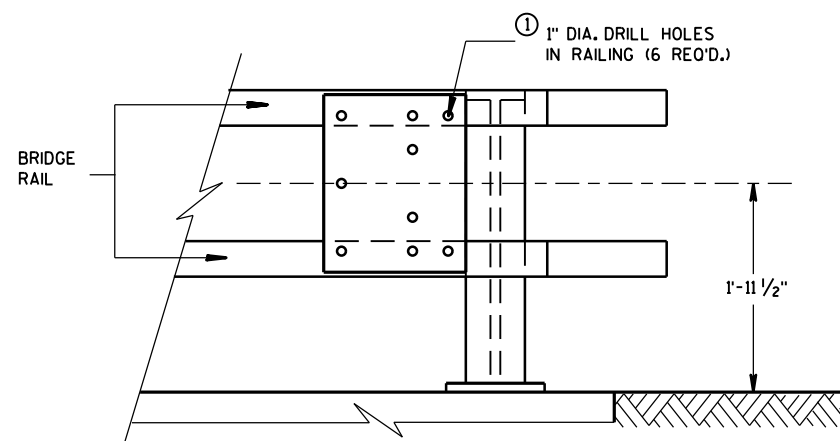
SDD 14b20-e Steel Thrie Beam Structure Approach, Connection to Bridge Railing Types "F" and "W"



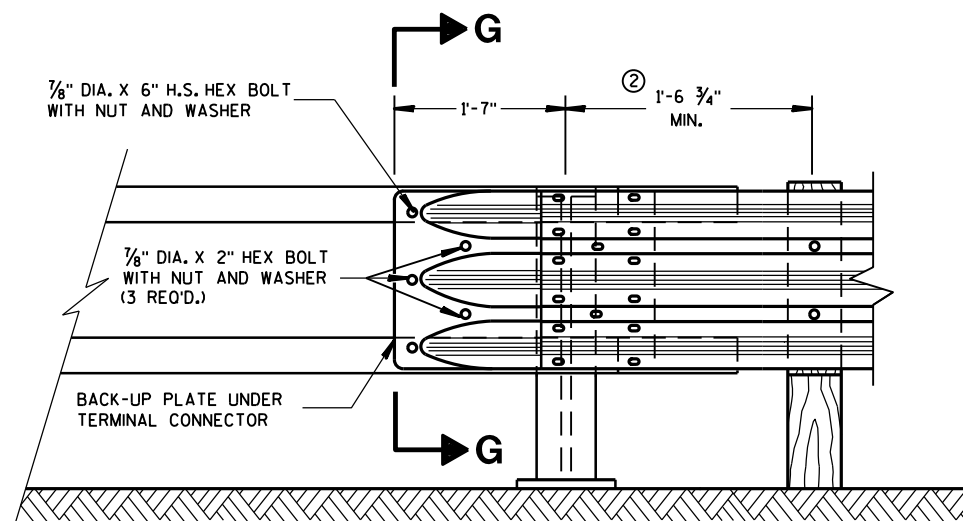
BACK-UP PLATE DETAIL



SECTION G-G

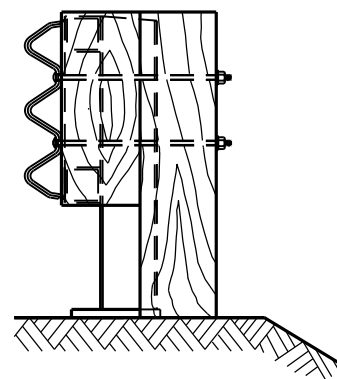


BACK-UP PLATE MOUNTING ONTO BRIDGE RAILING



FRONT VIEW

THRIE BEAM CONNECTION TO TUBULAR RAILING TYPE "F"

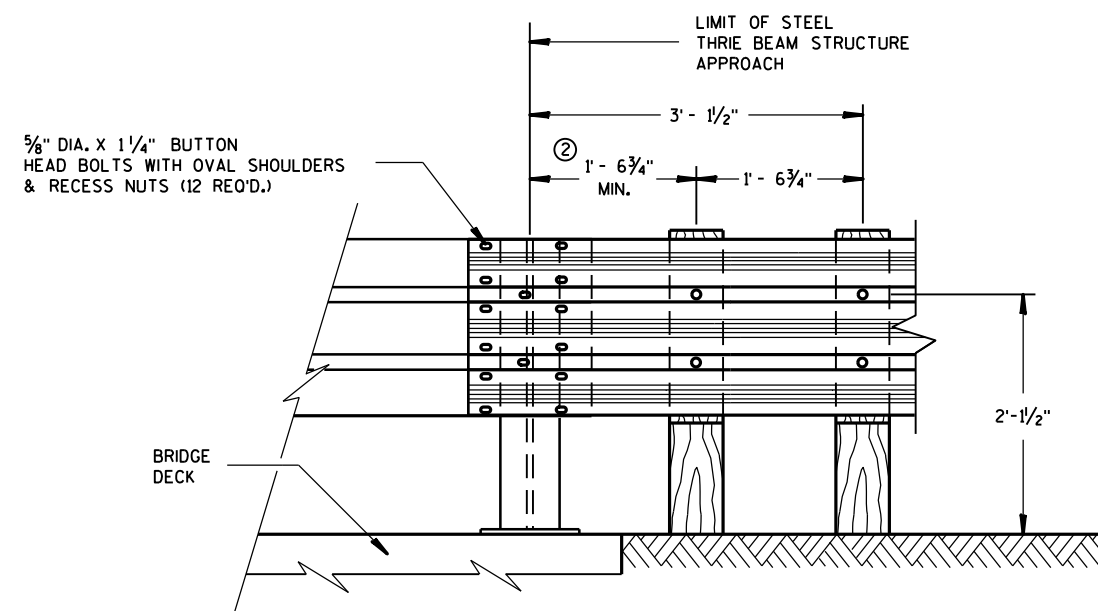


END VIEW

GENERAL NOTES

BOLTS, PLATES, NUTS AND WASHERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATION A 325 AND BE GALVANIZED IN ACCORDANCE WITH ASTM A 153.

- ① DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.
- ② VARY THIS DIMENSION DEPENDING ON ABUTMENT TYPE, WINGWALL DETAILS, AND ANGLE OF SKEW. PLACE THE FIRST WOOD POST OFF THE BRIDGE SHALL AS CLOSE AS FEASIBLE TO THE STEEL END POST.



FRONT VIEW
THRIE BEAM CONNECTION TO STEEL RAILING TYPE "W"

STEEL THRIE BEAM STRUCTURE
APPROACH, CONNECTION TO BRIDGE
RAILING TYPES "F" AND "W"

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
8/31/2012
DATE
FHWA

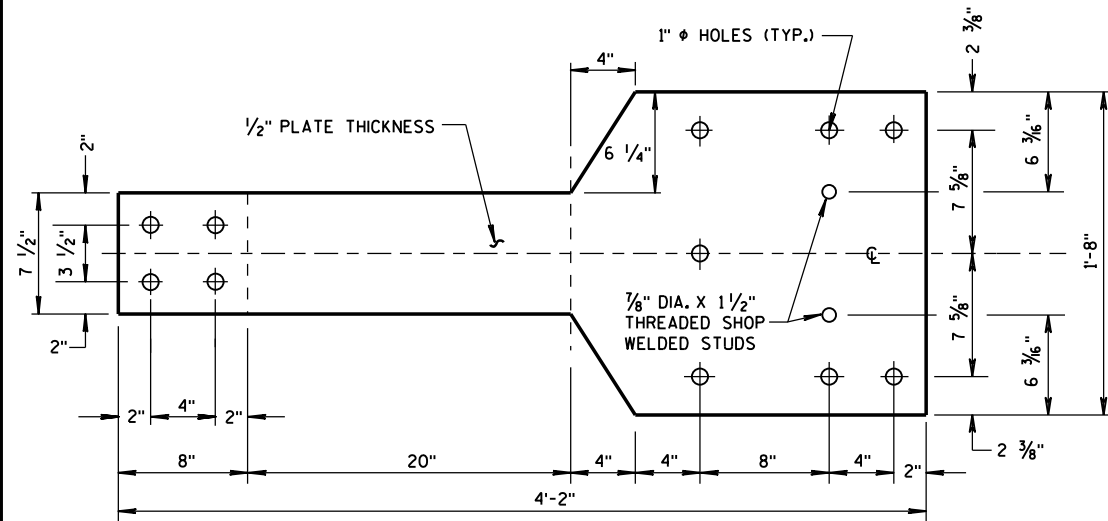
/S/ Jerry H. Zogg
ROADWAY STANDARDS DEVELOPMENT
ENGINEER



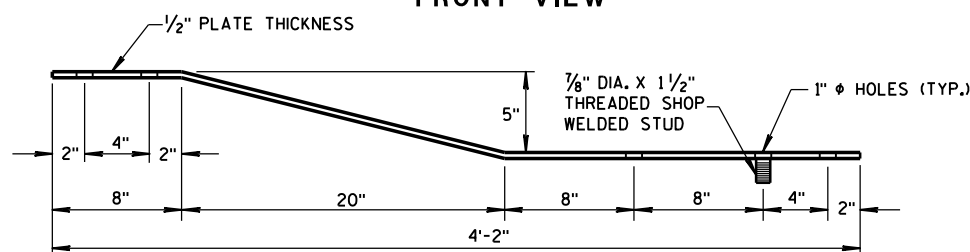
SDD 14b20-f Steel Thrie Beam Structure Approach, Connection to Bridge Railing Type "M"

GENERAL NOTES

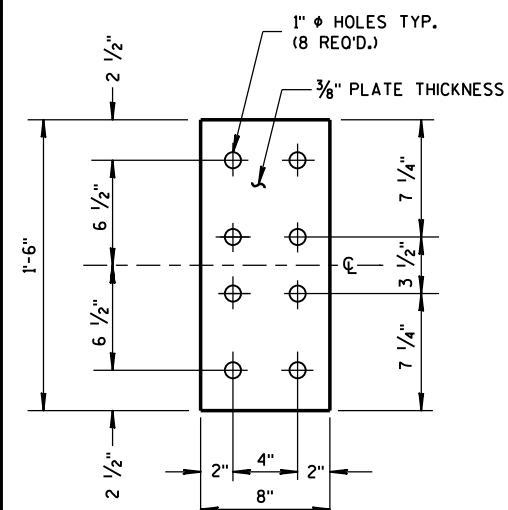
- VARY THIS DIMENSION DEPENDING ON ABUTMENT TYPE, WINGWALL DETAILS, AND ANGLE OF SKEW. PLACE THE FIRST WOOD POST OFF THE BRIDGE SHALL BE AS CLOSE AS FEASIBLE TO THE STEEL END POST.



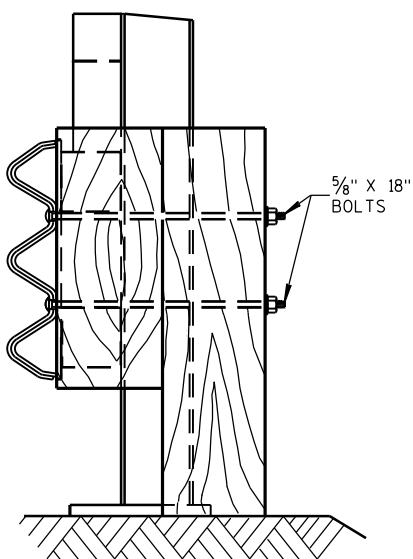
FRONT VIEW



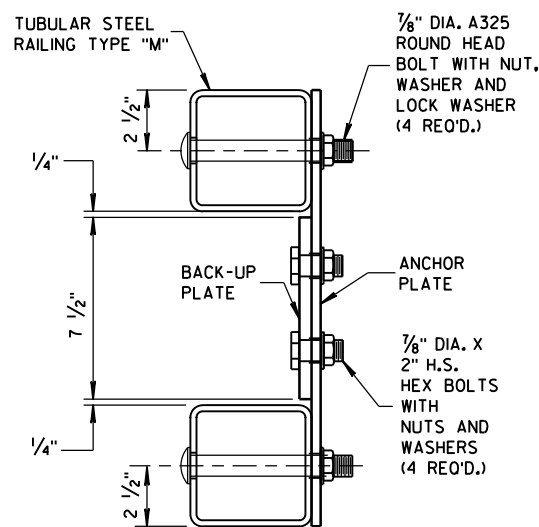
PLAN VIEW
BACK-UP PLATE DETAIL, TYPE "M"



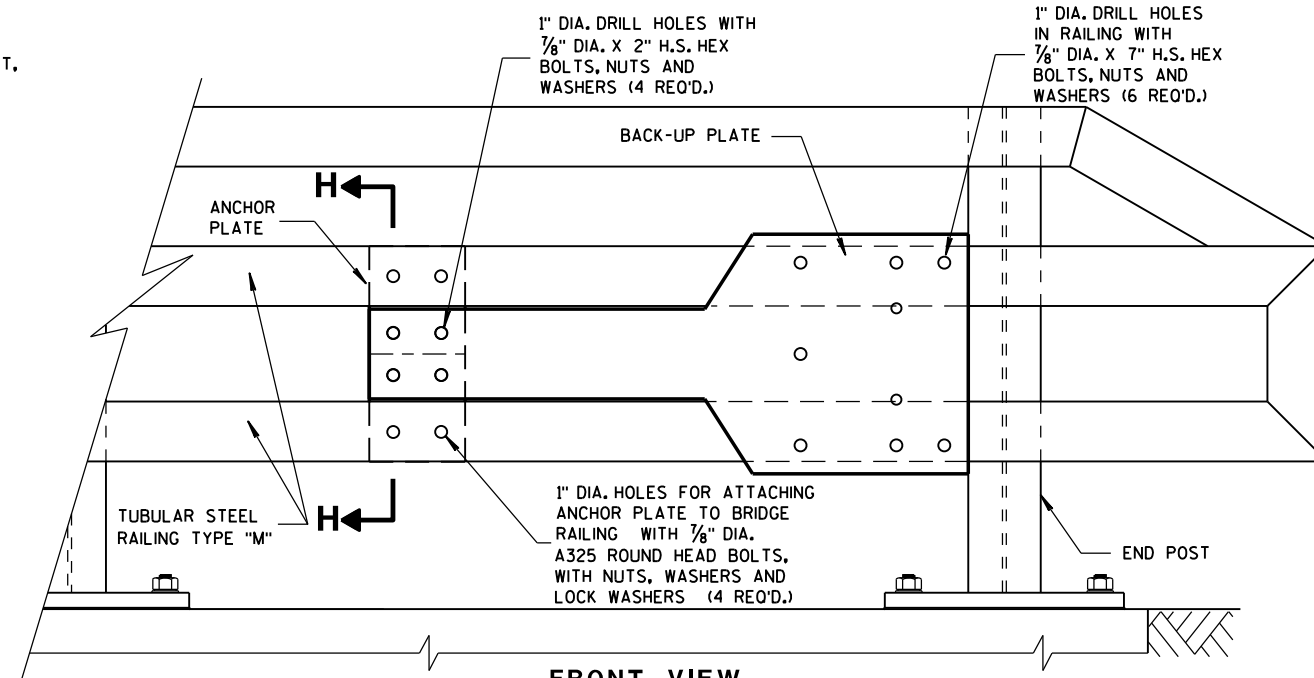
FRONT VIEW
ANCHOR PLATE DETAIL,
TYPE "M"



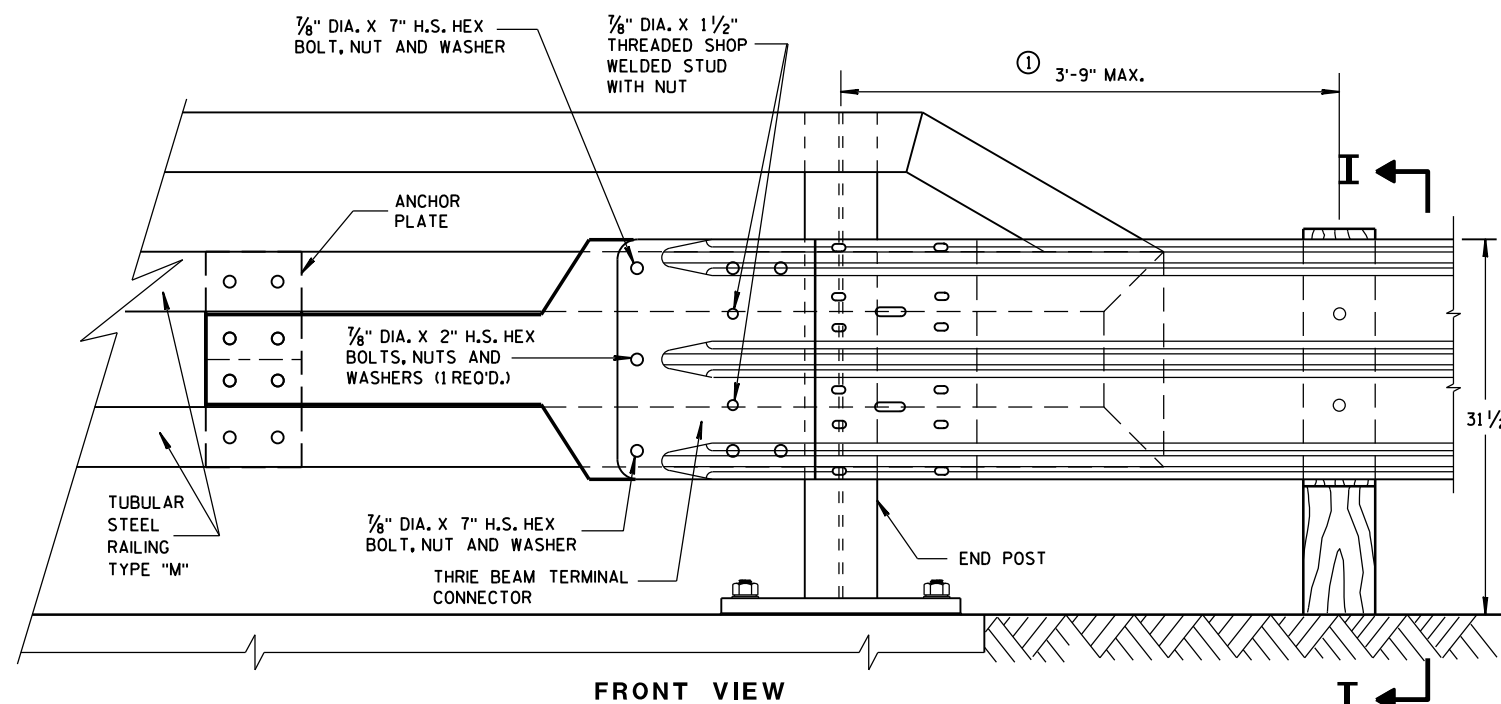
SECTION I-I



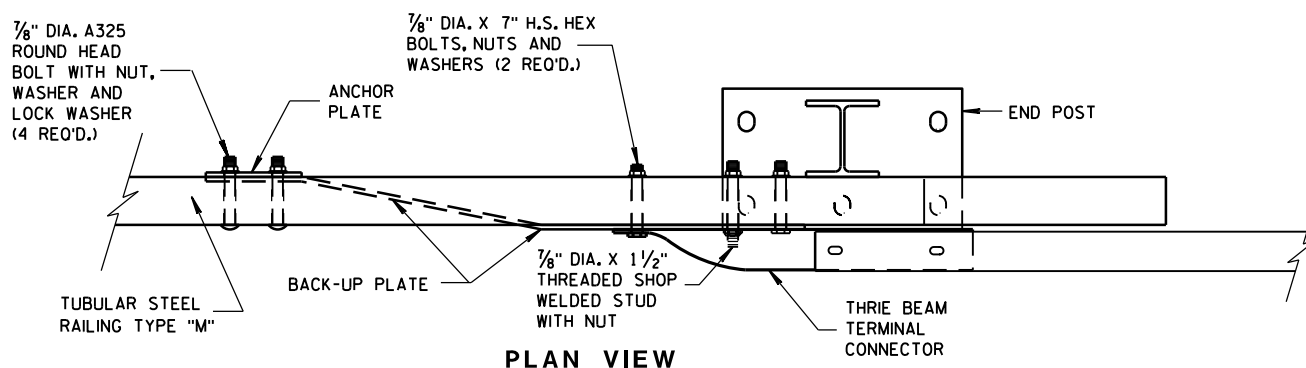
SECTION H-H



FRONT VIEW
ANCHOR AND BACK-UP PLATE MOUNTING TO BRIDGE RAILING, TYPE "M"



FRONT VIEW



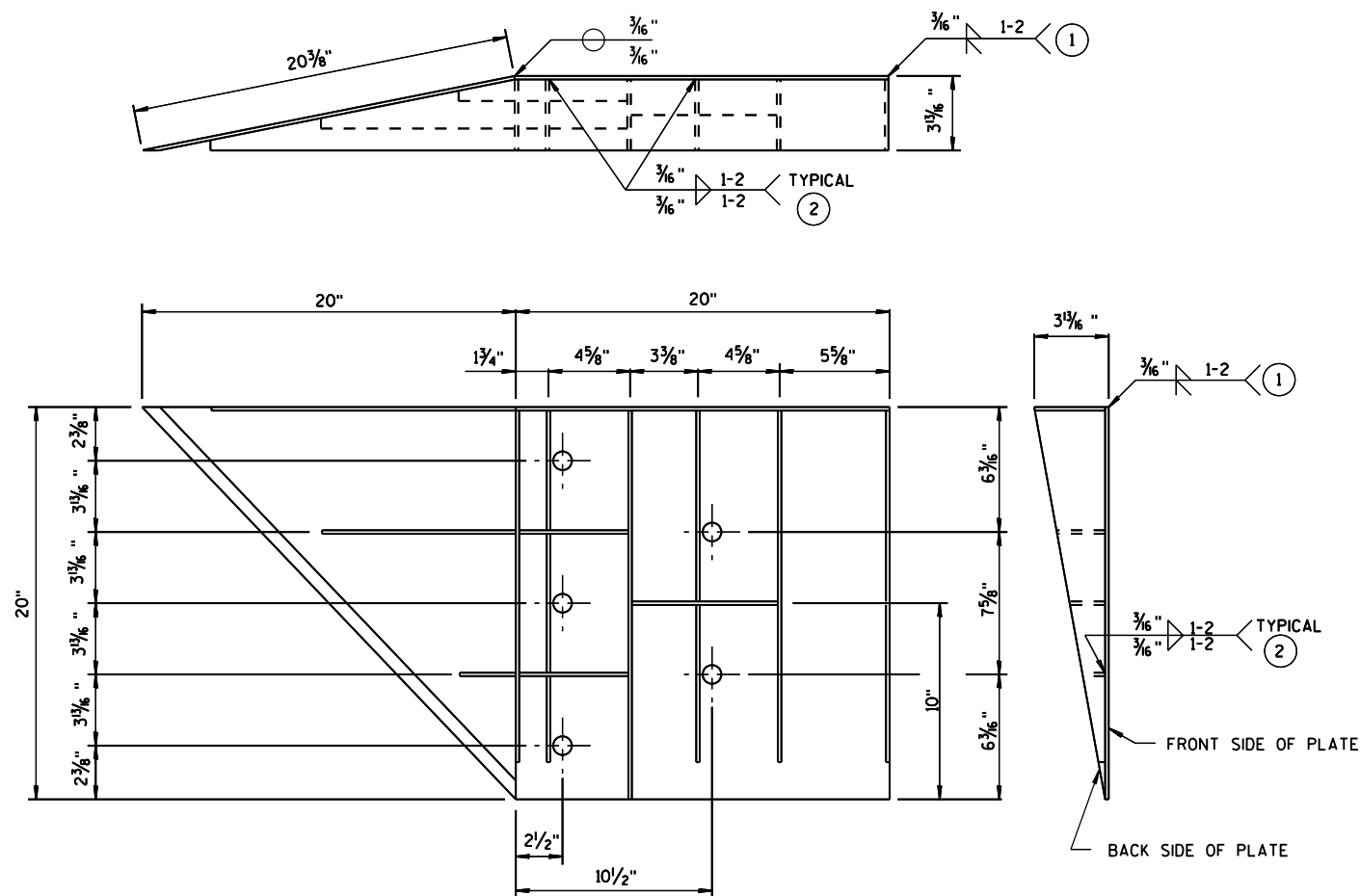
PLAN VIEW

THRIE BEAM CONNECTION TO TUBULAR RAILING, TYPE "M"

STEEL THRIE BEAM STRUCTURE
APPROACH, CONNECTION TO
BRIDGE RAILING TYPE "M"

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
8-31-2012 DATE /S/ Jerry H. Zoegg
ROADWAY STANDARDS DEVELOPMENT
ENGINEER
FHWA



WELDING INSTRUCTION

(VIEWED FROM BACK SIDE OF PLATE)

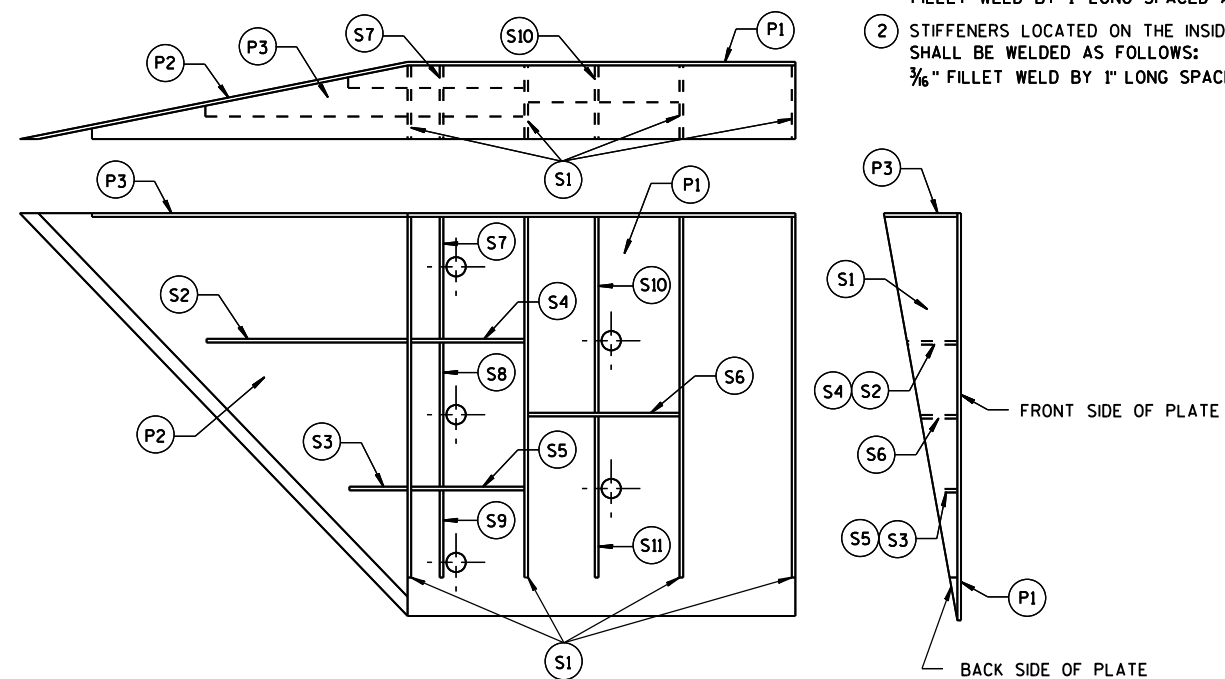


PLATE AND STIFFENER IDENTIFICATION

(VIEWED FROM BACK SIDE OF PLATE)

CONNECTOR PLATE DIMENSION (PER ASSEMBLY)				
PLATE	QUANTITY	SHAPE	SIZE (A x B x C x D)	THICKNESS
P1	1		20" x 20"	3/16"
P2	1		20" x 20" x 28 1/16"	3/16"
P3	1		39" x 3 5/8" x 20" x 19 5/16"	3/16"
S1	4		18 1/16" x 3 5/8" x 18 3/4"	1/4"
S2	1		10 1/4" x 2 1/16" x 10 3/8" x 1/2"	1/4"
S3	1		3" x 1/16" x 3 1/8" x 1/2"	1/4"
S4	1		6 1/8" x 2 1/16"	1/4"
S5	1		6 1/8" x 1 1/16"	1/4"
S6	1		7 3/4" x 1 3/4"	1/4"
S7	1		2 3/16" x 6" x 3 1/8" x 5 7/8"	1/4"
S8	1		1 5/32" x 7 1/2" x 2 1/2" x 7 3/8"	1/4"
S9	1		6 1/16" x 6 3/16" x 1 3/32"	1/4"
S10	1		1 7/8" x 9 7/8" x 3 5/8" x 9 1/16"	1/4"
S11	1		8 1/2" x 8 3/4" x 1 1/16"	1/4"

STEEL THRIE BEAM STRUCTURE APPROACH

GENERAL NOTES

COVER PLATE PANELS ARE $\frac{3}{16}$ " THICK.

ALL STIFFENERS ARE 1/4" THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE
A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SECTION 614 OF THE
STANDARD SPECIFICATIONS.

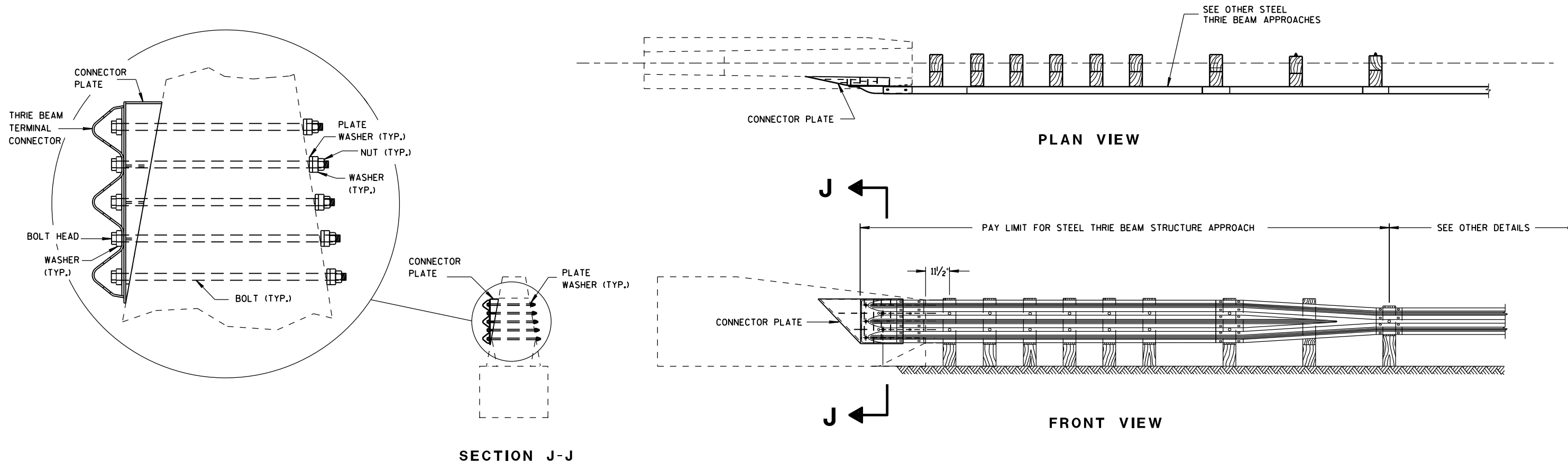
ALL HOLE DIAMETERS SHALL BE 1".

FOR OPPOSITE SIDE INSTALLATION MIRROR DRAWINGS.

- ① STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATES SHALL BE WELDED AS FOLLOWS:
SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND $\frac{3}{16}$ " FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
- ② STIFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS:
 $\frac{3}{16}$ " FILLET WELD BY 1" LONG SPACED AT 2".



SDD 14b20-h Steel Thrie Beam Structure Approach, Single Slope Attachment

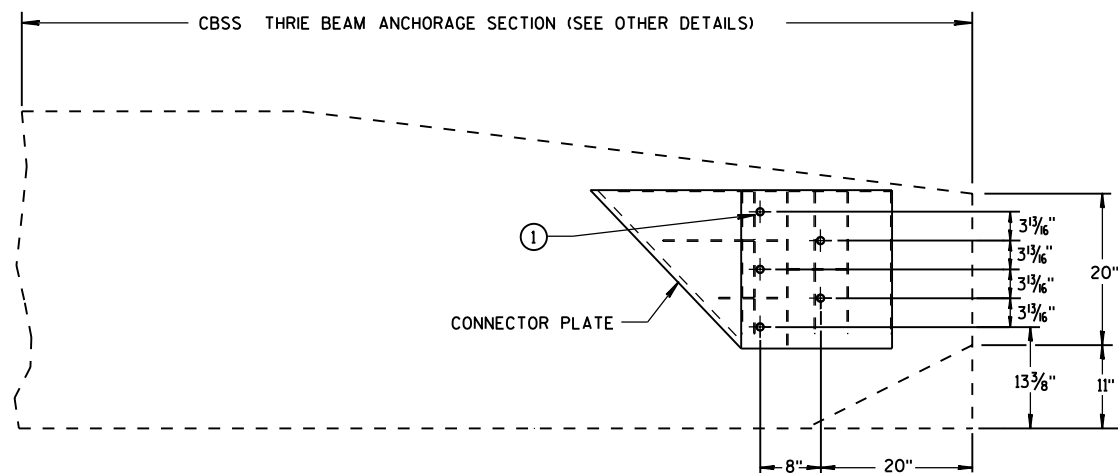


GENERAL NOTES

CONSTRUCT PER STANDARD SPECIFICATION 614.

CONNECTOR PLATE, DRILLING HOLES THROUGH PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.

- ① BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM TERMINAL CONNECTOR. BOLTS THAT EXTEND THROUGH THE PARAPET AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 2" O.D. X $\frac{5}{8}$ " THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.



