

STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

INDEX OF SHEETS

SEE SHEET 2

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO. STP 1902(150)

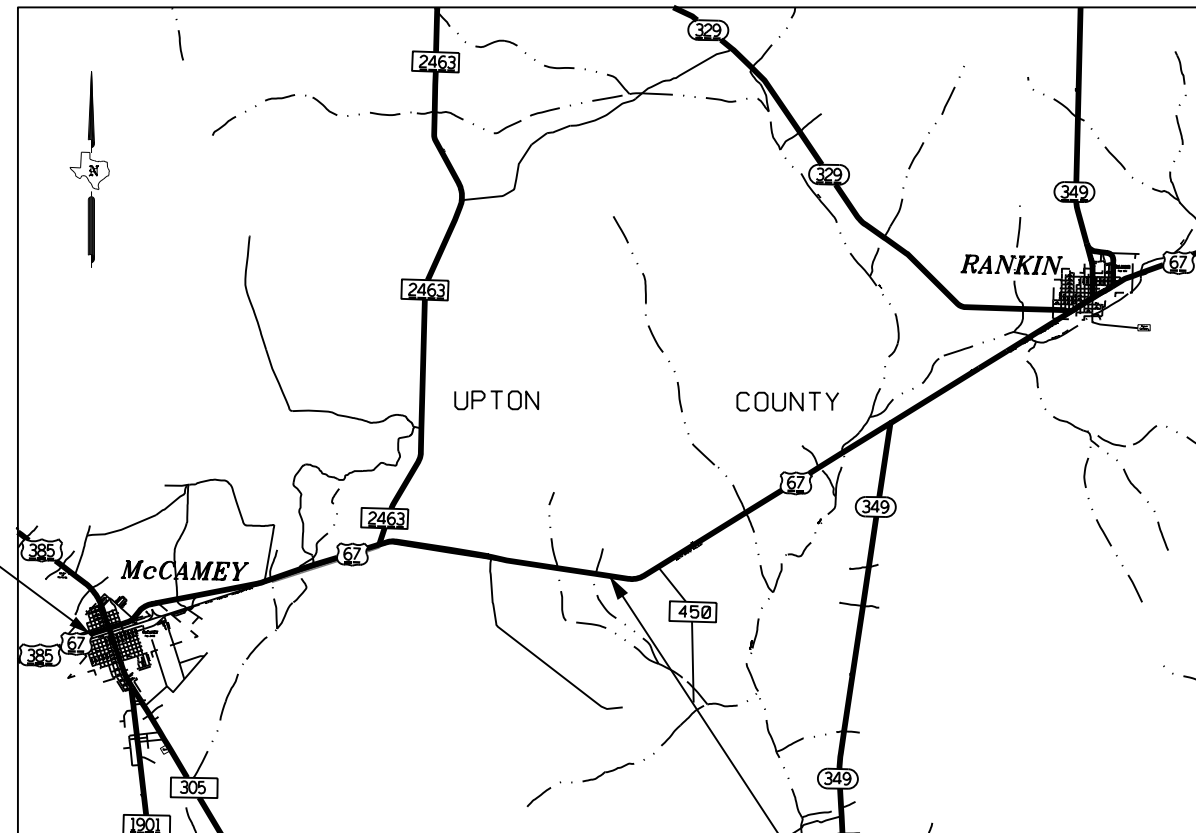
UPTON COUNTY US 67

NET LENGTH OF PROJECT: 50371.500' = 9.545 MI
LENGTH OF ROADWAY: 50174.020' = 9.509 MI

LENGTH OF BRIDGE CLASS CULVERT 163:	38.160' = 0.007 MI	PROP NBI: 06-231-0-0076-06-139
LENGTH OF BRIDGE CLASS CULVERT 167:	38.160' = 0.007 MI	PROP NBI: 06-231-0-0076-06-140
LENGTH OF BRIDGE CLASS CULVERT 177:	58.500' = 0.011 MI	PROP NBI: 06-231-0-0076-06-141
LENGTH OF BRIDGE CLASS CULVERT 184:	34.160' = 0.006 MI	PROP NBI: 06-231-0-0076-06-142
LENGTH OF BRIDGE CLASS CULVERT 186:	28.500' = 0.005 MI	PROP NBI: 06-231-0-0076-06-143

LIMITS: WEST OF US 385 TO 0.70 MILES WEST OF CR 450

FOR THE CONSTRUCTION OF A SUPER-2 HIGHWAY
CONSISTING OF EARTHWORK, FLEXIBLE BASE, HOT MIX ASPHALT, SURFACE TREATMENT,
STRUCTURE REPLACEMENT, ILLUMINATION, SIGNS, AND PAVEMENT MARKINGS



BEGIN PROJECT
CSJ 0076-06-037
US 67 STA 461+00.00
REF MRK 792+1.098

EQUATIONS: NA
EXCEPTIONS: NA
RR CROSSINGS: NA
SCALE: 1" = 35000'

END PROJECT
CSJ 0076-06-037
US 67 STA 965+00.00
REF MRK 782+1.553

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 2022).

FED. RD. DIV. NO.	6	PROJECT NO.	STP 1902(150)	SHEET NO.	1
STATE	TEXAS	STATE DIST.	ODA	COUNTY	UPTON
CONT.	0076	SECT.	06	JOB	037
				HIGHWAY NO.	US 67

FUNCTIONAL CLASS: MINOR ARTERIAL
DESIGN SPEED = 60 MPH
21.7% TRUCK TRAFFIC
AADT (2018) = 1955
AADT (2038) = 2486

FINAL PLANS

CONTRACTOR:

LETTING DATE:

DATE CONTRACTOR BEGAN WORK:

DATE WORK WAS COMPLETED:

DATE WORK WAS ACCEPTED:

FINAL CONTRACT COST: \$

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING: 7/18/2022

DocuSigned by: *[Signature]*, P.E.
1CFCC37BDE8 AREA ENGINEER

RECOMMENDED FOR LETTING: 7/18/2022

DocuSigned by: *[Signature]*, P.E.
3D19E61084 OF TRANSPORTATION
PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: 7/18/2022

DocuSigned by: *[Signature]*, P.E.
902D0C440F DISTRICT ENGINEER

PRINTED DATE: 07/08/2022 12:00 PM

COUNTY: UPTON PROJ. NO.: STP 1902(150)
HWY.: US 67 LETTING DATE: _____
DATE ACCEPTED: _____

DATE:07/08/2022 01:46 PM
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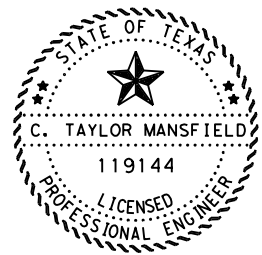
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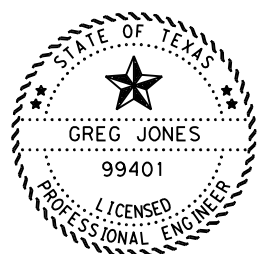
# 313-315	EC (9)-16
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THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE BY A MARK (#) HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

C. Taylor Mansfield
 C. TAYLOR MANSFIELD, P.E. 07/08/2022
 DATE

US 67
 INDEX OF SHEETS



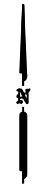
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Digitally signed by Greg Jones
 Date: 2022.07.08 13:32:18 -0500
 Greg Jones
 GREG JONES, P.E. 07/08/2022
 DATE

SHEET 1 OF 1

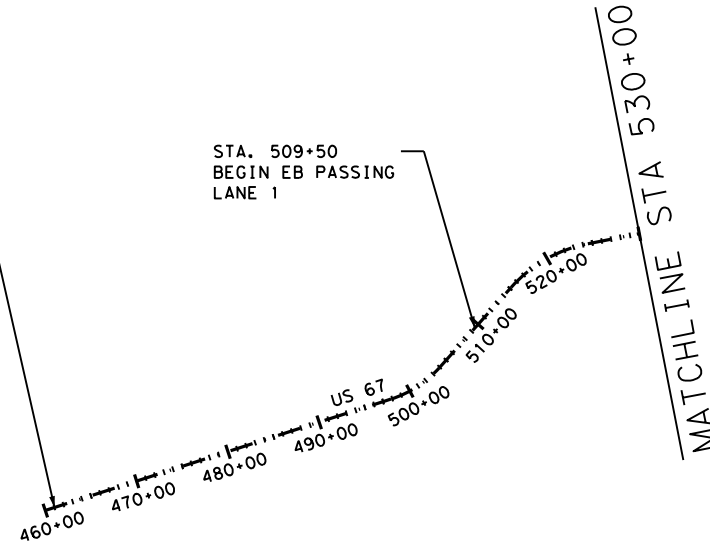
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0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		2

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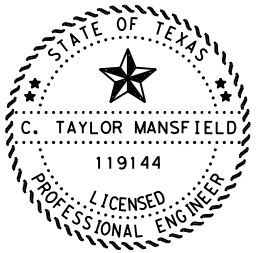


BEGIN PROJECT
CSJ 0076-06-037
US 67 STA 461+00.00

STA. 509+50
BEGIN EB PASSING
LANE 1



McCAMEY, TX




C. Taylor Mansfield 2021.11.01
10:45:26-05'00'

US 67
PROJECT LAYOUT

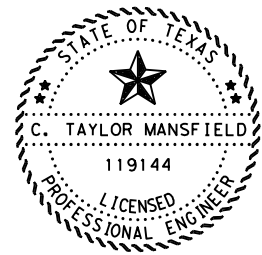
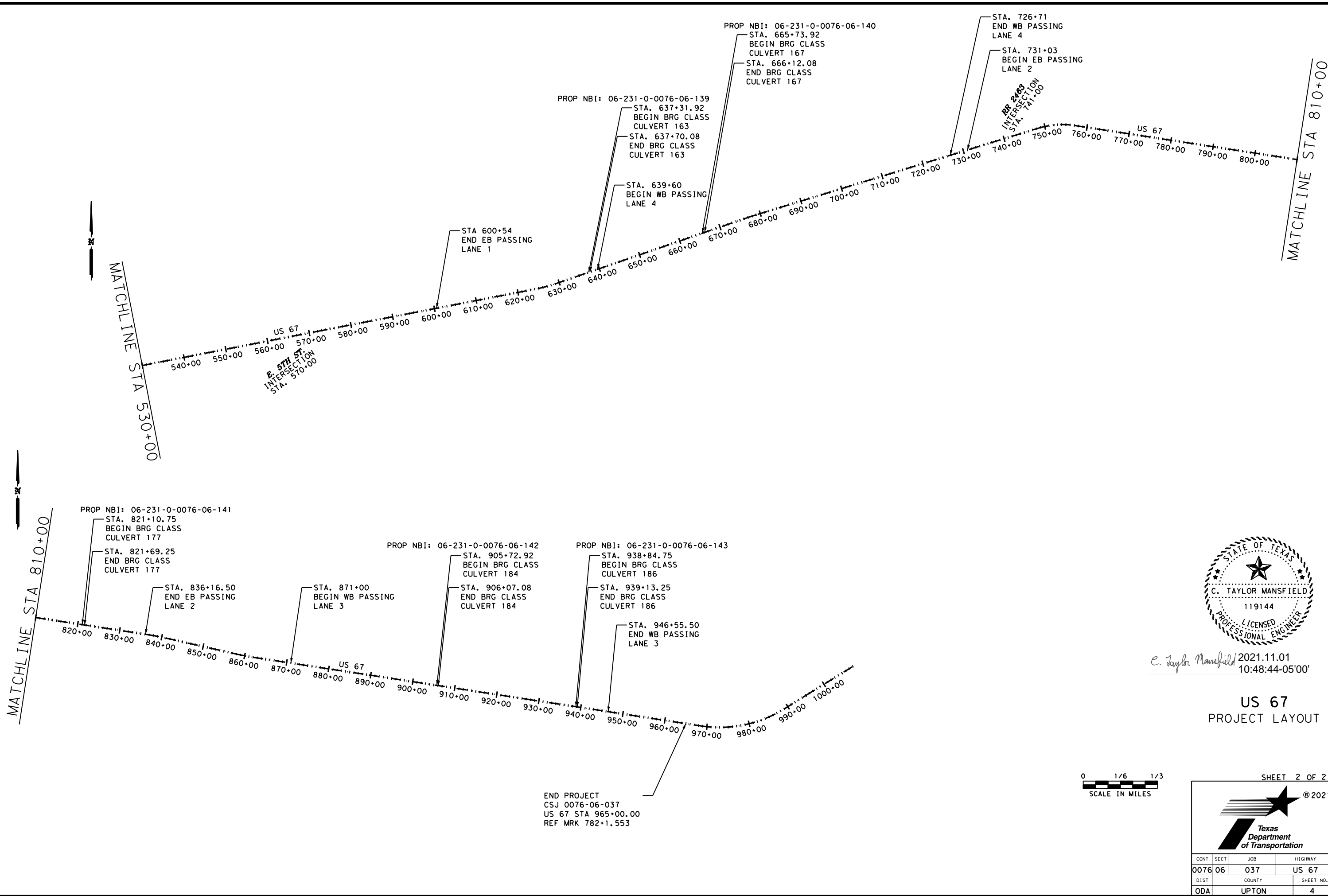


SHEET 1 OF 2

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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	3	

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C. Taylor Mansfield 2021.11.01
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**US 67
 PROJECT LAYOUT**



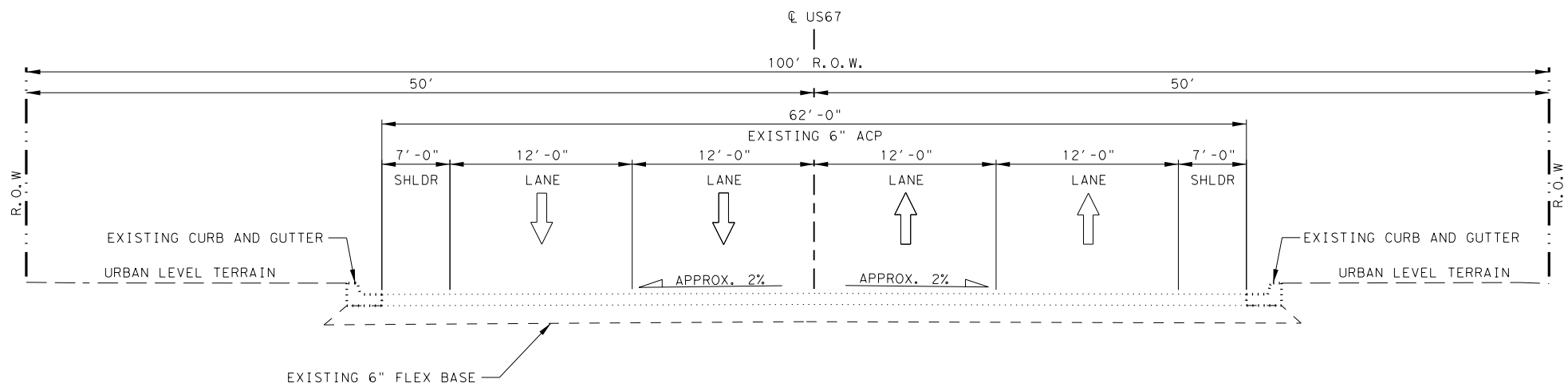
SHEET 2 OF 2

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 Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		4

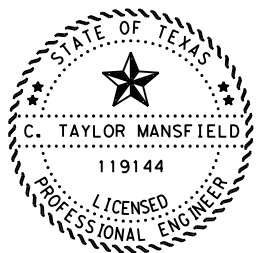
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DN: DW: CK: CK:



EXISTING TYPICAL SECTION
 STA. 461+00 TO STA. 503+69
 (TRANSITION FROM STA. 503+69 TO STA. 507+00)

C. Taylor Mansfield 2021.11.01
 10:49:44-05'00'



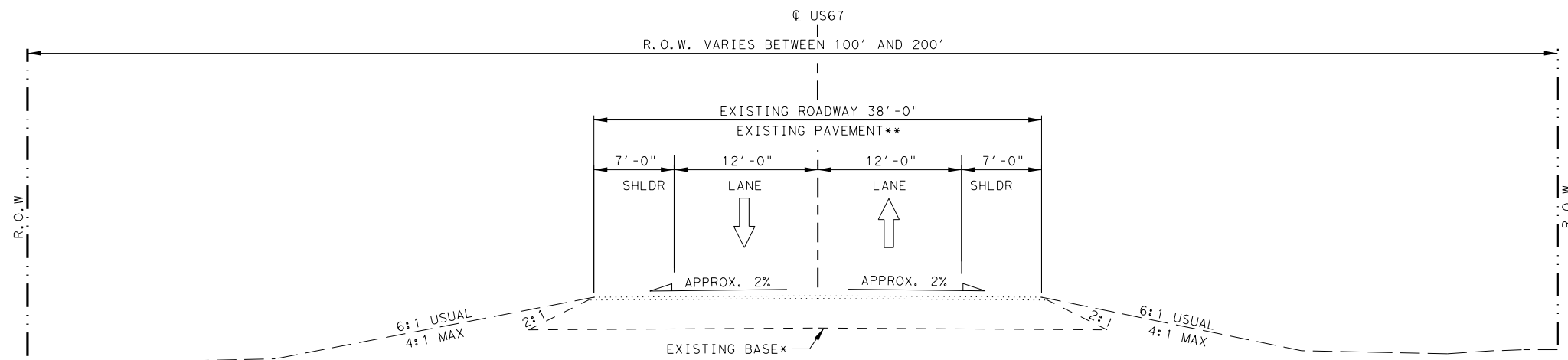
US 67
 EXISTING TYPICAL
 SECTIONS

SHEET 1 OF 2

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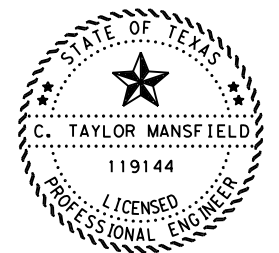
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0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		5

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EXISTING		
TYPICAL SECTION	BASE THICKNESS*	PAVEMENT**
STA. 507+00 TO STA. 950+00	8"	0.75" SEAL COATS
STA. 950+00.00 TO STA. 965+00	14"	0.75" SEAL COATS

C. Taylor Mansfield 2021.11.01
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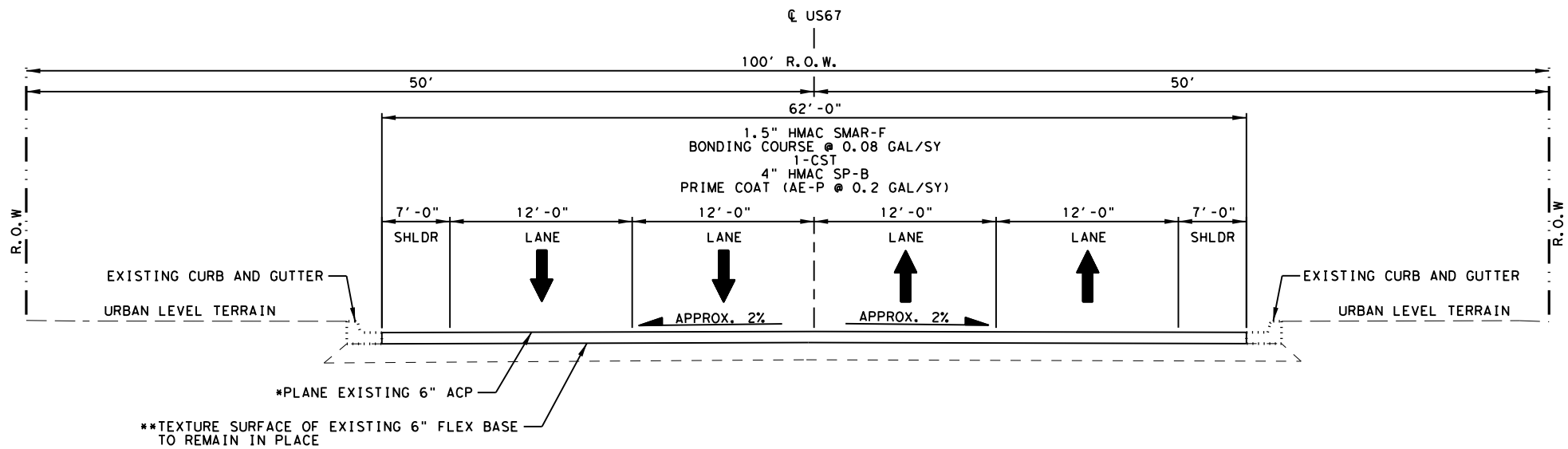


US 67
 EXISTING TYPICAL
 SECTIONS

SHEET 2 OF 2

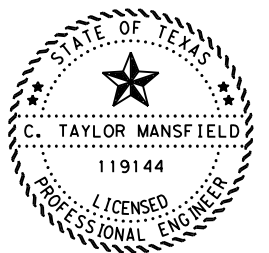
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0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		6

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PROPOSED TYPICAL SECTION
 STA. 461+00 TO STA. 503+69
 (TRANSITION FROM STA. 503+69 TO STA. 507+00)

C. Taylor Mansfield 2021.11.01
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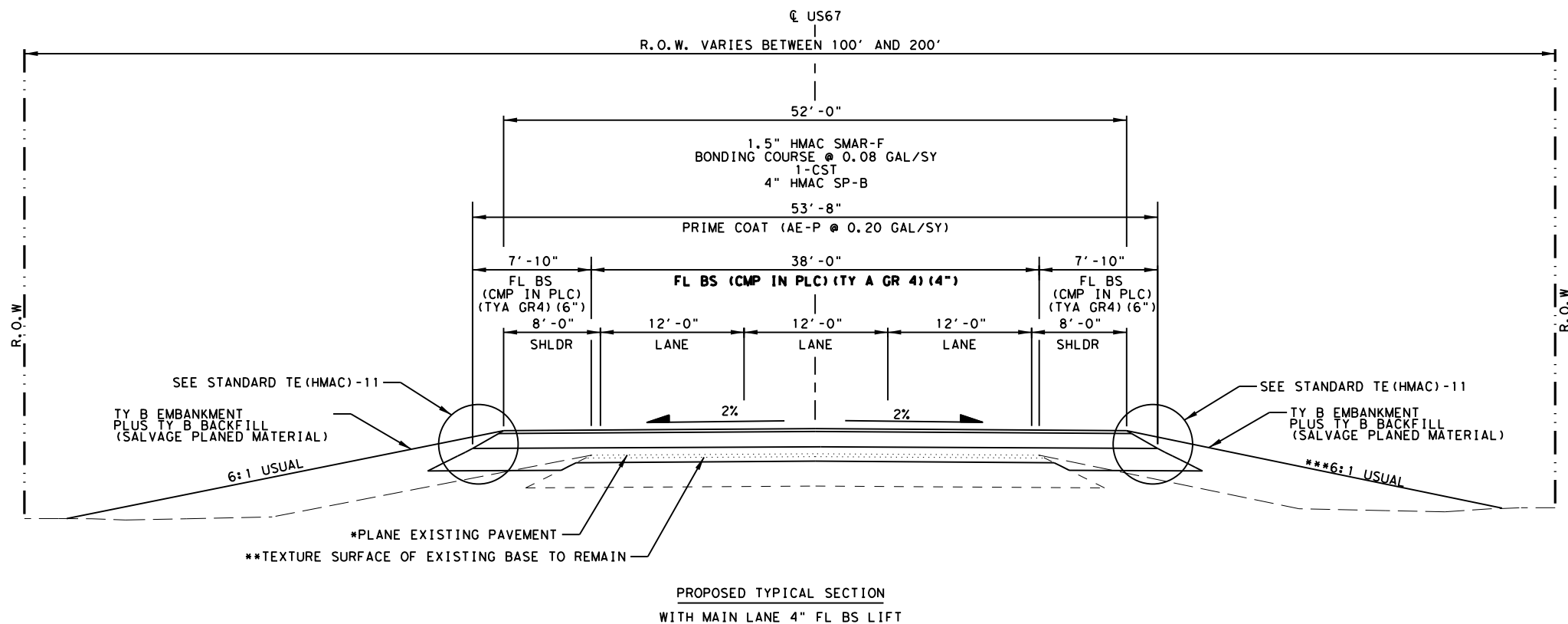


US 67
 PROPOSED TYPICAL
 SECTIONS

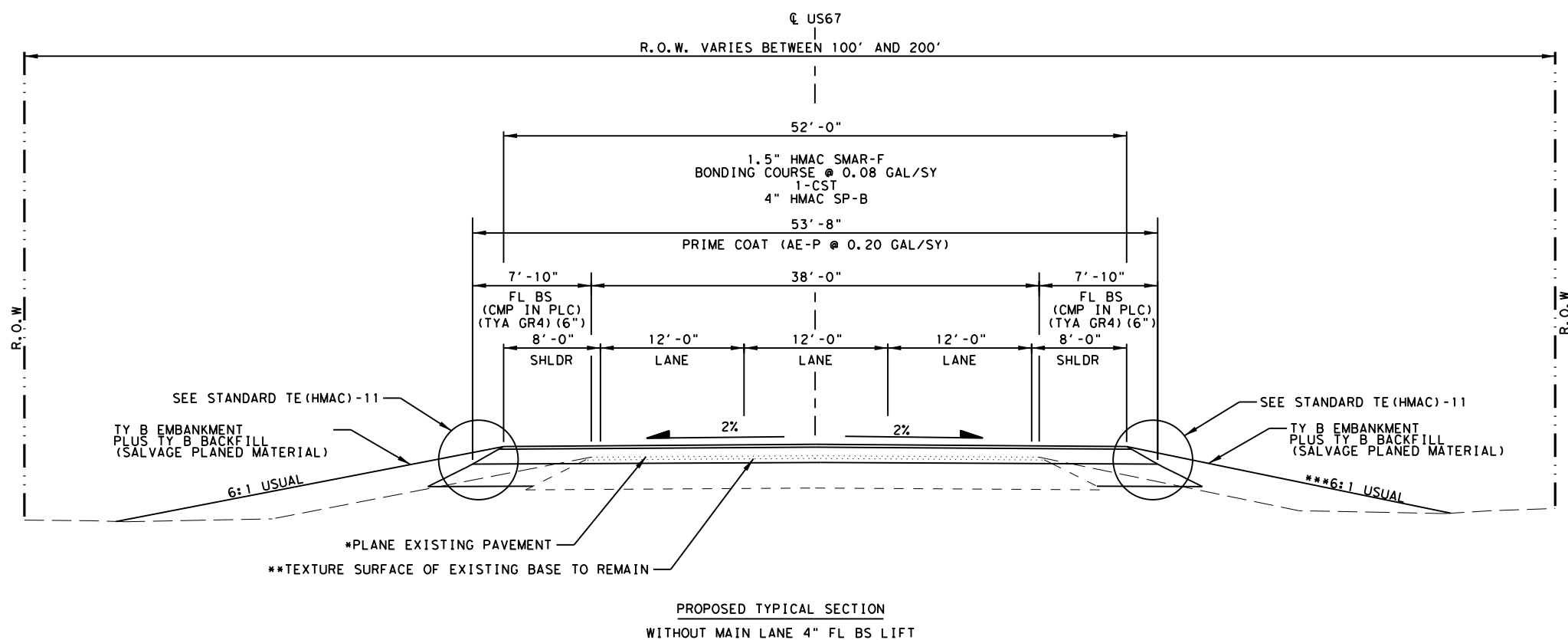
SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		7

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PROPOSED TYPICAL SECTION
WITH MAIN LANE 4" FL BS LIFT

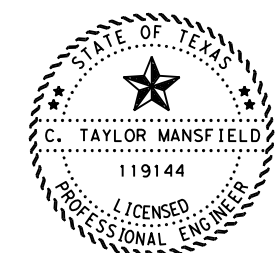


PROPOSED TYPICAL SECTION
WITHOUT MAIN LANE 4" FL BS LIFT

PROPOSED TYPICAL SECTION			
STATION RANGES	*PLANE DEPTH	**EXISTING BASE TO REMAIN THICKNESS	WITH MAIN LANE 4" FL BS LIFT
507+00 TO 520+00 (TRANS. 520+00 TO 524+00)	2"	6.75"	YES
524+00 TO 596+00 (TRANS. 596+00 TO 600+54)	3"	5.75"	YES
600+54 TO 764+00 (TRANS. 764+00 TO 768+00)	1"	7.75"	NO
768+00 TO 777+00 (TRANS. 777+00 TO 781+00)	3"	5.75"	YES
781+00 TO 847+00 (TRANS. 847+00 TO 851+00)	1"	7.75"	NO
851+00 TO 870+00 (TRANS. 870+00 TO 874+00)	3"	5.75"	YES
874+00 TO 946+55 (TRANS. 946+55 TO 952+55)	1"	7.75"	NO
960+57 TO 965+00 (TRANS.)	1"	13.75"	NO

***RIGHT SIDE FRONT SLOPE RATE	
STA. 525+00 TO STA. 529+00	4:1
STA. 623+00 TO STA. 642+00	4:1
STA. 857+00 TO STA. 869+00	4:1
STA. 879+00 TO STA. 903+00	4:1
STA. 904+00 TO STA. 914+00	3:1
STA. 931+00 TO STA. 950+00	3:1
STA. 960+57 TO STA. 965+00	4:1

C. Taylor Mansfield 2021.11.01
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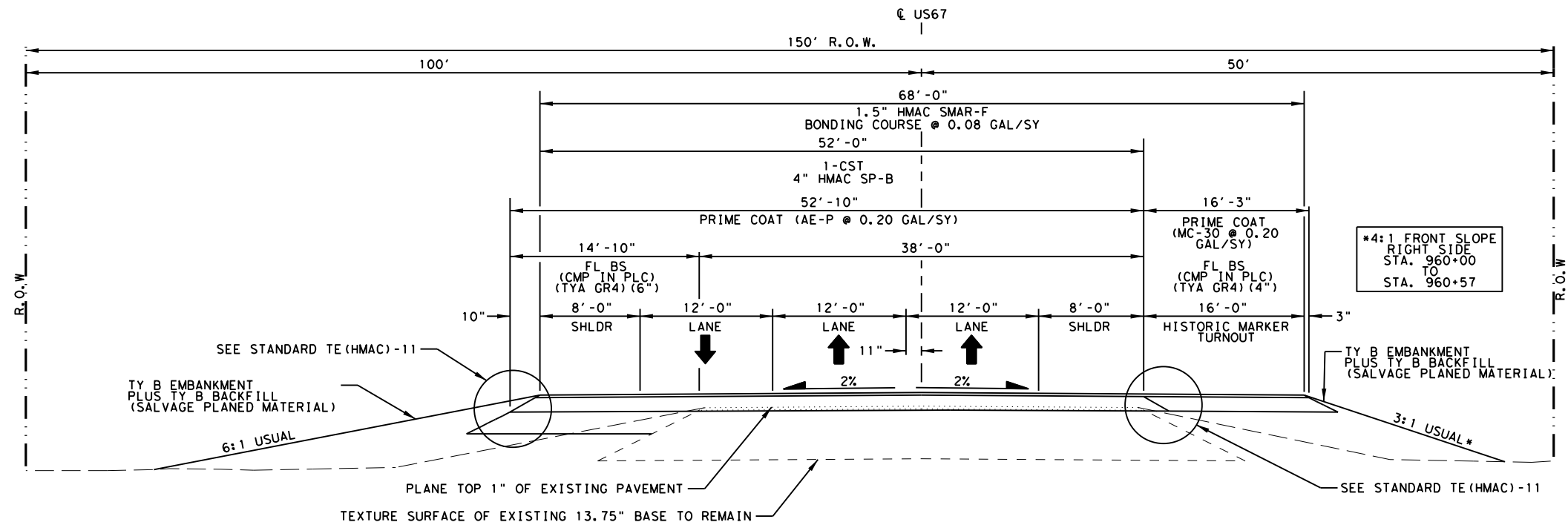


US 67
 PROPOSED TYPICAL
 SECTIONS

SHEET 2 OF 3

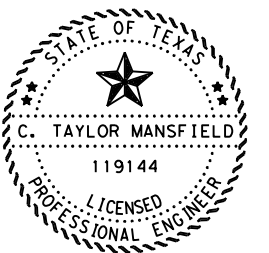
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0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		8

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PROPOSED TYPICAL SECTION
 STA. 952+55 TO STA. 954+57
 (TRANSITION FROM STA. 954+57 TO STA. 960+57)

C. Taylor Mansfield 2021.11.01
 10:54:20-05'00"



US 67
 PROPOSED TYPICAL
 SECTIONS

SHEET 3 OF 3


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		9

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BRIDGE		NON BRIDGE		ITEM NO.	DESC NO.	DESCRIPTION	UNIT	EST	FINAL
EST	FINAL	EST	FINAL						
		36.00		104	6015	REMOVING CONC (SIDEWALKS)	SY	36.00	
		136.00		104	6022	REMOVING CONC (CURB AND GUTTER)	LF	136.00	
		108.00		104	6043	REMOVE CONC (STONE SIDEWALK)	SY	108.00	
		29218.00		105	6018	REMOVING STABBASE AND ASPH PAV (7")	SY	29218.00	
		3680.00		105	6043	REMOVING STABBASE & ASPH PAV (0-6")	SY	3680.00	
		31373.00		105	6096	REMOV STABBASE AND ASPH PAV (0"-12")	SY	31373.00	
		52889.00		132	6004	EMBANKMENT (FINAL)(DENS CONT)(TY B)	CY	52889.00	
		878.00		134	6002	BACKFILL (TY B)	STA	878.00	
		50.00		150	6002	BLADING	HR	50.00	
		503527.00		164	6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	503527.00	
		50.00		216	6001	PROOF ROLLING	HR	50.00	
		29443.00		247	6064	FL BS (CMP IN PLC)(TY A GR 4)(6")	SY	29443.00	
		108387.00		247	6064	FL BS (CMP IN PLC)(TY A GR 4)(6")	SY	108387.00	
		53130.00		247	6212	FL BS (CMP IN PLC)(TY A GR 4)(4")	SY	53130.00	
		5889.00		310	6005	PRIME COAT (AE-P)	GAL	5889.00	
		61501.00		310	6005	PRIME COAT (AE-P)	GAL	61501.00	
		88653.00		316	6007	ASPH (A-R TYPE II)	GAL	88653.00	
		8879.00		316	6017	ASPH (AC-20-5TR)	GAL	8879.00	
		328.00		316	6124	AGGR(TY-PB GR-3 SAC-A)	CY	328.00	
		328.00		316	6126	AGGR(TY-PB GR-4 SAC-A)	CY	328.00	
		3100.00		316	6224	AGGR(TY-PB GR-4 SAC-B)	CY	3100.00	
		21000.00		351	6002	FLEXIBLE PAVEMENT STRUCTURE REPAIR (6")	SY	21000.00	
		192602.00		354	6022	PLANE ASPH CONC PAV(0"TO 3")	SY	192602.00	
324.00		390.00		400	6005	CEM STABIL BKFL	CY	714.00	
		3690.00		403	6001	TEMPORARY SPL SHORING	SF	3690.00	
		40.00		416	6029	DRILL SHAFT (RDWY ILL POLE) (30IN)	LF	40.00	
		7.00		420	6153	CL A CONC (DITCH INTERCEPTOR STRUCTURE)	EA	7.00	
		2.00		432	6001	RIPRAP (CONC)(4 IN)	CY	2.00	
22.00		46.00		432	6006	RIPRAP (CONC)(CL B)	CY	68.00	
30.00		23.00		432	6007	RIPRAP (CONC)(CL C)	CY	53.00	
263.00				450	6023	RAIL (TY SSTR)	LF	263.00	
		188.00		462	6001	CONC BOX CULV (3 FT X 2 FT)	LF	188.00	
		390.00		462	6003	CONC BOX CULV (4 FT X 2 FT)	LF	390.00	
		60.00		462	6004	CONC BOX CULV (4 FT X 3 FT)	LF	60.00	
		204.00		462	6005	CONC BOX CULV (4 FT X 4 FT)	LF	204.00	
		378.00		462	6006	CONC BOX CULV (5 FT X 2 FT)	LF	378.00	
		130.00		462	6007	CONC BOX CULV (5 FT X 3 FT)	LF	130.00	
		177.00		462	6008	CONC BOX CULV (5 FT X 4 FT)	LF	177.00	
		185.00		462	6014	CONC BOX CULV (7 FT X 3 FT)	LF	185.00	
240.00				462	6015	CONC BOX CULV (7 FT X 4 FT)	LF	240.00	
801.00				462	6019	CONC BOX CULV (8 FT X 4 FT)	LF	801.00	

US 67
 ESTIMATE OF
 QUANTITIES

SHEET 1 OF 3



© 2021

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		10


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Cks
 DWF
 Cks
 DWF

BRIDGE		NON BRIDGE		ITEM NO.	DESC NO.	DESCRIPTION	UNIT	EST	FINAL
EST	FINAL	EST	FINAL						
232.00				462	6020	CONC BOX CULV(8FT X 5 FT)	LF	232.00	
		620.00		464	6003	RC PIPE (CL III)(18 IN)	LF	620.00	
		334.00		464	6005	RC PIPE (CL III)(24 IN)	LF	334.00	
		1.00		466	6151	WINGWALL (FW -O)(HW=4 FT)	EA	1.00	
		2.00		466	6152	WINGWALL (FW -O)(HW=5 FT)	EA	2.00	
2.00				466	6181	WINGWALL (PW -I) (HW=6 FT)	EA	2.00	
1.00				466	6182	WINGWALL (PW -I) (HW=7 FT)	EA	1.00	
1.00				466	6183	WINGWALL (PW -I) (HW=8 FT)	EA	1.00	
		4.00		467	6109	SET (TYI)(S=3 FT)(HW= 3 FT)(6:I)(C)	EA	4.00	
		2.00		467	6112	SET (TYI)(S=3 FT)(HW= 4 FT)(4:I)(C)	EA	2.00	
		2.00		467	6119	SET (TYI)(S=3 FT)(HW= 5 FT)(6:I)(C)	EA	2.00	
		1.00		467	6137	SET (TYI)(S= 4 FT)(HW= 3 FT)(3:I) (C)	EA	1.00	
		4.00		467	6141	SET (TYI)(S= 4 FT)(HW= 3 FT)(6:I) (C)	EA	4.00	
		2.00		467	6144	SET (TYI)(S= 4 FT)(HW= 4 FT)(4:I) (C)	EA	2.00	
		1.00		467	6146	SET (TYI)(S= 4 FT)(HW= 4 FT)(6:I) (C)	EA	1.00	
		4.00		467	6147	SET (TYI)(S= 4 FT)(HW= 4 FT)(6:I) (P)	EA	4.00	
		4.00		467	6150	SET (TYI)(S= 4 FT)(HW= 5 FT)(4:I) (C)	EA	4.00	
		3.00		467	6152	SET (TYI)(S= 4 FT)(HW= 5 FT)(6:I) (C)	EA	3.00	
		3.00		467	6173	SET (TYI)(S= 5 FT)(HW= 3 FT)(6:I) (C)	EA	3.00	
		2.00		467	6175	SET (TYI)(S= 5 FT)(HW= 4 FT)(3:I) (C)	EA	2.00	
		1.00		467	6177	SET (TYI)(S= 5 FT)(HW= 4 FT)(4:I) (C)	EA	1.00	
		7.00		467	6179	SET (TYI)(S= 5 FT)(HW= 4 FT)(6:I) (C)	EA	7.00	
		3.00		467	6181	SET (TYI)(S= 5 FT)(HW= 5 FT)(3:I) (C)	EA	3.00	
		1.00		467	6182	SET (TYI)(S= 5 FT)(HW= 5 FT)(4:I) (C)	EA	1.00	
		5.00		467	6183	SET (TYI)(S= 5 FT)(HW= 5 FT)(6:I) (C)	EA	5.00	
4.00		3.00		467	6251	SET (TYI)(S= 7 FT)(HW= 5 FT)(6:I) (C)	EA	7.00	
6.00				467	6275	SET (TYI)(S= 8 FT)(HW= 5 FT)(3:I) (C)	EA	6.00	
4.00				467	6276	SET (TYI)(S= 8 FT)(HW= 5 FT)(4:I) (C)	EA	4.00	
13.00				467	6277	SET (TYI)(S= 8 FT)(HW= 5 FT)(6:I) (C)	EA	13.00	
4.00				467	6281	SET (TYI)(S= 8 FT)(HW= 6 FT)(6:I) (C)	EA	4.00	
		18.00		467	6363	SET (TYII) (18 IN) (RCP) (6:I) (P)	EA	18.00	
		6.00		467	6388	SET (TYII) (24IN) (RCP) (3:I) (C)	EA	6.00	
		2.00		467	6394	SET (TYII) (24IN) (RCP) (6:I) (C)	EA	2.00	
		252.00		496	6007	REMOV STR(PIPE)	LF	252.00	
1079.00		1018.00		496	6008	REMOV STR(BOX CULVERT)	LF	2097.00	
		330.00		496	6016	REMOV STR(PIPE)	EA	330.00	
		1.00		500	6001	MOBILIZATION	LS	1.00	
		20.00		502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	20.00	
		3710.00		506	6042	BIODEG EROSN CONT LOGS (INSTL)(18")	LF	3710.00	
		3710.00		506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	3710.00	
		960.00		512	6067	PTB (FRN&INSTL)(F SHAPE)(TY I) OR (STL)	LF	960.00	
		3120.00		512	6069	PTB (MOVE)(F SHAPE)(TY I) OR (STL)	LF	3120.00	
		960.00		512	6071	PTB (REMOVE)(F SHAPE)(TY I) OR (STL)	LF	960.00	
		108.00		531	6001	CONC SIDEWALKS (4")	SY	108.00	
		12.00		531	6018	CURB RAMPS (TY I)	SY	12.00	
		6.00		531	6022	CURB RAMPS (TY 5)	SY	6.00	
		136.00		531	6024	CURB RAMPS (TY 7)	SY	136.00	
		40.00		531	6027	CURB RAMPS (TY 10)	SY	40.00	
		92187.00		533	6001	RUMBLE STRIPS (SHOULDER)	LF	92187.00	
		45972.00		533	6002	RUMBLE STRIPS (CENTERLINE)	LF	45972.00	
		114.00		540	6002	MTL W-BEAM GD FEN (STEEL POST)	LF	114.00	

US 67
 ESTIMATE OF
 QUANTITIES

SHEET 2 OF 3



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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		11

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BRIDGE		NON BRIDGE		ITEM NO.	DESC NO.	DESCRIPTION	UNIT	EST	FINAL
EST	FINAL	EST	FINAL						
		8.00		540	6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	8.00	
		3.00		540	6033	MTL BM GD FEN (LONG SPAN SYSTEM)	EA	3.00	
		14.00		544	6001	GUARDRAIL END TREATMENT (INSTALL)	EA	14.00	
		70.00		545	6003	CRASH CUSH ATTEN(MOVE & RESET)	EA	70.00	
		22.00		545	6005	CRASH CUSH ATTEN(REMOVE)	EA	22.00	
		22.00		545	6013	CRASH CUSH ATTEN(INSTL)(R)(N)(TL3)	EA	22.00	
		5.00		610	6214	IN RD IL (TY SA) 40T-8250W EQ LED	EA	5.00	
		795.00		618	6023	CONDT (PVC) (SCH 40)(2")	LF	795.00	
		200.00		618	6024	CONDT (PVC) (SCH 40)(2") (BORE)	LF	200.00	
		995.00		620	6005	ELEC CONDR (NO.10) BARE	LF	995.00	
		1990.00		620	6006	ELEC CONDR (NO.10) INSULATED	LF	1990.00	
		6.00		624	6002	GROUND BOX TY A (I223)W/APRON	EA	6.00	
		2.00		628	6009	ELC SRV TY A I20/240060(NS)SS(E)SP(O)	EA	2.00	
		65.00		644	6001	IN SM RD SN SUP&AM TY10BWG(I)SA(P)	EA	65.00	
		5.00		644	6004	IN SM RD SN SUP&AM TY10BWG(I)SA(T)	EA	5.00	
		12.00		644	6027	IN SM RD SN SUP&AM TYS80(I)SA(P)	EA	12.00	
		20.00		644	6030	IN SM RD SN SUP&AM TYS80(I)SA(T)	EA	20.00	
		2.00		644	6031	IN SM RD SN SUP&AM TYS80(I)SA(T-2EXT)	EA	2.00	
		1.00		644	6033	IN SM RD SN SUP&AM TYS80(I)SA(U)	EA	1.00	
		4.00		644	6034	IN SM RD SN SUP&AM TYS80(I)SA(U-1EXT)	EA	4.00	
		59.00		644	6076	REMOVE SM RD SN SUP&AM	EA	59.00	
		46.00		658	6046	INSTL OM ASSM (OM-2X)(WC)GND	EA	46.00	
		53.00		658	6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	53.00	
		194196.00		662	6004	WK ZN PAVMRK NON-REMOV (W)4"(SLD)	LF	194196.00	
		810.00		662	6016	WK ZN PAVMRK NON-REMOV (W)24"(SLD)	LF	810.00	
		174496.00		662	6034	WK ZN PAVMRK NON-REMOV (Y)4"(SLD)	LF	174496.00	
		1091.00		662	6050	WK ZN PAVMRK REMOV (REFL) TY II-A-A	EA	1091.00	
		7728.00		662	6109	WK ZN PAVMRK SHT TERM (TAB)TY W	EA	7728.00	
		10304.00		662	6110	WK ZN PAVMRK SHT TERM (TAB)TY Y	EA	10304.00	
		3869.00		666	6006	REFL PAVMRK TY I (W)4"(DOT)(100MIL)	LF	3869.00	
		399.00		666	6036	REFL PAVMRK TY I (W)8"(SLD)(100MIL)	LF	399.00	
		204.00		666	6048	REFL PAVMRK TY I (W)24"(SLD)(100MIL)	LF	204.00	
		12397.00		666	6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	12397.00	
		99190.00		666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	99190.00	
		99258.00		666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	99258.00	
		8.00		668	6083	PREFAB PAVMRK TY C (W) (LNDP ARROW)	EA	8.00	
		644.00		672	6007	REFL PAVMRKR TY I-C	EA	644.00	
		1288.00		672	6009	REFL PAVMRKR TY II-A-A	EA	1288.00	
		363992.00		677	6001	ELIM EXT PAVMRK & MRKS (4")	LF	363992.00	
		5.00		681	6001	TEMP TRAF SIGNALS	EA	5.00	
		66861.00		3077	6007	SP MIXES SP-B SAC-BPG70-22	TON	66861.00	
		25054.00		3080	6021	STONE-MTRX-ASPH SMAR-F SAC-A	TON	25054.00	
		24045.00		3084	6001	BONDING COURSE	GAL	24045.00	
		2.00		6001	6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.00	
		2.00		6158	6001	TMSP RADAR SPEED CONTROL MONITOR	EA	2.00	
		554.00		6185	6002	TMA (STATIONARY)	DAY	554.00	
		63.00		6185	6005	TMA (MOBILE OPERATION)	DAY	63.00	
						FORCE ACCOUNT (EROSION CONTROL)			
						FORCE ACCOUNT (SAFETY)			
						STATE FORCE ACCOUNT			

US 67
 ESTIMATE OF
 QUANTITIES

SHEET 3 OF 3



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		12

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SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS																			
LOCATION	105 6018	134 6002	150 6002	216 6001	247 6064	310 6005	316 6017	316 6124	316 6126	403 6001	512 6067	512 6069	512 6071	545 6003	545 6005	545 6013	662 6004	662 6016	662 6034
	REMOVING STAB BASE AND ASPH PAV (7")	BACKFILL (TY B)	BLADING	PROOF ROLLING	SACRAFICIAL TEMPORARY PAVEMENT 2-CST				TEMPORARY SPL SHORING	PTB (FRN& INSTL) (F SHAPE) (TY 1) OR (STL)	PTB (MOVE) (F SHAPE) (TY 1) OR (STL)	PTB (REMOVE) (F SHAPE) (TY 1) OR (STL)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (REMOVE)	CRASH CUSH ATTEN (INSTL) (R)(N)(TL3)	WK ZN PAV MRK NON-REMOV (W)4*(SLD)	WK ZN PAV MRK NON-REMOV (W)24*(SLD)	WK ZN PAV MRK NON-REMOV (Y)4*(SLD)	
					FL BS (CMP IN PLC)(TY A GR 4) (6")	PRIME COAT (AE-P)	ASPH (AC-20-5TR)	AGGR(TY-PB GR-3 SAC-A)											AGGR(TY-PB GR-4 SAC-A)
					0.2 GAL/SY	0.2 GAL/SY	90 SY/CY	90 SY/CY											
	SY	STA	HR	HR	SY	GAL	GAL	CY	CY	SF	LF	LF	LF	EA	EA	EA	LF	LF	LF
PHASE 1					225	45	113	2	2	3690	960	3120	960	70	22	22	19700	810	
PHASE 2		439			14609	2922	4383	163	163										
PHASE 3		439			14609	2922	4383	163	163								87248		87248
PHASE 4	14609																87248		87248
PHASE 5	14609																		
PHASE 6																			
PHASE 9																			
PROJECT TOTALS	29218	878	50	50	29443	5889	8879	328	328	3690	960	3120	960	70	22	22	194196	810	174496

LOCATION	662 6050	662 6109	662 6110	677 6001	6001 6002	681* 6001	6158 6001	6185 6002	6185 6005
	WK ZN PAV MRK REMOV (REFL) TYII-A-A	WK ZN PAV MRK SHT TERM (TAB)TY W	WK ZN PAV MRK SHT TERM (TAB)TY Y	ELIM EXT PAV MRK & MRKS (4")	PORTABLE CHANGEABLE MESSAGE SIGN	TEMP TRAF SIGNALS	TMSP RADAR SPEED CONTROL MONITOR	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	EA	EA	EA	LF	EA	EA	EA	DAY	DAY
PHASE 1				15000	2	5	2	295	5
PHASE 2								60	5
PHASE 3	1091			174496				111	5
PHASE 4				174496				78	5
PHASE 5		7128	9504						40
PHASE 6								10	
PHASE 9		600	800						3
PROJECT TOTALS	1091	7728	10304	363992	2	5	2	554	63

*TEMP SIGNALS ARE FOR ONE LANE TWO-WAY TRAFFIC CONTROL. SEE TCP PHASE LAYOUT: PHASE 1 AND STANDARD TCP (2-8b)-18. PORTABLE TRAFFIC SIGNALS SUFFICE FOR ALL TEMPORARY TRAFFIC SIGNALS. ESTIMATE ASSUMES NO MORE THAN 5 WILL BE IN USE CONCURRENTLY.

US 67
 SUMMARY OF
 WORKZONE
 TCP ITEMS

SHEET 1 OF 1



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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		13

SUMMARY OF REMOVAL ITEMS LOCATION	104	104	104	496	658
	6015	6022	6043	6007	6060
	REMOVING CONC (SIDE WALKS) SY	REMOVING CONC (CURB AND GUTTER) LF	REMOVE CONC (STONE SIDEWALK) SY	REMOV STR (PIPE) LF	REMOVE DEL IN & OBJECT MARKER ASSMS EA
MCCAMEY MILL & FILL PLAN 1/2		42			
MCCAMEY MILL & FILL PLAN 2/2	36	94	108		
PLAN & PROFILE 1 OF 39					
PLAN & PROFILE 2 OF 39					2
PLAN & PROFILE 3 OF 39					2
PLAN & PROFILE 4 OF 39					2
PLAN & PROFILE 5 OF 39				42	5
PLAN & PROFILE 6 OF 39					2
PLAN & PROFILE 7 OF 39					
PLAN & PROFILE 8 OF 39					4
PLAN & PROFILE 9 OF 39					
PLAN & PROFILE 10 OF 39					2
PLAN & PROFILE 11 OF 39					
PLAN & PROFILE 12 OF 39					4
PLAN & PROFILE 13 OF 39				84	
PLAN & PROFILE 14 OF 39					4
PLAN & PROFILE 15 OF 39					2
PLAN & PROFILE 16 OF 39					
PLAN & PROFILE 17 OF 39					
PLAN & PROFILE 18 OF 39					2
PLAN & PROFILE 19 OF 39					
PLAN & PROFILE 20 OF 39					
PLAN & PROFILE 21 OF 39					2
PLAN & PROFILE 22 OF 39					
PLAN & PROFILE 23 OF 39					2
PLAN & PROFILE 24 OF 39					
PLAN & PROFILE 25 OF 39					2
PLAN & PROFILE 26 OF 39					
PLAN & PROFILE 27 OF 39				24	2
PLAN & PROFILE 28 OF 39					
PLAN & PROFILE 29 OF 39					
PLAN & PROFILE 30 OF 39				22	2
PLAN & PROFILE 31 OF 39					2
PLAN & PROFILE 32 OF 39					2
PLAN & PROFILE 33 OF 39					
PLAN & PROFILE 34 OF 39					4
PLAN & PROFILE 35 OF 39					
PLAN & PROFILE 36 OF 39					
PLAN & PROFILE 37 OF 39				80	4
PLAN & PROFILE 38 OF 39					
PLAN & PROFILE 39 OF 39					2
PROJECT TOTALS	36	136	108	252	53

SUMMARY OF ILLUMINATION ITEMS									
LOCATION	416	432	610	618	618	620	620	624	628
	6029	6001	6214	6023	6024	6005	6006	6002	6009
	DRILL SHAFT (RDWY ILL POLE) (30 IN)	RIPRAP (CONC) (4 IN)	IN RD IL (TY SA) 40T-8 (250W EQ) LED	CONDT (PVC) (SCH 40) (2")	CONDT (PVC) (SCH 40) (2") (BORE)	ELEC CONDR (NO. 10) BARE	ELEC CONDR (NO. 10) INSULATED	GROUND BOX TY A (122311) W/APRON	ELC SRV TY A 120/240 060 (NS) S S(E) SP (O)
	LF	CY	EA	LF	LF	LF	LF	EA	EA
5TH STREET	16	1	2	275	150	425	850	3	1
RR 2463	24	1	3	520	50	570	1140	3	1
PROJECT TOTALS	40	2	5	795	200	995	1990	6	2

SUMMARY OF SIGN ITEMS								
LOCATION	644	644	644	644	644	644	644	644
	6001	6004	6027	6030	6031	6033	6034	6076
	IN SM RD SN SUP&AM TY10BWG (1) SA (P)	IN SM RD SN SUP&AM TY10BWG (1) SA (T)	IN SM RD SN SUP&AM TY80 (1) SA (P)	IN SM RD SN SUP&AM TY80 (1) SA (T)	IN SM RD SN SUP&AM TY80 (1) SA (T-2EXT)	IN SM RD SN SUP&AM TY80 (1) SA (U)	IN SM RD SN SUP&AM TY80 (1) SA (U-1EXT)	REMOVE SM RD SN SUP&AM
	EA	EA	EA	EA	EA	EA	EA	EA
PROJECT TOTALS	65	5	12	20	2	1	4	59

US 67
 SUMMARY OF
 REMOVAL,
 ILLUMINATION,
 & SIGN ITEMS



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		14


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LOCATION	RDWY WIDTH	132	247	247	310	316	316	351	354	3077	3084	3080
		6004	6064	6212	6005	6007	6224	6002	6022	6007	6001	6021
		EMBANKMENT (FINAL) (DENS CONT) (TY B)	FL BS (CMP IN PLC) (TY A GR 4) (6")	FL BS (CMP IN PLC) (TY A GR 4) (4")	PRIME COAT (AE-P)	ASPH (A-R TYPE 1)	AGGR (TY-PB GR-4 SAC-B)	FLEXIBLE PAVEMENT STRUCTURE REPAIR (6")	PLANE ASPH CONC PAV (0" TO 3")	SP MIXES SP-B SAC-B PG70-22	BONDING COURSE	STONE-MTRX-ASP H SMAR-F SAC-A
		CY	SY	SY	GAL	GAL	CY	CY	SY	TON	GAL	TON
					0.2 GAL/SY	0.3 GAL/SY	95 SY/CY	*		440 LBS/SY	0.08 GAL/SY	165 LBS/SY
PLAN & PROFILE 18 OF 39												
STA 704 +00 TO 705 +00	52	126	159		116	173	6		419	127	46	48
STA 705 +00 TO 706 +00	52	126	159		116	173	6		419	127	46	48
STA 706 +00 TO 707 +00	52	126	159		116	173	6		419	127	46	48
STA 707 +00 TO 708 +00	52	126	159		116	173	6		419	127	46	48
STA 708 +00 TO 709 +00	52	126	159		116	173	6		419	127	46	48
STA 709 +00 TO 710 +00	52	126	159		116	173	6		419	127	46	48
STA 710 +00 TO 711 +00	52	126	159		116	173	6		419	127	46	48
STA 711 +00 TO 712 +00	52	126	159		116	173	6		419	127	46	48
STA 712 +00 TO 713 +00	52	126	159		116	173	6		419	127	46	48
STA 713 +00 TO 714 +00	52	126	159		116	173	6		419	127	46	48
STA 714 +00 TO 715 +00	52	126	159		116	173	6		419	127	46	48
STA 715 +00 TO 716 +00	52	126	159		116	173	6		419	127	46	48
SHEET TOTALS		1512	1905		1392	2076	72		5028	1524	552	576
PLAN & PROFILE 19 OF 39												
STA 716 +00 TO 717 +00	52	97	161		116	173	6		417	127	46	48
STA 717 +00 TO 718 +00	52	97	161		116	173	6		417	127	46	48
STA 718 +00 TO 719 +00	52	97	161		116	173	6		417	127	46	48
STA 719 +00 TO 720 +00	52	97	161		116	173	6		417	127	46	48
STA 720 +00 TO 721 +00	52	97	161		116	173	6		417	127	46	48
STA 721 +00 TO 722 +00	52	97	161		116	173	6		417	127	46	48
STA 722 +00 TO 723 +00	52	97	161		116	173	6		417	127	46	48
STA 723 +00 TO 724 +00	52	97	161		116	173	6		417	127	46	48
STA 724 +00 TO 725 +00	52	97	161		116	173	6		417	127	46	48
STA 725 +00 TO 726 +00	52	97	161		116	173	6		417	127	46	48
STA 726 +00 TO 727 +00	52	97	161		116	173	6		417	127	46	48
STA 727 +00 TO 728 +00	52	97	161		116	173	6		417	127	46	48
SHEET TOTALS		1164	1932		1392	2076	72		5004	1524	552	576
PLAN & PROFILE 20 OF 39												
STA 728 +00 TO 729 +00	52	105	159		116	173	6		419	127	46	48
STA 729 +00 TO 730 +00	52	105	159		116	173	6		419	127	46	48
STA 730 +00 TO 731 +00	52	105	159		116	173	6		419	127	46	48
STA 731 +00 TO 732 +00	52	105	159		116	173	6		419	127	46	48
STA 732 +00 TO 733 +00	52	105	159		116	173	6		419	127	46	48
STA 733 +00 TO 734 +00	52	105	159		116	173	6		419	127	46	48
STA 734 +00 TO 735 +00	52	105	159		116	173	6		419	127	46	48
STA 735 +00 TO 736 +00	52	105	159		116	173	6		419	127	46	48
STA 736 +00 TO 737 +00	52	105	159		116	173	6		419	127	46	48
STA 737 +00 TO 738 +00	52	105	159		116	173	6		419	127	46	48
STA 738 +00 TO 739 +00	52	105	159		116	173	6		419	127	46	48
STA 739 +00 TO 740 +00	52	105	159		116	173	6		419	127	46	48
SHEET TOTALS		1260	1908		1392	2076	72		5028	1524	552	576
PLAN & PROFILE 21 OF 39												
STA 740 +00 TO 741 +00	52	91	147		116	173	6		430	127	46	48
STA 741 +00 TO 742 +00	52	91	147		116	173	6		430	127	46	48
STA 742 +00 TO 743 +00	52	91	147		116	173	6		430	127	46	48
STA 743 +00 TO 744 +00	52	91	147		116	173	6		430	127	46	48
STA 744 +00 TO 745 +00	52	91	147		116	173	6		430	127	46	48
STA 745 +00 TO 746 +00	52	91	147		116	173	6		430	127	46	48
STA 746 +00 TO 747 +00	52	91	147		116	173	6		430	127	46	48
STA 747 +00 TO 748 +00	52	91	147		116	173	6		430	127	46	48
STA 748 +00 TO 749 +00	52	91	147		116	173	6		430	127	46	48
STA 749 +00 TO 750 +00	52	91	147		116	173	6		430	127	46	48
STA 750 +00 TO 751 +00	52	91	147		116	173	6		430	127	46	48
STA 751 +00 TO 752 +00	52	91	147		116	173	6		430	127	46	48
SHEET TOTALS		1092	1769		1392	2076	72		5160	1524	552	576
PLAN & PROFILE 22 OF 39												
STA 752 +00 TO 753 +00	52	111	162		116	173	6		416	127	46	48
STA 753 +00 TO 754 +00	52	111	162		116	173	6		416	127	46	48
STA 754 +00 TO 755 +00	52	111	162		116	173	6		416	127	46	48
STA 755 +00 TO 756 +00	52	111	162		116	173	6		416	127	46	48
STA 756 +00 TO 757 +00	52	111	162		116	173	6		416	127	46	48
STA 757 +00 TO 758 +00	52	111	162		116	173	6		416	127	46	48
STA 758 +00 TO 759 +00	52	111	162		116	173	6		416	127	46	48
STA 759 +00 TO 760 +00	52	111	162		116	173	6		416	127	46	48
STA 760 +00 TO 761 +00	52	111	162		116	173	6		416	127	46	48
STA 761 +00 TO 762 +00	52	111	162		116	173	6		416	127	46	48
STA 762 +00 TO 763 +00	52	111	162		116	173	6		416	127	46	48
STA 763 +00 TO 764 +00	52	111	162		116	173	6		416	127	46	48
SHEET TOTALS		1332	1942		1392	2076	72		4992	1524	552	576
PLAN & PROFILE 23 OF 39												
STA 764 +00 TO 765 +00	52	141	164		116	173	6		413	127	46	48
STA 765 +00 TO 766 +00	52	141	164		116	173	6		413	127	46	48
STA 766 +00 TO 767 +00	52	141	164		116	173	6		413	127	46	48
STA 767 +00 TO 768 +00	52	141	164		116	173	6		413	127	46	48
STA 768 +00 TO 769 +00	52	141	164	414	116	173	6		413	127	46	48
STA 769 +00 TO 770 +00	52	141	164	414	116	173	6		413	127	46	48
STA 770 +00 TO 771 +00	52	141	164	414	116	173	6		413	127	46	48
STA 771 +00 TO 772 +00	52	141	164	414	116	173	6		413	127	46	48
STA 772 +00 TO 773 +00	52	141	164	414	116	173	6		413	127	46	48
STA 773 +00 TO 774 +00	52	141	164	414	116	173	6		413	127	46	48
STA 774 +00 TO 775 +00	52	141	164	414	116	173	6		413	127	46	48
STA 775 +00 TO 776 +00	52	141	164	414	116	173	6		413	127	46	48
SHEET TOTALS		1692	1972	3312	1392	2076	72		4956	1524	552	576

*REPAIR PAVEMENT AS DIRECTED BY ENGINEER. FOR QUANTITY ESTIMATION PURPOSES, 10 PERCENT OF EXISTING PAVEMENT STRUCTURE FROM BEGIN PROJECT TO END PROJECT ASSUMED TO REQUIRE REPAIR. SEE SUMMARY OF ROADWAY ITEMS SHEET 7 OF 7 FOR FINAL QUANTITY AND SPECIFICATIONS OF SUBSIDIARY PAVEMENT MIX.

US 67
SUMMARY OF
ROADWAY
ITEMS


SHEET 4 OF 7



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		18

SUMMARY OF DRAINAGE ITEMS																	
LOCATION	400 6005	432 6006	432 6007	450 6023	462 6001	462 6003	462 6004	462 6005	462 6006	462 6007	462 6008	462 6014	462 6015	462 6019	462 6020	464 6005	466 6151
	CEM STABIL BKFL	RIPRAP (CONC)(C L B)	RIPRAP (CONC)(C L C)	RAIL (TY SSTR)	CONC BOX CULV (3 FT X 2 FT)	CONC BOX CULV (4 FT X 2 FT)	CONC BOX CULV (4 FT X 3 FT)	CONC BOX CULV (4 FT X 4 FT)	CONC BOX CULV (5 FT X 2 FT)	CONC BOX CULV (5 FT X 3 FT)	CONC BOX CULV (5 FT X 4 FT)	CONC BOX CULV (7 FT X 3 FT)	CONC BOX CULV (7 FT X 4 FT)	CONC BOX CULV (8 FT X 4 FT)	CONC BOX CULV (8 FT X 5 FT)	RC PIPE (CL III)(24 IN)	WINGWALL (FW - 0) (HW=4 FT)
	CY	CY	CY	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA
CULVERT 1 - STA. 518+56	22																184
CULVERT 2 - STA. 525+29	18		3														150
CULVERT 3 - STA. 537+04	30	6								120							
CULVERT 4 - STA. 549+75			2				60										
CULVERT 5 - STA. 571+06	63	4						204									
CULVERT 6 - STA. 591+05	32		3		126												
CULVERT 7 - STA. 595+08	36		4						192								
CULVERT 8 - STA. 609+11	29					132											
CULVERT 9 - STA. 637+51	71		8	78											232		
CULVERT 10 - STA. 665+93	64	7												252			
CULVERT 11 - STA. 677+88	23		3			78											
	466 6152	466 6181	466 6182	466 6183	467 6109	467 6112	467 6119	467 6137	467 6141	467 6144	467 6146	467 6147	467 6150	467 6152	467 6173	467 6175	467 6177
	WINGWALL (FW - 0) (HW=5 FT)	WINGWALL (PW - 1) (HW=6 FT)	WINGWALL (PW - 1) (HW=7 FT)	WINGWALL (PW - 1) (HW=8 FT)	SET (TY D(S=3 FT)(HW= 3 FT)(6:1) (C)	SET (TY D(S=3 FT)(HW= 4 FT)(4:1) (C)	SET (TY D(S=3 FT)(HW= 5 FT)(6:1) (C)	SET (TY D(S= 4 FT)(HW= 3 FT)(3:1) (C)	SET (TY D(S= 4 FT)(HW= 3 FT)(6:1) (C)	SET (TY D(S= 4 FT)(HW= 4 FT)(4:1) (C)	SET (TY D(S= 4 FT)(HW= 4 FT)(6:1) (C)	SET (TY D(S= 4 FT)(HW= 4 FT)(6:1) (P)	SET (TY D(S= 4 FT)(HW= 5 FT)(4:1) (C)	SET (TY D(S= 4 FT)(HW= 5 FT)(6:1) (C)	SET (TY D(S= 5 FT)(HW= 3 FT)(6:1) (C)	SET (TY D(S= 5 FT)(HW= 4 FT)(3:1) (C)	SET (TY D(S= 5 FT)(HW= 4 FT)(4:1) (C)
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
CULVERT 1 - STA. 518+56																	
CULVERT 2 - STA. 525+29																	
CULVERT 3 - STA. 537+04																	
CULVERT 4 - STA. 549+75																	
CULVERT 5 - STA. 571+06										1				3	3		
CULVERT 6 - STA. 591+05					2			2									
CULVERT 7 - STA. 595+08															3		
CULVERT 8 - STA. 609+11										2							
CULVERT 9 - STA. 637+51				1													
CULVERT 10 - STA. 665+93																	
CULVERT 11 - STA. 677+88											4						
	467 6179	467 6181	467 6182	467 6183	467 6251	467 6275	467 6276	467 6277	467 6281	467 6388	467 6394	496 6008	496 6016	658 6046			
	SET (TY D(S= 5 FT)(HW= 4 FT)(6:1) (C)	SET (TY D(S= 5 FT)(HW= 5 FT)(3:1) (C)	SET (TY D(S= 5 FT)(HW= 5 FT)(4:1) (C)	SET (TY D(S= 5 FT)(HW= 5 FT)(6:1) (C)	SET (TY D(S= 7 FT)(HW= 5 FT)(6:1) (C)	SET (TY D(S= 8 FT)(HW= 5 FT)(3:1) (C)	SET (TY D(S= 8 FT)(HW= 5 FT)(4:1) (C)	SET (TY D(S= 8 FT)(HW= 5 FT)(6:1) (C)	SET (TY D(S= 8 FT)(HW= 6 FT)(6:1) (C)	SET (TY D(S= 24 IN) (RCP) (3: 1) (C)	SET (TY D(S= 24 IN) (RCP) (6: 1) (C)	REMOV STR (BOX CULVERT)	REMOV STR (PIPE)	INSTL OM ASSM (OM-2X) (WC)GND			
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF	EA	EA			
CULVERT 1 - STA. 518+56										2	2	60		2			
CULVERT 2 - STA. 525+29										4		45		2			
CULVERT 3 - STA. 537+04	2			2								100		2			
CULVERT 4 - STA. 549+75												45		2			
CULVERT 5 - STA. 571+06												135		2			
CULVERT 6 - STA. 591+05												45		2			
CULVERT 7 - STA. 595+08	3											90		2			
CULVERT 8 - STA. 609+11													134	2			
CULVERT 9 - STA. 637+51									4			212		2			
CULVERT 10 - STA. 665+93							4	4				225		2			
CULVERT 11 - STA. 677+88													68	2			

US 67
 SUMMARY OF
 DRAINAGE ITEMS



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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		22


SUMMARY OF DRAINAGE ITEMS LOCATION	400 6005	432 6006	432 6007	450 6023	462 6001	462 6003	462 6004	462 6005	462 6006	462 6007	462 6008	462 6014	462 6015	462 6019	462 6020	464 6005	466 6151
	CEM STABIL BKFL	RIPRAP (CONC)(C L B)	RIPRAP (CONC)(C L C)	RAIL (TY SSTR)	CONC BOX CULV (3 FT X 2 FT)	CONC BOX CULV (4 FT X 2 FT)	CONC BOX CULV (4 FT X 3 FT)	CONC BOX CULV (4 FT X 4 FT)	CONC BOX CULV (5 FT X 2 FT)	CONC BOX CULV (5 FT X 3 FT)	CONC BOX CULV (5 FT X 4 FT)	CONC BOX CULV (7 FT X 3 FT)	CONC BOX CULV (7 FT X 4 FT)	CONC BOX CULV (8 FT X 4 FT)	CONC BOX CULV (8 FT X 5 FT)	RC PIPE (CL III)(24 IN)	WINGWALL (FW - 0) (HW=4 FT)
	CY	CY	CY	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA
CULVERT 12 - STA. 678+27		7							66								
CULVERT 13 - STA. 717+43	43		3							130							
CULVERT 14 - STA. 772+54			2		62												
CULVERT 15 - STA. 797+14	55	6									177						
CULVERT 16 - STA. 821+40	72	22		95										360			
CULVERT 17 - STA. 853+73			2			59											
CULVERT 18 - STA. 867+89			2			60											
CULVERT 19 - STA. 880+08		7										61					
CULVERT 20 - STA. 901+09	39	9										124					
CULVERT 21 - STA. 905+90	61		8	45									240				
CULVERT 22 - STA. 938+99	56		7	45										189			
CULVERT 23 - STA. 963+19			6			61											1
PROJECT TOTALS	714	68	53	263	188	390	60	204	378	130	177	185	240	801	232	334	1

	466 6152	466 6181	466 6182	466 6183	467 6109	467 6112	467 6119	467 6137	467 6141	467 6144	467 6146	467 6147	467 6150	467 6152	467 6173	467 6175	467 6177
	WINGWALL (FW - 0) (HW=5 FT)	WINGWALL (PW - 1) (HW=6 FT)	WINGWALL (PW - 1) (HW=7 FT)	WINGWALL (PW - 1) (HW=8 FT)	SET (TY IXS=3 FT)(HW= 3 FT)(6:1) (C)	SET (TY IXS=3 FT)(HW= 4 FT)(4:1) (C)	SET (TY IXS=3 FT)(HW= 5 FT)(6:1) (C)	SET (TY IXS= 4 FT)(HW= 3 FT)(3:1) (C)	SET (TY IXS= 4 FT)(HW= 3 FT)(6:1) (C)	SET (TY IXS= 4 FT)(HW= 4 FT)(4:1) (C)	SET (TY IXS= 4 FT)(HW= 4 FT)(6:1) (C)	SET (TY IXS= 4 FT)(HW= 4 FT)(6:1) (P)	SET (TY IXS= 4 FT)(HW= 5 FT)(4:1) (C)	SET (TY IXS= 4 FT)(HW= 5 FT)(6:1) (C)	SET (TY IXS= 5 FT)(HW= 3 FT)(6:1) (C)	SET (TY IXS= 5 FT)(HW= 4 FT)(3:1) (C)	SET (TY IXS= 5 FT)(HW= 4 FT)(4:1) (C)
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
CULVERT 12 - STA. 678+27																	1
CULVERT 13 - STA. 717+43																2	
CULVERT 14 - STA. 772+54					2	2											
CULVERT 15 - STA. 797+14																	
CULVERT 16 - STA. 821+40		1															
CULVERT 17 - STA. 853+73										1	1						
CULVERT 18 - STA. 867+89								1	1								
CULVERT 19 - STA. 880+08	1																
CULVERT 20 - STA. 901+09	1																
CULVERT 21 - STA. 905+90		1															
CULVERT 22 - STA. 938+99				1													
CULVERT 23 - STA. 963+19									1								
PROJECT TOTALS	2	2	1	1	4	2	2	1	4	2	1	4	4	3	3	2	1

	467 6179	467 6181	467 6182	467 6183	467 6251	467 6275	467 6276	467 6277	467 6281	467 6388	467 6394	496 6008	496 6016	658 6046
	SET (TY IXS= 5 FT)(HW= 4 FT)(6:1) (C)	SET (TY IXS= 5 FT)(HW= 5 FT)(3:1) (C)	SET (TY IXS= 5 FT)(HW= 5 FT)(4:1) (C)	SET (TY IXS= 5 FT)(HW= 5 FT)(6:1) (C)	SET (TY IXS= 7 FT)(HW= 5 FT)(6:1) (C)	SET (TY IXS= 8 FT)(HW= 5 FT)(3:1) (C)	SET (TY IXS= 8 FT)(HW= 5 FT)(4:1) (C)	SET (TY IXS= 8 FT)(HW= 5 FT)(6:1) (C)	SET (TY IXS= 8 FT)(HW= 6 FT)(6:1) (C)	SET (TY IXS= 24 IN) (RCP) (3: 1) (C)	SET (TY IXS= 24 IN) (RCP) (6: 1) (C)	REMOV STR (BOX CULVERT)	REMOV STR (PIPE)	INSTL OM ASSM (OM-2X) (WC)GND
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF	EA	EA
CULVERT 12 - STA. 678+27			1										128	2
CULVERT 13 - STA. 717+43	2											90		2
CULVERT 14 - STA. 772+54												45		2
CULVERT 15 - STA. 797+14		3		3								135		2
CULVERT 16 - STA. 821+40						6		6				180		2
CULVERT 17 - STA. 853+73												46		2
CULVERT 18 - STA. 867+89												46		2
CULVERT 19 - STA. 880+08					1							46		2
CULVERT 20 - STA. 901+09					2							45		2
CULVERT 21 - STA. 905+90					4							210		2
CULVERT 22 - STA. 938+99								3				252		2
CULVERT 23 - STA. 963+19												45		2
PROJECT TOTALS	7	3	1	5	7	6	4	13	4	6	2	2097	330	46

DITCH BLOCK SUMMARY		420 6153
		CL A CONC (DITCH INTERCEPTOR STRUCTURE)
		EA
STA. 585+59.83		1
STA. 594+85.74		1
STA. 608+90.89		1
STA. 717+25.98		1
STA. 798+34.48		1
STA. 854+14.22		1
STA. 902+28.02		1
PROJECT TOTALS		7

**US 67
SUMMARY OF
DRAINAGE ITEMS**




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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		23

SUMMARY OF PAVEMENT MARKING ITEMS											
LOCATION	533	533	666	666	666	666	666	666	668	672	672
	6001	6002	6006	6036	6048	6300	6303	6315	6083	6007	6009
	RUMBLE STRIPS (SHOULDER)	RUMBLE STRIPS (CENTER LINE)	REFL PAV MRK TY I (W) 4" (DOT) (100MIL)	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	RE PM W/RET REQ TY I (W) 4" (BRK) (100MIL)	RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	PREFAB PAV MRK TY C (W) (LNDP ARROW)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA
McCAMEY MILL & FILL SPMD 1/2	0	0	0	0	84	395	3159	3159	0	20	40
McCAMEY MILL & FILL SPMD 2/2	0	0	0	0	84	395	3159	3159	0	20	40
SPMD SHEET 1 OF 24	3862	1931	0	0	0	575	4600	4600	0	30	60
SPMD SHEET 2 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 3 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 4 OF 24	3872	1927	0	287	24	482	3872	4112	0	25	53
SPMD SHEET 5 OF 24	4000	2000	240	0	0	500	4000	4000	1	26	52
SPMD SHEET 6 OF 24	4000	2000	660	0	0	500	4000	4000	1	26	52
SPMD SHEET 7 OF 24	4000	2000	900	0	0	500	4000	4000	2	26	52
SPMD SHEET 8 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 9 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 10 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 11 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 12 OF 24	4053	1914	0	112	12	500	4000	3828	0	26	50
SPMD SHEET 13 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 14 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 15 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 16 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 17 OF 24	4000	2000	684	0	0	500	4000	4000	1	26	52
SPMD SHEET 18 OF 24	4000	2000	328	0	0	500	4000	4000	1	26	52
SPMD SHEET 19 OF 24	4000	2000	1012	0	0	500	4000	4000	2	26	52
SPMD SHEET 20 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 21 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 22 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 23 OF 24	4000	2000	0	0	0	500	4000	4000	0	26	52
SPMD SHEET 24 OF 24	400	200	45	0	0	50	400	400	0	3	5
PROJECT TOTALS	92187	45972	3869	399	204	12397	99190	99258	8	644	1288

US 67
 SUMMARY OF
 PAVEMENT MARKING
 ITEMS

SHEET 1 OF 1




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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		24

SUMMARY OF EROSION CONTROL ITEMS			
LOCATION	164 6033	506 6042	506 6043
	DRILL SEEDING (PERM) (RURAL) (SANDY)	BIODEG EROSN CONT LOGS (INSTL) (18")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	LF	LF
McCAMEY MILL & FILL SWP3 1/2	3673	320	320
McCAMEY MILL & FILL SWP3 2/2	322	30	30
SW3P SHEET 1 OF 24	9918	120	120
SW3P SHEET 2 OF 24	15388	240	240
SW3P SHEET 3 OF 24	20304	160	160
SW3P SHEET 4 OF 24	19518	160	160
SW3P SHEET 5 OF 24	21776	320	320
SW3P SHEET 6 OF 24	21776	120	120
SW3P SHEET 7 OF 24	21867	160	160
SW3P SHEET 8 OF 24	23516		
SW3P SHEET 9 OF 24	23755	320	320
SW3P SHEET 10 OF 24	23998		
SW3P SHEET 11 OF 24	23998	160	160
SW3P SHEET 12 OF 24	23020		
SW3P SHEET 13 OF 24	23529		
SW3P SHEET 14 OF 24	23998	160	160
SW3P SHEET 15 OF 24	23640	160	160
SW3P SHEET 16 OF 24	23094	160	160
SW3P SHEET 17 OF 24	23507		
SW3P SHEET 18 OF 24	23350	160	160
SW3P SHEET 19 OF 24	21580	320	320
SW3P SHEET 20 OF 24	21249	160	160
SW3P SHEET 21 OF 24	21688	160	160
SW3P SHEET 22 OF 24	21496	160	160
SW3P SHEET 23 OF 24	21539		
SW3P SHEET 24 OF 24	2028	160	160
PROJECT TOTALS	503527	3710	3710

US 67
 SUMMARY OF
 EROSION CONTROL
 ITEMS

SHEET 1 OF 1



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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		25

Material Specification Information

Grading Requirements

Item	Description	Grading Requirements				Soil		Wet
		Percent Retained - Sieves				L.L.	P.I.	Ball
		1-3/4"	7/8"	3/8"	#40	Max.	Max.	Max.
247	Type A GR 4	0-3	10-35	20-55	65-85	40	12	40

The maximum increase in material passing the number 40 sieve resulting from the wet ball mill test shall not exceed 20%.

Cure the finished section of flex base until the moisture content is at least half of the optimum moisture content or as directed by the engineer before applying the next successive course or prime coat.

There is potential for gypsum in the area and additional time may be necessary to process the subgrade and/or base material.

Contractor questions on this project will be accepted through email at the following address:

- ODA-PreLettingQuestions@txdot.gov

All contractor questions will be reviewed by the Engineer. All questions and/or responses will be posted to TxDOT's Public FTP at the following Address:

<https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/>

The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

Item 5: Control of the Work

For any structures containing bird nests, schedule all work to complete the demolition of the existing structures identified in the plans between September 15, 2022 and March 15, 2023. Failure to complete this work during the specified timeframe may cause construction delays due to environmental regulations.

The existing alignment is the control for the Contractor staking. Establish reference points for the control prior to removing the existing surface.

Use Method C for construction surveying.

In the event the finished surface does not conform to the typical sections or does not meet the required IRI, rework the non-conforming area to the limits necessary and employ additional survey control as directed.

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at <https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design>. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Item 6: Control of Materials

Restrict storage of equipment and materials to approved areas. The Engineer will not approve storage in any TxDOT yard.

Promptly and properly dispose of any waste generated from servicing equipment on the project.

Item 7: Legal Relations and Responsibilities

If access to the project is required through a new or unapproved driveway (i.e. Material source, stockpile location, field office, etc.), obtain an approved "Permit to Construct Access Driveway Facilities on Highway Right Of Way" (TxDOT Form 1058) before beginning any construction operations.

Utilities (public, private and TxDOT) exist throughout the project. Prior to any excavation, investigate to determine the utility locations within the project right of way. Contact the TxDOT Odessa Traffic Operations shop at 432-498-4690 to investigate and determine the location of any TxDOT utility that may exist within the project right of way. Exercise caution when excavating in areas where investigations have determined that utilities exist. The contractor is responsible for maintaining utility markings

No significant traffic generator events identified.

No significant traffic generator events have been identified.

As an element of ensuring public safety and convenience under Article 7.2.4, the Contractor is hereby directed to open all closed lanes and shoulder and remove all traffic control devices from any areas where work is not being actively performed unless overnight traffic control is required and approved by the engineer. Removed devices must be stored outside of the clear zones near the right of way line or removed from the right of way line entirely.

At any time during construction that a previously installed crash cushion is damaged by the traveling public and is requested to be repaired by the Engineer, the repair will be paid at the same unit cost as the original installation.

Item 8: Prosecution and Progress

The following portions of the plans may affect the Contractor's planned construction sequencing. The Contractor's attention is directed to the appropriate plan sheet or standard sheet.

- Traffic Control Plan
- Storm Water Pollution Prevention Plan
- Environmental Permit, Issues And Commitments (EPIC)
- Railroad Exhibits and/or Notes

Maintain ingress and egress to side streets and private property at all times.

Initiate the installation of Item 628 "Electrical Services" as part of the initial work sequence to allow TxDOT the lead-time necessary for coordination with utility companies to establish and provide for electrical service(s) proposed for this project.

Working days will be computed and charged in accordance with Article 8. 3.1.4. "Standard Workweek."

Incentive for early contract completion shall be based on contract administrative liquidated damage rates.

90 day lead time is needed to allow for sufficient time to obtain and produce materials needed for various bid items in this project.

Item 105: Removing Treated and Untreated Base and Asphalt Pavement

Saw cut and remove existing asphaltic pavement by an approved method.

Item 132: Embankment

For all material with a plasticity index of less than 20, use test method Tex-113-E in lieu of test method Tex-114-E for determining the percent of density.

Material quality test requirements will be waived for material excavated from the right of way on this project and utilized in embankment.

Type B embankment material shall meet testing requirements of Type A with the exception that the specification limit for PI is between 6 and 15, and no more that 15% of the total aggregate may be field sand or other uncrushed fine aggregate.

Item 247: Flexible Base

The estimated quantity of flexible base shown includes all roadways, intersecting streets and driveways. The measured area for payment will be the crown width only. The side slope tapers are not included in the measurements for the flexible base but are considered subsidiary to this item.

General Notes

Assume responsibility for the disposal of all boulders not fractured during ordinary rolling methods and those too large to be incorporated into the foundation course as approved.

Maintain moisture during compaction as directed by the Engineer. Determine the moisture content of the material in accordance with Tex-115-E or Tex-103-E as directed by the Engineer.

Item 316: Seal Coat

Apply one course surface treatment(s).

Furnish Class B aggregate for the surface course.

Do not apply asphalt cement between August 31st and May 1st unless authorized in writing.

Place a string line or other suitable marking where needed to assure smooth neat lines or as directed.

Surface treat the existing surfaced intersections, auxiliary lanes, curve widenings and widened dip sections plus any additional areas encountered during construction to conform to the existing surface. The limits are the greater of the end of the curb returns, the right of way line, or the adjacent traffic lane.

Surface treat turnouts before the roadway is treated with the second one course surface treatment.

Rates are shown in the plans.

Perform rock land and shoot test strips for each day's work at each location or as directed by the Engineer.

Provide the Engineer with this information prior to the seal coat application. Provide control that is acceptable to the Engineer for yield calculations.

Ensure that all sealed expansion joints on bridges are covered by an approved method immediately prior to seal coat application. Keep the expansion joints covered until sweeping operations are complete. This work will be paid for under Item 316 as part of surface preparation.

Wet the stockpile of aggregate prior to use.

The use of a variable rate nozzle will be required on this project as determined by the engineer.

Contractor shall provide a list of stockpile locations prior to any material placed on the job site. Contractor shall have the Engineer and Odessa District Environmental Officer approve any and all stockpile locations prior to stockpiling of aggregate or other material. Stockpile locations will not be permitted on or adjacent to landscaped and non-mow areas.

As seal coat operations are completed at each location, clean and level all stockpile locations to the satisfaction of the Engineer.

General Notes

Clean up paper, asphalt and excess rock after seal coat placement as each reference location is completed. Contractor shall not proceed ahead more than two reference locations before clean-up operations have been accomplished at the previous completed reference locations.

Contractor shall clean and remove asphalt from unauthorized concrete at the expense of the Contractor.

Item 354: Planning and Texturing Pavement

Unused planed material will become the Contractor's property. Dispose of this material in accordance with applicable Federal, State, and local regulations.

Item 400: Excavation and Backfill for Structures

Aggregate for cement stabilized backfill will be an approved material.

The addition of cement stabilized backfill under the pipe will not be required for this project. However, the Contractor will be required to shape the subgrade (trench bottom) to conform to a Class C bedding in sand or loam. If rock or rock outcrops are encountered, a Class B bedding consisting of sand or chat material will be required under the pipe.

Item 416: Drilled Shaft Foundations

For drilled shaft foundations for roadway illumination assemblies, provide Class C concrete with 6-1/2" slump for dry type placements in accordance with Table 2, Slump Requirements.

Item 420: Concrete Structures

Mass concrete will be measured in place.

Mass concrete will be paid for by the quantity shown in the plans

Item 421: Hydraulic Cement Concrete

Furnish a job site curing tank equipped with a recording thermometer with the capability to chart temperatures for 24 hours, 7 days and 30 days. Furnish the Engineer with copies of the temperature records.

Furnish disposable 4" or 6" cylinder molds and caps that meet testing tolerances.

The Engineer will provide strength testing equipment for acceptance testing.

Within seven (7) days after concrete has been placed for foundations for traffic signals, roadway illumination assemblies, or high mast illumination assemblies, provide a rub finish for exposed surfaces in accordance with Item 427, Surface Finishes for Concrete, Article 4.3.3.

Furnish Type II or IP cement.

Furnish Type II or IP cement for cast-in-place concrete.

General Notes

All plants and trucks may be inspected and approved by the Engineer in lieu of the NRMCA or Non-Department Engineer Sealed Certifications. The criteria and frequency of the Engineer approval of plants and trucks is the same used for NRMCA Certification.

Item 432: Riprap

Use approved expansion joint material and place between the proposed riprap and curb and gutter.

Reinforce all riprap on this project with no. 3 bars spaced 12 inches O.C.B.W. or no. 4 bars spaced at 18 inches O.C.B.W.

Broom finish all riprap on this project unless otherwise directed.

Polypropylene fiber may not be used in lieu of reinforcing steel.

In addition to reinforcing steel, polypropylene fiber is required at a rate of 1.5 lbs. /cy.

Item 464: Reinforced Concrete Pipe

At locations where existing culverts are cut, use Class A concrete to patch the areas at the joint between the new construction and the existing structure.

Item 467: Safety End Treatment

Provide shop drawings for pipe runners.

Item 479: Adjusting Manholes and Inlets

Raise the manholes and water valves up to finished roadway elevation, matching the finish cross-slope.

Item 502: Barricades, Signs, and Traffic Handling

Stop work immediately if any major traffic control element such as an advanced warning flashing panel or TMA or PCMS is not in good working order or control setup.

Maintain "No Center Line", "Do Not Pass" and "Pass With Care" signs until the permanent lane markings have been placed in accordance with plans.

Place orange fencing around sidewalk, wheelchair ramps and other pedestrian areas that pose a hazard to pedestrian traffic as directed.

Use Shoulder Drop-Off (CW8-9A) signs during construction when shoulder drop-off conditions are 3 inches or greater or as directed. Placement shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices".

This project has a regulatory work zone speed reduction within the project limits. The work zone speed limit is reduced from 75 mph to 45 mph. Placement of speed reduction zone signs shall comply with BC (3)-21. Speed resumption sign(s) is required at the end of a speed reduction zone.

General Notes

Place chevrons, at a minimum, on every other drum used for outsides of curves, merging tapers and shifting tapers.

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

When construction operations result in a drop-off of more than 2 inches, a 3:1 or flatter slope will be required. The slope must be constructed with a compacted material capable of supporting vehicles as approved by the Engineer. This work shall be done expeditiously during daylight hours. Flaggers and appropriate signing to safely guide traffic through the work area will be required as directed by the Engineer. This shall be considered subsidiary to Item 502.

Item 504: Field Office and Laboratory

Provide a Type D structure (asphalt mix control laboratory) adequately air conditioned and furnished with a minimum of one desk, three chairs, and one file cabinet. The structure will be provided with a 240 volt electrical service entrance. The service shall consist of a minimum of four 120 volt circuits with 20 amp breakers and no more than two grounded convenience outlets per circuit and provisions for a minimum of two 220 volt ovens with vents to the outside. The structure will have a minimum of two (2) convenience outlets per wall, and a utility sink with an adequate clean potable water supply for testing. Space heaters for heating the structure are unacceptable. Portable structures will be support blocked for stability and be tied down.

Provide a Type B structure (field office and laboratory) on the project site. The field office will not be required to be piped for water or fuel. The Contractor will not be required to furnish and install security lighting, potable water or fuel. The building will not be required to be serviced with a sewer or septic tank with connections and will not require a rest room with a toilet and lavatory. A parking area and chain link fence enclosing the field laboratory will not be required. The structure will be adequately air conditioned and furnished with a minimum of one desk, three chairs, and one file cabinet. The structure will be provided with a 240 volt electrical service entrance. The service will consist of a minimum of four 120 volt circuits with 20 amp breakers and no more than two grounded convenience outlets per circuit and provisions for a minimum of two 220 volt ovens with vents to the outside. The structure will have a minimum of two (2) convenience outlets per wall. Space heaters for heating the structure are unacceptable. Portable structures will be support blocked for stability and tied down.

Item 506: Temporary Erosion, Sedimentation, and Environmental Controls

In accordance with the Construction General Permit (CGP), erosion control and stabilization measures should be initiated as soon as practicable to include (list what our stabilization measures are – for example, replacing topsoil from windrow, erosion control blankets, seeding, etc.)

It is not anticipated that erosion control devices will be needed on this project. In the event that devices are needed, the Storm Water Pollution Prevention Plan shall consist of using the following

General Notes

Sheet: G

items and/or items as directed by the Engineer. Payment for the work may be determined in accordance with Item 4, Article 4. "Changes in the Work".

-Biodegradable Erosion Control Logs

The total disturbed area for this project is 129.57 Acres. The disturbed area in this project, all project locations in the contract, and Contractor Project Specific Locations (PSLS), within 1 mile of the project limits, for the contract will further establish the authorization requirements for storm water discharges. The department will obtain an authorization to discharge storm water from the Texas Commission On Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain any required authorization from the TCEQ for any Contractor PSLS for construction support activities on or off the right of way. When the total area disturbed for all projects in the contract and PSLS within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLS on the right of way, to the Engineer (or to the appropriate MS4 operator when on an off-state system route).

Upon acceptance of the project, all SW3P devices will become property of the State and maintenance responsibility is transferred to the State until final stabilization is attained.

When applying cement for emulsion, asphalt treatment, or any other soil stabilization, sprinkle water as needed to control cement from blowing and contaminating adjacent vegetation and waters.

Item 531: Sidewalks

Polypropylene fiber may not be used in lieu of reinforcing steel.

Item 540: Metal Beam Guard Fence

Provide steel post for this project.

Item 610: Roadway Illumination Assemblies

Changes in the locations of poles, conduit, pull boxes, or other items as shown on the plans may be made in those instances deemed necessary, or when requested by the Contractor and approved.

Item 618: Conduit

Place a single continuous piece of warning tape in accordance with this item along the entire length of each underground conduit installation. Locate warning tape approximately twelve inches above conduit as indication that a buried electrical line exists below the tape. Cement stabilized backfilled conduit is exempt from this requirement. Comply with warning tape requirements for any installation of buried conduit, including portions of conduit located outside of cement stabilized backfill.

When trenched conduit is proposed beneath roadways under construction, install conduit after grading operations have been completed and before any surfacing begins at that location.

When shown on the plans as bored conduit, install conduit by an approved directional boring method.

General Notes

Sheet: H

Maintain a minimum 24" depth from finish grade to top of conduit for conduit proposed beneath pavement.

Use an approved ditching method. Place and backfill conduit proposed beneath existing pavement in accordance with the section shown in the plans. Schedule and complete work so that all lanes open to traffic at night.

For conduit raceways that are intended to remain empty or unused, extend the lower end of conduit from the face of the foundation to a minimum of 1' beyond the edge of the foundation or the riprap apron, whichever is farthest, and use conduit cap fittings for both ends of conduit. Do not glue caps or use duct tape when capping ends of conduit raceways that are intended to remain empty. Prevent dirt and debris from entering raceways during construction by temporarily capping both ends of open raceways. Other than conduit raceways that are intended to remain unused, fit each exposed end of raceways with a bushing. Where steel raceway is used, install a ground-type bushing and connect the bushing and ground rod with a bonding jumper.

Item 620: Electrical Conductors

Note the requirements of Item 7, Article 18. Electrical Requirements, of the standard specifications.

Do not exceed four hundred and fifty feet (450') between ground boxes where conduit and conductor is used.

Item 628: Electrical Services

Initiate and complete the construction of all electrical services at the earliest possible time to facilitate lead-time required to coordinate with utility companies and establish power for the proposed electrical service(s.)

Before construction or installation of any electrical service(s) on this project, contact TxDOT Odessa Traffic Operations shop at 432-498-4690 to facilitate coordination with the appropriate energy company or companies.

Physically identify the location for each proposed electrical service on the project, and request the physical address for each proposed electrical service identified; the Engineer will provide the physical address for each respective location. Permanently mark the physical address of any proposed electrical service on the respective meter base lid. Use one of two methods for permanent marking. For the preferred method of marking, use an approved die-stamp, with a minimum 1/2" height of alpha-numeric characters and stamp physical address on meter base lid. After stamping, apply coating of zinc-rich paint to the stamped area. Do not damage meter base. Replace meter base if determined by the Engineer as damaged or unacceptable. No additional compensation will be made for replacement of meter bases in the event an unacceptable determination is made. When approved, use an alternate method of marking by providing a brass or aluminum plate tag with the physical address embossed by a machine-stamp process. Affix this tag to the meter base by a method approved by the Engineer. Provide a sample of a stamped plate tag for approval of this alternate method. The permanent physical address is required to be marked on the meter base prior to initiation of electrical service. Materials, labor, tools, equipment and incidentals necessary to complete this work will be considered as subsidiary to Item 628, "Electrical Services".

General Notes

Use materials from the Prequalified Material Producer Lists as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) Material Producer List. See TxDOT website (www.TxDOT.gov) - business > resources > material producer list - for list of prequalified manufacturers. Category is "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials found on this list."

For incidental material and parts necessary for construction of electrical services, including the service entrance weather-head, rigid metal conduit (RMC) and PVC conduit, conduit fittings, service conductors, circuit breakers, ground rods and clamps, grounding bushing(s), and mounting hardware including straps and channel brackets for conduit support, furnish products and/or materials that comply with the plans and specifications. Prior to construction of any electrical service, submit to the Engineer respective catalog cut sheets for incidental materials and parts. Electrical services constructed of materials or parts which do not comply with the plans and specifications will be cause for rejection of a portion or all of the work.

Install photocell(s) facing north when practical.

Item 644: Small Roadside Sign Assemblies

All new sign supports for stop and yield signs will have a 12" red strip of Type C High Specific Intensity Reflective tape. Place the top of the tape 4' above the edge of the roadway. This work will not be paid for directly and will be subsidiary to the pertinent bid item.

For standard small sign details and dimensions, refer to the "Standard Highway Sign Designs for Texas (SHSD)"; a supplement to the Texas Manual on Uniform Traffic Control Devices (TMUTCD)".

Locate and mark existing reference marker(s) perpendicular to the road and along the right of way, or as directed, prior to removal. Erect new reference marker(s) at the original location, upon completion of construction.

Only bolt clamp style slip bases will be allowed for sign assemblies. Set screws will not be allowed.

Item 658: Delineator and Object Marker Assemblies

Delineator and object marker assembly posts shall be composed of post-consumer recycled materials. Embedded stub shall be perforated square tubing.

Item 662: Work Zone Pavement Markings

After permanent pavement markings are placed, pull tabs from hot mix surface and/or cut off tabs flush with the pavement on seal coat surface. Remove tabs from the project and dispose of properly.

Materials used for non-removable work zone pavement markings will be paint and beads or other approved materials.

General Notes

Item 666 Retroreflectorized Pavement Markings

Type I markings shall meet the minimum retroreflectivity values defined by Article 4.4 Retroreflectivity Requirements.

This Contract totals more than 200,000 feet of pavement markings; use a mobile retroreflectometer for retroreflectivity measurements. Portable retroreflectometers may not be used for this Contract.

Place Type I pavement markings with a ribbon-gun application.

Measure thickness for markings in accordance with Tex-854-B using usage rates (Part II).

Item 668: Prefabricated Pavement Markings

Do not tab or use existing RR pavement markings for placement of proposed RR pavement marking; place proposed RR pavement markings in accordance with standard RCD(1)-16 and RCD(2)-16.

Item 672: Raised Pavement Markers

Do not place raised pavement markers until the micro-surfacing has cured a minimum of 48 hours.

Item 677: Eliminating Existing Pavement Markings and Markers

Submit eliminating plan for approval by the Engineer in accordance with Item 677.

Item 3077: Superpave Mixtures

Binder:

Provide a binder that has a Performance Grade of 70 -22 (PG 70 - 22) for the SP-B SAC-B PG70-22 mix.

Aggregate quality:

Furnish Class B aggregate for the Type SP-B SAC-B PG70-22 mix.

Furnish aggregates for the shoulders and/or ramps that meet project SAC requirements.

Magnesium sulfate soundness loss will not be greater than 20 percent when Class A aggregate is required.

Mixture design:

Design a mixture with a gradation that has stone on stone contact and passes below the reference zone.

Test method Tex-530-C (Boil Test) will not be required.

General Notes

Sheet: K

Placement:

Semi-trailer type vehicles are prohibited from dumping directly into the finishing machine for the finished surface unless the trailer is equipped with an auger slatted chain or another approved conveyor.

No RAP will be allowed in the surface course.

No more than 10% RAP will be allowed in non-surface courses.

No RAS will be allowed.

Mineral filler will not be allowed.

Lime will not be allowed as an anti-stripping agent.

Field sand will not be allowed.

Item 3080: Stone-Matrix Asphalt

Binder:

Provide a binder that has a Performance Grade of 70 - 22 (PG 70 - 22) for the STONE-MTRX-ASPH SMAR-F SAC-A mix.

Furnish Type I asphalt-rubber binder containing Grade C rubber.

Aggregate quality:

Provide Class A aggregate. Blending of SAC A and SAC B material will not be allowed for the coarse aggregate.

Magnesium sulfate soundness loss will not be greater than 20 percent when Class A aggregate is required.

Mixture design:

Test method Tex-530-C (Boil Test) will not be required.

Placement:

Semi-trailer type vehicles are prohibited from dumping directly into the finishing machine for the finished surface-unless the trailer is equipped with an auger slatted chain or another approved conveyor.

No RAP will be allowed in the surface course.

No more than 10% RAP will be allowed in non-surface courses.

No RAS will be allowed.

General Notes

Sheet: L

Mineral filler will not be allowed.

Lime will not be allowed as an anti-stripping agent.

Field sand will not be allowed.

Item 6001: Portable Changeable Message Sign

PCMS shall be placed in operation a minimum of one (1) week prior to construction. Location(s) and duration for PCMS shall be as directed by the Engineer;

Item 6185: Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

General Note 5 of TCP (2-1)-18 provides for additional shadow vehicle(s) with truck mounted attenuator (TMA); one (1) additional shadow vehicle with TMA is included in the basis of estimate for this operation. The shadow vehicle(s) with TMA specified on the traffic control plan as “required” plus the ‘additional shadow vehicle’ is the quantity that has been estimated for this operation.

General Note 8 of TCP (2-3)-18 provides for additional shadow vehicle(s) with truck mounted attenuator (TMA); one (1) additional shadow vehicle with TMA is included in the basis of estimate for this operation. The shadow vehicle(s) with TMA specified on the traffic control plan as “required” plus the ‘additional shadow vehicle’ is the quantity that has been estimated for this operation.

General Note 4 of TCP (2-5)-18 provides for additional shadow vehicle(s) with truck mounted attenuator (TMA); one (1) additional shadow vehicle with TMA is included in the basis of estimate for this operation. The shadow vehicle(s) with TMA specified on the traffic control plan as “required” plus the ‘additional shadow vehicle’ is the quantity that has been estimated for this operation.

Basis of Estimate for Stationary TMAs				
		TMA (Stationary)		
Phase	Standard	Required	Optional	TOTAL
1A and 1B	TCP (2-3)-18	1	0	1
2	TCP (2-1)-18	1	0	1
3	TCP (2-3)-18	1	0	1
4	TCP (2-5)-18	1	0	1
6	TCP (2-1)-18	2	0	2

There are no General Notes for additional shadow vehicle(s) with truck mounted attenuator (TMA) on TCP (3-1)-13; the shadow vehicle(s) with TMA specified on the traffic control plan as “required” is the quantity that has been estimated for this operation.

There are no General Notes for additional shadow vehicle(s) with truck mounted attenuator (TMA) on TCP (3-3)-14; the shadow vehicle(s) with TMA specified on the traffic control plan as “required” is the quantity that has been estimated for this operation.

Basis of Estimate for Mobile TMAs			
		TMA (Mobile Operation)	
Standard	Required	Optional	TOTAL
TCP (3-1)-13	2	0	2
TCP (3-3)-14	2	0	2

The Contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

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PHASE 1, STEP A: CULVERT REPLACEMENT (FIRST SIDE)*
PHASE 1, STEP B: CULVERT REPLACEMENT (SECOND SIDE)**

PLACE PROJECT LIMIT SIGNING AS DESCRIBED IN TCP ADVANCE SIGNS LAYOUT, TCP WORKZONES, AND STANDARDS BC(2)-14 AND BC(3)-14.

PLACE SWP3 IN ACCORDANCE WITH SWP3 LAYOUT PER TCP(2-1a)-18. VERIFY SWP3 LOCATIONS WITH ENGINEER PRIOR TO PLACEMENT.

PLACE PORTABLE TRAFFIC BARRIER AND OTHER TRAFFIC CONTROL DEVICES AS PER TCP PHASE LAYOUT FOR PHASE 1 AND TCP (2-8b)-18. EACH US 67 CROSS CULVERT REPLACEMENT MUST HAVE THE TAPERS, CHANNELIZATION, AND SIGN DETAILS OF TCP (2-8b)-18. ONE PAIR OF MOBILE TRAFFIC SIGNALS SHALL BE USED AT EACH CULVERT LOCATION; DO NOT IMPLEMENT TCP (2-8b)-18 TO ENCOMPASS MORE THAN ONE CULVERT LOCATION.

EXCAVATE AND PLACE TEMPORARY SPECIAL SHORING AS SHOWN IN TCP CULVERT TSS DETAIL SHEET.

REPLACE STRUCTURE AS PER CULVERT LAYOUTS. TO MAINTAIN POSITIVE DRAINAGE, THE SIDES OF CULVERTS TO BE REPLACED IN PHASE 1 STEP A AND STEP B ARE LISTED BELOW.

BACKFILL EXCAVATION AND PROOF ROLL AS DIRECTED BY THE ENGINEER. REFER TO CULVERT TSS DETAIL SHEET FOR STRUCTURAL EXCAVATION QUANTITIES.

PLACE PROPOSED PAVEMENT STRUCTURE AS SHOWN IN TCP TYPICAL SECTIONS PHASE 1, DETAILS A AND B.

TREAT EDGE CONDITIONS AND PLACE WK ZN PAV MRK PRIOR TO SHIFTING TRAFFIC. REFER TO TREATMENT FOR VARIOUS EDGE CONDITIONS SHEET.

CONTRACT TIME DETERMINATION ASSUMES THE FOLLOWING:
 - CONCURRENTLY REPLACE ALL CULVERTS WITHIN EACH OF THE 3 MILE WORKZONES AS SHOWN ON TCP WORKZONES AND BELOW.*** ADJACENT CULVERTS IN CLOSE PROXIMITY SHALL NOT BE CONSTRUCTED SIMULTANEOUSLY IF TRAFFIC CONTROL DEVICES OVERLAP.
 - PHASE 2 WILL BEGIN PRIOR TO COMPLETION OF ALL PHASE 1 STEPS A AND B ITEMS OF WORK.

***CULVERT REPLACEMENT GROUPS	*STEP A	*STEP B
WORKZONE 2 CULVERTS: 143, 144, 146, 147, 155, 157, 158, 161, 163	FIRST REPLACE NORTH SIDE OF CULVERT: CULVERT 143 CULVERT 144 CULVERT 146 CULVERT 147 CULVERT 155 CULVERT 157 CULVERT 158 CULVERT 163 CULVERT 171 CULVERT 173 CULVERT 178 CULVERT 180 CULVERT 181 CULVERT 183 CULVERT 187	FIRST REPLACE SOUTH SIDE OF CULVERT: CULVERT 167 CULVERT 175 CULVERT 177 CULVERT 184 CULVERT 186
WORKZONE 3 CULVERTS: 167, 168, 169, 171, 173, 175	SECONDLY REPLACE NORTH SIDE OF CULVERT: CULVERT 167 CULVERT 175 CULVERT 177 CULVERT 184 CULVERT 186	SECONDLY REPLACE SOUTH SIDE OF CULVERT: CULVERT 143 CULVERT 144 CULVERT 146 CULVERT 147 CULVERT 155 CULVERT 157 CULVERT 158 CULVERT 163 CULVERT 171 CULVERT 173 CULVERT 178 CULVERT 180 CULVERT 181 CULVERT 183 CULVERT 187

PHASE 2: SUPER 2 ROADWAY WIDENING (NORTH SIDE)

PLACE TRAFFIC CONTROL DEVICES AS SHOWN FOR PHASE 2 IN THE TCP PHASE LAYOUT SHEET. REFER TO TCP (2-1)-18 FOR TAPERS, CHANNELIZATION, AND SIGN DETAILS.

WIDEN SUBGRADE, PLACE EMBANKMENT, AND PROOF ROLL AS DIRECTED BY ENGINEER.

PLACE PROPOSED AND TEMPORARY PAVEMENT STRUCTURES AS SHOWN IN TCP TYPICAL SECTIONS PHASE 2, DETAILS C AND D.

RECONSTRUCT DRIVEWAYS AND INTERSECTIONS ON NORTH SIDE AS SHOWN ON THE DRIVEWAY DETAILS SHEET AND INTERSECTION STUB DETAILS SHEET. KEEP HALF OF DRIVEWAY OR INTERSECTING APPROACH OPEN AT ALL TIMES.

INSTALL MBGF AND SGTS ON NORTH SIDE.

TREAT EDGE CONDITIONS AND PLACE WK ZN PAV MRK PRIOR TO SHIFTING TRAFFIC. REFER TO TREATMENT FOR VARIOUS EDGE CONDITIONS SHEET.

PHASE 3: SUPER 2 ROADWAY WIDENING & HMAC SP-B (SOUTH SIDE)

PLACE TRAFFIC CONTROL DEVICES AS SHOWN FOR PHASE 3 IN THE TCP PHASE LAYOUT SHEET. REFER TO TCP (2-3)-18 FOR TAPERS, CHANNELIZATION, AND SIGN DETAILS.

WIDEN SUBGRADE AND PLACE EMBANKMENT.

PLACE PROPOSED AND TEMPORARY PAVEMENT STRUCTURES AS SHOWN IN TCP TYPICAL SECTIONS PHASE 3, DETAILS E THROUGH G.

RECONSTRUCT DRIVEWAYS AND INTERSECTIONS ON SOUTH SIDE AS SHOWN ON THE DRIVEWAY DETAILS SHEET AND INTERSECTION STUB DETAILS SHEET. KEEP HALF OF DRIVEWAY OR INTERSECTING APPROACH OPEN AT ALL TIMES.

INSTALL MBGF AND SGTS ON SOUTH SIDE.

TREAT EDGE CONDITIONS AND PLACE WK ZN PAV MRK PRIOR TO SHIFTING TRAFFIC. REFER TO TREATMENT FOR VARIOUS EDGE CONDITIONS SHEET.

PHASE 4: TEMPORARY WIDENING REMOVAL & SUPER 2 HMAC SP-B (NORTH SIDE)

PLACE TRAFFIC CONTROL DEVICES AS SHOWN FOR PHASE 4 IN THE TCP PHASE LAYOUT SHEET. REFER TO TCP (2-3)-18 FOR TAPERS, CHANNELIZATION, AND SIGN DETAILS.

SUBSIDIARY TO BID ITEM 134, SCARIFY THE TEMPORARY WIDENING PAVEMENT STRUCTURE AND INCORPORATE INTO THE TYPE B BACKFILLED PAVEMENT EDGE (NORTH SIDE). GRADE 6:1 FINAL FRONT SLOPE.

PLACE PROPOSED PAVEMENT STRUCTURES AS SHOWN IN TCP TYPICAL SECTIONS PHASE 4, DETAILS J & K.

PHASE 5: TEMP. WIDENING REMOVAL (SOUTH SIDE) & SUPER 2 SMAR-F

INSTALL FINAL SURFACE SMAR-F AS SHOWN IN TCP TYPICAL SECTIONS PHASE 5 AND PER TCP (3-1a)-13.

INSTALL FINAL STRIPING AND SIGNS AS PER TCP (3-1a)-13 AND TCP (3-3a)-14.

SUBSIDIARY TO BID ITEM 134, SCARIFY THE TEMPORARY WIDENING PAVEMENT STRUCTURE AND INCORPORATE INTO THE TYPE B BACKFILLED PAVEMENT EDGE (NORTH SIDE) AS PER TCP(2-1)-18. GRADE FINAL FRONT SLOPE.

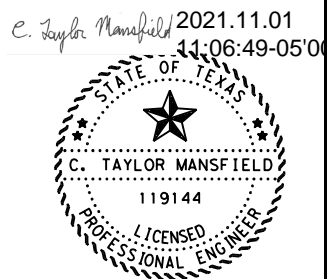
PHASE 6: ILLUMINATION INSTALLATIONS & FINAL CLEAN UP

COMPLETE ITEMS OF WORK AS SPECIFIED IN ILLUMINATION SHEETS AS PER TCP (2-1)-18.

PROVIDE FINAL CLEAN UP FOR LIMITS OF SUPER 2 SEGMENT. FINAL CLEAN UP MUST BE ACCEPTED BY THE ENGINEER.

NOTES:

- ① PH. 2 MAY BEGIN IN WORKZONE 2 PRIOR TO COMPLETION OF PH. 1 STEPS A AND B.
- ② FOR PHASE 1 THROUGH PHASE 4, USE 3-MILE LENGTH WORKZONES AS SHOWN IN SHEET FOR TCP WORKZONES.
- ③ SEE SHEET FOR TCP WORKZONES FOR ADDITIONAL INFORMATION, INCLUDING WORK ZONE SPEED LIMITS.



US 67
TCP
PHASE NARRATIVE:
SUPER 2 SEGMENT

SHEET 1 OF 1

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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST		COUNTY	SHEET NO.
ODA		UPTON	27

DATE: 10/22/2021 04:07 PM
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① PHASE 7: MILL AND FILL IN MCCAMEY CITY LIMITS (NORTH SIDE)

CLOSE THE TWO LANES ON THE NORTH HALF OF US 67 AND SHIFT TRAFFIC TO THE SOUTH EDGE OF PAVEMENT AS SHOWN IN DETAIL A: MCCAMEY MILL AND FILL TCP LAYOUT AND PER STANDARD TCP(2-3)-18.

REMOVE EXISTING ACP AND REFINISH PER PROJECT TYPICAL SECTIONS. TREAT EDGE CONDITIONS PER SHEET TREATMENT FOR VARIOUS EDGE CONDITIONS.

INSTALL HMAC SP-B PER PROJECT TYPICAL SECTIONS.

PHASE 8: MILL AND FILL IN MCCAMEY CITY LIMITS (SOUTH SIDE)

CLOSE THE TWO LANES ON THE SOUTH HALF OF US 67 AND SHIFT TRAFFIC TO THE NORTH EDGE OF PAVEMENT AS SHOWN IN DETAIL A: MCCAMEY MILL AND FILL TCP LAYOUT AND PER STANDARD TCP(2-3)-18.

REMOVE EXISTING ACP AND REFINISH PER PROJECT TYPICAL SECTIONS. TREAT EDGE CONDITIONS PER SHEET TREATMENT FOR VARIOUS EDGE CONDITIONS.

INSTALL HMAC SP-B PER PROJECT TYPICAL SECTIONS.

PHASE 9: INSTALL SMAR-F, FINAL PAVEMENT MARKINGS, AND CURB RAMPS

INSTALL FINAL SURFACE SMAR-F AS SHOWN IN PROJECT TYPICAL SECTIONS PER TCP (3-1a)-13.

INSTALL FINAL PAVEMENT MARKINGS AS SHOWN IN PROJECT SIGNING AND STRIPING SHEETS PER TCP (3-1a)-13 AND TCP (3-3a)-14.

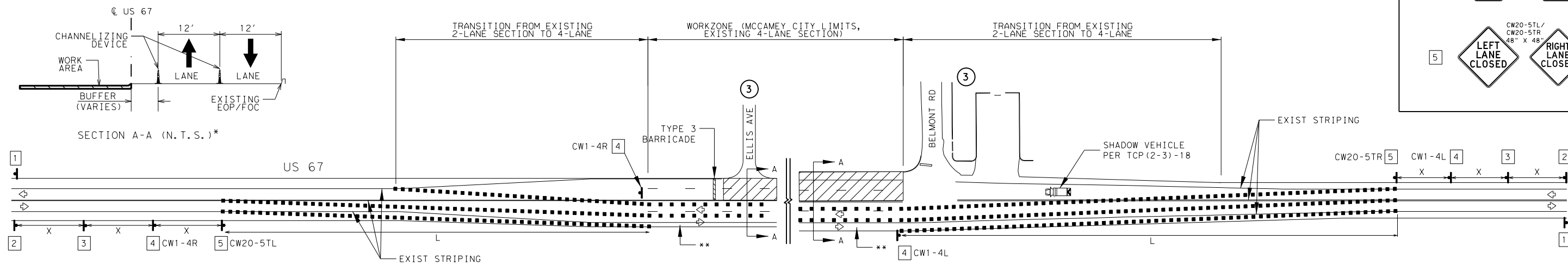
INSTALL CURB RAMPS AS SHOWN IN PROJECT PLAN AND PROFILE SHEETS PER TCP (2-1a)-18.

NOTES:

- ① MCCAMEY SEGMENT CONSTRUCTION (WORKZONE 1) MAY BE MOVED TO EARLIER PHASES OF THE PROJECT WITH ENGINEER'S APPROVAL.
- ② WORK ZONE SPEED LIMITS TO BE IMPLEMENTED AS DESCRIBED IN SHEET FOR TCP WORKZONES.
- ③ ENSURE ACCESS TO DRIVEWAYS AND INTERSECTING STREETS IS PROVIDED AT ALL TIMES. INSTALL CROSSROAD SIGNS PER BC(2)-14 FOR US 385/FM 305. FLAGGERS SHALL BE USED TO CONTROL TRAFFIC ON THE SIDE STREETS DURING INTERSECTION CONSTRUCTION.

LEGEND:

- ■ ■ CHANNELIZING DEVICES
- 1 END ROAD WORK G20-2 48" X 24"
- 2 ROAD WORK AHEAD CW20-1D 48" X 48" (Flags Required)
- 3 DO NOT PASS R4-1 24" X 30"
- 4 45 MPH CW13-1P 24" X 24" 45 MPH CW1-4R/CW1-4L 48" X 48"
- 5 LEFT LANE CLOSED CW20-5TL/CW20-5TR 48" X 48" RIGHT LANE CLOSED

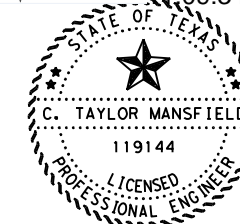


*REVERSE TEMPORARY TRAFFIC LANES TO THE NORTH EDGE OF PAVEMENT FOR PHASE 8

** SHOULDER TO BE USED FOR TEMP TRAVEL LANE AS SHOWN IN SECTION A-A

DETAIL A: MCCAMEY MILL AND FILL TCP LAYOUT *
N. T. S.

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11:09:34-05'00"



**US 67
TCP
PHASE NARRATIVE:
MCCAMEY SEGMENT**

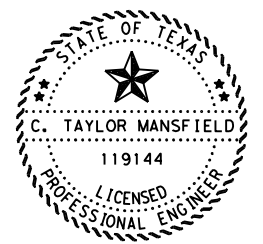
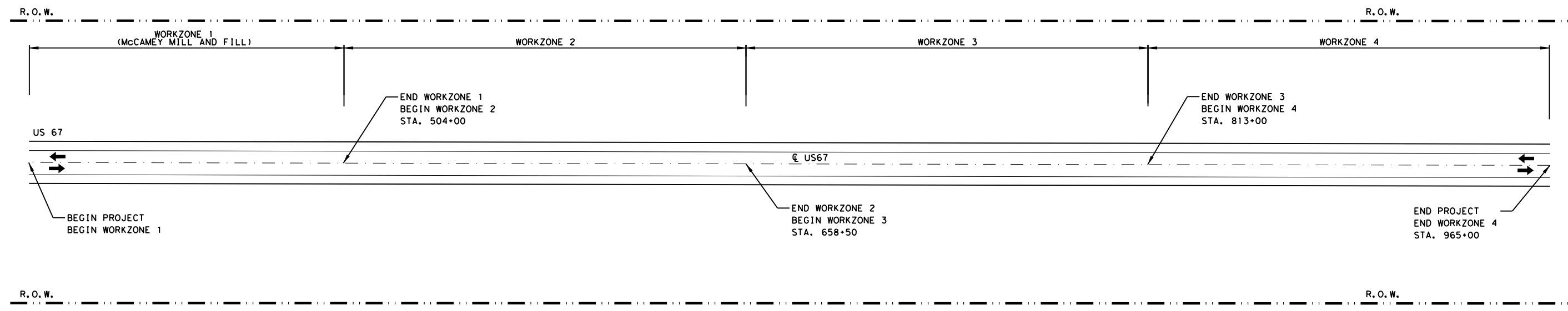
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY	SHEET NO.	
ODA	UPTON	28	

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DWG: []
 CHK: []
 DWF: []
 CJK: []

- NOTES:**
- ① PH. 2 MAY BEGIN IN WORKZONE 2 PRIOR TO COMPLETION OF PH. 1.
 - ② BEGIN PHASE 2 AT WORKZONE 2, AND SEQUENTIALLY PROCEED THROUGH PHASES 3 AND 4 WITHIN ONE WORKZONE AT A TIME. ALL ITEMS OF WORK FOR PHASES 2 THROUGH 4 MUST BE COMPLETED PRIOR TO PROCEEDING TO THE NEXT WORKZONE. SEQUENCE THROUGH WORKZONES 2 THROUGH 4 IN NUMERIC ORDER.
 - ③ SEE NOTE 1 ON TCP PHASE NARRATIVE: MCCAMEY SEGMENT FOR MORE INFORMATION ON WORKZONE 1.
 - ④ WORK ZONE SPEED LIMIT OF 60 MPH TO BE IMPLEMENTED THROUGHOUT PROJECT LIMITS AT ALL TIMES EXCEPT WITHIN MCCAMEY, WHERE ALL EXISTING SPEED LIMITS LESS THAN 60 MPH SHALL REMAIN IN PLACE. ADDITIONALLY, IMPLEMENT WORK ZONE SPEED LIMIT OF 45 MPH WITHIN ALL 3-MILE WORKZONES WITH ACTIVE CONSTRUCTION. SIGNS TO BE INSTALLED PER STANDARD BC(3)-14.



C. Taylor Mansfield 2021.11.01
11:12:28-05'00"

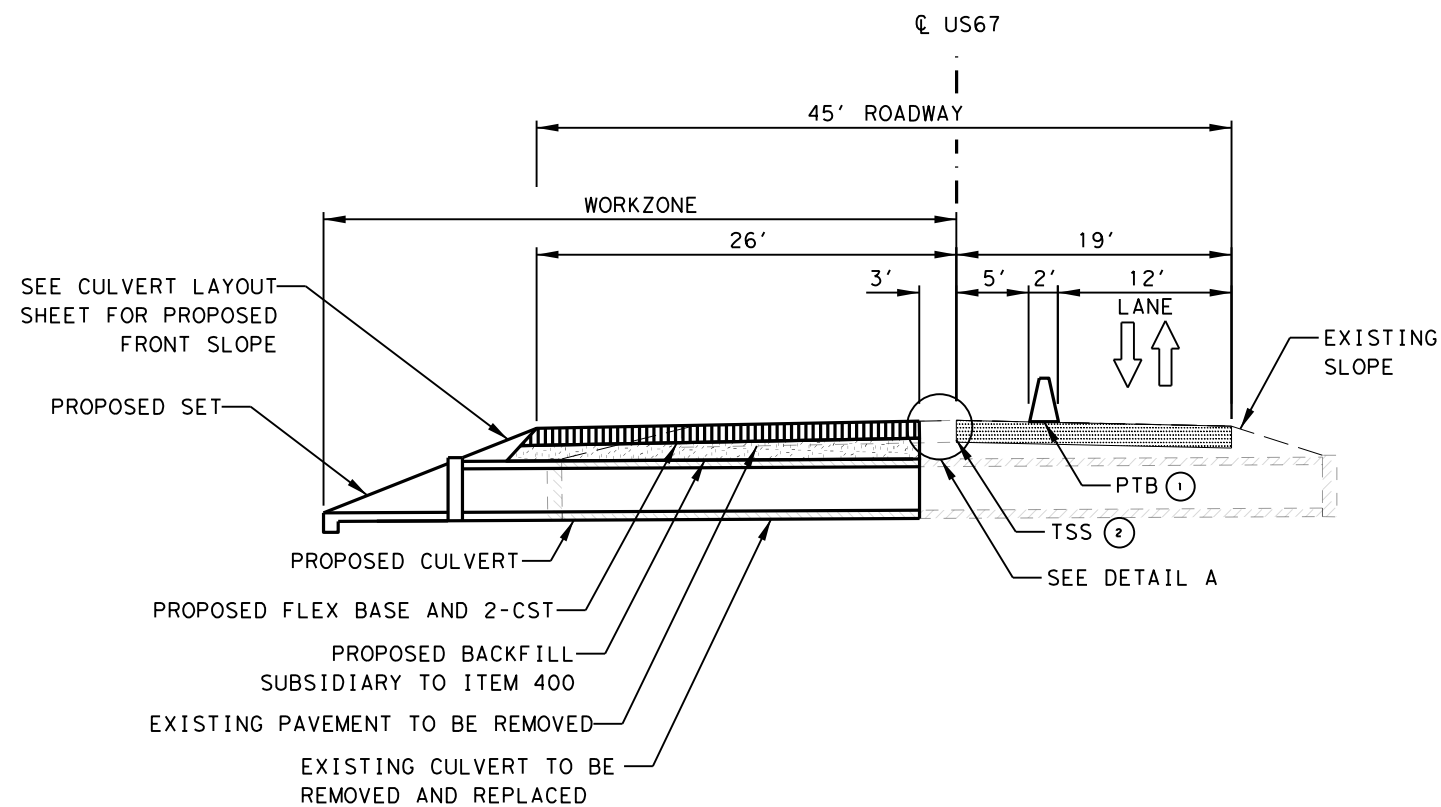
**US 67
TCP
WORKZONES**

N. T. S. SHEET 1 OF 1

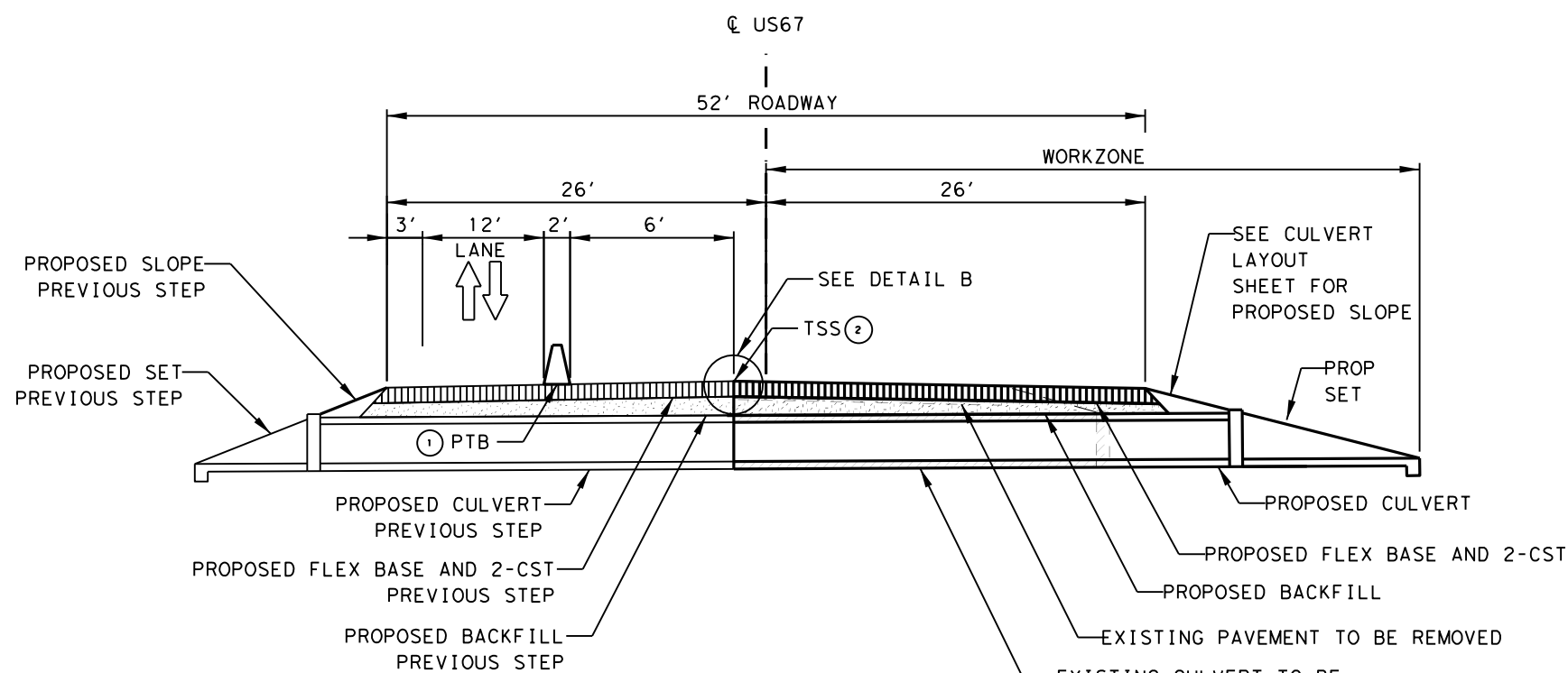


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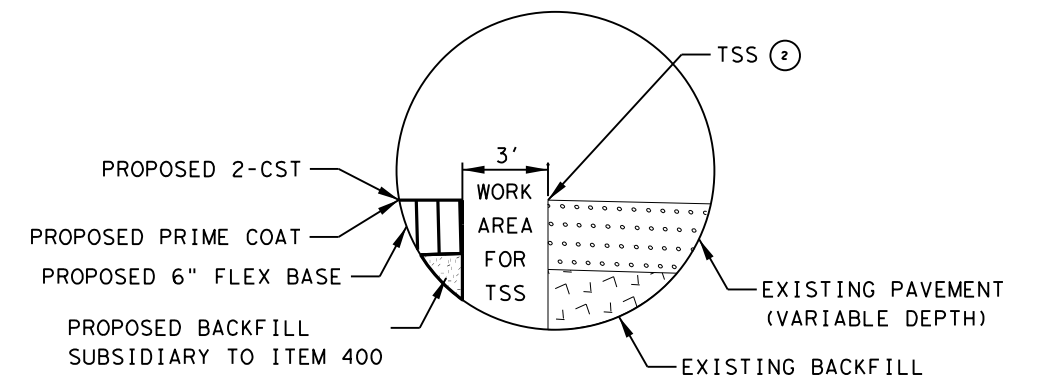
**PHASE 1, STEP A:
CULVERT REPLACEMENT**



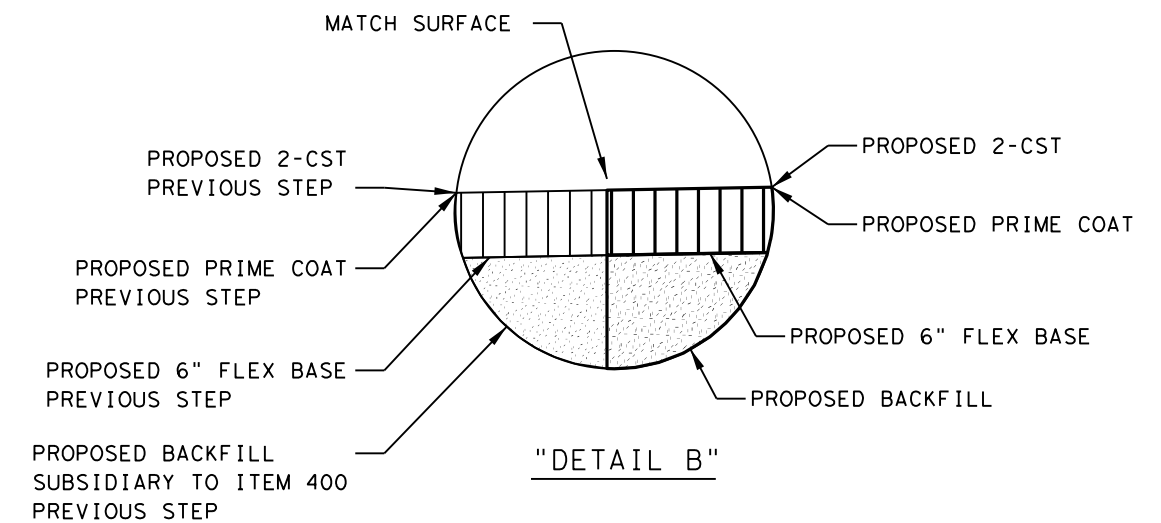
**PHASE 1, STEP B:
CULVERT REPLACEMENT**

NOTES:

- ① SEE "CRASH CUSHION SUMMARY" SHEET FOR PTB AND CRASH CUSHION ATTENUATOR LENGTH AND PLACEMENT.
- ② SEE "TCP CULVERT TSS DETAIL" SHEET AND "TCP PHASE LAYOUT" SHEETS FOR MORE INFORMATION.
- ③ SEE "BC STANDARD" FOR CHANNELIZATION SELECTION.
- ④ SEE DETAILS A AND B BELOW FOR PAVEMENT SECTION.

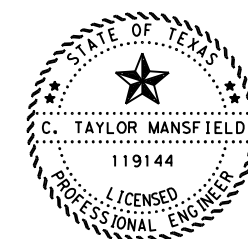


"DETAIL A"



"DETAIL B"

**US 67
TCP
TYPICAL SECTIONS**

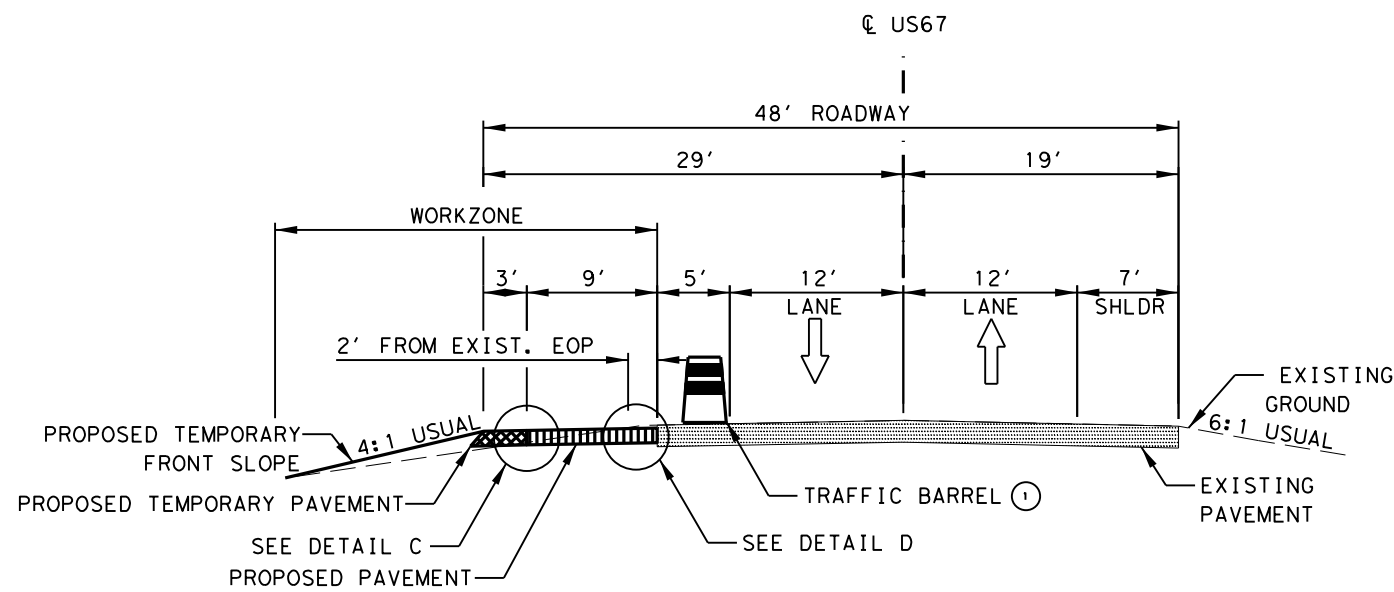


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N. T. S. SHEET 1 OF 5

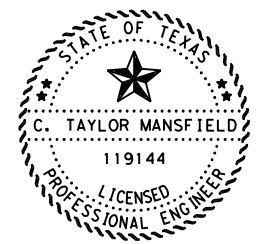
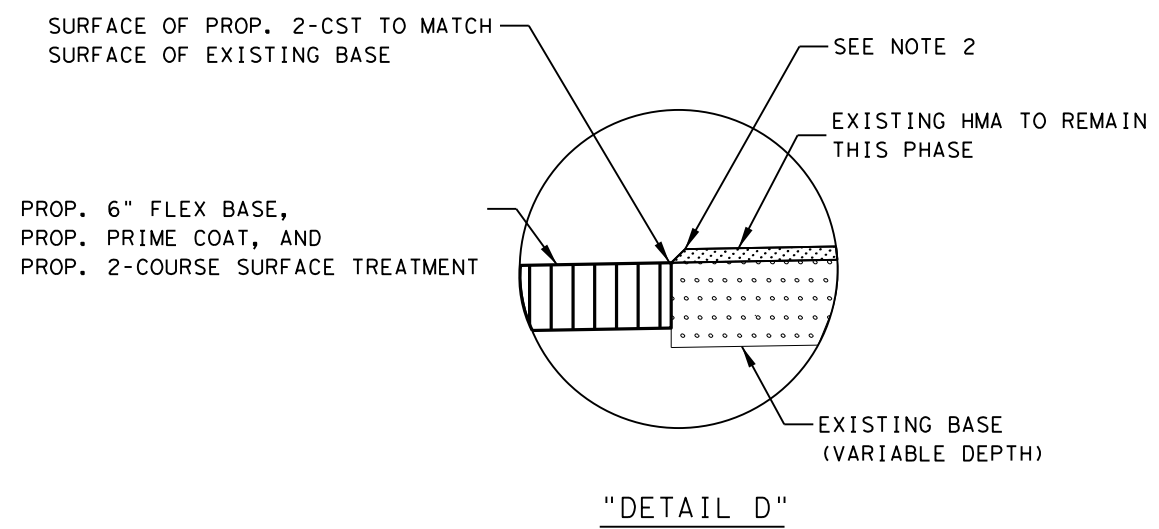
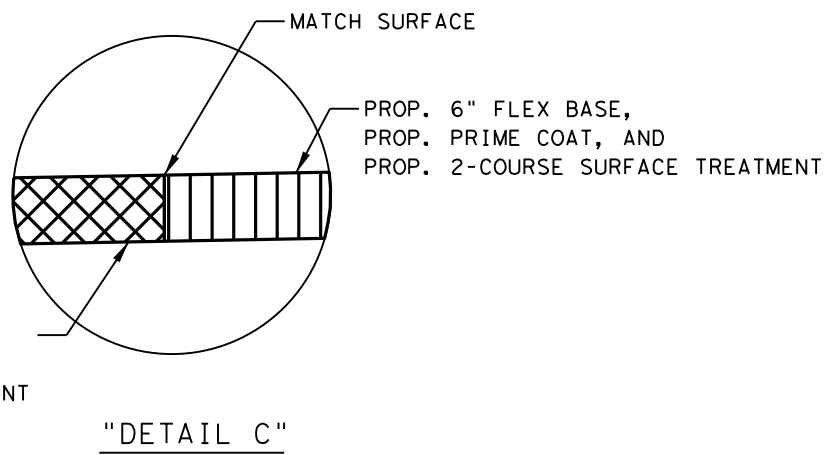
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**PHASE 2:
 ROADWAY WIDENING (NORTH SIDE)**

- NOTES:
- ① SEE "BC STANDARD" FOR CHANNELIZATION SELECTION.
 - ② MILL EXISTING ASPHALT OVERLAY AS NECESSARY TO ENSURE PAVEMENT DROP OFF COMPLIES WITH SHEET "WORKSHEET FOR EDGE CONDITION TREATMENT TYPES".
 - ③ SEE DETAILS C AND D BELOW FOR PAVEMENT SECTION



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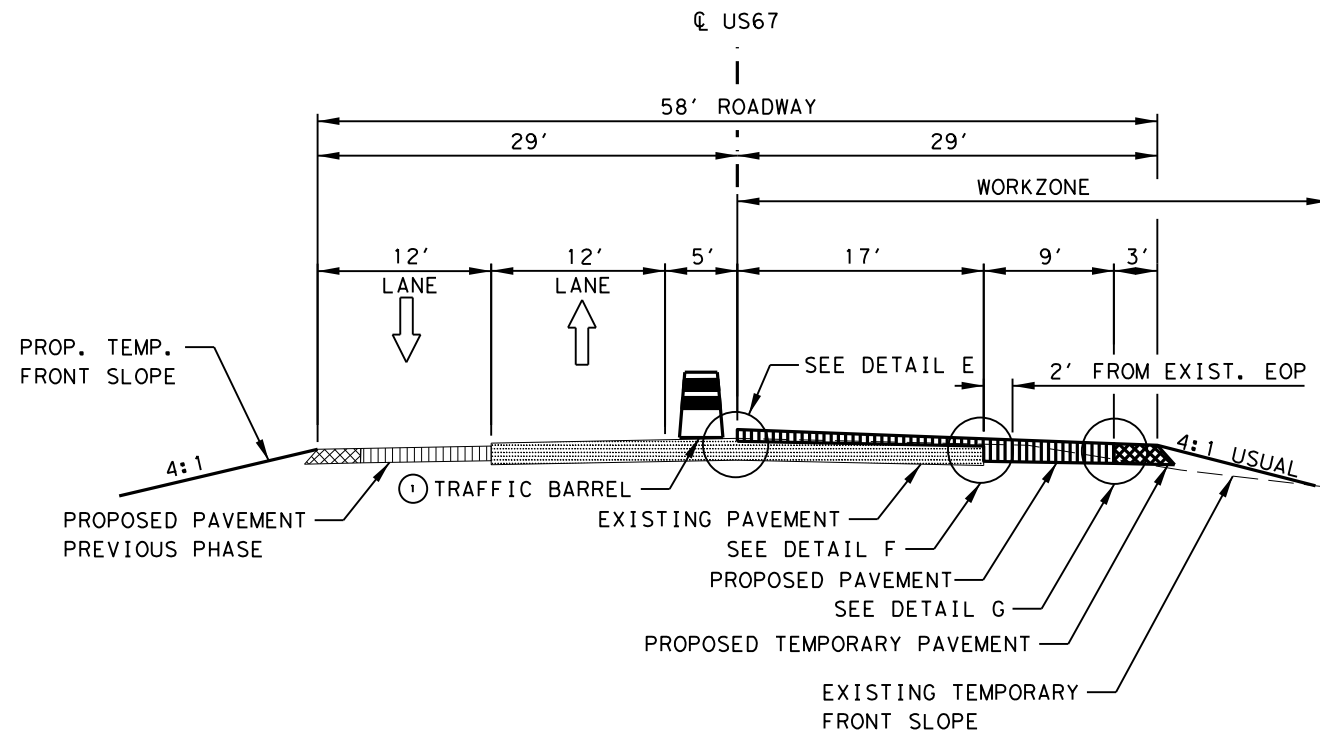
**US 67
 TCP
 TYPICAL SECTIONS**

N. T. S. SHEET 2 OF 5

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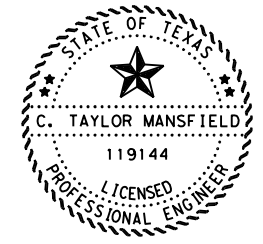
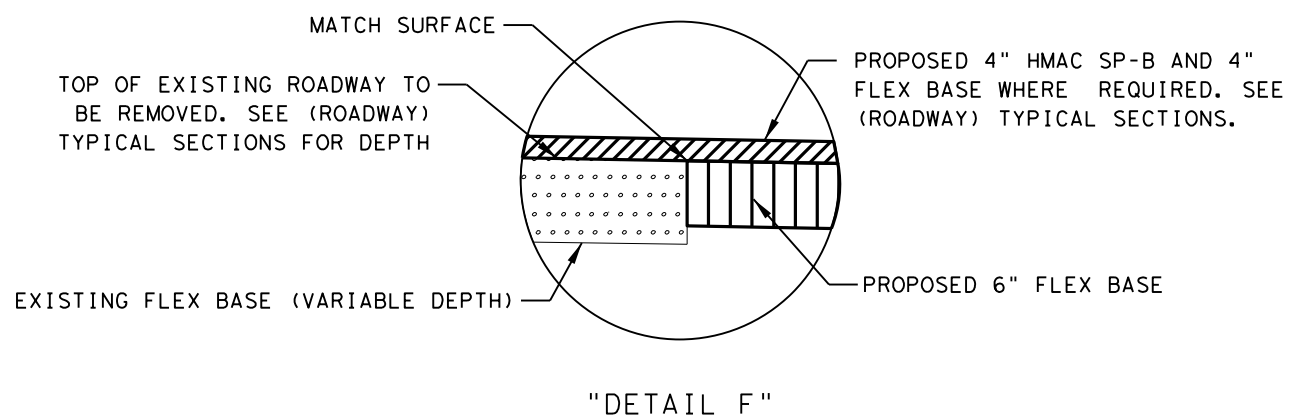
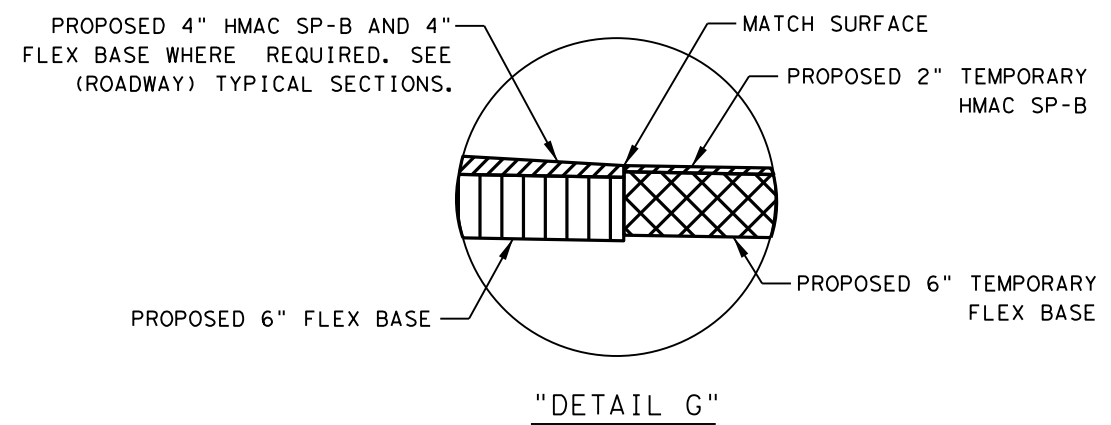
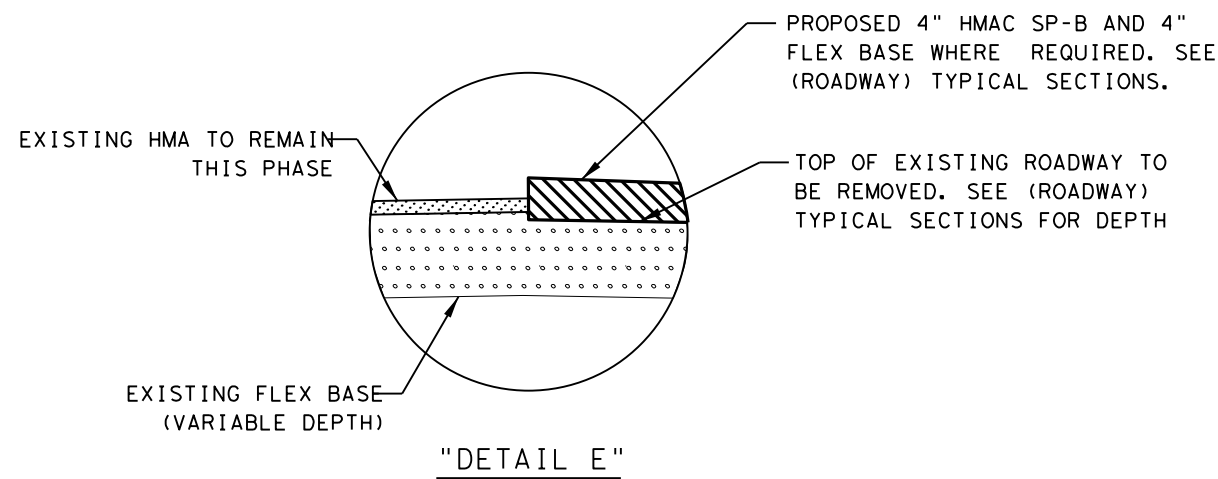
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PHASE 3:
 ROADWAY WIDENING & HMAC SP-B (SOUTH SIDE)

- NOTES:
- ① SEE "BC STANDARD" FOR CHANNELIZATION SELECTION.
 - ② LANE SHIFTS TO BE INSTALLED IN ACCORDANCE WITH STANDARD TCP(2-3)-18 AS NECESSARY TO ALIGN LANES ON BRIDGE APPROACHES WITH LANES ON BRIDGE, AND TO ALIGN LANES ACROSS CULVERT WITH LANES ON APPROACHING ROADWAY.
 - ③ SEE DETAILS E, F, AND G BELOW FOR PAVEMENT SECTIONS.



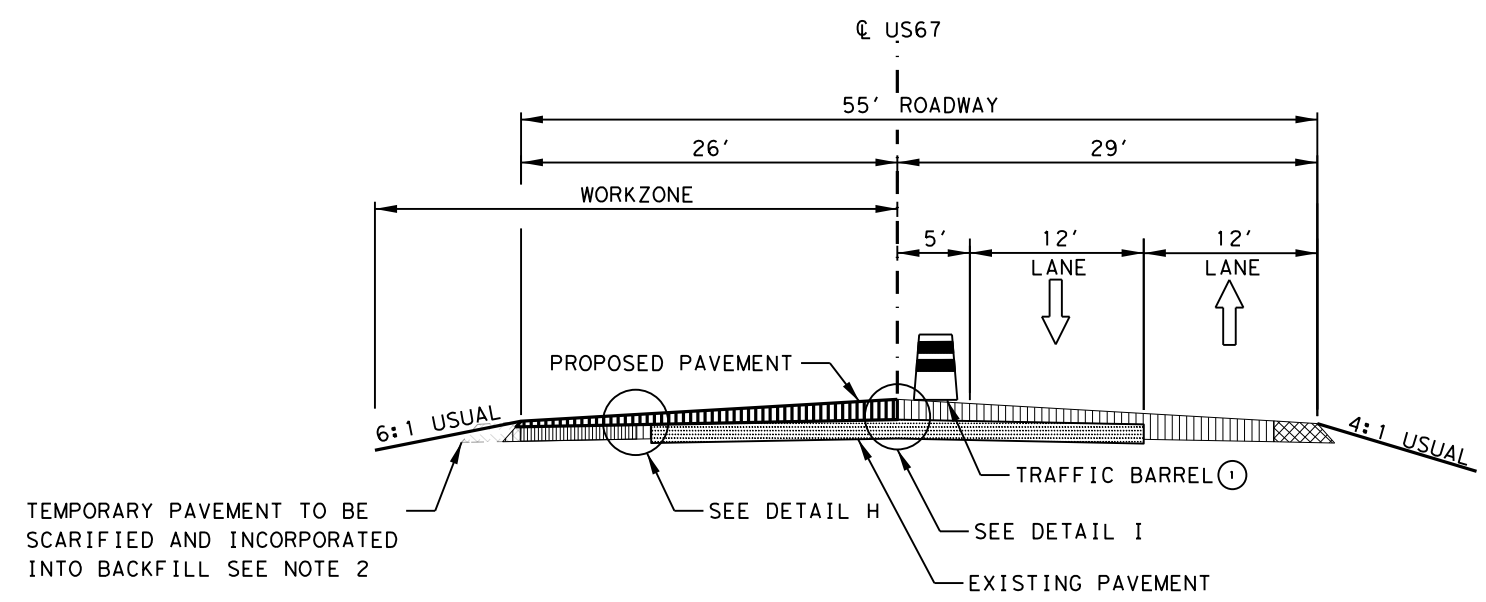
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US 67
 TCP
 TYPICAL SECTIONS

N. T. S. SHEET 3 OF 5

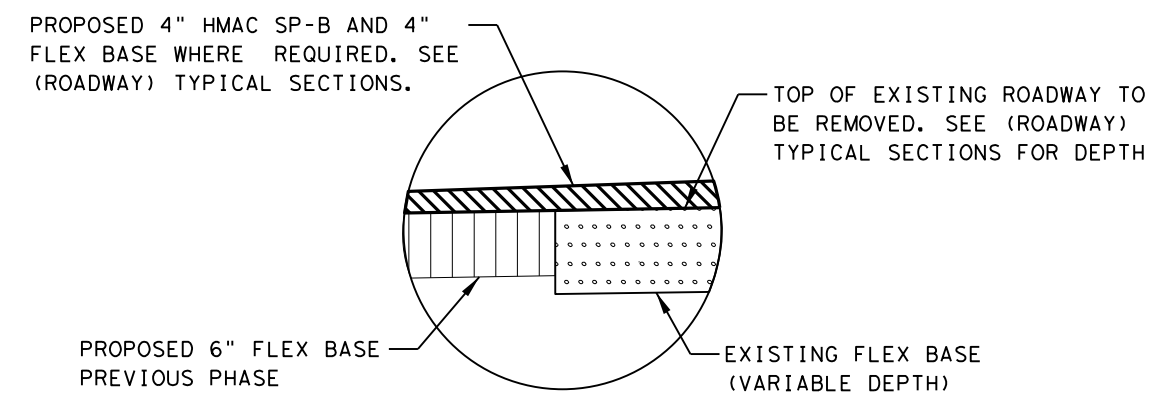
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ODA	UPTON		32

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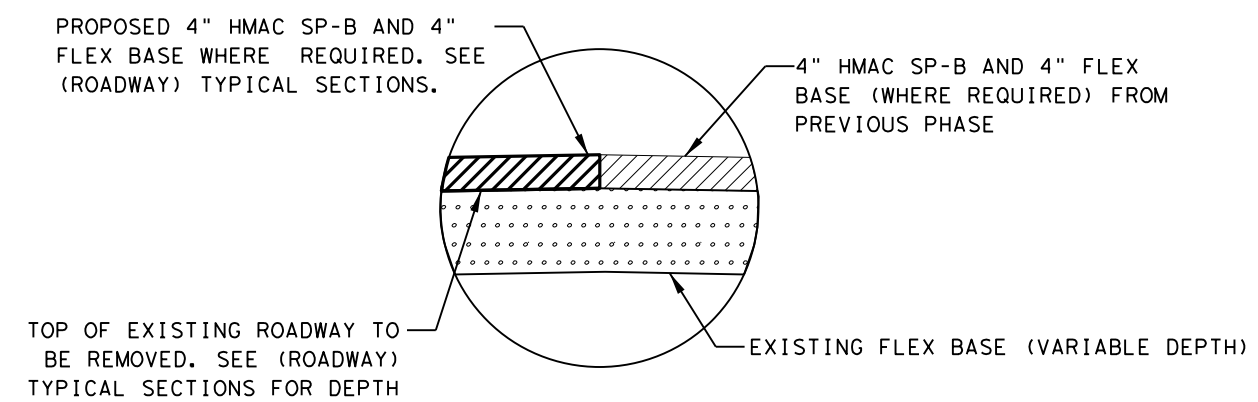


PHASE 4:
TEMPORARY WIDENING REMOVAL & HMAC SP-B (NORTH SIDE)

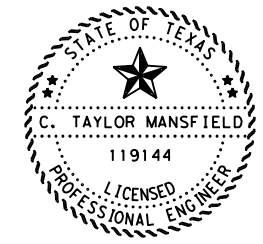
- NOTES:
- ① SEE "BC STANDARD" FOR CHANNELIZATION SELECTION.
 - ② PAVEMENT EDGE TO BE BACKFILLED USING SCARIFIED TEMPORARY PAVEMENT REMOVED THIS PHASE. IN ADDITION, INSTALL EMBANKMENT AS INDICATED IN PROPOSED TYPICAL SECTIONS.
 - ③ LANE SHIFTS TO BE INSTALLED IN ACCORDANCE WITH STANDARD TCP(2-3)-18 AS NECESSARY TO ALIGN LANES ON BRIDGE APPROACHES WITH LANES ON BRIDGE, AND TO ALIGN LANES ACROSS CULVERT WITH LANES ON APPROACHING ROADWAY.
 - ④ SEE DETAILS H AND I FOR PAVEMENT SECTION.



"DETAIL H"



"DETAIL I"



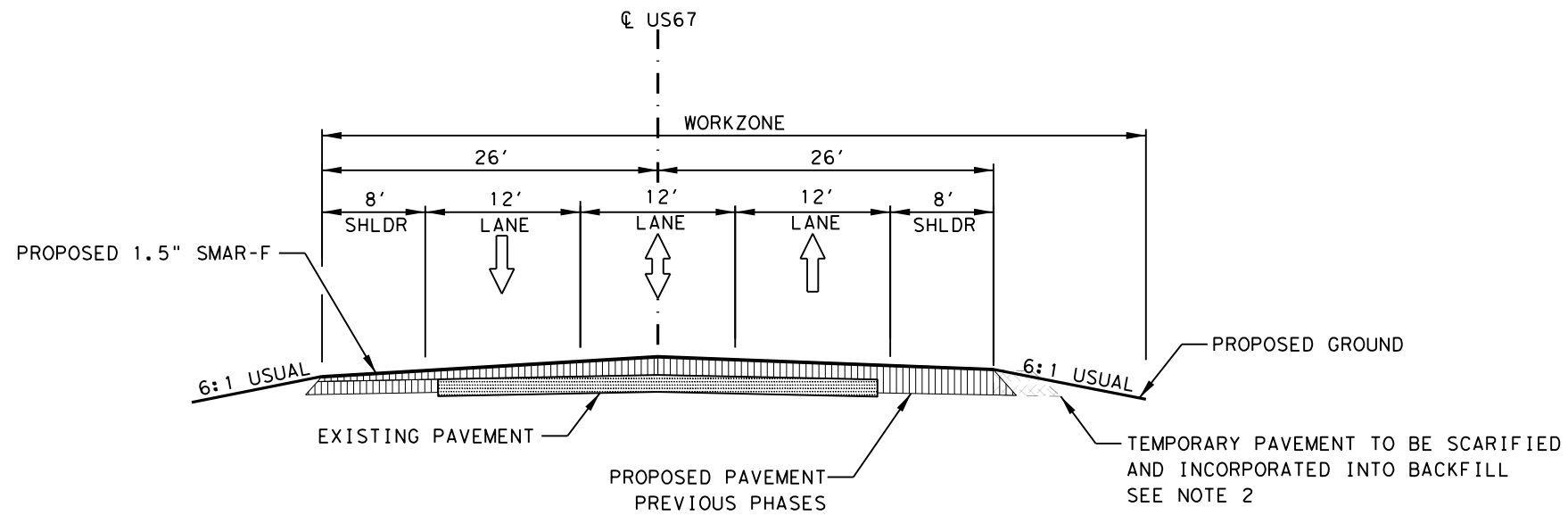
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US 67
TCP
TYPICAL SECTIONS

N. T. S. SHEET 4 OF 5

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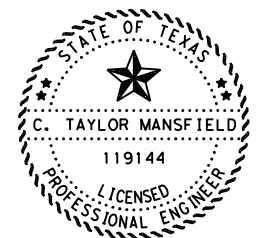
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PHASE 5:
TEMPORARY WIDENING REMOVAL (SOUTH SIDE) & SMAR-F

NOTES:

- ① PAVEMENT EDGE TO BE BACKFILLED USING SCARIFIED TEMPORARY PAVEMENT REMOVED THIS PHASE. IN ADDITION, INSTALL EMBANKMENT AS INDICATED IN PROPOSED TYPICAL SECTIONS.
- ② COMPLETE PAVEMENT SCARIFICATION AND INSTALL EMBANKMENT IN ACCORDANCE WITH STANDARD TCP(2-1)-18. INSTALL SMAR-F IN ACCORDANCE WITH STANDARD TCP(3-1)-13.



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US 67
TCP
TYPICAL SECTIONS

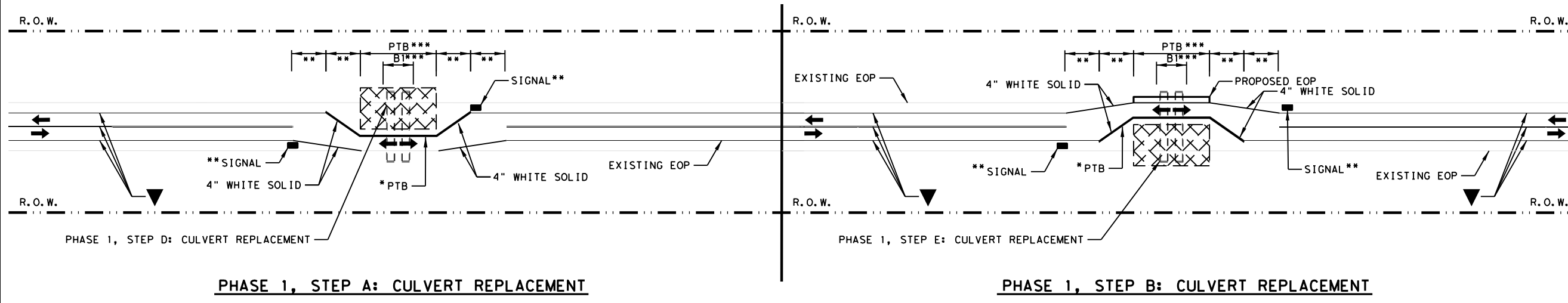
N. T. S. SHEET 5 OF 5

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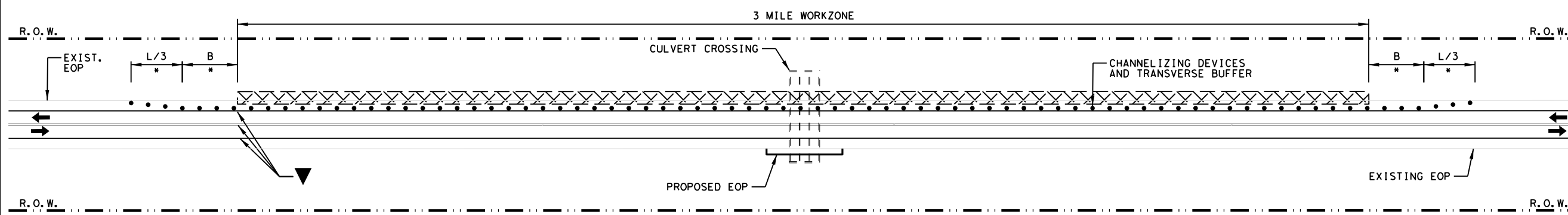
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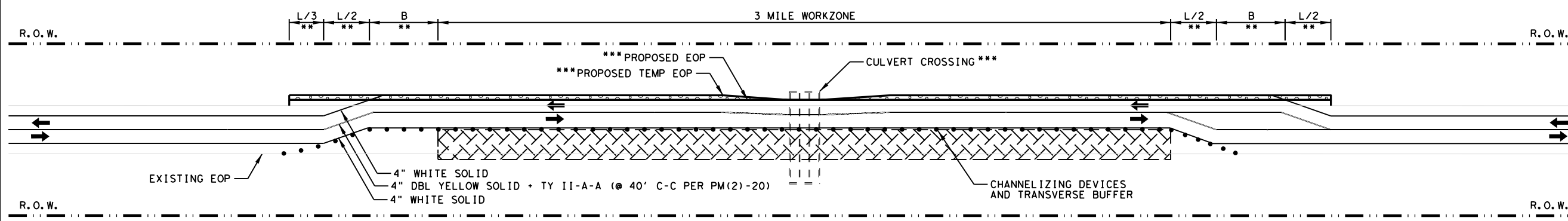
* SEE CRASH CUSHION SUMMARY SHEET FOR CRASH CUSHION PLACEMENT AND PTB LENGTH.
 ** SEE TCP (2-8b)-18 FOR TAPERS, CHANNELIZATION AND SIGN DETAILS.
 *** SEE TCP CULVERT TSS AND STRUCTURAL EXCAVATION DETAILS.



* SEE TCP (2-1)-18 FOR TAPERS, CHANNELIZATION AND SIGN DETAILS.

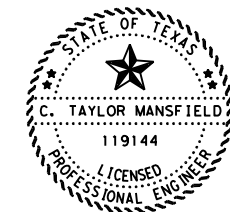


* SEE CRASH CUSHION SUMMARY SHEET FOR CRASH CUSHION PLACEMENT AND PTB LENGTH.
 ** SEE TCP (2-3)-18 FOR TAPERS, CHANNELIZATION AND SIGN DETAILS.
 *** INSTALL TAPERS FOR TEMPORARY PAVEMENT AT CULVERT CROSSINGS PER NOTE 1.



LEGEND

- c-c- BARRICADES
- ▬ CRASH CUSHION
- ▼ EXISTING STRIPING
- ▬ PTB
- CHANNELIZING DEVICES
- ⊠ WORKZONE
- ▨ TEMPORARY PAVEMENT



C. Taylor Mansfield 2021.11.01
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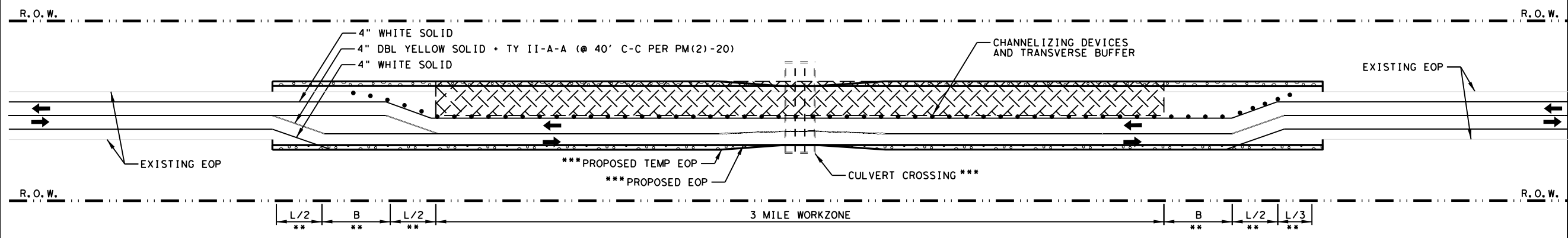
**US 67
 TCP
 PHASE LAYOUT**

N. T. S. SHEET 1 OF 2

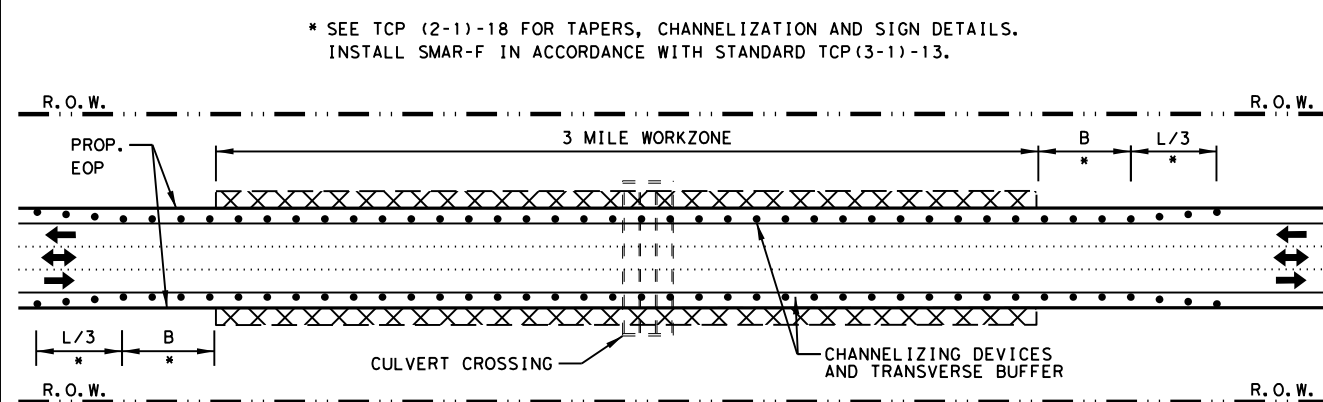
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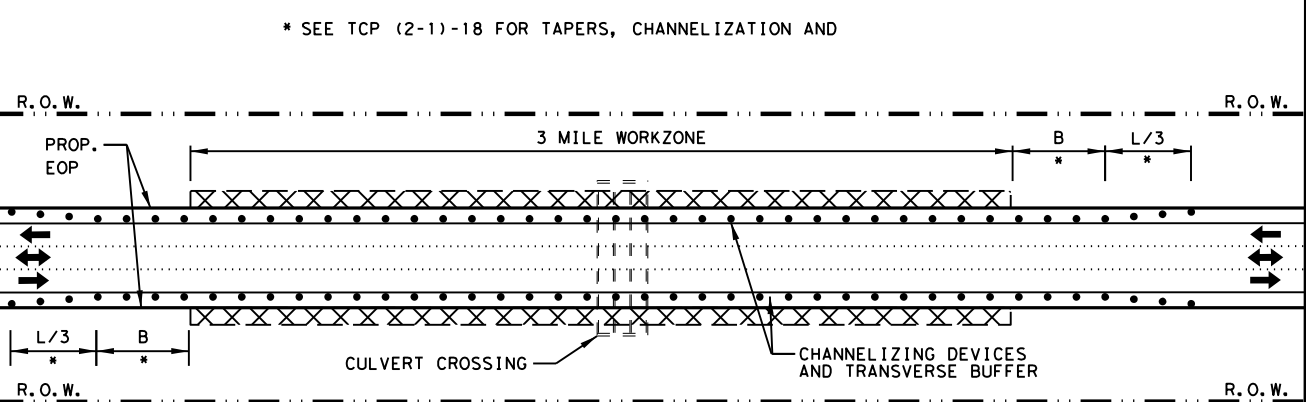
* SEE CRASH CUSHION SUMMARY SHEET FOR CRASH CUSHION PLACEMENT AND PTB LENGTH.
 ** SEE TCP (2-3)-18 FOR TAPERS, CHANNELIZATION AND SIGN DETAILS.
 *** INSTALL TAPERS FOR TEMPORARY PAVEMENT AT CULVERT CROSSINGS PER NOTE 1.



PHASE 4: TEMPORARY WIDENING REMOVAL & HMAC SP-B (NORTH SIDE)



PHASE 5: TEMPORARY WIDENING REMOVAL & SMAR-F

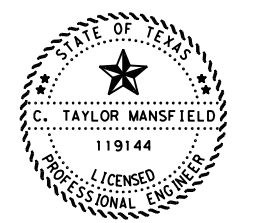


PHASE 6: ILLUMINATION INSTALLATIONS & FINAL CLEAN-UP

- LEGEND**
- c-c- BARRICADES
 - ▬ CRASH CUSHION
 - ▼ EXISTING STRIPING
 - ▬ PTB
 - CHANNELIZING DEVICES
 - ⊠ WORKZONE
 - ◻ TEMPORARY PAVEMENT

NOTES:

1. LANE SHIFT TO BE INSTALLED IN ACCORDANCE WITH STANDARD TCP (2-3)-18 TO ALIGN LANES ACROSS CULVERT WITH LANES ON APPROACHING ROADWAY.



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**US 67
TCP
PHASE LAYOUT**

N. T. S. SHEET 2 OF 2

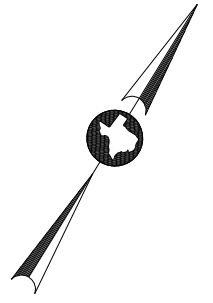


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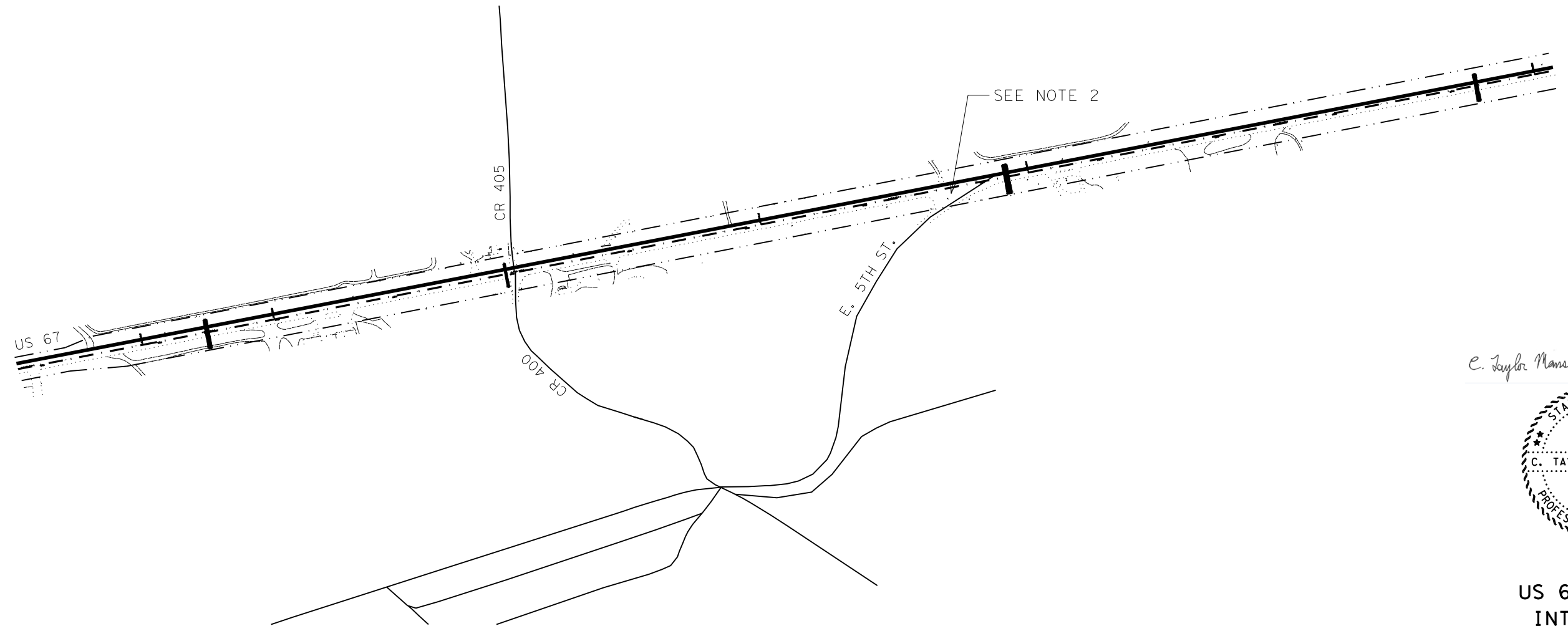
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INTERSECTION TCP NOTES

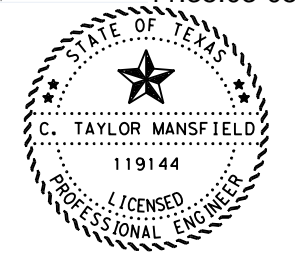
1. INTERSECTION TCP AT E. 5TH STREET TO FOLLOW PHASING, NOTES, AND TYPICAL SECTIONS ON TCP PHASE NARRATIVE AND TCP TYPICAL SECTIONS.
2. INSTALL MESSAGE BOARDS DIRECTING TRAFFIC TO USE CR 400 AND OTHER DEVICES AS NECESSARY FOR TEMPORARY CLOSURES OF THE E. 5TH STREET APPROACH AT THE INTERSECTION.
3. ENSURE NO TRAFFIC CONTROL DEVICES ARE INSTALLED WITHIN 50 FEET OF RAILROAD.