CONNECTOR PLATE LOCATION

STEEL THRIE BEAM STRUCTURE APPROACH

STEEL THRIE BEAM
STRUCTURE APPROACH,
SINGLE SLOPE ATTACHMENT

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED

8/31/2012

DATE

FHWA

/S/ Jerry H. Zogg

ROADWAY STANDARDS DEVELOPMENT

ENGINEER

References:

[Standard Spec 614](#)
[FDM 11-45-2](#)
[FDM 11-45-1](#)
AASHTO Roadside Design Guide
NCHRP Report 350 Test 3-21 of the Thrie Beam Transition to
Wisconsin Type “M” Tubular Steel Bridge Rail, January 2003
MwRSF report TRP-03-47-95

Bid items associated with this drawing:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
603.0105	Concrete Barrier Single-Faced 32-Inch	LF
603.0205	Concrete Barrier Double-Faced 32-Inch	LF
603.1000 - 1999	Concrete Barrier (type)	LF
614.0200	Steel Thrie Beam Structure Approach	LF
614.0230	Steel Thrie Beam	LF
614.0250	Steel Thrie Beam Structure Approach Temporary	LF
614.0300 - 0339	Steel Plate Beam Guard (class)	LF
614.0360	Steel Plate Beam Guard Temporary	LF
614.0370	Steel Plate Beam Guard Energy Absorbing Terminal	EACH
614.0380	Steel Plate Beam Guard Energy Absorbing Terminal Temporary	EACH
614.0390	Steel Plate Beam Guard Short Radius Terminal	EACH
614.0395 - 0399	Guardrail Mow Strip (material)	SY
614.0400	Adjusting Steel Plate Beam Guard	LF
614.0920	Salvaged Rail	LF
614.0925	Salvaged Guardrail End Treatments	EACH
614.0930 - 0939	Salvaged (component)	EACH
614.0950	Replacing Guardrail Posts and Blocks	EACH
614.0951	Replacing Guardrail Rail and Hardware	LF
690.0150	Sawing Asphalt	LF
690.0250	Sawing Concrete	LF

Standardized Special Provisions associated with this drawing:

<u>STSP NUMBER</u>	<u>TITLE</u>
NONE	

Other SDDs associated with this drawing:

SDD 14B11	Concrete Barrier (Double Faced)
SDD 14B15	Steel Plate Beam Guard, Class “A”, Installation & Elements, Mow Strip Detail
SDD 14B22	Concrete Barrier, Single-Faced (With Anchorage)
SDD 14B24	Steel Plate Beam Guard Energy Absorbing Terminal
SDD 14B32	Concrete Barrier Single Slope
SDD 14B33	Thrie Beam Anchorages
SDD 14B34	Short Concrete Barrier Sections (Use for runs of less than 40'
SDD 14B41	Roadside Retaining Wall Barrier

Design Notes:

Projects with PSE due August 2011 or later are required to install MGS beam guard (MGS) for new beam guard installations. Some exceptions allowing the installation of new non-MGS beam guard may be granted by Bureau of Project Development (BPD). A few of these exceptions require minimum documentation (e.g. there is no short radius version of MGS designer would need to install non-MGS beam guard). Other exceptions require more documentation and discussion with Bureau of Project Development. Projects on the NHS or subject to FHWA oversight are to review the use of MGS with FHWA.

Consider surface runoff from a structure when installing thrie beam structural approach. Excessive run-off will scour beam guard posts in the structural approach affecting the performance of the system. Include

appropriate protection for these areas by providing concrete surface drains. Avoid removing of post to accommodate drainage structures.

It may be necessary to increase post length to accommodate steeper slopes.

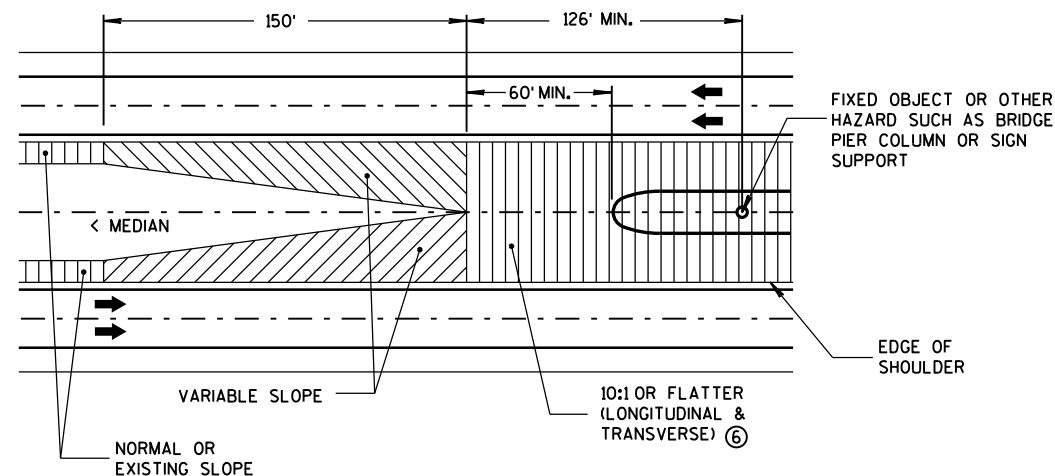
Do not install curb and gutter in front of Steel Thrie Beam Structure Approach when installing concrete barrier single slope anchor.

Contact Person:

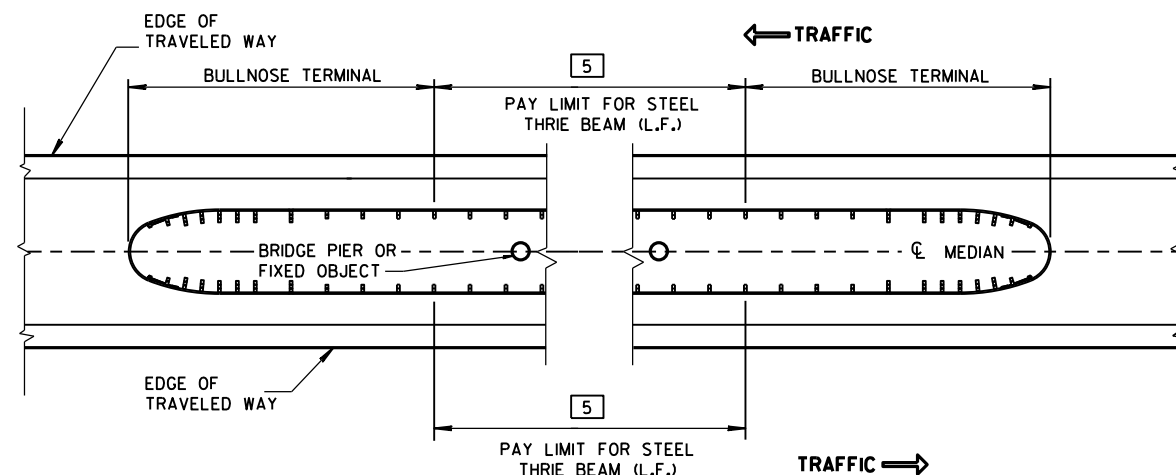
Erik Emerson (608) 266-2842



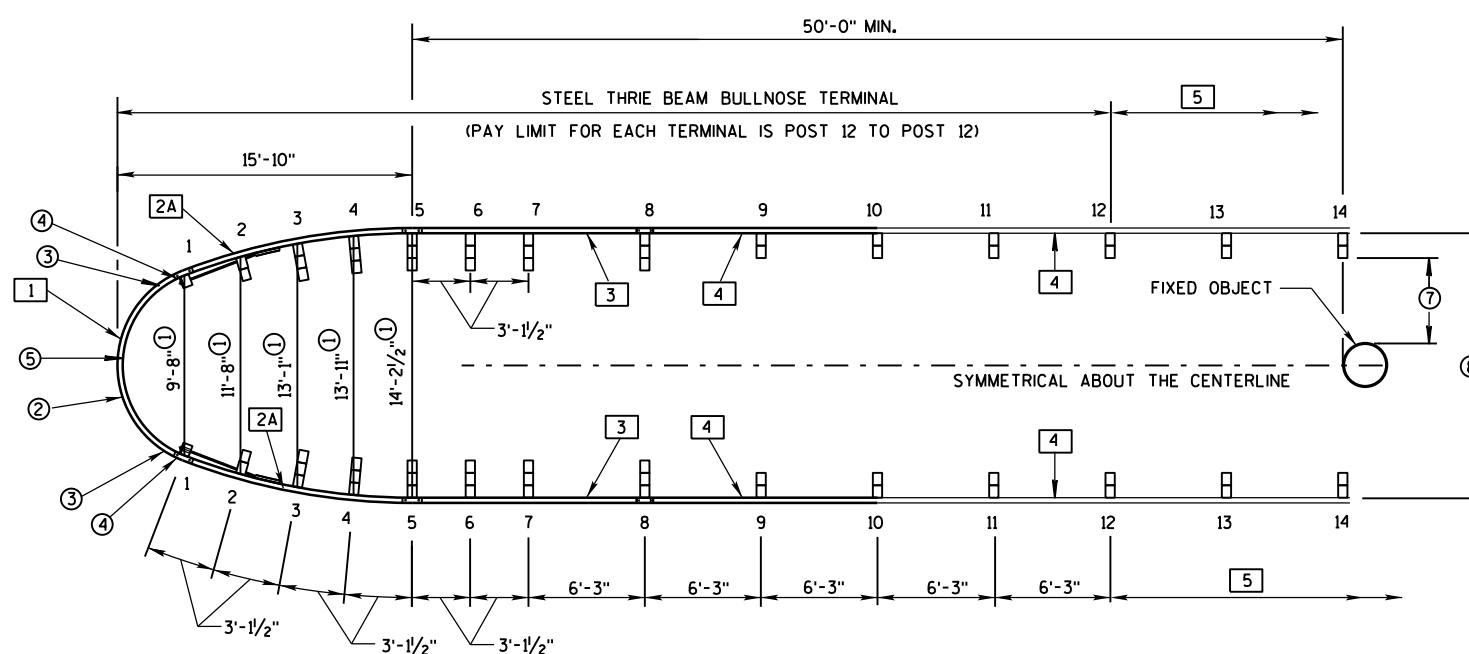
SDD 14b26-a Steel Thrie Beam Bullnose Terminal



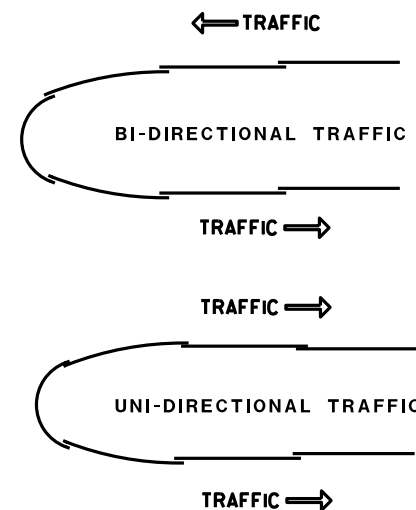
PLAN VIEW
GRADING AT BULLNOSE
(ALL INSTALLATIONS)



MEDIAN HAZARD PROTECTION PAY LIMITS



PLAN VIEW
TYPICAL BULLNOSE LAYOUT



LAPPING DETAIL
(ALL INSTALLATIONS)

GENERAL NOTES

SEE STANDARD DETAIL DRAWINGS 14 B 26a-e.

PUNCHING, DRILLING, CUTTING OR WELDING IS NOT PERMITTED ON ANY GALVANIZED THRIE BEAM ACCESSORY OR TERMINAL ACCESSORY.

OTHER ANCHOR CABLE ASSEMBLIES HAVING 40,000 LBS. MIN. BREAKING STRENGTH MAY BE USED.

FOR POSTS 2 THROUGH 14, IF POST CANNOT BE INSTALLED AT SPECIFIED LOCATION 1 EXTRA STANDARD WOOD BLOCK MAY BE ADDED.

THE USE OF STEEL POSTS ON THE BULLNOSE IS NOT ALLOWED.

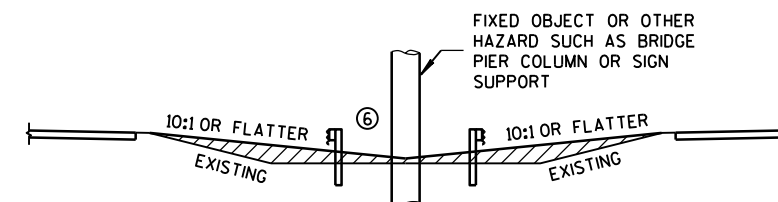
BOLTS AND ALL NECESSARY HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A 153.

ALL THRIE BEAM SHALL BE 12-GAUGE.

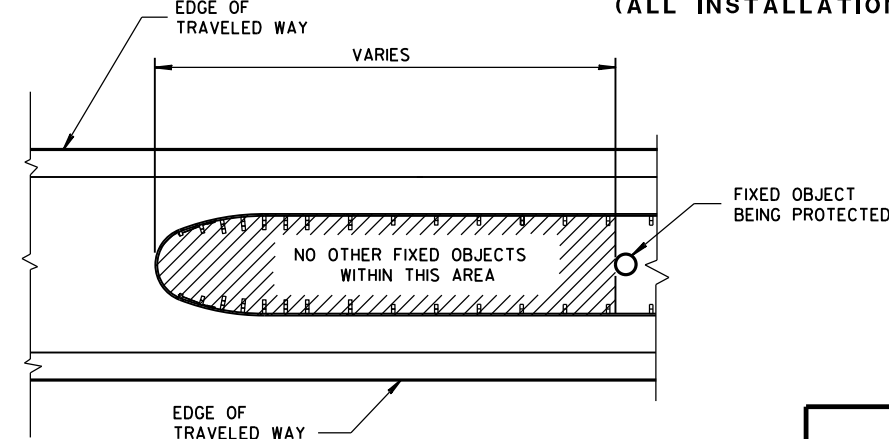
IF ROCK IS ENCOUNTERED, REMOVE ROCK TO FULL DEPTH OF POST PLUS 2 1/2" AND 12" DIAMETER AROUND POST. SEE SDD 14B15 OR SDD 14B42 FOR MORE INFORMATION.

- 1 SLOTTED THRIE BEAM RAIL NO. 1. (POST 1 TO POST 1)
- 2A SLOTTED THRIE BEAM RAIL NO. 2A. (POST 1 TO POST 5)
- 3 SLOTTED THRIE BEAM RAIL NO. 3. (POST 5 TO POST 8)
- 4 UNBENT STANDARD THRIE-BEAM RAIL NO. 4. (POST 8 TO POST 10 & POST 10 TO POST 12)
- 5 BEYOND POST 12: CONSTRUCT STEEL THRIE BEAM - USE UNBENT STANDARD THRIE BEAM RAIL NO. 5.

- ① DIMENSIONS ARE FROM BACK OF RAIL TO BACK OF RAIL WHERE RAIL IS BOLTED TO POST OR BLOCK.
- ② U-BOLT CABLE CLIPS (3 PER CABLE) SPACED OUT ON NOSE, TO HOLD CABLE TO BACKSIDE OF THE RAIL.
- ③ NOSE CABLE W/SWAGGED END BUTTONS.
- ④ NOSE CABLE ANCHOR PLATE (BACKSIDE OF SPLICE).
- ⑤ THE SLACK IN THE NOSE CABLES SHALL BE EVENLY DISTRIBUTED BETWEEN THE CABLE CLIP FASTENERS AND POST NO. 1 ON EITHER SIDE OF THE NOSE.
- ⑥ PROVIDE SUITABLE DRAINAGE WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.
- ⑦ 2'-6" MINIMUM LATERAL DISTANCE BETWEEN BACK OF POST AND FACE OF FIXED OBJECT.
- ⑧ MAXIMUM WIDTH OF SYSTEM IS 14'-2 1/2" MEASURED FROM BACK OF RAIL TO BACK OF RAIL WHERE RAIL IS BOLTED TO A POST OR BLOCK.



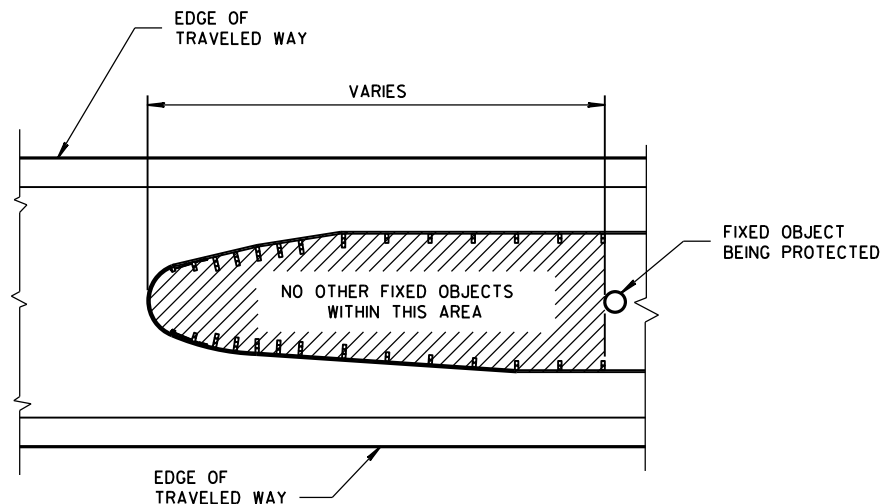
MEDIAN GRADING SECTION
(ALL INSTALLATIONS)



HAZARD FREE
AREA INSIDE BULLNOSE

STEEL THRIE BEAM
BULLNOSE TERMINAL

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



HAZARD FREE AREA INSIDE BULLNOSE

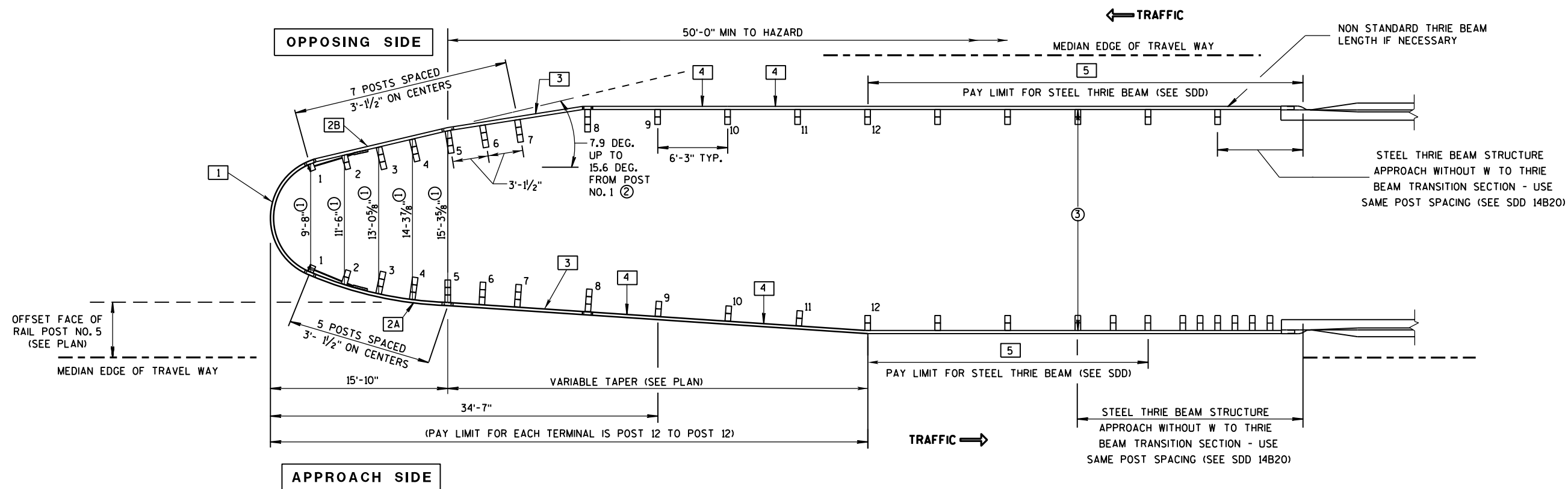
GENERAL NOTES

SEE STANDARD DETAIL DRAWINGS 14 B 26a-e.

FOR POSTS 2 THROUGH 14, IF POST CANNOT BE INSTALLED AT SPECIFIED LOCATION 1 EXTRA STANDARD WOOD BLOCK MAY BE ADDED.

- 1 SLOTTED THRIE BEAM RAIL NO. 1, (POST 1 TO POST 1)
- 2A SLOTTED THRIE BEAM RAIL NO. 2A, (POST 1 TO POST 5)
- 2B SLOTTED THRIE BEAM RAIL NO. 2B, (POST 1 TO POST 5)
- 3 SLOTTED THRIE BEAM RAIL NO. 3, (POST 5 TO POST 8)
- 4 UNBENT STANDARD THRIE-BEAM RAIL NO. 4, (POST 8 TO POST 10 & POST 10 TO POST 12)
- 5 BEYOND POST 12: CONSTRUCT STEEL THRIE BEAM - USE UNBENT STANDARD THRIE BEAM RAIL NO. 5.

- ① DIMENSIONS ARE FROM BACK OF RAIL TO BACK OF RAIL WHERE RAIL IS BOLTED TO POST.
- ② TAPER BEGINNING AT POST NO. 1 MUST CONTINUE TO POST NO. 5. PAST POST NO. 5 TAPER MAY END OR BE EXTENDED UP TO 15.6 DEGREES TO FIT VARIABLE MEDIAN WIDTHS. (SEE PLAN)
- ③ FOR MEDIANS WIDER THAN 14'-2 1/2" MEASURED FROM BACK OF RAIL TO BACK OF RAIL WHERE RAIL IS BOLTED TO A POST OR BLOCK.



PLAN VIEW

WIDENED BULLNOSE DESIGN

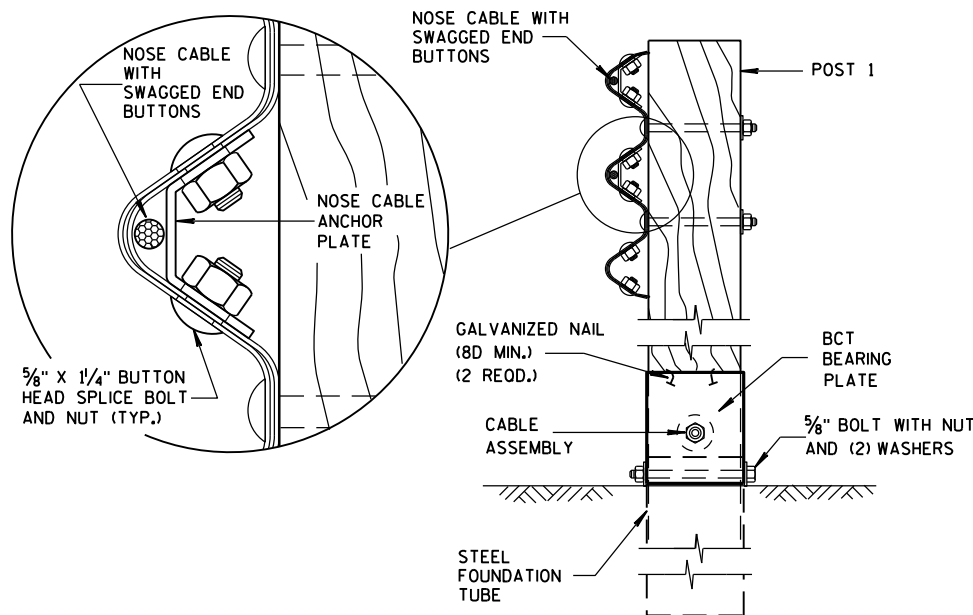
(INSTALLATION AT TWIN BRIDGES WITH BI-DIRECTIONAL TRAFFIC SHOWN)

STEEL THRIE BEAM
BULLNOSE TERMINAL

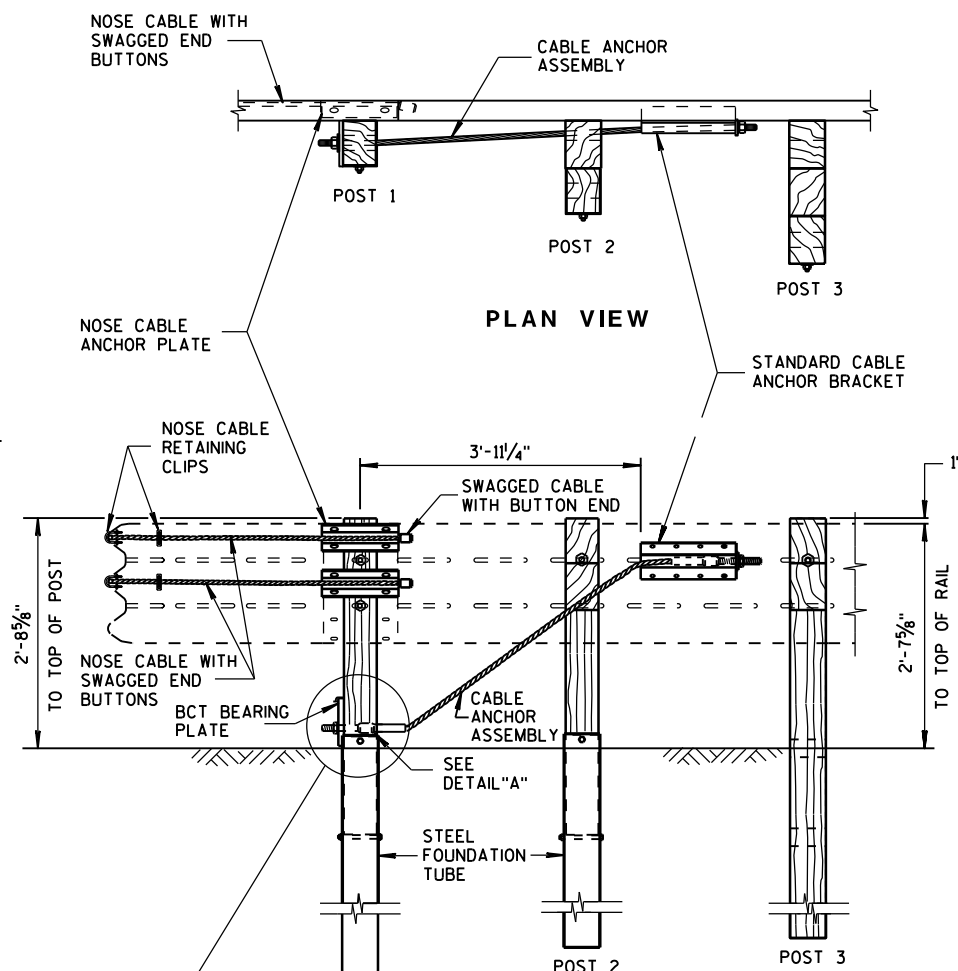
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



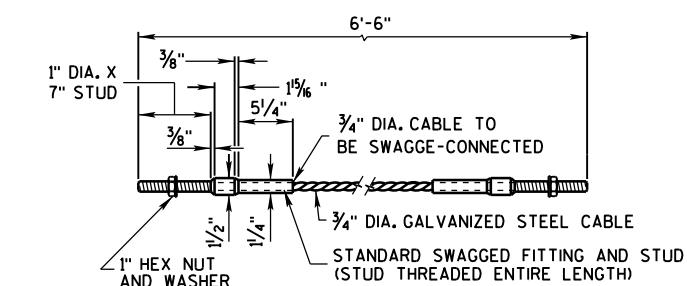
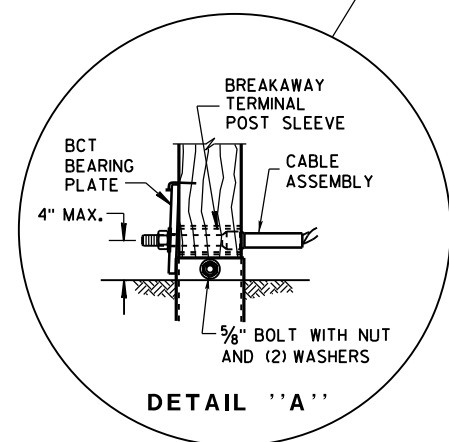
SDD 14b26-c Steel Thrie Beam Bullnose Terminal



NOSE CABLE ASSEMBLY AT POST NO. 1



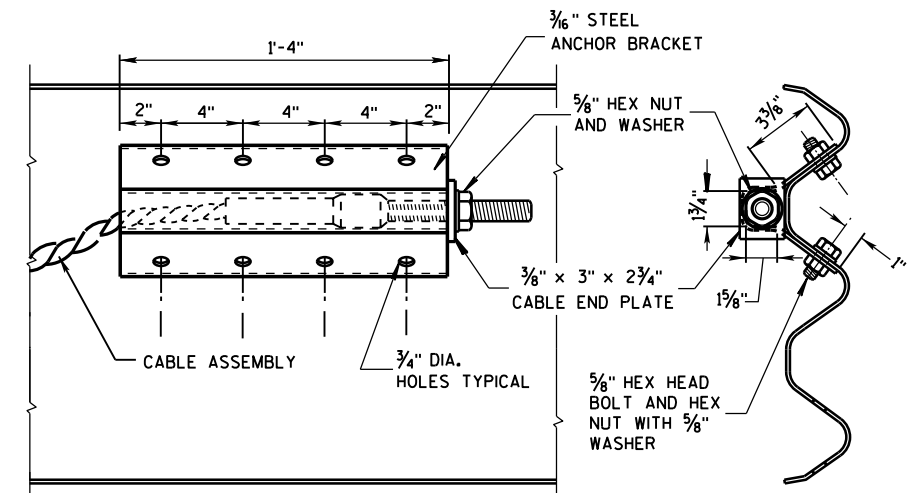
FRONT VIEW
NOSE CABLE ANCHOR AND
STANDARD BRACKET ASSEMBLY



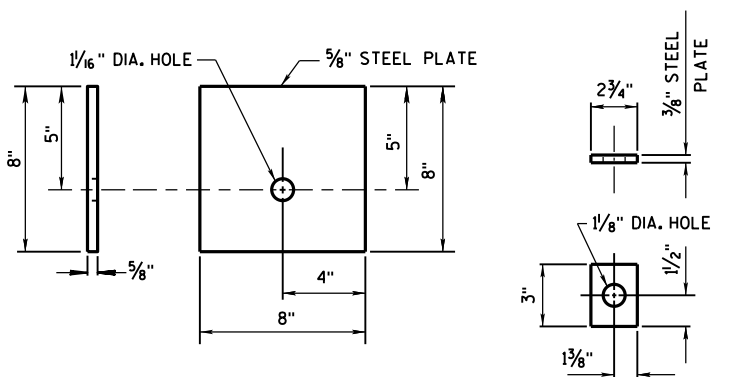
DETAILS OF CABLE ANCHOR ASSEMBLY

GENERAL NOTES

SEE STANDARD DETAIL DRAWINGS 14 B 26a-e.

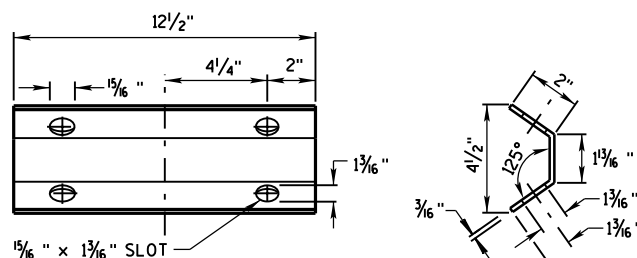


FRONT VIEW
DETAILS OF CABLE ANCHOR BRACKET
END VIEW



BCT BEARING PLATE

CABLE
END PLATE

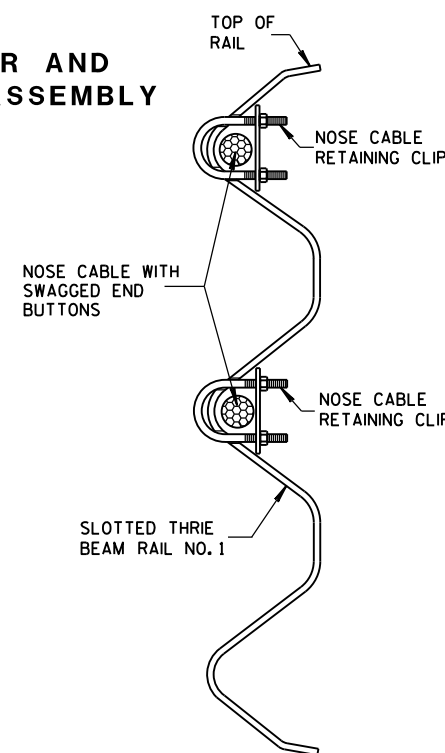


ELEVATION VIEW

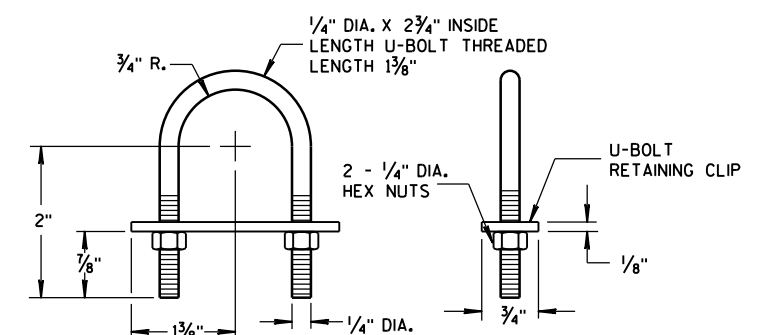
END VIEW

NOSE CABLE ANCHOR PLATE

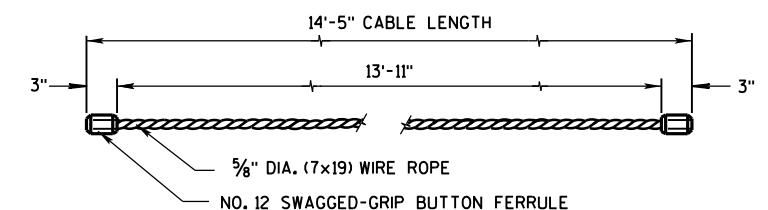
NOTE: 12 1/2" x 5 1/8" x 3/16" STEEL PLATE (A306)



PLACEMENT OF NOSE
CABLE RETAINING CLIP



NOSE CABLE RETAINING CLIP



NOSE CABLE WITH
SWAGGED END BUTTONS

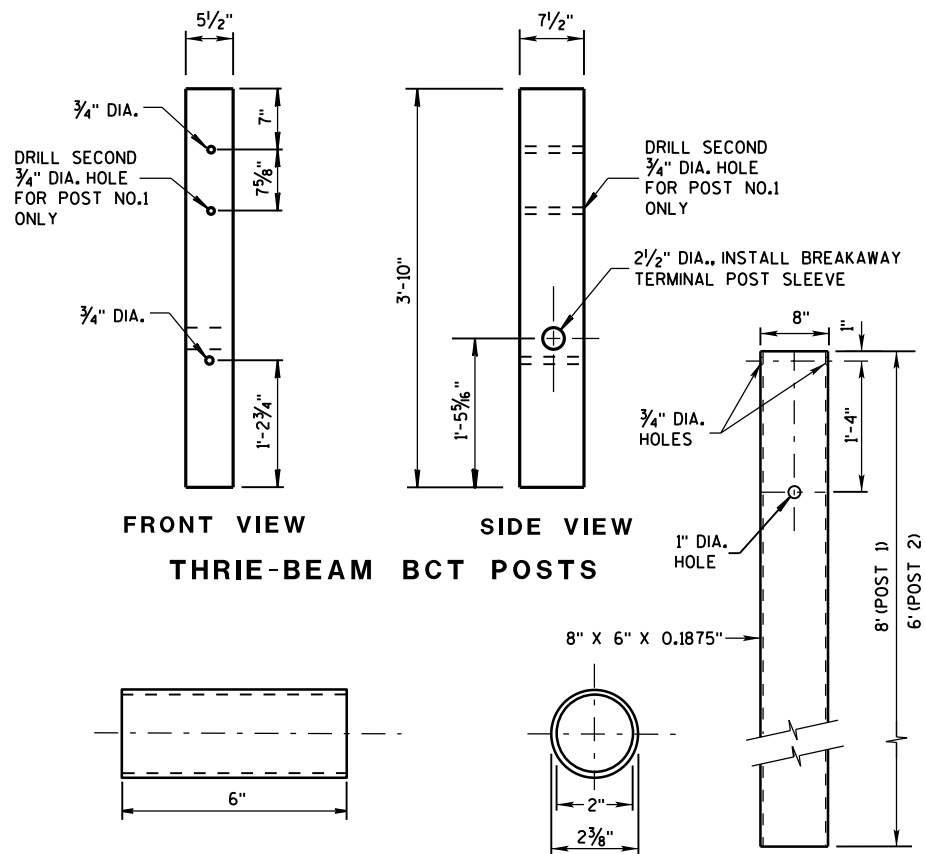
TO PULL OFF SWAGGED GRIP BUTTON FERRULE FROM WIRE ROPE REQUIRES A FORCE EQUAL TO 98% OF THE WIRE ROPE'S BREAKING STRENGTH.

STEEL THRIE BEAM
BULLNOSE TERMINAL

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



SDD 14b26-d Steel Thrie Beam Bullnose Terminal

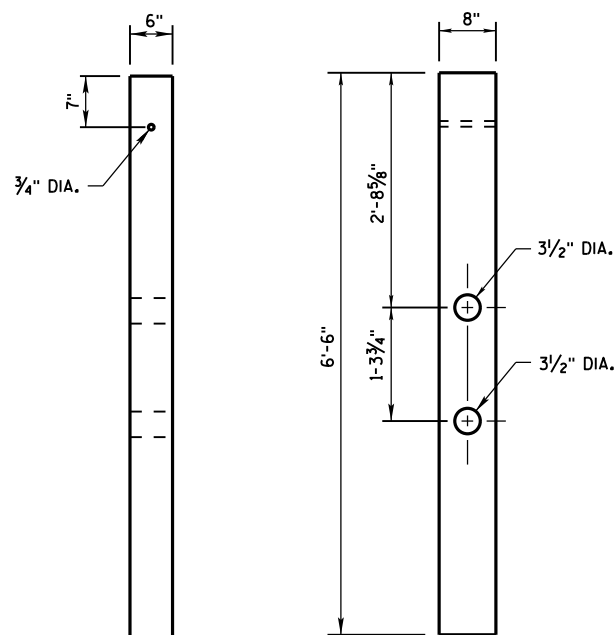


FRONT VIEW
THRIE-BEAM BCT POSTS

SIDE VIEW

BREAKAWAY TERMINAL
POST SLEEVE

STEEL
FOUNDATION TUBE



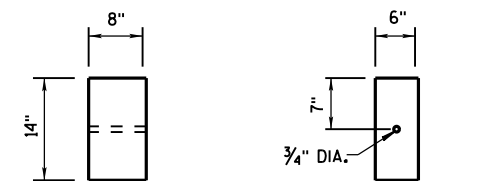
FRONT VIEW

SIDE VIEW

THRIE-BEAM CRT WOOD POSTS

GENERAL NOTES

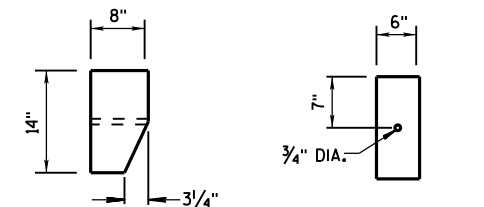
SEE STANDARD DETAIL DRAWINGS 14 B 26a-e.



SIDE VIEW

FRONT VIEW

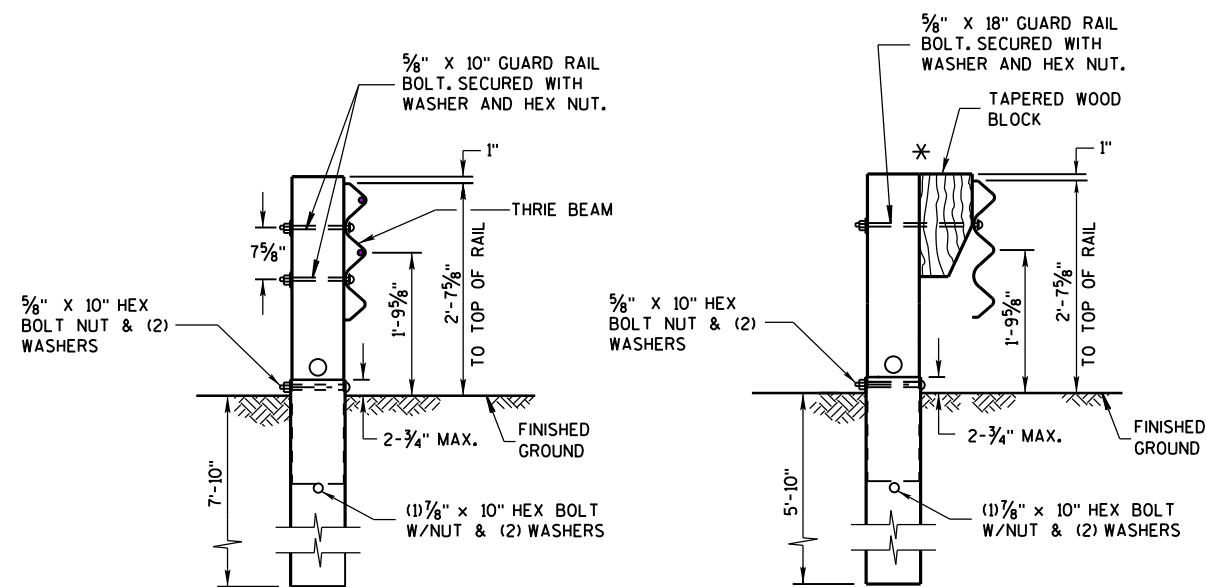
STANDARD WOOD BLOCK



SIDE VIEW

FRONT VIEW

TAPERED WOOD BLOCK

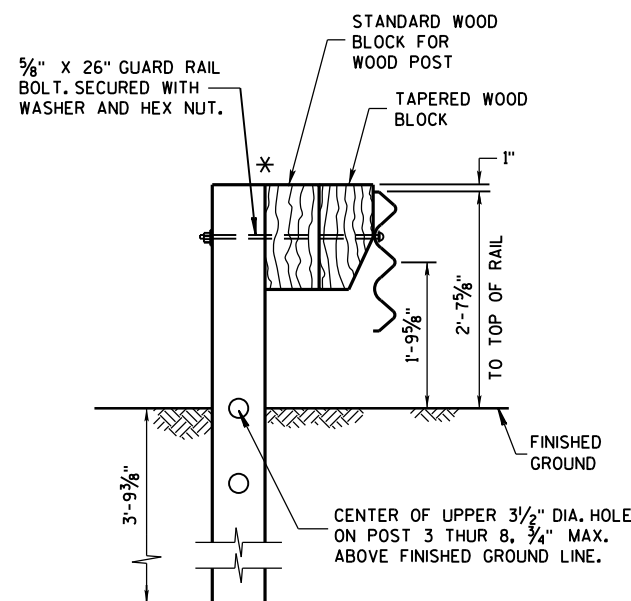


THRIE-BEAM BCT POST
(WITH 8'-0" FOUNDATION TUBE)

POST NO. 1

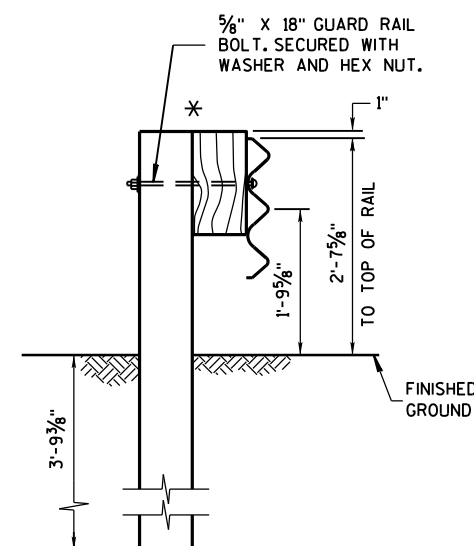
THRIE-BEAM BCT POST
(WITH 6'-0" FOUNDATION TUBE
AND 1'-2" TAPERED BLOCK)

POST NO. 2



THRIE-BEAM CRT POST
(6'-6" LONG POST WITH 1'-2" BLOCK
AND 1'-2" TAPERED BLOCK)

POST NO. 3,4,5,6,7, & 8



THRIE-BEAM POST
(6'-6" LONG POST
WITH 1'-2" BLOCK)

POST NO. 9,10,11, & 12

(ALSO USE FOR STEEL
THRIE BEAM BEYOND POST 12)

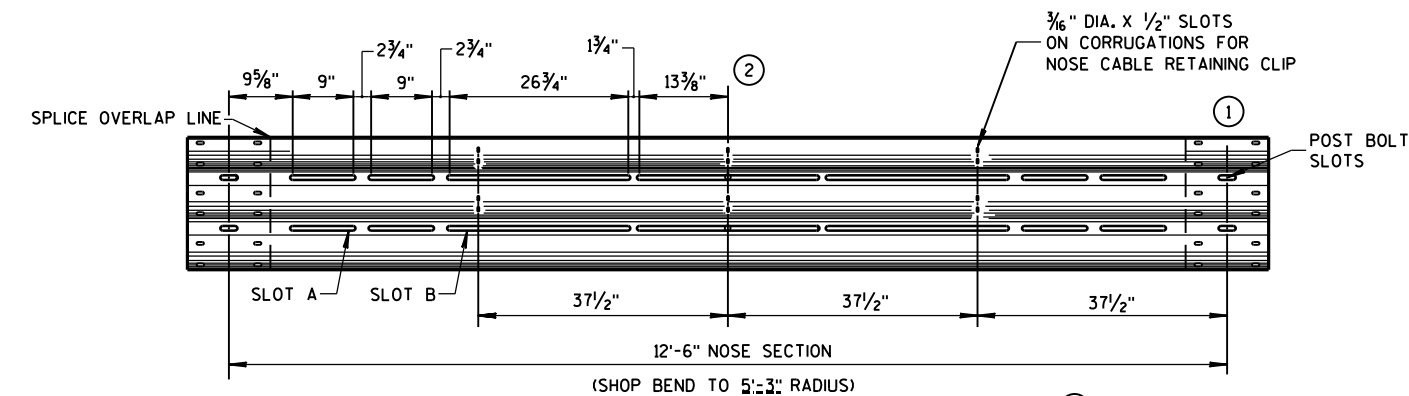
* IF NEEDED DUE TO AN UNDERGROUND
OBSTACLE ADD 1 ADDITIONAL STANDARD
BLOCKOUT TO POST.

STEEL THRIE BEAM
BULLNOSE TERMINAL

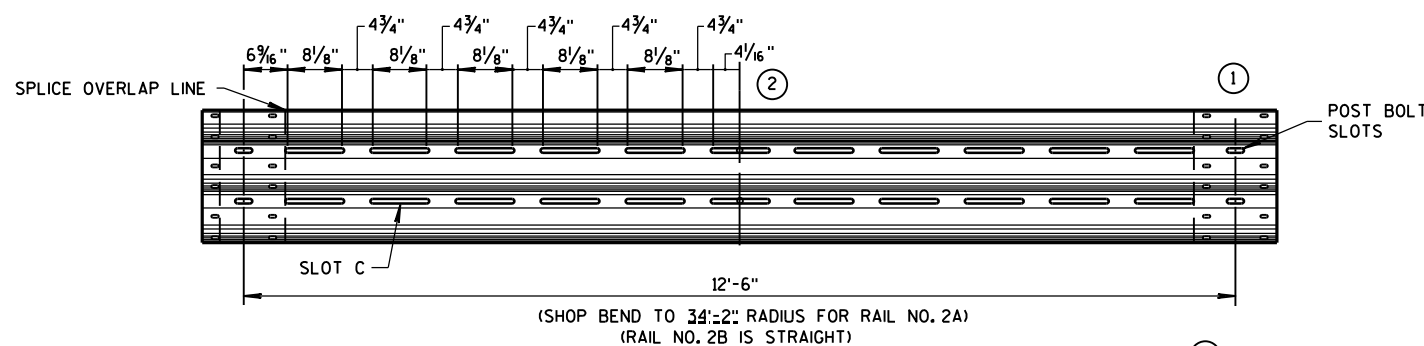
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



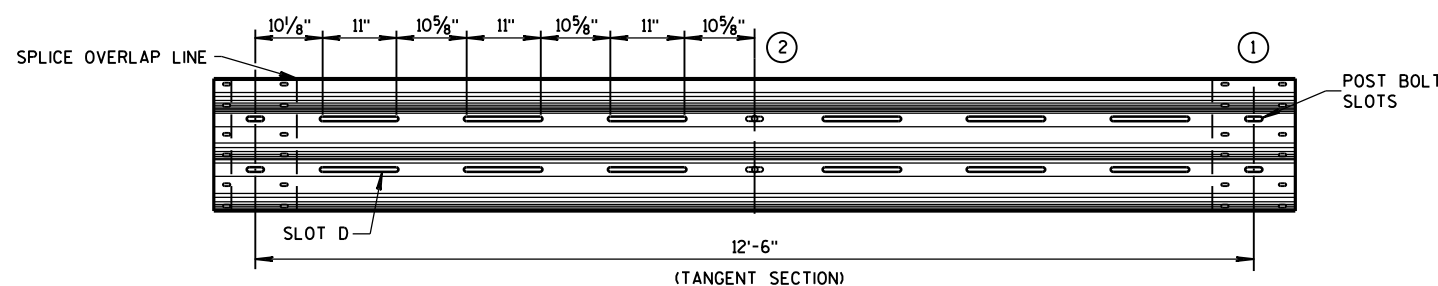
SDD 14b26-e Steel Thrie Beam Bullnose Terminal



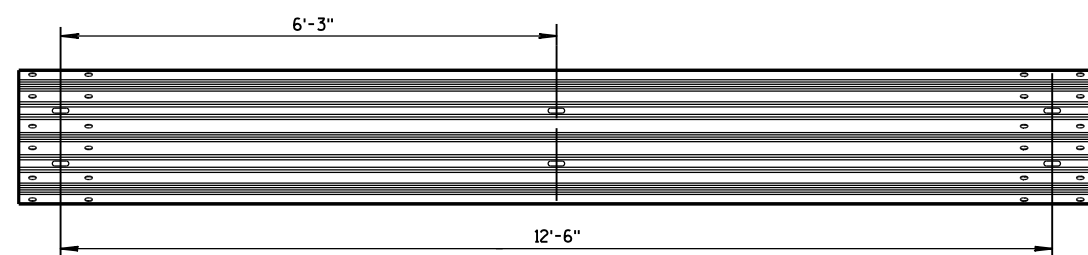
SLOTTED THRIE BEAM RAIL NO. 1



SLOTTED THRIE BEAM RAILS NO. 2A AND NO. 2B



SLOTTED THRIE BEAM RAIL NO. 3

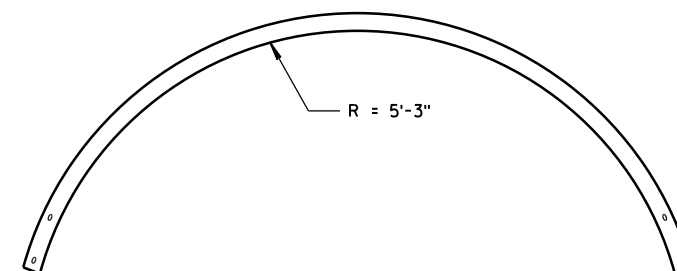


UNBENT STANDARD THRIE BEAM RAIL NO. 4 AND NO. 5

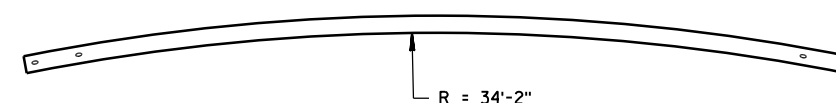
GENERAL NOTES

SEE STANADRD DETAIL DRAWINGS 14 B 26a-e.

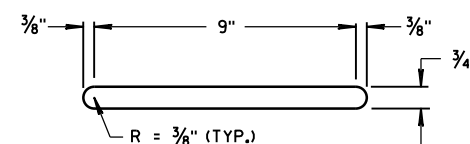
- ① SLOTTED THRIE BEAM RAIL DIMENSIONS SHOWN ARE BEFORE BENDING TO THE RADIUS SHOWN.
- ② SLOT SIZE AND SPACING SYMMETRIC.
- ③ SLOTTED THRIE BEAM RAIL NO. 1, 12'-6", SHOP BEND TO R=5'-3".
- ④ SLOTTED THRIE BEAM RAIL NO. 2A, 12'-6", SHOP BEND TO R=34'-2". SLOTTED THRIE BEAM RAIL NO. 2B, 12'-6", RAIL IS STRAIGHT.
- ⑤ SLOTTED THRIE BEAM RAIL NO. 3, 12'-6", TANGENT.



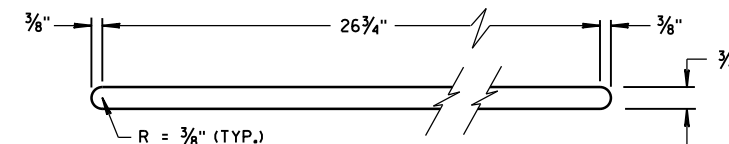
**PLAN VIEW
SLOTTED THRIE BEAM RAIL NO. 1**



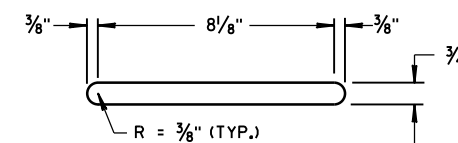
**PLAN VIEW
SLOTTED THRIE BEAM RAIL NO. 2A**



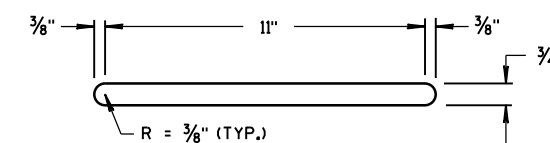
SLOT A



SLOT B



SLOT C



SLOT D

SLOT DETAILS

**STEEL THRIE BEAM
BULLNOSE TERMINAL**

**STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION**

APPROVED
June 2014
DATE
FHWA

/s/ Jerry H. Zogg
ROADWAY STANDARDS DEVELOPMENT
ENGINEER

References:

[Standard Spec 614](#)
[FDM 11-45-1](#)
AASHTO Roadside Design Guide
MwRSF Research Report No. TRP-03-95-00
FHWA approval letter HSA-1\HSA-CC68,dated November 8, 2000

Bid items associated with this drawing:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
614.0200	Steel Thrie Beam Structure Approach	LF
614.0220	Steel Thrie Beam Bullnose Terminal	EACH
614.0230	Steel Thrie Beam	LF
614.0010	Barrier System Grading Shaping Finishing.....	EACH

Standardized Special Provisions associated with this drawing:

<u>STSP NUMBER</u>	<u>TITLE</u>
NONE	

Other SDDs associated with this drawing:

SDD 14b15	Steel Plate Beam Guard, Class A, Installation and Elements*
SDD 14b20	Thrie Beam Structure Approaches
SDD 14b42	Midwest Guardrail System (MGS) Guardrail*

* If thrie beam bullnose is the only semi-rigid barrier system being installed, only one of the SDDs is required in the plan set to provide the guidance on rock excavation for posts. On plans with both the thrie beam transition, and beam guard, SDD 14B15 or SDD 14b42 will be included in the plan.

Design Notes:

Steel thrie beam bullnose (i.e. bullnose) is a non-gating system that has passed NCHRP 350 crash testing. The system can be used to protect hazards, such as bridge piers; overhead sign support structures, gaps between twin bridges and gore areas. It can be used to protect uni-directional (between a ramp and the mainline) or bi-directional (median application) traffic from impacting a fixed object.

The advantages of bullnose system are: it is typically farther from the roadway than a traditional beam guard installation (i.e. less likely to be hit), smaller amount of overall barrier required (i.e. less likely to be hit), and because the fixed object is surrounded, errant vehicles have difficulties getting to the fixed object. The disadvantages of the bullnose are: potential for more grading and drainage structures, and it may be more expensive to repair once impacted (i.e. nose impacts may require bent rail).

During a head-on impact, an errant vehicle will stop within the area hazard free area inside the bullnose. This area is to be free of fixed objects and traversable. During a side impact (e.g. between post 7 through 14), the bullnose acts like other semi-rigid barrier systems (i.e. post rotation is important).

If there are erosion or maintenance concern designer may use a mow strip design similar to SDD 14b15. However, early coordination with BPD will be required and construction details may be needed. Other methods to control erosion or maintenance concerns near a bullnose detail will require significant coordination with BPD and will only be granted on a limited case-by-case basis and requires documentation within the DSR.

Avoid placing curb and gutter near a bullnose. If curb and gutter is needed near a bullnose, document why curb and gutter is needed in the DSR. Curb and gutter may have a negative impact on barrier performance. If curb and gutter needed provide driveway curb & gutter on approaches to bullnose up to post 7.

Recommended layout procedure for the bi-directional variable width bullnose is:

1. Position post 5 of the approach side at the shy line offset value.
2. Use appropriate taper rates on the approach side of the bullnose.
3. Adjust opposing side’s taper rates per detail.

Use taper rates listed in Table 5.7 of the 2006 AASHTO Roadside Design Guide. Shy line offsets listed in Table 5.5 of the 2006 AASHTO Roads Design Guide. Use linear interpolation to get intermediate values.

If there are difficulties in placing the bullnose options are:

Adjust approach side post 5 position

- Desirable offset is shy line offset.
- Minimum offset would be edge of shoulder.
- Less than minimum would be inside the shoulder (requires design exception)

Lengthen installation

- Use flatter taper rates on the approach side (e.g. for a given speed taper rate is 21:1, use 24:1)
- Add more thrie beam sections between post 12 and hazards being protected.

Grading is critical for system to function correctly. Proper grading provides strength to the bullnose system and increase the probability that an errant vehicle will properly engage the bullnose.

Cut cross sections: at least 210' prior to system, 60' prior to system, post 1, post 5 and at fixed object being protected. More cross sections may be needed to show drainage, or how to blend slopes together.

Review drainage and subsurface conflicts (e.g. utilities, drainage structures, rock...) near installation early in the design process. Posts for the bullnose are embedded deeper in the ground than standard beam guard posts. This can cause underground conflicts. Drainage issues may require the installation or adjustment of drainage structures.

Provide SDD 14b15 or 14B42 to provide guidance on rock excavation for bullnose posts.

Provide individual construction details for each bullnose installation in the plan (i.e. construction details). At a minimum, show the following: slope intercepts, underground utilities, drainage structures, taper/flare rates, offset distance to post 5, distance from post 5 to hazard(s) being protected, and lateral offset from back of post to hazard.

More complicated installation (e.g. variable width bullnose, potential underground utility conflicts...), may require a more detailed layout. If there is a potential for a utility conflict, it is recommended that individual post location be detailed. If using the variable width bullnose, proper rail lengths are need (i.e. 12.5' from center of post to center of post). Designing for proper rail length or match into a thrie beam structure approach may cause the bullnose to be longer than what is needed to protect the hazard or a rail will need to be cut in the field.

If an odd length of rail is needed indicate in plan that a field cut is needed. It is not desirable to cut rails between posts 1 through 7.

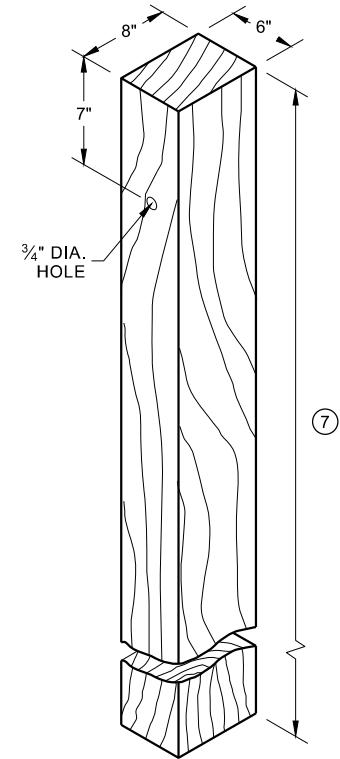
Thrie beam bullnose may use the Grading and Shaping and Finishing for Barrier Systems Item.

Contact Person:

Erik Emerson (608) 266-2842

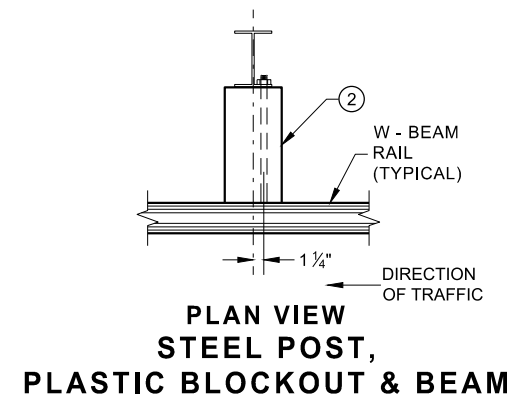
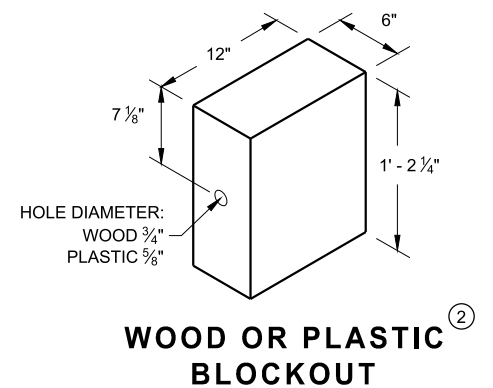
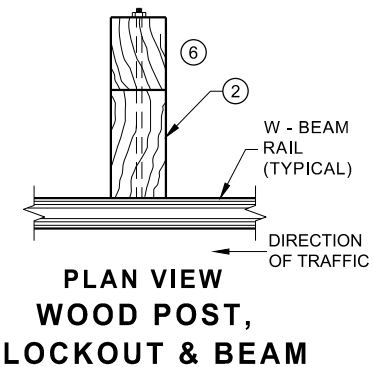
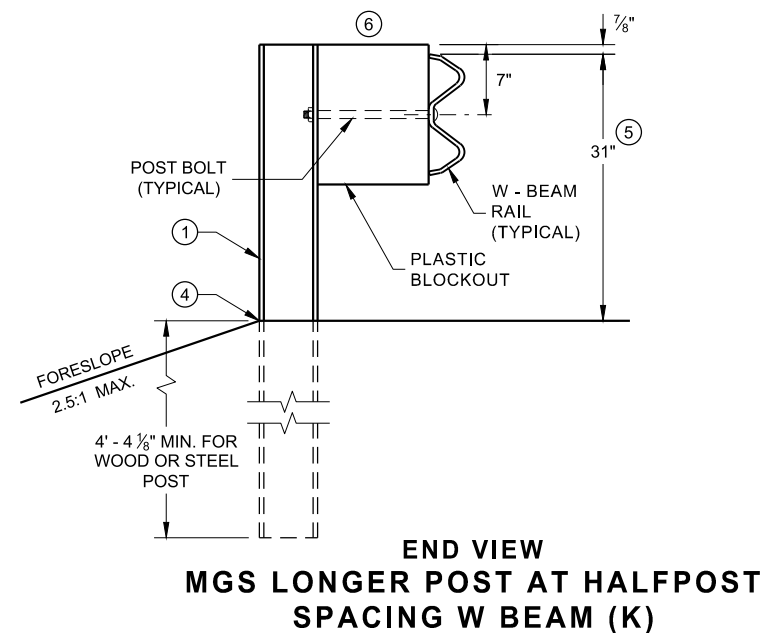
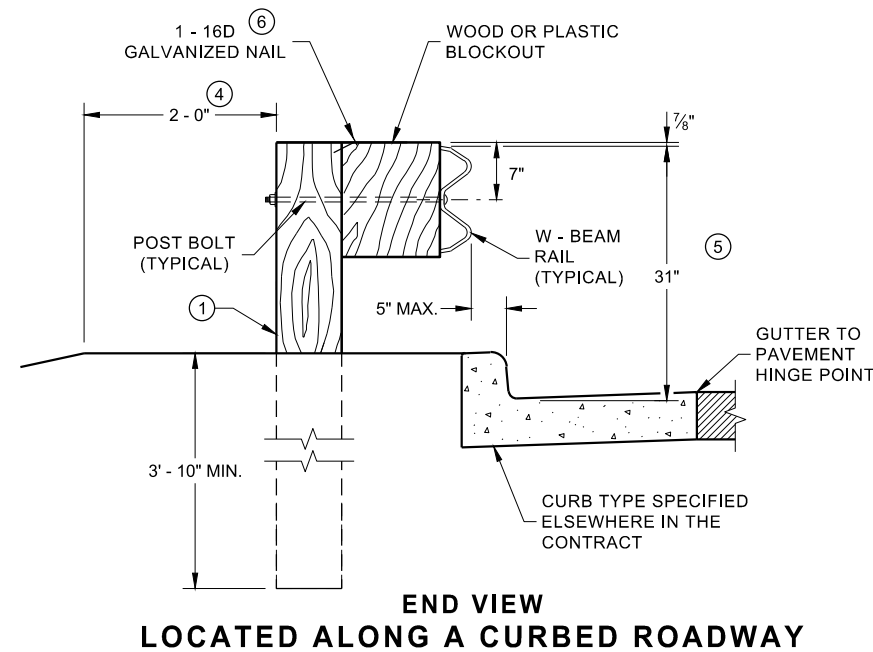
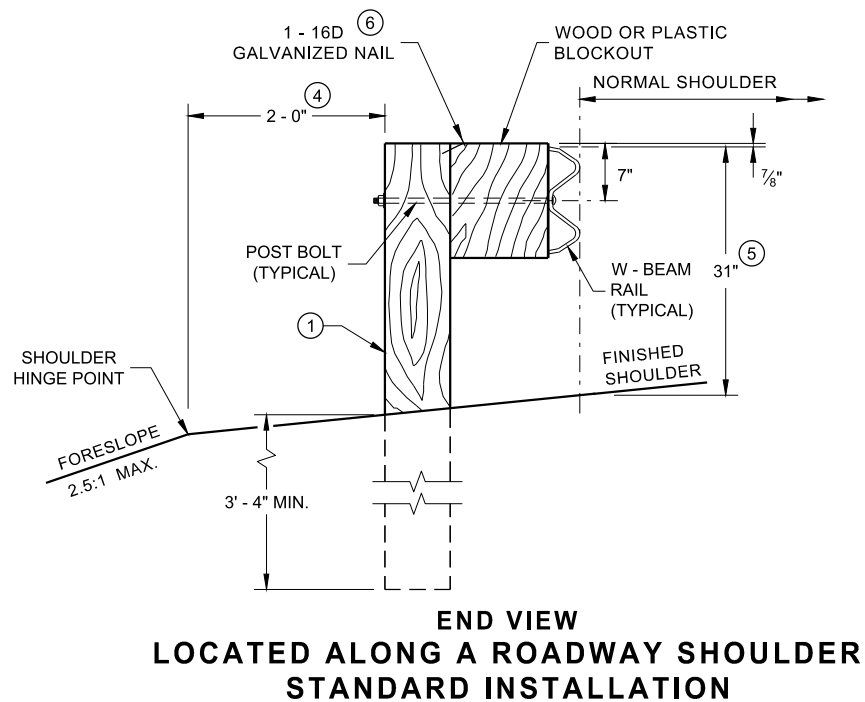


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STEEL POST & HOLE PUNCHING DETAIL (W 6 X 9) ①