SCALE 1" = 500'



e. Taylor Mansfield 2021.11.01
11:35:03-05'00"



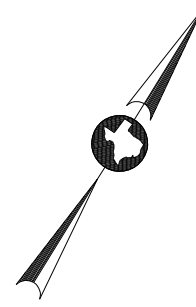
US 67/E 5TH ST
INTERSECTION
TCP

SHEET 1 OF 1



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		37

DATE: 10/22/2021 04:24 PM
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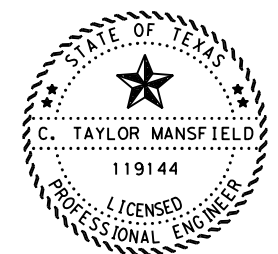
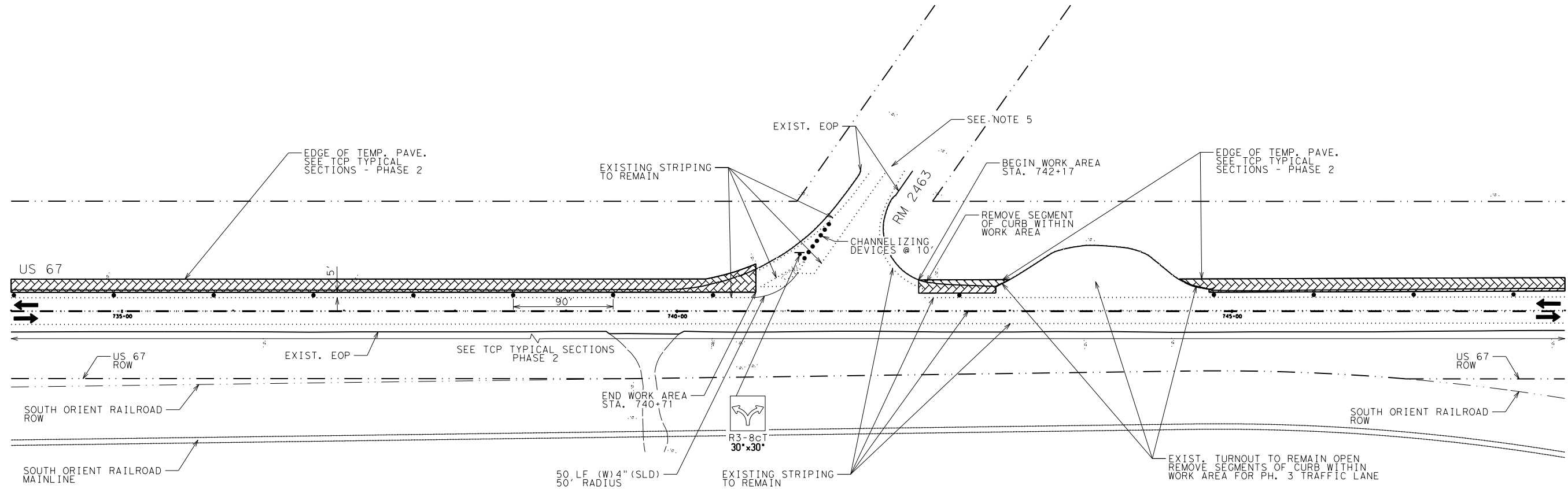
INTERSECTION TCP PHASE 2 NARRATIVE

1. ENSURE CONSTRUCTION SPEED ZONE SIGNS ARE INSTALLED PER TCP WORKZONES PLANSHEET PRIOR TO INTERSECTION CONSTRUCTION.
2. ELIMINATE EXISTING PAVEMENT MARKINGS AS INDICATED AND INSTALL TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THIS LAYOUT, STANDARD TCP(2-3)-18, AND OTHER RELEVANT STANDARDS INCLUDED WITH PLANSET.
3. ENSURE NO TRAFFIC CONTROL DEVICES ARE INSTALLED WITHIN 50 FEET OF RAILROAD.
4. RECONSTRUCT PAVEMENT IN WORK AREAS DEFINED IN THIS LAYOUT ACCORDING TO PLAN AND PROFILE AND TYPICAL SECTION SHEETS.
5. INSTALL CROSSROAD SIGNS PER BC(2)-14 FOR RM 2463.

LEGEND

WORK AREA	
COMPLETED AREA	
CHANNELIZING DEVICE	
TYPE 3 BARRICADE	
SIGN	

SCALE 1" = 100'



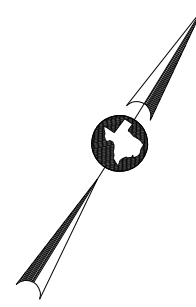
C. Taylor Mansfield 2021.11.01
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**US 67/RR 2463
INTERSECTION
TCP: PHASE 2**

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	38	

DATE: 10/22/2021 04:24 PM
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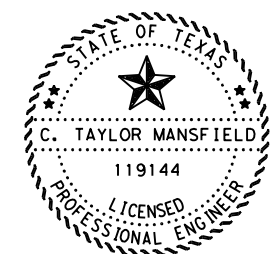
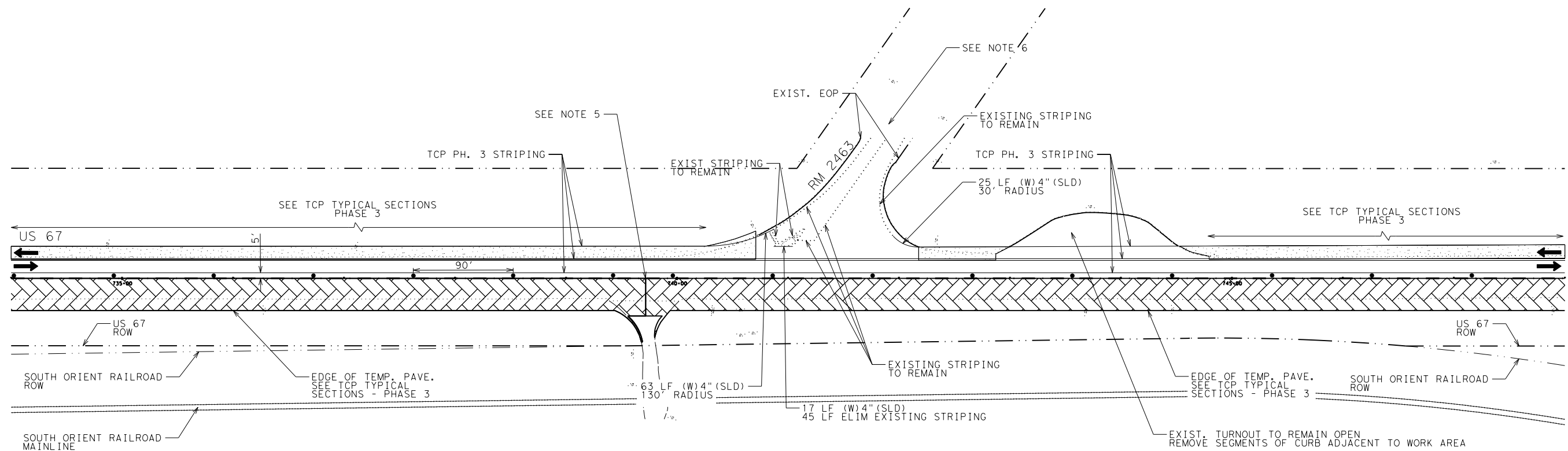
INTERSECTION TCP PHASE 3 NARRATIVE

1. ENSURE CONSTRUCTION SPEED ZONE SIGNS ARE INSTALLED PER TCP WORKZONES PLANSHEET PRIOR TO INTERSECTION CONSTRUCTION.
2. ELIMINATE EXISTING PAVEMENT MARKINGS AS INDICATED AND INSTALL TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THIS LAYOUT, STANDARD TCP(2-3)-18, AND OTHER RELEVANT STANDARDS INCLUDED WITH PLANSET.
3. ENSURE NO TRAFFIC CONTROL DEVICES ARE INSTALLED WITHIN 50 FEET OF RAILROAD.
4. RECONSTRUCT PAVEMENT IN WORK AREAS DEFINED IN THIS LAYOUT ACCORDING TO PLAN AND PROFILE AND TYPICAL SECTION SHEETS.
5. ENSURE ACCESS TO DRIVEWAYS AND INTERSECTING STREETS IS PROVIDED AT ALL TIMES. FLAGGERS SHALL BE USED TO CONTROL TRAFFIC ON THE SIDE STREETS DURING INTERSECTION CONSTRUCTION.
6. INSTALL CROSSROAD SIGNS PER BC(2)-14 FOR RM 2463.

LEGEND

WORK AREA	
COMPLETED AREA	
CHANNELIZING DEVICE	
TYPE 3 BARRICADE	
SIGN	

SCALE 1" = 100'



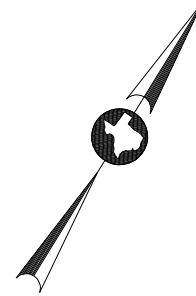
C. Taylor Mansfield 2021.11.01
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**US 67/RR 2463
 INTERSECTION
 TCP: PHASE 3**

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	39	

DATE: 10/22/2021 04:24 PM
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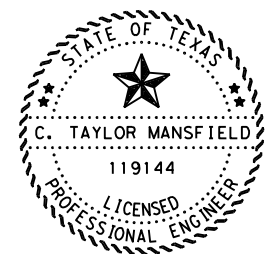
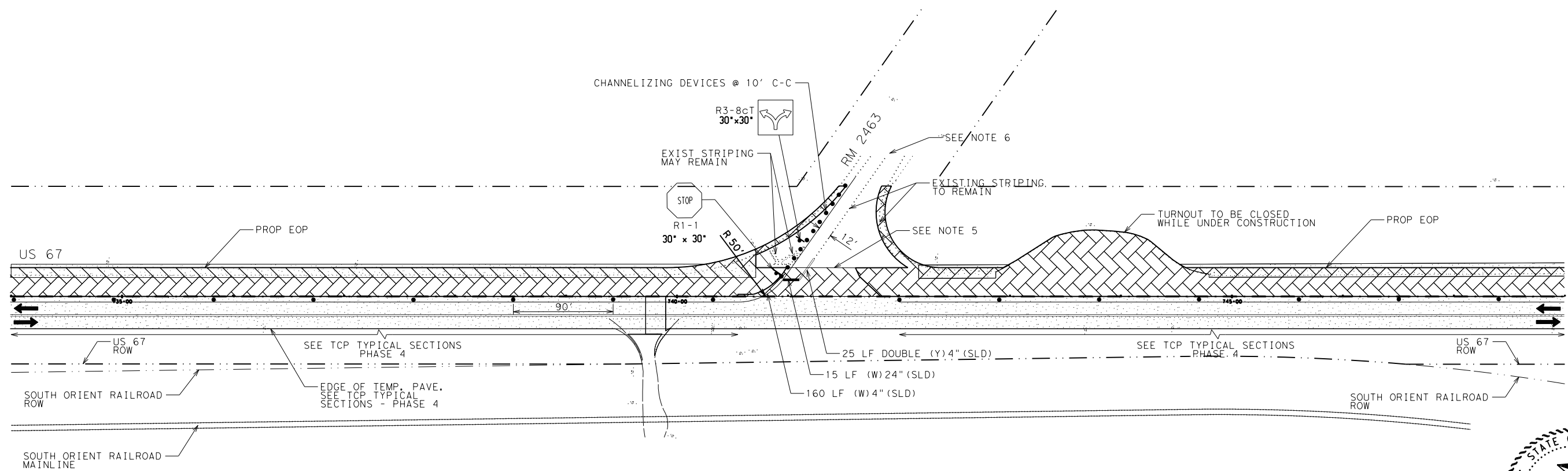
INTERSECTION TCP PHASE 4 NARRATIVE

1. ENSURE CONSTRUCTION SPEED ZONE SIGNS ARE INSTALLED PER TCP WORKZONES PLANSHEET PRIOR TO INTERSECTION CONSTRUCTION.
2. ELIMINATE EXISTING PAVEMENT MARKINGS AS INDICATED AND INSTALL TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THIS LAYOUT, STANDARD TCP(2-3)-18, AND OTHER RELEVANT STANDARDS INCLUDED WITH PLANSET.
3. ENSURE NO TRAFFIC CONTROL DEVICES ARE INSTALLED WITHIN 50 FEET OF RAILROAD.
4. RECONSTRUCT PAVEMENT IN WORK AREAS DEFINED IN THIS LAYOUT ACCORDING TO PLAN AND PROFILE AND TYPICAL SECTION SHEETS.
5. ENSURE ACCESS TO DRIVEWAYS AND INTERSECTING STREETS IS PROVIDED AT ALL TIMES. FLAGGERS SHALL BE USED TO CONTROL TRAFFIC ON THE SIDE STREETS DURING INTERSECTION CONSTRUCTION.
6. INSTALL CROSSROAD SIGNS PER BC(2)-14 FOR RM 2463.

LEGEND

WORK AREA	
COMPLETED AREA	
CHANNELIZING DEVICE	
TYPE 3 BARRICADE	
SIGN	

SCALE 1" = 100'



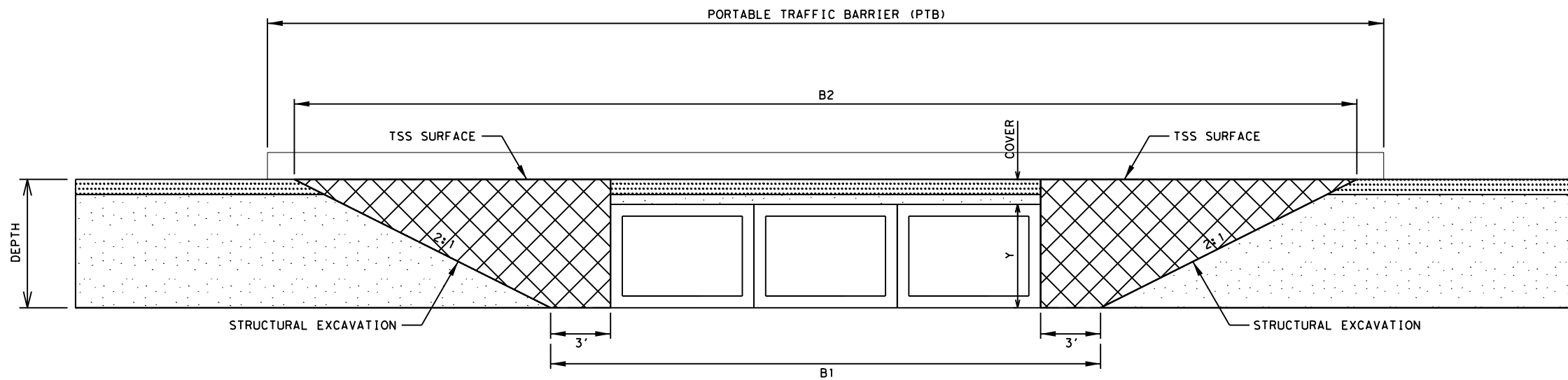
C. Taylor Mansfield 2021.11.01
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**US 67/RR 2463
 INTERSECTION
 TCP: PHASE 4**

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	40	

DATE: 10/22/2021 04:07 PM
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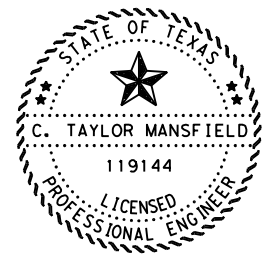


LEGEND

	ROAD PAVEMENT
	SUBGRADE
	TEMPORARY SPECIAL SHORING (TSS) SURFACE

CULVERT ID	STATION	COVER (FT)	Y (FT)	DEPTH (FT)	B1 (FT)	B2 (FT)	PTB (FT)	TSS (SF)	STRUCTURAL EXCAVATION (CY) *
144	525+29	2.25	2	4.25	10	27	30	N/A	111
146	537+04	2.5	2	4.5	16	34	30	N/A	159
157	591+05	4	2	6	12	36	60	108	203
158	595+08	3	2	5	21	41	60	80	219
161	609+11	2	2	4	14	30	30	N/A	124
163	637+51	2.5	5	7.5	38	68	90	158	560
168	677+88	1.5	2	3.5	14	28	30	N/A	104
169	678+50	3.75	2	5.75	11	34	30	101	183
171	717+43	2.5	3	5.5	16	38	60	94	209
173	772+54	2.75	2	4.75	9	28	30	N/A	124
175	797+05	2.75	4	6.75	21	48	60	132	328
177	821+40	2.5	4	6.5	54	80	90	124	613
178	853+73	3	2	5	10	30	30	80	141
181	880+08	2.5	3	5.5	13	35	30	94	186
183	901+09	2.5	3	5.5	20	42	60	94	240
184	905+90	2.75	4	6.75	34	61	60	132	452
186	938+99	4	4	8	30	62	60	176	518
187	963+19	2.75	2	4.75	10	29	30	N/A	131
TOTALS:							870	1373	4605*

*FOR INFORMATION ONLY. NOT FOR PAYMENT.



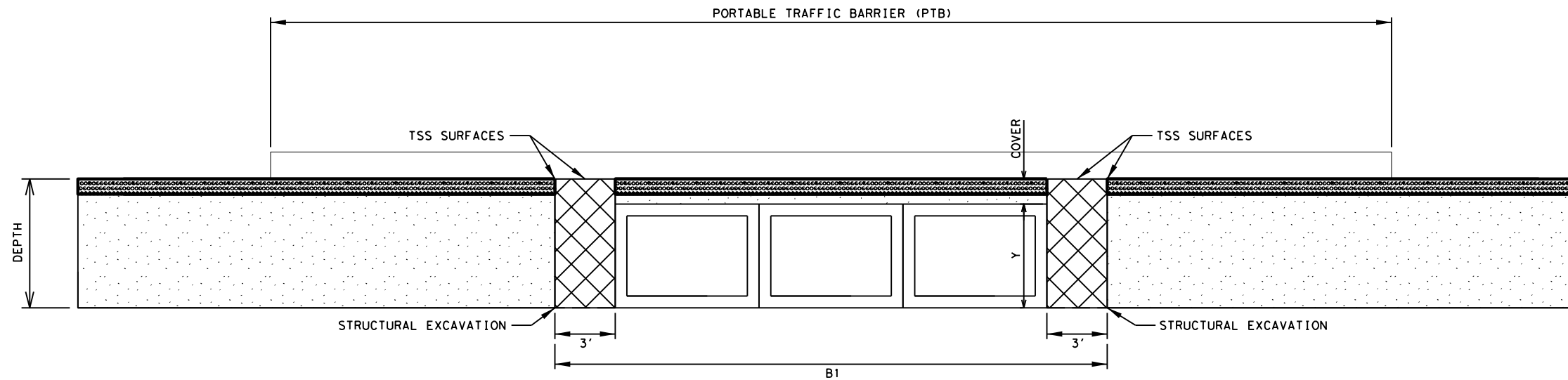
C. Taylor Mansfield 2021.11.01
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**US 67
TCP CULVERT TSS &
STRUCTURAL EXCA.
DETAILS**

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		41

DATE: 10/22/2021 04:07 PM
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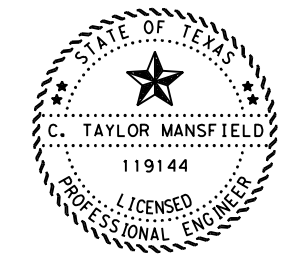


LEGEND

	ROAD PAVEMENT
	SUBGRADE
	TEMPORARY SPECIAL SHORING (TSS) SURFACE

CULVERT ID	STATION	COVER (FT)	Y (FT)	DEPTH (FT)	B1 (FT)	PTB (FT)	TSS (SF)	STRUCTURAL EXCAVATION (CY) *
143	518+56	3.5	2	5.5	10	30	451	78
147	549+75	2.5	3	5.5	10	30	451	78
155	571+09	2.25	4	6.25	18	30	513	159
167	665+93	2	4	6	38	30	492	321
180	867+89	3	2	5	10	30	410	71
					TOTALS:	150	2317	707*

*FOR INFORMATION ONLY. NOT FOR PAYMENT.



C. Taylor Mansfield 2021.11.01
 11:43:16-05'00"

US 67
TCP CULVERT TSS &
STRUCTURAL EXCA.
DETAILS

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		42

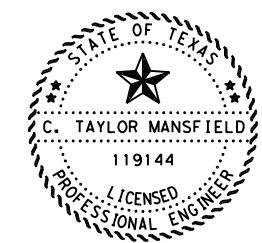
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LOC NO.	TCP PHASE	WORK ZONE NO.	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			CRASH CUSHION										
							PROPOSED MATERIAL	PROPOSED THICKNESS	PORTABLE TRAFFIC BARRIER DESCRIPTION	WIDTH	HEIGHT	LENGTH	INSTALL	REMOVE	MOVE / RESET		L	L	R	R	S	S
															MOVE/RESET	FROM LOC. #	N	W	N	W	N	W
15	1D	2	CULVERT 155	570+92	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30	X					X				
15	1D	2	CULVERT 155	571+12	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30	X					X				
16	1E	2	CULVERT 155	570+92	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	15		X				
16	1E	2	CULVERT 155	571+12	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	15		X				
17	1D	2	CULVERT 157	590+93	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60	X					X				
17	1D	2	CULVERT 157	591+13	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60	X					X				
18	1E	2	CULVERT 157	590+93	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	17		X				
18	1E	2	CULVERT 157	591+13	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	17		X				
19	1D	2	CULVERT 158	594+92	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60	X					X				
19	1D	2	CULVERT 158	595+12	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60	X					X				
20	1E	2	CULVERT 158	594+92	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	19		X				
20	1E	2	CULVERT 158	595+12	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	19		X				
21	1D	2	CULVERT 161	608+93	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30	X					X				
21	1D	2	CULVERT 161	609+13	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30	X					X				
22	1E	2	CULVERT 161	608+93	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	21		X				
22	1E	2	CULVERT 161	609+13	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	21		X				
23	1D	2	CULVERT 163	637+18	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	90	X					X				
23	1D	2	CULVERT 163	637+58	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	90	X					X				
24	1E	2	CULVERT 163	637+18	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	90			X	23		X				
24	1E	2	CULVERT 163	637+58	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	90			X	23		X				
25	1D	3	CULVERT 167	665+57	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	14		X				
25	1D	3	CULVERT 167	665+97	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	14		X				
26	1E	3	CULVERT 167	665+57	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	25		X				
26	1E	3	CULVERT 167	665+97	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	25		X				
27	1D	3	CULVERT 168	677+69	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	16		X				
27	1D	3	CULVERT 168	677+89	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	16		X				
28	1E	3	CULVERT 168	677+69	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	27		X				
28	1E	3	CULVERT 168	677+89	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	27		X				
										PRECAST CSB TOTALS			10		18							

LEGEND:
 L=LOW MAINTENANCE
 R=REUSABLE
 S=SACRIFICIAL
 N=NARROW
 W=WIDE

NOTES:
 *8" ASPHALT MAY ALSO BE USED
 FOR OTHER CRASH CUSHION ATTENUATOR OPTIONS SEE QUAD(N)-16 AND TAU-II(N)-16 STANDARDS
 INSTALLS ARE AT PHASE START
 MOVE & REMOVE ARE AT PHASE END

FOR DEFINITIONS SEE CRASH CUSHION ATTENUATOR CHART AT
http://crossroads.org/des/Crash_Cushion_Attenuator_Chart_w_Categorization.pdf



C. Taylor Mansfield 2021.11.01
 11:45:01-05'00"

CRASH CUSHION SUMMARY SHEET
 SHEET 2 OF 5

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		44

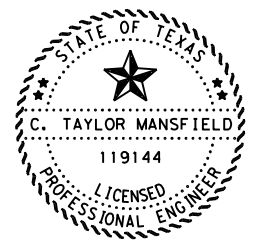
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LOC NO.	TCP PHASE	WORK ZONE NO.	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			CRASH CUSHION											
							PROPOSED MATERIAL	PROPOSED THICKNESS	PORTABLE TRAFFIC BARRIER DESCRIPTION	WIDTH	HEIGHT	LENGTH	INSTALL	REMOVE	MOVE / RESET		L	L	R	R	S	S	
															MOVE/RESET	FROM LOC. #	N	W	N	W	N	W	
29	1D	3	CULVERT 169	678+17	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	18			X				
29	1D	3	CULVERT 169	678+37	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	18			X				
30	1E	3	CULVERT 169	678+17	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	29			X				
30	1E	3	CULVERT 169	678+37	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	29			X				
31	1D	3	CULVERT 171	717+32	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	20			X				
31	1D	3	CULVERT 171	717+52	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	20			X				
32	1E	3	CULVERT 171	717+32	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	31			X				
32	1E	3	CULVERT 171	717+52	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	31			X				
33	1D	3	CULVERT 173	772+42	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	22			X				
33	1D	3	CULVERT 173	772+62	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	22			X				
34	1E	3	CULVERT 173	772+42	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	33			X				
34	1E	3	CULVERT 173	772+62	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	33			X				
35	1D	3	CULVERT 175	796+95	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	24			X				
35	1D	3	CULVERT 175	797+15	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	24			X				
36	1E	3	CULVERT 175	796+95	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	35			X				
36	1E	3	CULVERT 175	797+15	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	35			X				
37	1D	4	CULVERT 177	821+01	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	90			X	26			X				
37	1D	4	CULVERT 177	821+81	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	90			X	26			X				
38	1E	4	CULVERT 177	637+18	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	90			X	37			X				
38	1E	4	CULVERT 177	821+81	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	90			X	37			X				
39	1D	4	CULVERT 178	853+62	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	28			X				
39	1D	4	CULVERT 178	853+82	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	28			X				
40	1E	4	CULVERT 178	853+62	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	39			X				
40	1E	4	CULVERT 178	853+82	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	39			X				
41	1D	4	CULVERT 180	867+77	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	30			X				
41	1D	4	CULVERT 180	867+97	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	30			X				
42	1E	4	CULVERT 180	677+69	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	41			X				
42	1E	4	CULVERT 180	867+97	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	41			X				
										PRECAST CSB TOTALS					28								

LEGEND:
 L=LOW MAINTENANCE
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NOTES:
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FOR DEFINITIONS SEE CRASH CUSHION ATTENUATOR CHART AT
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CRASH CUSHION SUMMARY SHEET
 SHEET 3 OF 5

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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		45

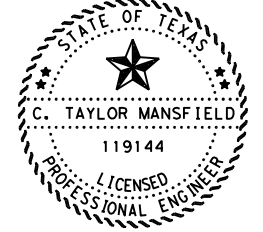
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LOC NO.	TCP PHASE	WORK ZONE NO.	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			CRASH CUSHION											
							PROPOSED MATERIAL	PROPOSED THICKNESS	PORTABLE TRAFFIC BARRIER DESCRIPTION	WIDTH	HEIGHT	LENGTH	INSTALL	REMOVE	MOVE / RESET		L	L	R	R	S	S	
															MOVE/ RESET	FROM LOC. #	N	W	N	W	N	W	
43	1D	4	CULVERT 181	879+94	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	32			X				
43	1D	4	CULVERT 181	880+14	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	32			X				
44	1E	4	CULVERT 181	879+94	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	43			X				
44	1E	4	CULVERT 181	880+14	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	43			X				
45	1D	4	CULVERT 183	900+95	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	34			X				
45	1D	4	CULVERT 183	901+15	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	34			X				
46	1E	4	CULVERT 183	900+95	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	45			X				
46	1E	4	CULVERT 183	901+15	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	45			X				
47	1D	4	CULVERT 184	905+59	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	36			X				
47	1D	4	CULVERT 184	905+99	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	36			X				
48	1E	4	CULVERT 184	905+59	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	47			X				
48	1E	4	CULVERT 184	905+99	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	47			X				
49	1D	4	CULVERT 186	938+65	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60	X						X				
49	1D	4	CULVERT 186	939+05	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60	X						X				
50	1E	4	CULVERT 186	938+65	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	49			X				
50	1E	4	CULVERT 186	939+05	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60			X	49			X				
51	1D	4	CULVERT 187	963+07	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30	X						X				
51	1D	4	CULVERT 187	963+27	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30	X						X				
52	1E	4	CULVERT 187	963+07	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	51			X				
52	1E	4	CULVERT 187	963+27	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30			X	51			X				
50	1E	4	CULVERT 186	938+65	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60		X		50			X				
50	1E	4	CULVERT 186	939+05	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60		X		50			X				
52	1E	4	CULVERT 187	963+07	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30		X		52			X				
52	1E	4	CULVERT 187	963+27	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30		X		52			X				
												PRECAST CSB TOTALS			4	4	16						

LEGEND:
 L=LOW MAINTENANCE
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NOTES:
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 INSTALLS ARE AT PHASE START
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FOR DEFINITIONS SEE CRASH CUSHION ATTENUATOR CHART AT
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CRASH CUSHION SUMMARY SHEET
 SHEET 4 OF 5

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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		46

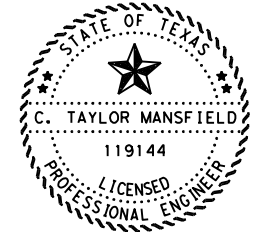
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LOC NO.	TCP PHASE	WORK ZONE NO.	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			CRASH CUSHION										
							PROPOSED MATERIAL	PROPOSED THICKNESS	PORTABLE TRAFFIC BARRIER DESCRIPTION	WIDTH	HEIGHT	LENGTH	INSTALL	REMOVE	MOVE / RESET		L	L	R	R	S	S
															MOVE/RESET	FROM LOC. #	N	W	N	W	N	W
8	1E	1	CULVERT 143	594+92	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60		X		8			X			
8	1E	1	CULVERT 143	595+12	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60		X		8			X			
10	1E	1	CULVERT 144	608+93	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30		X		10			X			
10	1E	1	CULVERT 144	609+13	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30		X		10			X			
12	1E	1	CULVERT 146	637+18	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60		X		12			X			
12	1E	1	CULVERT 146	637+58	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60		X		12			X			
38	1E	3	CULVERT 177	637+18	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	120		X		38			X			
38	1E	3	CULVERT 177	821+81	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	120		X		38			X			
40	1E	3	CULVERT 178	853+62	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30		X		40			X			
40	1E	3	CULVERT 178	853+82	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30		X		40			X			
42	1E	3	CULVERT 180	677+69	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30		X		42			X			
42	1E	3	CULVERT 180	867+97	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30		X		42			X			
44	1E	3	CULVERT 181	879+94	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30		X		44			X			
44	1E	3	CULVERT 181	880+14	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	30		X		44			X			
46	1E	3	CULVERT 183	900+95	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60		X		46			X			
46	1E	3	CULVERT 183	901+15	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60		X		46			X			
48	1E	4	CULVERT 184	905+59	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60		X		48			X			
48	1E	4	CULVERT 184	905+99	TL-3	BI	CONCRETE	6"*	PRECAST CSB (F SHAPE) (TY1)	24"	2'-8"	60		X		48			X			
												PRECAST CSB TOTALS			18							

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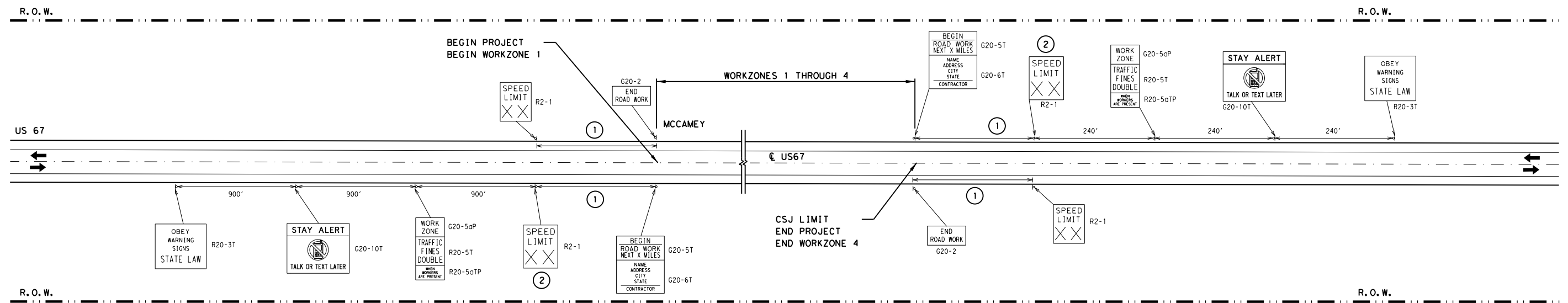
CRASH CUSHION SUMMARY SHEET
 SHEET 5 OF 5

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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		47

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- NOTES:**
- ① SPACING BETWEEN SIGNS R2-1 AND G20-5T/G20-6T DIFFERS FOR CONSTRUCTION BEGINNING AT THE CSJ LIMITS (WORK ZONES 1 AND 4) AND CONSTRUCTION BEGINNING DOWNSTREAM OF THE CSJ LIMITS (WORK ZONES 2 AND 3). LOCATION AND SPACING FOR R2-1 AND G20-5T/G20-6T SHALL BE PER BC(2)-4 AND DEPENDENT ON CURRENTLY ACTIVE WORK ZONE. ADDITIONALLY INCLUDE APPROPRIATE CONSTRUCTION WARNING SIGNS AS NECESSARY (CW DESIGNATIONS) AS PER BC(2)-4 AND THE TCP PLANSHEETS.
 - ② WORK ZONE SPEED LIMIT OF 60 MPH TO BE IMPLEMENTED THROUGHOUT PROJECT LIMITS AT ALL TIMES EXCEPT WITHIN MCCAMEY, WHERE ALL EXISTING SPEED LIMITS LESS THAN 60 MPH SHALL REMAIN IN PLACE. ADDITIONALLY, IMPLEMENT WORK ZONE SPEED LIMIT OF 45 MPH WITHIN CURRENTLY ACTIVE 3-MILE WORKZONE. SIGNS TO BE INSTALLED PER STANDARD BC(3)-14.



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**US 67
TCP - ADVANCE
SIGNS LAYOUT**

N. T. S. SHEET OF

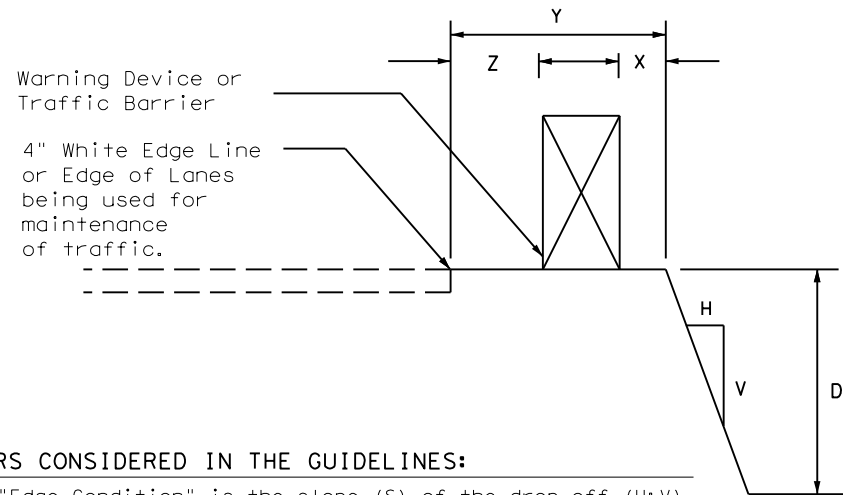
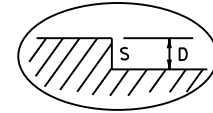
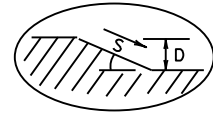
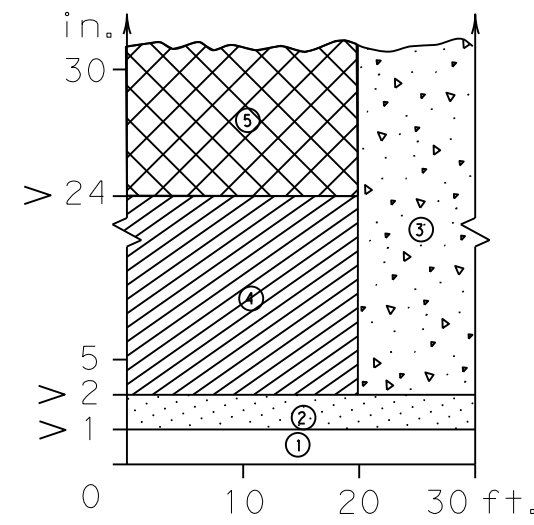
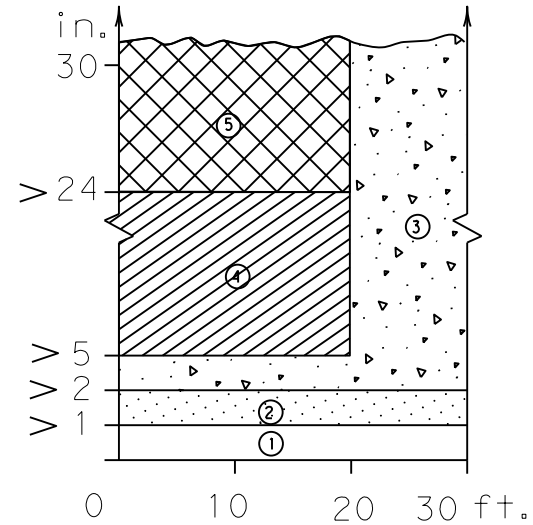
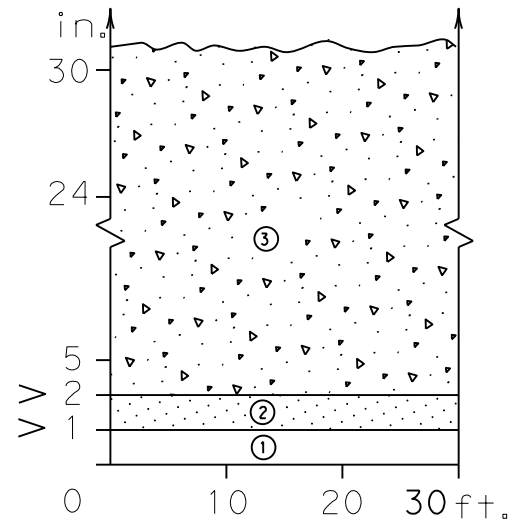
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	48	

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DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet



FACTORS CONSIDERED IN THE GUIDELINES:

- The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height" is the depth of the drop-off "D".
- Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.
- In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.
- The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.
- If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

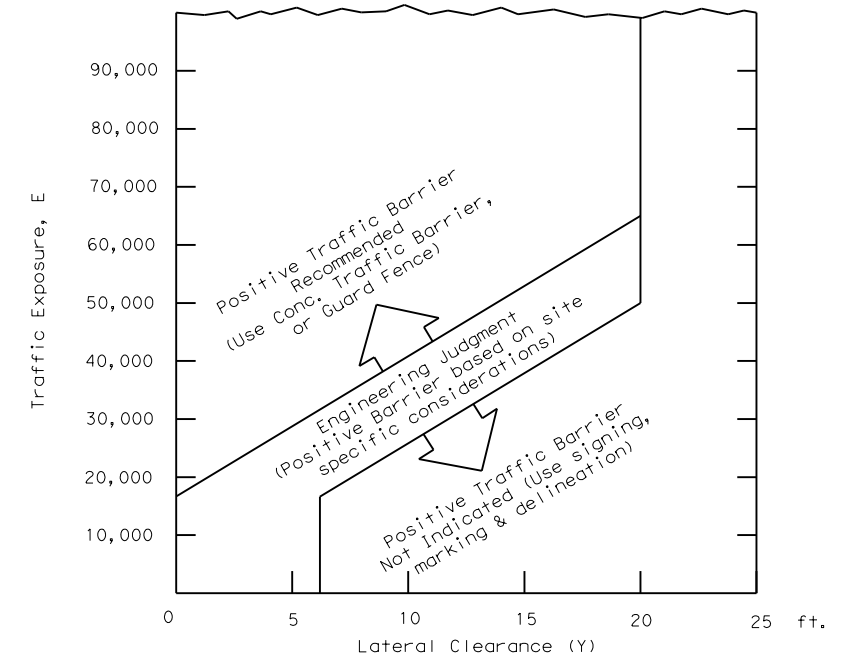
Zone Treatment Types Guidelines:

- No treatment
- CW 8-11 "Uneven Lanes" signs.
- CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
- CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the proferred Edge Condition I.
- Check indications (Figure-1) for positive barrier. Where positive barrier is not indicated, the treatment shown above for Zone-4 may be used after consideration of other applicable factors.

Edge Condition Notes:

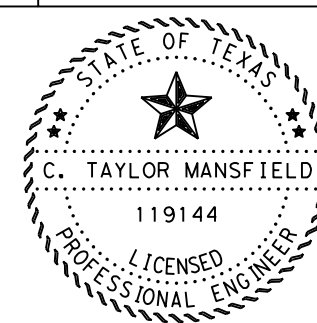
- Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.
- Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exceeds 24 inches, the possibility for rollover is greater in most vehicles.
- Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.
- Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 ([Cross-hatched])



- $E = ADT \times T$
 Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.
- Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.
- An approved end treatment should be provided for any positive barrier end located within the clear zone.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.



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TREATMENT FOR VARIOUS EDGE CONDITIONS

FILE: edgecon.dgn	DN:	CK:	DW:	CK:
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REVISIONS	0076	06	037	US 67
03-01	DIST	COUNTY		SHEET NO.
08-01	ODA	UPTON		49
9-21				

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

- The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
- The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
- Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
- When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
- The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
- The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
- Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
- Traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:


- Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.
- Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

- Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
- Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

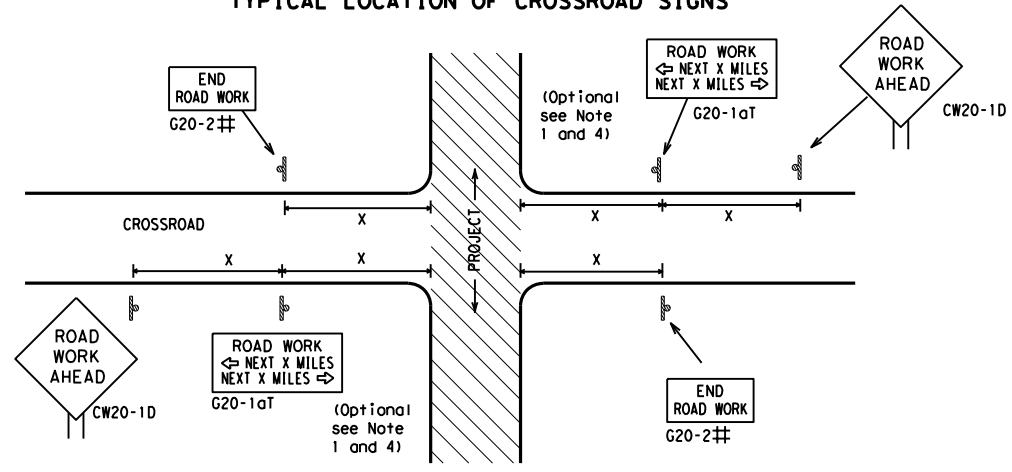
THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

SHEET 1 OF 12

 Texas Department of Transportation		Traffic Safety Division Standard	
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS			
BC (1) - 21			
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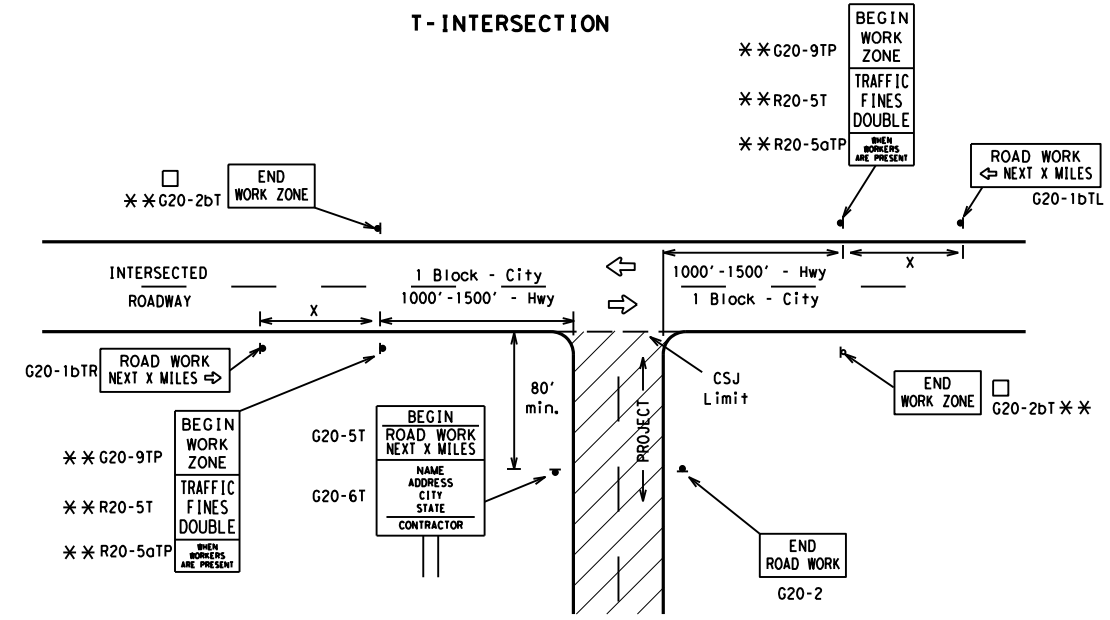
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TYPICAL LOCATION OF CROSSROAD SIGNS



- ## May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)
- The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D) sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
 - The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
 - Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
 - The "ROAD WORK NEXT X MILES" (G20-1aT) sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
 - Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
 - When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

- The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
- If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME" (G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow (G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR) signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING^{1,5,6}

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 ⁴	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	48" x 48"	48" x 48"	55	500 ²
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12			60	600 ²
			65	700 ²
			70	800 ²
			75	900 ²
			80	1000 ²
			*	* ³

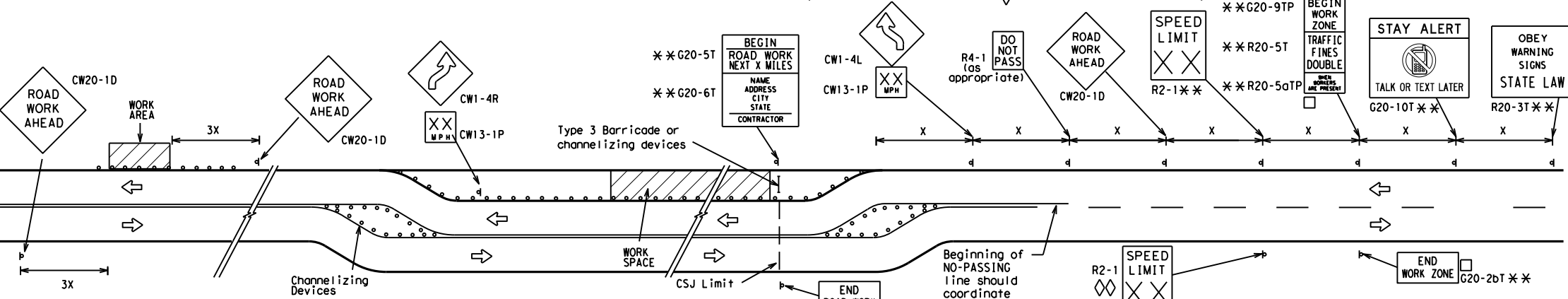
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

Δ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

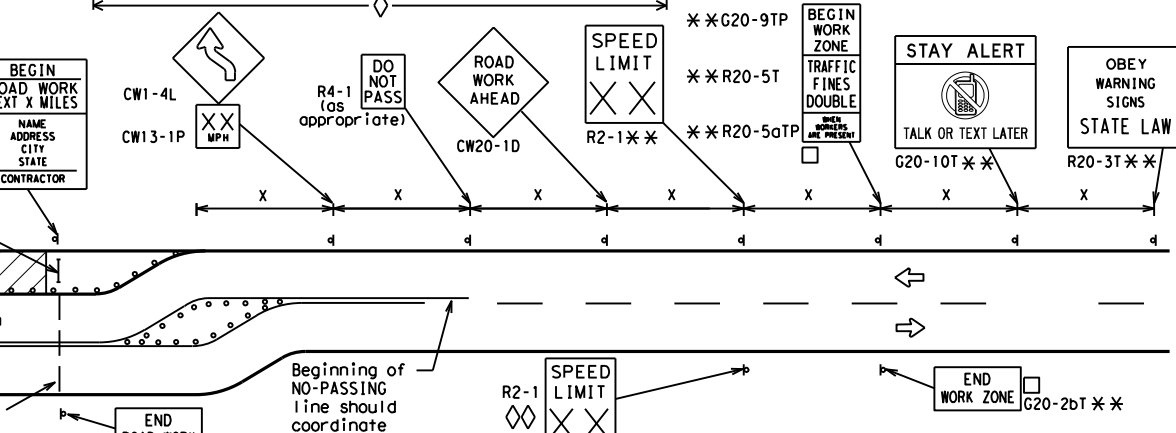
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
- Only diamond shaped warning sign sizes are indicated.
- See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

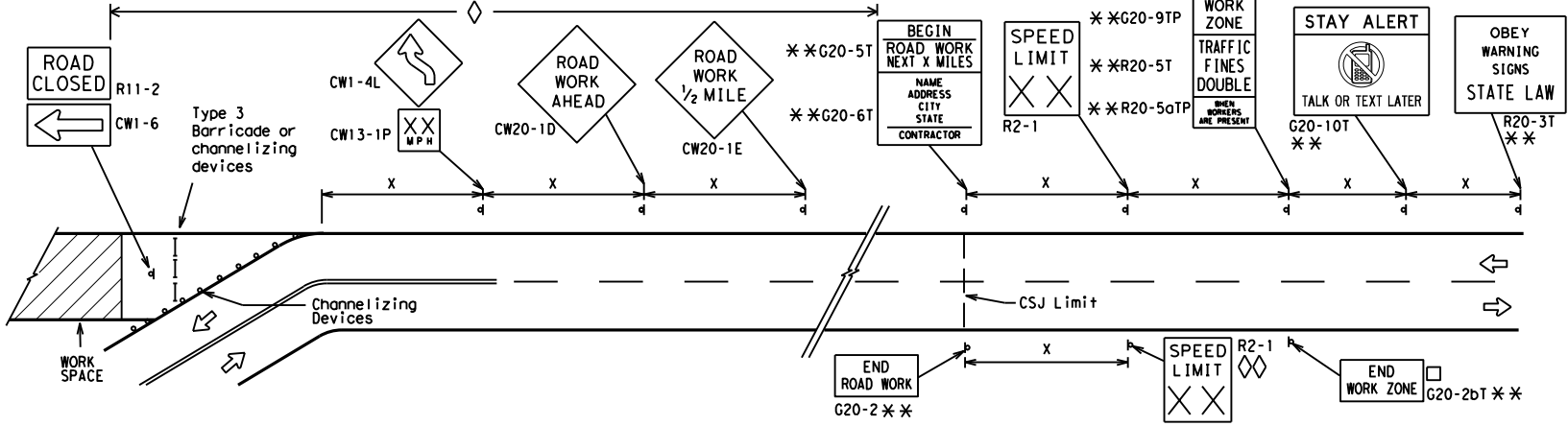


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "x" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
 - CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
 - Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
 - Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

—	Type 3 Barricade
○ ○ ○	Channelizing Devices
■	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

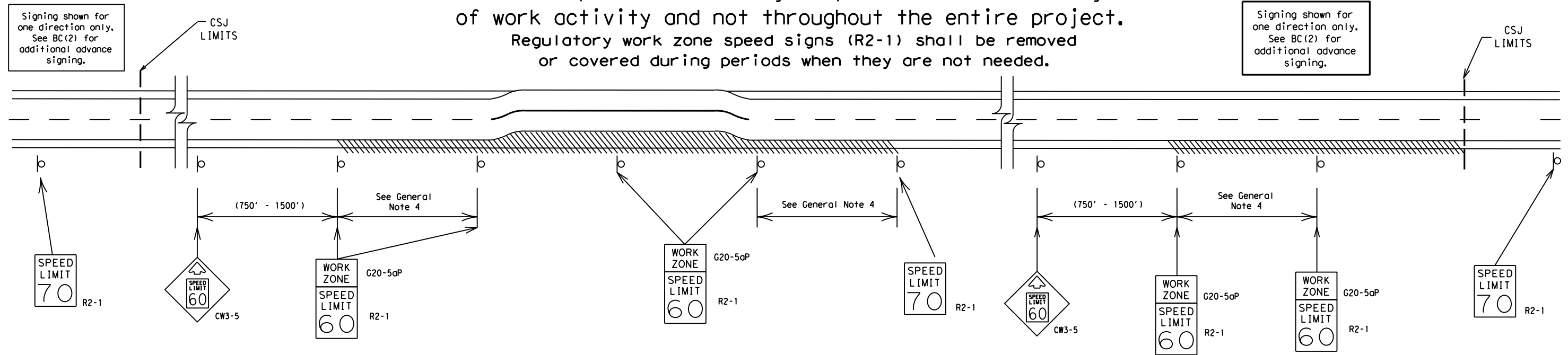
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered. (See Removing or Covering on BC(4)).

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:

40 mph and greater	0.2 to 2 miles
35 mph and less	0.2 to 1 mile
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - Law enforcement.
 - Flagger stationed next to sign.
 - Portable changeable message sign (PCMS).
 - Low-power (drone) radar transmitter.
 - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

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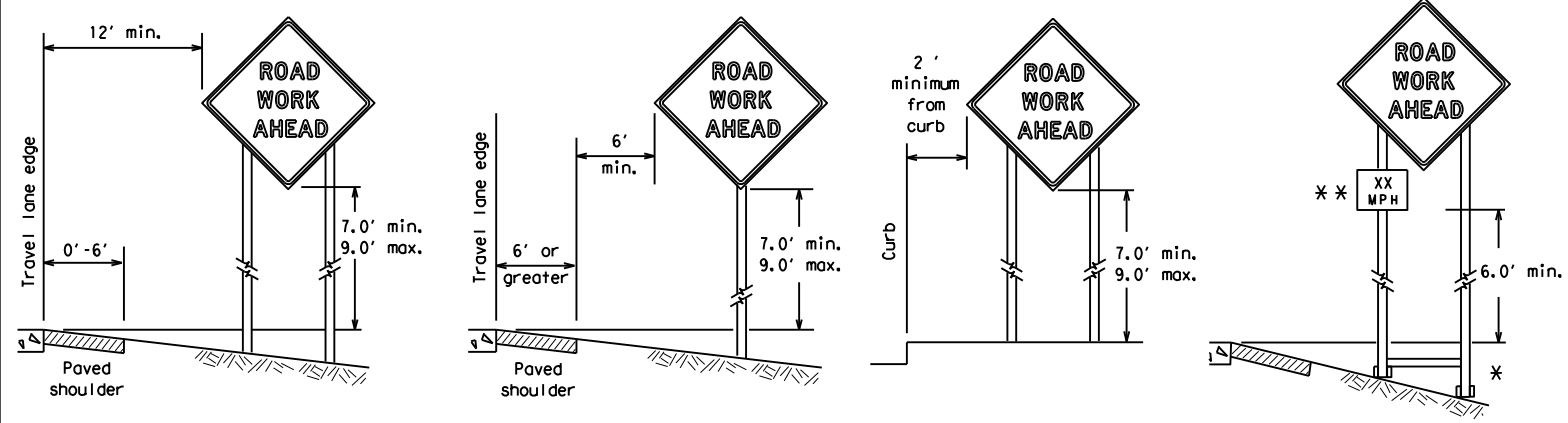
SHEET 3 OF 12

		Traffic Safety Division Standard	
<h2>BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT</h2>			
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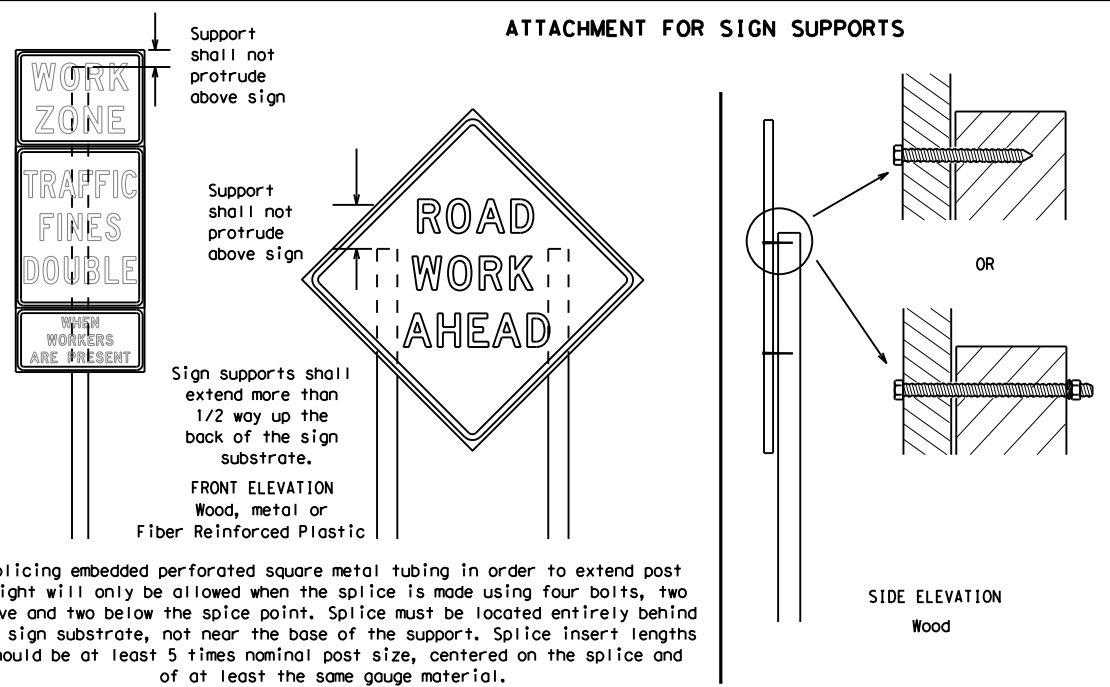
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed.
 Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
- The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
- The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
- The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
- Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
- The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

- The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
 - Long-term stationary - work that occupies a location more than 3 days.
 - Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
 - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - Short, duration - work that occupies a location up to 1 hour.
 - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
- The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
- Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

- The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

- The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

- All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

- All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
- Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

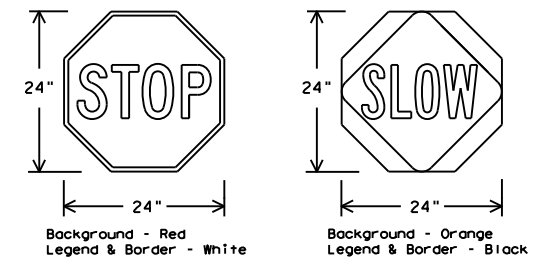
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
- Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

- Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

STOP/SLOW PADDLES

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- STOP/SLOW paddles shall be retroreflective when used at night.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B _{FL} OR C _{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

- Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
- When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
- If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
- Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.



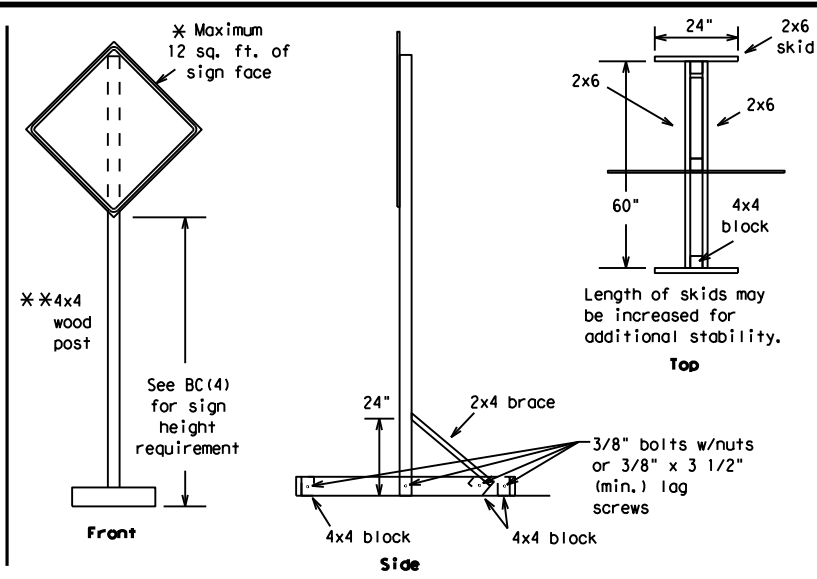
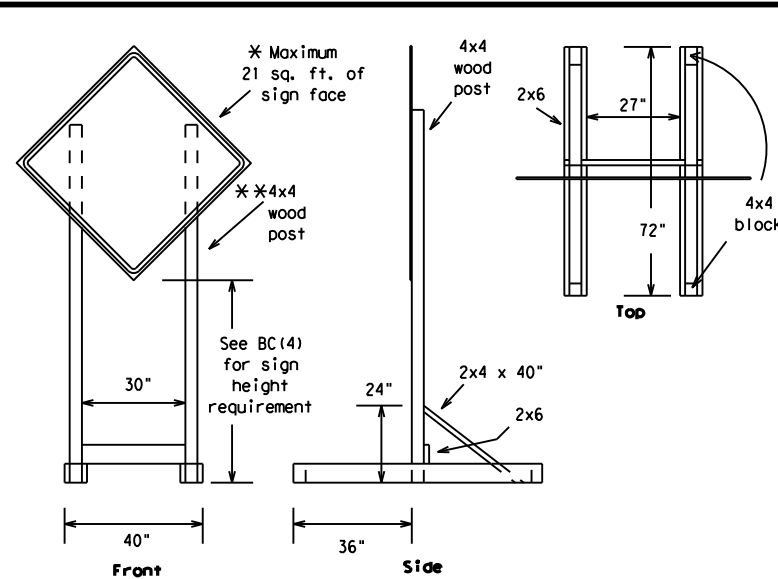
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

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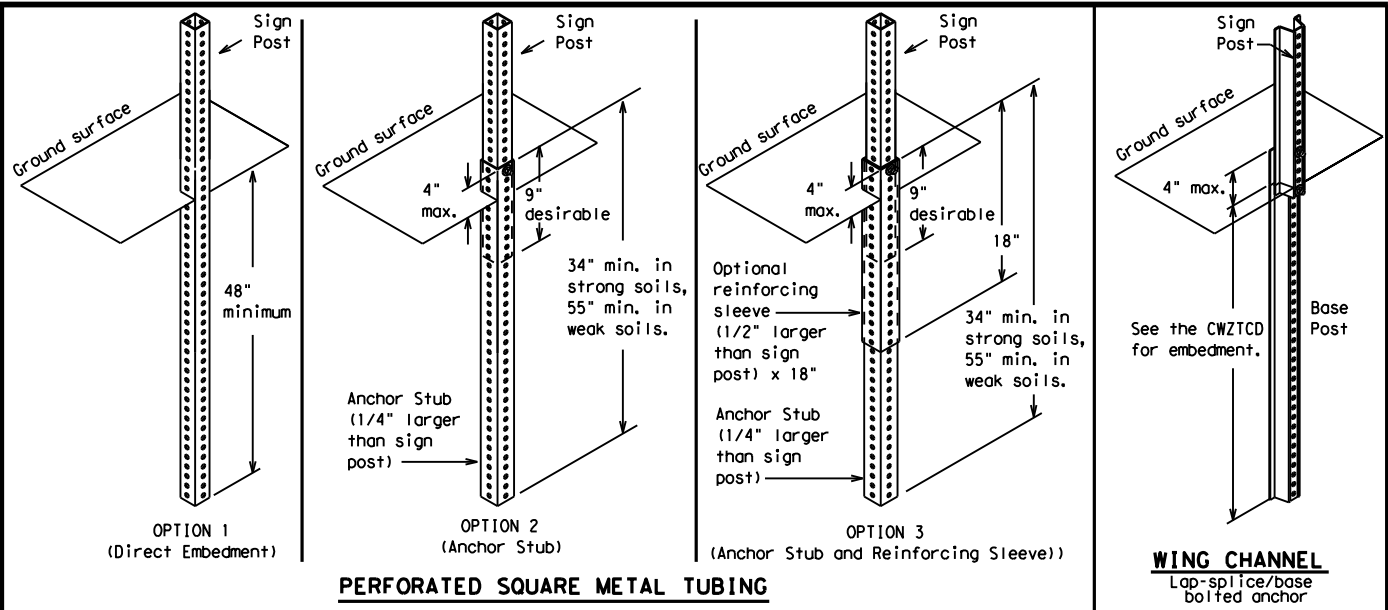
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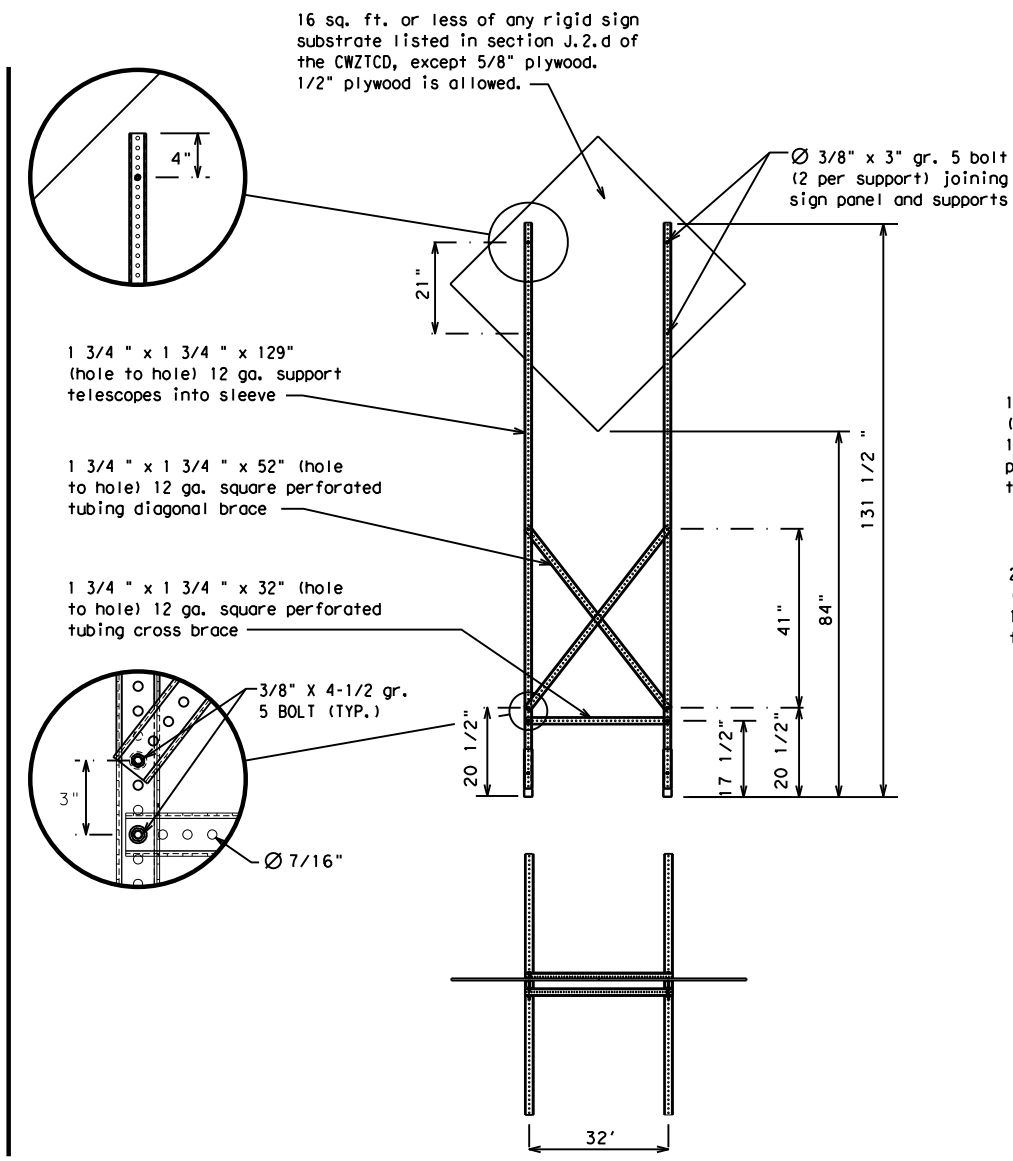
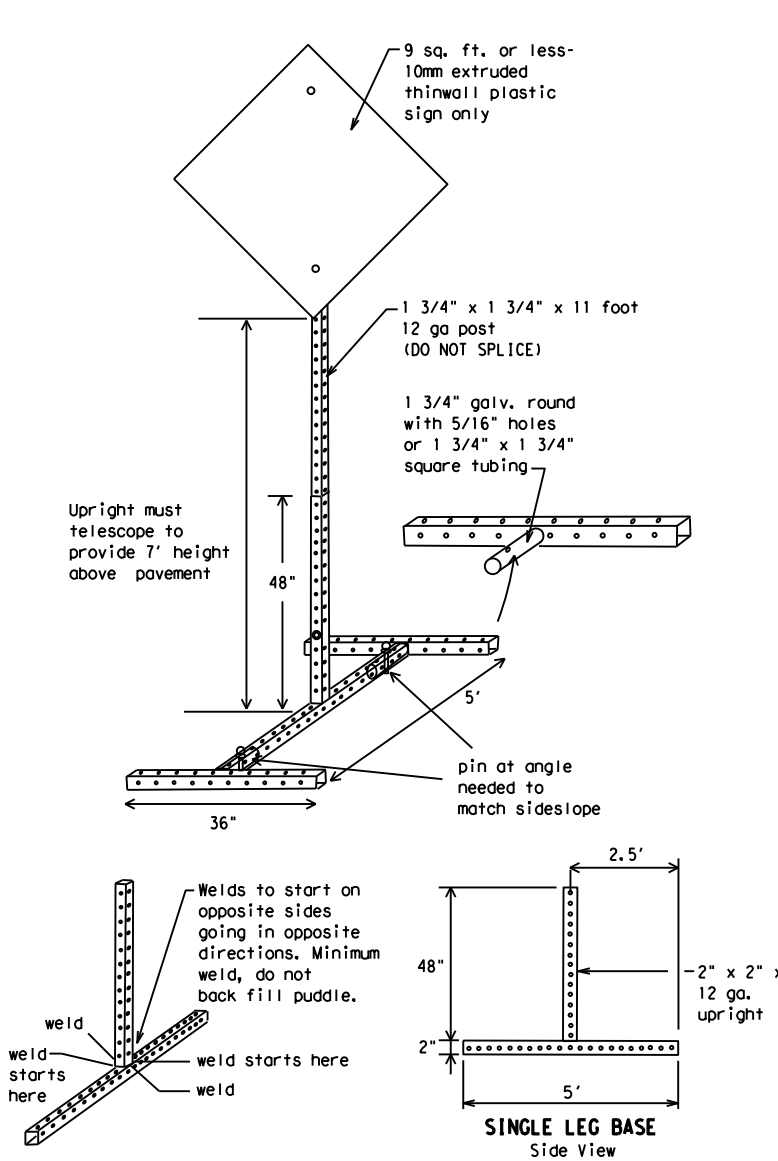
SKID MOUNTED WOOD SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support. The maximum sign square footage shall adhere to the manufacturer's recommendation. Two post installations can be used for larger signs.



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS
 Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS
 MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

- GENERAL NOTES**
- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
 - No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
 - When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.
- * See BC(4) for definition of "Work Duration."
 - ** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
 - See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC (5) - 21

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
- Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
- The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
- PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
- Each line of text should be centered on the message board rather than left or right justified.
- If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Cannot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	Hwy	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXX BLVD CLOSED

Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXXX TO XXXXXX
US XXX TO FM XXXX

Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

** Advance Notice List

TUE-FRI XX AM - X PM
APR XX - XX X PM - X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X - X XX PM - XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM - XX AM

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
- For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbol signs, such as the "Flagger Symbol" (CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
- A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.



BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

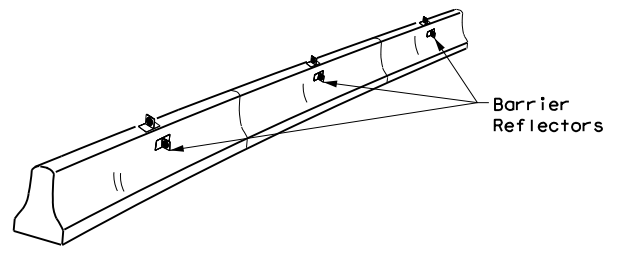
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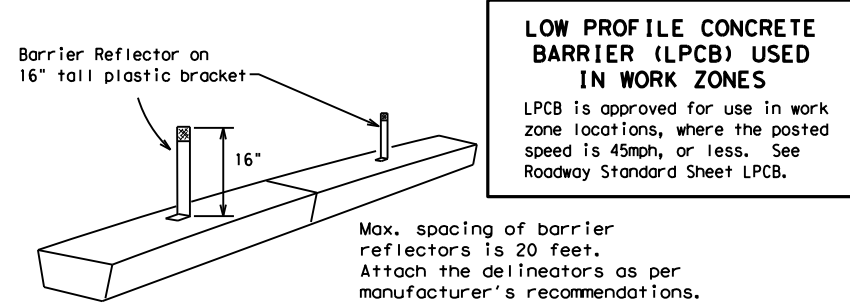
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.

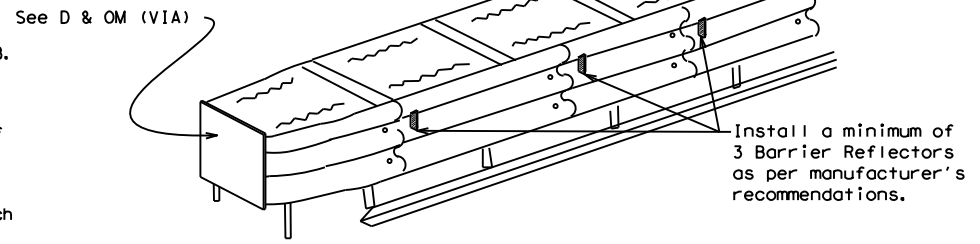


CONCRETE TRAFFIC BARRIER (CTB)



LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES
 LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
- Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional) while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.



DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES
 End treatments used on CTB's in work zones shall meet the appropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

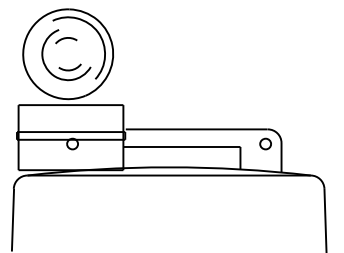
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

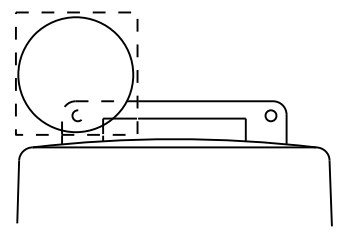
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
- Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
- The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



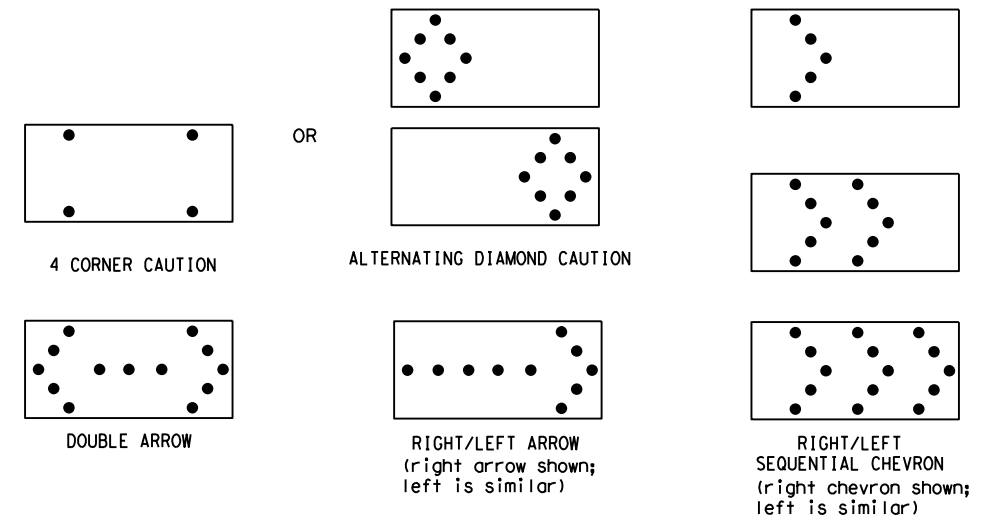
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

- The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
- The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
 Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC (7) - 21

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GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
- For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
- Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
- The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

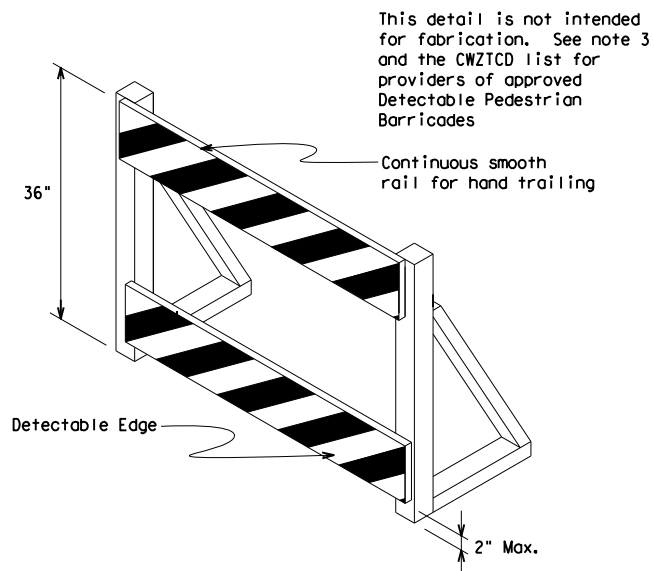
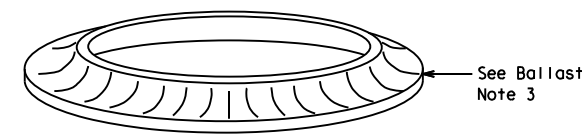
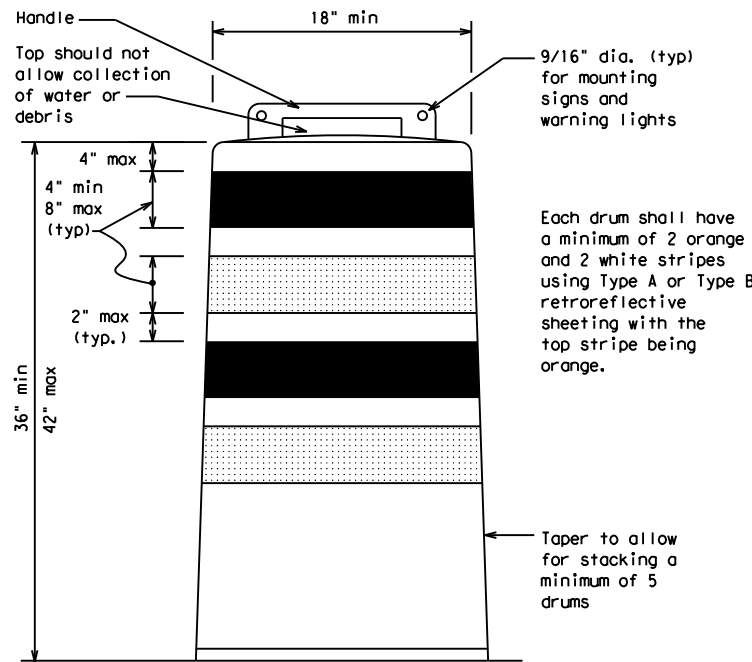
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
- Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
- The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
- The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectORIZED space between any two adjacent stripes shall not exceed 2 inches in width.
- Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
- The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

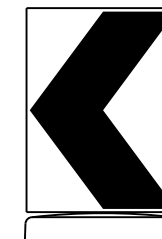
BALLAST

- Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
- Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
- When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.

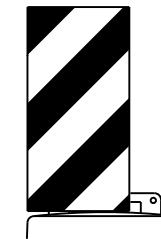


DETECTABLE PEDESTRIAN BARRICADES

- When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
- Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
- Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
- Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
- Warning lights shall not be attached to detectable pedestrian barricades.
- Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane
Divider, Driveway sign D70a, Keep Right
R4 series or other signs as approved
by Engineer



12" x 24"
Vertical Panel
mount with diagonals
sloping down towards
travel way

Plywood, Aluminum or Metal sign
substrates shall NOT be used on
plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
- R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

SHEET 8 OF 12



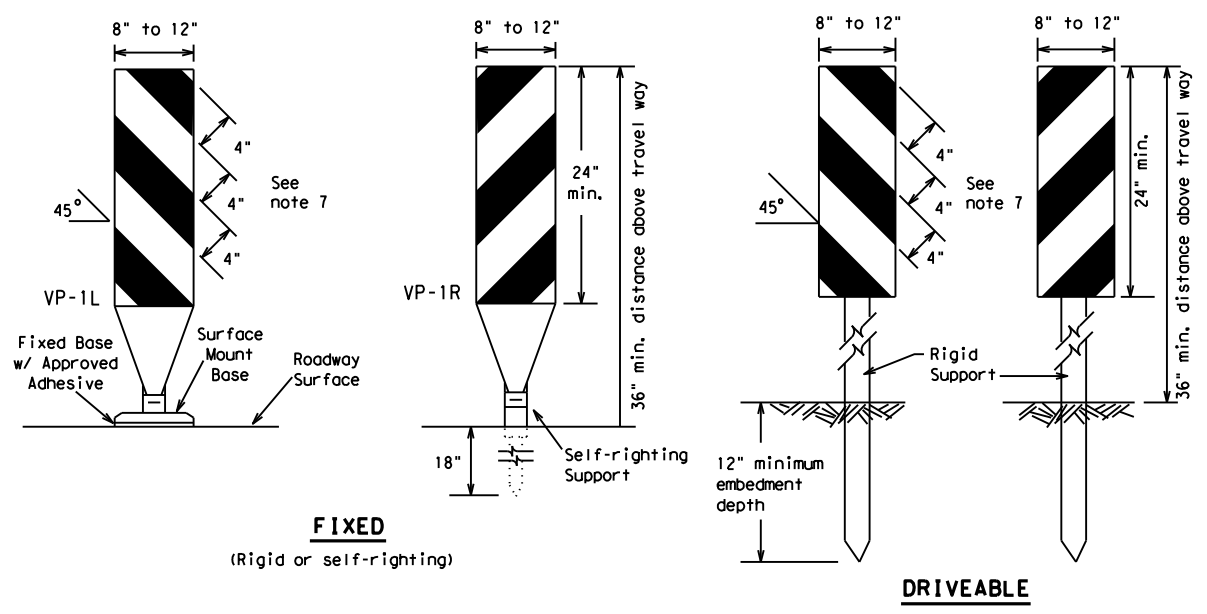
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 21

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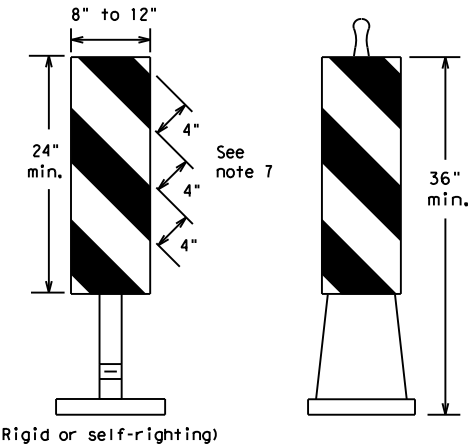
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FIXED
(Rigid or self-righting)

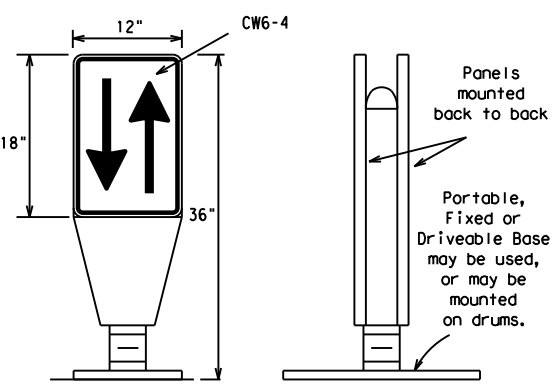
DRIVEABLE



PORTABLE

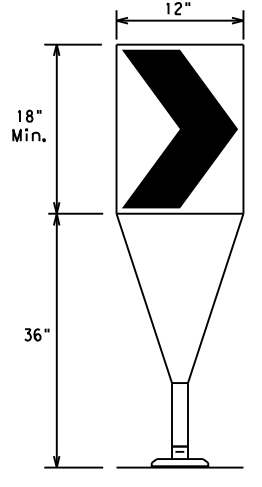
VERTICAL PANELS (VPs)

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
- VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

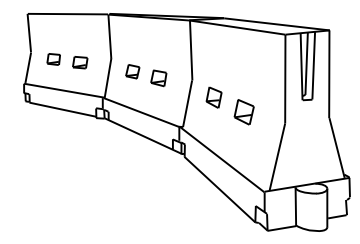
- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.



Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

- LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
- Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

GENERAL NOTES

- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
- Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
- The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

Posted Speed	Formula	Minimum Desirable Taper Lengths			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS ² / 60	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

**Taper lengths have been rounded off.
 L=Length of Taper (FT.) W=Width of Offset (FT.)
 S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 21

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TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



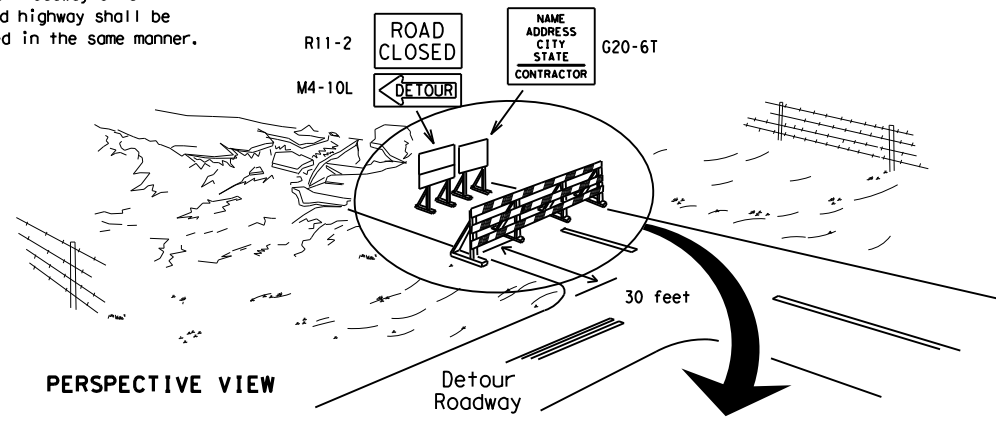
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

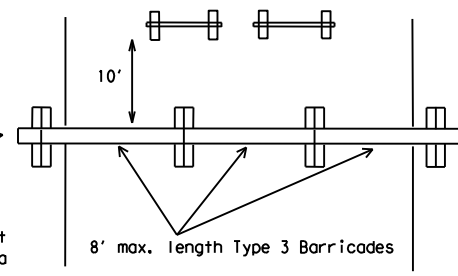
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

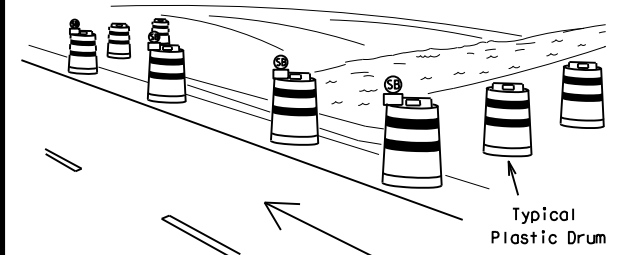
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



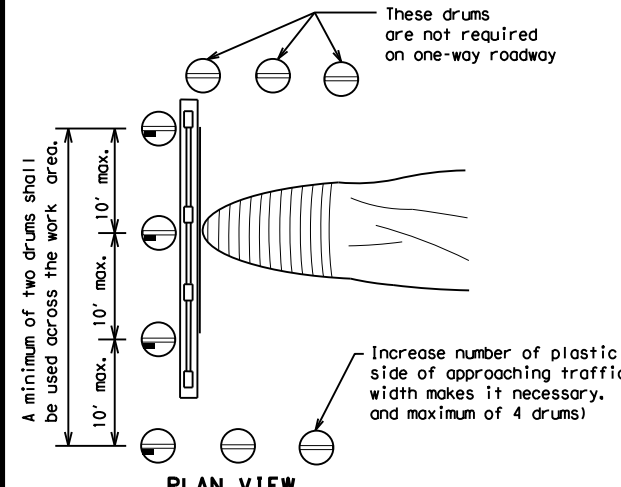
PLAN VIEW

1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

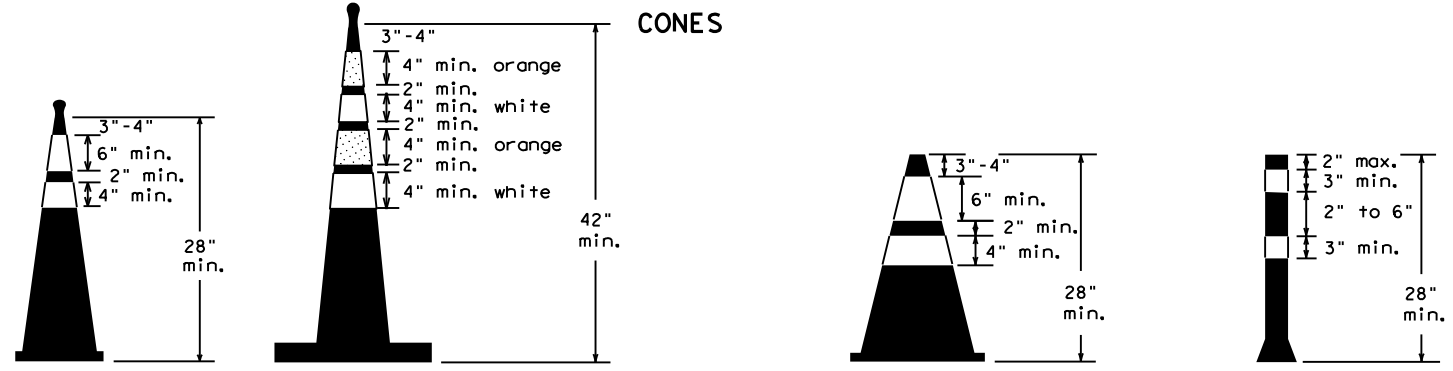


PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
	Steady burn warning light or yellow warning reflector



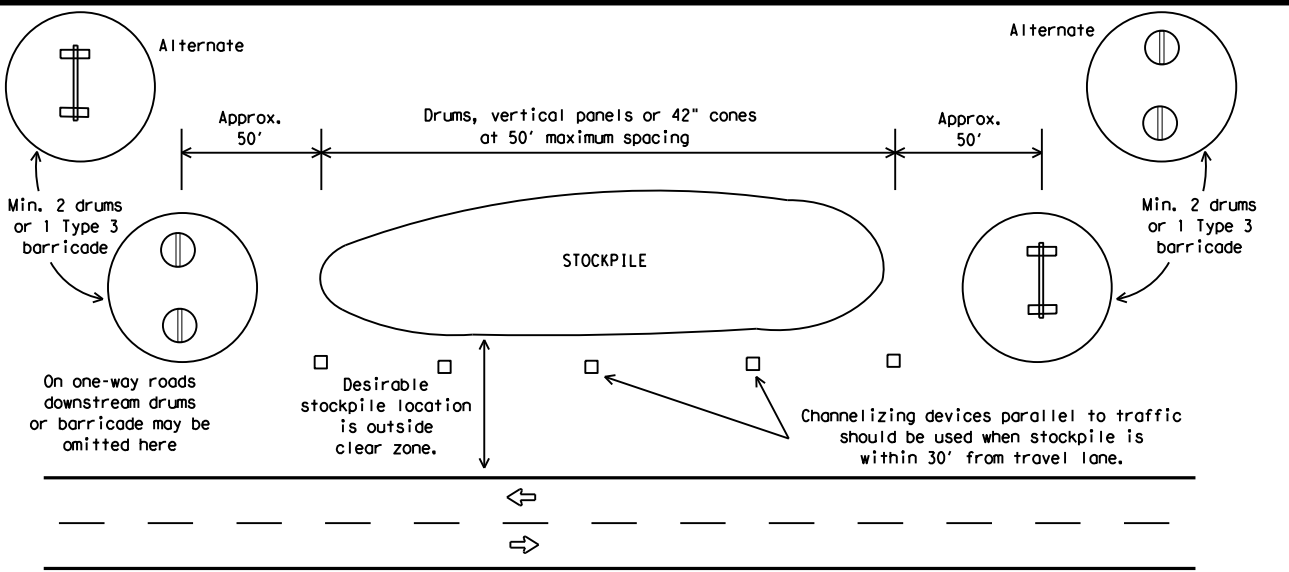
Two-Piece cones

One-Piece cones

Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.
 42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

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7-13 5-21	ODA	UPTON	59	

WORK ZONE PAVEMENT MARKINGS

GENERAL

- The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
- When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

- Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
- Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

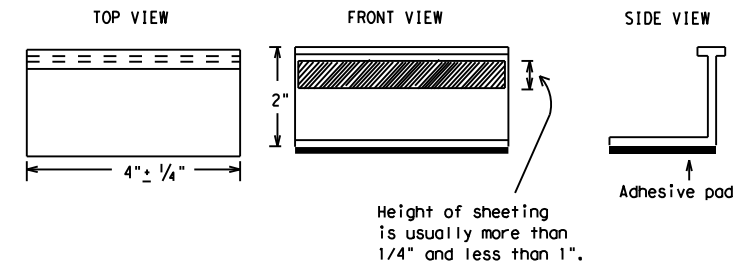
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
- The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
- Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

- Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
- The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
- Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
- Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



**STAPLES OR NAILS SHALL NOT BE USED TO SECURE
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER
TABS TO THE PAVEMENT SURFACE**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
 - Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
 - Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
- Small design variances may be noted between tab manufacturers.
- See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
 YELLOW - (two amber reflective surfaces with yellow body).
 WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

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BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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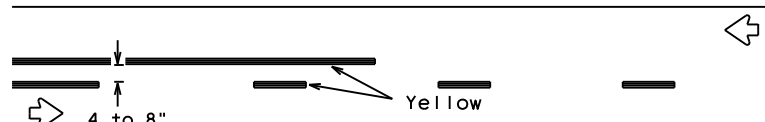
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PAVEMENT MARKING PATTERNS

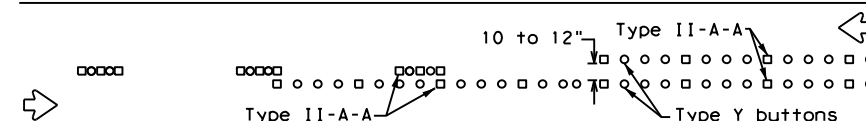


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

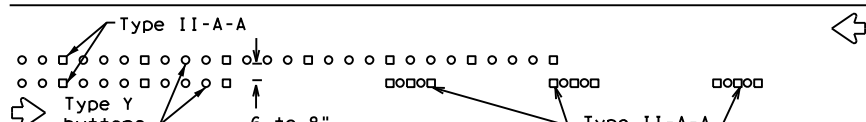


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectORIZED pavement markings.



RAISED PAVEMENT MARKERS - PATTERN A



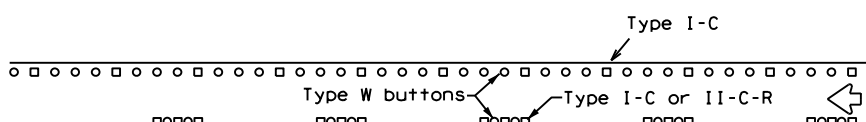
RAISED PAVEMENT MARKERS - PATTERN B

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



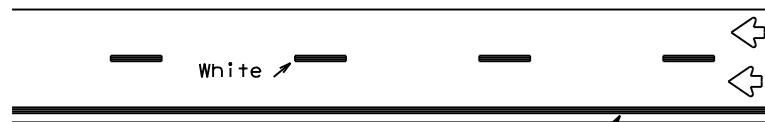
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



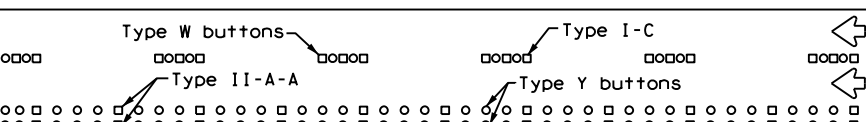
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



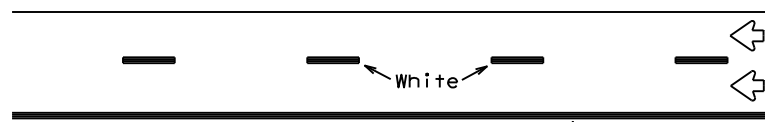
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



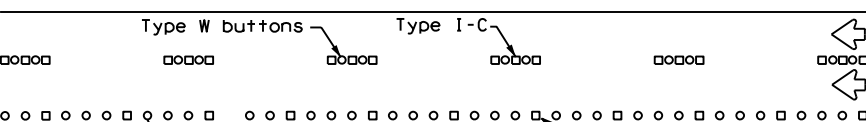
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

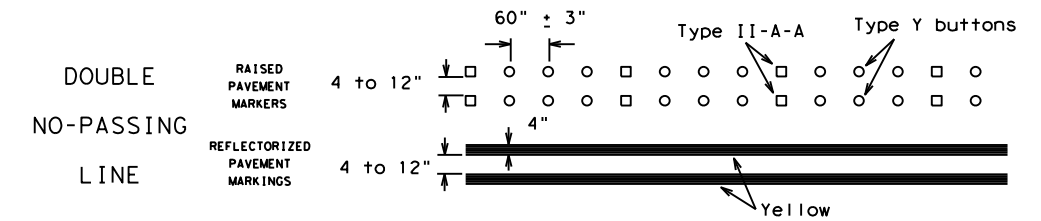
Prefabricated markings may be substituted for reflectORIZED pavement markings.



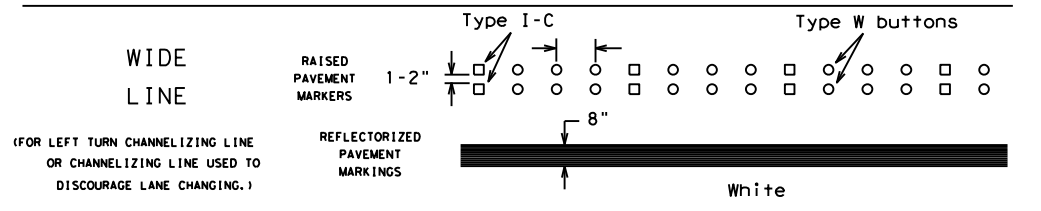
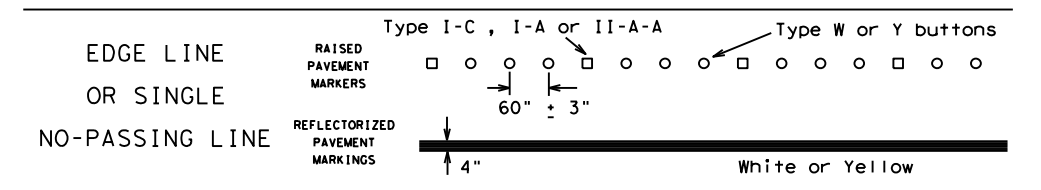
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

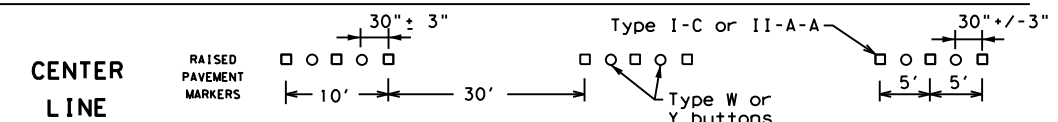
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



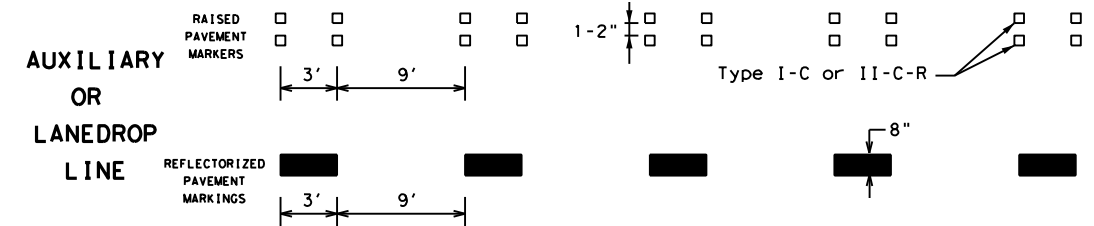
SOLID LINES



(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

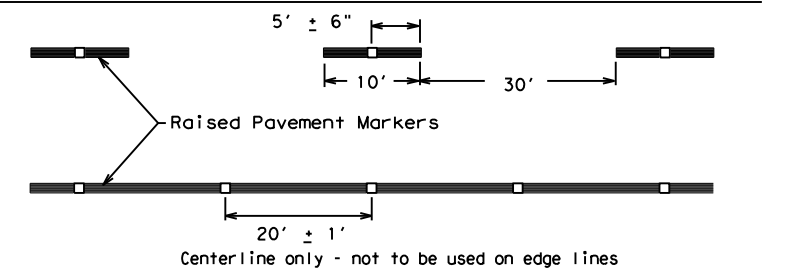


BROKEN LINES



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

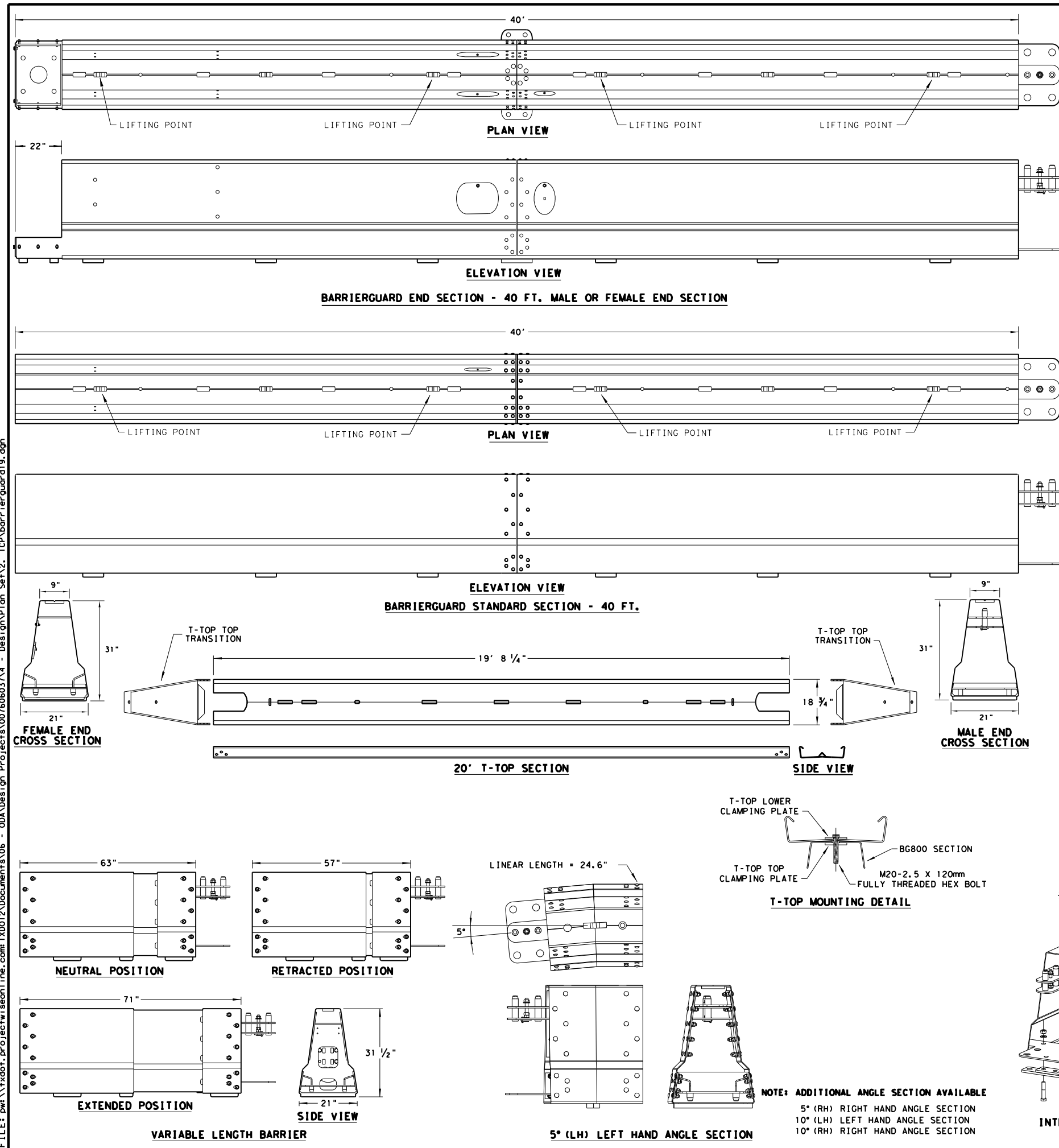
BC (12) - 21

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©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076	06	037	US 67
1-97 9-07 5-21	DIST	COUNTY	SHEET NO.	
2-98 7-13	ODA	UPTON	61	
11-02 8-14				

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

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GENERAL NOTES

1. THE SYSTEM SHOWN ON THIS DRAWING IS A PROPRIETARY BARRIER TRADED AS BARRIERGUARD 800 AND BARRIERGUARD 800 MDS AND HAS BEEN DESIGNED AND MANUFACTURED BY LAURA METAAL ROAD SAFETY INC. FOR TECHNICAL ASSISTANCE AND APPLICATION SUPPORT CONTACT LEE STUART AT LAURA METAAL ROAD SAFETY INC. AT (702) 664-2009 OR lee.stuart@laura-metaal.com
2. THE BARRIERGUARD 800 SYSTEM HAS BEEN CRASH TESTED TO MASH AND HAS FHWA APPROVAL AS A TL-3 BARRIER. THE DEFLECTION TABLE OUTLINES BASIC SYSTEM PERFORMANCE AND COMPONENT ANCHORING REQUIREMENTS.
3. THIS DRAWING PACKAGE PROVIDES THE RELEVANT INFORMATION AND GENERAL GRAPHICS REQUIRED TO IDENTIFY THE COMPONENT PARTS OF BARRIERGUARD 800 AND THEIR INCORPORATION AS A WHOLE SYSTEM FOR DEPARTMENTAL STANDARD APPLICATIONS.
4. BARRIERGUARD 800 REQUIRES ANCHORING (PINNING) AT EACH END OF THE INSTALLED LENGTH. (INTERMEDIATE ANCHORS CAN BE USED TO REDUCE DEFLECTION).
5. INSTALLATION OF BARRIERGUARD 800 OR BARRIERGUARD 800 MDS, NORMALLY STARTS WITH A MALE TERMINAL SECTION AND IS FINISHED WITH A FEMALE TERMINAL SECTION. STANDARD SECTIONS ARE USED BETWEEN THE TERMINAL SECTIONS TO OBTAIN THE REQUIRED LENGTH OF POSITIVE BARRIER PROTECTION.
6. THE FULL HEIGHT TERMINAL (FHT) SECTIONS MAY BE CAPPED WITH A FHT COVER, HOWEVER IF EXPOSED TO ON-COMING TRAFFIC THE END SHOULD BE PROTECTED WITH A SUITABLE CRASH CUSHION. THE BARRIERGUARD 800 RANGE IS COMPATIBLE WITH MOST COMMONLY USED CRASH CUSHION END TREATMENTS. FOR DETAILS OF BARRIERGUARD 800 CRASH CUSHION CONNECTIONS THAT ARE NOT DETAILED WITHIN THESE DRAWINGS, PLEASE CONTACT LAURA METAAL ROAD SAFETY INC. FOR MORE DETAILS. THE FULL HEIGHT TERMINAL COVER IS SUITABLE FOR THE "DOWN STREAM" END OF A SYSTEM THAT DOES NOT HAVE EXPOSURE TO ON-COMING TRAFFIC.
7. WHEN INSTALLING THE MINIMUM DEFLECTION SYSTEM (MDS), THE SYSTEM CAN BE INSTALLED WITH ADDITIONAL INTERMEDIATE ANCHORS ALONG THE LENGTH OF THE BARRIER RUN AT INTERVALS SHOWN IN THE DEFLECTION TABLE. EACH BARRIER RUN CAN BE MADE UP OF ANY MIXTURE OF THE SYSTEMS BY THE INTRODUCTION OF INTERMEDIATE ANCHORS AND/OR T-TOP AS REQUIRED.
8. THERE ARE SEVERAL METHODS OF ACHIEVING RADIUS IN A LENGTH OF BARRIERGUARD 800. RADIUS CAN BE ACHIEVED USING VARIOUS METHODS AND THUS ALLOWING THE BARRIERGUARD TO FOLLOW THE DESIRED CURVATURE IN THE INSTALLATION, THESE METHODS ARE, THE MOVEMENT IN THE QUICKLINK, ADJUSTABLE 20FT. SECTIONS OR SHORT ANGLED SECTIONS WHICH ALLOW A RADIUS AS LOW AS 12FT. FOR FURTHER INFORMATION AND ADVICE CONTACT LAURA METAAL ROAD SAFETY INC.
9. A BARRIERGUARD 800 VARIABLE LENGTH BARRIER (VLB) SECTION SHOULD BE USED WHEN BARRIERGUARD 800 OR BARRIERGUARD 800 MDS IS ANCHORED ACROSS A BRIDGE EXPANSION JOINT. IF T-TOP IS TO BE USED IN CONJUNCTION WITH THE VLB, THE T-TOP SHOULD BE USED FOR MINIMUM 40FT ON EITHER SIDE OF THE VLB AND TERMINATED WITH TRANSITIONS. THE VLB SECTION PROVIDES APPROXIMATELY 7in OF EXTENSION AND 7in OF CONTRACTION. MULTIPLE VLB'S CAN BE LINKED TOGETHER TO PROVIDE MORE EXPANSION OR CONTRACTION. THE VLB'S SHOULD BE PLACED IN THE VICINITY OF THE EXPANSION JOINT. THE VLB DOES NOT NEED TO BE PLACED DIRECTLY OVER THE EXPANSION JOINT BUT MUST BE BETWEEN THE NEAREST ANCHORS ON EACH SIDE OF THE JOINT. IT IS RECOMMENDED THAT THE VLB IS PLACED WITHIN 40FT OF THE JOINT.
10. THE T-TOP CAN BE INSTALLED EITHER BEFORE OR AFTER THE BARRIERGUARD 800 HAS BEEN FULLY ASSEMBLED AND ANCHORED IN PLACE. T-TOP IS REQUIRED WHEN THE BARRIERGUARD 800 IS USED AS A MDS, ANCHORED EVERY 20FT, GATE SECTIONS AND VARIABLE LENGTH BARRIERS. THE T-TOP SHOULD EXTEND 40FT ON EITHER SIDE OF THESE CONDITIONS AND BE TERMINATED WITH TRANSITIONS.
11. THE BARRIERGUARD 800 RANGE HAS BEEN DESIGNED TO BE USED ON AND HAS BEEN TESTED ANCHORED ON ASPHALT, CONCRETE AND COMPACTED SUBBASE. CONTACT LAURA METAAL ROAD SAFETY INC. FOR FURTHER INFORMATION.
12. BARRIERGUARD 800 COMPONENTS ARE MANUFACTURED IN SI [METRIC] UNITS. ENGLISH UNITS SHOWN ARE APPROXIMATE. ALL COMPONENTS ARE FULLY GALVANIZED.
13. BARRIERGUARD 800 SYSTEMS SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS DETAILED DRAWINGS, PROCEDURES AND SPECIFICATIONS. FOR ANY INSTALLATIONS OUTSIDE OF THE SCOPE OF THESE DRAWINGS PLEASE CONTACT LAURA METAAL ROAD SAFETY INC. FOR DETAILS.

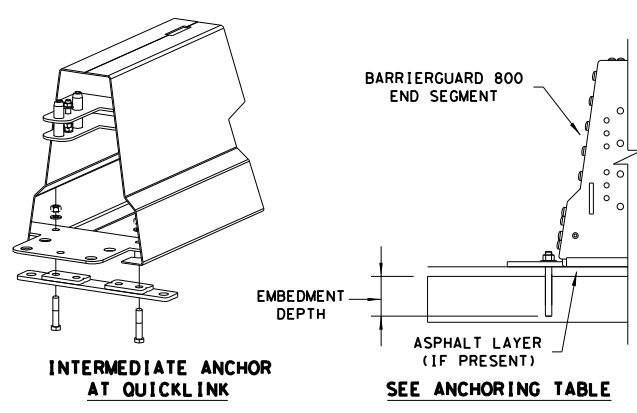
BARRIERGUARD 800 DEFLECTION TABLE

	STANDARD SYSTEM	MINIMUM DEFLECTION SYSTEMS (MDS)
DESCRIPTION	ONLY ANCHORED AT THE EXTREME ENDS OF THE BARRIER LENGTH	ANCHORED EVERY 20 FT.
DEFLECTION AT MASH TL-3	5'-6"	18 1/2"
T-TOP REQUIREMENTS	NONE REQUIRED	REQUIRED FOR MDS SECTIONS

STANDARD ANCHORING REQUIREMENTS (TABLE)

	RESIN STUD ANCHORS			DRIVEN ANCHORS		Hilti HSL-3 SHALLOW MECHANICAL
	CONCRETE *	UNREINFORCED CONCRETE *	ASPHALT	ASPHALT	SUBBASE/SOIL	CONCRETE
ANCHOR DIAMETER	1 in.	1 in.	1 in.	1-3/16 in.	5-1/2 in.	**
EMBEDMENT DEPTH	6 in.	8 in.	16 in.	16 in.	32 in.	**
DRILL DIAMETER	1-1/8 in.	1-1/8 in.	1-1/8 in.	1-3/16 in.	DRIVEN	**
PULL OUT CAPACITY (MIN)	17500 lb	17500 lb	N/A	N/A	N/A	**
SHEAR CAPACITY (MIN)	25000 lb	25000 lb	N/A	N/A	N/A	**

* ALTERNATIVE ANCHORS INCLUDING MECHANICAL ANCHORS FOR CONCRETE MAYBE USED IF THEY MEET THE STRENGTH REQUIREMENTS LISTED, DETAILS WILL BE MANUFACTURER SPECIFIC.
 ** CONTACT: LAURA METAAL ROAD SAFETY INC. FOR SPECIFIC APPLICATION.

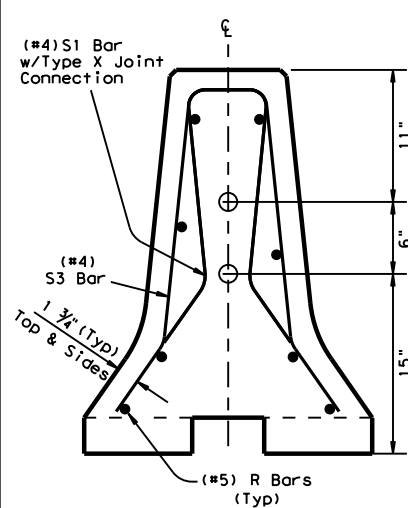


Design Division Standard

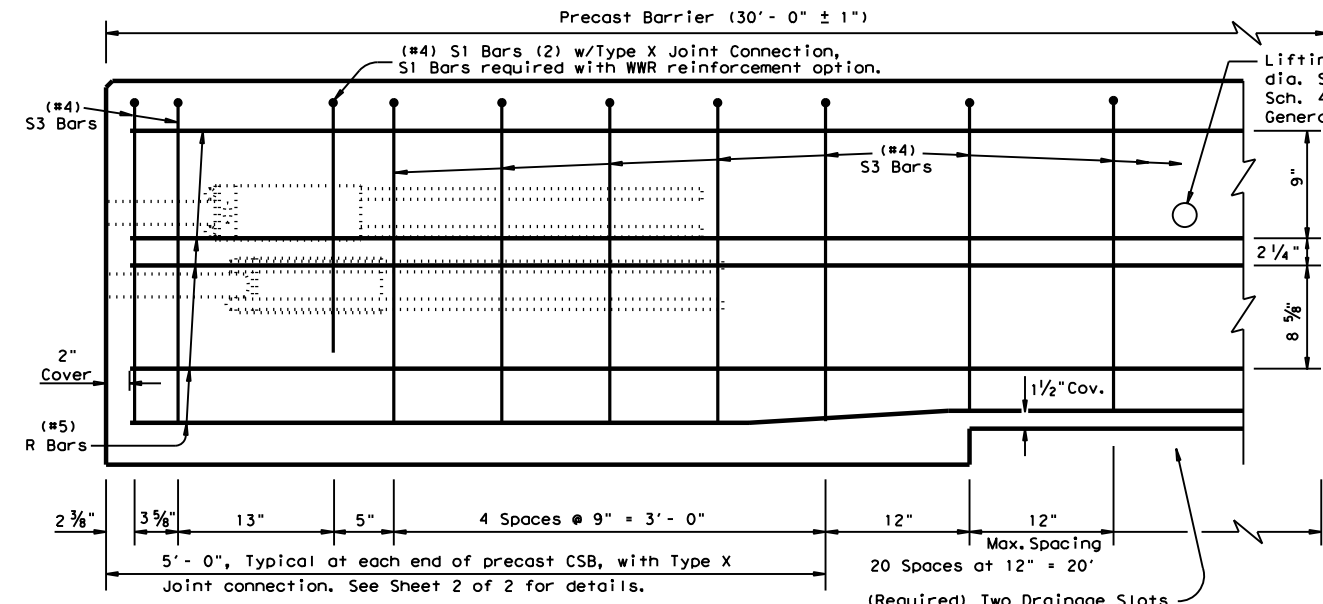
BARRIERGUARD 800 SYSTEM
STEEL BARRIER
MASH TL-3
BARRIERGUARD-19

FILE: barrierguard19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT SECT	JOB	HIGHWAY	
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	DIST	COUNTY	SHEET NO.	
	ODA	UPTON	62	

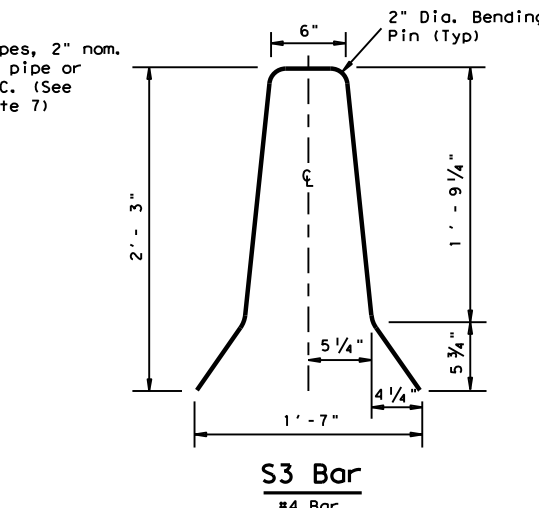
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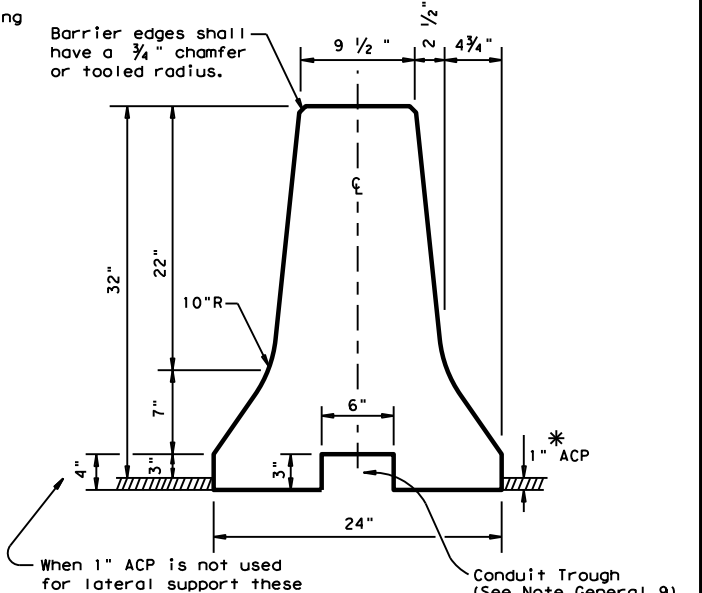
End View Precast Barrier
 See sheet 2 of 3 for Joint connection Type X



Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)
 Showing reinforcement for Joint Type X



S3 Bar
 #4 Bar

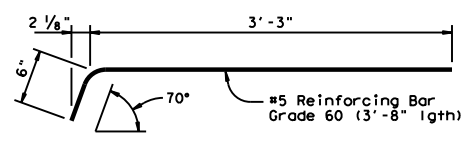


Concrete Safety Barrier

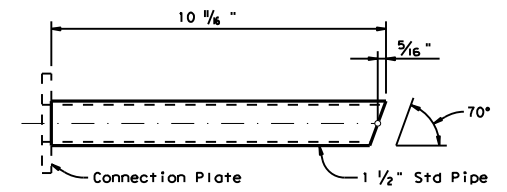
* When 1\" ACP is "not" used as lateral support for permanent barrier placement. A permissible method of attaining the equivalent lateral support may be used, See CSB(6) sheet.

GENERAL NOTES

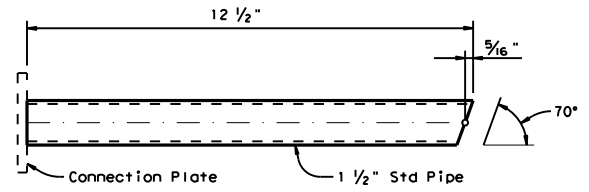
- Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
- Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
- Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
- All precast barrier edges shall have a 3/4" chamfer or toolled radius.
- All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
- All steel assemblies for joint shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
- Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
- Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items involved.
- Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.



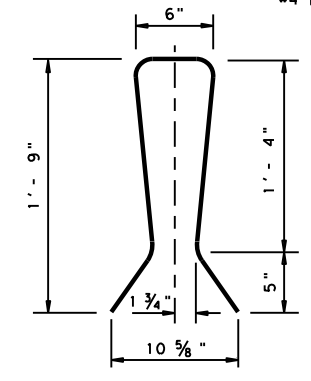
DEFORMED BAR ANCHOR DETAILS
 Two (2) Bars required per assembly. Eight (8) required per joint.



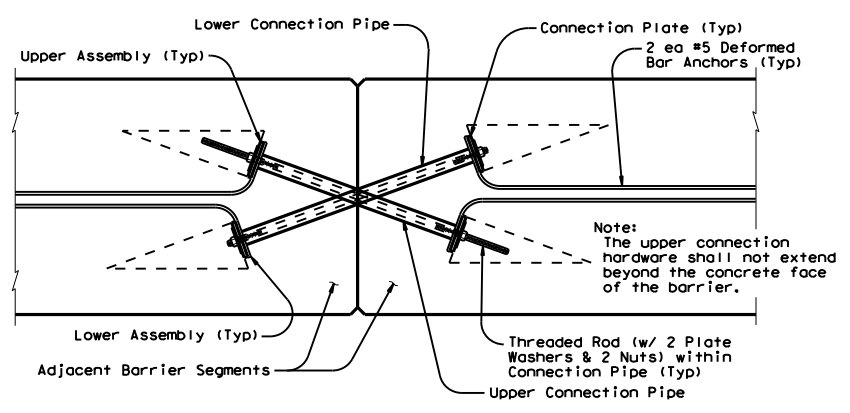
UPPER CONNECTION PIPE DETAILS
 One (1) Steel Pipe required per Upper Assembly. Two (2) required per joint.



LOWER CONNECTION PIPE DETAILS
 One (1) Steel Pipe required per Lower Assembly. Two (2) required per joint.

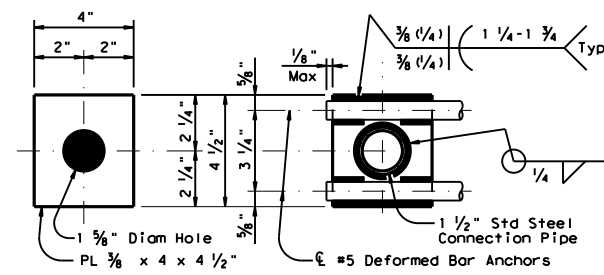


S1 Bar
 #4 Bar (2)
 (Joint Type X)

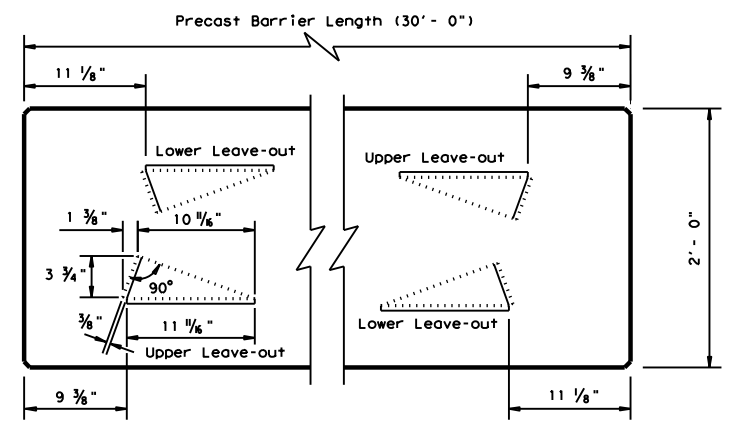


TYPE X JOINT INSTALLATION DETAIL

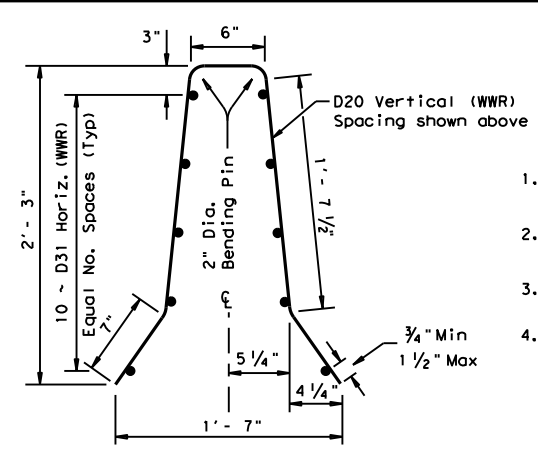
Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.



CONNECTION PLATE DETAILS
 One (1) Plate required per assembly. Four (4) required per joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.

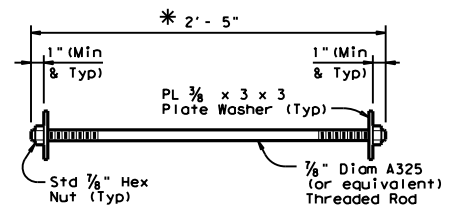


BARRIER PLAN AT END JOINTS



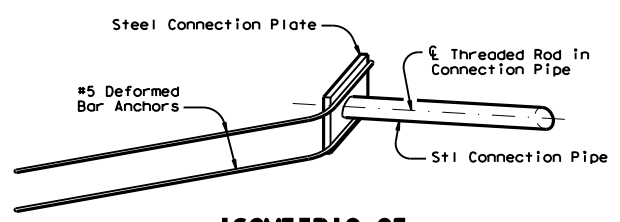
Welded Wire Reinforcement (WWR) Option for Bars R and S3
 (WWR) General Notes

- Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
- Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
- All reinforcement shall comply with Item 440, "Reinforcing Steel."
- Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".



CONNECTION BOLT OR THREADED ROD DETAIL
 Two (2) Threaded Rods (or Equivalent Hex Hd. Bolts) (w/ Two (2) PL 3/8 x 3 x 3 Plate Washers & Two (2) Std Hex Nuts) required per joint.

* The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

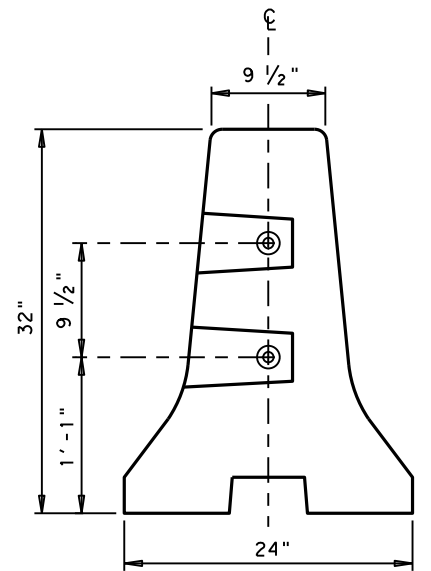
Four (4) [2 Upper & 2 Lower] Assemblies required per joint.

Weight of one Precast 30 ft. (CSB) segment = Approx. 6.5 Tons or 440 lbs per ft.

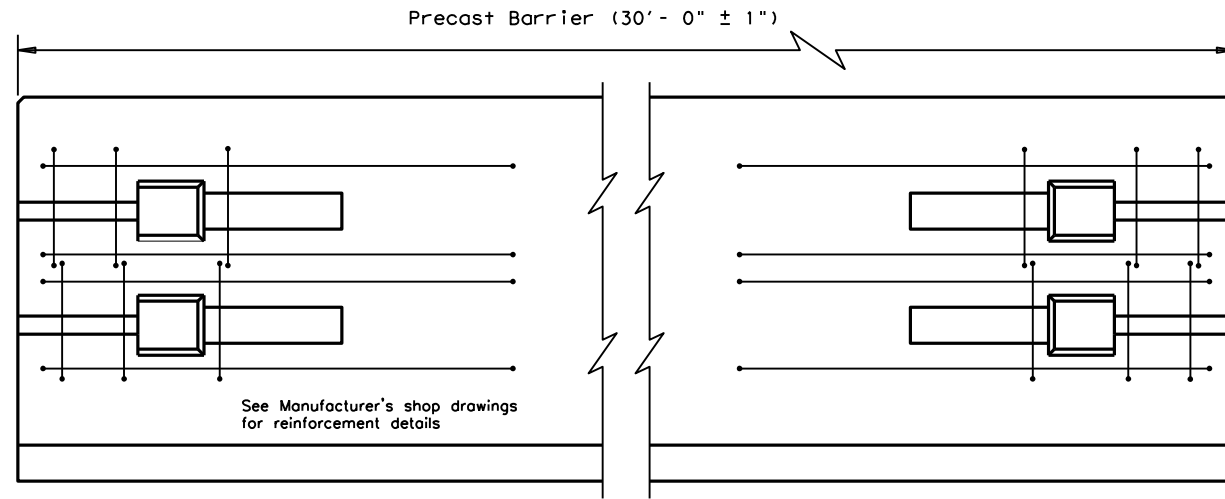
		Design Division Standard	
CONCRETE SAFETY BARRIER (F-SHAPE) PRECAST BARRIER (TYPE 1) CSB(1)-10			
FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD
© TxDOT December 2010	CONT: 0076 06	SECT: 037	HIGHWAY: US 67
REVISIONS	DIST: ODA	COUNTY: UPTON	SHEET NO.: 63

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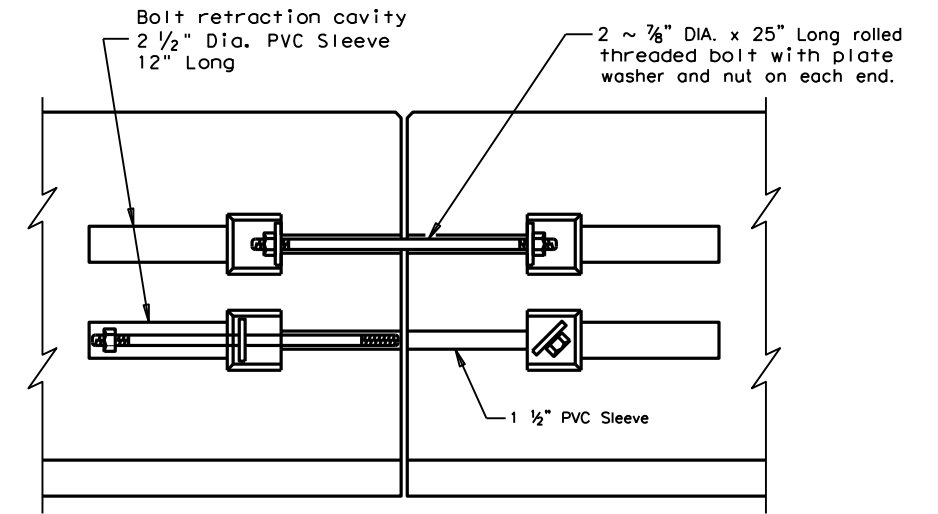
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END VIEW (CSB) QUICK-BOLT
 QUICK-BOLT POCKET LOCATIONS

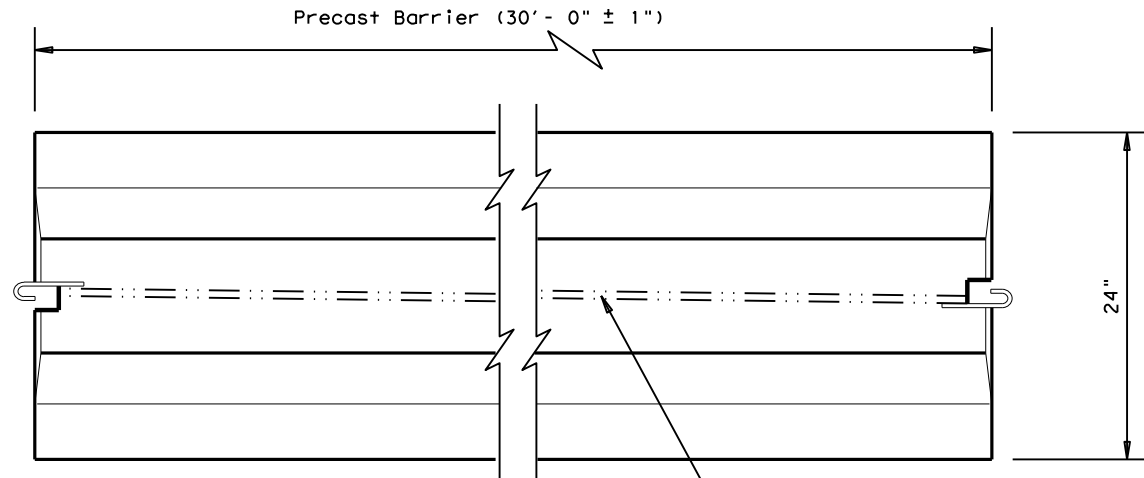


ELEVATION (CSB) QUICK-BOLT
 See Manufacturer's shop drawing for additional details

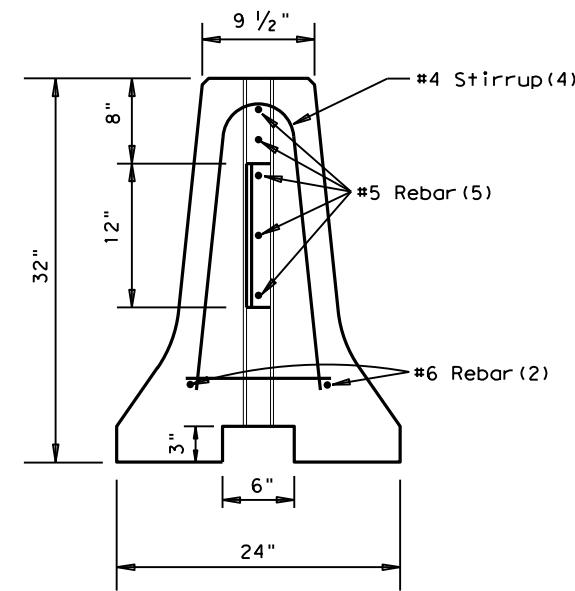


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

Joint Connection (Type Q)

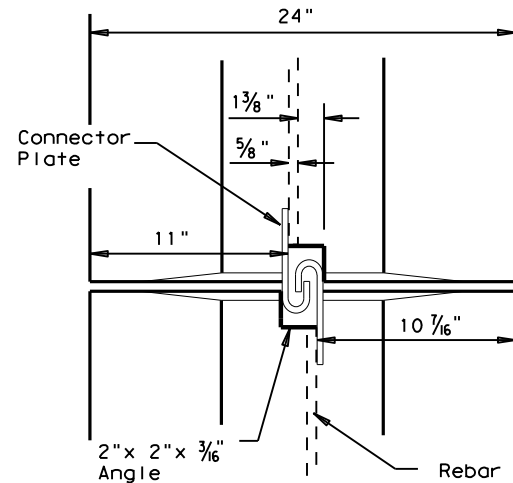


TOP VIEW
PRECAST (CSB) WITH J-J HOOKS
 See Manufacturer's shop drawing for additional details



END VIEW
J-J HOOK CONNECTION

Joint Connection (Type J)



VIEW FROM ABOVE
J-J HOOK CONNECTION

Proprietary Joint Connections (CSB)

Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

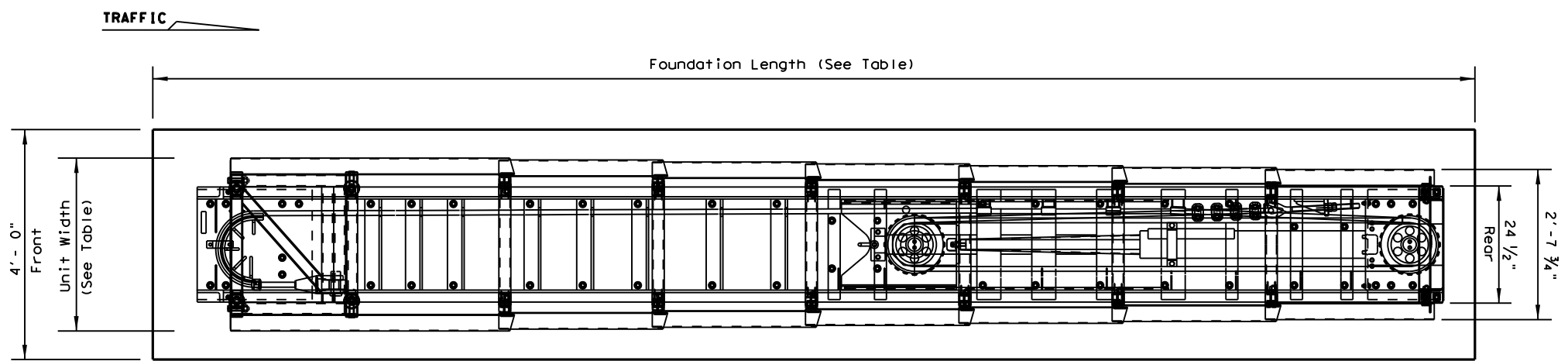
J-J Hooks by Easi-Set Industries, (800)547-4045
 Quick-Bolt by Bexar Concrete, (210)497-3773

If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.

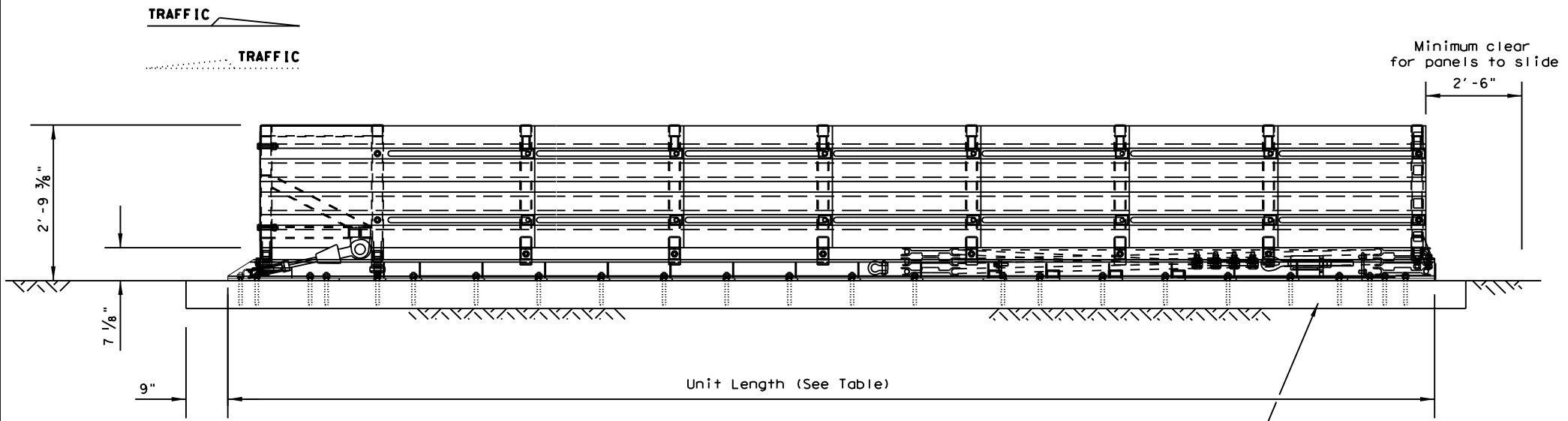
SHEET 2 OF 2

		<i>Design Division Standard</i>	
CONCRETE SAFETY BARRIER (F-SHAPE) PRECAST BARRIER (TYPE 1) CSB(1)-10			
FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD
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REVISIONS	0076 06	037	US 67
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PLAN VIEW



ELEVATION VIEW

6" Reinforced pad shown
(See Foundation Options)

GENERAL NOTES

1. For specific information regarding installation and technical guidance of the system, contact: Work Area Protection, Corp. at (800) 327-4417, or (630) 377-9100.
2. For bi-directional traffic, appropriate transition panels will be required.
3. Additional details for the transition option and foundation option will be shown on the manufacturer's shop drawings furnished to the Engineer.
4. Concrete shall be class "S" with a minimum compressive strength of 4,000 psi.
5. Maximum permissible cross-slope is 8%.
6. The installation area should be free from curbs, elevated objects, or depressions.
7. The SCI100GM & SCI70GM systems should be approximately parallel with the barrier or ϕ of merging barriers.

For attachment and transitions to other shapes, barriers, railings and bi-directional traffic flows are available. (See manufacturer's product manual)

NOTE: Side Panels can travel 30" beyond the last terminal brace at the rear of the cushion. All objects that may interfere with this motion can affect performance of and may cause undue damage to the crash cushion.

MODEL	TEST LEVEL	UNIT LENGTH (approx.)	UNIT WIDTH	FOUNDATION LENGTH	OBSTACLE WIDTH
SCI70GM	TL-2	13'-6"	2'-10 5/8"	15'- 6 1/4"	24" to 36"
SCI100GM	TL-3	21'-6"	3'-1 1/2"	23'- 0"	24" to 36"

System and pad lengths vary depending on backup type.

FOUNDATION OPTIONS
6" Reinforced Concrete (5 1/2" Anchor Embedment)
8" Unreinforced Concrete (5 1/2" Anchor Embedment)
3" Min. Asphalt over 3" Min. Concrete (16 1/2" Anchor Embed.)
6" Asphalt over 6" Compact Subbase (16 1/2" Anchor Embed.)
8" Minimum Asphalt (16 1/2" Anchor Embedment)

For steel placement in concrete foundations, see manufacturer's product manual.

TRANSITION OPTIONS
Concrete Vertical Wall
Concrete Traffic Barriers
Guardrail (W-Beam)
Guardrail (Thrie-Beam)

Transition types are shown elsewhere on the plans (i.e. Attenuator location details or in the general notes).

For bi-directional transition panel and end shoe details, see manufacturer's product manual.



WORK AREA PROTECTION CORP (SMART-NARROW) SMTN (N) - 16

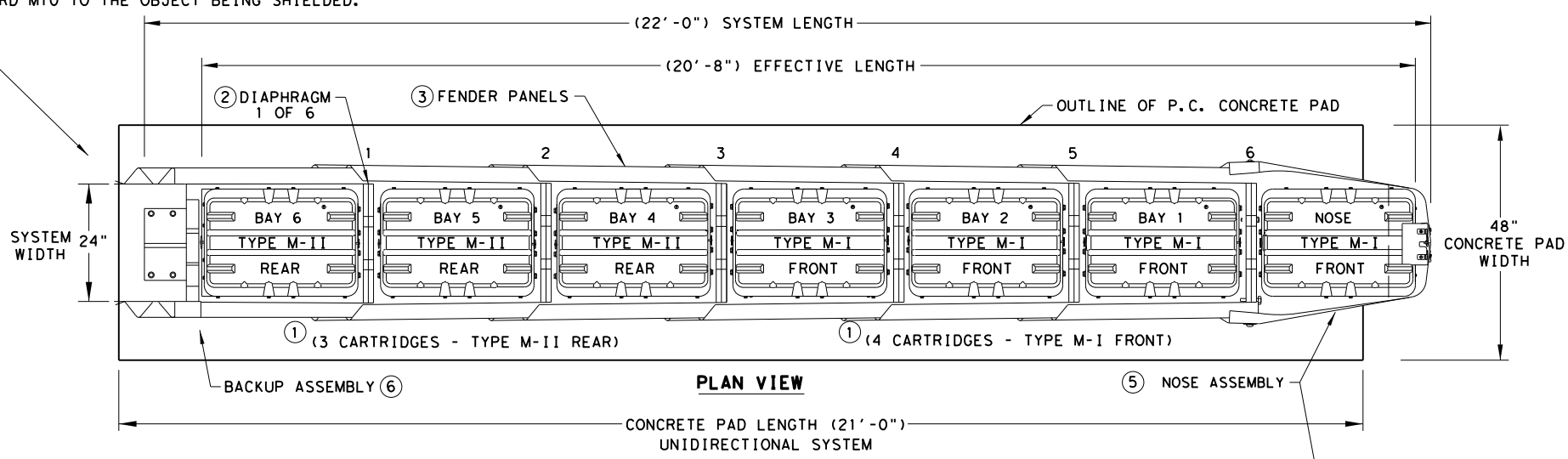
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© TxDOT: February 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076	06	037	US 67
REVISED 06, 2013 (VP)	DIST	COUNTY	SHEET NO.	
REVISED 03, 2016 (VP)	ODA	UPTON	65	

LOW MAINTENANCE

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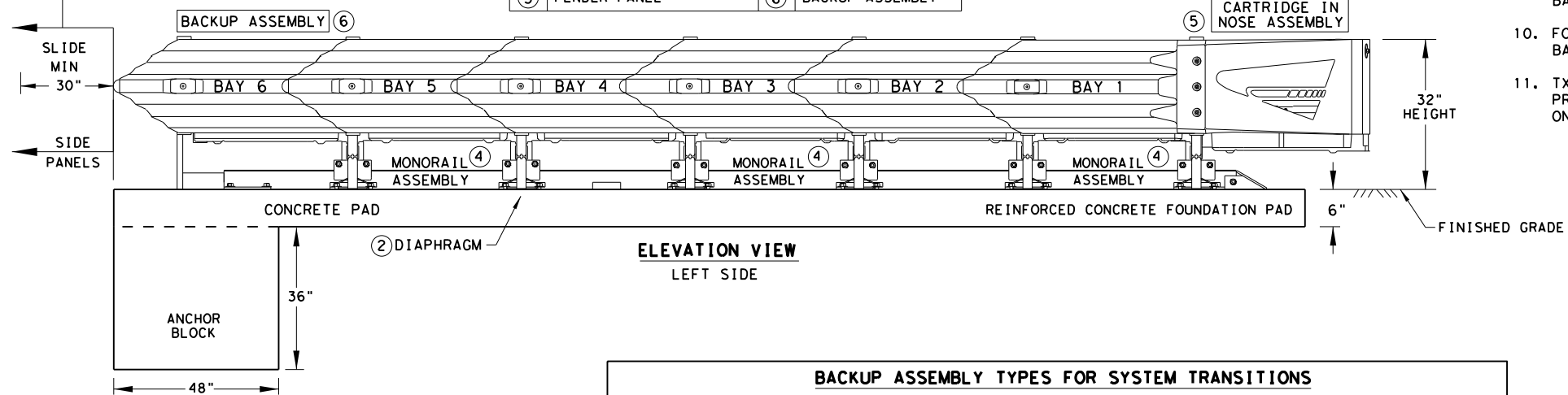
NOTE:
A TRANSITION MAY BE REQUIRED TO INSTALL THE QUADGUARD M10 TO THE OBJECT BEING SHIELDED.

QUADGUARD M10 24" WIDE 6-BAY SYSTEM

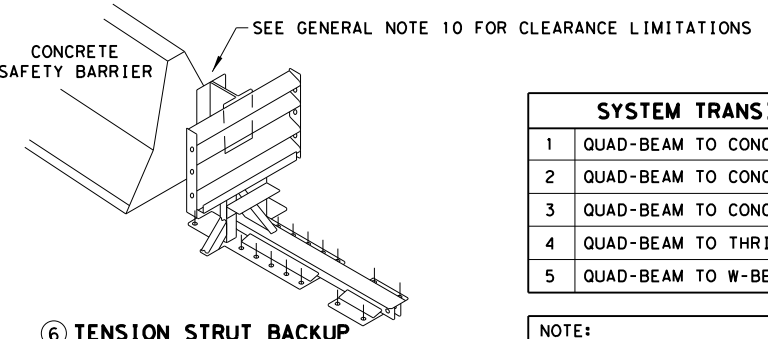


KEY		KEY	
①	QUADGUARD CARTRIDGE	④	MONORAILS
②	DIAPHRAGM	⑤	NOSE ASSEMBLY
③	FENDER PANEL	⑥	BACKUP ASSEMBLY

NOTE:
PROVISION SHALL BE MADE FOR REAR FENDER SIDE PANELS TO SLIDE REARWARD UPON IMPACT, 30" MIN.



BACKUP ASSEMBLY TYPES FOR SYSTEM TRANSITIONS



SYSTEM TRANSITIONS TYPES	
1	QUAD-BEAM TO CONCRETE SAFETY BARRIER
2	QUAD-BEAM TO CONCRETE BRIDGE RAIL
3	QUAD-BEAM TO CONCRETE END SHOE
4	QUAD-BEAM TO THRIE-BEAM RAIL
5	QUAD-BEAM TO W-BEAM RAIL

NOTE:
TRANSITION ASSEMBLIES FOR THE QUADGUARD M10 TO THRIE-BEAM OR W-BEAM FENCE REQUIRES I-BEAM POSTS:
ALL POSTS W6X8.5/9 I-BEAMS (78" LONG).

NOTE:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR THE CORRECT BACKUP ASSEMBLY AND TRANSITION PANELS OR SIDE PANELS USED FOR STANDARD AND BI-DIRECTIONAL INSTALLATIONS: AT DIVIDED-HIGHWAY MEDIANS OR UNDIVIDED ROADWAYS WHERE THE SYSTEM IS EXPOSED TO IMPACTS FROM ONE OR TWO DIFFERENT DIRECTIONS OF TRAFFIC FLOW.

GENERAL NOTES

- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY - ENERGY ABSORPTION INC. AT 1 (888) 323-6374.
- SEE THE RECENT QUADGUARD M10 PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS AND THE DRAWING PACKAGE FOR THE NARROW 24" SYSTEM BEFORE INSTALLING THE QUADGUARD M10 SYSTEM AT ANY GIVEN LOCATION.
- FOR BI-DIRECTIONAL TRAFFIC: THE PLACEMENT OF THE QUADGUARD M10 IS RESTRICTED. AS BI-DIRECTIONAL TRAFFIC APPROACHES THE REAR OF THE QUADGUARD M10 THE CRASH CUSHION MUST BE PLACED SUCH THAT THE TRAFFIC SIDE OF CRASH CUSHION IS AT LEAST AS FAR FROM ADJACENT TRAVEL LANE LINE AS THE TRAFFIC SIDE OF BARRIER/OBJECT BEING SHIELDED.
- SYSTEM TRANSITION: APPROPRIATE TRANSITION PANELS OR SIDE PANELS WILL BE REQUIRED FOR PROPER IMPACT PERFORMANCE. THE CORRECT PANEL(S) TO USE WILL DEPEND ON THE DIRECTION OF TRAFFIC FLOW AND WHAT TYPE OF BARRIER OR ROAD FEATURE THE QUADGUARD M10 SYSTEM IS SHIELDING. SEE THE QUADGUARD M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL FOR FURTHER DETAILS.
- COMPONENTS FOR THE QUADGUARD M10 BACKUP AND REINFORCING DETAILS ARE SHOWN ON THE QUADGUARD M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL.
- CONCRETE PAD SHALL BE 6" MIN. REINFORCED 28MPa [4,000 PSI] (P.C.) OR 8" MIN. NON-REINFORCED 28MPa [4,000 PSI] CONCRETE ROADWAY MEASURING AT LEAST 12'-0" WIDE BY 50'-0" LONG. ANCHOR BLOCK IS NOT REQUIRED WHEN USING 8" CONCRETE PAD INSTALLED AGAINST AN IMMOVABLE STRUCTURE, E.G. CONCRETE WALL.
- IF THE CROSS-SLOPE VARIES MORE THAN 2% OVER THE LENGTH OF THE SYSTEM, THE CONCRETE PAD WILL REQUIRE LEVELING. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
- THE INSTALLATION AREA SHOULD BE FREE OF CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
- THE QUADGUARD M10 SYSTEM SHOULD BE INSTALLED APPROXIMATELY PARALLEL WITH THE BARRIER.
- FOR THE TENSION STRUT BACKUP THE DISTANCE BETWEEN THE BACK OF BACKUP AND THE BARRIER WALL SHOULD NOT EXCEED 7" IN ANY CASE.
- TXDOT HAS ONLY APPROVED THE 24" WIDE QUADGUARD M10 SYSTEM. THE QUADGUARD M10 PRODUCT DESCRIPTION AND ASSEMBLY MANUAL INCLUDES SYSTEM WIDTH OF 24". ONLY THE 24" SYSTEM IS ALLOWED TO BE INSTALLED ON TEXAS ROADWAYS.

FOUNDATION & ANCHORING REQUIREMENTS
FOUNDATION TYPES: A, B, C, & D

FOUNDATION TYPE: A	REINFORCED CONCRETE PAD OR ROADWAY
FOUNDATION:	6" MINIMUM DEPTH (P.C.C.)
ANCHORAGE:	7" STUDS EMBEDDED 5 1/2" - APPROVED ADHESIVE
FOUNDATION TYPE: B	ASPHALT OVER P.C.C.
FOUNDATION:	3" MIN. (A.C.) OVER 3" MIN. (P.C.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 1/2" - APPROVED ADHESIVE
FOUNDATION TYPE: C	ASPHALT OVER SUBBASE
FOUNDATION:	6" MIN. (A.C.) OVER 6" MIN. (C.S.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 1/2" - APPROVED ADHESIVE
FOUNDATION TYPE: D	ASPHALT ONLY
FOUNDATION:	8" MIN. (A.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 1/2" - APPROVED ADHESIVE

KEY:
ASPHALT CONCRETE (A.C.)
COMPACTED SUBBASE (C.S.)
PORTLAND CEMENT CONCRETE (P.C.C.)

NOTE: SEE TRINITY'S PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR THE APPROVED ADHESIVE.
IF THE UNIT IS ANCHORED TO ASPHALTIC CONCRETE, IT SHOULD BE RELOCATED TO FRESH, UNDISTURBED ASPHALT AND RE-ANCHORED AFTER EACH IMPACT TO ENSURE ADEQUATE FUTURE PERFORMANCE.

TENSION STRUT BACKUP MAY BE USED IN CONSTRUCTION ZONES ON ASPHALT CONCRETE (A.C.) FOR TEMPORARY USE ONLY.

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR CONCRETE PAD AND ANCHOR BLOCK INSTALLATION REQUIREMENTS.

A MANUFACTURER'S DRAWING PACKAGE UNIQUE AND SPECIFIC FOR THE QUADGUARD M10 (N) INSTALLATION AND DETAILED INFORMATION REGARDING THE TYPE OF BACKUP ASSEMBLY FOR THE REQUIRED TRANSITION WILL BE PROVIDED TO THE ENGINEER AND INSTALLER.

6" REINFORCED CONCRETE PAD REQUIRES THE INSTALLATION OF AN ANCHOR BLOCK AS SHOWN ON THE MANUFACTURER'S DRAWING PACKAGE.

8" NON-REINFORCED CONCRETE PAD MAY NOT REQUIRE AN ANCHOR BLOCK, IF THE PAD IS INSTALLED AGAINST AN IMMOVABLE CONCRETE BACKUP.

CONCRETE PAD AND ANCHOR BLOCK COMBINATIONS SHALL BE CONFIRMED WITH THE MANUFACTURER BASED UPON SITE SPECIFIC DATA (SSD).

NOTE:
THE QUADGUARD M10 24" WIDE 6-BAY - NARROW SYSTEM HAS BEEN TESTED TO MASH TEST LEVEL 3.

TL-3 MODEL #	QM10024	CARTRIDGE TYPES IN BAYS		
BAYS	6	TYPE-MII	TYPE-MI	TYPE-MI
DIAPHRAGMS	6	3	3	1
WIDTH	24"	REAR	FRONT	NOSE

TL-2 MODEL #	QM7024	CARTRIDGE TYPES IN BAYS		
BAYS	3	TYPE-MII	TYPE-MI	TYPE-MI
DIAPHRAGMS	3	1	2	1
WIDTH	24"	REAR	FRONT	NOSE

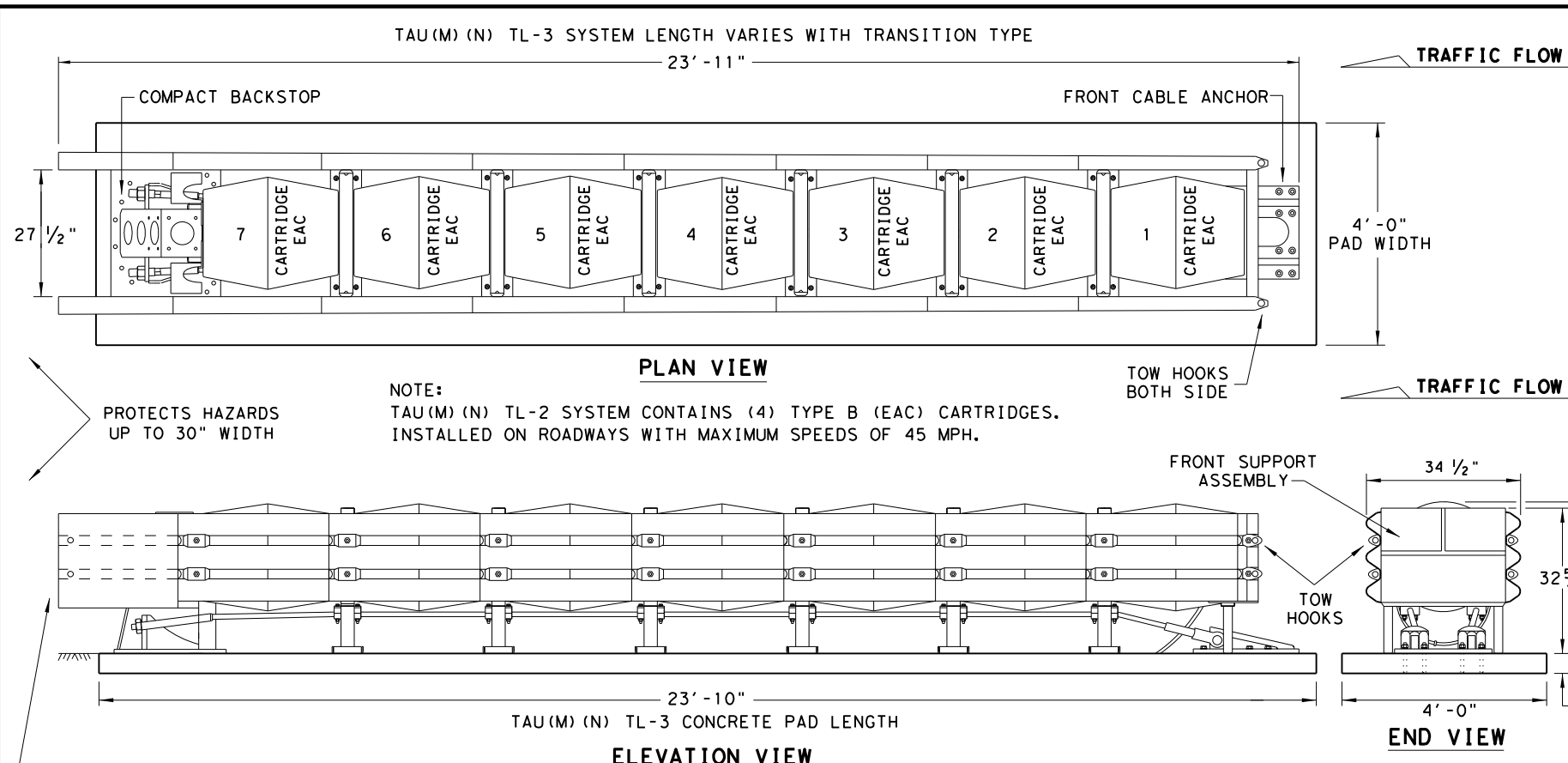
NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE QUADGUARD M10 SYSTEM AND IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

REUSABLE

		Design Division Standard	
TRINITY HIGHWAY ENERGY ABSORPTION QUADGUARD M10 (MASH TL-3 & TL-2 NARROW-24" ONLY)			
QUADGUARD (M10) (N) - 20			
FILE: qguardm10n20.dgn	DN: TXDOT	CK: KM	DW: VP
© TXDOT: NOVEMBER 2020	CONT SECT	JOB	HIGHWAY
REVISIONS	0076 06	037	US 67
	DIST	COUNTY	SHEET NO.
	ODA	UPTON	66

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- ### GENERAL NOTES
- FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
 - REFER TO THE LATEST (LTS) INSTALLATION INSTRUCTION MANUAL FOR IMPORTANT SAFETY MESSAGES, COMPLETE SYSTEM ASSEMBLY, AND ANCHOR INSTALLATION REQUIREMENTS FOR THE NINE (9) DIFFERENT SITE TRANSITIONS.
 - INSTALLATION DETAILS FOR THE COMPACT BACKSTOP, FRONT CABLE ANCHOR AND FOUNDATION OPTIONS ARE SHOWN ON THE INSTALLATION INSTRUCTION MANUAL FURNISHED TO THE ENGINEER.
 - CONCRETE SHALL BE CLASS "S" WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 P.S.I.
 - IF THE CROSS-SLOPES VARIES MORE THAN 2% OVER THE LENGTH OF THE SYSTEM, THE CONCRETE PAD WILL REQUIRE LEVELING. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%
 - THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
 - THE TAU(M) (N) SYSTEM SHOULD BE APPROXIMATELY PARALLEL WITH THE BARRIER OR CENTER LINE OF MERGING BARRIERS.
 - THIS DRAWING REPRESENTS THE UNIVERSAL TAU(M) (N) TL-3 SYSTEM, A RE-DIRECTIVE NON-GATING CRASH CUSHION THAT CAN PROTECT HAZARDS UP TO 30-INCHES IN WIDTH. ALSO AVAILABLE IN TL-2 CONFIGURATION.
- NOTE: PAD THICKNESS VARIES - SEE FOUNDATION OPTIONS

NOTE: TAU(M) (N) TL-2 SYSTEM CONTAINS (4) TYPE B (EAC) CARTRIDGES. INSTALLED ON ROADWAYS WITH MAXIMUM SPEEDS OF 45 MPH.

PROTECTS HAZARDS UP TO 30" WIDTH

NOTES:
 TRANSITIONS AND ATTACHMENTS TO VARIOUS BARRIER SHAPES, RAILINGS AND BI-DIRECTIONAL TRAFFIC FLOWS ARE AVAILABLE. SEE MANUFACTURER'S INSTALLATION INSTRUCTIONS MANUAL FOR ADDITIONAL TRANSITION DETAILS.

NOTE:
 CONCRETE FOUNDATION PAD LENGTH VARIES WITH TL-3 AND TL-2 SYSTEMS, SEE SYSTEM & FOUNDATION LENGTH TABLE.

BILL OF MATERIALS FOR TAU(M) (N) TL-3 & TL-2 SYSTEMS		QUANTITIES	
PART NUMBER	PART DESCRIPTION	TL-3 SYSTEM	TL-2 SYSTEM
BSI-1708019-00	SLIDING PANEL GALVANIZED TAU(M) (N)	14	8
BSI-1708030-00	END PANEL, THRIE BEAM, GALV, TAU(M) (N)	2	2
BSI-1706001-00	CABLE ASSEMBLY, 7 BAY, TAU(M) (N)	2	-
BSI-1805036-00	CABLE ASSEMBLY, 4 BAY, TAU(M) (N)	-	2
BSI-1708018-00	FRONT CABLE ANCHOR	1	1
BSI-1707034-00	COMPACT BACKSTOP	1	1
B030703	MIDDLE SUPPORT ASSEMBLY	6	3
B030704	FRONT SUPPORT	1	1
B010722	ENERGY ABSORBING CARTRIDGE, TYPE B	7	4
K001005	TAU-II FRONT SUPPORT LEG KIT	1	1
BSI-1709083-KT	TETHER KIT (INCLUDES ALL HARDWARE)	1	1
BSI-1809041-KT	SLIDER KIT (INCLUDES ALL HARDWARE)	7	4
BSI-1808033-KT	CABLE GUIDE KIT (INCLUDES ALL HARDWARE)	6	3
BSI-1809040-KT	TOW HOOK KIT (INCLUDES ALL HARDWARE)	1	1
BSI-1808034-KT	DELINEATION BRACKET KIT (INCLUDES ALL HARDWARE)	1	1
BSI-1808035-KT	END PANEL MOUNT KIT (INCLUDES ALL HARDWARE)	1	1
BSI-1808036-KT	CONCRETE ANCHORING KIT	1	1
SEE NOTE	HIGH REFLECTIVE DECAL	1	1
ECN 3883	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

FOUNDATION OPTIONS
6" REINFORCED CONCRETE
8" UNREINFORCED CONCRETE
ASPHALT OVER CONCRETE WITH MINIMUM 6" EMBEDMENT IN CONCRETE
6" ASPHALT OVER 6" COMPACT SUBBASE
8" MINIMUM ASPHALT

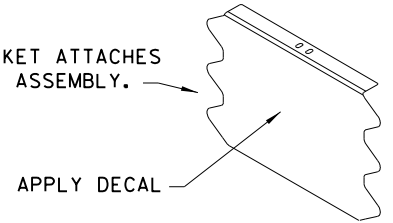
SYSTEM & FOUNDATION LENGTH TABLE	
SYSTEM LENGTH	FOUNDATION LENGTH
TL-2 = 15'-5"	TL-2 = 15'-4"
TL-3 = 23'-11"	TL-3 = 23'-10"

* NOTE:
 REQUIRES AN ASPHALT ANCHORAGE PACKAGE: INCLUDES ADDITIONAL BRACES FOR THE FRONT CABLE ANCHOR AND THE COMPACT BACKSTOP, AND ASPHALT HARDWARE KIT. THE TL-3 ASPHALT CONFIGURATION ALSO REQUIRES NESTED SLIDER PANELS AND SHIMS AT THE LAST TWO BAYS. SEE MANUFACTURER'S INSTALLATION INSTRUCTION MANUAL FOR DETAILS.

NOTE:
 SEE MANUFACTURER'S INSTALLATION INSTRUCTION MANUAL FOR FOUNDATION SPECIFICATIONS THAT INCLUDE, STONE AGGREGATE MIX, COMPRESSION STRENGTH, STEEL SIZE, ANCHOR SIZE, AND EMBEDMENT DEPTH.

* * NOTE:
 ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

TRANSITION OPTIONS	
USE THE COMPACT BACKSTOP	VERTICAL WALL
	CONCRETE TRAFFIC BARRIERS
	W-BEAM GUARDRAIL
	THRIE BEAM GUARDRAIL



NOTE:
 APPLY A HIGH REFLECTIVE DECAL TO THE DELINEATION BRACKET. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALS ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

NOTES:
 UPGRADE KITS ARE AVAILABLE TO RETROFIT EXISTING NCHRP 350 TAU-II SYSTEMS TO MASH COMPLIANT SYSTEMS. SEE MANUFACTURER'S PRODUCT INFORMATION.

THE TAU(M) (N) UNIDIRECTIONAL SYSTEM IS FREE STANDING AND IS NOT REQUIRED TO BE CONNECTED TO THE HAZARD.

TRANSITIONS TO GUARD FENCE, BRIDGE RAILS AND ROADSIDE BARRIERS SHALL BE IN ACCORDANCE WITH TxDOT'S POLICY.

NOTE:
 THIS STANDARD IS A BASIC REPRESENTATION OF THE UNIVERSAL TAU(M) (N) SYSTEM, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTION MANUAL.

NOTE:
 FOR BI-DIRECTIONAL TRANSITION PANELS AND BRIDGE RAIL END SHOE DETAILS. SEE MANUFACTURER'S INSTALLATION INSTRUCTIONS MANUAL.