WOOD POST (6" X 8") NOMINAL ⁽¹⁾

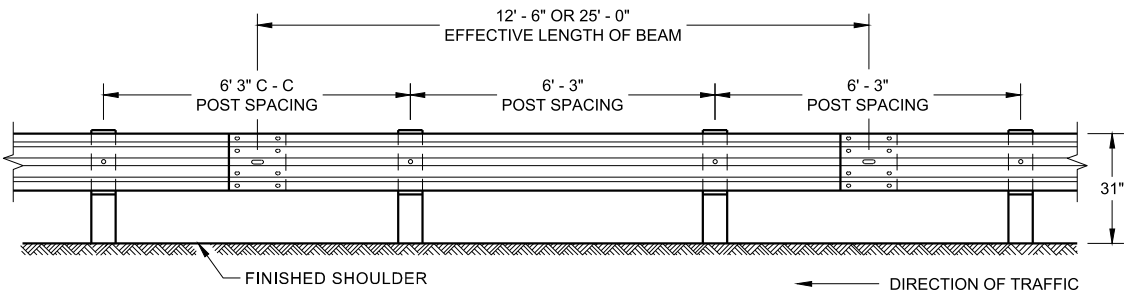


**MIDWEST GUARDRAIL SYSTEM
(MGS) GUARDRAIL**

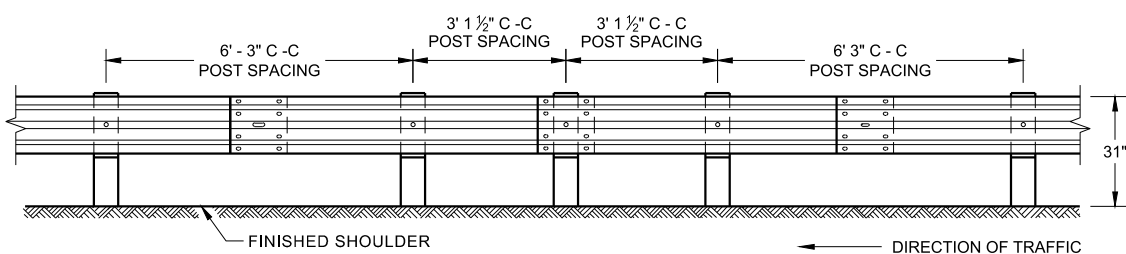
STATE OF WISCONSIN 151
DEPARTMENT OF TRANSPORTATION



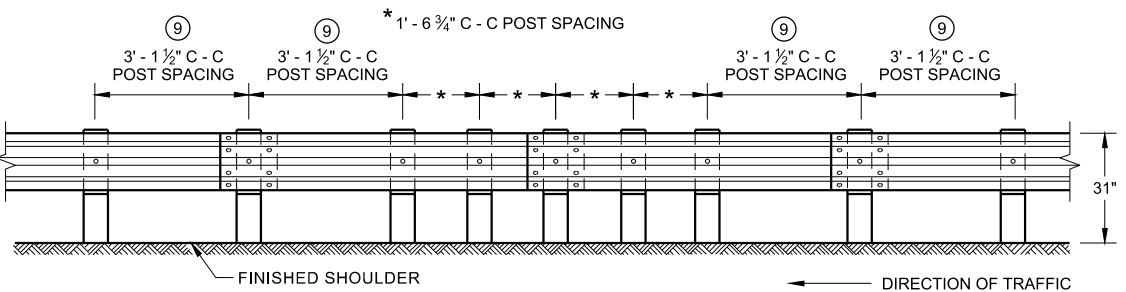
SDD 14B42-b Midwest Guardrail System (MGS) Guardrail



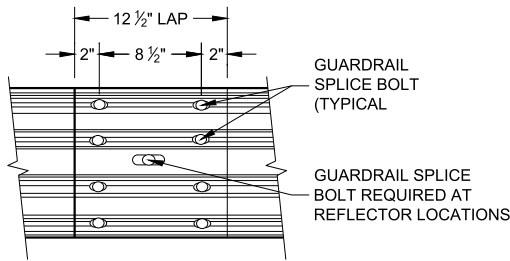
**FRONT VIEW
POST SPACING STANDARD INSTALLATION**



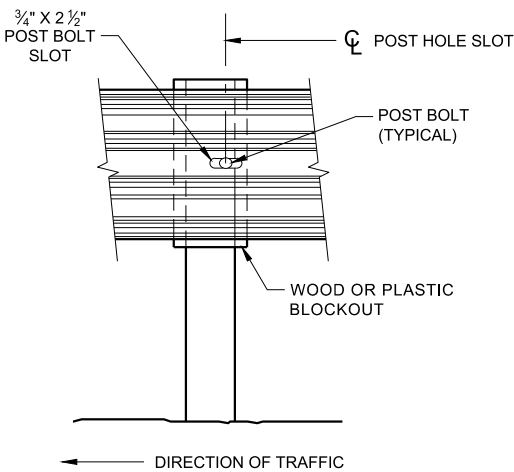
**FRONT VIEW
HALF POST SPACING (HS) AND
HALF POST SPACING WITH LONGER POSTS (K)**



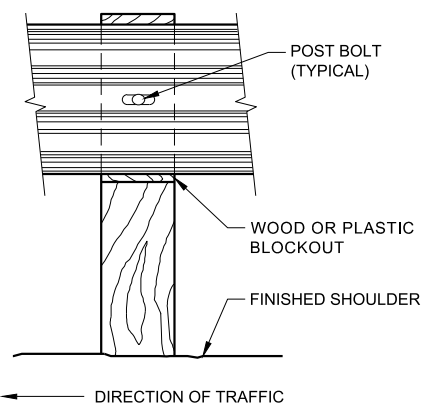
**FRONT VIEW
QUARTER POST SPACING (QS)**



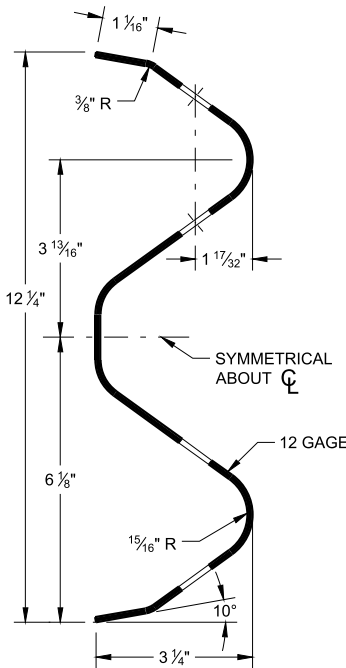
**FRONT VIEW
MID-SPAN BEAM SPLICE**



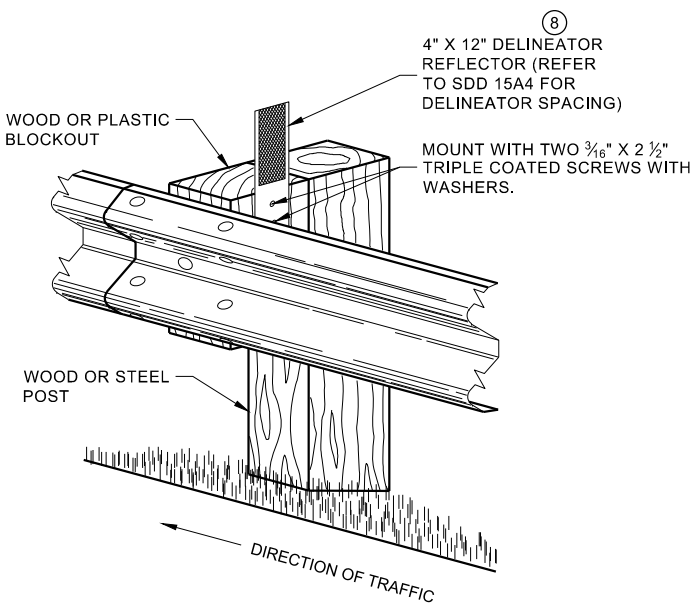
FRONT VIEW AT STEEL POST



FRONT VIEW AT WOOD POST



SECTION THRU W-BEAM RAIL



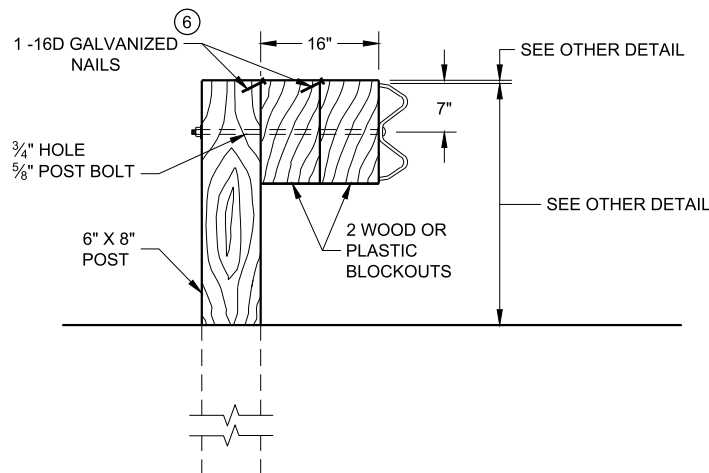
**ONE SIDED REFLECTOR DETAIL
AND TYPICAL INSTALLATION**

GENERAL NOTES

- 8 DO NOT INSTALL REFLECTORS ON THE FIRST 50 FEET OF THE APPROACH END OF THE ENERGY ABSORBING TERMINAL. RAIL SPLICE LOCATIONS ARE THE ONLY ACCEPTABLE LOCATIONS FOR REFLECTORS.
- 9 25 FEET OF HALF POST SPACING IS REQUIRED ON APPROACH AND DEPARTURE ENDS OF QUARTER POST SPACING.
- POST BOLTS ARE A 3/4" DIAMETER ASTM A307 GUARDRAIL BOLT. A POST BOLT REQUIRES 3/4" DIAMETER A563A DOUBLE RECESSED (DR) HEAVY HEX NUT AND 3/4" DIAMETER F844 FLAT WASHER. POST BOLTS MAY BE LONGER IF MULTIPLE BLOCKOUTS ARE BEING USED.
- GUARD RAIL SPLICE BOLTS ARE A 3/4" DIAMETER ASTM A307 GUARDRAIL HEAD BOLT. A GUARDRAIL SPLICE BOLT REQUIRES 3/4" DIAMETER A563A DOUBLE RECESSED (DR) HEAVY HEX NUT.



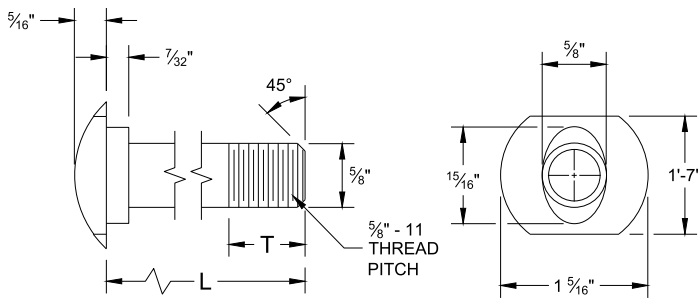
SDD 14B42-c Midwest Guardrail System (MGS) Guardrail



DETAIL FOR 16" BLOCKOUT DEPTH

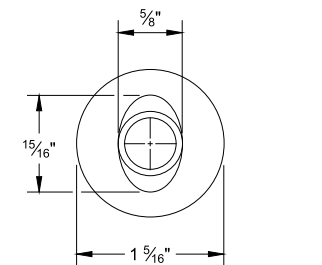
IT IS ACCEPTABLE TO USE BLOCKOUTS UP TO 16" DEEP TO INCREASE THE POST OFFSET TO AVOID UNDERGROUND OBSTACLES. THERE IS NO LIMIT TO THE NUMBER OF POSTS THAT CAN HAVE ADDITIONAL BLOCKOUTS UP TO 16" DEEP.

- NOTE:
- ALL FILLETS SHALL HAVE A MINIMUM RADIUS OF $\frac{3}{16}$ ".
 - IF THE BOLT EXTENDS MORE THAN $\frac{1}{4}$ " FROM THE NUT THE BOLT SHOULD BE TRIMMED BACK.

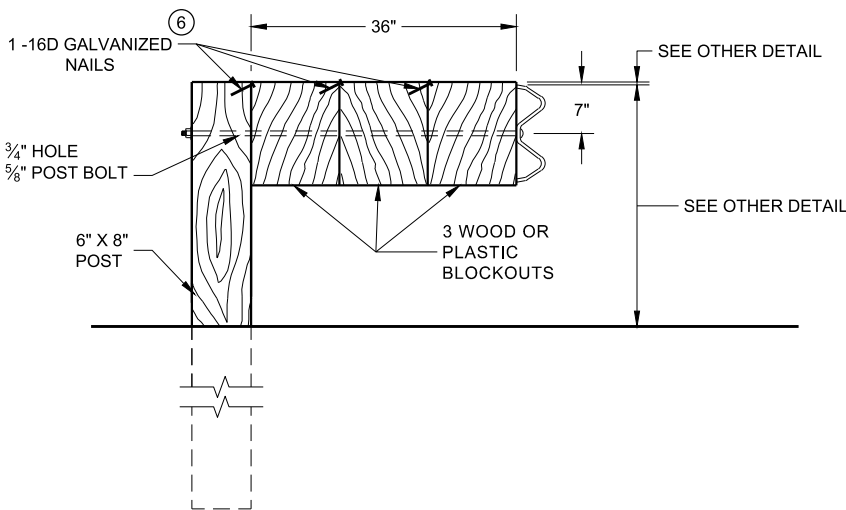


POST BOLT TABLE

L	T (MIN.)
1 1/4"	1 1/8"
2"	1 3/4"
10"	4"
14"	4 1/16"
18"	4"
21"	4 1/16"
25"	4"



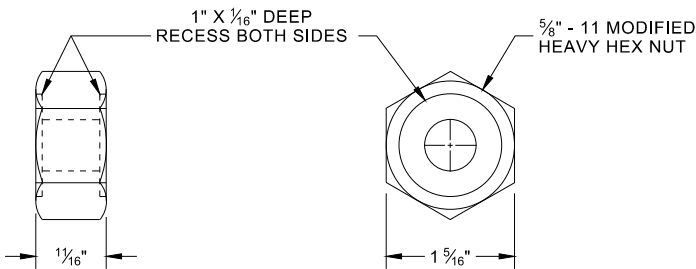
ALTERNATE BOLT HEAD



DETAIL FOR 36" BLOCKOUT DEPTH

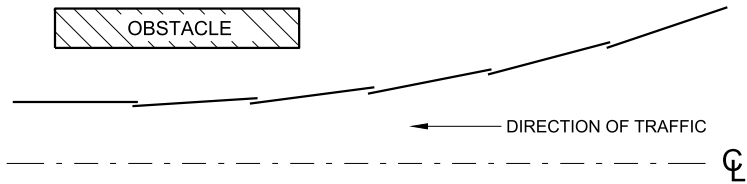
NOTES: UNDER SPECIAL CIRCUMSTANCES, SUCH AS AVOIDING OBSTACLES THAT ARE NOT RELOCATED, IT IS ACCEPTABLE TO INSTALL ADDITIONAL BLOCKOUTS TO OBTAIN UP TO 36" DEPTH FOR ONE OR TWO POSTS IN A SECTION OF GUARDRAIL.

DO NOT USE 16" OR 36" BLOCKOUTS IF IT CAUSES THE POST TO BE DRIVEN BEYOND SHOULDER HINGE POINT OR CAUSES A FIXED OBJECT TO BE WITHIN THE DEFLECTION DISTANCE OF THE BARRIER.

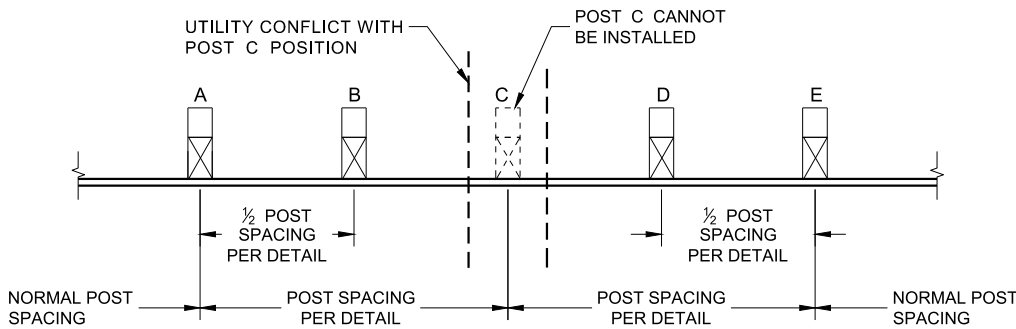


POST BOLT, SPLICE BOLT AND RECESS NUT

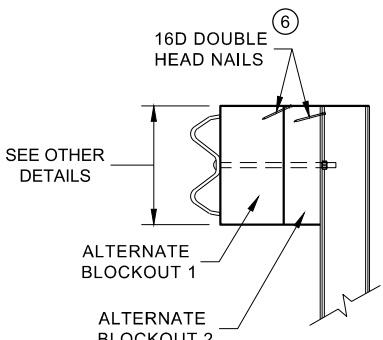
- ⑥ WHEN USING STEEL POST AD WOOD BLOCKOUTS, INSTALL FOUR 16D GALVANIZED NAILS. INSTALL NAILS AT THE BACK CORNERS OF THE BLOCK AND BEND THE NAILS OVER THE FLANGE OF THE STEEL POST.



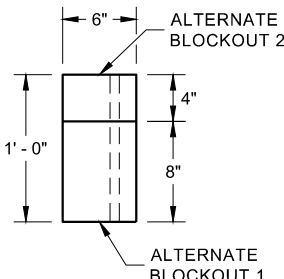
PLAN VIEW BEAM LAPPING DETAIL



POST DRIVING FOR CONTINUOUS UNDERGROUND OBSTRUCTION



SIDE VIEW



PLAN VIEW

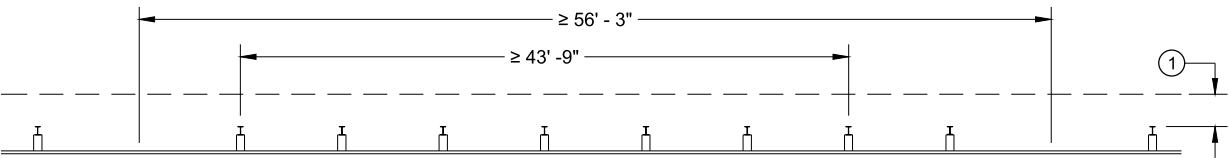
ALTERNATE WOOD BLOCKOUT DETAIL

**MIDWEST GUARDRAIL SYSTEM
(MGS) GUARDRAIL**

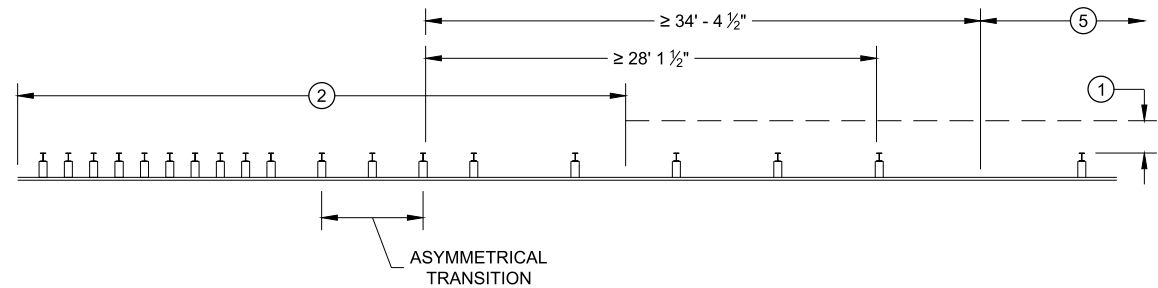
STATE OF WISCONSIN 153
DEPARTMENT OF TRANSPORTATION



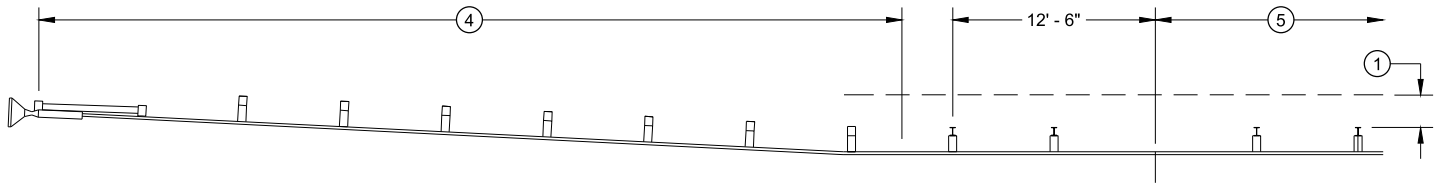
SDD 14B42-d Midwest Guardrail System (MGS) Guardrail



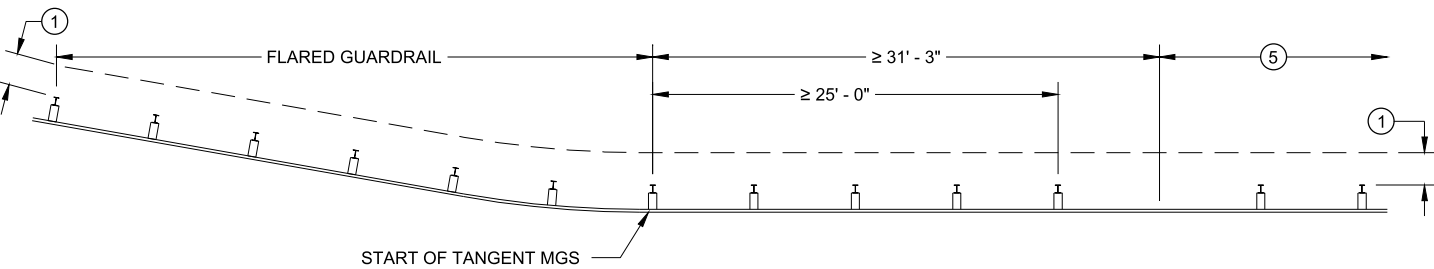
MISSING POST IN NORMAL BEAM GUARD RUN



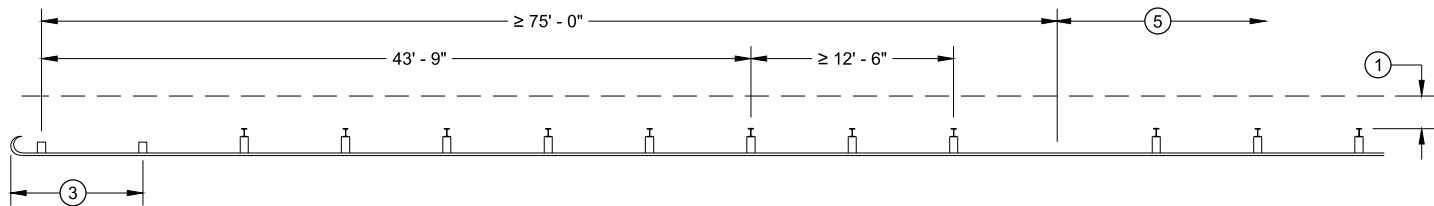
MISSING POST NEAR APPROACH THRIE BEAM TRANSITION



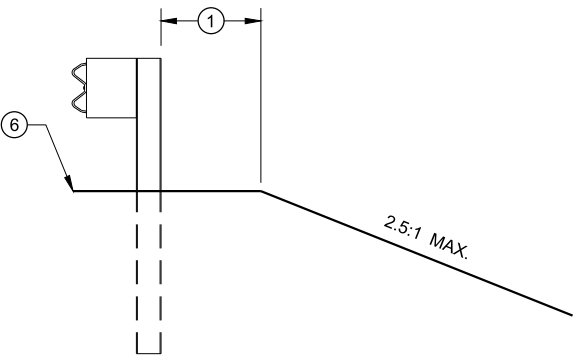
MISSING POST IN NORMAL BEAM GUARD RUN NEAR EAT



MISSING POST IN NORMAL BEAM GUARD RUN
NEAR FLARED BEAM GUARD



MISSING POST IN NORMAL BEAM GUARD RUN
NEAR TYPE 2 TERMINAL



CROSS SECTION VIEW

- (1) MINIMUM OF 2 FEET OF GRADING BEHIND POST.
- (2) SEE SDD 14B45 FOR MORE DETAILS.
- (3) SEE SDD 14B47 FOR MORE DETAILS.
- (4) SEE SDD 14B44 FOR MORE DETAILS.
- (5) SEE MISSING POST IN NORMAL BEAM GUARD RUN FOR DISTANCE TO NEXT MISSING POST AND AREA FOR WELL DRAINED, COMPACTED SOILS.
- (6) SEE PLAN FOR SHOULDER DESIGN.

MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
7/2018
DATE
/S/ Rodney Taylor
ROADWAY STANDARDS DEVELOPMENT
UNIT SUPERVISOR
FHWA

References:

[Standard Spec 614](#)
[FDM 11-45-2](#)
AASHTO Roadside Design Guide
MwRSF Report TRP-03-136-03, MwRSF Report TRP-03-139-04
MwRSF Report TRP-03-157-04, MwRSF Report TRP-03-170-06
MwRSF Report TRP-03-172-06, MwRSF Report TRP-03-171-06
MwRSF Report TRP-03-165-07, MwRSF Report TRP-03-191-08
MwRSF Report TRP-03-188-08, MwRSF Report TRP-03-205-09
MwRSF Report TRP-03-221-09, MwRSF Report TRP-03-185-10
MwRSF Report TRP-03-237-10, MwRSF Report TRP-03-234-10
MwRSF Report TRP-03-241-11, MwRSF Report TRP-03-243-11
MwRSF Report TRP-03-255-12, MwRSF Report TRP-03-274-12
MwRSF Report TRP-03-271-12, MwRSF Report TRP-03-276-13
MwRSF Report TRP-03-272-13, MwRSF Report TRP-03-314-15
MwRSF Report TRP-03-326-16, MwRSF Report TRP-03-320-16
TTI Report 0-4162-2
FHWA Memo W-Beam Guardrail Installations in Rock and in Mowing Strips March 10, 2004
FHWA Memo Roadside Design: Steel Strong Post W-beam Guardrail May 17, 2010

Bid items associated with this drawing:

ITEM NUMBER	DESCRIPTION	UNIT
614.0010	Barrier System Grading Shaping Finishing.....	EACH
614.0400	Adjusting Steel Plate Beam Guard	LF
614.0920	Salvaged Rail	LF
614.0925	Salvaged Guardrail End Treatments	EACH
614.0930 – 0939	Salvaged (component).....	EACH
614.0950	Replacing Guardrail Posts and Blocks	EACH
614.0951	Replacing Guardrail Rail and Hardware	LF
614.0952	Replacing Guardrail Reflectors	EACH
614.1000	MGS Guardrail Temporary.....	LF
614.1100	MGS Guardrail Temporary Thrie Beam Transition	LF
614.1200	MGS Guardrail Temporary Terminal EAT	EACH
614.2300	MGS Guardrail 3	LF
614.2310	MGS Guardrail 3 HS	LF
614.2320	MGS Guardrail 3 QS	LF
614.2330	MGS Guardrail 3 K.....	LF
614.2340	MGS Guardrail 3 L	LF
614.2500	MGS Thrie Beam Transition	LF
614.2610	MGS Guardrail Terminal EAT	EACH
614.2620	MGS Guardrail Terminal Type 2	EACH

Standardized Special Provisions associated with this drawing:

STSP NUMBER	TITLE
NONE	

Other SDDs associated with this drawing:

SDD 8D1	Concrete Curb, Concrete Curb & Gutter and Ties
SDD 14B28	Guardrail Mow Strip
SDD 14B43	Midwest Guardrail System Long Span (MGS L)
SDD 14B44	Midwest Guardrail System Terminal (MGS)
SDD 14B45	Midwest Guardrail System (MGS) Thrie Beam Transition
SDD 14B47	Midwest Guardrail System (MGS) Type 2 Terminal
SDD 15A4	Deflector Post with Reflective Sheeting (Required)

Design Notes:

Midwest guardrail system (MGS) is a semi-rigid barrier system. MGS is NCHRP 350 or MASH test level 3 compliant. All projects with August 2011 PSE or later are to use MGS details for new beam guard installations.

Indicate in plan where different types of MGS (e.g. HS, QS, K, L...) are to be installed. If the distance from the back of post to the shoulder hinge point is less than 2-feet, install longer post at half post spacing (MGS K).

Semi-rigid barrier systems use post rotation to absorb impact energy. Pinning the post into position (e.g. encasing within asphalt or concrete, placing rip rap next to the posts...) will make it more likely that the barrier system will not function as intended. Mow strips or concrete curb and gutter can be used to control erosion and other maintenance concerns near MGS.

It is not required to install mow strips or curb and gutter near MGS. Discuss with regional or local maintenance staff the need for mow strips or curb and gutter.

Placement of objects that limit post rotation requires approval by BPD. Limited project by project exceptions for placing objects that may limit post rotation may be granted by BPD. However, these exceptions will be rare. Document the exception in DSR.

Contact Person:

Erik Emerson (608) 266-2842

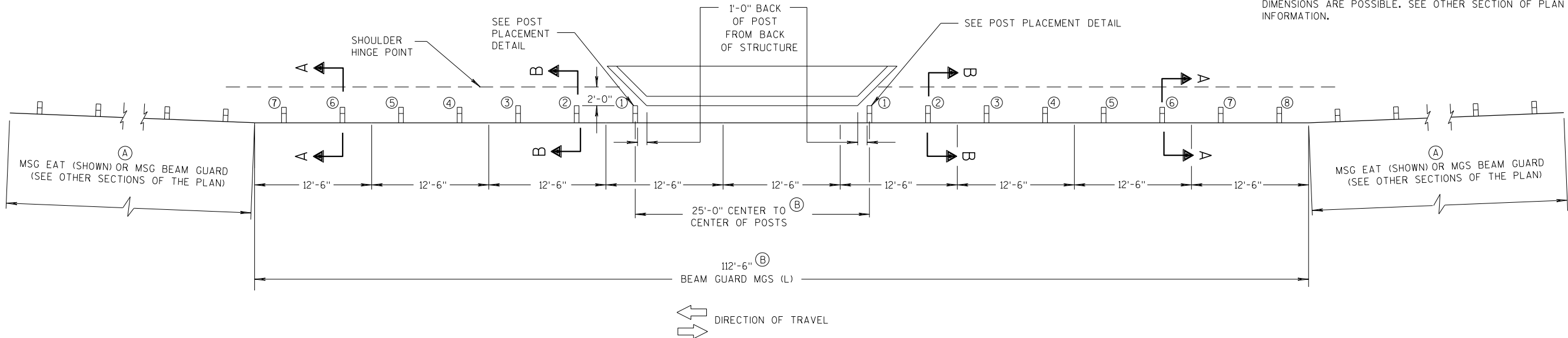
GENERAL NOTES

POSTS 1 THROUGH 3 ARE CRT POSTS.
ALL OTHER POSTS SHALL BE WOOD OR STEEL.

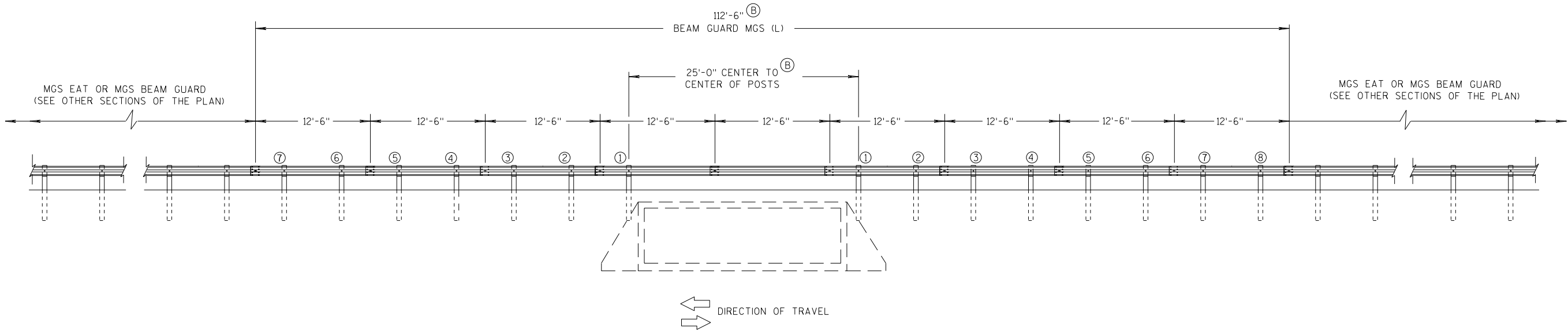
SEE SDD 14 B 42 FOR MORE DETAILS.

(A) FLARE FOR MGS EAT SHOWN, IF INSTALLING MGS NO FLARE NEEDED.

(B) VALUES SHOWN ON DRAWING REPRESENT THE MAXIMUM LENGTH. SHORTER DIMENSIONS ARE POSSIBLE. SEE OTHER SECTION OF PLAN FOR MORE INFORMATION.



PLAN VIEW



ELEVATION VIEW

MIDWEST GUARDRAIL SYSTEM LONG SPAN MGS (L) TWO-WAY TRAFFIC

MIDWEST GUARDRAIL SYSTEM
LONG SPAN MGS (L)

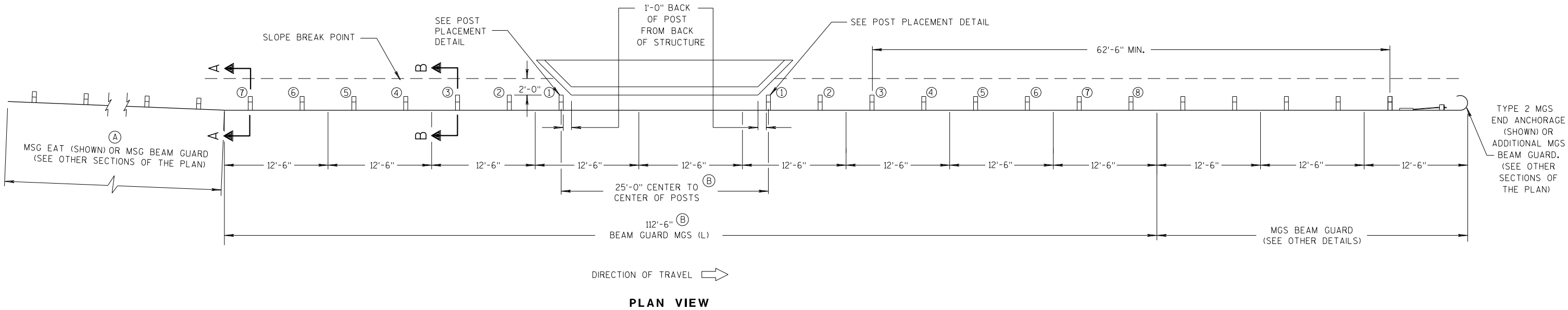
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

GENERAL NOTES

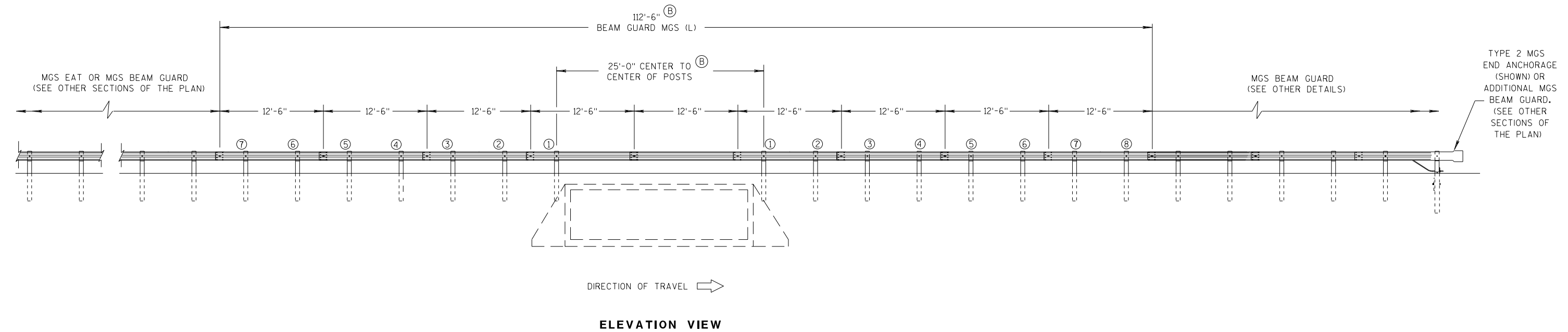
POSTS 1 THROUGH 3 ARE CRT POSTS.
ALL OTHER POSTS SHALL BE WOOD OR STEEL.

SEE SDD 14 B 42 FOR MORE DETAILS.

- (A) FLARE FOR MGS EAT SHOWN. IF INSTALLING MGS NO FLARE NEEDED.
- (B) VALUES SHOWN ON DRAWING REPRESENT THE MAXIMUM LENGTH. SHORTER DIMENSIONS ARE POSSIBLE. SEE OTHER SECTION OF PLAN FOR MORE INFORMATION.



PLAN VIEW

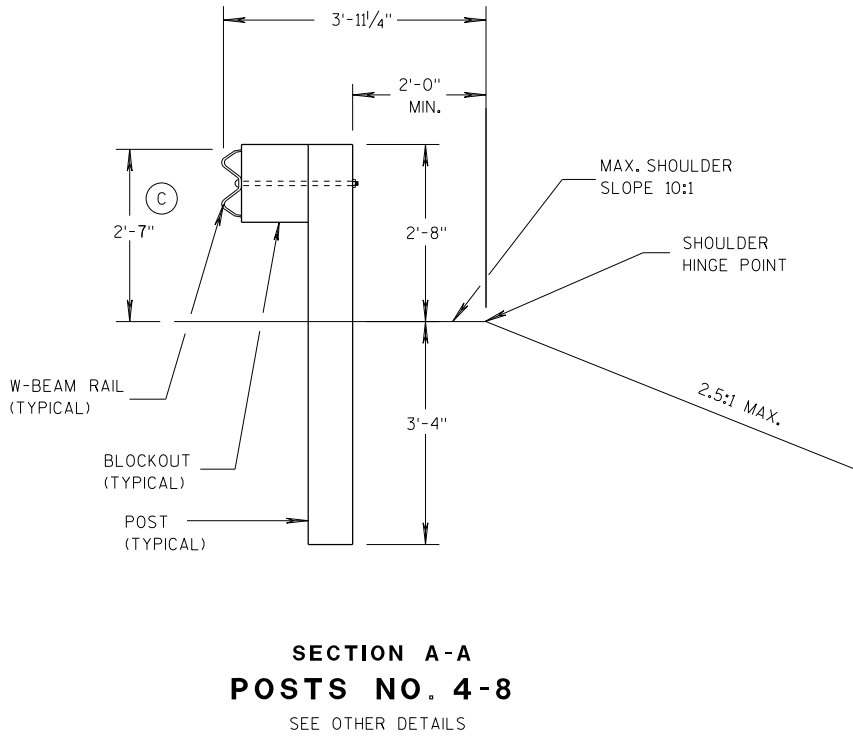
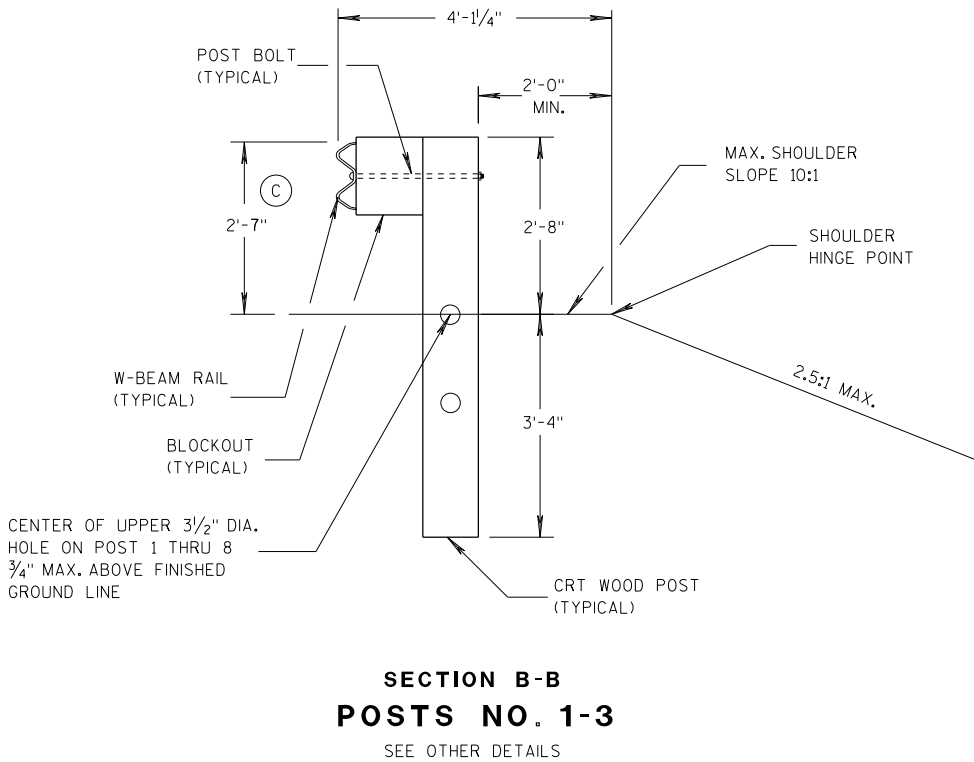
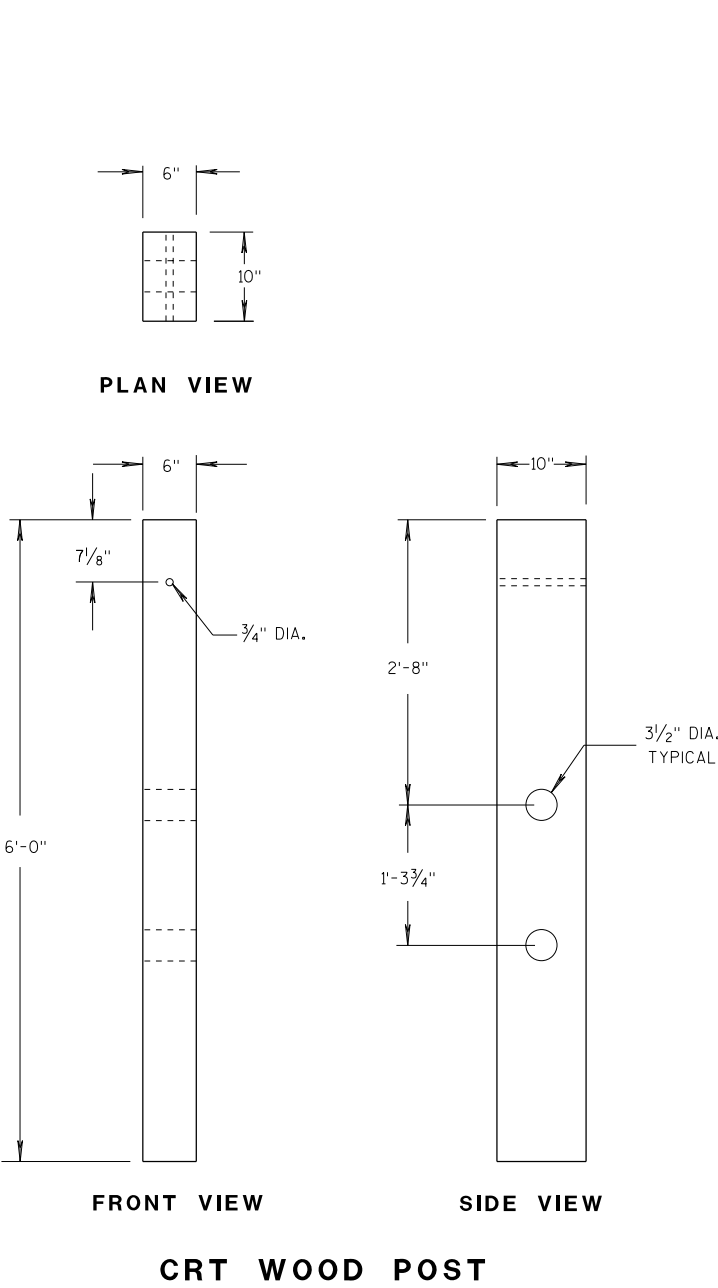


ELEVATION VIEW

MIDWEST GUARDRAIL SYSTEM LONG SPAN MGS (L) ONE-WAY TRAFFIC

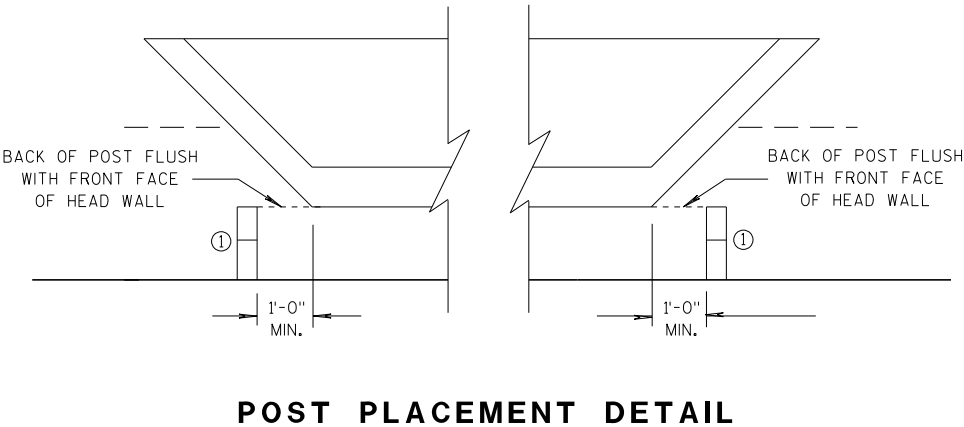
MIDWEST GUARDRAIL SYSTEM
LONG SPAN MGS (L)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



GENERAL NOTES

(C) TOLERANCE FOR TOP OF W-BEAM RAIL IS ± 1".



MIDWEST GUARDRAIL SYSTEM LONG SPAN MGS (L)	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION	
APPROVED 07/2018 DATE	/S/ Rodney Taylor 159 ROADWAY STANDARDS DEVELOPMENT ENGINEER
FHWA	

References:

[Standard Spec 614](#)
[FDM 11-45-1](#)
[FDM 11-45-2](#)
[SDD 14b42](#)
AASHTO Roadside Design Guide
MwRSF Report TRP-03-187-07

Bid items associated with this drawing:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
614.0010	Barrier System Grading Shaping Finishing.....	EACH
614.0400	Adjusting Steel Plate Beam Guard	LF
614.0920	Salvaged Rail	LF
614.0925	Salvaged Guardrail End Treatments	EACH
614.0950	Replacing Guardrail Posts and Blocks	EACH
614.0951	Replacing Guardrail Rail and Hardware	LF
614.0952	Replacing Guardrail Reflectors	EACH
614.2300	MGS Guardrail 3	LF
614.2340	MGS Guardrail 3 L	LF
614.2610	MGS Guardrail Terminal EAT	EACH
614.2620	MGS Guardrail Terminal Type 2	EACH

Standardized Special Provisions associated with this drawing:

<u>STSP NUMBER</u>	<u>TITLE</u>
NONE	

Other SDDs associated with this drawing:

SDD 14b28	Guardrail Mow Strip
SDD 14b42	Midwest Guardrail System
SDD 14b44	Midwest Guardrail System Terminal EAT (MGS)
SDD 14b45	Midwest Guardrail System Transitions (MGS)
SDD 14b47	Midwest Guardrail System Type 2 terminal (MGS)

Design Notes:

Midwest guardrail System L (MGS L) is a specially designed semi-rigid barrier system. MGS L is designed to span over drainage structures, box culverts and underground obstructions. Maximum span length (i.e. distance between post 1 to post 1) is shown on front side of this SDD. Smaller spans between post 1 to post 1 may be used. Document span length in plans.

Provide working width for MGS L. Working width for MGS L is 94 inches from front face of rail to front of fixed object. If working width cannot be provided provide documentation within DSR.

Top of a box culvert or other drainage structure’s header is flush or below shoulder elevation at the back of post 1. If header is above this elevation it may snag or trip errant vehicle during impact or redirection.

Individual construction detail drawings are required (See [FDM 11-45-2.5.2](#)). Post embedment, post location, and grading near post are critical design features. Front sides of SDD show minimum layout of standard MGS upstream and downstream of MGS L. Installing shorter lengths of standard MGS upstream or downstream may impair the function of MGS L.For example on “sheet b”, 62 feet and 6 inches of MGS L and MGS, measured from post 3, is required on the downstream end of the box culvert. Reducing grading near MGS L will degrade performance.

MGS L was not designed to be directly connected to stiffer or more flexible semi rigid barriers.

There are other crashworthy options to span beam guard over a drainage structure or box culvert. Coordination with the Bureau of Project Development, Bureau of Structures and Regional Maintenance is required. MGS may have to be connected to drainage structure or box culvert. Connecting MGS to a drainage structure or box culvert requires structural analysis, discussion with maintenance staff, and

additional design effort. Special provisions and special details may be required. BPD recommends that this coordination is done early in the design or scoping process.

Another option would be to use a different barrier system to span over a drainage structure, box culvert, or underground obstruction. For an example, a single slope concrete barrier could be installed over a shallow fill culvert.

Do not install curb and gutter in front of or below rail when using MGS type L.

MGS L may use grading and shaping items.

See [SDD 14b42](#) for additional guidance.

Contact Person:

Erik Emerson (608) 266-2842



SDD 14B44-a Midwest Guardrail System (MGS) Energy Absorbing Terminal

GENERAL NOTES

- (A) THE SLOPE IN THE AREA BOUNDED BY THE GRADELINE, THE HINGE POINT LINE (HPL) AND THE CLEAR ZONE LIMITS (CZL) SHALL BE 4:1 OR FLATTER.
- (B) AFTER FINAL ASSEMBLY, RECHECK CABLE TO BE SURE IT IS TAUT AND HAS NOT RELAXED
- (C) DIFFERENT MANUFACTURERS REQUIRE DIFFERENT PERFORATED W - BEAM RAIL END PANELS. SEE MANUFACTURER'S INFORMATION.
- (D) ATTACH ALUMINUM SHEET TO E.A.T. HEAD USING 4 STAINLESS STEEL SELF - TAPPING SCREWS. ONE SCREW PER CORNER.
- (E) HARDWARE MAY VARY BETWEEN MANUFACTURER. SEE MANUFACTURER'S DRAWING FOR INFORMATION.
- (F) DIMENSIONS MAY VARY, MANUFACTURER'S INFORMATION.

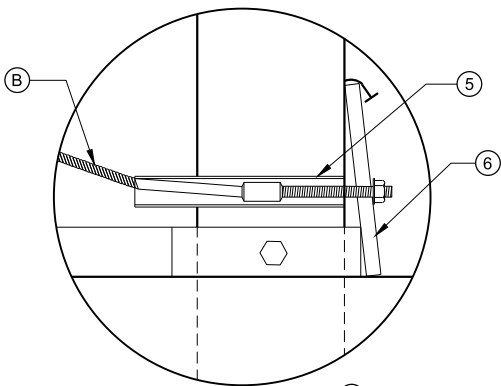
SEE SDD 14B42 FOR MORE INFORMATION.

* DO NOT ATTACH BLOCKOUTS TO POST 1 AND 2.

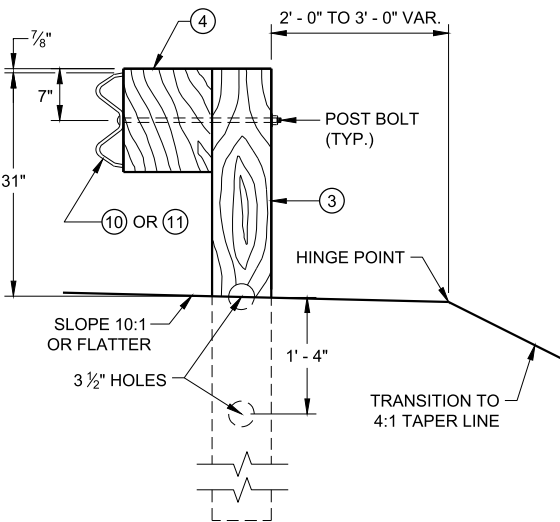
DO NOT INSTALL REFLECTORS ON THE FIRST 50 FEET OF THE APPROACH END OF THE ENERGY ABSORBING TERMINAL.

SEE MANUFACTURER'S DRAWING FOR SPLICE LOCATION, HARDWARE DIMENSIONS AND INSTALLATION INSTRUCTIONS.

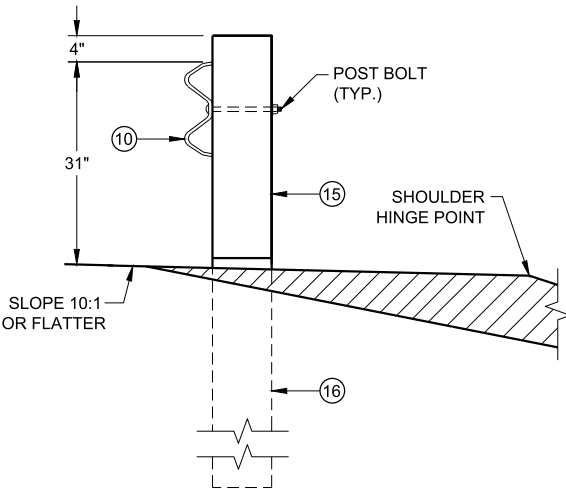
THE CENTER OF THE UPPER 3 1/2" DIAMETER HOLE ON POST NUMBER 3 THROUGH POST 9 IS TO BE FLUSH WITH THE GROUND LINE UP TO A MAXIMUM OF 2" ABOVE GROUND LINE. WOOD BLOCKS ON POSTS NUMBERED 3 THROUGH 9 MAY BE ADJUSTED UP TO 3" ABOVE THE TOP OF POST.



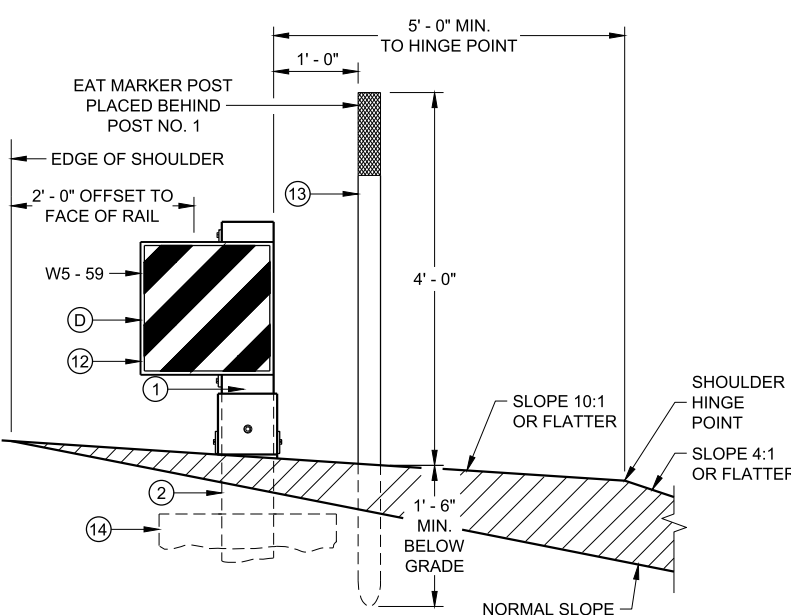
DETAIL "A"



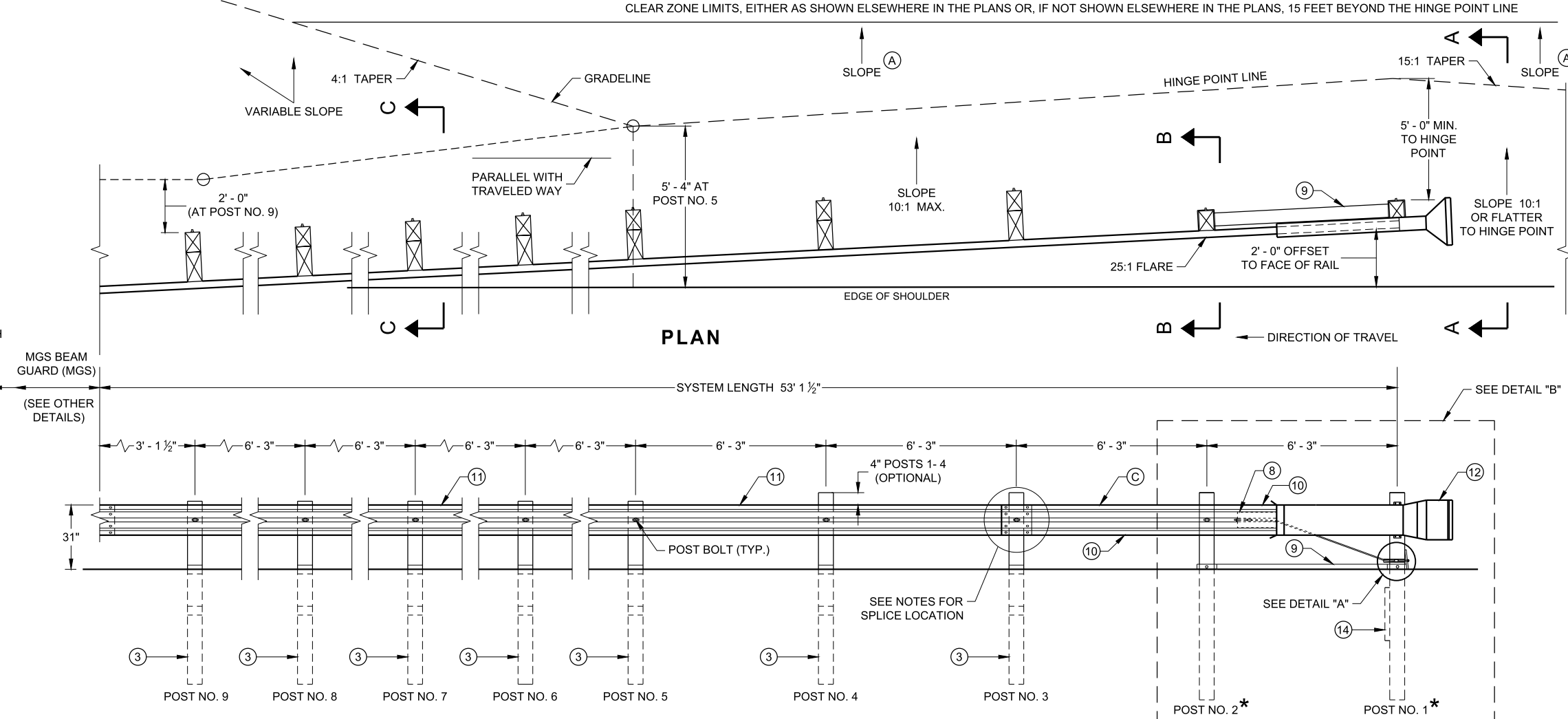
SECTION C - C
TYPICAL AT POST NOS. 3 - 9



SECTION B - B
TYPICAL AT POST NO. 2*

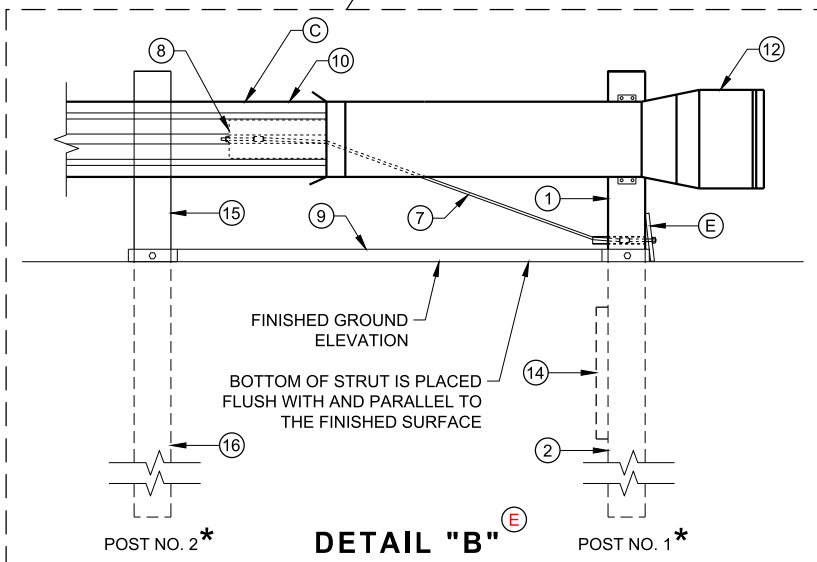


SECTION A - A
TYPICAL AT POST NO. 1*



PLAN

ELEVATION



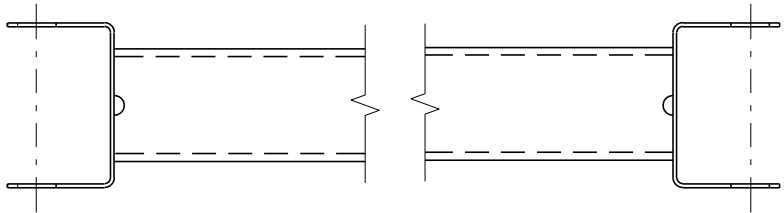
DETAIL "B"

**MIDWEST GUARDRAIL SYSTEM
ENERGY ABSORBING TERMINAL
(MGS)**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

SDD 14B44 - 04a

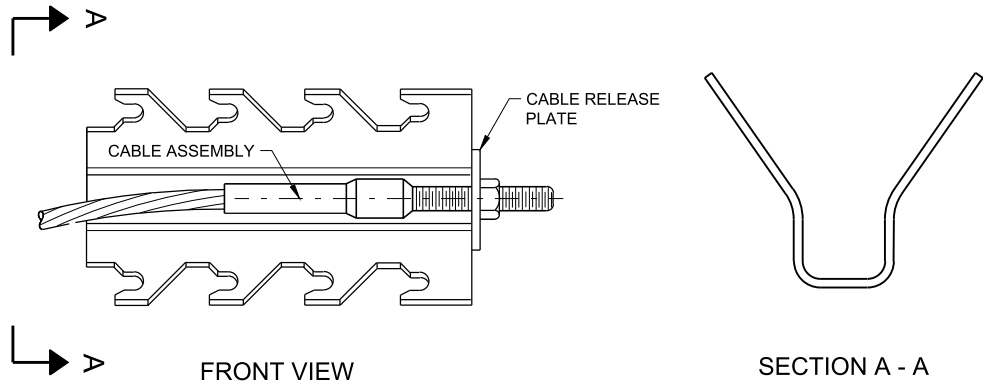
SDD 14B44 - 04a



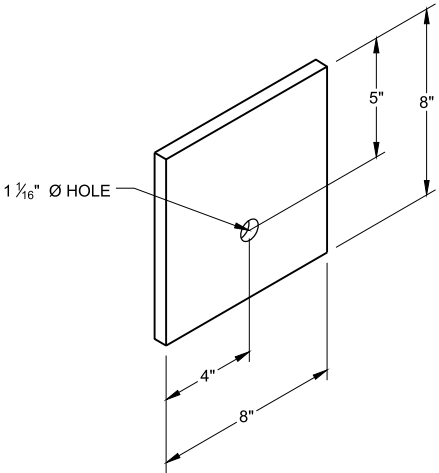
GENERIC GROUND STRUT ⁹ (E)

BILL OF MATERIALS

PART NO.	DESCRIPTION MATERIALS PROVIDED BY MGS EAT MANUFACTURER. SEE MANUFACTURER'S DETAILS FOR MORE INFORMATION.
①	UPPER POST NO. 1 6" X 6" TUBE
②	LOWER POST NO. 1
③	WOOD CRT
④	WOOD BLOCKOUT
⑤	PIPE SLEEVE
⑥	BEARING PLATE
⑦	BCT CABLE ASSEMBLY
⑧	ANCHOR CABLE BOX
⑨	GROUND STRUT
⑩	PERFORATED W-BEAM RAIL END PANEL, 12'-6" LONG.
⑪	STANDARD W-BEAM RAIL. MULTIPLE SECTIONS REQUIRED. SECTIONS VARY IN LENGTH.
⑫	IMPACT HEAD
⑬	EAT MARKER POST - YELLOW (SEE APPROVED PRODUCTS LIST)
⑭	SOIL PLATE
⑮	UPPER POST NO. 2
⑯	LOWER POST NO. 2



GENERIC ANCHOR CABLE BOX ⁹ (E)

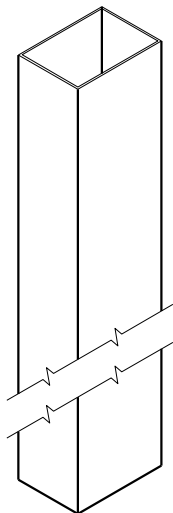


BEARING PLATE ⁶ (E)

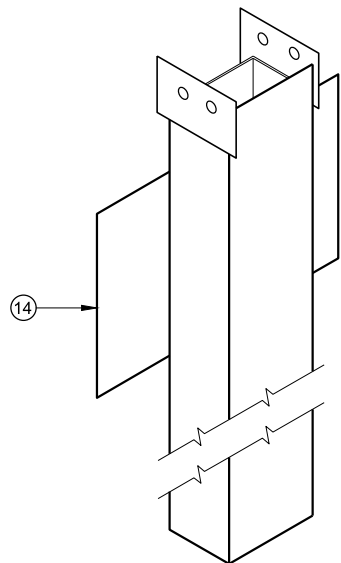
MIDWEST GUARDRAIL SYSTEM
ENERGY ABSORBING TERMINAL
(MGS)



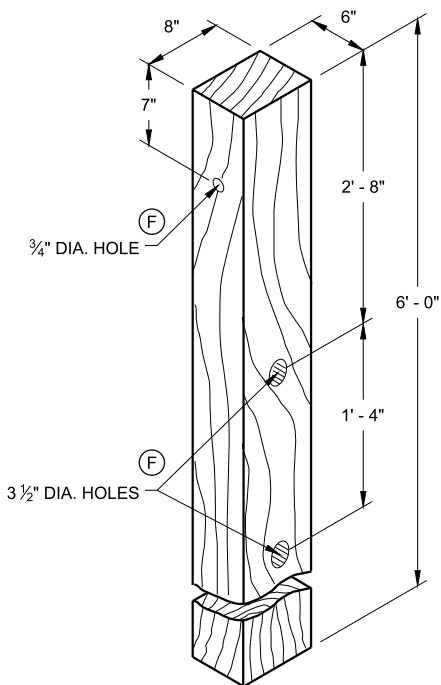
SDD 14B44-c Midwest Guardrail System (MGS) Energy Absorbing Terminal



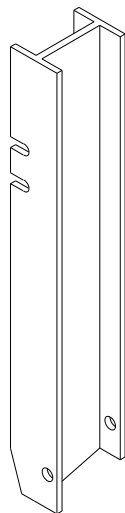
UPPER POST NO. 1^{(1) (E)}



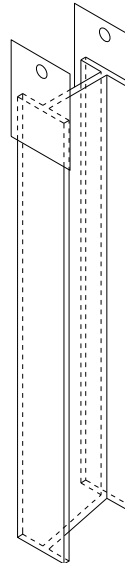
LOWER POST NO. 1^{(2) (E)}



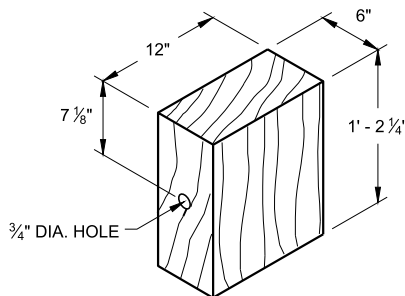
WOOD CRT POST^{(3) (E)}
POSTS NUMBER 3-9



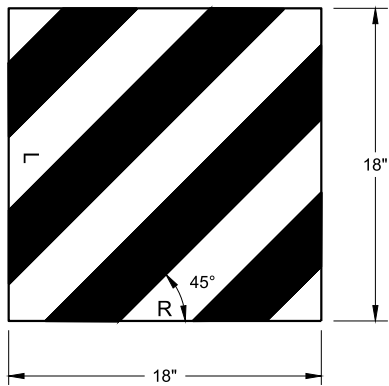
UPPER POST NO. 2^{(15) (E)}



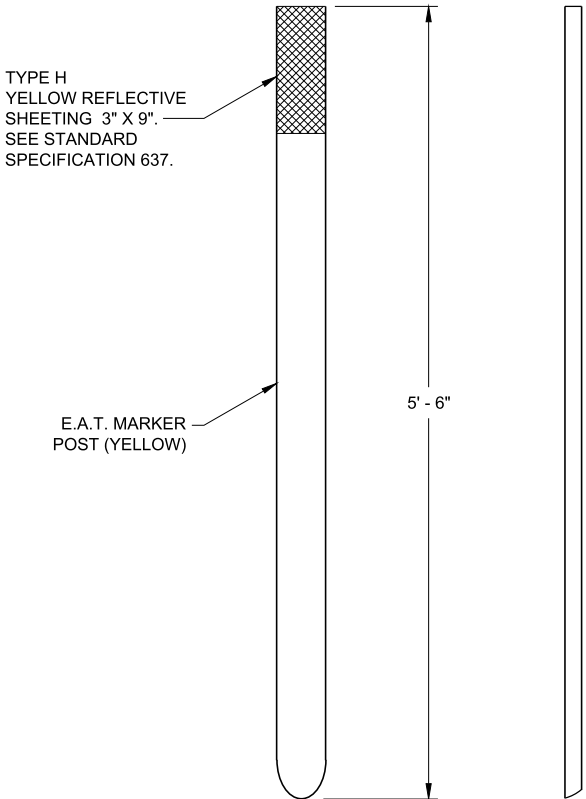
LOWER POST NO. 2^{(16) (E)}



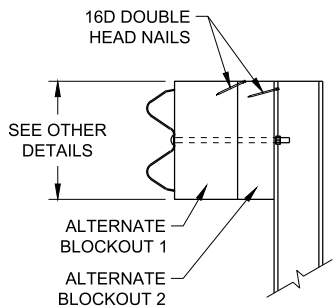
WOOD BLOCKOUT⁽⁴⁾
REQ'D. AT ALL POSTS EXCEPT POST NO'S 1 & 2



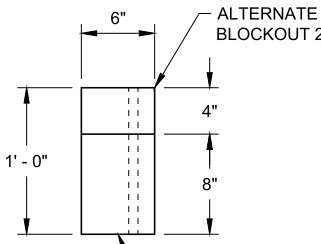
REFLECTIVE SHEETING DETAIL^(E)



E.A.T. MARKER POST⁽¹³⁾



SIDE VIEW



TOP VIEW

ALTERNATE WOOD
BLOCKOUT DETAIL

MIDWEST GUARDRAIL SYSTEM
ENERGY ABSORBING TERMINAL
(MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
7/2018 DATE /S/ Rodney Taylor
ROADWAY STANDARDS DEVELOPMENT
UNIT SUPERVISOR
FHWA

References:

[CMM 6-26](#)
[FDM 11-45-2](#)
AASHTO Roadside Design Guide
[Standard Spec 614](#)

Bid items associated with this drawing:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
614.0010	Barrier System Grading Shaping Finishing.....	EACH
614.0920	Salvaged Rail	LF
614.0925	Salvaged Guardrail End Treatments	EACH
614.0930 – 0939	Salvaged (component).....	EACH
614.1000	MGS Guardrail Temporary.....	LF
614.1100	MGS Guardrail Temporary Thrie Beam Transition	LF
614.1200	MGS Guardrail Temporary Terminal EAT	EACH
614.2300	MGS Guardrail 3	LF
614.2310	MGS Guardrail 3 HS	LF
614.2320	MGS Guardrail 3 QS	LF
614.2330	MGS Guardrail 3 K.....	LF
614.2340	MGS Guardrail 3 L	LF
614.2500	MGS Thrie Beam Transition	LF
614.2610	MGS Guardrail Terminal EAT	EACH
614.2620	MGS Guardrail Terminal Type 2	EACH

Standardized Special Provisions associated with this drawing:

<u>STSP NUMBER</u>	<u>TITLE</u>
NONE	

Other SDDs associated with this drawing:

SDD 8D1	Concrete Curb, Concrete Curb & Gutter and Ties
SDD 14B28	Mow Strip Detail
SDD 14B42	Midwest Guardrail System
SDD 14B43	Midwest Guardrail System Long Span (MGS L)
SDD 14B44	Midwest Guardrail System Terminal (MGS)
SDD 14B45	Midwest Guardrail System Transitions (MGS)
SDD 14B47	Midwest Guardrail System Type 2 Terminal (MGS)

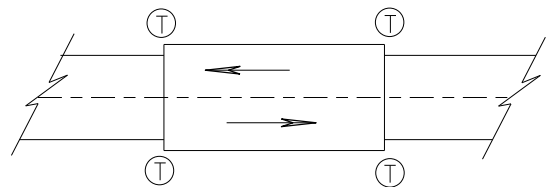
Design Notes:

Review drainage and grading near MGS EAT early in the scoping or design process. Additional right of way may be needed to accommodate grading, and drainage near MGS EAT.