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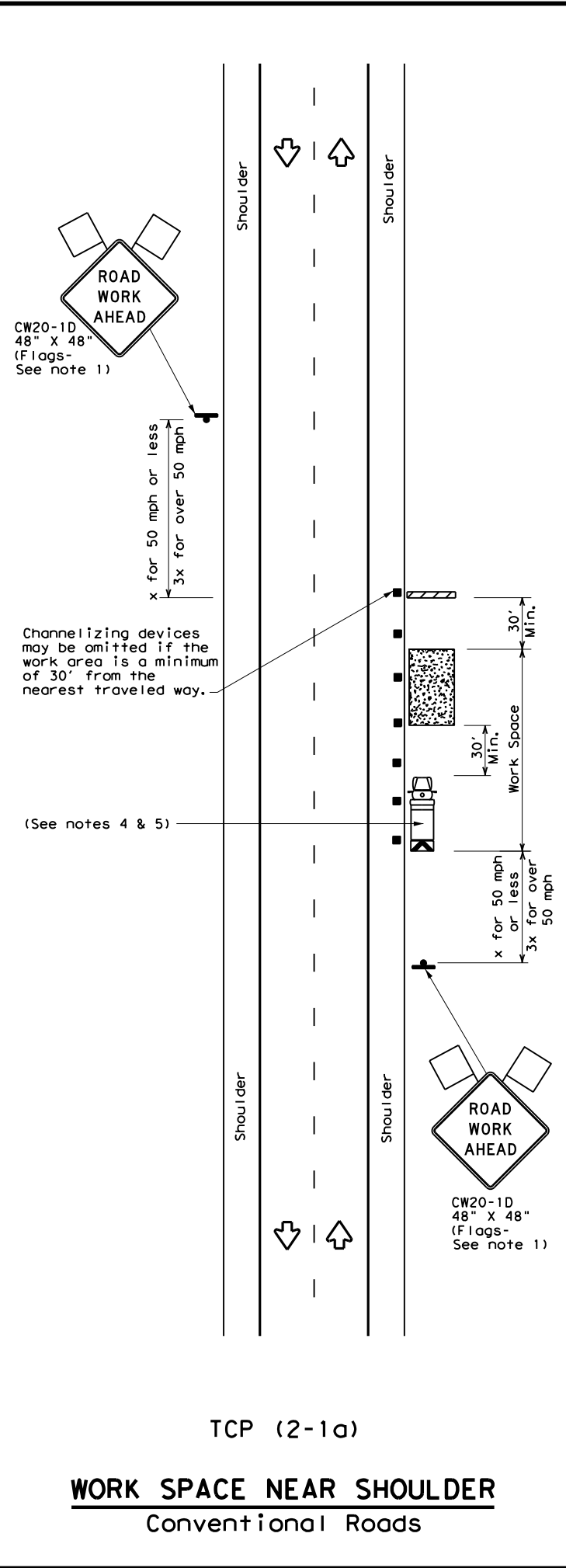
Design Division Standard

LINDSAY TRANSPORTATION SOLUTIONS
 UNIVERSAL
 CRASH CUSHION
 (MASH TL-3 & TL-2)
 TAU(M) (N) - 19

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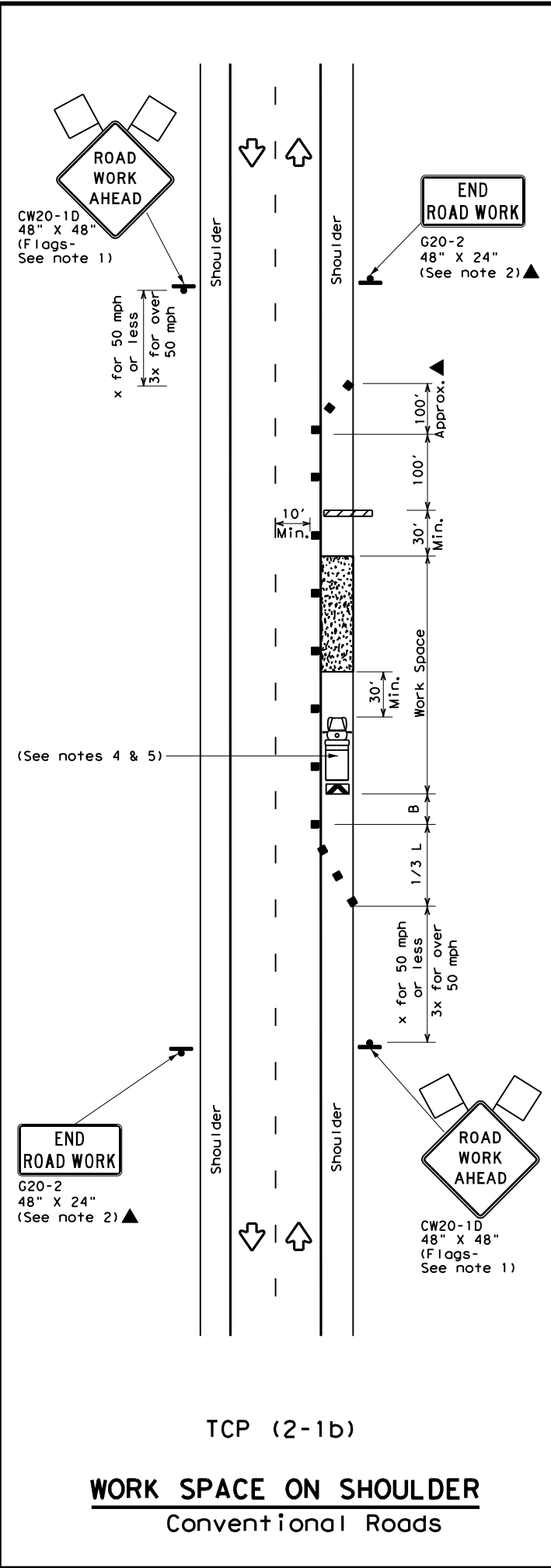
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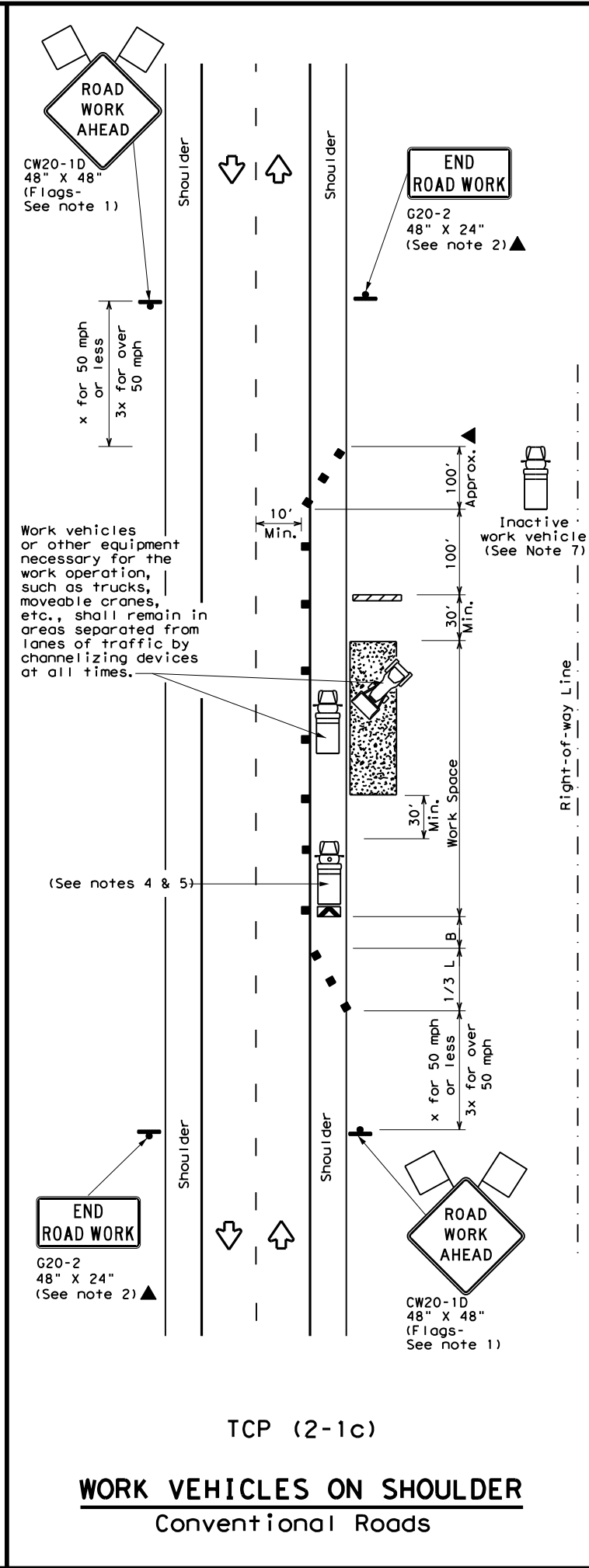
TCP (2-1a)

WORK SPACE NEAR SHOULDER
 Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
 Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
 Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
 - Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
 - Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
 - See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
 - Additional work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
 - CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation
 Traffic Operations Division Standard

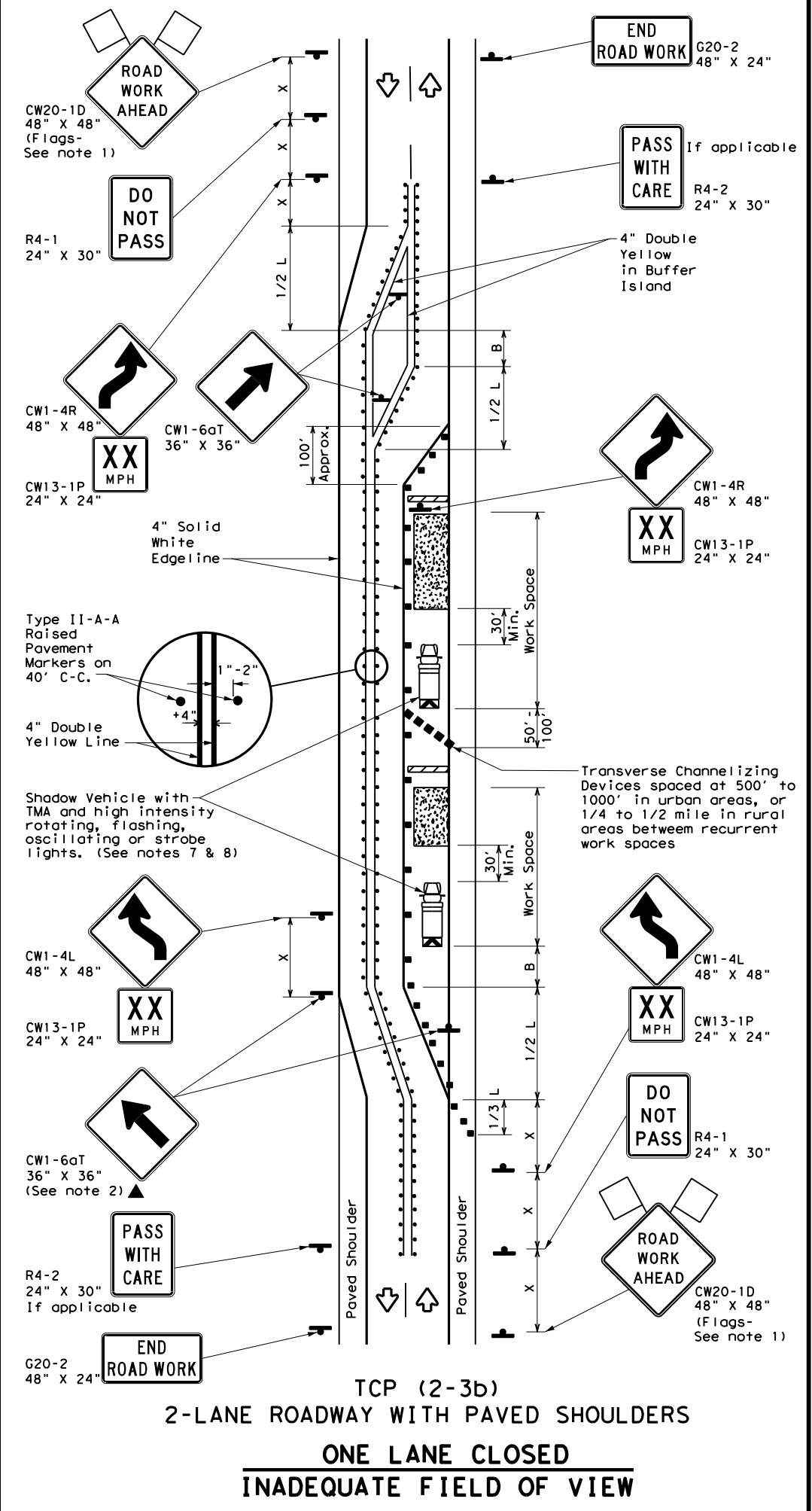
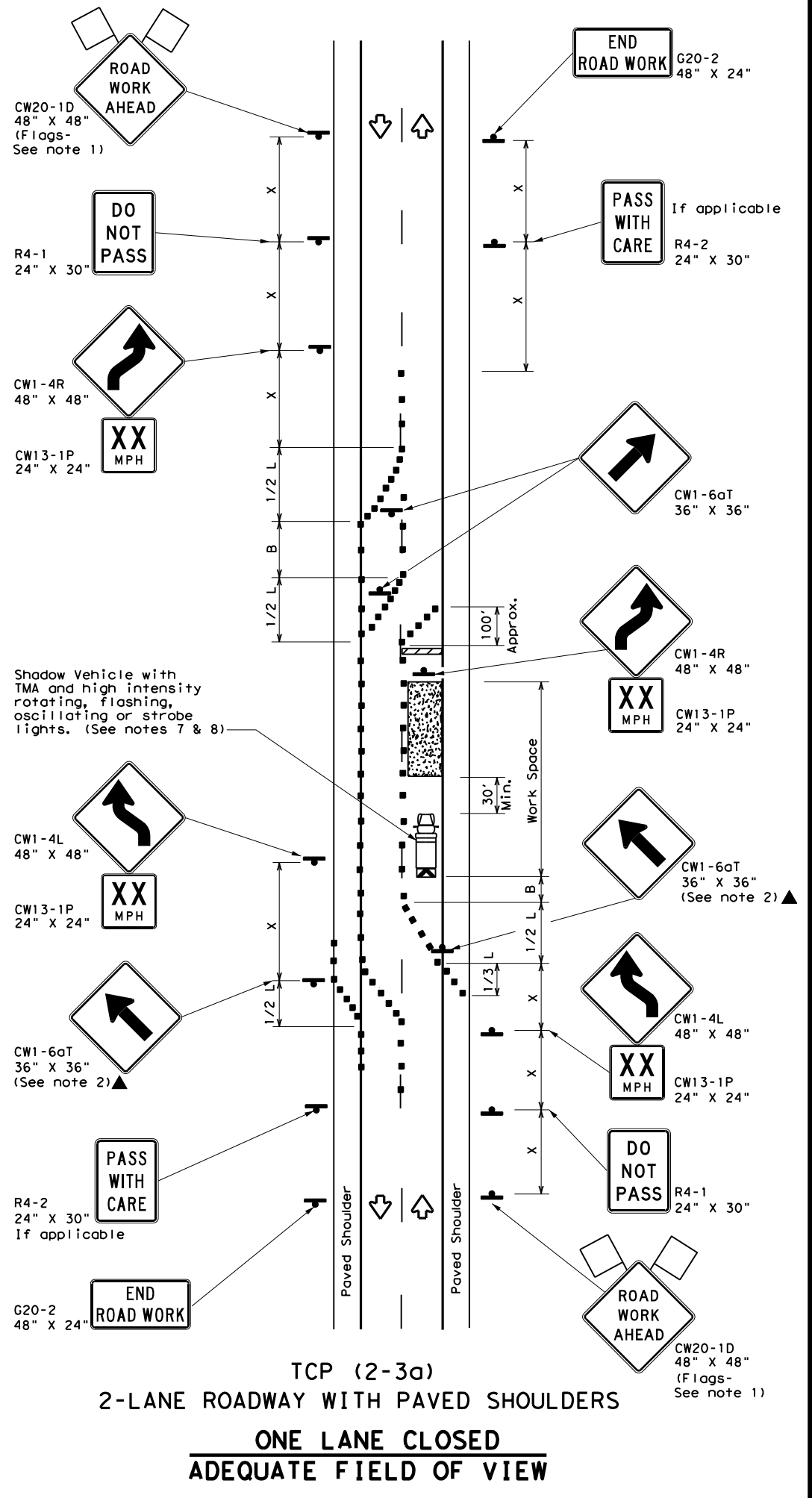
TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (2-1) - 18

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1-97	2-18			
		DIST	COUNTY	SHEET NO.
		ODA	UPTON	68

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LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓
				TCP (2-3b) ONLY

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
 - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
 - The R4-1 "DO NOT PASS," R4-2 "PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
 - Conflicting pavement marking shall be removed for long term projects.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-3a)**
- Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON
TWO-LANE ROADS

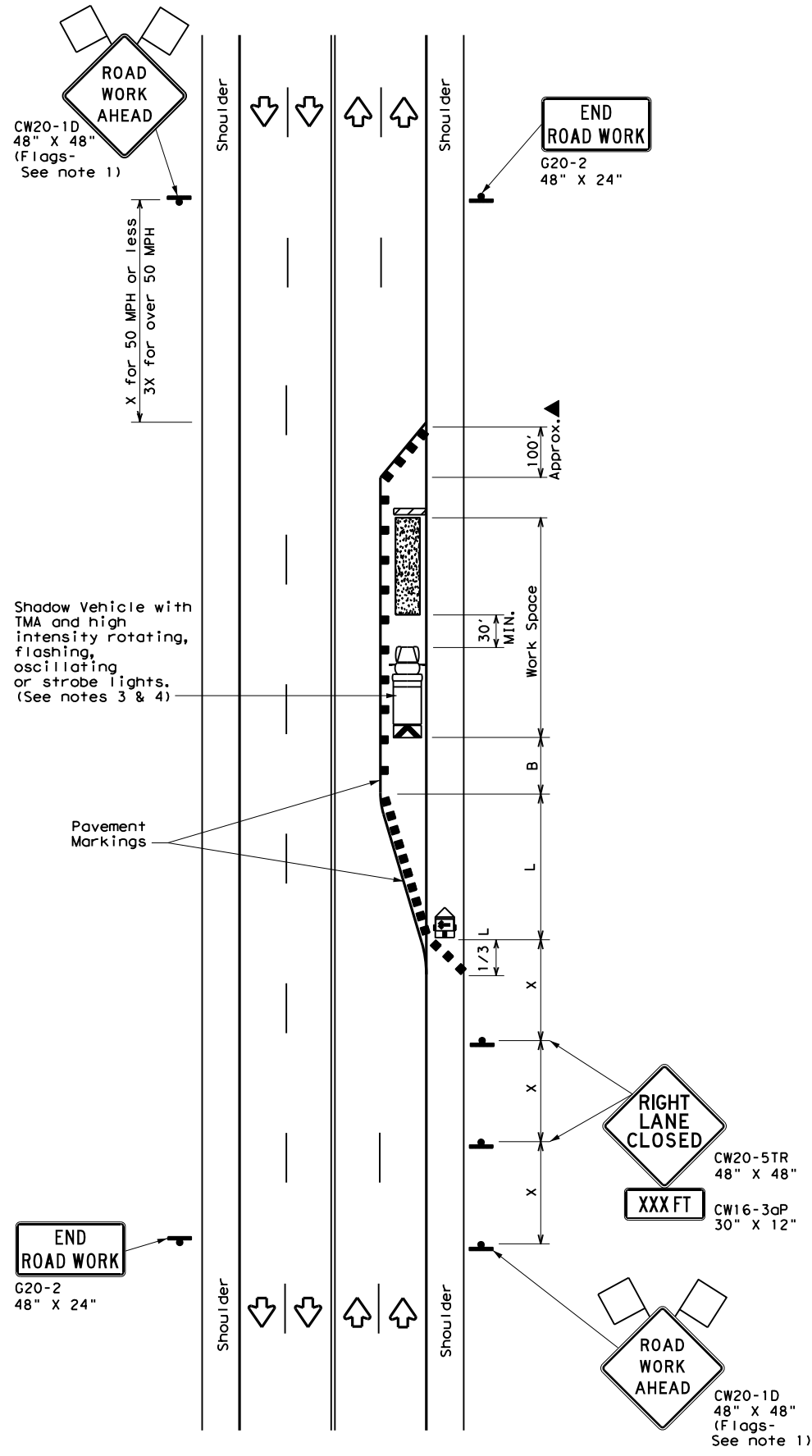
TCP (2-3) - 18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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1-97 2-12	ODA	UPTON	69	
4-98 2-18				

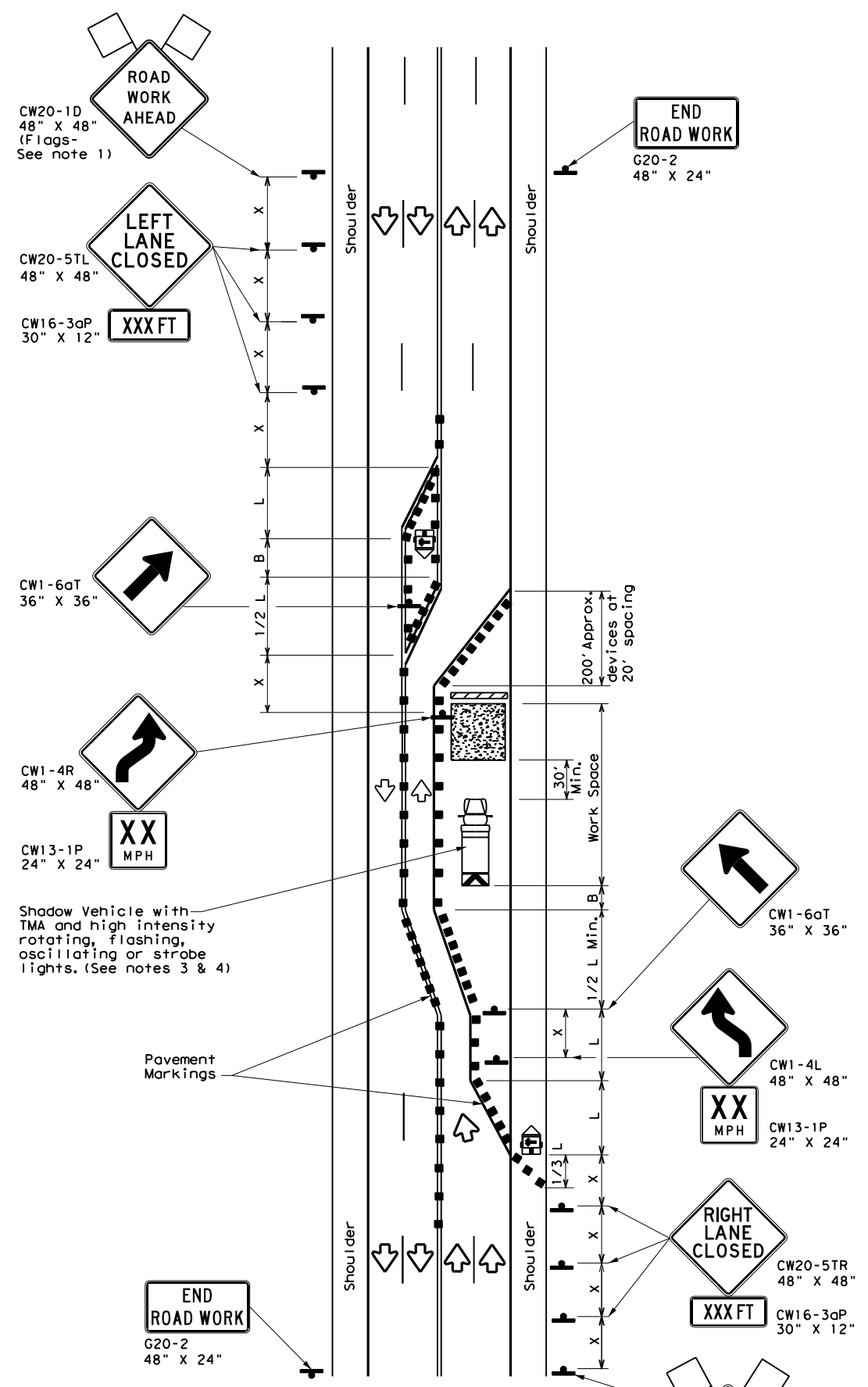
163

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TCP (2-5a)
ONE LANE CLOSED



TCP (2-5b)
TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

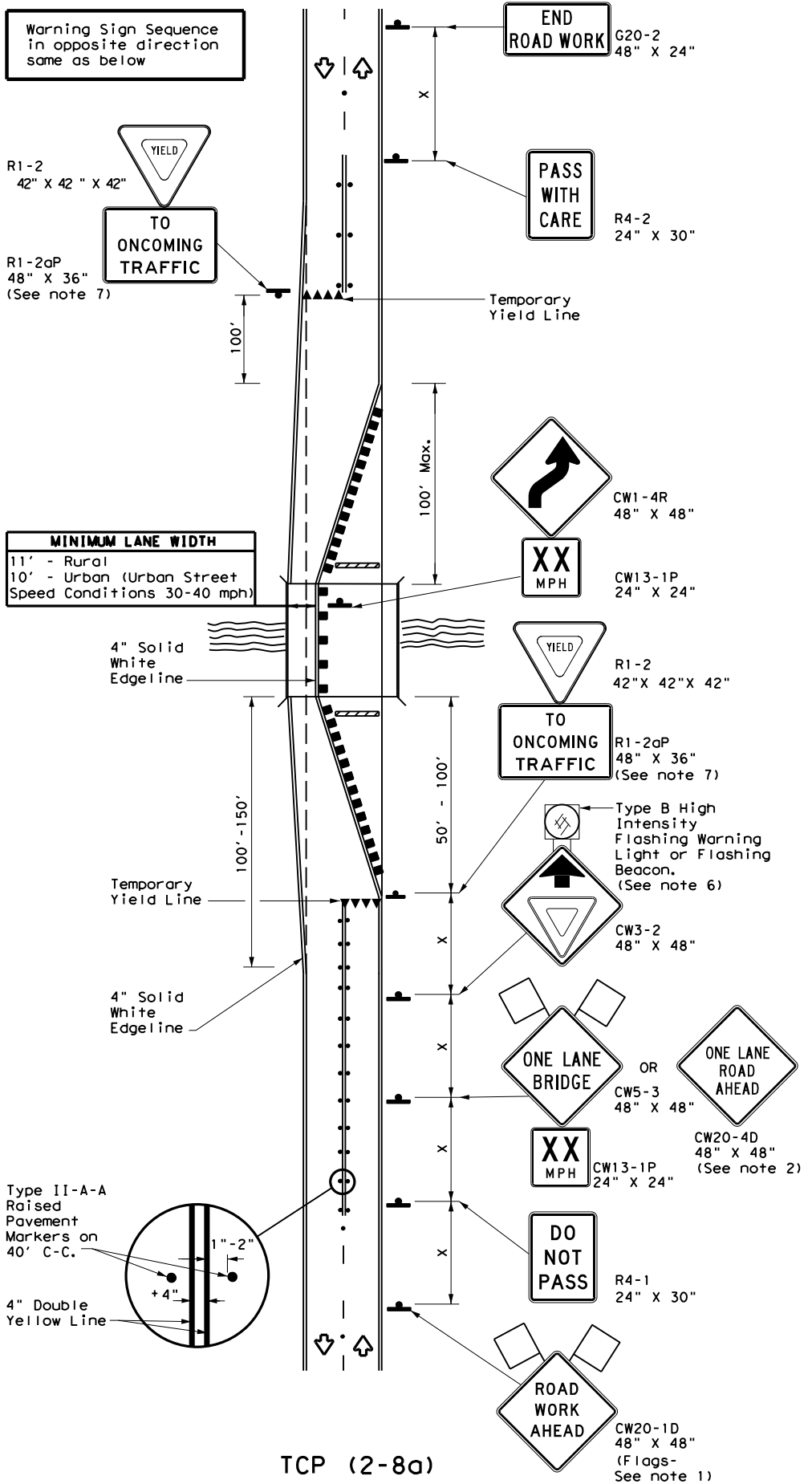
- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
 - The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

- TCP (2-5a)**
- If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.
- TCP (2-5b)**
- Conflicting pavement markings shall be removed for long-term projects.

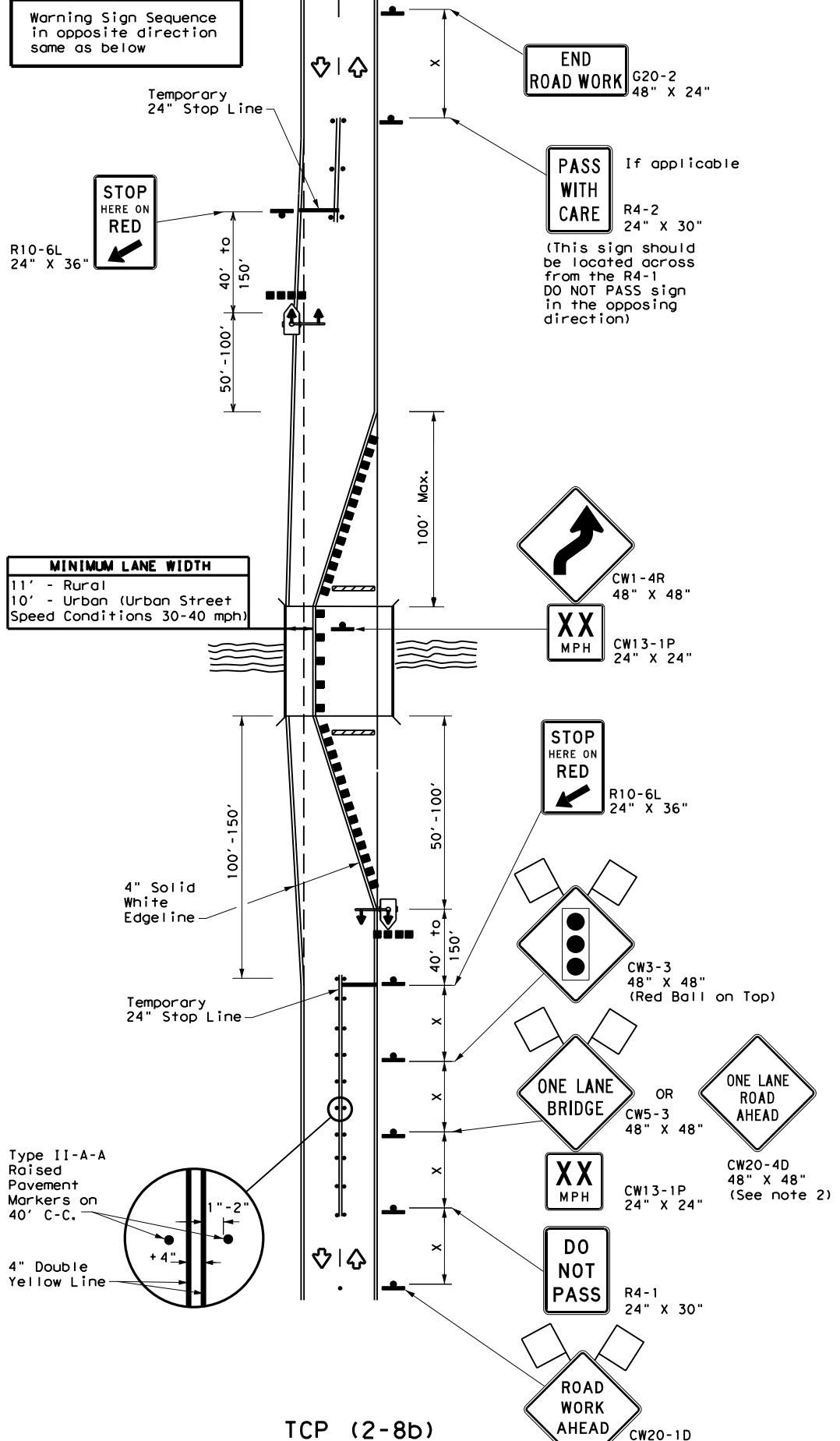
		Traffic Operations Division Standard	
TRAFFIC CONTROL PLAN			
LONG TERM LANE CLOSURES			
MULTILANE CONVENTIONAL RDS.			
TCP (2-5) - 18			
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© TxDOT	December 1985	CONT	SECT
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4-98	2-18	ODA	UPTON
			70

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TCP (2-8a)
ONE LANE TWO-WAY
TRAFFIC CONTROL WITH YIELD SIGNS
 (Less Than 2000 ADT-See Note 5)



TCP (2-8b)
ONE LANE TWO-WAY
TRAFFIC CONTROL WITH TRAFFIC SIGNAL

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Sign		Traffic Flow
	Flag		Flagger
	Raised Pavement Markers Ty II-AA		Temporary or Portable Traffic Signal

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
 - Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
 - For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.
- TCP (2-8a)**
- Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
 - If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
 - The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.
- TCP (2-8b)**
- A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
 - Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LONG TERM ONE-LANE
TWO-WAY CONTROL

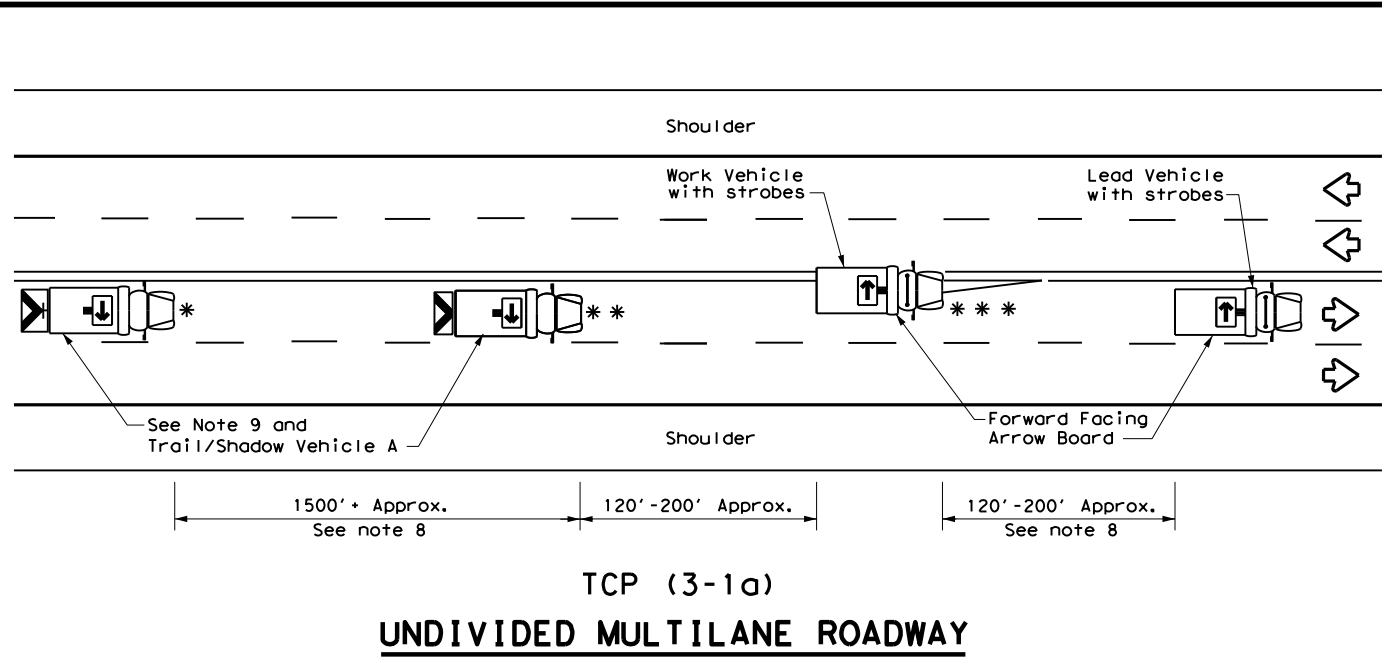
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4-98 2-18				

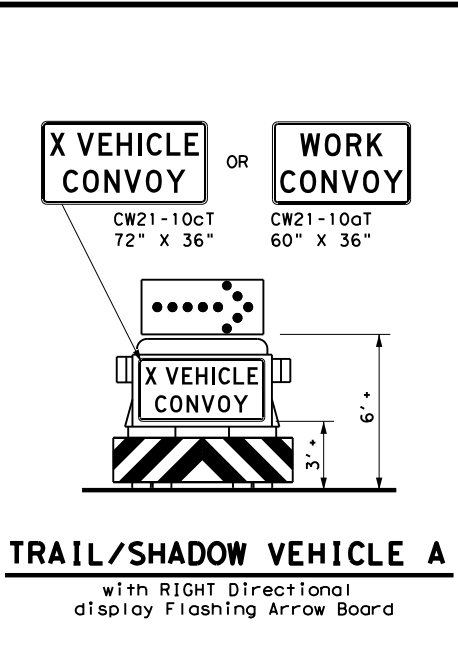
168

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TCP (3-1a)
UNDIVIDED MULTILANE ROADWAY



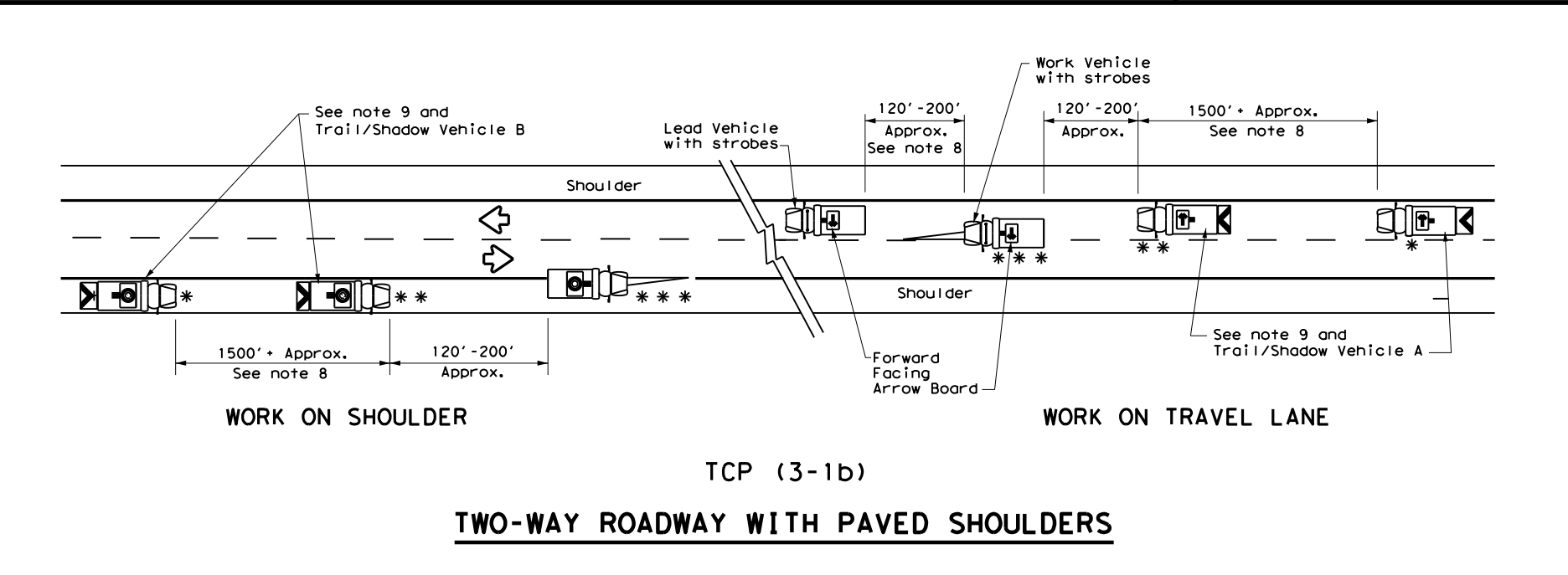
TRAIL/SHADOW VEHICLE A
 with RIGHT Directional display Flashing Arrow Board

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
** *	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

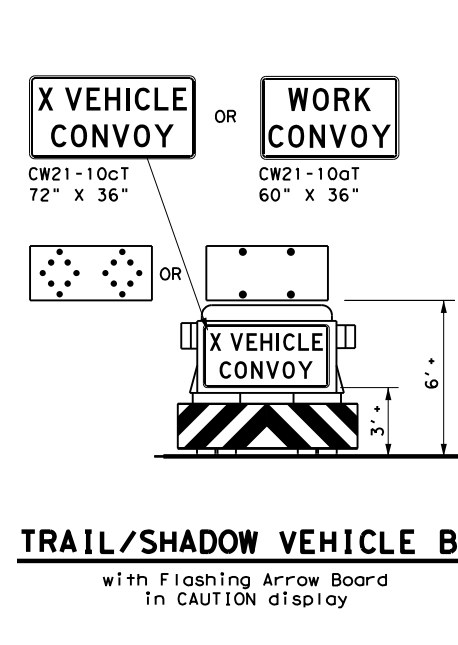
TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
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GENERAL NOTES

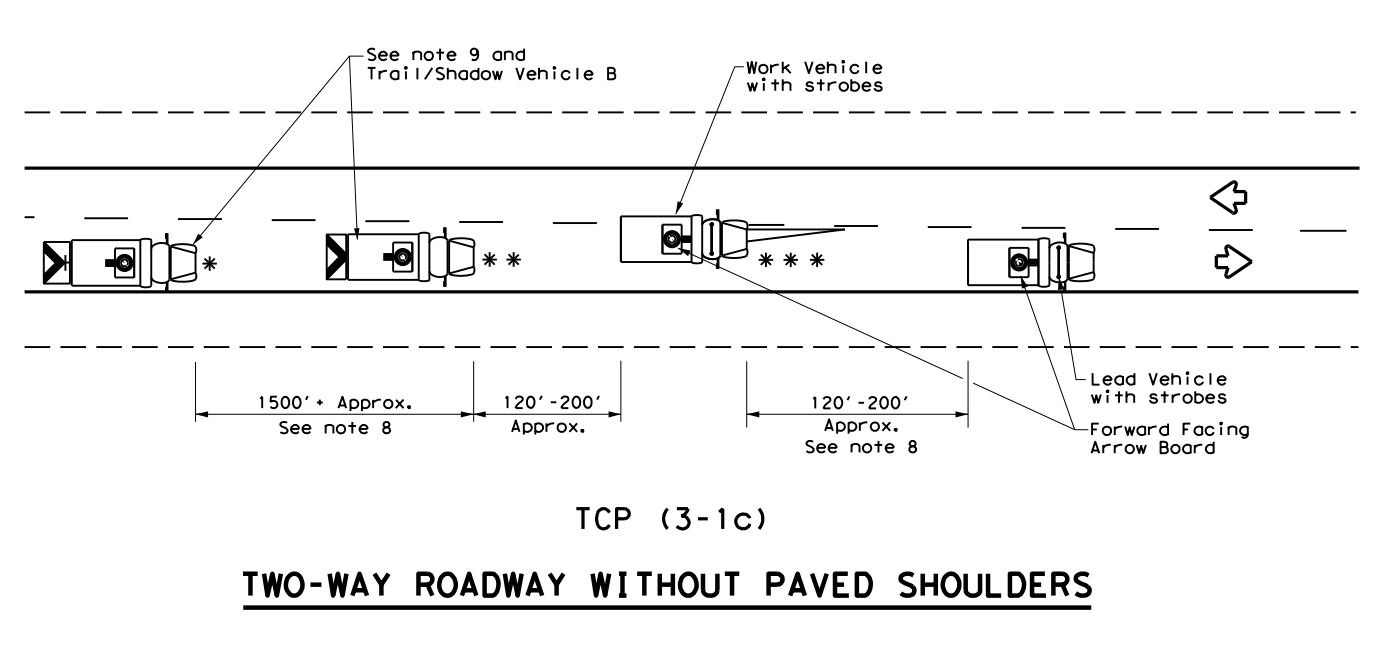
1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY" (CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



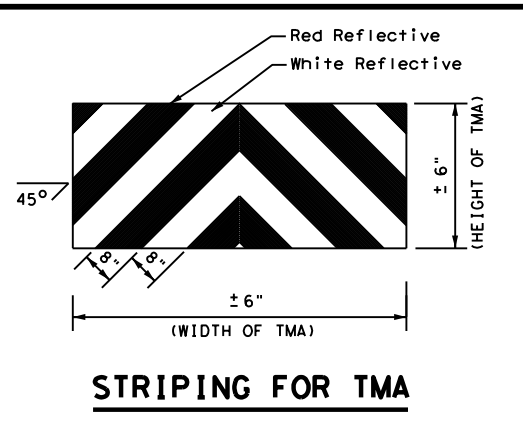
TCP (3-1b)
TWO-WAY ROADWAY WITH PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B
 with Flashing Arrow Board in CAUTION display



TCP (3-1c)
TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



STRIPING FOR TMA

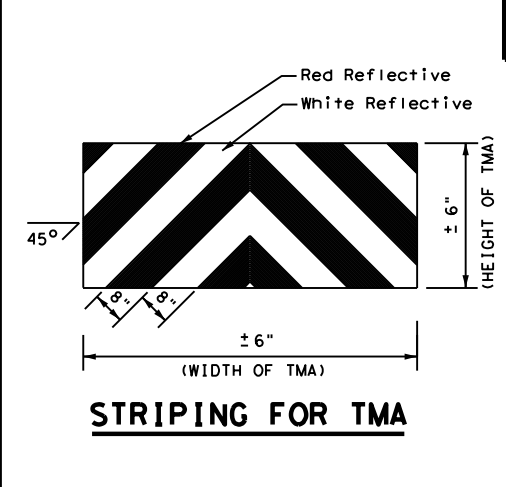
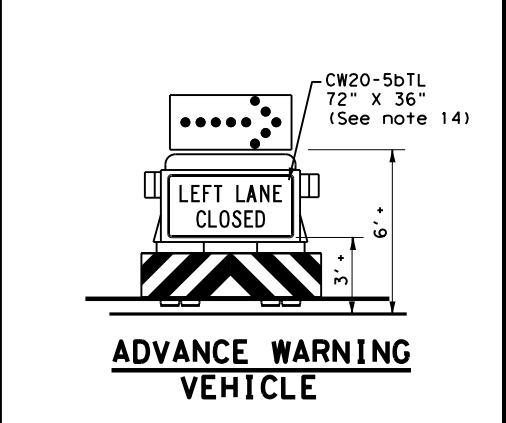
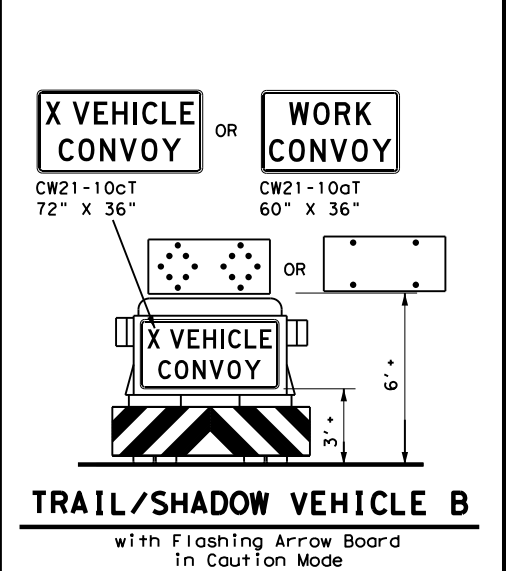
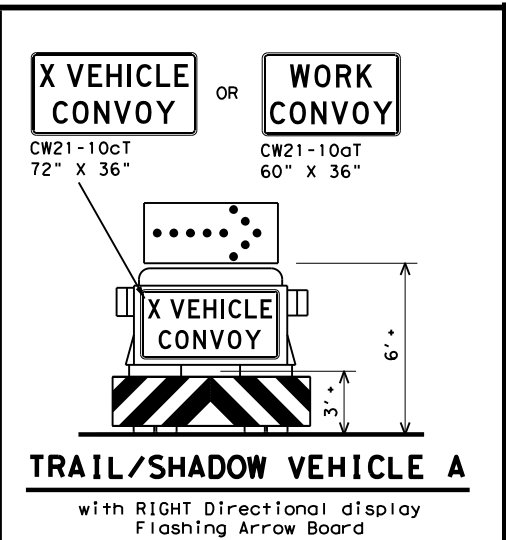
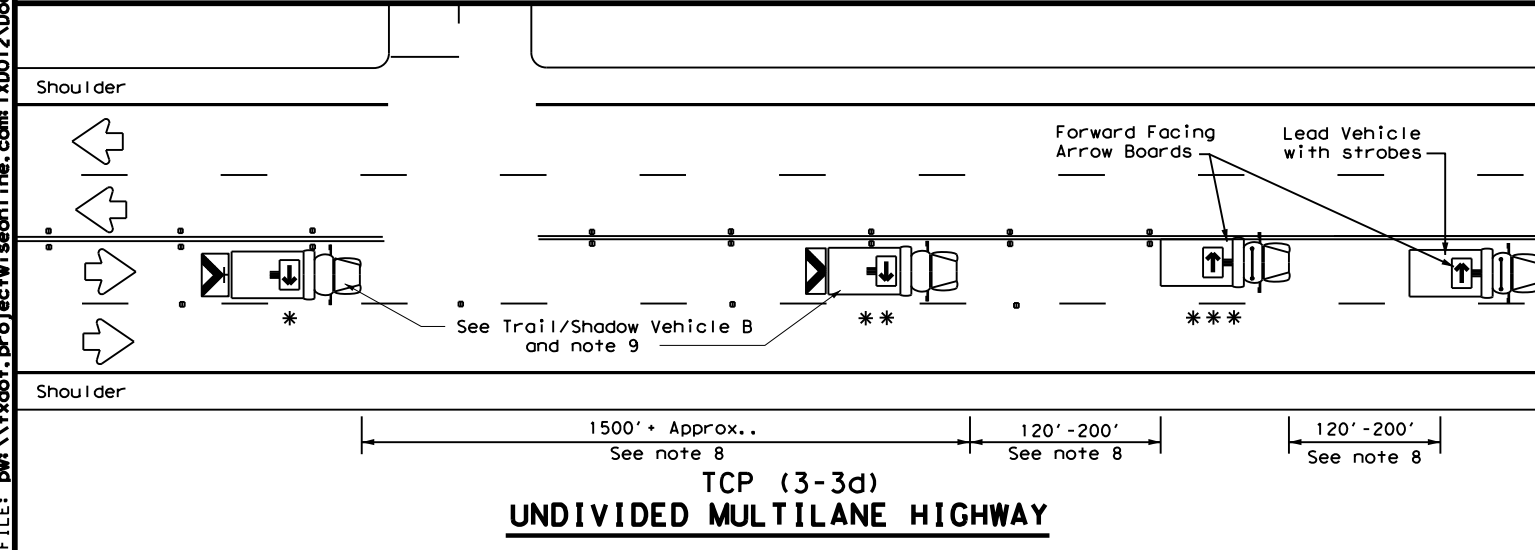
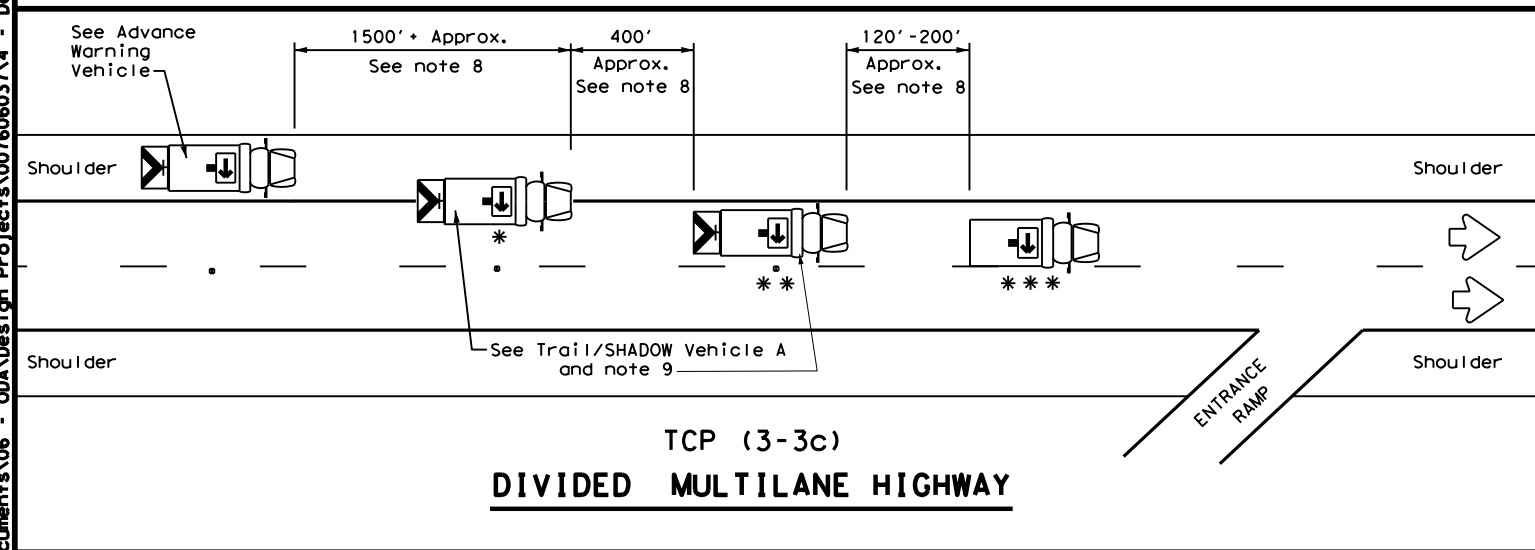
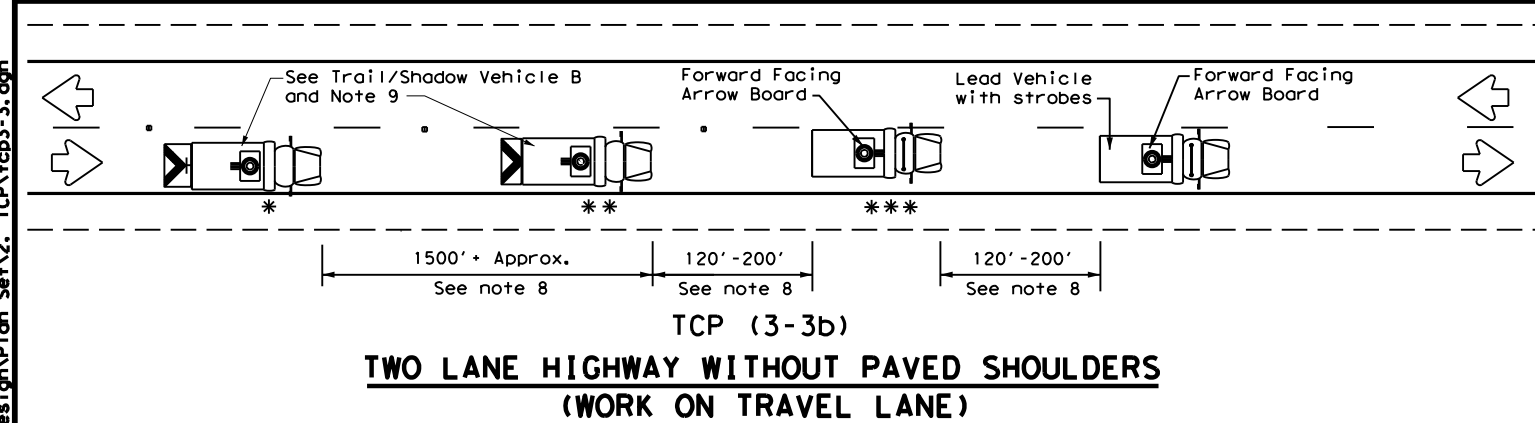
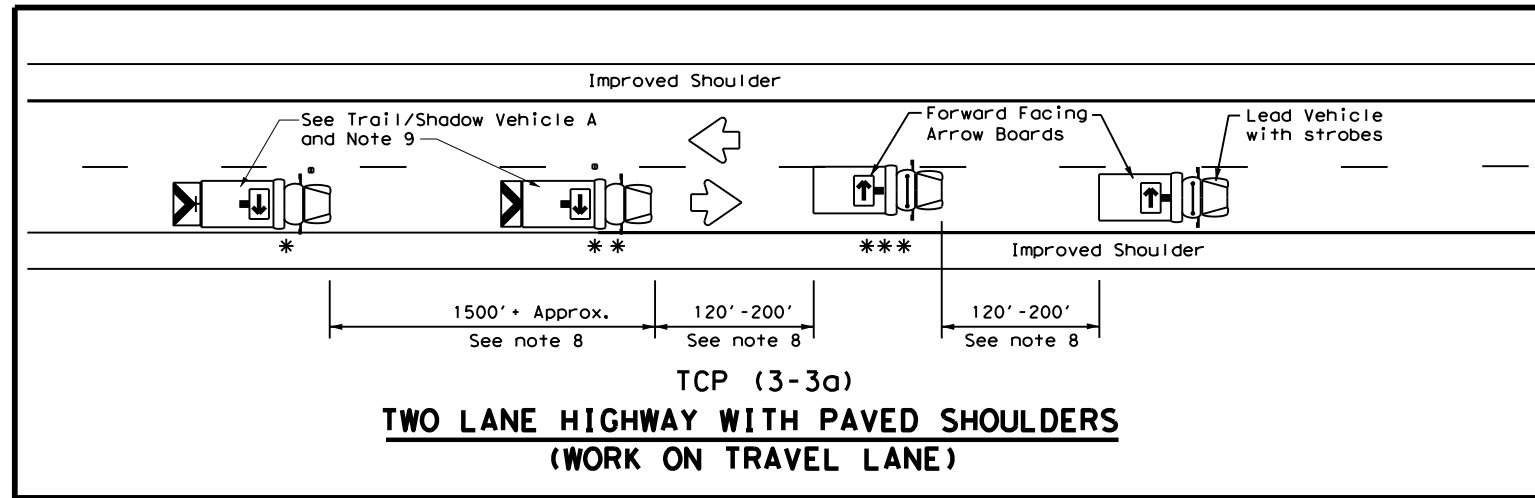
Texas Department of Transportation
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN
 MOBILE OPERATIONS
 UNDIVIDED HIGHWAYS**

TCP (3-1) - 13

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2-94	4-98	DIST	COUNTY	SHEET NO.					
8-95	7-13	ODA	UPTON	72					
1-97									

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LEGEND		
* Trail Vehicle	ARROW BOARD DISPLAY	
** Shadow Vehicle		
*** Work Vehicle		RIGHT Directional
		LEFT Directional
		Double Arrow
		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

- TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
- The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
- The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
- Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
- Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
- Each vehicle shall have two-way radio communication capability.
- When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
- Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
- X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
- For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
- A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
- For divided highways with three or four lanes in each direction, use TCP(3-2).
- Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
- The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
- On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

Texas Department of Transportation

Traffic Operations Division Standard

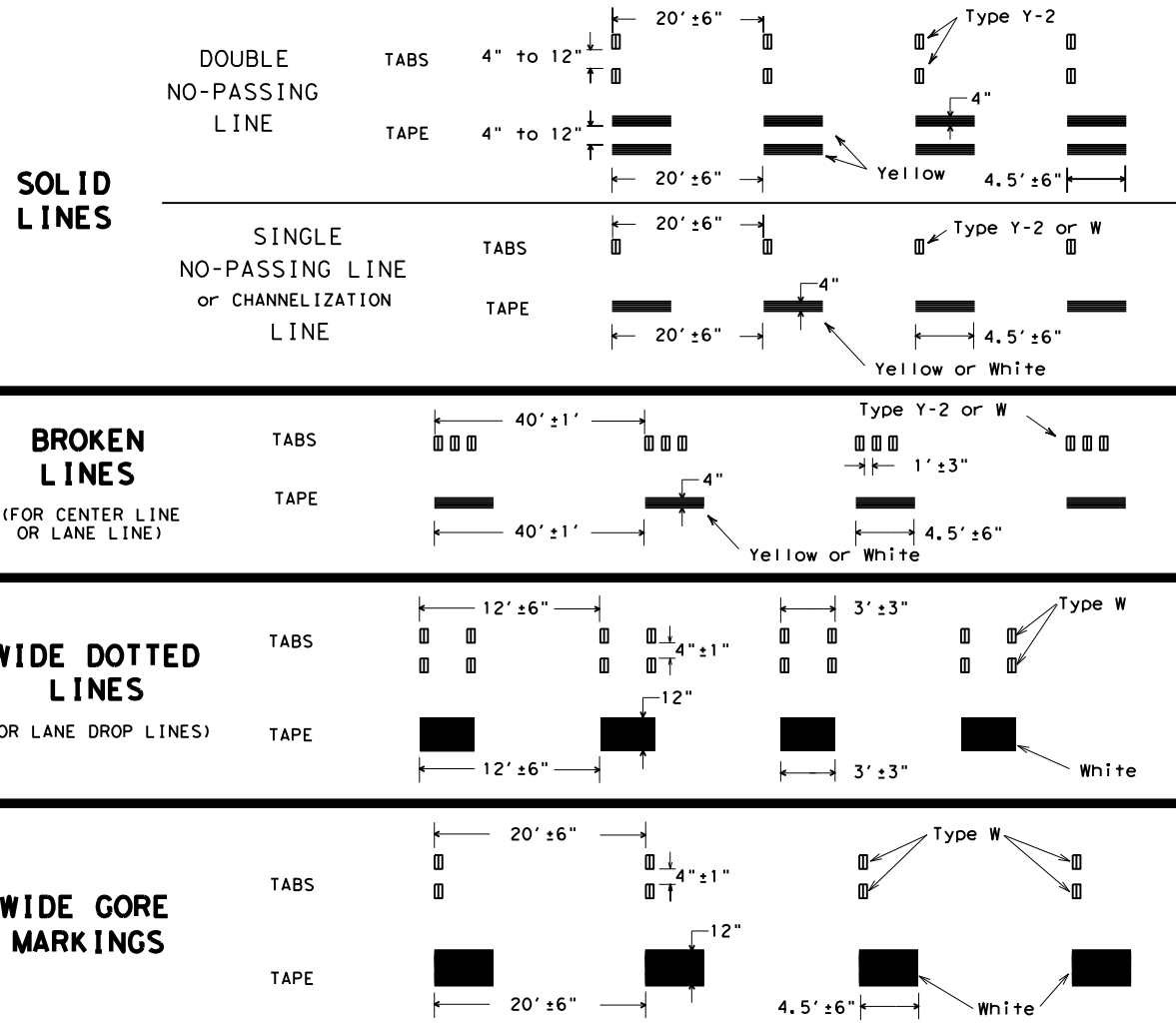
TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
RAISED PAVEMENT
MARKER INSTALLATION/REMOVAL
TCP (3-3) - 14

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ODA			UPTON	SHEET NO. 73

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WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



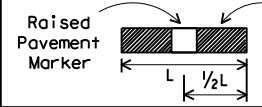
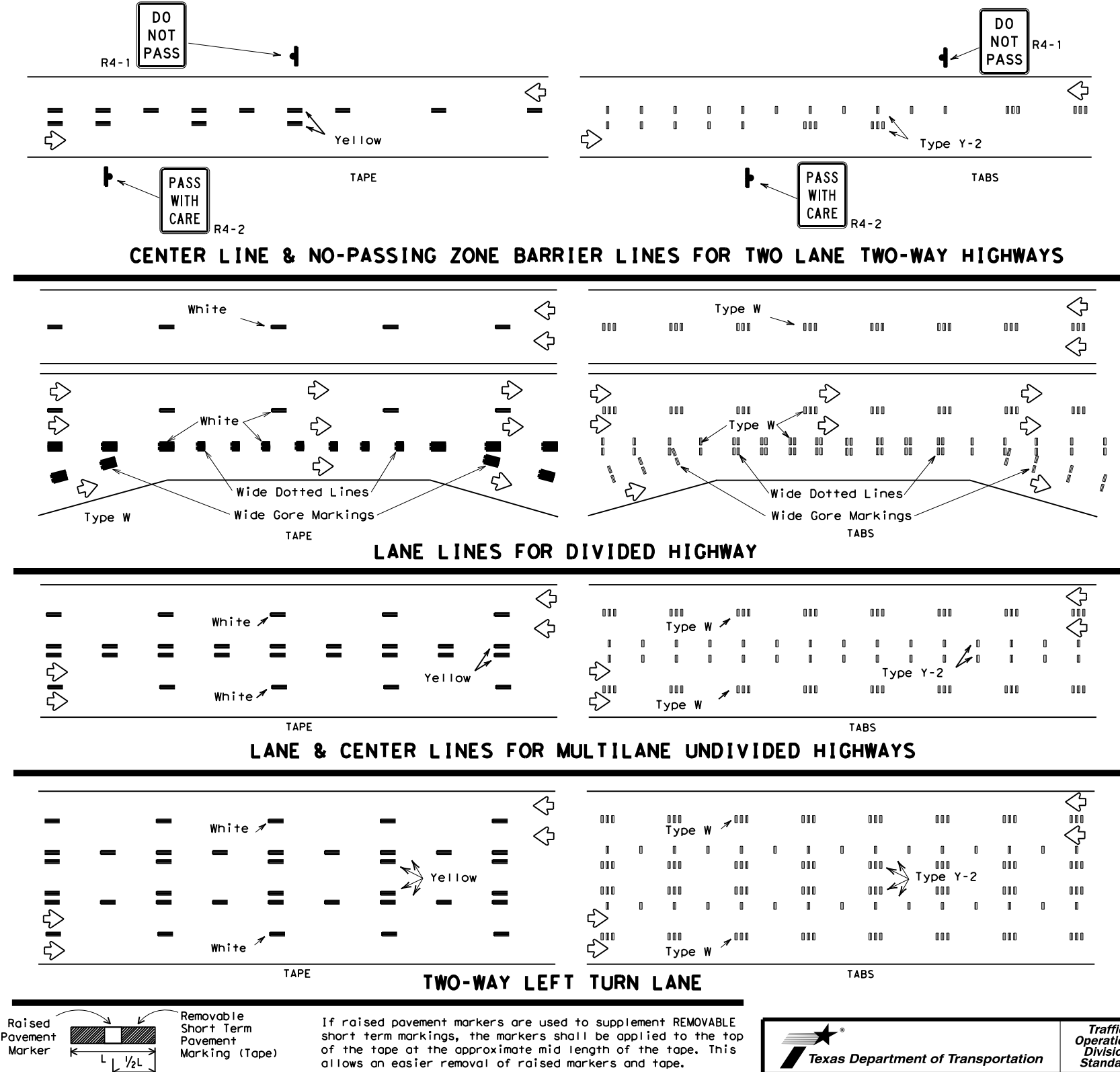
NOTES:

- Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
- Short term pavement markings shall NOT be used to simulate edge lines.
- Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
- Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
- No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
- For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
- For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
- For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

- Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
- Tabs shall meet requirements of Departmental Material Specification DMS-8242.
- When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
- No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

- Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
- Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Construction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

- DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm



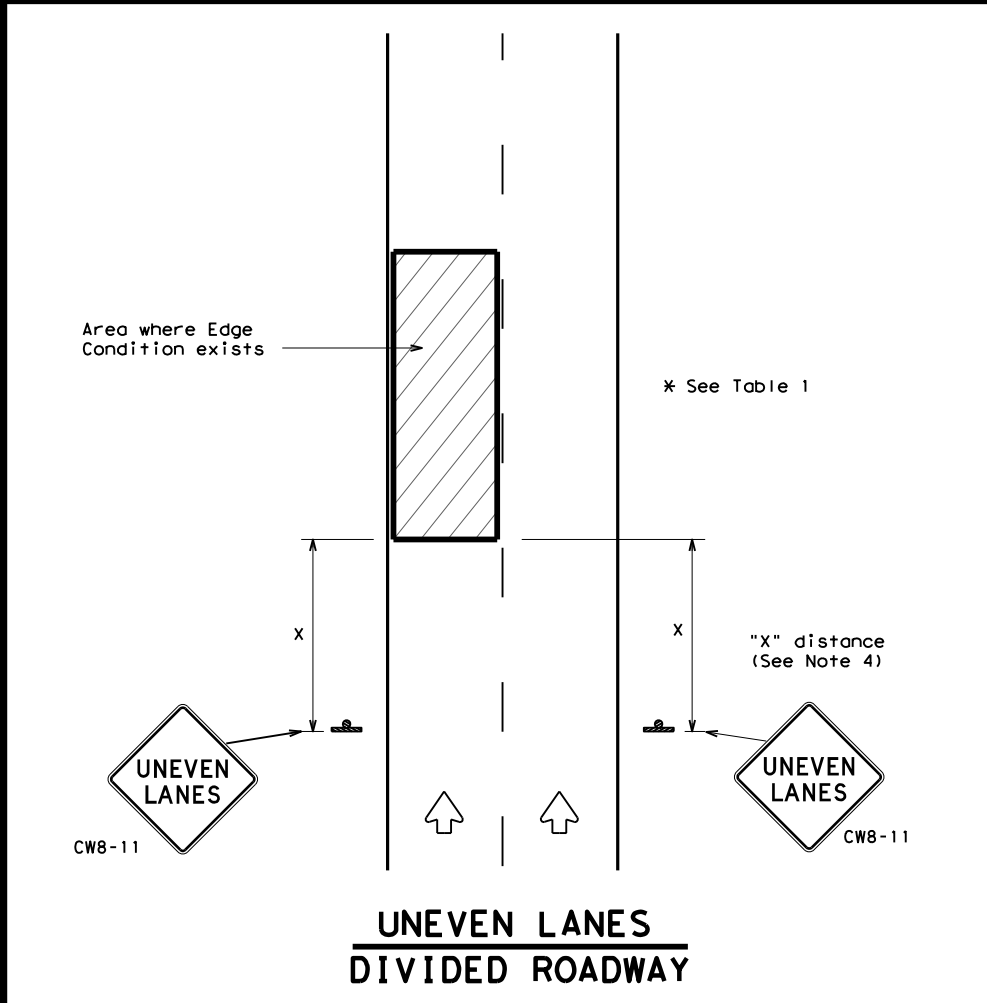
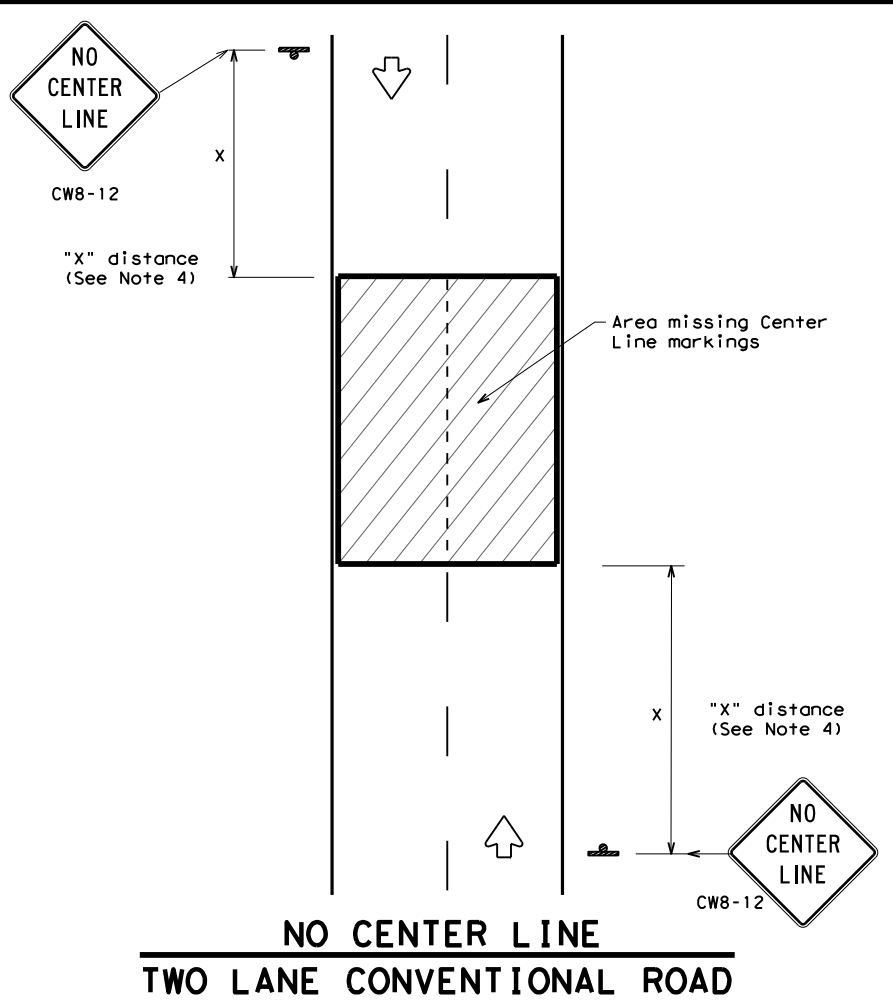
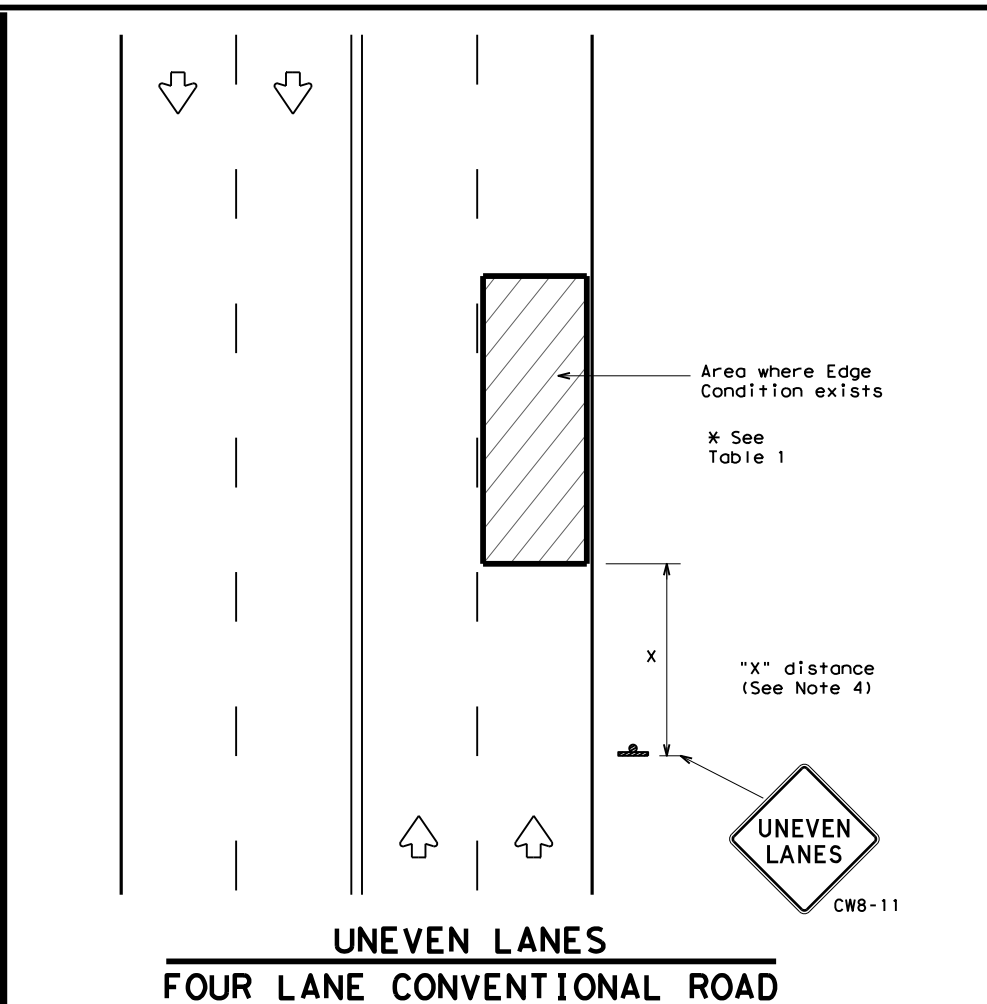
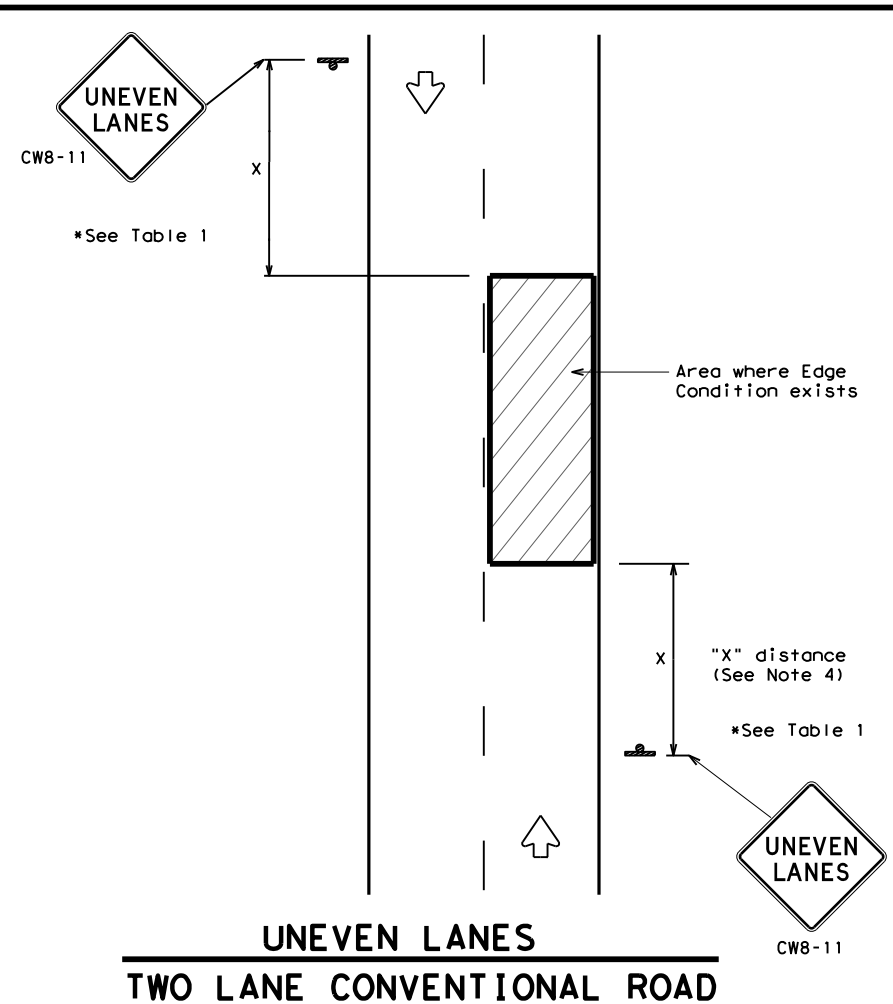
WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ (STPM) - 13

FILE:	wzstpm-13.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	April 1992	CONT:	0076 06	SECT:	037	JOB:		HIGHWAY:	
REVISIONS:						DIST:		COUNTY:	SHEET NO.:
1-97						ODA		UPTON	74
3-03									
7-13									

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 10/22/2021 04:07 PM
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DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B _{FL} OR TYPE C _{FL} SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

- If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
- UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
- NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
- Signs shall be spaced at the distances recommended as per BC standards.
- Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
- Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
- Short term markings shall not be used to simulate edge lines.
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

Edge Condition	Edge Height (D)	* Warning Devices
①	Less than or equal to: 1/4" (maximum-planing) 1/2" (typical-overlay)	Sign: CW8-11
②	Less than or equal to 3"	Sign: CW8-11
③	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation
 Traffic Operations Division Standard

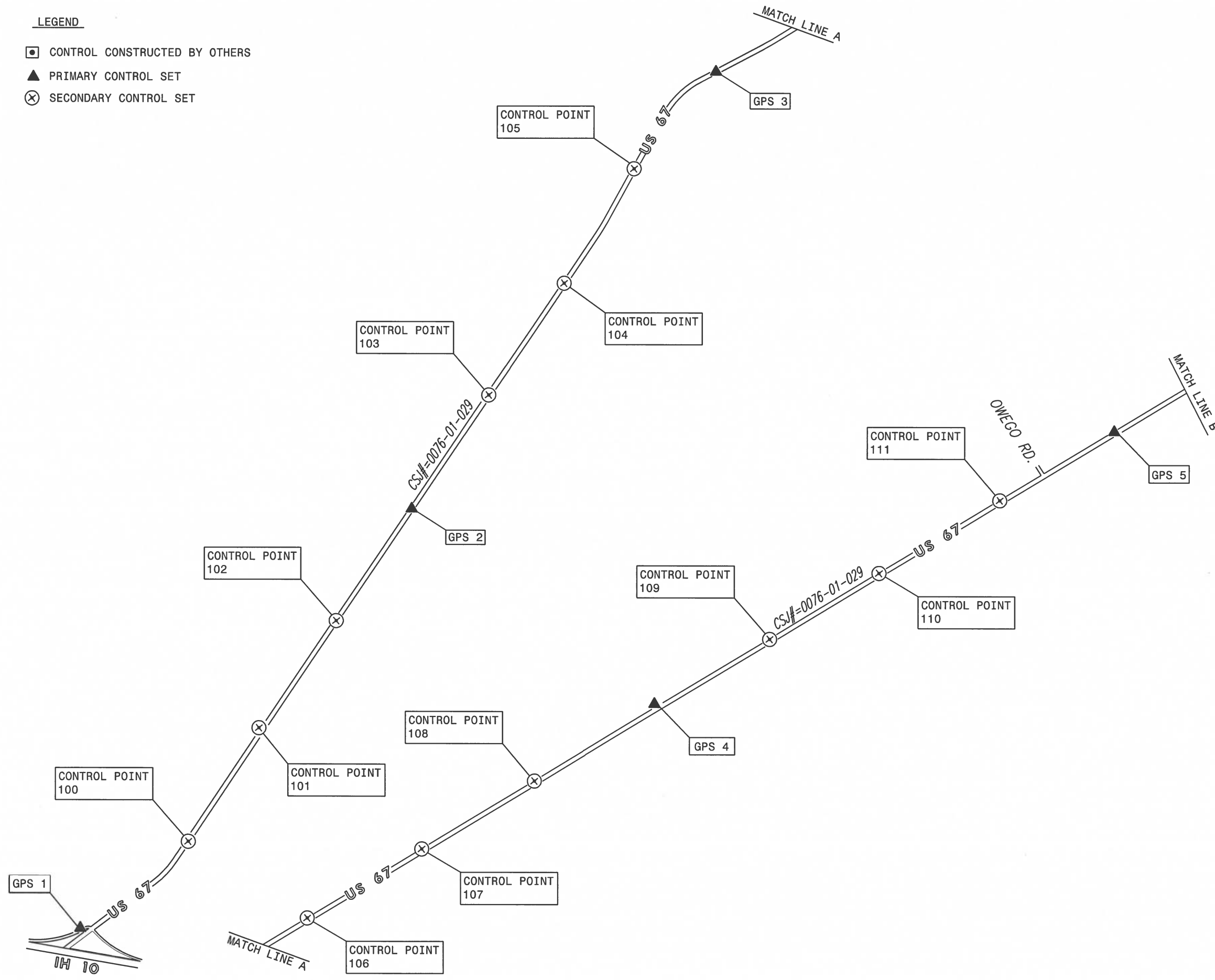
SIGNING FOR UNEVEN LANES

WZ (UL) - 13

FILE: wZUL-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT	APRIL 1992	CONT	SECT	HIGHWAY
REVISIONS	0076 06	037	US 67	
8-95 2-98 7-13	DIST	COUNTY	SHEET NO.	
1-97 3-03	ODA	UPTON	75	

LEGEND

- ◻ CONTROL CONSTRUCTED BY OTHERS
- ▲ PRIMARY CONTROL SET
- ⊗ SECONDARY CONTROL SET



NOTES:

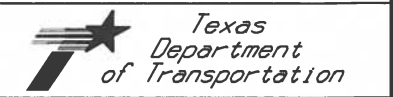
1. THE COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD 83 (2011, EPOCH 2010.00). THE PROJECT'S VERTICAL DATUM IS NAVD 88 (GEOID 12A). THE COORDINATES AND DISTANCES PROVIDED HEREON HAVE BEEN SCALED (SCALING ORIGIN N 0.00 E 0.00) FROM GRID COORDINATES USING A SURFACE ADJUSTMENT FACTOR OF 1.00020. THE UNITS ARE U.S. SURVEY FEET.
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 - SECONDARY CONTROL: RTK OBSERVATIONS.
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DATE: 03/22/2017
 SHEET 1 SURVTX # 2016-0044

REVISIONS	
3/22/17	FORMATTING

SURVOTEX LLC
 PROFESSIONAL SURVEYING AND MAPPING SERVICES
 600 W. Whitestone Blvd.
 Cedar Park, Texas 78613
 (512) 249-8875
 Fax (512) 249-5040
 TBPLS FIRM NO. 10084600

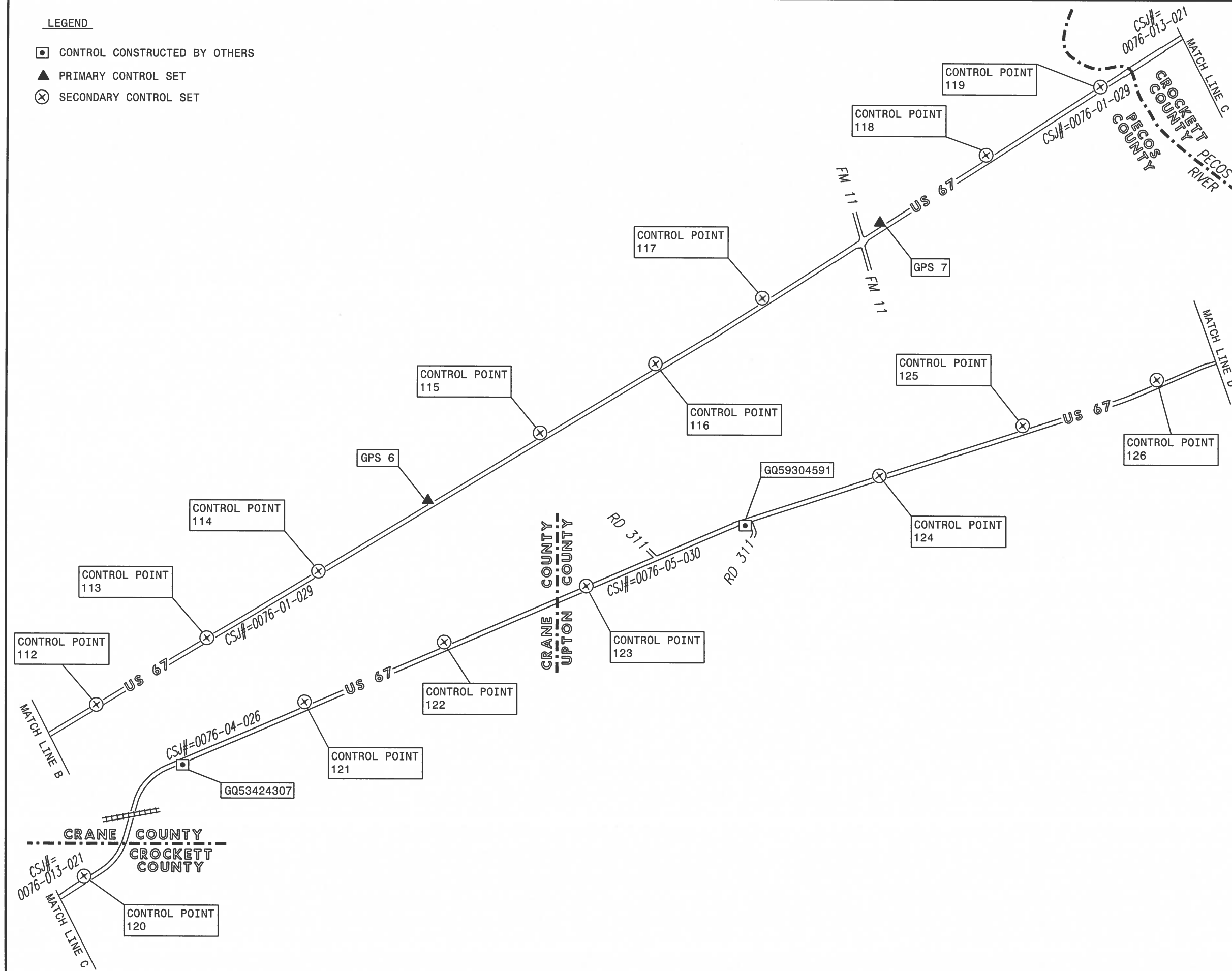


INDEX SHEET FOR
 U.S. 67
 PRIMARY CONTROL &
 SECONDARY CONTROL

FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
		76
STATE	DISTRICT	COUNTY
TEXAS	ODESSA	CRANE, CROCKETT, PECOS, UPTON
CONTROL	SECTION	JOB HIGHWAY NO.
		U.S. 67

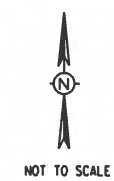
LEGEND

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- ⊗ SECONDARY CONTROL SET



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DATE: 03/22/2017
 SHEET 2 OF 2
 SURVTEX # 2016-0044

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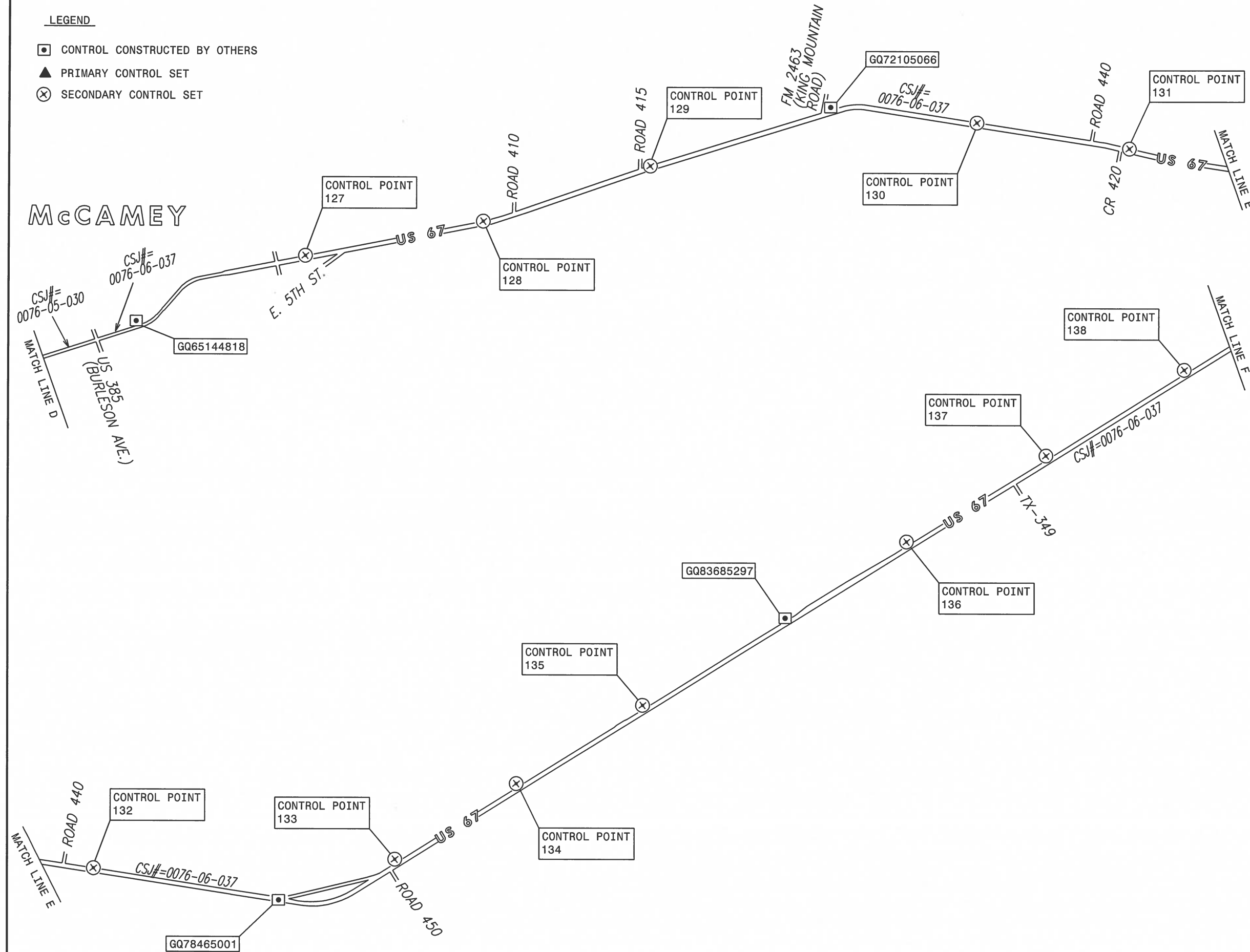


INDEX SHEET FOR
 U. S. 67
 PRIMARY CONTROL &
 SECONDARY CONTROL

FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
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STATE	DISTRICT	COUNTY
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CONTROL	SECTION	JOB
		HIGHWAY NO.
		U. S. 67

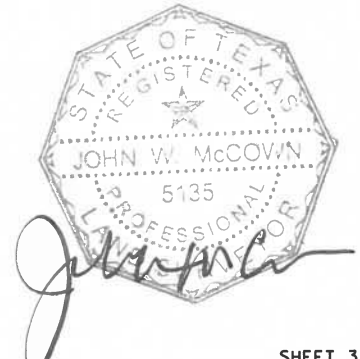
LEGEND

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- ⊗ SECONDARY CONTROL SET



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DATE: 03/22/2017
 SHEET 3
 SURVTEX # 2016-0044

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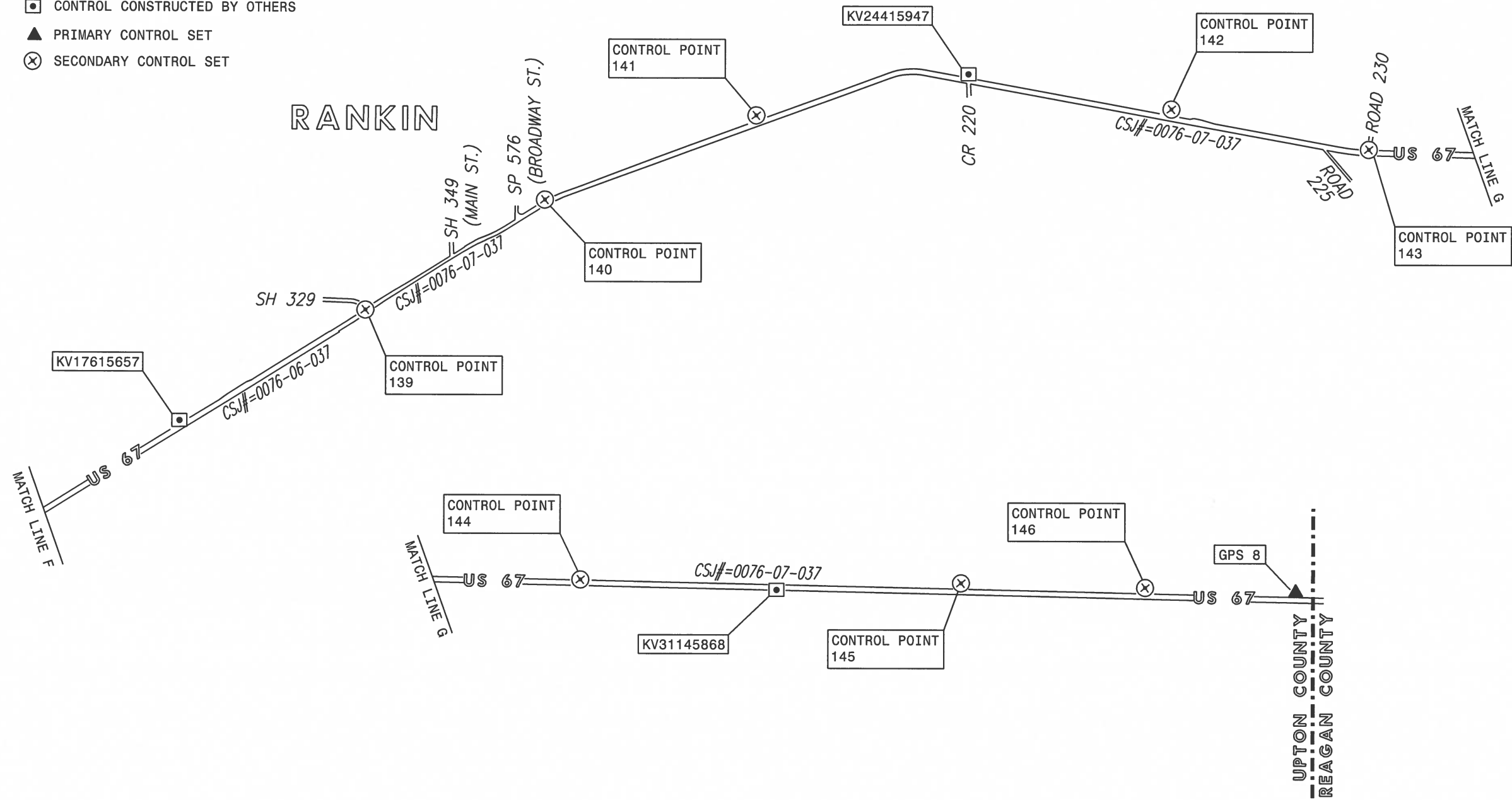


INDEX SHEET FOR
 U.S. 67
 PRIMARY CONTROL &
 SECONDARY CONTROL

FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
		78
STATE	DISTRICT	COUNTY
TEXAS	ODESSA	CRANE, CROCKETT, PECOS, TARRANT
CONTROL	SECTION	JOB HIGHWAY NO.
		U.S. 67

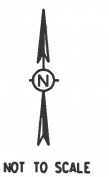
LEGEND

- ◻ CONTROL CONSTRUCTED BY OTHERS
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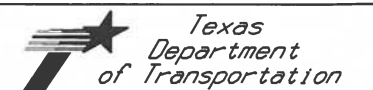
DATE: 03/22/2017
 SHEET 4
 SURVTEX # 2016-0044

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INDEX SHEET FOR
 U. S. 67
 PRIMARY CONTROL &
 SECONDARY CONTROL

FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
STATE	DISTRICT	COUNTY
TEXAS	ODESSA	CRANE, CROCKETT, PECOS, UPTON
CONTROL	SECTION	JOB
		HIGHWAY NO.
		U. S. 67

AS SURVEYED VALUES - SURVTEX (GEOID 12A)				PUBLISHED VALUES - PROVIDED BY OTHERS (GEOID 03)			
NAME	NORTHING	EASTING	ELEVATION	NAME	NORTHING	EASTING	ELEVATION
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GPS-GQ65144818	10384557.46	1706979.54	2468.61	GPS-GQ65144818	10384557.46	1706979.50	2468.54
GPS-GQ72105066	10391719.85	1730119.05	2577.87	GPS-GQ72105066	10391719.84	1730119.00	2577.79
GPS-GQ78465001	10388722.38	1750886.26	2478.73	GPS-GQ78465001	10388722.38	1750886.22	2478.63
GPS-GQ83685297	10397696.62	1768383.32	2419.70	GPS-GQ83685297	10397696.61	1768383.26	2419.69
GPS-KV17615657	10409358.44	1787229.68	2481.24	GPS-KV17615657	10409358.46	1787229.65	2481.22
GPS-KV24415947	10419124.86	1809435.69	2560.60	GPS-KV24415947	10419124.90	1809435.72	2560.65
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NOT TO SCALE

John W. McCown

DATE: 03/22/2017
 SHEET 5 SURVTEX # 2016-0044

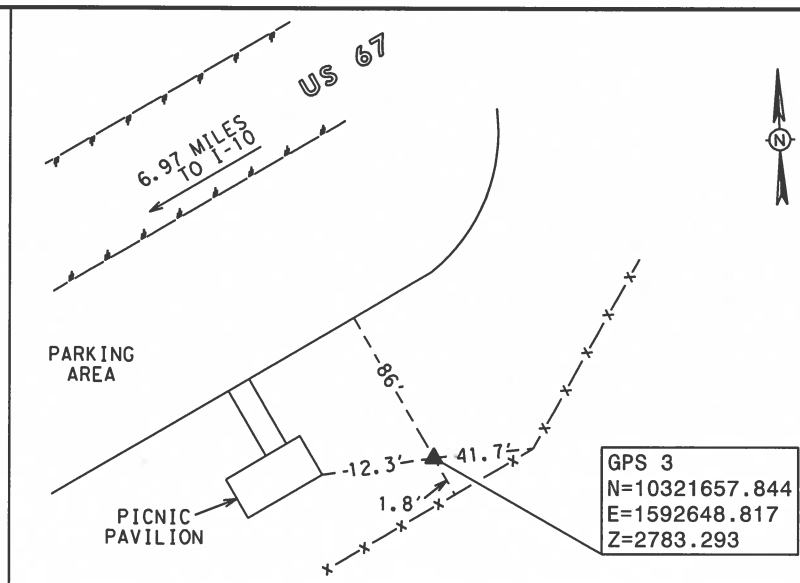
REVISIONS
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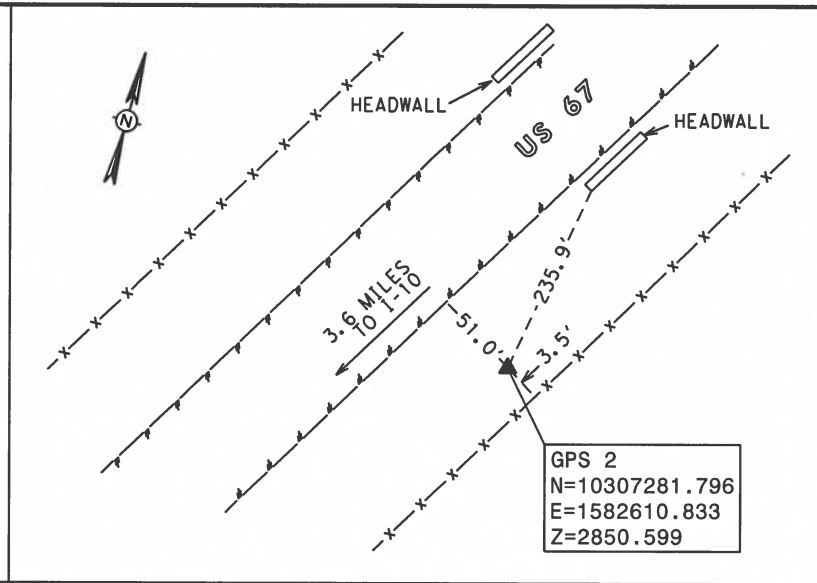


U.S. 67
 PRIMARY CONTROL

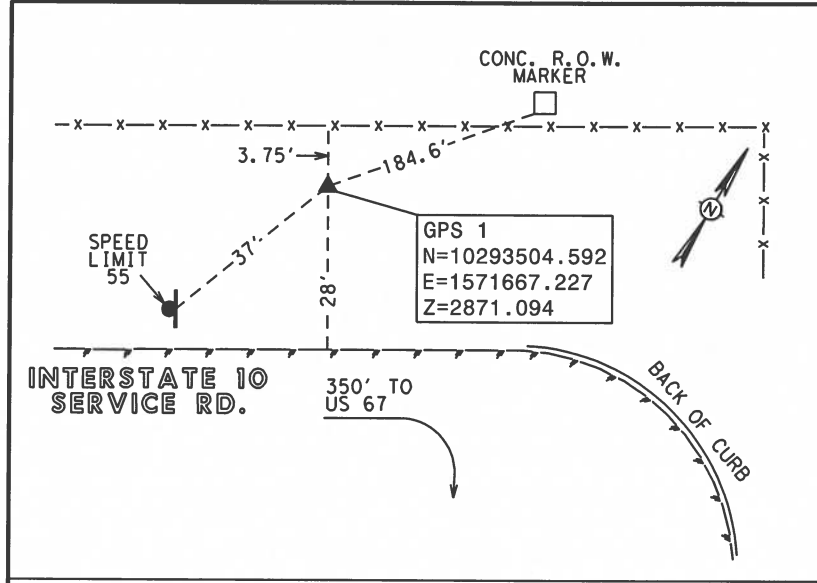
FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
STATE	DISTRICT	COUNTY
TEXAS	ODESSA	CRANE, CROCKETT, PECOS, UPTON
CONTROL	SECTION	JOB
		HIGHWAY NO.
		U.S. 67



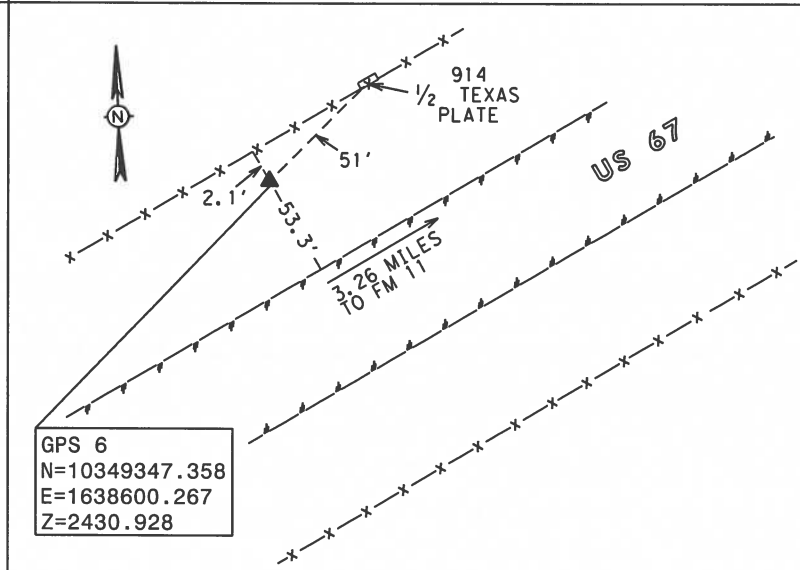
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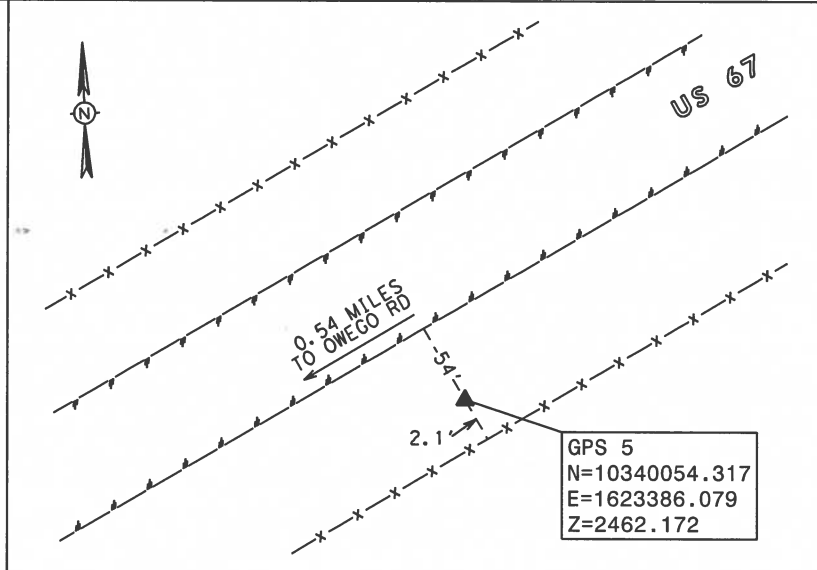
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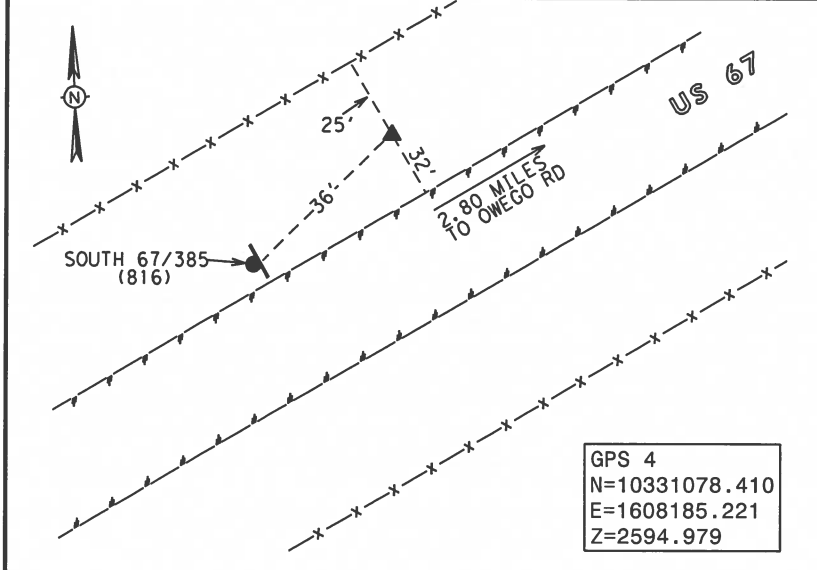
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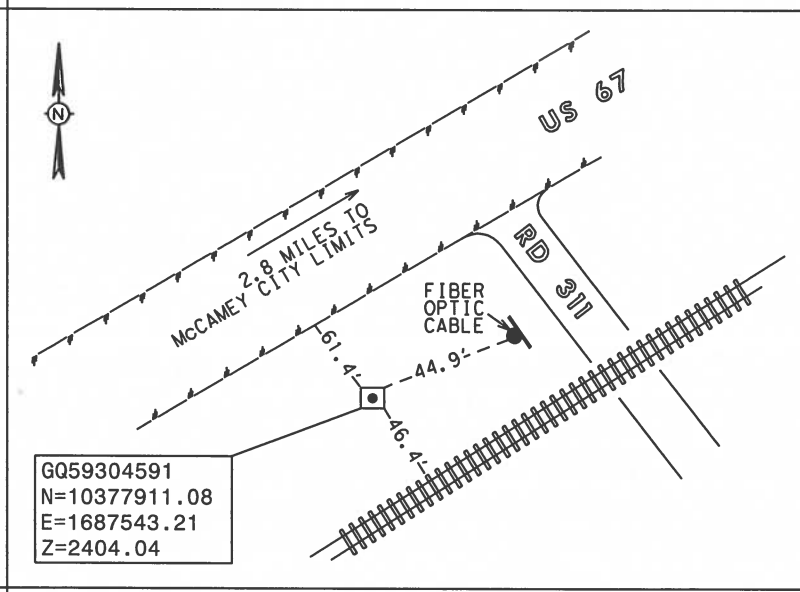
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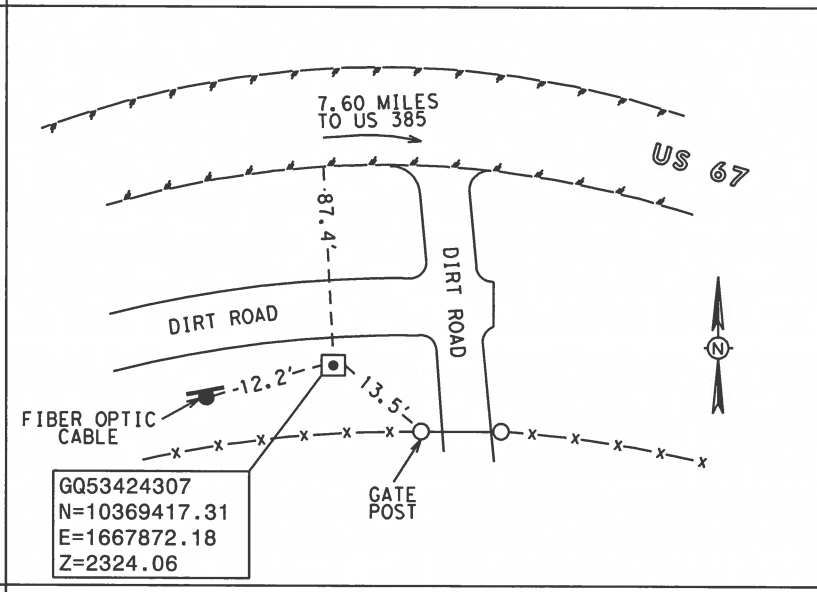
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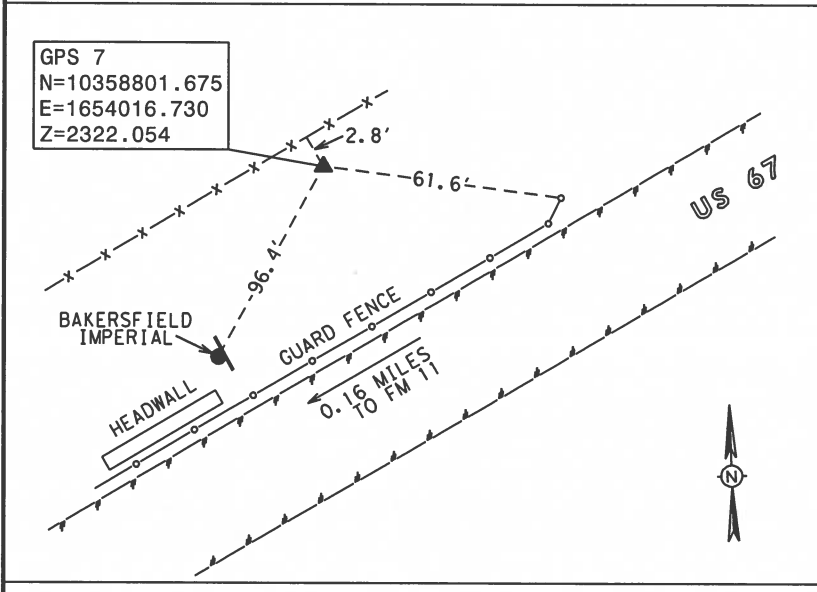
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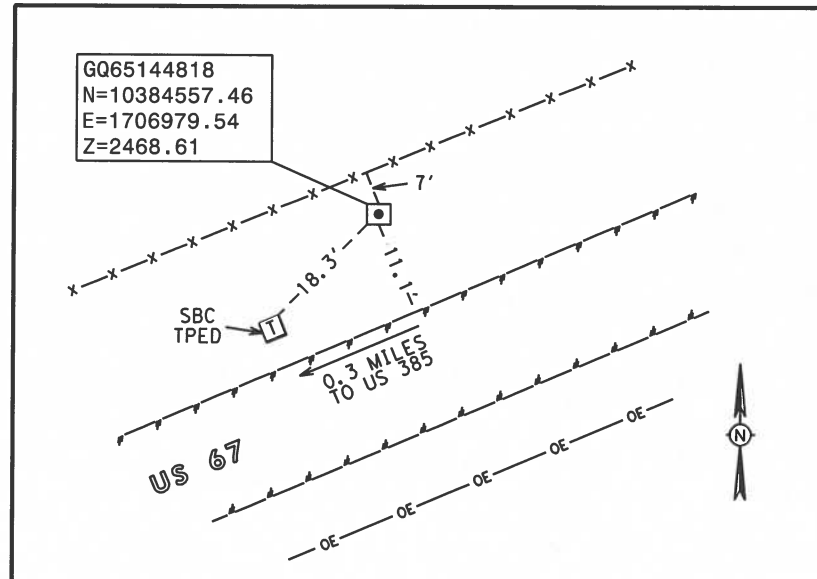
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TxDOT TYPE II CONCRETE MONUMENT FOUND

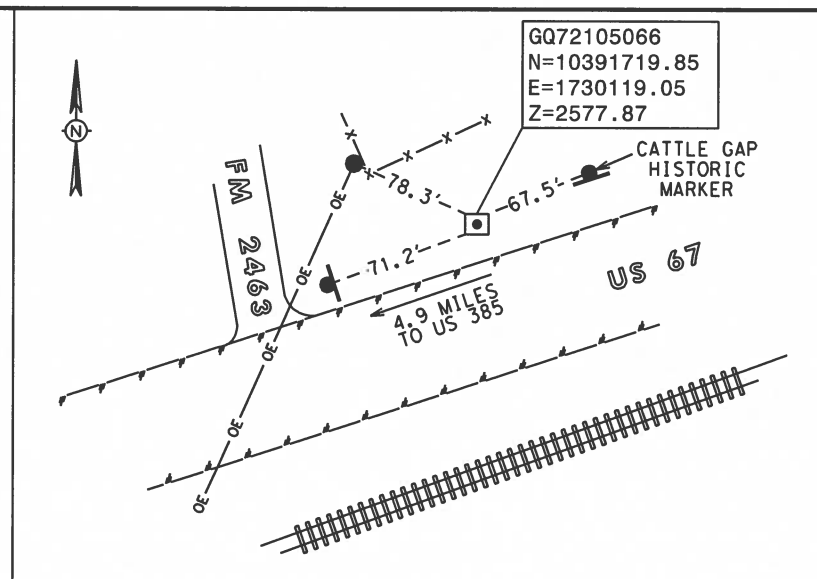


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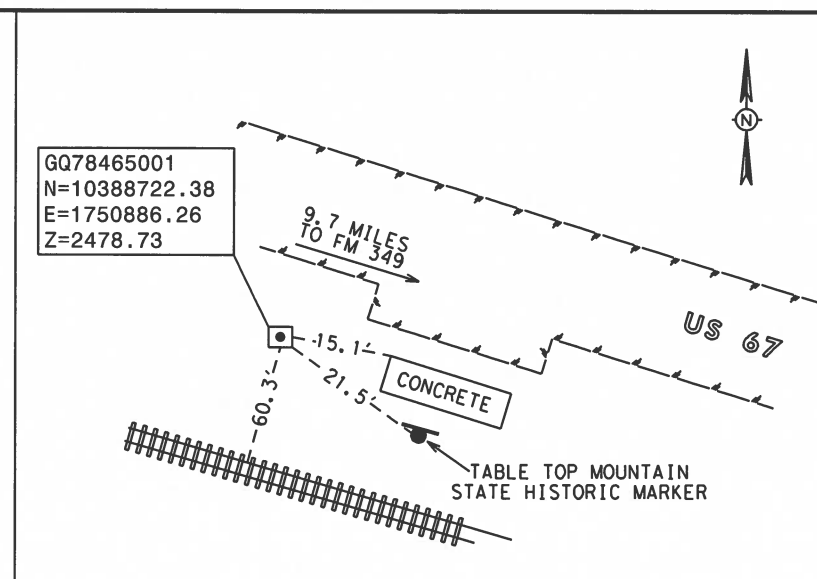
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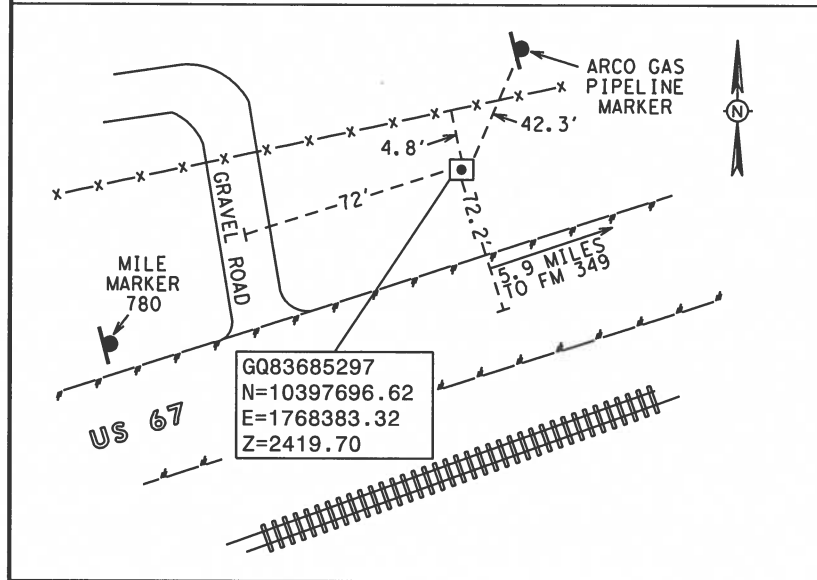


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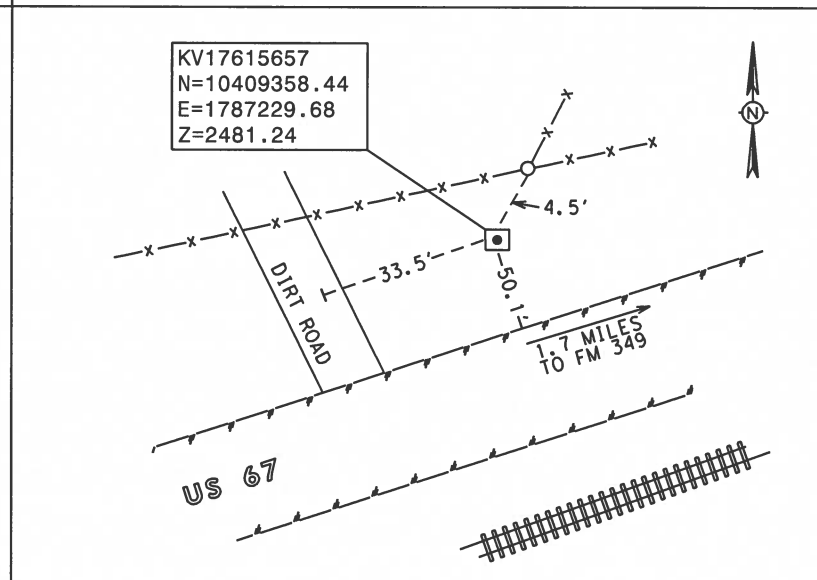
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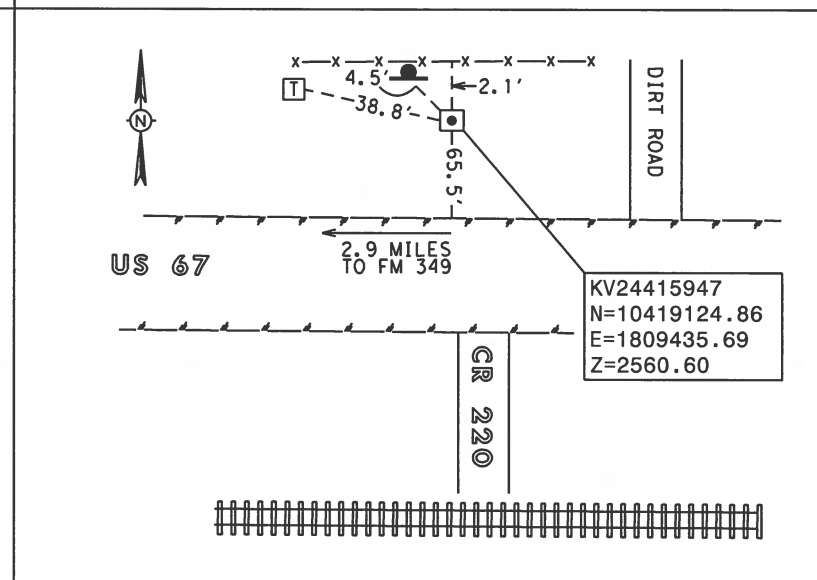
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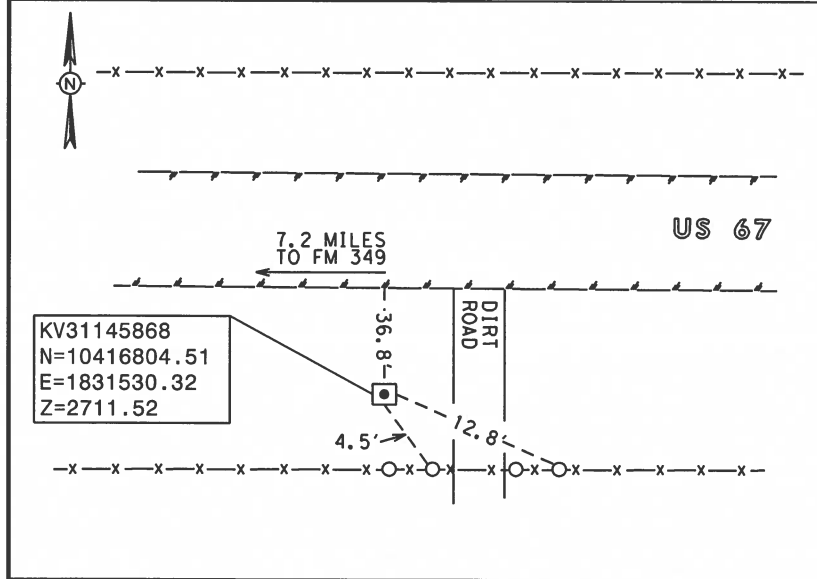
NOT TO SCALE

DATE: 03/22/2017

SHEET 6
SURVEX #
2016-0044

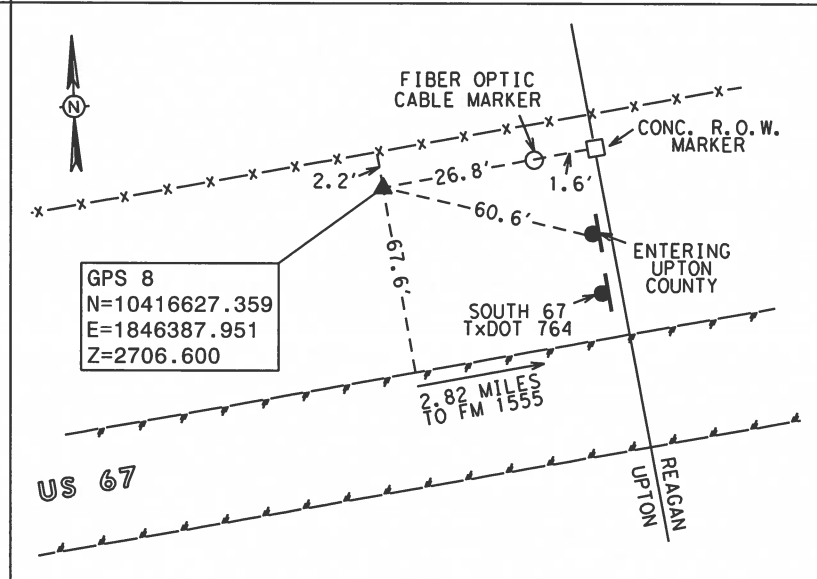
REVISIONS

3/22/17	FORMATTING
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TxDOT TYPE II CONCRETE MONUMENT FOUND



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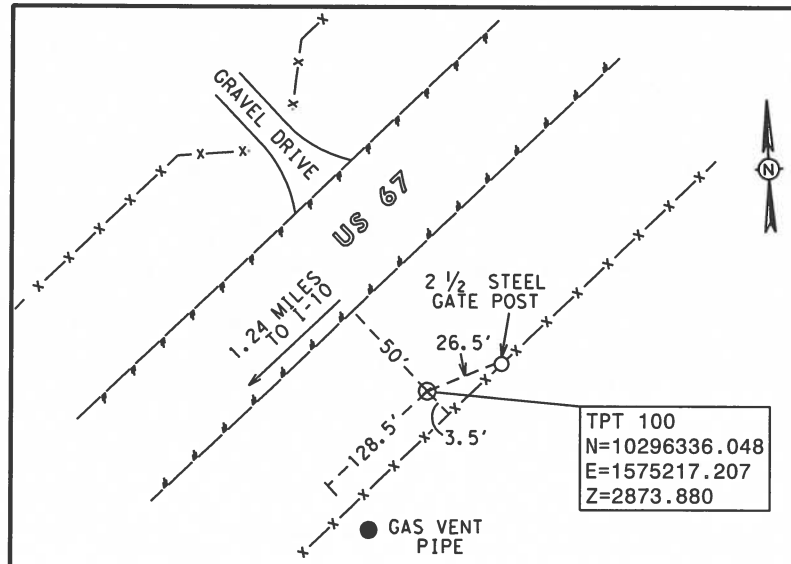
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Cedar Park, Texas 78613
(512) 249-8875
Fax (512) 249-5040
TBPLS FIRM NO. 10084600

Texas Department of Transportation

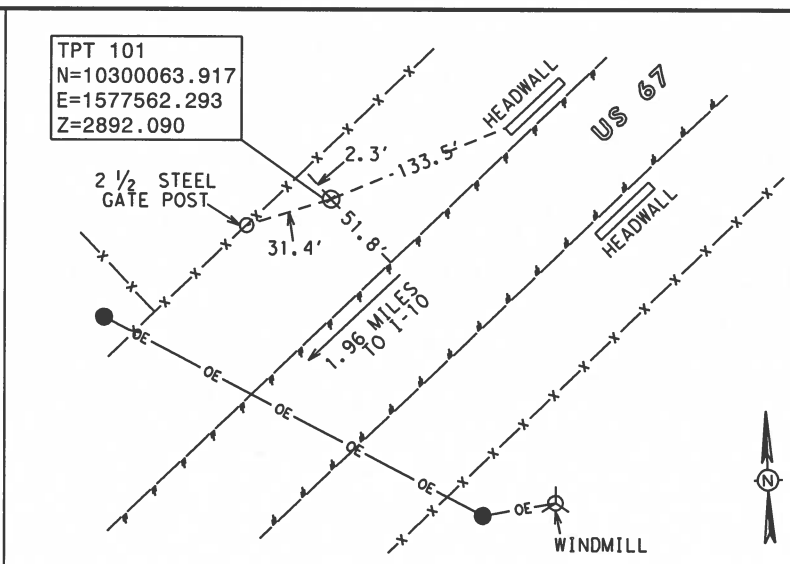
U.S. 67
PRIMARY CONTROL

FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
		81
STATE	DISTRICT	COUNTY
TEXAS	0055A	CRANE, CHISLEY, PECOS, UPTON
CONTROL	SECTION	JOB
		HIGHWAY NO.
		U.S. 67



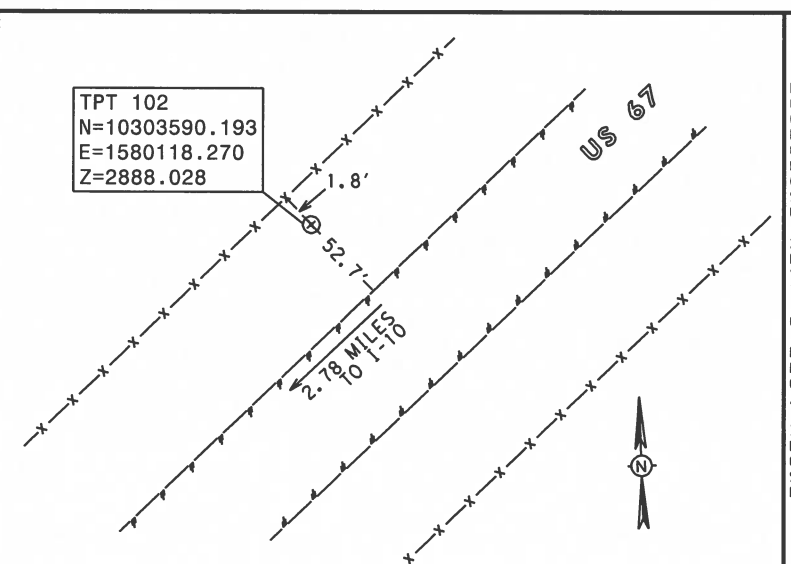
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Z=2873.880

5/8" IRON ROD SET WITH
"TXDOT" ALUM. CAP



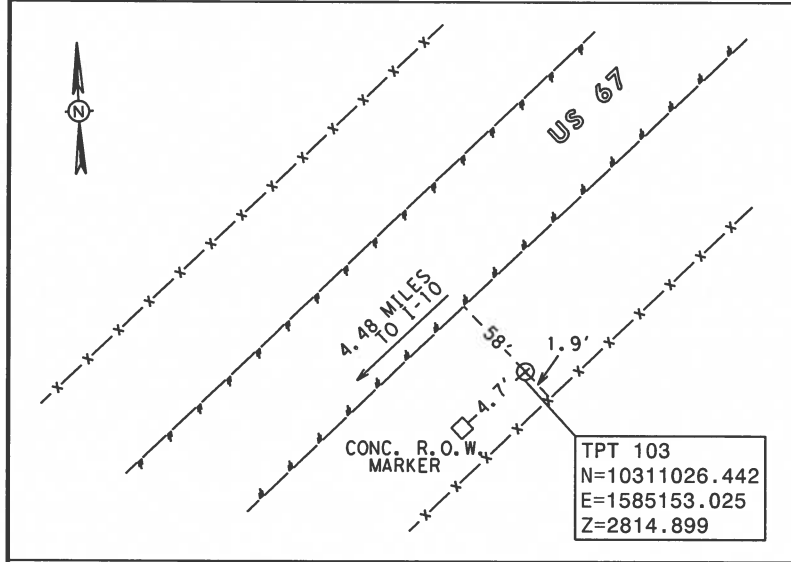
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5/8" IRON ROD SET WITH
"TXDOT" ALUM. CAP



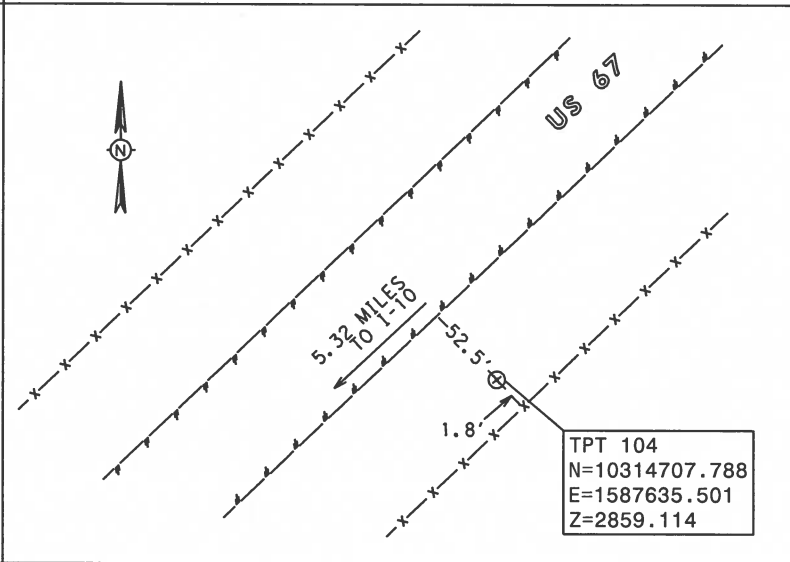
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"TXDOT" ALUM. CAP



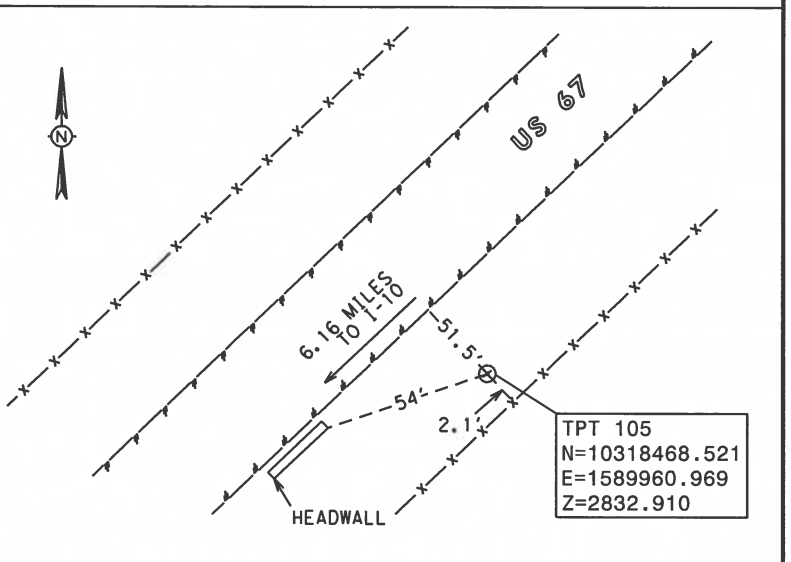
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"TXDOT" ALUM. CAP



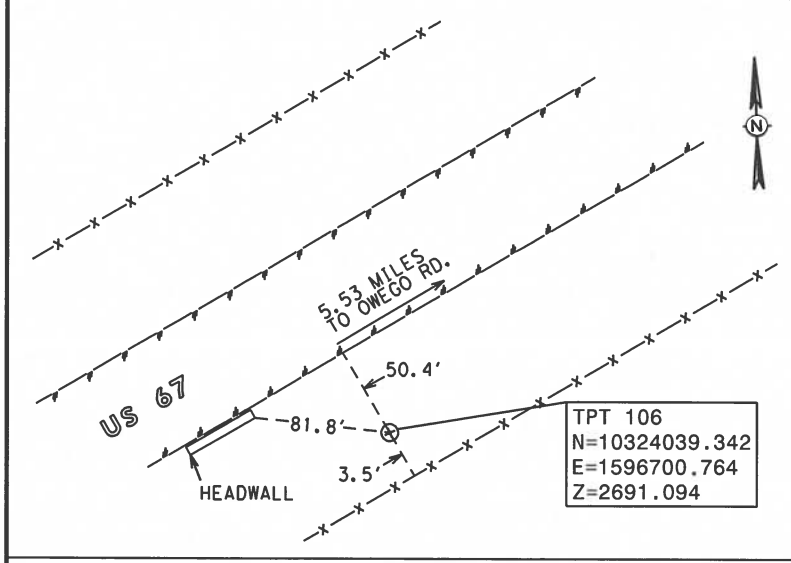
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"TXDOT" ALUM. CAP



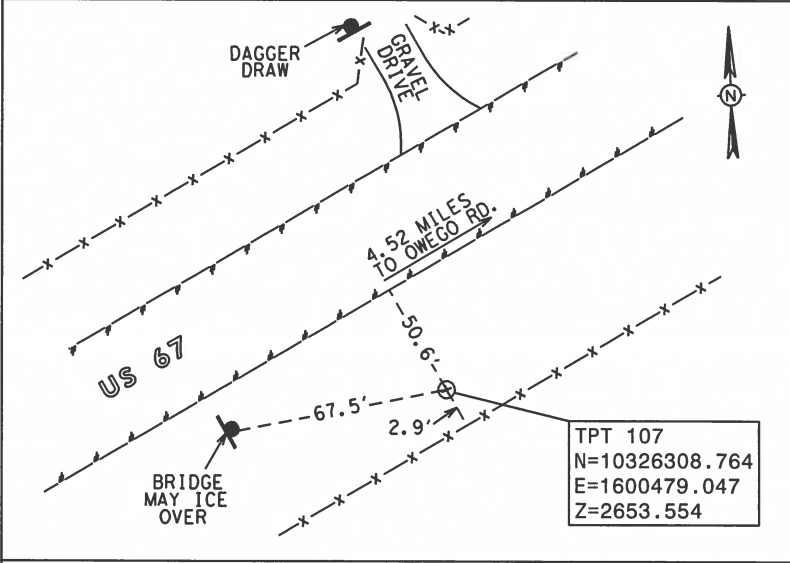
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5/8" IRON ROD SET WITH
"TXDOT" ALUM. CAP



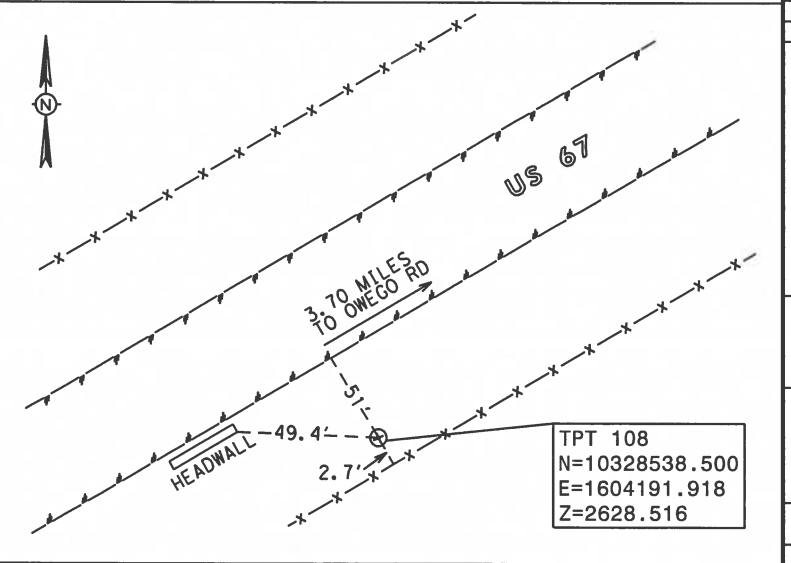
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5/8" IRON ROD SET WITH
"TXDOT" ALUM. CAP



TPT 107
N=10326308.764
E=1600479.047
Z=2653.554

5/8" IRON ROD SET WITH
"TXDOT" ALUM. CAP



TPT 108
N=10328538.500
E=1604191.918
Z=2628.516

5/8" IRON ROD SET WITH
"TXDOT" ALUM. CAP

NOTES:
1. THE COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD 83 (2011, EPOCH 2010.00). THE PROJECT'S VERTICAL DATUM IS NAVD 88 (GEOID 12A). THE COORDINATES AND DISTANCES PROVIDED HEREON HAVE BEEN SCALED (SCALING ORIGIN N 0 00 E 0 00) FROM GRID COORDINATES USING A SURFACE ADJUSTMENT FACTOR OF 1.00020. THE UNITS ARE U.S. SURVEY FEET.
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- SECONDARY CONTROL: RTK OBSERVATIONS PRIOR TO THE FINAL ADJUSTMENT (HOLDING PUBLISHED NGS CORS STATIONS). A MINIMAL CONSTRAINT WAS PERFORMED AND YIELDED ACCEPTABLE RESULTS.
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NOT TO SCALE



DATE: 03/22/2017
SHEET 7
SURVTEX # 2016-0044

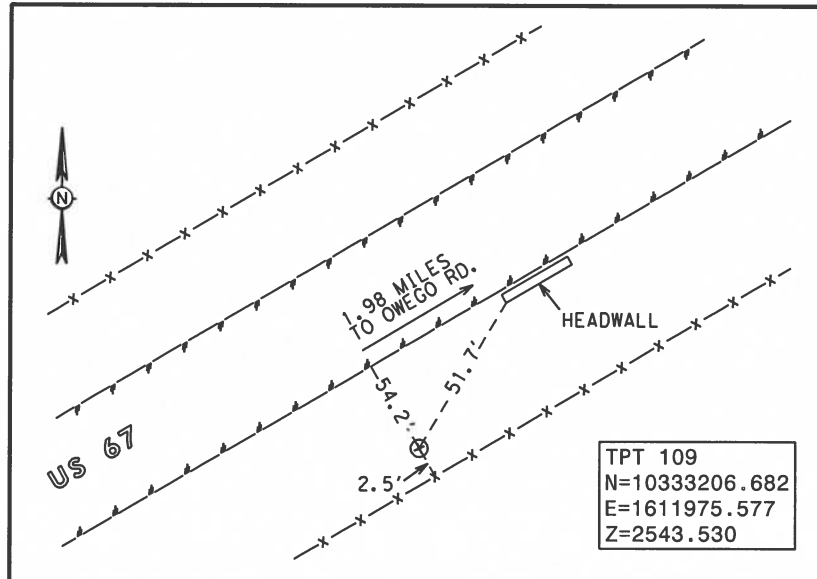
REVISIONS	
3/22/17	FORMATTING

SURVOTEX LLC
PROFESSIONAL SURVEYING AND MAPPING SERVICES
600 W. Whitestone Blvd.
Cedar Park, Texas 78613
(512) 249-8875
Fax (512) 249-5040
TBPLS FIRM NO. 10084600



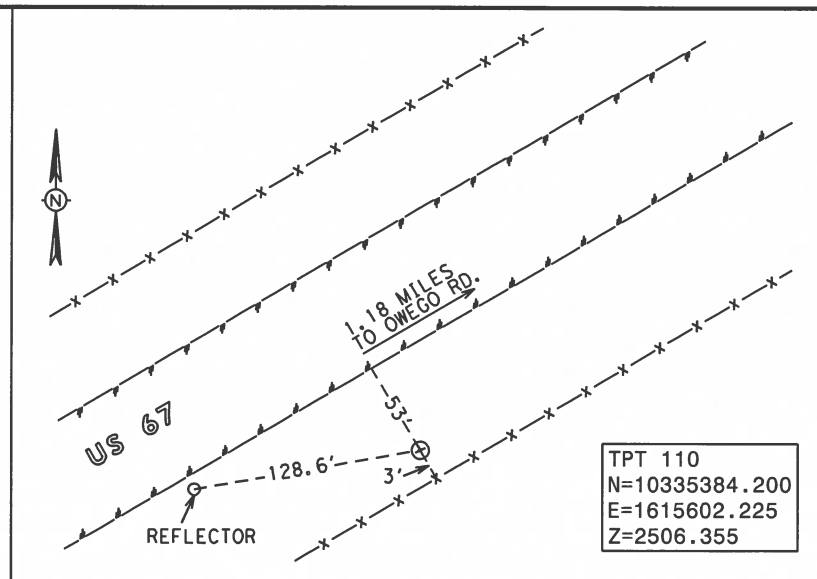
U. S. 67
SECONDARY CONTROL

FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
STATE	DISTRICT	COUNTY
TEXAS	ODESSA	CHASE, CROCKETT, PECOS, PITH
CONTROL	SECTION	JOB
		HIGHWAY NO.
		U. S. 67



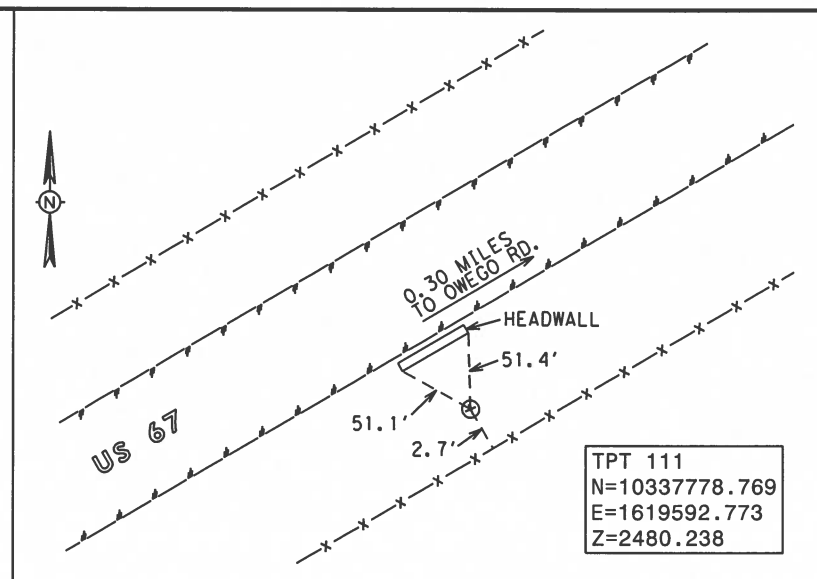
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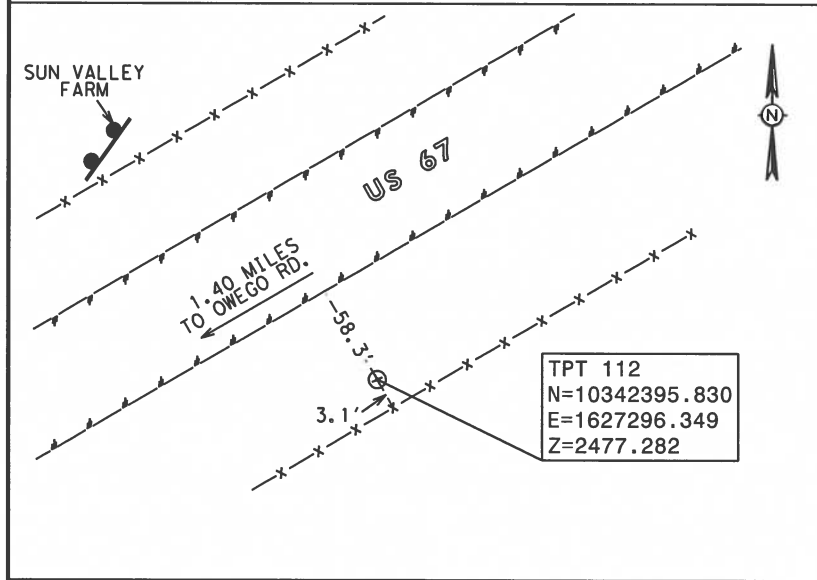
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5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



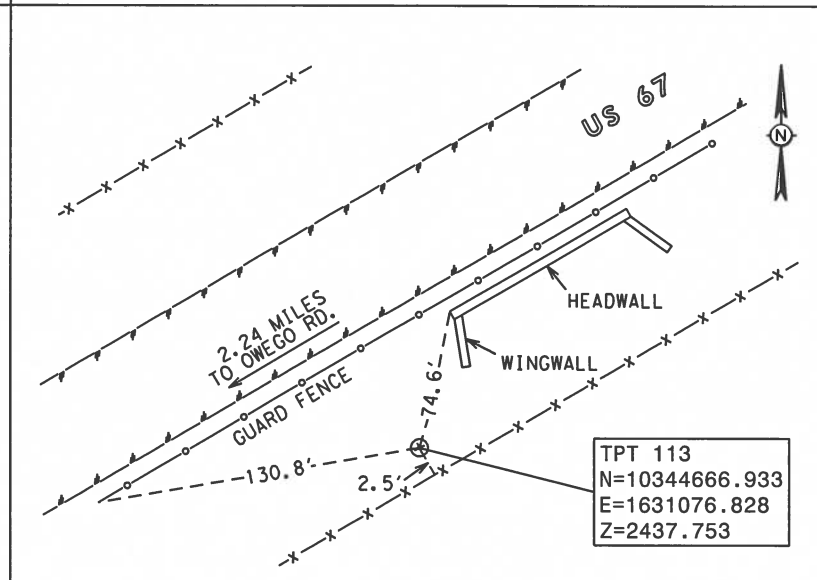
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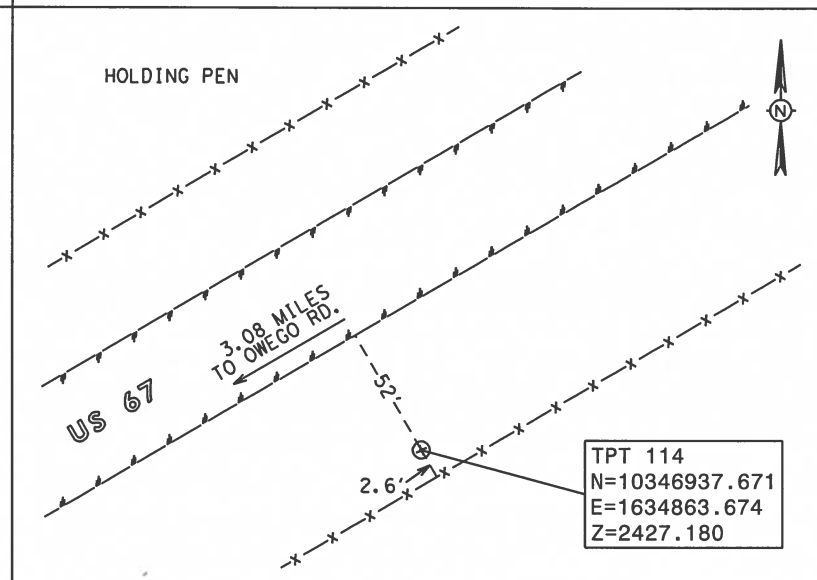
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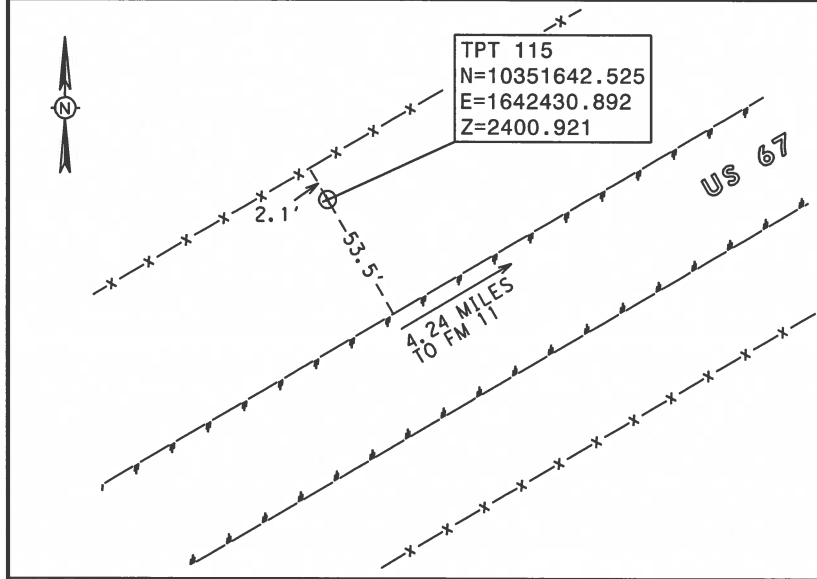
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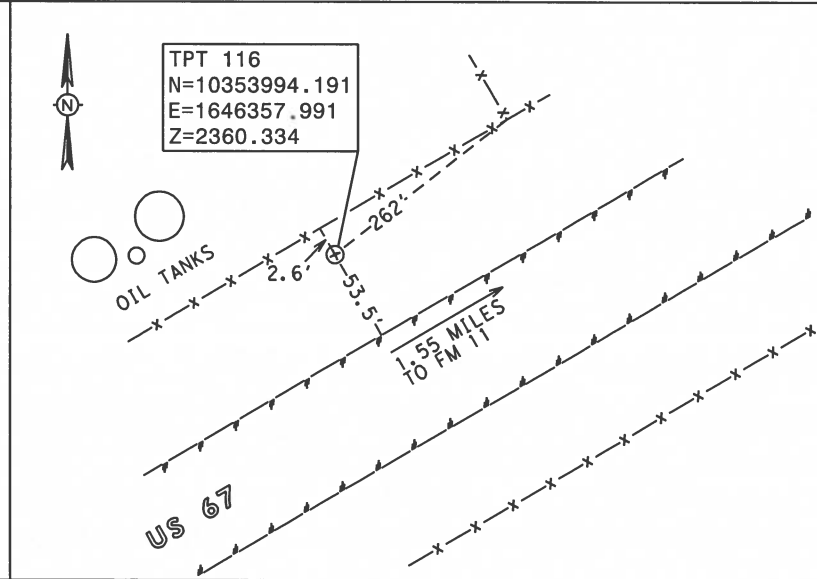
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5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



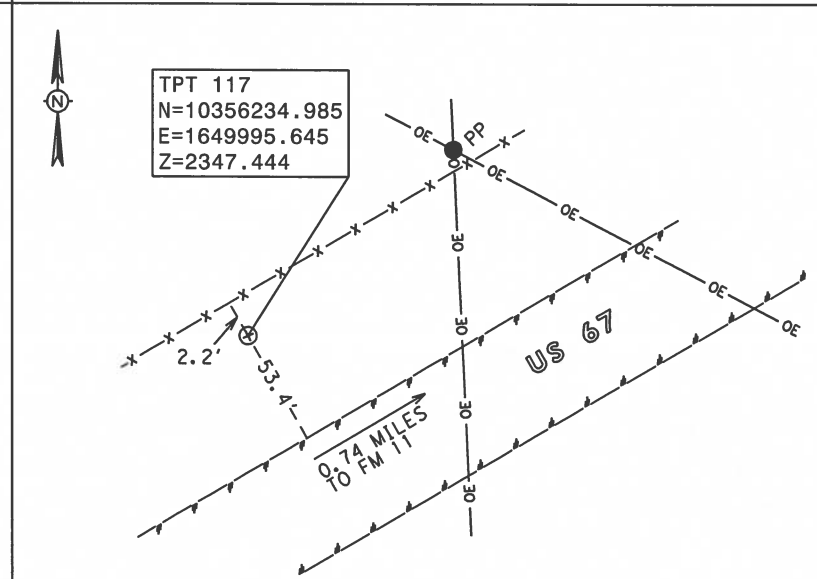
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5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



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 Z=2360.334

5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



TPT 117
 N=10356234.985
 E=1649995.645
 Z=2347.444

5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP

NOTES:
 1. THE COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM CENTRAL ZONE NAD 83 (2011 EPOCH 2010.00). THE PROJECT'S VERTICAL DATUM IS NAVD 88 (GEOID 12A). THE COORDINATES AND DISTANCES PROVIDED HEREON HAVE BEEN GRADED (SCALING ORIGIN N 0.00 E 0.00) FROM GRID COORDINATES USING A SURFACE ADJUSTMENT FACTOR OF 1.00020. THE UNITS ARE U.S. SURVEY FEET.
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NOT TO SCALE

DATE: 03/22/2017

SHEET 8
 SURVEX #
 2016-0044

REVISIONS

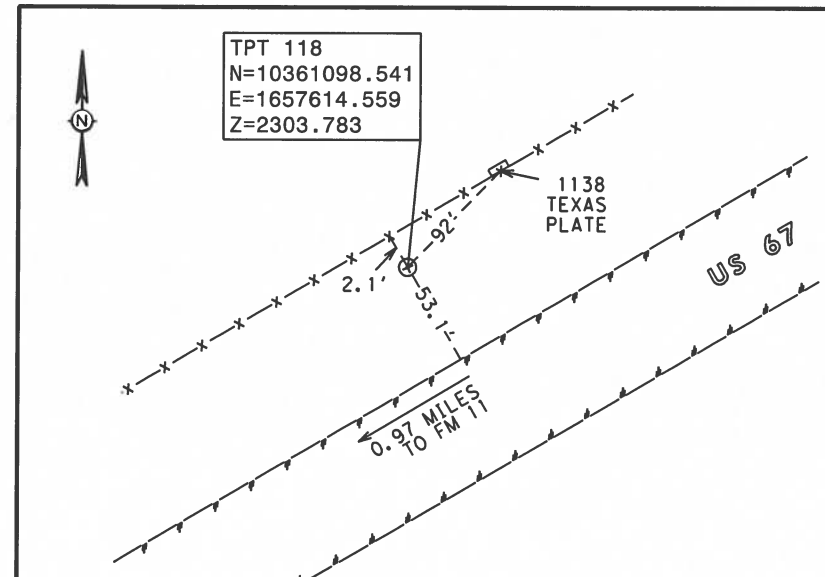
3/22/17 FORMATTING

SURVOTEX LLC
 PROFESSIONAL SURVEYING AND MAPPING SERVICES
 600 W. Whitestone Blvd.
 Cedar Park, Texas 78613
 (512) 249-8875
 Fax (512) 249-5040
 TBPLS FIRM NO. 10084600

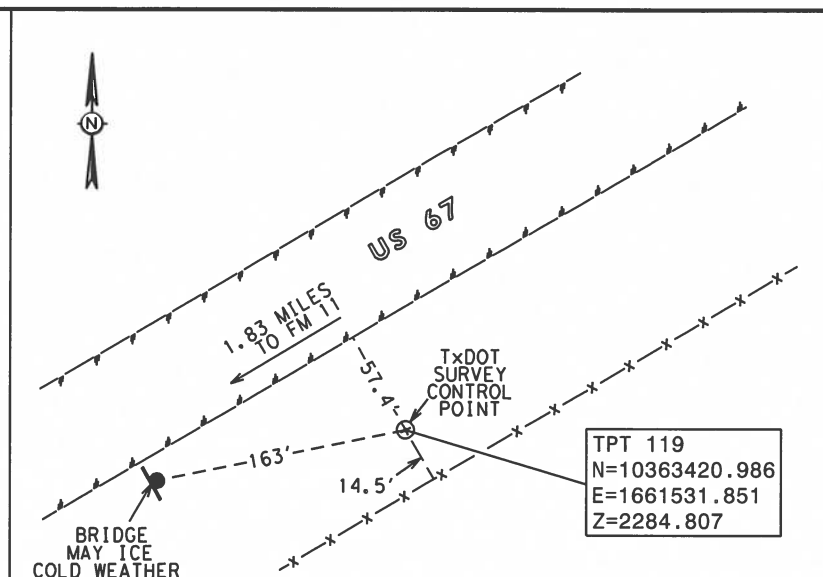
Texas Department of Transportation

U. S. 67
 SECONDARY CONTROL

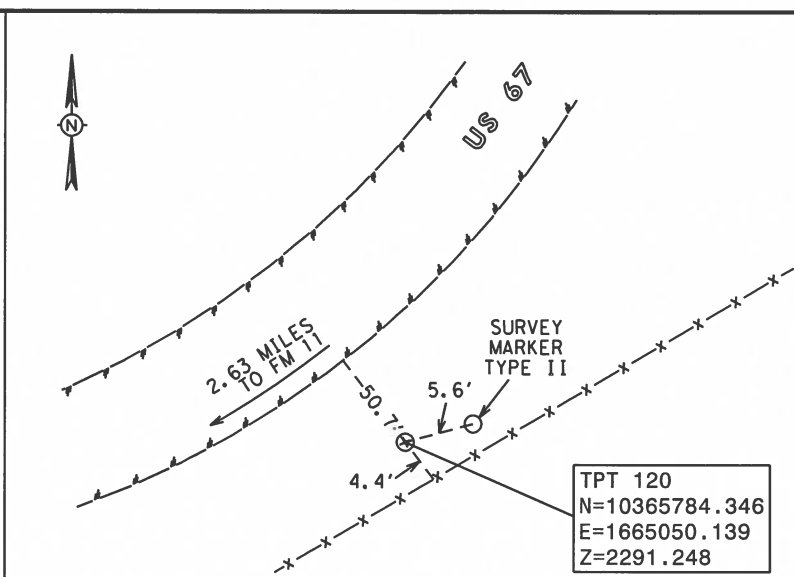
FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
TEXAS	0055A	83
CONTROL	SECTION	JOB
		CRANE, CROCKETT, PECCO, UPTON
		HIGHWAY NO.
		U.S. 67



5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



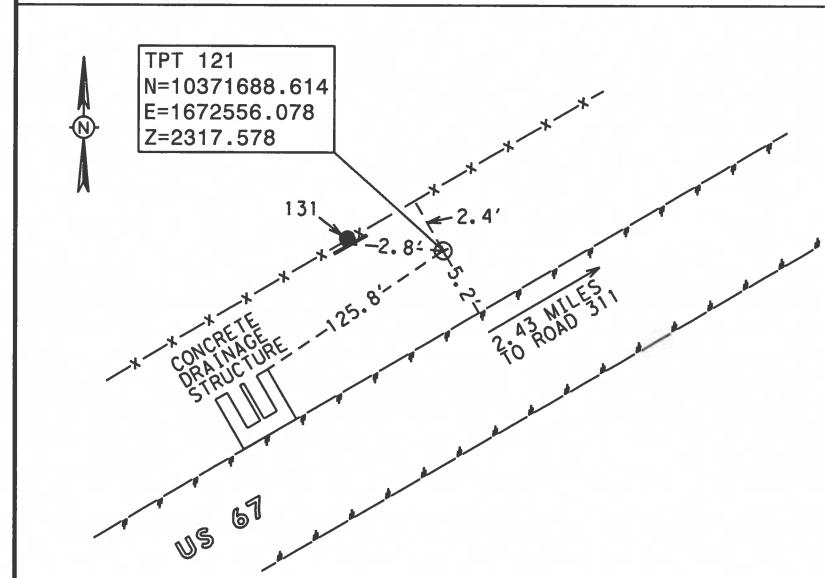
ALUMINUM CAP FOUND TxDOT SURVEY CONTROL POINT



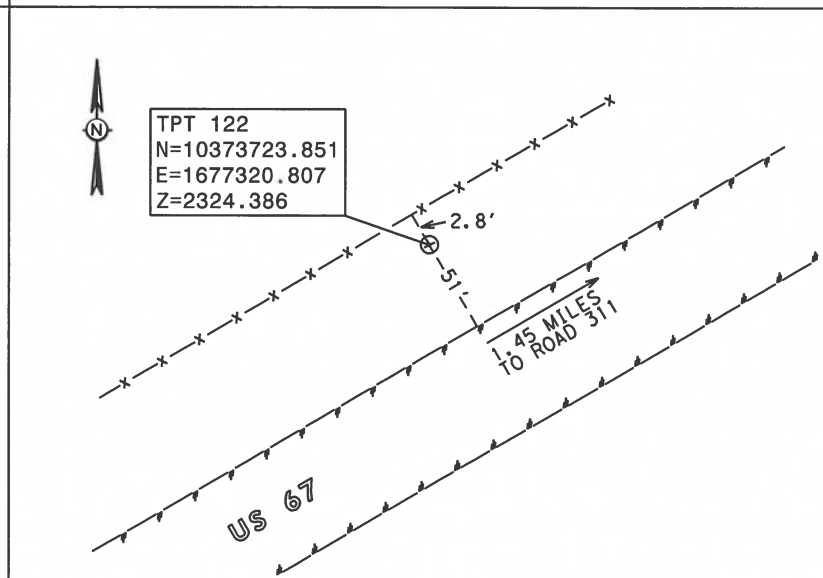
5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP

NOTES:

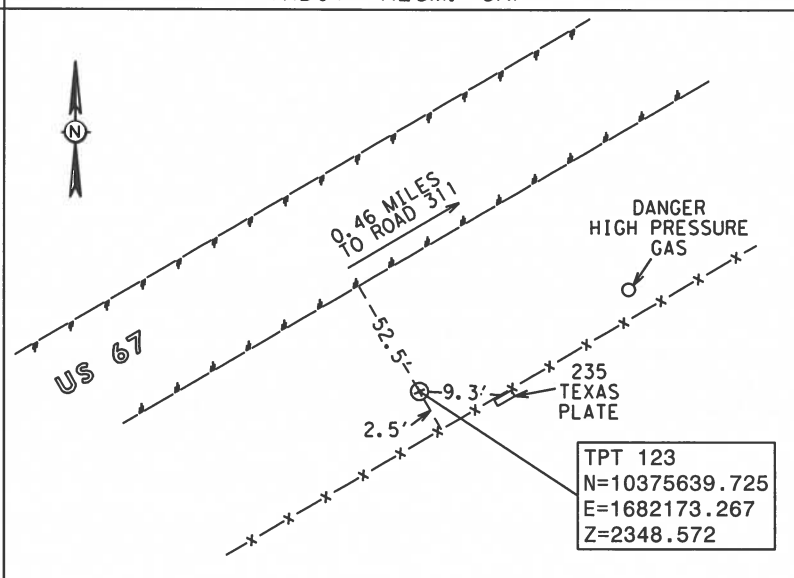
1. THE COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD 83 (2011, EPOCH 2010.00). THE PROJECT'S VERTICAL DATUM IS NAVD 88 (GEOID 12A). THE COORDINATES AND DISTANCES PROVIDED HEREON HAVE BEEN SCALED (SCALING ORIGIN N 0.00 E 0.00) FROM GRID COORDINATES USING A SURFACE ADJUSTMENT FACTOR OF 1.00020. THE UNITS ARE U.S. SURVEY FEET.
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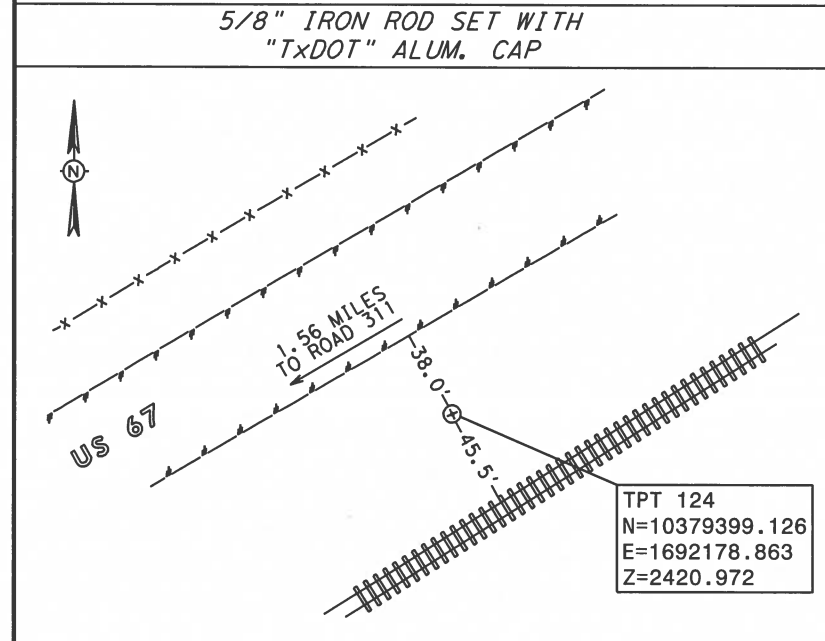
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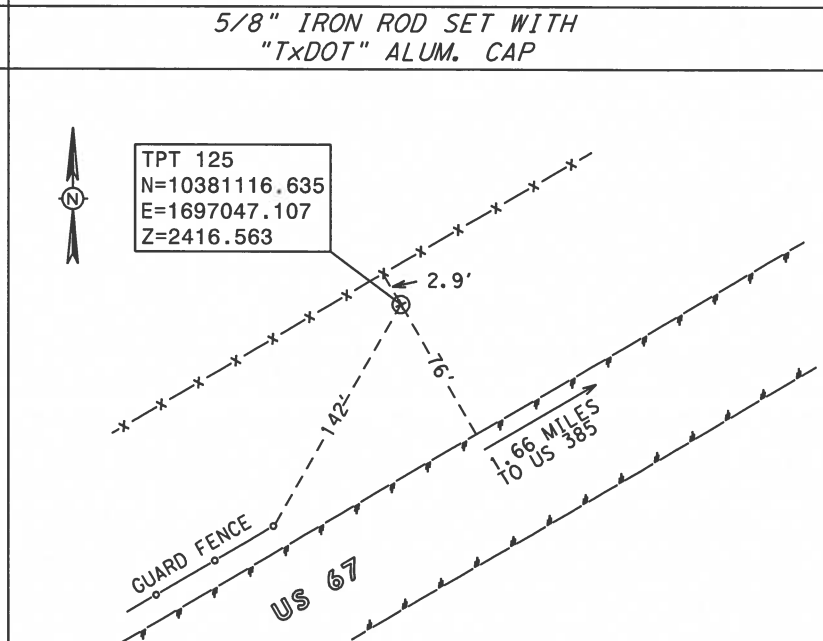
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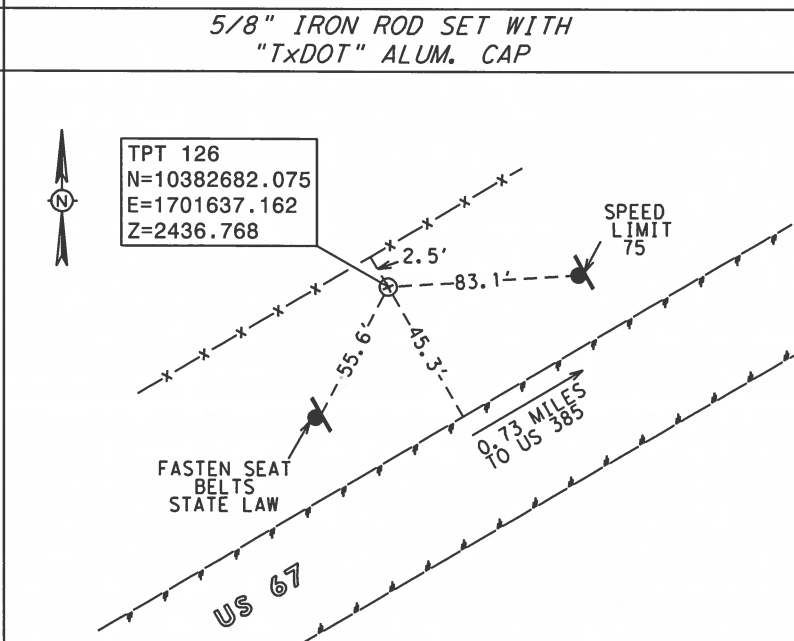
5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



TxDOT TYPE II CONCRETE MONUMENT



5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP

NOT TO SCALE

John W. McCown

DATE: 03/22/2017

SHEET 9
SURVTEX # 2016-0044

REVISIONS

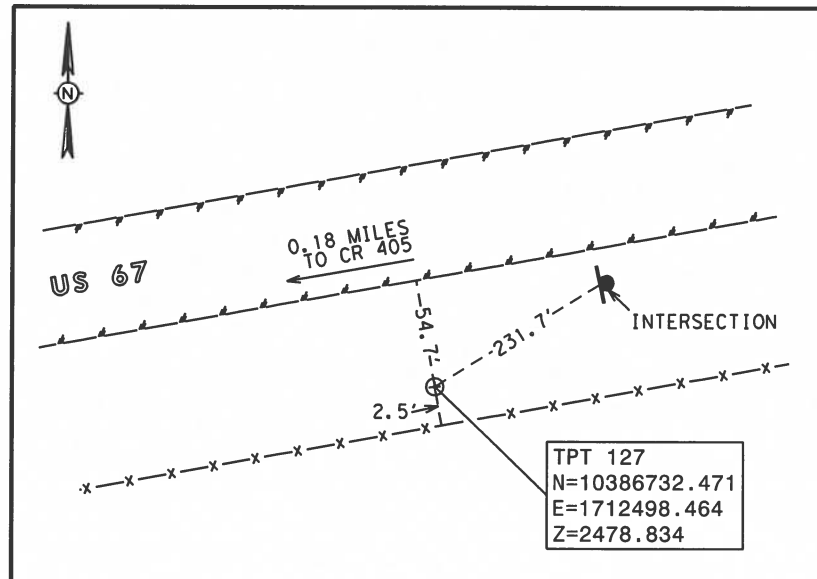
3/22/17 FORMATTING

SURVOTEX LLC
PROFESSIONAL SURVEYING AND MAPPING SERVICES
600 W. Whitestone Blvd.
Cedar Park, Texas 78613
(512) 249-8875
Fax (512) 249-5040
TBPLS FIRM NO. 10084600

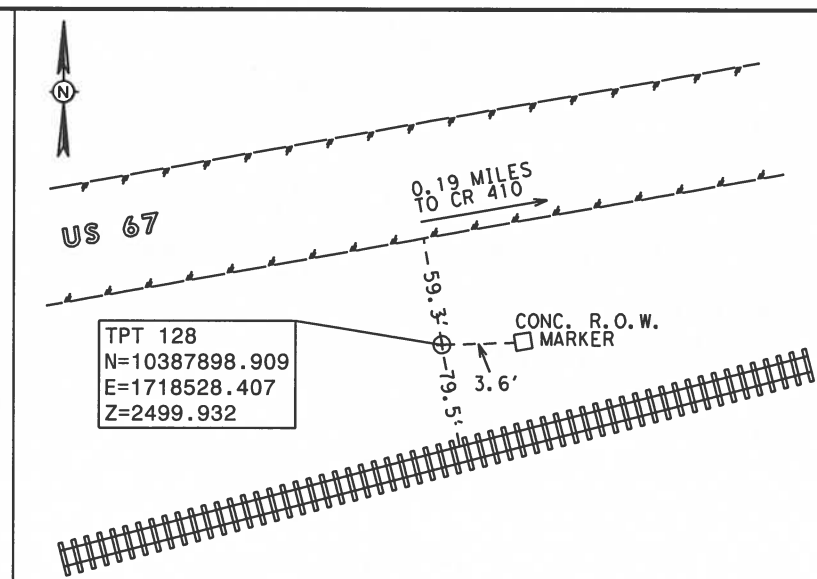
Texas Department of Transportation

U.S. 67
SECONDARY CONTROL

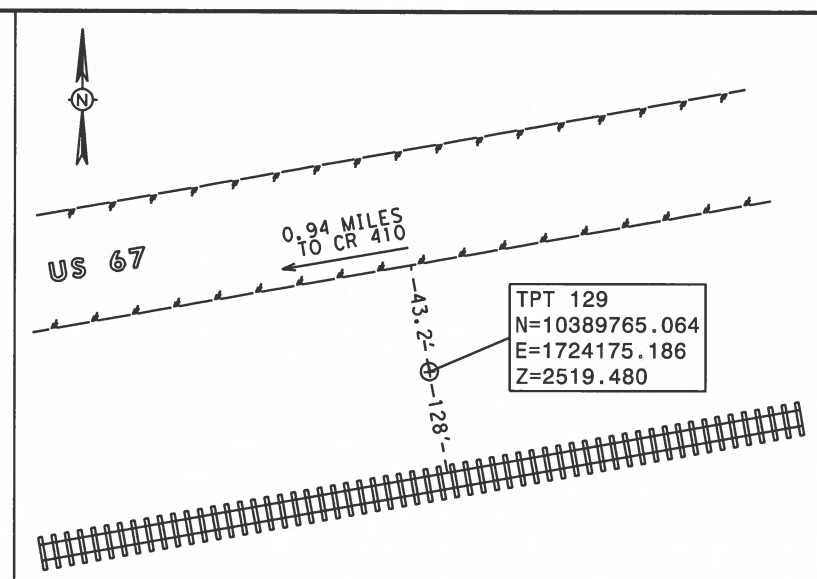
FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
TEXAS	ODessa	84
CONTROL	SECTION	JOB
		CRANE, CROCKETT, PECOS, UPTON
		HIGHWAY NO.
		U.S. 67



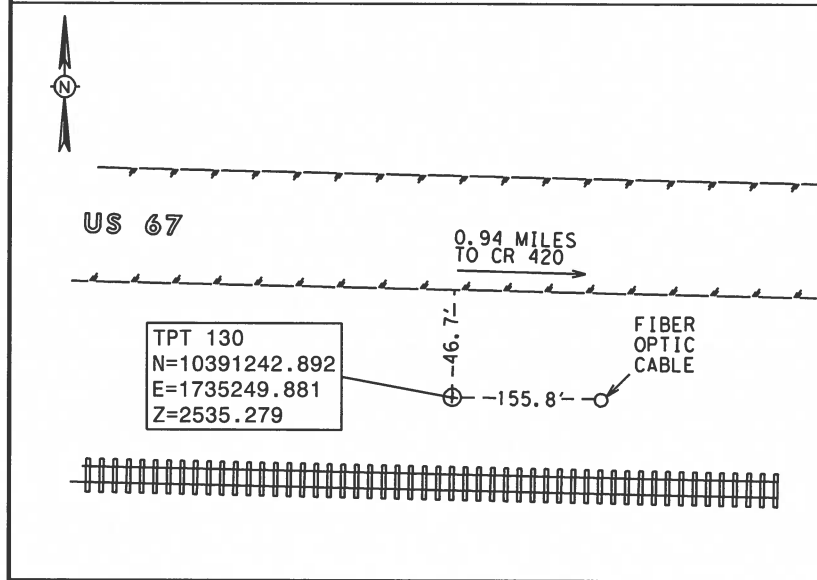
5/8" IRON ROD SET WITH "TXDOT" ALUM. CAP



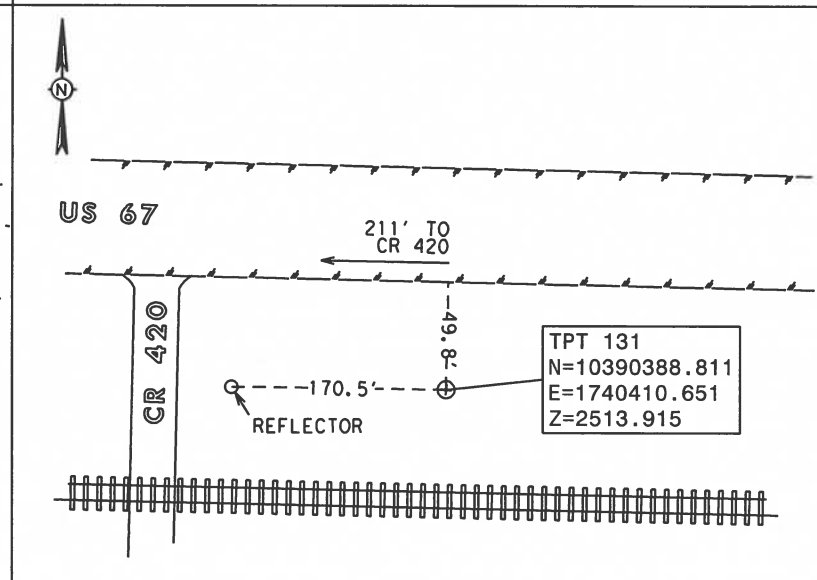
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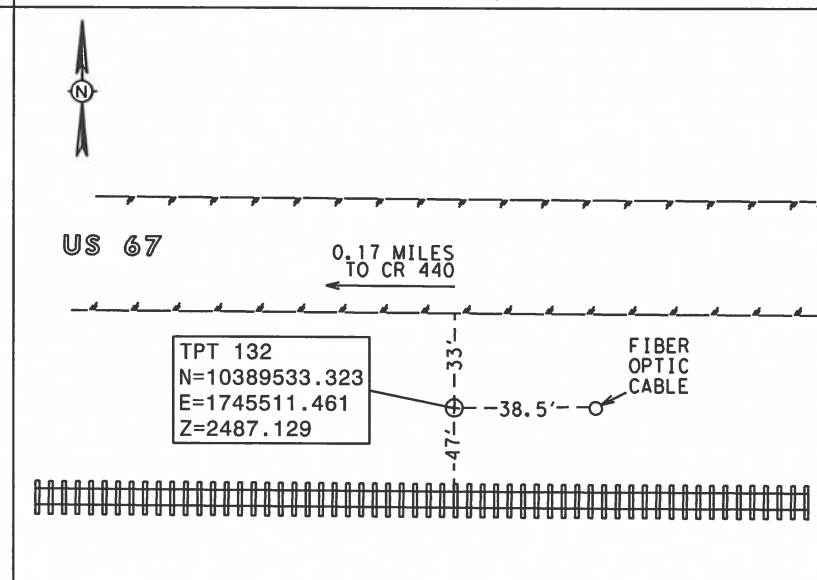
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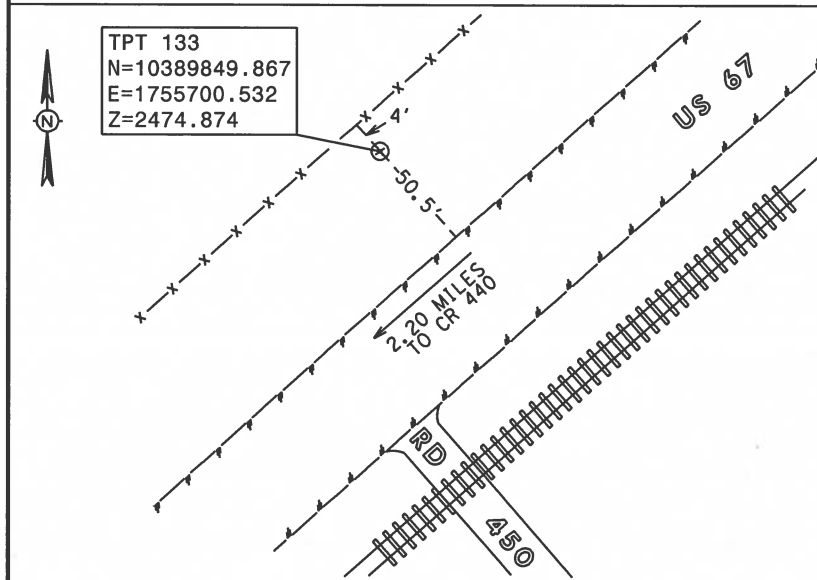
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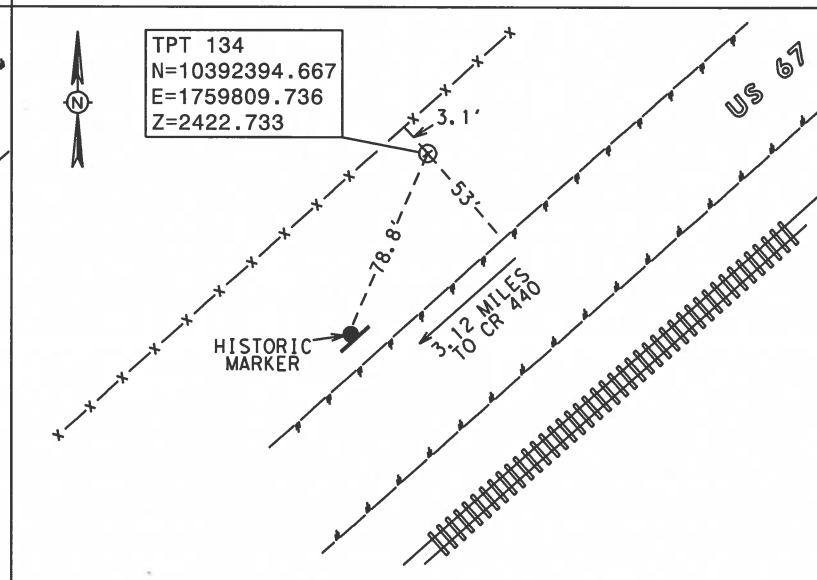
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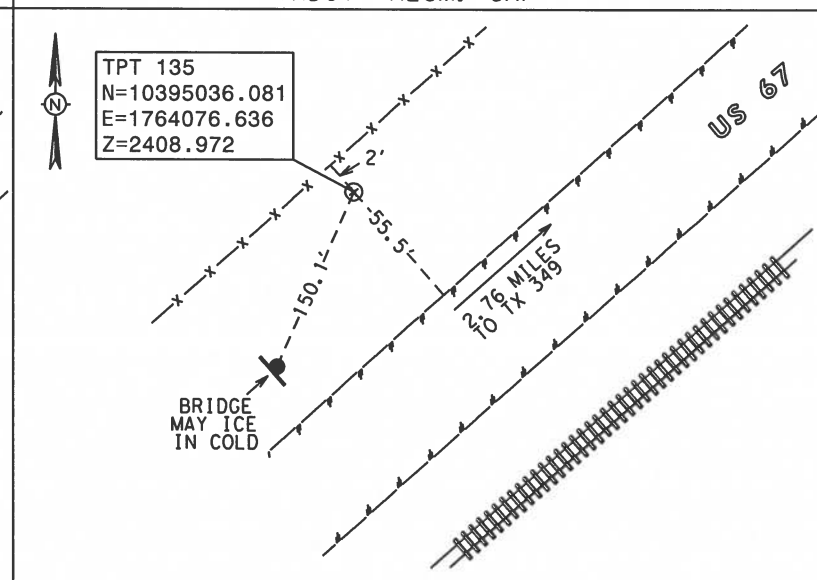
5/8" IRON ROD SET WITH "TXDOT" ALUM. CAP



5/8" IRON ROD SET WITH "TXDOT" ALUM. CAP



5/8" IRON ROD SET WITH "TXDOT" ALUM. CAP



5/8" IRON ROD SET WITH "TXDOT" ALUM. CAP

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NOT TO SCALE



DATE: 03/22/2017

SHEET 10
SURVTEX #
2016-0044

REVISIONS

3/22/17 FORMATTING

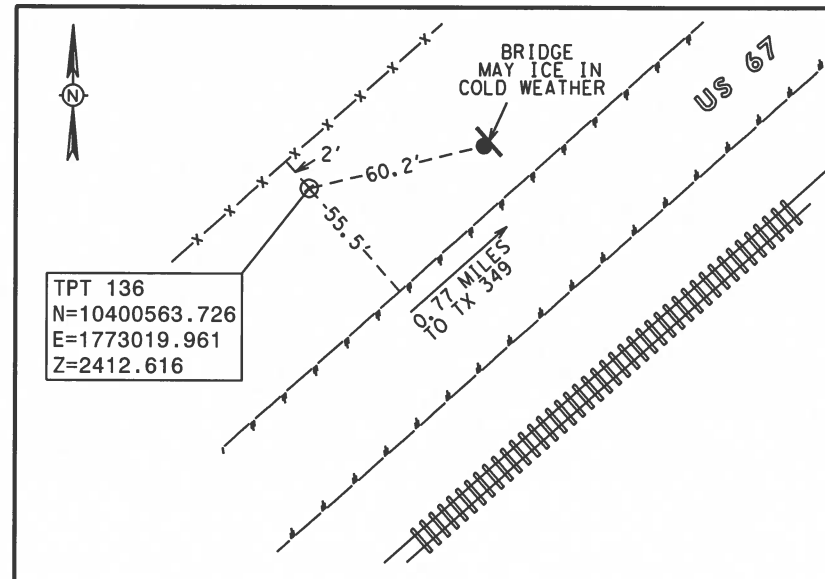


PROFESSIONAL SURVEYING AND MAPPING SERVICES
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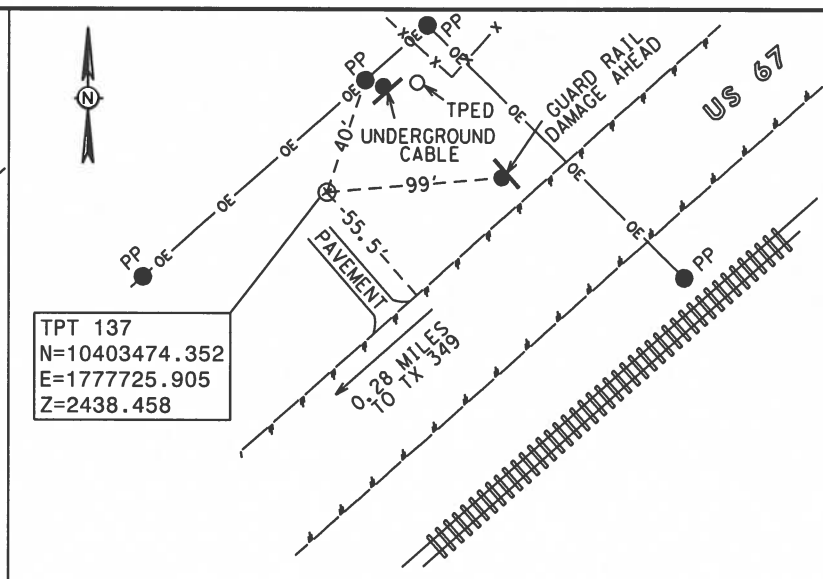


U.S. 67
SECONDARY CONTROL

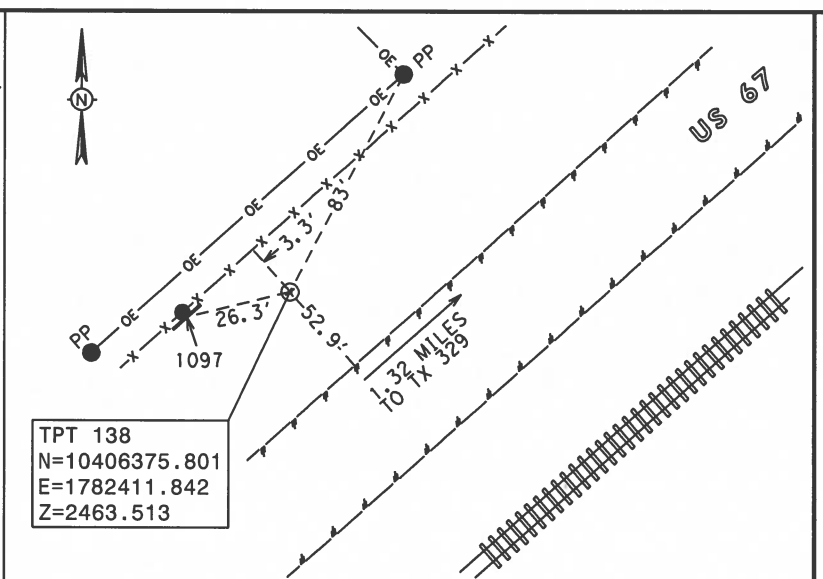
FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
STATE	DISTRICT	COUNTY
TEXAS	ODESSA	CRANE, CROCKETT, PECOS, UPTON
CONTROL	SECTION	JOB
		HIGHWAY NO.
		U.S. 67



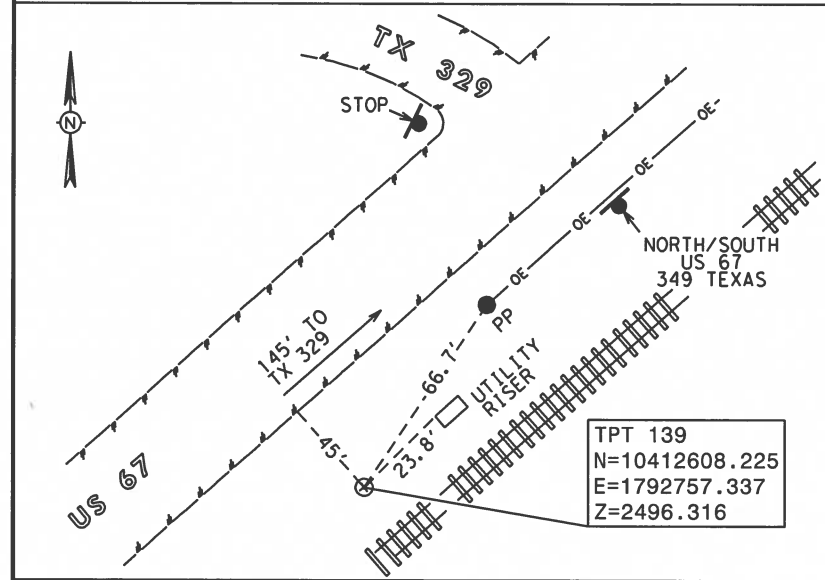
5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



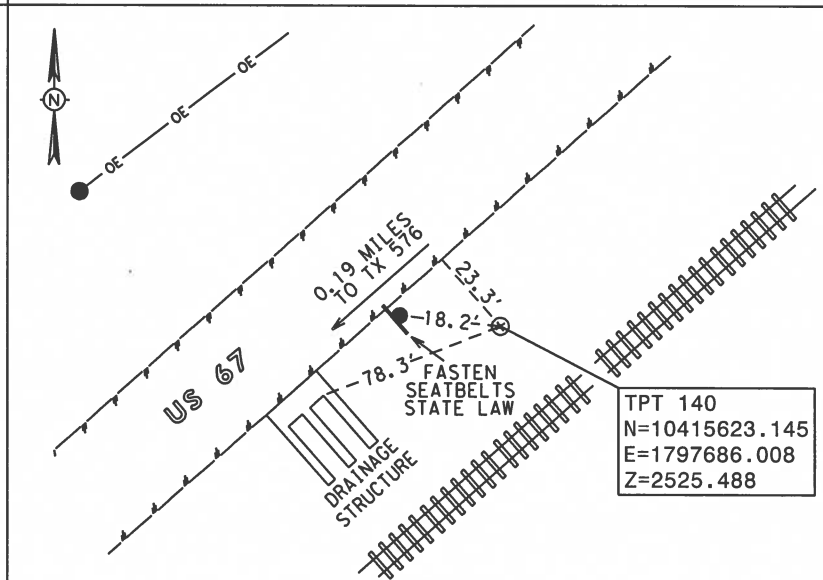
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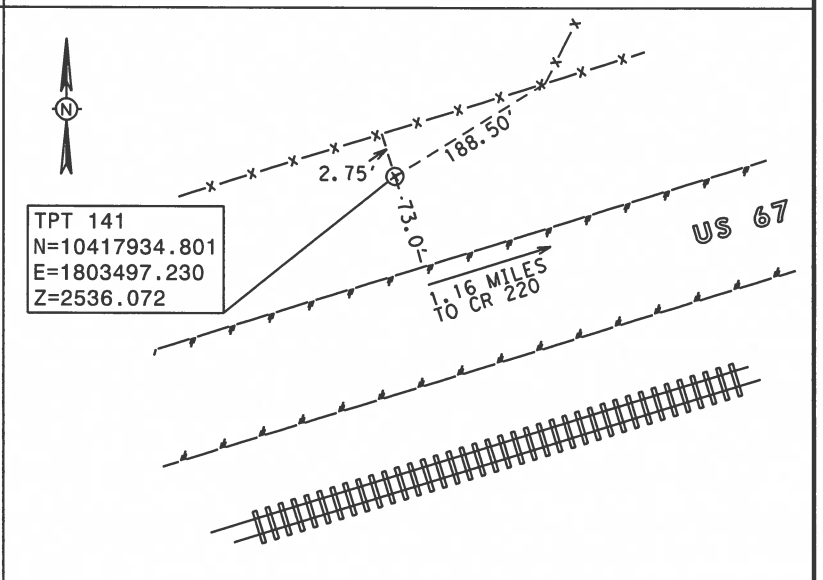
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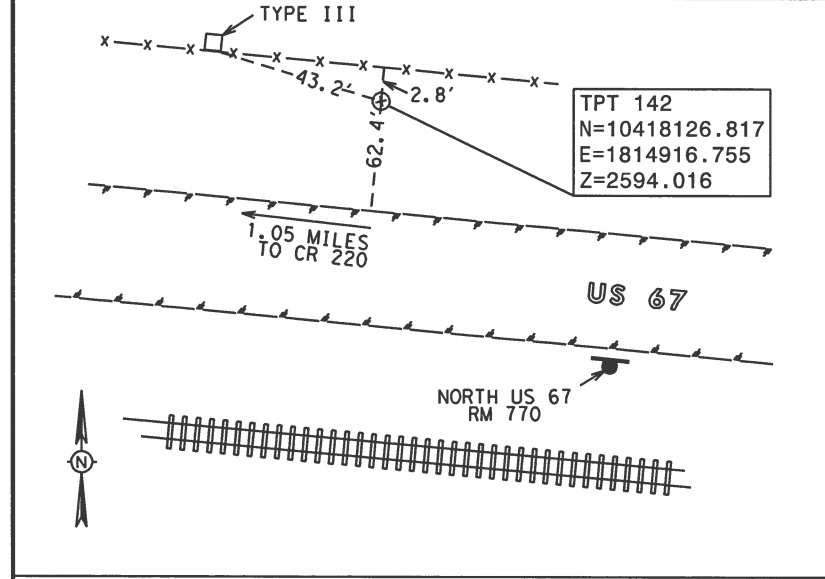
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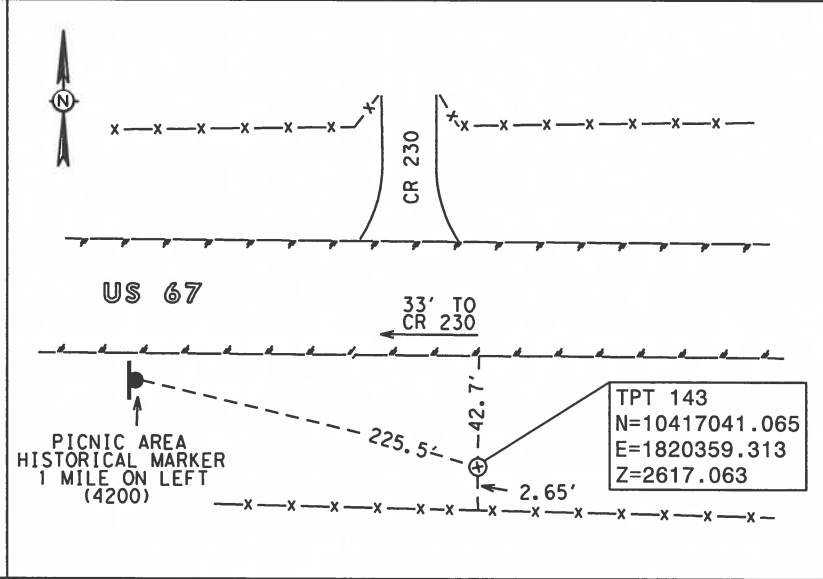
5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



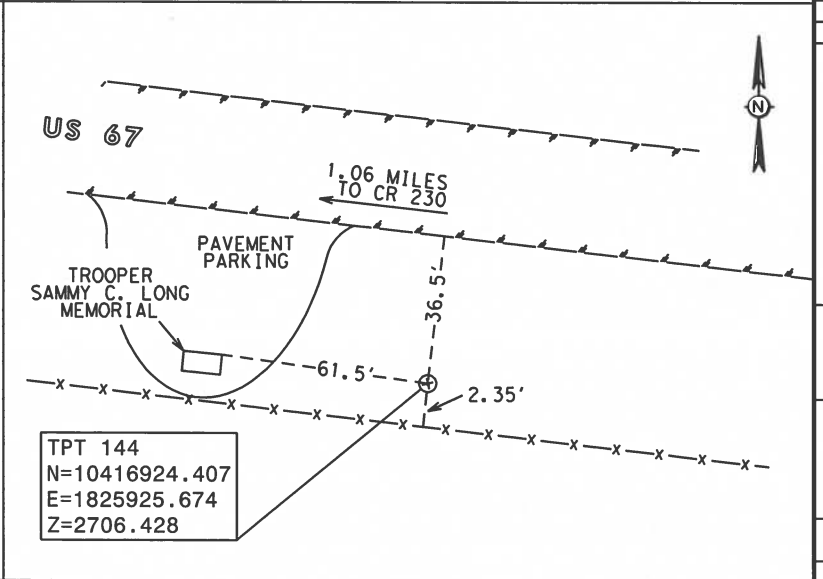
5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP



5/8" IRON ROD SET WITH "TxDOT" ALUM. CAP

- NOTES:**
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DATE: 03/22/2017
SHEET 11
SURVTEX # 2016-0044

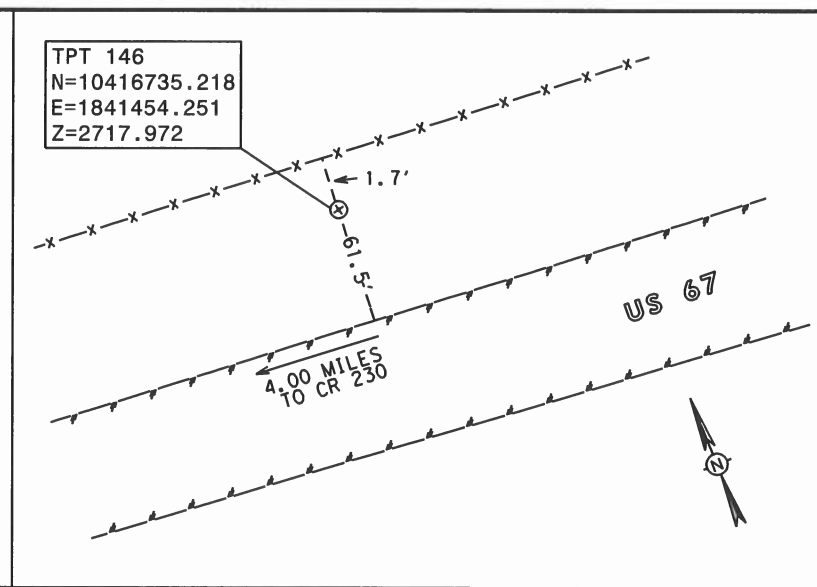
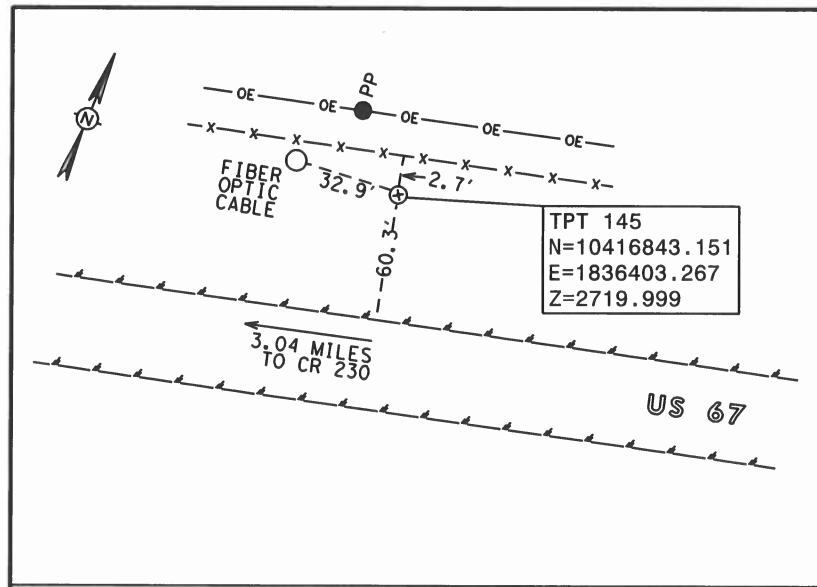
REVISIONS	
3/22/17	FORMATTING

SURVOTEX LLC
PROFESSIONAL SURVEYING AND MAPPING SERVICES
600 W. Whitestone Blvd.
Cedar Park, Texas 78613
(512) 249-8875
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TBPLS FIRM NO. 10084600



U. S. 67
SECONDARY CONTROL

FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
STATE	DISTRICT	COUNTY
TEXAS	ODESSA	ORANGE, CHISHOPEE, PECOS, TARRANT
CONTROL	SECTION	JOB
		HIGHWAY NO.
		U.S. 67



5/8" IRON ROD SET WITH
"TXDOT" ALUM. CAP

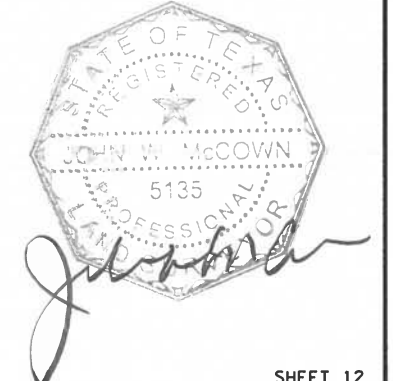
5/8" IRON ROD SET WITH
"TXDOT" ALUM. CAP

NOTES:

1. THE COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD 83 (2011, EPOCH 2010.00). THE PROJECT'S VERTICAL DATUM IS NAVD 88 (GEOID 12A). THE COORDINATES AND DISTANCES PROVIDED HEREON HAVE BEEN SCALED (SCALING ORIGIN N 0.00 E 0.00) FROM GRID COORDINATES USING A SURFACE ADJUSTMENT FACTOR OF 1.00020. THE UNITS ARE U.S. SURVEY FEET.
2. THE HORIZONTAL AND VERTICAL CONTROL FOR THIS PROJECT WAS ESTABLISHED UTILIZING VARIOUS GPS METHODS IN ACCORDANCE WITH THE CURRENT TXDOT SURVEY MANUAL.
 - PRIMARY CONTROL: STATIC GPS OBSERVATIONS.
 - SECONDARY CONTROL: RTK OBSERVATIONS PRIOR TO THE FINAL ADJUSTMENT (HOLDING PUBLISHED NGS CORS STATIONS), A MINIMAL CONSTRAINT WAS PERFORMED AND YIELDED ACCEPTABLE RESULTS.
3. A LIMITED AMOUNT OF DIFFERENTIAL LEVELING (DIGITAL) WAS PERFORMED TO CONFIRM RELATIVE DIFFERENCES BETWEEN STATIC AND RTK ELEVATIONS PRIOR TO PERFORMING THE FINAL ADJUSTMENT.