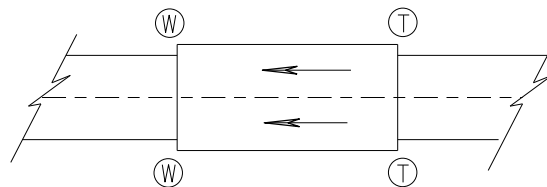
Downturned ends are no longer considered an acceptable end treatment. Contact BPD to install a downturned end treatment (see [FDM 11-45-2.5.4](#)).

Contact Person:

Erik Emerson (608) 266-2842



TWO WAY TRAFFIC



ONE WAY TRAFFIC

(T) THRIE BEAM CONNECTION

(W) W-BEAM CONNECTION WHEN REQUIRED

TYPICAL LOCATIONS OF THRIE BEAM AND W-BEAM CONNECTIONS TO BRIDGE

GENERAL NOTES

IF ROCK IS ENCOUNTERED, REMOVE ROCK TO FULL DEPTH OF POST PLUS 2 1/2", AND 12" DIAMETER AROUND POST. SEE 14B42 FOR MORE DETAILS.

TRANSITION USES STEEL POSTS ONLY.

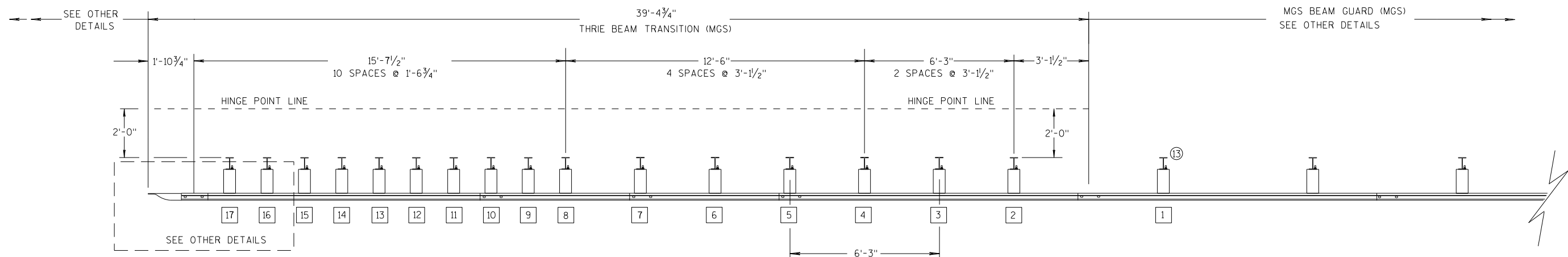
SEE STANDARD DETAIL DRAWING 14 B 42 FOR MORE INFORMATION.

POST 2 THROUGH 17 USES STEEL POST ONLY

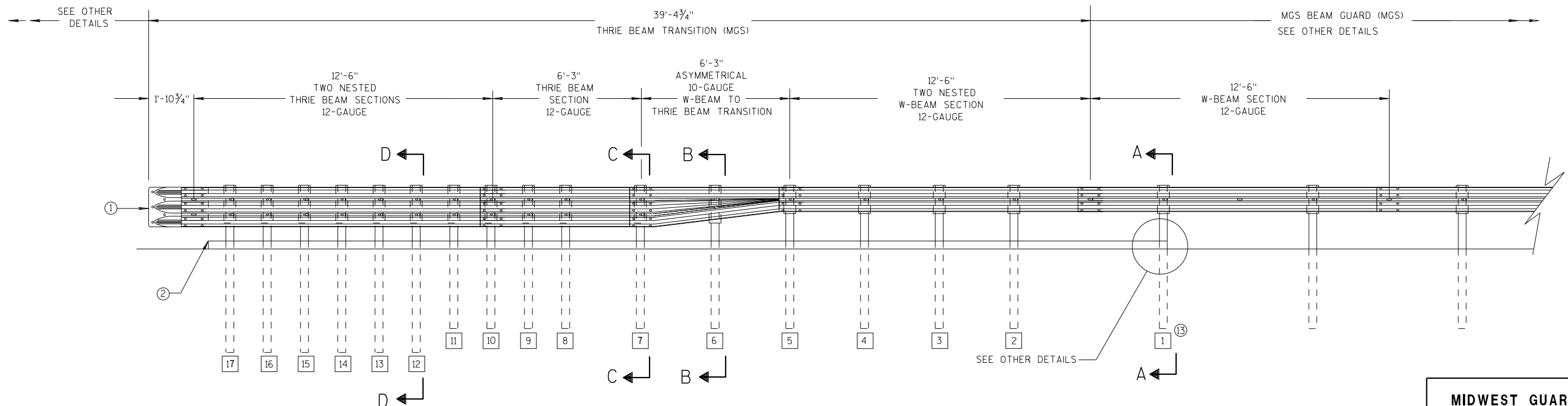
① BRIDGE RAILING TYPE "W" DOES NOT REQUIRE A TERMINAL CONNECTOR.

② OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.

⑬ STEEL OR WOOD POST IS ACCEPTABLE AT POST 1. SEE SDD14B42



PLAN VIEW



ELEVATION VIEW

MIDWEST GUARDRAIL SYSTEM THRIE BEAM TRANSITION

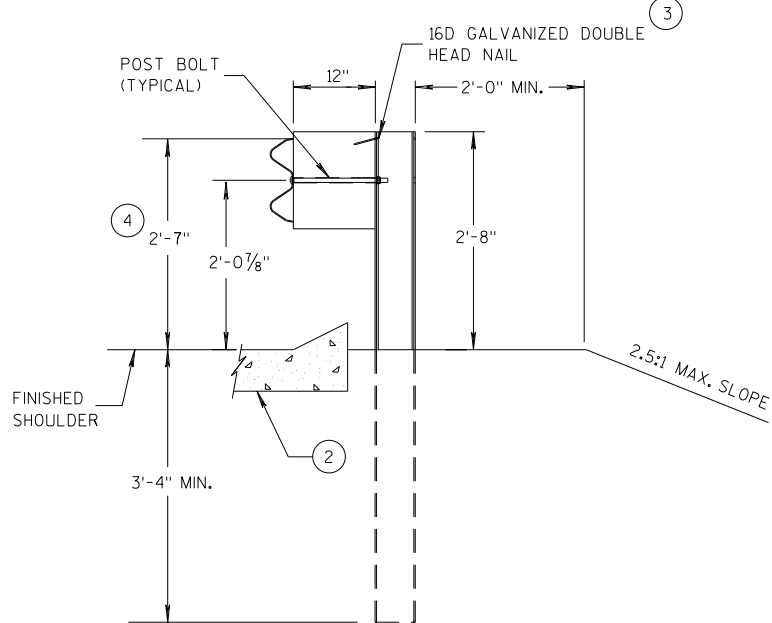
MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

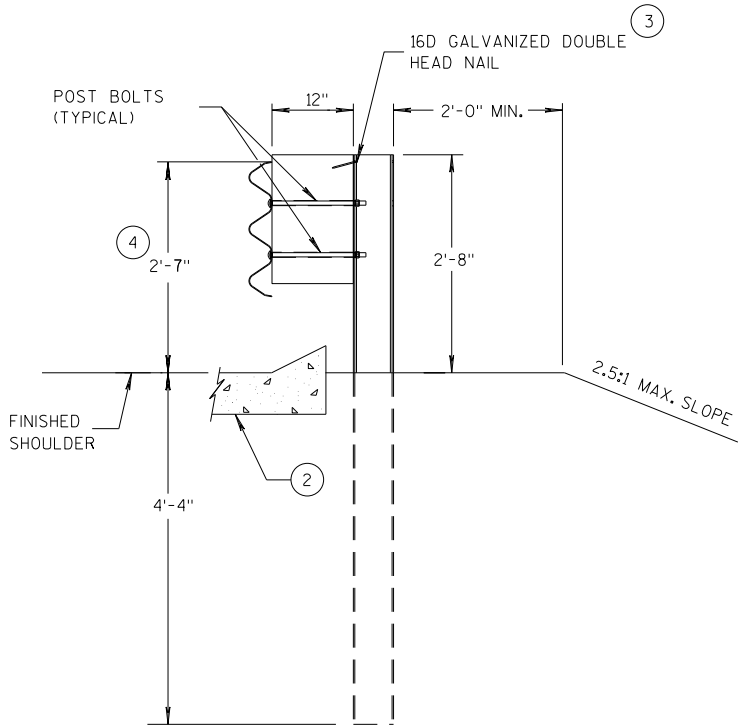
186

GENERAL NOTES

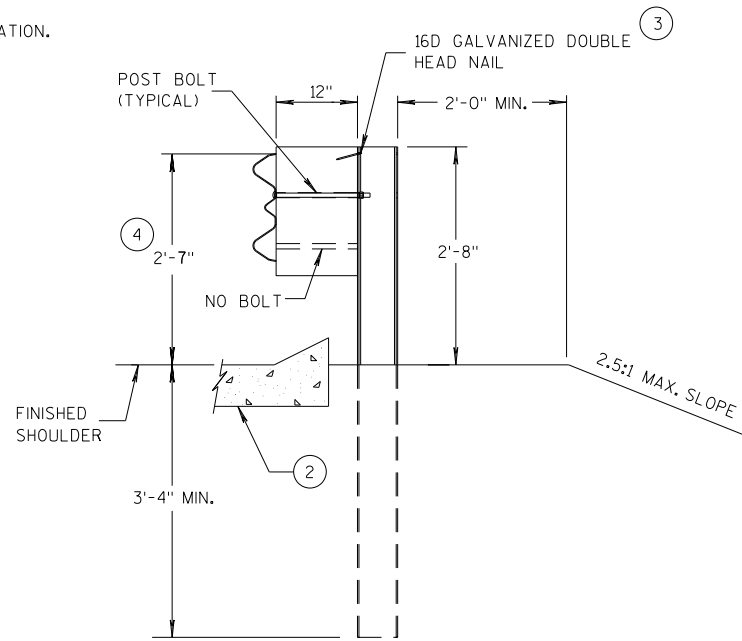
- 2 OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.
- 3 WHEN USING STEEL POSTS AND WOOD BLOCKOUTS INSTALL FOUR 10D GALVANIZED NAILS. INSTALL NAILS AT THE BACK CORNERS OF THE BLOCK AND BEND THE NAILS OVER THE FLANGE OF THE STEEL POST.
- 4 TOLERANCE FOR TOP OF W-BEAM RAIL IS $\pm 1"$.
- 13 STEEL OR WOOD POST IS ACCEPTABLE AT POST 1. SEE SDD 14B42



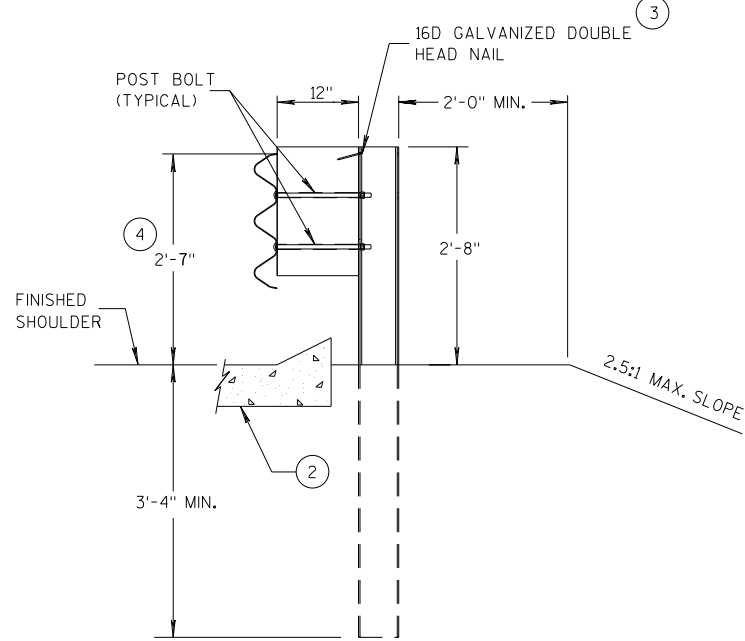
SECTION A-A
POSTS 1-5



SECTION D-D
POSTS 12-17



SECTION B-B
POST 6



SECTION C-C
POSTS 7-11

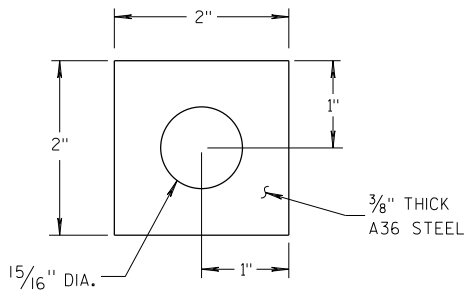
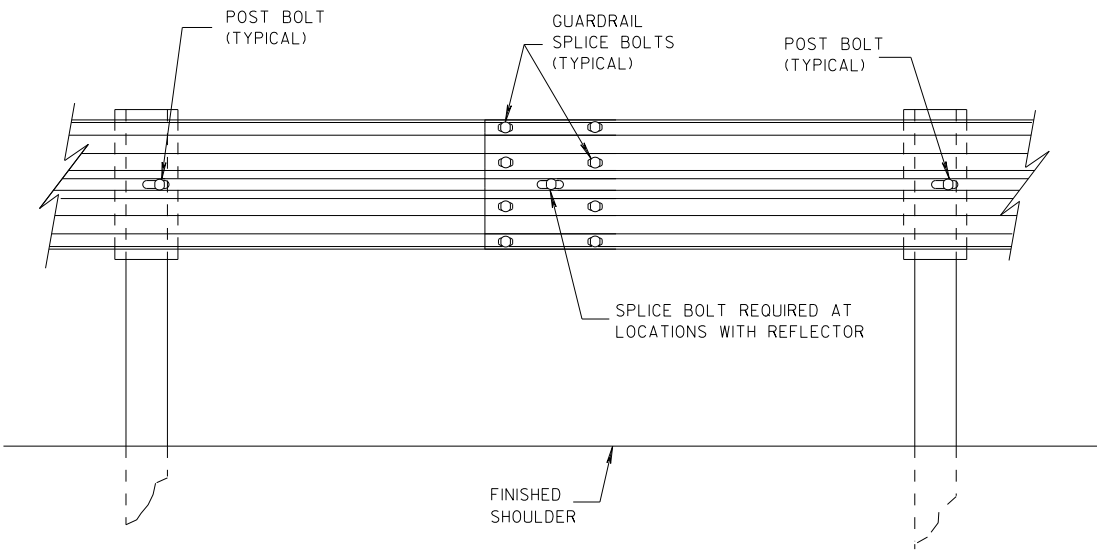
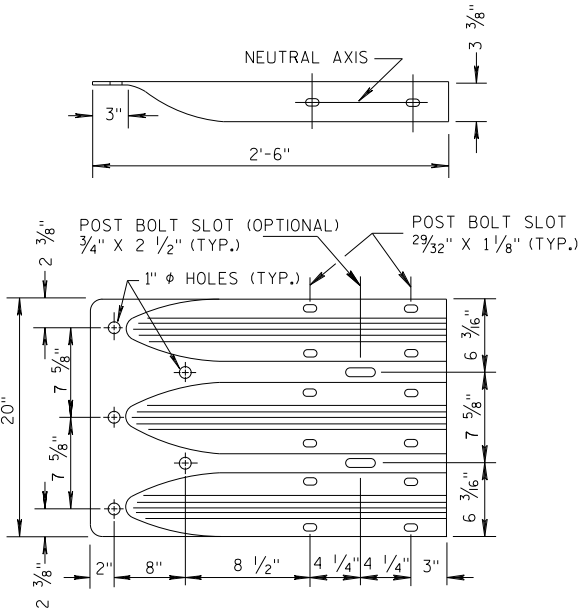


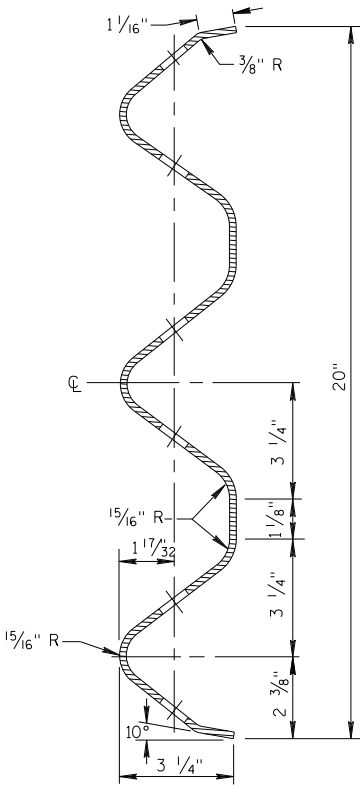
PLATE WASHER DETAIL



SPLICE DETAIL



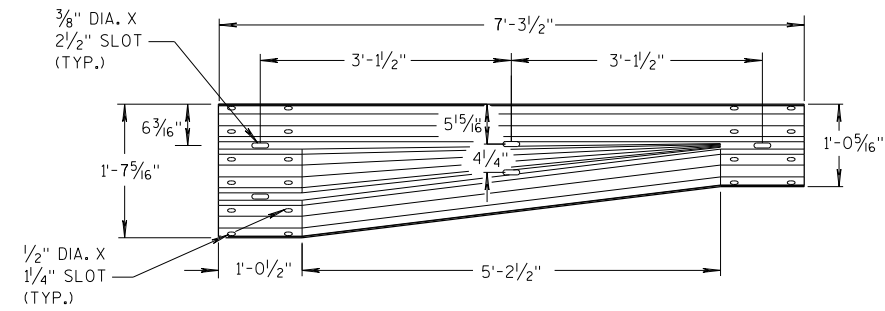
THRIE BEAM
TERMINAL CONNECTOR



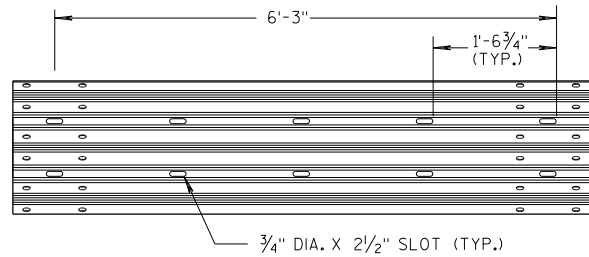
SECTION THRU THRIE
BEAM RAIL ELEMENT

MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

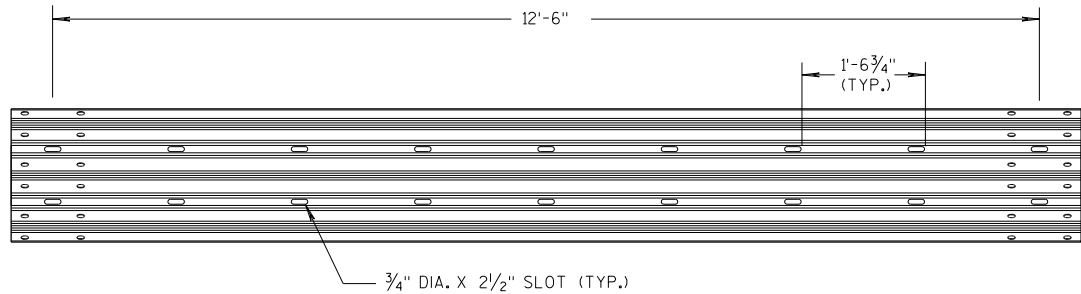
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



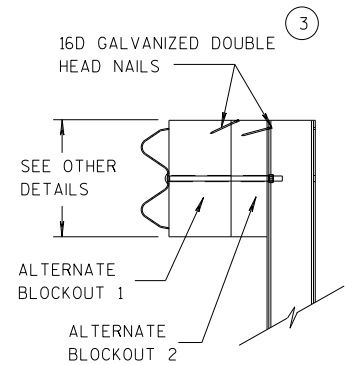
W-BEAM TO THRIE BEAM TRANSITION SECTION



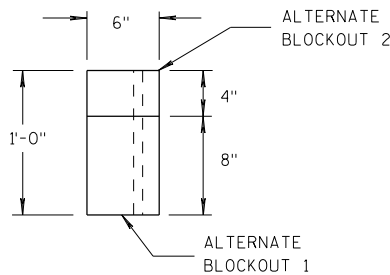
6'-3" THRIE BEAM SECTION



12'-6" THRIE BEAM SECTION

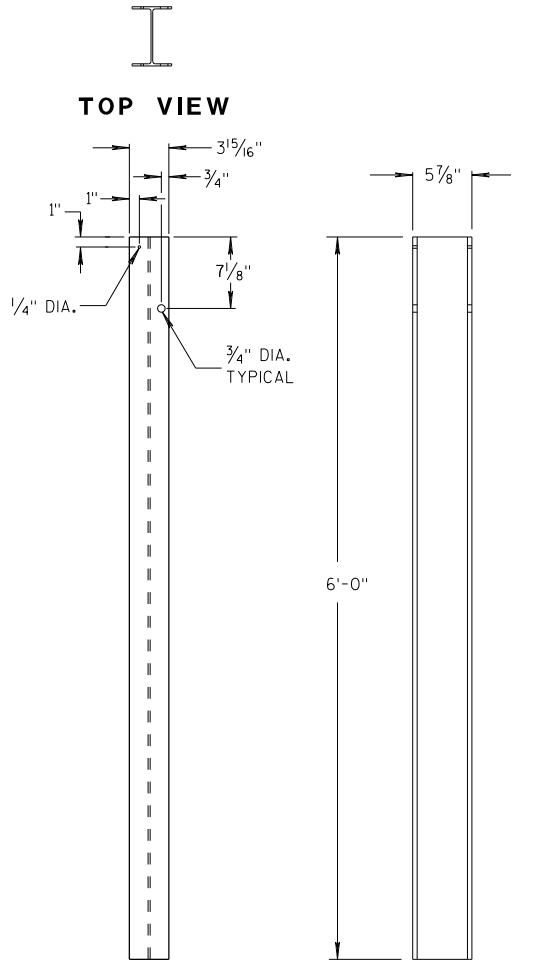


SIDE VIEW



TOP VIEW

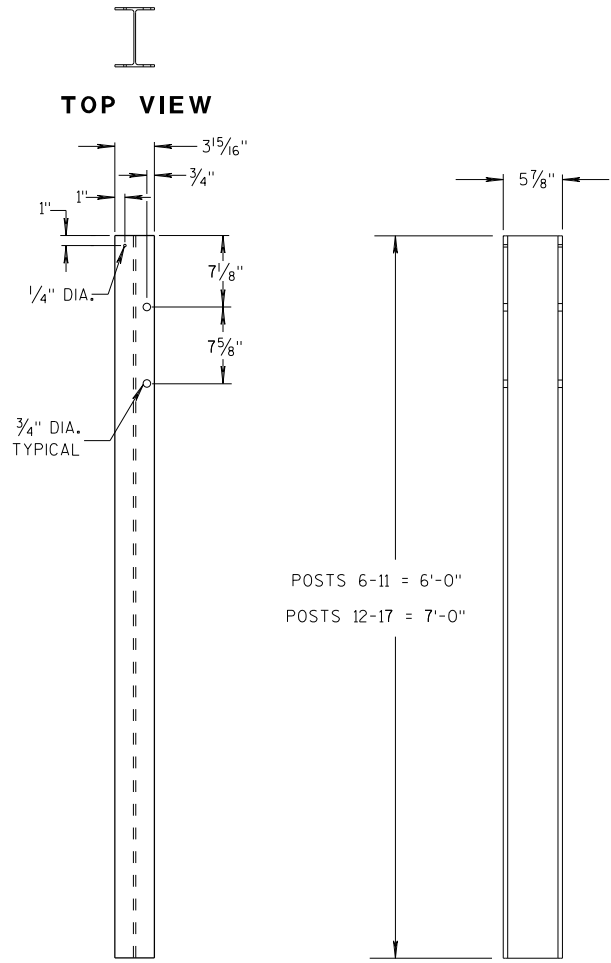
ALTERNATE WOOD BLOCKOUT DETAIL



FRONT VIEW

SIDE VIEW

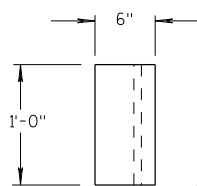
STEEL POSTS 1-5



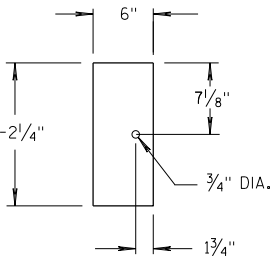
FRONT VIEW

SIDE VIEW

STEEL POSTS 6-17

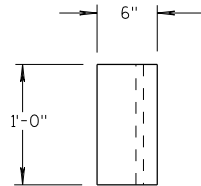


TOP VIEW

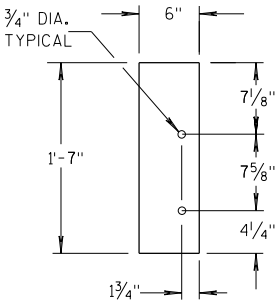


FRONT VIEW

BLOCKOUT POSTS 1-5



TOP VIEW



FRONT VIEW

BLOCKOUT POSTS 6-17

GENERAL NOTES

STEEL POSTS ARE W6X9 OR W6X8.5.

BOLT HOLES FOR POST ARE ON FRONT AND OF SIDE OF POST.

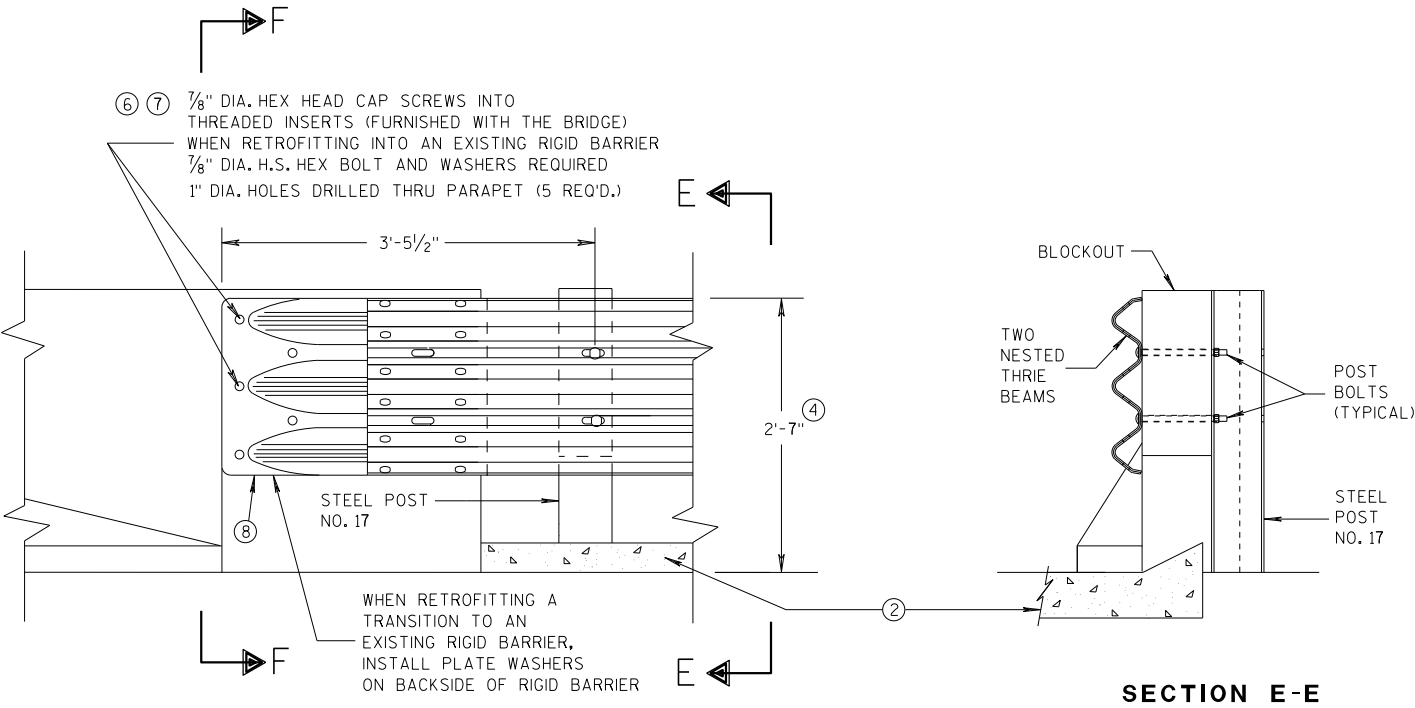
3 WHEN USING STEEL POSTS AND WOOD BLOCKOUTS INSTALL FOUR 16D GALVANIZED NAILS. INSTALL NAILS AT THE BACK CORNERS OF THE BLOCK AND BEND THE NAILS OVER THE FLANGE OF THE STEEL POST.

5 WOOD BLOCKS MAY BE CONSTRUCTED OUT OF 2 WOOD BLOCKS. SEE ALTERNATE WOOD BLOCK DETAIL.

13 STEEL OR WOOD POST IS ACCEPTABLE AT POST 1. SEE SDD 14B42.

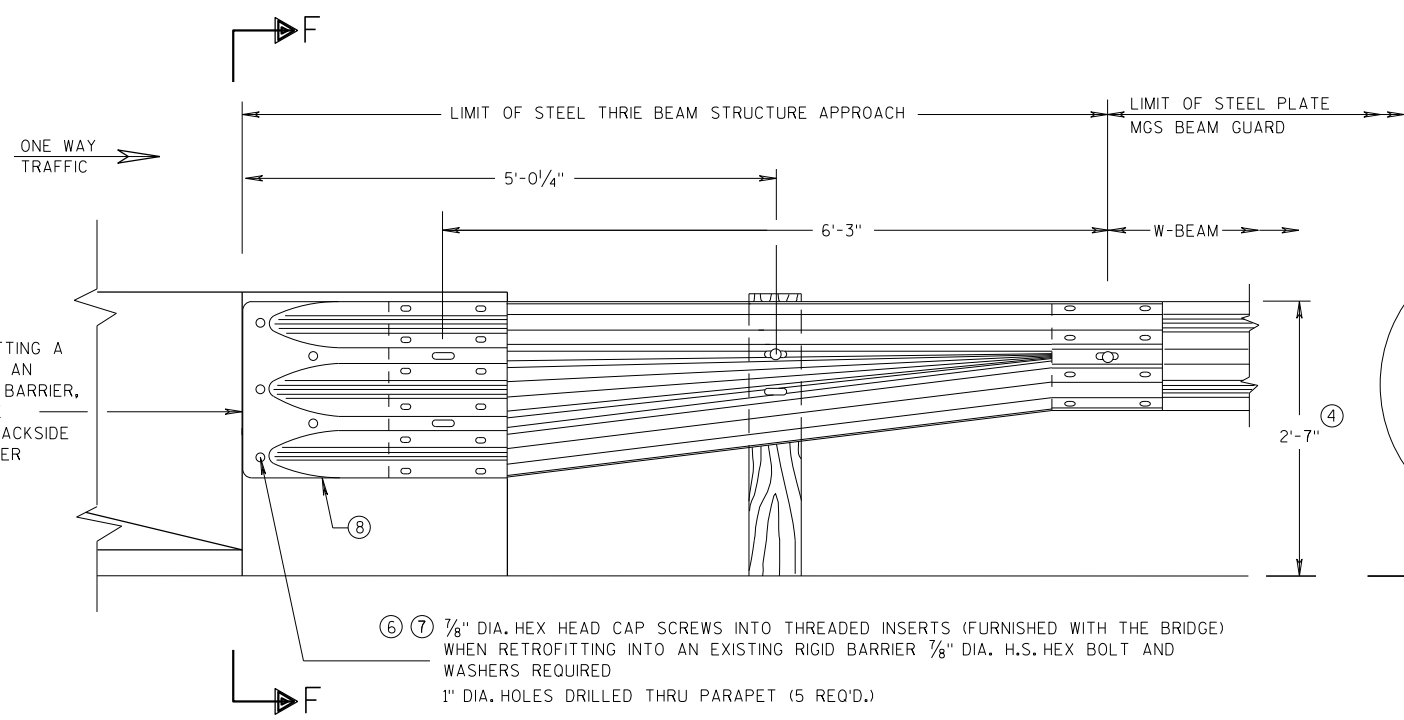
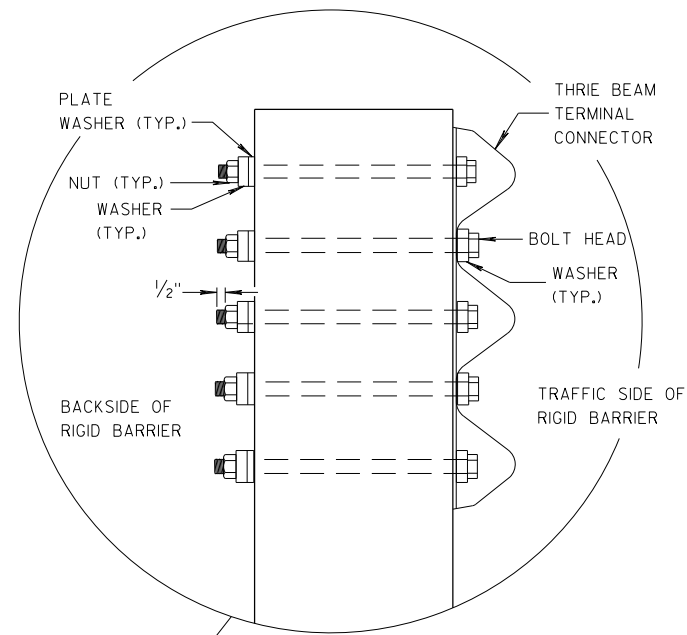
MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

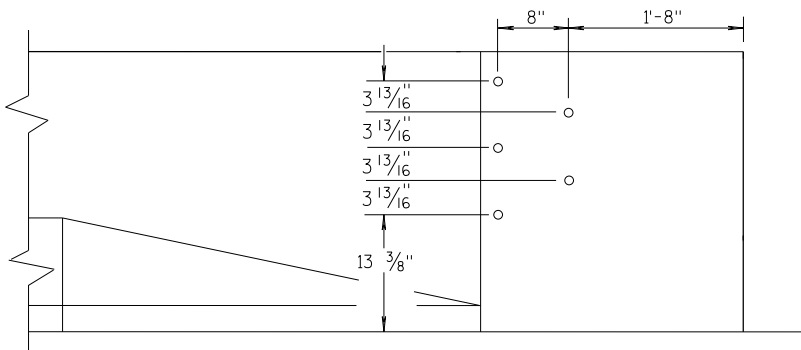


GENERAL NOTES

- THESE ARE TYPICAL CONNECTION DETAILS. ADJUST THE POSTION OF CONNECTIONS TO EXISTING BRIDGES TO FIT THE ACTUAL BRIDGE AND SITE DIMENSIONS.
- ② OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.
- ④ TOLERANCE FOR TOP OF BEAM IS $\pm 1"$.
- ⑥ DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.
- ⑦ BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM CONNECTOR PLATE. BOLTS THAT EXTEND THROUGH THE PARAPET AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 2" O.D. X 5/8" THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.
- ⑧ THE RECESS FOR A W-BEAM CONNECTION, WHICH EXISTS ON SOME PARAPETS OF THIS TYPE, SHALL BE FILLED WITH A TREATED TIMBER BLOCKOUT. BLOCKOUT SIZE IS 1'-6" X 2'-0" X 3 1/2".



SECTION F-F

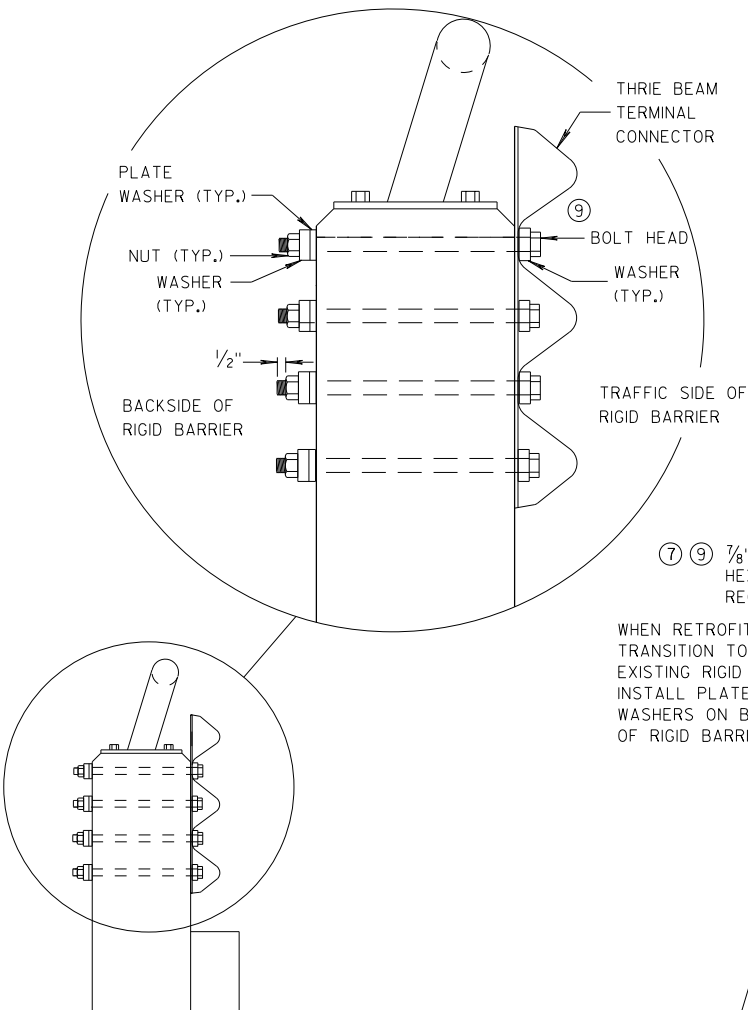


MIDWEST GUARDRAIL SYSTEM THRIE BEAM TRANSITION (MGS)	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION	
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FHWA	

GENERAL NOTES

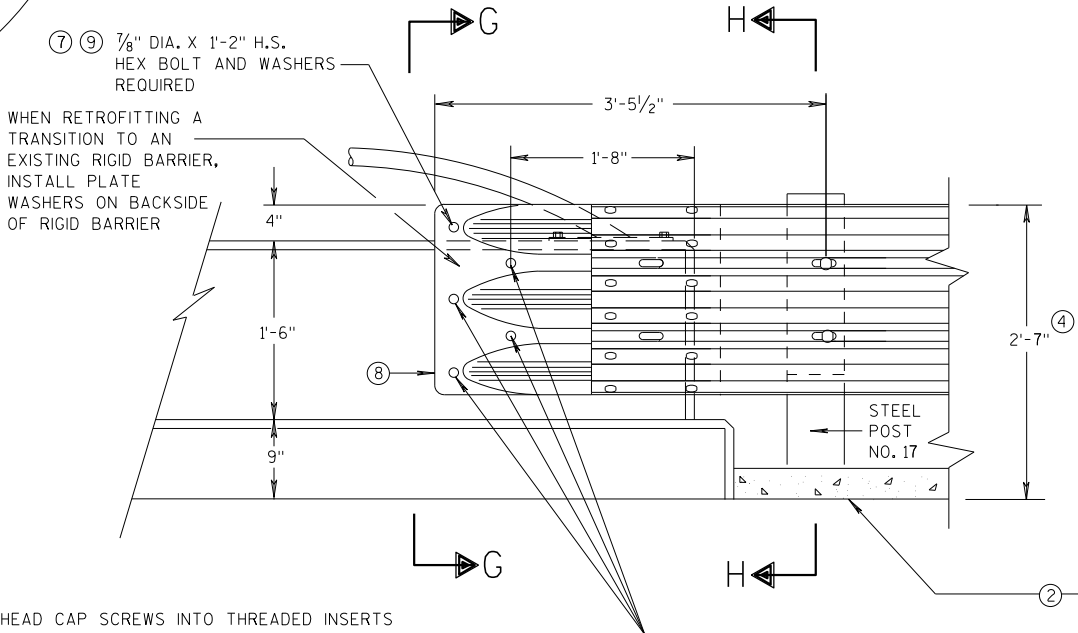
THESE ARE TYPICAL CONNECTION DETAILS. ADJUST THE POSTION OF CONNECTIONS TO EXISTING BRIDGES TO FIT THE ACTUAL BRIDGE AND SITE DIMENSIONS.

- ②
- OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.
- ④
- TOLERANCE FOR TOP OF BEAM IS $\pm 1"$.
- ⑥
- DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.
- ⑦
- BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM CONNECTOR PLATE. BOLTS THAT EXTEND THROUGH THE PARAPET AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 2" O.D. X $\frac{5}{8}"$ THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.
- ⑧
- THE RECESS FOR A W-BEAM CONNECTION, WHICH EXISTS ON SOME PARAPETS OF THIS TYPE, SHALL BE FILLED WITH A TREATED TIMBER BLOCKOUT. BLOCKOUT SIZE IS 1'-6" X 2'-0" X 3 $\frac{1}{2}"$.
- ⑨
- BOLT, NUT AND WASHERS NOT REQUIRED FOR THIS LOCATION WHEN RETROFITTING AN EXISTING PAPAPET AND THE HOLE IS EITHER ABOVE PARAPET OR WITHIN 4 INCHES OF THE EDGE OF PARAPET.



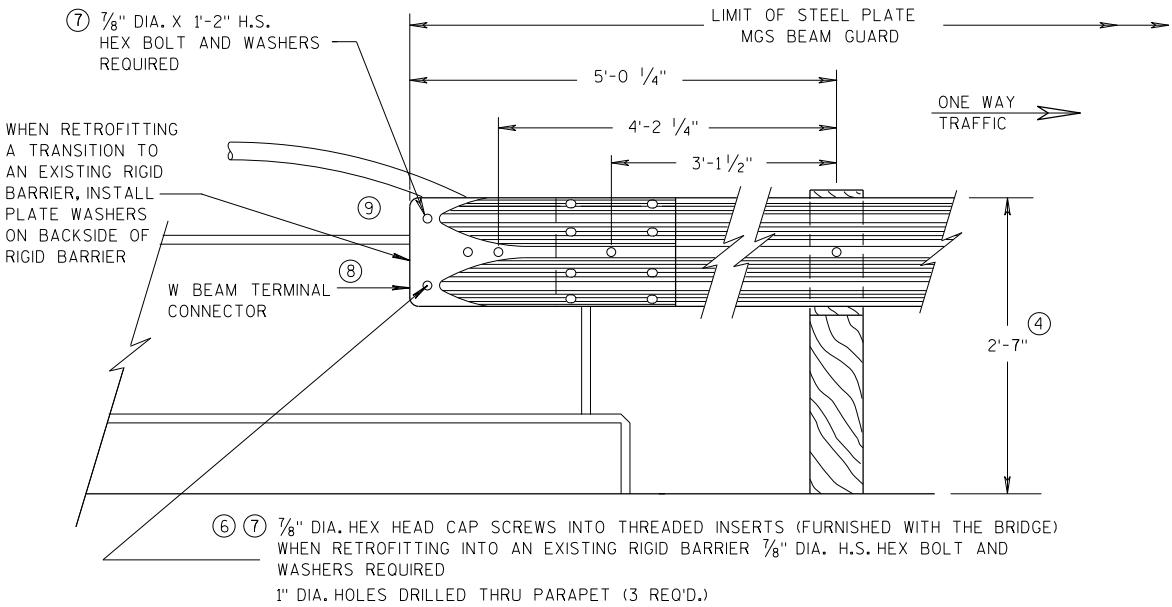
SECTION G-G

- ⑥ ⑦
- $\frac{7}{8}"$ DIA. HEX HEAD CAP SCREWS INTO THREADED INSERTS (FURNISHED WITH THE BRIDGE) WHEN RETROFITTING INTO AN EXISTING RIGID BARRIER $\frac{7}{8}"$ DIA. H.S. HEX BOLT AND WASHERS REQUIRED 1" DIA. HOLES DRILLED THRU PARAPET (4 REQ'D.)



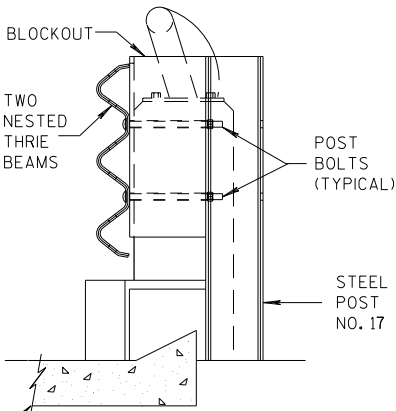
FRONT VIEW

THRIE BEAM CONNECTION TO VERTICAL FACED PARAPETS



FRONT VIEW

W BEAM CONNECTION TO VERTICAL FACE PARAPET
(USE ONLY ON THE TRAFFIC EXIT END OF ONE WAY BRIDGES)

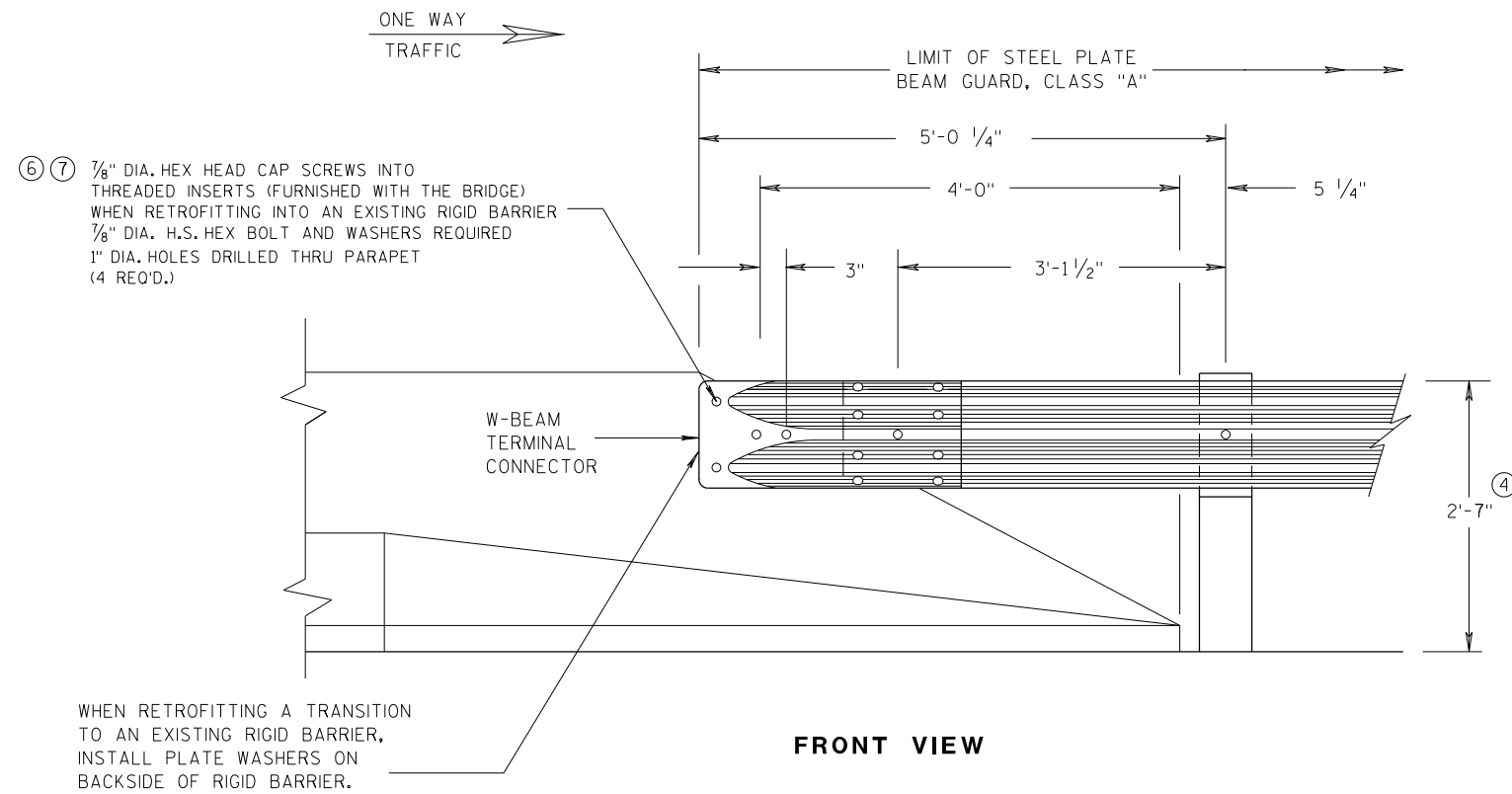


SECTION H-H

MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

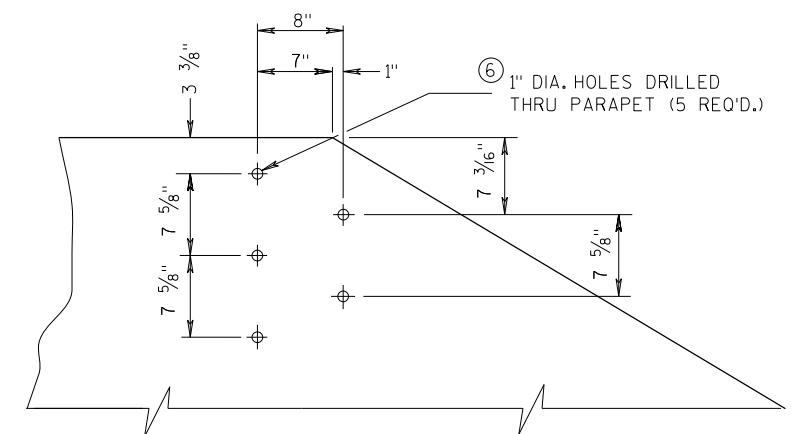
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07/2018 /S/ Rodney Taylor
DATE ROADWAY STANDARDS DEVELOPMENT
FHWA UNIT SUPERVISOR



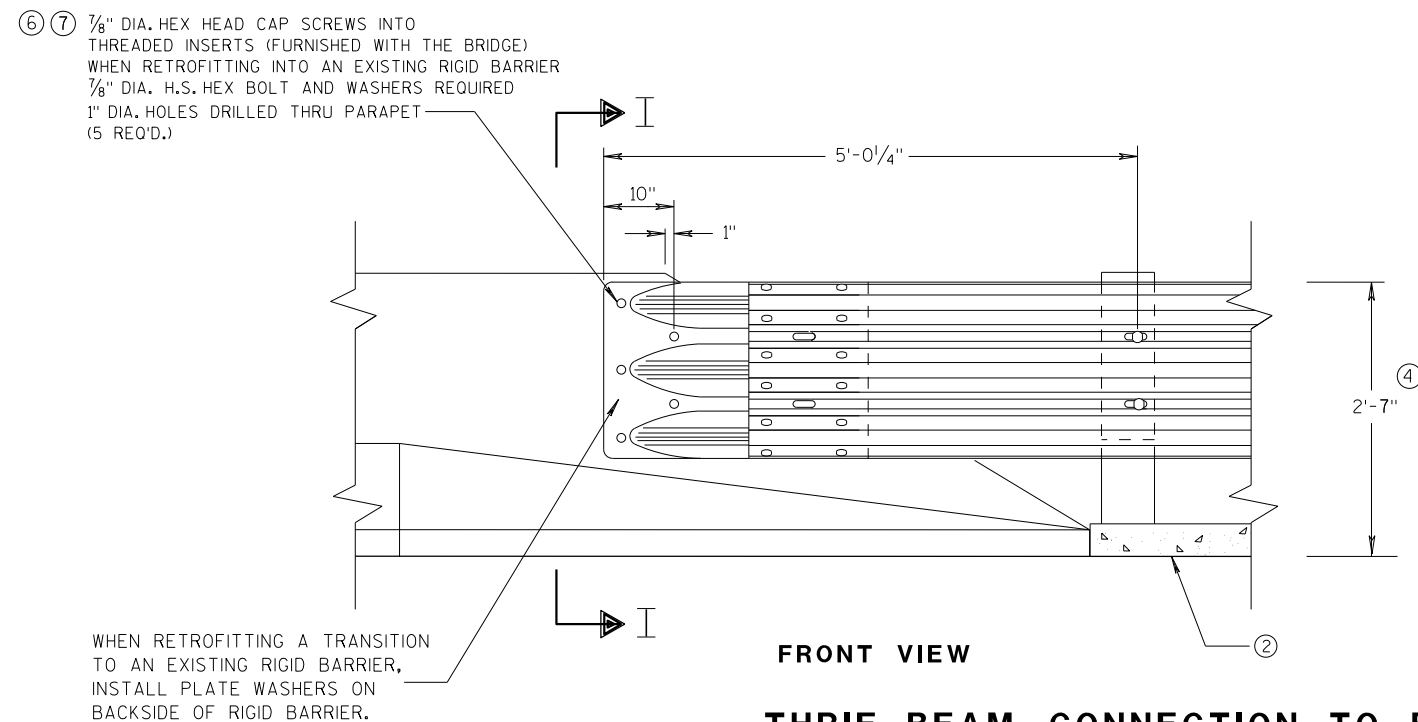
**W BEAM CONNECTION TO
PARAPETS WITH SLOPED ENDS
(USE ONLY AT TRAFFIC EXIT END OF ONE WAY BRIDGE)**

GENERAL NOTES

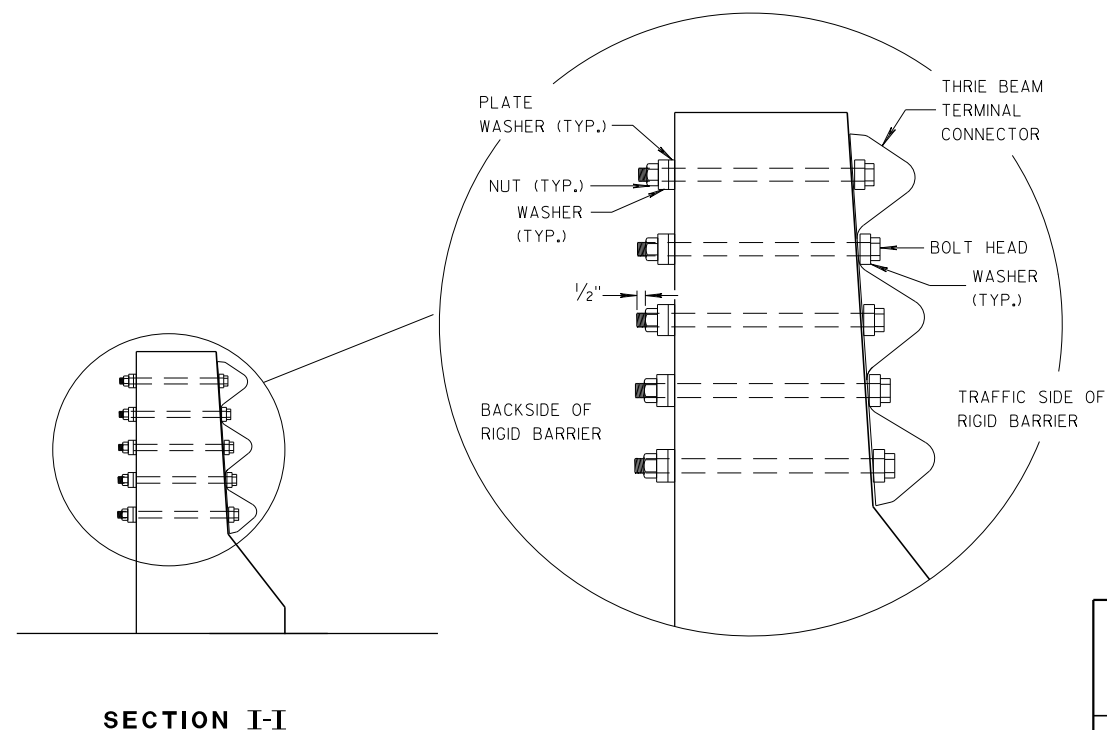
- ② OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.
- ④ TOLERANCE FOR TOP OF BEAM IS $\pm 1"$.
- ⑥ DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.
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**DRILL HOLE LOCATION AND PATTERN
FOR THRIE BEAM CONNECTION**



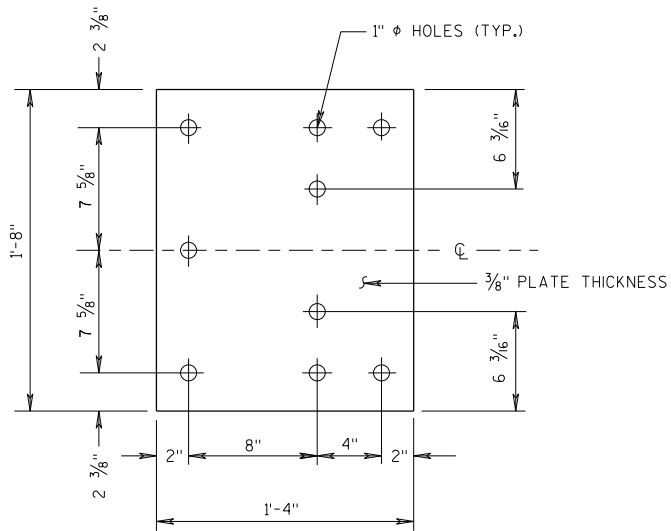
**THRIE BEAM CONNECTION TO BRIDGE
PARAPETS WITH SLOPED ENDS**



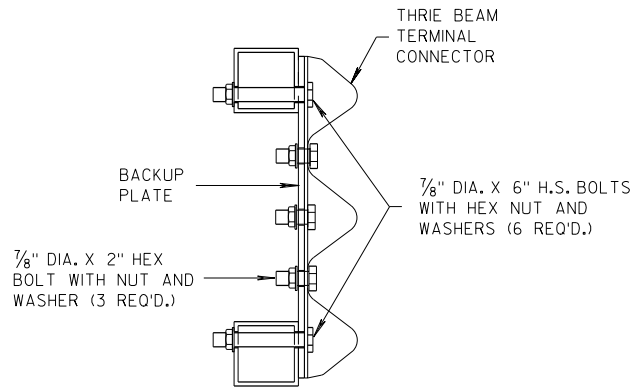
**MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

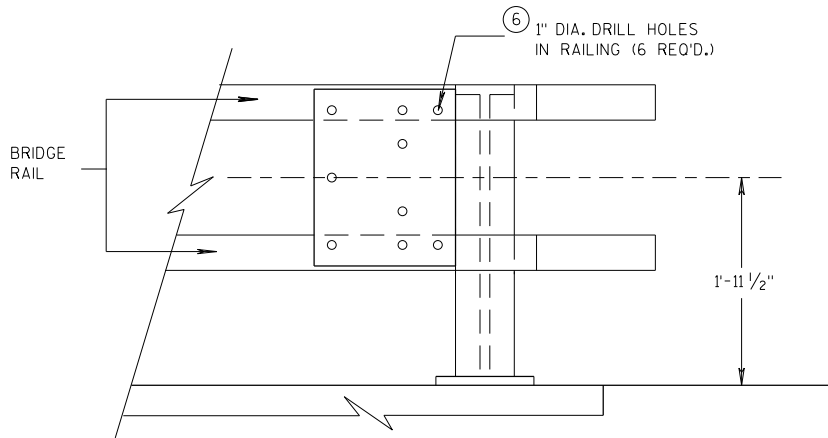
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FHWA



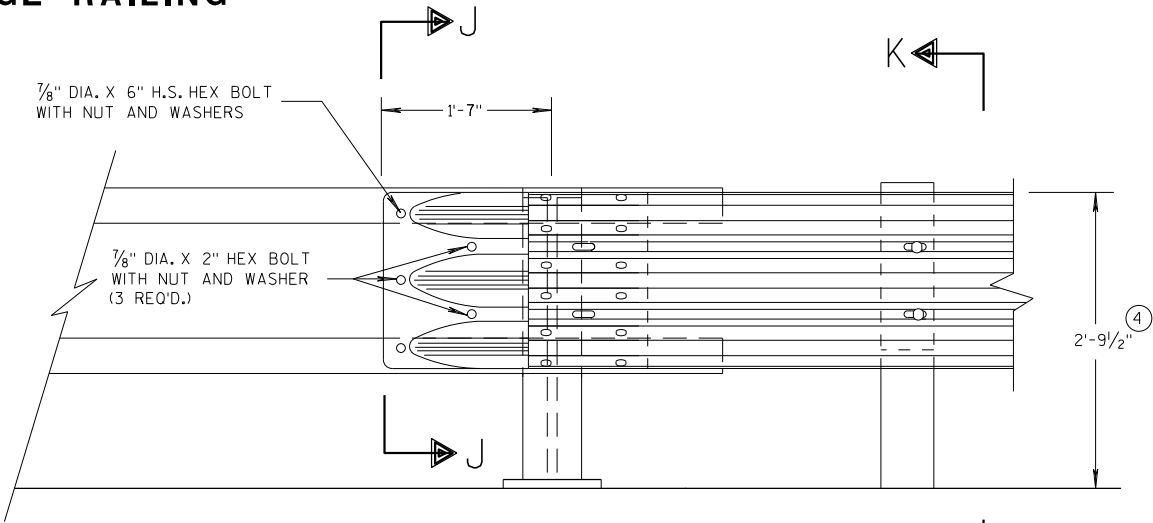
BACK-UP PLATE DETAIL



SECTION J-J

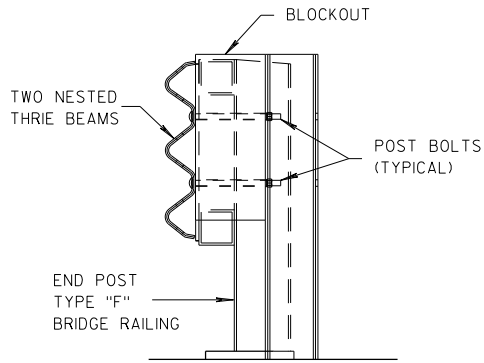


BACK-UP PLATE MOUNTING ONTO BRIDGE RAILING



FRONT VIEW

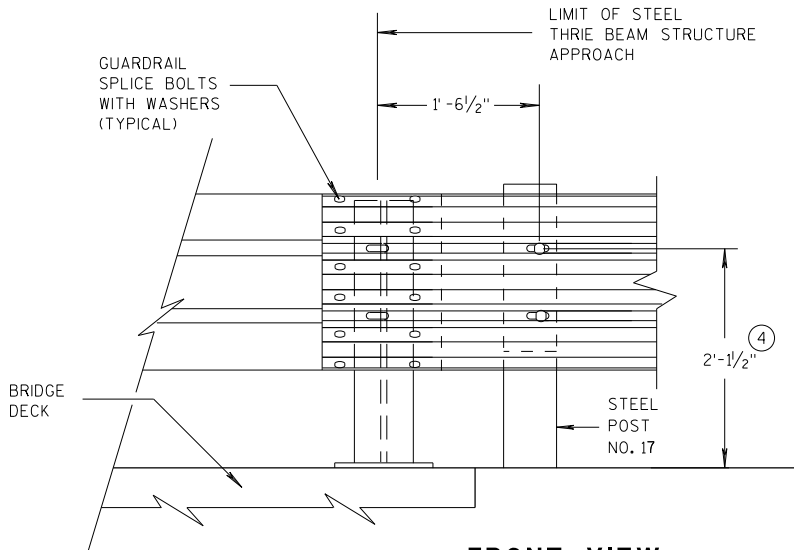
THRIE BEAM CONNECTION TO TUBULAR RAILING TYPE "F"



SECTION K-K

GENERAL NOTES

- ④ TOLERANCE FOR TOP OF BEAM IS $\pm 1"$.
- ⑥ DRILLING HOLES THROUGH THE PAPER, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.