NOT TO SCALE



DATE: 03/22/2017
SHEET 12
SURVTX # 2016-0044

REVISIONS	
3/22/17	FORMATTING

SURVTX LLC
PROFESSIONAL SURVEYING AND MAPPING SERVICES
600 W. Whitestone Blvd.
Cedar Park, Texas 78613
(512) 249-8875
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TBPLS FIRM NO. 10084600



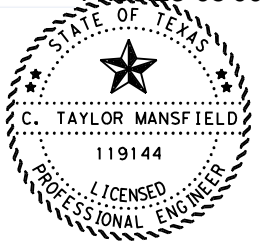
INDEX SHEET FOR
U. S. 67
PRIMARY CONTROL &
SECONDARY CONTROL

FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
STATE	DISTRICT	COUNTY
TEXAS	ODESSA	CRANE, CROCKETT, PECOS, UPTON
CONTROL	SECTION	JOB
		HIGHWAY NO.
		U. S. 67

TABLE 1 OF 4

Element: Linear				
POB	()	452+17.5423	10383051.41	1702664.824
PC	()	456+46.5518	10383220.66	1703059.036
	Tangential Direction:	N 66.8 E		
	Tangential Length:	429.0095		
Element: Circular				
PC	()	456+46.5518	10383220.66	1703059.036
PI	()	459+12.8092	10383325.7	1703303.697
CC	()	10377983	1705307.793	
PT	()	461+78.6798	10383407.48	1703557.084
	Radius:	5700		
	Delta:	5.3 Right		
	Degree of Curvature (Arc):	1		
	Length:	532.128		
	Tangent:	266.2574		
	Chord:	531.9348		
	Middle Ordinate:	6.2085		
	External:	6.2153		
	Tangent Direction:	N 66.8 E		
	Radial Direction:	S 23.2 E		
	Chord Direction:	N 69.4 E		
	Radial Direction:	S 17.9 E		
	Tangent Direction:	N 72.1 E		
Element: Linear				
PT	()	461+78.6798	10383407.48	1703557.084
PI	()	465+54.2038	10383522.82	1703914.457
	Tangential Direction:	N 72.1 E		
	Tangential Length:	375.524		
Element: Linear				
PI	()	465+54.2038	10383522.82	1703914.457
PI	()	470+25.7014	10383667.38	1704363.247
	Tangential Direction:	N 72.1 E		
	Tangential Length:	471.4976		
Element: Linear				
PI	()	470+25.7014	10383667.38	1704363.247
PI	()	472+59.1791	10383739.08	1704585.444
	Tangential Direction:	N 72.1 E		
	Tangential Length:	233.4777		
Element: Linear				
PI	()	472+59.1791	10383739.08	1704585.444
PI	()	482+38.8644	10384039.99	1705517.77
	Tangential Direction:	N 72.1 E		
	Tangential Length:	979.6853		
Element: Linear				
PI	()	482+38.8644	10384039.99	1705517.77
PI	()	486+01.7411	10384151.12	1705863.213
	Tangential Direction:	N 72.2 E		
	Tangential Length:	362.8767		
Element: Linear				
PI	()	486+01.7411	10384151.12	1705863.213
PI	()	489+82.6527	10384268.06	1706225.73
	Tangential Direction:	N 72.1 E		
	Tangential Length:	380.9115		
Element: Linear				
PI	()	489+82.6527	10384268.06	1706225.73
PI	()	492+48.0959	10384349.49	1706478.375
	Tangential Direction:	N 72.1 E		
	Tangential Length:	265.4432		
Element: Linear				
PI	()	492+48.0959	10384349.49	1706478.375
POE	()	497+00.0000	10384488.33	1706908.423
	Tangential Direction:	N 72.1 E		
	Tangential Length:	451.9041		

C. Taylor Mansfield 2021.11.01
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US 67
 HORIZONTAL
 ALIGNMENT DATA

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		88

DATE: 10/22/2021 04:32 PM
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TABLE 2 OF 4

Element: Linear	POB	() 497+00.0000 R1	10384488.33	1706908.423
	PC	() 497+88.6113 R1	10384515.51	1706992.761
		Tangential Direction: N 72.1 E		
		Tangential Length: 88.6113		
Element: Circular	PC	() 497+88.6113 R1	10384515.51	1706992.761
	PI	() 500+97.7384 R1	10384610.35	1707286.98
	CC	()	10385600.53	1706643.009
	PT	() 503+92.3474 R1	10384840.83	1707492.983
		Radius: 1140		
		Delta: 30.3 Left		
		Degree of Curvature (Arc): 5		
		Length: 603.736		
		Tangent: 309.1271		
		Chord: 596.7053		
		Middle Ordinate: 39.7338		
		External: 41.1687		
		Tangent Direction: N 72.1 E		
		Radial Direction: S 17.9 E		
		Chord Direction: N 57.0 E		
		Radial Direction: S 48.2 E		
		Tangent Direction: N 41.8 E		
Element: Linear	PT	() 503+92.3474 R1	10384840.83	1707492.983
	PC	() 515+15.5623 R1	10385678.29	1708241.497
		Tangential Direction: N 41.8 E		
		Tangential Length: 1123.2149		
Element: Circular	PC	() 515+15.5623 R1	10385678.29	1708241.497
	PI	() 520+01.7099 R1	10386040.76	1708565.467
	CC	()	10384715.34	1709318.877
	PT	() 524+53.4795 R1	10386133.69	1709042.65
		Radius: 1445		
		Delta: 37.2 Right		
		Degree of Curvature (Arc): 4		
		Length: 937.9172		
		Tangent: 486.1476		
		Chord: 921.5393		
		Middle Ordinate: 75.4321		
		External: 79.5867		
		Tangent Direction: N 41.8 E		
		Radial Direction: S 48.2 E		
		Chord Direction: N 60.4 E		
		Radial Direction: S 11.0 E		
		Tangent Direction: N 79.0 E		
Element: Linear	PT	() 524+53.4795 R1	10386133.69	1709042.65
	PI	() 534+29.4873 R1	10386320.27	1710000.659
		Tangential Direction: N 79.0 E		
		Tangential Length: 976.0077		
Element: Linear	PI	() 534+29.4873 R1	10386320.27	1710000.659
	PI	() 539+89.7485 R1	10386427.07	1710550.647
		Tangential Direction: N 79.0 E		
		Tangential Length: 560.2613		
Element: Linear	PI	() 539+89.7485 R1	10386427.07	1710550.647
	PI	() 560+61.1155 R1	10386823.35	1712583.752
		Tangential Direction: N 79.0 E		
		Tangential Length: 2071.367		
Element: Linear	PI	() 560+61.1155 R1	10386823.35	1712583.752
	PI	() 571+99.3406 R1	10387040.55	1713701.063
		Tangential Direction: N 79.0 E		
		Tangential Length: 1138.2251		
Element: Linear	PI	() 571+99.3406 R1	10387040.55	1713701.063
	PI	() 593+52.8806 R1	10387450.72	1715815.18
		Tangential Direction: N 79.0 E		
		Tangential Length: 2153.54		
Element: Linear	PI	() 593+52.8806 R1	10387450.72	1715815.18
	PC	() 624+75.5531 R1	10388046.92	1718880.409
		Tangential Direction: N 79.0 E		
		Tangential Length: 3122.6724		

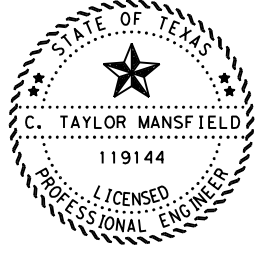
TABLE 3 OF 4

Element: Circular	PC	() 624+75.5531 R1	10388046.92	1718880.409
	PI	() 626+85.2117 R1	10388086.95	1719086.21
	CC	()	10390991.74	1718307.627
	PT	() 628+94.1897 R1	10388155.22	1719284.444
		Radius: 3000		
		Delta: 8 Left		
		Degree of Curvature (Arc): 1.9		
		Length: 418.6366		
		Tangent: 209.6586		
		Chord: 418.297		
		Middle Ordinate: 7.2994		
		External: 7.3172		
		Tangent Direction: N 79.0 E		
		Radial Direction: S 11.0 E		
		Chord Direction: N 75.0 E		
		Radial Direction: S 19.0 E		
		Tangent Direction: N 71.0 E		
Element: Linear	PT	() 628+94.1897 R1	10388155.22	1719284.444
	PC	() 676+64.5179 R1	10389708.47	1723794.816
		Tangential Direction: N 71.0 E		
		Tangential Length: 4770.3282		
Element: Circular	PC	() 676+64.5179 R1	10389708.47	1723794.816
	PI	() 678+00.4890 R1	10389752.74	1723923.378
	CC	()	10382144.42	1726399.662
	PT	() 679+36.4338 R1	10389792.62	1724053.369
		Radius: 8000		
		Delta: 1.9 Right		
		Degree of Curvature (Arc): 0.7		
		Length: 271.9159		
		Tangent: 135.9711		
		Chord: 271.9028		
		Middle Ordinate: 1.1553		
		External: 1.1554		
		Tangent Direction: N 71.0 E		
		Radial Direction: S 19.0 E		
		Chord Direction: N 72.0 E		
		Radial Direction: S 17.1 E		
		Tangent Direction: N 72.9 E		
Element: Linear	PT	() 679+36.4338 R1	10389792.62	1724053.369
	PC	() 748+48.7144 R1	10391819.9	1730661.679
		Tangential Direction: N 72.9 E		
		Tangential Length: 6912.2805		
Element: Circular	PC	() 748+48.7144 R1	10391819.9	1730661.679
	PI	() 752+85.5466 R1	10391948.01	1731079.302
	CC	()	10389993.89	1731221.857
	PT	() 757+07.6067 R1	10391881.86	1731511.096
		Radius: 1910		
		Delta: 25.8 Right		
		Degree of Curvature (Arc): 3		
		Length: 858.8924		
		Tangent: 436.8322		
		Chord: 851.674		
		Middle Ordinate: 48.0755		
		External: 49.3168		
		Tangent Direction: N 72.9 E		
		Radial Direction: S 17.1 E		
		Chord Direction: N 85.8 E		
		Radial Direction: S 8.7 W		
		Tangent Direction: S 81.3 E		
Element: Linear	PT	() 757+07.6067 R1	10391881.86	1731511.096
	PC	() 836+94.6048 R1	10390672.36	1739405.983
		Tangential Direction: S 81.3 E		
		Tangential Length: 7986.9981		
Element: Circular	PC	() 836+94.6048 R1	10390672.36	1739405.983
	PI	() 838+99.9223 R1	10390641.26	1739608.932
	CC	()	10385008.44	1738538.265
	PT	() 841+05.0641 R1	10390595.73	1739809.136
		Radius: 5730		
		Delta: 4.1 Right		
		Degree of Curvature (Arc): 1		
		Length: 410.4593		
		Tangent: 205.3175		
		Chord: 410.3716		
		Middle Ordinate: 3.6749		
		External: 3.6773		
		Tangent Direction: S 81.3 E		
		Radial Direction: S 8.7 W		
		Chord Direction: S 79.2 E		
		Radial Direction: S 12.8 W		
		Tangent Direction: S 77.2 E		

TABLE 4 OF 4

Element: Linear	PT	() 841+05.0641 R1	10390595.73	1739809.136
	PC	() 857+92.0529 R1	10390221.57	1741454.109
		Tangential Direction: S 77.2 E		
		Tangential Length: 1686.9888		
Element: Circular	PC	() 857+92.0529 R1	10390221.57	1741454.109
	PI	() 859+97.0599 R1	10390176.1	1741654.01
	CC	()	10395808.85	1742724.98
	PT	() 862+01.8920 R1	10390145.03	1741856.649
		Radius: 5730		
		Delta: 4.1 Left		
		Degree of Curvature (Arc): 1		
		Length: 409.839		
		Tangent: 205.0069		
		Chord: 409.7517		
		Middle Ordinate: 3.6638		
		External: 3.6662		
		Tangent Direction: S 77.2 E		
		Radial Direction: S 12.8 W		
		Chord Direction: S 79.2 E		
		Radial Direction: S 8.7 W		
		Tangent Direction: S 81.3 E		
Element: Linear	PT	() 862+01.8920 R1	10390145.03	1741856.649
	PI	() 880+64.8401 R1	10389862.72	1743698.082
		Tangential Direction: S 81.3 E		
		Tangential Length: 1862.9481		
Element: Linear	PI	() 880+64.8401 R1	10389862.72	1743698.082
	PI	() 889+60.1333 R1	10389727.82	1744583.155
		Tangential Direction: S 81.3 E		
		Tangential Length: 895.2932		
Element: Linear	PI	() 889+60.1333 R1	10389727.82	1744583.155
	PI	() 927+20.2115 R1	10389157.24	1748299.687
		Tangential Direction: S 81.3 E		
		Tangential Length: 3760.0782		
Element: Linear	PI	() 927+20.2115 R1	10389157.24	1748299.687
	PI	() 946+27.6283 R1	10388868.88	1750185.182
		Tangential Direction: S 81.3 E		
		Tangential Length: 1907.4168		
Element: Linear	PI	() 946+27.6283 R1	10388868.88	1750185.182
	PI	() 965+00.0000 R1	10388584.32	1752035.804
		Tangential Direction: S 81.3 E		
		Tangential Length: 1872.3717		

e. Taylor Mansfield 2021.11.01
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US 67
HORIZONTAL
ALIGNMENT DATA

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		89

DATE: 10/22/2021 04:32 PM
 FILE: \\txdot\project\wiseon\line.com\TXDOT2\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_super_elev_summary.dgn

SUPERELEVATION: 1

STATION	TRANSITION TYPE	LEFTLANE CROSS SLOPE	POINT TYPE	RIGHTLANE CROSS SLOPE
512+44.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%
515+64.00	LINEAR	6.00%	FULL SUPER	-6.00%
524+05.00	LINEAR	6.00%	FULL SUPER	-6.00%
527+25.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%

SUPERELEVATION: 2

STATION	TRANSITION TYPE	LEFTLANE CROSS SLOPE	POINT TYPE	RIGHTLANE CROSS SLOPE
622+51.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%
625+15.00	LINEAR	-4.60%	FULL SUPER	4.60%
628+55.00	LINEAR	-4.60%	FULL SUPER	4.60%
631+19.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%

SUPERELEVATION: 3

STATION	TRANSITION TYPE	LEFTLANE CROSS SLOPE	POINT TYPE	RIGHTLANE CROSS SLOPE
675+01.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%
676+93.00	LINEAR	2.80%	FULL SUPER	-2.80%
679+08.00	LINEAR	2.80%	FULL SUPER	-2.80%
681+00.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%

SUPERELEVATION: 4

STATION	TRANSITION TYPE	LEFTLANE CROSS SLOPE	POINT TYPE	RIGHTLANE CROSS SLOPE
745+90.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%
748+94.00	LINEAR	5.60%	FULL SUPER	-5.60%
756+62.00	LINEAR	5.60%	FULL SUPER	-5.60%
759+66.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%

SUPERELEVATION: 5

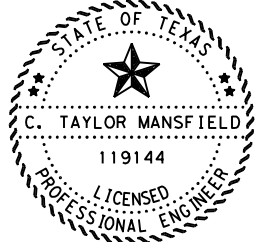
STATION	TRANSITION TYPE	LEFTLANE CROSS SLOPE	POINT TYPE	RIGHTLANE CROSS SLOPE
835+31.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%
837+23.00	LINEAR	2.80%	FULL SUPER	-2.80%
840+76.00	LINEAR	2.80%	FULL SUPER	-2.80%
842+68.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%

SUPERELEVATION: 6

STATION	TRANSITION TYPE	LEFTLANE CROSS SLOPE	POINT TYPE	RIGHTLANE CROSS SLOPE
856+29.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%
858+21.00	LINEAR	-2.80%	FULL SUPER	2.80%
861+73.00	LINEAR	-2.80%	FULL SUPER	2.80%
863+65.00	LINEAR	-2.00%	NORMAL CROWN	-2.00%

NOTE:
 HORIZONTAL/VERTICAL AND CROSS SECTIONAL US 67 GEOMETRY FOR MCCAMEY MILL AND FILL SEGMENT TO REMAIN AS EXISTING, INCLUDING NORMAL CROWN THROUGHOUT WITHOUT SUPERELEVATION.

C. Taylor Mansfield 2021.11.01
 12:07:29-05'00"



**US 67
 SUPERELEVATION
 SUMMARY**

SHEET 1 OF 1

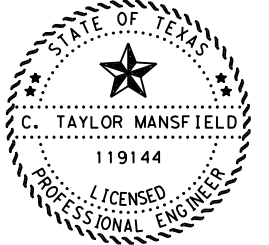
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0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		90

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TABLE 3 OF 3

	STA.	ELEV.	G1	G2	G2-G1	L	K	CREST/SAG
	PVI 774+92.0704	2549.664	-1.16%	-1.16%	-0.22%	207.9334		
	PVI 777+00.0039	2547.248	-0.94%	-0.94%	-0.22%	58.0975		
	PVI 777+58.1014	2546.701	-0.72%	-0.72%	-0.03%	251.3522		
	PVI 780+09.4536	2544.9	-0.68%	-0.68%	0.01%	90.5362		
	PVI 780+99.9898	2544.282	-0.70%	-0.70%	-0.22%	219.9055		
	PVI 783+19.8953	2542.753	-0.48%	-0.48%	-0.11%	529.541		
	PVI 788+49.4363	2540.231	-0.37%	-0.37%	-0.25%	406.9736		
	PVI 792+56.4099	2538.74	-0.12%	-0.12%	-0.18%	226.4621		
	PVI 794+82.8720	2538.47	0.06%	0.06%	0.00%	145.7473		
Parabola	PVC 796+28.6193	2538.554	0.06%	-0.32%	0.00%	180	475	CREST
	PVT 798+08.6193	2538.318	-0.32%	-0.32%	-0.08%	24.0689		
	PVI 798+32.6882	2538.241	-0.24%	-0.24%	-0.08%	319.6316		
	PVI 801+52.3198	2537.474	-0.16%	-0.16%	0.15%	847.6739		
	PVI 809+99.9937	2536.13	-0.31%	-0.31%	0.00%	5.2766		
Parabola	PVC 810+05.2704	2536.113	-0.31%	-0.62%	0.00%	270	874	CREST
	PVT 812+75.2704	2534.854	-0.62%	-0.62%	-0.05%	124.7229		
	PVI 813+99.9933	2534.079	-0.57%	-0.57%	-0.18%	102.2995		
	PVI 815+02.2928	2533.496	-0.39%	-0.39%	-0.45%	281.1592		
	PVI 817+83.4520	2532.388	0.06%	0.06%	0.08%	448.1942		
	PVI 822+31.6462	2532.652	-0.02%	-0.02%	-0.45%	384.451		
	PVI 826+16.0972	2532.582	0.43%	0.43%	0.00%	14.5917		
Parabola	PVC 826+30.6889	2532.645	0.43%	-0.34%	0.00%	180	234	CREST
	PVT 828+10.6889	2532.731	-0.34%	-0.34%	0.09%	211.1024		
	PVI 830+21.7913	2532.024	-0.42%	-0.42%	0.00%	259.6945		
Parabola	PVC 832+81.4858	2530.927	-0.42%	-1.02%	0.00%	180	299	CREST
	PVT 834+61.4858	2529.625	-1.02%	-1.02%	0.24%	487.3123		
	PVI 839+48.7981	2524.636	-1.26%	-1.26%	-0.26%	127.2336		
	PVI 840+76.0317	2523.027	-1.00%	-1.00%	-0.15%	365.5369		
	PVI 844+41.5686	2519.36	-0.86%	-0.86%	-0.07%	258.4213		
	PVI 846+99.9898	2517.15	-0.78%	-0.78%	0.31%	94.0881		
	PVI 847+94.0780	2516.415	-1.10%	-1.10%	-0.49%	47.5939		
	PVI 848+41.6718	2515.893	-0.61%	-0.61%	0.23%	83.0168		
	PVI 849+24.6886	2515.387	-0.84%	-0.84%	-0.50%	67.3189		
	PVI 849+92.0075	2514.819	-0.35%	-0.35%	0.00%	107.9757		
	PVI 850+99.9833	2514.446	-0.34%	-0.34%	0.00%	0.0066		
	PVI 850+99.9898	2514.446	-0.34%	-0.32%	0.00%	526.382		
	PVI 856+26.3718	2512.735	-0.69%	-0.69%	-0.42%	96.0582		
	PVI 857+22.4299	2512.067	-0.28%	-0.28%	0.29%	138.2408		
	PVI 858+60.6708	2511.687	-0.56%	-0.56%	-0.20%	164.9947		
	PVI 860+25.6655	2510.762	-0.36%	-0.36%	0.06%	293.1474		
	PVI 863+18.8129	2509.709	-0.42%	-0.42%	0.17%	432.0683		
	PVI 867+50.8812	2507.89	-0.60%	-0.60%	0.00%	33.5548		
Parabola	PVC 867+84.4361	2507.69	-0.60%	0.04%	0.00%	180	285	SAG
	PVT 869+64.4361	2507.187	0.04%	0.04%	0.24%	1.6955		
	PVI 869+66.1316	2507.188	-0.21%	-0.21%	0.05%	33.8608		
	PVI 869+99.9924	2507.117	-0.25%	-0.25%	0.33%	316.2219		
	PVI 873+16.2143	2506.315	-0.59%	-0.59%	0.06%	83.772		
	PVI 873+99.9863	2505.824	-0.65%	-0.65%	0.19%	29.7237		
	PVI 874+29.7100	2505.631	-0.84%	-0.84%	0.00%	335.9213		
Parabola	PVC 877+65.6313	2502.823	-0.84%	-0.10%	0.00%	200	271	SAG
	PVT 879+65.6313	2501.889	-0.10%	-0.10%	0.28%	435.8709		
	PVI 884+01.5022	2501.459	-0.38%	-0.38%	0.31%	207.2121		
	PVI 886+08.7143	2500.676	-0.68%	-0.68%	-0.34%	206.3349		
	PVI 888+15.0493	2499.266	-0.35%	-0.35%	0.26%	222.7545		
	PVI 890+37.8038	2498.494	-0.60%	-0.60%	0.32%	128.9648		
	PVI 891+66.7687	2497.717	-0.92%	-0.92%	-0.05%	305.4659		
	PVI 894+72.2345	2494.899	-0.87%	-0.87%	0.00%	341.0596		
Parabola	PVC 898+13.2941	2491.929	-0.87%	0.07%	0.00%	180	190	SAG
	PVT 899+93.2941	2491.212	0.07%	0.07%	0.21%	111.9764		
	PVI 901+05.2705	2491.294	-0.14%	-0.14%	0.24%	306.0631		
	PVI 904+11.3336	2490.869	-0.38%	-0.38%	-0.20%	264.6531		
	PVI 906+75.9867	2489.875	-0.18%	-0.18%	0.44%	72.1128		
	PVI 907+48.0994	2489.745	-0.62%	-0.62%	-0.35%	451.0702		
	PVI 911+99.1697	2486.935	-0.27%	-0.27%	-0.16%	96.5671		
	PVI 912+95.7368	2486.673	-0.11%	-0.11%	0.33%	405.0547		
	PVI 917+00.7914	2486.225	-0.44%	-0.44%	-0.22%	105.0422		
	PVI 918+05.8337	2485.767	-0.22%	-0.22%	0.29%	194.5584		
	PVI 920+00.3920	2485.342	-0.51%	-0.51%	-0.29%	298.2188		
	PVI 922+98.6109	2483.817	-0.23%	-0.23%	-0.08%	198.125		
	PVI 924+96.7359	2483.369	-0.14%	-0.14%	0.24%	190.8598		
	PVI 926+87.5957	2483.095	-0.39%	-0.39%	0.42%	300.1979		
	PVI 929+87.7936	2481.937	-0.80%	-0.80%	0.00%	433.3763		
Parabola	PVC 934+21.1699	2478.452	-0.80%	0.14%	0.00%	340	359	SAG
	PVT 937+61.1699	2477.325	0.14%	0.14%	0.36%	93.5427		
	PVI 938+54.7126	2477.458	-0.22%	-0.22%	-0.17%	192.13		
	PVI 940+46.8426	2477.038	-0.05%	-0.05%	-0.19%	504.0534		
	PVI 945+50.8960	2476.782	0.14%	0.14%	0.00%	370.9376		
Parabola	PVC 949+21.8335	2477.289	0.14%	0.94%	0.00%	210	261	SAG
	PVT 951+31.8335	2478.418	0.94%	0.94%	0.04%	92.9555		
	PVI 952+24.7890	2479.29	0.89%	0.89%	0.13%	89.5896		
	PVI 953+14.3786	2480.091	0.76%	0.76%	-0.18%	198.755		
	PVI 955+13.1337	2481.606	0.94%	0.94%	0.24%	275.4455		
	PVI 957+88.5792	2484.198	0.70%	0.70%	0.20%	261.5297		
	PVI 960+50.1089	2486.04	0.50%	0.50%	-0.50%	115.9068		
	PVI 961+66.0157	2486.626	1.00%	1.00%	0.00%	213.3143		
	PVI 963+79.3300	2488.75	0.50%	0.50%	-0.50%	120.6700		
	PVI 965+00.0000	2489.35						

C. Taylor Mansfield 2021.11.01
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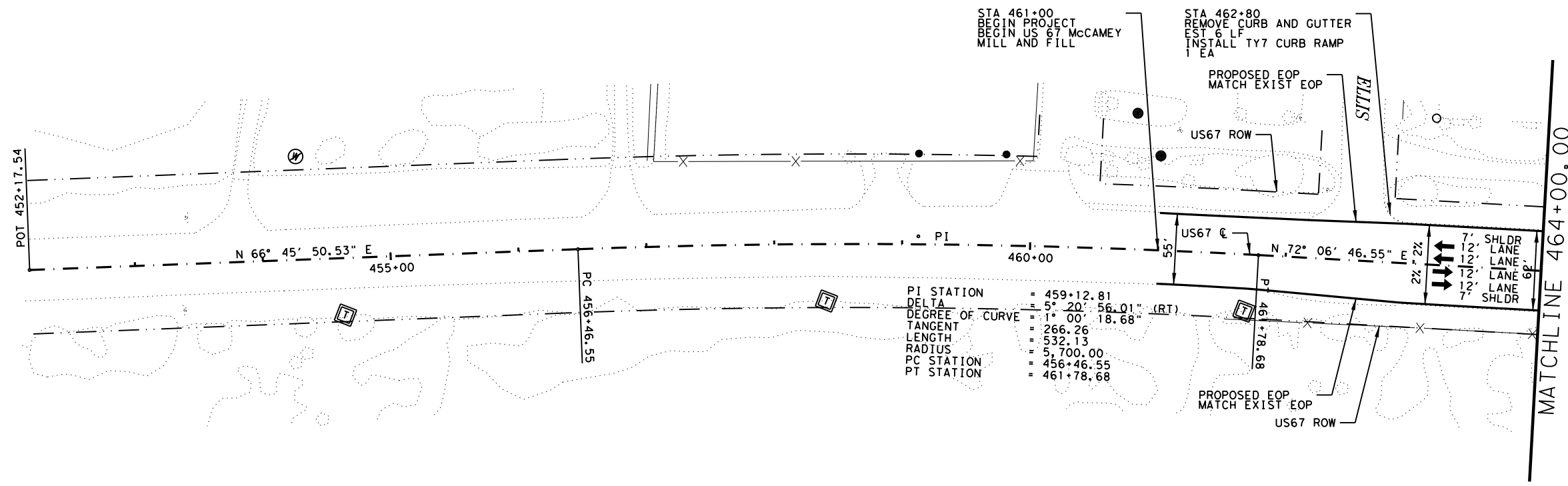


US 67
VERTICAL
ALIGNMENT DATA

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		92

DATE: 10/22/2021 05:15 PM
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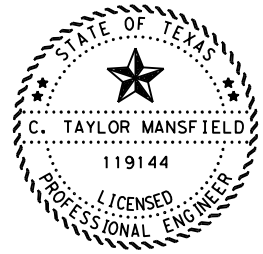
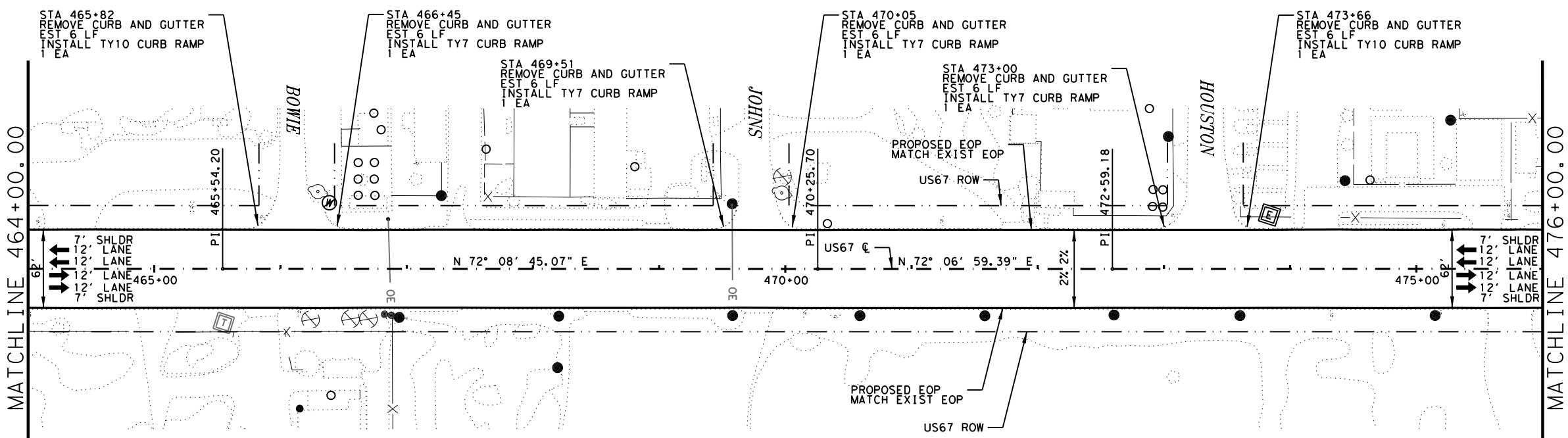


PI STATION = 459+12.81
 DELTA = 5° 20' 56.01" (RT)
 DEGREE OF CURVE = 1° 00' 18.68"
 TANGENT = 266.26
 LENGTH = 532.13
 RADIUS = 5,700.00
 PC STATION = 456+46.55
 PT STATION = 461+78.68

NOTE:
 HORIZONTAL/VERTICAL AND CROSS SECTIONAL US 67 GEOMETRY FOR MCCAMEY MILL AND FILL SEGMENT TO REMAIN AS EXISTING.

LEGEND

- WATER METER
- TELEPHONE PEDESTAL
- TIMBER UTILITY POLE
- METAL UTILITY POLE
- FIRE HYDRANT
- ELECTRICAL PEDESTAL
- WATER VALVE
- NATURAL GAS VALVE
- OVERHEAD ELECTRIC



C. Taylor Mansfield 2021.11.01
 12:23:50-05'00"

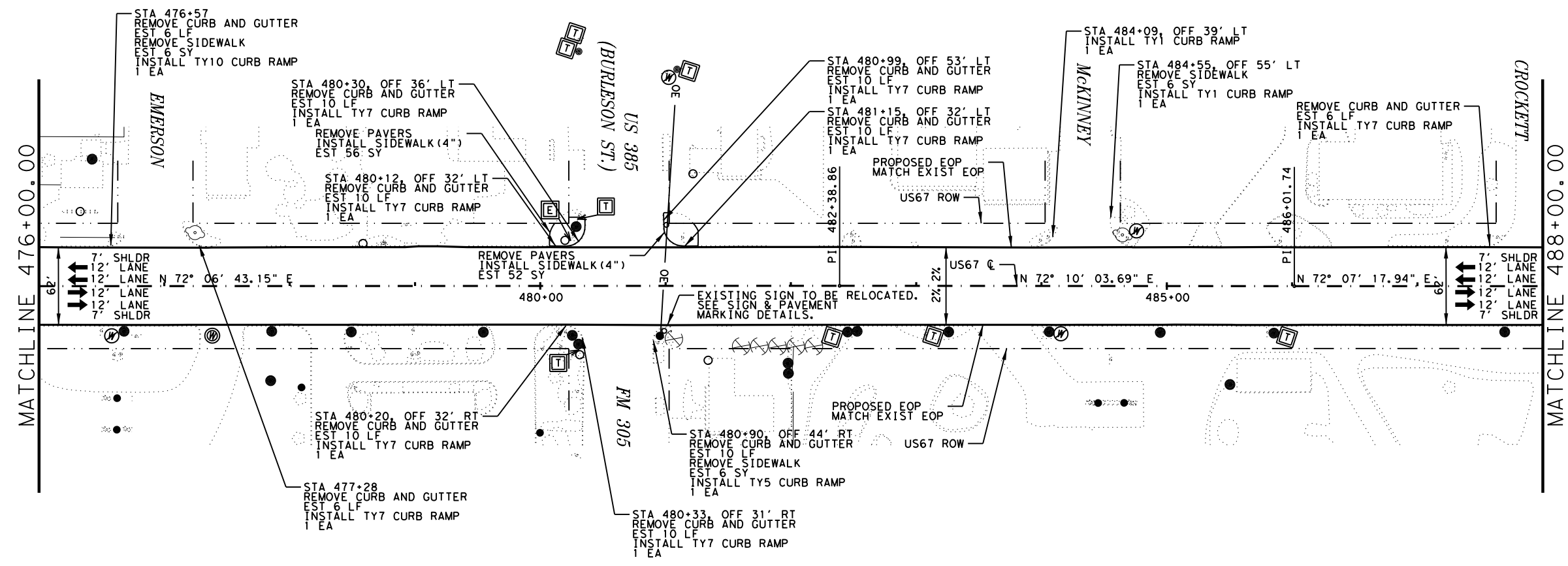
**US 67
 MCCAMEY MILL &
 FILL LAYOUT**

HORIZ SCALE 1"=100'
 SHEET 1 OF 2

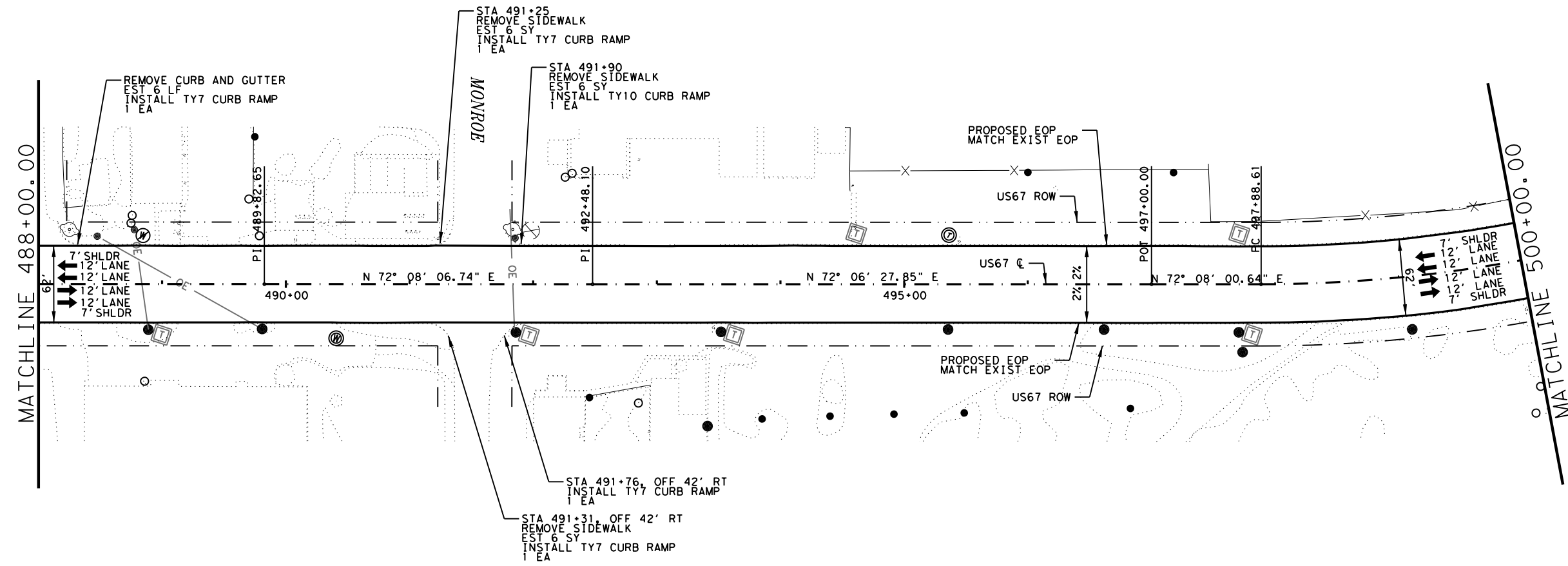


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	93	

DATE: 10/22/2021 05:15 PM
 FILE: pw:\txdot\project\wiseonline.com:TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_McCamey_Layou_2.dgn



LEGEND	
	TELEPHONE MANHOLE
	SEWER MANHOLE
	WATER METER
	TELEPHONE PEDESTAL
	TIMBER UTILITY POLE
	METAL UTILITY POLE
	FIRE HYDRANT
	ELECTRICAL PEDESTAL
	WATER VALVE
	NATURAL GAS VALVE
	OVERHEAD ELECTRIC



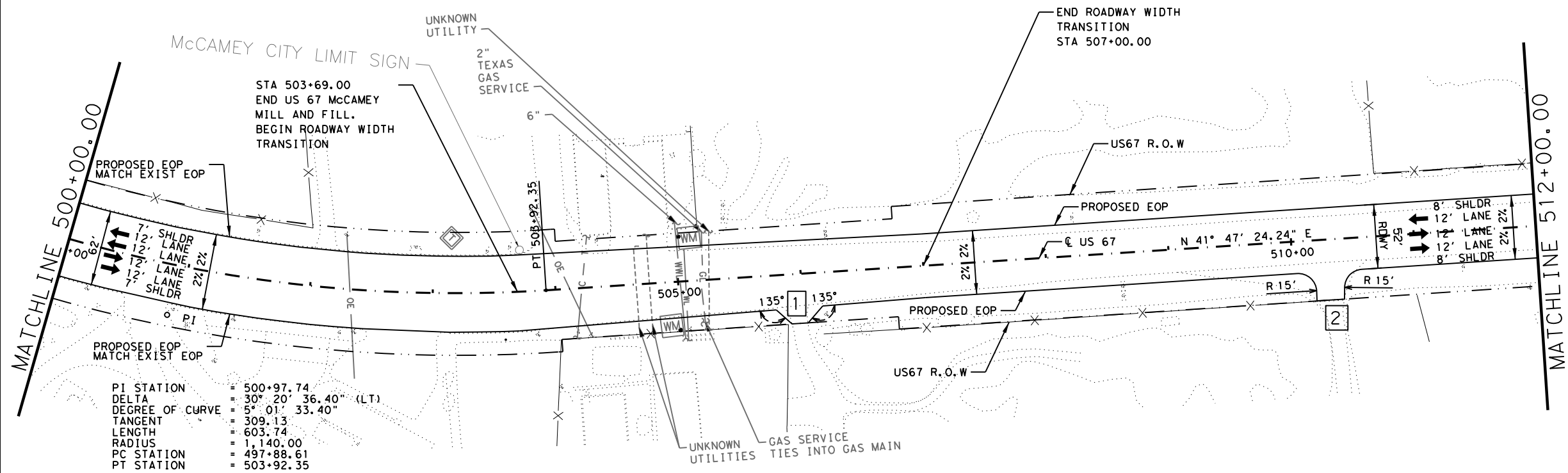
C. Taylor Mansfield 2021.11.01
 12:25:26-05'00"

**US 67
 McCAMEY MILL &
 FILL LAYOUT**

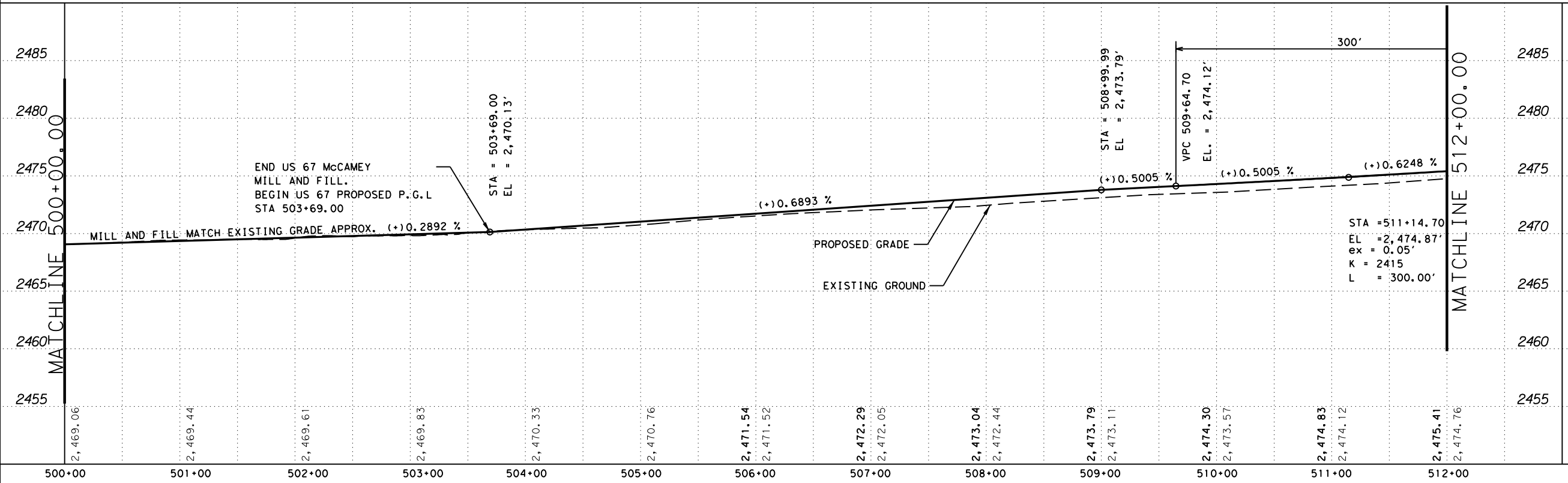
HORIZ SCALE 1"=100'
 SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	94	

DATE: 10/22/2021 04:31 PM
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- LEGEND**
- T TELEPHONE PEDESTAL
 - # DRIVEWAY NUMBER
 - WM WATER METER
 - GL --- GAS LINE
 - WL --- WATER LINE
 - WWL --- WASTEWATER LINE
 - UNKNOWN UTILITY
 - C --- T --- CABLE/TELEPHONE
 - OE --- OVERHEAD ELECTRIC



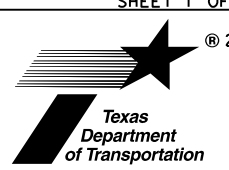


C. Taylor Mansfield
 2021.11.01
 12:30:04-05'00"

**US 67
 PLAN & PROFILE**

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

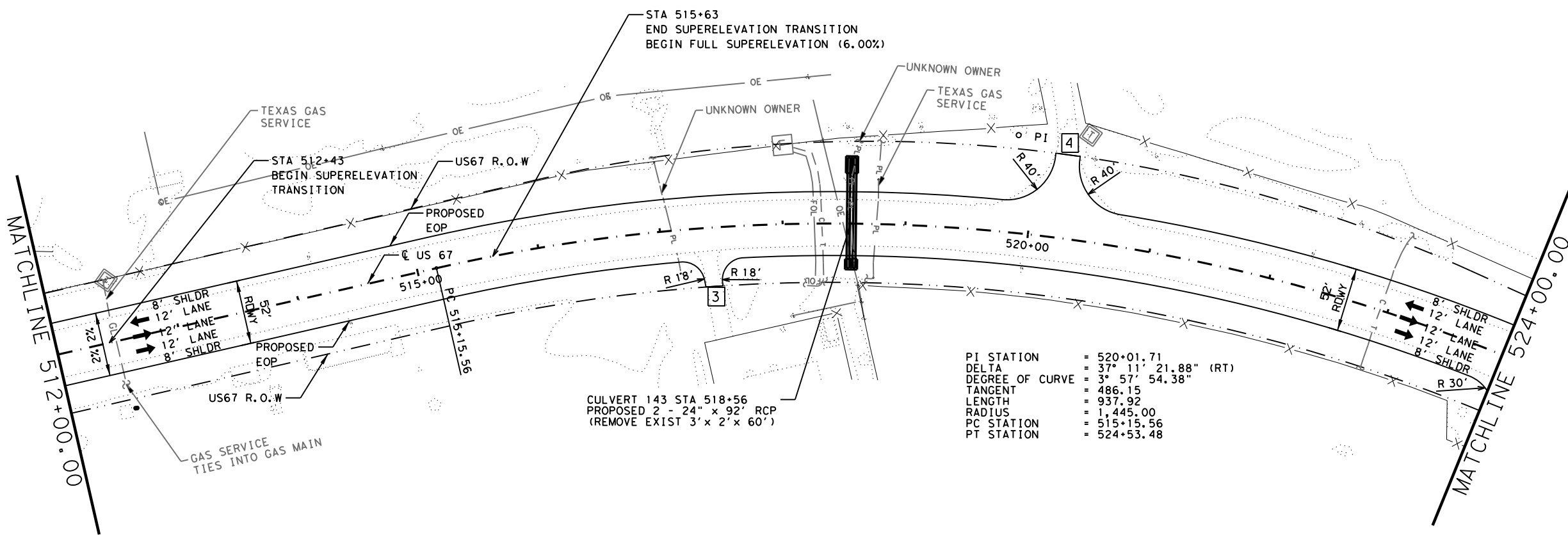
SHEET 1 OF 39



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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	95	

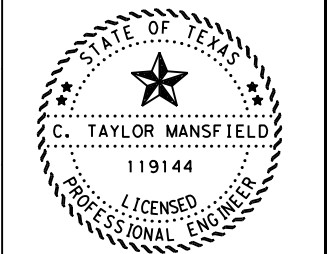
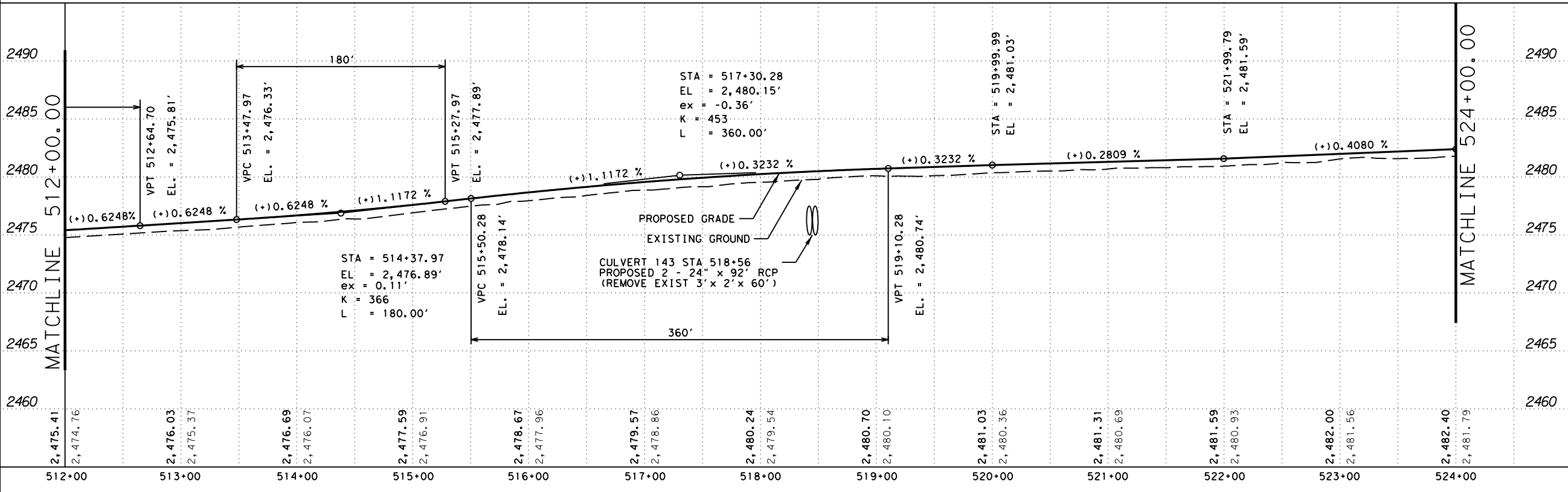
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- LEGEND**
- T TELEPHONE PEDESTAL
 - # DRIVEWAY NUMBER
 - GL --- GAS LINE
 - PL — PIPELINE
 - C — T — CABLE/TELEPHONE
 - FOL — FIBER OPTIC
 - OE — OVERHEAD ELECTRIC

PI STATION = 520+01.71
 DELTA = 37° 11' 21.88" (RT)
 DEGREE OF CURVE = 3° 57' 54.38"
 TANGENT = 486.15
 LENGTH = 937.92
 RADIUS = 1,445.00
 PC STATION = 515+15.56
 PT STATION = 524+53.48

CULVERT 143 STA 518+56
 PROPOSED 2 - 24" x 92' RCP
 (REMOVE EXIST 3' x 2' x 60')



C. Taylor Mansfield 2021.11.01
 12:30:04-05'00"

**US 67
PLAN & PROFILE**

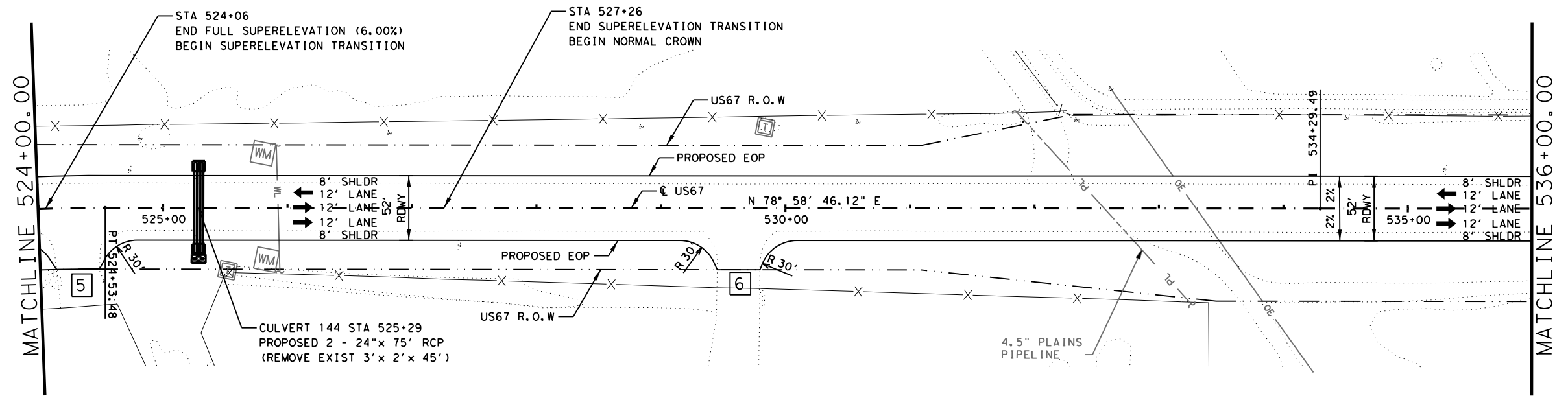
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 VERT SCALE 1"=10'

SHEET 2 OF 39

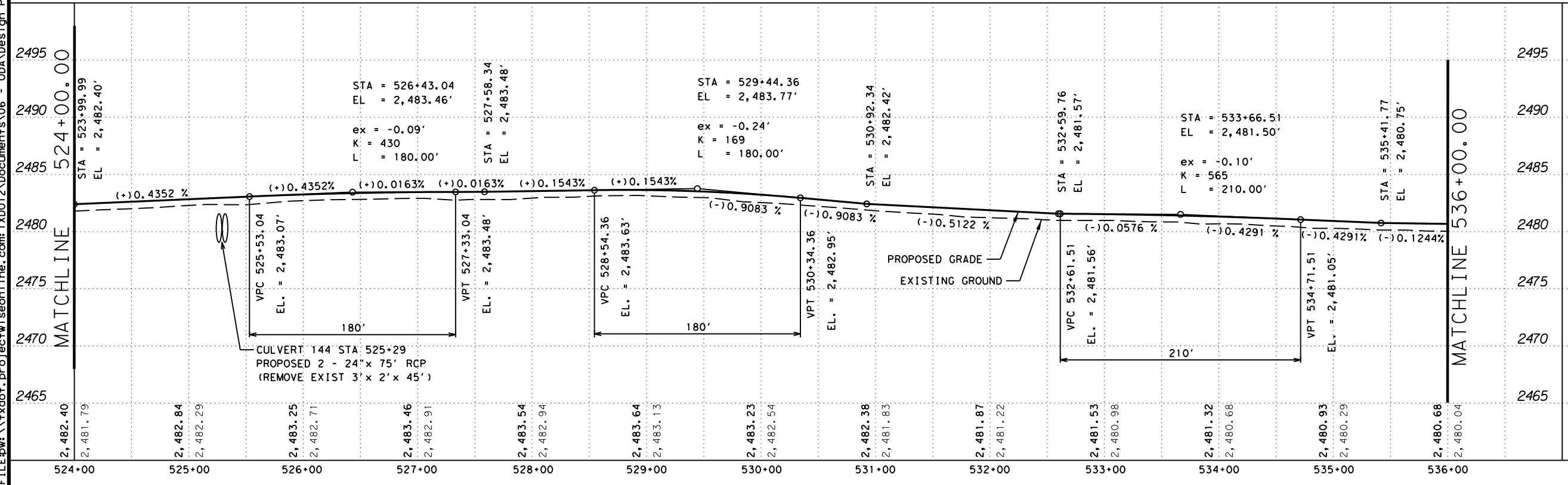


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		96

DATE: 10/22/2021 04:31 PM
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- LEGEND**
- T TELEPHONE PEDESTAL
 - # DRIVEWAY NUMBER
 - WM WATER METER
 - WL — WATER LINE
 - PL — PIPELINE
 - OE — OVERHEAD ELECTRIC



C. TAYLOR MANSFIELD
119144
LICENSED PROFESSIONAL ENGINEER

C. Taylor Mansfield 2021.11.01
12:30:04-05'00"

**US 67
PLAN & PROFILE**

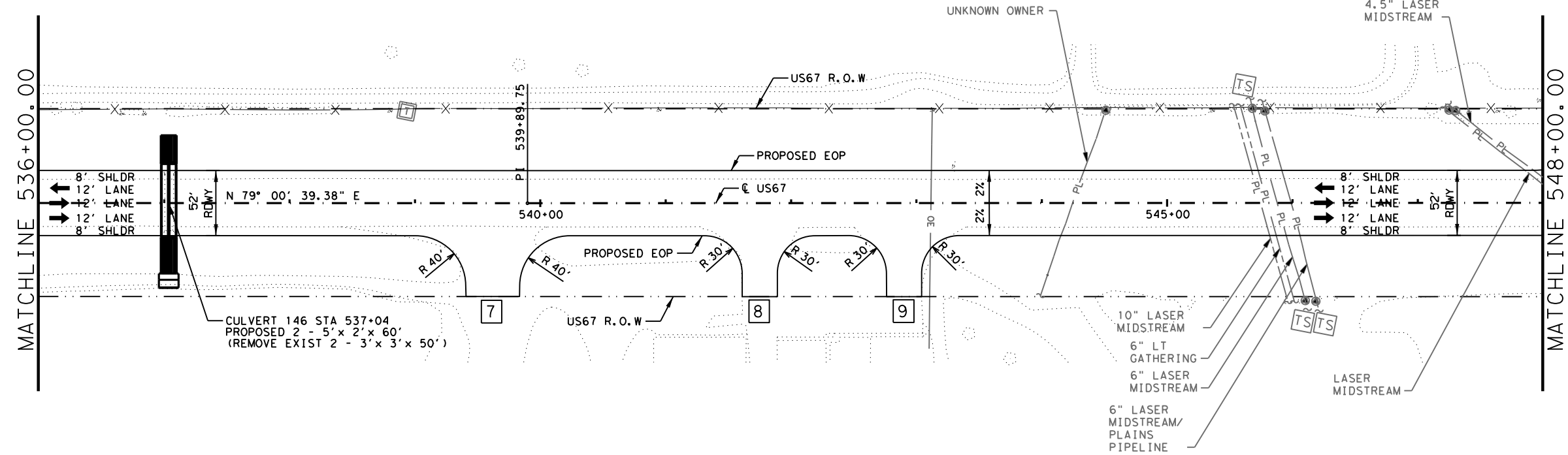
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VERT SCALE 1"=10'

SHEET 3 OF 39

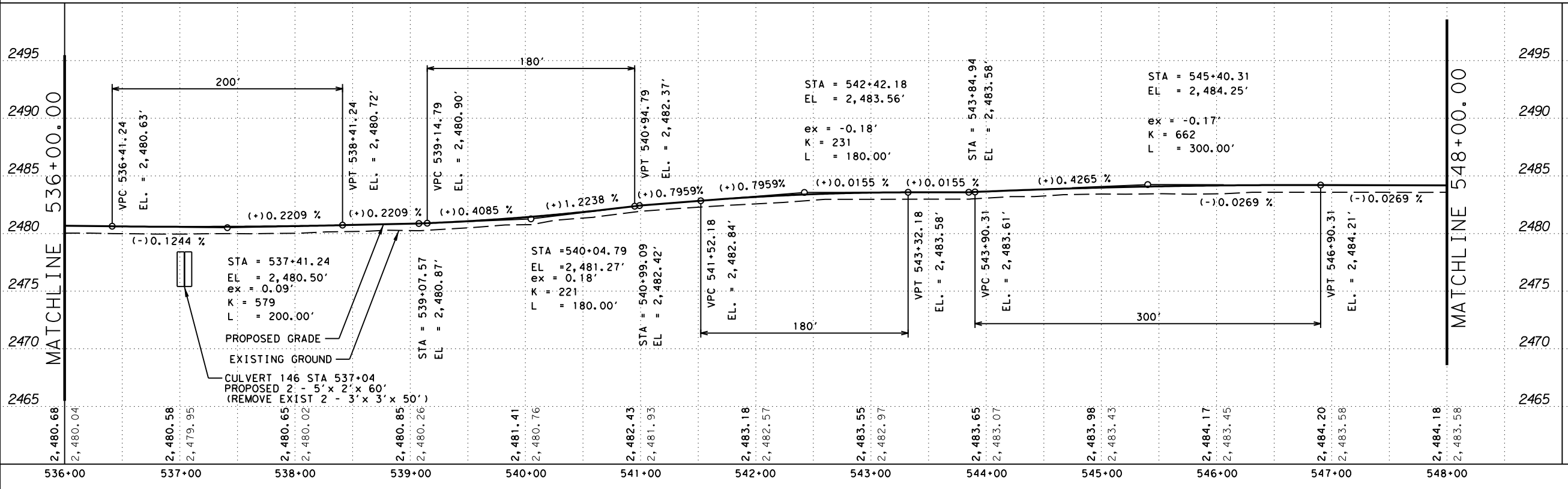
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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		97

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- LEGEND**
- T TELEPHONE PEDESTAL
 - # DRIVEWAY NUMBER
 - TS TRANSMISSION SENSOR
 - GAS VENT PIPE
 - PL — PIPELINE
 - OE — OVERHEAD ELECTRIC



C. TAYLOR MANSFIELD
 119144
 LICENSED PROFESSIONAL ENGINEER

C. Taylor Mansfield 2021.11.01
 12:30:05-05'00'

**US 67
 PLAN & PROFILE**

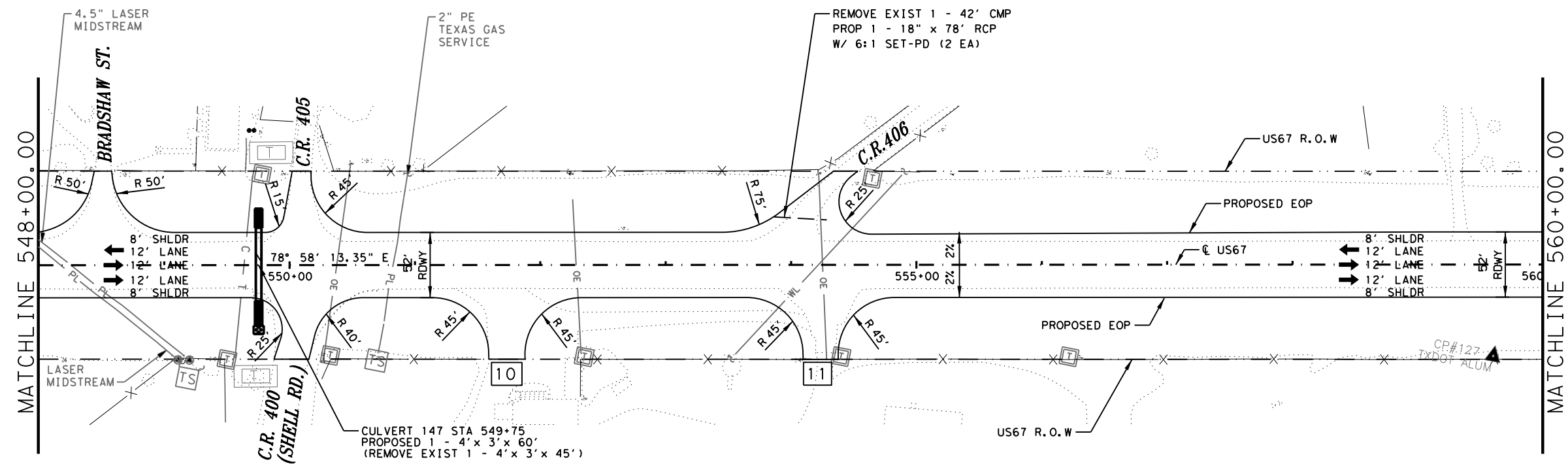
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 VERT SCALE 1"=10'

SHEET 4 OF 39

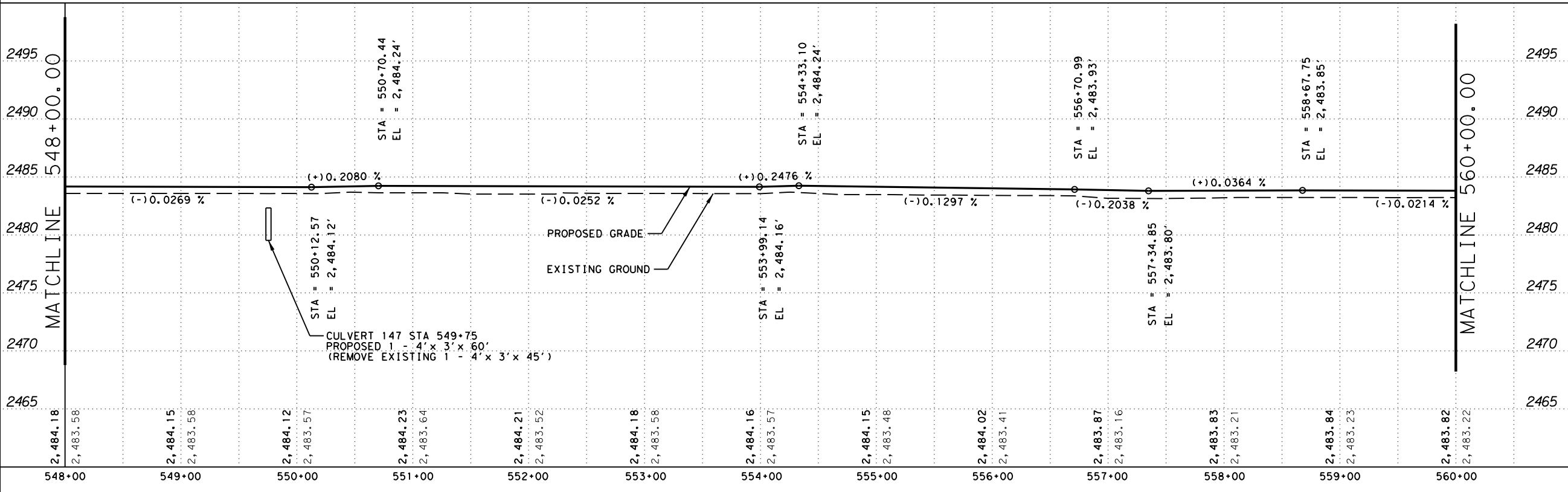
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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		98

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- LEGEND**
- TELEPHONE PEDESTAL
 - DRIVEWAY NUMBER
 - TELEPHONE CABINET
 - TRANSMISSION SENSOR
 - GAS VENT PIPE
 - WATER LINE
 - PIPELINE
 - OVERHEAD ELECTRIC
 - CABLE/TELEPHONE



C. Taylor Mansfield 2021.11.01
12:30:05-05'00"

**US 67
PLAN & PROFILE**

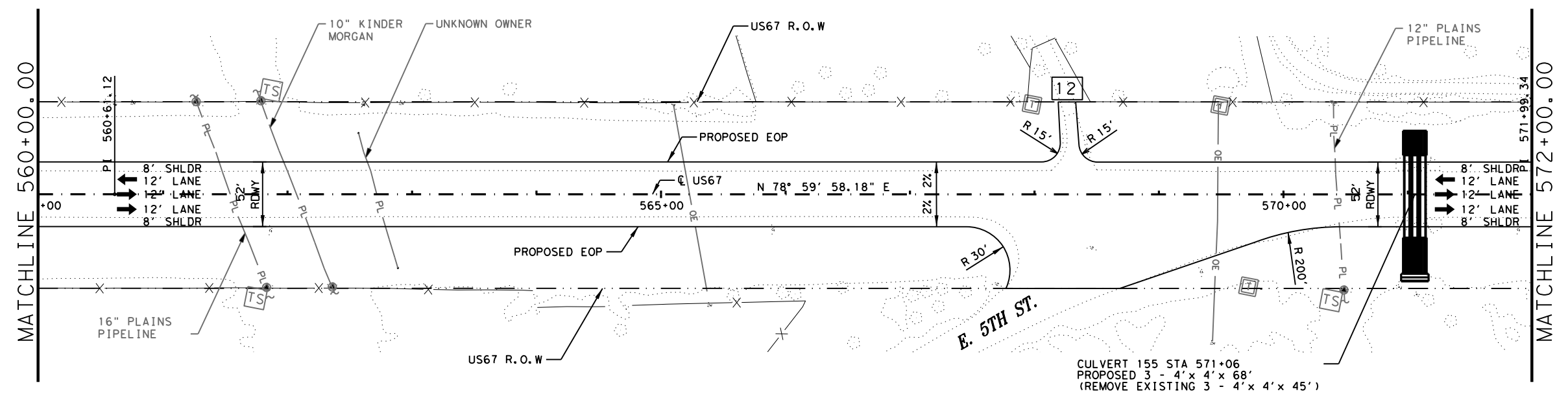
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SHEET 5 OF 39

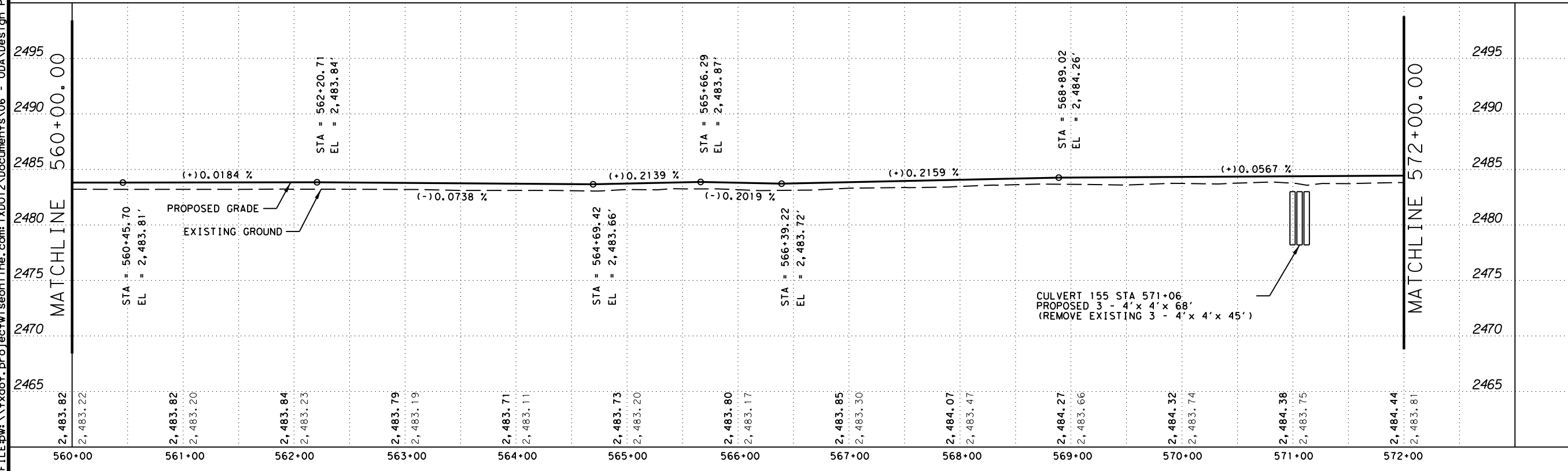
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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	99	

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- LEGEND**
- T TELEPHONE PEDESTAL
 - # DRIVEWAY NUMBER
 - TS TRANSMISSION SENSOR
 - GAS VENT PIPE
 - PL — PIPELINE
 - OE — OVERHEAD ELECTRIC



C. Taylor Mansfield 2021.11.01
12:30:05-05'00"

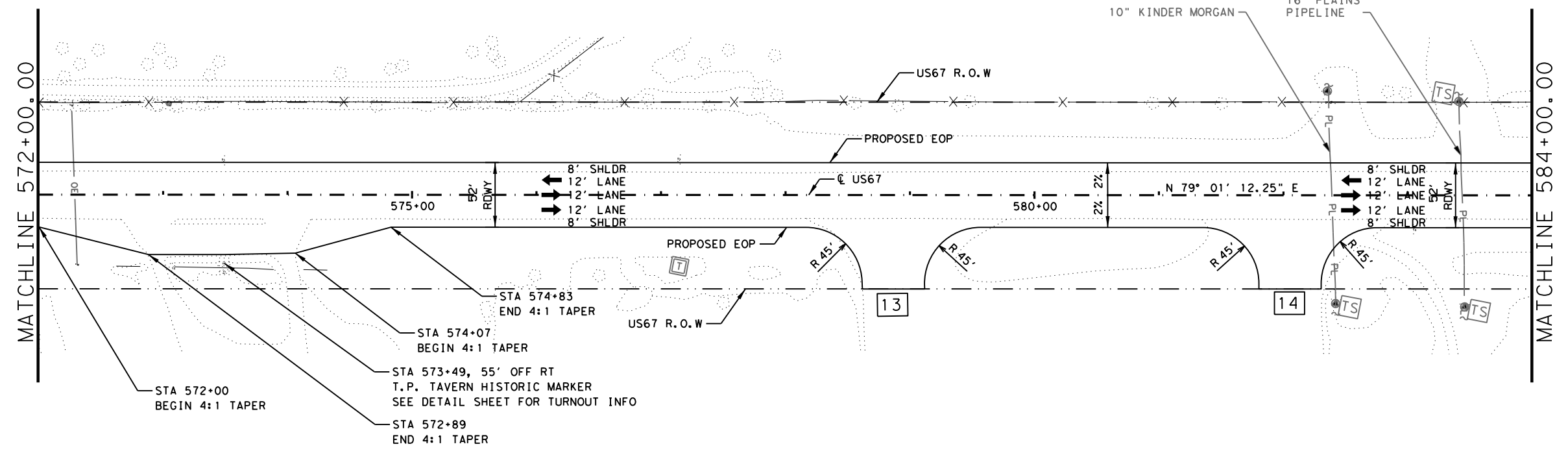
US 67
PLAN & PROFILE

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VERT SCALE 1"=10'

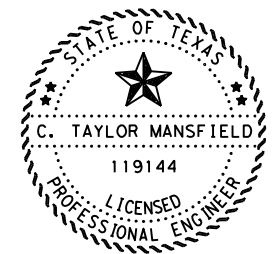
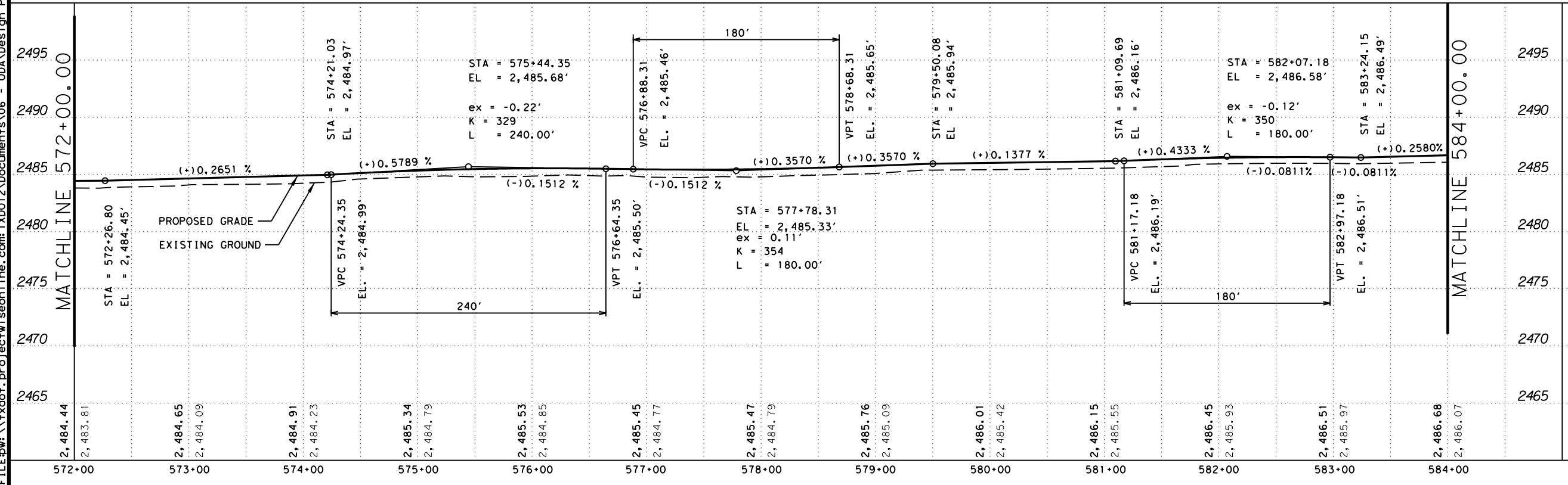
SHEET 6 OF 39

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		100

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- LEGEND**
- T TELEPHONE PEDESTAL
 - # DRIVEWAY NUMBER
 - TS TRANSMISSION SENSOR
 - GAS VENT PIPE
 - PL — PIPELINE



C. Taylor Mansfield 2021.11.01
12:30:05-05'00"

**US 67
PLAN & PROFILE**

HORIZ SCALE 1"=100'
VERT SCALE 1"=10'

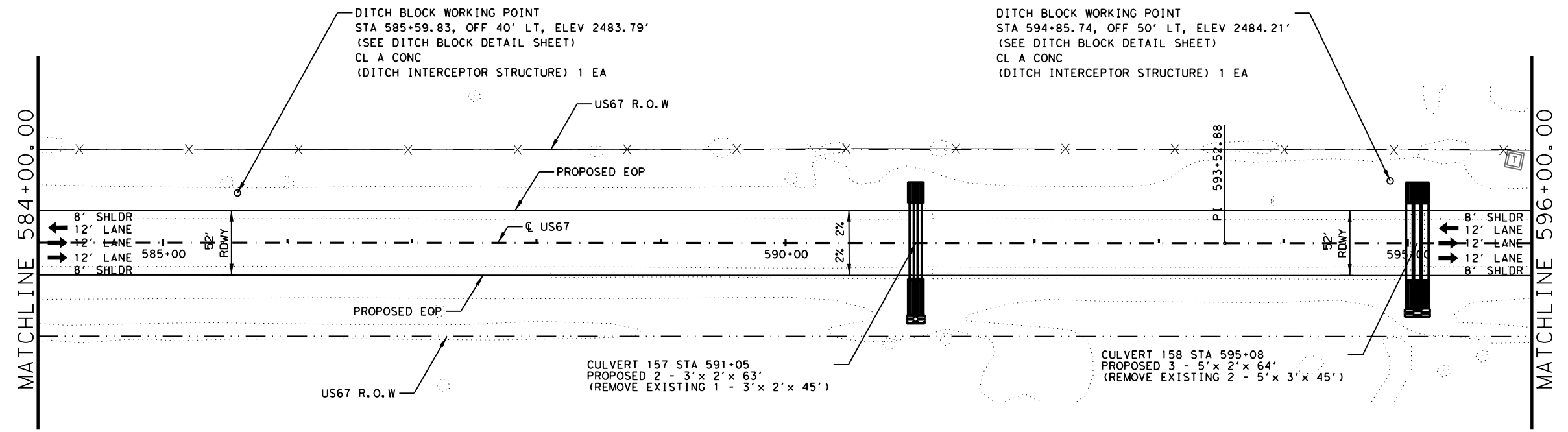
SHEET 7 OF 39



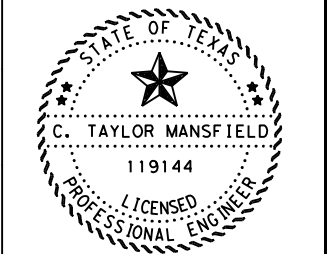
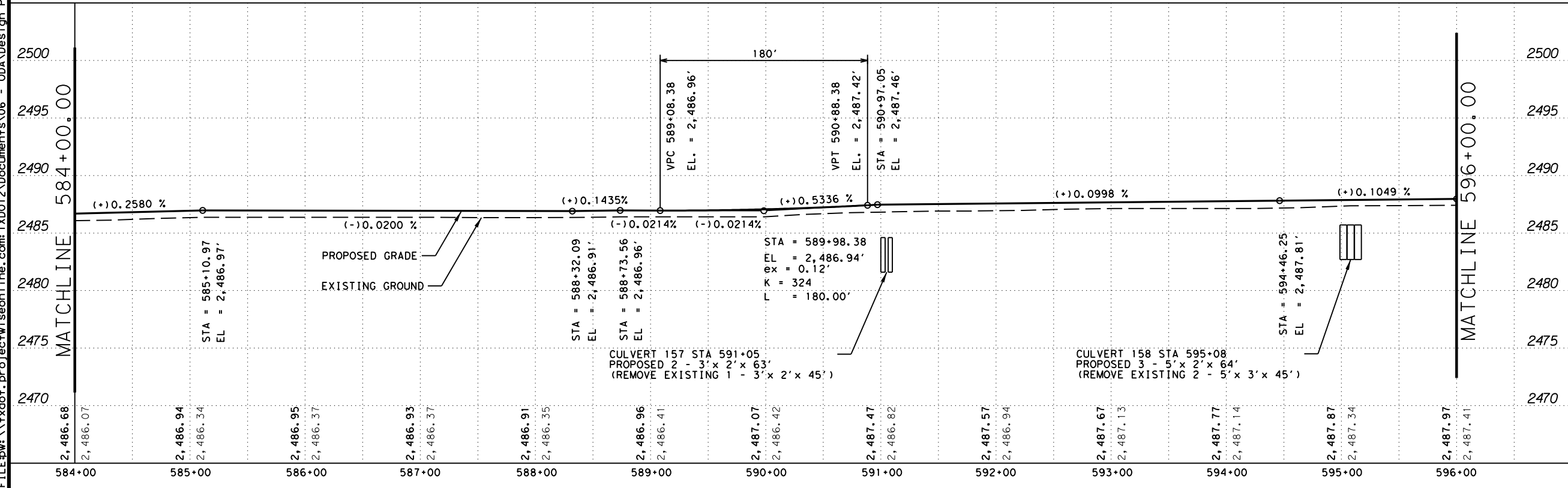
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	101	

DATE: 10/22/2021 04:31 PM
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DWG: _____
 CHK: _____
 DWF: _____
 CDS: _____



LEGEND
 TELEPHONE PEDESTAL



C. Taylor Mansfield
 2021.11.01
 12:30:05-05'00'

**US 67
 PLAN & PROFILE**

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

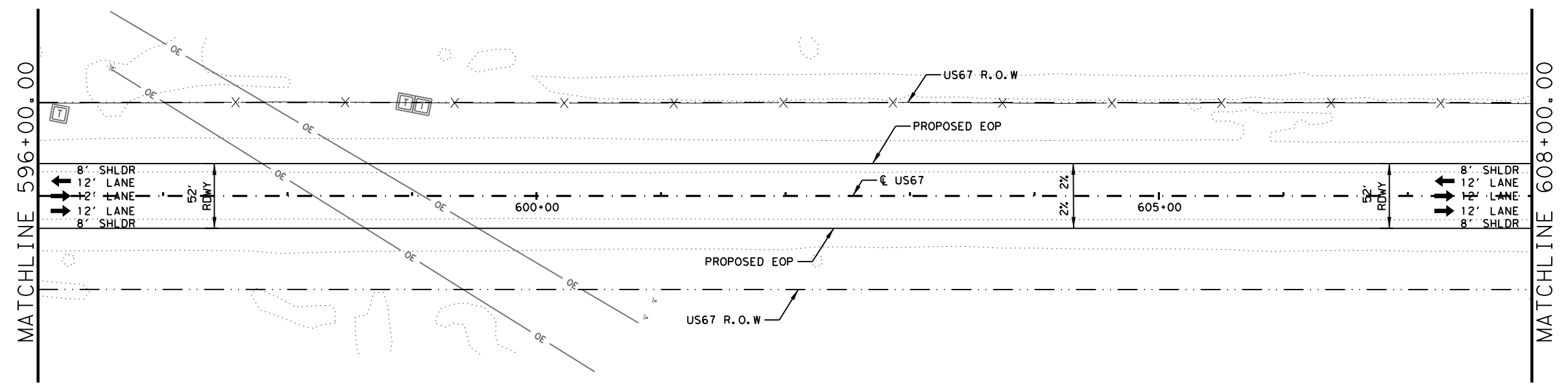
SHEET 8 OF 39



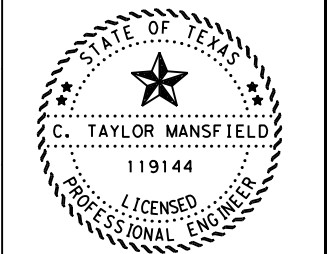
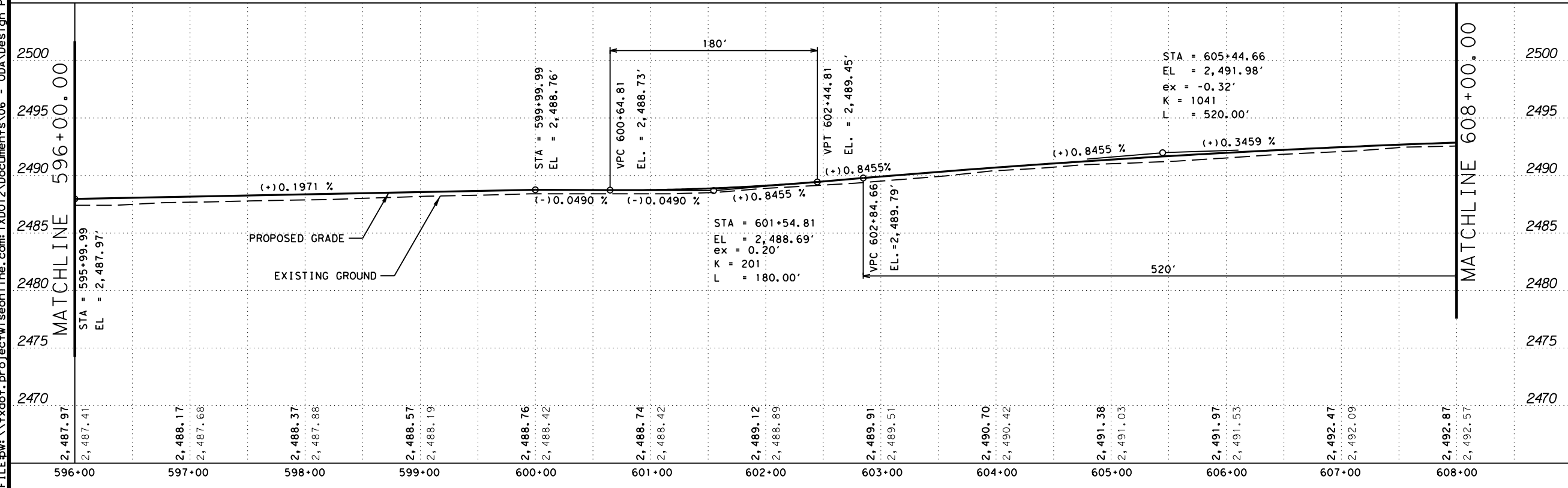
CONTRACT	SECTION	JOB	HIGHWAY
0076	06	037	US 67
DISTRICT	COUNTY	SHEET NO.	
ODA	UPTON	102	

DATE: 10/22/2021 04:31 PM
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DWG: CDS DWF: CDS



LEGEND
 TELEPHONE PEDESTAL
 OE OVERHEAD ELECTRIC



C. Taylor Mansfield 2021.11.01
 12:30:05-05'00"

**US 67
 PLAN & PROFILE**

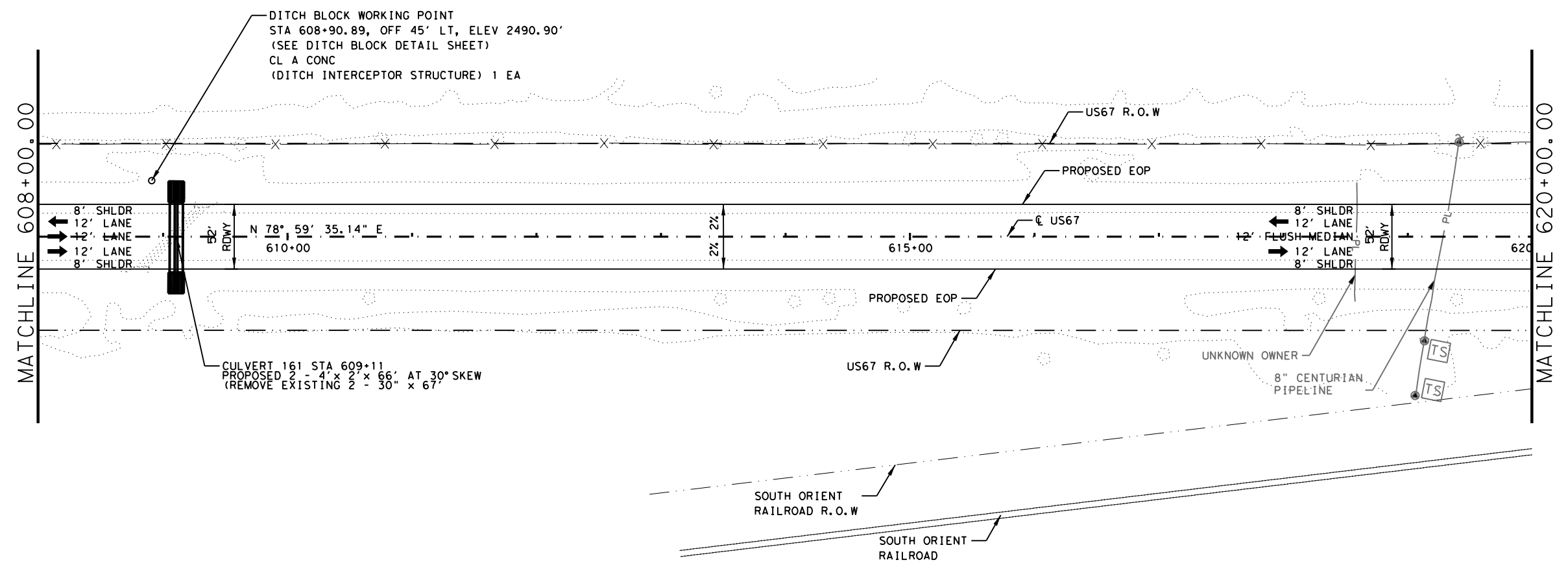
HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

SHEET 9 OF 39



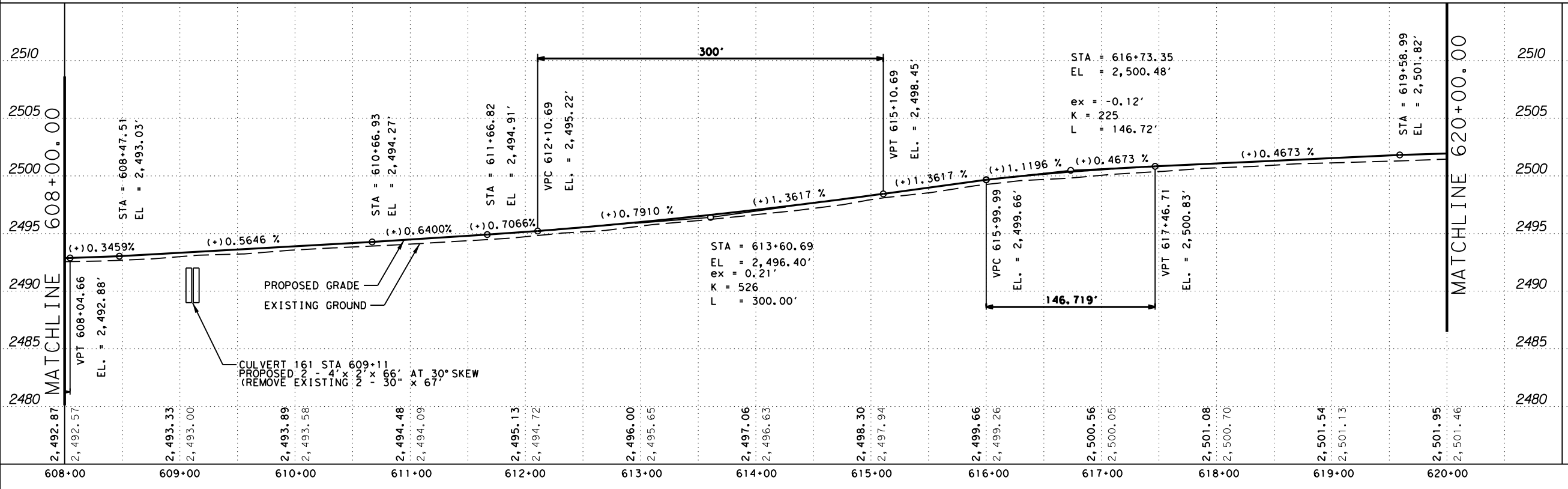
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	103	

DATE: 10/22/2021 04:31 PM
 FILE: \\fwdot.projectwiseonline.com\TXDOT\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_10.dgn



LEGEND

- TS TRANSMISSION SENSOR
- GAS VENT PIPE
- PL — PIPELINE



C. Taylor Mansfield 2021.11.01
12:30:05-05'00'

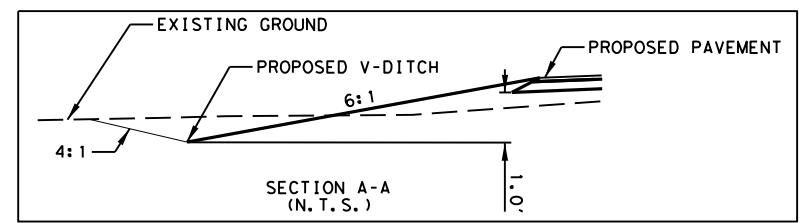
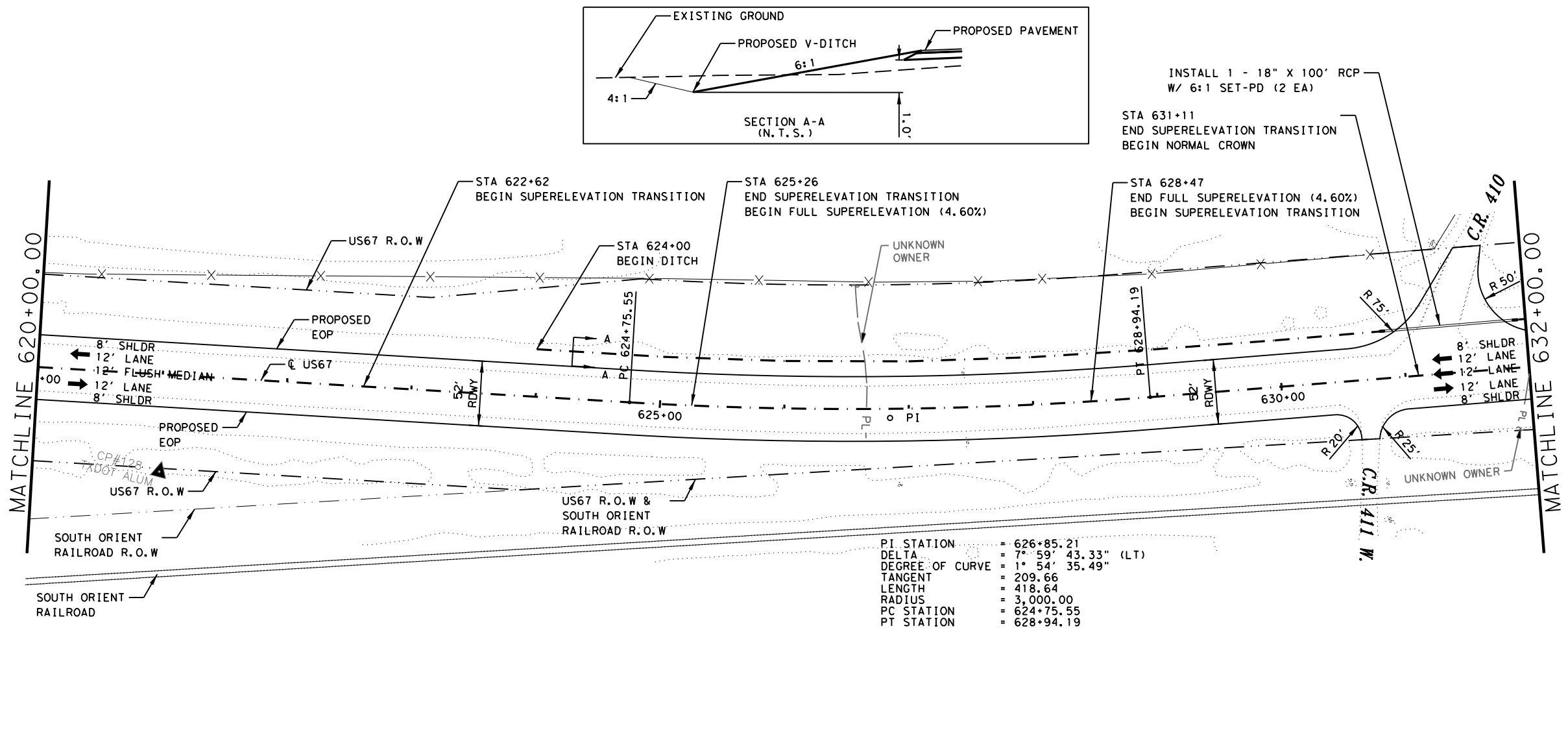
US 67
PLAN & PROFILE

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

SHEET 100F 39

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		104

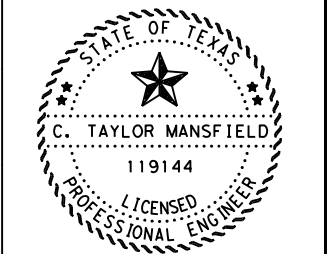
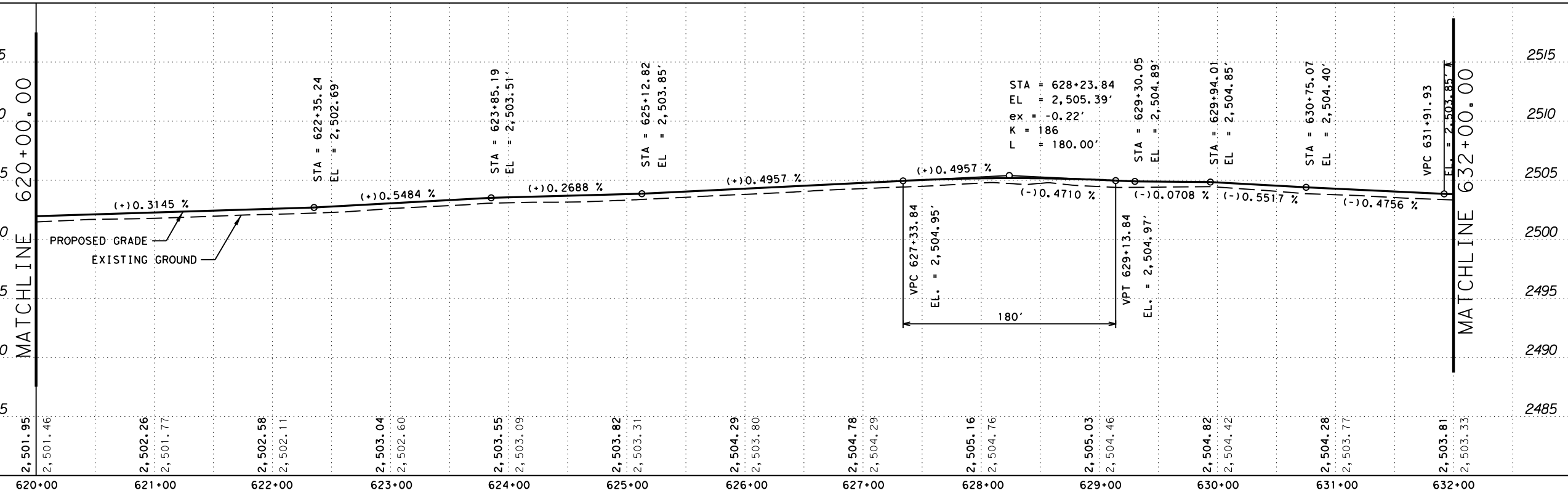
DATE: 10/22/2021 04:32 PM
 FILE: P:\projects\wisson\ine.com\TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_11.dgn



INSTALL 1 - 18" X 100' RCP
 W/ 6:1 SET-PD (2 EA)
 STA 631+11
 END SUPERELEVATION TRANSITION
 BEGIN NORMAL CROWN

LEGEND
 PL PIPELINE

PI STATION = 626+85.21
 DELTA = 7° 59' 43.33" (LT)
 DEGREE OF CURVE = 1° 54' 35.49"
 TANGENT = 209.66
 LENGTH = 418.64
 RADIUS = 3,000.00
 PC STATION = 624+75.55
 PT STATION = 628+94.19



C. Taylor Mansfield 2021.11.01
 12:30:05-05'00"

US 67
PLAN & PROFILE

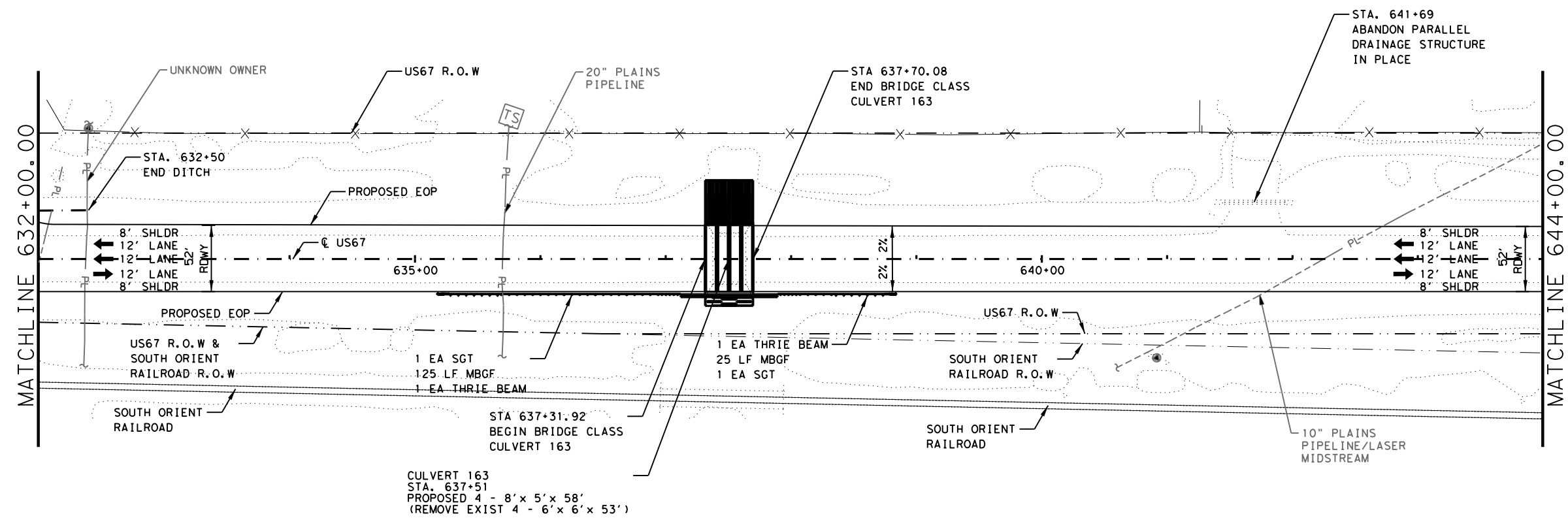
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 VERT SCALE 1"=10'

SHEET 11 OF 39



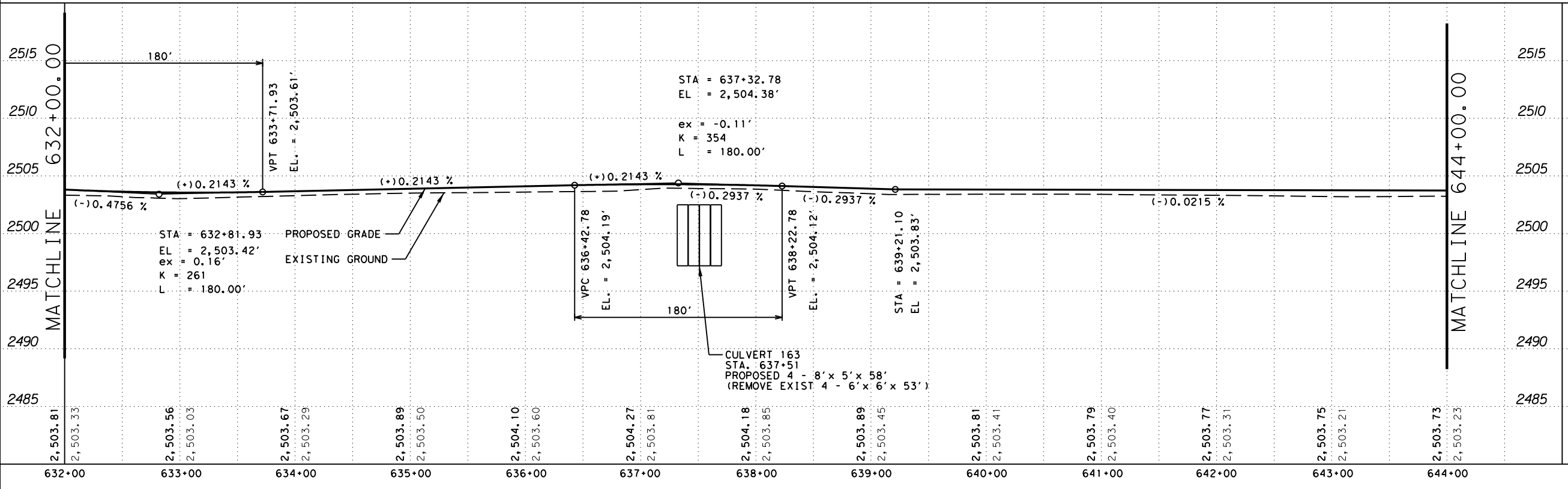
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		105

DATE: 10/22/2021 04:32 PM
 FILE: \\fwdot.projectwiseonline.com\TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_12.dgn



LEGEND

- TS TRANSMISSION SENSOR
- GAS VENT PIPE
- PL — PIPELINE



C. Taylor Mansfield
2021.11.01
12:30:05-05'00"

**US 67
PLAN & PROFILE**

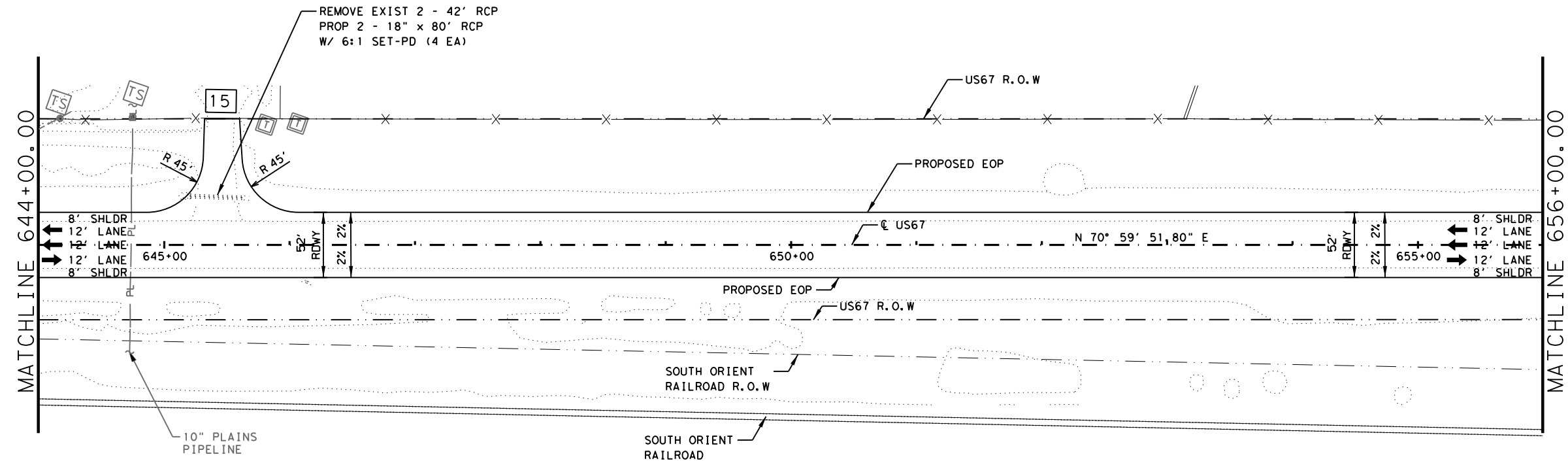
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VERT SCALE 1"=10'

SHEET 12 OF 39

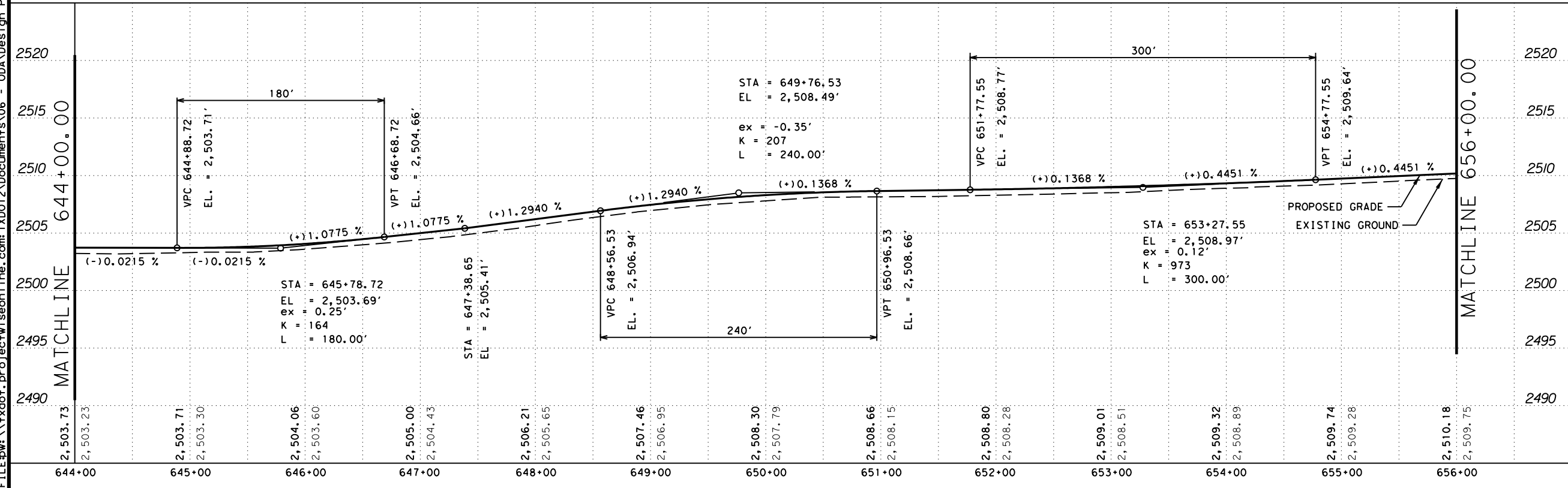
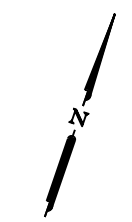
© 2021

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		106

DATE: 10/22/2021 04:32 PM
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- LEGEND**
- T TELEPHONE PEDESTAL
 - # DRIVEWAY NUMBER
 - TS TRANSMISSION SENSOR
 - GAS VENT PIPE
 - PL — PIPELINE



C. TAYLOR MANSFIELD
119144
LICENSED PROFESSIONAL ENGINEER

C. Taylor Mansfield 2021.11.01
12:30:05-05'00'

**US 67
PLAN & PROFILE**

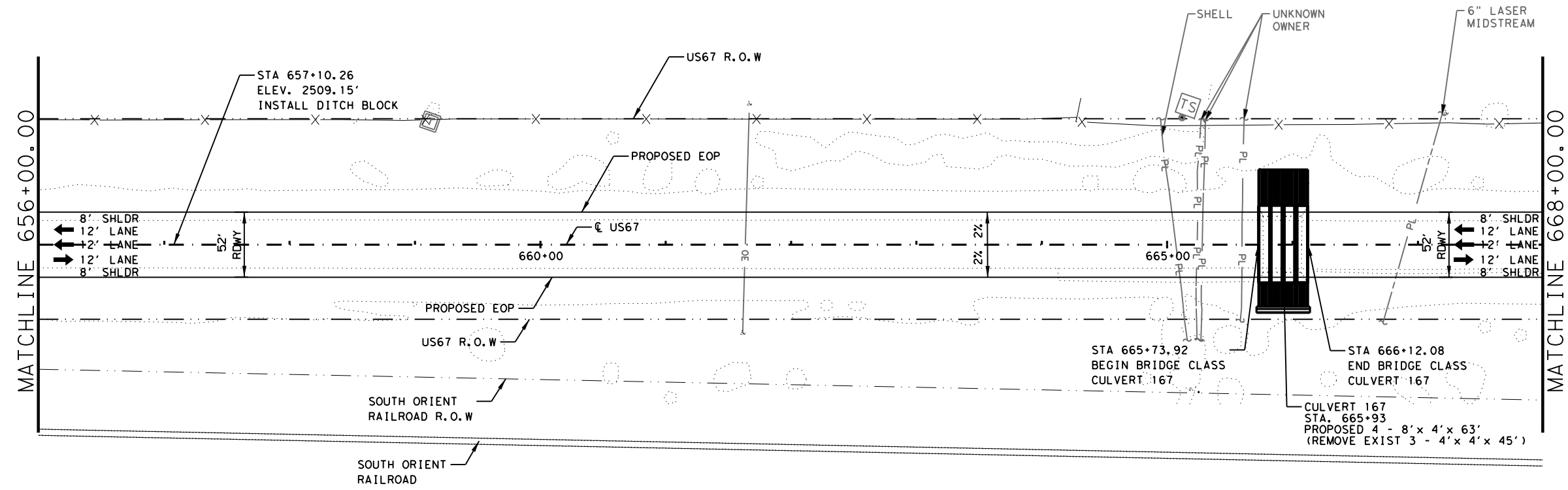
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VERT SCALE 1"=10'

SHEET 13 OF 39

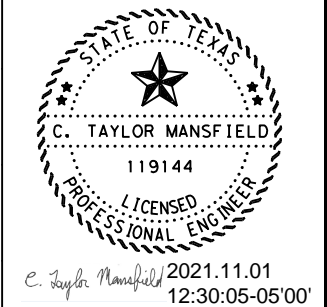
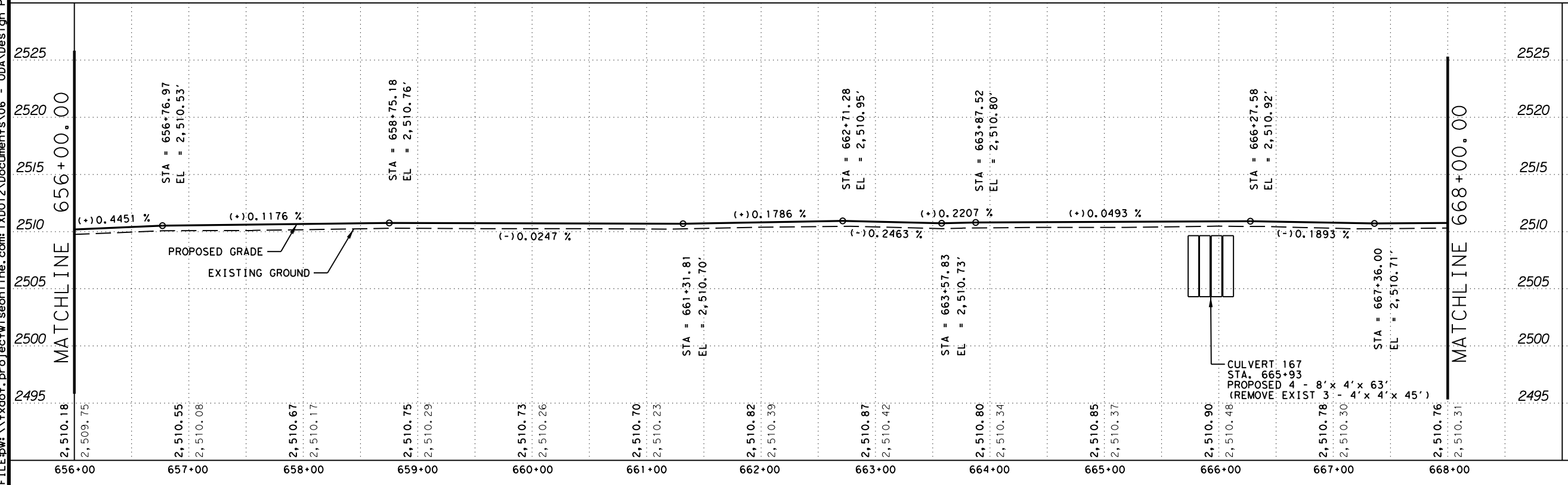
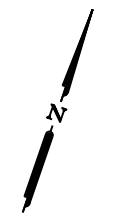
© 2021

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		107

DATE: 10/22/2021 04:32 PM
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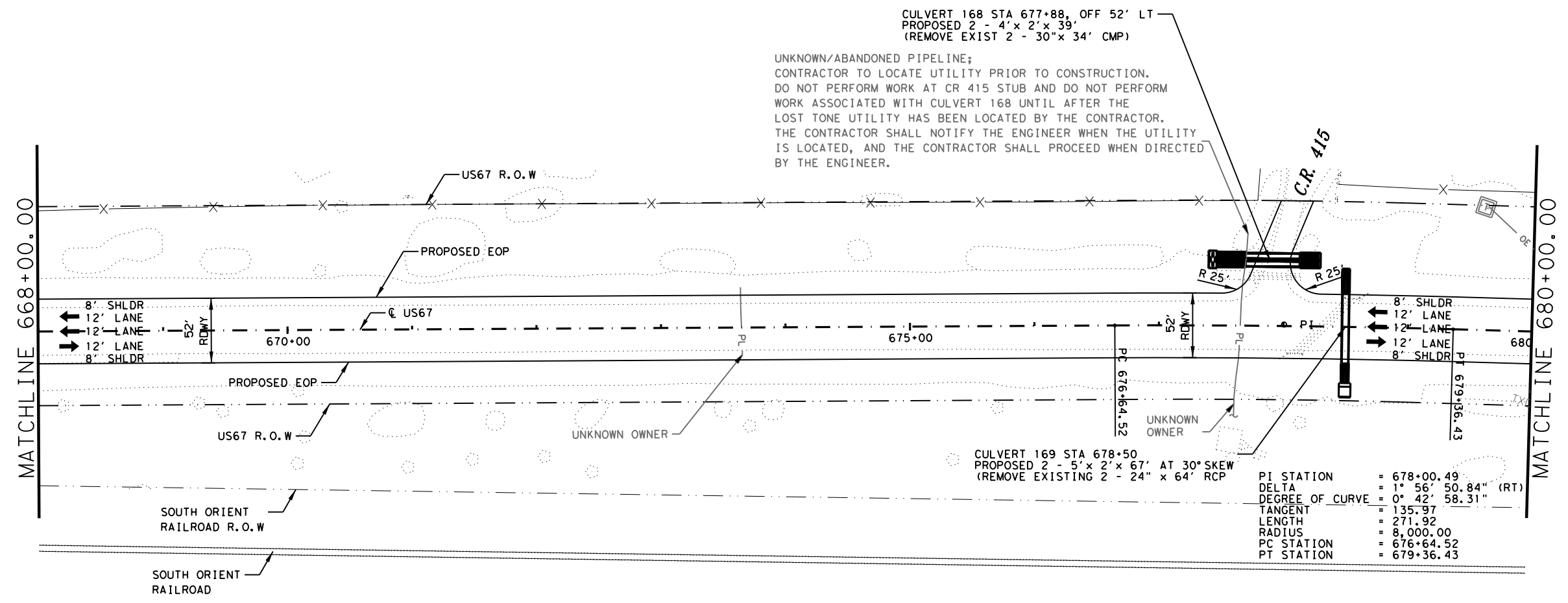
- LEGEND**
- T TELEPHONE PEDESTAL
 - TS TRANSMISSION SENSOR
 - GAS VENT PIPE
 - PL — PIPELINE
 - OE — OVERHEAD ELECTRIC



US 67
PLAN & PROFILE
 HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'
 SHEET 14 OF 39

		© 2021	
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		108

DATE: 10/22/2021 04:32 PM
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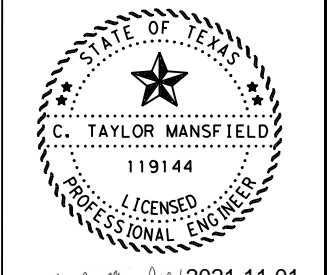
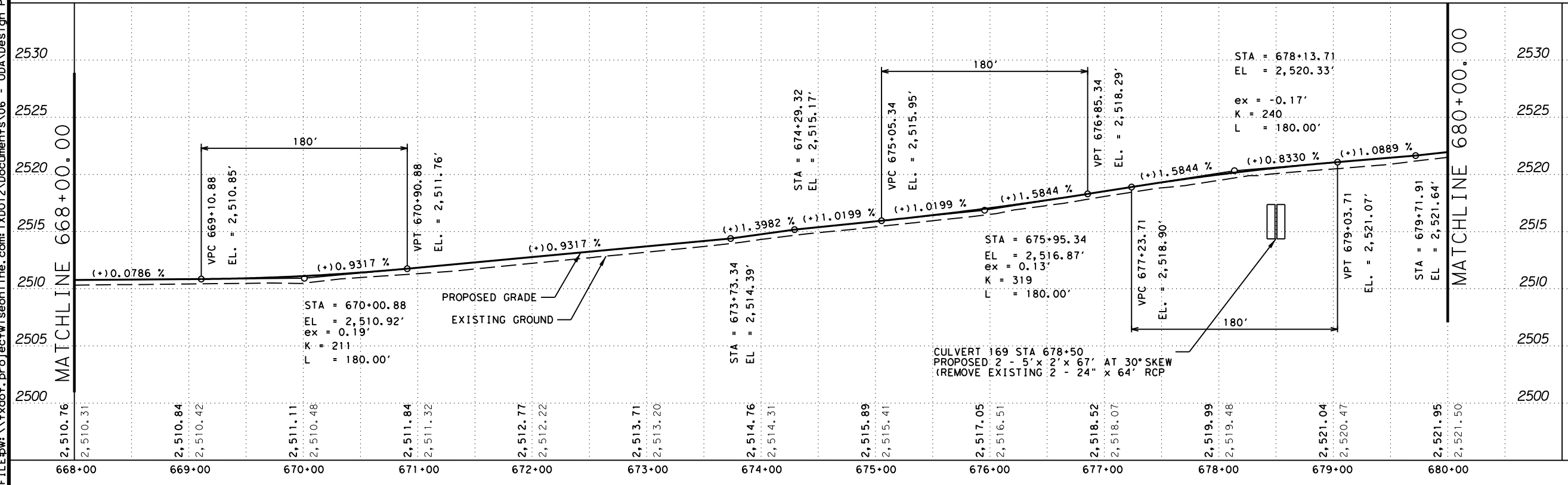
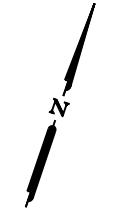


LEGEND

T TELEPHONE PEDESTAL
 — PL — PIPELINE

NOTE:

UTILITIES (PUBLIC, PRIVATE, AND TXDOT) EXIST THROUGHOUT THE PROJECT. PRIOR TO ANY CONSTRUCTION, INVESTIGATE THE UTILITY LOCATIONS WITHIN THE PROJECT RIGHT-OF-WAY. CONTACT THE TXDOT ODESSA TRAFFIC OPERATIONS SHOP AT 432-498-4690 TO INVESTIGATE AND DETERMINE THE LOCATION OF ANY TXDOT UTILITY THAT MAY EXIST WITHIN THE PROJECT RIGHT-OF-WAY. EXERCISE CAUTION WHEN EXCAVATING IN AREAS WHERE INVESTIGATIONS HAVE DETERMINED THAT UTILITIES EXIST.



C. Taylor Mansfield 2021.11.01
 12:49:31-05'00"

US 67
PLAN & PROFILE

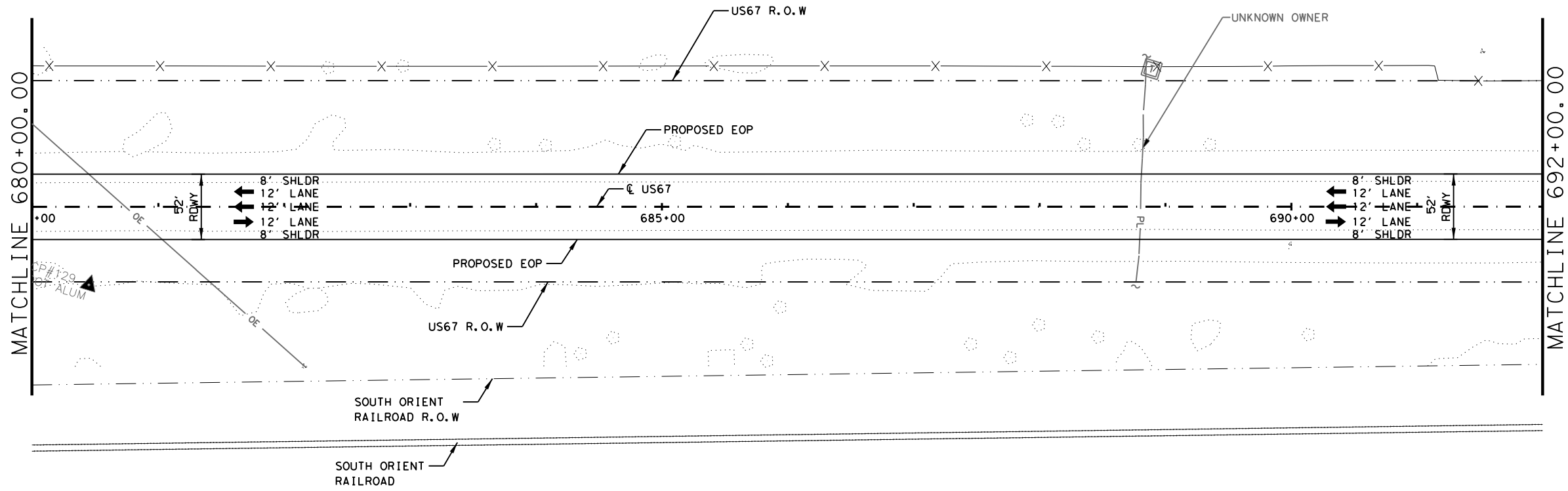
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 VERT SCALE 1"=10'

SHEET 15 OF 39

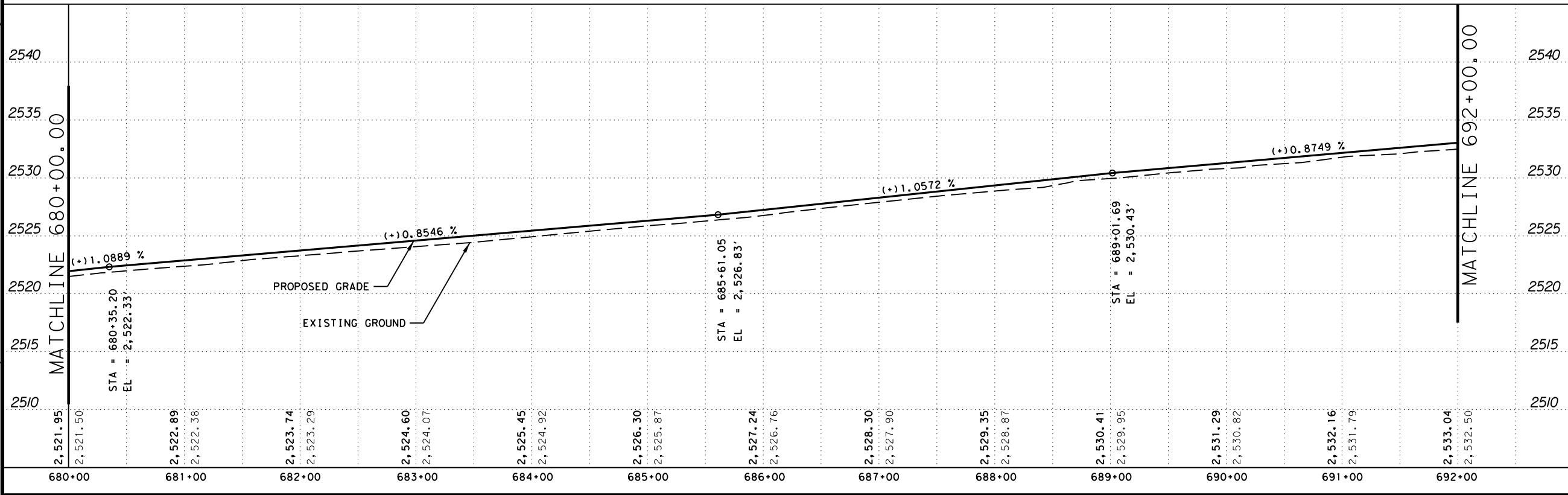


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	109	

DATE: 10/22/2021 04:32 PM
 FILE: \\fsdot\project\wiseon\ine.com\TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_16.dgn



- LEGEND**
- TELEPHONE PEDESTAL
 - PIPELINE
 - OVERHEAD ELECTRIC

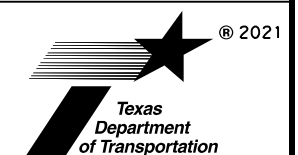


C. Taylor Mansfield 2021.11.01
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**US 67
 PLAN & PROFILE**

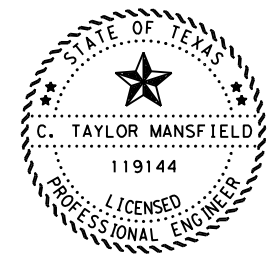
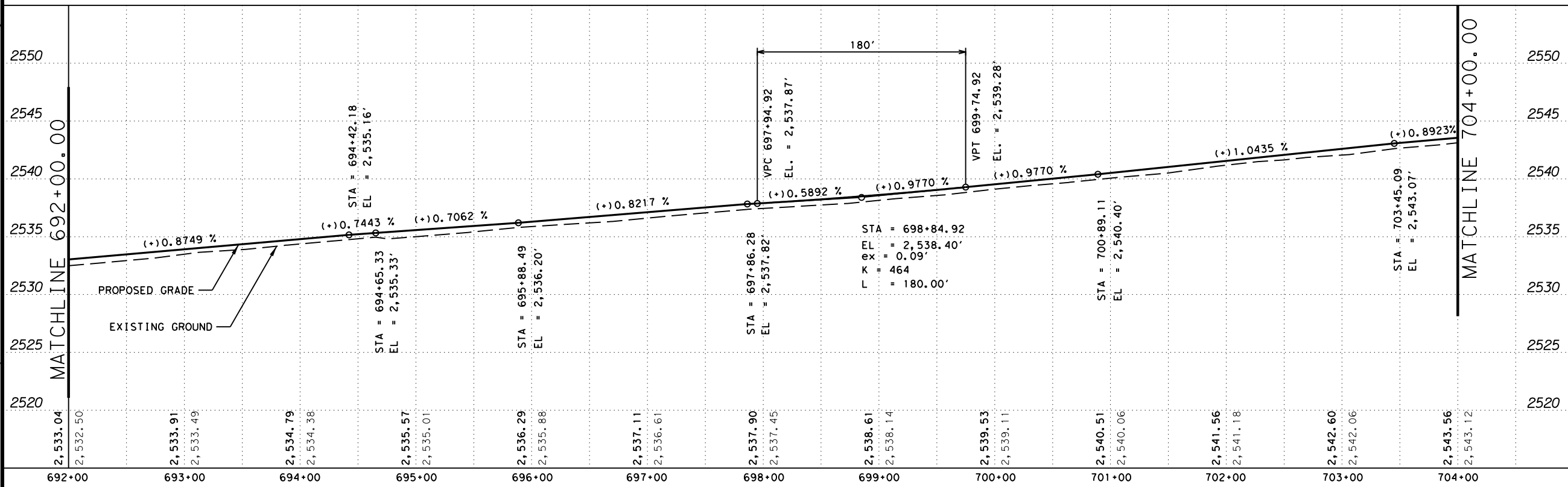
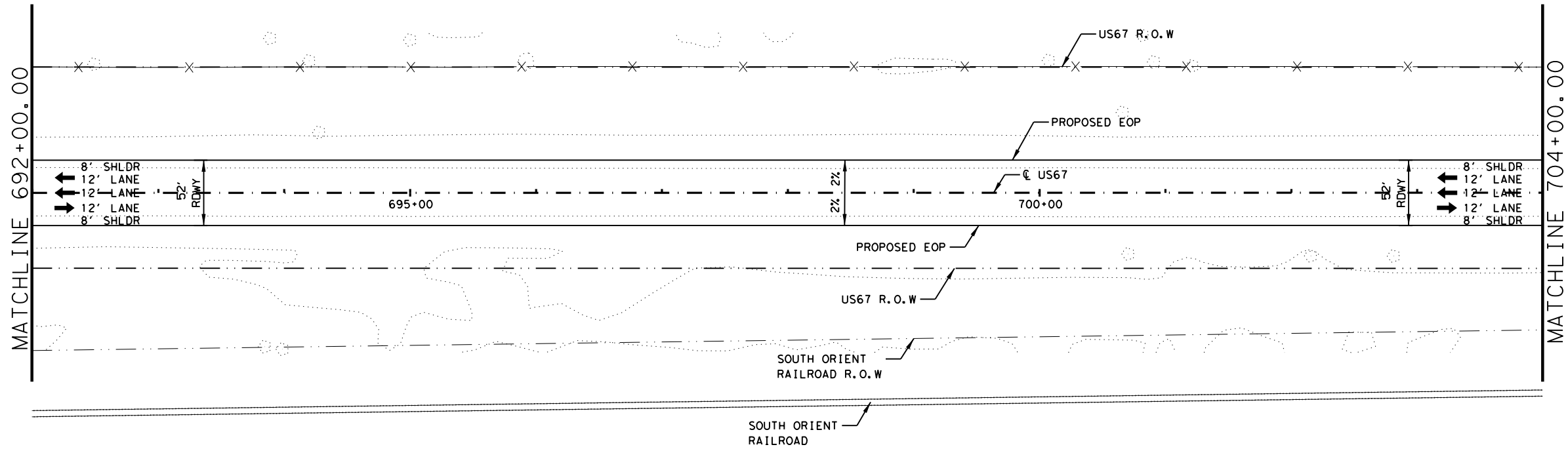
HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

SHEET 16 OF 39



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	110	

DATE: 10/22/2021 04:32 PM
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C. Taylor Mansfield 2021.11.01
 12:30:06-05'00"

US 67
PLAN & PROFILE

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

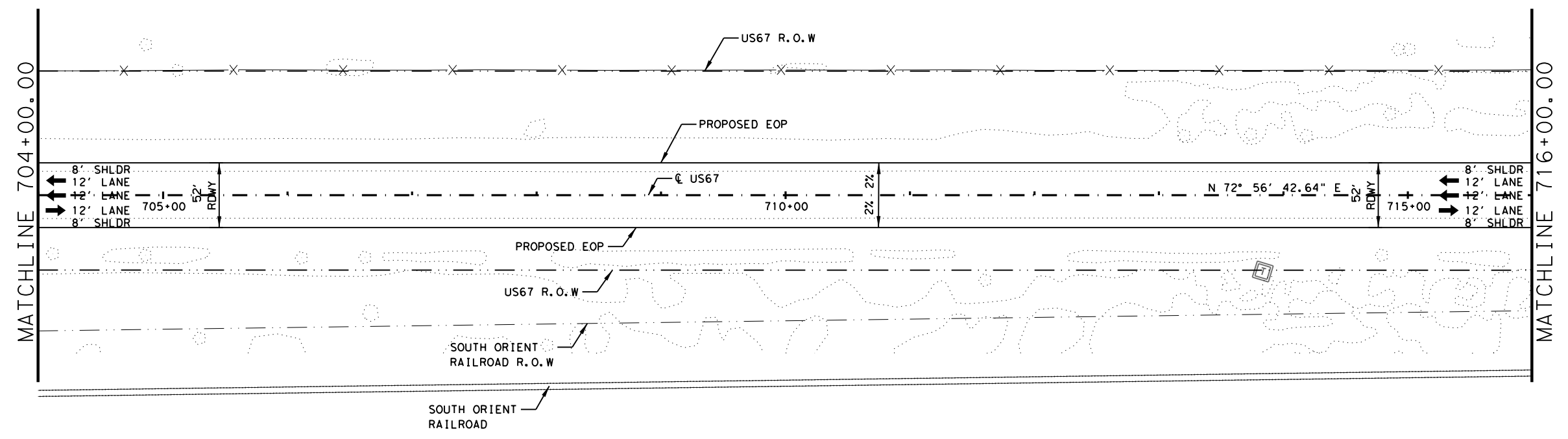
SHEET 17 OF 39



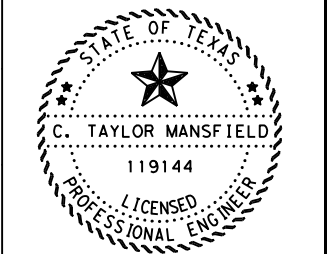
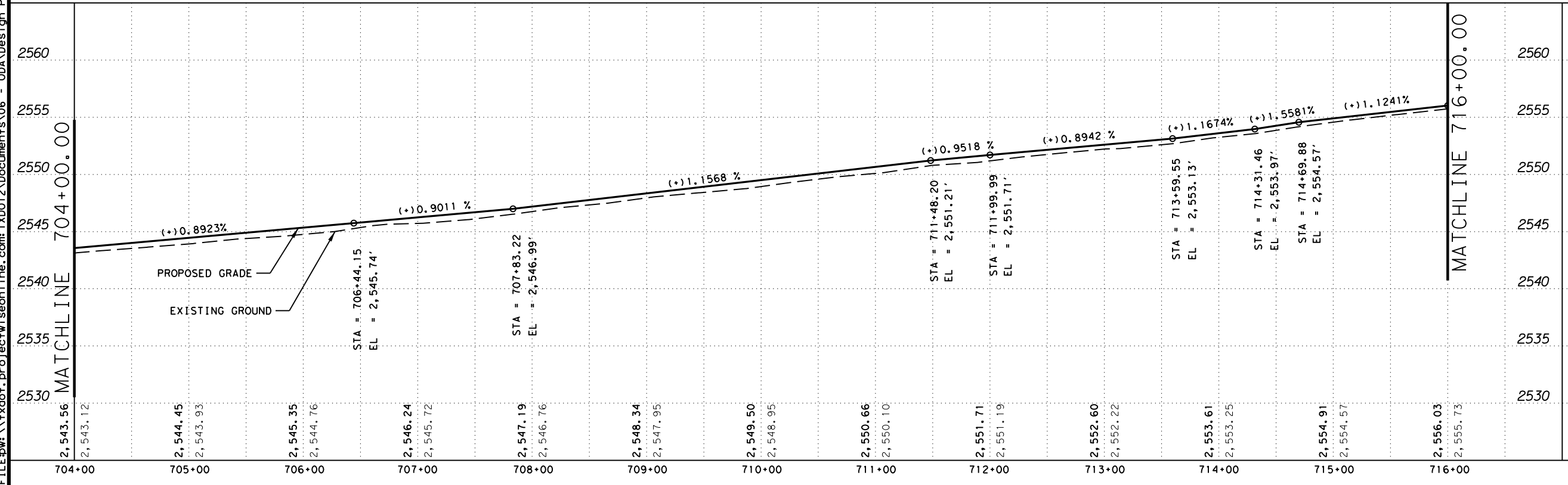
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		111

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DWG: CDS: DW: CDS: CDS:



LEGEND
 TELEPHONE PEDESTAL



C. Taylor Mansfield 2021.11.01
 12:30:06-05'00'

US 67
PLAN & PROFILE

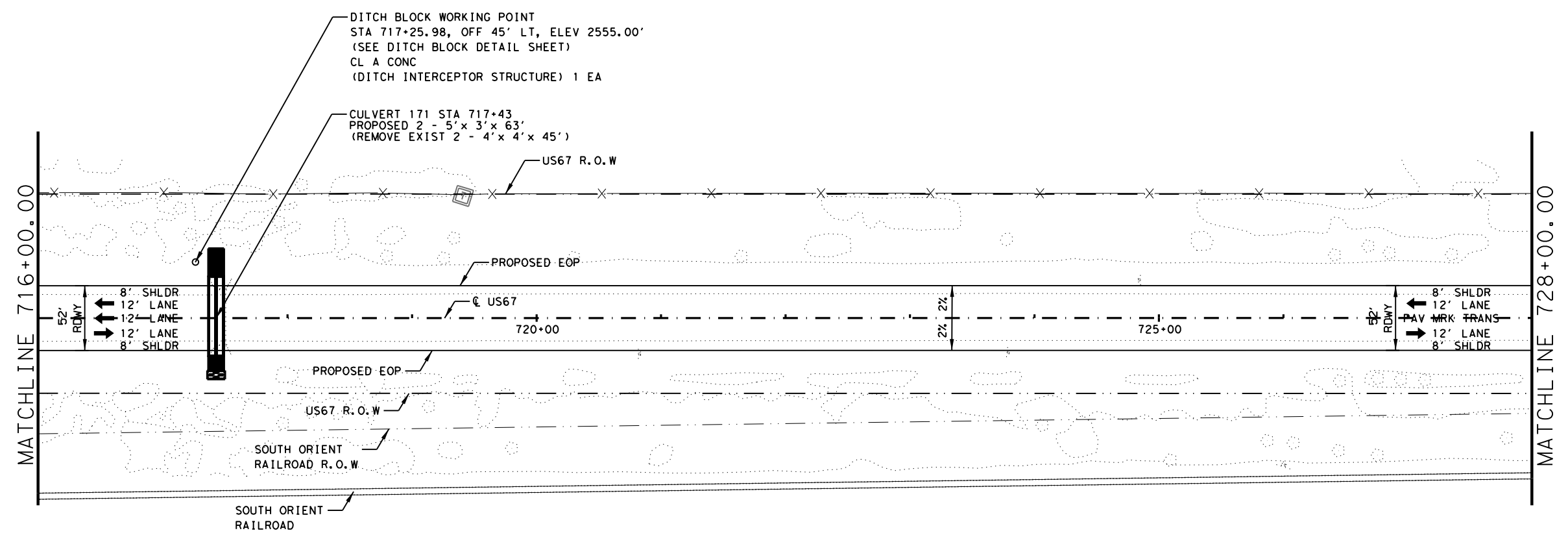
HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

SHEET 18 OF 39

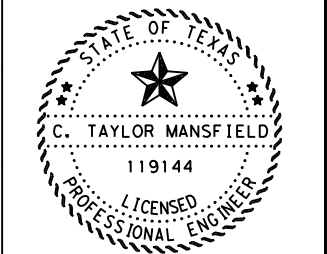
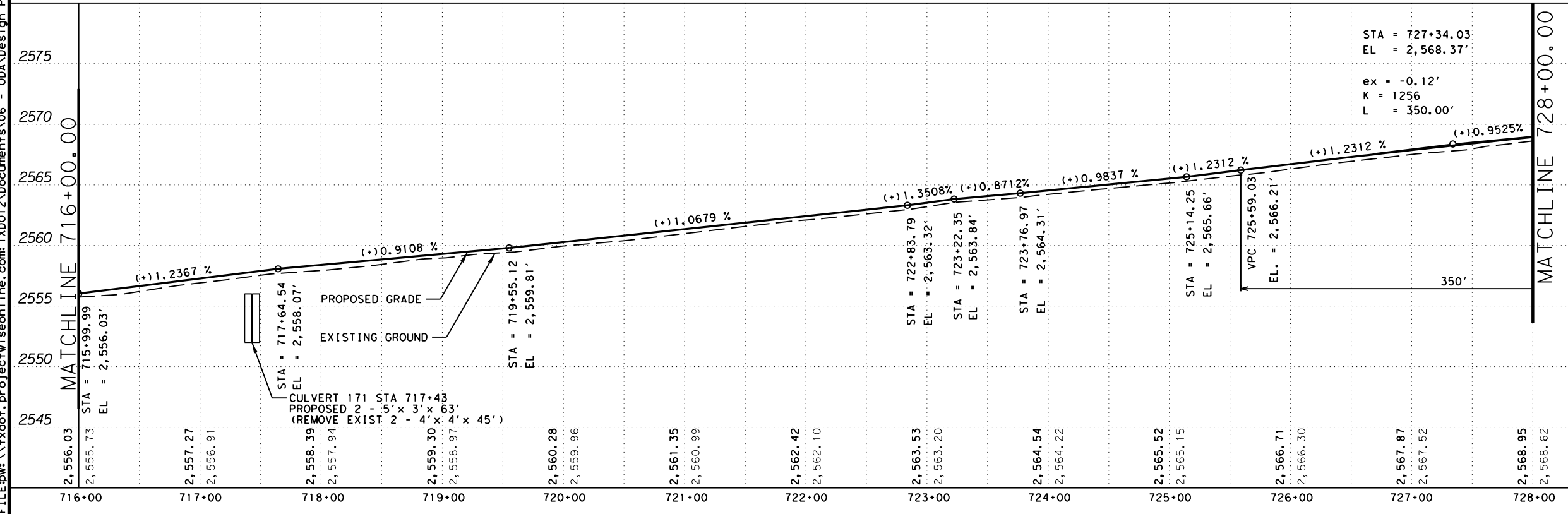


CONTRACT	SECTION	JOB	HIGHWAY
0076	06	037	US 67
DISTRICT	COUNTY	SHEET NO.	
ODA	UPTON	112	

DATE: 10/22/2021 04:32 PM
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LEGEND
 [Symbol] TELEPHONE PEDESTAL



C. Taylor Mansfield 2021.11.01
 12:30:06-05'00"

**US 67
 PLAN & PROFILE**

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

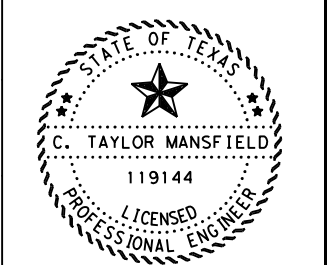
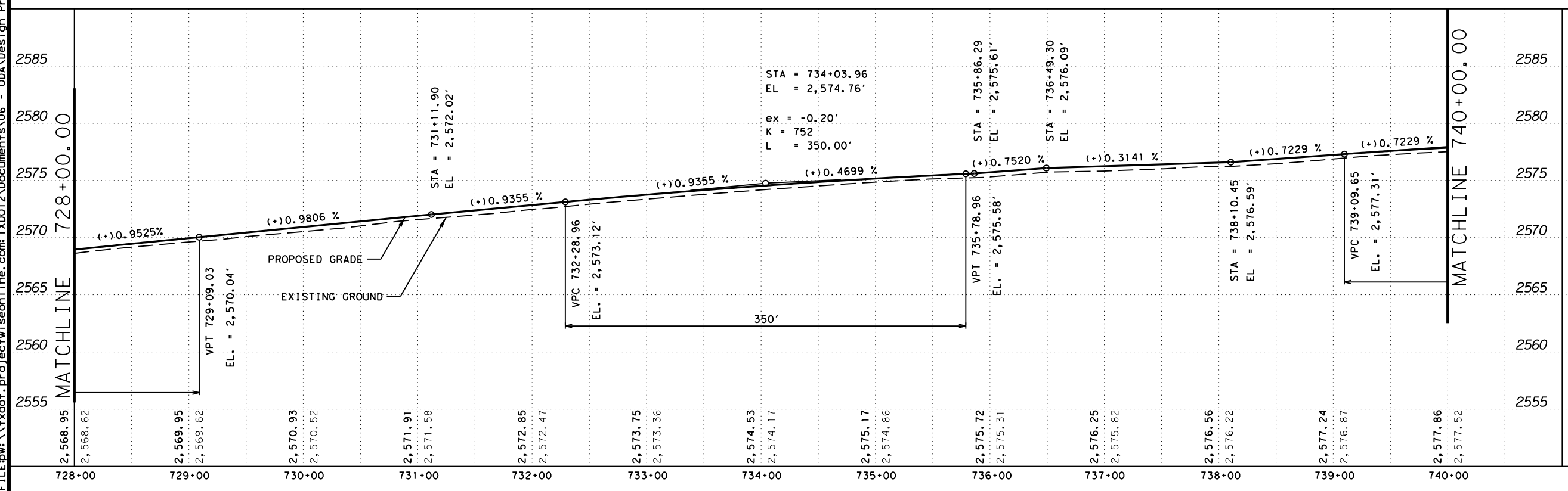
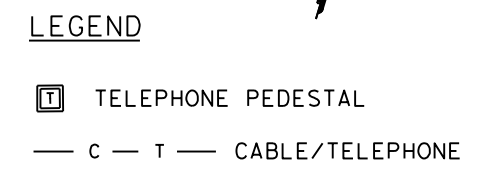
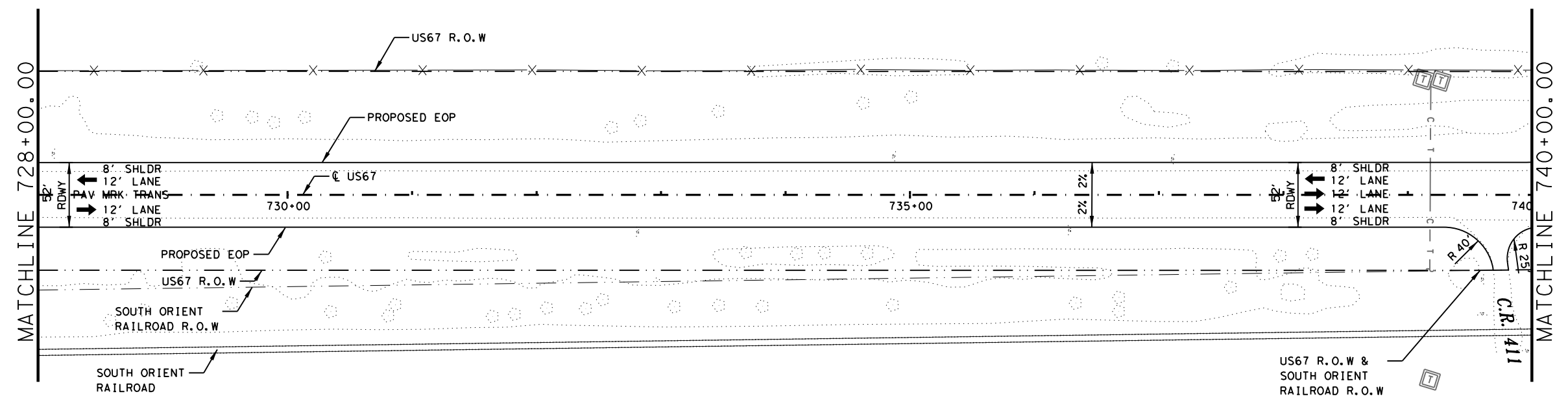
SHEET 190F 39



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		113

DATE: 10/22/2021 04:32 PM
 FILE: \\fwdot.projects\wiseon\ine.com\TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_20.dgn

Cks:
 DWG:
 Cks:
 DWG:



C. Taylor Mansfield 2021.11.01
 12:30:06-05'00'

**US 67
 PLAN & PROFILE**

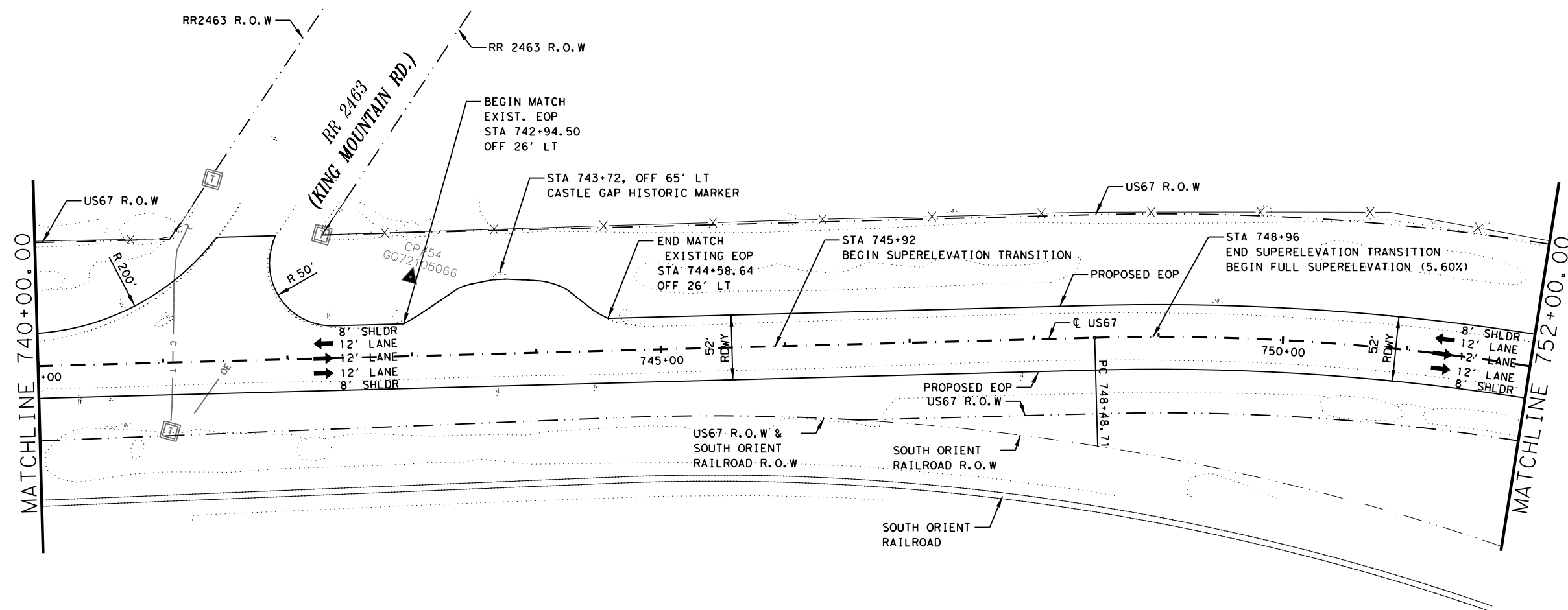
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 VERT SCALE 1"=10'

SHEET 200F 39



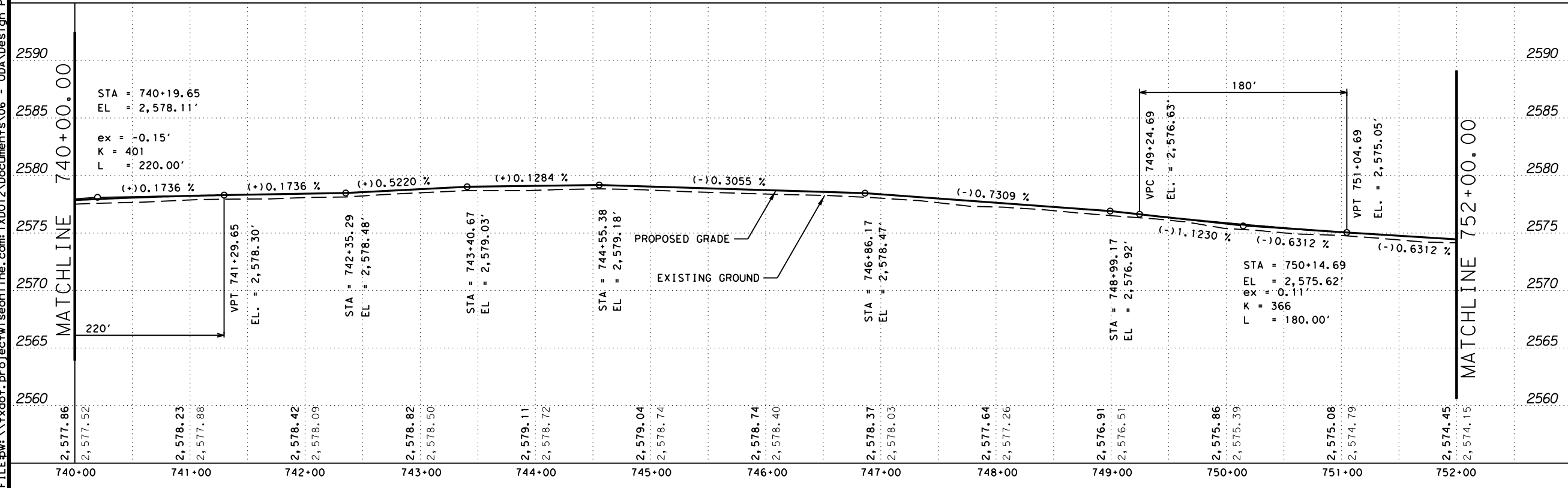
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	114	

DATE: 10/22/2021 04:32 PM
 FILE: \\fsdot.projectwiseonline.com:TXDOT\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_21.dgn



LEGEND

- T TELEPHONE PEDESTAL
- C — T — CABLE/TELEPHONE
- OVERHEAD ELECTRIC



C. TAYLOR MANSFIELD
119144
LICENSED PROFESSIONAL ENGINEER

C. Taylor Mansfield 2021.11.01
12:30:06-05'00'

**US 67
PLAN & PROFILE**

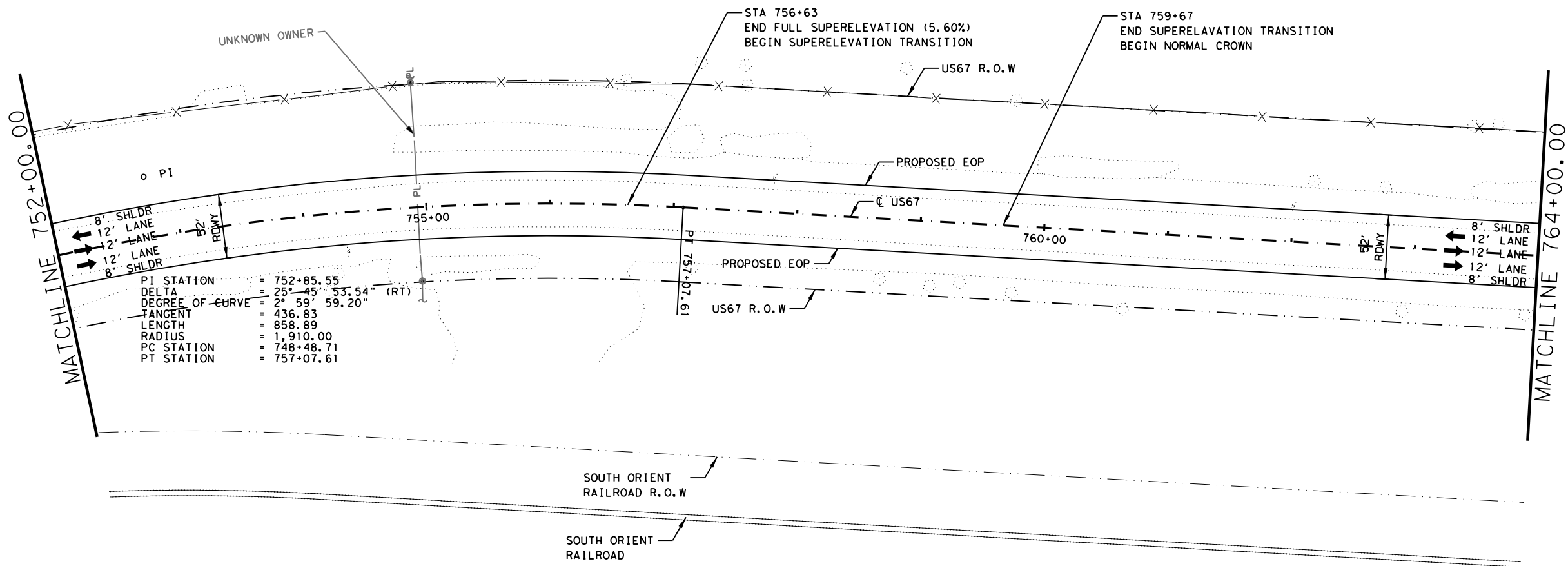
HORIZ SCALE 1"=100'
VERT SCALE 1"=10'

SHEET 21 OF 39

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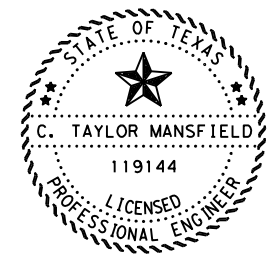
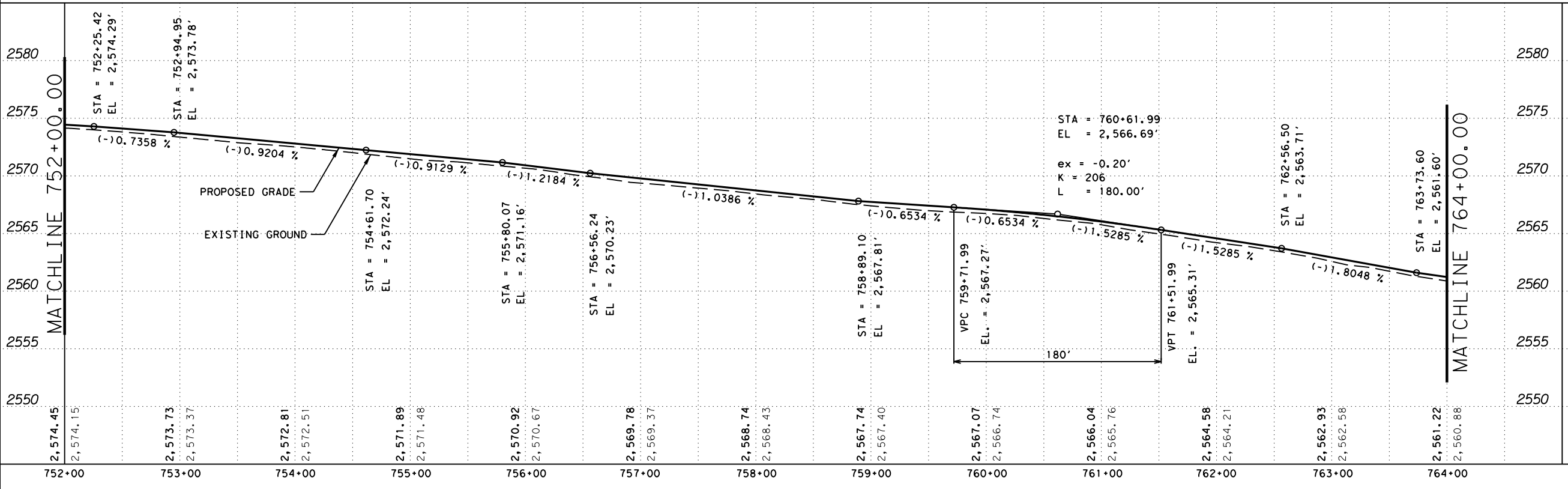
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		115

DATE: 10/22/2021 04:32 PM
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PI STATION = 752+85.55
 DELTA = 25° 45' 55.54" (RT)
 DEGREE OF CURVE = 29.59' 59.20"
 TANGENT LENGTH = 436.83
 RADIUS = 1,910.00
 PC STATION = 748+48.71
 PT STATION = 757+07.61

- LEGEND**
- TS TRANSMISSION SENSOR
 - GAS VENT PIPE
 - PL — PIPELINE



C. Taylor Mansfield 2021.11.01
 12:30:06-05'00"

**US 67
 PLAN & PROFILE**

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

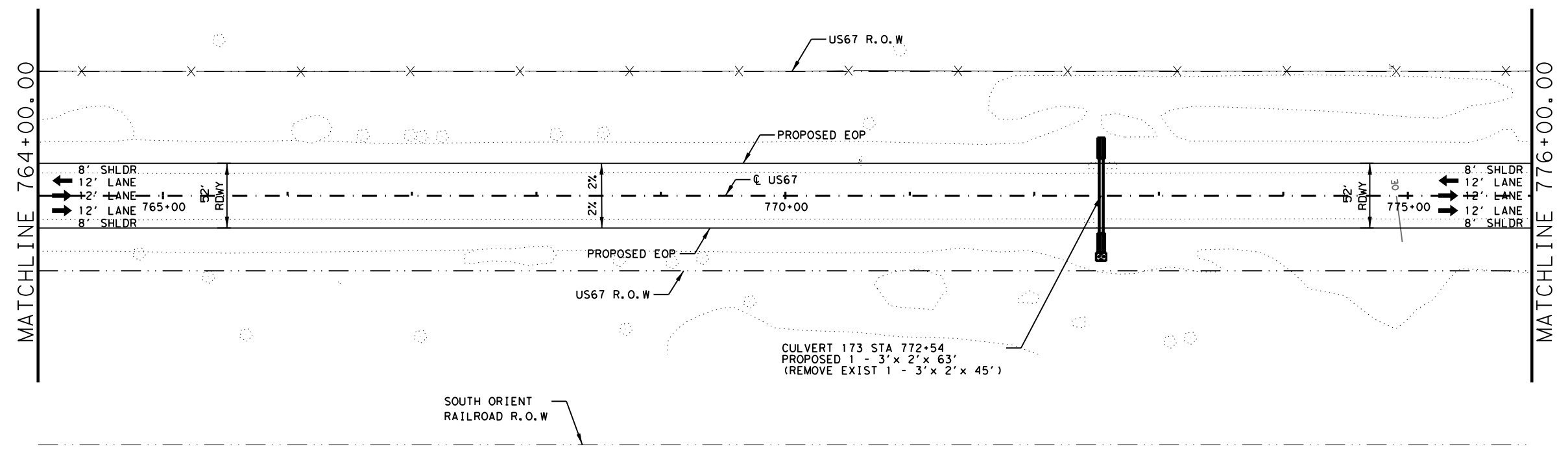
SHEET 22 OF 39



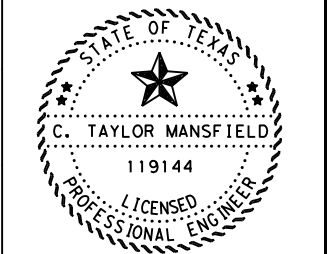
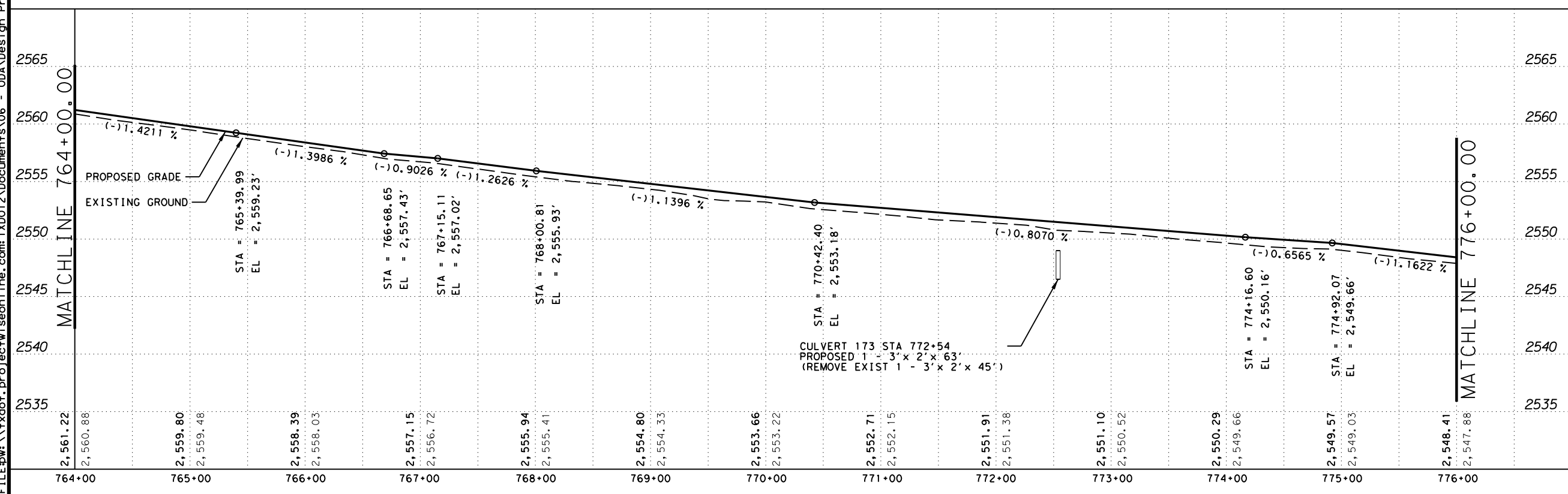
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	116	

DATE: 10/22/2021 04:32 PM
 FILE: \\fwdot.projectwiseonline.com:TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_23.dgn

DWG: C&G: DMF: C&G: C&G:



LEGEND
 — OE — OVERHEAD ELECTRIC



C. Taylor Mansfield 2021.11.01
 12:30:06-05'00'

**US 67
 PLAN & PROFILE**

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

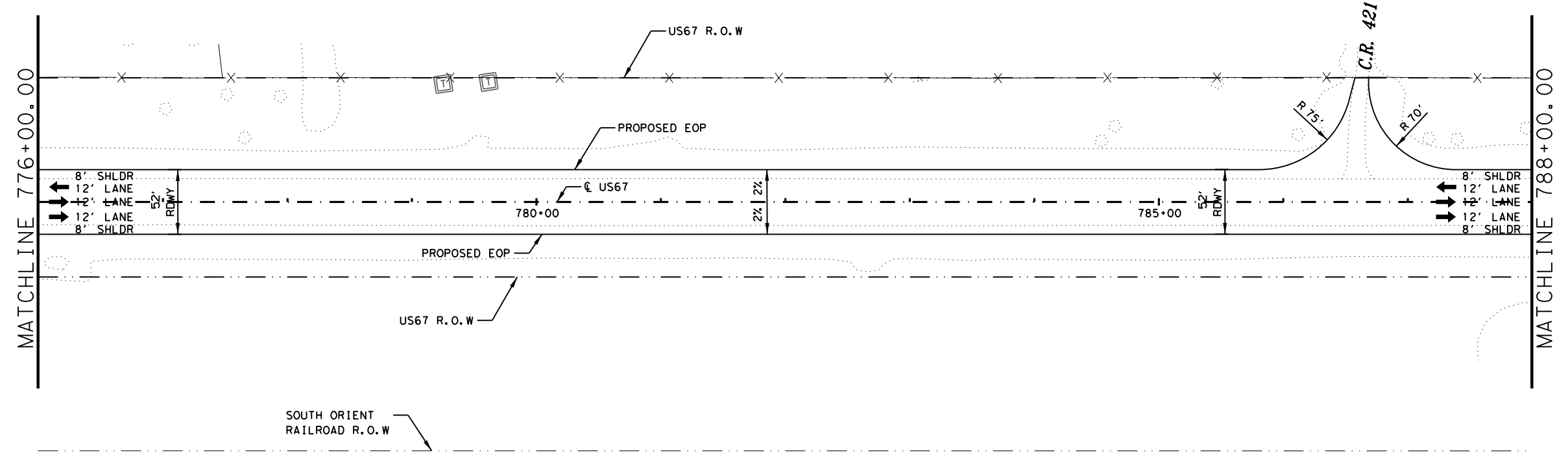
SHEET 23 OF 39



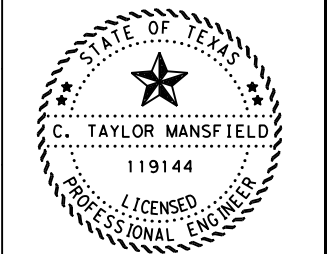
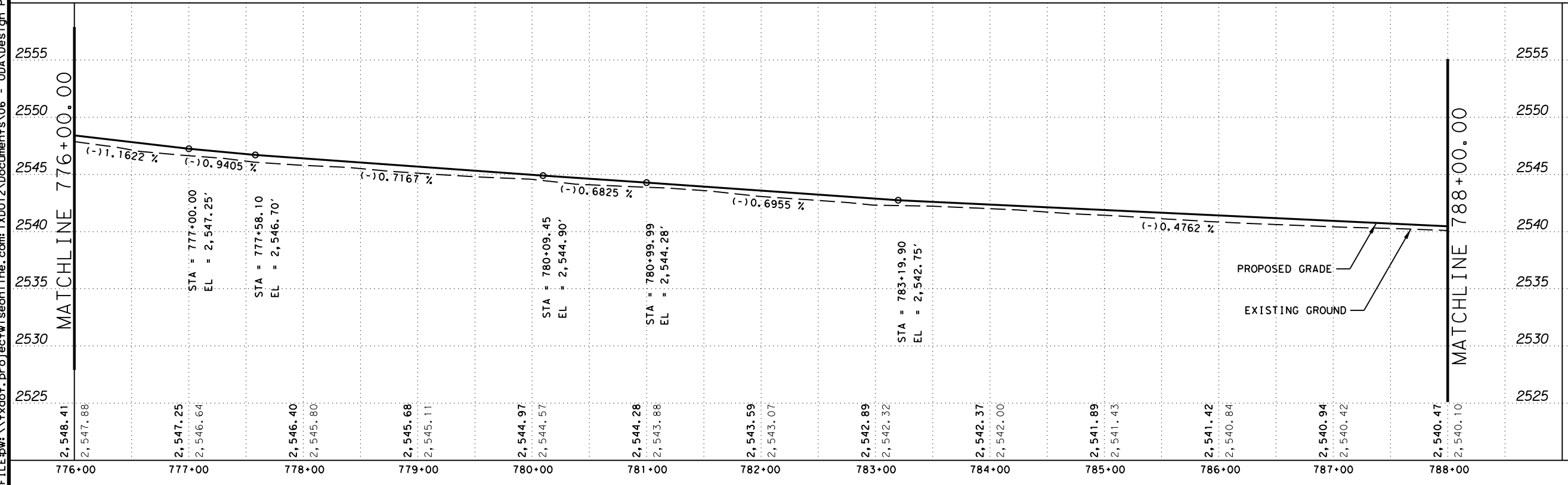
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	117	

DATE: 10/22/2021 04:32 PM
 FILE: \\fsdot\project\wiseonline.com\TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_24.dgn

DWG: C&S: DWG: C&S: C&S: C&S:



LEGEND
 □ TELEPHONE PEDESTAL



C. Taylor Mansfield 2021.11.01
 12:30:06-05'00'

**US 67
 PLAN & PROFILE**

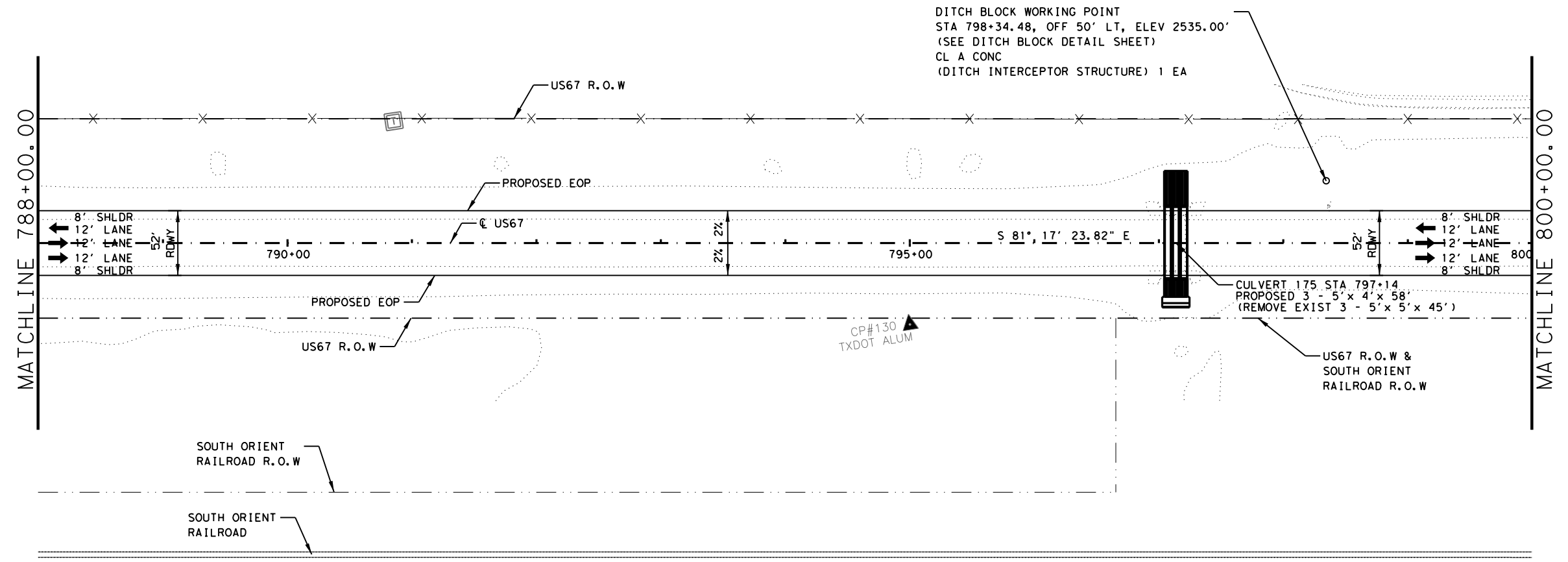
HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

SHEET 24 OF 39



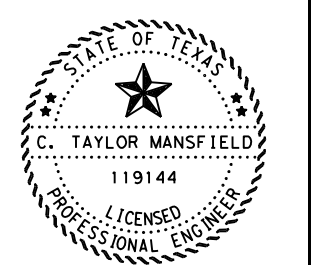
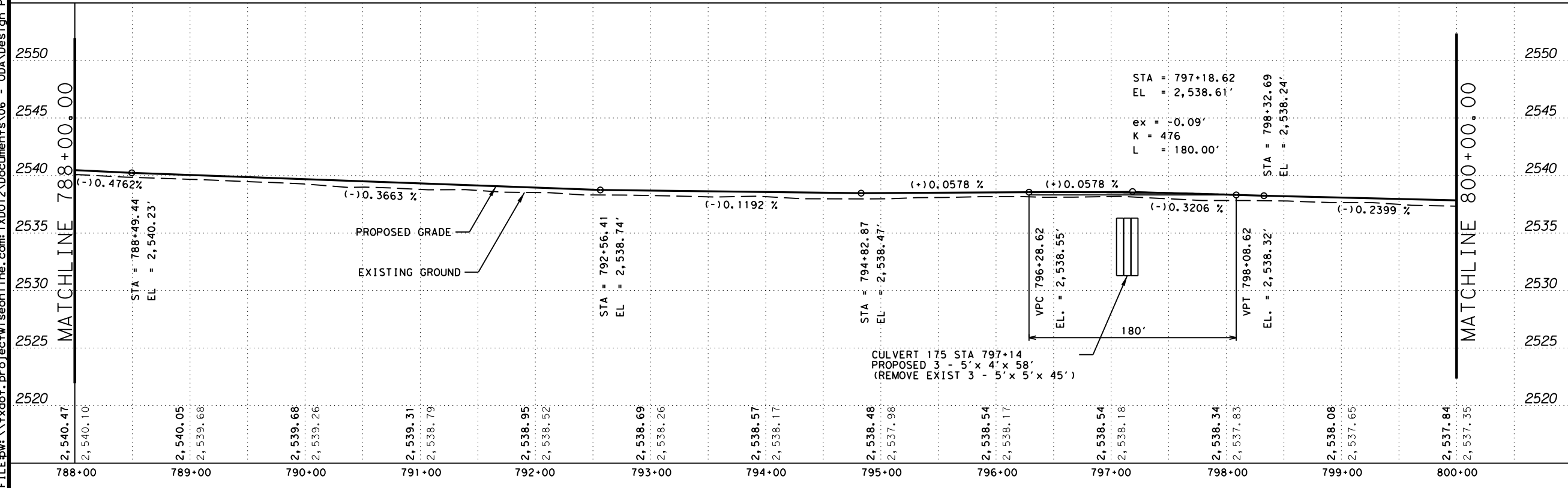
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	118	

DATE: 10/22/2021 04:32 PM
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LEGEND

☐ TELEPHONE PEDESTAL



C. Taylor Mansfield 2021.11.01
 12:30:06-05'00'

US 67
 PLAN & PROFILE

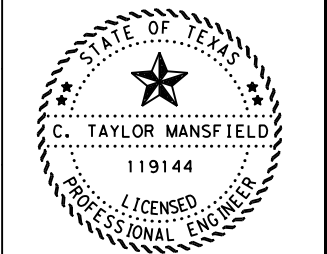
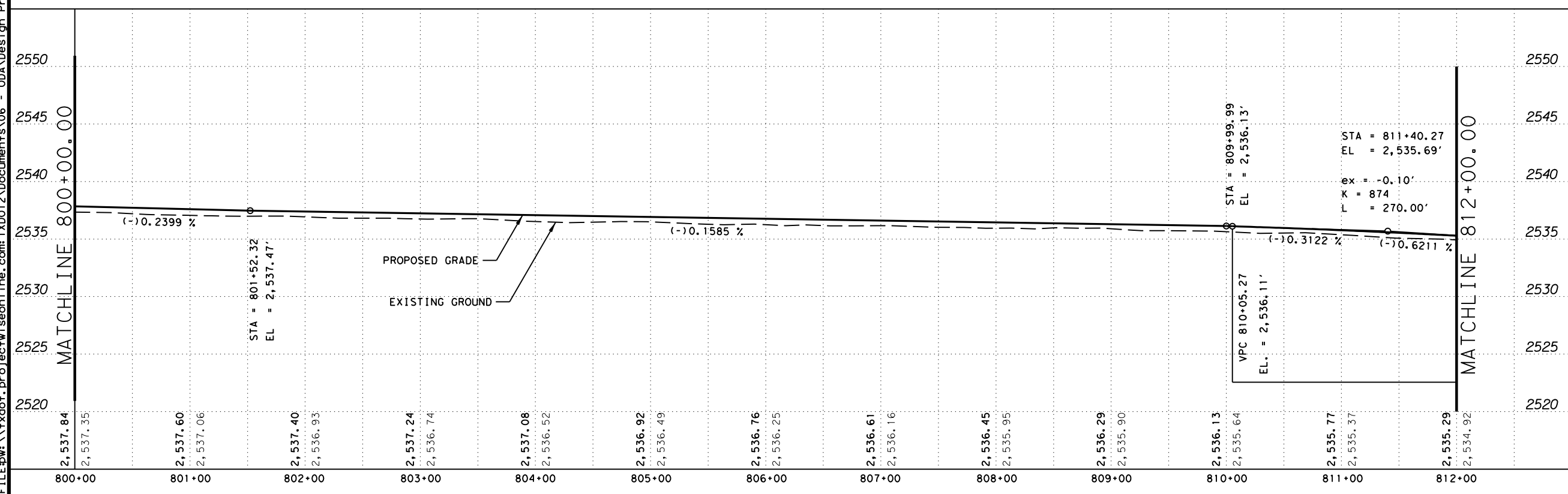
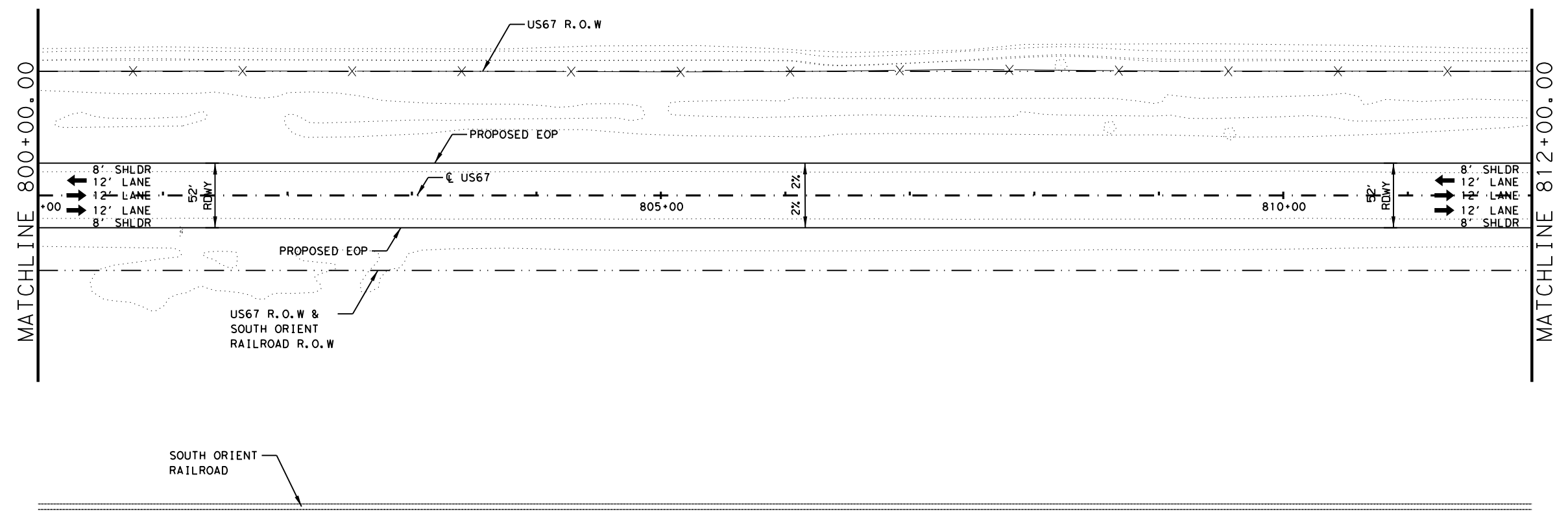
HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

SHEET 25 OF 39



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		119

DATE: 10/22/2021 04:32 PM
 FILE: \\fsdot\project\wiseon\ine.com\TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_26.dgn



C. Taylor Mansfield 2021.11.01
 12:30:07-05'00'

US 67 PLAN & PROFILE

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

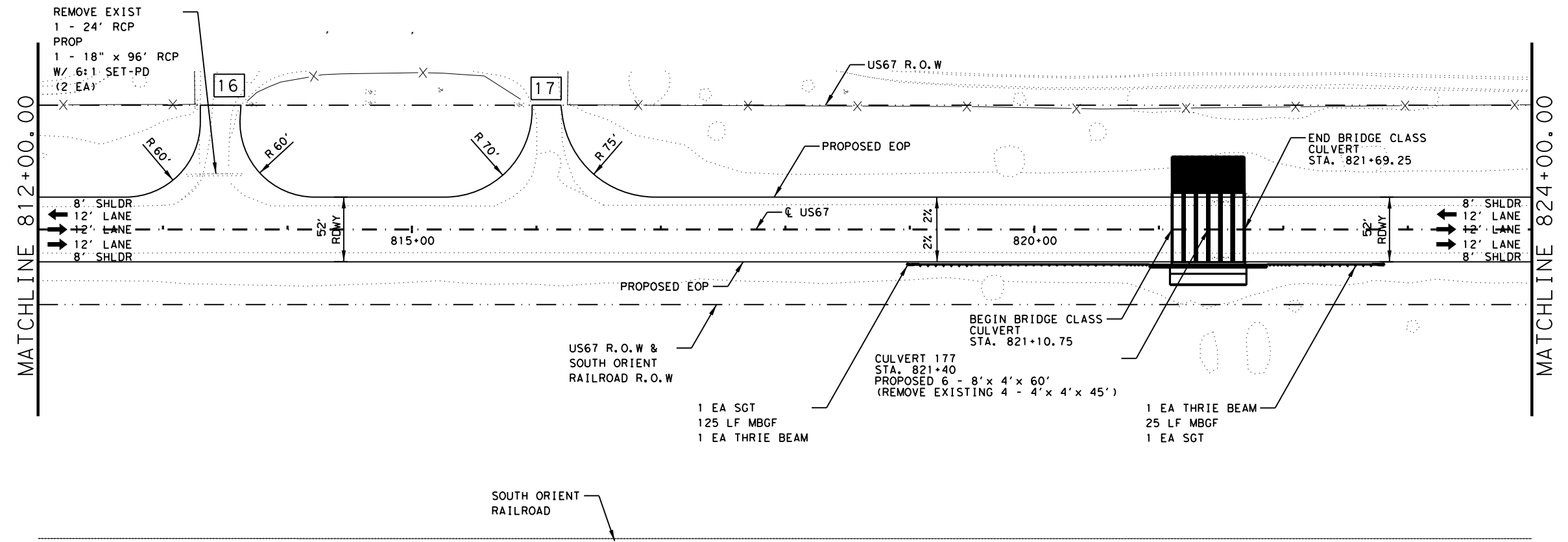
SHEET 26 OF 39



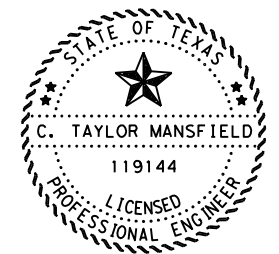
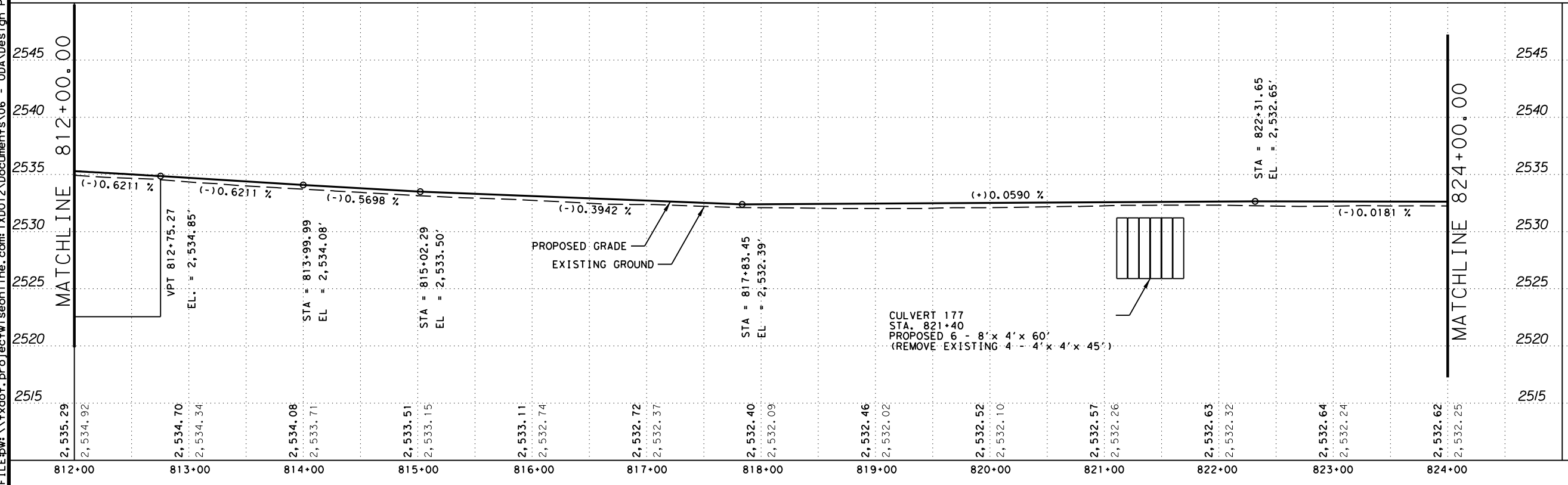
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	120	



DATE: 10/22/2021 04:32 PM
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LEGEND
 # DRIVEWAY NUMBER



C. Taylor Mansfield 2021.11.01
 12:30:07-05'00'

**US 67
 PLAN & PROFILE**

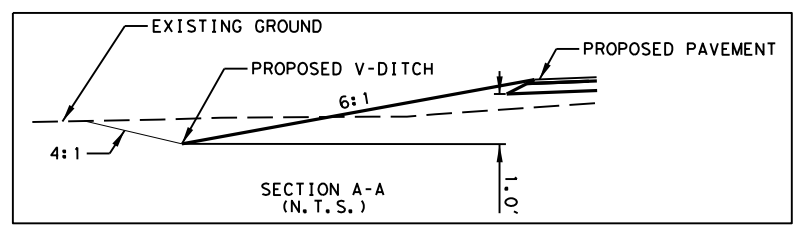
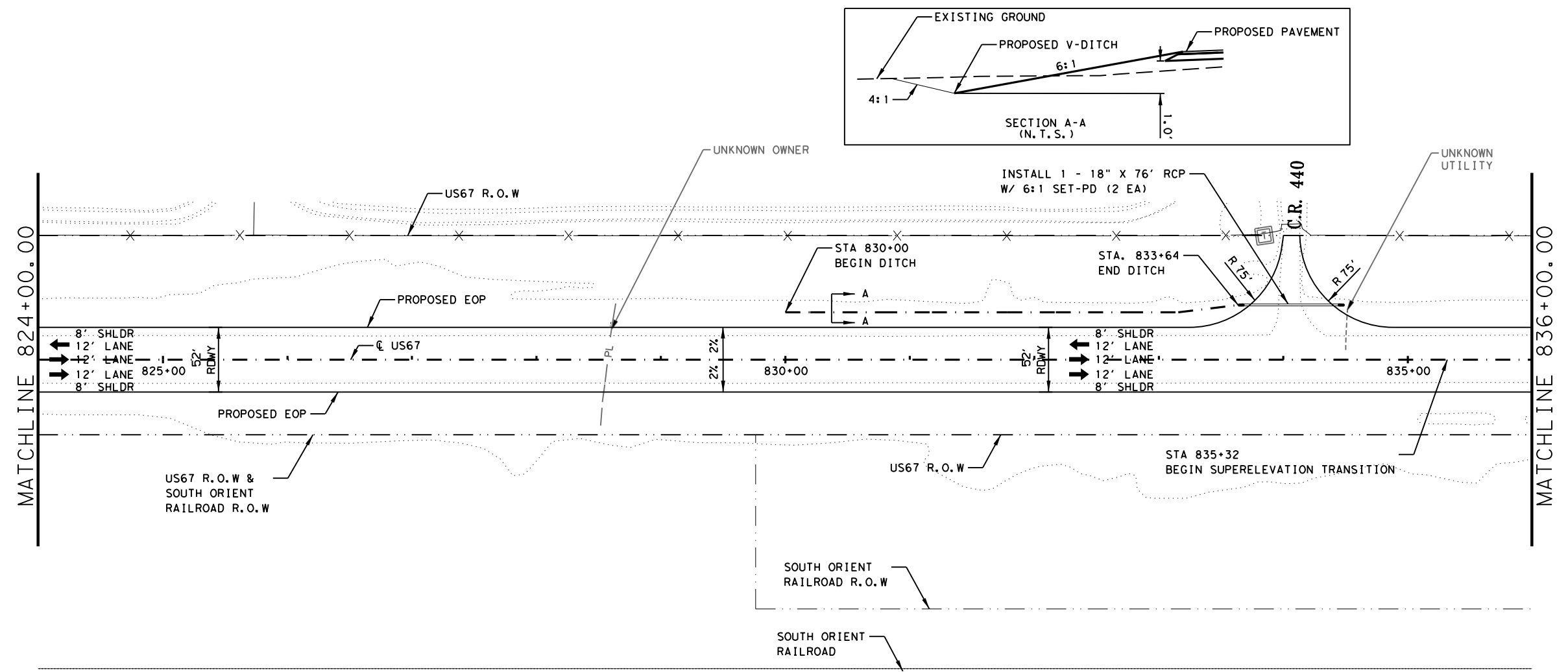
HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

SHEET 27 OF 39

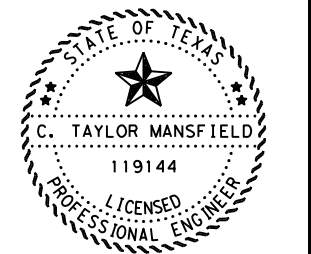
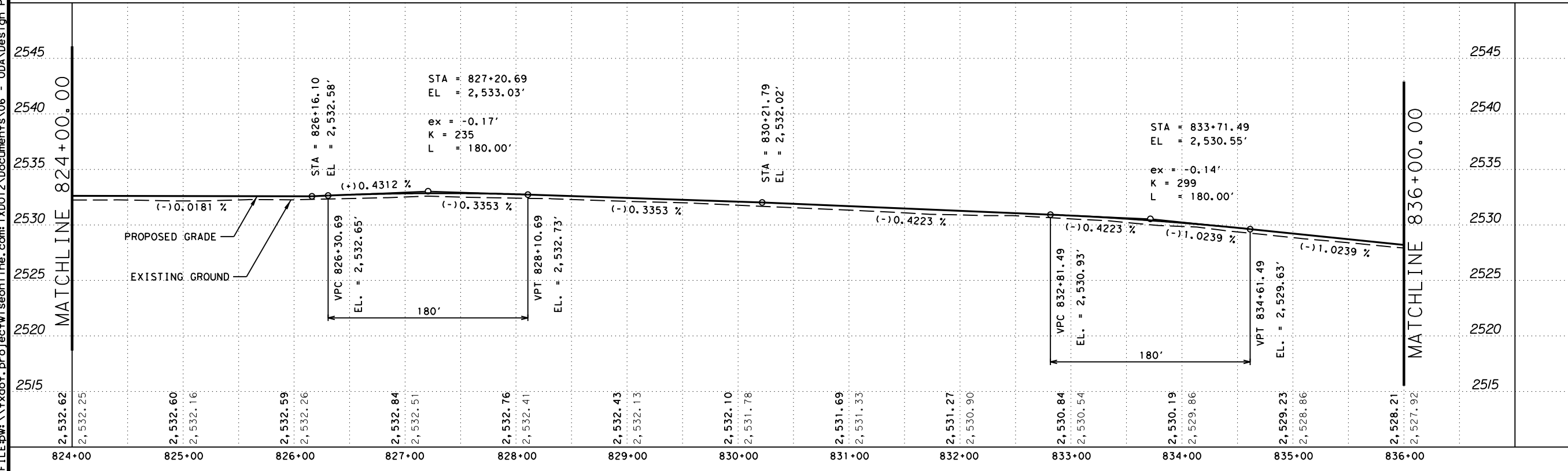


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		121

DATE: 10/22/2021 04:32 PM
 FILE: \\fwdot.projects\wiseonline.com\TXDOT\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_28.dgn



- LEGEND**
- T TELEPHONE PEDESTAL
 - # DRIVEWAY NUMBER
 - PL — PIPELINE
 - - - - - UNKNOWN UTILITY



C. Taylor Mansfield 2021.11.01
 12:30:07-05'00"

**US 67
 PLAN & PROFILE**

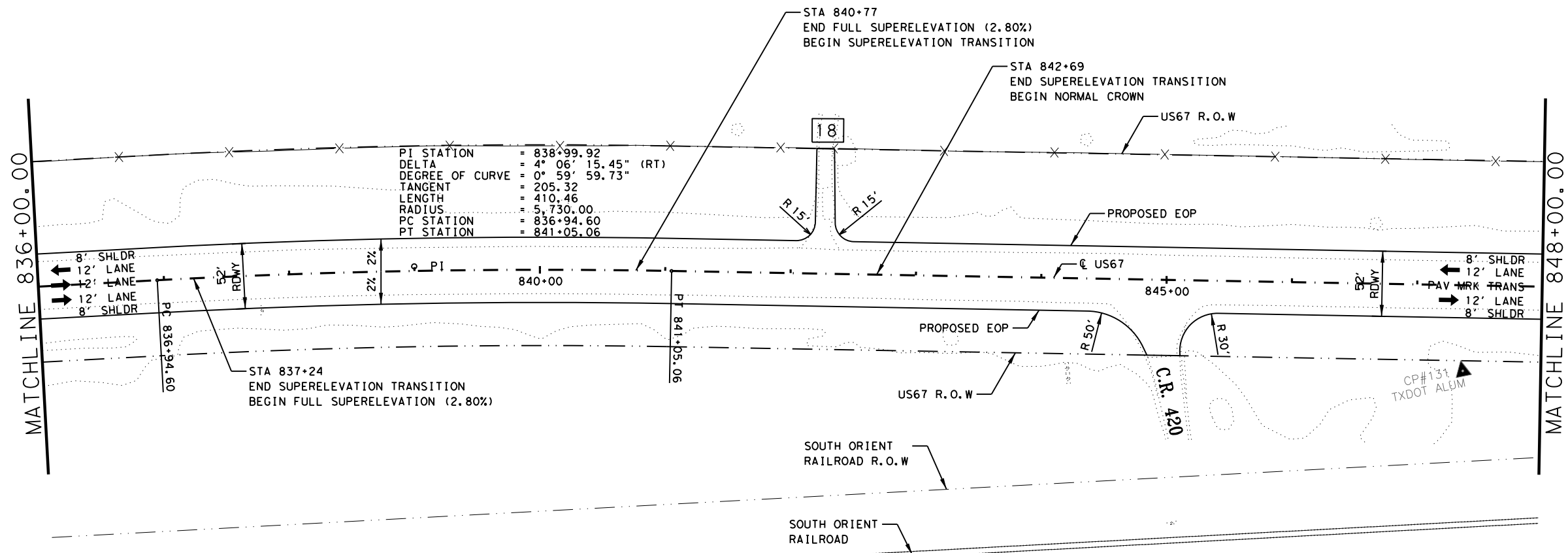
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 VERT SCALE 1"=10'

SHEET 28 OF 39

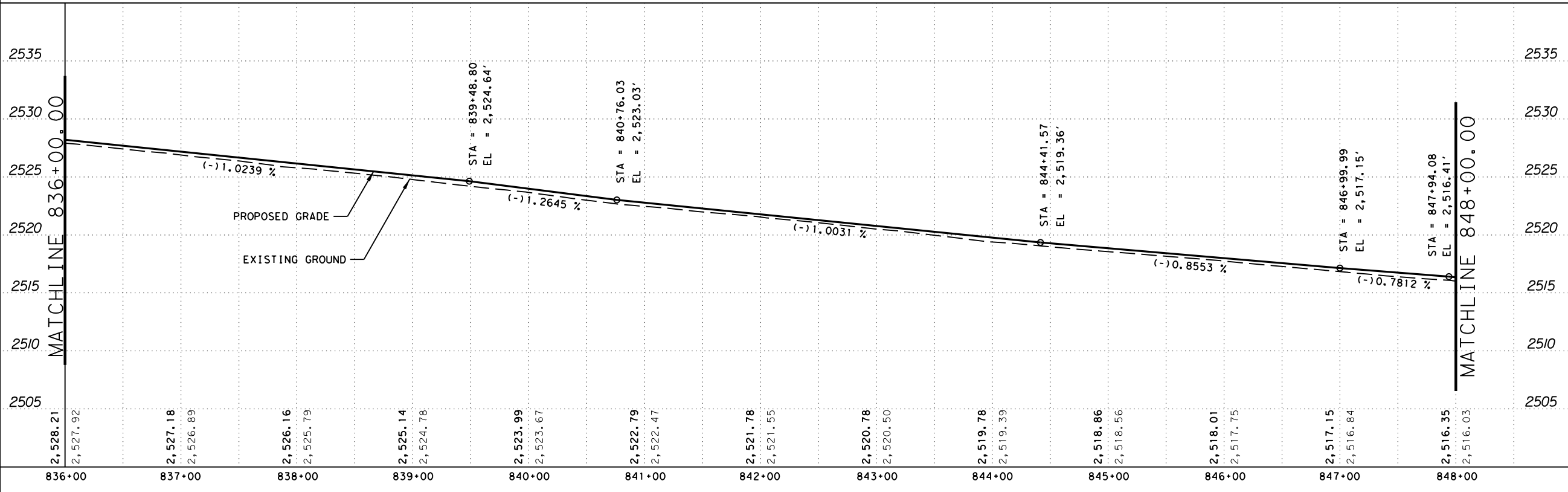


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		122

DATE: 10/22/2021 04:32 PM
 FILE: \\p:\dot\project\wiseon\ine.com\TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_29.dgn



LEGEND
 # DRIVEWAY NUMBER



C. Taylor Mansfield
 2021.11.01
 12:30:07-05'00"

**US 67
 PLAN & PROFILE**

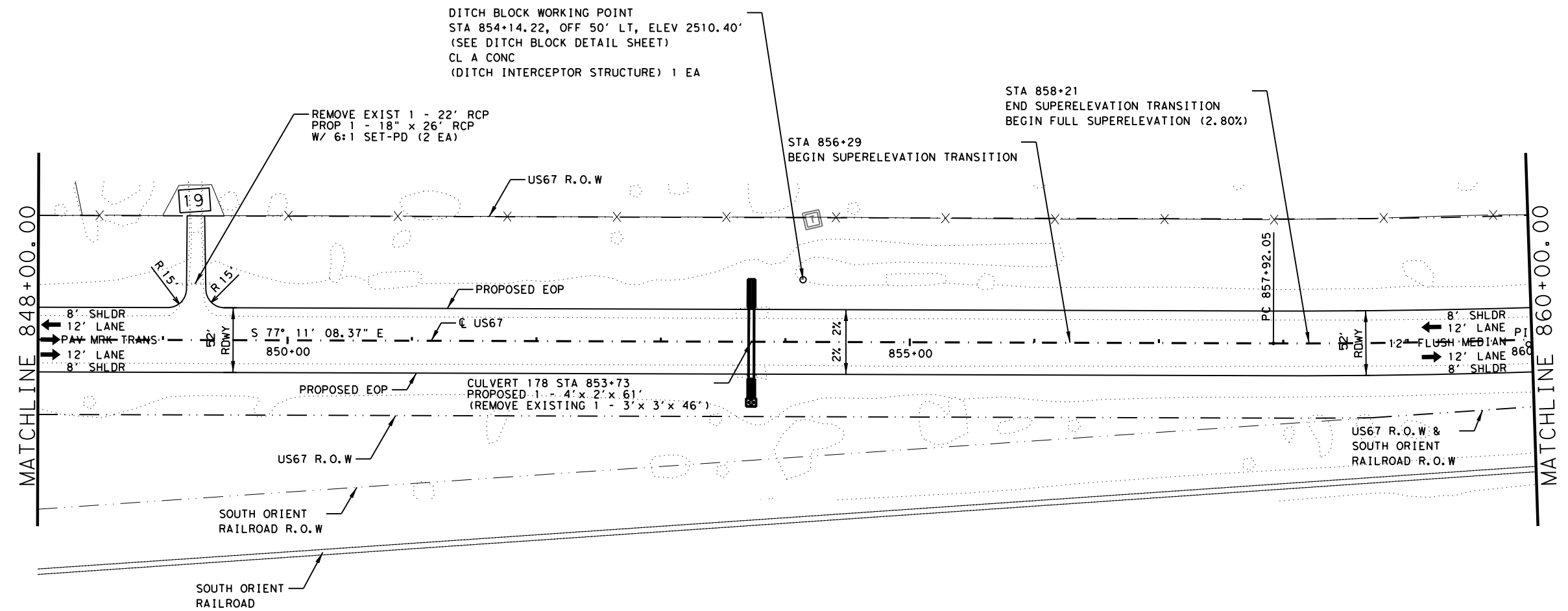
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 VERT SCALE 1"=10'

SHEET 29 OF 39

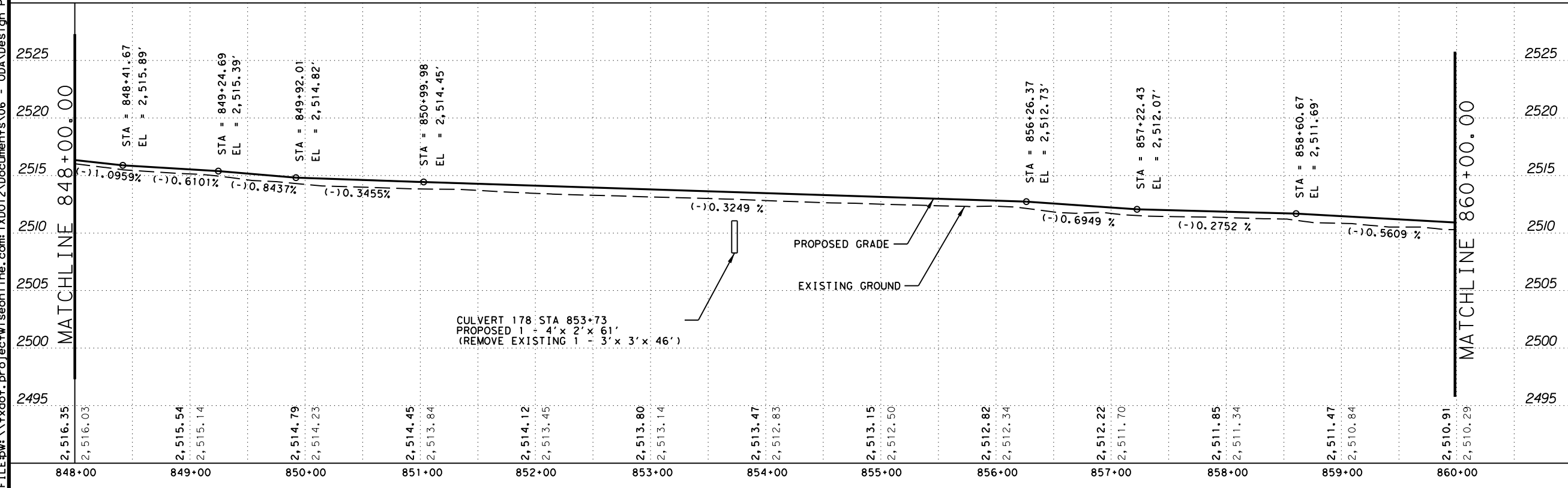
© 2021

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		123

DATE: 10/22/2021 04:32 PM
 FILE: \\p:\dot\project\wiseon\ine.com\TXDOT\2\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_30.dgn



- LEGEND**
- T TELEPHONE PEDESTAL
 - # DRIVEWAY NUMBER



C. TAYLOR MANSFIELD
 119144
 LICENSED PROFESSIONAL ENGINEER

C. Taylor Mansfield 2021.11.01
 12:30:07-05'00'

US 67
PLAN & PROFILE

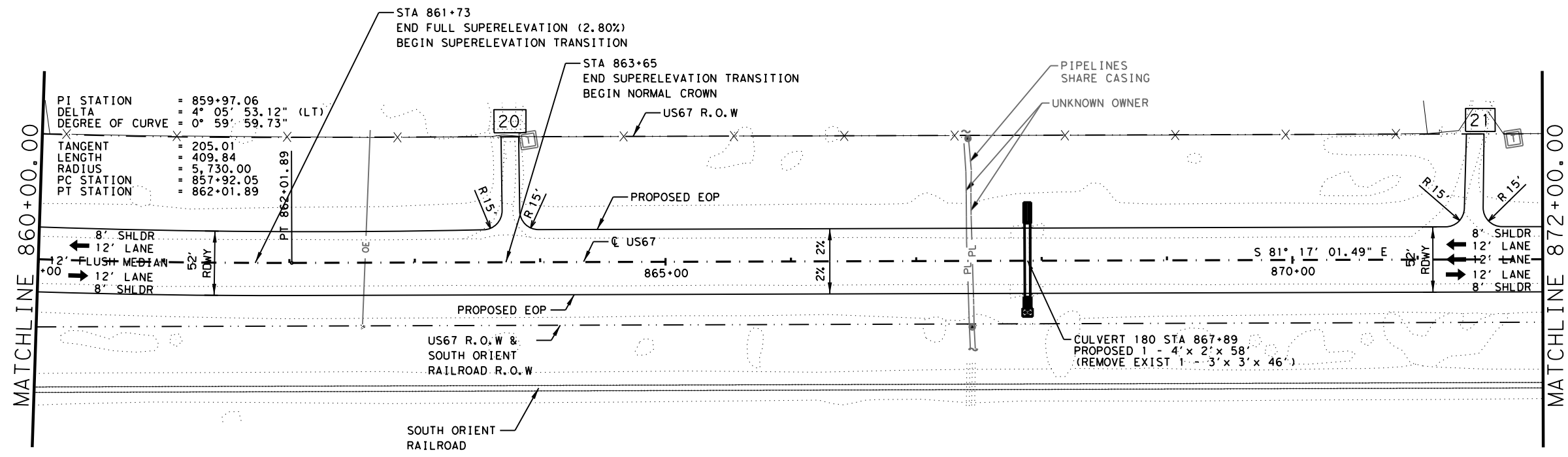
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 VERT SCALE 1"=10'

SHEET 300F 39

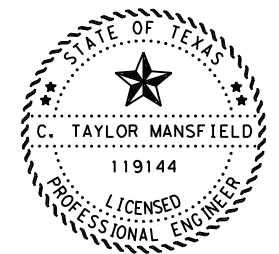
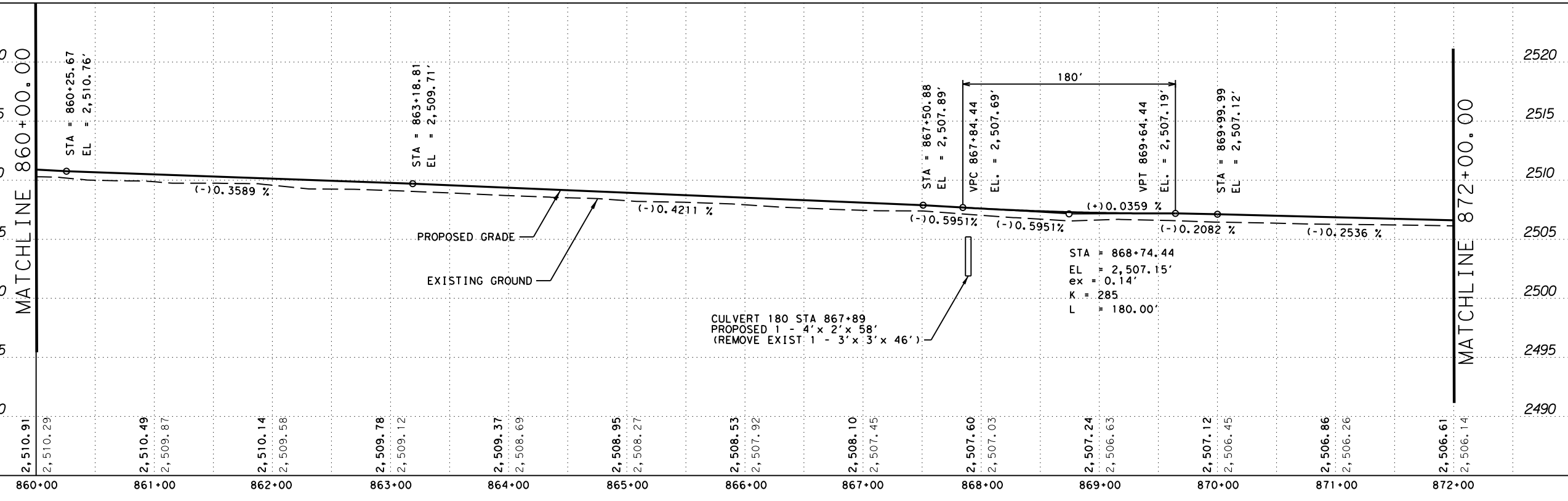
Texas Department of Transportation
 © 2021

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		124

DATE: 10/22/2021 04:32 PM
 FILE: \\fsdot\project\wiseon\ine.com\TXDOT\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_31.dgn



- LEGEND**
- T TELEPHONE PEDESTAL
 - # DRIVEWAY NUMBER
 - GAS VENT PIPE
 - PL — PIPELINE
 - OE — OVERHEAD ELECTRIC



C. Taylor Mansfield 2021.11.01
 12:30:07-05'00"

US 67
PLAN & PROFILE

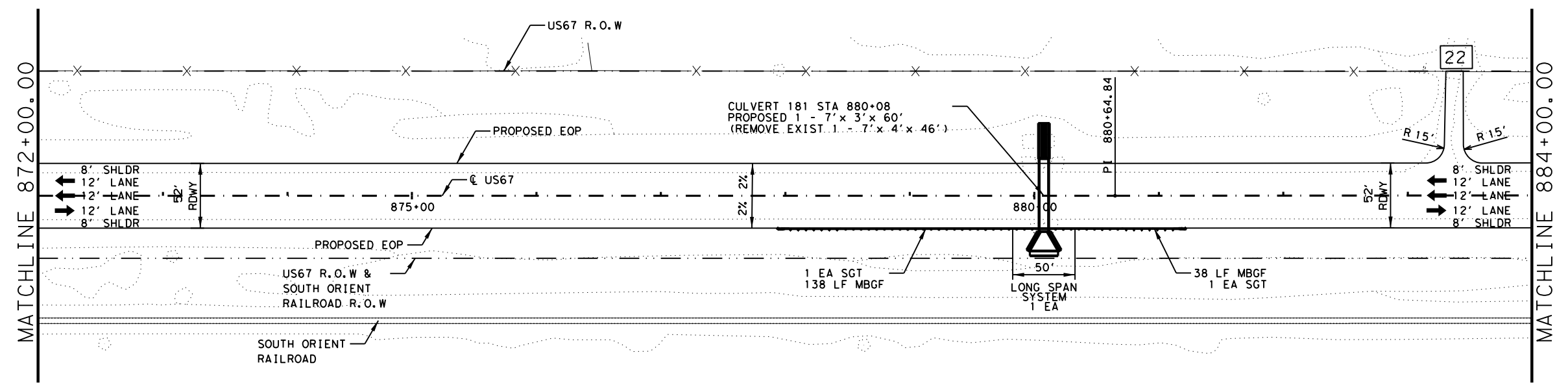
HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

SHEET 31 OF 39



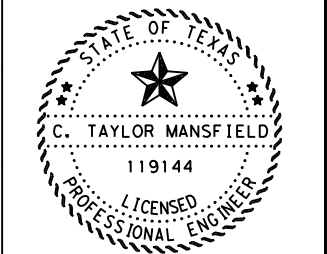
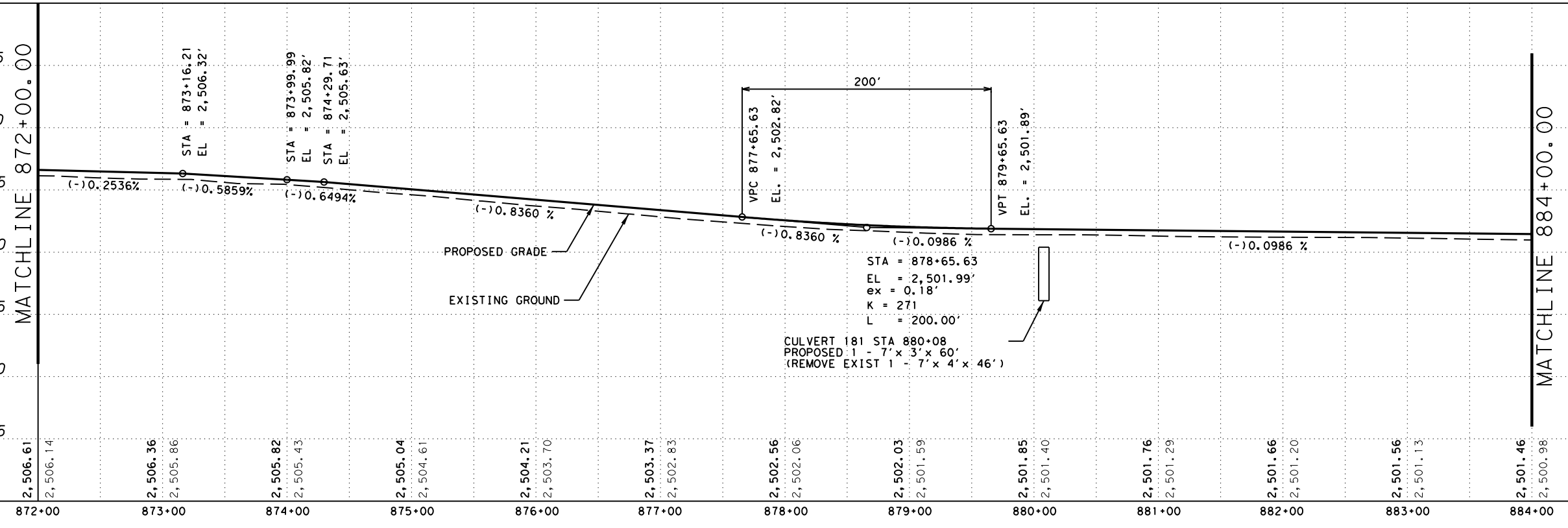
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		125

DATE: 10/22/2021 04:32 PM
 FILE: \\fsdot\project\wiseon\ine.com\TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_32.dgn



LEGEND

DRIVEWAY NUMBER



C. Taylor Mansfield 2021.11.01
12:30:07-05'00'

**US 67
PLAN & PROFILE**

HORIZ SCALE 1"=100'
VERT SCALE 1"=10'

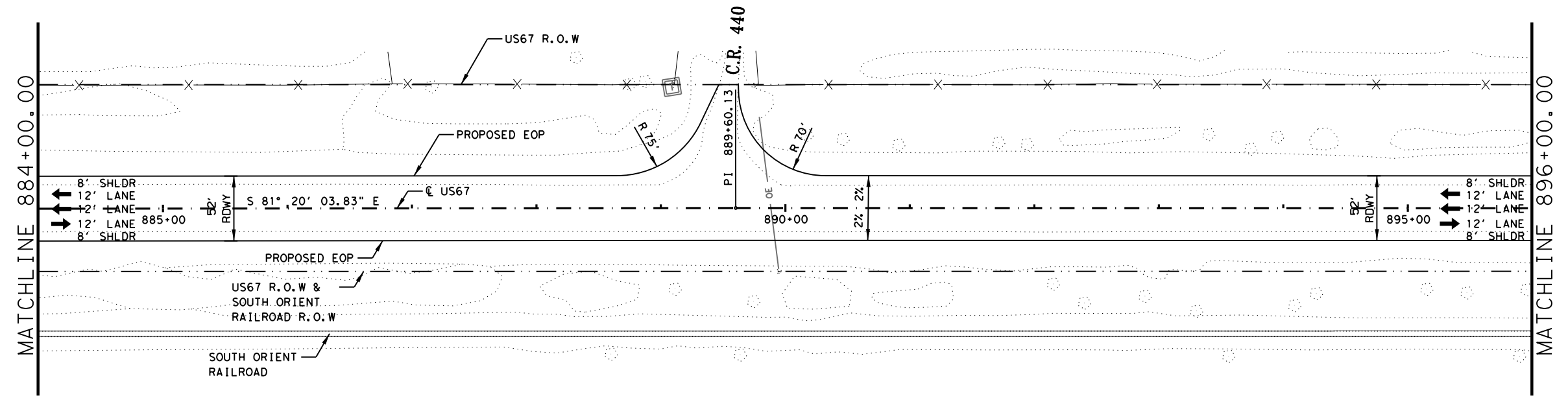
SHEET 32 OF 39



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		126

DATE: 10/22/2021 04:32 PM
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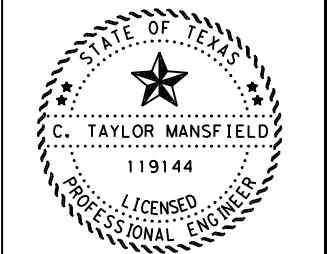
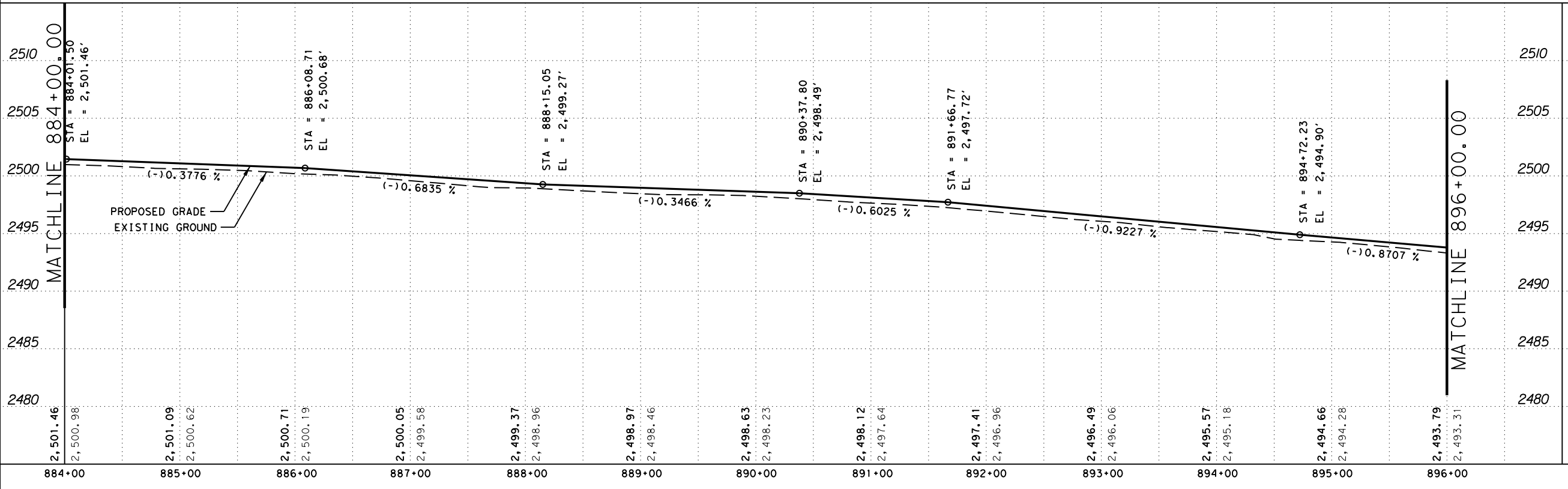
DWG: C&S: DWG: C&S: DWG: C&S:



LEGEND

TELEPHONE PEDESTAL

OE OVERHEAD ELECTRIC



C. Taylor Mansfield 2021.11.01
 12:30:07-05'00'

**US 67
 PLAN & PROFILE**

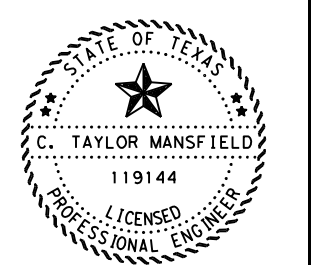
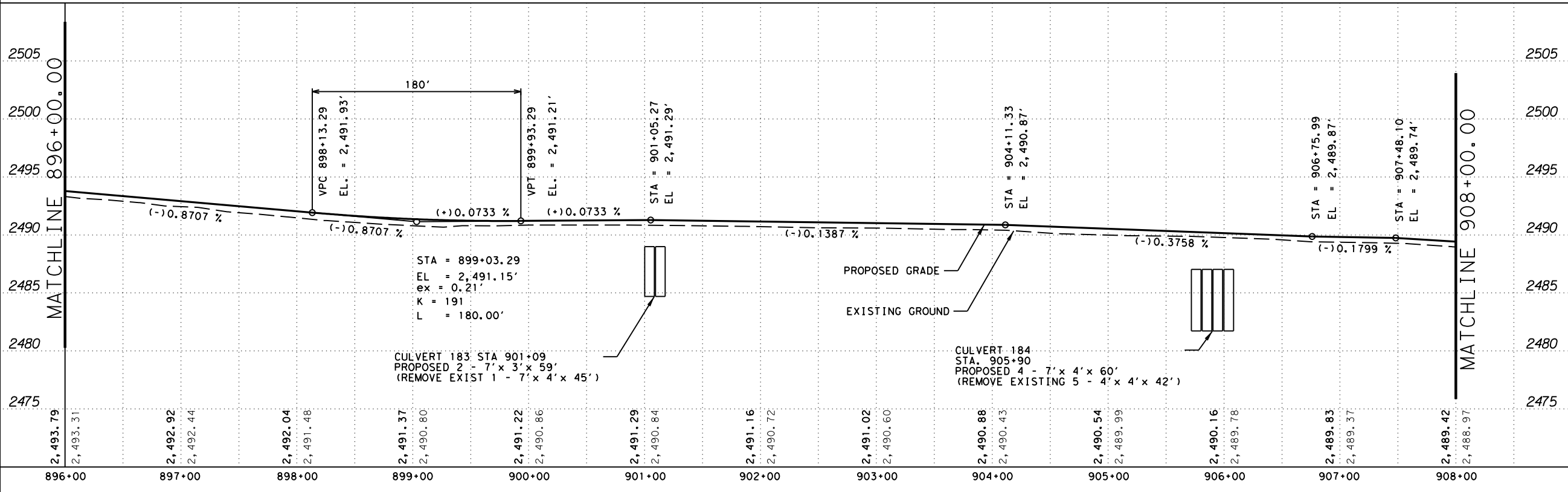
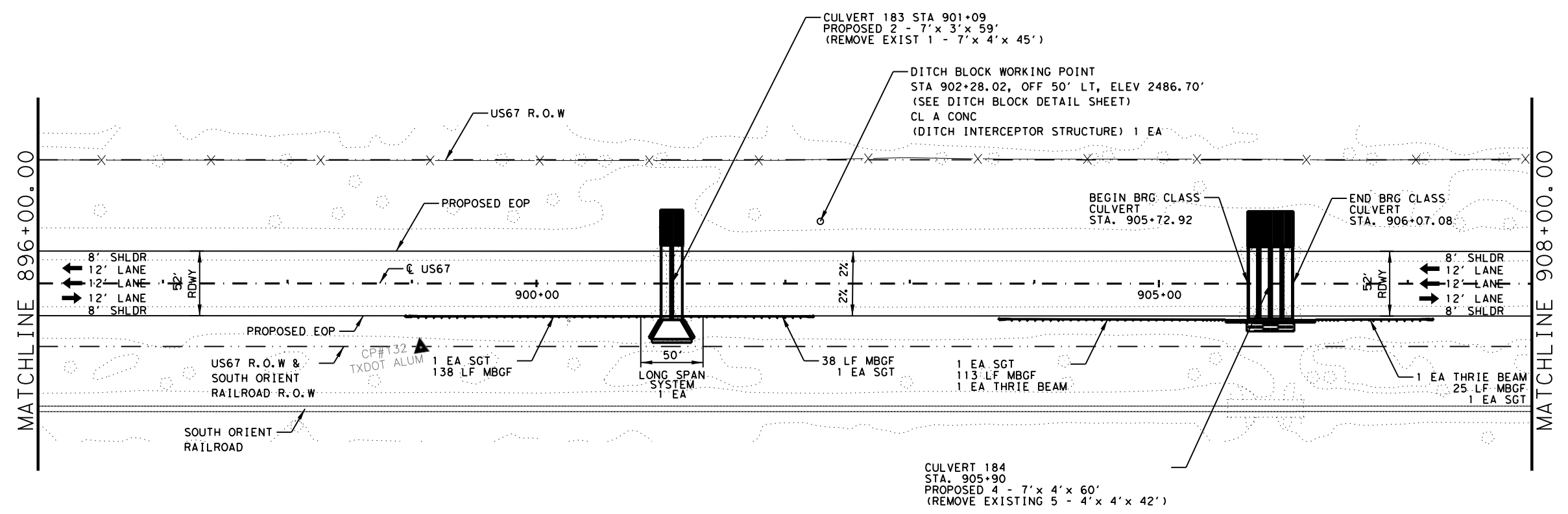
HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

SHEET 33 OF 39



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		127

DATE: 10/22/2021 04:32 PM
 FILE: \\txdot\project\wiseon\ine.com\TXDOT\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3 - Roadway\us67w_P&P_34.dgn



C. Taylor Mansfield 2021.11.01
 12:30:07-05'00'

US 67
PLAN & PROFILE

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

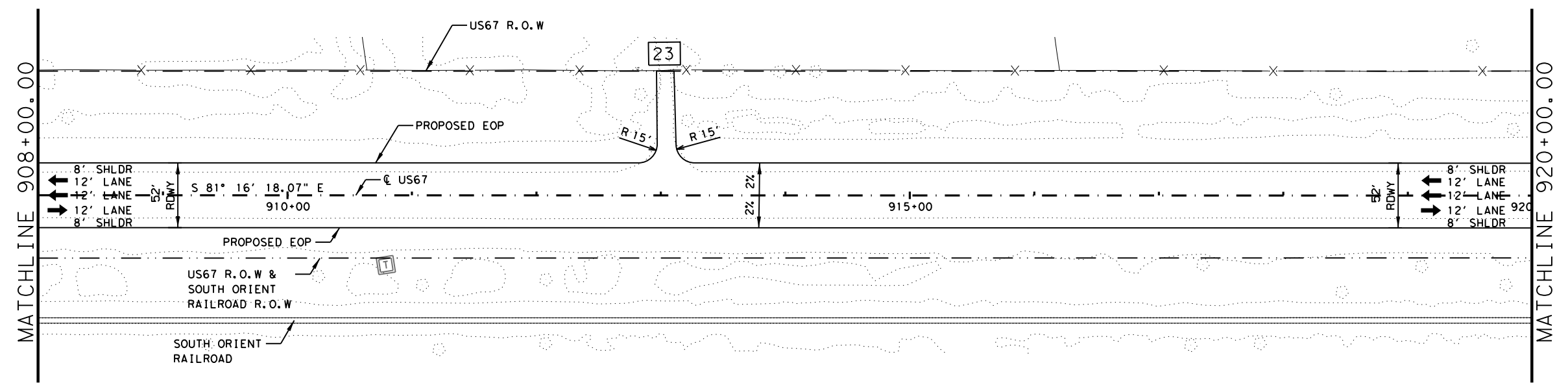
SHEET 34 OF 39



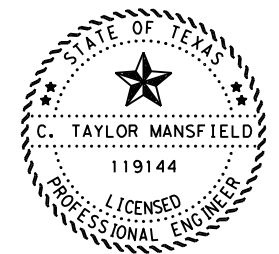
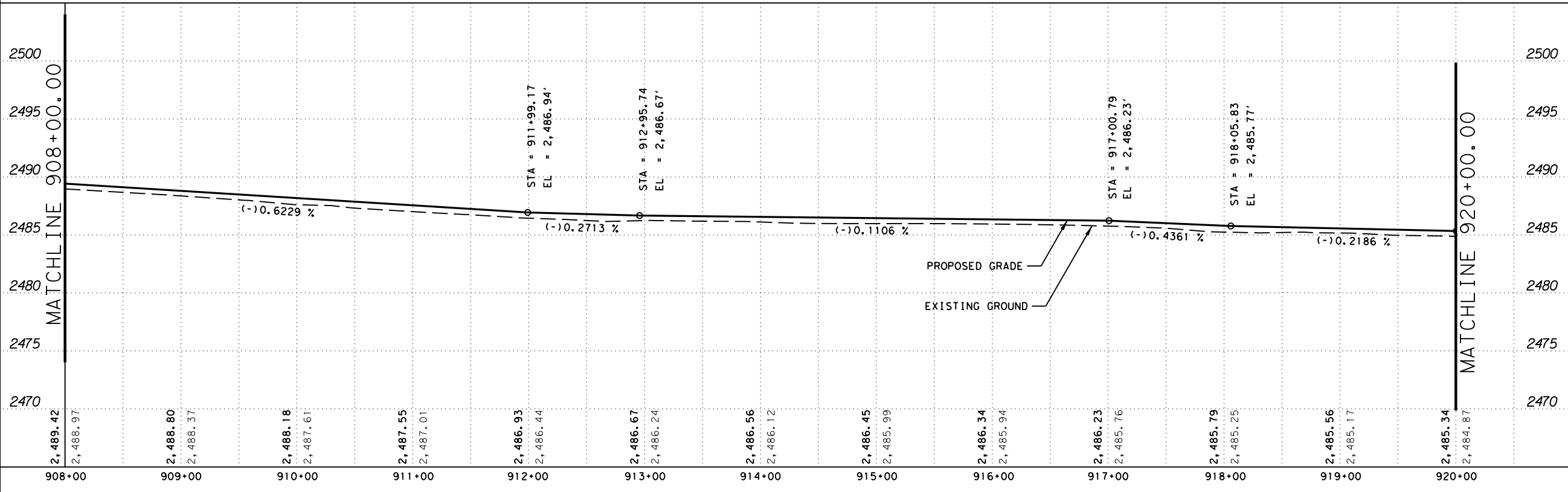
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		128

DATE: 10/22/2021 04:32 PM
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Cks: DW: Cks: DW: Cks: DW:



- LEGEND**
- TELEPHONE PEDESTAL
 - DRIVEWAY NUMBER



C. Taylor Mansfield 2021.11.01
 12:30:07-05'00'

**US 67
 PLAN & PROFILE**

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

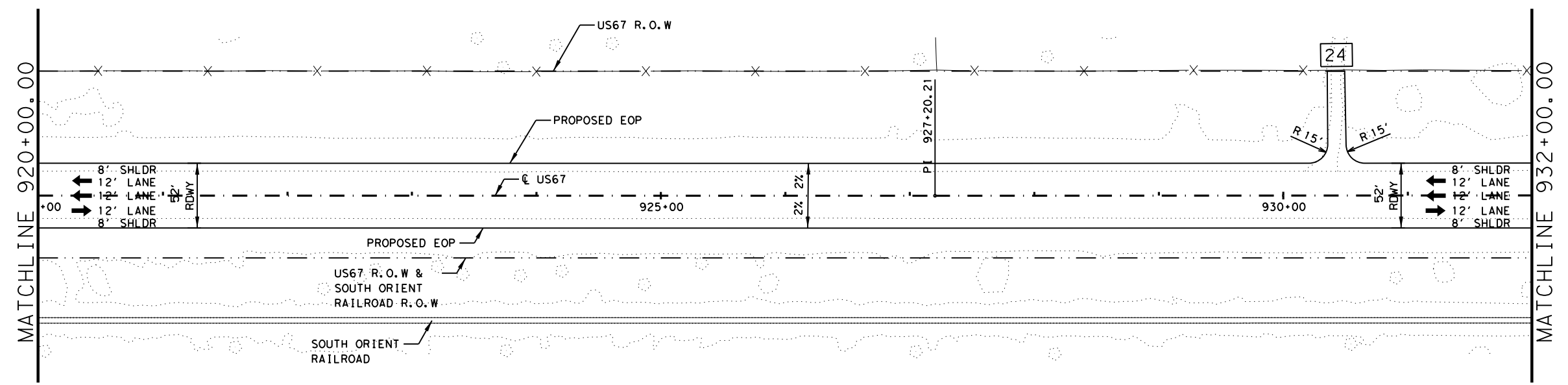
SHEET 35 OF 39



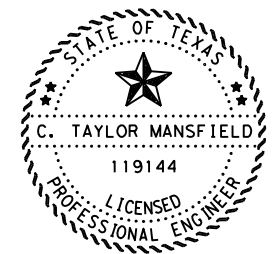
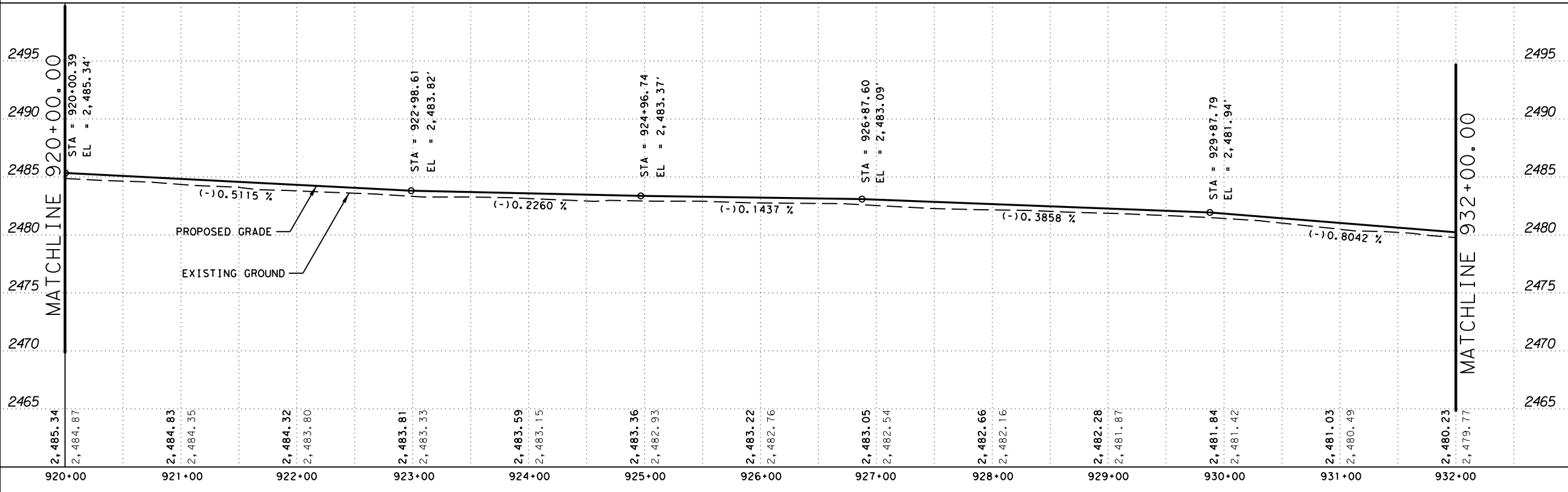
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	129	

DATE: 10/22/2021 04:32 PM
 FILE: \\fsdot\project\wiseon\ine.com\TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_36.dgn

DWG: C&S: DWG: C&S: C&S: DWG: C&S:



LEGEND
 # DRIVEWAY NUMBER



C. Taylor Mansfield 2021.11.01
 12:30:07-05'00'

US 67
 PLAN & PROFILE

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

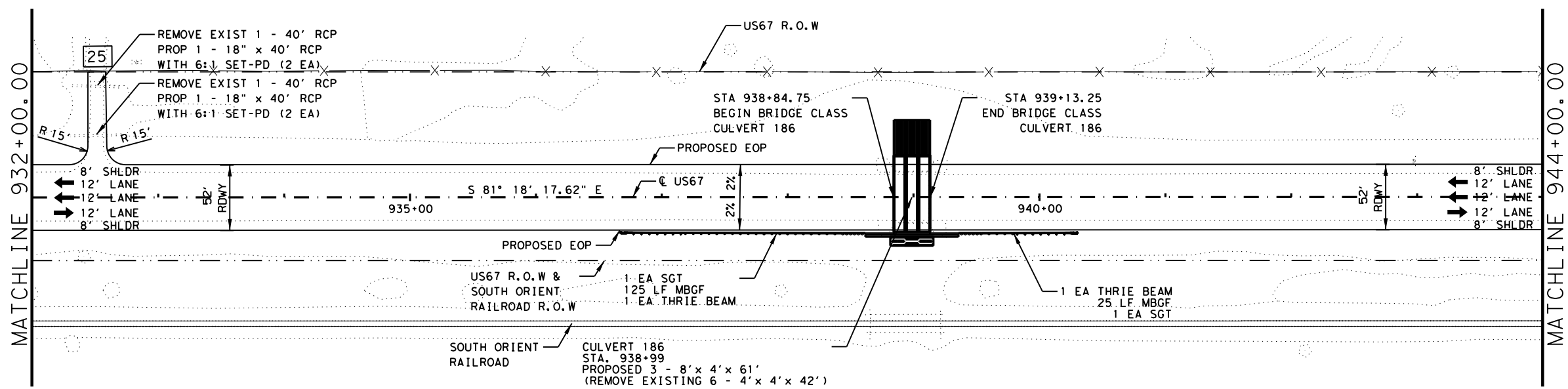
SHEET 36 OF 39



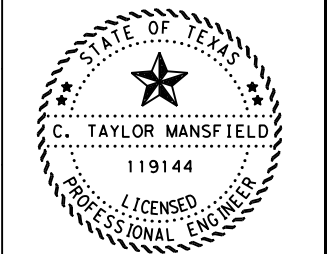
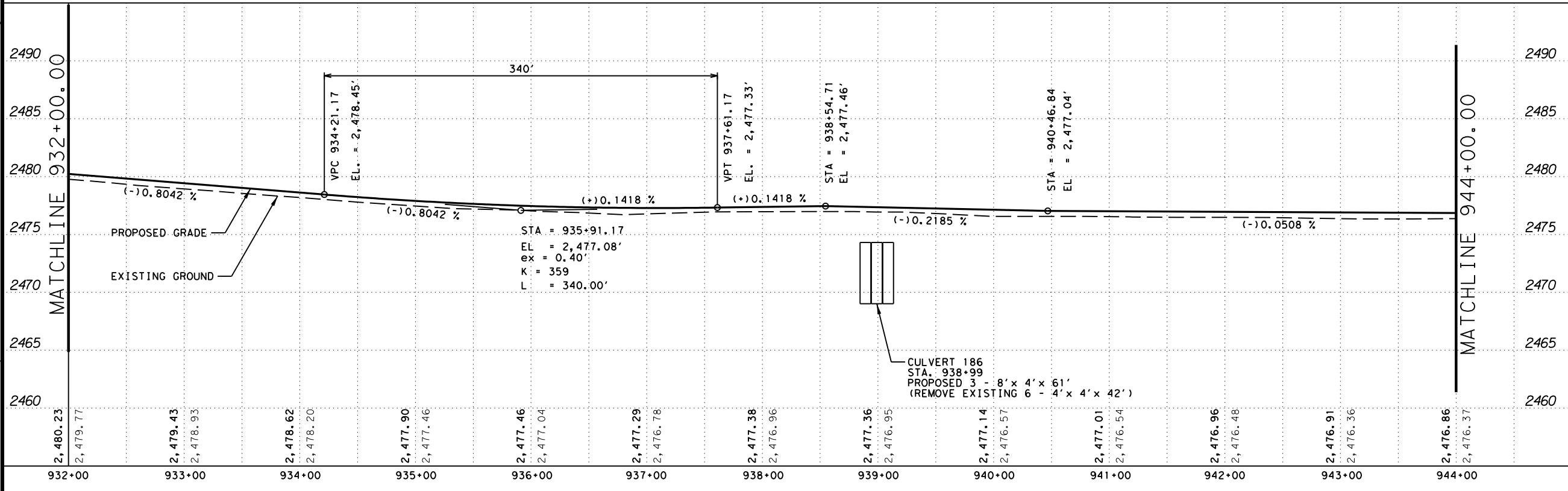
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	130	

DATE: 10/22/2021 04:32 PM
 FILE: \\fwdot.projects\wiseonline.com\TXDOT\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_37.dgn

DATE: 10/22/2021 04:32 PM
 FILE: \\fwdot.projects\wiseonline.com\TXDOT\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_37.dgn



LEGEND
 # DRIVEWAY NUMBER



C. Taylor Mansfield 2021.11.01
 12:30:08-05'00'

**US 67
 PLAN & PROFILE**

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

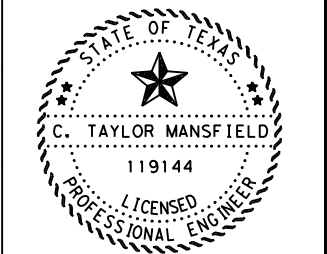
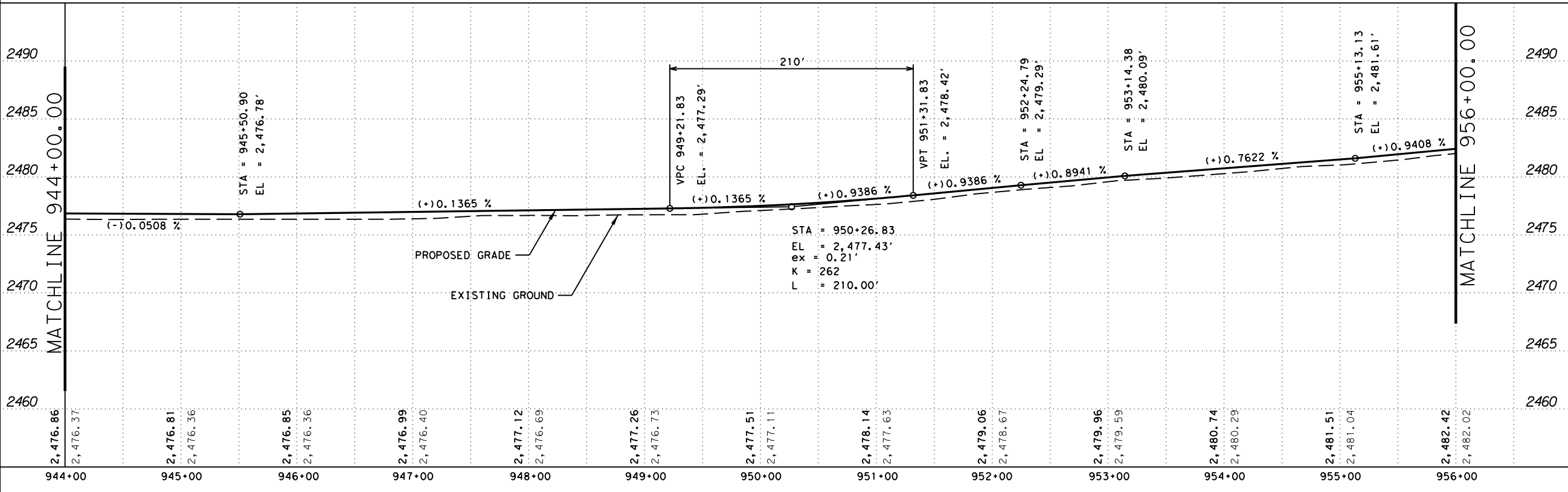
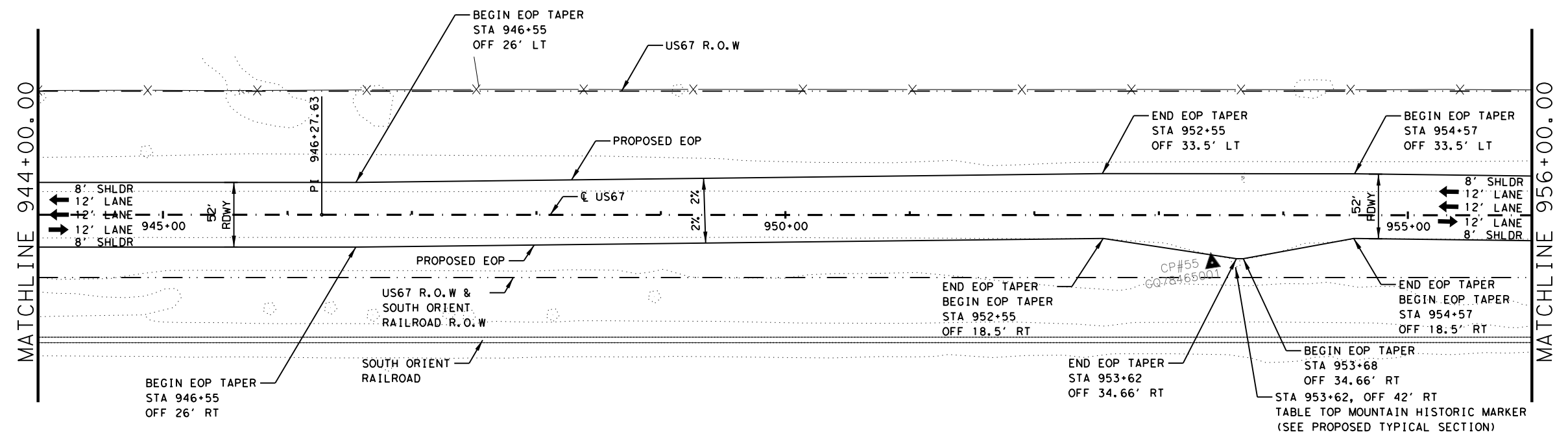
SHEET 37 OF 39



CONTRACT	SECTION	JOB	HIGHWAY
0076	06	037	US 67
DISTRICT	COUNTY	SHEET NO.	
ODA	UPTON	131	

DATE: 10/22/2021 04:32 PM
 FILE: \\fwdot.projectwiseonline.com\TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\us67w_P&P_38.dgn

Cks: DWG: Cks: DWG: Cks: DWG:



C. Taylor Mansfield 2021.11.01
 12:30:08-05'00'

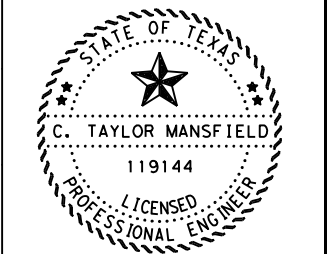
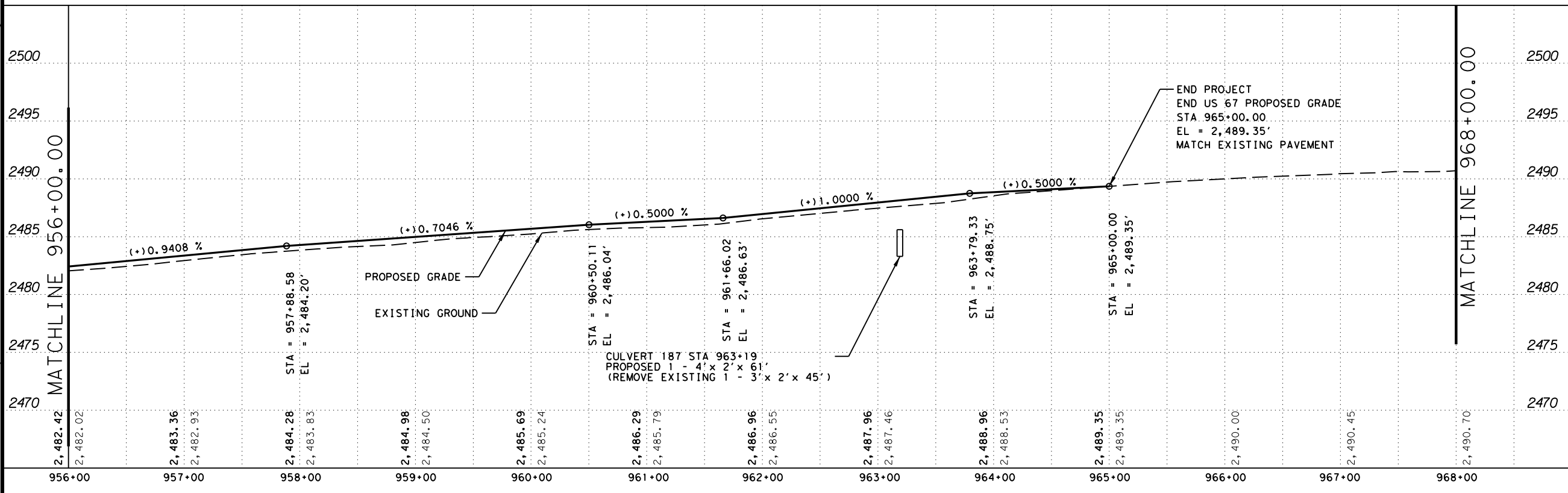
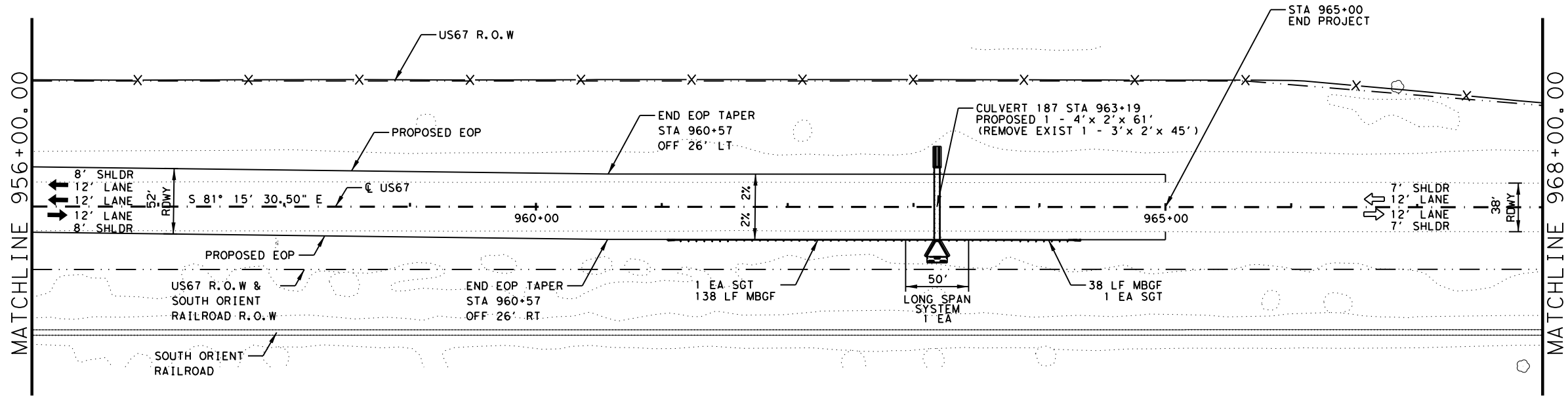
**US 67
 PLAN & PROFILE**

HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

SHEET 38 OF 39



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		132



C. Taylor Mansfield 2021.11.01
 12:30:08-05'00'

**US 67
 PLAN & PROFILE**

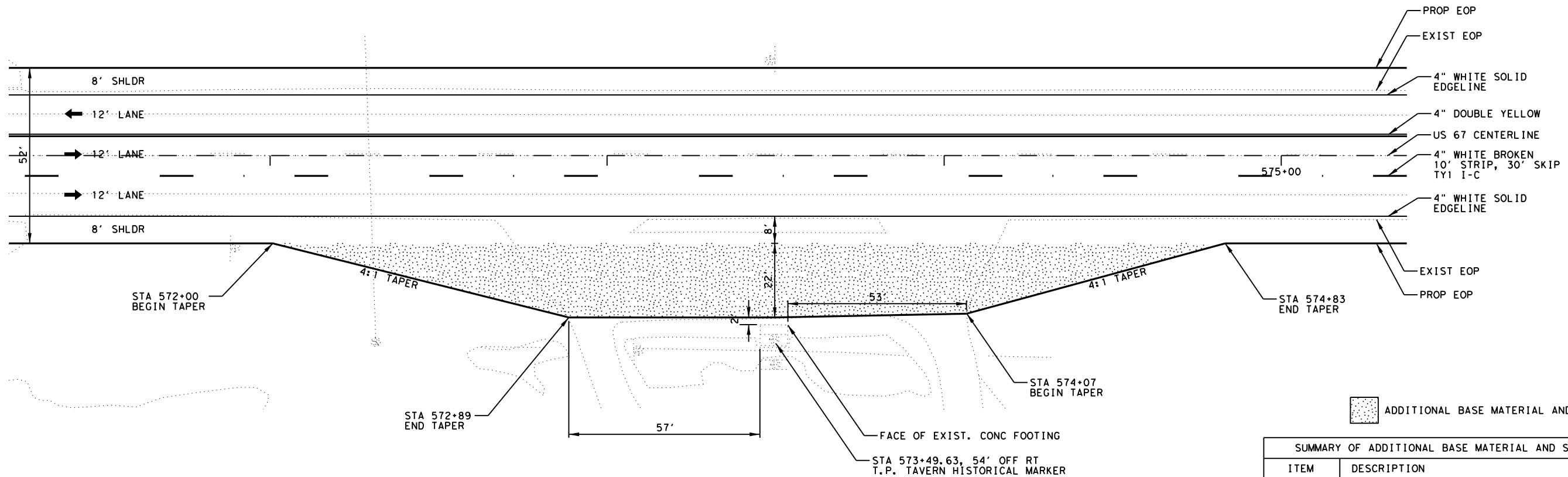
HORIZ SCALE 1"=100'
 VERT SCALE 1"=10'

SHEET 39 OF 39



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		133

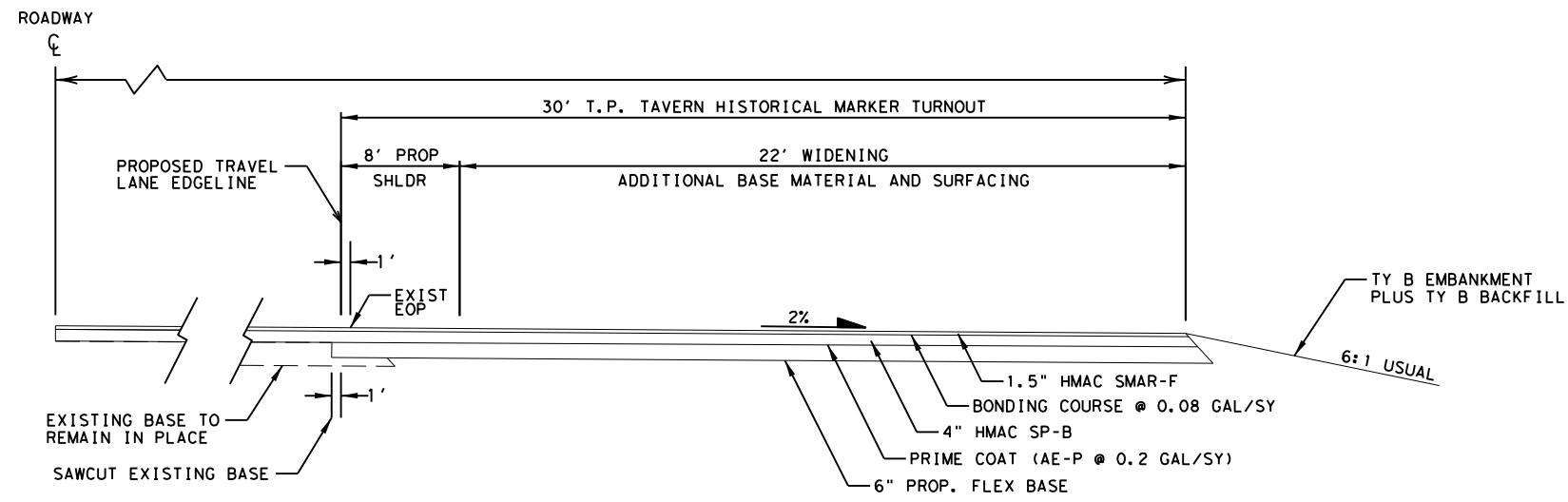
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PLAN

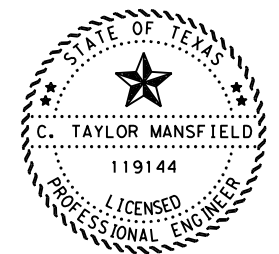
ADDITIONAL BASE MATERIAL AND SURFACING

SUMMARY OF ADDITIONAL BASE MATERIAL AND SURFACING QUANTITIES			
ITEM	DESCRIPTION	QTY	UNIT
0105-6043	REMOVING STAB BASE & ASPH PAV (0-6")	395	SY
0247-6064	FL BS (CMP IN PLC) (TY A GR 4) (6")	481	SY
0310-6005	PRIME COAT (AE-P)	97	GAL
0346-6040	SMAR-F SAC-A	40	TON
3077-6007	SP-B SAC-B PG70-22	106	TON
3084-6001	BONDING COURSE	39	GAL



SECTION

C. Taylor Mansfield 2021.11.01
 12:51:28-05'00"



US 67
T.P. TAVERN
HISTORICAL
MARKER TURNOUT
DETAILS

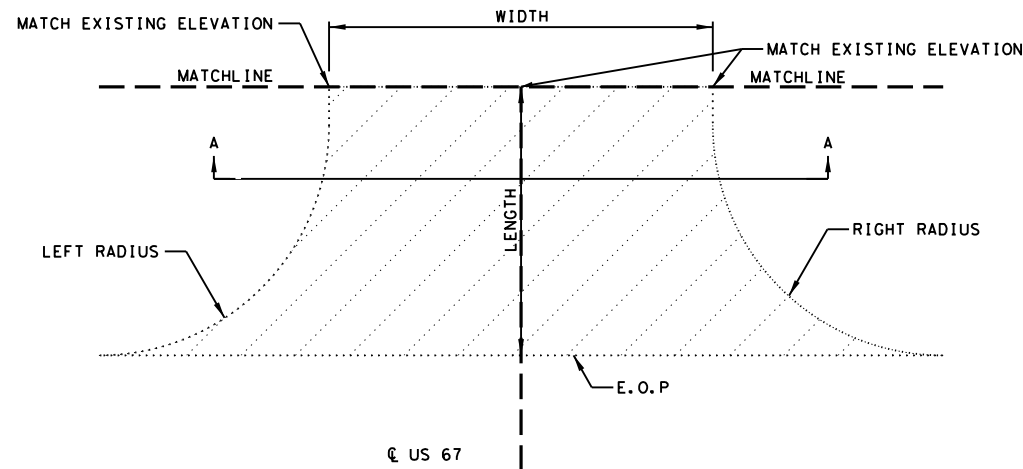
N. T. S. SHEET 1 OF 1



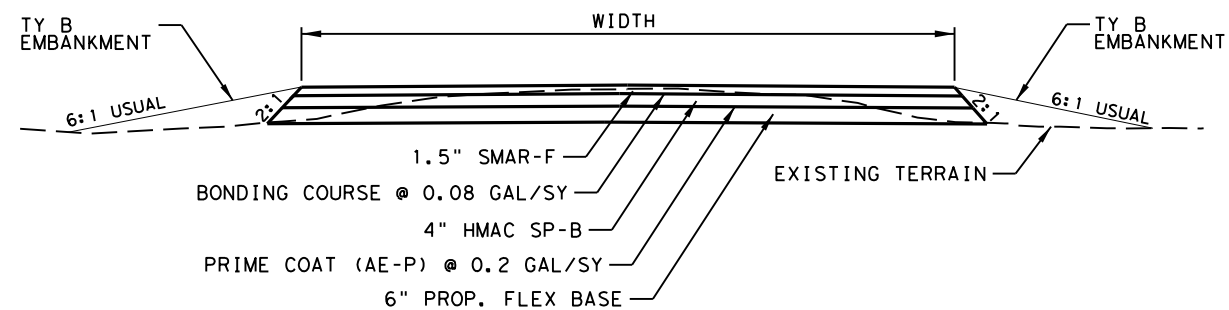
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	134	

DATE: 10/22/2021 04:32 PM
 FILE: pw: \\txdot\projectwiseon\line.com\TXDOT2\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan_Set\3. Roadway\us67W_Intersection_Stub_Detail\is.dgn

NAME	STA.	SIDE	INTERSECTING ROADWAY				AREA (SY)	PIPE OFF. (FT)	REMOVE EXIST. STRUCTURE (FT)		PARALLEL DRAINAGE	
			WIDTH (FT)	RADIUS (FT)	LT/RT	LENGTH (FT)			PROG. RC PIPE (CL IN)	PROP. SET (TY IN)(RCP)(G)(IP) (EA)		
BRADSHAW	548+51	LT	14	50		201						
CR 400	550+01	RT	28	25/40		192						
CR 405	550+10	LT	15	15/45		158						
CR 406	554+45	LT	20	75/25		232	37'	1 - 42'	1 - 18" x 78'	2		
E. 5TH ST	568+32	RT	100	200/35		933						
CR 411 W	630+68	RT	14	25/20		59						
CR 410	631+57	LT	22	75/50		457						
CR 415	678+10	LT	25	25		254						
CR 411	739+75	RT	12	25/40		95						
FM 2463	741+70	LT	47	200/50		791						
CR 421	786+63	LT	12	75/70		357						
CR 430	813+47	LT	32	75/60		482						
CR 420	844+99	RT	27	30/50		172						
CR 440	889+55	LT	15	75/70		431						
TOTAL						4814		42	78	2		



INTERSECTION STUB TYPICAL PLAN



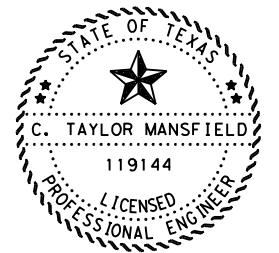
INTERSECTION STUB TYPICAL SECTION

NOTE 1:
INTERSECTION STUBS MAY BE ADJUSTED IN THE FIELD AS DETERMINED BY THE ENGINEER.

NOTE 2:
PARALLEL DRAINAGE STRUCTURES SHALL HAVE AT LEAST 18 INCHES COVER.

NOTE 3:
USE 6:1 SLOPE FOR PARALLEL SAFETY END TREATMENTS.

C. Taylor Mansfield 2021.11.01
12:52:56-0500



US 67
INTERSECTION
STUB DETAILS

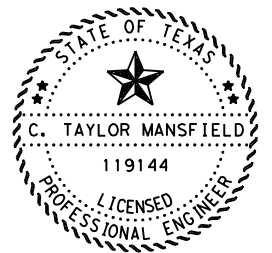
SHEET 1 OF 1

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Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	135	

DATE: 10/22/2021 05:16 PM
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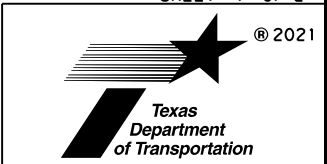
NUMBER	USE	STA.	SIDE	DRIVEWAY				PARALLEL DRAINAGE			
				WIDTH (FT)	RADIUS (FT)	LENGTH (FT)	AREA (SY)	PIPE OFF. (FT)	REMOVE EXIST. STRUCTURE (FT)	PROP. RC PIPE (CL IN)(8 IN) (FT)	PROP. SET (TY IN)(8 IN)(RCP)(6)(IP) (EA)
1	RES	505 + 97	RT	14	15	14	31				
2	RES	510 + 30	RT	23	15	23	69				
3	SERV	517 + 41	RT	14	18	21	50				
4	RES	520 + 25	LT	20	15	41	104				
5	COMM	524 + 31	RT	34	30	23	130				
6	COMM	529 + 63	RT	34	30	23	130				
7	COMM	539 + 63	RT	42	40	48	307				
8	COMM	541 + 76	RT	28	30	48	192				
9	COMM	542 + 91	RT	28	30	48	192				
10	COMM	551 + 74	RT	28	45	48	251				
11	COMM	554 + 24	RT	28	45	48	251				
12	RES	568 + 28	LT	14	15	49	89				
13	COMM	578 + 89	RT	50	45	49	368				
14	COMM	582 + 07	RT	50	45	49	368				
15	COMM	645 + 46	LT	28	45	74	329	40'	2 - 42'	2 - 18" x 80'	4
16	RES	813 + 44	LT	32	60	74	433	44'	1 - 24'	1 - 18" x 96'	2
17	RES	834 + 07	LT	14	75	74	380				
18	RES	842 + 27	LT	14	15	73	125				
19	RES	849 + 26	LT	14	15	73	125	45'	1 - 22'	1 - 18" x 26'	2
20	RES	863 + 76	LT	14	15	73	125				
21	RES	871 + 48	LT	14	15	74	130				
22	RES	883 + 38	LT	14	15	74	130				
23	RES	913 + 04	LT	14	15	74	130				
24	RES	930 + 43	LT	14	15	74	130				
25	RES	932 + 52	LT	14	15	74	130	49'	1 - 40'	1 - 18" x 42'	2
								88'	1 - 40'	1 - 18" x 42'	2
TOTAL							4699		383	568	24



C. Taylor Mansfield 2021.11.01
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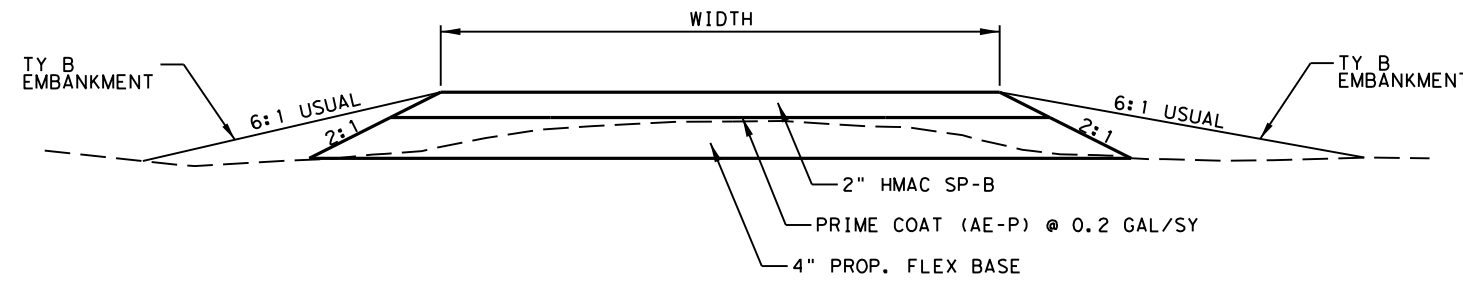
**US 67
 DRIVEWAY
 DETAILS**

SHEET 1 OF 2

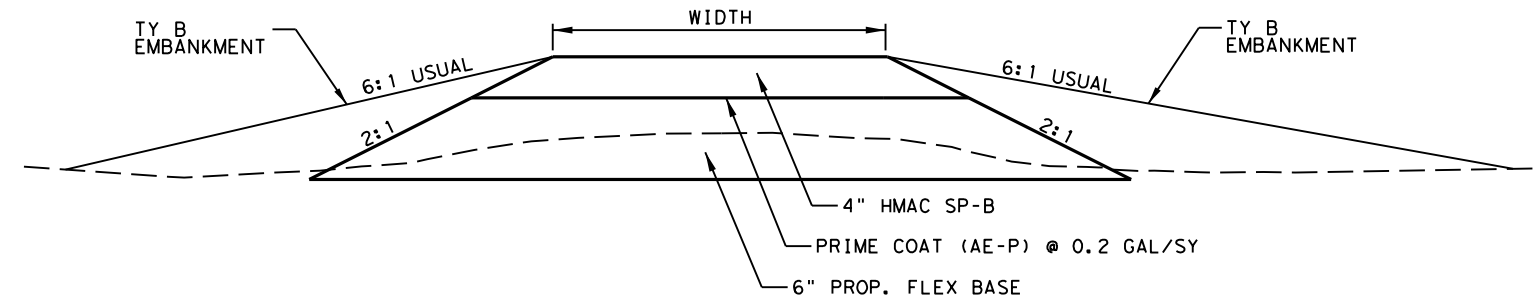


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		136

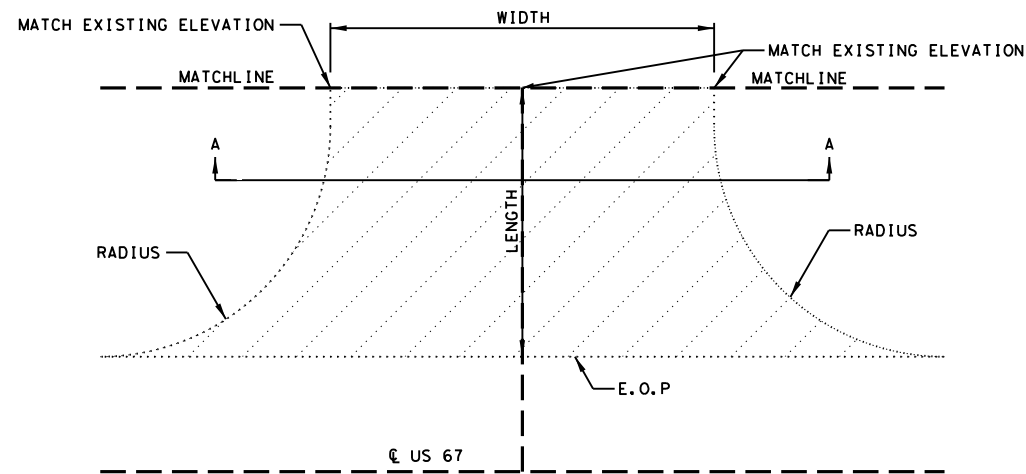
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TYPICAL RESIDENTIAL DRIVEWAY SECTION



TYPICAL COMMERCIAL/SERVICE DRIVEWAY SECTION

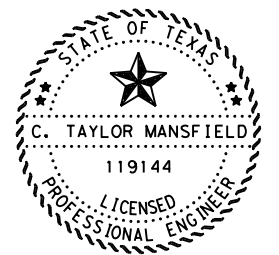


TYPICAL DRIVEWAY PLAN

NOTE 1:
PROPOSED DRIVEWAYS MAY BE ADJUSTED IN THE FIELD AS DETERMINED BY THE ENGINEER.

NOTE 2:
PARALLEL DRAINAGE STRUCTURES SHALL HAVE AT LEAST 18 INCHES COVER.

NOTE 3:
USE 6:1 SLOPE FOR PARALLEL SAFETY END TREATMENTS.



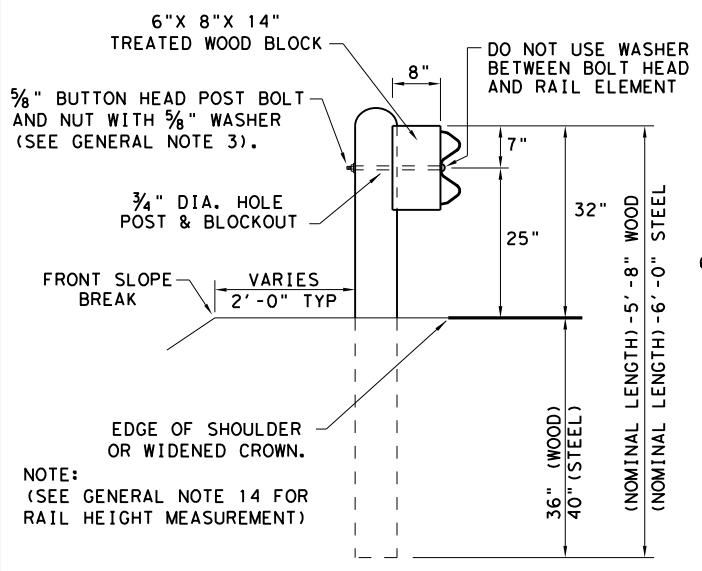
C. Taylor Mansfield 2021.11.01
12:53:56-05'00'

**US 67
DRIVEWAY
DETAILS**

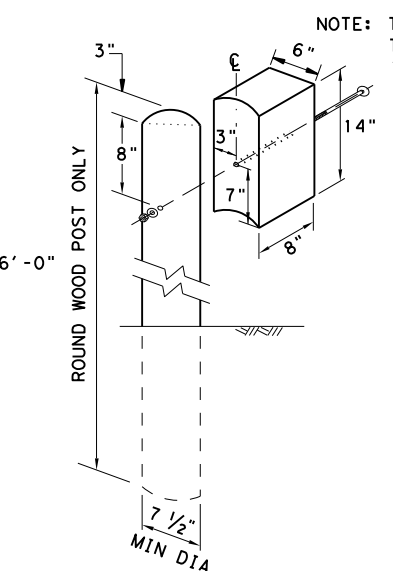
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		137

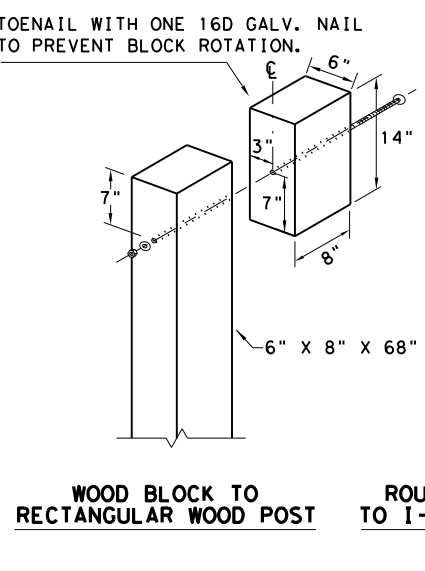
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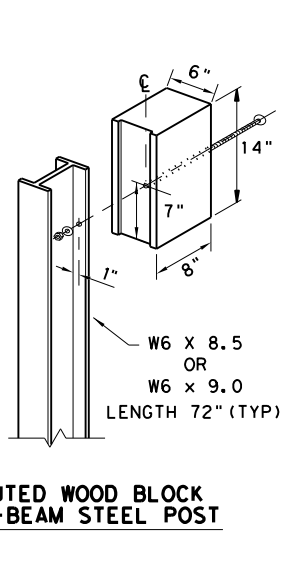
TYPICAL POST PLACEMENT



WOOD BLOCK TO ROUND WOOD POST



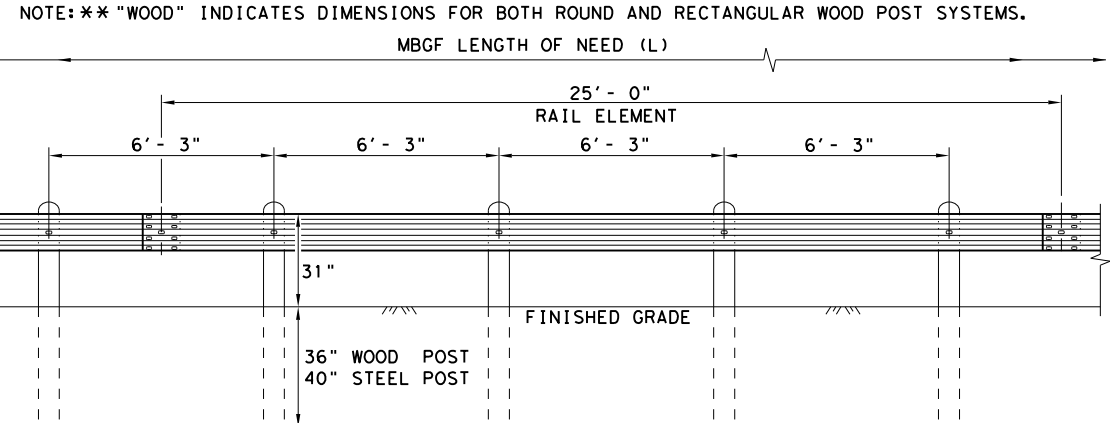
WOOD BLOCK TO RECTANGULAR WOOD POST



ROUTED WOOD BLOCK TO I-BEAM STEEL POST

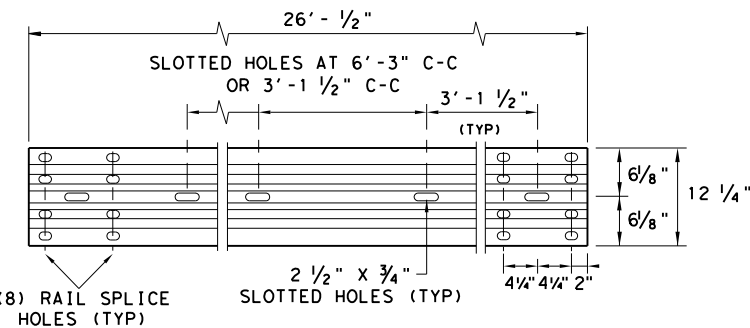
GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'-0", OR 12'-6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 3/8" WASHER (FWC16G) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.



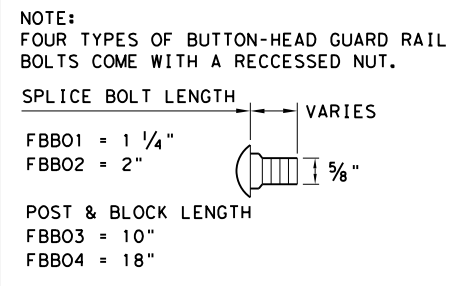
ELEVATION MID-SPAN RAIL SPLICE

NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



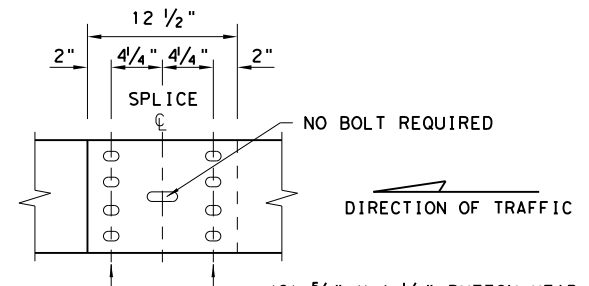
ELEVATION 25'-0" (NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES. SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.



BUTTON HEAD BOLT

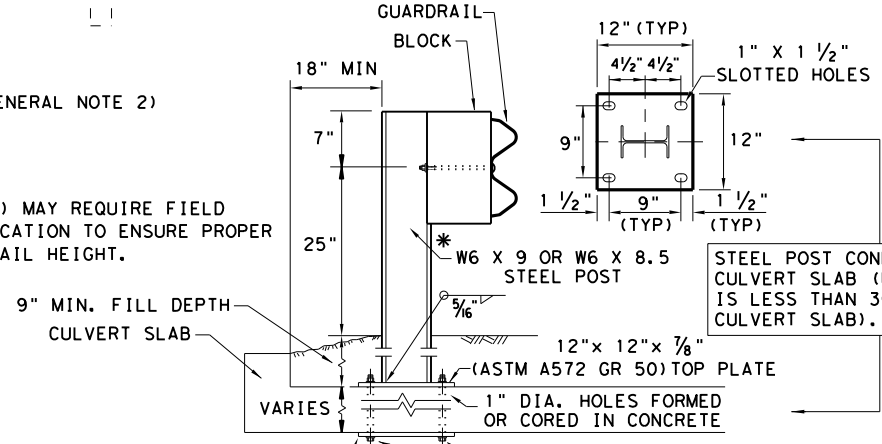
NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

* POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

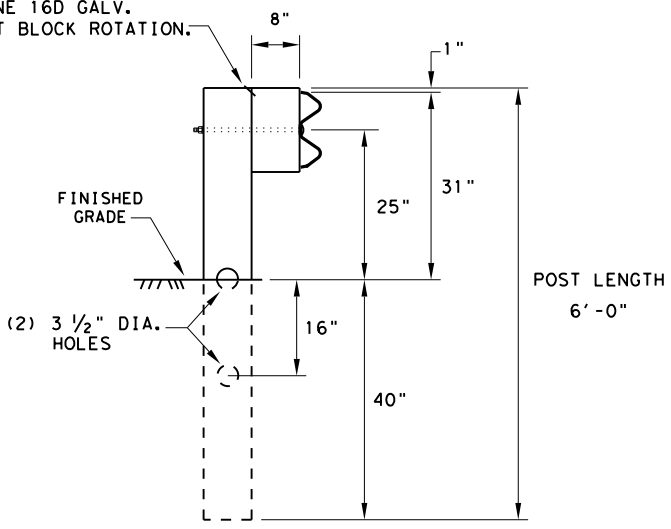
1. **BOLT-THROUGH OPTION:** REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.
2. **EPOXY ANCHOR OPTION:** THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

		Design Division Standard	
METAL BEAM GUARD FENCE TL-3 MASH COMPLIANT GF(31)-19			
FILE: gf3119.dgn	DN: TXDOT	CK: KM	DW: VP
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS	0076	06	037
	DIST	COUNTY	SHEET NO.
	ODA	UPTON	138

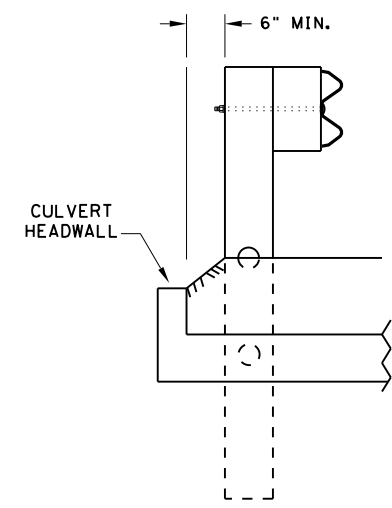
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NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.



**RECTANGULAR CRT POST
(6" X 8" X 6' LONG)**

(6) CRT REQUIRED
SEE ELEVATION DETAIL FOR LOCATIONS



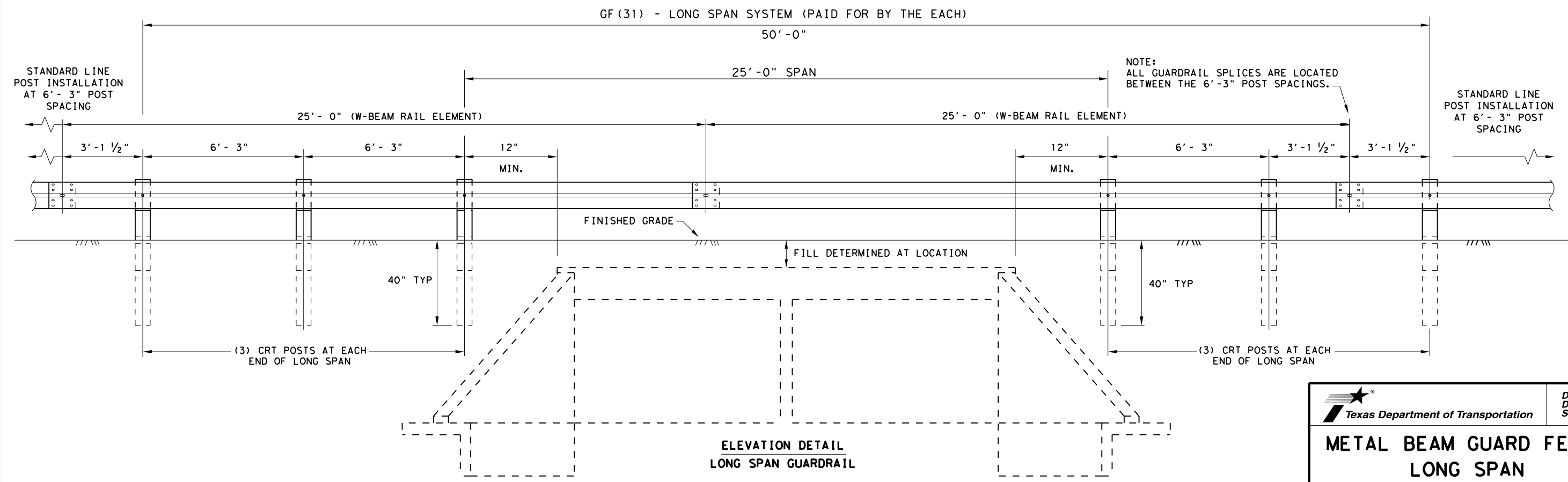
**LATERAL OFFSET BETWEEN THE
GUARDRAIL AND THE CULVERT HEADWALL**

GENERAL NOTES

1. THE TYPE OF LINE POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF THE TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT SHALL MEET ALL REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 12' - 6" OR 25' - 0" NOMINAL LENGTHS.
3. RAIL POST HOLES ARE OFFSET 3' - 1 1/2" FROM STANDARD GUARDRAIL TO ACCOMMODATE THE MIDSPAN SPLICING.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC160) AND NO MORE THAN 1" BEYOND IT.
5. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
7. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
8. REFER TO GF (31) STANDARD SHEET FOR ADDITIONAL DETAILS.
9. FLAME CUTTING OF HOLES IN GUARDRAIL SHALL NOT BE PERMITTED. IF YOU ENCOUNTER MIS-ALIGNED BOLT HOLES IN GUARDRAIL CONTACT THE DESIGN DIVISION FOR ADDITIONAL INFORMATION & OPTIONS.

NOTE: SEE GF (31) STANDARD FOR STANDARD LINE POSTS.

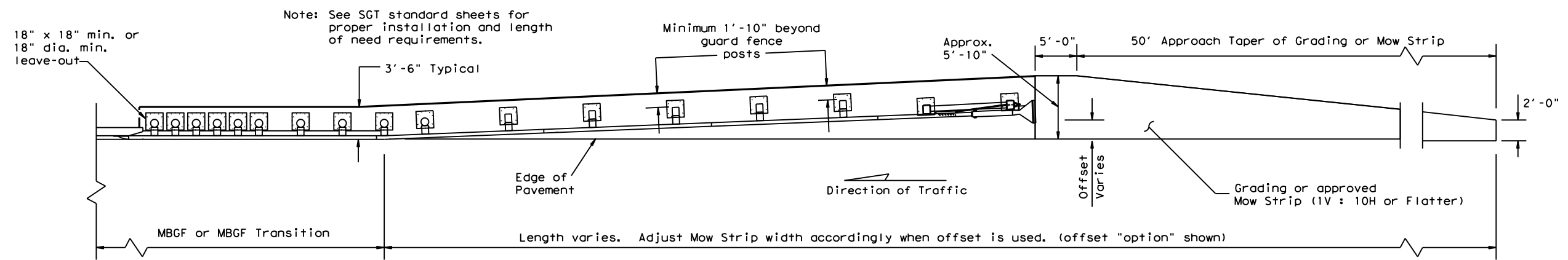
DIRECTION OF TRAFFIC



**ELEVATION DETAIL
LONG SPAN GUARDRAIL**

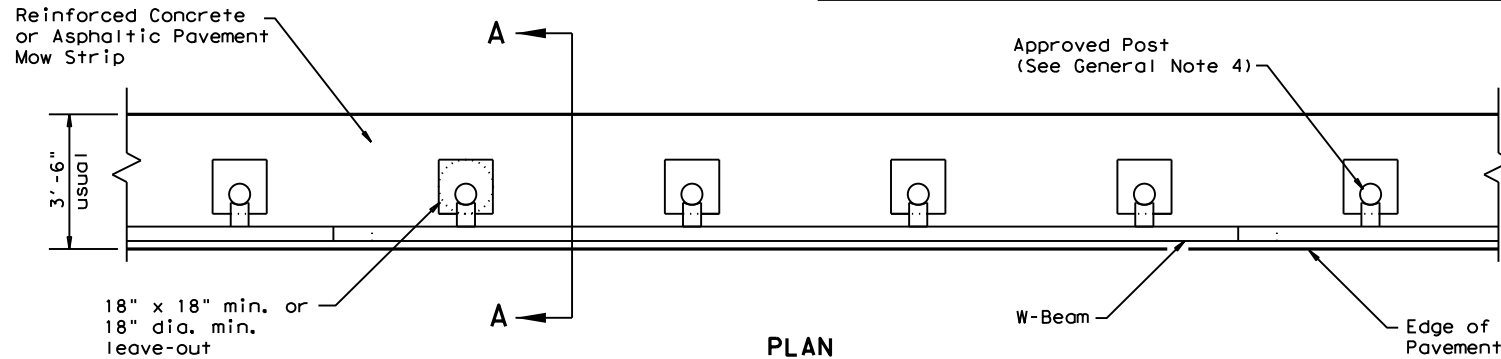
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METAL BEAM GUARD FENCE LONG SPAN TL-3 MASH COMPLIANT GF (31) LS-19			
FILE: gf311s19.dgn	DN: TXDOT	CK: KM	DW: VP
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS	0076	06	037
	DIST	COUNTY	SHEET NO.
	ODA	UPTON	139

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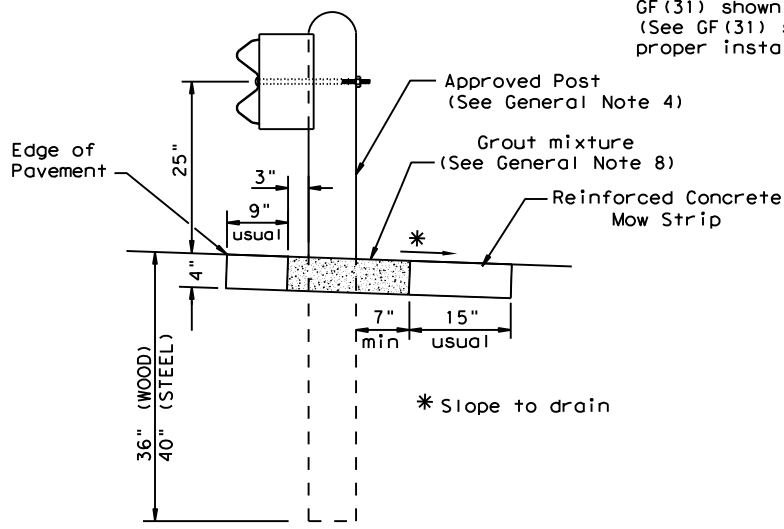
GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS

Note: Site Condition(s)
 Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.
 Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.



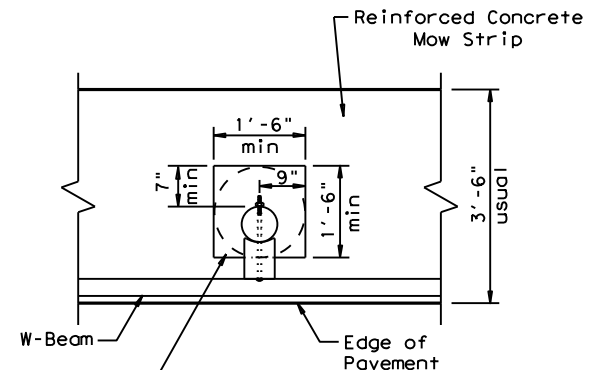
PLAN

GF(31) shown with Mow Strip
 (See GF(31) standard sheet for proper installation)



SECTION A-A

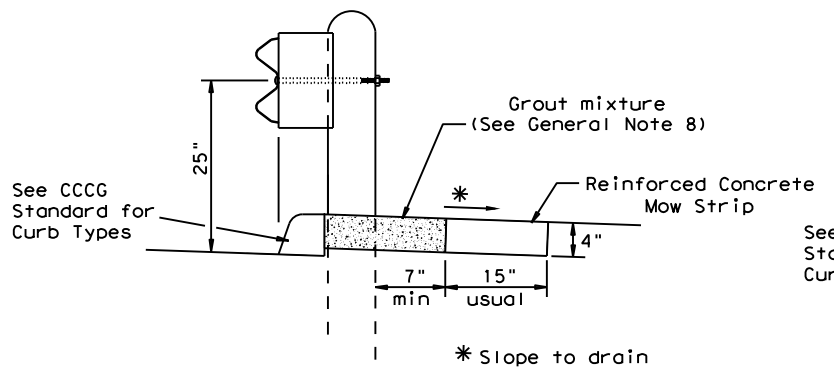
Typical



MOW STRIP DETAIL

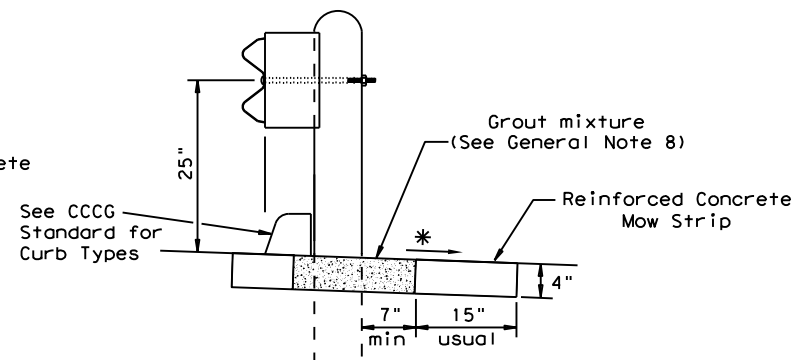
Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.

- GENERAL NOTES**
1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
 2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
 3. The leave-out behind the post shall be a minimum of 7".
 4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 1/2" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
 5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
 6. Thickness of the mow strip will be 4".
 7. The limits of payment for reinforced concrete will include leave-outs for the posts.
 8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type I or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.



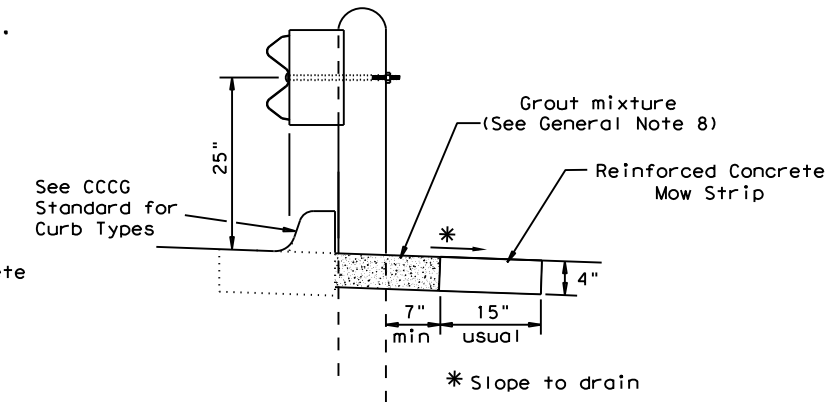
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip

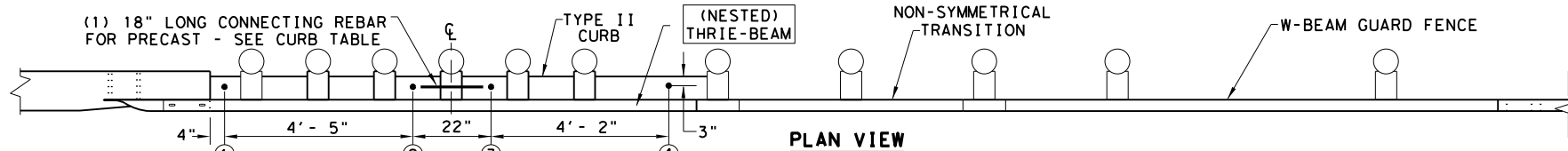


CURB OPTION (3)

		Design Division Standard	
METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT GF(31)MS-19			
FILE: gf31ms19.dgn	DN: TXDOT	CK: KM	DW: VP
©TXDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS	0076	06	037
	DIST	COUNTY	SHEET NO.
	ODA	UPTON	140

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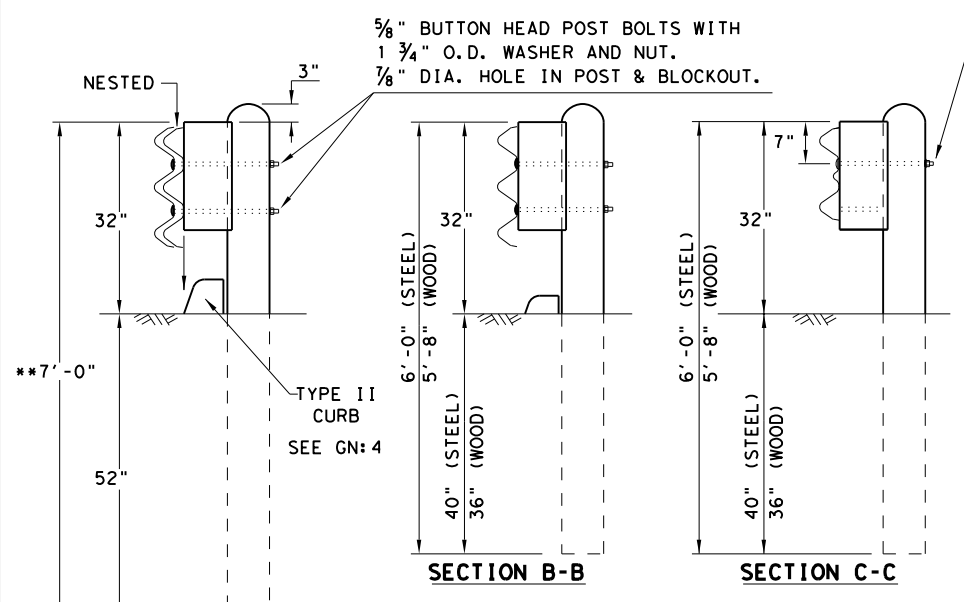
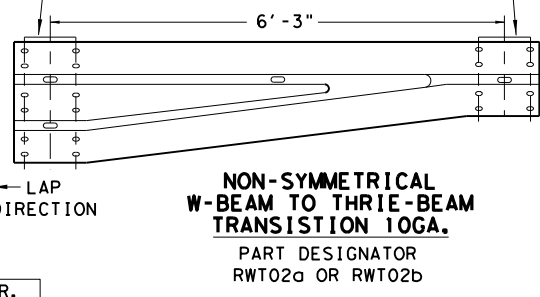
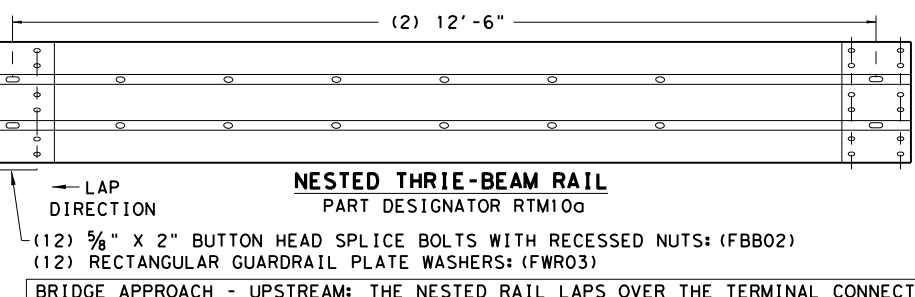
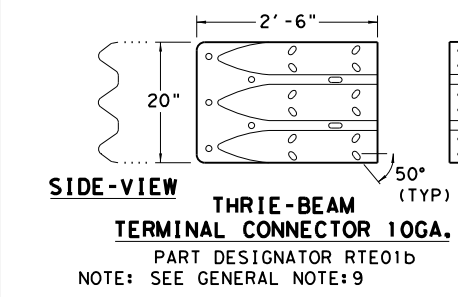
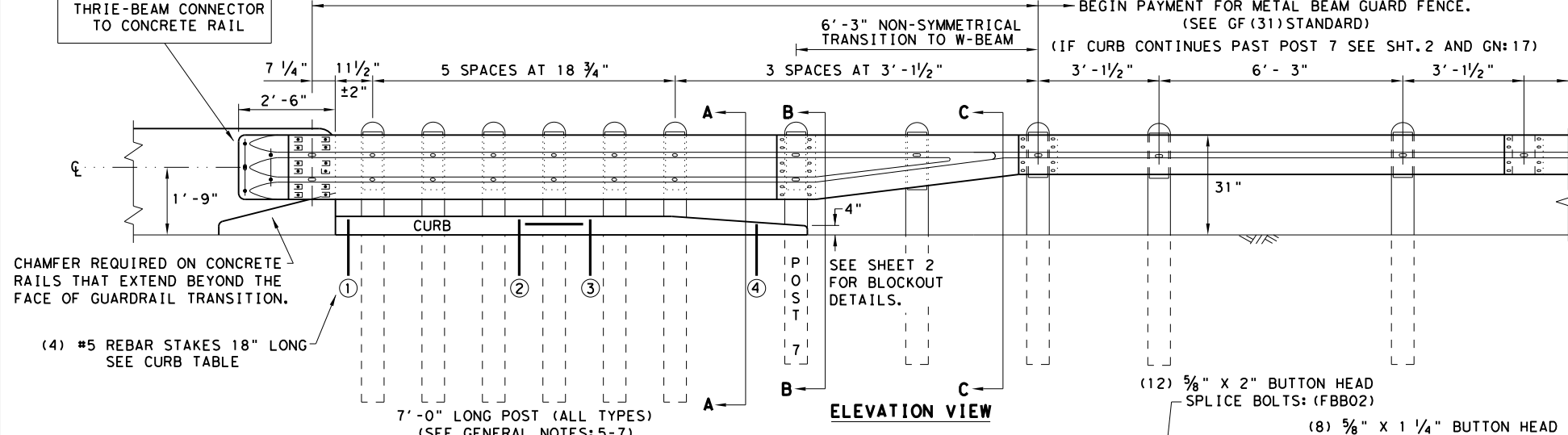
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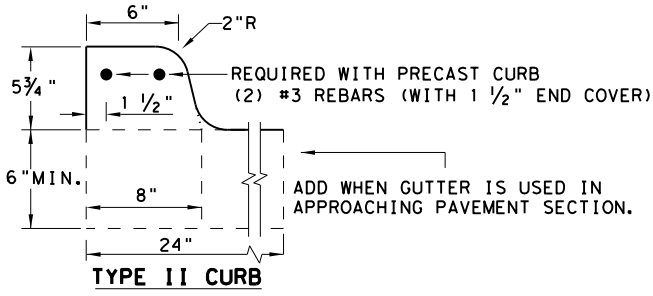
- (5) 1" DIA. HOLES.
- (5) 7/8" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR A325 OR A449).
- (10) 1 3/4" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
- (5) 7/8" DIA. HEAVY HEX NUTS (ASTM A194 OR A563).

NOTE:
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE 7/8" HEX NUT. TRIM AS REQUIRED.

NOTE:
CURB IS A REQUIRED COMPONENT FOR THE TRANSITION TO FUNCTION PROPERLY. SEE GENERAL NOTES: 2-4 AND 16-17.



THRIE-BEAM TERMINAL - CURB TABLE	
PRECAST CURB FULL LENGTH EQUALS 12'- 2"	
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.	
CURB (1)	LENGTH 5'- 8"
CURB (2)	LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7	
CONNECTING PRECAST CURB SECTIONS (1) & (2):	
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END.	
USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.	
SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:	
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND 1/2" BELOW TOP OF CURB.	
FILL HOLES WITH APPROVED GROUT MIXTURE.	



* NOTES: NOT NEEDED FOR CAST-IN-PLACE. SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS. PERCUSSION DRILLING IS NOT PERMITTED WITH: TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.

GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- 3/4" HEIGHT); SEE CURRENT CCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE:17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF (31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST 5/8" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16G) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF (31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED) (TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED) (STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

HIGH-SPEED TRANSITION
SHEET 1 OF 2

		Design Division Standard	
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT GF (31) TR TL3-20			
FILE: gf31tr+1320.dgn	DN: TxDOT	CK: KM	DW: VP
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ODA	UPTON	141	

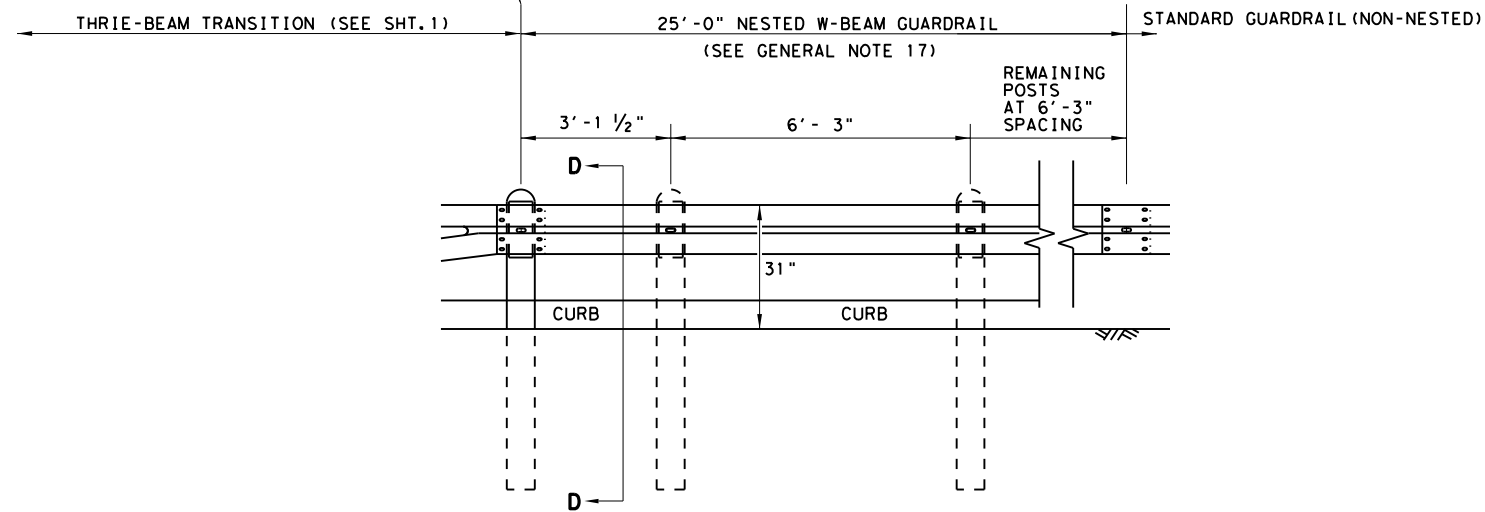
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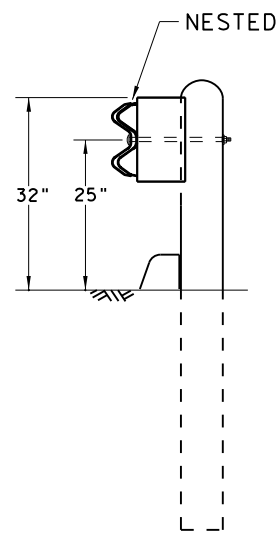
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)

END PAYMENT FOR METAL BEAM GUARD FENCE TRANSITION.
 BEGIN PAYMENT FOR METAL BEAM GUARD FENCE.

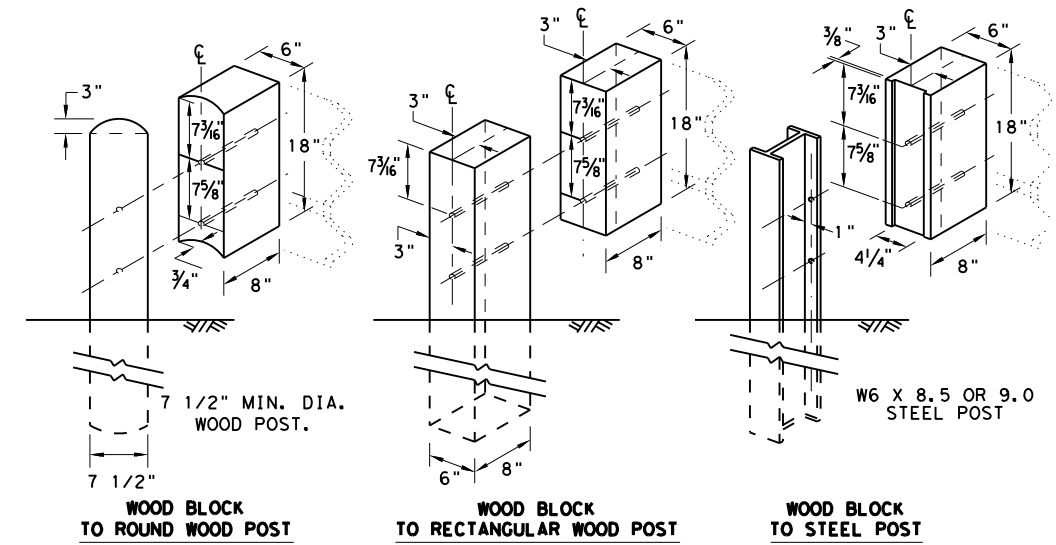
(SEE GF (31) STANDARD SHEET)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

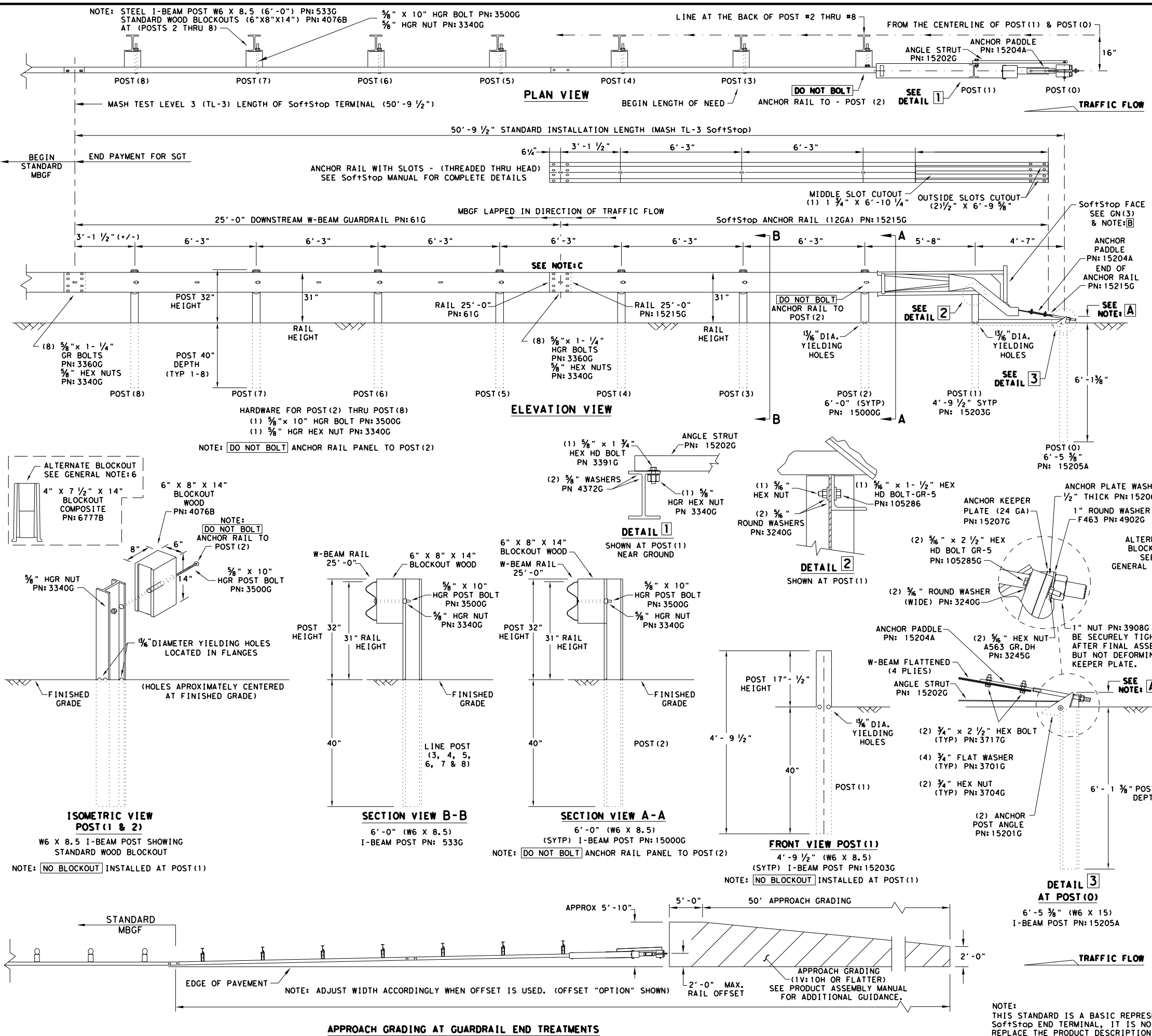


METAL BEAM GUARD FENCE
 THRIE-BEAM TRANSITION
 TL-3 MASH COMPLIANT

GF (31) TR TL3-20

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	ODA	UPTON	142	

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- GENERAL NOTES**
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374, 2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN:620237B
 - APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
 - FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TxDOT'S LATEST ROADWAY MOW STRIP STANDARD.
 - HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
 - A COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
 - IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBBF STANDARD FOR INSTALLATION GUIDANCE.
 - POSTS SHALL NOT BE SET IN CONCRETE.
 - IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
 - DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
 - UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
 - A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCRoaching ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

NOTE: A THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-3/4" MIN. TO 4" MAX. ABOVE FINISHED GRADE.

NOTE: B PART PN:5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
PART PN:5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)

NOTE: C W-BEAM SPLICE LOCATED BETWEEN LINE POST (4) AND LINE POST (5)
GUARDRAIL PANEL 25'-0" PN:61G
ANCHOR RAIL 25'-0" PN:15215G
LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25' - 0")
15205A	1	POST #0 - ANCHOR POST (6' - 5 3/8")
15203G	1	POST #1 - (SYTP) (4' - 9 1/2")
15000G	1	POST #2 - (SYTP) (6' - 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 X 8.5) (6' - 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" X 8" X 14")
6777B	7	BLOCKOUT - COMPOSITE (4" X 7 1/2" X 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (1/2" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
HARDWARE		
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	3/4" X 2 1/2" HEX BOLT A325
3701G	4	3/4" ROUND WASHER F436
3704G	2	3/4" HEAVY HEX NUT A563 GR.DH
3360G	16	5/8" X 1 1/4" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	5/8" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	5/8" X 10" HGR POST BOLT A307
3391G	1	5/8" X 1 3/4" HEX HD BOLT A325
4489G	1	5/8" X 9" HEX HD BOLT A325
4372G	4	5/8" WASHER F436
105285G	2	5/8" X 2 1/2" HEX HD BOLT GR-5
105286G	1	5/8" X 1 1/2" HEX HD BOLT GR-5
3240G	6	5/8" ROUND WASHER (WIDE)
3245G	3	5/8" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

Texas Department of Transportation

TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT (10S) 31-16

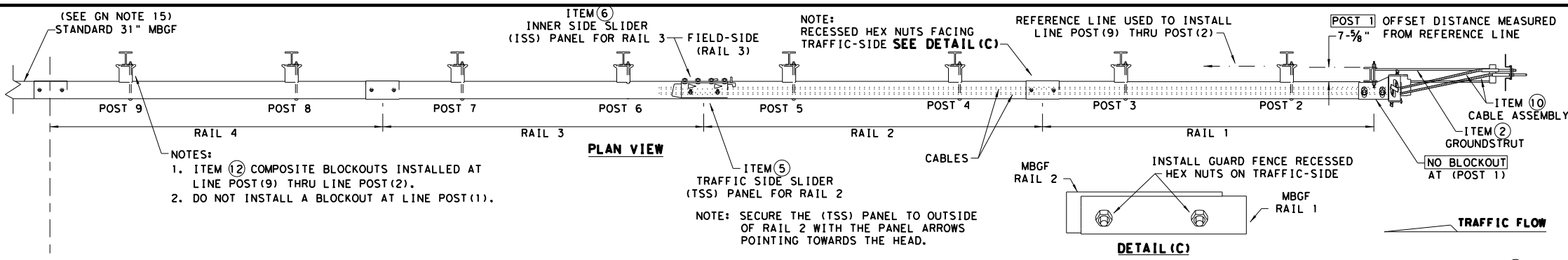
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NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE SoftStop END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

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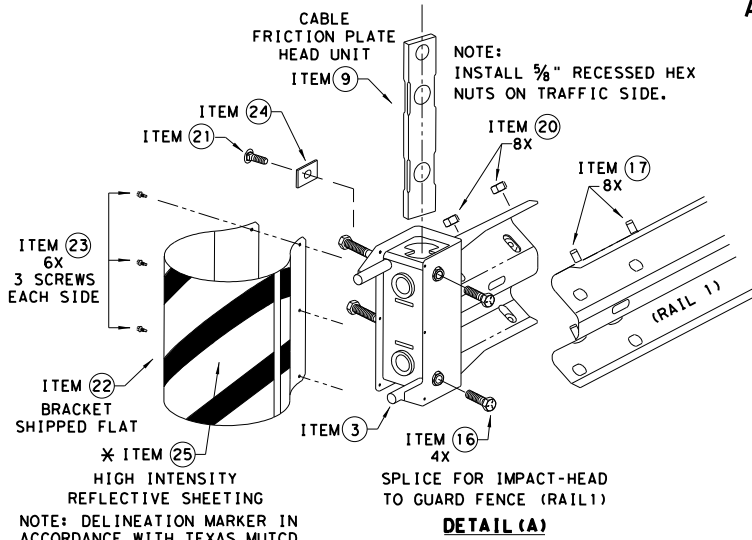
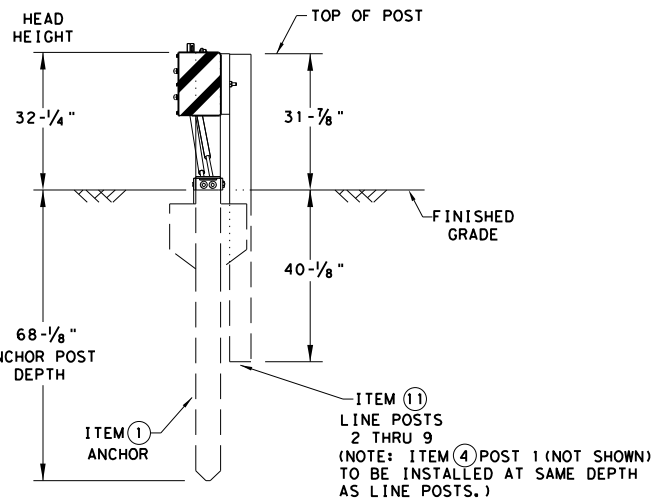
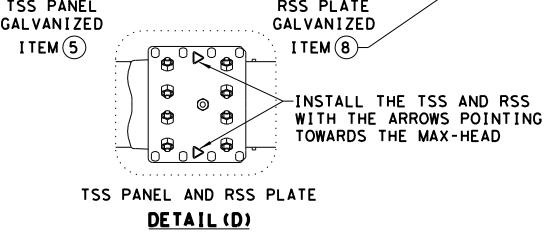
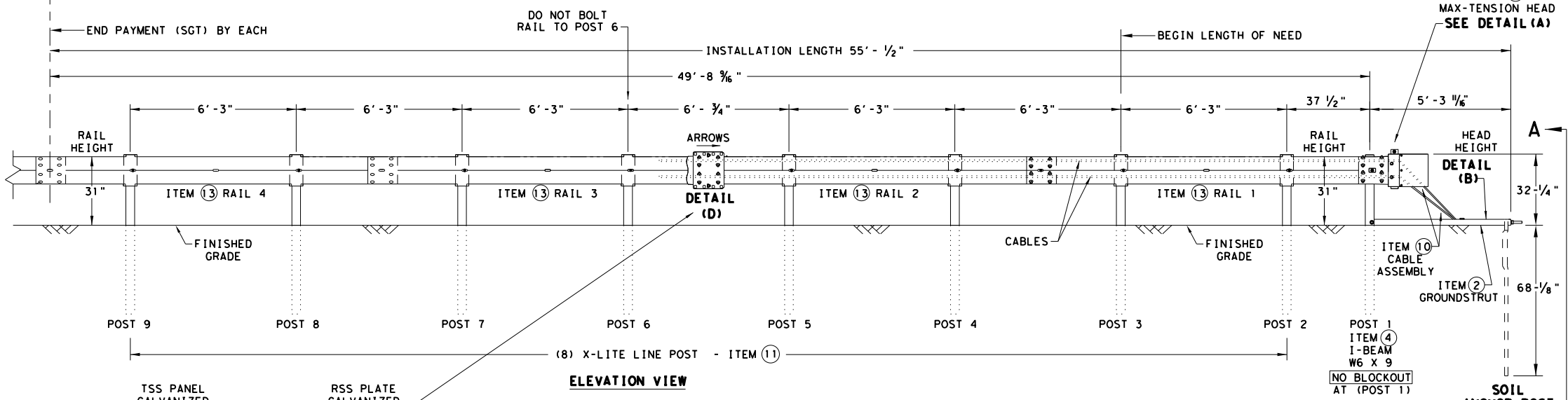


- NOTES:
- ITEM ② COMPOSITE BLOCKOUTS INSTALLED AT LINE POST (9) THRU LINE POST (2).
 - DO NOT INSTALL A BLOCKOUT AT LINE POST (1).

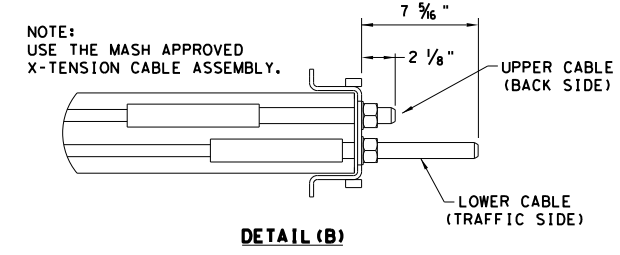
NOTE: RECESSED HEX NUTS FACING TRAFFIC-SIDE SEE DETAIL (C)

NOTE: SECURE THE (TSS) PANEL TO OUTSIDE OF RAIL 2 WITH THE PANEL ARROWS POINTING TOWARDS THE HEAD.