FRONT VIEW

THRIE BEAM CONNECTION TO STEEL RAILING TYPE "W"

MIDWEST GUARDRAIL SYSTEM THRIE BEAM TRANSITION (MGS)	
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④ TOLERANCE FOR TOP OF W-BEAM RAIL IS $\pm 1"$.



6



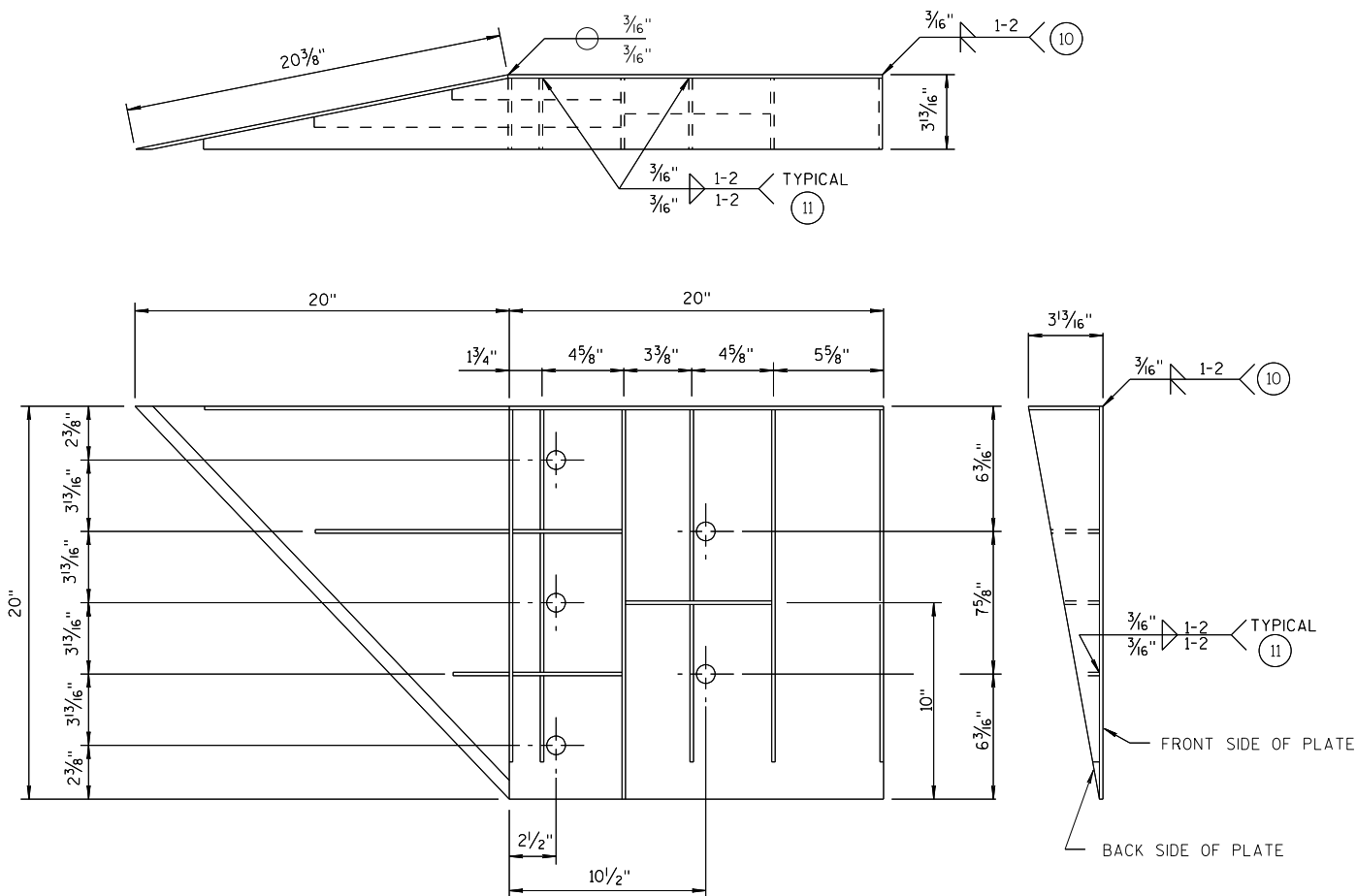
SECTION M-M



FRONT VIEW



Taylor
173

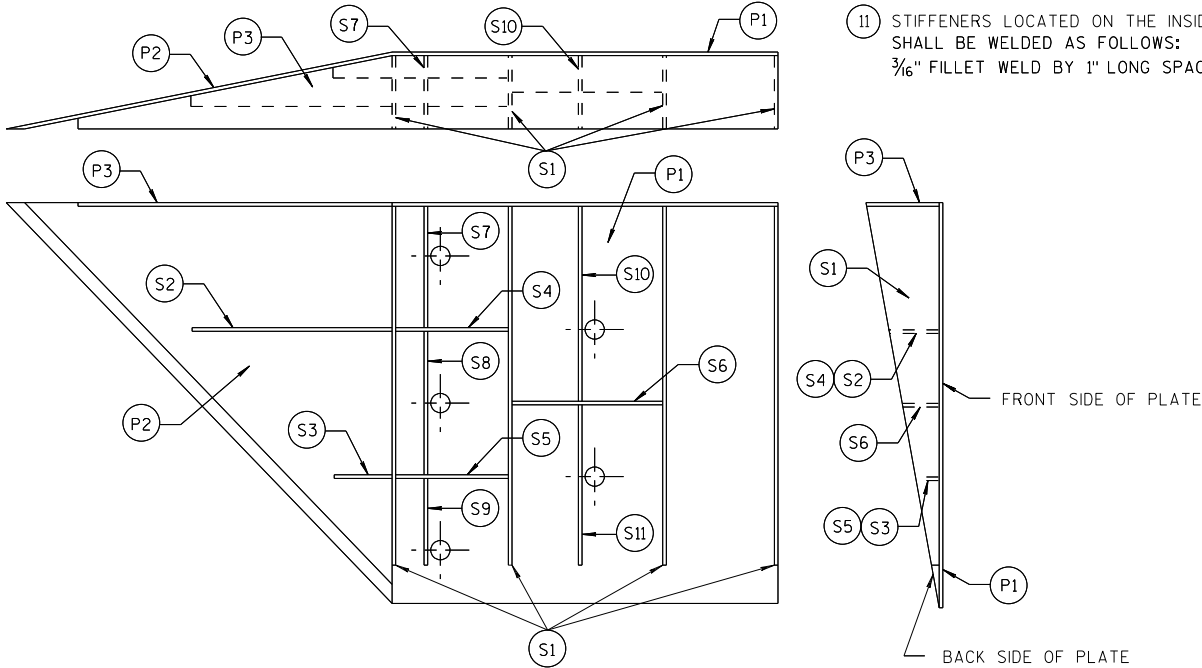


WELDING INSTRUCTION
(VIEWED FROM BACK SIDE OF PLATE)

SINGLE SLOPE CONNECTION PLATE

CONNECTOR PLATE DIMENSION (PER ASSEMBLY)				
PLATE	QUANTITY	SHAPE	SIZE (A x B x C x D)	THICKNESS
P1	1		20" x 20"	3/16"
P2	1		20" x 20" x 28 3/16"	3/16"
P3	1		39" x 3 5/8" x 20" x 19 5/16"	3/16"
S1	4		18 7/16" x 3 5/8" x 18 3/4"	1/4"
S2	1		10 1/4" x 2 1/16" x 10 3/8" x 1/2"	1/4"
S3	1		3" x 1 1/16" x 3 3/8" x 1/2"	1/4"
S4	1		6 1/8" x 2 7/16"	1/4"
S5	1		6 1/8" x 1 1/16"	1/4"
S6	1		7 3/4" x 1 3/4"	1/4"
S7	1		2 3/16" x 6" x 3 5/8" x 5 7/8"	1/4"
S8	1		1 5/32" x 7 1/2" x 2 1/2" x 7 3/8"	1/4"
S9	1		6 1/16" x 6 3/16" x 1 3/32"	1/4"
S10	1		1 7/8" x 9 7/8" x 3 5/8" x 9 11/16"	1/4"
S11	1		8 1/2" x 8 3/4" x 1 3/16"	1/4"

PLATE AND STIFFENER IDENTIFICATION
(VIEWED FROM BACK SIDE OF PLATE)



GENERAL NOTES

COVER PLATE PANELS ARE 3/16" THICK.

ALL STIFFENERS ARE 1/4" THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SECTION 614 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".

FOR OPPOSITE SIDE INSTALLATION MIRROR DRAWINGS.

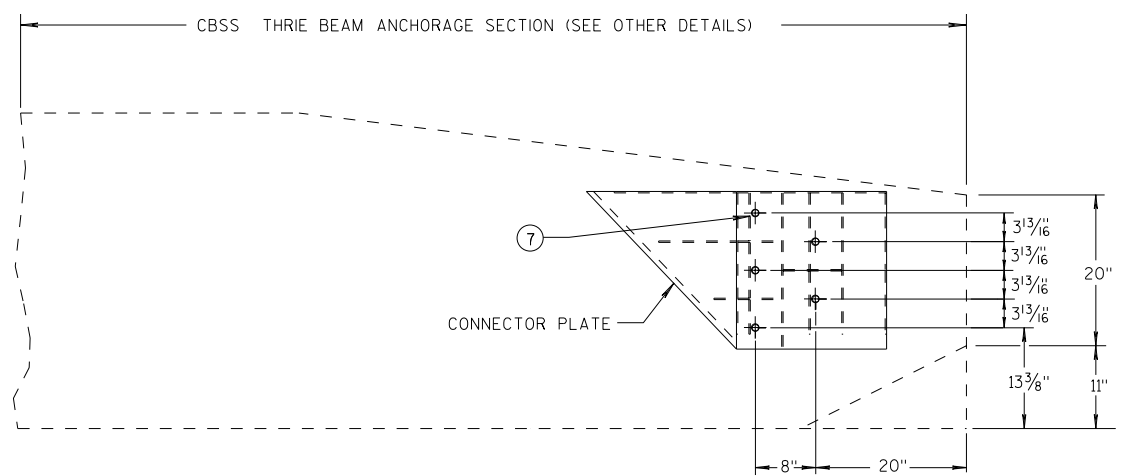
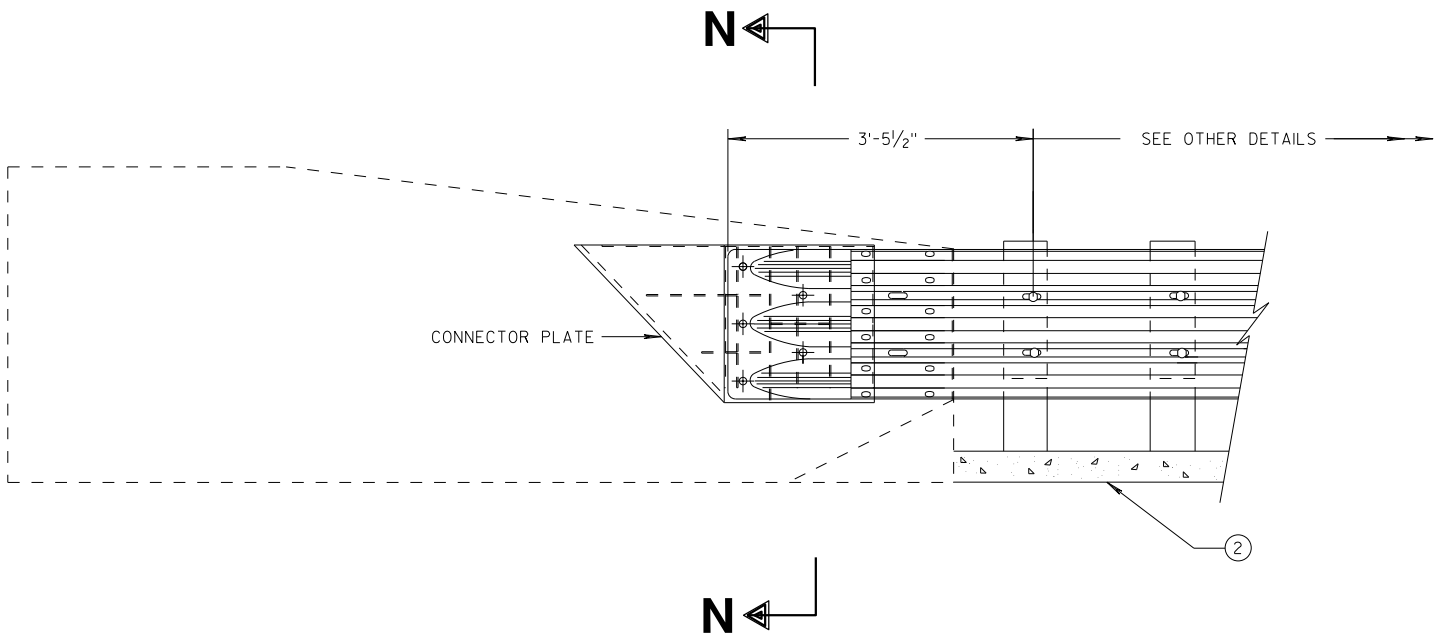
- (10) STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATES SHALL BE WELDED AS FOLLOWS:
SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND 3/16" FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
- (11) STIFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS:
3/16" FILLET WELD BY 1" LONG SPACED AT 2".

MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

STATE OF WISCONSIN
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UNIT SUPERVISOR
FHWA

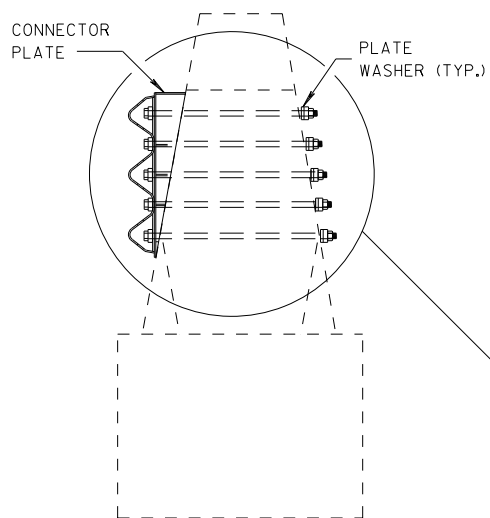
THRIE BEAM CONNECTION TO SINGLE SLOPE BARRIER



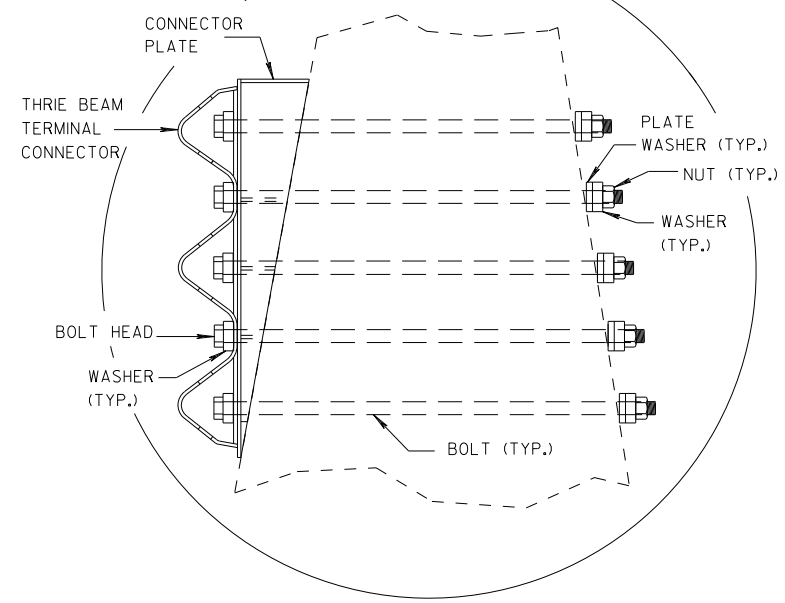
SINGLE SLOPE CONNECTION PLATE PLACEMENT

GENERAL NOTES

- CONNECTOR PLATE, DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.
- ② OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.
- ⑦ BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM CONNECTOR PLATE. BOLTS THAT EXTEND THROUGH THE PARAPET AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 2" O.D. X 5/8" THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.



SECTION N-N



MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

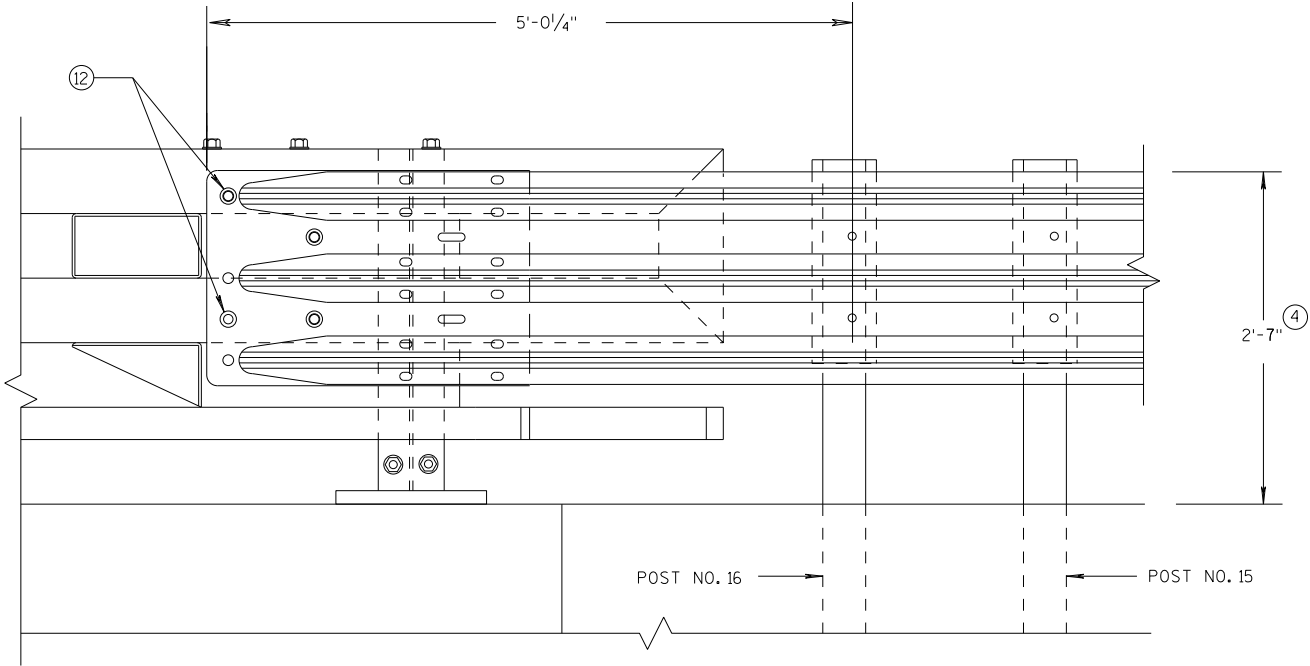
STATE OF WISCONSIN
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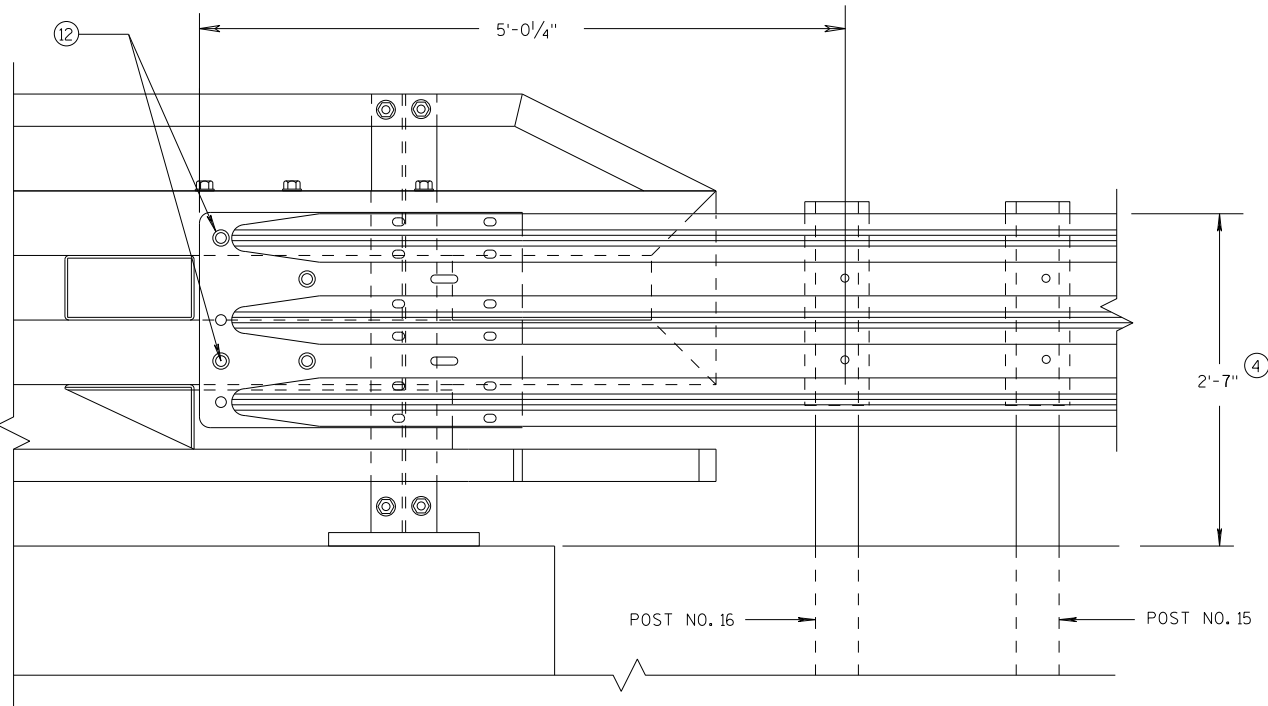
/S/ Rodney Taylor
ROADWAY STANDARDS DEVELOPMENT
UNIT SUPERVISOR

GENERAL NOTES

- ④ TOLERANCE FOR TOP OF BEAM IS $\pm 1"$.
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ELEVATION OF DETAIL AT NY3 END POST
THRIE BEAM RAIL ATTACHMENT

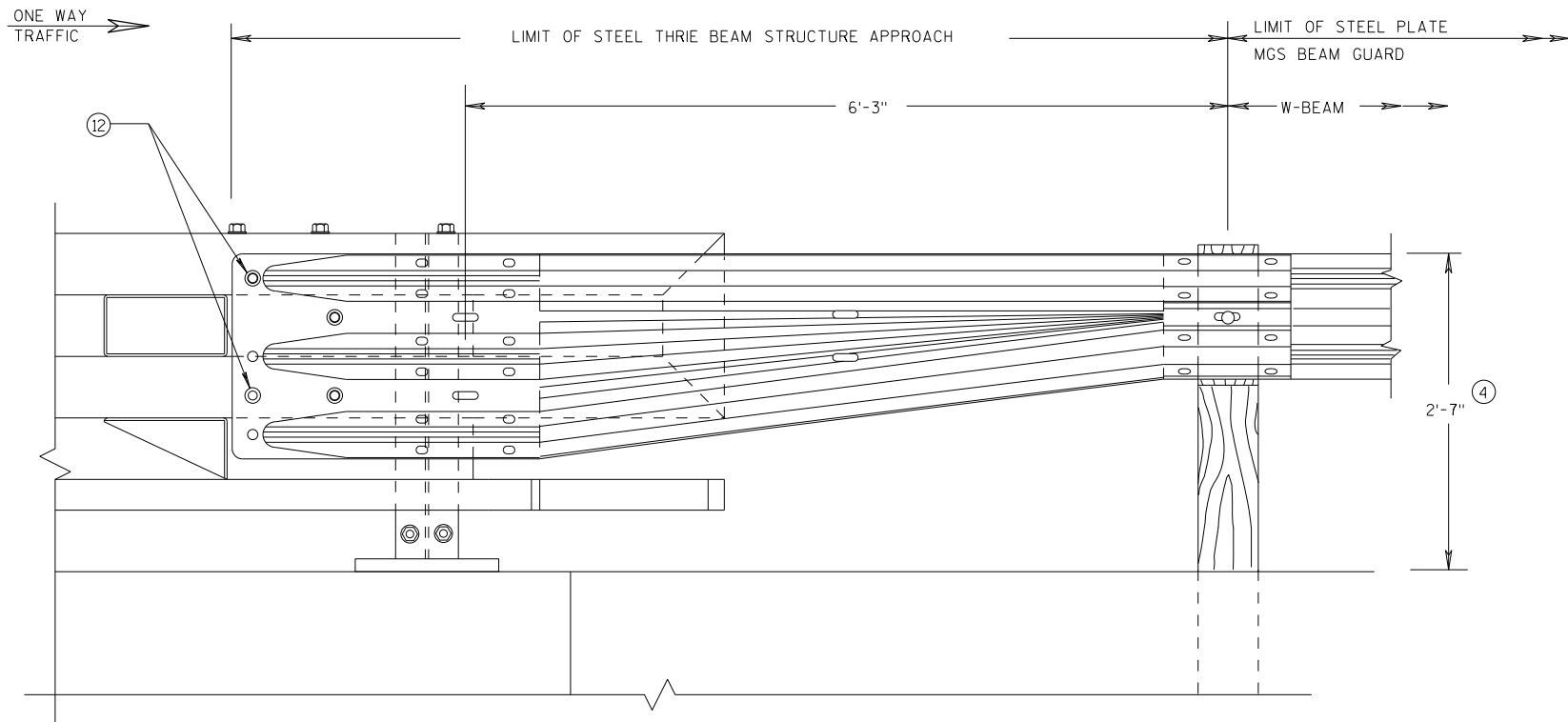


ELEVATION OF DETAIL AT NY4 END POST
THRIE BEAM RAIL ATTACHMENT

MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

STATE OF WISCONSIN
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DATE 7/2018 /S/ Rodney Taylor
FHWA ROADWAY STANDARDS DEVELOPMENT UNIT SUPERVISOR



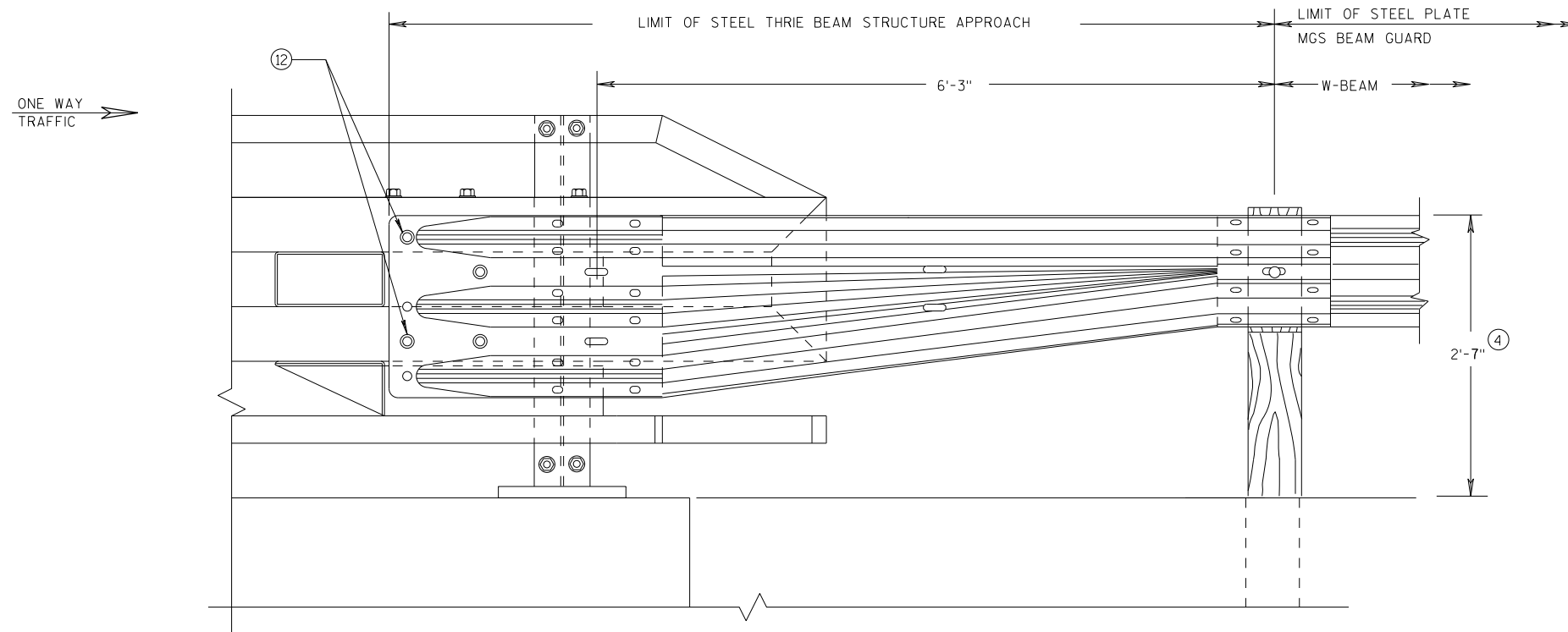
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FRONT VIEW

W BEAM TRANSITION AND CONNECTION TO BRIDGE RAILING TYPE "NY3" (USE ONLY ON THE TRAFFIC EXIT END OF ONE WAY BRIDGES)



FRONT VIEW

W BEAM TRANSITION AND CONNECTION TO BRIDGE RAILING TYPE "NY4" (USE ONLY ON THE TRAFFIC EXIT END OF ONE WAY BRIDGES)

MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED

7/2018

DATE

FHWA

/S/ Rodney Taylor

ROADWAY STANDARDS DEVELOPMENT
UNIT SUPERVISOR

References:

[Standard Spec 614](#)
[FDM 11-45-2](#)
AASHTO Roadside Design Guide
Midwest Roadside Safety Facility (MwRSF) Report No. TRP-03-047-95
MwRSF Report No. TRP-03-167-07
MwRSF Report No. TRP-03-210-10
MwRST Report No. TRP-03-291-14

Bid items associated with this drawing:

ITEM NUMBER	DESCRIPTION	UNIT
614.0010	Barrier System Grading Shaping Finishing.....	EACH
614.0400	Adjusting Steel Plate Beam Guard	LF
614.0920	Salvaged Rail	LF
614.0925	Salvaged Guardrail End Treatments	EACH
614.0930 - 0939	Salvaged (component).....	EACH
614.0950	Replacing Guardrail Posts and Blocks	EACH
614.0951	Replacing Guardrail Rail and Hardware	LF
614.0952	Replacing Guardrail Reflectors	EACH
614.1000	MGS Guardrail Temporary.....	LF
614.1100	MGS Guardrail Temporary Thrie Beam Transition	LF
614.1200	MGS Guardrail Temporary Terminal EAT	EACH
614.2300	MGS Guardrail 3	LF
614.2310	MGS Guardrail 3 HS	LF
614.2320	MGS Guardrail 3 QS	LF
614.2330	MGS Guardrail 3 K.....	LF
614.2500	MGS Thrie Beam Transition	LF
614.2610	MGS Guardrail Terminal EAT	EACH
614.2620	MGS Guardrail Terminal Type 2	EACH

Standardized Special Provisions associated with this drawing:

STSP NUMBER	TITLE
NONE	

Other SDDs associated with this drawing:

SDD8d1	Concrete Curb, Concrete Curb and Gutter and Ties
SDD14b28	Mow Strip Detail
SDD14b42	Midwest Guardrail System (Required)
SDD14b44	Midwest Guardrail System Terminal (MGS)
SDD14b45	Midwest Guardrail System Transitions (MGS)
SDD14b47	Midwest Guardrail System Type 2 terminal (MGS)

Design Notes:

Midwest Guardrail System Thrie Beam Transition (MGS transition) is a specially designed transition to rigid barrier for the MGS system. MGS transition is required when connecting MGS to rigid barriers (roadway concrete barrier, bridge parapets).

Provide working width for MGS transition. Document in Design Study Report (DSR) when working width cannot be provided. Thrie beam transition working width is the same as standard MGS.

Modifications shown on SDD allow for the MGS transition to have TBT, and TBTT curb installed. Flow line of curb is to line up with front face of block. Install TBT or TBTT curb when MGS transition is connecting to concrete bridge parapets, older New Jersey shaped barrier (SDD 14B11 or SDD 14B22).

Single Slope Thrie Beam Anchorages (SDD 14B33) do not require TBT or TBTT curb for operation of the thrie beam transition. However, TBT or TBTT curb and gutter can be installed to control water.

M, W, F, NY3, NY4, should not have curb and gutter installed by them.

Note: If designer is planning to use SDD 8D2 or SDD 8D3 to control drainage by a structure, modifications to the curb head will be required. The curb head should match the TBT or TBTT design. BPD is in the process of updating SDD 8D2 and SDD 8D3, but was not able to get the drawing updated in time for this publication.

The 12.5 feet of MGS beam guard at half post spacing beyond the asymmetrical transition piece is required for all installations.

Do not flare MGS thrie beam transition. Install 25 feet of MGS beam guard tangent to the MGS thrie beam transition. The 25 feet of additional tangent MGS may include the 12.5 feet of half post spacing MGS beam guard shown on sheet A. After the 25 feet of tangent MGS beam guard, the MGS beam guard may be flared. No additional beam guard is needed when an EAT is flared.

Use this SDD for temporary thrie beam installations.

Individual construction detail drawings are required (See [FDM 11-45-2.5.2](#)). Review drainage and grading near MGS transitions to rigid barrier. Installing MGS transition with missing posts, improper embedment, or improper grading behind post may cause system not to function as intended. Review [FDM 11-45-2.5.2.10](#) for more information.

MGS transition may use grading and shaping item.

See [SDD 14B42](#) for additional guidance.

Sheets H and I are required when connecting to a single slop thrie beam anchorage ([SDD 14b33](#)).

If installing a thrie beam transition on to an existing NY3 or NY4 parapet that does not have the additional hardware for attaching the thrie beam (see Bridge Standard Detail 30.28), provide special provisions and detail drawings to have contractor install hardware.

Contact Person:

Erik Emerson (608) 266-2842