- GENERAL NOTES**
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
 - FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE: MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
 - APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
 - FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
 - ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
 - SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
 - COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
 - REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
 - IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
 - POSTS SHALL NOT BE SET IN CONCRETE.
 - A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
 - MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
 - IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
 - THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
 - A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

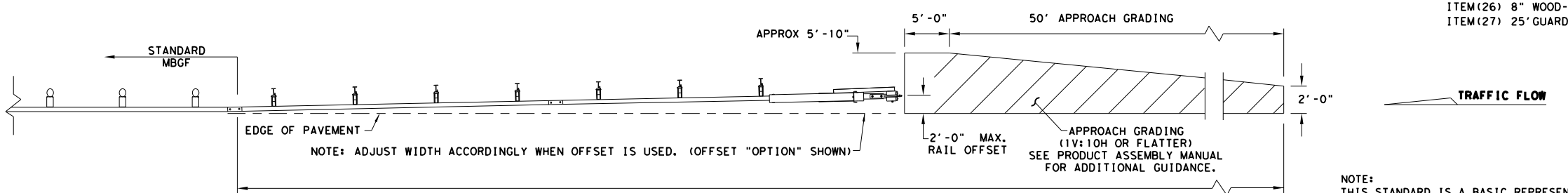


ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT. -GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	3/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	3/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWRO3	1
25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL, 8-SPACE, 12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1



* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN.
 ITEM (26) 8" WOOD-BLOCKOUTS
 ITEM (27) 25' GUARD FENCE PANELS



NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

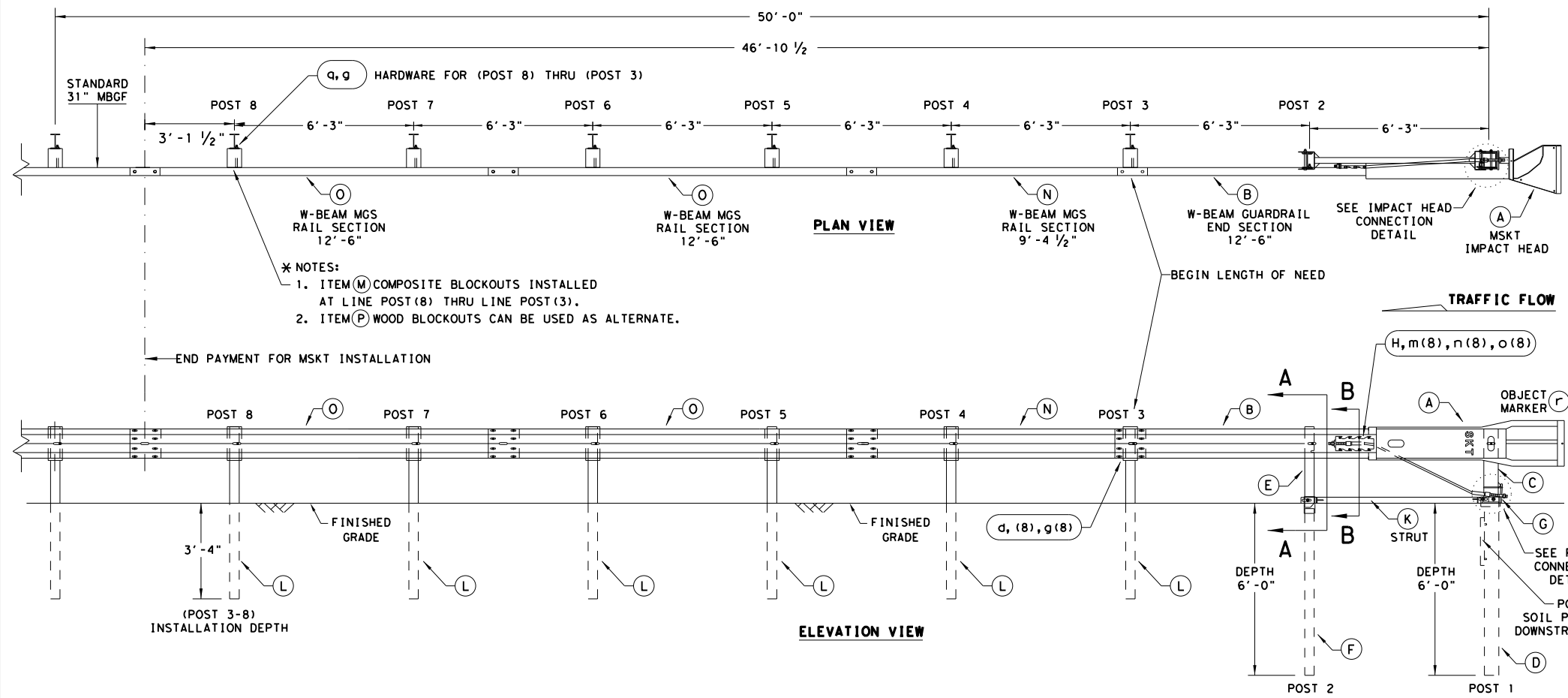
Texas Department of Transportation
 Design Division Standard

MAX-TENSION END TERMINAL
MASH - TL-3
SGT (11S) 31-18

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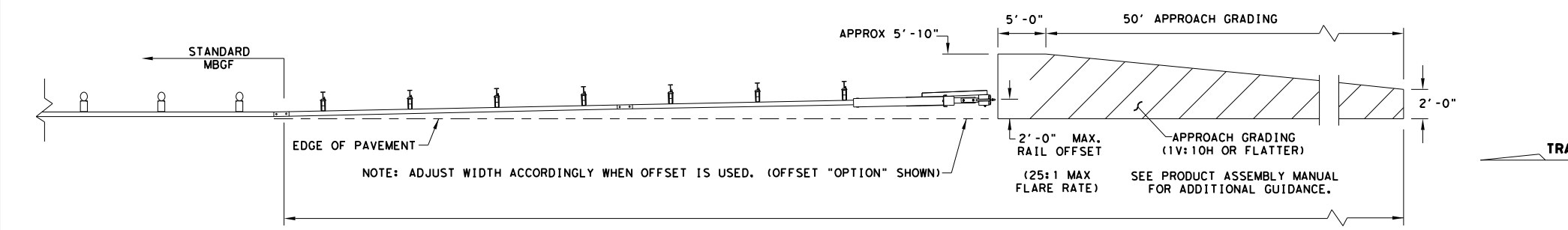
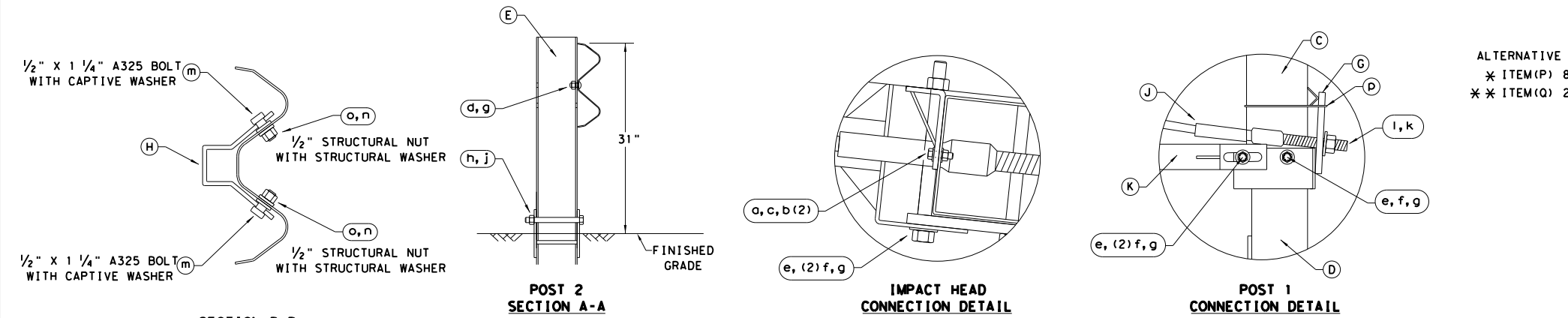
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- GENERAL NOTES**
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE: MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION-062717).
 - APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
 - FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
 - HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
 - SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
 - A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
 - IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBSGF STANDARD FOR INSTALLATION GUIDANCE.
 - POSTS SHALL NOT BE SET IN CONCRETE.
 - SYSTEM MUST BE ATTACHED TO STANDARD 31" MBSGF.
 - UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
 - A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCRoACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
 - THE SYSTEM IS SHOWN WITH TWO 12'-6" MBSGF PANELS, ONE 25'-0" MBSGF PANEL IS ALSO ALLOWED IN ITS PLACE.
 - A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Go.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6X9 OR W6X8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
SMALL HARDWARE			
o	2	3/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	3/8" WASHER	W0516
c	2	3/8" HEX NUT	N0516
d	25	3/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	3/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	3/8" WASHER	W050
g	33	3/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
i	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/8" O.D. x 3/8" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	3/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151



NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Design Division Standard

SINGLE GUARDRAIL TERMINAL

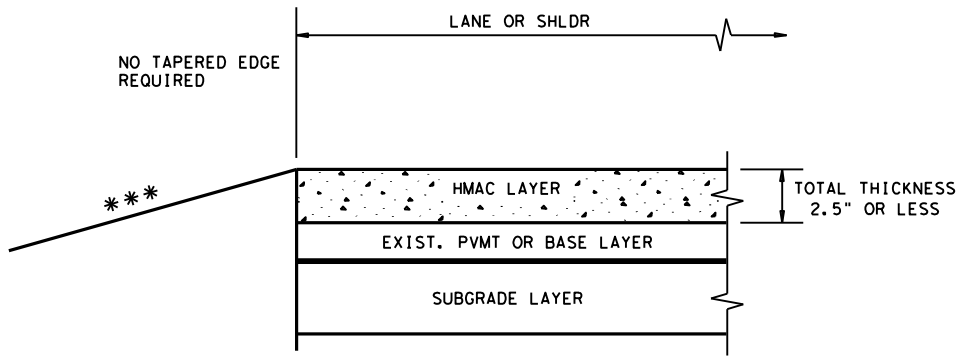
MSKT-MASH-TL-3

SGT (12S) 31-18

FILE: sgt12s3118.dgn	DN: TXDOT	CK: KM	DW: VP	CK: CL
© TXDOT: APRIL 2018	CONT SECT	JOB	HIGHWAY	
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	DIST	COUNTY	SHEET NO.	
	ODA	UPTON	145	

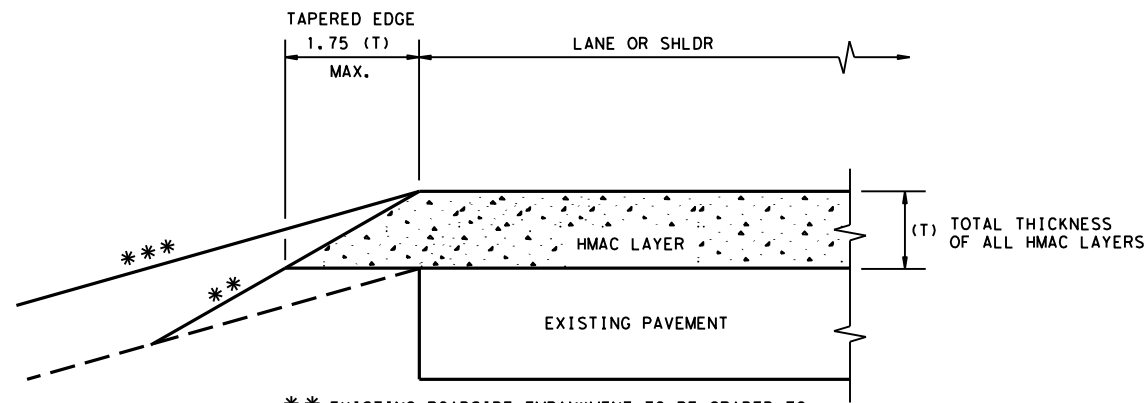
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*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

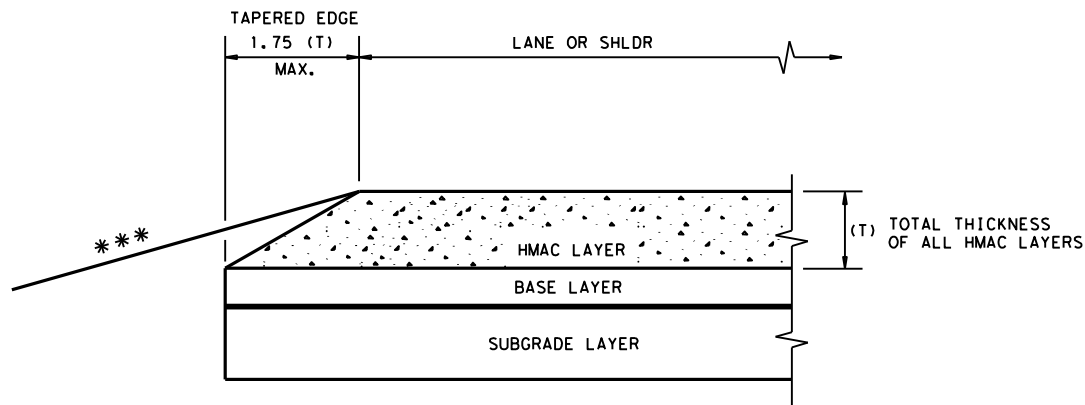
CONDITION - 1
 THIN HMAC SURFACES OR HMAC OVERLAY
 WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

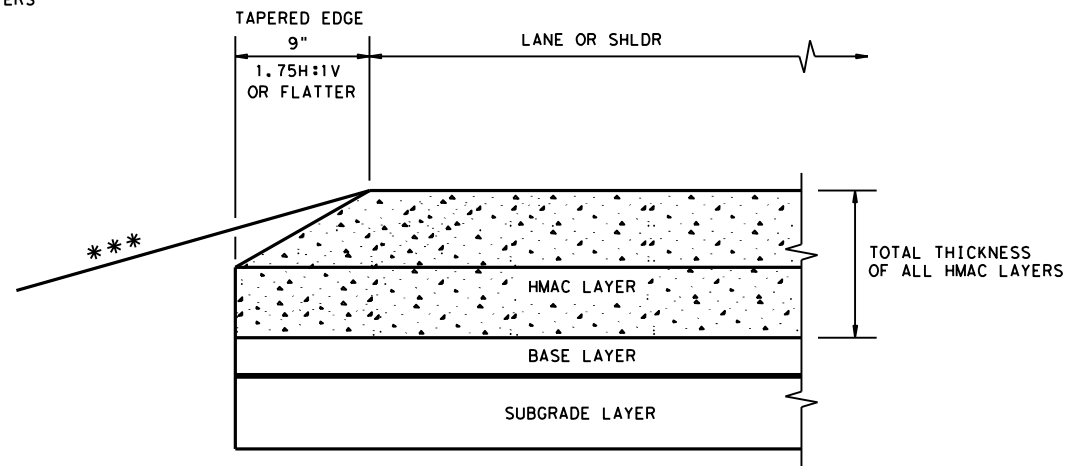
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
 OVERLAY OF EXISTING PAVEMENT
 HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
 NEW OR RECONSTRUCTED PAVEMENT
 HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
 NEW OR RECONSTRUCTED PAVEMENT
 HMAC THICKNESS 5" OR GREATER

GENERAL NOTES

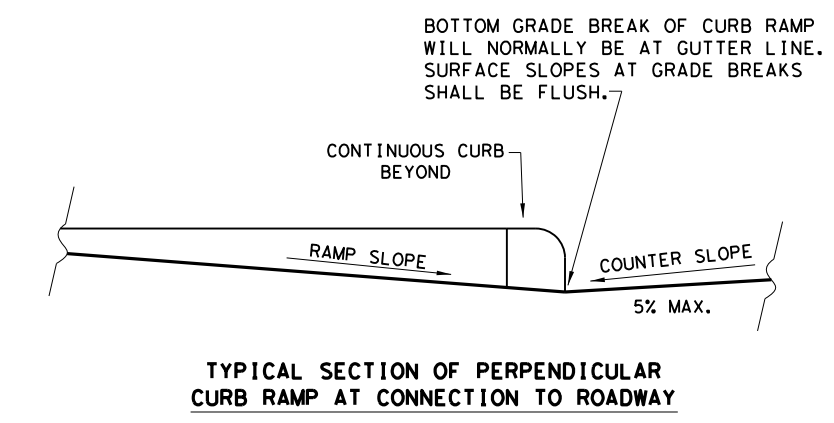
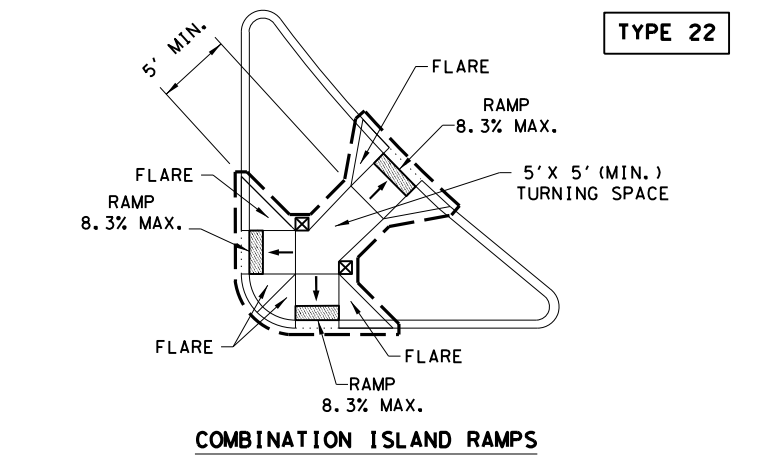
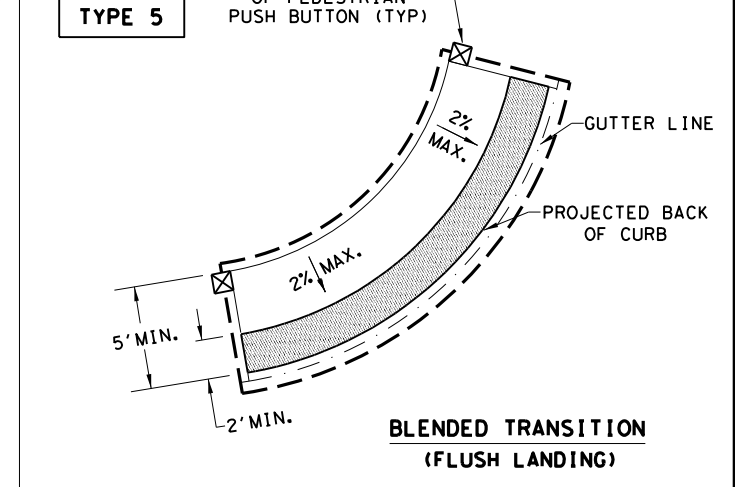
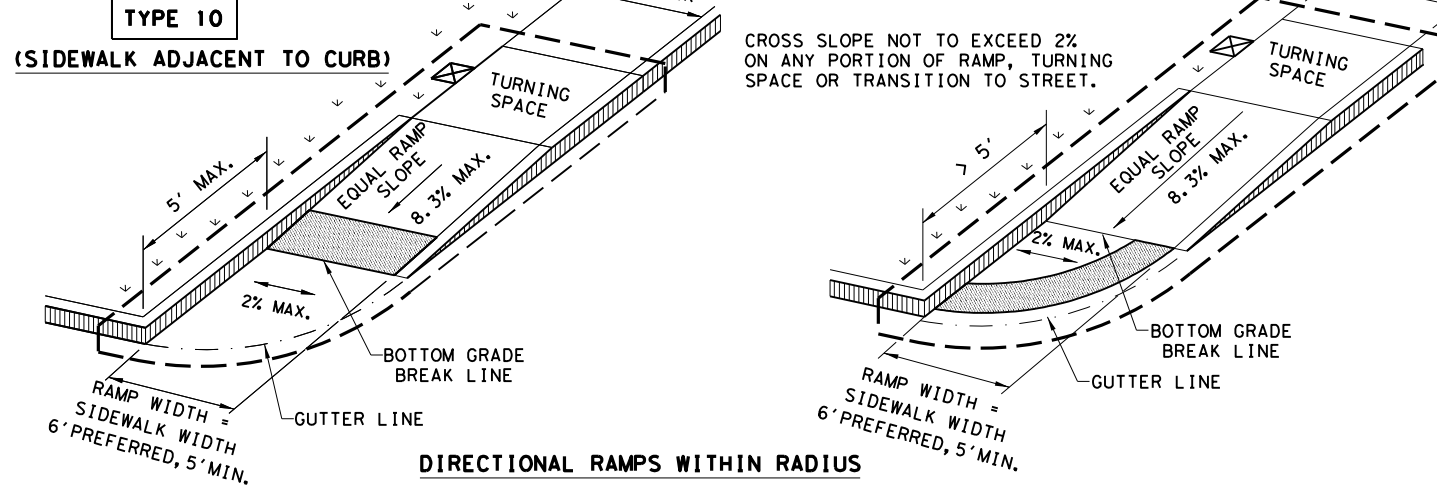
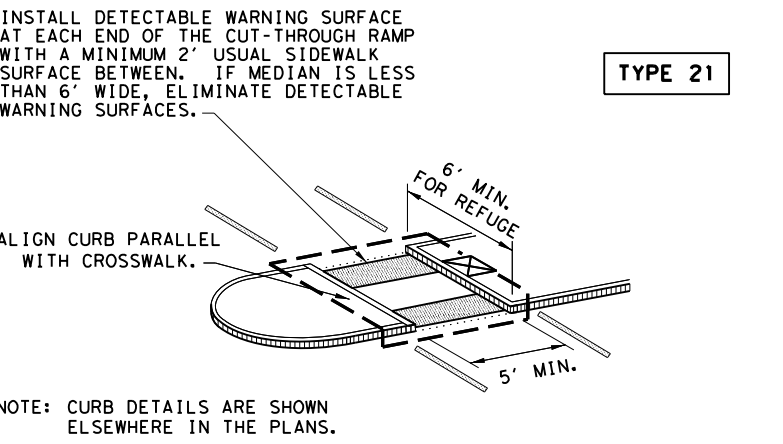
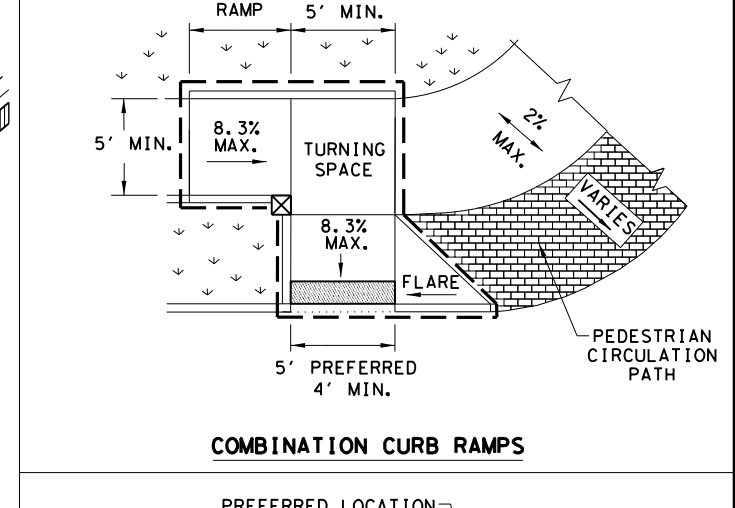
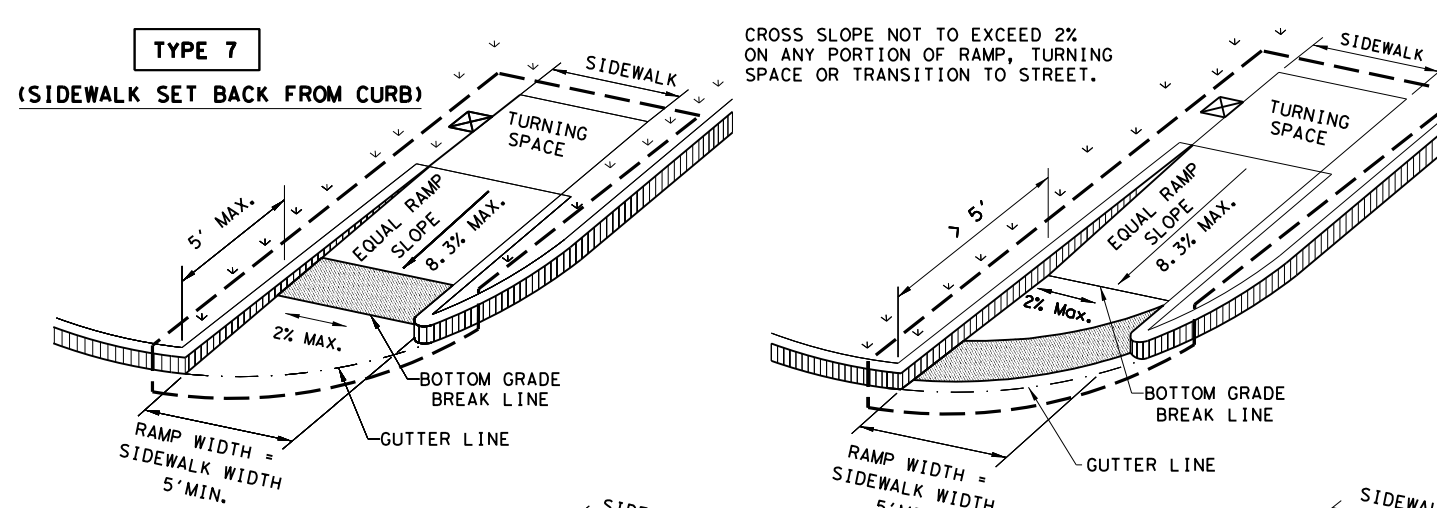
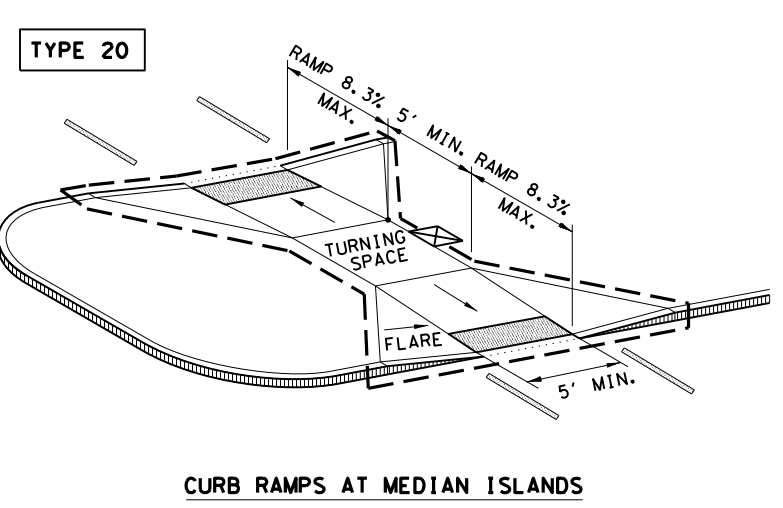
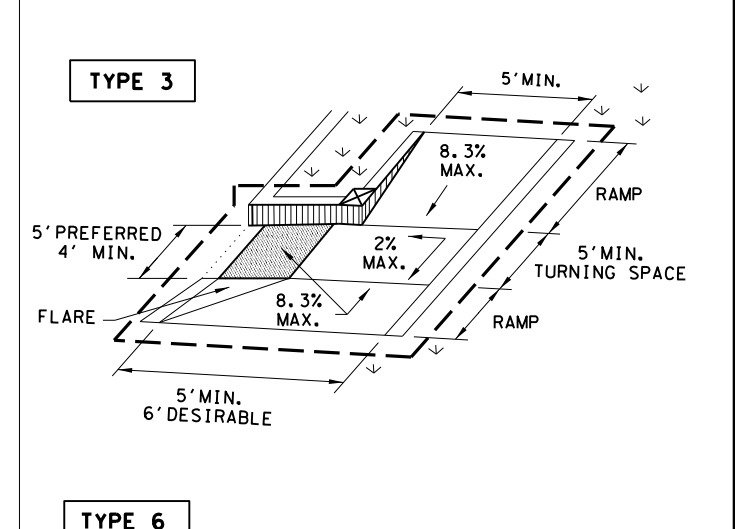
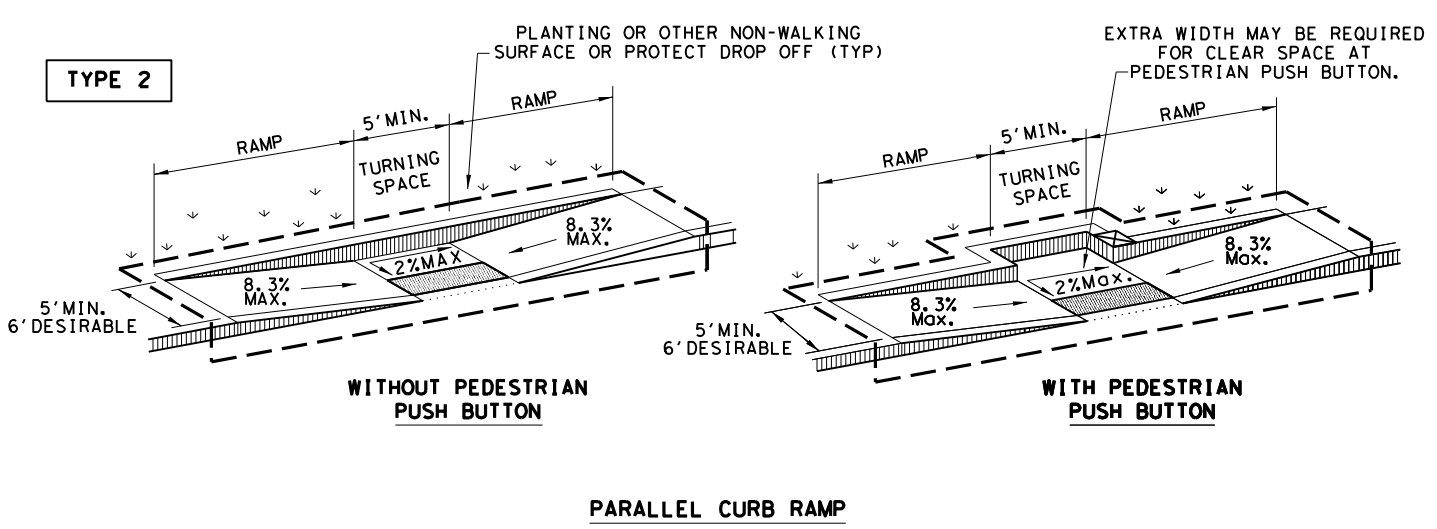
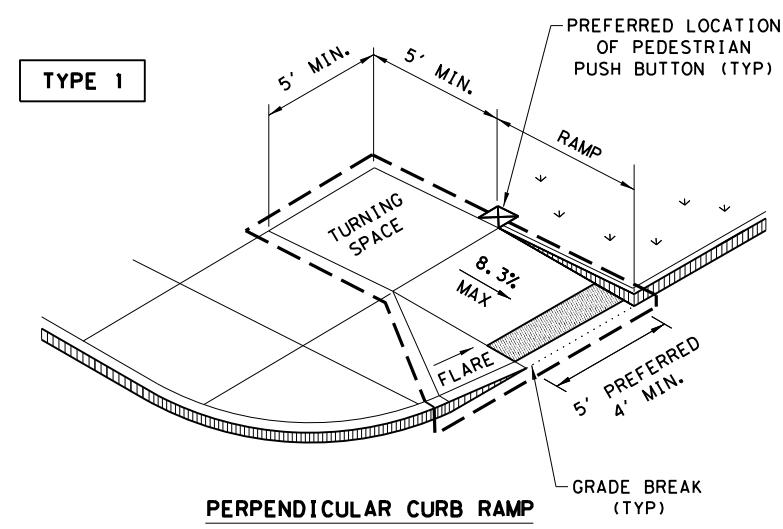
- UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
- FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
- PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
- THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
- THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

(NOT TO SCALE)

				Design Division Standard	
TAPERED EDGE DETAILS HMAC PAVEMENT					
TE (HMAC) - 11					
FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:	
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY	
REVISIONS		0076 06	037	US 67	
DIST	COUNTY	SHEET NO.			
ODA	UPTON	146			

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 FILE: \\pwt\tdot\project\seon\line.com\TXDOT\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\ped18.dgn



NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

Detectable Warning Surface: [Symbol]

Grade Break: [Symbol]

Ramp Limits of Payment: [Symbol]

Gutter Line: [Symbol]

Continuous Curb Beyond: [Symbol]

Ramp Slope: [Symbol]

Counter Slope: [Symbol]

SHEET 1 OF 4

Texas Department of Transportation
 Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076	06	037	US 67
REVISOR: 08, 2005	DIST	COUNTY	SHEET NO.	
REVISOR: 06, 2012	ODA	UPTON	147	
REVISOR: 01, 2018				

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GENERAL NOTES

CURB RAMP

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5' x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5' x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4' x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5' x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicable standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

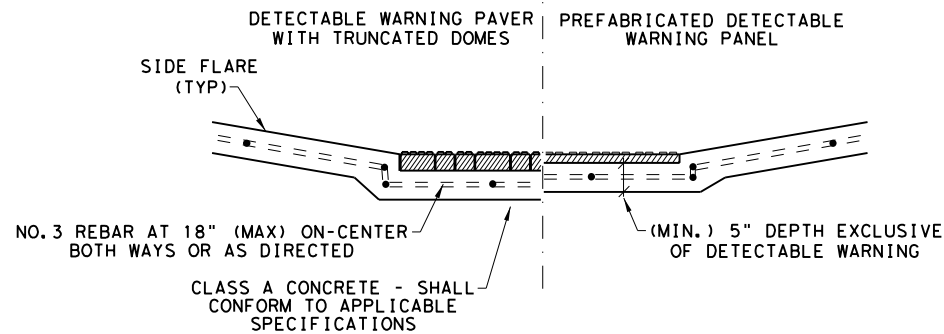
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

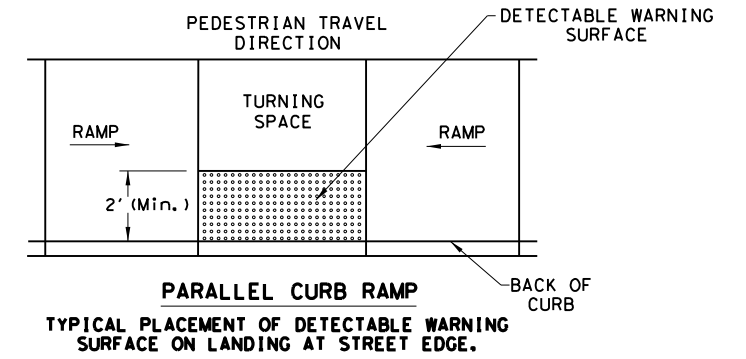
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

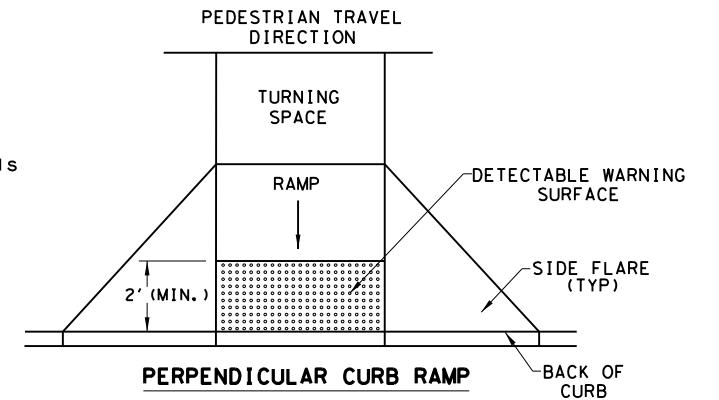


**SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS**

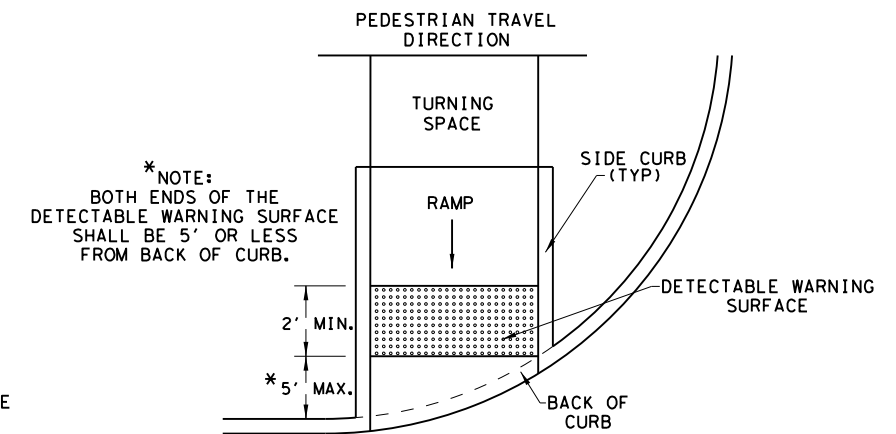
DETECTABLE WARNING SURFACE DETAILS



**PARALLEL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.**



**PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.**



* NOTE:
BOTH ENDS OF THE
DETECTABLE WARNING SURFACE
SHALL BE 5' OR LESS
FROM BACK OF CURB.

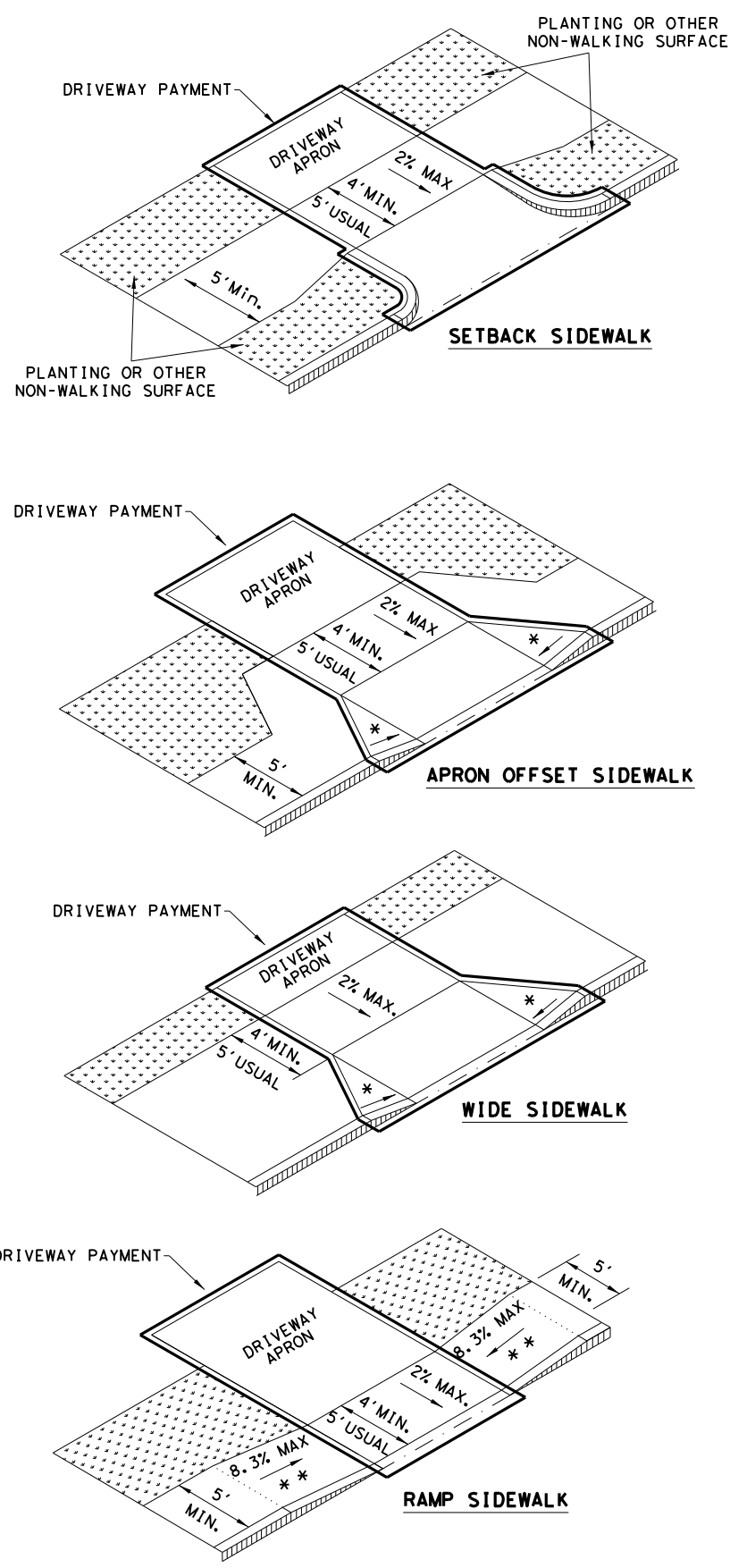
**DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.**

SHEET 2 OF 4

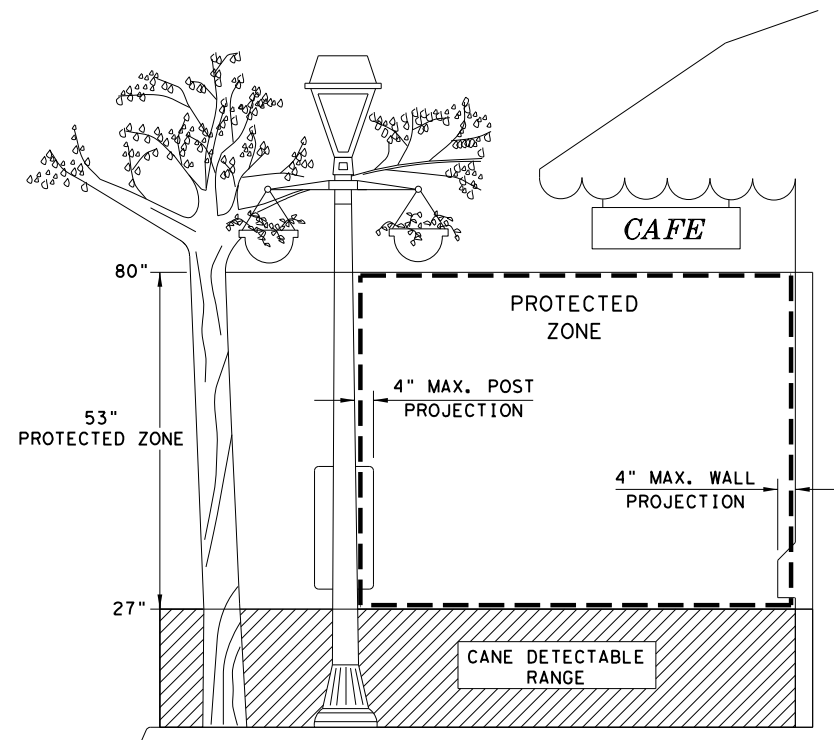
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PEDESTRIAN FACILITIES CURB RAMP			
PED-18			
FILE: ped18	DN: TxDOT	DW: VP	CK: KM
© TxDOT: MARCH, 2002	CONT	SECT	JOB
REVISIONS	0076	06	037
REVISOR: 08, 2005	DIST	COUNTY	SHEET NO.
REVISOR: 06, 2012	ODA	UPTON	148
REVISOR: 01, 2018			

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 FILE: p:\t\dot\project\1\seon\1\ine.com\TXDOT12\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\3. Roadway\ped18.dgn

SIDEWALK TREATMENT AT DRIVEWAYS

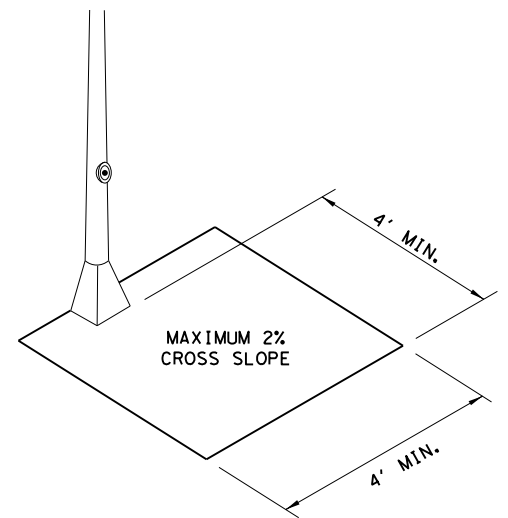


NOTES:
 * WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.
 * * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

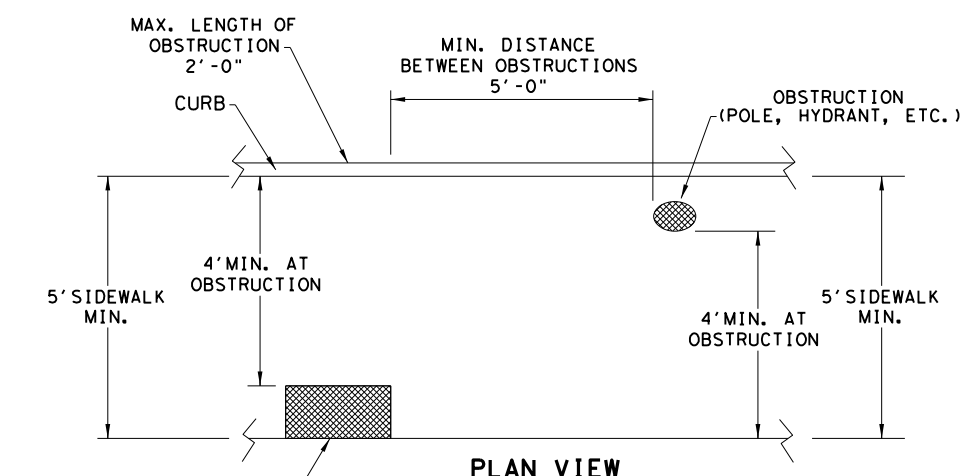


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.

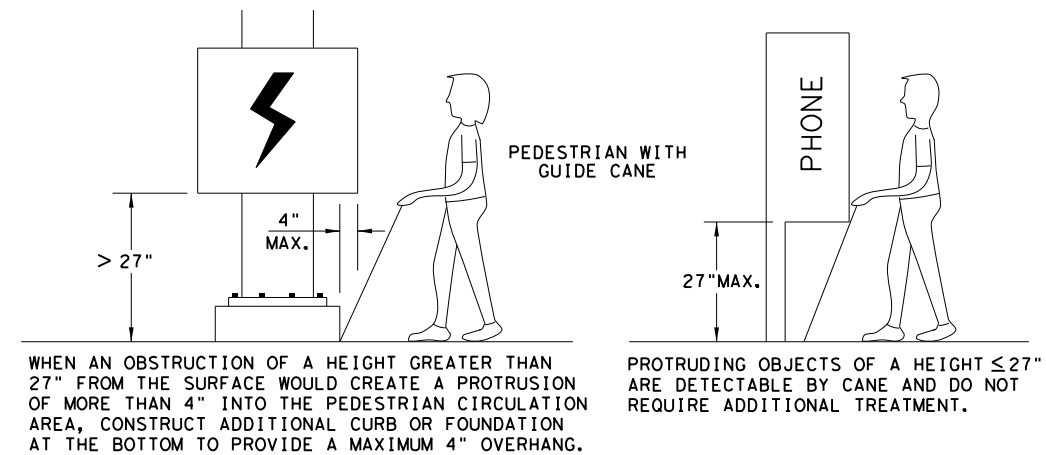


CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



**PLAN VIEW
 PLACEMENT OF STREET FIXTURES**

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

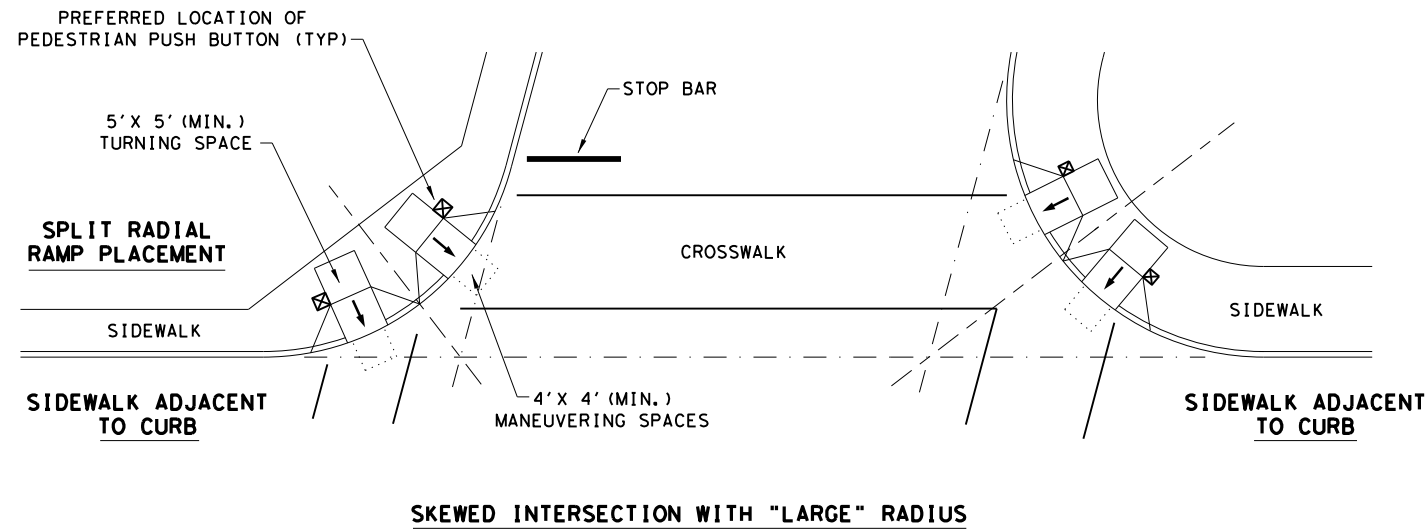
SHEET 3 OF 4

		Design Division Standard	
PEDESTRIAN FACILITIES CURB RAMPS			
PED-18			
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© TXDOT: MARCH, 2002	CONT	SECT	HIGHWAY
REVISIONS	0076	06	037
REVISOR	DIST	COUNTY	SHEET NO.
0076	06	037	US 67
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0076	06	037	US 67

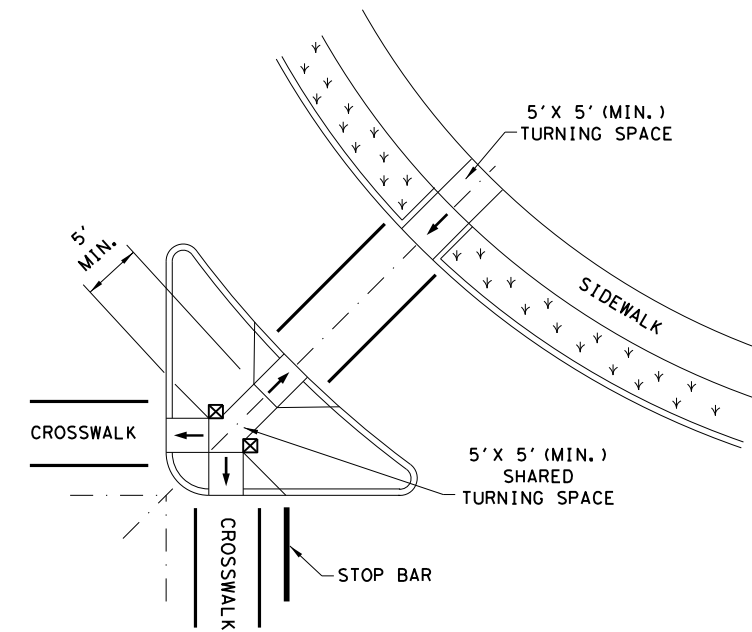
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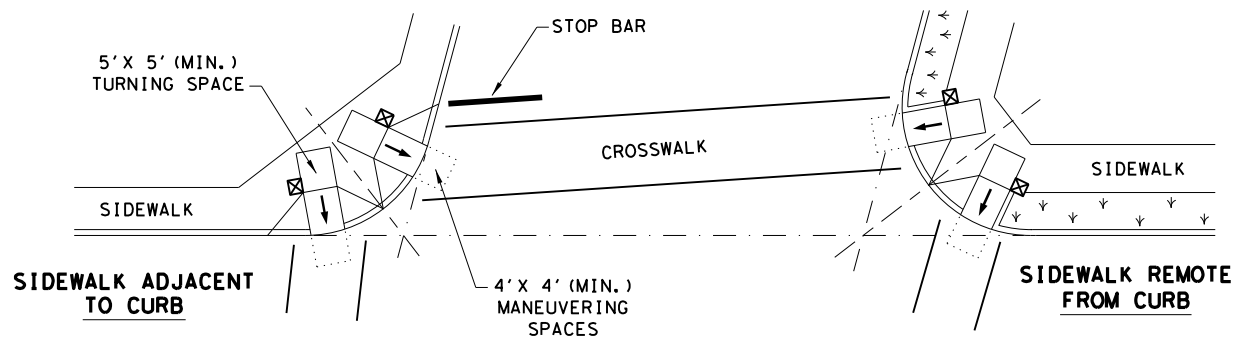
TYPICAL CROSSING LAYOUTS
 SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



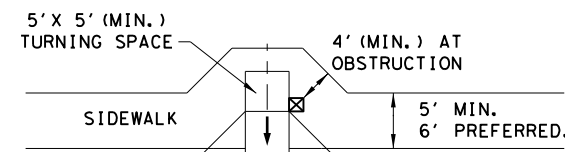
SKewed INTERSECTION WITH "LARGE" RADIUS



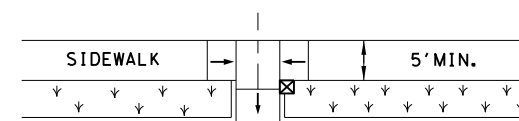
AT INTERSECTION
 W/FREE RIGHT TURN & ISLAND



SKewed INTERSECTION WITH "SMALL" RADIUS

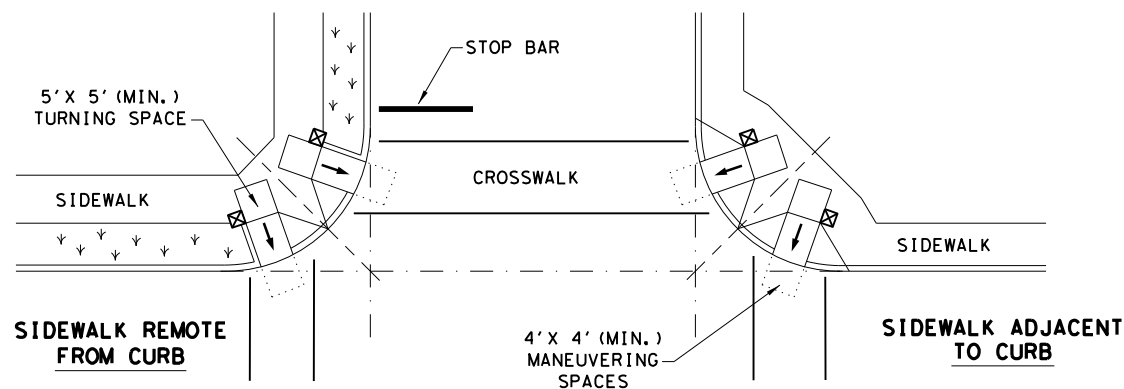


SIDEWALK ADJACENT TO CURB



SIDEWALK REMOTE FROM CURB

MID-BLOCK PLACEMENT PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH. ↙ ↘ ↙ ↘ ↙ ↘



PEDESTRIAN FACILITIES
 CURB RAMPS

PED-18

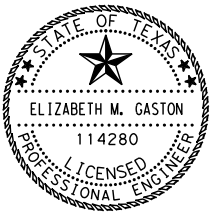
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© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076	06	037	US 67
REVISED 08, 2005	DIST	COUNTY	SHEET NO.	
REVISED 06, 2012	ODA	UPTON	150	
REVISED 01, 2018				

CULVERT ID	CULVERT STATION	10 YEAR DESIGN FREQUENCY								100 YEAR CHECK FLOOD FREQUENCY					
		CONDITION	Q (CFS)	TW	ALLOW HW *	HW	OUTLET VEL (FT/S)	TW VEL (FT/S)	OVERTOP DEPTH (FT)	CONDITION	Q (CFS)	TW	HW	OUTLET VEL (FT/S)	TW VEL (FT/S)
143	518+56	PROP	17	2477.50	2482.09	2478.02	2.68	0.87	N/A	PROP	42	2477.99	2478.64	4.48	1.17
144	525+29	PROP	26	2479.76	2483.72	2481.43	8.38	1.68	N/A	PROP	41	2479.97	2481.79	8.82	1.92
146	537+04	PROP	120	2477.64	2479.98	2478.64	6.00	2.59	N/A	PROP	236	2478.31	2480.80	9.82	3.10
147	549+75	PROP	150	2482.16	2483.62	2483.57	8.22	1.85	N/A	PROP	239	2482.64	2483.95	8.90	2.06
155	571+06	PROP	378	2482.56	2483.86	2483.82	7.29	3.92	N/A	PROP	1208	2485.07	2485.07	9.24	5.35
157	591+05	PROP	345	2485.50	2486.95	2486.39	7.39	2.39	N/A	PROP	945	2487.53	2487.55	9.25	2.99
158	595+08	PROP	230	2485.34	2487.36	2485.43	4.26	2.13	N/A	PROP	739	2487.13	2487.36	8.29	3.01
161	609+11	PROP	111	2491.89	2492.79	2491.96	3.85	1.81	N/A	PROP	328	2492.88	2493.17	6.77	2.53
168	677+91	PROP	228	2516.97	2520.43	2519.35	13.15	2.82	N/A	PROP	883	2518.51	2520.57	8.41	3.64
169	678+50	PROP	229	2517.89	2521.40	2518.93	6.45	3.14	N/A	PROP	880	2520.16	2520.50	9.15	4.31
171	717+43	PROP	268	2553.97	2557.28	2556.47	9.10	5.43	N/A	PROP	865	2556.19	2558.56	9.80	7.53
173	772+54	PROP	74	2545.78	2550.88	2549.51	10.71	1.81	N/A	PROP	279	2546.71	2550.28	11.60	2.72
175	797+14	PROP	821	2536.05	2538.01	2536.70	5.92	6.41	N/A	PROP	2816	2537.77	2538.87	9.79	9.83
177	821+40	PROP	914	2531.99	2532.18	2532.16	2.83	5.24	N/A	PROP	3451	2536.01	2536.01	7.50	7.77
178	853+73	PROP	80	2510.00	2512.95	2510.84	5.70	2.01	N/A	PROP	450	2511.38	2512.10	6.72	2.41
180	867+89	PROP	165	2505.62	2507.20	2507.12	7.68	2.75	N/A	PROP	598	2506.57	2507.62	8.51	3.71
181	880+08	PROP	522	2501.31	2501.38	2501.32	7.75	3.20	N/A	PROP	1938	2504.27	2504.28	12.08	4.64
183	901+09	PROP	592	2489.96	2490.77	2489.98	7.22	2.94	N/A	PROP	2058	2493.85	2493.86	12.75	4.06
187	963+19	PROP	29	2482.70	2487.62	2485.56	8.27	1.67	N/A	PROP	61	2483.23	2486.23	9.26	2.01
188	976+19	PROP	56	2484.07	2491.13	2488.57	10.18	3.19	N/A	PROP	89	2484.27	2489.61	11.21	3.73



* EDGE OF PAVEMENT ELEVATION WAS USED FOR ALLOWABLE HEADWATER. OVERTOPPING DEPTH CALCULATED AS HW MINUS ALLOWABLE HW.

NOTES:

1. HY-8 (VERSION 7.5) WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN.
2. REFER TO CROSSING CULVERT LAYOUT SHEETS FOR CULVERT DETAILS.
3. SEE FLOW BYPASS COMPUTATIONS SHEET FOR DISTRIBUTION OF FLOWS.



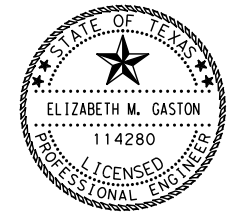
E. Gaston
10/25/2021

REV. NO.	DATE	DESCRIPTION	BY
 FIRM REGISTRATION NO. F-230			
 US 67			
NON-BRIDGE CLASS CULVERTS HYDRAULIC DATA			
SHEET 1 OF 1			
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.
CK:		TEXAS	STP 1902 (150)
DRN:	STATE DISTRICT	COUNTY	CONTROL NO. SECTION NO. JOB NO.
CK:	ODA	UPTON	0076 06 037
			SHEET NO. 151



PROPOSED FLOW BYPASS COMPUTATIONS											
CROSSING NUMBER	CALCULATED Q (CFS)		BYPASS FROM (CFS)			TOTAL DESIGN Q (CFS)		OVERTOPPING Q (CFS)	BYPASS TO (CFS)		
	10 YR	100 YR	CROSSING #	10 YR	100 YR	10 YR	100 YR		CROSSING #	10 YR	100 YR
143	17	26	144	0	15	17	42	18	OFF PROJECT	0	23
144	26	41	N/A	N/A	N/A	26	41	25	143	0	15
146	46	72	147	74	163	120	236	N/A	SAG	N/A	N/A
147	150	239	N/A	N/A	N/A	150	239	76	146	74	163
155	47	276	157	331	932	378	1208	N/A	SAG	N/A	N/A
157	149	240	158	196	705	345	945	13	155	331	932
158	127	419	161	102	320	230	739	34	157	196	705
161	111	178	163	0	150	111	328	8	158	102	320
163	646	2367	167	0	348	646	2715	N/A	161	0	150
167	354	1148	169	222	873	575	2021	N/A	163	0	348
168	6	10	169	222	873	228	883	N/A	N/A	N/A	N/A
169	89	143	171	140	737	229	880	7	167	222	873
171	268	865	N/A	N/A	N/A	268	865	128	169	140	737
173	74	279	N/A	N/A	N/A	74	279	14	175	60	265
175	761	2551	173	60	265	821	2816	131	177	690	2685
177	224	766	175	690	2685	914	3451	N/A	178	0	323
178	80	127	177	0	323	80	450	22	180	58	428
180	107	170	178	58	428	165	598	46	181	119	551
181	404	1387	180	119	551	522	1938	16	183	507	1922
183	85	135	181	507	1922	592	2058	43	184	549	2015
184	78	277	183	549	2015	627	2291	N/A	186	125	1010
186	332	1213	184 & 187	132	1049	464	2262	N/A	SAG	N/A	N/A
187	29	45	188	0	16	29	61	22	186	7	39
188	56	89	N/A	N/A	N/A	56	89	73	187	0	16

NOTES:

- CROSS CULVERTS ALONG US 67 ALLOW BYPASS FLOW TO ADJACENT DOWNGRADE CULVERTS PRIOR TO OVERTOPPING THE ROADWAY.
- CALCULATED FLOWS WERE DEVELOPED BY HYDROLOGIC PARAMETERS FOR EACH CROSSING AS INDICATED ON THE DRAINAGE AREA MAPS.
- OVERTOPPING FLOW REFERS TO THE FLOW RATE AT WHICH WATER WILL OVERTOP THE DITCH BLOCK OR GRADE BREAK AND CONTRIBUTE FLOW TO THE ADJACENT CULVERT.
- BYPASS FLOWS WERE COMPUTED THROUGH ITERATIVE MODELING TO DETERMINE THE CAPACITY AND OVERTOPPING FLOW AT EACH LOCATION.
- HEADWATER COMPUTATIONS WERE BASED ON THE TOTAL DESIGN FLOW WHICH IS EQUAL TO CALCULATED PLUS BYPASS FLOW.

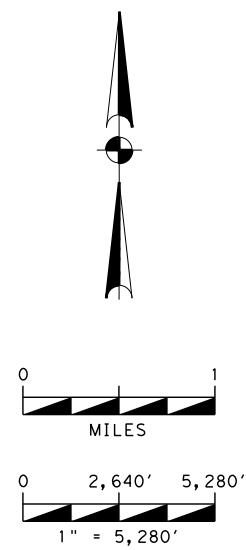


E. Gaston
10/25/2021




REV. NO.	DATE	DESCRIPTION	BY
			
			
US 67 FLOW BYPASS COMPUTATIONS			
SHEET 1 OF 1			
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.
CK:		TEXAS	
DRN:	STATE DISTRICT	COUNTY	CONTROL NO. SECTION NO. JOB NO.
CK:	ODA	UPTON	0076 06 037
			152

10/25/2021
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10/25/2021
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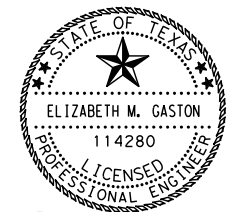


LEGEND

-  DRAINAGE AREA ID
-  DIRECTION OF FLOW
-  DRAINAGE AREA BOUNDARY

NOTES:

1. RATIONAL AND NRCS METHODS WERE USED FOR DRAINAGE AREAS LESS THAN AND GREATER THAN 200 ACRES, RESPECTIVELY.
2. SEE PROPOSED DRAINAGE AREA MAPS FOR RUNOFF COMPUTATIONS.



E. Gaston
 10/25/2021

REV. NO.	DATE	DESCRIPTION	BY

FIRM REGISTRATION NO. F-230




**US 67
 OVERALL
 DRAINAGE AREA MAP**

SHEET 1 OF 1

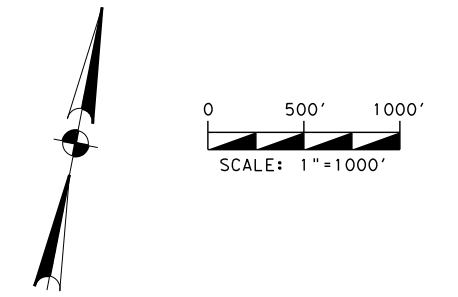
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.
CK:		TEXAS	STP 1902 (150)	67
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.
CK:	ODA	UPTON	0076	06
			JOB NO.	SHEET NO.
			037	153

P:\PROJECTS\TXDT17105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US*67*DDOVERALL.dgn

DRAINAGE CALCULATIONS - RATIONAL METHOD

DA	OUTLET TYPE	AREA (AC)	DESCRIPTION	C	Tc (MIN)		10-YEAR		100-YEAR	
					ACTUAL	USED	I10 (IN/HR)	Q10 (CFS)	I100 (IN/HR)	Q100 (CFS)
143	CULVERT	13.96	ARID/SEMI-ARID RANGELAND	0.39	34.70	34.70	3.03	17	4.82	26
144	CULVERT	20.29	ARID/SEMI-ARID RANGELAND	0.38	30.59	30.59	3.29	26	5.20	41
146	CULVERT	38.54	ARID/SEMI-ARID RANGELAND	0.39	35.29	35.29	3.00	46	4.77	72
147	CULVERT	138.69	ARID/SEMI-ARID RANGELAND	0.38	38.35	38.35	2.83	150	4.52	239
157	CULVERT	168.76	ARID/SEMI-ARID RANGELAND	0.38	51.42	51.42	2.31	149	3.73	240
161	CULVERT	117.92	ARID/SEMI-ARID RANGELAND	0.39	48.42	48.42	2.41	111	3.88	178

HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, RAINFALL INTENSITIES WERE DERIVED FROM THE EBDLKUP-2015.XLSX SPREADSHEET OF WHICH ARE BASED ON THE DATA CONTAINED IN THE ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).



LEGEND

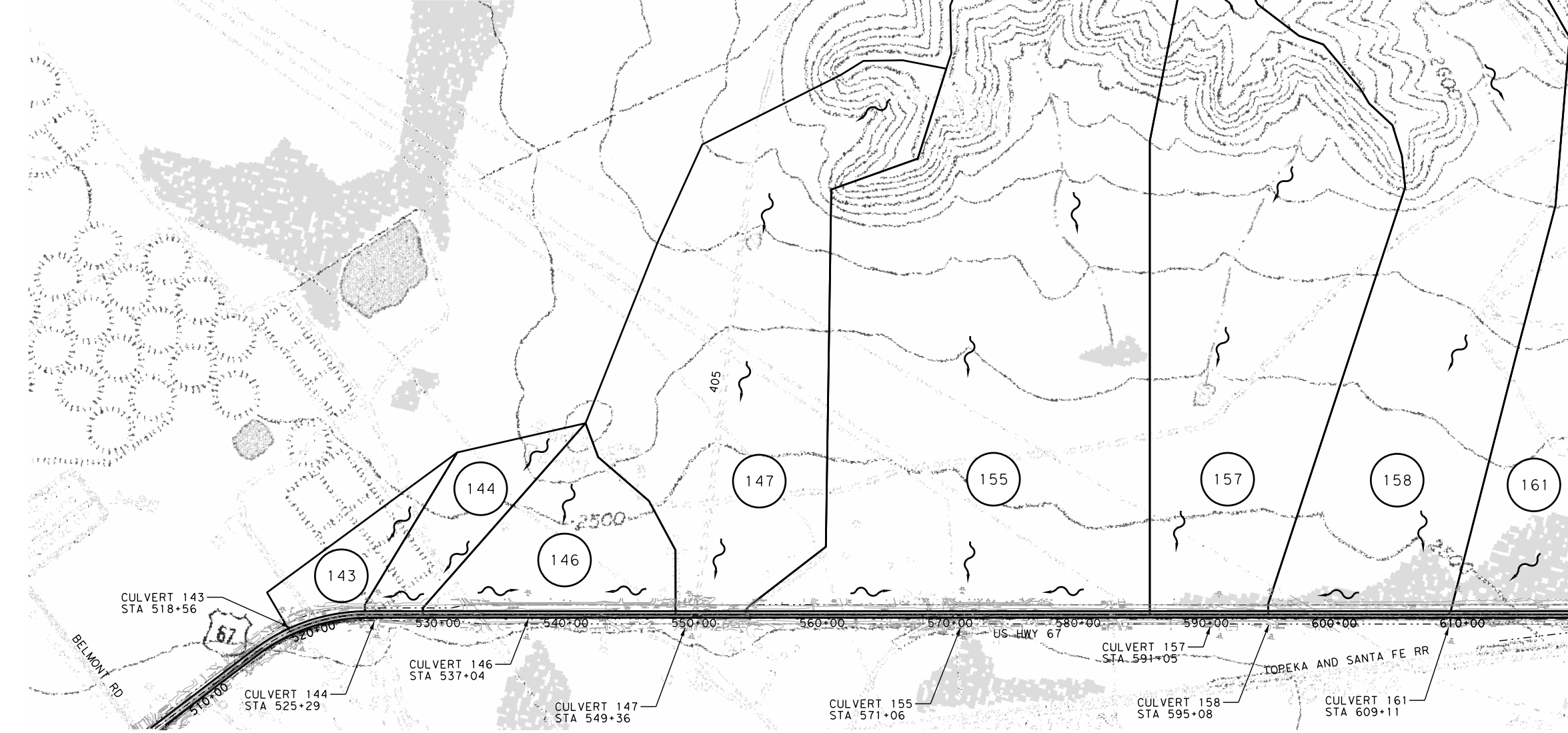
- XXX DRAINAGE AREA ID
- DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY

NOTES:

1. RATIONAL AND NRCS METHODS WERE USED FOR DRAINAGE AREAS LESS THAN AND GREATER THAN 200 ACRES, RESPECTIVELY.
2. RUNOFF COMPUTATIONS ARE SHOWN ON THE SHEET WHERE OUTFALL IS LOCATED.
3. HEC-RAS VERSION 5.0.7 AND HY-8 VERSION 7.50 WERE USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS AND NON-BRIDGE CLASS CROSSINGS, RESPECTIVELY, UNLESS OTHERWISE STATED.
4. THE STARTING WATER SURFACE ELEVATION AT EACH CROSSING WAS BASED ON NORMAL DEPTH CALCULATION.
5. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.



MATCH LINE STA. 619+00



RUNOFF COMPUTATIONS FOR LARGE WATERSHEDS (NRCS METHOD)

DA ID	AREA (SQ MI)	Tc (HR)	LAG TIME (HR)	LAG TIME (MIN)	BASE RCN	USED RCN	% IMPERVIOUS %	INITIAL ABSTR (IN)	24-HOUR PRECIPITATION (IN)						PEAK DISCHARGE (CFS)					
									2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
155	0.44	0.78	0.47	28.16	72	60	1.5	1.875	2.1	3.0	3.5	4.4	5.1	5.9	6	16	47	119	185	276
158	0.37	0.90	0.54	32.29	83	67	1.5	1.185	2.1	3.0	3.5	4.4	5.1	5.9	11	72	127	232	315	419

NRCS METHOD MODELED IN HEC-HMS VERSION 4.2.1.
 HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, PRECIPITATION DATA WAS DERIVED FROM ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).
 SOILS DATA OBTAINED FROM NRCS WEB SOIL SURVEY UTILITY.
 LAND USE DATA OBTAINED FROM AERIAL PHOTOGRAMMETRY.
 THE BASE RCN WAS ADJUSTED BASED ON THE LOWER BOUND EQUIVALENT TO THE CURVE NUMBER FOR AMC I, A CURVE NUMBER OF 60, OR THE RECOMMENDED REDUCTION FROM TXDOT HYDRAULIC MANUAL, FIGURE 4-22, WHICHEVER IS HIGHER.
 FOR DRAINAGE AREAS GREATER THAN 10 SQUARE MILES, AN AREAL DEPTH ADJUSTMENT WAS PERFORMED IN ACCORDANCE WITH THE TXDOT HYDRAULIC DESIGN MANUAL.

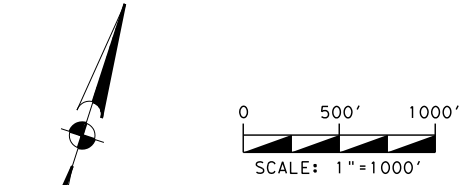
FIRM REGISTRATION NO. F-230			
US 67 PROPOSED DRAINAGE AREA MAP BEGIN PROJECT TO STA 619+00			
SHEET 1 OF 5			
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.
CK:		TEXAS	STP 1902 (150)
DRN:	STATE DISTRICT	COUNTY	CONTROL NO. SECTION NO. JOB NO.
CK:	ODA	UPTON	0076 06 037
			154

10/25/2021 DESIGN FILE NAME: P:\PROJECTS\TXDOT\1105\6_US_67\CADD\SHEETS\CSJ_0076-06-037\US*67*DDA01.dgn

DRAINAGE CALCULATIONS - RATIONAL METHOD

DA	OUTLET TYPE	AREA (AC)	DESCRIPTION	C	Tc (MIN)		10-YEAR		100-YEAR	
					ACTUAL	USED	I10 (IN/HR)	Q10 (CFS)	I100 (IN/HR)	Q100 (CFS)
168	CULVERT	4.24	ARID/SEMI-ARID RANGELAND	0.40	26.03	26.03	3.63	6	5.71	10
169	CULVERT	92.00	ARID/SEMI-ARID RANGELAND	0.40	47.58	47.58	2.44	89	3.93	143

HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, RAINFALL INTENSITIES WERE DERIVED FROM THE EBDLKUP-2015.XLSX SPREADSHEET OF WHICH ARE BASED ON THE DATA CONTAINED IN THE ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).

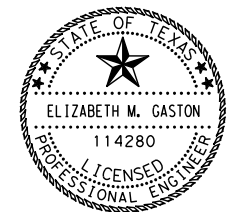
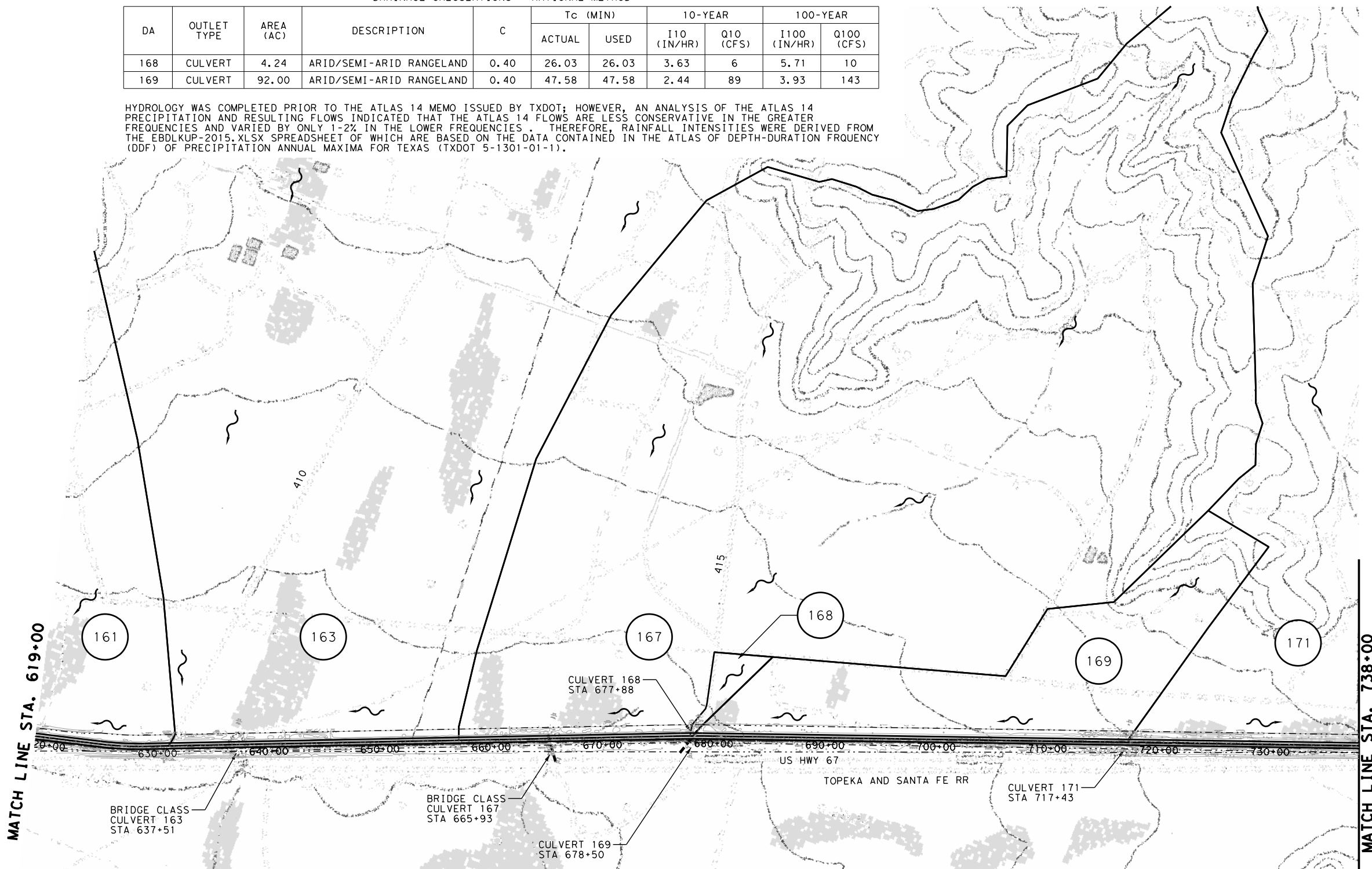


LEGEND

- XXX DRAINAGE AREA ID
- DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY

NOTES:

1. RATIONAL AND NRCS METHODS WERE USED FOR DRAINAGE AREAS LESS THAN AND GREATER THAN 200 ACRES, RESPECTIVELY.
2. RUNOFF COMPUTATIONS ARE SHOWN ON THE SHEET WHERE OUTFALL IS LOCATED.
3. HEC-RAS VERSION 5.0.7 AND HY-8 VERSION 7.50 WERE USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS AND NON-BRIDGE CLASS CROSSINGS, RESPECTIVELY, UNLESS OTHERWISE STATED.
4. THE STARTING WATER SURFACE ELEVATION AT EACH CROSSING WAS BASED ON NORMAL DEPTH CALCULATION.
5. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.



E. Gaston
10/25/2021

RUNOFF COMPUTATIONS FOR LARGE WATERSHEDS (NRCS METHOD)

DA ID	AREA (SQ MI)	Tc (HR)	LAG TIME (HR)	LAG TIME (MIN)	BASE RCN	USED RCN	% IMPERVIOUS	INITIAL ABSTR (IN)	24-HOUR PRECIPITATION (IN)						PEAK DISCHARGE (CFS)					
									2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
163	4.64	1.77	1.06	63.71	80	62	1.5	1.360	2.1	3.0	3.5	4.4	5.1	5.9	43	335	646	1231	1792	2367
167	1.06	0.92	0.55	33.29	83	67	1.5	1.167	2.1	3.0	3.5	4.4	5.1	5.9	31	201	354	639	867	1148
171	0.93	1.06	0.63	38.02	83	68	1.5	1.162	2.1	3.0	3.5	4.4	5.1	5.9	24	153	268	483	656	865

NRCS METHOD MODELED IN HEC-HMS VERSION 4.2.1.
 HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, PRECIPITATION DATA WAS DERIVED FROM ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).
 SOILS DATA OBTAINED FROM NRCS WEB SOIL SURVEY UTILITY.
 LAND USE DATA OBTAINED FROM AERIAL PHOTOGRAMMETRY.
 THE BASE RCN WAS ADJUSTED BASED ON THE LOWER BOUND EQUIVALENT TO THE CURVE NUMBER FOR AMC I, A CURVE NUMBER OF 60, OR THE RECOMMENDED REDUCTION FROM TXDOT HYDRAULIC MANUAL, FIGURE 4-22, WHICHEVER IS HIGHER.
 FOR DRAINAGE AREAS GREATER THAN 10 SQUARE MILES, AN AREAL DEPTH ADJUSTMENT WAS PERFORMED IN ACCORDANCE WITH THE TXDOT HYDRAULIC DESIGN MANUAL.

REV. NO.	DATE	DESCRIPTION	BY



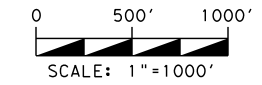
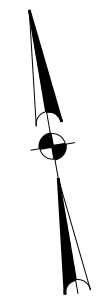
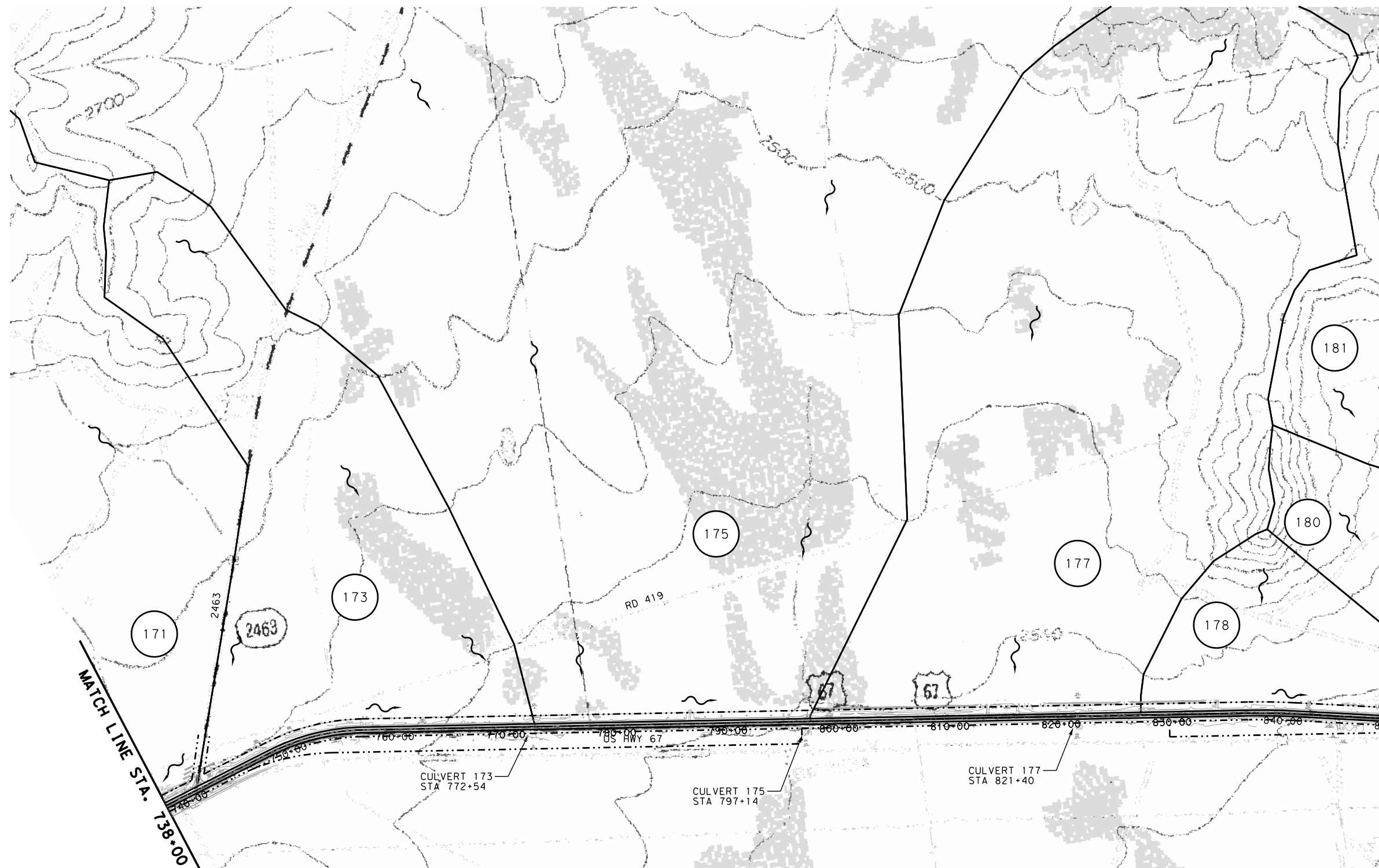
US 67
 PROPOSED
 DRAINAGE AREA MAP
 STA 619+00 TO STA 738+00

SHEET 2 OF 5

DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.		
CK:		TEXAS	STP 1902 (150)	67		
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	ODA	UPTON	0076	06	037	155

10/25/2021 DESIGN FILE NAME: P:\PROJECTS\TXDOT\1105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US*67*DDA02.dgn

10/25/2021
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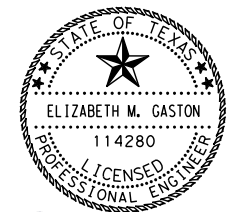


LEGEND

- XXX DRAINAGE AREA ID
- DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY

NOTES:

1. RATIONAL AND NRCS METHODS WERE USED FOR DRAINAGE AREAS LESS THAN AND GREATER THAN 200 ACRES.
2. RUNOFF COMPUTATIONS ARE SHOWN ON THE SHEET WHERE OUTFALL IS LOCATED.
3. HEC-RAS VERSION 5.0.7 AND HY-8 VERSION 7.50 WERE USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS AND NON-BRIDGE CLASS CROSSINGS, RESPECTIVELY, UNLESS OTHERWISE STATED.
4. THE STARTING WATER SURFACE ELEVATION AT EACH CROSSING WAS BASED ON NORMAL DEPTH CALCULATION.
5. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.



E. Gaston
10/25/2021

RUNOFF COMPUTATIONS FOR LARGE WATERSHEDS (NRCS METHOD)

DA ID	AREA (SQ MI)	Tc (HR)	LAG TIME (HR)	LAG TIME (MIN)	BASE RCN	USED RCN	% IMPERVIOUS %	INITIAL ABSTR (IN)	24-HOUR PRECIPITATION (IN)						PEAK DISCHARGE (CFS)					
									2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
173	0.34	0.80	0.48	28.62	80	62	1.5	1.358	2.1	3.0	3.5	4.4	5.1	5.9	4	38	74	145	203	279
175	3.12	1.19	0.71	42.89	82	66	1.5	1.211	2.1	3.0	3.5	4.4	5.1	5.9	62	422	761	1396	1926	2551
177	0.75	0.94	0.57	33.91	82	65	1.5	1.233	2.1	3.0	3.5	4.4	5.1	5.9	17	123	224	417	572	766

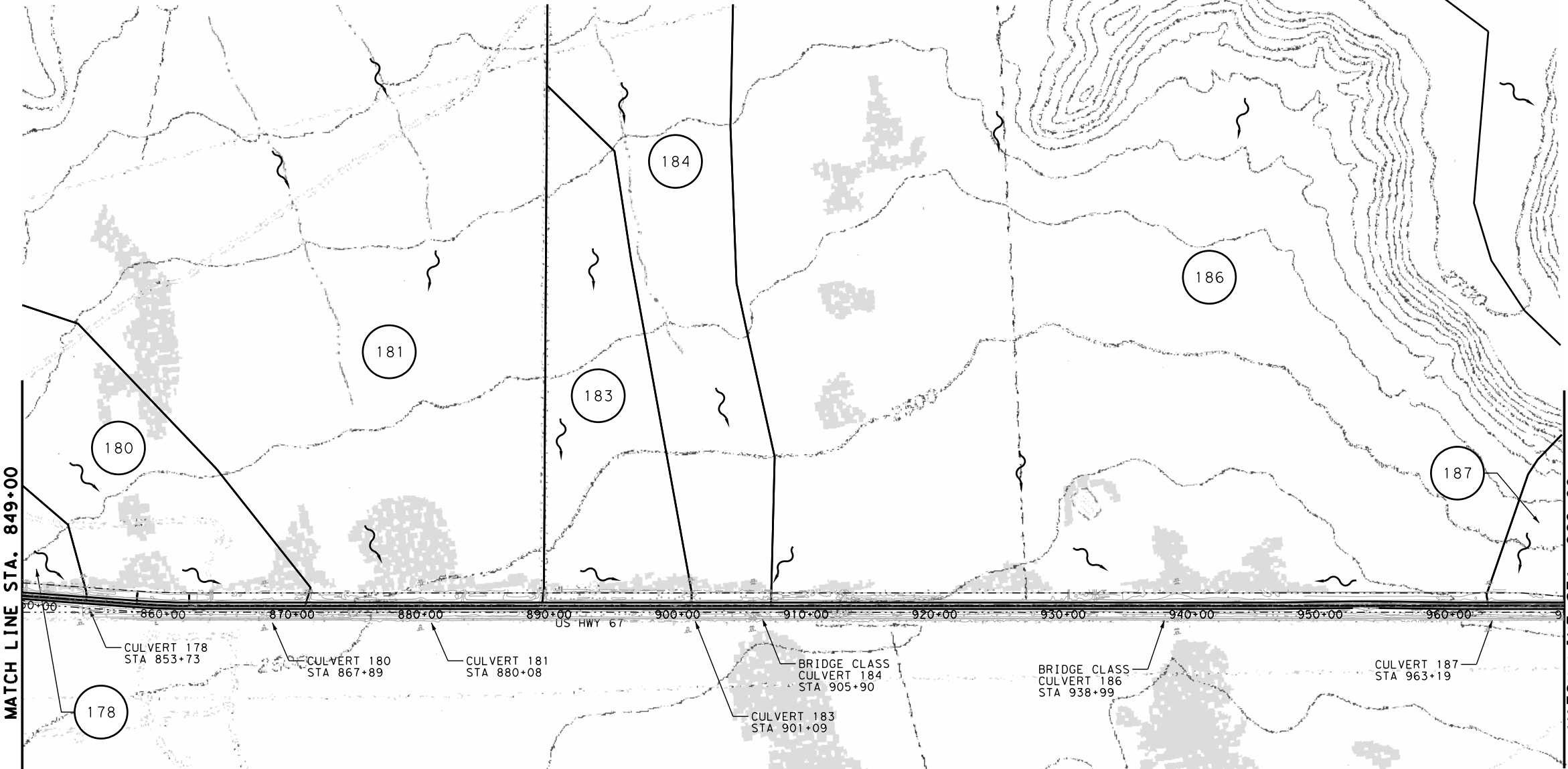
NRCS METHOD MODELED IN HEC-HMS VERSION 4.2.1.
 HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, PRECIPITATION DATA WAS DERIVED FROM ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).
 SOILS DATA OBTAINED FROM NRCS WEB SOIL SURVEY UTILITY.
 LAND USE DATA OBTAINED FROM AERIAL PHOTOGRAMMETRY.
 THE BASE RCN WAS ADJUSTED BASED ON THE LOWER BOUND EQUIVALENT TO THE CURVE NUMBER FOR AMC I, A CURVE NUMBER OF 60, OR THE RECOMMENDED REDUCTION FROM TXDOT HYDRAULIC MANUAL, FIGURE 4-22, WHICHEVER IS HIGHER.
 FOR DRAINAGE AREAS GREATER THAN 10 SQUARE MILES, AN AREAL DEPTH ADJUSTMENT WAS PERFORMED IN ACCORDANCE WITH THE TXDOT HYDRAULIC DESIGN MANUAL.

REV. NO.	DATE	DESCRIPTION	BY
FIRM REGISTRATION NO. F-230			
US 67 PROPOSED DRAINAGE AREA MAP STA 738+00 TO STA 849+00			
SHEET 3 OF 5			
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.
CK:		TEXAS	STP 1902 (150)
DRN:	STATE DISTRICT	COUNTY	CONTROL NO. SECTION NO. JOB NO.
CK:	ODA	UPTON	0076 06 037
			SHEET NO. 156

DRAINAGE CALCULATIONS - RATIONAL METHOD

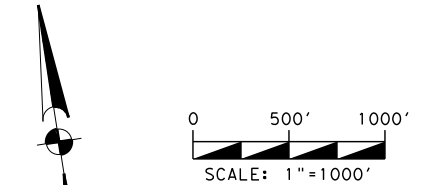
DA	OUTLET TYPE	AREA (AC)	DESCRIPTION	C	Tc (MIN)		10-YEAR		100-YEAR	
					ACTUAL	USED	I10 (IN/HR)	Q10 (CFS)	I100 (IN/HR)	Q100 (CFS)
178	CULVERT	67.12	ARID/SEMI-ARID RANGELAND	0.40	35.19	35.19	3.00	80	4.78	127
180	CULVERT	91.48	ARID/SEMI-ARID RANGELAND	0.39	35.00	35.00	3.01	107	4.79	170
183	CULVERT	71.33	ARID/SEMI-ARID RANGELAND	0.39	33.61	33.61	3.09	85	4.91	135
187	CULVERT	19.77	ARID/SEMI-ARID RANGELAND	0.39	25.26	25.26	3.70	29	5.81	45

HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, PRECIPITATION DATA WAS DERIVED FROM ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).



MATCH LINE STA. 849+00

MATCH LINE STA. 969+00

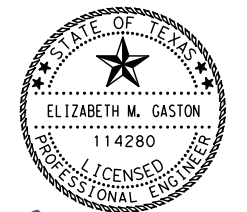


LEGEND

- XXX DRAINAGE AREA ID
- DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY

NOTES:

1. RATIONAL AND NRCS METHODS WERE USED FOR DRAINAGE AREAS LESS THAN AND GREATER THAN 200 ACRES, RESPECTIVELY.
2. RUNOFF COMPUTATIONS ARE SHOWN ON THE SHEET WHERE OUTFALL IS LOCATED.
3. HEC-RAS VERSION 5.0.7 AND HY-8 VERSION 7.50 WERE USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS AND NON-BRIDGE CLASS CROSSINGS, RESPECTIVELY, UNLESS OTHERWISE STATED.
4. THE STARTING WATER SURFACE ELEVATION AT EACH CROSSING WAS BASED ON NORMAL DEPTH CALCULATION.
5. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.



E. Gaston
10/25/2021

RUNOFF COMPUTATIONS FOR LARGE WATERSHEDS (NRCS METHOD)

DA ID	AREA (SQ MI)	Tc (HR)	LAG TIME (HR)	LAG TIME (MIN)	BASE RCN	USED RCN	% IMPERVIOUS	INITIAL ABSTR (IN)	24-HOUR PRECIPITATION (IN)						PEAK DISCHARGE (CFS)					
									2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
181	1.55	1.07	0.64	38.37	82	65	1.5	1.241	2.1	3.0	3.5	4.4	5.1	5.9	30	221	404	751	1038	1387
184	0.30	0.93	0.56	33.57	81	64	1.5	1.274	2.1	3.0	3.5	4.4	5.1	5.9	5	42	78	148	205	277
186	1.46	1.04	0.62	37.34	80	63	1.5	1.321	2.1	3.0	3.5	4.4	5.1	5.9	21	175	332	638	895	1213

NRCS METHOD MODELED IN HEC-HMS VERSION 4.2.1.

HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, PRECIPITATION DATA WAS DERIVED FROM ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).

SOILS DATA OBTAINED FROM NRCS WEB SOIL SURVEY UTILITY.

LAND USE DATA OBTAINED FROM AERIAL PHOTOGRAMMETRY.

THE BASE RCN WAS ADJUSTED BASED ON THE LOWER BOUND EQUIVALENT TO THE CURVE NUMBER FOR AMC I, A CURVE NUMBER OF 60, OR THE RECOMMENDED REDUCTION FROM TXDOT HYDRAULIC MANUAL, FIGURE 4-22, WHICHEVER IS HIGHER.

FOR DRAINAGE AREAS GREATER THAN 10 SQUARE MILES, AN AREAL DEPTH ADJUSTMENT WAS PERFORMED IN ACCORDANCE WITH THE TXDOT HYDRAULIC DESIGN MANUAL.

REV. NO.	DATE	DESCRIPTION	BY



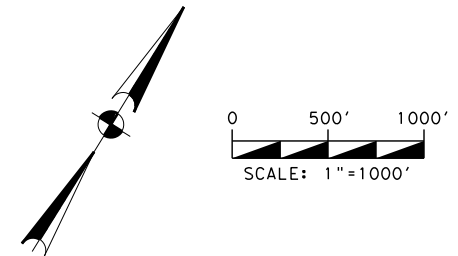
US 67
PROPOSED
DRAINAGE AREA MAP
STA 849+00 TO STA 969+00

SHEET 4 OF 5

DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.		
CK:		TEXAS	STP 1902 (150)	67		
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	ODA	UPTON	0076	06	037	157

10/25/2021 DESIGN FILE NAME: P:\PROJECTS\TXDOT\1105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US67\DDA04.dgn

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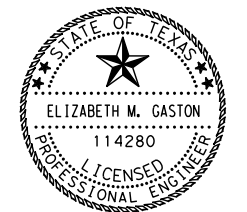


LEGEND

- XXX DRAINAGE AREA ID
- DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY

NOTES:

1. RATIONAL AND NRCS METHODS WERE USED FOR DRAINAGE AREAS LESS THAN AND GREATER THAN 200 ACRES, RESPECTIVELY.
2. RUNOFF COMPUTATIONS ARE SHOWN ON THE SHEET WHERE OUTFALL IS LOCATED.
3. HEC-RAS VERSION 5.0.7 AND HY-8 VERSION 7.50 WERE USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS AND NON-BRIDGE CLASS CROSSINGS, RESPECTIVELY, UNLESS OTHERWISE STATED.
4. THE STARTING WATER SURFACE ELEVATION AT EACH CROSSING WAS BASED ON NORMAL DEPTH CALCULATION.
5. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.



E. Gaston
10/25/2021

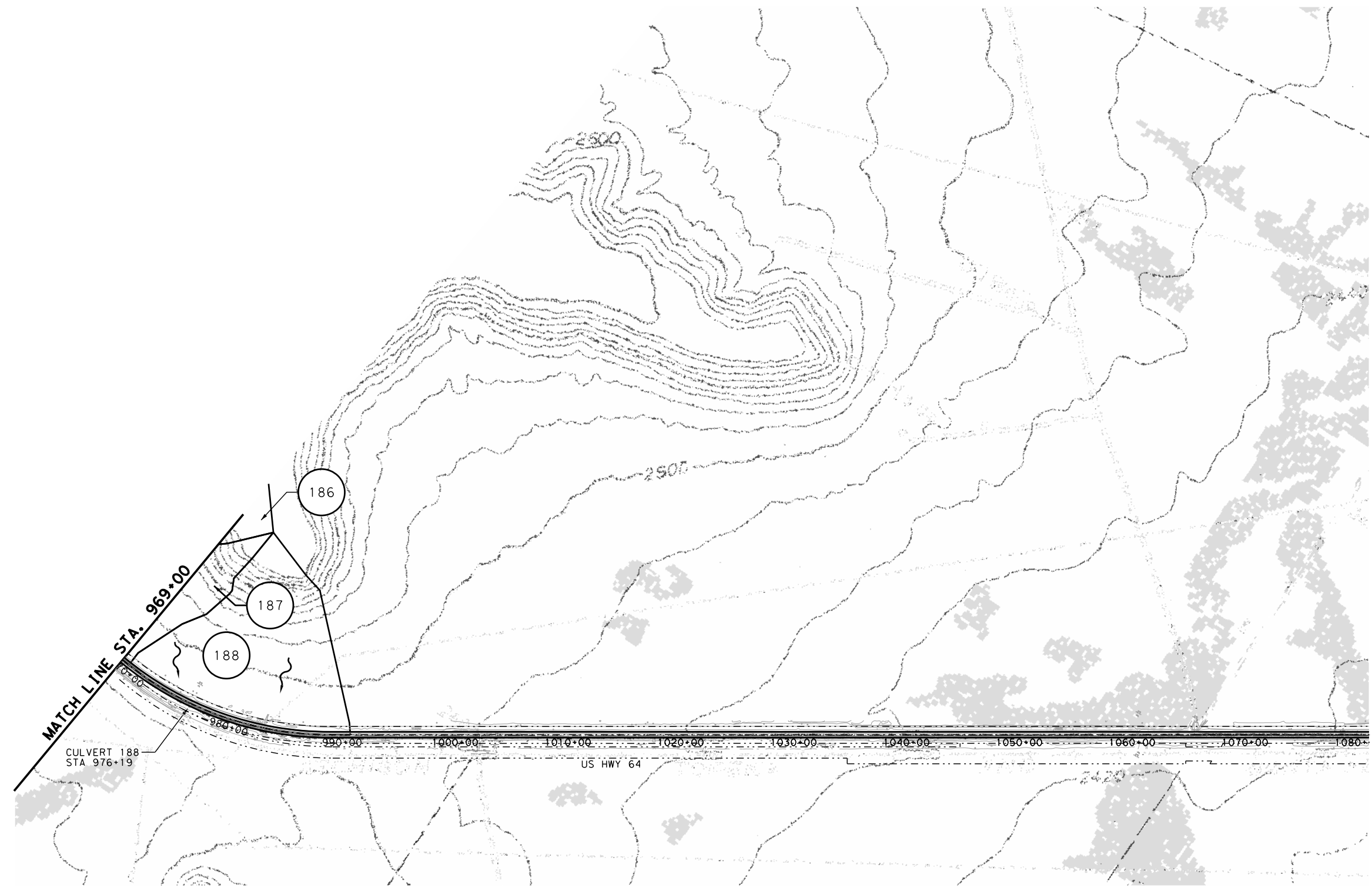
REV. NO.	DATE	DESCRIPTION	BY



**US 67
PROPOSED
DRAINAGE AREA MAP
STA 969+00 TO END PROJECT**

SHEET 5 OF 5

DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.		
CK:		TEXAS	STP 1902 (150)	67		
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	ODA	UPTON	0076	06	037	158



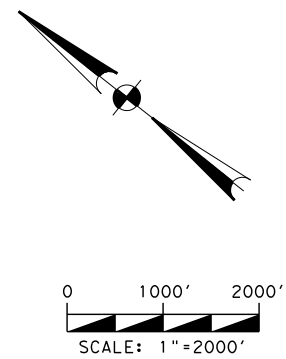
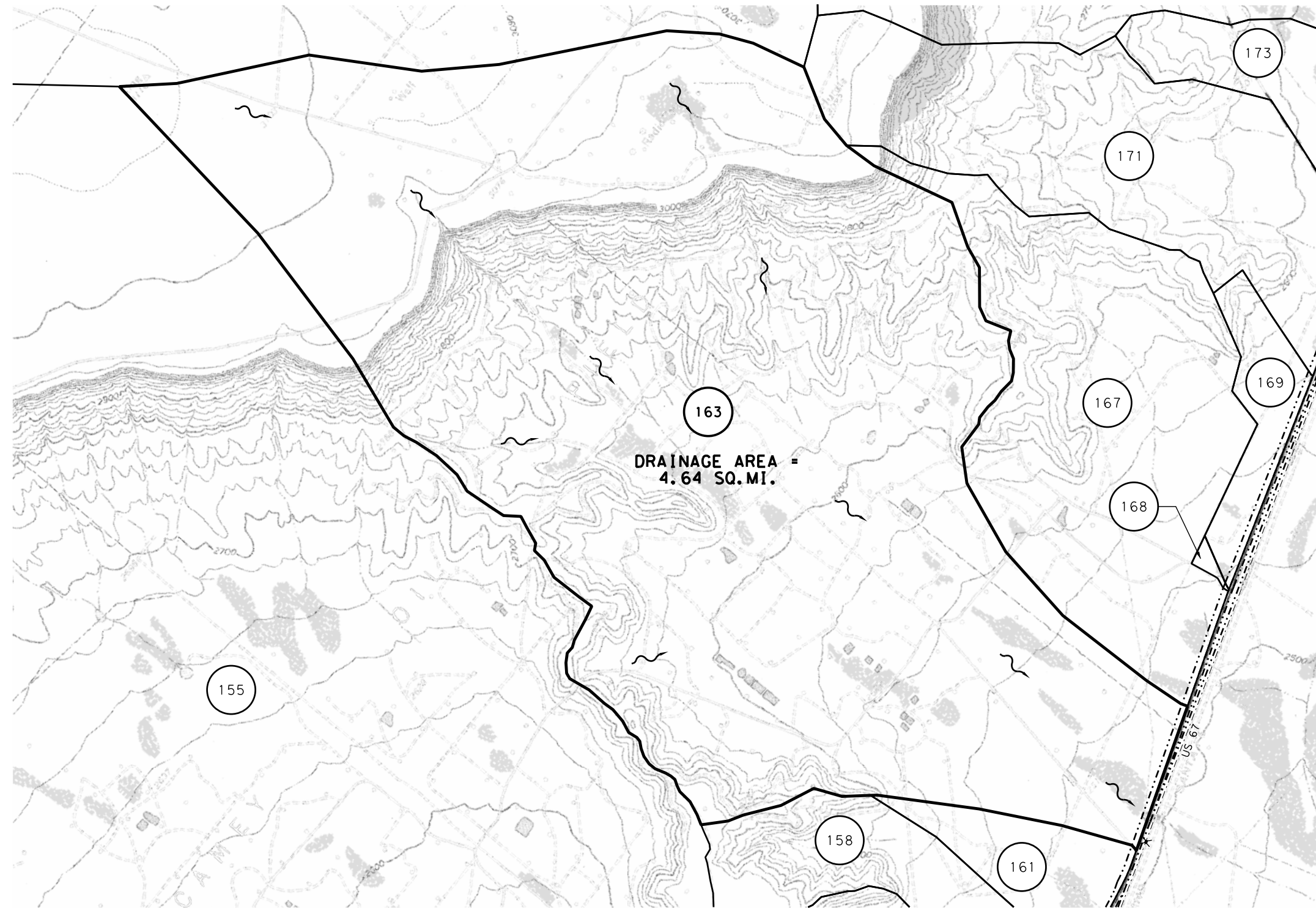
DRAINAGE CALCULATIONS - RATIONAL METHOD

DA	OUTLET TYPE	AREA (AC)	DESCRIPTION	C	Tc (MIN)		10-YEAR		100-YEAR	
					ACTUAL	USED	I10 (IN/HR)	Q10 (CFS)	I100 (IN/HR)	Q100 (CFS)
188	CULVERT	43.86	ARID/SEMI-ARID RANGELAND	0.39	30.90	30.90	3.27	56	5.17	89

HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, RAINFALL INTENSITIES WERE DERIVED FROM THE EBDLKUP-2015.XLSX SPREADSHEET OF WHICH ARE BASED ON THE DATA CONTAINED IN THE ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).

10/25/2021 DESIGN FILE NAME: P:\PROJECTS\TXDOT\1105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US67\DDA05.dgn

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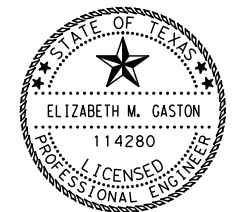


LEGEND

- XXX DRAINAGE AREA ID
- DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY

NOTES:

1. ALL ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
2. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS CROSSINGS.
3. THE STARTING WATER SURFACE ELEVATION IS BASED ON NORMAL DEPTH CALCULATION.
4. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.
5. CROSS CULVERTS ALONG US 67 ALLOW BYPASS FLOW TO ADJACENT DOWNGRADE CULVERTS PRIOR TO OVERTOPPING THE ROADWAY. HEADWATER COMPUTATIONS ARE BASED ON THE TOTAL DESIGN FLOW WHICH IS EQUAL TO CALCULATED PLUS BYPASS FLOW.



E. Gaston
10/25/2021

RUNOFF COMPUTATIONS FOR LARGE WATERSHEDS (NRCS METHOD)

DA ID	AREA (SQ MI)	T _c (HR)	LAG TIME (HR)	LAG TIME (MIN)	BASE RCN	USED RCN	% IMPERVIOUS %	INITIAL ABSTR (IN)	24-HOUR PRECIPITATION (IN)						PEAK DISCHARGE (CFS)					
									2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
163	4.64	1.77	1.06	63.71	80	62	1.5	1.360	2.1	3.0	3.5	4.4	5.1	5.9	43	335	646	1231	1792	2367

NRCS METHOD MODELED IN HEC-HMS VERSION 4.2.1.

HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, PRECIPITATION DATA WAS DERIVED FROM ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).

KERBY-KIRPICH METHOD USED TO CALCULATE TIME OF CONCENTRATION.

SOILS DATA OBTAINED FROM NRCS WEB SOIL SURVEY UTILITY.

LAND USE DATA OBTAINED FROM AERIAL PHOTOGRAMMETRY.

THE BASE RCN WAS ADJUSTED BASED ON THE LOWER BOUND EQUIVALENT TO THE CURVE NUMBER FOR AMC I, A CURVE NUMBER OF 60, OR THE RECOMMENDED REDUCTION FROM TXDOT HYDRAULIC MANUAL, FIGURE 4-22, WHICHEVER IS HIGHER.

FOR DRAINAGE AREAS GREATER THAN 10 SQUARE MILES, AN AREAL DEPTH ADJUSTMENT WAS PERFORMED IN ACCORDANCE WITH THE TXDOT HYDRAULIC DESIGN MANUAL.

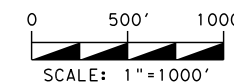
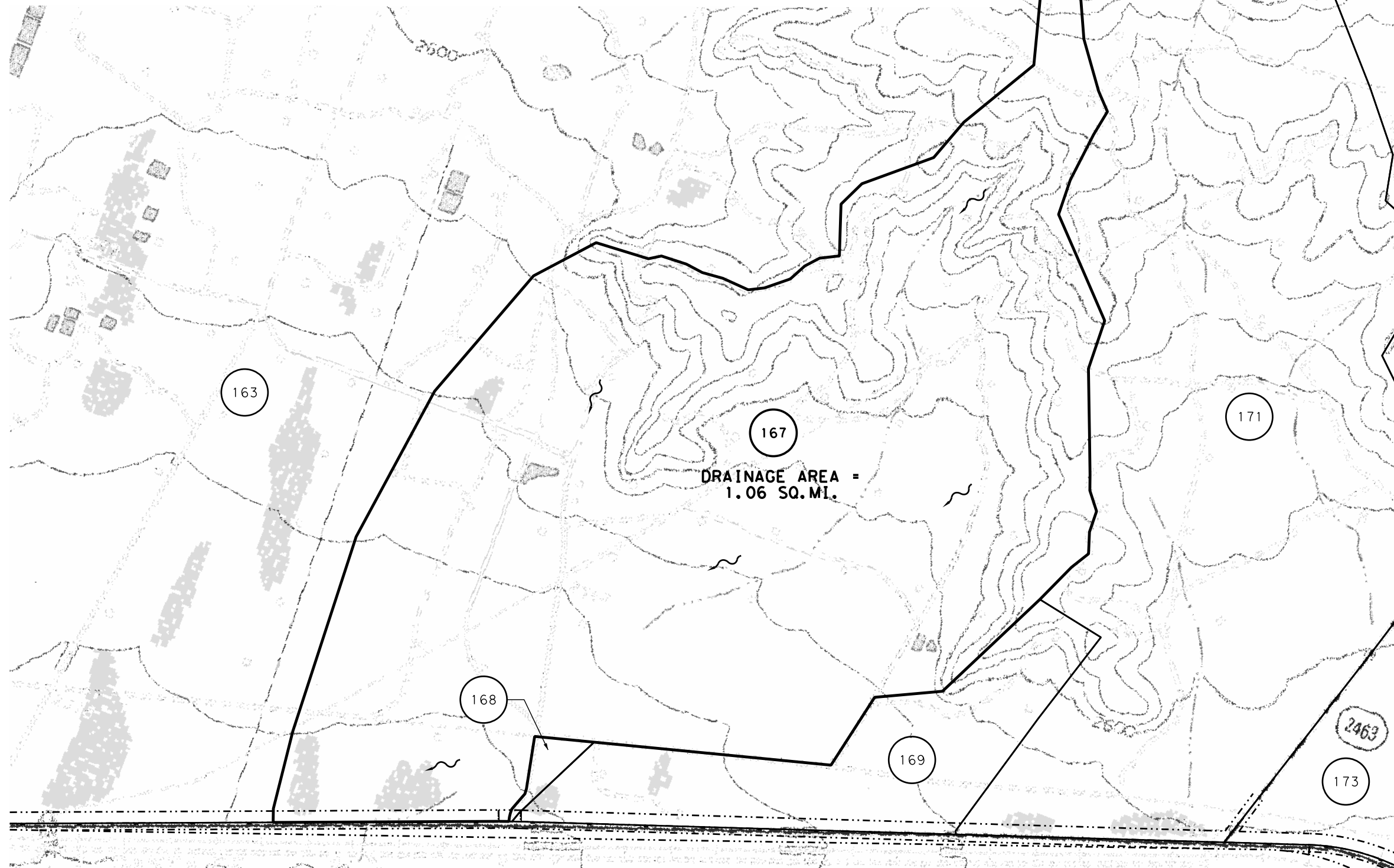
REV. NO.	DATE	DESCRIPTION	BY
FIRM REGISTRATION NO. F-230			
US 67 PROPOSED BRIDGE CLASS CULVERT 163 DRAINAGE AREA MAP STA 637+51			
SHEET 1 OF 5			
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.
CK:		TEXAS	STP 1902 (150)
DRN:	STATE DISTRICT	COUNTY	CONTROL NO. SECTION NO. JOB NO.
CK:	ODA	UPTON	0076 06 037
			HIGHWAY NO. SHEET NO.
			67 159

10/25/2021
 DESIGN FILE NAME: P:\PROJECTS\TXDOT\1105\6_US_67\CADD\SHEETS\CSJ_0076-06-037\US*67*163*DA.dgn

RUNOFF COMPUTATIONS FOR LARGE WATERSHEDS (NRCS METHOD)

DA ID	AREA (SQ MI)	Tc (HR)	LAG TIME (HR)	LAG TIME (MIN)	BASE RCN	USED RCN	% IMPERVIOUS %	INITIAL ABSTR (IN)	24-HOUR PRECIPITATION (IN)						PEAK DISCHARGE (CFS)					
									2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
167	1.06	0.92	0.55	33.29	83	67	1.5	1.167	2.1	3.0	3.5	4.4	5.1	5.9	31	201	354	639	867	1148

NRCS METHOD MODELED IN HEC-HMS VERSION 4.2.1.
 HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, PRECIPITATION DATA WAS DERIVED FROM ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).
 KERBY-KIRPICH METHOD USED TO CALCULATE TIME OF CONCENTRATION.
 SOILS DATA OBTAINED FROM NRCS WEB SOIL SURVEY UTILITY.
 LAND USE DATA OBTAINED FROM AERIAL PHOTOGRAMMETRY.
 THE BASE RCN WAS ADJUSTED BASED ON THE LOWER BOUND EQUIVALENT TO THE CURVE NUMBER FOR AMC I, A CURVE NUMBER OF 60, OR THE RECOMMENDED REDUCTION FROM TXDOT HYDRAULIC MANUAL, FIGURE 4-22, WHICHEVER IS HIGHER.
 FOR DRAINAGE AREAS GREATER THAN 10 SQUARE MILES, AN AREAL DEPTH ADJUSTMENT WAS PERFORMED IN ACCORDANCE WITH THE TXDOT HYDRAULIC DESIGN MANUAL.

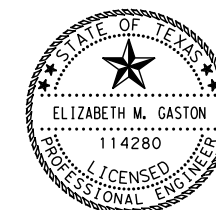


LEGEND

- XXX DRAINAGE AREA ID
- DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY

NOTES:

1. ALL ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
2. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS CROSSINGS.
3. THE STARTING WATER SURFACE ELEVATION IS BASED ON NORMAL DEPTH CALCULATION.
4. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.
5. CROSS CULVERTS ALONG US 67 ALLOW BYPASS FLOW TO ADJACENT DOWNGRADE CULVERTS PRIOR TO OVERTOPPING THE ROADWAY. HEADWATER COMPUTATIONS ARE BASED ON THE TOTAL DESIGN FLOW WHICH IS EQUAL TO CALCULATED PLUS BYPASS FLOW.



E. Gaston
10/25/2021

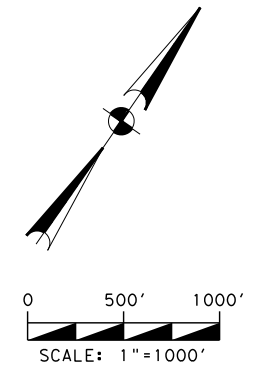
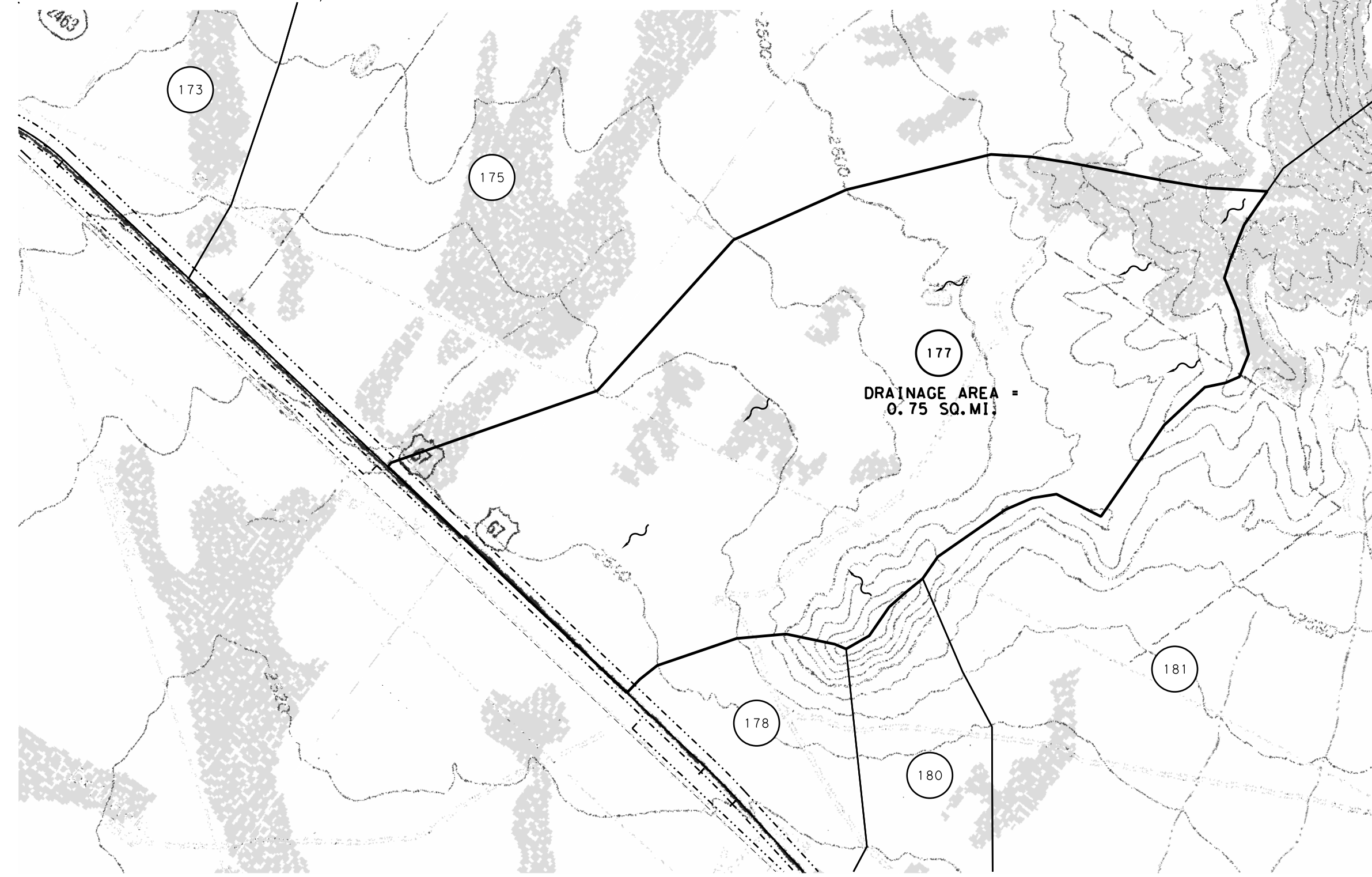
REV. NO.	DATE	DESCRIPTION	BY
FIRM REGISTRATION NO. F-230			
US 67 PROPOSED BRIDGE CLASS CULVERT 167 DRAINAGE AREA MAP STA 665+93			
SHEET 2 OF 5			
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.
CK:		TEXAS	STP 1902 (150)
DRN:	STATE DISTRICT	COUNTY	CONTROL NO. SECTION NO. JOB NO.
CK:	ODA	UPTON	0076 06 037
			HIGHWAY NO. SHEET NO.
			67 160

10/25/2021 DESIGN FILE NAME: P:\PROJECTS\TXDOT\17105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US*67*167*DA.dgn

RUNOFF COMPUTATIONS FOR LARGE WATERSHEDS (NRCS METHOD)

DA ID	AREA (SQ MI)	Tc (HR)	LAG TIME (HR)	LAG TIME (MIN)	BASE RCN	USED RCN	% IMPERVIOUS %	INITIAL ABSTR (IN)	24-HOUR PRECIPITATION (IN)						PEAK DISCHARGE (CFS)					
									2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
177	0.75	0.94	0.57	33.91	82	65	1.5	1.233	2.1	3.0	3.5	4.4	5.1	5.9	17	123	224	417	572	766

NRCS METHOD MODELED IN HEC-HMS VERSION 4.2.1.
 HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, PRECIPITATION DATA WAS DERIVED FROM ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).
 KERBY-KIRPICH METHOD USED TO CALCULATE TIME OF CONCENTRATION.
 SOILS DATA OBTAINED FROM NRCS WEB SOIL SURVEY UTILITY.
 LAND USE DATA OBTAINED FROM AERIAL PHOTOGRAMMETRY.
 THE BASE RCN WAS ADJUSTED BASED ON THE LOWER BOUND EQUIVALENT TO THE CURVE NUMBER FOR AMC I, A CURVE NUMBER OF 60, OR THE RECOMMENDED REDUCTION FROM TXDOT HYDRAULIC MANUAL, FIGURE 4-22, WHICHEVER IS HIGHER.
 FOR DRAINAGE AREAS GREATER THAN 10 SQUARE MILES, AN AREAL DEPTH ADJUSTMENT WAS PERFORMED IN ACCORDANCE WITH THE TXDOT HYDRAULIC DESIGN MANUAL.

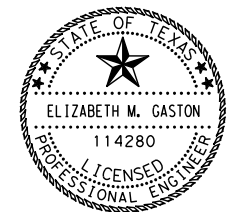


LEGEND

- XXX DRAINAGE AREA ID
- DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY

NOTES:

1. ALL ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
2. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS CROSSINGS.
3. THE STARTING WATER SURFACE ELEVATION IS BASED ON NORMAL DEPTH CALCULATION.
4. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA. THEREFORE A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.
5. CROSS CULVERTS ALONG US 67 ALLOW BYPASS FLOW TO ADJACENT DOWNGRADE CULVERTS PRIOR TO OVERTOPPING THE ROADWAY. HEADWATER COMPUTATIONS ARE BASED ON THE TOTAL DESIGN FLOW WHICH IS EQUAL TO CALCULATED PLUS BYPASS FLOW.



E. Gaston
10/25/2021

REV. NO.	DATE	DESCRIPTION	BY



US 67
 PROPOSED BRIDGE CLASS
 CULVERT 177
 DRAINAGE AREA MAP
 STA 821+40

SHEET 3 OF 5

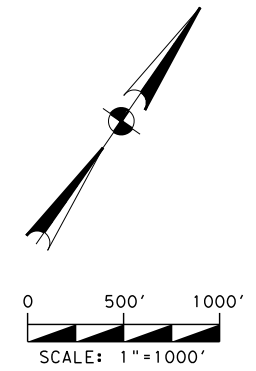
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.
CK:		TEXAS	STP 1902 (150)	67
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.
CK:	ODA	UPTON	0076	06
				JOB NO.
				037
				SHEET NO.
				161

10/25/2021 DESIGN FILE NAME: P:\PROJECTS\TXDOT\17105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US+67+177+DA.dgn

RUNOFF COMPUTATIONS FOR LARGE WATERSHEDS (NRCS METHOD)

DA ID	AREA (SQ MI)	T _c (HR)	LAG TIME (HR)	LAG TIME (MIN)	BASE RCN	USED RCN	% IMPERVIOUS %	INITIAL ABSTR (IN)	24-HOUR PRECIPITATION (IN)						PEAK DISCHARGE (CFS)					
									2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
184	0.30	0.93	0.56	33.57	81	64	1.5	1.274	2.1	3.0	3.5	4.4	5.1	5.9	5	42	78	148	205	277

NRCS METHOD MODELED IN HEC-HMS VERSION 4.2.1.
 HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, PRECIPITATION DATA WAS DERIVED FROM ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).
 KERBY-KIRPICH METHOD USED TO CALCULATE TIME OF CONCENTRATION.
 SOILS DATA OBTAINED FROM NRCS WEB SOIL SURVEY UTILITY.
 LAND USE DATA OBTAINED FROM AERIAL PHOTOGRAMMETRY.
 THE BASE RCN WAS ADJUSTED BASED ON THE LOWER BOUND EQUIVALENT TO THE CURVE NUMBER FOR AMC I, A CURVE NUMBER OF 60, OR THE RECOMMENDED REDUCTION FROM TXDOT HYDRAULIC MANUAL, FIGURE 4-22, WHICHEVER IS HIGHER.
 FOR DRAINAGE AREAS GREATER THAN 10 SQUARE MILES, AN AREAL DEPTH ADJUSTMENT WAS PERFORMED IN ACCORDANCE WITH THE TXDOT HYDRAULIC DESIGN MANUAL.

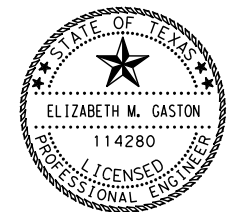


LEGEND

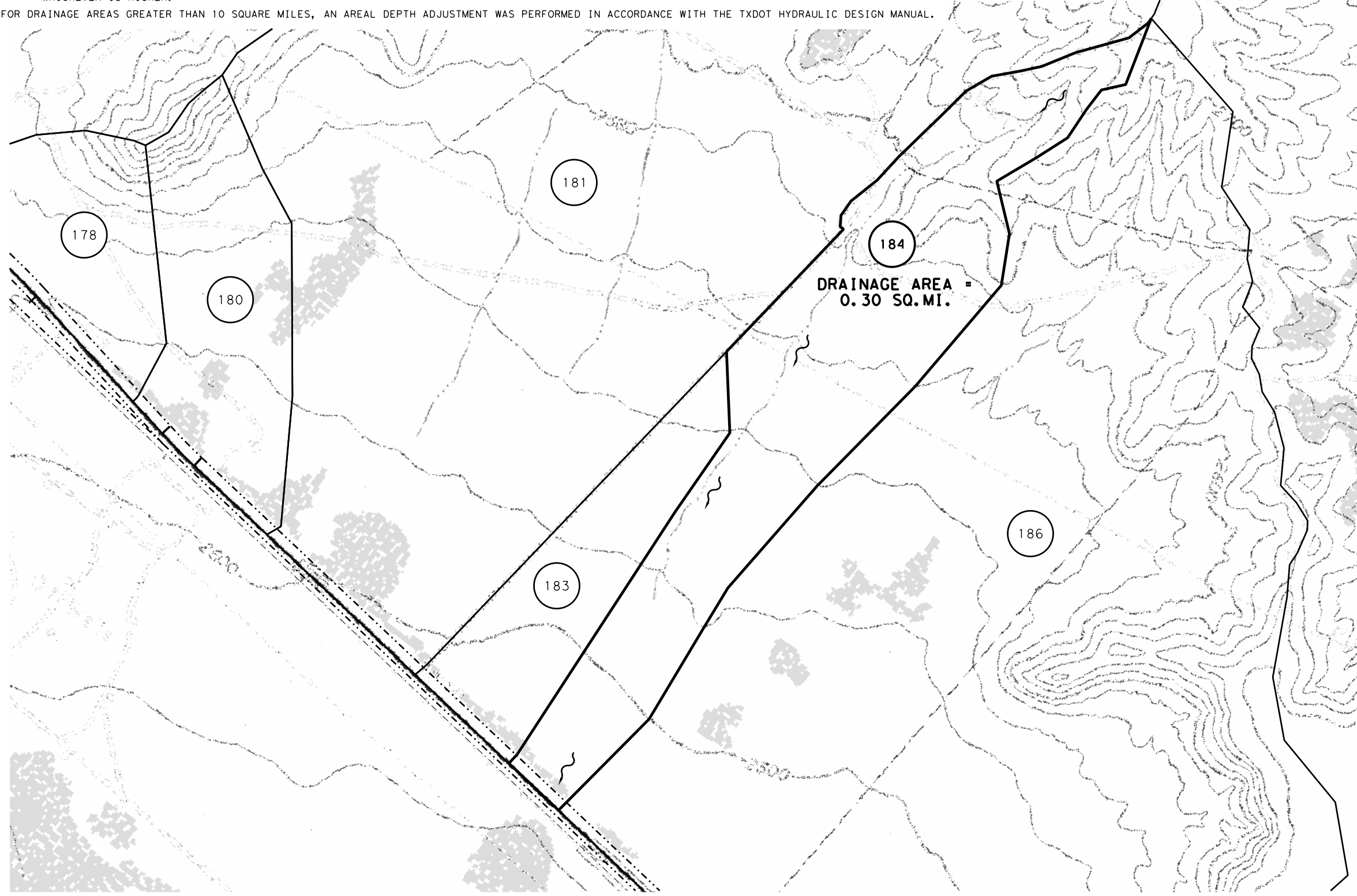
- XXX DRAINAGE AREA ID
- DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY

NOTES:

1. ALL ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
2. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS CROSSINGS.
3. THE STARTING WATER SURFACE ELEVATION IS BASED ON NORMAL DEPTH CALCULATION.
4. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.
5. CROSS CULVERTS ALONG US 67 ALLOW BYPASS FLOW TO ADJACENT DOWNGRADE CULVERTS PRIOR TO OVERTOPPING THE ROADWAY. HEADWATER COMPUTATIONS ARE BASED ON THE TOTAL DESIGN FLOW WHICH IS EQUAL TO CALCULATED PLUS BYPASS FLOW.



E. Gaston
10/25/2021



10/25/2021 DESIGN FILE NAME: P:\PROJECTS\TXDOT\1105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US*67*184*DA.dgn

REV. NO.	DATE	DESCRIPTION	BY
FIRM REGISTRATION NO. F-230			
US 67 PROPOSED BRIDGE CLASS CULVERT 184 DRAINAGE AREA MAP STA 905+90			
SHEET 4 OF 5			
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.
CK:		TEXAS	STP 1902 (150)
DRN:	STATE DISTRICT	COUNTY	CONTROL NO. SECTION NO. JOB NO.
CK:	ODA	UPTON	0076 06 037
			SHEET NO. 162

RUNOFF COMPUTATIONS FOR LARGE WATERSHEDS (NRCS METHOD)

DA ID	AREA (SQ MI)	Tc (HR)	LAG TIME (HR)	LAG TIME (MIN)	BASE RCN	USED RCN	% IMPERVIOUS %	INITIAL ABSTR (IN)	24-HOUR PRECIPITATION (IN)						PEAK DISCHARGE (CFS)					
									2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
186	1.46	1.04	0.62	37.34	80	63	1.5	1.321	2.1	3.0	3.5	4.4	5.1	5.9	21	175	332	638	895	1213

NRCS METHOD MODELED IN HEC-HMS VERSION 4.2.1.

HYDROLOGY WAS COMPLETED PRIOR TO THE ATLAS 14 MEMO ISSUED BY TXDOT; HOWEVER, AN ANALYSIS OF THE ATLAS 14 PRECIPITATION AND RESULTING FLOWS INDICATED THAT THE ATLAS 14 FLOWS ARE LESS CONSERVATIVE IN THE GREATER FREQUENCIES AND VARIED BY ONLY 1-2% IN THE LOWER FREQUENCIES. THEREFORE, PRECIPITATION DATA WAS DERIVED FROM ATLAS OF DEPTH-DURATION FREQUENCY (DDF) OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS (TXDOT 5-1301-01-1).

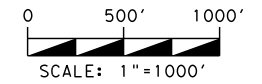
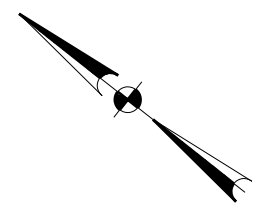
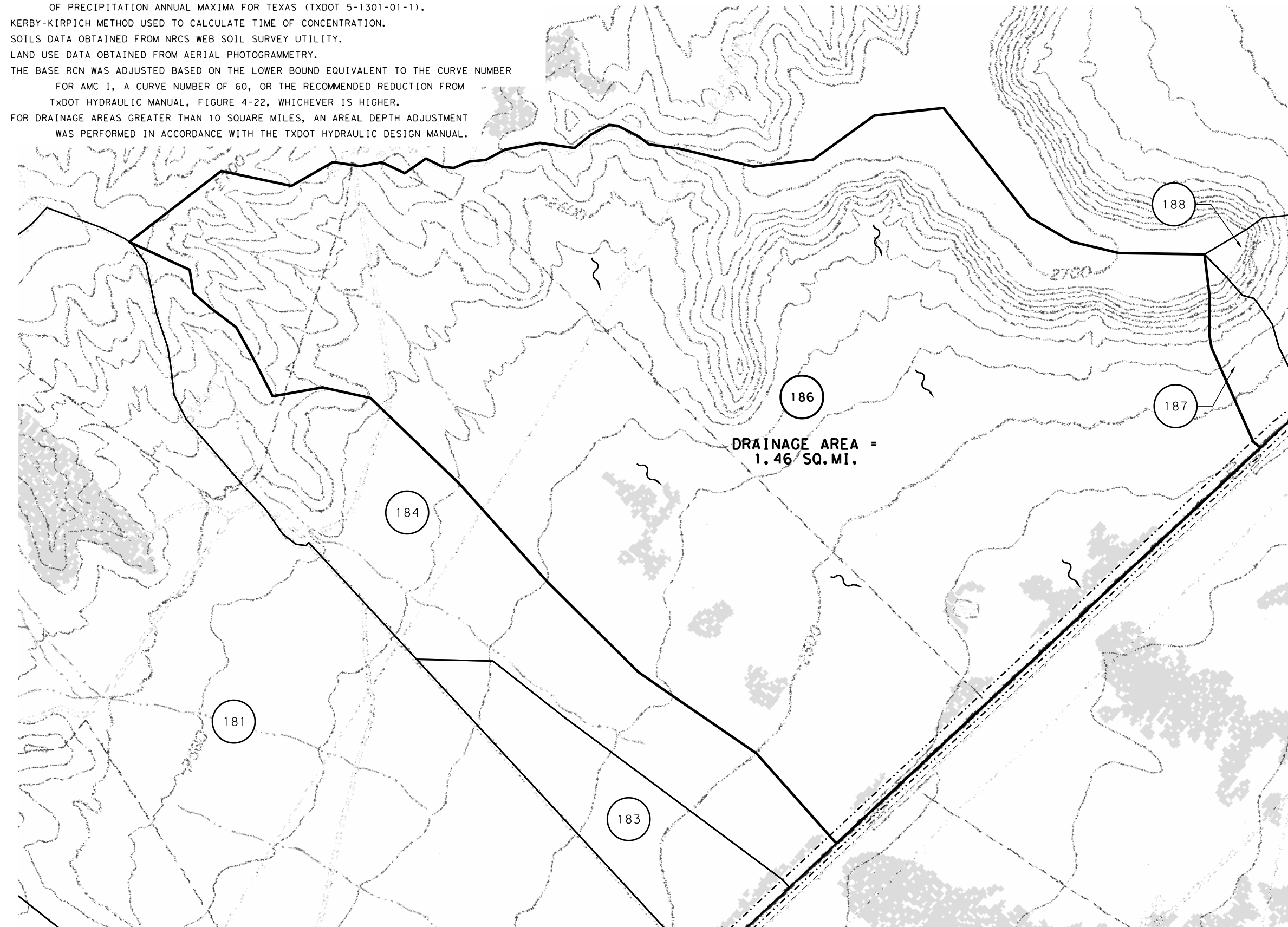
KERBY-KIRPICH METHOD USED TO CALCULATE TIME OF CONCENTRATION.

SOILS DATA OBTAINED FROM NRCS WEB SOIL SURVEY UTILITY.

LAND USE DATA OBTAINED FROM AERIAL PHOTOGRAMMETRY.

THE BASE RCN WAS ADJUSTED BASED ON THE LOWER BOUND EQUIVALENT TO THE CURVE NUMBER FOR AMC I, A CURVE NUMBER OF 60, OR THE RECOMMENDED REDUCTION FROM TXDOT HYDRAULIC MANUAL, FIGURE 4-22, WHICHEVER IS HIGHER.

FOR DRAINAGE AREAS GREATER THAN 10 SQUARE MILES, AN AREAL DEPTH ADJUSTMENT WAS PERFORMED IN ACCORDANCE WITH THE TXDOT HYDRAULIC DESIGN MANUAL.

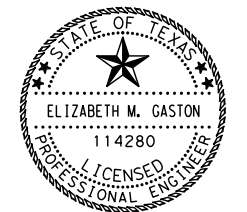


LEGEND

- XXX DRAINAGE AREA ID
- DIRECTION OF FLOW
- DRAINAGE AREA BOUNDARY

NOTES:

1. ALL ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
2. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS CROSSINGS.
3. THE STARTING WATER SURFACE ELEVATION IS BASED ON NORMAL DEPTH CALCULATION.
4. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.
5. CROSS CULVERTS ALONG US 67 ALLOW BYPASS FLOW TO ADJACENT DOWNGRADE CULVERTS PRIOR TO OVERTOPPING THE ROADWAY. HEADWATER COMPUTATIONS ARE BASED ON THE TOTAL DESIGN FLOW WHICH IS EQUAL TO CALCULATED PLUS BYPASS FLOW.



E. Gaston
10/25/2021

REV. NO.	DATE	DESCRIPTION	BY



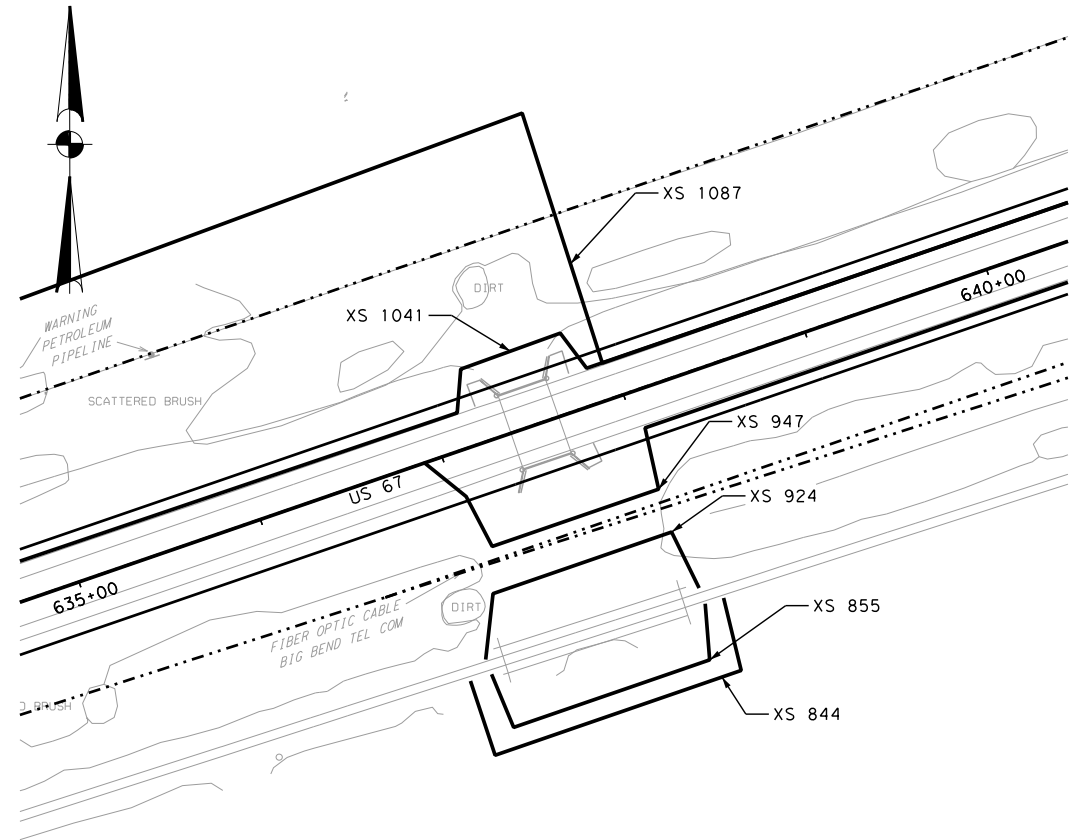
US 67
PROPOSED BRIDGE CLASS
CULVERT 186
DRAINAGE AREA MAP
STA 938+99

SHEET 5 OF 5

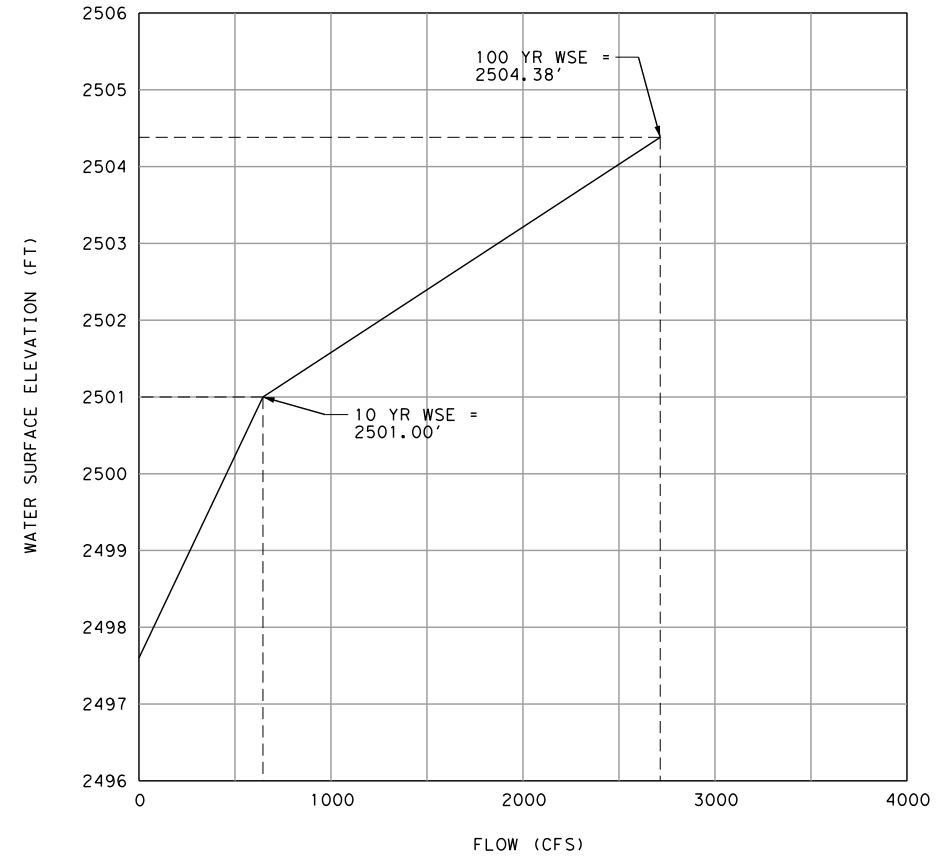
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.		
CK:		TEXAS	STP 1902 (150)	67		
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	ODA	UPTON	0076	06	037	163

10/25/2021 DESIGN FILE NAME: P:\PROJECTS\TXDOT\17105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US+67+186+DA.dgn

P:\PROJECTS\TXDOT\17105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US+67+186+DA.dgn



CROSS SECTION LOCATION MAP



ELEVATION VS. DISCHARGE AT XS 1041
SCALE: NTS

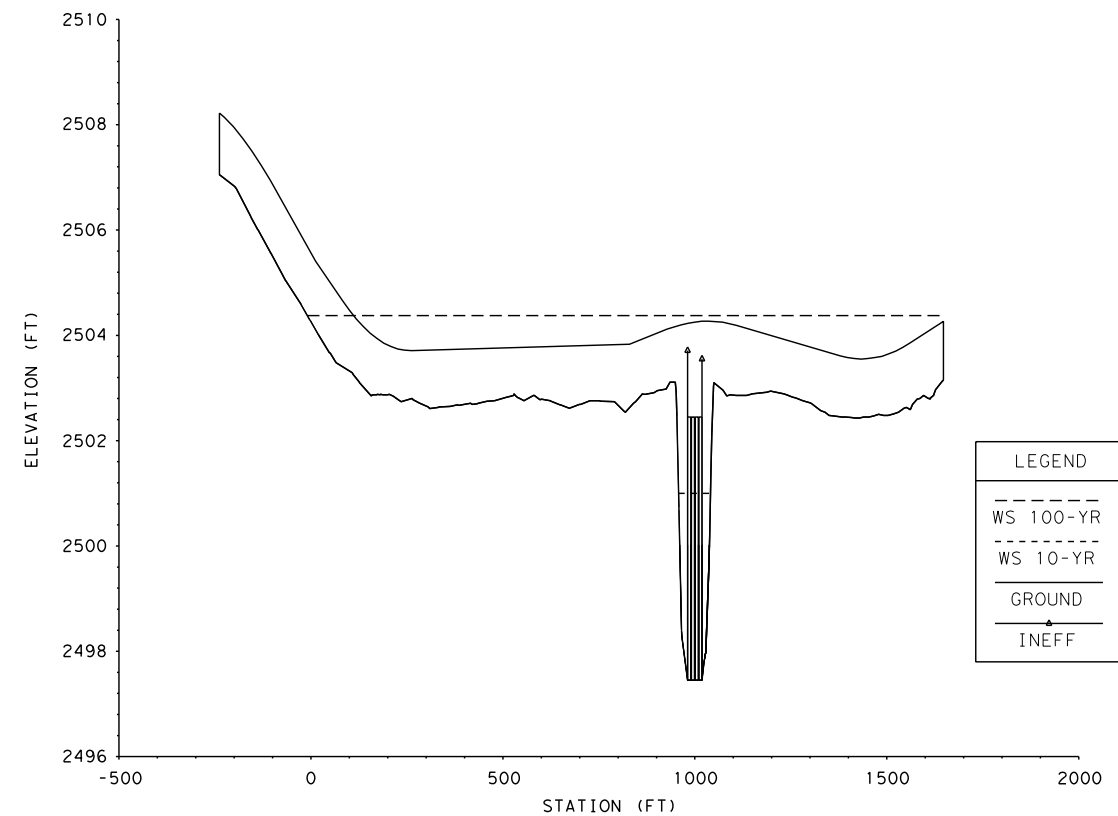
NOTES:

1. ALL ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
2. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS CROSSINGS.
3. THE STARTING WATER SURFACE ELEVATION IS BASED ON NORMAL DEPTH CALCULATION.
4. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.
5. CROSS CULVERTS ALONG US 67 ALLOW BYPASS FLOW TO ADJACENT DOWNGRADE CULVERTS PRIOR TO OVERTOPPING THE ROADWAY. HEADWATER COMPUTATIONS ARE BASED ON THE TOTAL DESIGN FLOW WHICH IS EQUAL TO CALCULATED PLUS BYPASS FLOW.

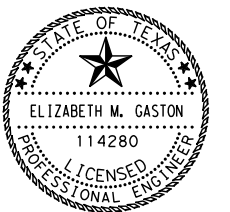
RIVER STATION	FLOW TOTAL (CFS)	WATER SURFACE ELEVATION (FT)			CHANNEL VELOCITY (FPS)	
		EXISTING	PROPOSED	DELTA	EXISTING	PROPOSED
100-YEAR STORM EVENT						
1087	2715	2504.05	2504.45	0.40	2.22	1.80
1086.5	LATERAL STRUCTURE					
1041	2715	2503.89	2504.38	0.49	2.87	2.12
1000	US 67 CULVERT					
947	2715	2502.80	2502.90	0.10	3.81	3.71
924	2715	2502.37	2502.45	0.08	5.37	5.43
888	RR BRIDGE					
855	2715	2500.12	2500.17	0.05	8.22	8.32
844	2715	2500.32	2500.38	0.06	4.43	4.47

RIVER STATION	FLOW TOTAL (CFS)	WATER SURFACE ELEVATION (FT)			CHANNEL VELOCITY (FPS)	
		EXISTING	PROPOSED	DELTA	EXISTING	PROPOSED
10-YEAR STORM EVENT						
1087	646	2502.29	2501.94	-0.35	1.96	2.56
1086.5	LATERAL STRUCTURE					
1041	646	2500.99	2501.00	0.01	7.06	5.43
1000	US 67 CULVERT					
947	646	2499.90	2499.53	-0.37	8.99	7.51
924	646	2499.60	2499.60	0.00	2.92	2.92
888	RR BRIDGE					
855	646	2498.42	2498.42	0.00	4.17	4.17
844	646	2498.35	2498.35	0.00	2.62	2.62

HEC-RAS INFORMATION



US 67 AT CULVERT 163
SCALE: NTS



E. Gaston
10/25/2021

REV. NO.	DATE	DESCRIPTION	BY

FIRM REGISTRATION NO. F-230

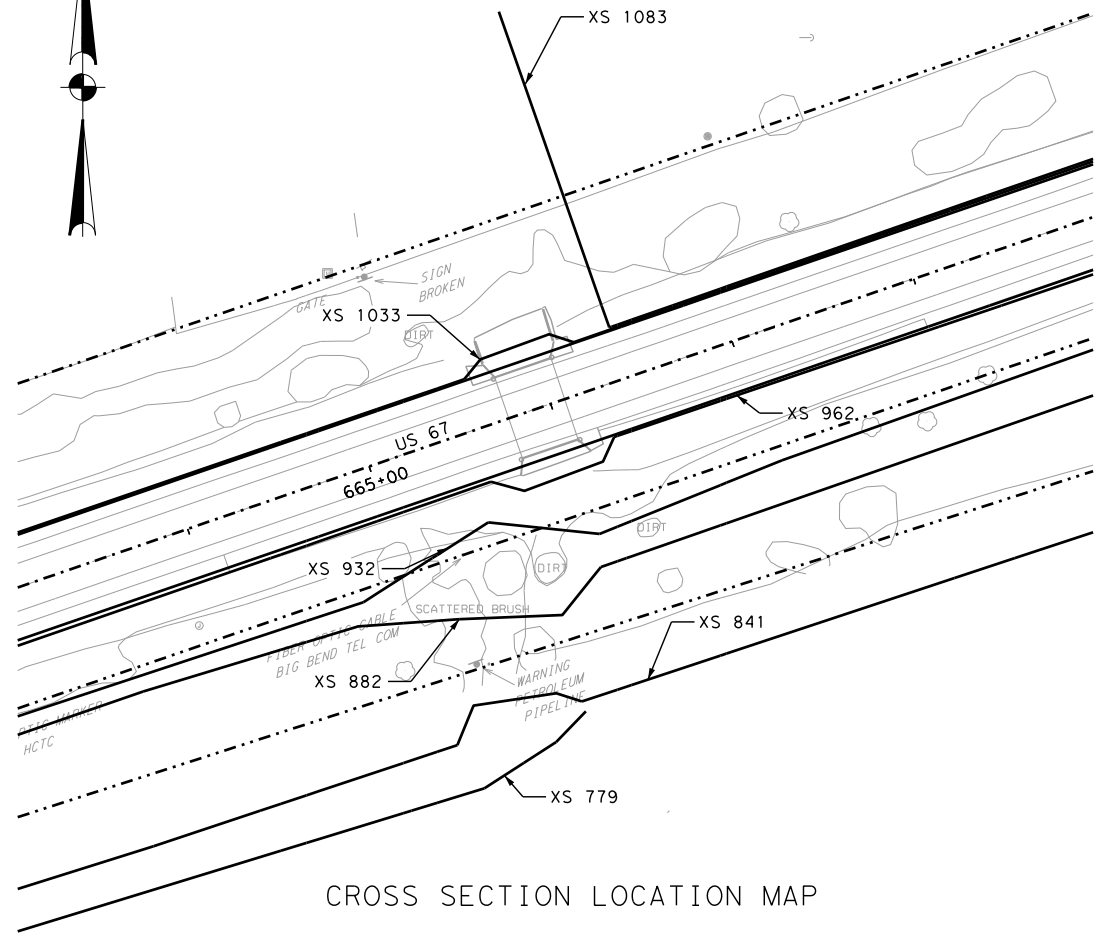


US 67
BRIDGE CLASS CULVERT 163
HYDRAULIC DATA
STA 637+51

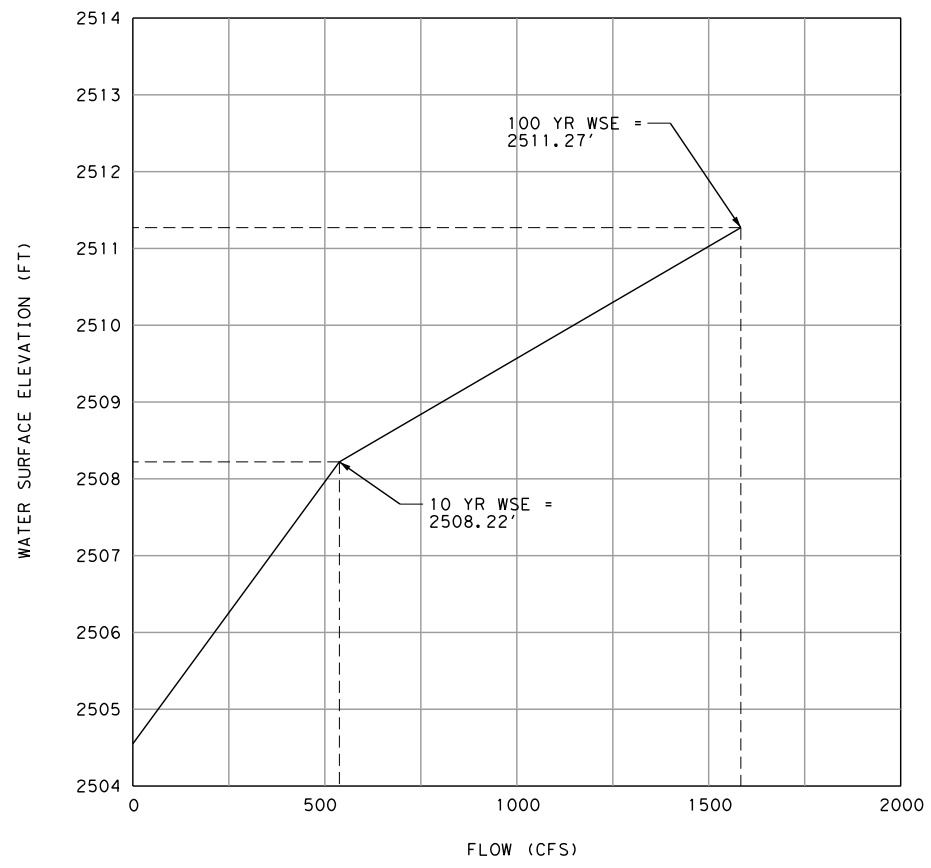
SHEET 1 OF 5

DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.		
CK:		TEXAS	STP 1902 (150)	67		
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	ODA	UPTON	0076	06	037	164

10/25/2021 DESIGN FILE NAME: P:\PROJECTS\TXD117105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US*67*163*HDS01.dgn



CROSS SECTION LOCATION MAP



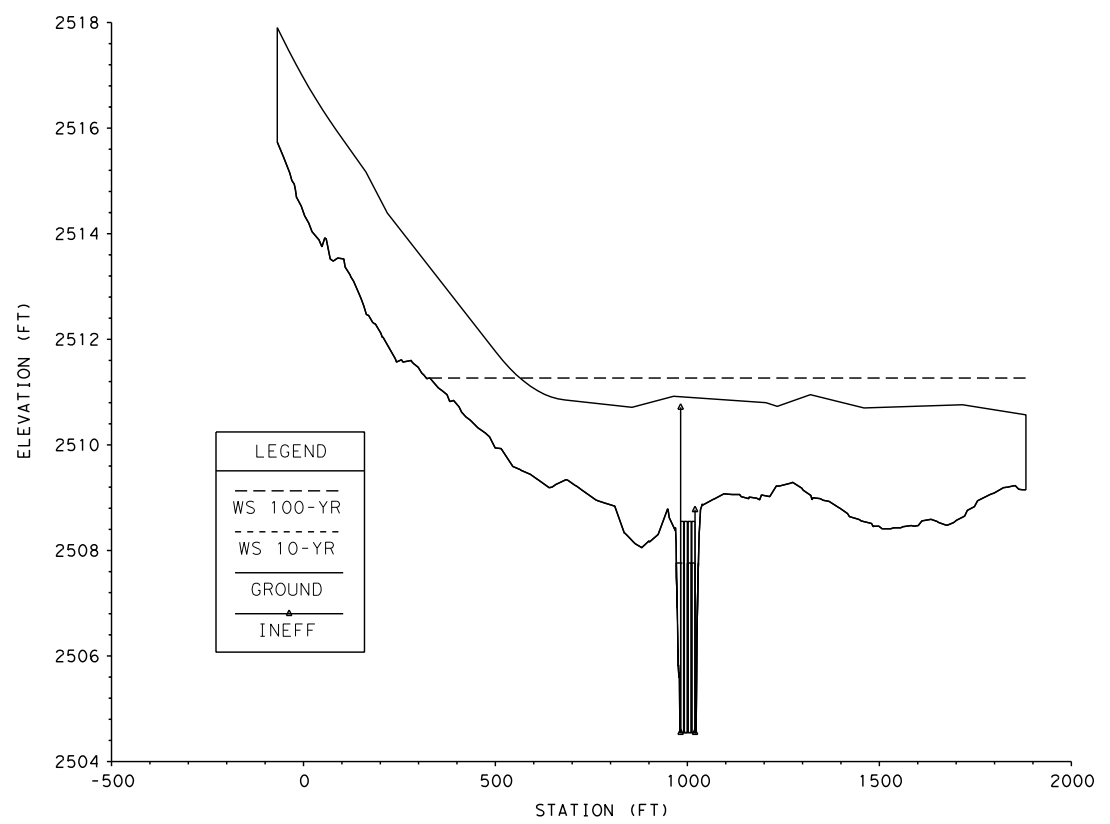
ELEVATION VS. DISCHARGE AT XS 1033
SCALE: NTS

- NOTES:
1. ALL ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
 2. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS CROSSINGS.
 3. THE STARTING WATER SURFACE ELEVATION IS BASED ON NORMAL DEPTH CALCULATION.
 4. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.
 5. CROSS CULVERTS ALONG US 67 ALLOW BYPASS FLOW TO ADJACENT DOWNGRADE CULVERTS PRIOR TO OVERTOPPING THE ROADWAY. HEADWATER COMPUTATIONS ARE BASED ON THE TOTAL DESIGN FLOW WHICH IS EQUAL TO CALCULATED PLUS BYPASS FLOW.

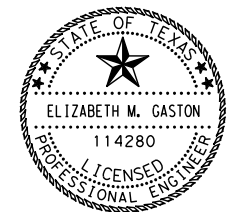
RIVER STATION	FLOW TOTAL (CFS)	WATER SURFACE ELEVATION (FT)			CHANNEL VELOCITY (FPS)	
		EXISTING	PROPOSED	DELTA	EXISTING	PROPOSED
100-YEAR STORM EVENT						
1083	2021	2511.26	2511.40	0.14	2.59	2.41
1082.5	LATERAL STRUCTURE					
1033	1667	2511.09	2511.27	0.18	1.19	1.05
1000	US 67 CULVERT					
962	1667	2511.07	2510.86	-0.21	0.93	0.99
932	1667	2511.07	2510.86	-0.21	0.58	0.60
882	1667	2511.07	2510.85	-0.22	0.55	0.57
841	1667	2509.93	2509.75	-0.18	7.47	7.35
810	RR BRIDGE					
779	1667	2507.20	2507.10	-0.10	10.15	9.90
729	1667	2506.48	2506.37	-0.11	6.70	6.60

RIVER STATION	FLOW TOTAL (CFS)	WATER SURFACE ELEVATION (FT)			CHANNEL VELOCITY (FPS)	
		EXISTING	PROPOSED	DELTA	EXISTING	PROPOSED
10-YEAR STORM EVENT						
1083	575	2509.32	2508.86	-0.46	3.39	5.21
1082.5	LATERAL STRUCTURE					
1033	575	2508.33	2508.22	-0.11	5.30	4.18
1000	US 67 CULVERT					
962	575	2507.58	2507.70	0.12	6.77	4.73
932	575	2507.73	2507.71	-0.02	1.53	1.55
882	575	2507.60	2507.58	-0.02	1.43	1.46
841	575	2506.98	2506.95	-0.03	4.86	4.83
810	RR BRIDGE					
779	575	2505.30	2505.28	-0.02	5.89	5.85
729	575	2504.40	2504.38	-0.02	4.69	4.66

HEC-RAS INFORMATION



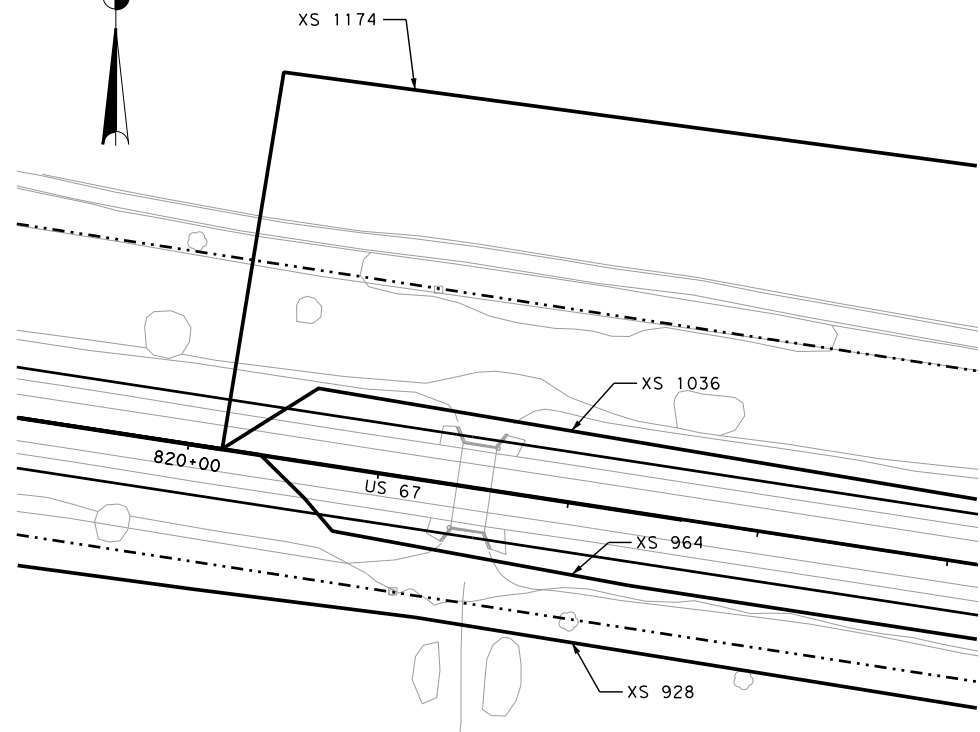
US 67 AT CULVERT 167
SCALE: NTS



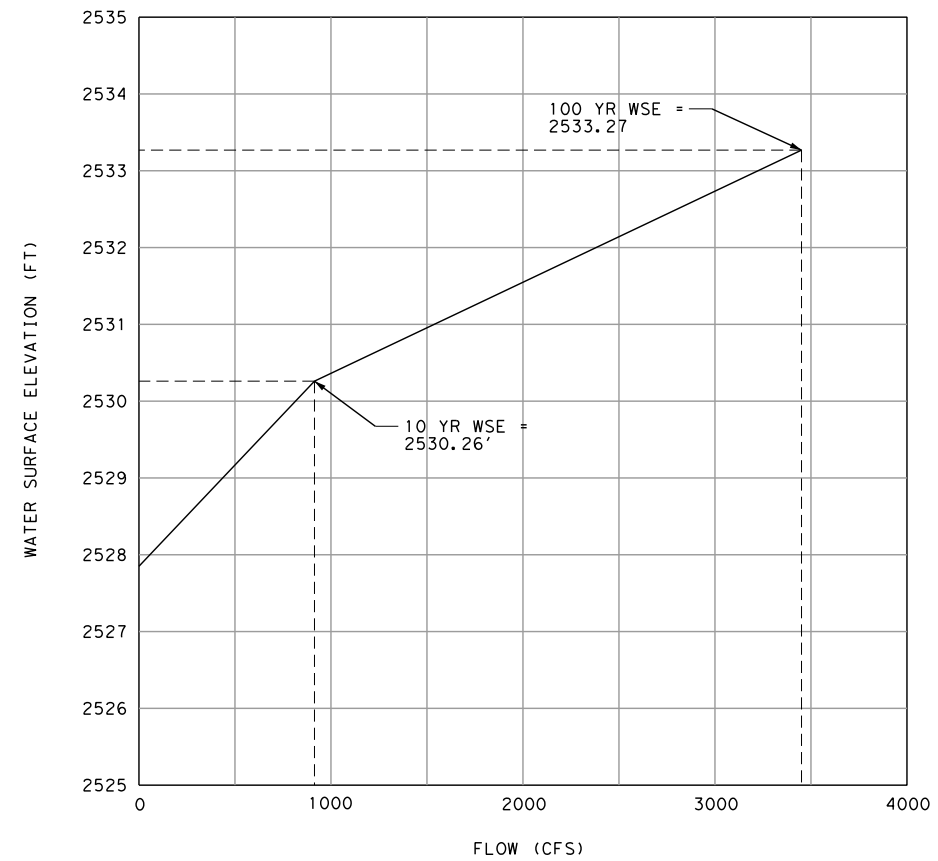
E. Gaston
10/25/2021

REV. NO.	DATE	DESCRIPTION	BY
FIRM REGISTRATION NO. F-230 			
US 67 BRIDGE CLASS CULVERT 167 HYDRAULIC DATA STA 665+93			
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.
CK:		TEXAS	STP 1902 (150)
DRN:	STATE DISTRICT	COUNTY	CONTROL NO. SECTION NO. JOB NO.
CK:	ODA	UPTON	0076 06 037
			HIGHWAY NO. SHEET NO.
			67 165

10/25/2021
 DESIGN FILE NAME: P:\PROJECTS\TXDOT\1105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US67*167*HDS01.dgn



CROSS SECTION LOCATION MAP



ELEVATION VS. DISCHARGE AT XS 1036
SCALE: NTS

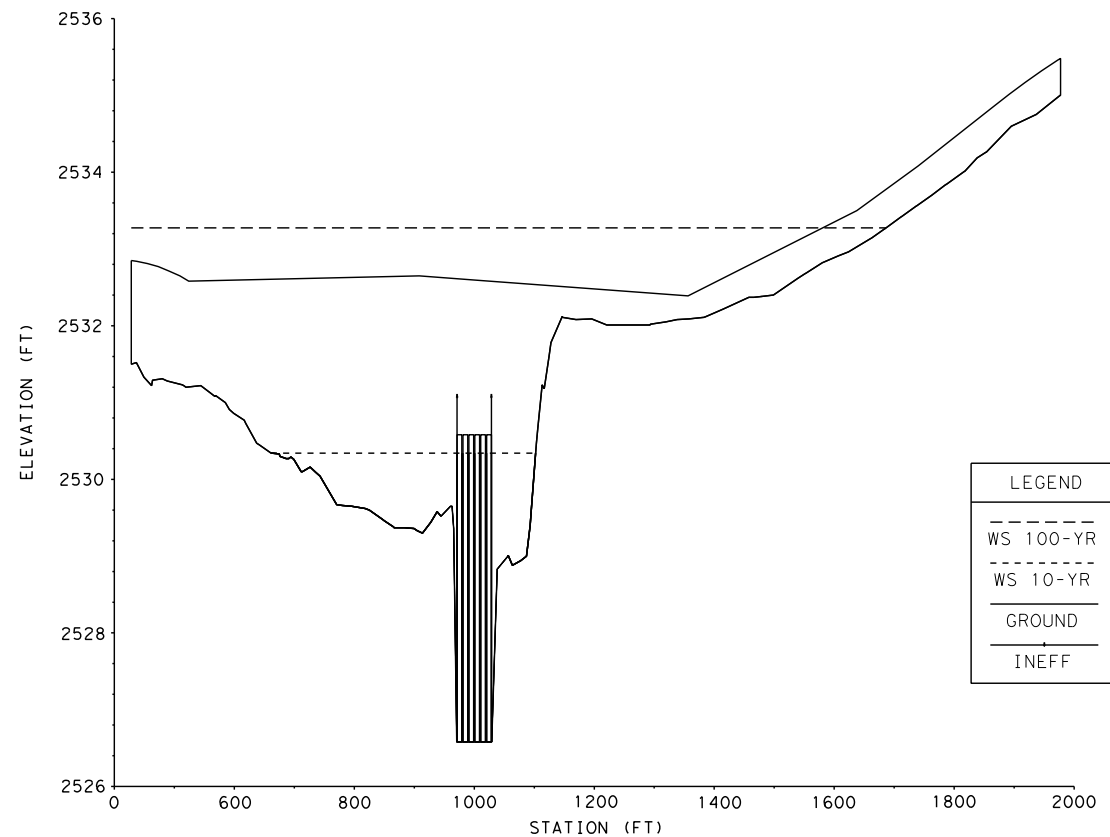
NOTES:

1. ALL ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
2. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS CROSSINGS.
3. THE STARTING WATER SURFACE ELEVATION IS BASED ON NORMAL DEPTH CALCULATION.
4. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.
5. CROSS CULVERTS ALONG US 67 ALLOW BYPASS FLOW TO ADJACENT DOWNGRADE CULVERTS PRIOR TO OVERTOPPING THE ROADWAY. HEADWATER COMPUTATIONS ARE BASED ON THE TOTAL DESIGN FLOW WHICH IS EQUAL TO CALCULATED PLUS BYPASS FLOW.

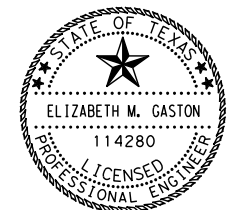
RIVER STATION	FLOW TOTAL (CFS)	WATER SURFACE ELEVATION (FT)			CHANNEL VELOCITY (FPS)	
		EXISTING	PROPOSED	DELTA	EXISTING	PROPOSED
100-YEAR STORM EVENT						
1174	3451	2533.64	2533.68	0.04	4.22	4.10
1170		LATERAL STRUCTURE				
1036	3451	2533.20	2533.27	0.07	2.63	2.54
1000		US 67 CULVERT				
964	3451	2531.31	2531.31	0.00	3.88	3.88
960		LATERAL STRUCTURE				
928	3451	2530.96	2530.96	0.00	4.13	4.13

RIVER STATION	FLOW TOTAL (CFS)	WATER SURFACE ELEVATION (FT)			CHANNEL VELOCITY (FPS)	
		EXISTING	PROPOSED	DELTA	EXISTING	PROPOSED
10-YEAR STORM EVENT						
1174	914	2532.58	2532.74	0.16	3.07	2.55
1170		LATERAL STRUCTURE				
1036	914	2532.49	2530.26	-2.23	1.02	8.13
1000		US 67 CULVERT				
964	914	2530.32	2530.32	0.00	1.99	1.99
960		LATERAL STRUCTURE				
928	914	2530.04	2530.04	0.00	3.62	3.62

HEC-RAS INFORMATION

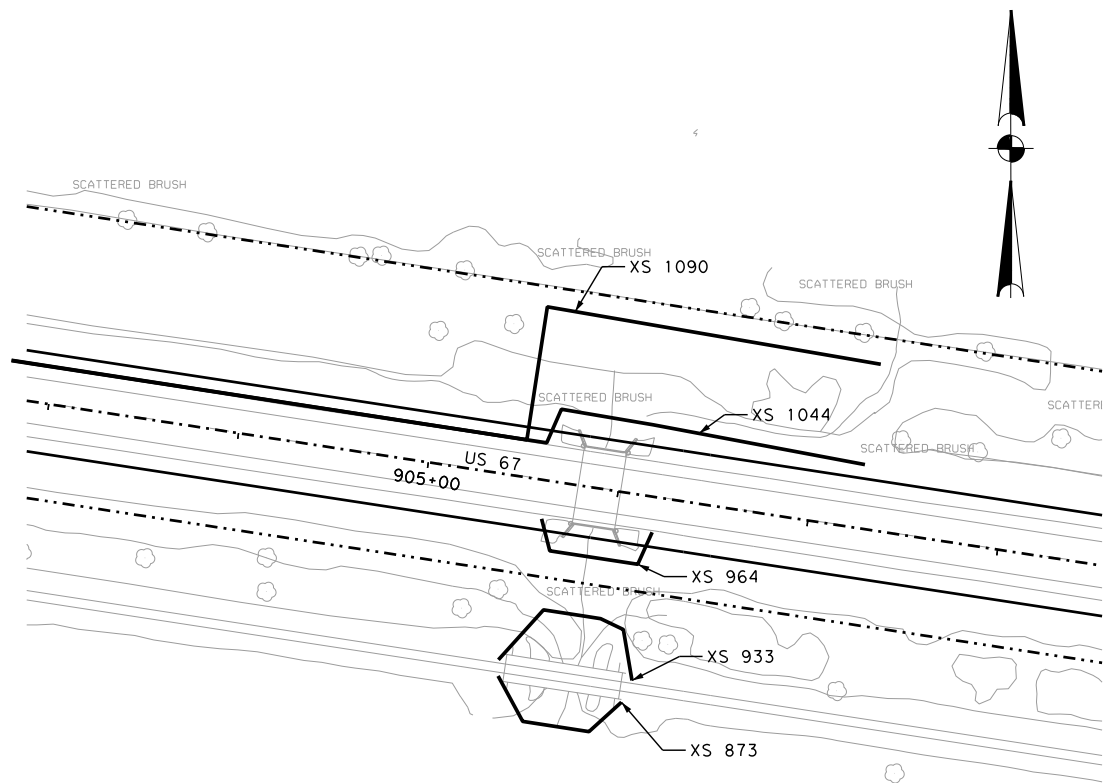


US 67 AT CULVERT 177
SCALE: NTS

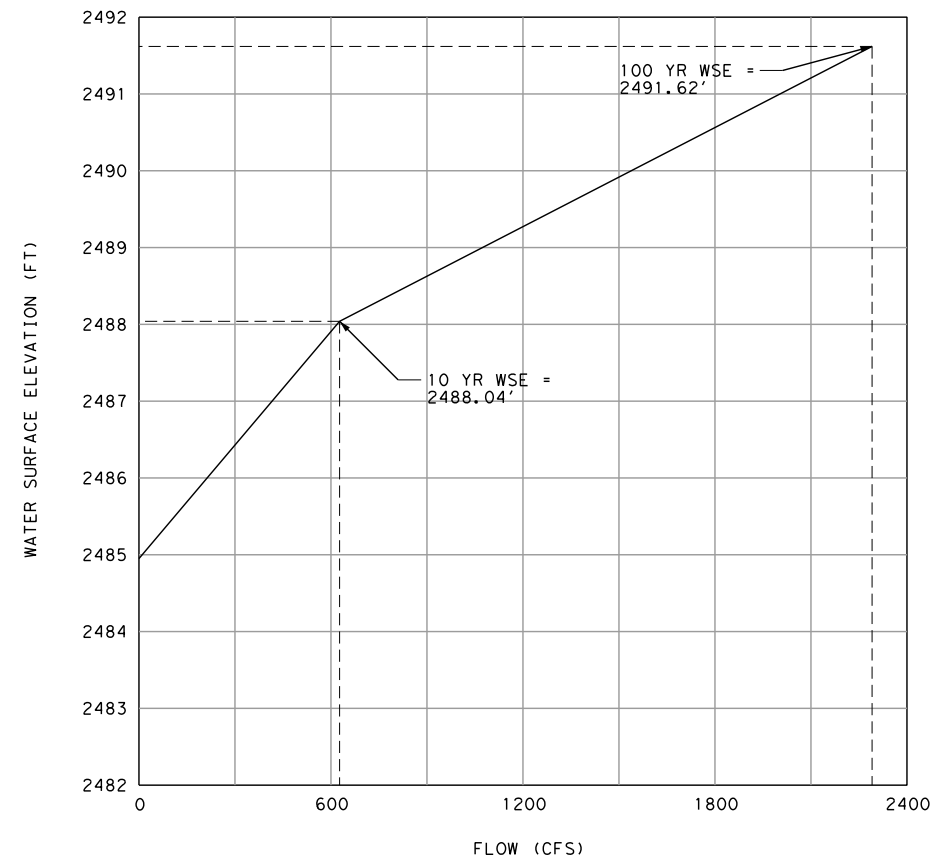


E. Gaston
10/25/2021

REV. NO.	DATE	DESCRIPTION	BY	
FIRM REGISTRATION NO. F-230				
US 67 BRIDGE CLASS CULVERT 177 HYDRAULIC DATA STA 821+40 SHEET 3 OF 5				
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.
CK:		TEXAS	STP 1902(150)	67
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.
CK:	ODA	UPTON	0076	06
			JOB NO.	SHEET NO.
			037	166



CROSS SECTION LOCATION MAP



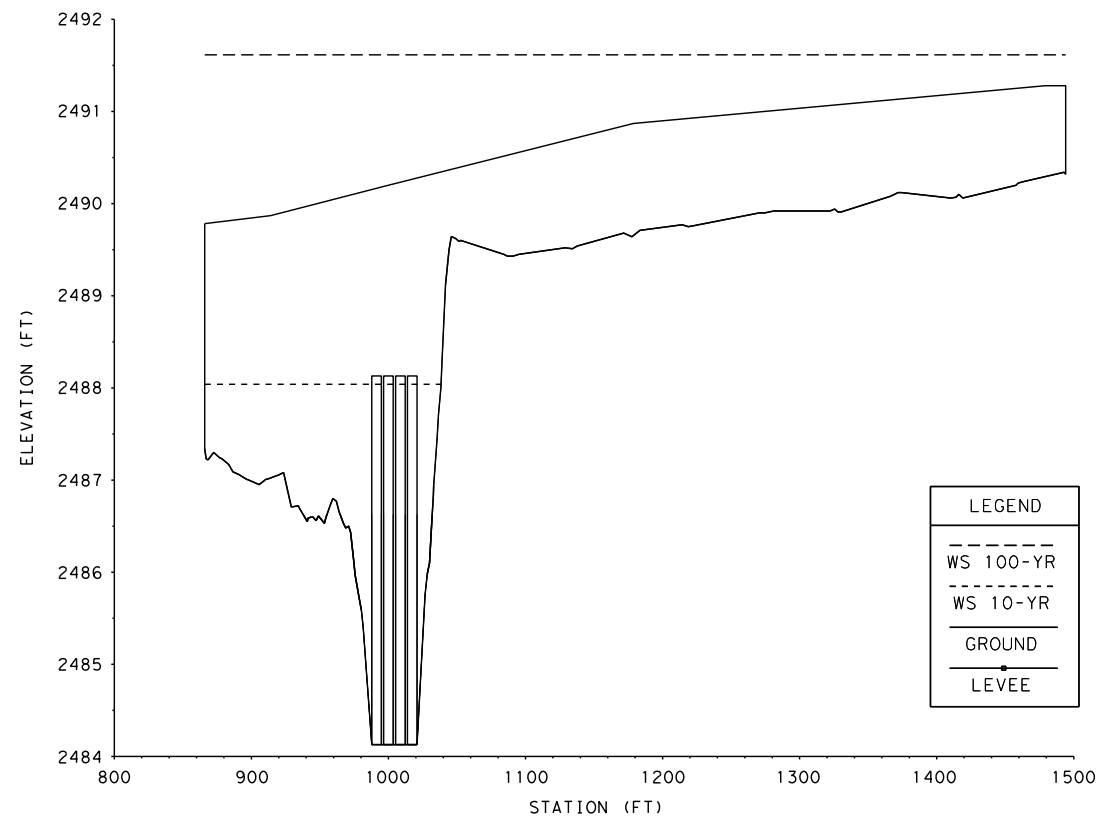
ELEVATION VS. DISCHARGE AT XS 1044
SCALE: NTS

- NOTES:
1. ALL ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
 2. HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS CROSSINGS.
 3. THE STARTING WATER SURFACE ELEVATION IS BASED ON NORMAL DEPTH CALCULATION.
 4. A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.
 5. CROSS CULVERTS ALONG US 67 ALLOW BYPASS FLOW TO ADJACENT DOWNGRADE CULVERTS PRIOR TO OVERTOPPING THE ROADWAY. HEADWATER COMPUTATIONS ARE BASED ON THE TOTAL DESIGN FLOW WHICH IS EQUAL TO CALCULATED PLUS BYPASS FLOW.

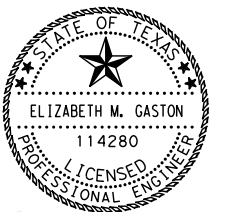
RIVER STATION	FLOW TOTAL (CFS)	WATER SURFACE ELEVATION (FT)			CHANNEL VELOCITY (FPS)	
		EXISTING	PROPOSED	DELTA	EXISTING	PROPOSED
100-YEAR STORM EVENT						
1090	2291	2491.45	2491.69	0.24	2.28	2.08
1085	LATERAL STRUCTURE					
1044	2291	2491.36	2491.62	0.26	2.52	2.28
1000	US 67 CULVERT					
964	2291	2490.91	2490.93	0.02	5.37	5.04
960	LATERAL STRUCTURE					
933	2291	2490.76	2490.75	-0.01	5.17	5.16
899	RR BRIDGE					
873	2291	2489.04	2489.03	-0.01	7.73	7.72

RIVER STATION	FLOW TOTAL (CFS)	WATER SURFACE ELEVATION (FT)			CHANNEL VELOCITY (FPS)	
		EXISTING	PROPOSED	DELTA	EXISTING	PROPOSED
10-YEAR STORM EVENT						
1090	627	2491.45	2488.42	-3.03	1.41	3.09
1085	LATERAL STRUCTURE					
1044	627	2491.36	2488.04	-3.32	1.43	2.86
1000	US 67 CULVERT					
964	627	2490.91	2487.06	-3.85	4.61	3.78
960	LATERAL STRUCTURE					
933	627	2490.76	2486.92	-3.84	3.30	3.04
899	RR BRIDGE					
873	627	2489.04	2485.99	-3.05	5.19	4.85

HEC-RAS INFORMATION



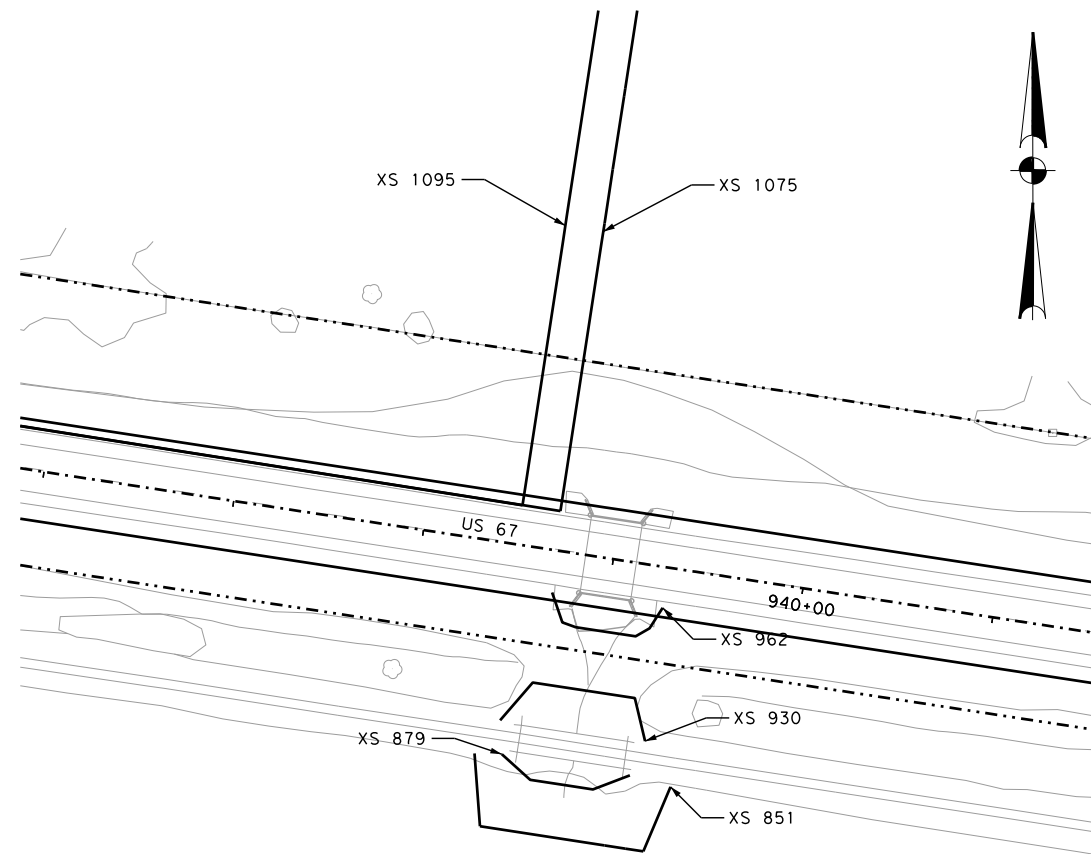
US 67 AT CULVERT 184
SCALE: NTS



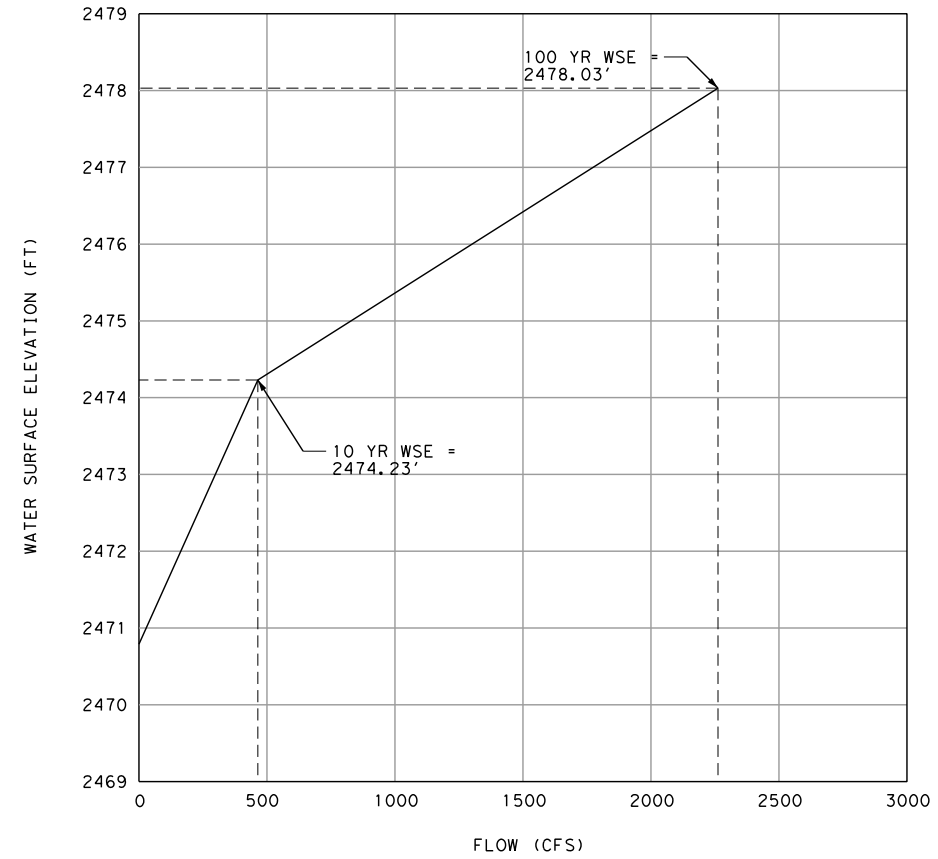
E. Gaston
10/25/2021

REV. NO.	DATE	DESCRIPTION	BY
FIRM REGISTRATION NO. F-230 			
US 67 BRIDGE CLASS CULVERT 184 HYDRAULIC DATA STA 905+90 SHEET 4 OF 5			
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.
CK:		TEXAS	STP 1902(150)
DRN:	STATE DISTRICT	COUNTY	CONTROL NO. SECTION NO. JOB NO.
CK:	ODA	UPTON	0076 06 037

10/25/2021
 DESIGN FILE NAME: P:\PROJECTS\TXDOT\17105\6 US 67\CADD\SHEETS\CSJ_0076-06-037\US67*184*HDS01.dgn



CROSS SECTION LOCATION MAP



ELEVATION VS. DISCHARGE AT XS 1075
SCALE: NTS

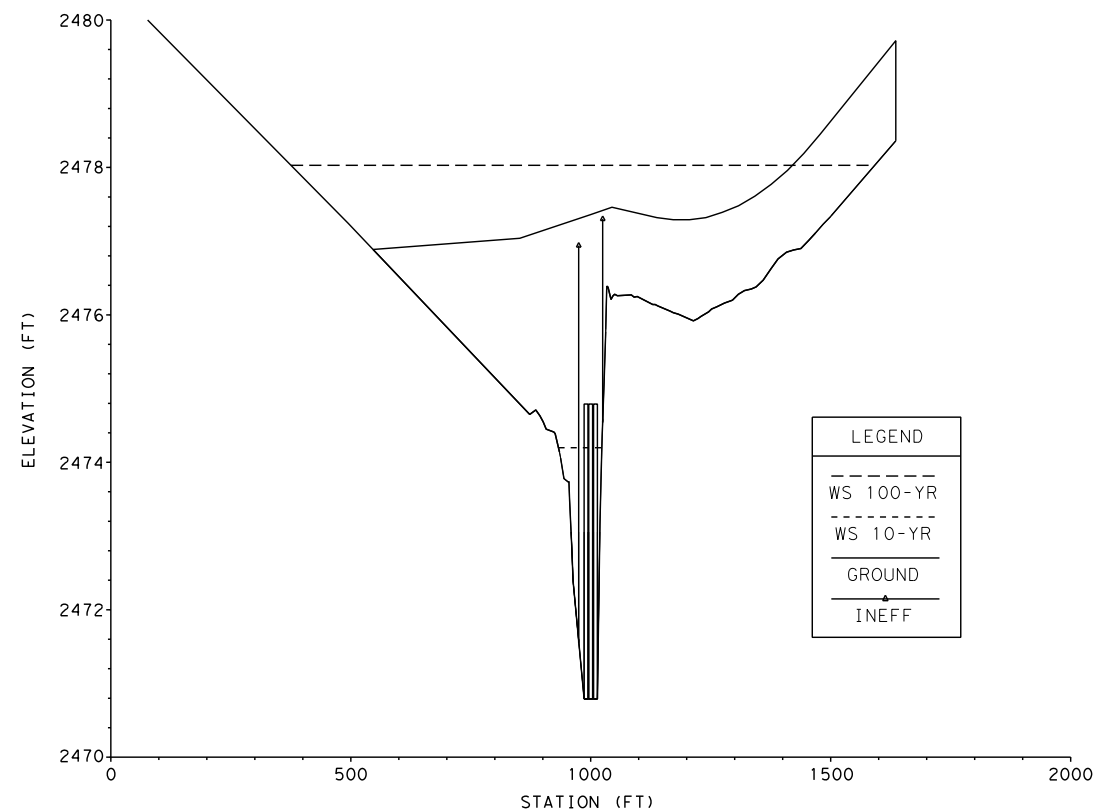
NOTES:

- ALL ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
- HEC-RAS VERSION 5.0.7 WAS USED FOR THE HYDRAULIC ANALYSIS OF BRIDGE CLASS CROSSINGS.
- THE STARTING WATER SURFACE ELEVATION IS BASED ON NORMAL DEPTH CALCULATION.
- A FEMA STUDY HAS NOT BEEN CONDUCTED TO DETERMINE FLOOD HAZARDS FOR THE PROJECT AREA; THEREFORE, A FLOOD MAP WAS NOT AVAILABLE AT THE TIME OF THIS STUDY.
- CROSS CULVERTS ALONG US 67 ALLOW BYPASS FLOW TO ADJACENT DOWNGRADE CULVERTS PRIOR TO OVERTOPPING THE ROADWAY. HEADWATER COMPUTATIONS ARE BASED ON THE TOTAL DESIGN FLOW WHICH IS EQUAL TO CALCULATED PLUS BYPASS FLOW.

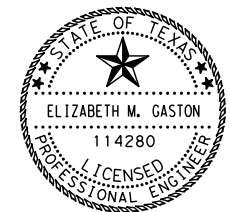
RIVER STATION	FLOW TOTAL (CFS)	WATER SURFACE ELEVATION (FT)			CHANNEL VELOCITY (FPS)	
		EXISTING	PROPOSED	DELTA	EXISTING	PROPOSED
100-YEAR STORM EVENT						
1095	2262	2477.78	2478.05	0.27	2.34	2.13
1075	2262	2477.76	2478.03	0.27	2.33	2.11
1000	US 67 CULVERT					
962	2262	2477.57	2477.75	0.18	3.86	3.59
930	2262	2477.09	2477.22	0.13	5.41	5.50
900	RR BRIDGE					
879	2262	2474.04	2474.17	0.13	11.30	11.32
851	2262	2473.08	2473.15	0.07	4.87	4.94

RIVER STATION	FLOW TOTAL (CFS)	WATER SURFACE ELEVATION (FT)			CHANNEL VELOCITY (FPS)	
		EXISTING	PROPOSED	DELTA	EXISTING	PROPOSED
10-YEAR STORM EVENT						
1095	464	2476.87	2474.40	-2.47	1.55	2.78
1075	464	2476.84	2474.23	-2.61	1.76	3.23
1000	US 67 CULVERT					
962	464	2474.26	2472.97	-1.29	5.27	3.35
930	464	2474.18	2472.82	-1.36	3.67	2.84
900	RR BRIDGE					
879	464	2472.03	2471.24	-0.79	8.70	6.86
851	464	2471.61	2470.96	-0.65	3.46	2.71

HEC-RAS INFORMATION



US 67 AT CULVERT 186
SCALE: NTS



E. Gaston
10/28/2021

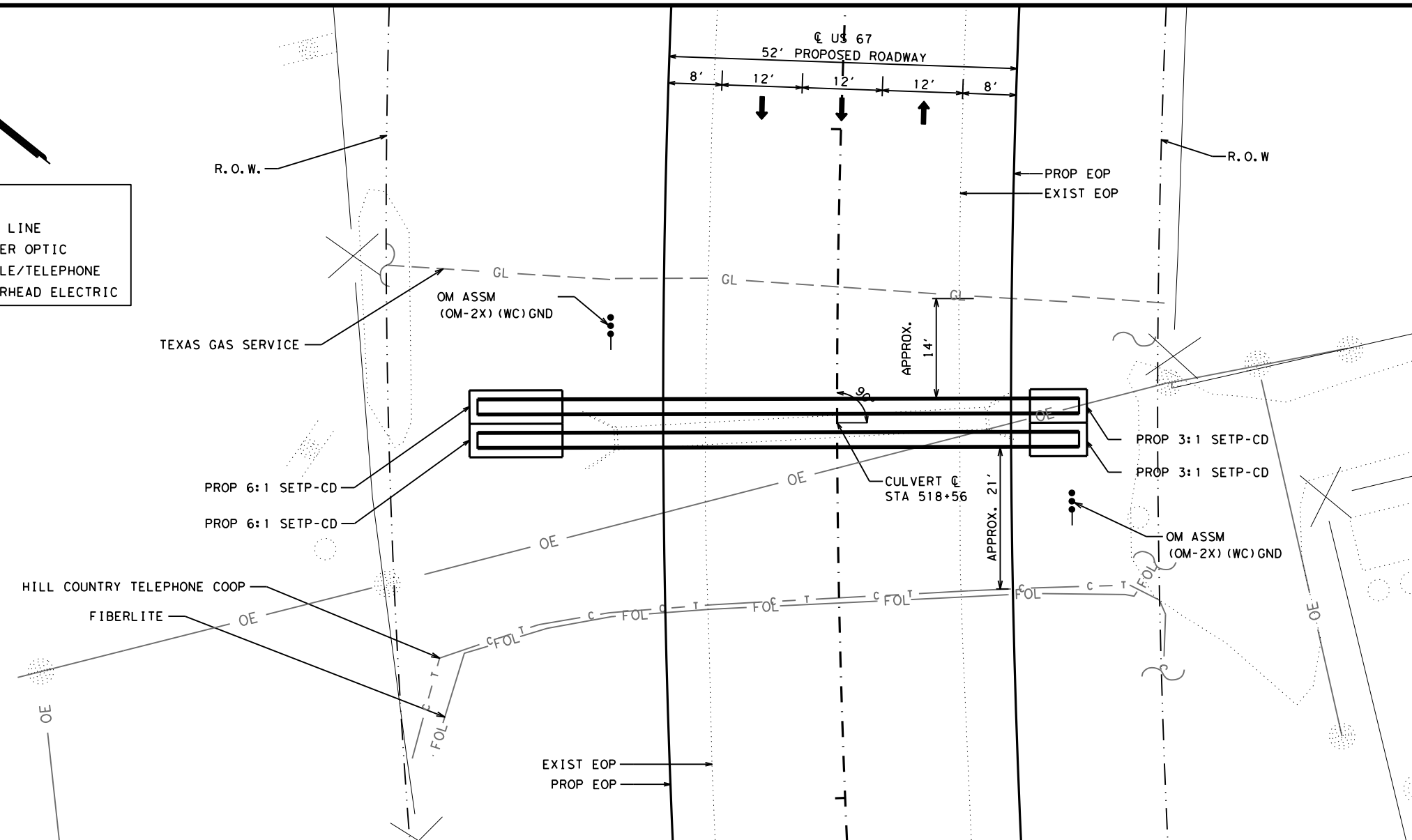
REV. NO.	DATE	DESCRIPTION	BY
FIRM REGISTRATION NO. F-230 			
US 67 BRIDGE CLASS CULVERT 186 HYDRAULIC DATA STA 938+99 SHEET 5 OF 5			
DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.
CK:		TEXAS	STP 1902 (150)
DRN:	STATE DISTRICT	COUNTY	CONTROL NO. SECTION NO. JOB NO.
CK:	ODA	UPTON	0076 06 037
			SHEET NO. 168

10/28/2021
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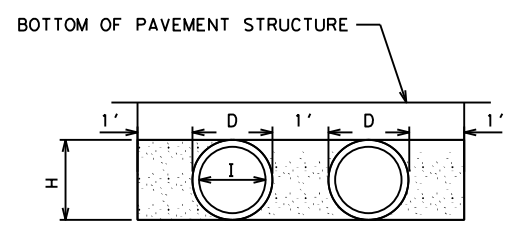
DATE: 10/25/2021 02:48 PM
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LEGEND

---	GL	GAS LINE
---	FOL	FIBER OPTIC
---	C T	CABLE/TELEPHONE
---	OE	OVERHEAD ELECTRIC



CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR TWO PARALLEL IDENTICAL PIPE CULVERTS



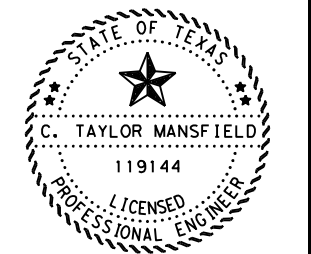
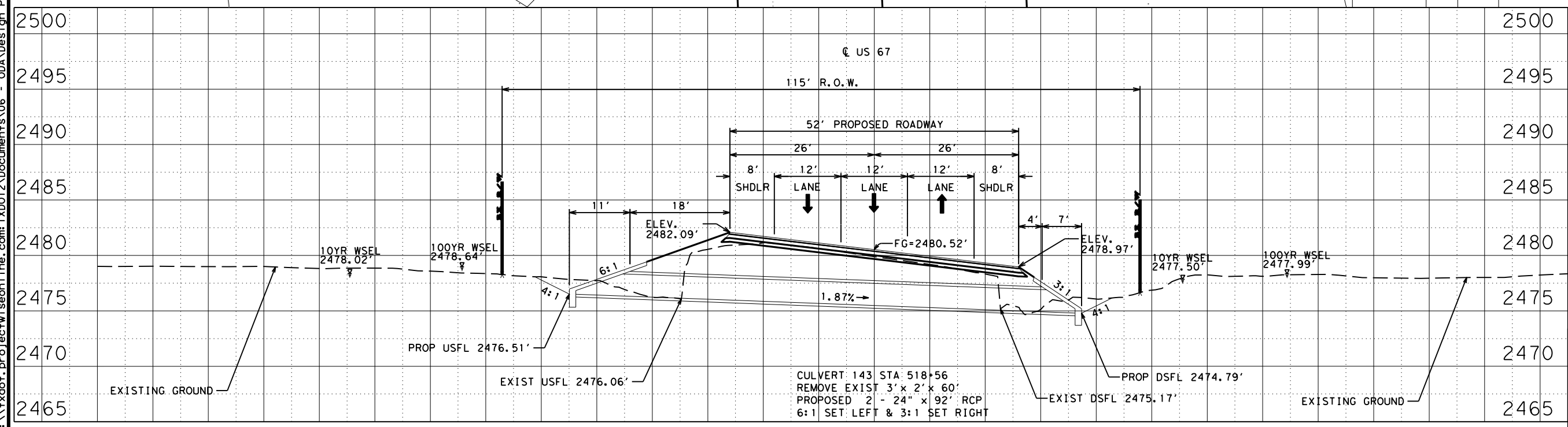
CEMENT STABILIZED BACKFILL (CY)
 L = LENGTH OF PROP RCP (FT)
 I = INNER DIAMETER OF RCP (FT)
 D = I + 0.5 (FT)
 H = 0.9 x D (FT)

$$CY = \left(\left((D' + D' + 3) \times H' \right) - \left(\frac{3.142 \times D' \times D'}{2} \right) \right) \times \frac{L'}{27}$$

CY = 22, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS

BID CODE	QTY	UNIT	DESCRIPTION
0464 6005	184	LF	RC PIPE (CL III) (24 IN)
0467 6388	2	EA	SET (TY II) (24 IN) (RCP) (3:1) (C)
0467 6394	2	EA	SET (TY II) (24 IN) (RCP) (6:1) (C)
0496 6008	60	LF	REMOV STR (BOX CULVERT)
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND



C. Taylor Mansfield
 2021.11.01
 12:56:03-05'00"

US 67 CULVERT LAYOUT

HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 1 OF 23

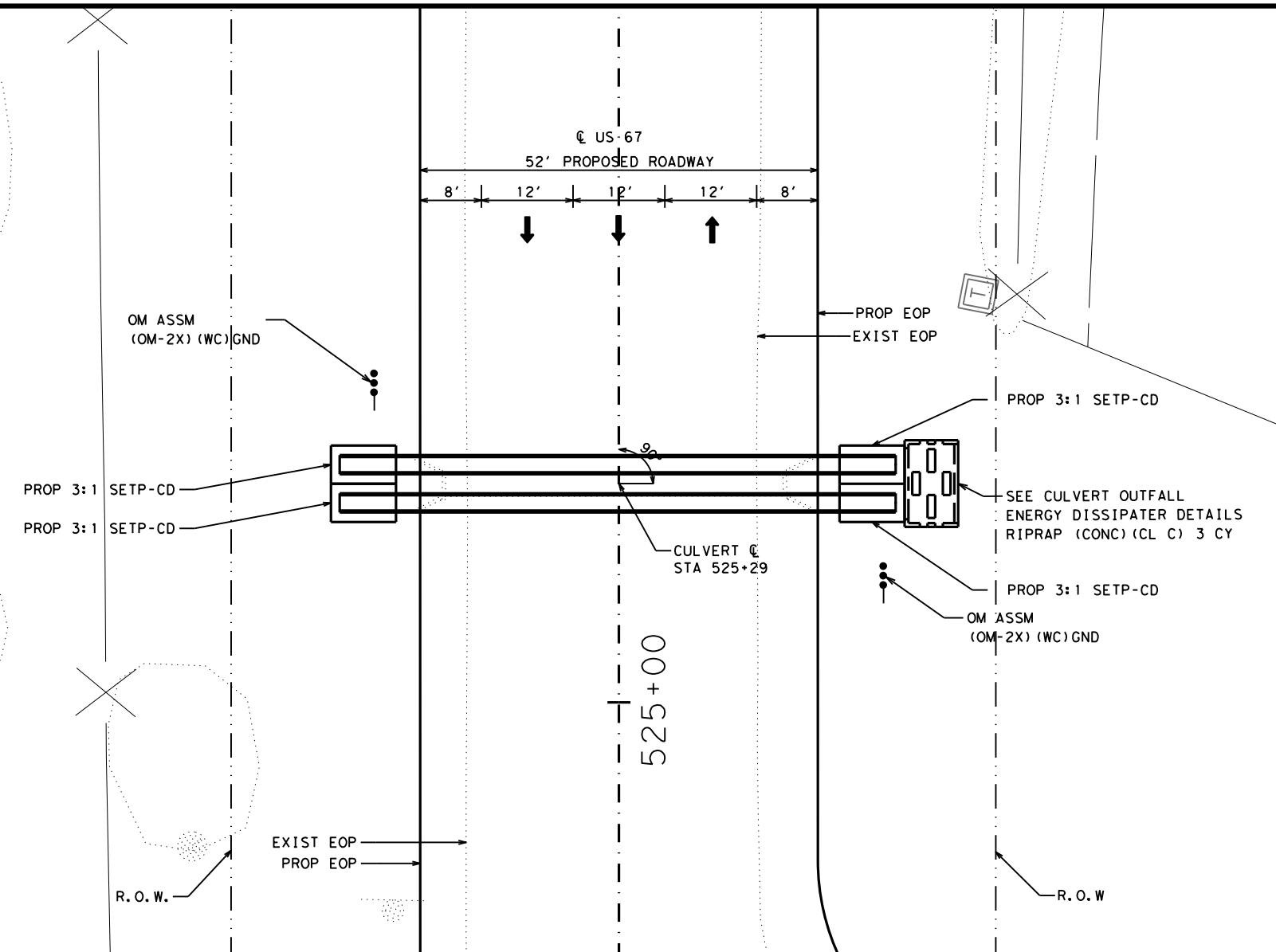
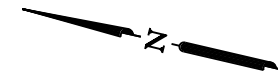


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	169	

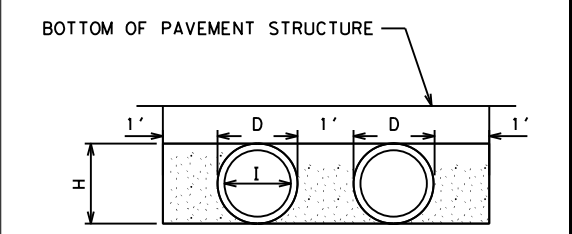
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LEGEND

☐ TELEPHONE PEDESTAL



CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR TWO PARALLEL IDENTICAL PIPE CULVERTS

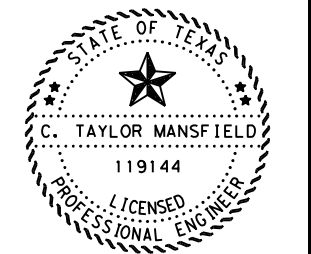
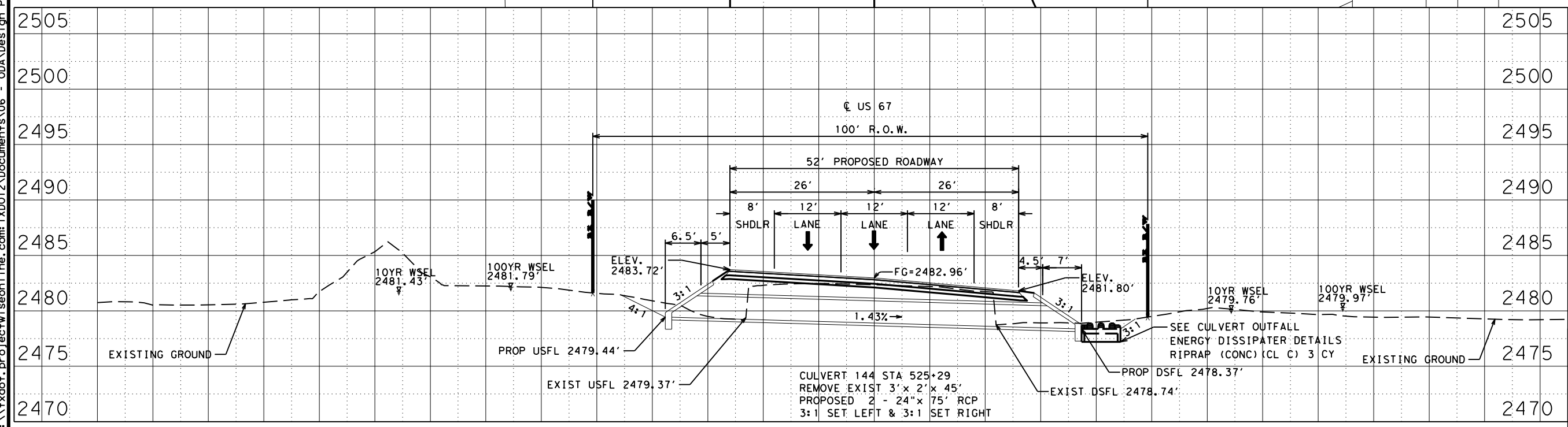


- ☐ CEMENT STABILIZED BACKFILL (CY)
- L = LENGTH OF PROP RCP (FT)
- I = INNER DIAMETER OF RCP (FT)
- D = I + 0.5 (FT)
- H = 0.9 x D (FT)

$$CY = \left((D' + D' + 3) \times H' \right) - \left(\frac{3.142 \times D' \times D'}{2} \right) \times \frac{L'}{27}$$

CY = 18, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
0432 6007	3	CY	RIPRAP (CONC) (CL C)
0464 6005	150	LF	RC PIPE (CL III) (24 IN)
0467 6388	4	EA	SET (TY II) (24 IN) (RCP) (3:1) (C)
0496 6008	45	LF	REMOV STR (BOX CULVERT)
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND



C. Taylor Mansfield 2021.11.01 12:56:03-05'00"

US 67 CULVERT LAYOUT

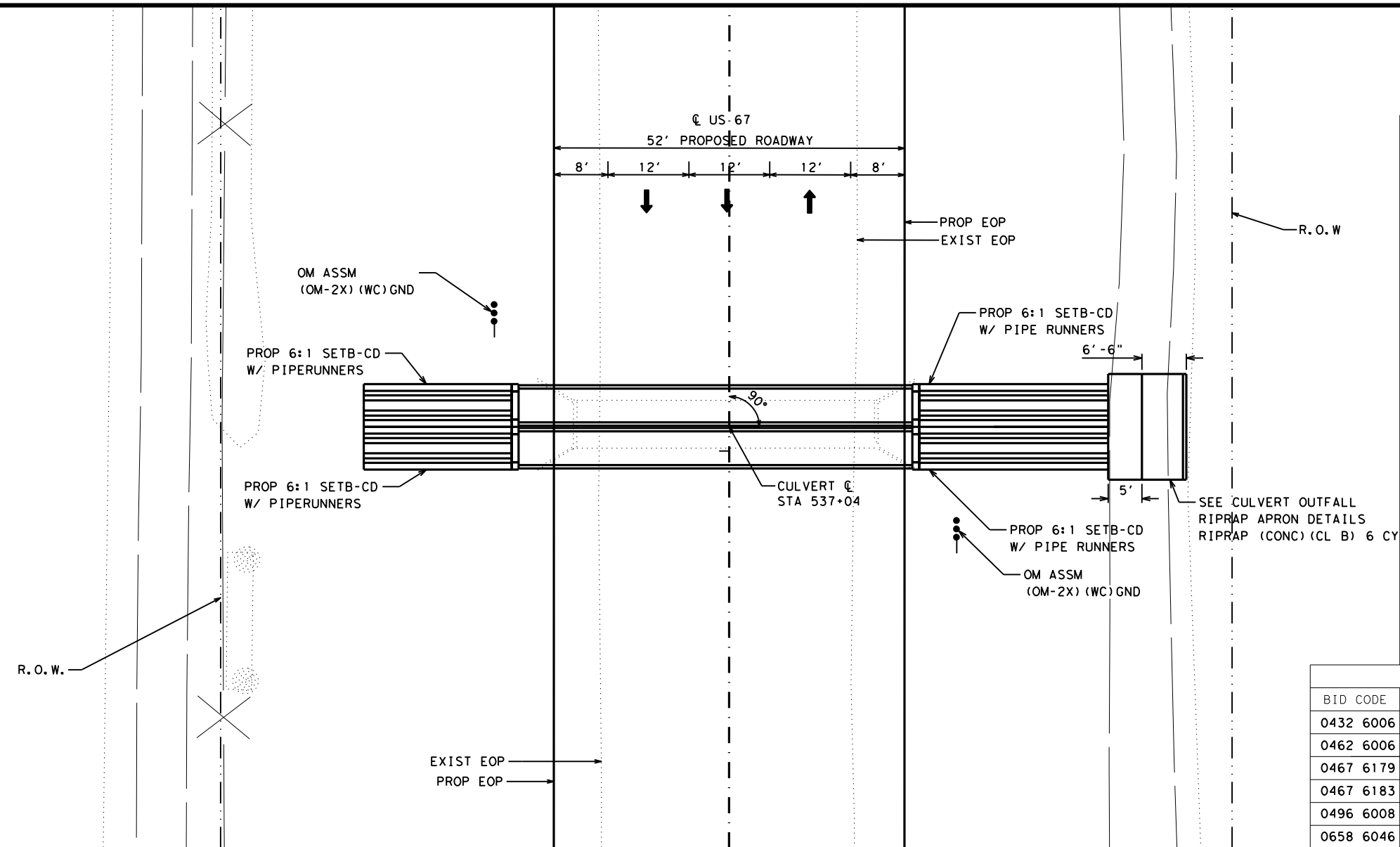
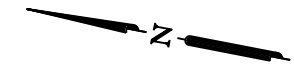
HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 2 OF 23

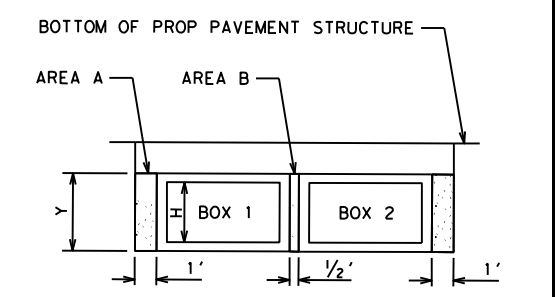


CONTRACT	SECTION	JOB	HIGHWAY
0076	06	037	US 67
DISTRICT	COUNTY	SHEET NO.	
ODA	UPTON	170	

DATE: 10/25/2021 02:48 PM
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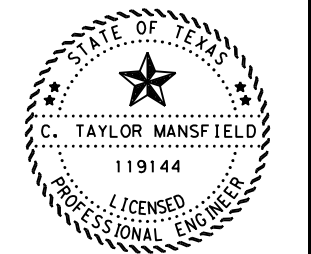
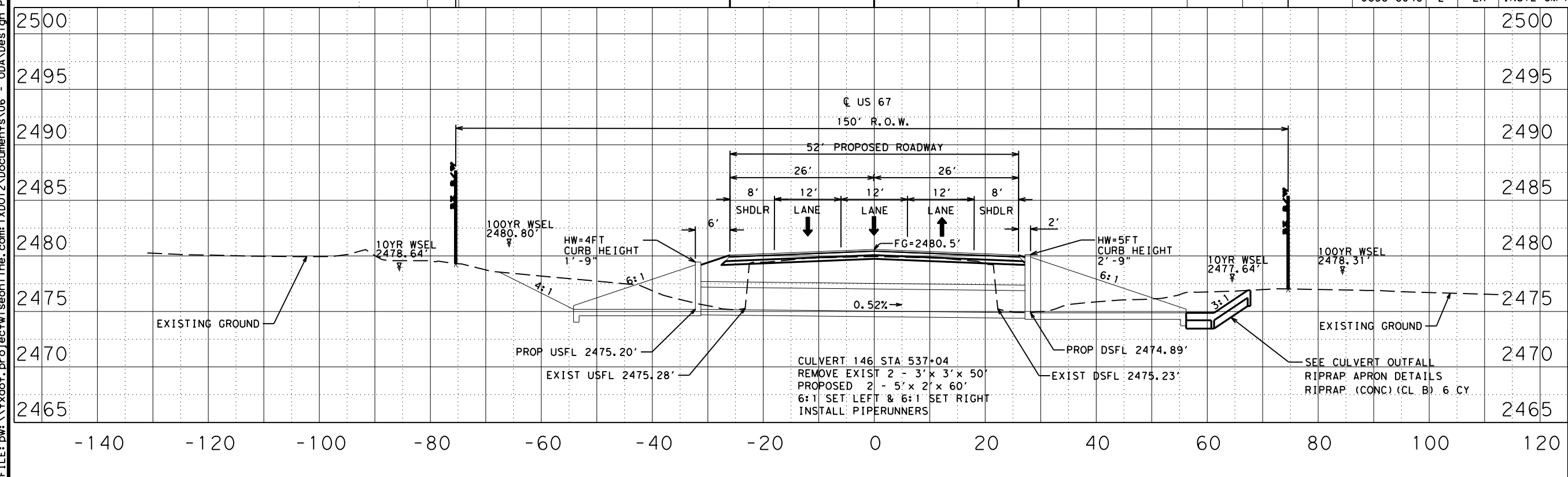
CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS



LIMITS OF CEMENT STABILIZED BACKFILL
 H = INNER HEIGHT OF BOX (FT)
 A = 2' X (H + 1)' (SF)
 B = 1/2' X (H + 1)' (SF)
 L = PROP LENGTH OF BOX CULVERT (FT)
 N = COUNT OF BOXES

$$CY = \frac{(2 \times A) + (B \times (N - 1)) \times L}{27}$$
 CY = 30, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0432 6006	6	CY	RIPRAP (CONC) (CL B)	
0462 6006	120	LF	CONC BOX CULV (5 FT X 2 FT)	
0467 6179	2	EA	SET (TY I) (S= 5 FT) (HW= 4 FT) (6:1) (C)	
0467 6183	2	EA	SET (TY I) (S= 5 FT) (HW= 5 FT) (6:1) (C)	
0496 6008	100	LF	REMOV STR (BOX CULVERT)	
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND	



C. Taylor Mansfield 2021.11.01 12:56:03-05'00"

US 67 CULVERT LAYOUT

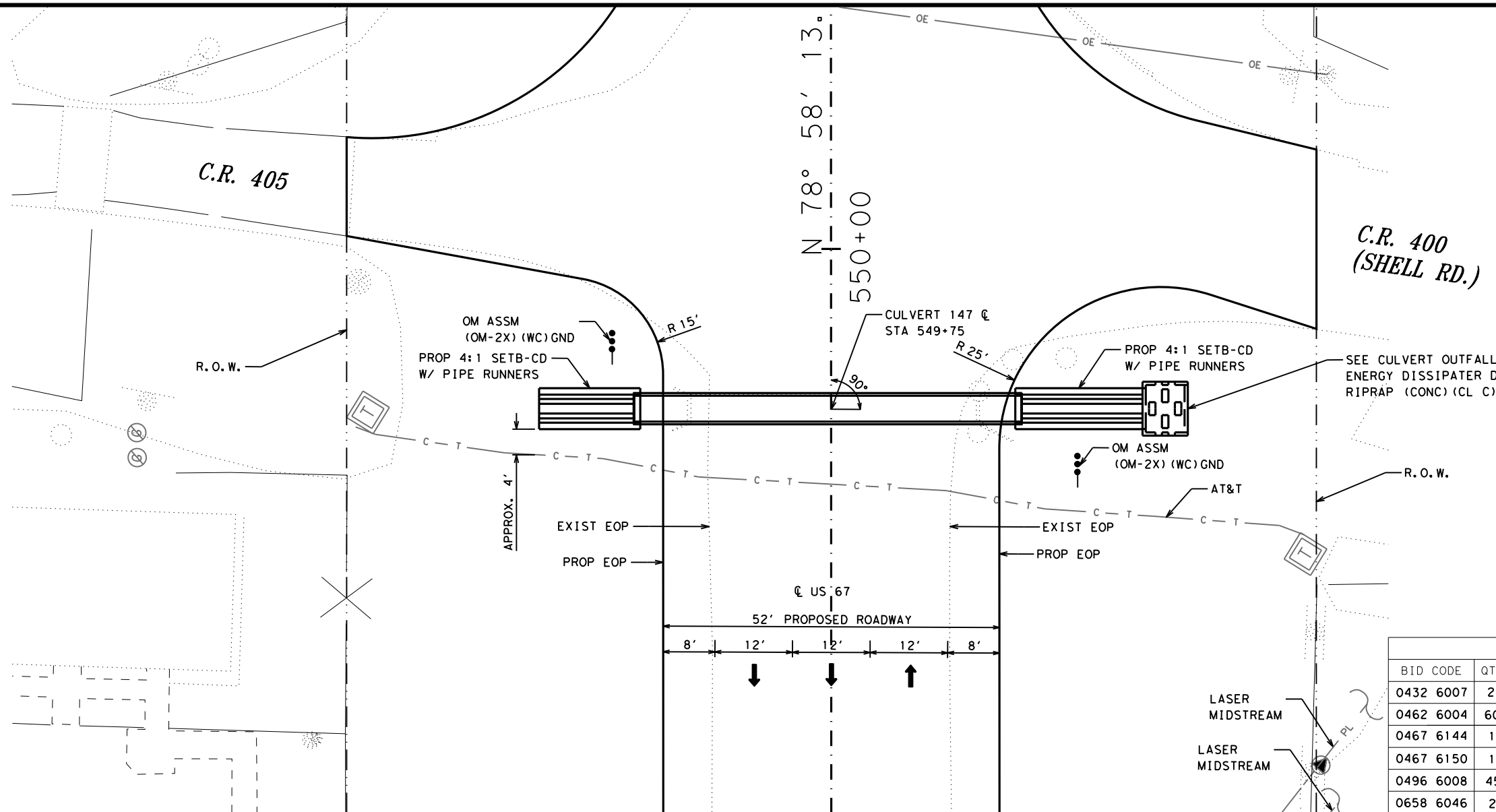
HORI SCALE 1" = 20'
VERT SCALE 1" = 10'

SHEET 3 OF 23



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	171	

DATE: 10/25/2021 02:48 PM
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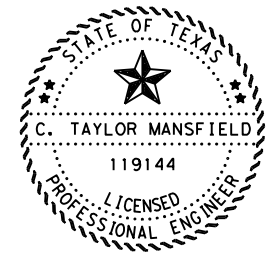
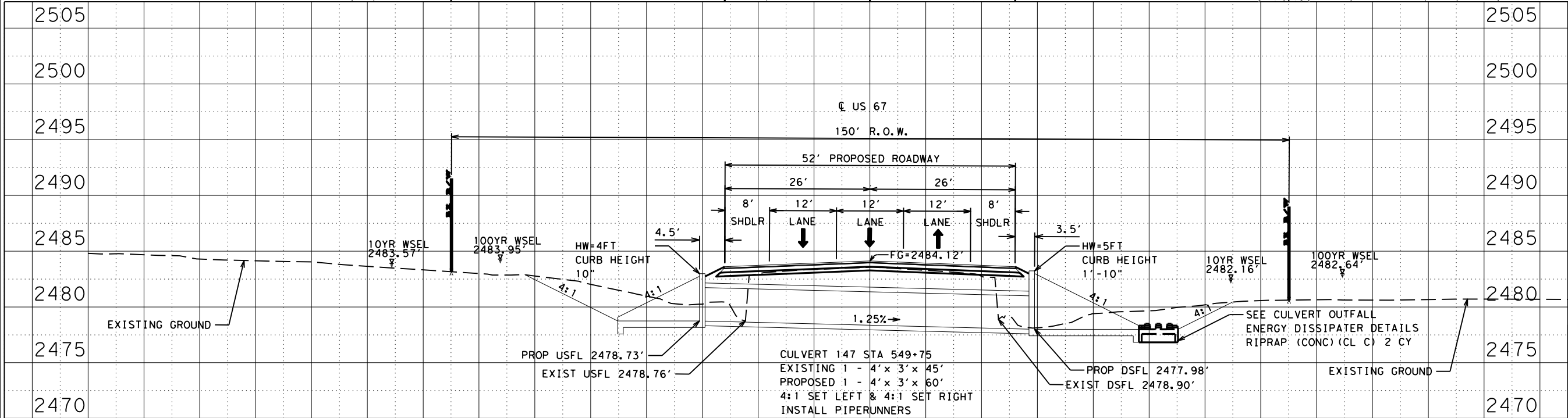


LEGEND

- TELEPHONE PEDESTAL
- GAS VENT PIPE
- GAS METER
- PIPELINE
- CABLE/TELEPHONE
- OVERHEAD ELECTRIC

SHEET TOTALS

BID CODE	QTY	UNIT	DESCRIPTION
0432 6007	2	CY	RIPRAP (CONC) (CL C)
0462 6004	60	LF	CONC BOX CULV (4FT X 3FT)
0467 6144	1	EA	SET (TYI) (S=4FT) (HW=4FT) (4:1) (C)
0467 6150	1	EA	SET (TYI) (S=4FT) (HW=5FT) (4:1) (C)
0496 6008	45	LF	REMOV STR (BOX CULVERT)
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND



C. Taylor Mansfield 2021.11.01
 12:56:03-05'00"

**US 67
 CULVERT
 LAYOUT**

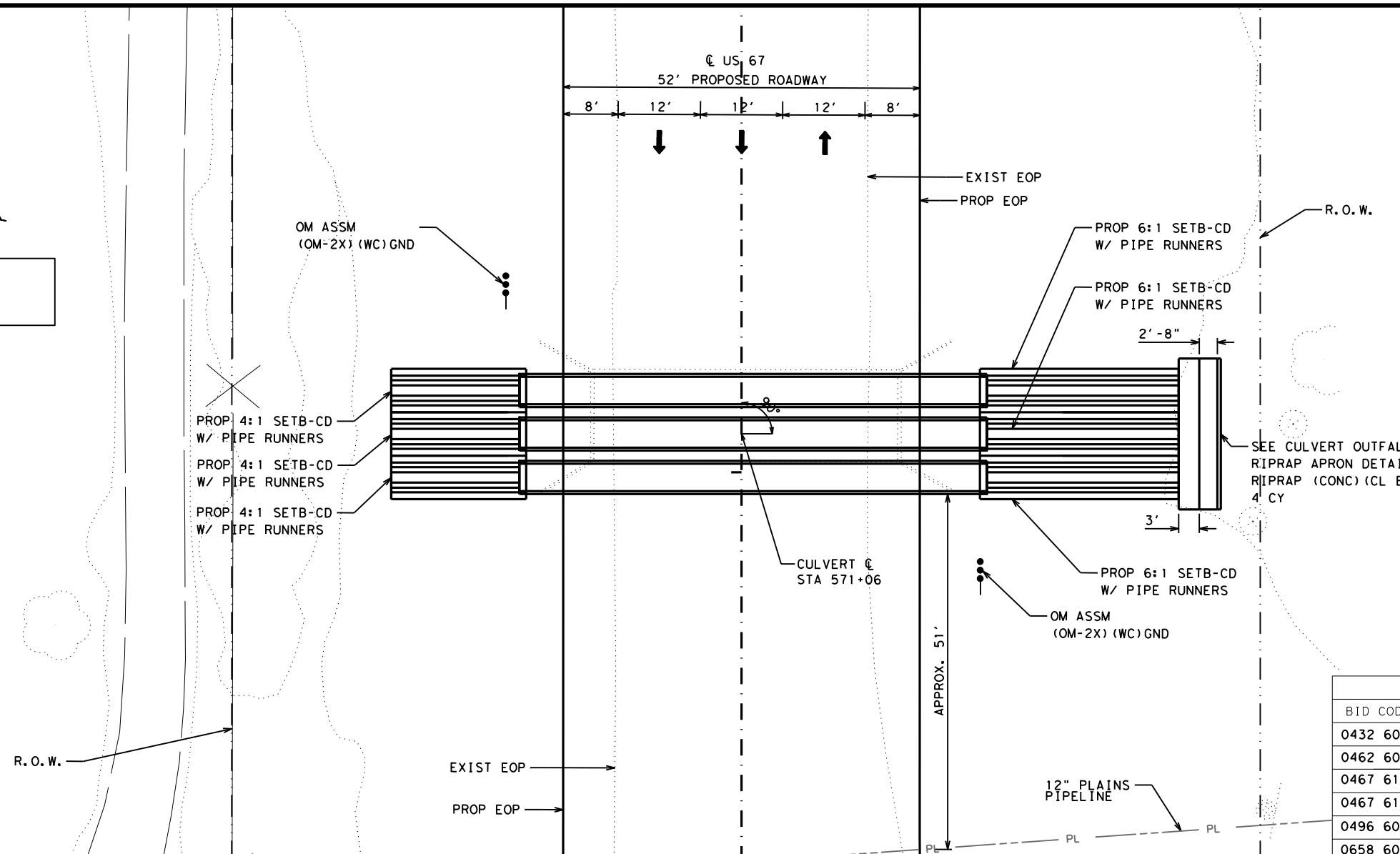
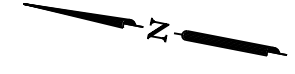
HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 4 OF 23

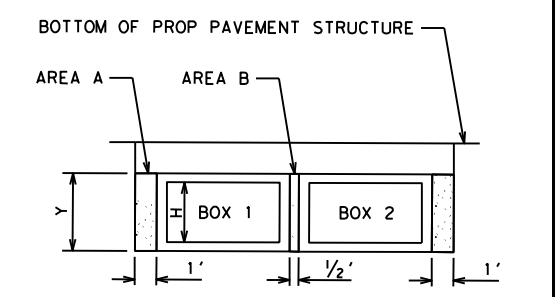


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	172	

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CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS



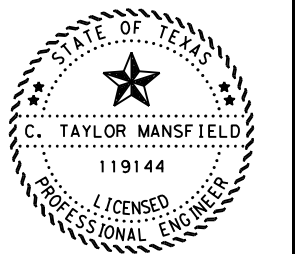
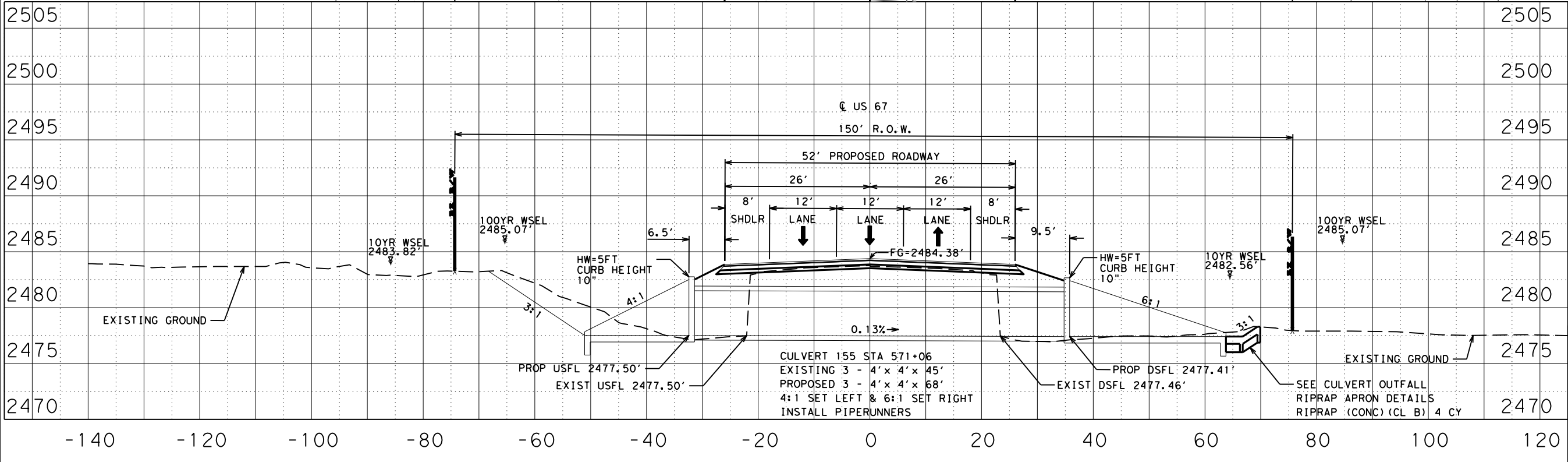
LIMITS OF CEMENT STABILIZED BACKFILL

H = INNER HEIGHT OF BOX (FT)
 A = 2' X (H + 1)' (SF)
 B = 1/2' X (H + 1)' (SF)
 L = PROP LENGTH OF BOX CULVERT (FT)
 N = COUNT OF BOXES

$$CY = \frac{(2 \times A) + (B \times (N - 1)) \times L}{27}$$

CY = 63, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0432 6006	4	CY	RIPRAP (CONC) (CL B)	
0462 6005	204	LF	CONC BOX CULV (4FT X 4FT)	
0467 6150	3	EA	SET (TYI) (S=4FT) (HW=5FT) (4:1) (C)	
0467 6152	3	EA	SET (TYI) (S=4FT) (HW=5FT) (6:1) (C)	
0496 6008	135	LF	REMOV STR (BOX CULVERT)	
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND	



C. Taylor Mansfield 2021.11.01 12:56:03-05'00"

US 67 CULVERT LAYOUT

HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 5 OF 23



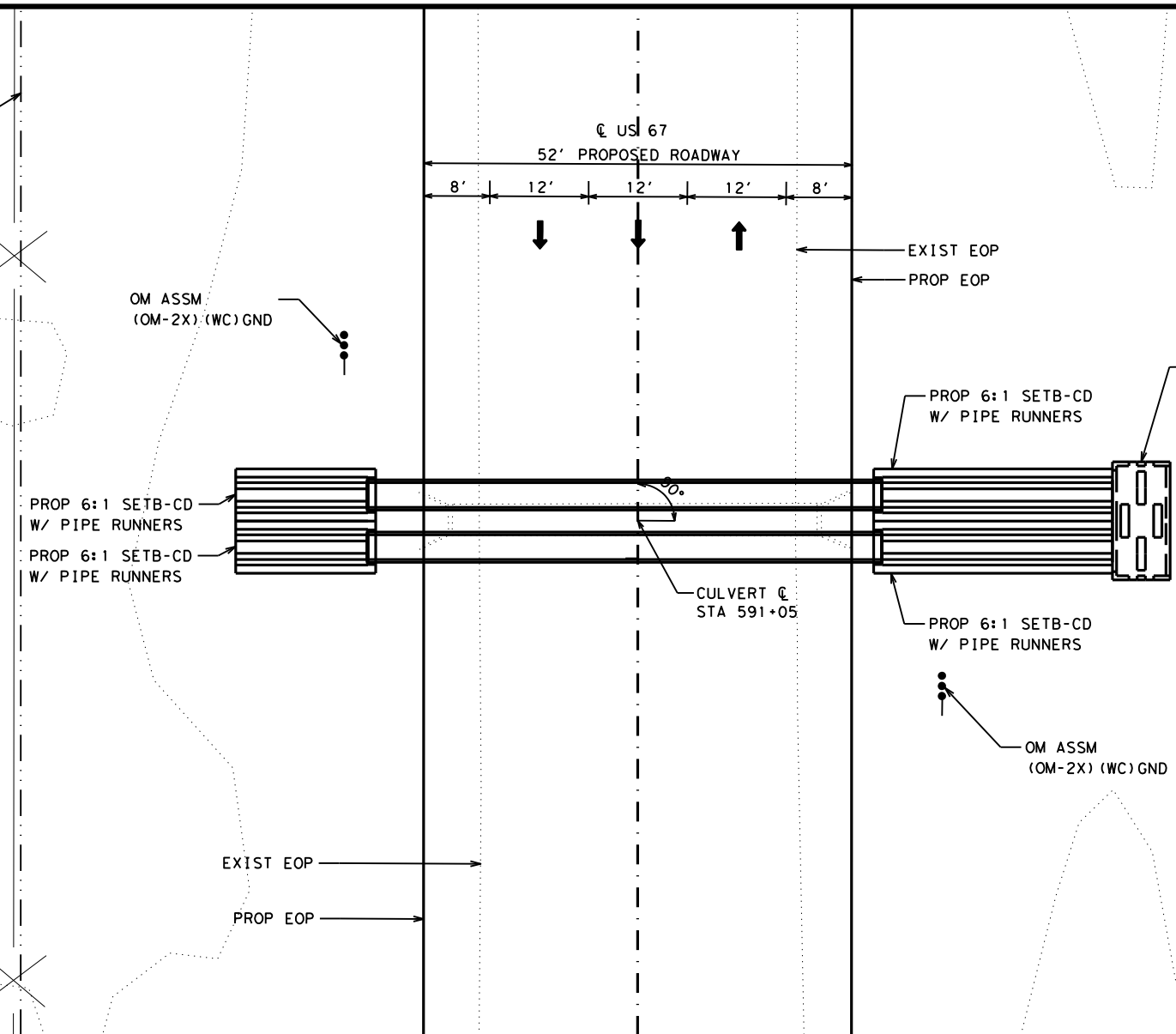
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	173	

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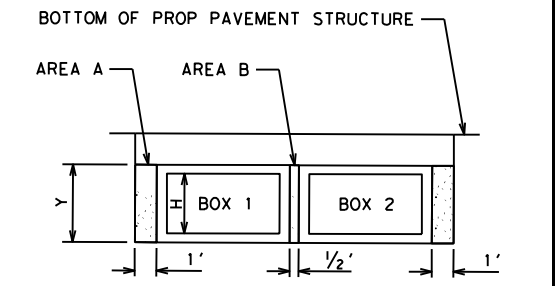


R.O.W.

R.O.W.



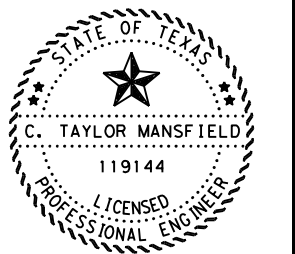
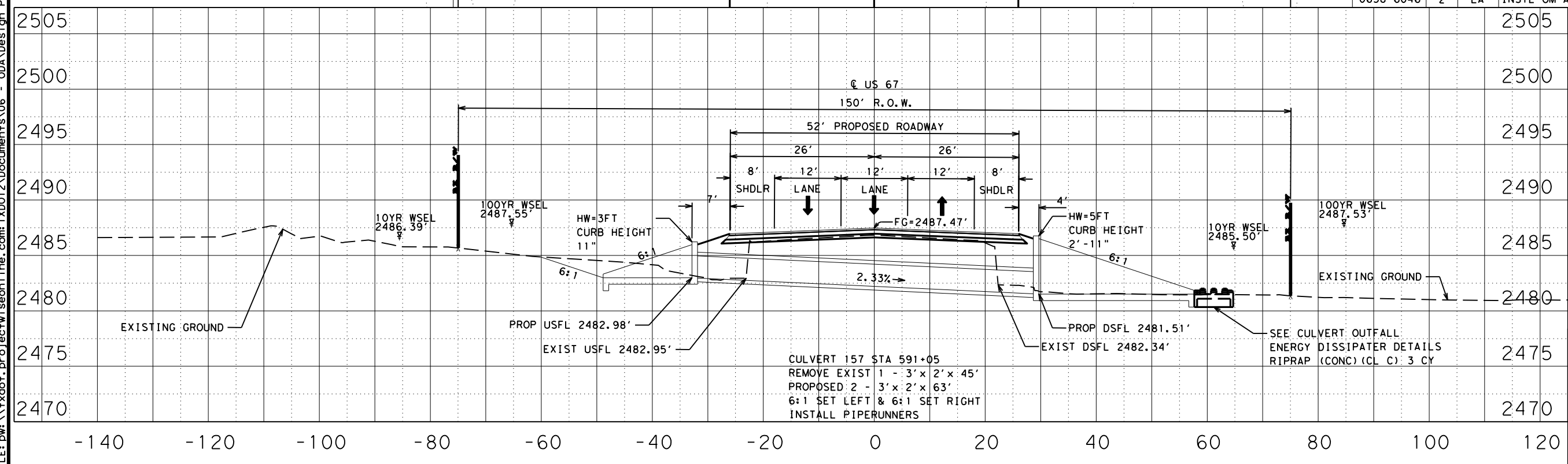
CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS



LIMITS OF CEMENT STABILIZED BACKFILL
 H = INNER HEIGHT OF BOX (FT)
 A = 2' X (H + 1)' (SF)
 B = 1/2' X (H + 1)' (SF)
 L = PROP LENGTH OF BOX CULVERT (FT)
 N = COUNT OF BOXES

$$CY = \frac{(2 \times A) + (B \times (N - 1)) \times L}{27}$$
 CY = 32, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0432 6007	3	CY	RIPRAP (CONC) (CL C)	
0462 6001	126	LF	CONC BOX CULV (3FT X 2FT)	
0467 6109	2	EA	SET (TYI) (S=3FT) (HW=3FT) (6:1) (C)	
0467 6119	2	EA	SET (TYI) (S=3FT) (HW=5FT) (6:1) (C)	
0496 6008	45	LF	REMOV STR (BOX CULVERT)	
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND	



C. Taylor Mansfield 2021.11.01 12:56:04-05'00"

US 67 CULVERT LAYOUT

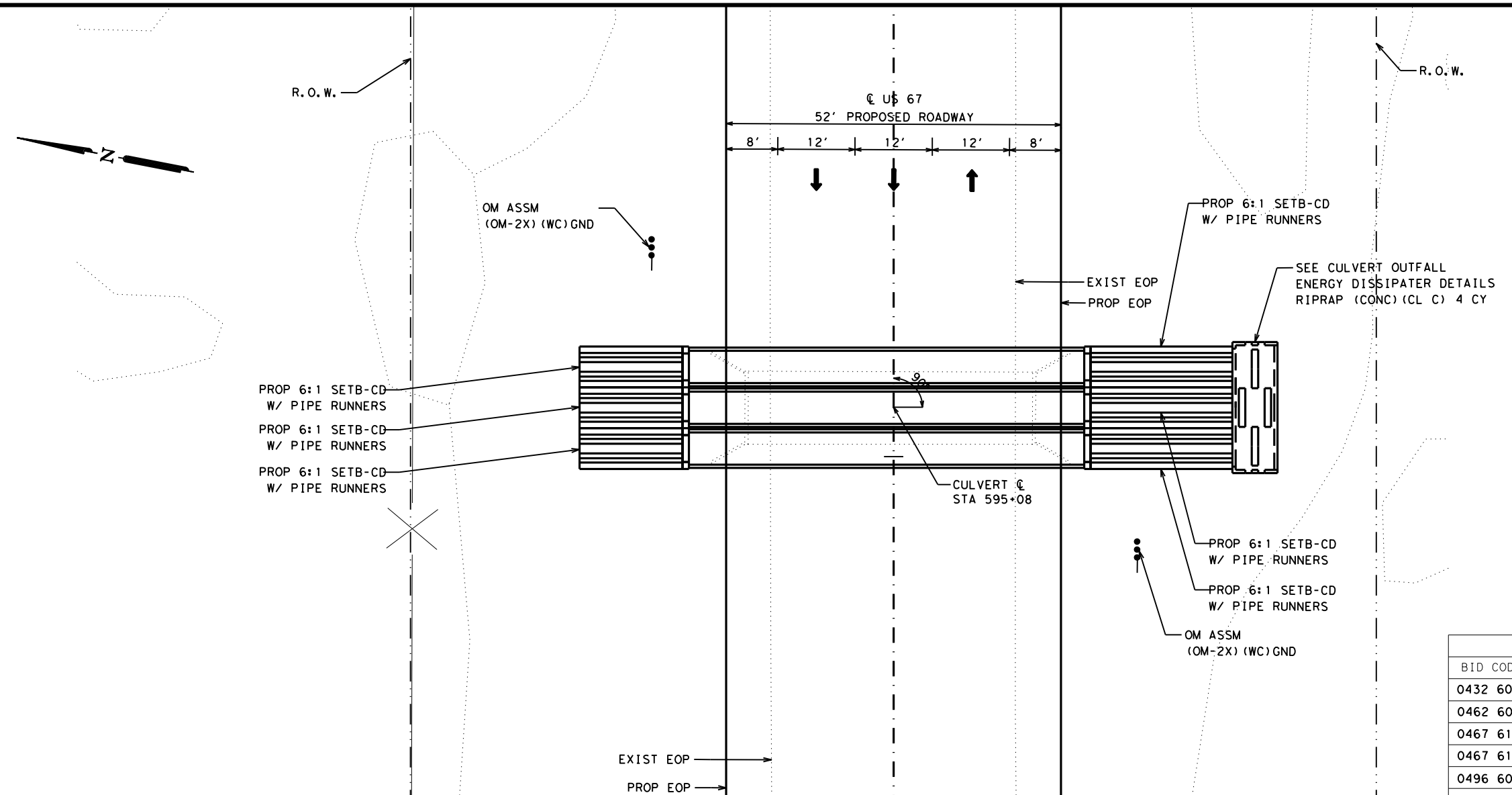
HORI SCALE 1" = 20'
VERT SCALE 1" = 10'

SHEET 6 OF 23



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	174	

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CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS

BOTTOM OF PROP PAVEMENT STRUCTURE

AREA A AREA B

H = INNER HEIGHT OF BOX (FT)

A = 2' X (H + 1)' (SF)

B = 1/2' X (H + 1)' (SF)

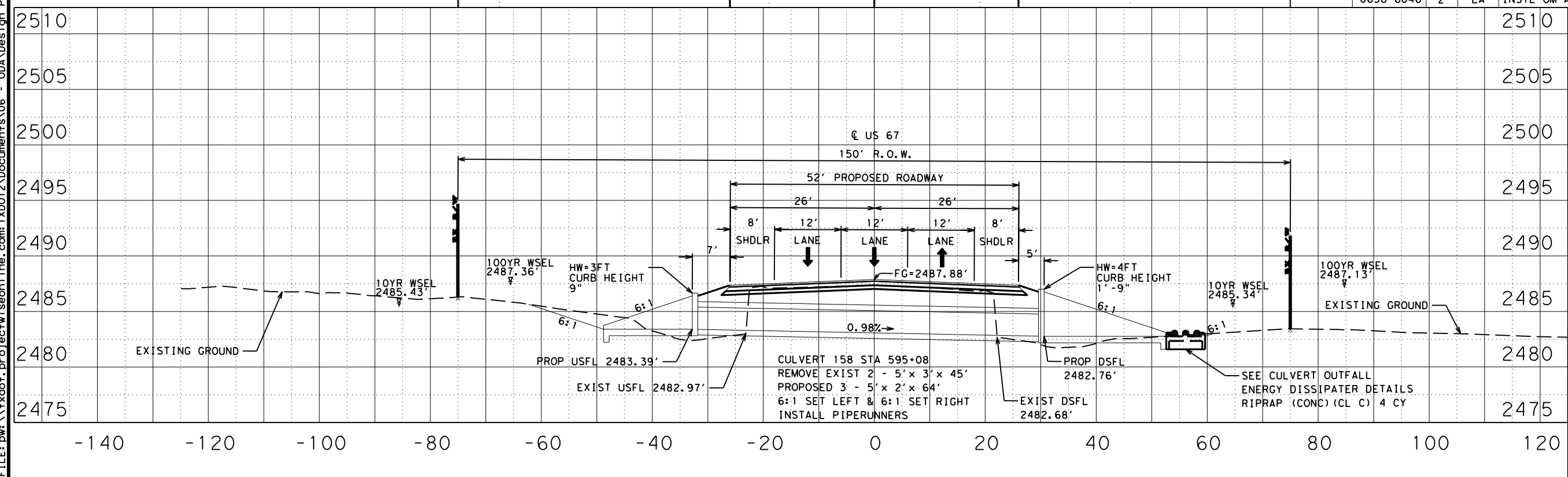
L = PROP LENGTH OF BOX CULVERT (FT)

N = COUNT OF BOXES

$$CY = \frac{(2 \times A) + (B \times (N - 1)) \times L}{27}$$

CY = 36, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0432 6007	4	CY	RIPRAP (CONC) (CL C)	
0462 6006	192	LF	CONC BOX CULV (5 FT X 2 FT)	
0467 6173	3	EA	SET (TY I) (S= 5 FT) (HW= 3 FT) (6:1) (C)	
0467 6179	3	EA	SET (TY I) (S= 5 FT) (HW= 4 FT) (6:1) (C)	
0496 6008	90	LF	REMOV STR (BOX CULVERT)	
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND	

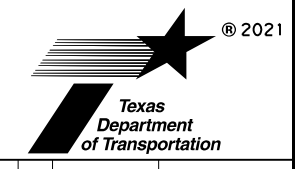


C. Taylor Mansfield 2021.11.01 12:56:04-05'00"

**US 67
CULVERT
LAYOUT**

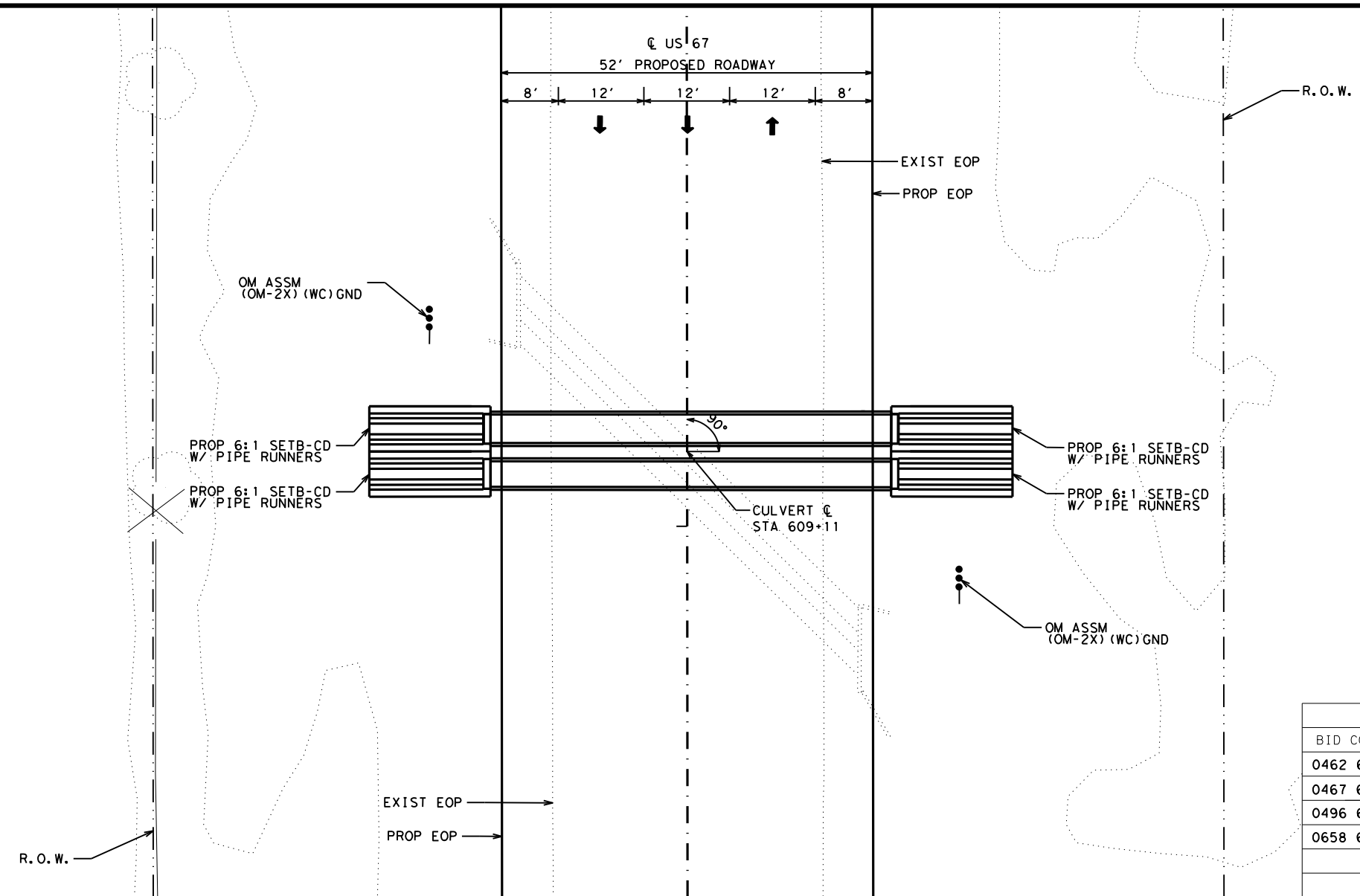
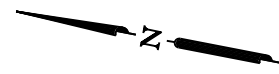
HORI SCALE 1" = 20'
VERT SCALE 1" = 10'

SHEET 7 OF 23

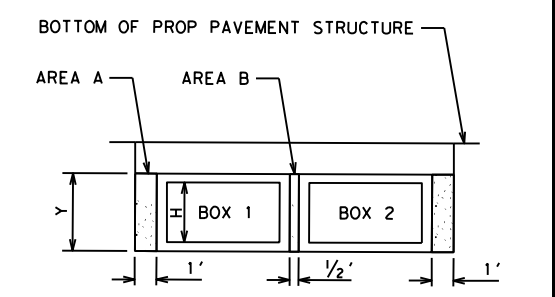


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	175	

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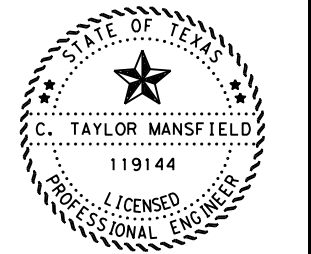
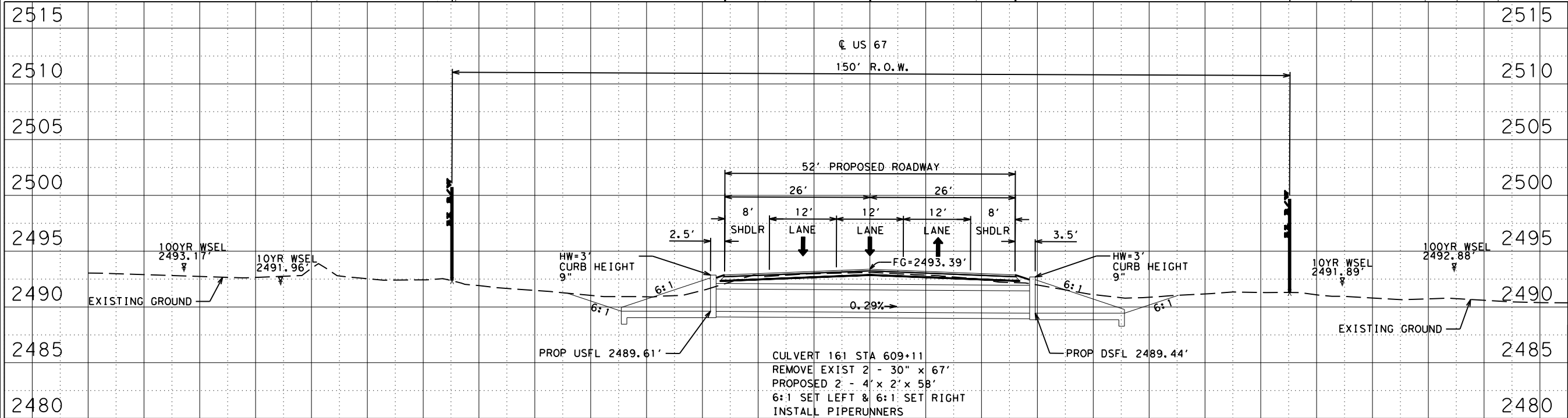
CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS



LIMITS OF CEMENT STABILIZED BACKFILL
 H = INNER HEIGHT OF BOX (FT)
 A = 2' X (H + 1)' (SF)
 B = 1/2' X (H + 1)' (SF)
 L = PROP LENGTH OF BOX CULVERT (FT)
 N = COUNT OF BOXES

$$CY = \frac{(2 \times A) + (B \times (N - 1)) \times L}{27}$$
 CY = 29, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
0462 6003	116	LF	CONC BOX CULV (4 FT X 2 FT)
0467 6141	2	EA	SET (TY I) (S= 4 FT) (HW= 3 FT) (6:1) (C)
0496 6016	134	LF	REMOV STR (PIPE)
0658 6046	2	EA	INSTL OM ASSM(OM-2X) (WC) GND



C. Taylor Mansfield 2021.11.01 12:56:04-05'00"

US 67 CULVERT LAYOUT

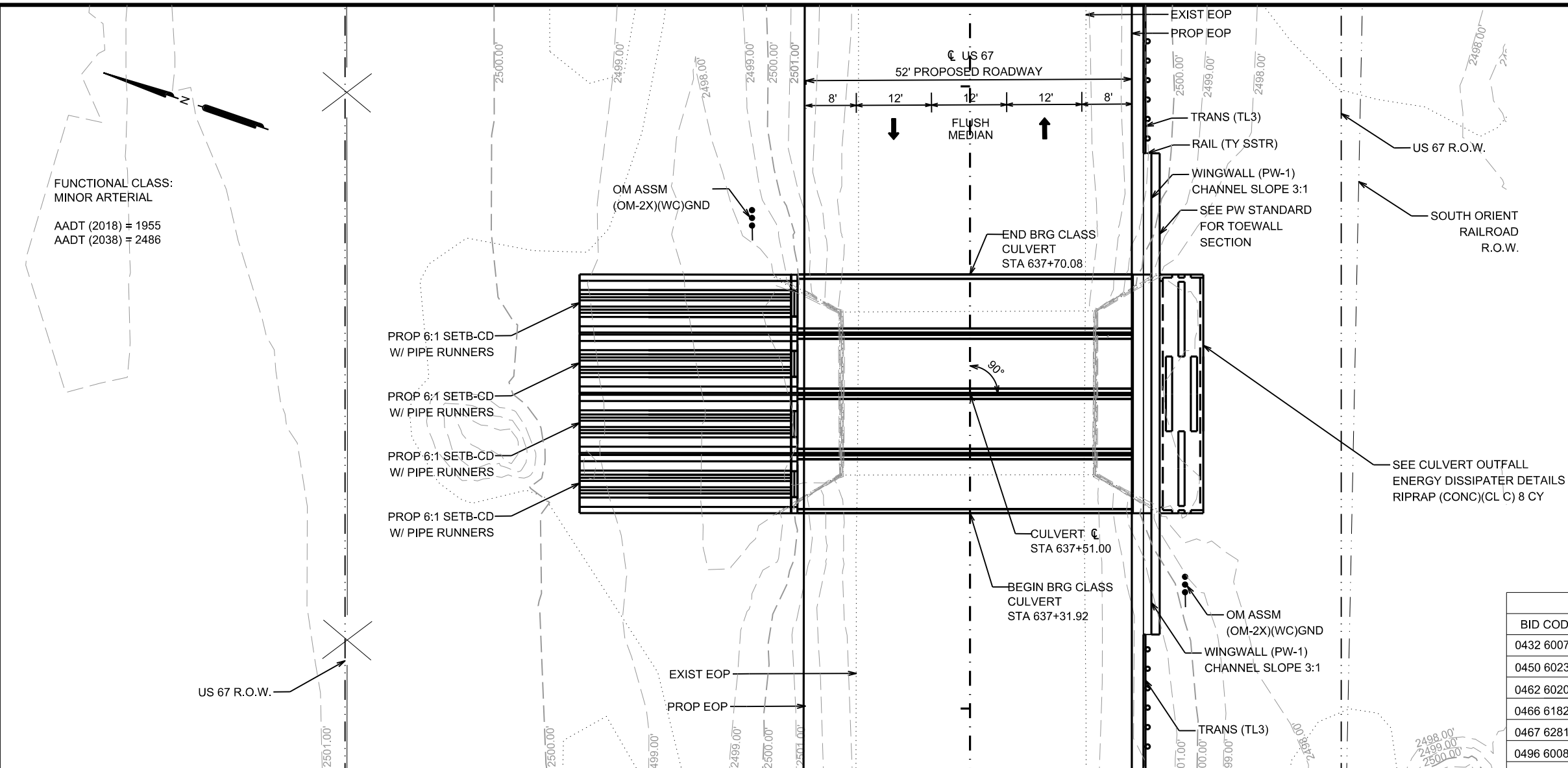
HORI SCALE 1" = 20'
VERT SCALE 1" = 10'

SHEET 8 OF 23



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	176	

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CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS

BOTTOM OF PROP PAVEMENT STRUCTURE

AREA A

AREA B

BOX 1

BOX 2

LIMITS OF CEMENT STABILIZED BACKFILL

H = INNER HEIGHT OF BOX (FT)

A = 2' X (H + 1') (SF)

B = 1/2' X (H + 1') (SF)

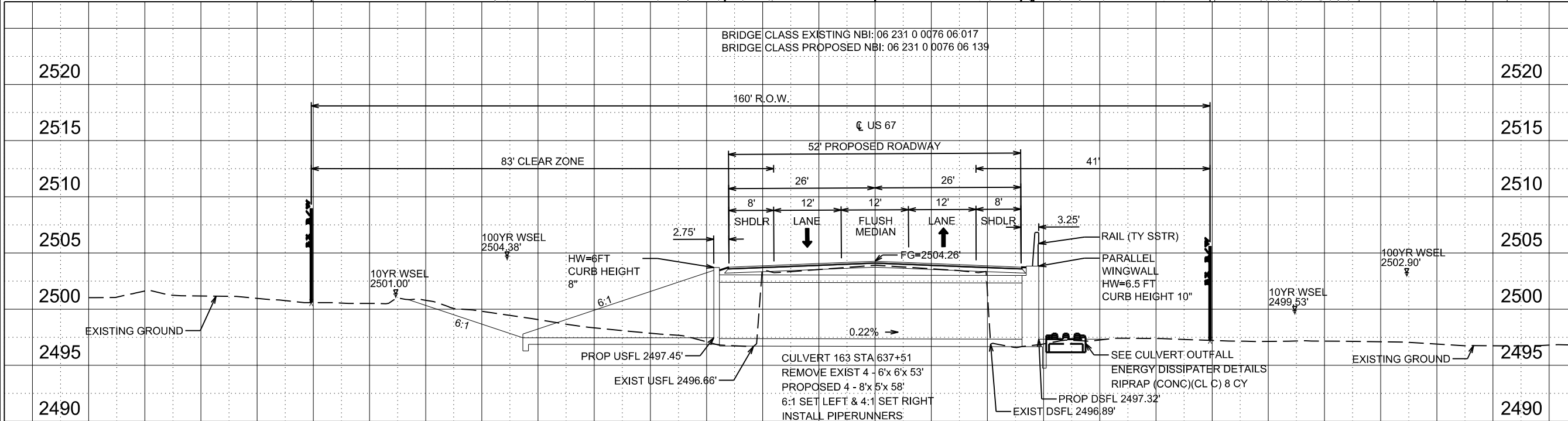
L = PROP LENGTH OF BOX CULVERT (FT)

N = COUNT OF BOXES

$$CY = \frac{(2XA) + (B \times (N - 1) \times L)}{27}$$

CY = 71, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
0432 6007	8	CY	RIPRAP (CONC)(CL C)
0450 6023	78	LF	RAIL (TY SSTR)
0462 6020	232	LF	CONC BOX CULV (8 FT X 5 FT)
0466 6182	1	EA	WINGWALL (PW-1)(HW=7FT)
0467 6281	4	EA	SET (TY I)(S= 8 FT)(HW= 6 FT)(6:1)(C)
0496 6008	212	LF	REMOV STR (BOX CULVERT)
0658 6046	2	EA	INSTL OM ASSM(OM-2X)(WC)GND



C. TAYLOR MANSFIELD
119144
LICENSED PROFESSIONAL ENGINEER

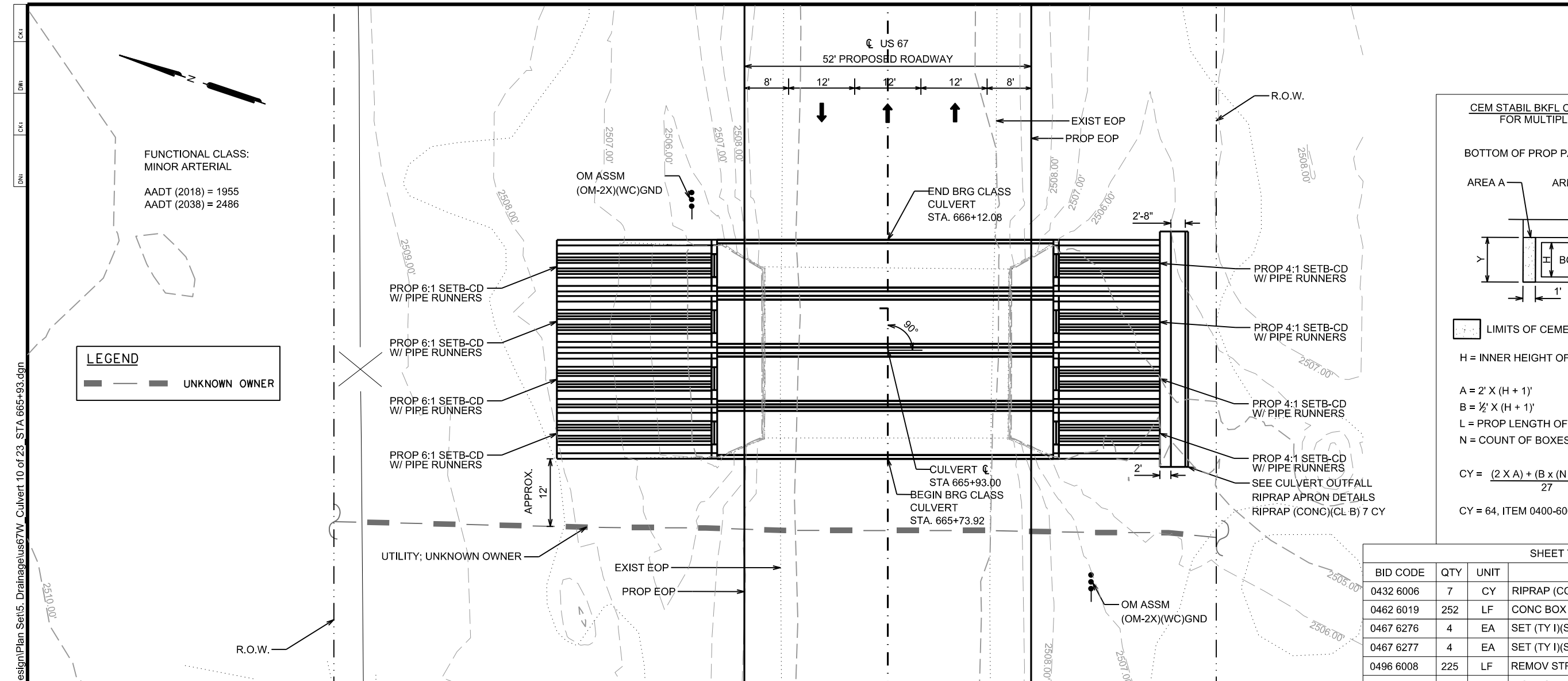
E. Taylor Mansfield 2021.11.01 12:56:04-05'00"

US 67 CULVERT LAYOUT

HORI SCALE 1" = 20'
VERT SCALE 1" = 10'

SHEET 9 OF 23

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	177	



CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS

BOTTOM OF PROP PAVEMENT STRUCTURE

AREA A AREA B

Y

BOX 1 BOX 2

1' 1'

LIMITS OF CEMENT STABILIZED BACKFILL

H = INNER HEIGHT OF BOX (FT)

A = 2' X (H + 1') (SF)

B = 1/2' X (H + 1') (SF)

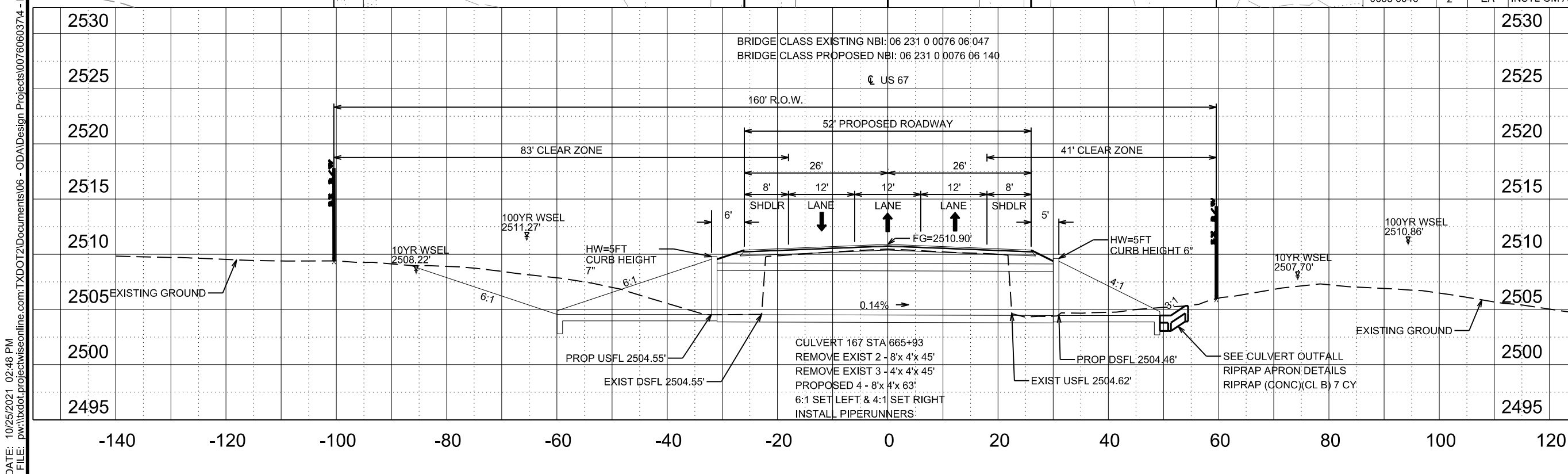
L = PROP LENGTH OF BOX CULVERT (FT)

N = COUNT OF BOXES

$CY = \frac{(2 X A) + (B X (N - 1)) X L}{27}$

CY = 64, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
0432 6006	7	CY	RIPRAP (CONC)(CL B)
0462 6019	252	LF	CONC BOX CULV (8 FT X 4 FT)
0467 6276	4	EA	SET (TY I)(S= 8 FT)(HW= 5 FT)(4:1)(C)
0467 6277	4	EA	SET (TY I)(S= 8 FT)(HW= 5 FT)(6:1)(C)
0496 6008	225	LF	REMOV STR (BOX CULVERT)
0658 6046	2	EA	INSTL OM ASSM(OM-2X)(WC)GND



C. TAYLOR MANSFIELD
119144
LICENSED PROFESSIONAL ENGINEER

C. Taylor Mansfield 2021.11.01
12:56:04-05'00"

US 67 CULVERT LAYOUT

HORI SCALE 1" = 20'
VERT SCALE 1" = 10'

SHEET 10 OF 23

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	178	

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FUNCTIONAL CLASS:
MINOR ARTERIAL

AADT (2018) = 1955
AADT (2038) = 2486

LEGEND

UNKNOWN OWNER

UTILITY; UNKNOWN OWNER

BRIDGE CLASS EXISTING NBI: 06 231 0 0076 06:047
BRIDGE CLASS PROPOSED NBI: 06 231 0 0076 06 140

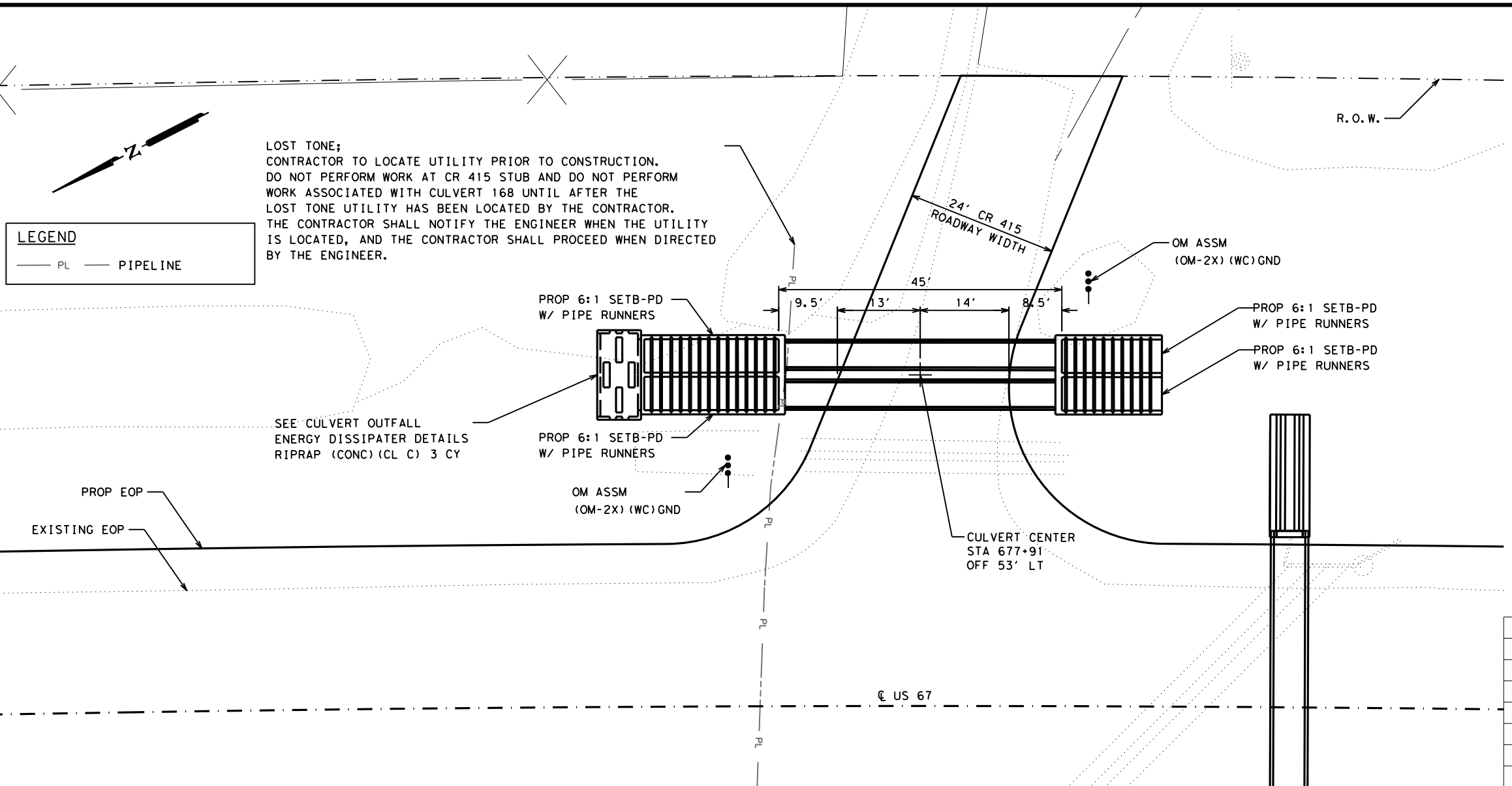
CULVERT 167 STA 665+93
REMOVE EXIST 2 - 8'x 4'x 45'
REMOVE EXIST 3 - 4'x 4'x 45'
PROPOSED 4 - 8'x 4'x 63'
6:1 SET LEFT & 4:1 SET RIGHT
INSTALL PIPERUNNERS

SEE CULVERT OUTFALL
RIPRAP APRON DETAILS
RIPRAP (CONC)(CL B) 7 CY

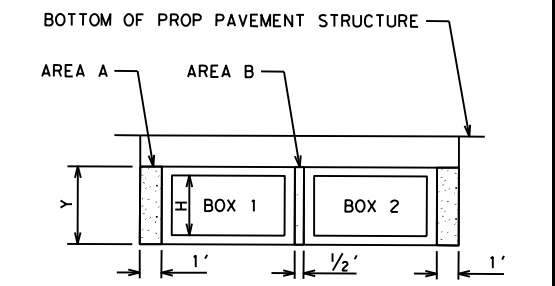
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LOST TONE;
 CONTRACTOR TO LOCATE UTILITY PRIOR TO CONSTRUCTION.
 DO NOT PERFORM WORK AT CR 415 STUB AND DO NOT PERFORM
 WORK ASSOCIATED WITH CULVERT 168 UNTIL AFTER THE
 LOST TONE UTILITY HAS BEEN LOCATED BY THE CONTRACTOR.
 THE CONTRACTOR SHALL NOTIFY THE ENGINEER WHEN THE UTILITY
 IS LOCATED, AND THE CONTRACTOR SHALL PROCEED WHEN DIRECTED
 BY THE ENGINEER.



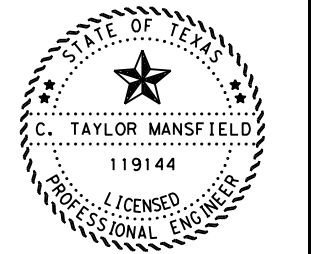
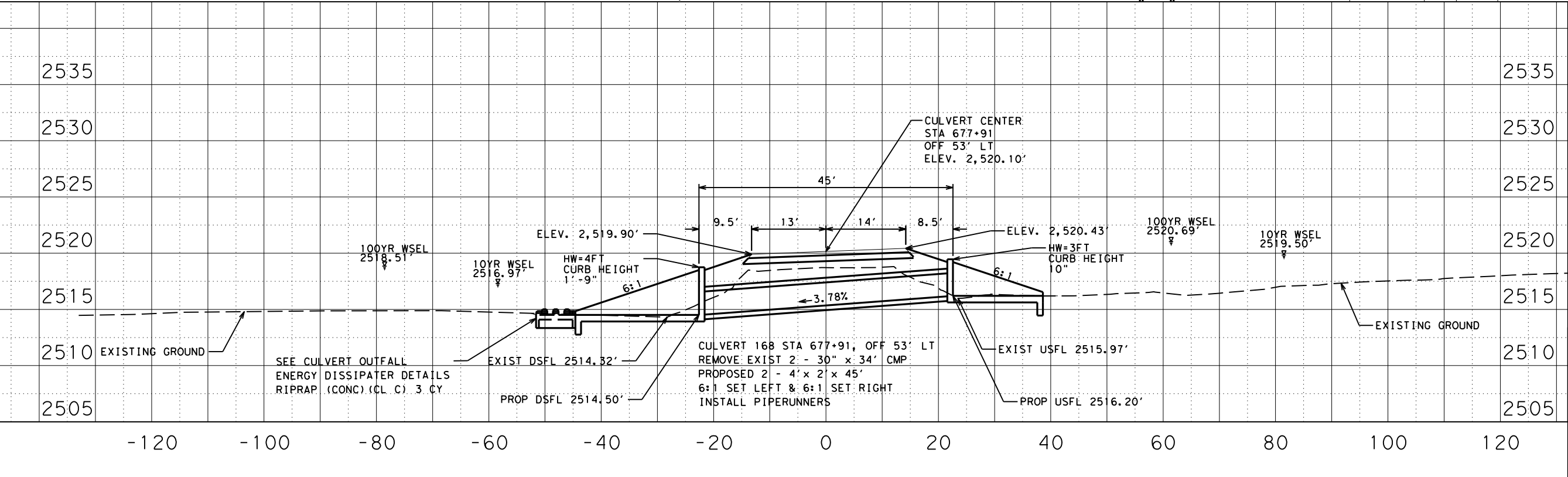
CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS



LIMITS OF CEMENT STABILIZED BACKFILL
 H = INNER HEIGHT OF BOX (FT)
 A = 2' X (H + 1)' (SF)
 B = 1/2' X (H + 1)' (SF)
 L = PROP LENGTH OF BOX CULVERT (FT)
 N = COUNT OF BOXES

$$CY = \frac{(2 \times A) + (B \times (N - 1)) \times L}{27}$$
 CY = 23, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0432 6007	3	CY	RIPRAP (CONC) (CL C)	
0462 6003	90	EA	CONC BOX CULV (4 FT X 2 FT)	
0467 6142	2	EA	SET (TY I) (S= 4 FT) (HW= 3 FT) (6:1) (P)	
0467 6147	2	EA	SET (TY I) (S= 4 FT) (HW= 4 FT) (6:1) (P)	
0496 6016	68	LF	REMOV STR (PIPE)	
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND	



C. Taylor Mansfield 2021.11.01
 12:56:04-05'00"

**US 67
 CULVERT
 LAYOUT**

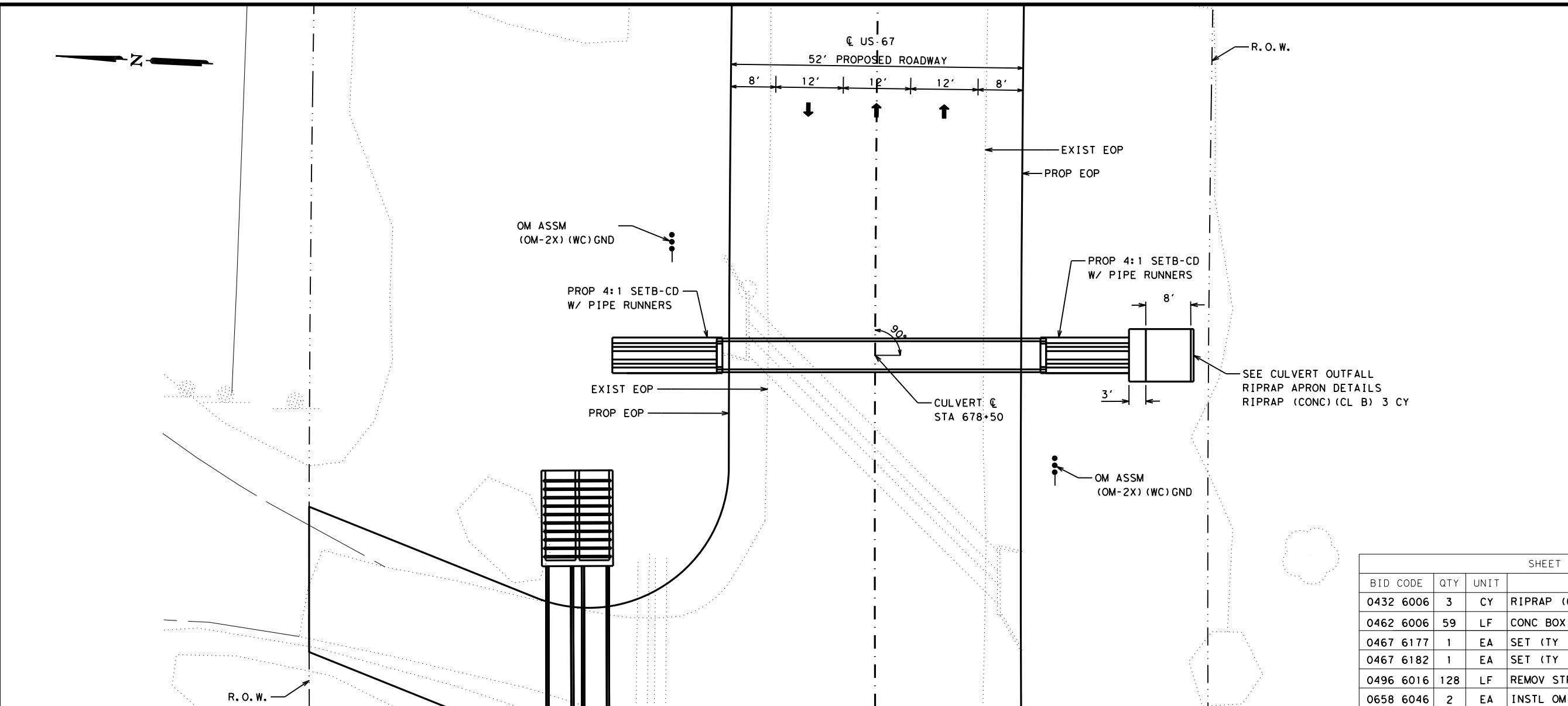
HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 11 OF 23

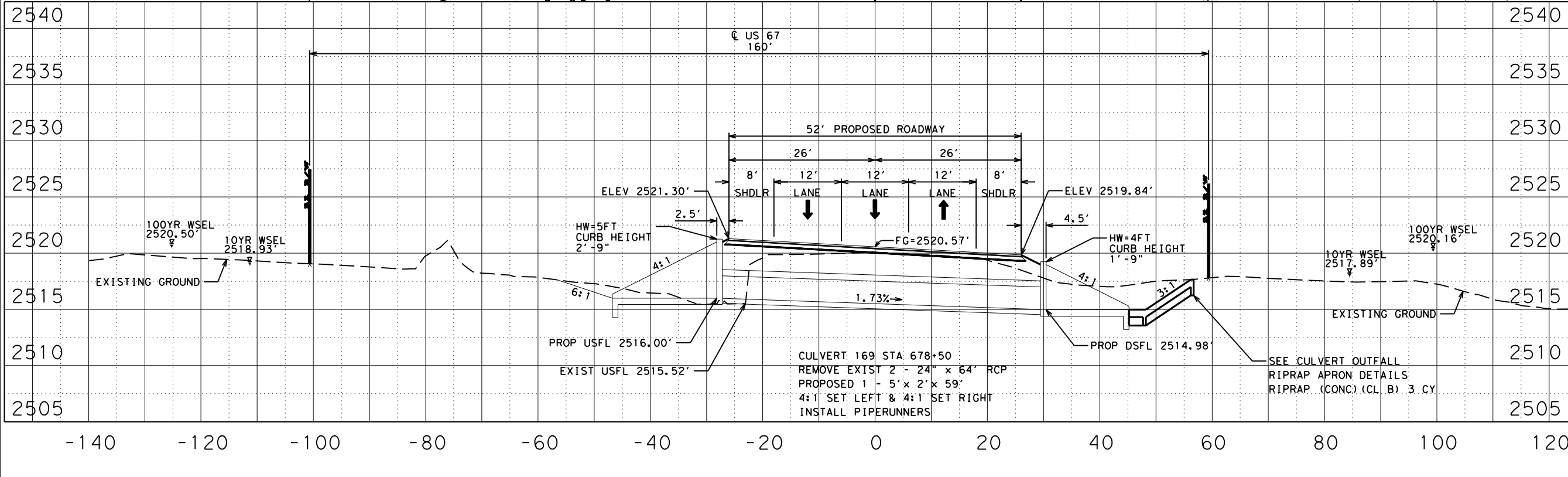


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	179	

DATE: 10/25/2021 02:48 PM
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SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0432 6006	3	CY	RIPRAP (CONC) (CL B)	
0462 6006	59	LF	CONC BOX CULV (5 FT X 2 FT)	
0467 6177	1	EA	SET (TY I) (S= 5 FT) (HW= 4 FT) (4:1) (C)	
0467 6182	1	EA	SET (TY I) (S= 5 FT) (HW= 5 FT) (4:1) (C)	
0496 6016	128	LF	REMOV STR (PIPE)	
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND	



C. TAYLOR MANSFIELD
 119144
 LICENSED PROFESSIONAL ENGINEER

E. Taylor Mansfield 2021.11.01
 12:56:04-05'00"

US 67 CULVERT LAYOUT

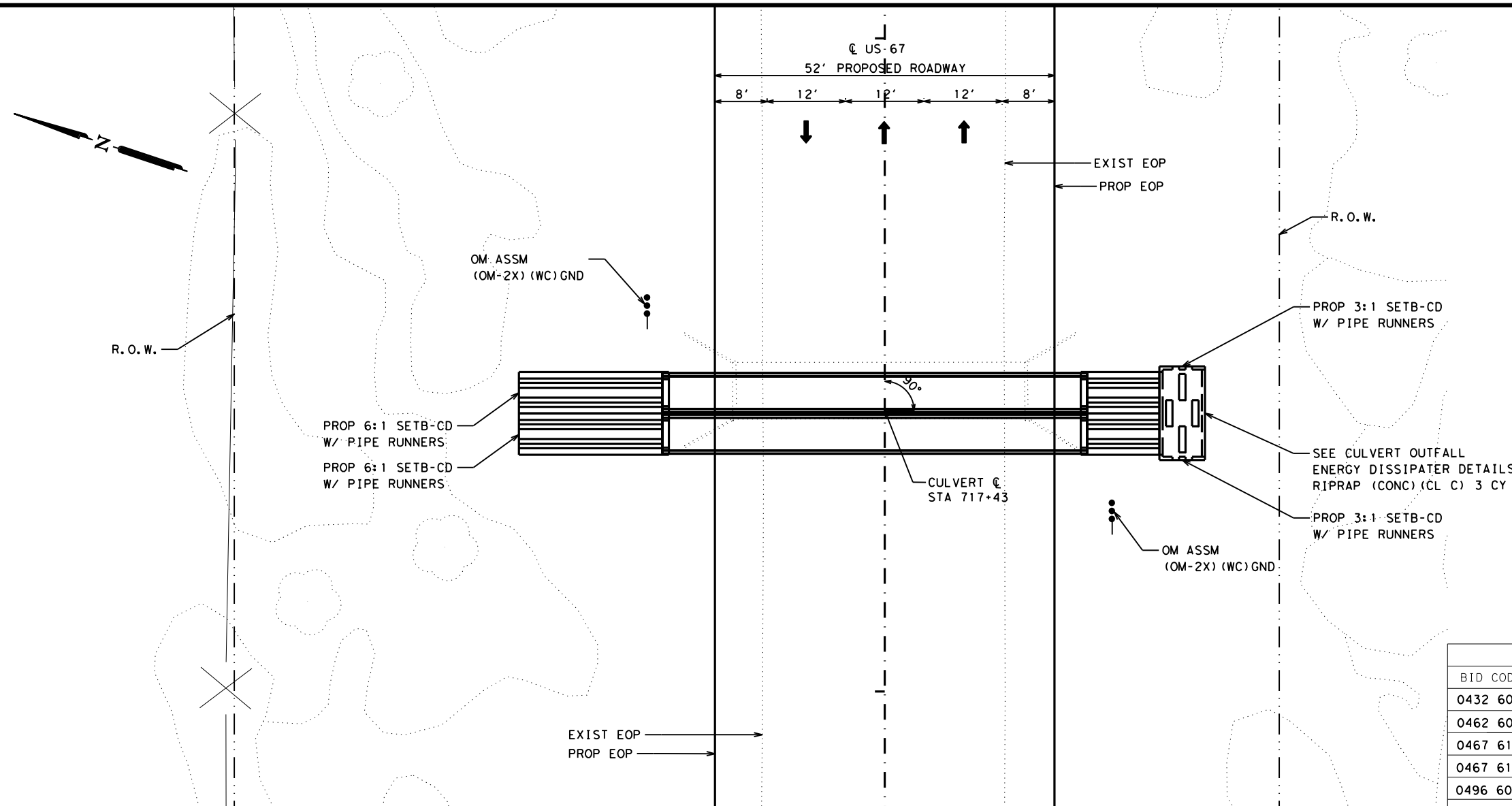
HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 12 OF 23

© 2021

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		180

DATE: 10/25/2021 02:48 PM
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CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS

BOTTOM OF PROP PAVEMENT STRUCTURE

AREA A AREA B

Y

BOX 1 BOX 2

1' 1/2' 1'

LIMITS OF CEMENT STABILIZED BACKFILL

H = INNER HEIGHT OF BOX (FT)

A = 2' X (H + 1)' (SF)

B = 1/2' X (H + 1)' (SF)

L = PROP LENGTH OF BOX CULVERT (FT)

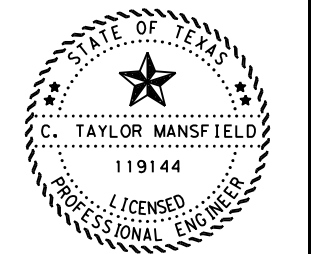
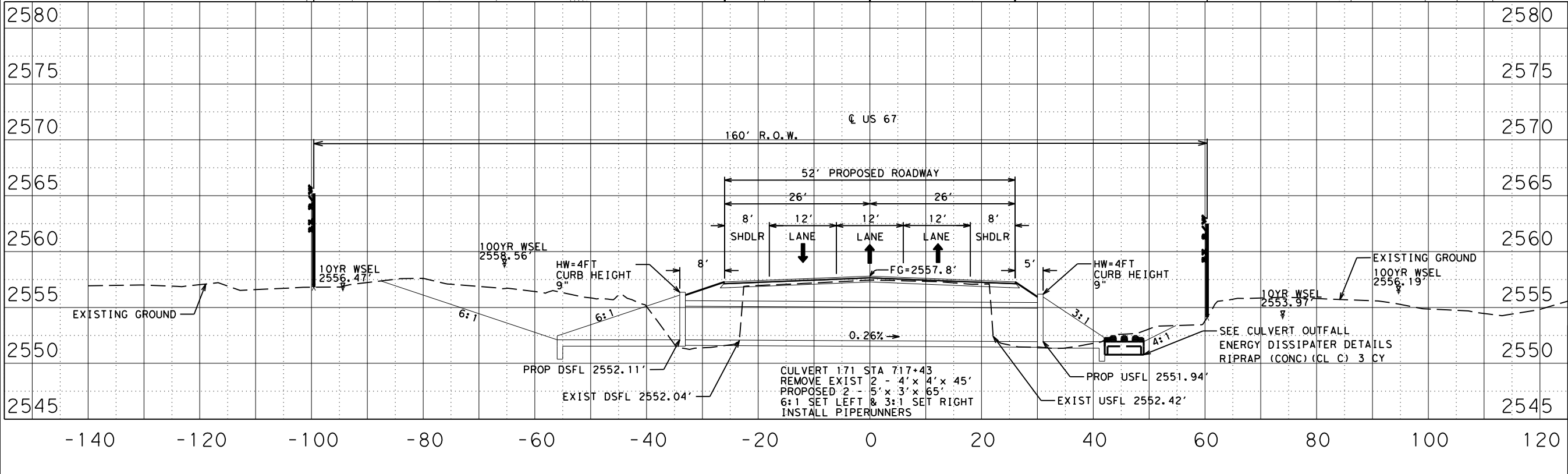
N = COUNT OF BOXES

$$CY = \frac{(2 \times A) + (B \times (N - 1)) \times L}{27}$$

CY = 43, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS

BID CODE	QTY	UNIT	DESCRIPTION
0432 6007	3	CY	RIPRAP (CONC) (CL C)
0462 6007	130	LF	CONC BOX CULV (5 FT X 3 FT)
0467 6175	2	EA	SET (TY I) (S= 5 FT) (HW= 4 FT) (3:1) (C)
0467 6179	2	EA	SET (TY I) (S= 5 FT) (HW= 4 FT) (6:1) (C)
0496 6008	90	LF	REMOV STR (BOX CULVERT)
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND



C. Taylor Mansfield 2021.11.01 12:56:04-05'00"

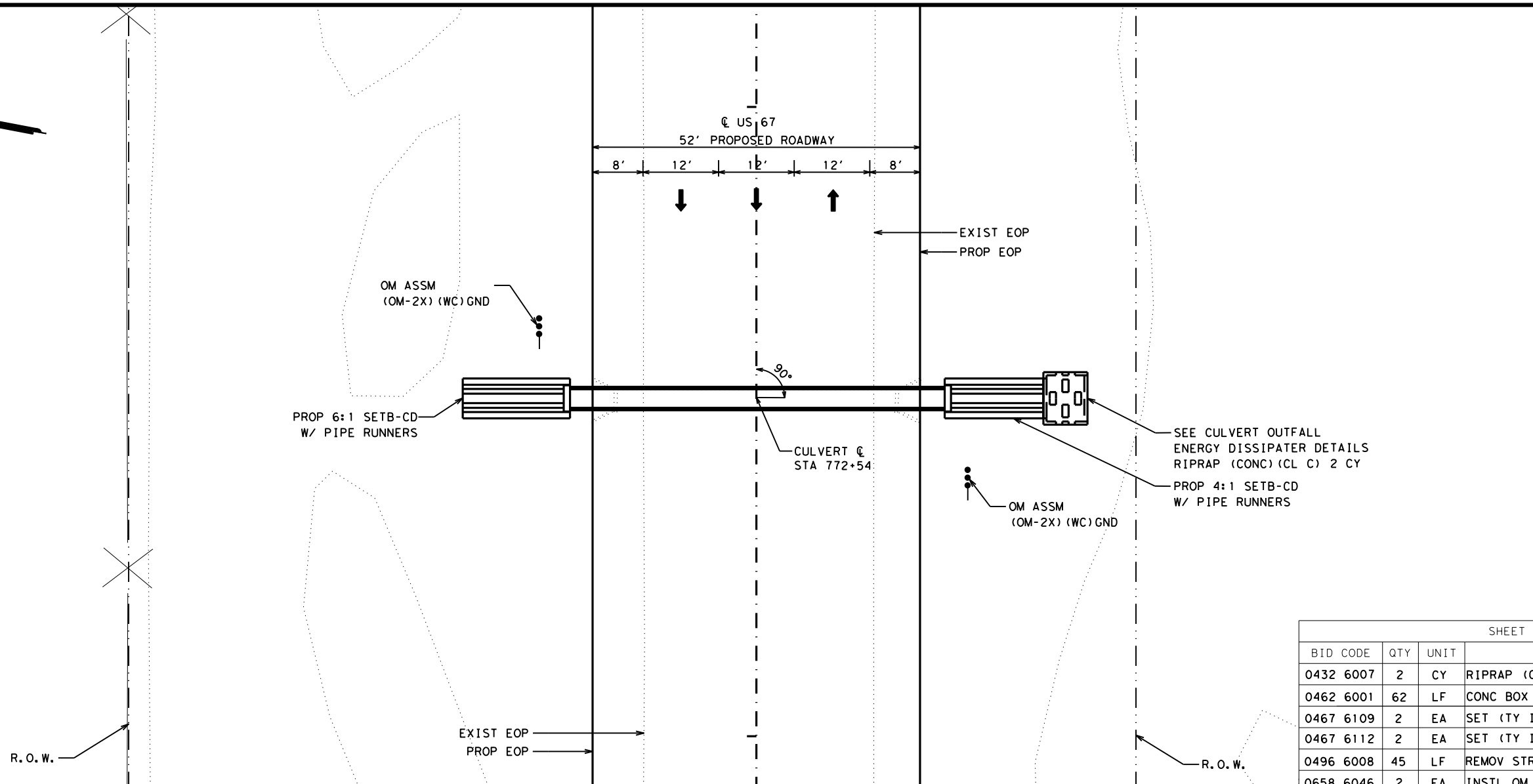
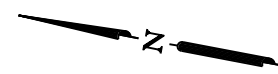
US 67 CULVERT LAYOUT
 HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 13 OF 23

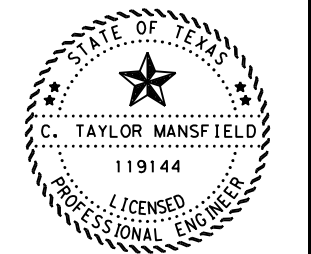
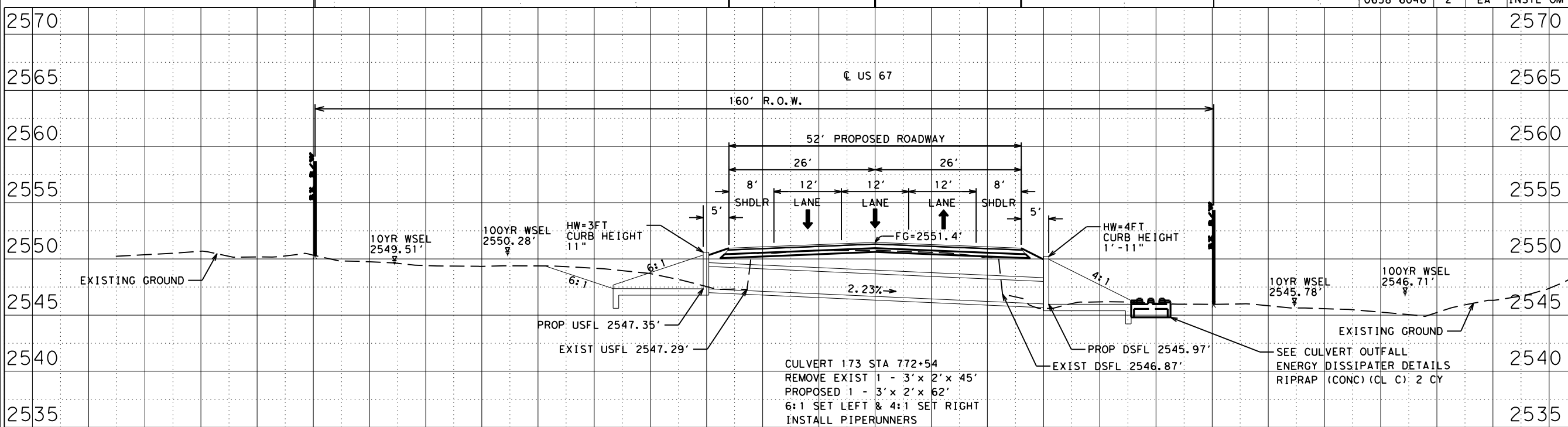


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	181	

DATE: 10/25/2021 02:48 PM
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SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
0432 6007	2	CY	RIPRAP (CONC) (CL C)
0462 6001	62	LF	CONC BOX CULV (3 FT X 2 FT)
0467 6109	2	EA	SET (TY I) (S= 3 FT) (HW= 3 FT) (6:1) (C)
0467 6112	2	EA	SET (TY I) (S= 3 FT) (HW= 4 FT) (4:1) (C)
0496 6008	45	LF	REMOV STR (BOX CULVERT)
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND



C. Taylor Mansfield 2021.11.01
 12:56:04-05'00"

**US 67
 CULVERT
 LAYOUT**

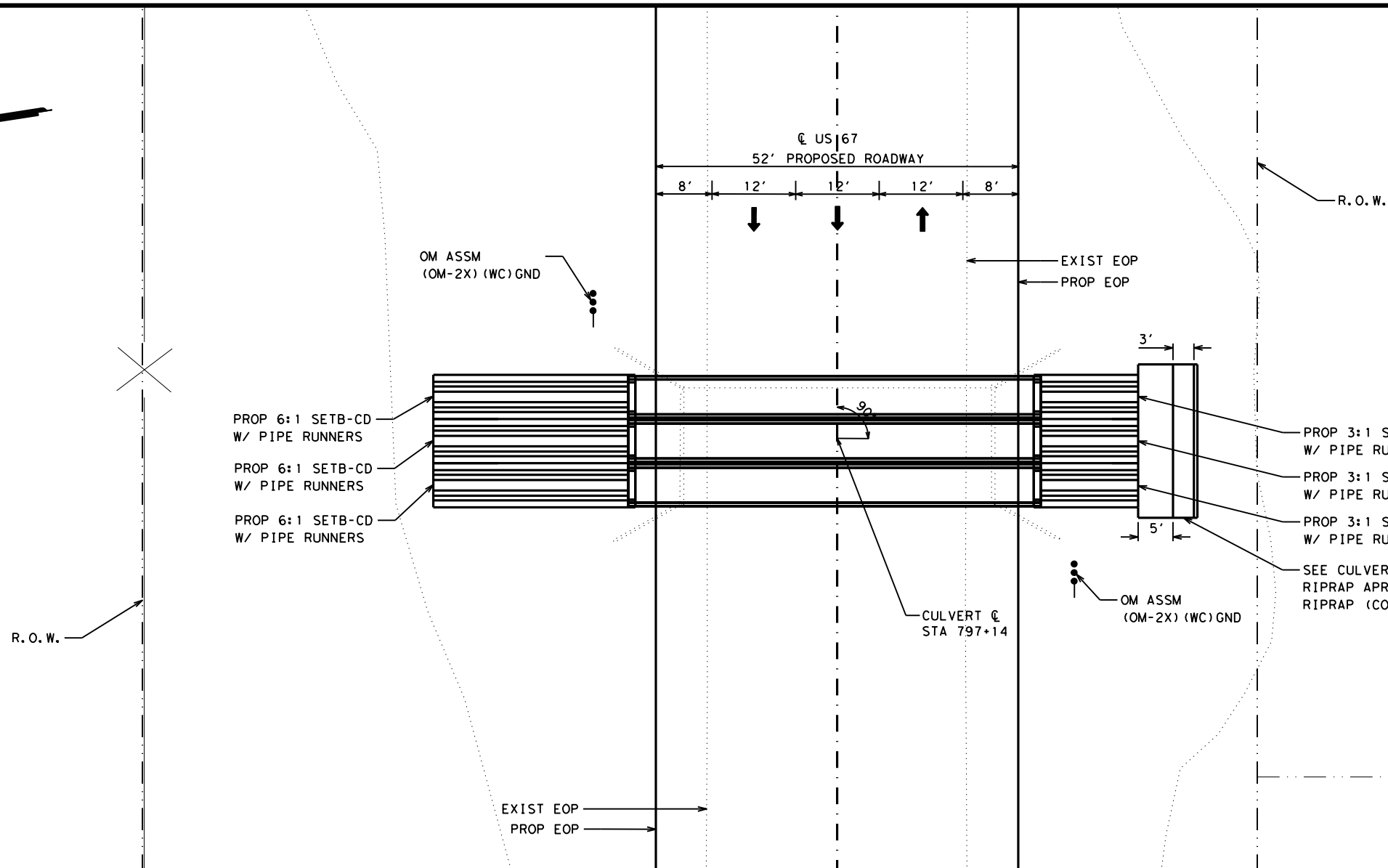
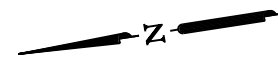
HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 14 OF 23

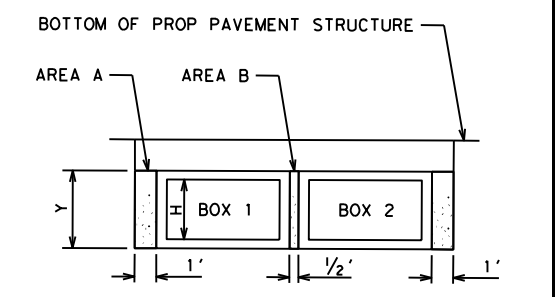


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	182	

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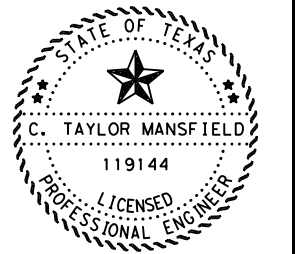
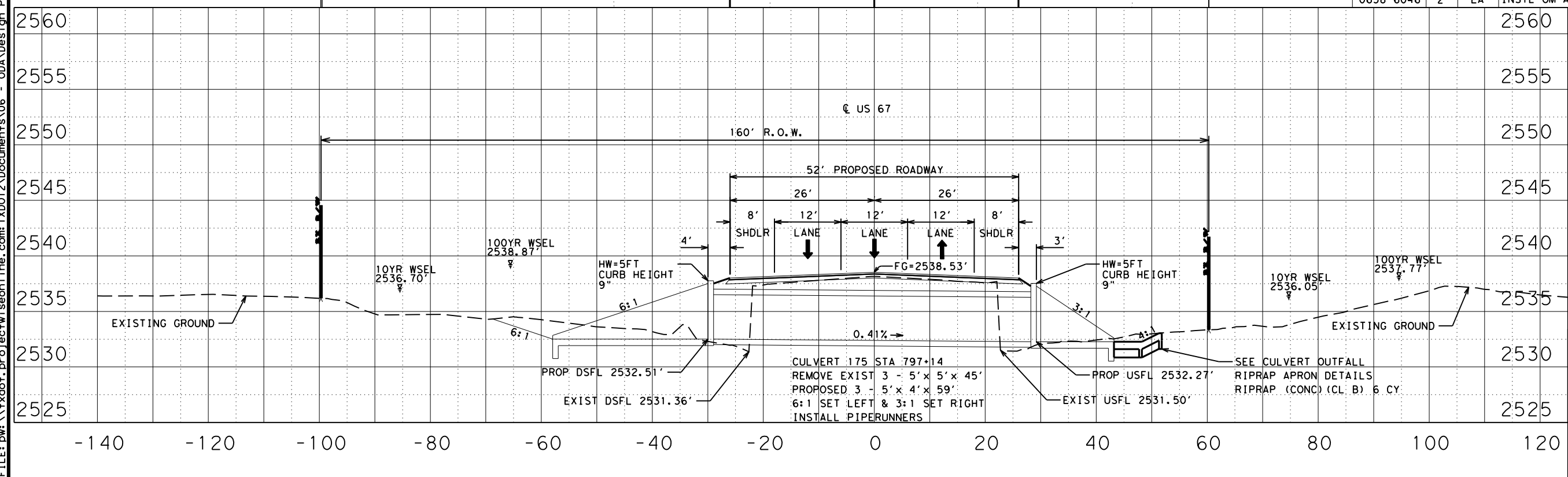


CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS



LIMITS OF CEMENT STABILIZED BACKFILL
 H = INNER HEIGHT OF BOX (FT)
 A = 2' X (H + 1)' (SF)
 B = 1/2' X (H + 1)' (SF)
 L = PROP LENGTH OF BOX CULVERT (FT)
 N = COUNT OF BOXES
 $CY = \frac{(2 \times A) + (B \times (N - 1)) \times L}{27}$
 CY = 55, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0432 6006	6	CY	RIPRAP (CONC) (CL B)	
0462 6008	177	LF	CONC BOX CULV (5 FT X 4 FT)	
0467 6181	3	EA	SET (TY I) (S= 5 FT) (HW= 5 FT) (3:1) (C)	
0467 6183	3	EA	SET (TY I) (S= 5 FT) (HW= 5 FT) (6:1) (C)	
0496 6008	135	LF	REMOV STR (BOX CULVERT)	
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND	



C. Taylor Mansfield 2021.11.01 12:56:04-05'00"

US 67 CULVERT LAYOUT

HORI SCALE 1" = 20'
VERT SCALE 1" = 10'

SHEET 15 OF 23

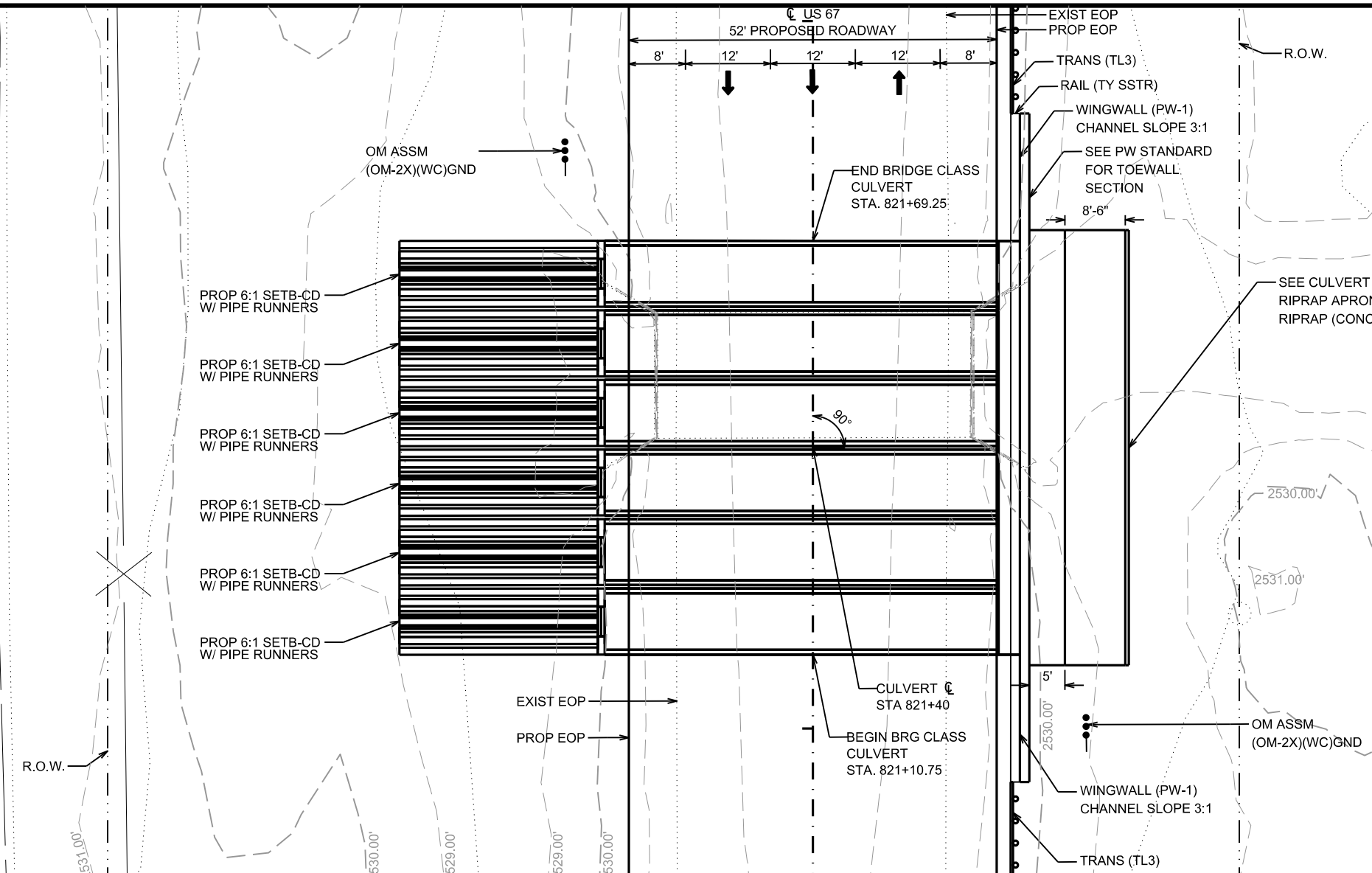


CONTRACT	SECTION	JOB	HIGHWAY
0076	06	037	US 67
DISTRICT	COUNTY	SHEET NO.	
ODA	UPTON	183	

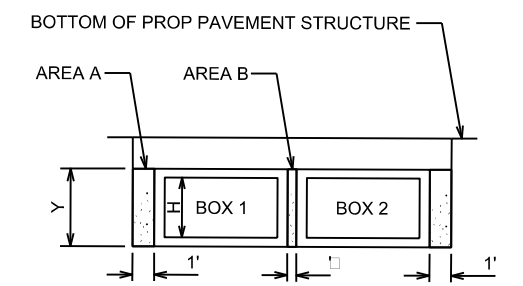
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FUNCTIONAL CLASS:
 MINOR ARTERIAL

AADT (2018) = 1955
 AADT (2038) = 2486



CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS



LIMITS OF CEMENT STABILIZED BACKFILL

H = INNER HEIGHT OF BOX (FT)

A = 2' X (H + 1') (SF)

B = 1/2' X (H + 1') (SF)

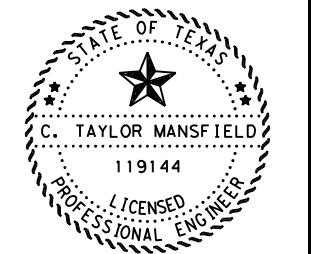
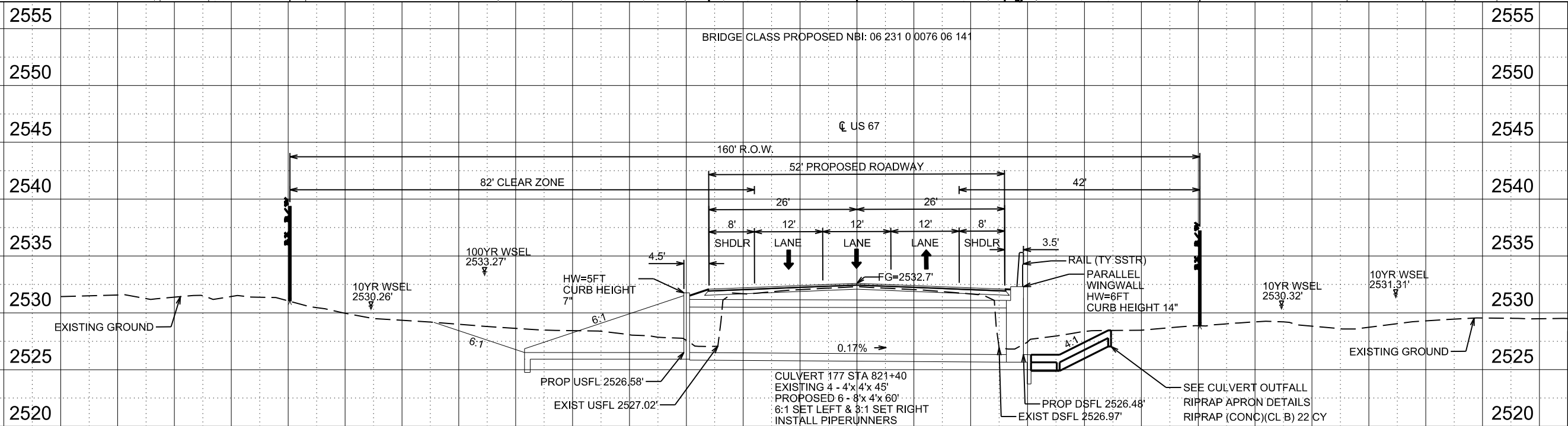
L = PROP LENGTH OF BOX CULVERT (FT)

N = COUNT OF BOXES

$$CY = \frac{(2 \times A) + (B \times (N - 1)) \times L}{27}$$

CY = 72, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
0432 6006	22	CY	RIPRAP (CONC)(CL B)
0450 6023	95	LF	RAIL (TY SSTR)
0462 6019	360	LF	CONC BOX CULV (8 FT X 4 FT)
0466 6181	1	EA	WINGWALL (PW-1)(HW=6FT)
0467 6275	6	EA	SET (TY I)(S= 8 FT)(HW= 5 FT)(3:1)(C)
0467 6277	6	EA	SET (TY I)(S= 8 FT)(HW= 5 FT)(6:1)(C)
0496 6008	180	LF	REMOV STR (BOX CULVERT)
0658 6046	2	EA	INSTL OM ASSM(OM-2X)(WC)GND



C. Taylor Mansfield 2021.11.01
 12:56:04-05'00"

US 67
 CULVERT
 LAYOUT

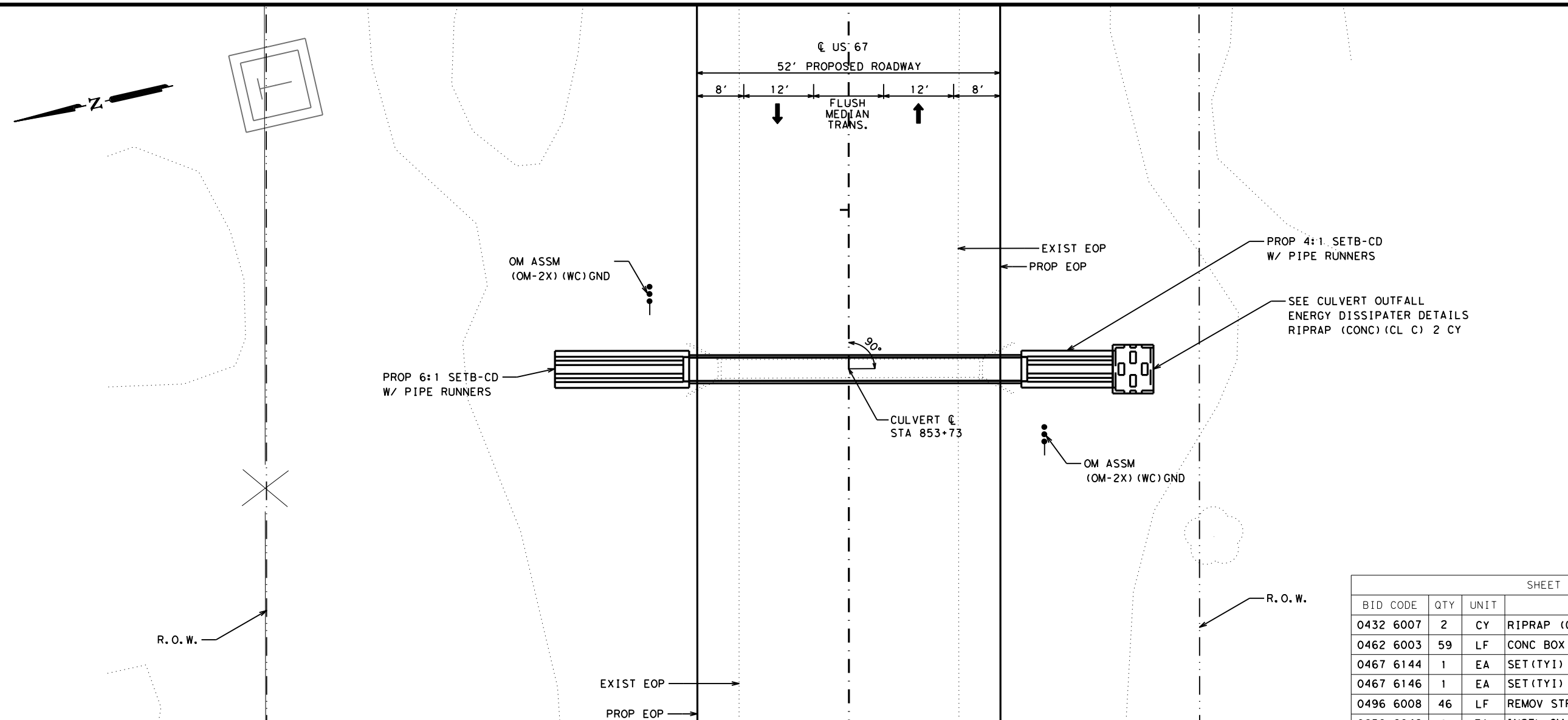
HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 16 OF 23

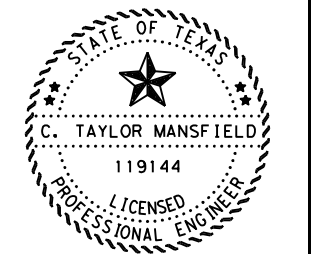
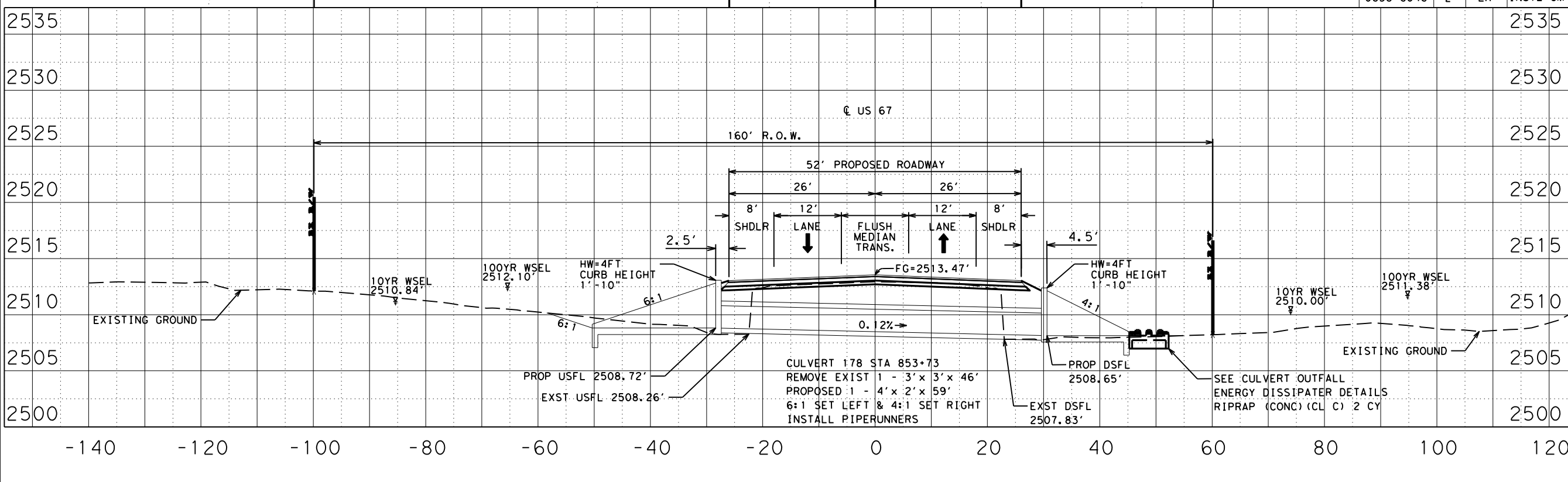


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	184	

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SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0432 6007	2	CY	RIPRAP (CONC) (CL C)	
0462 6003	59	LF	CONC BOX CULV (4FT X 2FT)	
0467 6144	1	EA	SET (TYI) (S=4FT) (HW=4FT) (4:1) (C)	
0467 6146	1	EA	SET (TYI) (S=4FT) (HW=4FT) (6:1) (C)	
0496 6008	46	LF	REMOV STR (BOX CULVERT)	
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND	



C. Taylor Mansfield 2021.11.01
12:56:05-05'00"

**US 67
CULVERT
LAYOUT**
 HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 17 OF 23

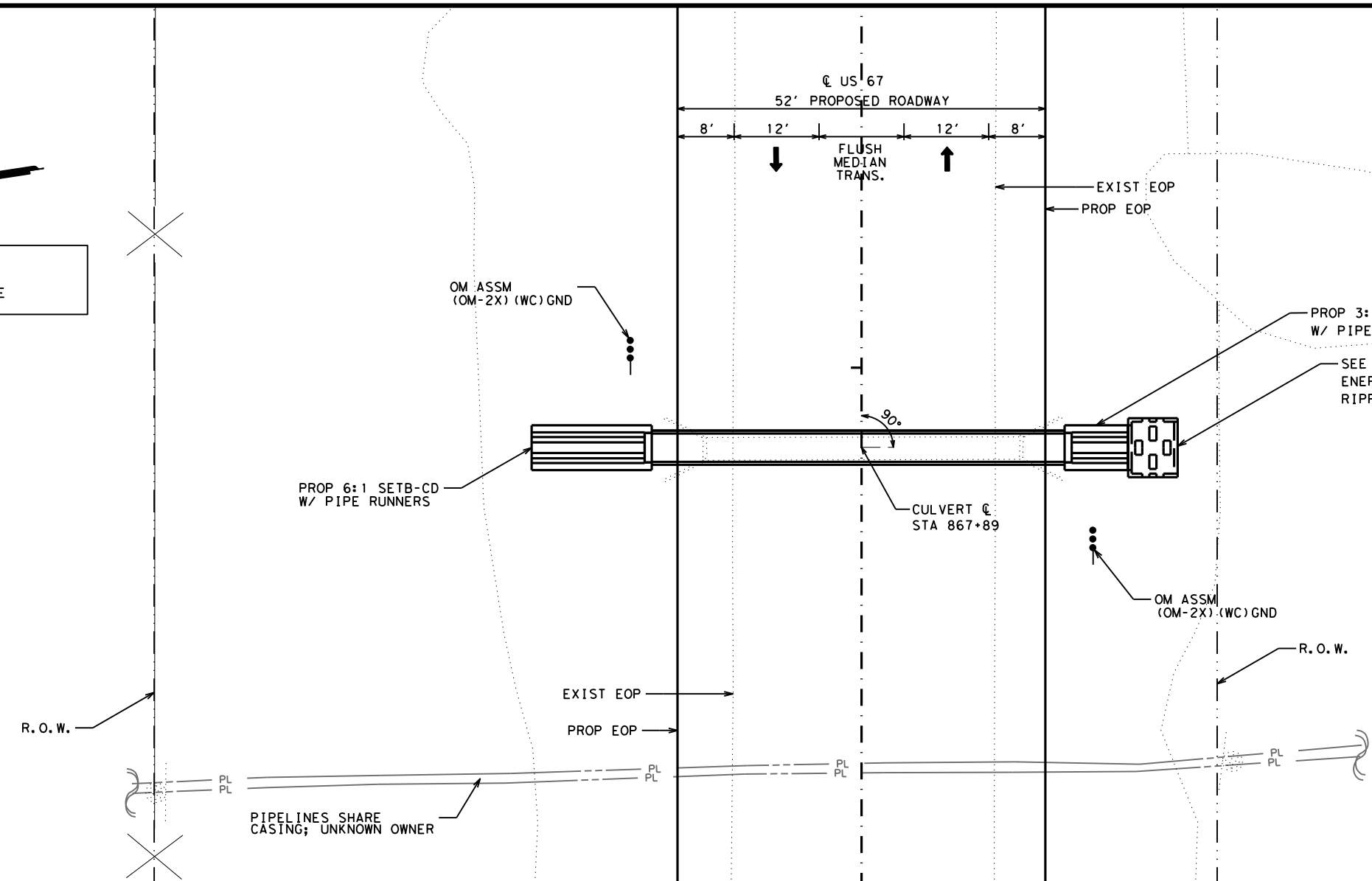


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	185	

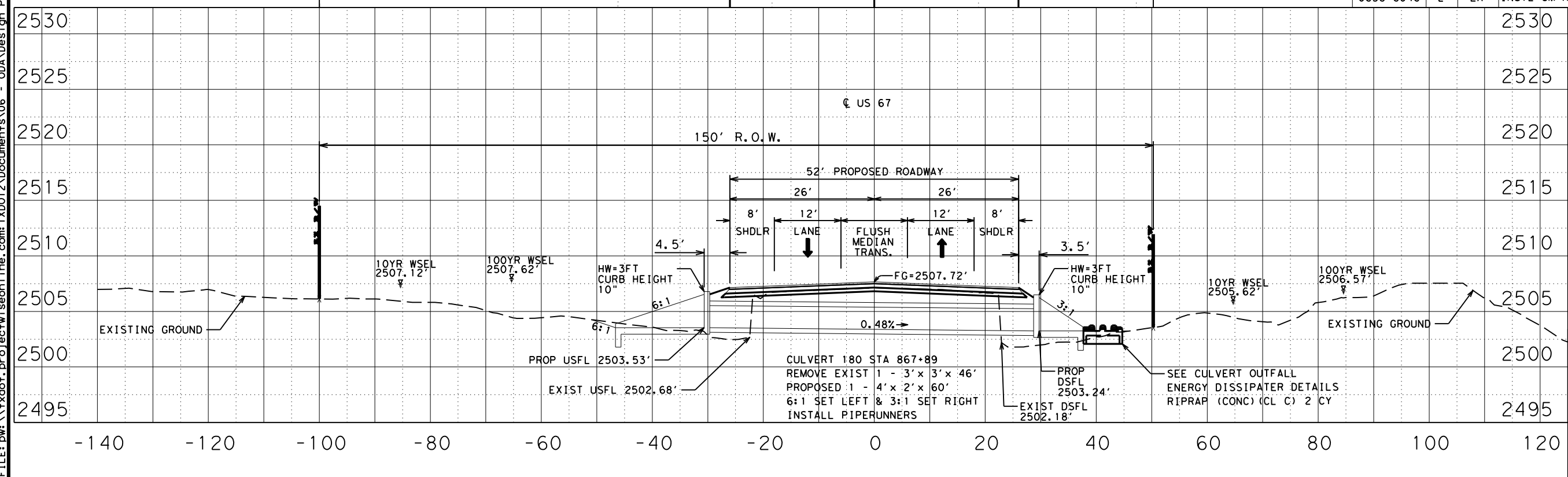
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LEGEND

— PL — PIPELINE



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0432 6007	2	CY	RIPRAP (CONC) (CL C)	
0462 6003	60	LF	CONC BOX CULV (4FT X 2FT)	
0467 6137	1	EA	SET (TYI) (S=4FT) (HW=3FT) (3:1) (C)	
0467 6141	1	EA	SET (TYI) (S=4FT) (HW=3FT) (6:1) (C)	
0496 6008	46	LF	REMOV STR (BOX CULVERT)	
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND	



E. Taylor Mansfield 2021.11.01
 12:56:05-05'00"

**US 67
 CULVERT
 LAYOUT**

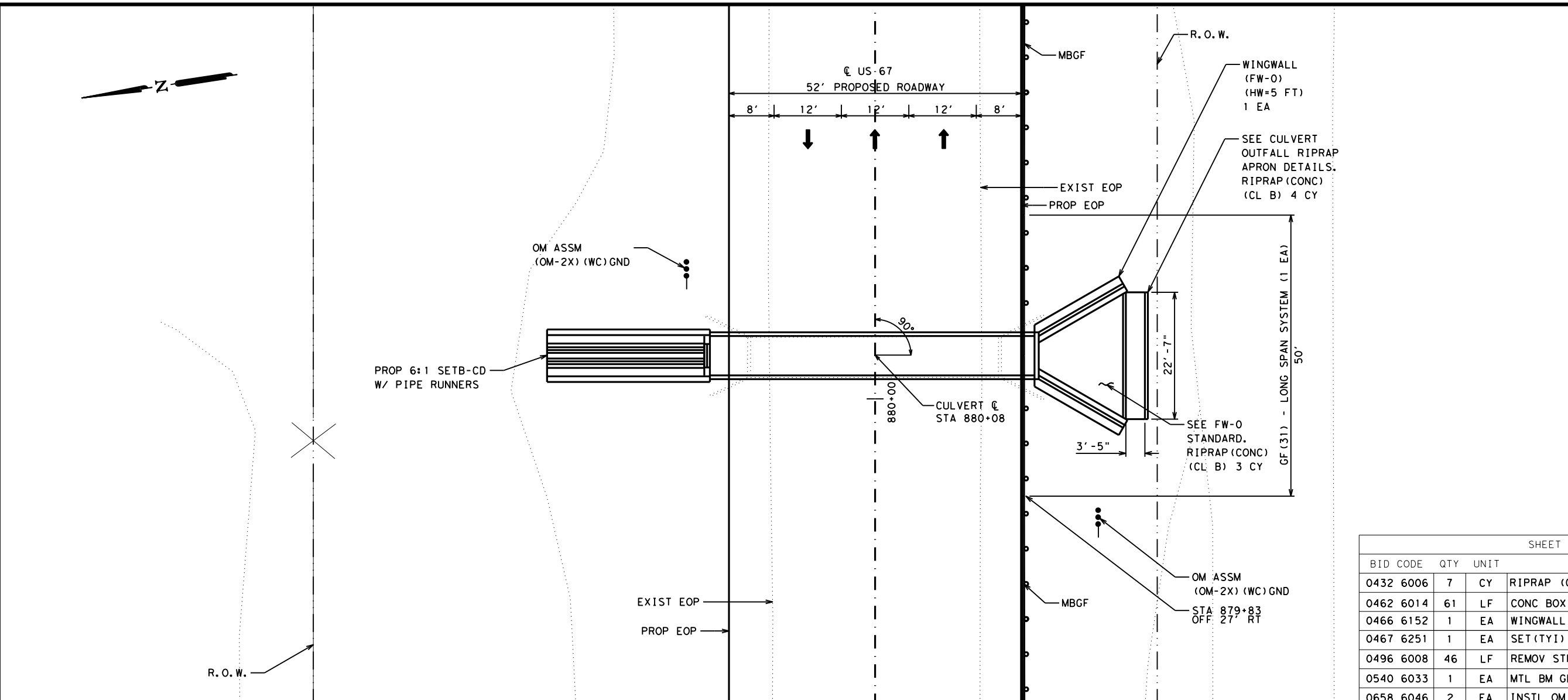
HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 18 OF 23

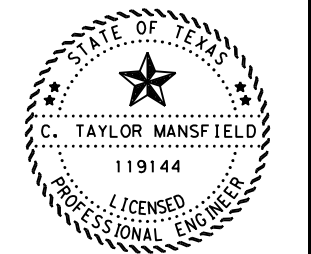
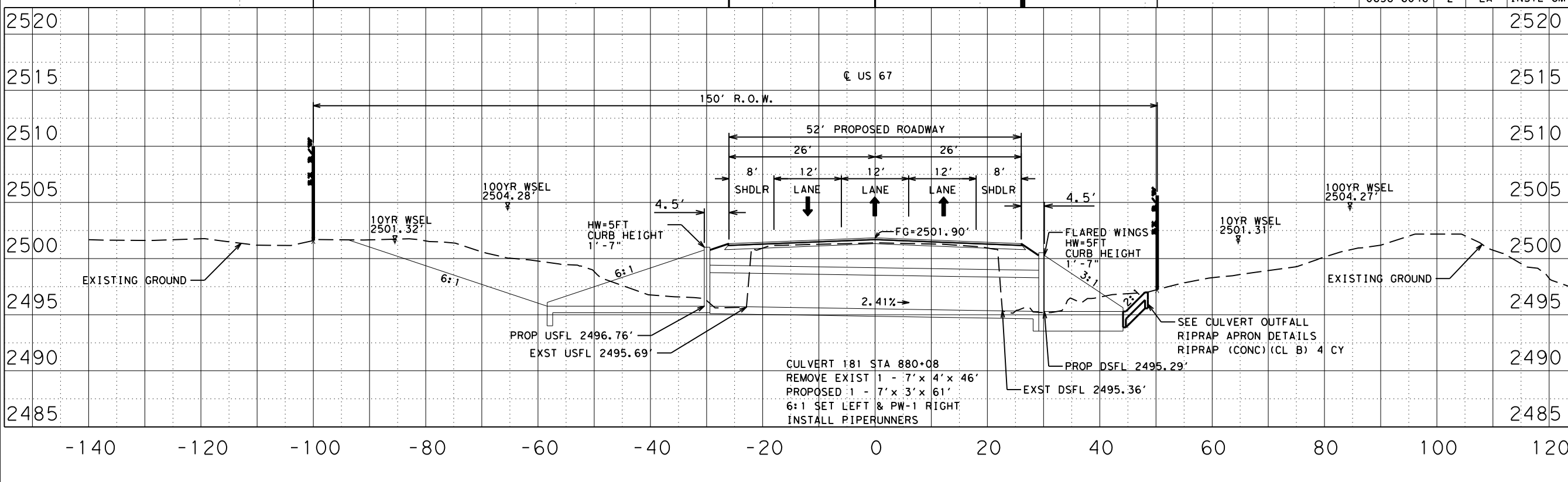


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	186	

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SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0432 6006	7	CY	RIPRAP (CONC) (CL B)	
0462 6014	61	LF	CONC BOX CULV (7FT X 3FT)	
0466 6152	1	EA	WINGWALL (FW - 0) (HW=5 FT)	
0467 6251	1	EA	SET (TYI) (S=7FT) (HW=5FT) (6:1) (C)	
0496 6008	46	LF	REMOV STR (BOX CULVERT)	
0540 6033	1	EA	MTL BM GD FEN (LONG SPAN SYSTEM)	
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND	



E. Taylor Mansfield 2021.11.01
 12:56:05-05'00"

**US 67
 CULVERT
 LAYOUT**

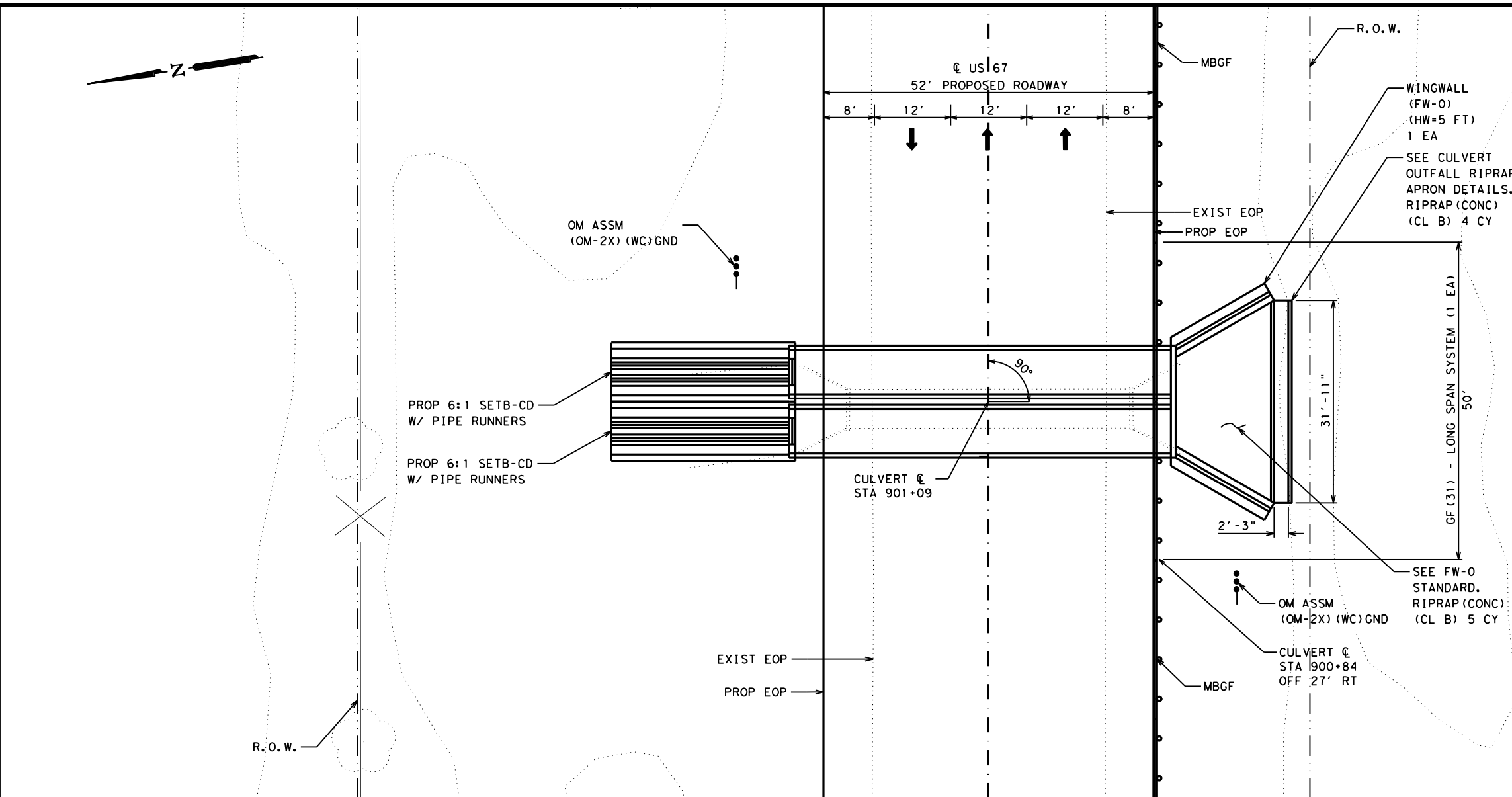
HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 19 OF 23



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	187	

DATE: 10/25/2021 02:48 PM
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CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS

BOTTOM OF PROP PAVEMENT STRUCTURE

AREA A AREA B

H = INNER HEIGHT OF BOX (FT)

A = 2' X (H + 1)' (SF)

B = 1/2' X (H + 1)' (SF)

L = PROP LENGTH OF BOX CULVERT (FT)

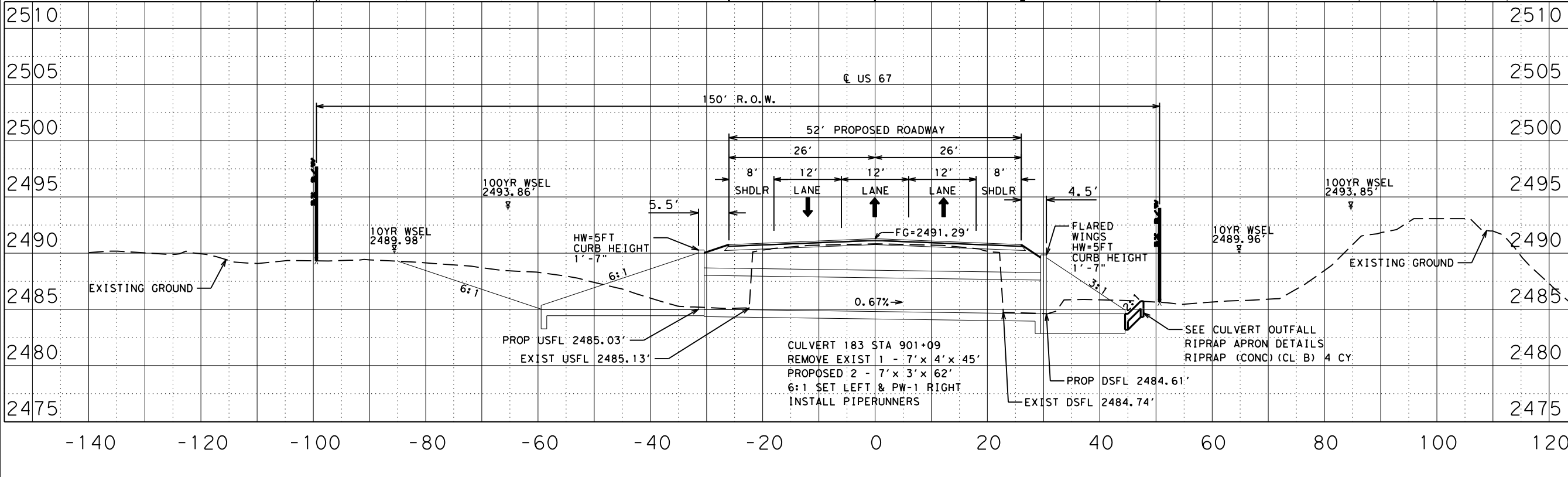
N = COUNT OF BOXES

$$CY = \frac{(2 \times A) + (B \times (N - 1)) \times L}{27}$$

CY = 39, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS

BID CODE	QTY	UNIT	DESCRIPTION
0432 6006	9	CY	RIPRAP (CONC) (CL B)
0462 6014	124	LF	CONC BOX CULV (7FT X 3FT)
0466 6152	1	EA	WINGWALL (FW - 0) (HW=5 FT)
0467 6251	2	EA	SET (TYI) (S=7FT) (HW=5FT) (6:1) (C)
0496 6008	45	LF	REMOV STR (BOX CULVERT)
0540 6033	1	EA	MTL BM GD FEN (LONG SPAN SYSTEM)
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND



C. Taylor Mansfield 2021.11.01 12:56:05-05'00"

**US 67
CULVERT
LAYOUT**

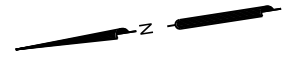
HORI SCALE 1" = 20'
VERT SCALE 1" = 10'

SHEET 20 OF 23

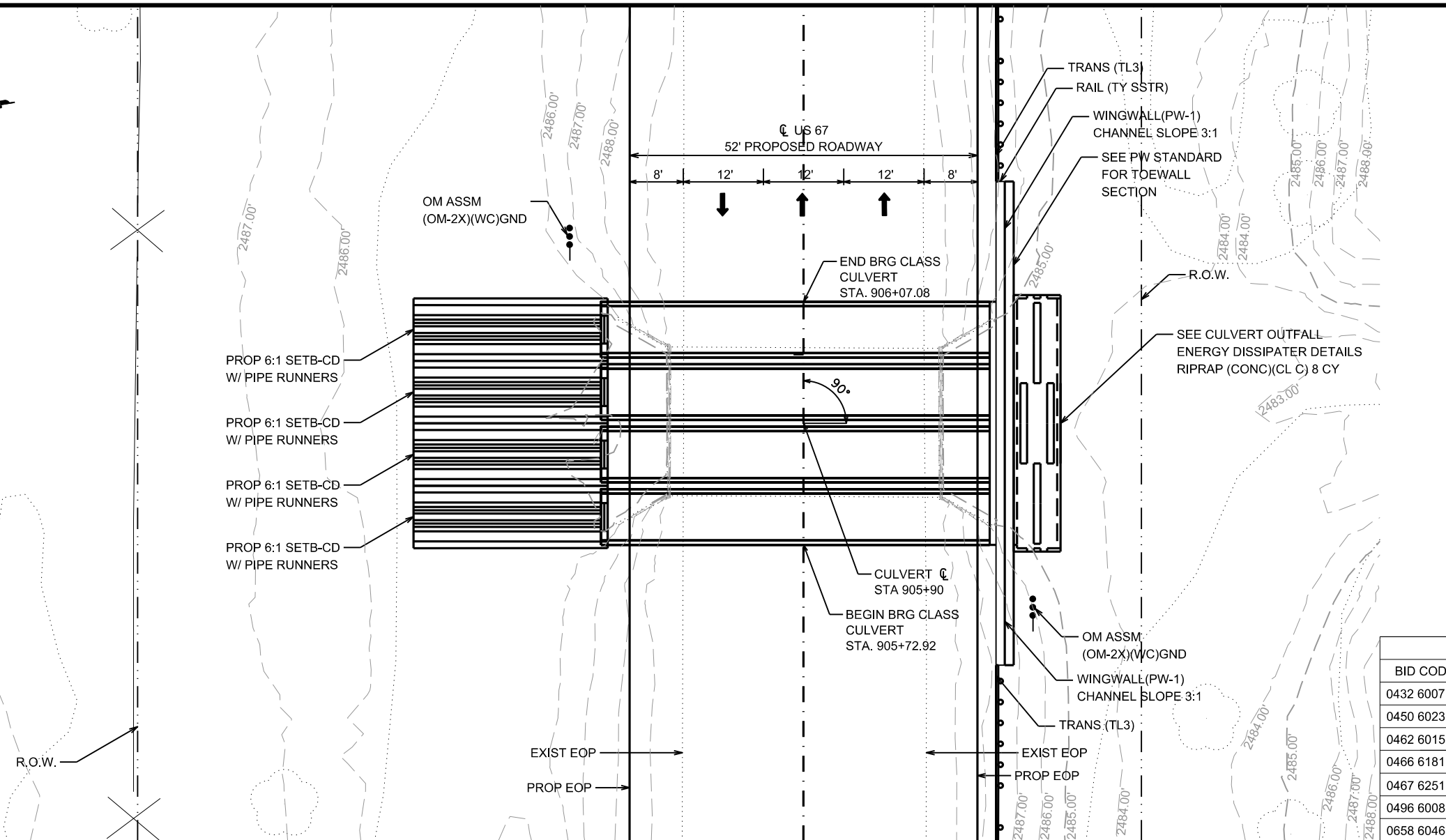


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	188	

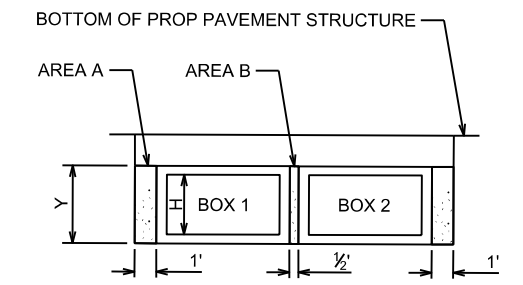
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FUNCTIONAL CLASS:
 MINOR ARTERIAL
 AADT (2018) = 1955
 AADT (2038) = 2486



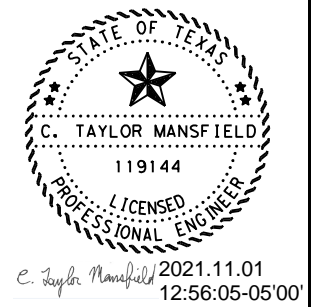
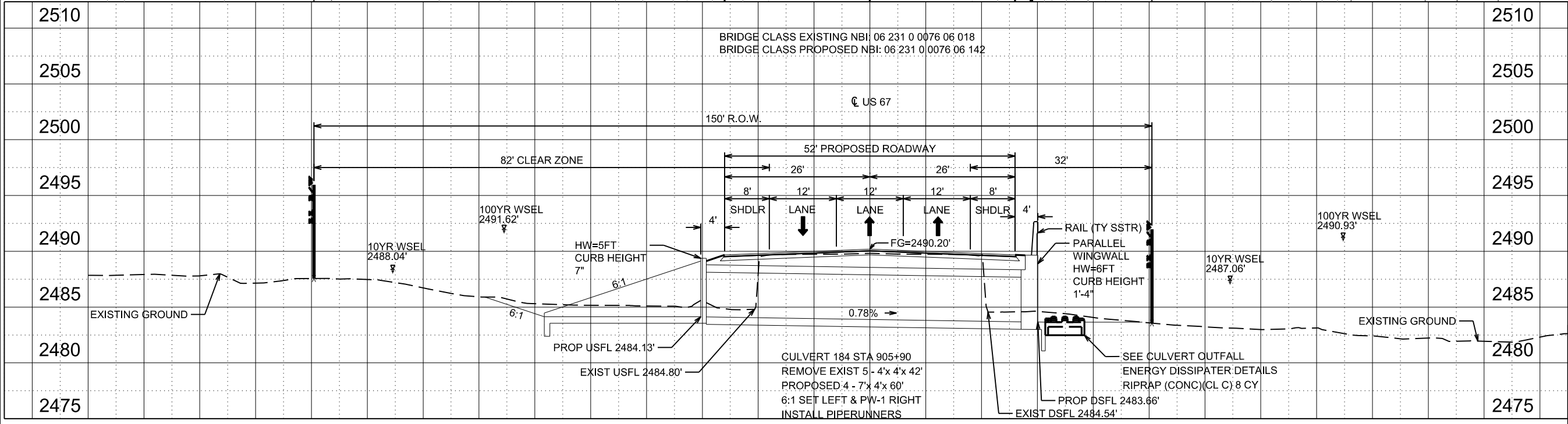
CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS



LIMITS OF CEMENT STABILIZED BACKFILL
 H = INNER HEIGHT OF BOX (FT)
 A = 2' x (H + 1') (SF)
 B = 1/2' x (H + 1') (SF)
 L = PROP LENGTH OF BOX CULVERT (FT)
 N = COUNT OF BOXES

$$CY = \frac{(2 \times A) + (B \times (N - 1)) \times L}{27}$$
 CY = 61, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
0432 6007	8	CY	RIPRAP (CONC)(CL C)
0450 6023	45	LF	RAIL (TY SSTR)
0462 6015	240	LF	CONC BOX CULV (7FT X 4FT)
0466 6181	1	EA	WINGWALL (PW-1)(HW=6FT)
0467 6251	4	EA	SET(TYI)(S=7FT)(HW=5FT)(6:1)(C)
0496 6008	210	LF	REMOV STR (BOX CULVERT)
0658 6046	2	EA	INSTL OM ASSM(OM-2X)(WC)GND



US 67 CULVERT LAYOUT
 HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

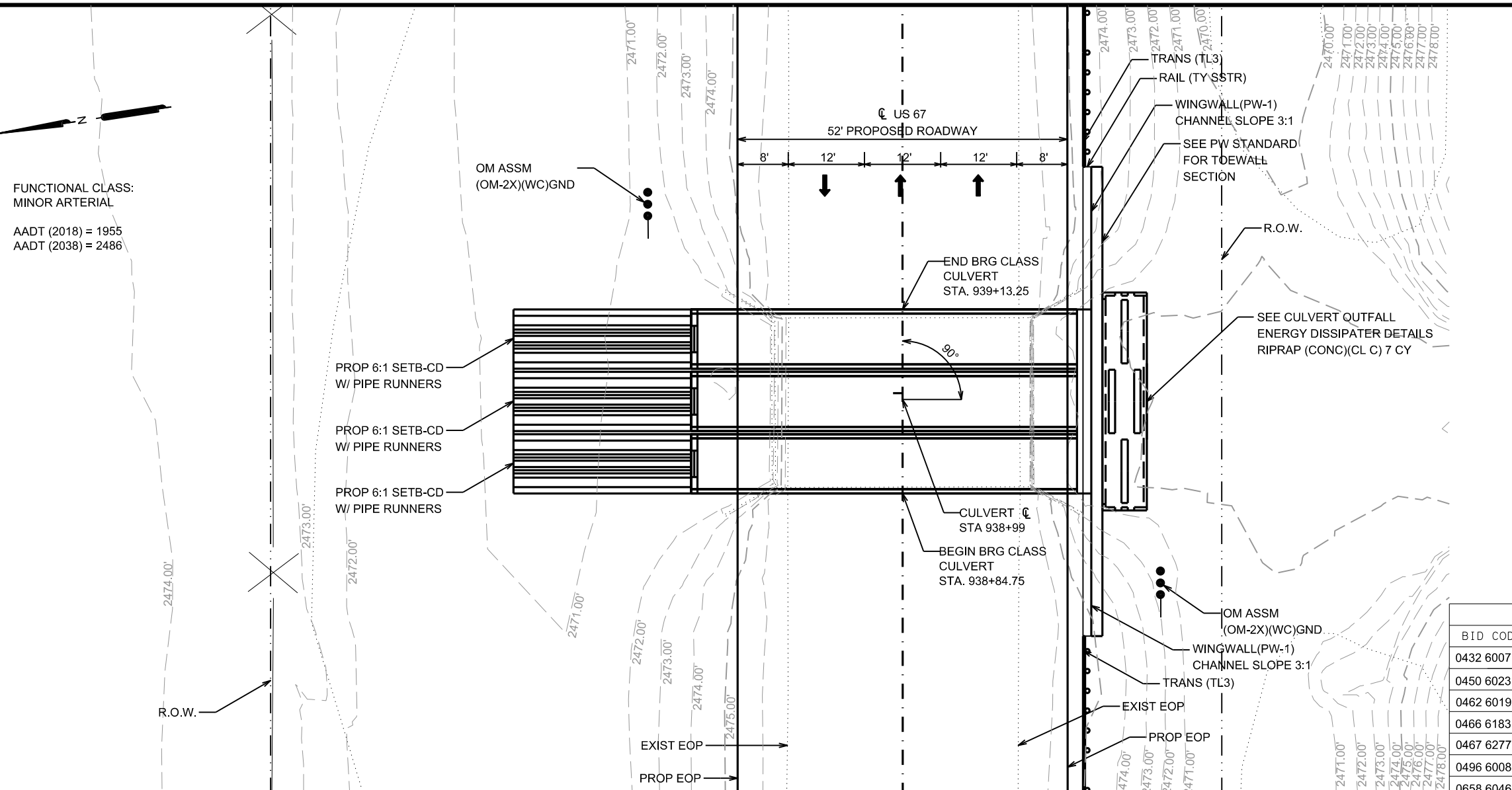
SHEET 21 OF 23



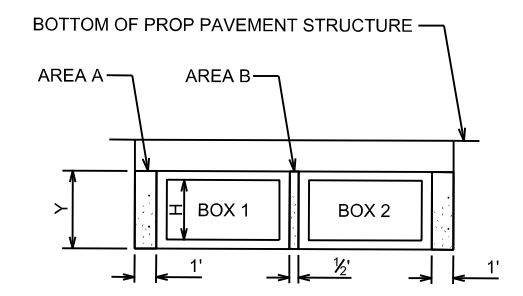
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	189	

DATE: 10/25/2021 02:48 PM
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FUNCTIONAL CLASS:
 MINOR ARTERIAL
 AADT (2018) = 1955
 AADT (2038) = 2486



CEM STABIL BKFL CUBIC YARD (CY) CALCULATION FOR MULTIPLE PARALLEL BOX CULVERTS



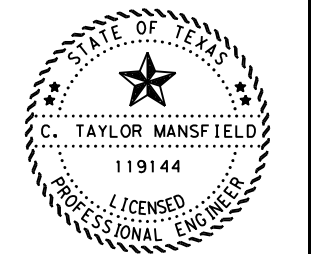
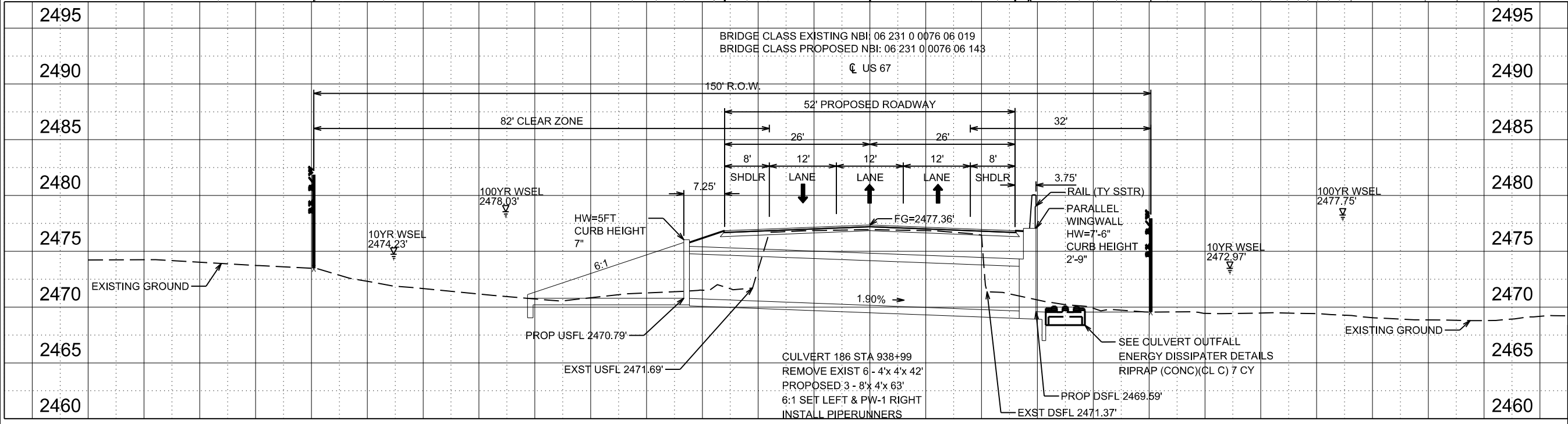
LIMITS OF CEMENT STABILIZED BACKFILL

H = INNER HEIGHT OF BOX (FT)
 A = 2' X (H + 1') (SF)
 B = 1/2' X (H + 1') (SF)
 L = PROP LENGTH OF BOX CULVERT (FT)
 N = COUNT OF BOXES

$$CY = \frac{(2 \times A) + (B \times (N - 1) \times L)}{27}$$

CY = 56, ITEM 0400-6005, CEM STABIL BKFL

SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
0432 6007	7	CY	RIPRAP (CONC)(CL C)
0450 6023	45	LF	RAIL (TY SSTR)
0462 6019	189	LF	CONC BOX CULV (8FT X 4FT)
0466 6183	1	EA	WINGWALL (PW-1)(HW=8FT)
0467 6277	3	EA	SET(TYI)(S=8FT)(HW=5FT)(6:1)(C)
0496 6008	252	LF	REMOV STR (BOX CULVERT)
0658 6046	2	EA	INSTL OM ASSM(OM-2X)(WC)GND



C. Taylor Mansfield 2021.11.01
 12:56:05-05'00"

**US 67
 CULVERT
 LAYOUT**

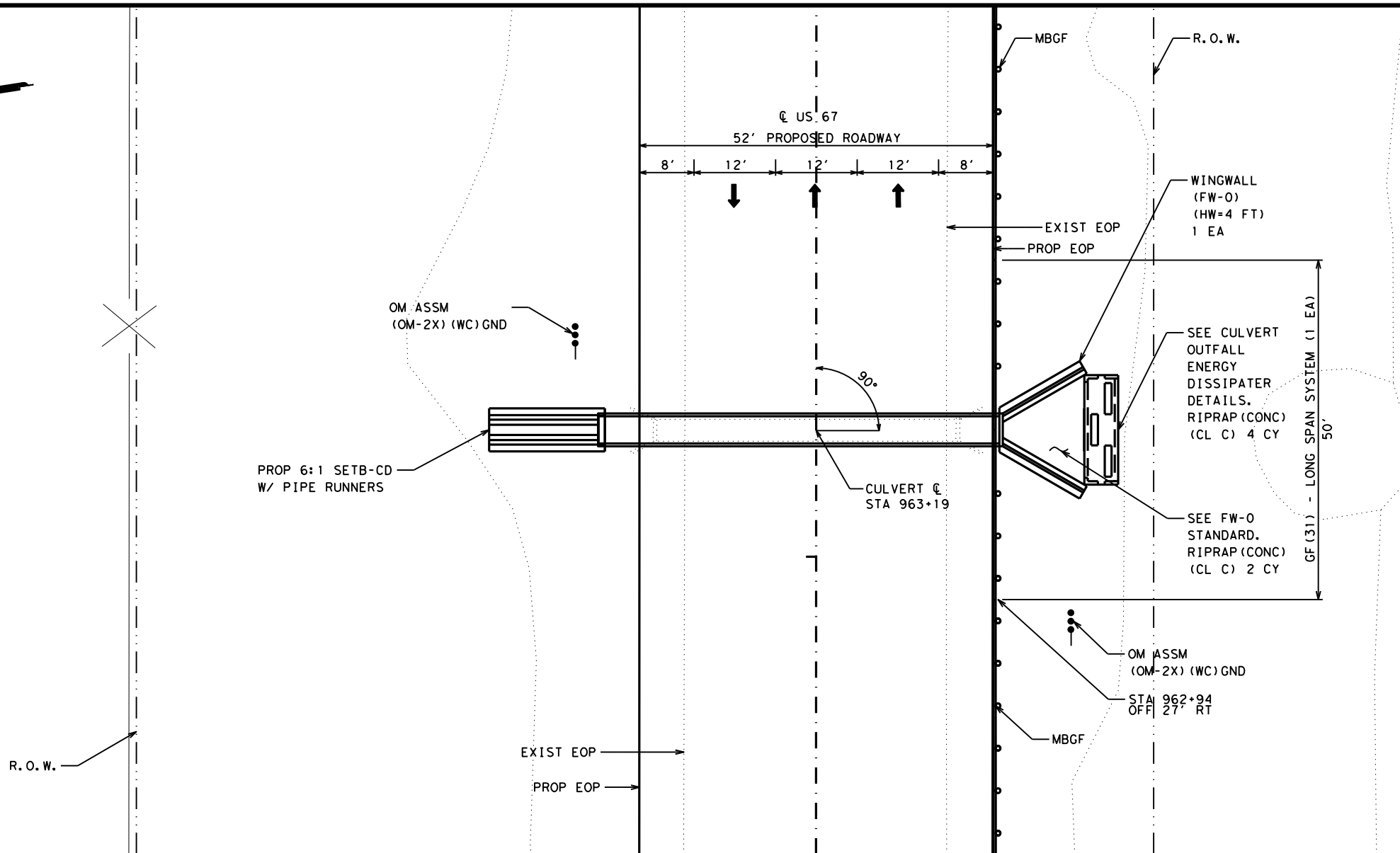
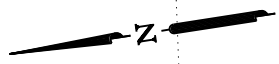
HORI SCALE 1"= 20'
 VERT SCALE 1"= 10'

SHEET 22 OF 23

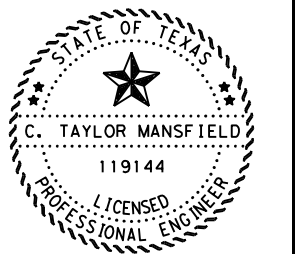
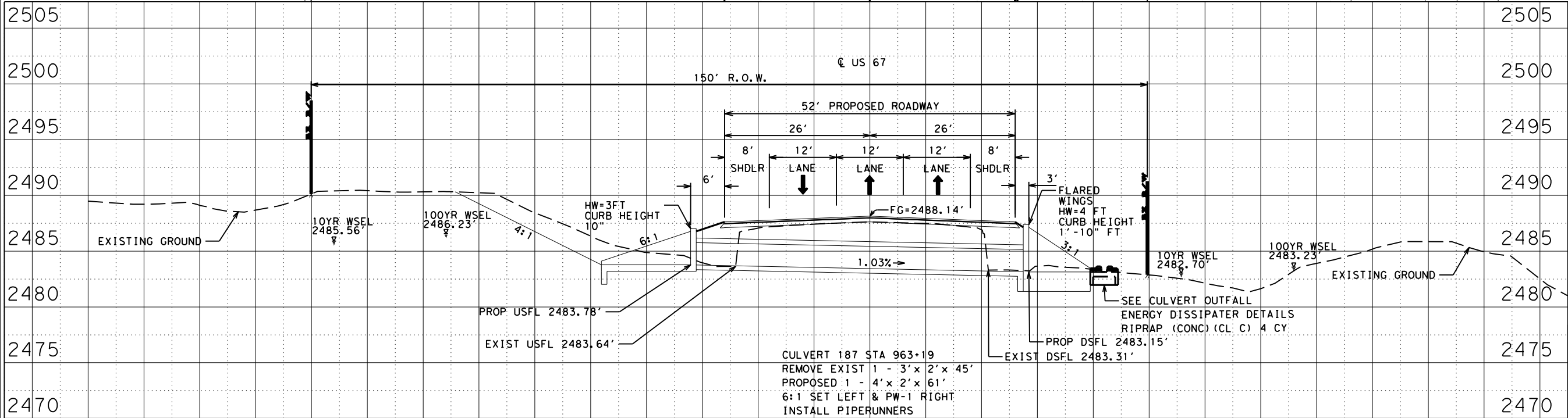


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	190	

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SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0432 6007	6	CY	RIPRAP (CONC) (CL C)	
0462 6003	61	LF	CONC BOX CULV (4FT X 2FT)	
0466 6151	1	EA	WINGWALL (FW - 0) (HW=4 FT)	
0467 6141	1	EA	SET (TYI) (S=4FT) (HW=3FT) (6:1) (C)	
0496 6008	45	LF	REMOV STR (BOX CULVERT)	
0540 6033	1	EA	MTL BM GD FEN (LONG SPAN SYSTEM)	
0658 6046	2	EA	INSTL OM ASSM (OM-2X) (WC) GND	



C. Taylor Mansfield 2021.11.01
 12:56:05-05'00"

**US 67
 CULVERT
 LAYOUT**

HORI SCALE 1" = 20'
 VERT SCALE 1" = 10'

SHEET 23 OF 23



CONTRACT	SECTION	JOB	HIGHWAY
0076	06	037	US 67
DISTRICT	COUNTY	SHEET NO.	
ODA	UPTON	191	

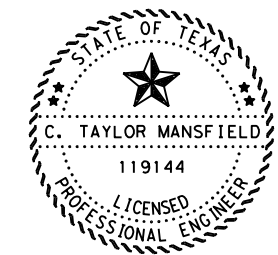
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DATE: 10/25/2021 09:24 AM
 FILE: \\txdotproject\wisonline.com\TXDOT\Documents\06 ODA\Design Projects\0076060374 - Design\Plan Set\5. Drainage\us67w_bcsssdel_1of1.dgn

Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard ④	Applicable Wingwall or End Treatment Standard	Skew Angle (0°, 15°, 30°, or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (C.Y.)	Class "C" Conc (Curb) (C.Y.)	Class "C" Conc (Wingwall) (C.Y.)	Total Wingwall Area (S.F.)
Culvert 146 STA 537+04 (Lt)	2 ~ 5' x 2'	3'	SCP-5	SETB-CD	0°	6:1	6"	6"	1.750'	4.000'	N/A	N/A	22.000'	N/A	12.667'	0.0	0.8	9.4	N/A
Culvert 146 STA 537+04 (Rt)	2 ~ 5' x 2'	3'	SCP-5	SETB-CD	0°	6:1	6"	6"	2.750'	5.000'	N/A	N/A	28.000'	N/A	12.667'	0.0	1.3	12.8	N/A
Culvert 147 STA 549+75 (Lt)	1 ~ 4' x 3'	2.3'	SCP-4	SETB-CD	0°	4:1	5"	5"	0.830'	4.000'	N/A	N/A	14.667'	N/A	5.167'	0.0	0.1	3.1	N/A
Culvert 147 STA 549+75 (Rt)	1 ~ 4' x 3'	2.3'	SCP-4	SETB-CD	0°	4:1	5"	5"	1.830'	5.000'	N/A	N/A	18.667'	N/A	5.167'	0.0	0.3	4.4	N/A
Culvert 155 STA 571+06 (Lt)	3 ~ 4' x 4'	2.5'	SCP-4	SETB-CD	0°	4:1	5"	5"	0.830'	5.000'	N/A	N/A	18.667'	N/A	15.833'	0.0	0.5	11.1	N/A
Culvert 155 STA 571+06 (Rt)	3 ~ 4' x 4'	2.5'	SCP-4	SETB-CD	0°	6:1	5"	5"	0.830'	5.000'	N/A	N/A	28.000'	N/A	15.833'	0.0	0.5	16.4	N/A
Culvert 157 STA 591+05 (Lt)	2 ~ 3' x 2'	2.9'	SCP-3	SETB-CD	0°	6:1	4"	4"	0.900'	2.979'	N/A	N/A	15.875'	N/A	8.333'	0.0	0.3	4.8	N/A
Culvert 157 STA 591+05 (Rt)	2 ~ 3' x 2'	2.9'	SCP-3	SETB-CD	0°	6:1	4"	4"	2.900'	4.979'	N/A	N/A	27.875'	N/A	8.333'	0.0	0.8	10.0	N/A
Culvert 158 STA 595+08 (Lt)	3 ~ 5' x 2'	3.3'	SCP-5	SETB-CD	0°	6:1	6"	6"	0.750'	3.000'	N/A	N/A	16.000'	N/A	19.167'	0.0	0.5	9.4	N/A
Culvert 158 STA 595+08 (Rt)	3 ~ 5' x 2'	3.3'	SCP-5	SETB-CD	0°	6:1	6"	6"	1.750'	4.000'	N/A	N/A	22.000'	N/A	19.167'	0.0	1.2	13.7	N/A
Culvert 161 STA 609+11 (Lt)	2 ~ 4' x 2'	1.4'	SCP-4	SETB-CD	0°	6:1	7.5"	5"	0.750'	3.125'	N/A	N/A	16.750'	N/A	10.500'	0.0	0.3	5.9	N/A
Culvert 161 STA 609+11 (Rt)	2 ~ 4' x 2'	1.4'	SCP-4	SETB-CD	0°	6:1	7.5"	5"	0.750'	3.125'	N/A	N/A	16.750'	N/A	10.500'	0.0	0.3	5.9	N/A
Culvert 163 STA 637+51 (Lt)	4 ~ 8' x 5'	1.2'	SCP-8	SETB-CD	0°	6:1	8"	8"	0.666'	6.083'	N/A	N/A	34.500'	N/A	38.833'	0.0	1.0	41.9	N/A
Culvert 163 STA 637+51 (Rt)	4 ~ 8' x 5'	1.2'	SCP-8	PW-1	0°	3:1	8"	8"	0.833'	6.500'	N/A	N/A	19.500'	38.833'	N/A	0.0	1.2	18.0	254
Culvert 167 STA 665+93 (Lt)	4 ~ 8' x 4'	1.7'	SCP-8	SETB-CD	0°	6:1	8"	8"	0.583'	5.000'	N/A	N/A	28.000'	N/A	38.833'	0.0	0.8	32.5	N/A
Culvert 167 STA 665+93 (Rt)	4 ~ 8' x 4'	1.7'	SCP-8	SETB-CD	0°	4:1	8"	8"	0.500'	4.917'	N/A	N/A	18.333'	N/A	38.833'	0.0	0.7	21.6	N/A
Culvert 168 STA 677+91 (Lt)	2 ~ 4' x 2'	2.3'	SCP-4	SETB-PD	0°	6:1	5"	5"	1.750'	3.917'	N/A	N/A	22.000'	N/A	10.500'	0.0	0.7	8.2	N/A
Culvert 168 STA 677+91 (Rt)	2 ~ 4' x 2'	2.3'	SCP-4	SETB-PD	0°	6:1	5"	5"	0.833'	3.000'	N/A	N/A	16.500'	N/A	10.500'	0.0	0.3	5.7	N/A
Culvert 169 STA 678+50 (Lt)	1 ~ 5' x 2'	2.5'	SCP-5	SETB-CD	0°	4:1	6"	6"	2.750'	5.000'	N/A	N/A	18.667'	N/A	6.167'	0.0	0.6	4.8	N/A
Culvert 169 STA 678+50 (Rt)	1 ~ 5' x 2'	2.5'	SCP-5	SETB-CD	0°	4:1	6"	6"	1.750'	4.000'	N/A	N/A	14.667'	N/A	6.167'	0.0	0.4	3.5	N/A
Culvert 171 STA 717+43 (Lt)	2 ~ 5' x 3'	2.3'	SCP-5	SETB-CD	0°	6:1	6"	6"	0.750'	4.000'	N/A	N/A	22.000'	N/A	12.667'	0.0	0.3	9.4	N/A
Culvert 171 STA 717+43 (Rt)	2 ~ 5' x 3'	2.3'	SCP-5	SETB-CD	0°	3:1	6"	6"	0.750'	4.000'	N/A	N/A	11.000'	N/A	12.667'	0.0	0.3	4.9	N/A
Culvert 173 STA 772+54 (Lt)	1 ~ 3' x 2'	2.5'	SCP-3	SETB-CD	0°	6:1	4"	4"	0.916'	3.000'	N/A	N/A	16.000'	N/A	4.167'	0.0	0.1	2.7	N/A
Culvert 173 STA 772+54 (Rt)	1 ~ 3' x 2'	2.5'	SCP-3	SETB-CD	0°	4:1	4"	4"	1.916'	4.000'	N/A	N/A	14.667'	N/A	4.167'	0.0	0.3	2.8	N/A
Culvert 175 STA 797+14 (Lt)	3 ~ 5' x 4'	2.5'	SCP-5	SETB-CD	0°	6:1	6"	6"	0.750'	5.000'	N/A	N/A	28.000'	N/A	19.167'	0.0	0.5	18.5	N/A
Culvert 175 STA 797+14 (Rt)	3 ~ 5' x 4'	2.5'	SCP-5	SETB-CD	0°	3:1	6"	6"	0.750'	5.000'	N/A	N/A	14.000'	N/A	19.167'	0.0	0.5	9.5	N/A
Culvert 177 STA 821+40 (Lt)	6 ~ 8' x 4'	1.5'	SCP-8	SETB-CD	0°	6:1	8"	8"	0.583'	5.000'	N/A	N/A	28.000'	N/A	58.500'	0.0	1.3	48.2	N/A
Culvert 177 STA 821+40 (Rt)	6 ~ 8' x 4'	1.5'	SCP-8	PW-1	0°	3:1	8"	8"	1.166'	5.833'	N/A	N/A	17.500'	58.500'	N/A	0.0	2.5	17.3	204
Culvert 178 STA 853+73 (Lt)	1 ~ 4' x 2'	2.7'	SCP-4	SETB-CD	0°	6:1	5"	5"	1.833'	4.000'	N/A	N/A	22.000'	N/A	5.167'	0.0	0.3	4.6	N/A
Culvert 178 STA 853+73 (Rt)	1 ~ 4' x 2'	2.7'	SCP-4	SETB-CD	0°	4:1	5"	5"	1.833'	4.000'	N/A	N/A	14.667'	N/A	5.167'	0.0	0.3	3.1	N/A
Culvert 180 STA 867+89 (Lt)	1 ~ 4' x 2'	3'	SCP-4	SETB-CD	0°	6:1	5"	5"	0.833'	3.000'	N/A	N/A	16.000'	N/A	5.167'	0.0	0.1	3.1	N/A
Culvert 180 STA 867+89 (Rt)	1 ~ 4' x 2'	3'	SCP-4	SETB-CD	0°	3:1	5"	5"	0.833'	3.000'	N/A	N/A	8.000'	N/A	5.167'	0.0	0.1	1.6	N/A
Culvert 181 STA 880+08 (Lt)	1 ~ 7' x 3'	2.6'	SCP-7	SETB-CD	0°	6:1	8"	8"	1.583'	5.000'	N/A	N/A	28.000'	N/A	8.333'	0.0	0.5	8.5	N/A
Culvert 181 STA 880+08 (Rt)	1 ~ 7' x 3'	2.6'	SCP-7	FW-0	0°	3:1	8"	8"	1.583'	5.000'	14.000'	8.083'	16.166'	N/A	N/A	3.2	0.5	5.5	86
Culvert 183 STA 901+09 LT (Lt)	2 ~ 7' x 3'	2.8'	SCP-7	SETB-CD	0°	6:1	8"	8"	1.583'	5.000'	N/A	N/A	28.000'	N/A	17.167'	0.0	1.0	15.7	N/A
Culvert 183 STA 901+09 RT (Rt)	2 ~ 7' x 3'	2.8'	SCP-7	FW-0	0°	3:1	8"	8"	1.583'	5.000'	14.000'	8.083'	16.166'	N/A	N/A	5.3	1.0	5.5	86
Culvert 184 STA 905+90 LT (Lt)	4 ~ 7' x 4'	1.6'	SCP-7	SETB-CD	0°	6:1	8"	8"	0.583'	5.000'	N/A	N/A	28.000'	N/A	34.833'	0.0	0.8	30.0	N/A
Culvert 184 STA 905+90 RT (Rt)	4 ~ 7' x 4'	1.6'	SCP-7	PW-1	0°	3:1	8"	8"	1.333'	6.000'	N/A	N/A	18.000'	34.833'	N/A	0.0	1.7	15.9	216
Culvert 186 STA 938+99 LT (Lt)	3 ~ 8' x 4'	2.6'	SCP-8	SETB-CD	0°	6:1	8"	8"	0.583'	5.000'	N/A	N/A	28.000'	N/A	29.000'	0.0	0.6	24.7	N/A
Culvert 186 STA 938+99 RT (Rt)	3 ~ 8' x 4'	2.6'	SCP-8	PW-1	0°	3:1	8"	8"	2.750'	7.417'	N/A	N/A	22.250'	29.000'	N/A	0.0	3.0	22.8	330
Culvert 187 STA 963+19 LT (Lt)	1 ~ 4' x 2'	2.3'	SCP-4	SETB-CD	0°	6:1	5"	5"	0.833'	3.000'	N/A	N/A	16.000'	N/A	5.167'	0.0	0.1	3.1	N/A
Culvert 187 STA 963+19 RT (Rt)	1 ~ 4' x 2'	2.3'	SCP-4	FW-0	0°	3:1	5"	5"	1.833'	4.000'	11.000'	6.351'	12.702'	N/A	N/A	1.8	0.3	3.6	55

NOTES:
 Skew Angle = 0° for SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standards.
 30° Maximum for Safety End Treatment
 SL:1 = Horizontal:1 Vertical
 Side Slope at culvert for Flared or Straight Wingwalls.
 Channel Slope for Parallel Wingwalls.
 Slope shall be 3:1 or flatter for Safety End Treatments.
 T = Box Culvert Top Slab Thickness.
 Dimension can be found on the applicable Box Culvert Standard.
 U = Box Culvert Wall Thickness.
 Dimension can be found on the applicable Box Culvert Standard.
 C = Curb Height.

See applicable wing or end treatment standards for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.
 Hw = Height of Wingwall.
 A = Distance from Face of Curb to End of Wingwall (Not applicable to Parallel or Straight Wingwalls).
 B = Offset of End of Wingwall (Not applicable to Parallel or Straight Wingwalls).
 Lw = Length of Longest Wingwall.
 Ltw = Length of Culvert Toewall (Not applicable when using Riprap Apron).
 Atw = Length of Anchor Toewall (Applicable to Safety End Treatment only).
 Total Wingwall Area = Wingwall area in S.F. for two wingwalls (one structure end) if Lt or Rt.
 Area for four wingwalls (two structure ends) if Both.



C. Taylor Mansfield 2021.11.01
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		Bridge Division Standard	
BOX CULVERT SUPPLEMENT WINGS AND END TREATMENTS			
BCS			
FILE: bcsssdel1.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT
CK: GAF	CON: 0076	SECT: 06	JOB: 037
REVISIONS	DATE: February 2010	HIGHWAY: US 67	
DIST: ODA	COUNTY: UPTON	SHEET NO.: 192	

SPECIAL NOTE:
 Note that the tabular quantities are given for estimating purposes only. It is likely that these quantities will change due to field conditions. Therefore, all dimensions shall be verified by the Contractor in the field prior to fabrication of the Safety End Treatment components.



- ① The wall heights shown will be rounded to the nearest Foot for bidding purposes.
- ② Concrete volume shown is for box culvert curb only. For curbs using the RAC standard, quantities shown must be increased by a factor of 2. If Class "S" concrete is required for the top slab of the culvert, the curb concrete shall also be Class "S". Curb concrete is considered part of the Box Culvert for payment.
- ③ Concrete volume shown is total of wing, footing, culvert toewall (if any), anchor toewall (if any) and wingwall toewall. Riprap apron, culvert and curb quantities are not included.
- ④ Regardless of the type of culvert shown on this sheet, the Contractor shall have the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it shall be the Contractor's responsibility to make the such adjustments to the dimensions and quantities shown.

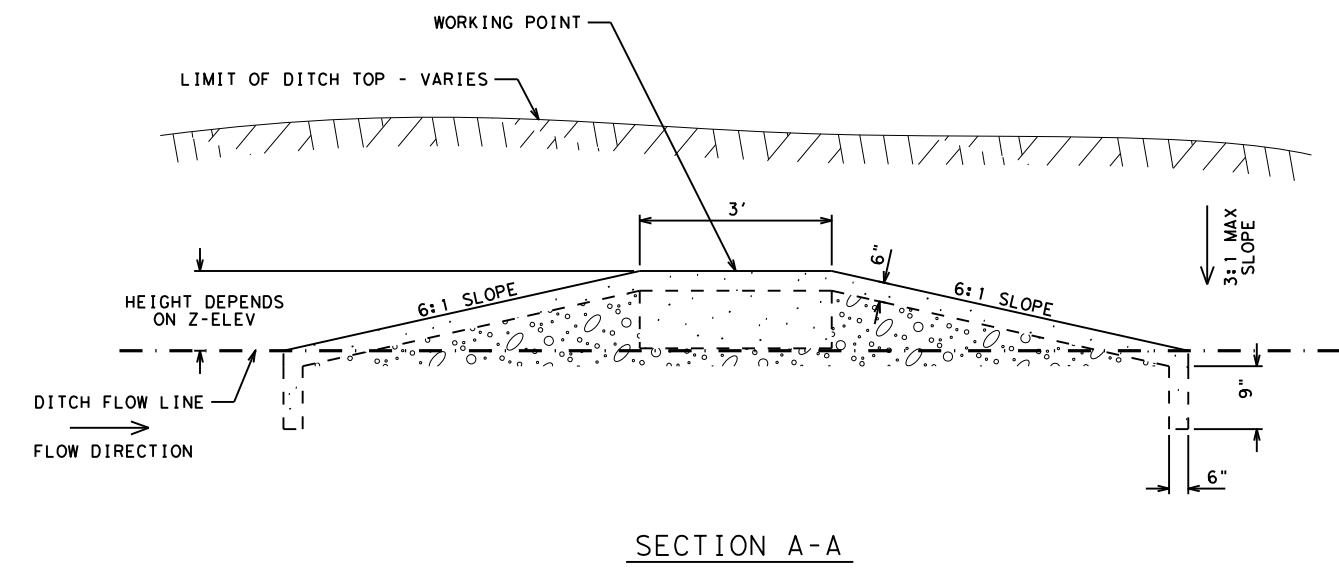
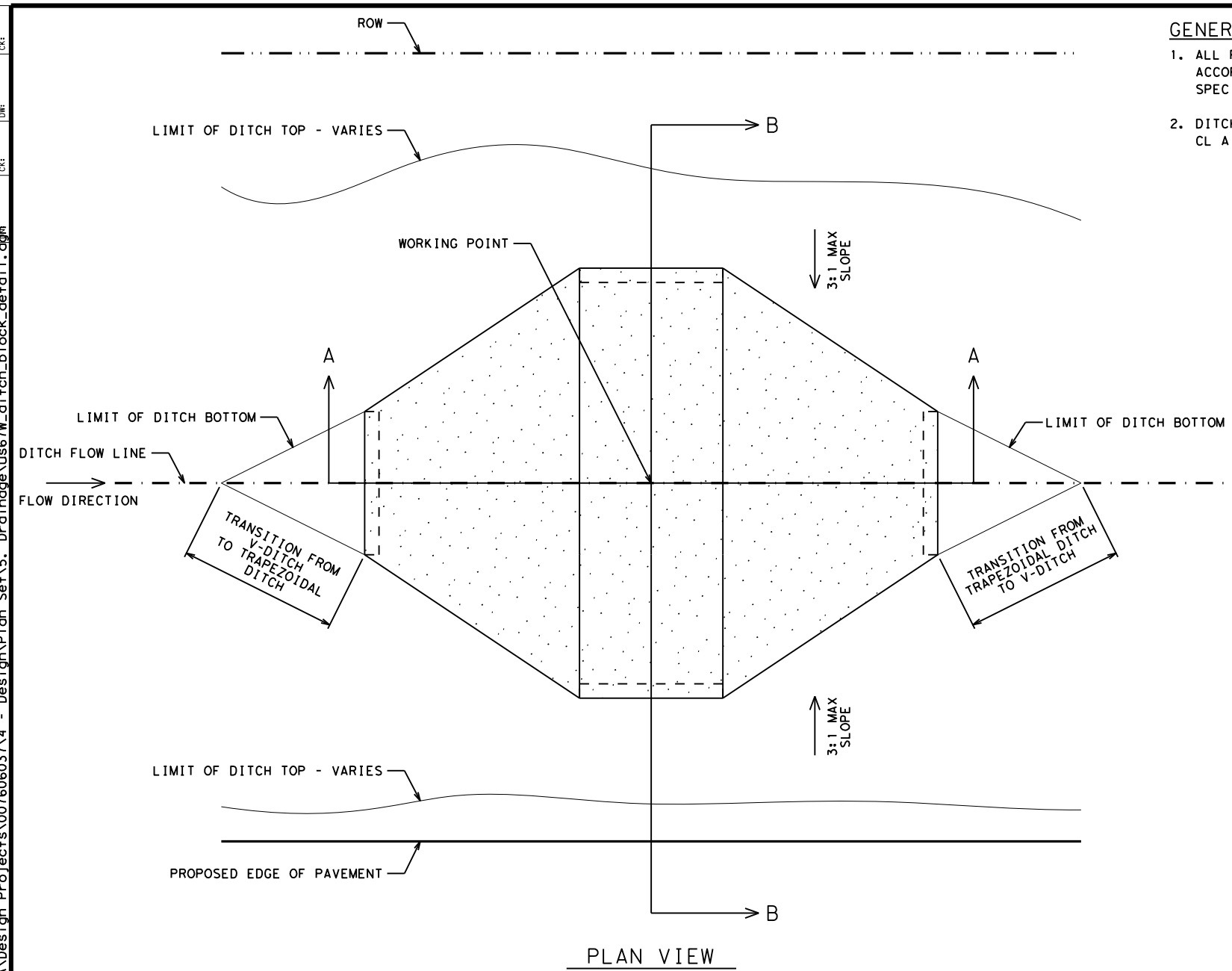
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GENERAL NOTES:

1. ALL RIPRAP SHALL BE INSTALLED ACCORDING TO TXDOT STANDARD SPECIFICATION ITEM 432 RIPRAP.
2. DITCH BLOCK SHALL BE PAID AS CL A CONC (DITCH INTERCEPTOR STRUCTURE) (EA)
3. DITCH BLOCK SHALL BE INSTALLED ACCORDING TO TXDOT STANDARD SPECIFICATION ITEM 400 EXCAVATION AND BACKFILL FOR STRUCTURES.
4. MATCH CONCRETE EDGES TO FINISHED GROUND.

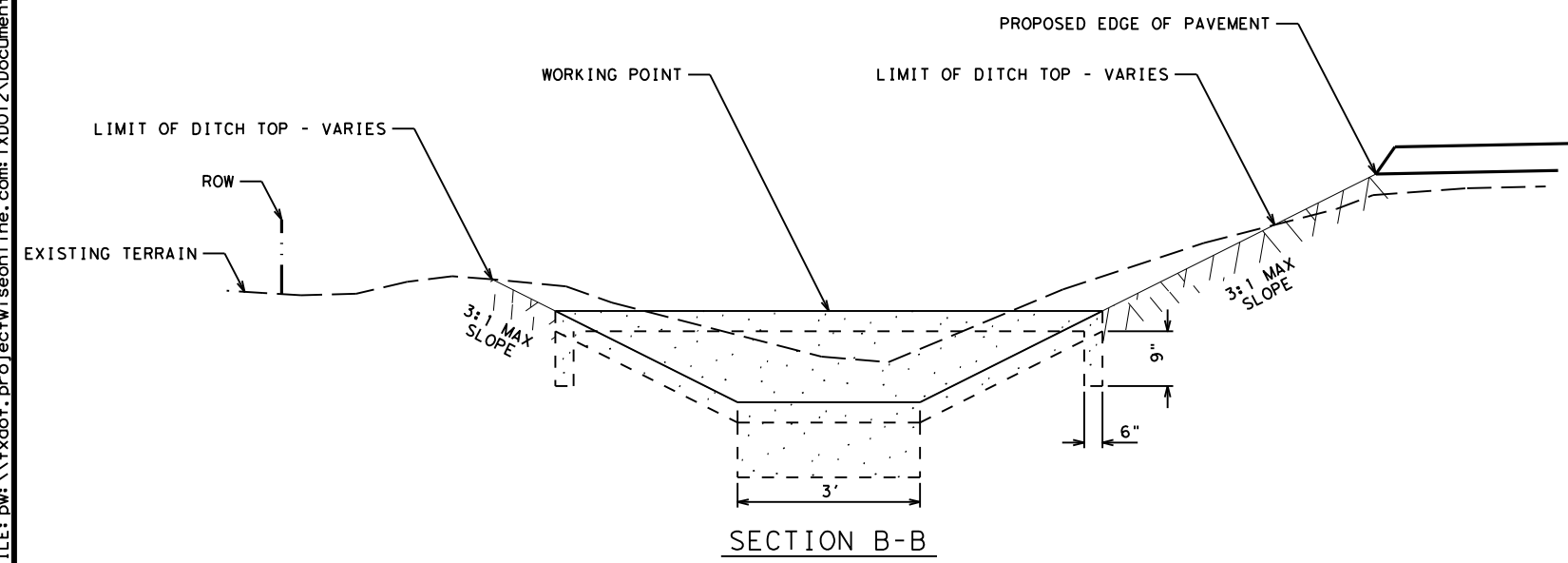
LEGEND:

-  CL A CONC (DITCH INTERCEPTOR STRUCTURE)
-  TY B BACKFILL



PLAN VIEW

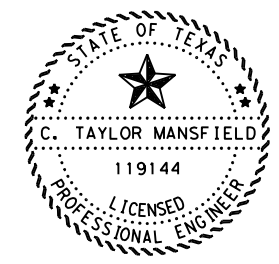
SECTION A-A



SECTION B-B

DITCH BLOCK WORKING POINT SUMMARY TABLE				
STA.	OFF.	ELEV.	0420-6153 CL A CONC (DITCH INTERCEPTOR STRUCTURE) (EACH)	APPROX. DITCH BLOCK CONC CUBIC YARDS (FOR INFO ONLY)
585+59.83	40' LT	2483.79	1	4
594+85.74	50' LT	2484.21	1	1
608+90.89	45' LT	2490.90	1	1
717+25.98	45' LT	2555.00	1	4
798+34.48	50' LT	2535.00	1	3
854+14.22	50' LT	2510.40	1	2
902+28.02	50' LT	2486.70	1	2

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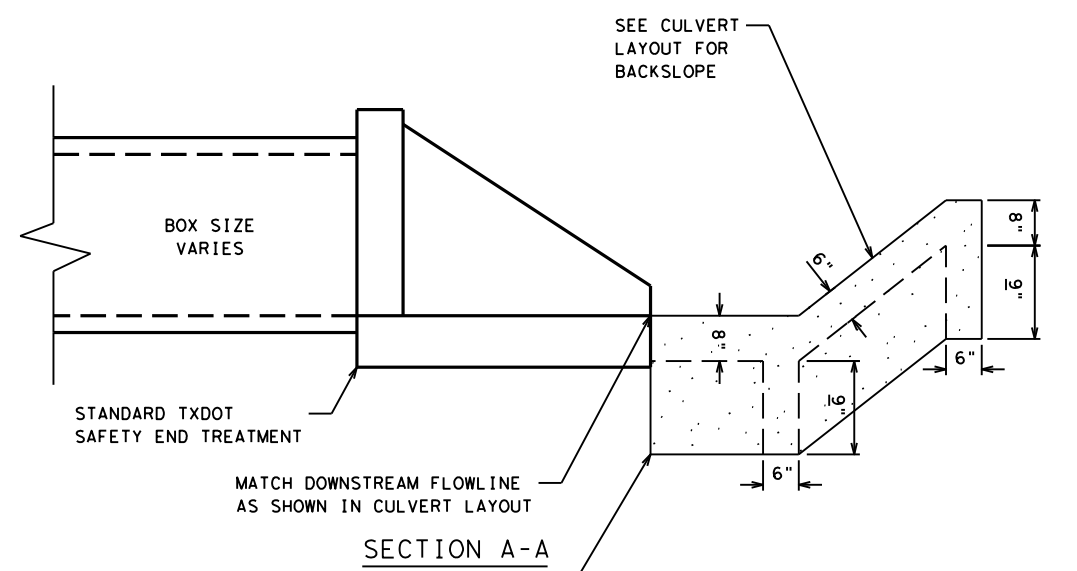
US 67
DITCH BLOCK
DETAIL

N. T. S. SHEET 1 OF 1

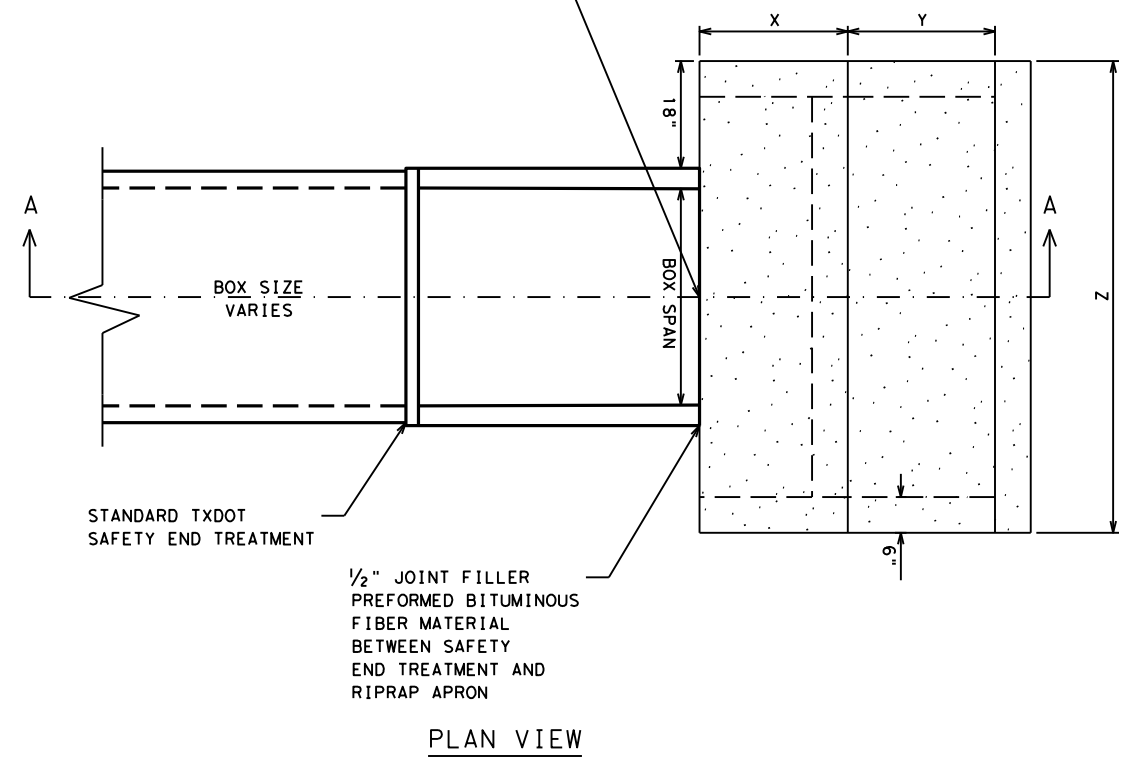


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		193

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 FILE: pw:\txdot\projectwiseonline.com\TXDOT2\Documents\06 - ODA\Design Projects\007606037\4 - Design\Plan Set\5. Drainage\us67w_r_riprap_apron_detail.dgn



FOR MULTIPLE BOX CULVERTS,
PLACE ADDITIONAL TOEWALL AT
EACH BOX MIDSPAN INTERVAL.



PLAN VIEW

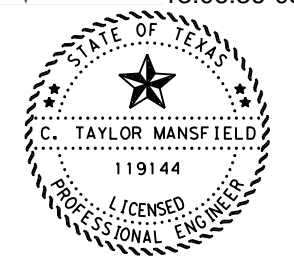
- GENERAL NOTES:**
1. ALL RIPRAP SHALL BE INSTALLED ACCORDING TO TXDOT STANDARD SPECIFICATION ITEM 432 RIPRAP.
 2. RIPRAP APRON SHALL BE PAID AS RIPRAP (CONC) (CL B) BY THE CUBIC YARD.
 3. RIPRAP APRON SHALL BE INSTALLED ACCORDING TO TXDOT STANDARD SPECIFICATION ITEM 400 EXCAVATION AND BACKFILL FOR STRUCTURES.
 4. MATCH RIPRAP EDGES TO FINISHED GROUND.

LEGEND:

RIPRAP (CONC) (CL B)

SUMMARY TABLE					0432-6006 RIPRAP (CONC) (CL B)	
STA	CULVERT ID	X (FT)	Y (FT)	Z (FT)	(CY)	
537+04	146	5	6.5	15.667	6	
571+06	155	3	2.66	18.833	4	
665+93	167	2	2.66	41.833	7	
678+50	169	3	8	9.333	3	
797+14	175	5	3	22.167	6	
BRIDGE CLASS	821+40	177	5	8.5	61.5	22
BRIDGE CLASS	880+08	181	0.5	3.417	22.583	4
	901+09	183	0.5	2.25	31.917	4

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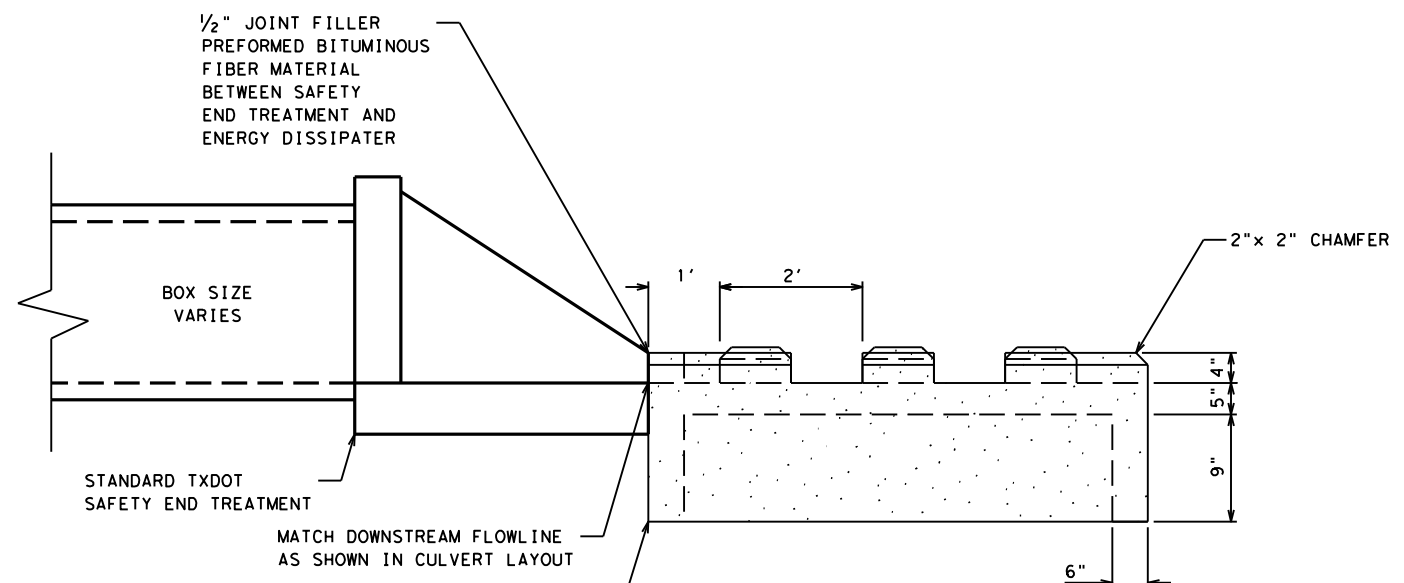
**US 67
CULVERT OUTFALL
RIPRAP APRON
DETAILS**

N. T. S. SHEET 1 OF 1

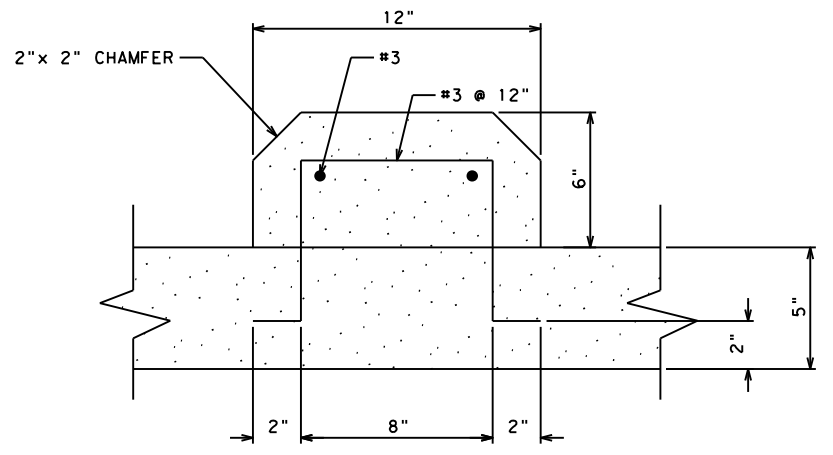


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		194

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SECTION A-A

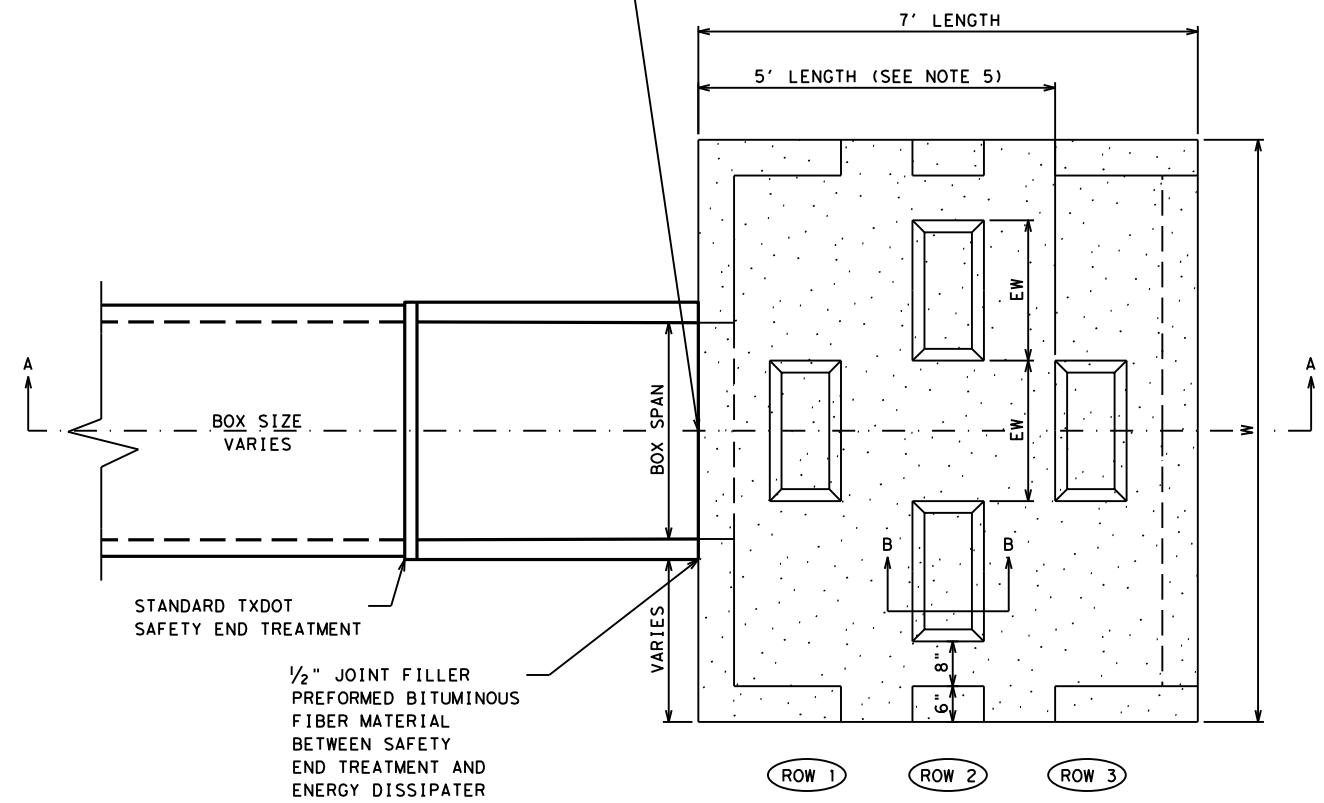


SECTION B-B

- GENERAL NOTES:**
1. ALL RIPRAP SHALL BE INSTALLED ACCORDING TO TXDOT STANDARD SPECIFICATION ITEM 432 RIPRAP.
 2. ENERGY DISSIPATER SHALL BE PAID AS RIPRAP (CONC) (CL C) BY THE CUBIC YARD.
 3. ENERGY DISSIPATER SHALL BE INSTALLED ACCORDING TO TXDOT STANDARD SPECIFICATION ITEM 400 EXCAVATION AND BACKFILL FOR STRUCTURES.

LEGEND:
 RIPRAP (CONC) (CL C)

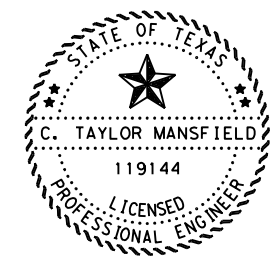
FOR MULTIPLE CULVERTS, PLACE ADDITIONAL TRANSVERSE TOEWALL AT EACH CULVERT MIDSPAN INTERVAL.



PLAN VIEW

SUMMARY TABLE				0432-6007 RIPRAP (CONC) (CL C)	
STA	CULVERT ID	EW (FT)	W (FT)	(CY)	
525+29	144	3	11.3333	3	
549+75	147	2	8.3333	2	
591+05	157	4	14.3333	3	
595+08	158	6	20.3333	4	
BRIDGE CLASS	637+51	163	12	38.3333	8
	677+91	168	4	14.3333	3
	717+43	171	4	14.3333	3
	772+54	173	2	8.3333	2
	853+73	178	2	8.3333	2
	867+89	180	2	8.3333	2
BRIDGE CLASS	905+90	184	12	38.3333	8
BRIDGE CLASS	938+99	186	10	34.3333	7
(EXCLUDE ROW 3)	963+19	187	4.5833	16.1667	4

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**US 67
 CULVERT OUTFALL
 ENERGY DISSIPATER
 DETAILS**

N. T. S. SHEET 1 OF 1



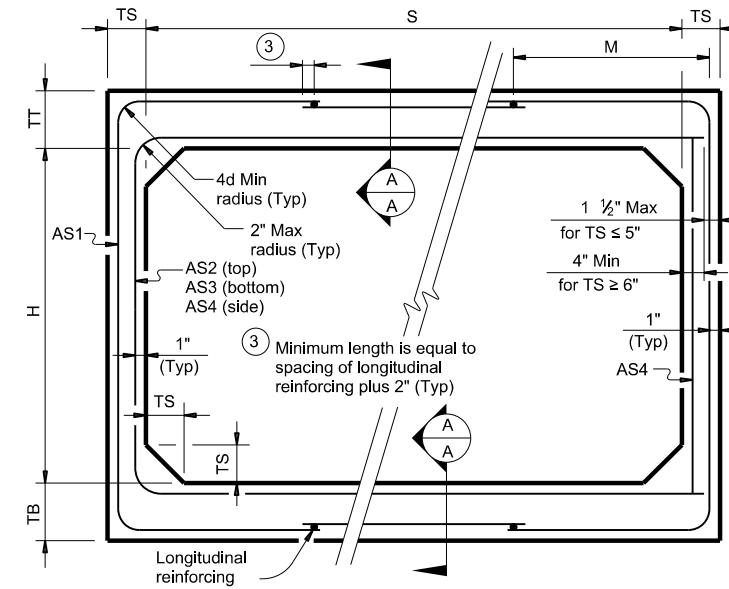
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0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		195

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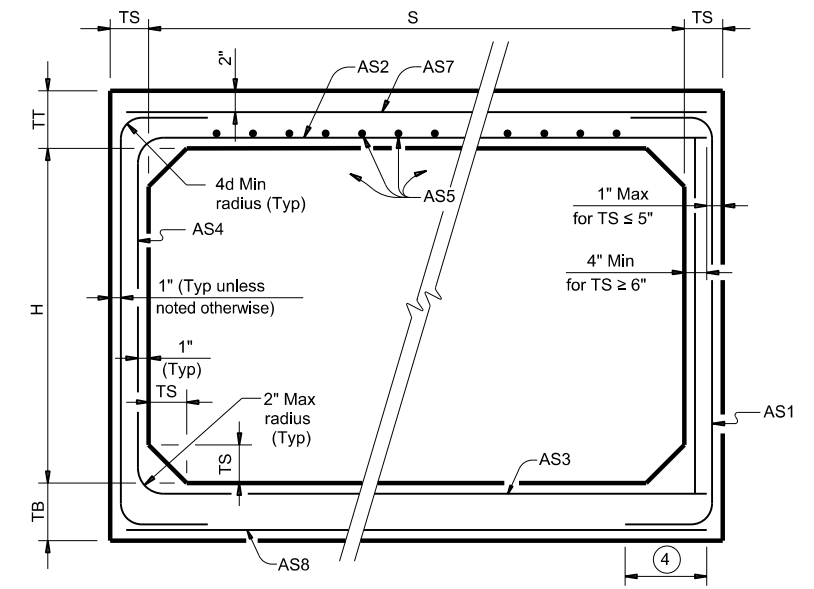
BOX DATA

SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ^②								① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8		
3	2	7	6	4	< 2	-	0.17	0.25	0.16	0.10	0.17	0.17	0.14	3.3	
3	2	4	4	4	2 < 3	31	0.13	0.19	0.18	0.10	-	-	-	2.4	
3	2	4	4	4	3 - 5	31	0.10	0.11	0.12	0.10	-	-	-	2.4	
3	2	4	4	4	10	31	0.10	0.10	0.10	0.10	-	-	-	2.4	
3	2	4	4	4	15	31	0.10	0.13	0.13	0.10	-	-	-	2.4	
3	2	4	4	4	20	31	0.11	0.17	0.17	0.10	-	-	-	2.4	
3	2	4	4	4	25	31	0.14	0.21	0.21	0.10	-	-	-	2.4	
3	2	4	4	4	30	31	0.17	0.25	0.25	0.10	-	-	-	2.4	
3	2	4	4	4	35	31	0.20	0.29	0.30	0.10	-	-	-	2.4	
3	3	7	6	4	< 2	-	0.17	0.27	0.17	0.10	0.17	0.17	0.14	3.7	
3	3	4	4	4	2 < 3	31	0.10	0.22	0.21	0.10	-	-	-	2.8	
3	3	4	4	4	3 - 5	31	0.10	0.14	0.14	0.10	-	-	-	2.8	
3	3	4	4	4	10	31	0.10	0.11	0.11	0.10	-	-	-	2.8	
3	3	4	4	4	15	31	0.10	0.14	0.15	0.10	-	-	-	2.8	
3	3	4	4	4	20	31	0.10	0.18	0.19	0.10	-	-	-	2.8	
3	3	4	4	4	25	31	0.10	0.23	0.23	0.10	-	-	-	2.8	
3	3	4	4	4	30	31	0.12	0.27	0.28	0.10	-	-	-	2.8	
3	3	4	4	4	35	31	0.14	0.32	0.32	0.10	-	-	-	2.8	



CORNER OPTION "A" CORNER OPTION "B"

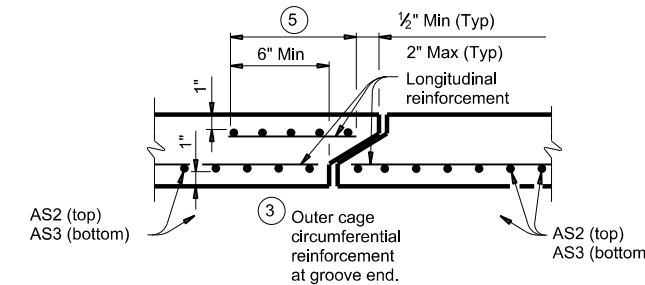
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

④ Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

		Bridge Division Standard	
<h2>SINGLE BOX CULVERTS PRECAST</h2> <p>3'-0" SPAN</p> <h3>SCP-3</h3>			
FILE:	sc03sts-20.dgn	DN: TxDOT	CK: TxDOT
REV:	February 2020	SECT:	HIGHWAY
REVISIONS	0076 06	JOB	US 67
DIST	ODA	COUNTY	SHEET NO.
		UPTON	196

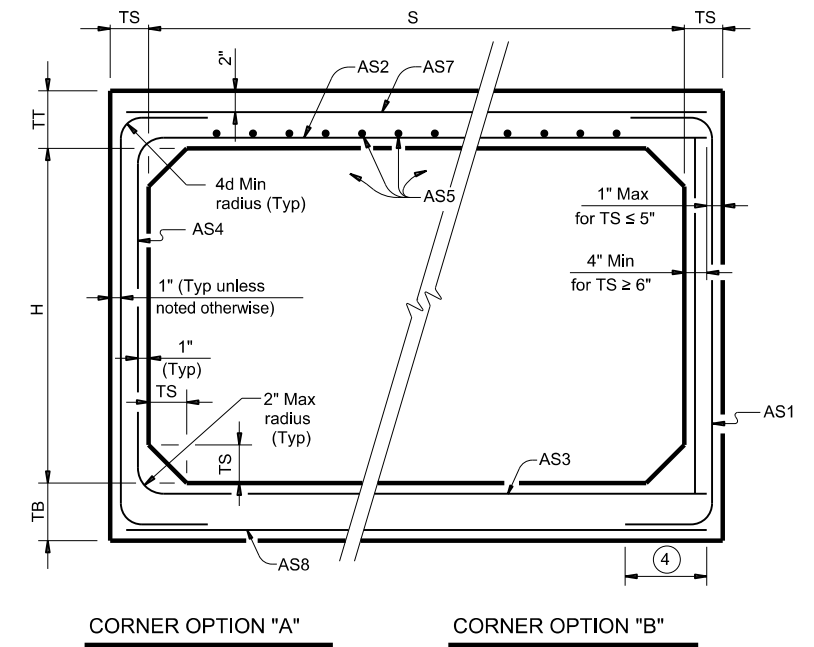
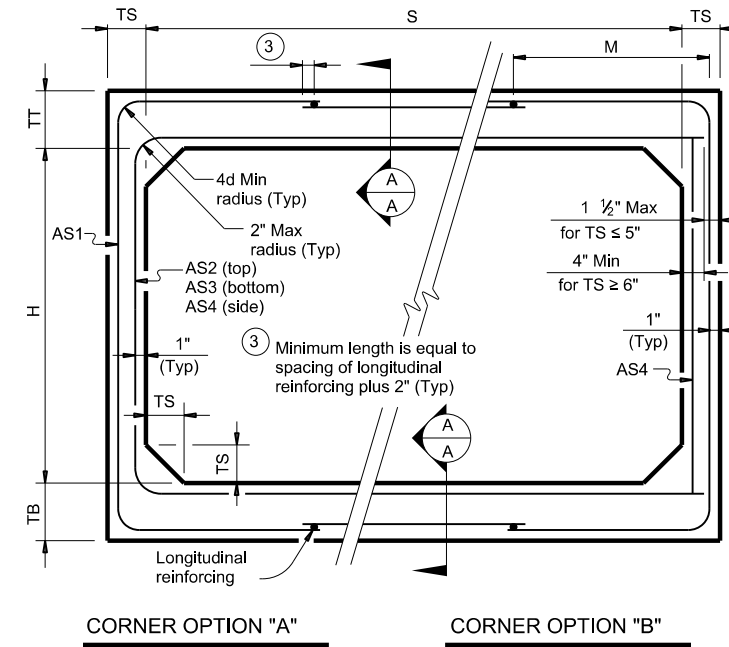
① For box length = 8'-0"

② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

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 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units.

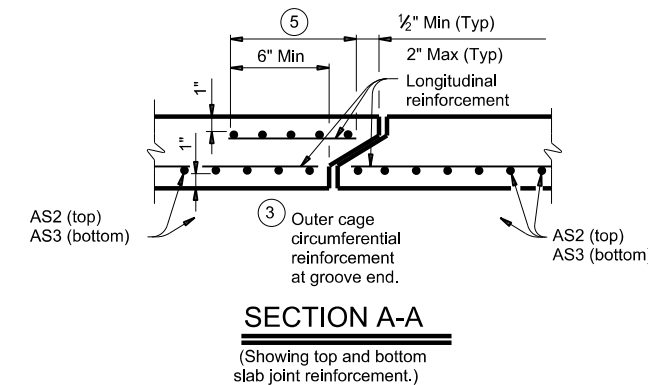
BOX DATA

SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ^②								① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8		
4	2	7.5	6	5	< 2	-	0.18	0.27	0.15	0.12	0.18	0.18	0.14	4.5	
4	2	5	5	5	2 < 3	38	0.18	0.19	0.17	0.12	-	-	-	3.6	
4	2	5	5	5	3 - 5	38	0.13	0.13	0.13	0.12	-	-	-	3.6	
4	2	5	5	5	10	38	0.12	0.12	0.12	0.12	-	-	-	3.6	
4	2	5	5	5	15	38	0.14	0.16	0.16	0.12	-	-	-	3.6	
4	2	5	5	5	20	38	0.18	0.20	0.21	0.12	-	-	-	3.6	
4	2	5	5	5	25	38	0.23	0.25	0.25	0.12	-	-	-	3.6	
4	2	5	5	5	30	38	0.28	0.30	0.30	0.12	-	-	-	3.6	
4	3	7.5	6	5	< 2	-	0.18	0.31	0.18	0.12	0.18	0.18	0.14	5.0	
4	3	5	5	5	2 < 3	38	0.15	0.23	0.20	0.12	-	-	-	4.1	
4	3	5	5	5	3 - 5	38	0.12	0.16	0.16	0.12	-	-	-	4.1	
4	3	5	5	5	10	38	0.12	0.14	0.14	0.12	-	-	-	4.1	
4	3	5	5	5	15	38	0.12	0.18	0.18	0.12	-	-	-	4.1	
4	3	5	5	5	20	38	0.14	0.23	0.24	0.12	-	-	-	4.1	
4	3	5	5	5	25	38	0.17	0.29	0.29	0.12	-	-	-	4.1	
4	3	5	5	5	30	38	0.21	0.35	0.35	0.12	-	-	-	4.1	
4	4	7.5	6	5	< 2	-	0.18	0.33	0.20	0.12	0.18	0.18	0.14	5.5	
4	4	5	5	5	2 < 3	38	0.12	0.26	0.23	0.12	-	-	-	4.6	
4	4	5	5	5	3 - 5	38	0.12	0.18	0.18	0.12	-	-	-	4.6	
4	4	5	5	5	10	38	0.12	0.15	0.15	0.12	-	-	-	4.6	
4	4	5	5	5	15	38	0.12	0.19	0.20	0.12	-	-	-	4.6	
4	4	5	5	5	20	38	0.12	0.25	0.25	0.12	-	-	-	4.6	
4	4	5	5	5	25	38	0.14	0.31	0.31	0.12	-	-	-	4.6	
4	4	5	5	5	30	38	0.17	0.37	0.37	0.12	-	-	-	4.6	



FILL HEIGHT 2 FT AND GREATER

FILL HEIGHT LESS THAN 2 FT



MATERIAL NOTES:
 Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
 Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:
 Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
 See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

- ① For box length = 8'-0"
- ② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

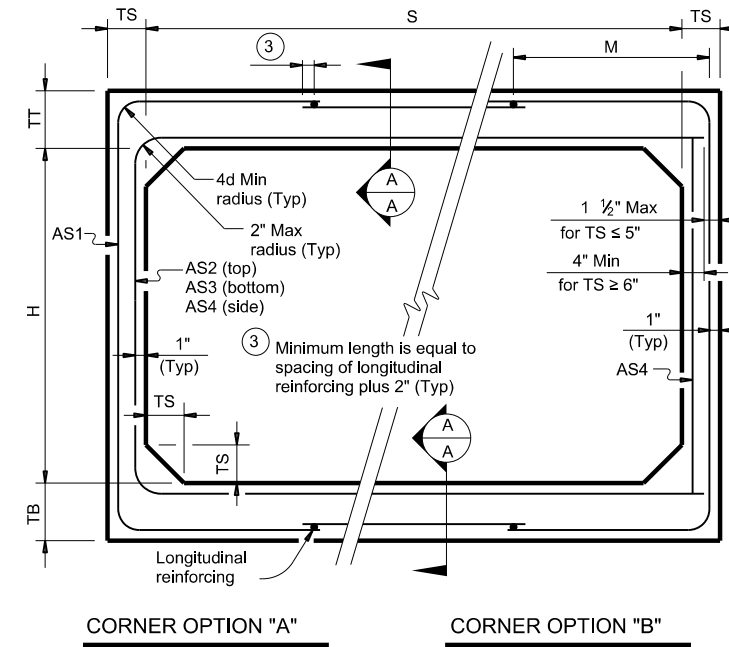
HL93 LOADING

		<i>Bridge Division Standard</i>	
SINGLE BOX CULVERTS PRECAST 4'-0" SPAN			
SCP-4			
FILE: scp04sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT February 2020	CONT	SECT	HIGHWAY
REVISIONS	0076	06	037
DIST	COUNTY		SHEET NO.
ODA	UPTON		197

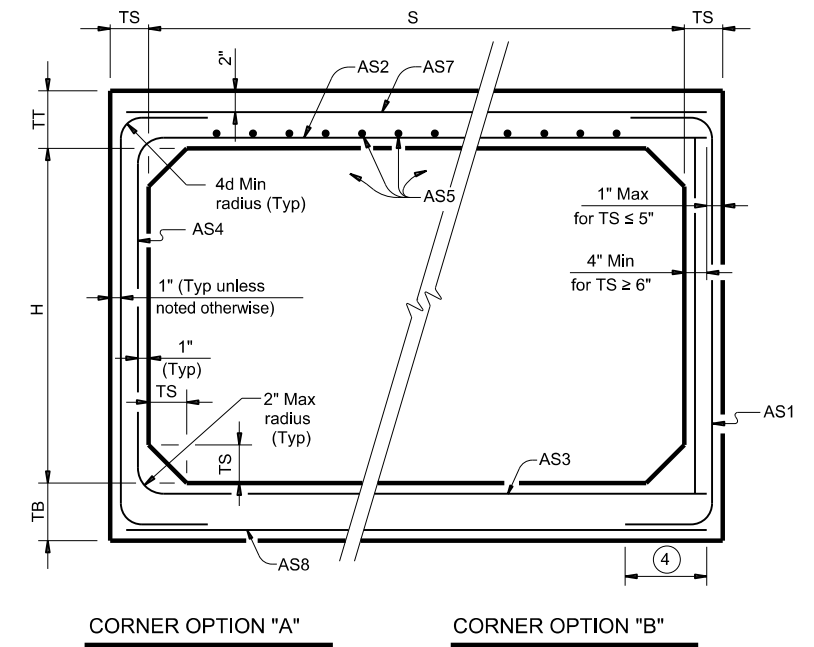
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 ODA\Design Projects\100760503\scps-20.dgn
 The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units.

BOX DATA

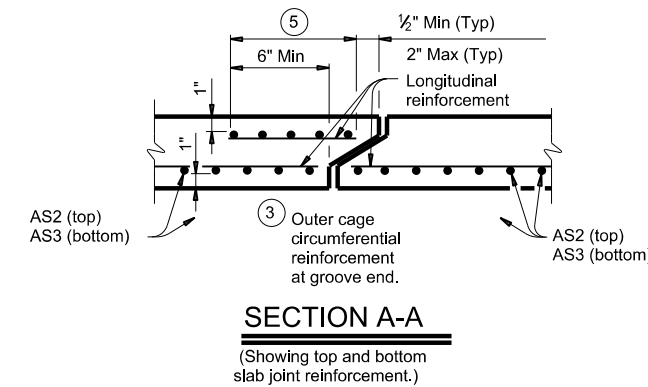
SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ^②								① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8		
5	2	8	7	6	< 2	-	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0	
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	-	-	-	5.1	
5	2	6	6	6	3 - 5	44	0.16	0.14	0.14	0.14	-	-	-	5.1	
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	-	-	-	5.1	
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	-	-	-	5.1	
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	-	-	-	5.1	
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	-	-	-	5.1	
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	-	-	-	5.1	
5	3	8	7	6	< 2	-	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6	
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	-	-	-	5.7	
5	3	6	6	6	3 - 5	36	0.14	0.17	0.16	0.14	-	-	-	5.7	
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	-	-	-	5.7	
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	-	-	-	5.7	
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	-	-	-	5.7	
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	-	-	-	5.7	
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	-	-	-	5.7	
5	4	8	7	6	< 2	-	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2	
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	-	-	-	6.3	
5	4	6	6	6	3 - 5	45	0.14	0.19	0.18	0.14	-	-	-	6.3	
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	-	-	-	6.3	
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	-	-	-	6.3	
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	-	-	-	6.3	
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	-	-	-	6.3	
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	-	-	-	6.3	
5	5	8	7	6	< 2	-	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8	
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	-	-	-	6.9	
5	5	6	6	6	3 - 5	45	0.14	0.21	0.20	0.14	-	-	-	6.9	
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	-	-	-	6.9	
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	-	-	-	6.9	
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	-	-	-	6.9	
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	-	-	-	6.9	
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	-	-	-	6.9	



FILL HEIGHT 2 FT AND GREATER



FILL HEIGHT LESS THAN 2 FT



SECTION A-A
(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:
 Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
 Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:
 Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
 See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

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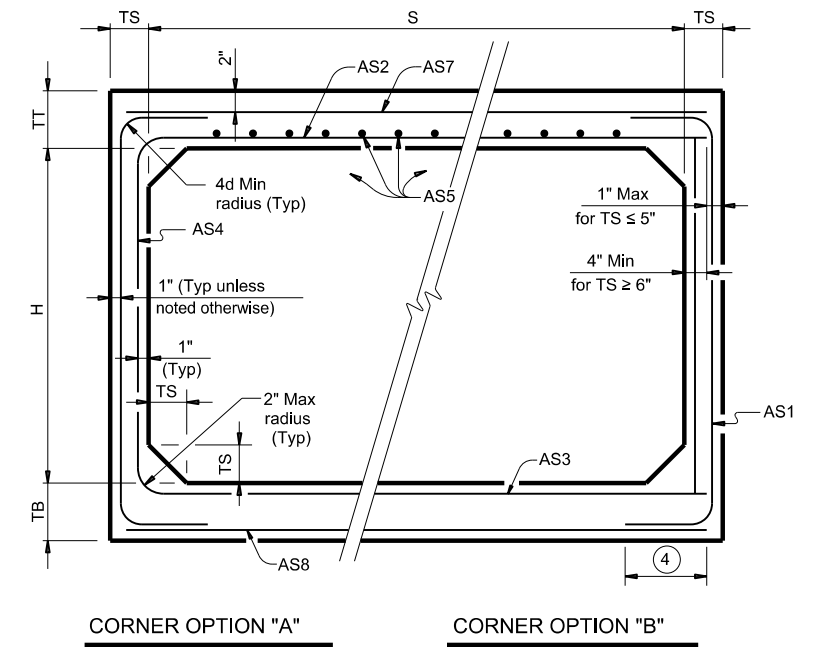
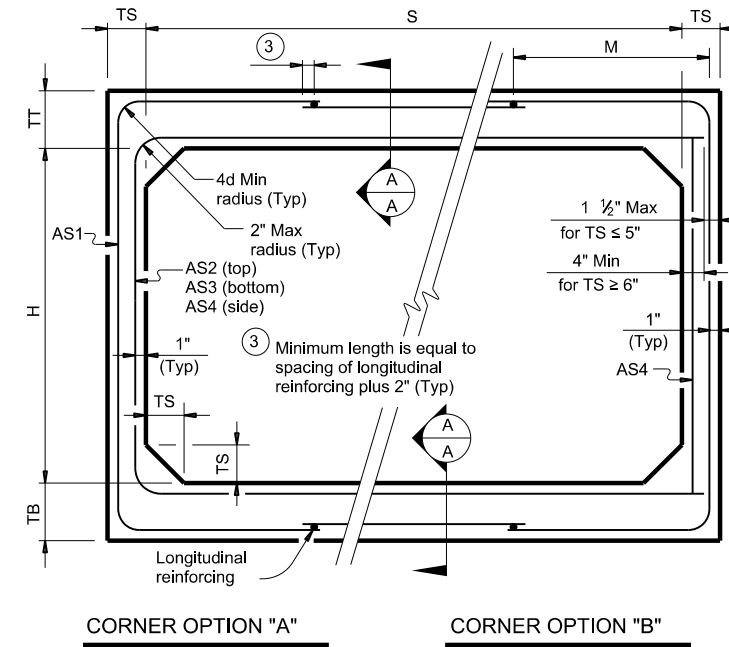
		<i>Bridge Division Standard</i>	
SINGLE BOX CULVERTS PRECAST 5'-0" SPAN			
SCP-5			
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©TxDOT February 2020	CONT	SECT	HIGHWAY
REVISIONS	0076 06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	198	

① For box length = 8'-0"
 ② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcing per linear foot of box length. AS5 is minimum required area of reinforcing per linear foot of box width.

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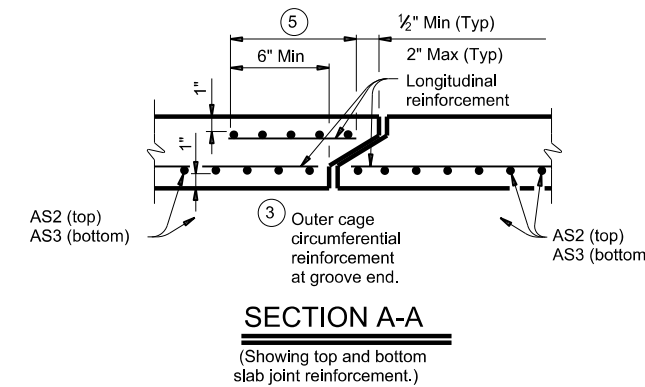
BOX DATA

SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ^②							① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8	
7	3	8	8	8	< 2	-	0.23	0.31	0.22	0.19	0.19	0.19	0.19	9.6
7	3	8	8	8	2 < 3	47	0.27	0.25	0.24	0.19	-	-	-	9.6
7	3	8	8	8	3 - 5	43	0.19	0.19	0.19	0.19	-	-	-	9.6
7	3	8	8	8	10	43	0.21	0.20	0.21	0.19	-	-	-	9.6
7	3	8	8	8	15	43	0.28	0.26	0.27	0.19	-	-	-	9.6
7	3	8	8	8	20	43	0.36	0.34	0.35	0.19	-	-	-	9.6
7	3	8	8	8	25	43	0.45	0.42	0.43	0.19	-	-	-	9.6
7	3	8	8	8	30	43	0.54	0.50	0.51	0.19	-	-	-	9.6
7	4	8	8	8	< 2	-	0.21	0.34	0.25	0.19	0.19	0.19	0.19	10.4
7	4	8	8	8	2 < 3	43	0.23	0.28	0.28	0.19	-	-	-	10.4
7	4	8	8	8	3 - 5	43	0.19	0.22	0.19	0.19	-	-	-	10.4
7	4	8	8	8	10	43	0.19	0.23	0.23	0.19	-	-	-	10.4
7	4	8	8	8	15	41	0.24	0.30	0.30	0.19	-	-	-	10.4
7	4	8	8	8	20	41	0.31	0.38	0.39	0.19	-	-	-	10.4
7	4	8	8	8	25	41	0.38	0.47	0.48	0.19	-	-	-	10.4
7	4	8	8	8	30	41	0.46	0.57	0.57	0.19	-	-	-	10.4
7	5	8	8	8	< 2	-	0.19	0.36	0.27	0.19	0.19	0.19	0.19	11.2
7	5	8	8	8	2 < 3	47	0.21	0.31	0.31	0.19	-	-	-	11.2
7	5	8	8	8	3 - 5	43	0.19	0.24	0.21	0.19	-	-	-	11.2
7	5	8	8	8	10	43	0.19	0.25	0.26	0.19	-	-	-	11.2
7	5	8	8	8	15	41	0.21	0.32	0.33	0.19	-	-	-	11.2
7	5	8	8	8	20	41	0.27	0.41	0.42	0.19	-	-	-	11.2
7	5	8	8	8	25	41	0.33	0.51	0.52	0.19	-	-	-	11.2
7	5	8	8	8	30	41	0.40	0.61	0.62	0.19	-	-	-	11.2
7	6	8	8	8	< 2	-	0.19	0.38	0.30	0.19	0.19	0.19	0.19	12.0
7	6	8	8	8	2 < 3	59	0.19	0.33	0.34	0.19	-	-	-	12.0
7	6	8	8	8	3 - 5	47	0.19	0.25	0.23	0.19	-	-	-	12.0
7	6	8	8	8	10	43	0.19	0.26	0.27	0.19	-	-	-	12.0
7	6	8	8	8	15	41	0.19	0.34	0.35	0.19	-	-	-	12.0
7	6	8	8	8	20	41	0.24	0.43	0.45	0.19	-	-	-	12.0
7	6	8	8	8	25	41	0.29	0.53	0.55	0.19	-	-	-	12.0
7	6	8	8	8	30	41	0.35	0.64	0.65	0.19	-	-	-	12.0
7	7	8	8	8	< 2	-	0.19	0.40	0.33	0.19	0.19	0.19	0.19	12.8
7	7	8	8	8	2 < 3	59	0.19	0.36	0.37	0.19	-	-	-	12.8
7	7	8	8	8	3 - 5	59	0.19	0.27	0.25	0.19	-	-	-	12.8
7	7	8	8	8	10	47	0.19	0.27	0.29	0.19	-	-	-	12.8
7	7	8	8	8	15	43	0.19	0.35	0.37	0.19	-	-	-	12.8
7	7	8	8	8	20	43	0.22	0.44	0.46	0.19	-	-	-	12.8
7	7	8	8	8	25	43	0.27	0.54	0.57	0.19	-	-	-	12.8
7	7	8	8	8	30	41	0.32	0.65	0.67	0.19	-	-	-	12.8



FILL HEIGHT 2 FT AND GREATER

FILL HEIGHT LESS THAN 2 FT



④ Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete (f_c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

		Bridge Division Standard	
SINGLE BOX CULVERTS PRECAST 7'-0" SPAN			
SCP-7			
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CONT:	February 2020	CK:	TxDOT
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SHEET NO.:			199

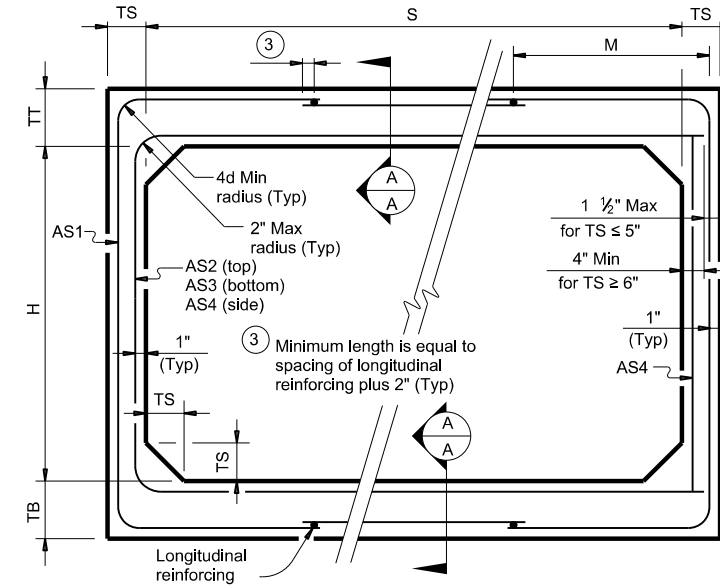
① For box length = 8'-0"

② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

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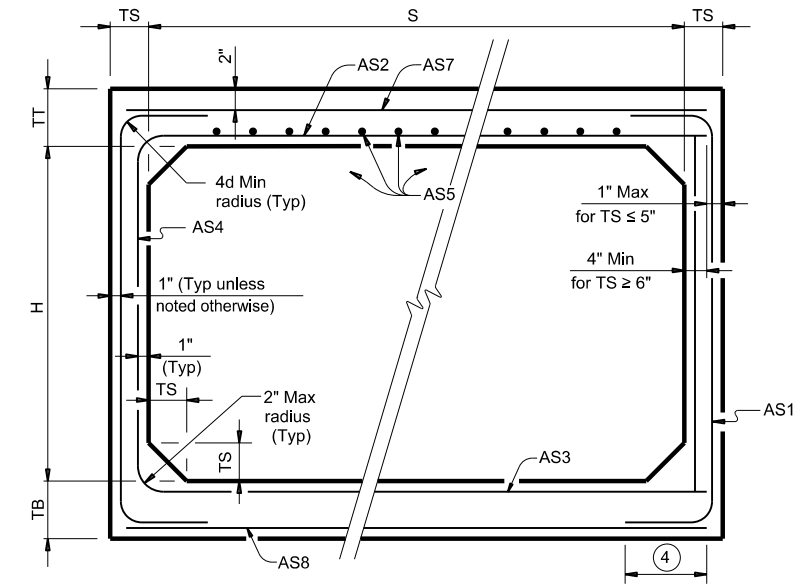
BOX DATA

SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ^②								① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8		
8	3	8	8	8	< 2	-	0.31	0.35	0.25	0.19	0.19	0.19	0.19	10.4	
8	3	8	8	8	2 < 3	55	0.35	0.29	0.28	0.19	-	-	-	10.4	
8	3	8	8	8	3 - 5	50	0.28	0.23	0.24	0.19	-	-	-	10.4	
8	3	8	8	8	10	45	0.29	0.25	0.26	0.19	-	-	-	10.4	
8	3	8	8	8	15	45	0.39	0.33	0.34	0.19	-	-	-	10.4	
8	3	8	8	8	20	45	0.51	0.43	0.44	0.19	-	-	-	10.4	
8	3	8	8	8	25	45	0.63	0.53	0.54	0.19	-	-	-	10.4	
8	4	8	8	8	< 2	-	0.27	0.38	0.29	0.19	0.19	0.19	0.19	11.2	
8	4	8	8	8	2 < 3	50	0.31	0.34	0.32	0.19	-	-	-	11.2	
8	4	8	8	8	3 - 5	50	0.25	0.27	0.27	0.19	-	-	-	11.2	
8	4	8	8	8	10	45	0.26	0.28	0.29	0.19	-	-	-	11.2	
8	4	8	8	8	15	41	0.34	0.37	0.38	0.19	-	-	-	11.2	
8	4	8	8	8	20	41	0.44	0.48	0.49	0.19	-	-	-	11.2	
8	5	8	8	8	< 2	-	0.24	0.40	0.32	0.19	0.19	0.19	0.19	12.0	
8	5	8	8	8	2 < 3	50	0.28	0.37	0.35	0.19	-	-	-	12.0	
8	5	8	8	8	3 - 5	45	0.23	0.29	0.30	0.19	-	-	-	12.0	
8	5	8	8	8	10	45	0.23	0.31	0.32	0.19	-	-	-	12.0	
8	5	8	8	8	15	41	0.30	0.41	0.42	0.19	-	-	-	12.0	
8	5	8	8	8	20	41	0.39	0.52	0.54	0.19	-	-	-	12.0	
8	6	8	8	8	< 2	-	0.22	0.42	0.35	0.19	0.19	0.19	0.19	12.8	
8	6	8	8	8	2 < 3	50	0.25	0.40	0.38	0.19	-	-	-	12.8	
8	6	8	8	8	3 - 5	50	0.21	0.32	0.33	0.19	-	-	-	12.8	
8	6	8	8	8	10	45	0.22	0.33	0.34	0.19	-	-	-	12.8	
8	6	8	8	8	15	41	0.28	0.43	0.45	0.19	-	-	-	12.8	
8	6	8	8	8	20	41	0.36	0.55	0.57	0.19	-	-	-	12.8	
8	7	8	8	8	< 2	-	0.20	0.44	0.37	0.19	0.19	0.19	0.19	13.6	
8	7	8	8	8	2 < 3	55	0.23	0.43	0.41	0.19	-	-	-	13.6	
8	7	8	8	8	3 - 5	55	0.19	0.34	0.35	0.19	-	-	-	13.6	
8	7	8	8	8	10	50	0.20	0.34	0.36	0.19	-	-	-	13.6	
8	7	8	8	8	15	41	0.26	0.45	0.47	0.19	-	-	-	13.6	
8	7	8	8	8	20	41	0.33	0.57	0.60	0.19	-	-	-	13.6	
8	8	8	8	8	< 2	-	0.20	0.45	0.40	0.19	0.19	0.19	0.19	14.4	
8	8	8	8	8	2 < 3	65	0.21	0.45	0.44	0.19	-	-	-	14.4	
8	8	8	8	8	3 - 5	65	0.19	0.36	0.38	0.19	-	-	-	14.4	
8	8	8	8	8	10	55	0.19	0.35	0.38	0.19	-	-	-	14.4	
8	8	8	8	8	15	45	0.24	0.46	0.49	0.19	-	-	-	14.4	
8	8	8	8	8	20	45	0.31	0.59	0.62	0.19	-	-	-	14.4	



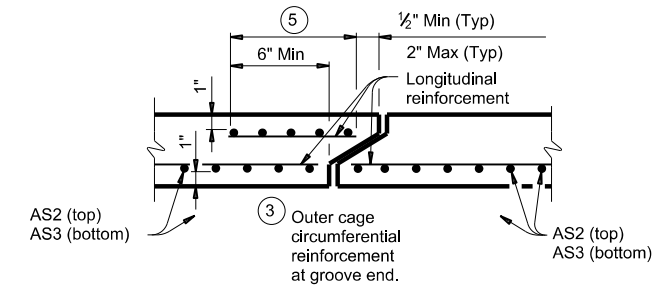
CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT



SECTION A-A
(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:
 Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
 Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:
 Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
 See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

① For box length = 8'-0"
 ② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

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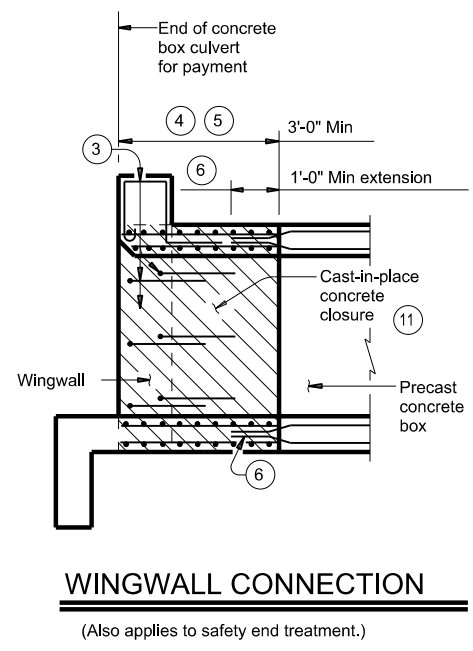
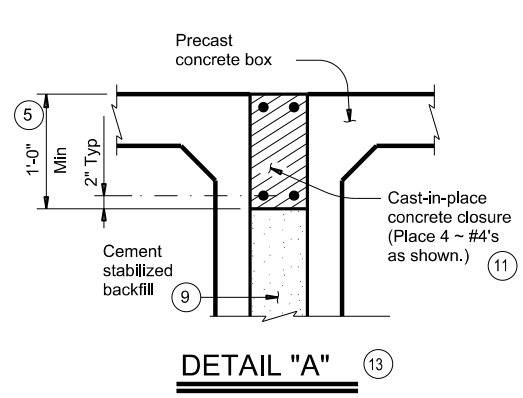
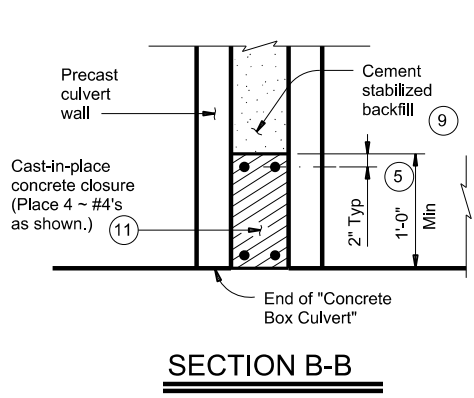
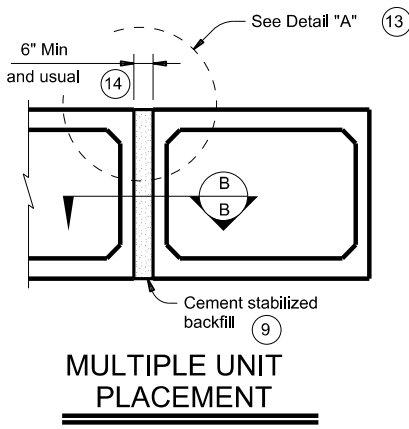
Bridge Division Standard

SINGLE BOX CULVERTS PRECAST 8'-0" SPAN

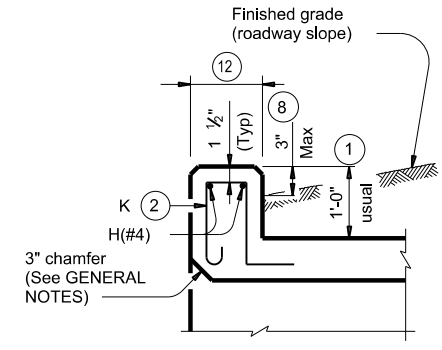
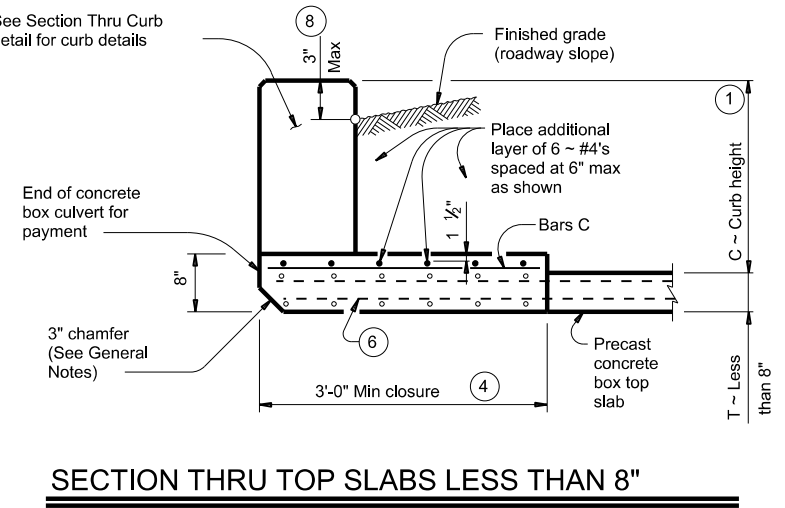
SCP-8

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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ODA	UPTON		200	

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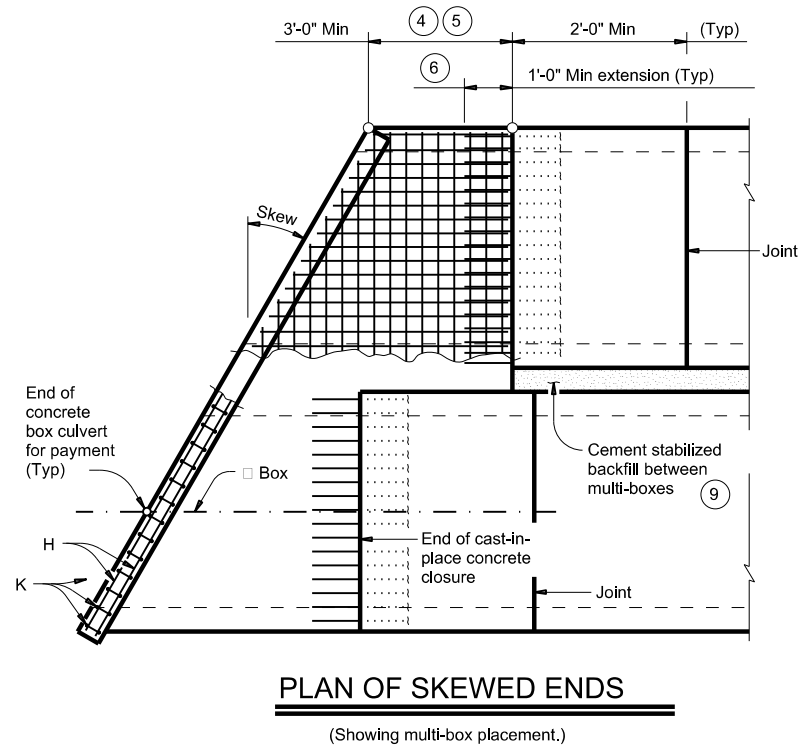
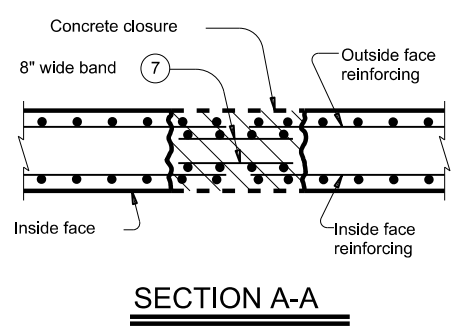
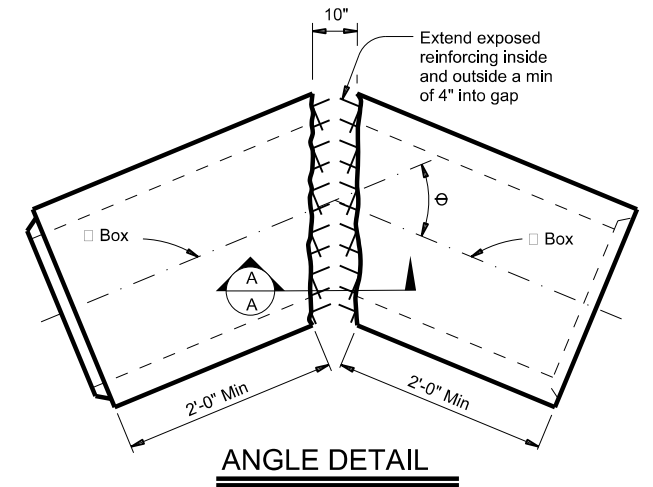
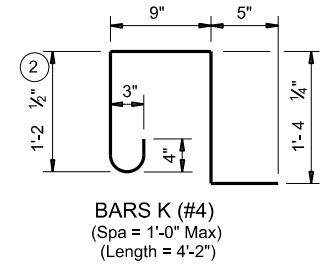
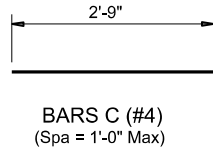


- 1 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- 2 For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
- 3 Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
- 4 Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcing spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.
- 5 For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.
- 6 Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).
- 7 Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
- 8 For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade. Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- 9 Cement stabilized backfill between boxes is considered part of the box culvert for payment.
- 10 All curb concrete and reinforcing is considered part of the box culvert for payment.
- 11 Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
- 12 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
- 13 For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
- 14 This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.



QUANTITIES PER FOOT OF CURB

Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



MATERIAL NOTES:
 Provide Grade 60 reinforcing steel.
 Provide ASTM A1064 welded wire reinforcement.
 Provide Class C concrete (f_c = 3,600 psi) for the closures.
 Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
 Any additional concrete required for the closures will be considered subsidiary to the box culvert.

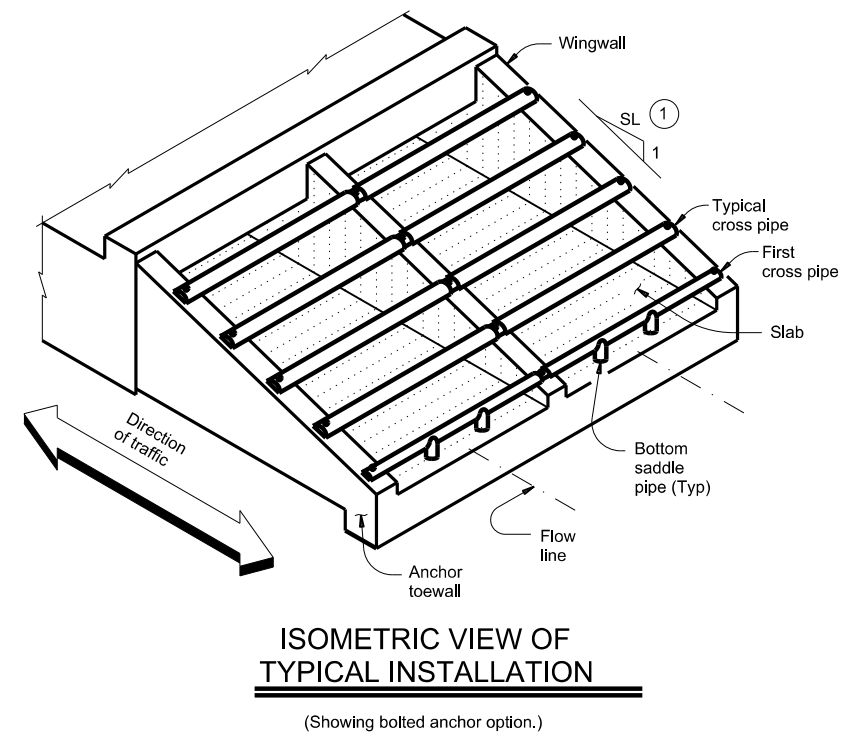
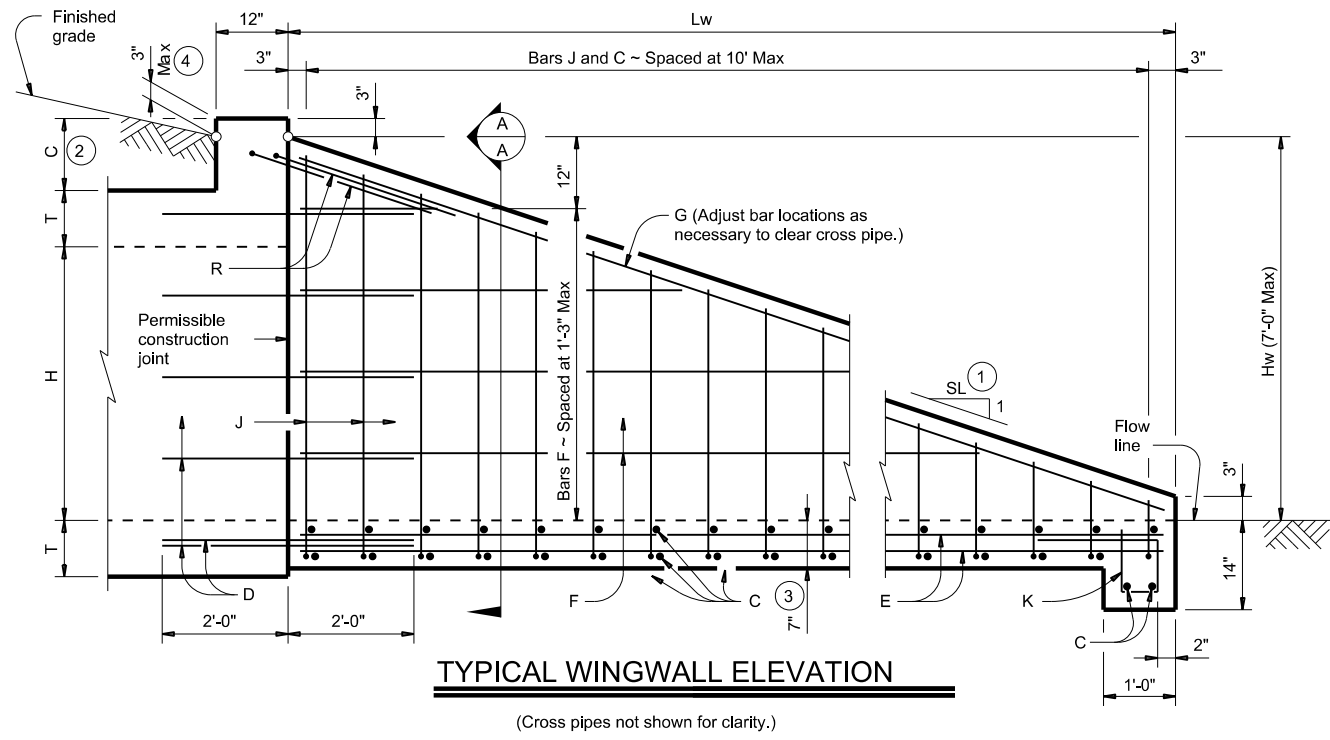
GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
 Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bars dimensions are out-to-out of bars.

HL93 LOADING

		Bridge Division Standard	
BOX CULVERTS PRECAST MISCELLANEOUS DETAILS			
SCP-MD			
FILE: scpmdsts-20.dgn	DN: GAF	ck: LMW	DW: BWH/TXDOT
©TxDOT February 2020	CONT: SECT	JOB: 037	HIGHWAY: US 67
REVISIONS	0076 06	037	US 67
DIST: ODA	COUNTY: UPTON	SHEET NO. 201	

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 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units.



WING DIMENSION CALCULATIONS:

$$Hw = H + T + C - 0.250'$$

$$Lw = (Hw - 0.333') (SL)$$

For cast-in-place culverts:
 $Atw = (N) (S) + (N + 1) (U)$

For precast culverts:
 $Atw = (N) (2U + S) + (N - 1) (0.500')$

Total Wingwall Area (SF)
 $= (0.5) (Hw + 0.333') (Lw) (N - 1)$

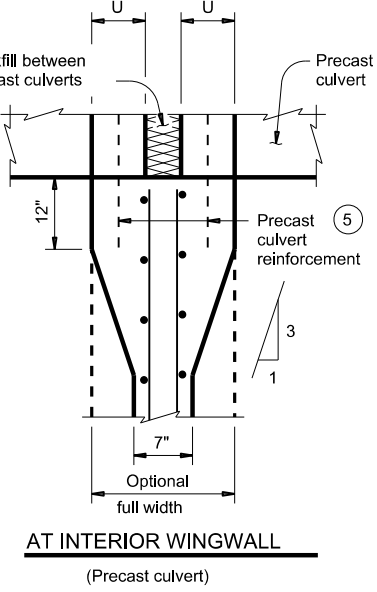
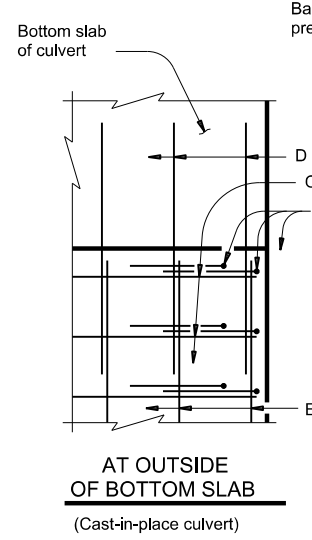
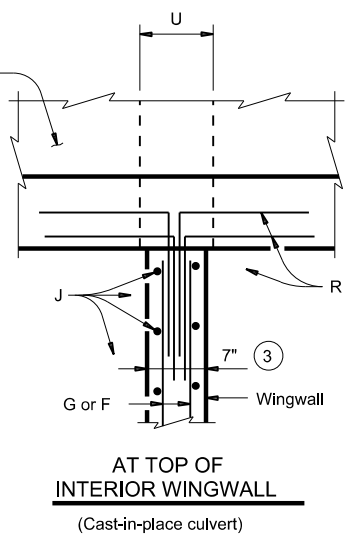
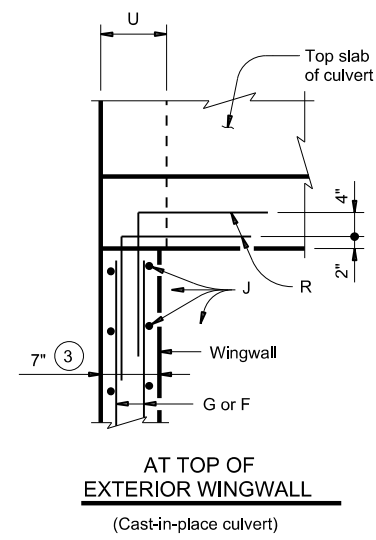
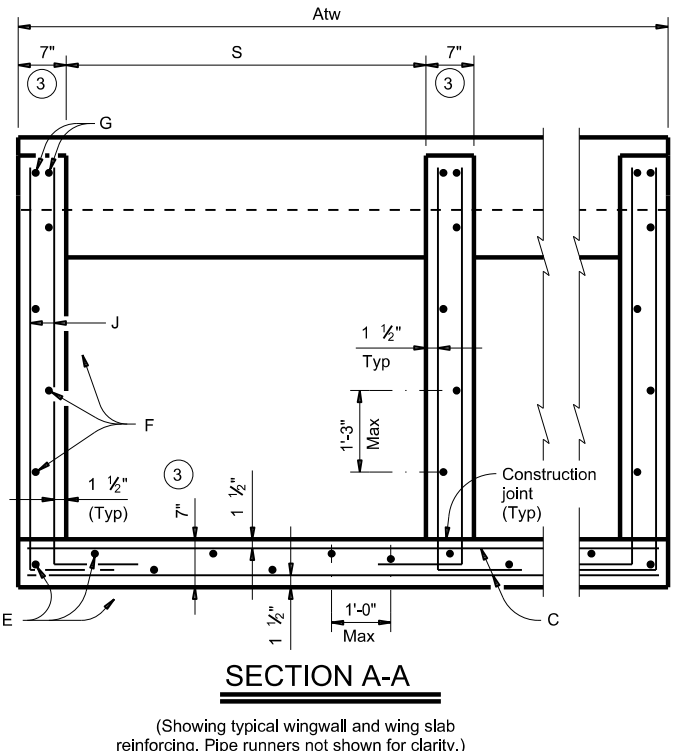
Total Concrete Volume (CY)
 $= [(Wingwall Area) (0.583') + (Lw) (Atw) (0.583') + (Atw) (1.167') (1.167' - 0.583')] + (27)$

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length (feet)
 $= (Lw) (K1) - (1.917')$

Total Reinforcing (Lb)
 $= (1.55) (Lw) (Atw) + (4.43) (Atw) + (K2) (Hw) (N + 1) (Lw)$

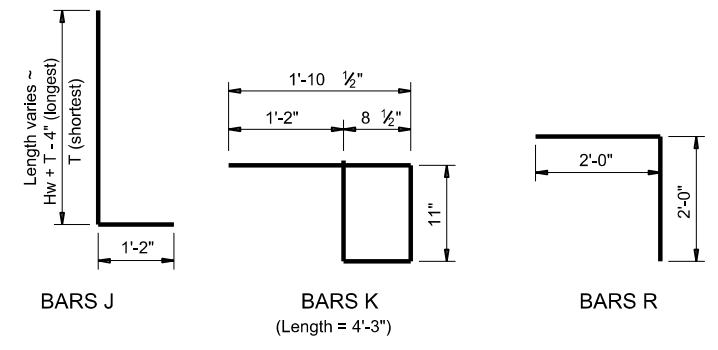
C = Height of curb above top of top slab (feet)
 Hw = Height of wingwall (feet)
 K = Constant value for use in formulas
 Slope SL: 1 K1 K2
 3:1 ~ 1.054 ~ 7.45
 4:1 ~ 1.031 ~ 8.49
 6:1 ~ 1.014 ~ 10.30
 Atw = Anchor toewall length (feet)
 Lw = Length of wingwall (feet)
 N = Number of culvert barrels
 SL:1 = Side slope ratio (horizontal : 1 vertical)
 See applicable box culvert standard for H, S, T, and U values.



PLAN VIEWS OF CORNER DETAILS

- ① Provide 6:1 or flatter slope.
- ② 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to Extended Curb Details the Extended Curb Details (ECD) standard sheet.
- ③ Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" Minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.
- ④ For vehicle safety, reduce height, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.
- ⑤ For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.

TABLE OF REINFORCING BAR SIZES AND SPACING		
Bar	Size	Spacing
C	#4	10' Max
D	#4	Match F and E
E	#4	1'-0" Max
F	#4	1'-3" Max
G	#6	As shown
J	#4	10' Max
K	#4	1'-0" Max
R	#4	As shown



MATERIAL NOTES:
 Provide Grade 60 reinforcing steel.
 Provide galvanized reinforcing steel if required elsewhere in the plans. Adjust reinforcing as necessary to provide a minimum clear cover of 1 1/2".
 Provide Class "C" concrete (f'c = 3,600 psi).
 Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
 Provide ASTM A307 bolts.
 Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.
 Repair galvanizing damaged during transport or construction in accordance with Item 445, "Galvanizing."

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.
 Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.
 The quantities for concrete, reinforcing steel, and cross pipes resulting from the formulas given herein are for Contractor's information only.
 See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
 Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

SHEET 1 OF 2

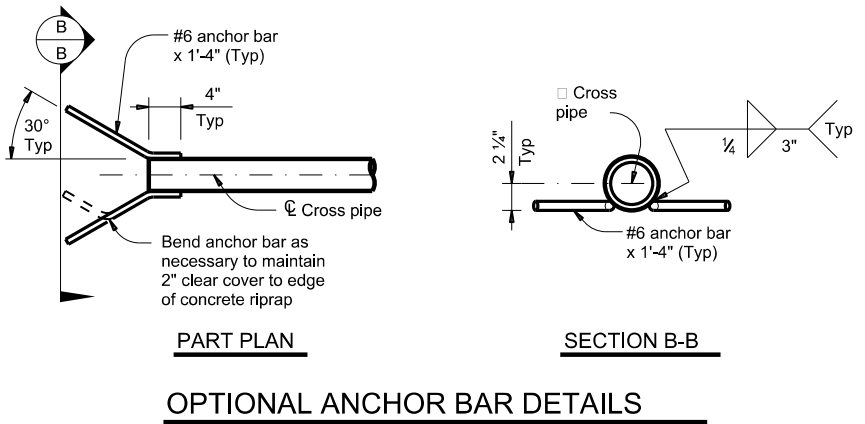
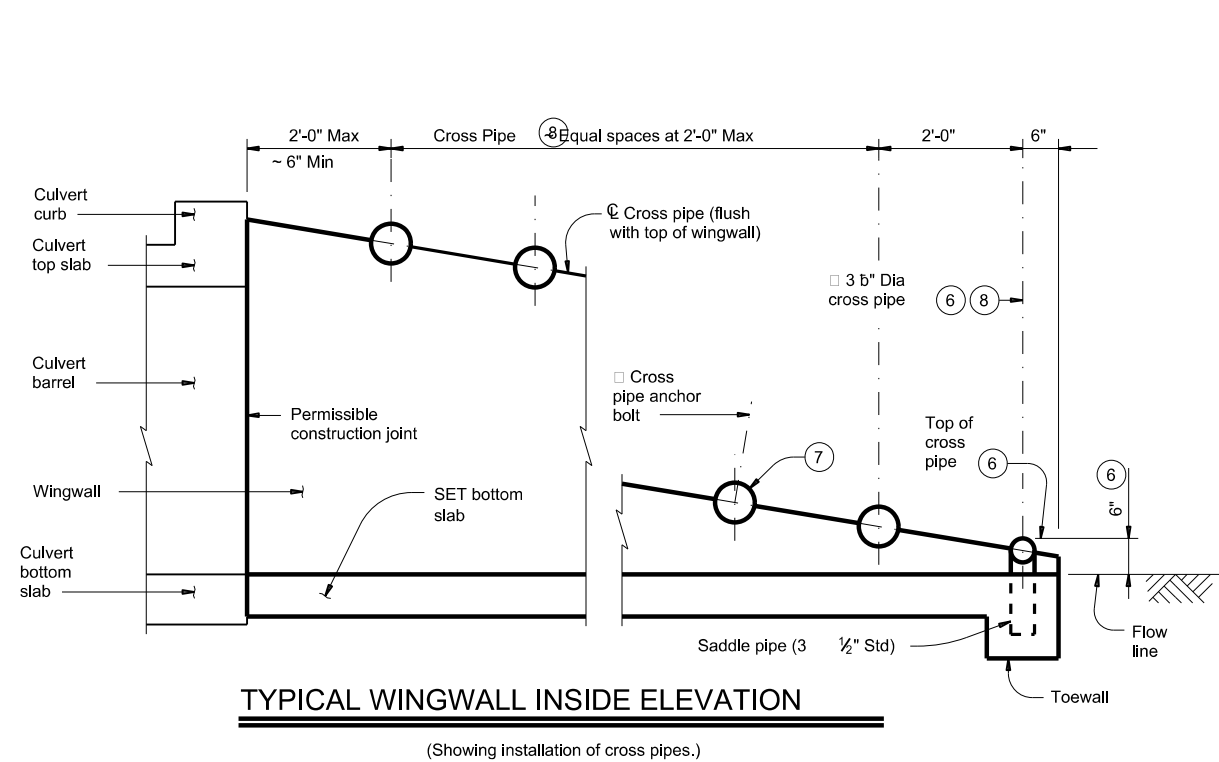
Bridge Division Standard

SAFETY END TREATMENT FOR BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ PARALLEL DRAINAGE

SETB-PD

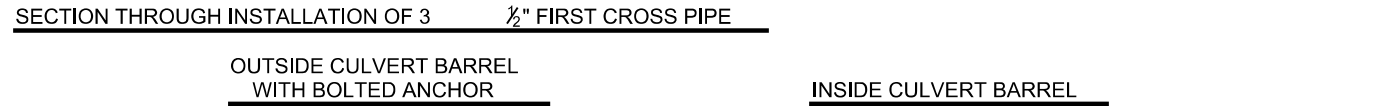
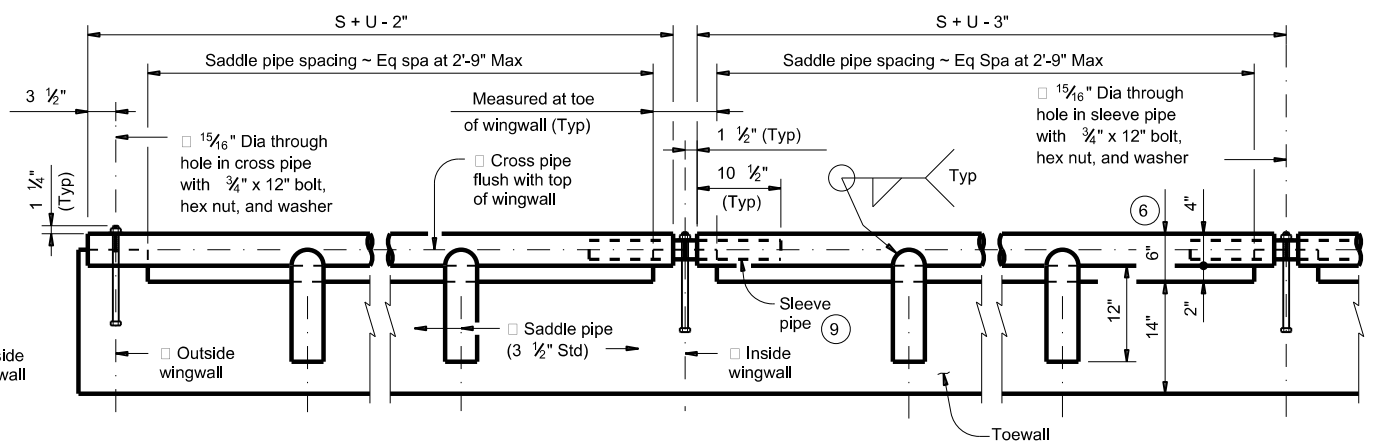
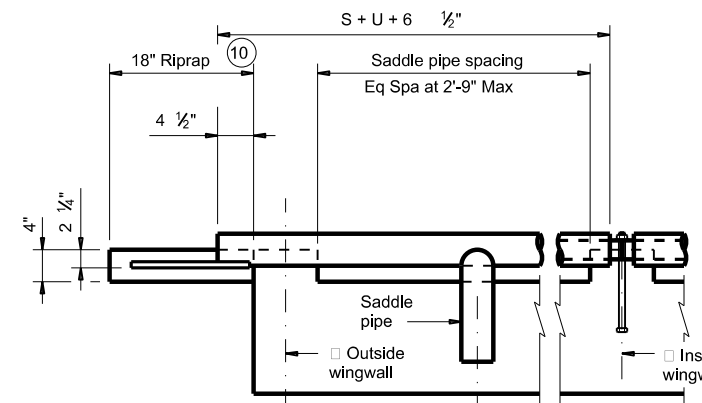
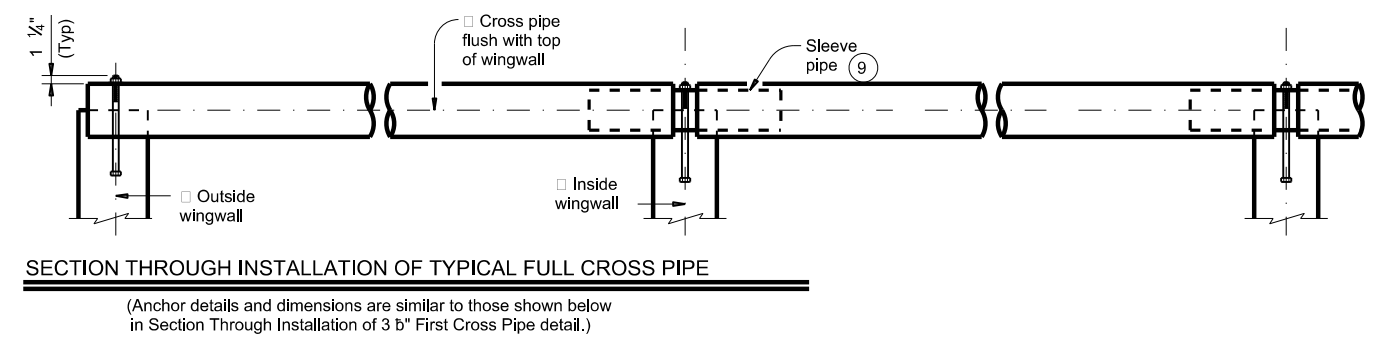
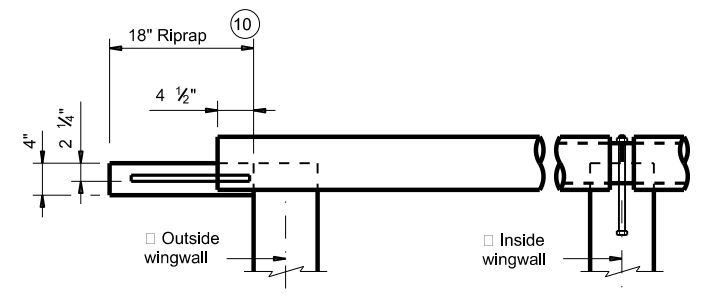
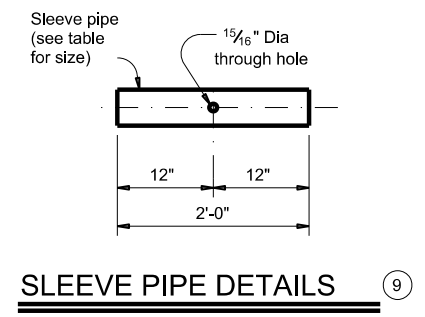
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REQUIRED PIPE SIZES (8)			STANDARD PIPE SIZES		
Culvert Span Sizes	Cross Pipe Size	Sleeve Pipe Size (9)	Pipe Size	Pipe O.D.	Pipe I.D.
First Pipe	3 1/2" STD	2 1/2" STD	2 1/2" STD	2.875"	2.469"
30" to 42"	4" STD	3" STD	3" STD	3.500"	3.068"
48" to 72"	5" STD	4" STD	3 1/2" STD	4.000"	3.548"
78" to 120"	6" STD	5" STD	4" STD	4.500"	4.026"
			5" STD	5.563"	5.047"
			6" STD	6.625"	6.065"

- 6 The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe at no more than 6" above the flow line.
- 7 Always install the third cross pipe from the bottom of the culvert using a bolted connection. Take care to ensure that concrete does not flow into this cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.
- 8 Provide cross pipes and sleeve pipes (if required) as shown in the Required Pipe Sizes table. Provide 3 1#2" saddle pipes for the 3 1#2" first cross pipe.
- 9 At Contractor's option, make the cross pipe continuous across the inside wingwalls. If this option is selected, omit the sleeve pipe and make a 15#16" diameter through hole in the cross pipe to accept the anchor bolt at the centerline of each interior wingwall.
- 10 Provide riprap when using the Optional Anchor Bar details. Riprap is included in the bid price for Safety End Treatment. Provide riprap in accordance with Item 432, "Riprap".

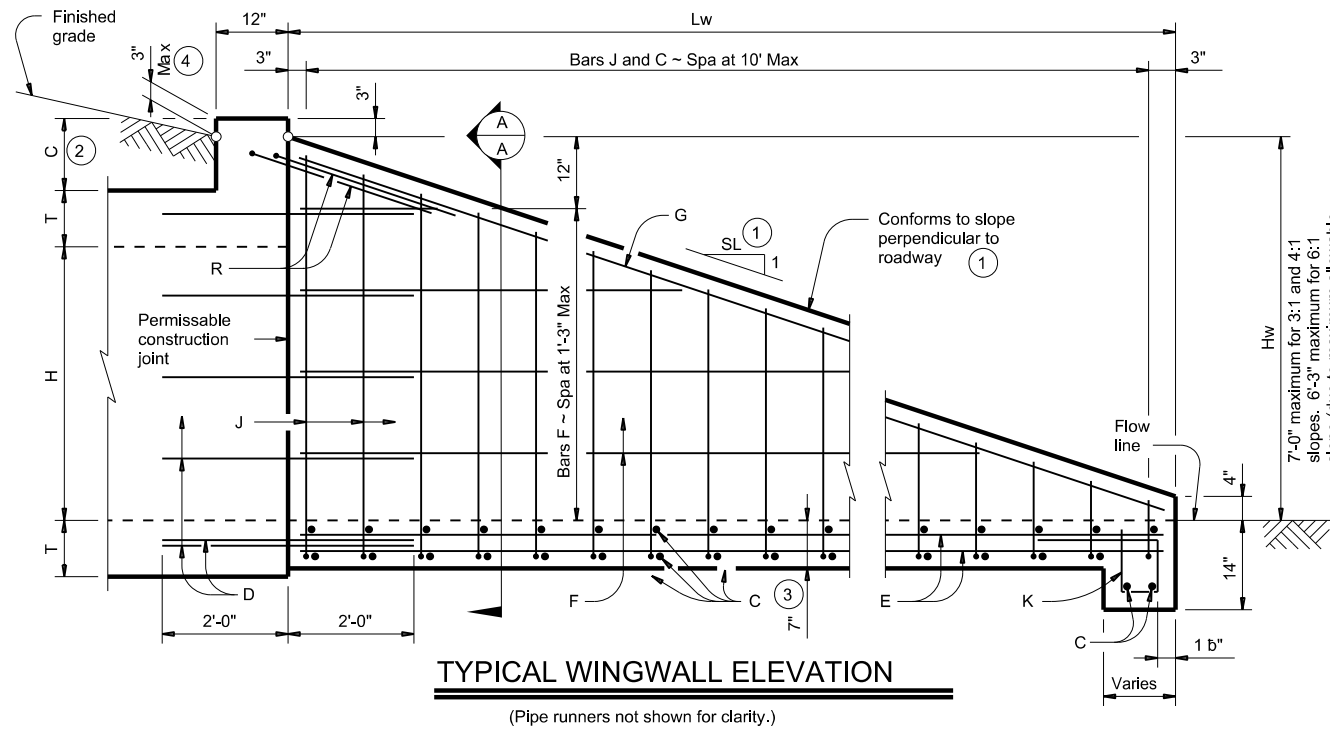


CROSS PIPE INSTALLATION DETAILS

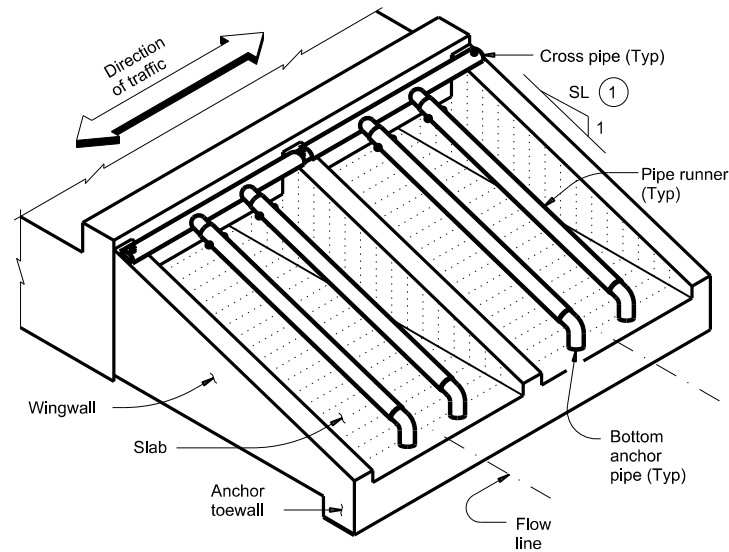
SHEET 2 OF 2

		Bridge Division Standard	
SAFETY END TREATMENT FOR BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ PARALLEL DRAINAGE			
SETB-PD			
FILE: setbpdse-20.dgn	DN: GAF	CK: CAT	DW: TXDOT
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TYPICAL WINGWALL ELEVATION
(Pipe runners not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

WING DIMENSION CALCULATIONS:

$$Hw = H + T + C - 0.25'$$

$$Lw = (Hw - 0.333') (SL)$$

For cast-in-place culverts:
 $Atw = (N) (S) + (N + 1) (U)$

For precast culverts:
 $Atw = (N) (2U + S) + (N - 1) (0.500')$

Total Wingwall Area (SF)
 $= (0.5) (Hw + 0.333') (Lw) (N + 1)$

Total Concrete Volume (CY)
 $= [(Wingwall Area) (0.583') + (Lw) (Atw) (0.583') + (Atw) (1.167') (1.167' - 0.583')] + (27)$

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length
 $= (Lw) (K1) (1.917')$

Total Reinforcing (Lb)
 $= (1.55) (Lw) (Atw) + (4.43) (Atw) + (K2) (Hw) (N + 1) (Lw)$

C = Height of curb above top of top slab (feet)
 Hw = Height of wingwall (feet)
 K = Constant value for use in formulas
 Slope SL: 1 K1 K2
 3:1 ~ 1.054 ~ 7.45
 4:1 ~ 1.031 ~ 8.49
 6:1 ~ 1.014 ~ 10.30
 Atw = Anchor toewall length (feet)
 Lw = Length of wingwall (feet)
 N = Number of culvert barrels
 SL: 1 = Side slope ratio (horizontal : 1 vertical)

See applicable box culvert standard for H, S, T, and U values.

MATERIAL NOTES:

- Provide Grade 60 reinforcing steel.
- Provide galvanized reinforcing steel if required elsewhere in the plans.
- Adjust reinforcing as necessary to provide a minimum clear cover of 1 1/2".
- Provide Class "C" concrete (f'c = 3,600 psi).
- Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
- Provide ASTM A307 bolts.
- Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.
- Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".

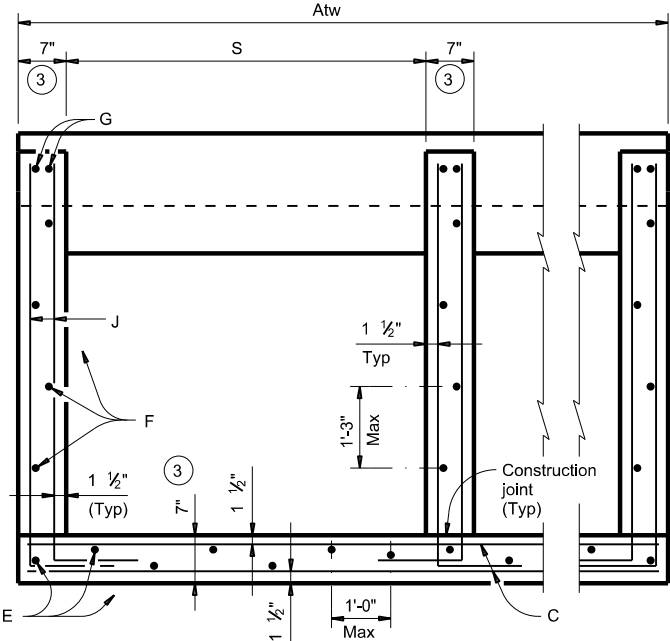
GENERAL NOTES:

- Designed according to AASHTO LRFD Bridge Design Specifications.
- The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
- Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
- The quantities for pipe runners, reinforcing steel, and concrete resulting from the formulas given herein are for Contractor's information only.
- See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
- Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

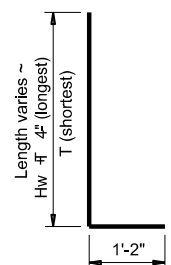
SHEET 1 OF 2

			Bridge Division Standard	
SAFETY END TREATMENT FOR 0° SKEW BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ CROSS DRAINAGE				
SETB-CD				
FILE: setbdse-20.dgn	DN: GAF	CK: CAT	DW: TXDOT	CK: TXDOT
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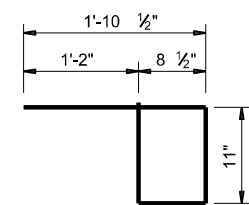


SECTION A-A

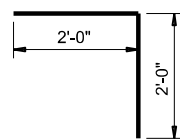
(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)



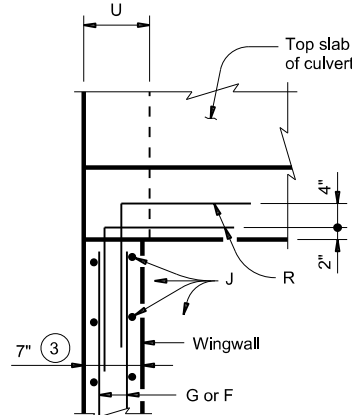
BARS J



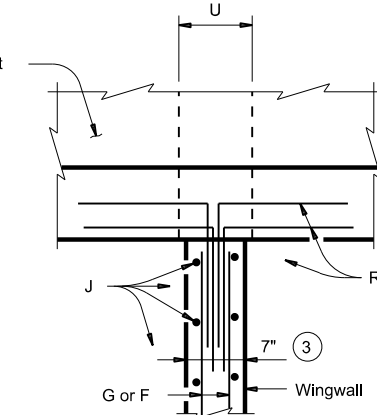
BARS K
(Length = 4'-3")



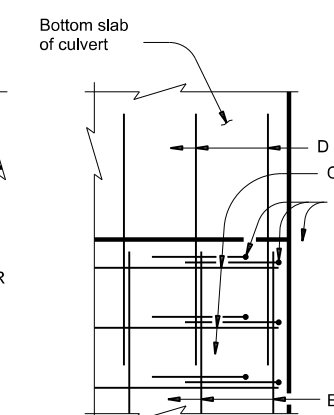
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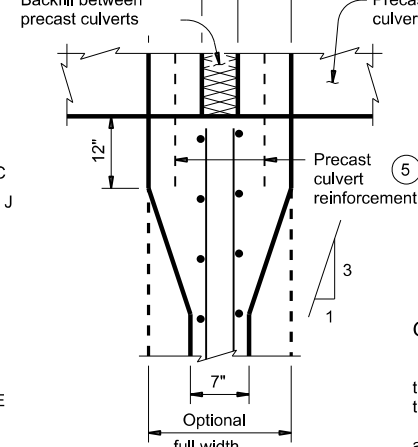
AT TOP OF EXTERIOR WINGWALL
(Cast-in-place culvert)



AT TOP OF INTERIOR WINGWALL
(Cast-in-place culvert)



AT OUTSIDE OF BOTTOM SLAB
(Cast-in-place culvert)



AT INTERIOR WINGWALL
(Precast culvert)

PLAN VIEWS OF CORNER DETAILS

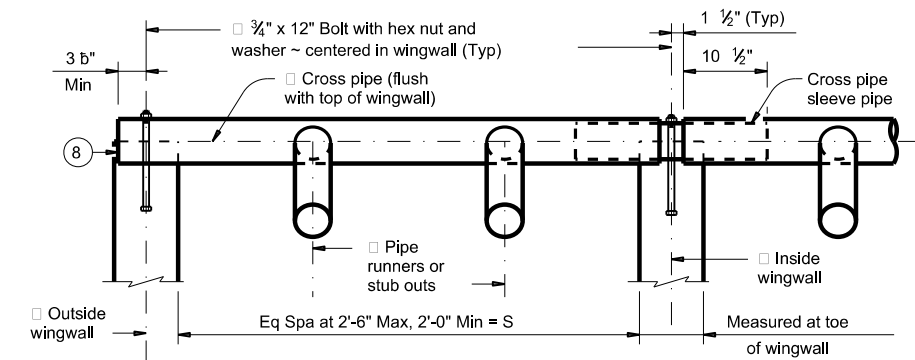
- Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.
- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet.
- Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.
- For vehicle safety, reduce curb height, if necessary, to provide a maximum 3" projection. No changes will be made in quantities and no additional compensation will be allowed for this work.
- For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall Bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.

TABLE OF REINFORCING BAR SIZES AND SPACING

Bar	Size	Spacing
C	#4	10' Max
D	#4	Match F and E
E	#4	1'-0" Max
F	#4	1'-3" Max
G	#6	As shown
J	#4	10' Max
K	#4	1'-0" Max
R	#4	As shown

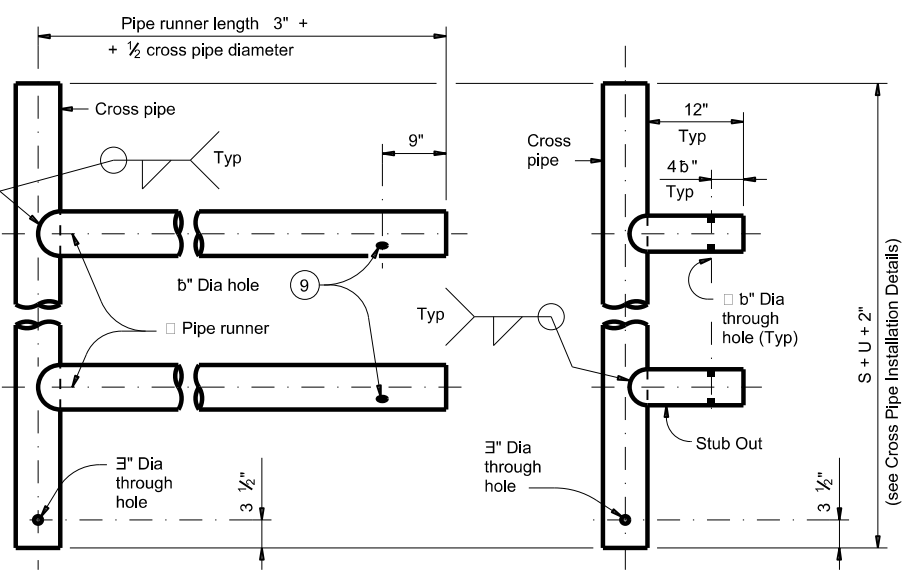
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 ODA Design Project 10760037 SETB-CD-20.dgn
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- ⑥ Cross pipe is the same size as the pipe runner. Cross pipe stub out is the same size as the anchor pipe.
- ⑦ Note that actual slope of safety pipe runner may vary slightly from side slope.
- ⑧ Take care to ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.
- ⑨ After installation, inspect the 1#2" hole to ensure that the lap of the safety pipe runner with the bottom anchor pipe is adequate.
- ⑩ At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

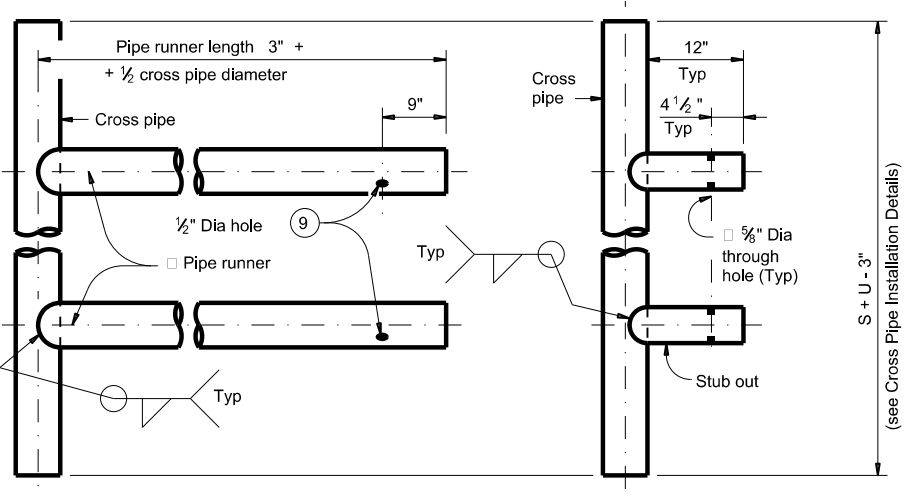


NOTE: At Contractor's option, make the cross pipe continuous across the inside wingwalls. If option is selected, omit the sleeve pipe and make a 3" diameter through hole in the cross pipe to accept the anchor bolt at the centerline of each inside wingwall.

CROSS PIPE INSTALLATION DETAILS

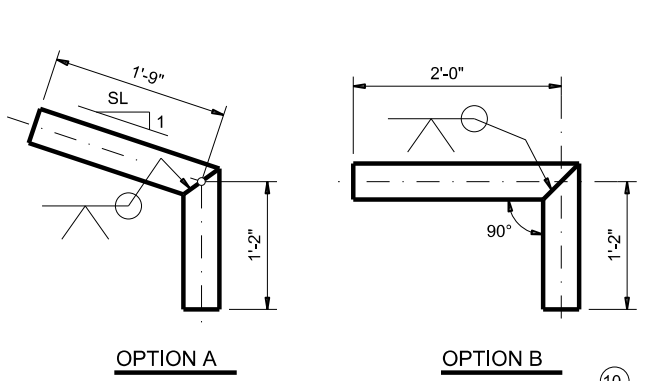


FOR USE IN OUTSIDE CULVERT BAY



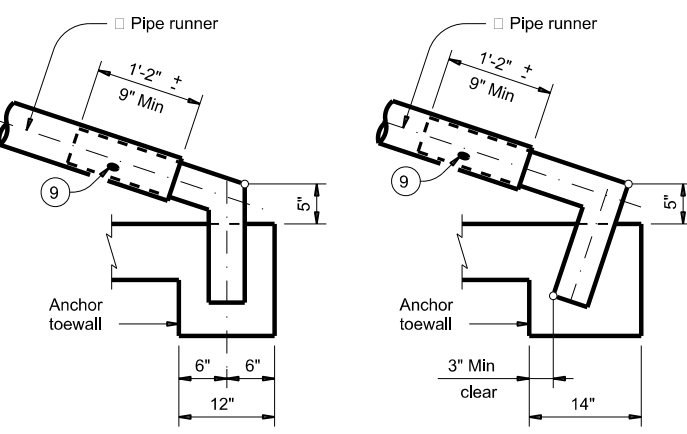
FOR USE IN INSIDE CULVERT BAY

CROSS PIPE AND CONNECTIONS DETAILS



OPTION A OPTION B

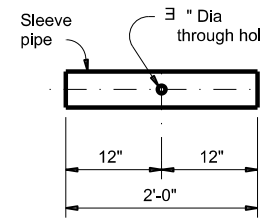
BOTTOM ANCHOR PIPE DETAILS



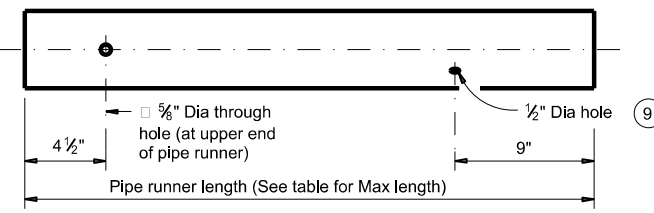
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Wingwall not shown for clarity.)



CROSS PIPE SLEEVE PIPE DETAILS

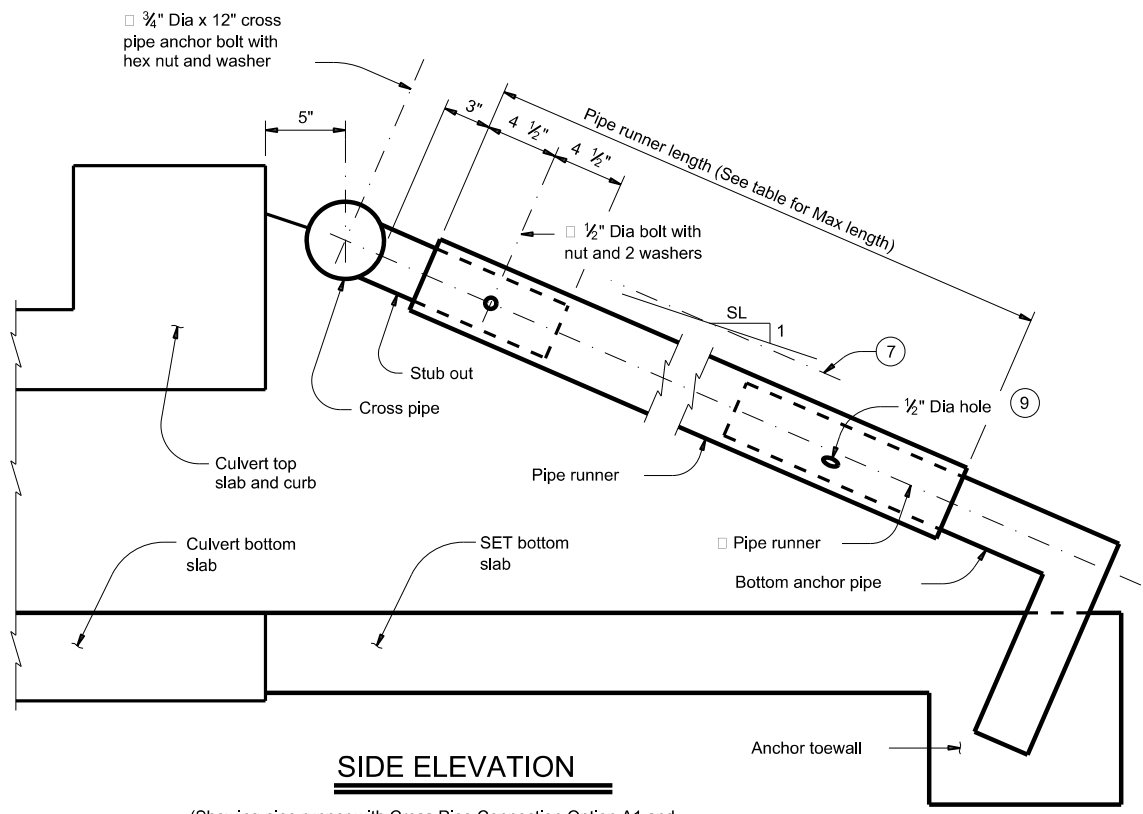


NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

MAXIMUM PIPE RUNNER LENGTHS AND REQUIRED PIPE RUNNER AND ANCHOR PIPE SIZES

Maximum Pipe Runner Length	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
10'-0"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'-8"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
34'-2"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"



SIDE ELEVATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Bottom Anchor Toewall Option B2. Wingwall not shown for clarity.)

SHEET 2 OF 2

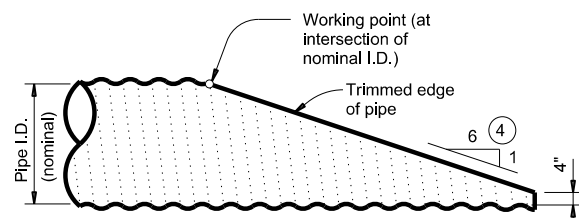
Texas Department of Transportation
 Bridge Division Standard

SAFETY END TREATMENT
 FOR 0° SKEW BOX CULVERTS
 (MAXIMUM Hw = 7'-0")
 TYPE I ~ CROSS DRAINAGE

SETB-CD

FILE: setbdse-20.dgn	DN: GAF	CK: CAT	DW: TXDOT	CK: TXDOT
©TxDOT February 2020	CONT: 0076	SECT: 06	JOB: 037	HIGHWAY: US 67
REVISIONS	DIST: ODA	COUNTY: UPTON	SHEET NO. 205	

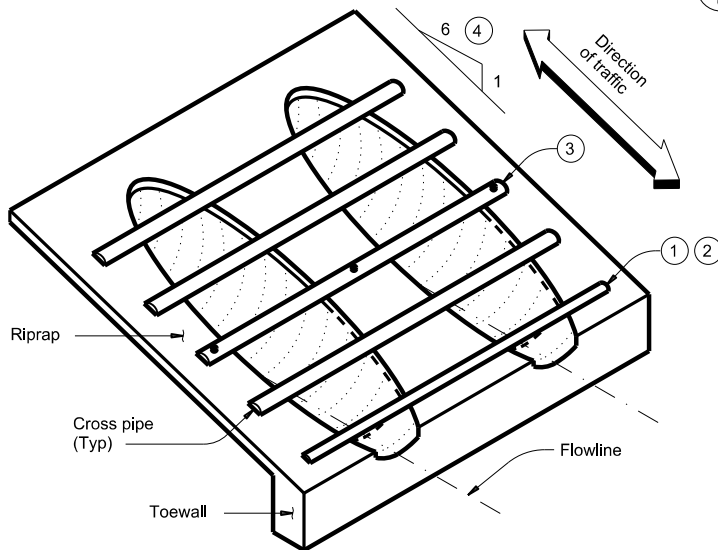
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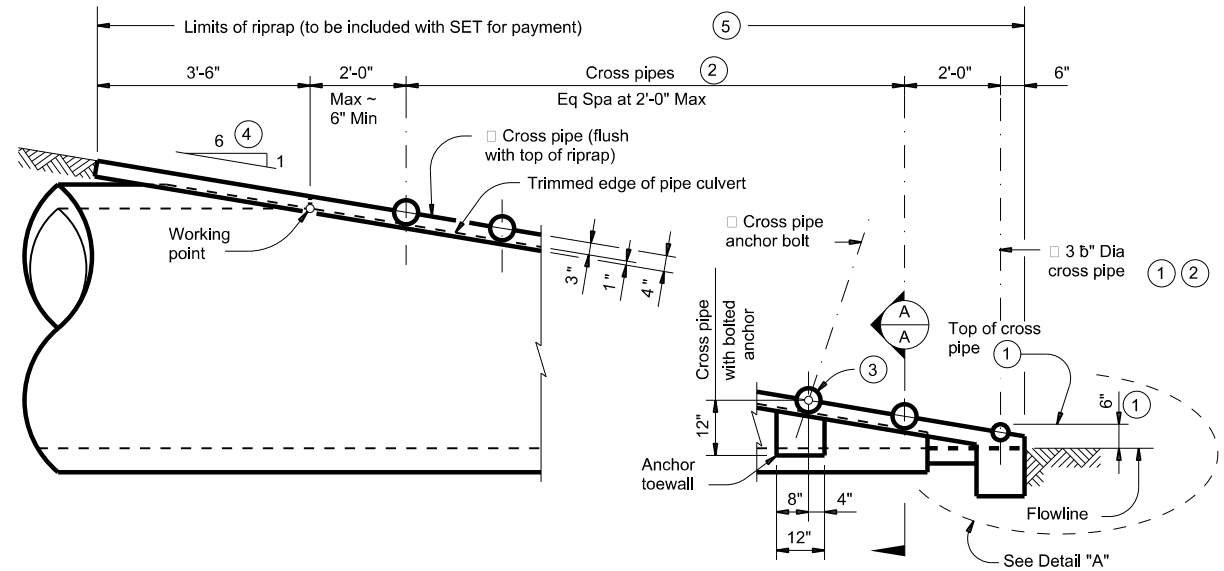
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details at reinforced concrete pipe (RCP) culvert are similar.)

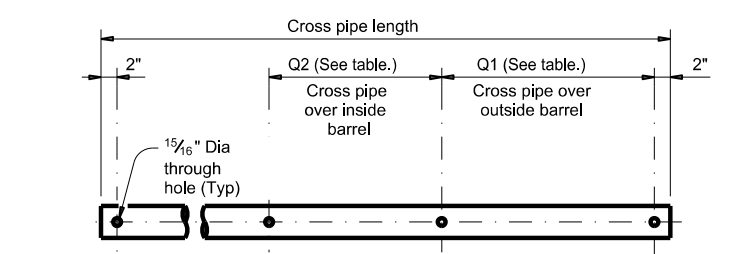


ISOMETRIC VIEW OF TYPICAL INSTALLATION

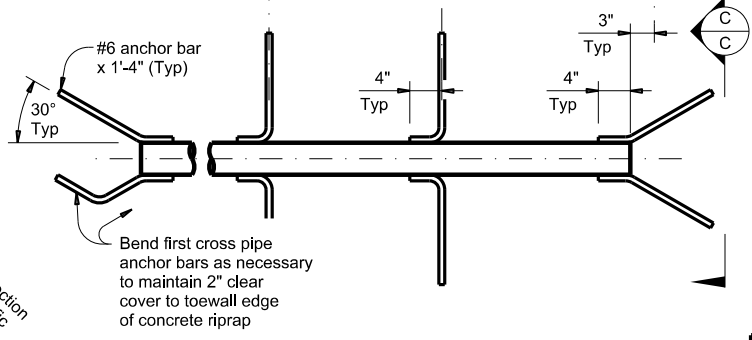


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

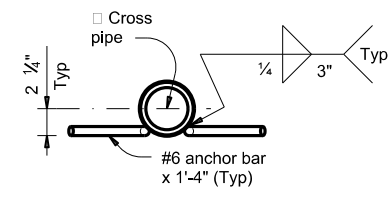
(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



PIPE WITH BOLTED ANCHOR

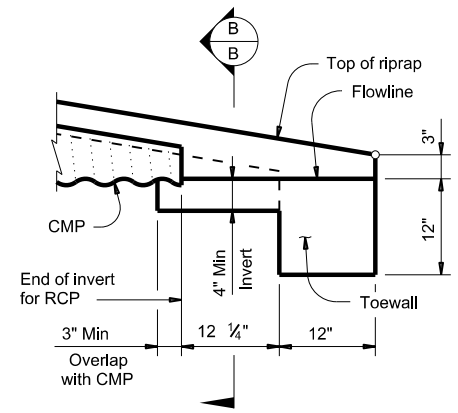


PIPE WITH ANCHOR BARS



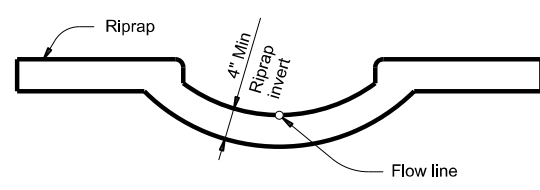
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

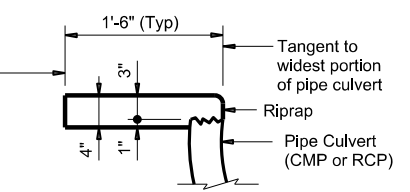
(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



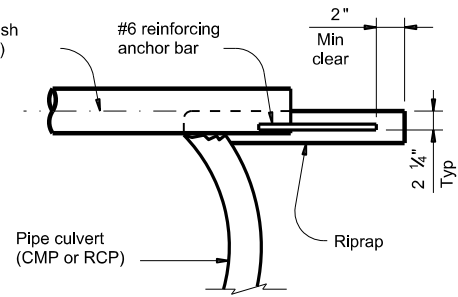
SECTION B-B

(Cross pipes not shown for clarity.)

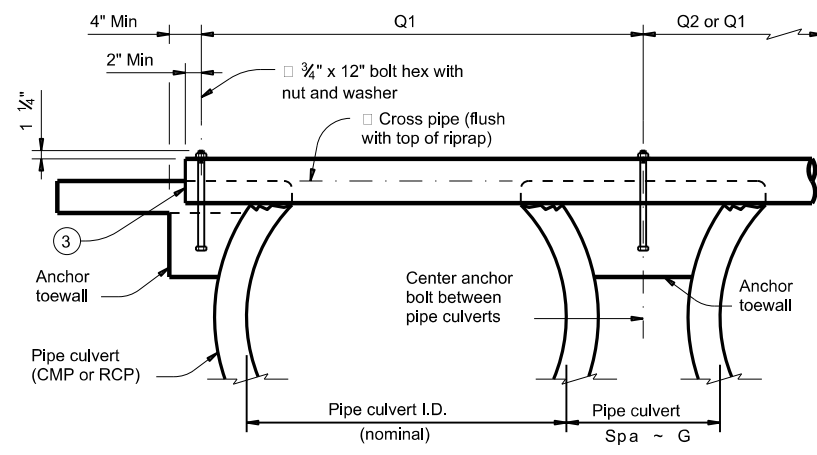
Limits of riprap (to be included with SET for payment) 5



SHOWING TYPICAL PIPE CULVERT AND RIPRAP



SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"		
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	3 1/2" Std (4.000" O.D.)
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"	All pipe culverts	5" Std (5.563" O.D.)
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

- The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.
- Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1/2" standard pipe (4" O.D.) for the first bottom pipe.
- Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.
- Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.
- Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".
- Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52. Provide ASTM A307 bolts and nuts. Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981. Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes. Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap". Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

Bridge Division Standard

SAFETY END TREATMENT
FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

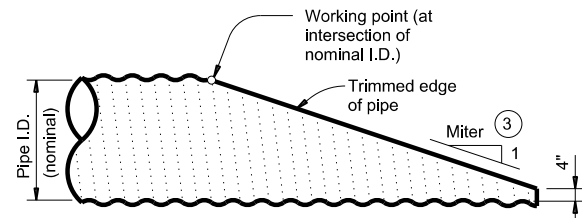
SETP-PD

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©TXDOT	February 2020	CON: 0076	SECT: 06	HIGHWAY: 037
REVISIONS		0076	06	US 67
		DIST: ODA	COUNTY: UPTON	SHEET NO: 206

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS

① ②

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' - 7"	3' - 5"	N/A	N/A	N/A	5' - 10"	N/A	N/A	N/A	8' - 1"	N/A	N/A	N/A	12' - 9"
27"	1' - 8"	3' - 8"	N/A	N/A	5' - 5"	6' - 11"	N/A	N/A	7' - 7"	9' - 7"	N/A	N/A	11' - 11"	14' - 11"
30"	1' - 10"	3' - 11"	N/A	N/A	6' - 4"	8' - 0"	N/A	N/A	8' - 9"	11' - 0"	N/A	N/A	13' - 8"	17' - 0"
33"	1' - 11"	4' - 2"	6' - 2"	6' - 5"	7' - 3"	9' - 1"	8' - 6"	8' - 10"	10' - 0"	12' - 5"	13' - 3"	13' - 9"	15' - 5"	19' - 2"
36"	2' - 1"	4' - 5"	6' - 11"	7' - 3"	8' - 2"	10' - 2"	9' - 6"	9' - 11"	11' - 2"	13' - 10"	14' - 9"	15' - 3"	17' - 2"	21' - 3"
42"	2' - 4"	4' - 11"	8' - 6"	8' - 10"	9' - 11"	12' - 4"	11' - 7"	12' - 0"	13' - 6"	16' - 8"	17' - 9"	18' - 5"	20' - 8"	25' - 7"
48"	2' - 7"	5' - 5"	10' - 1"	10' - 5"	11' - 9"	N/A	13' - 7"	14' - 2"	15' - 10"	N/A	20' - 9"	21' - 6"	24' - 2"	N/A
54"	3' - 0"	5' - 11"	11' - 8"	12' - 1"	N/A	N/A	15' - 8"	16' - 3"	N/A	N/A	23' - 10"	24' - 8"	N/A	N/A
60"	3' - 3"	6' - 5"	13' - 3"	N/A	N/A	N/A	17' - 9"	N/A	N/A	N/A	26' - 10"	N/A	N/A	N/A



NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details of reinforced concrete pipe (RCP) culvert are similar.)

TYPICAL PIPE CULVERT MITERS

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS

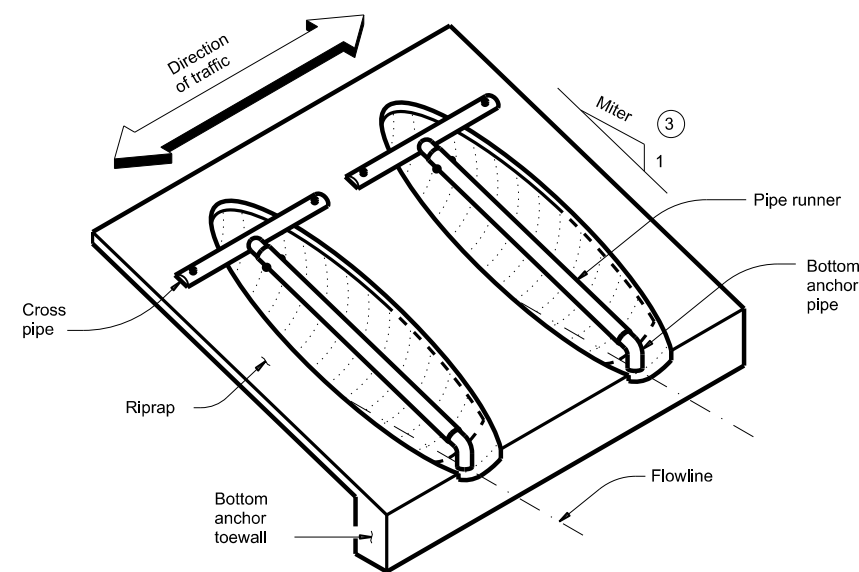
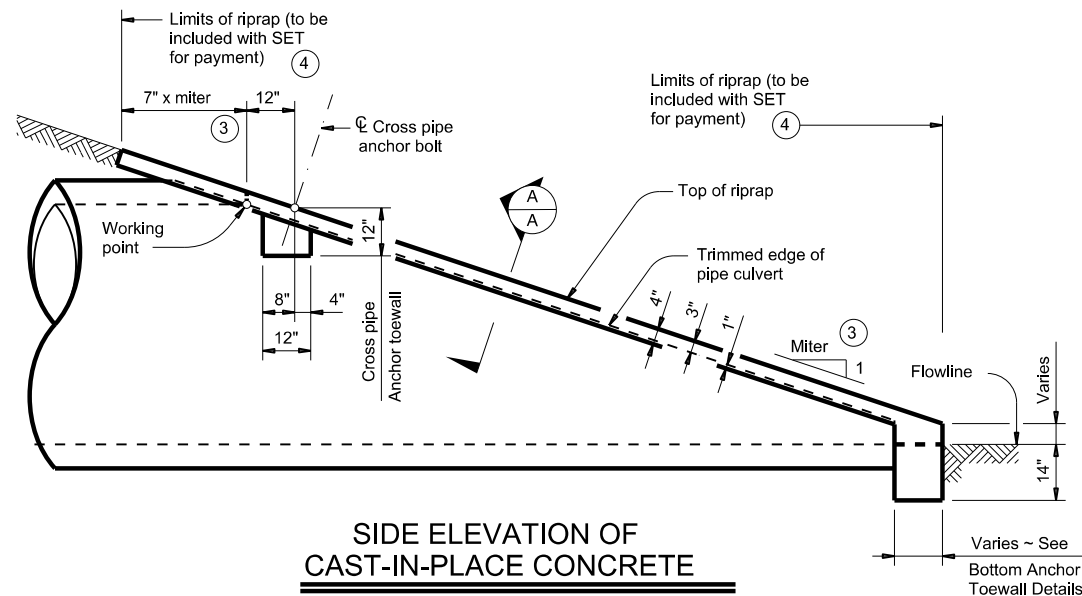
Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' - 0"
4" STD	4.500"	4.026"	19' - 8"
5" STD	5.563"	5.047"	34' - 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details of corrugated metal pipe (CMP) culvert are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

① Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

② This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

- For 60" culvert pipes, the skew must not exceed 0°.
- For 54" culvert pipes, the skew must not exceed 15°.
- For 48" culvert pipes, the skew must not exceed 30°.
- For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

③ Miter = slope of mitered end of pipe culvert.

④ Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

⑤ Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

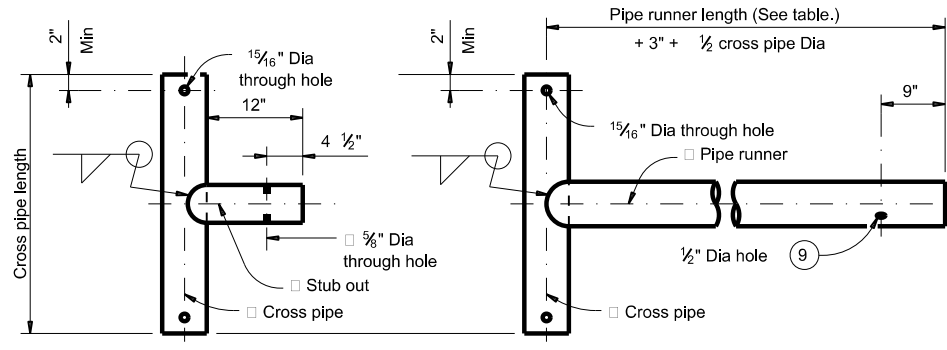
SHEET 1 OF 2

Texas Department of Transportation
 Bridge Division Standard
SAFETY END TREATMENT
 FOR 12" DIA TO 60" DIA
 PIPE CULVERTS
 TYPE II ~ CROSS DRAINAGE
SETP-CD

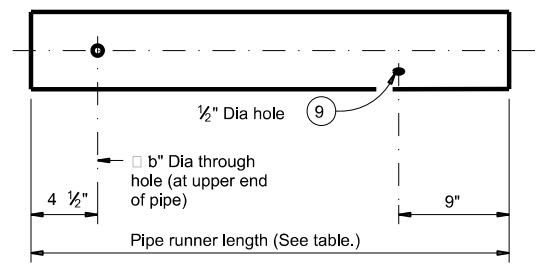
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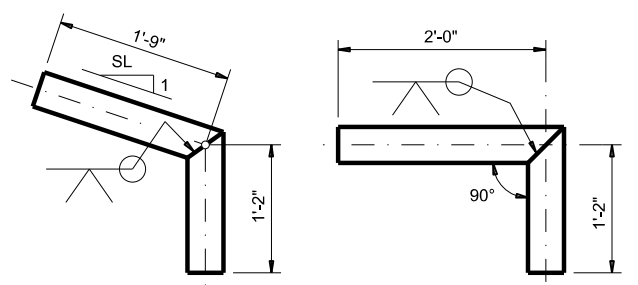


OPTION A1
 OPTION A2
CROSS PIPE AND CONNECTIONS DETAILS

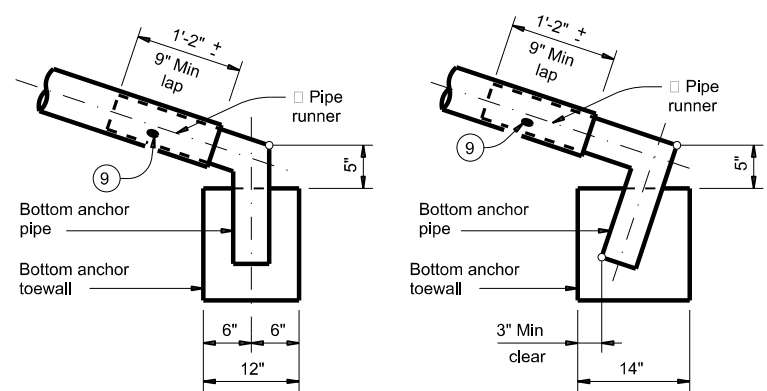


NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

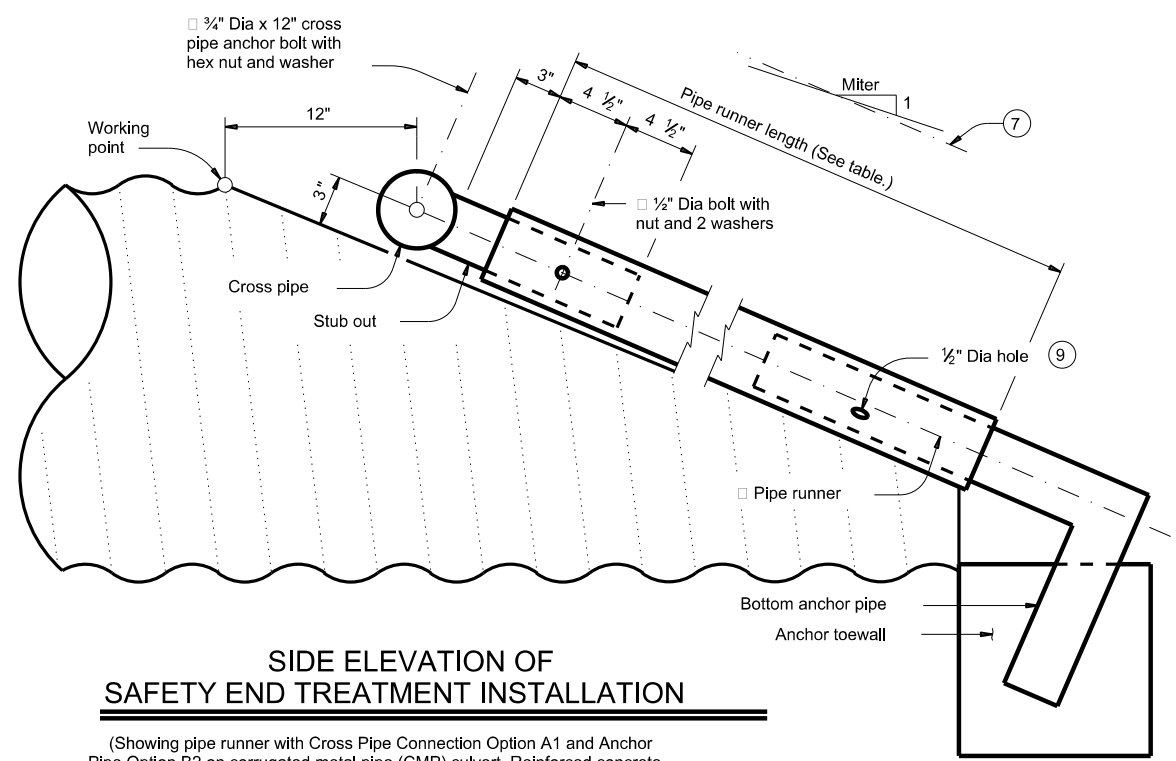
PIPE RUNNER DETAILS



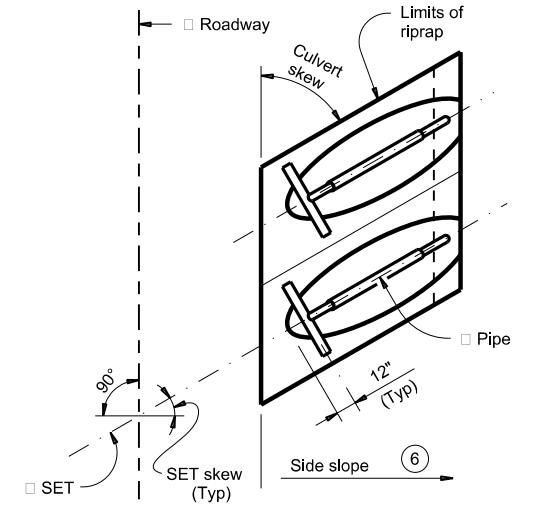
OPTION B1
 OPTION B2
BOTTOM ANCHOR PIPE DETAILS ⑩



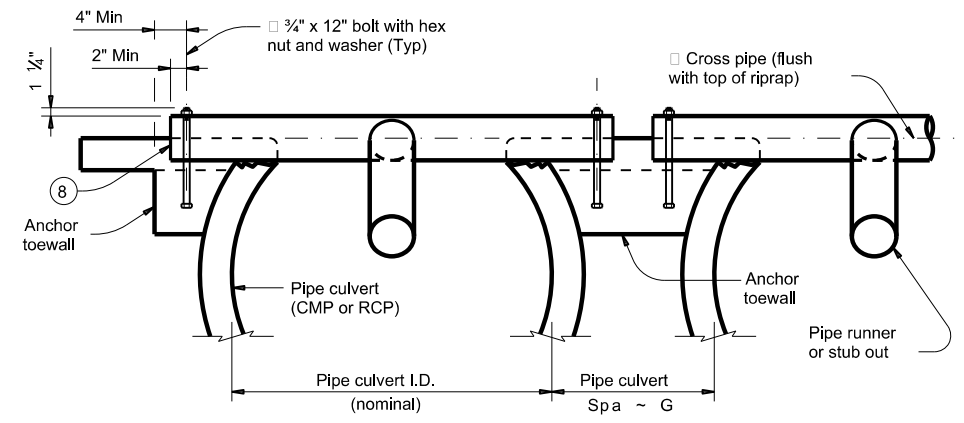
OPTION B1
 OPTION B2
BOTTOM ANCHOR TOEWALL DETAILS
 (Culvert and riprap not shown for clarity.)



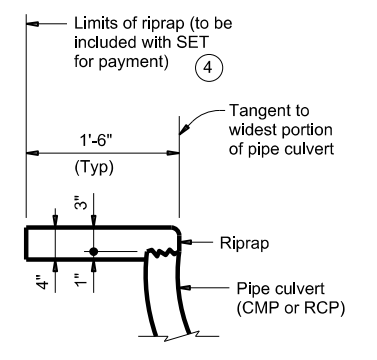
SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION
 (Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity.)



PLAN OF SKEWED INSTALLATION



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

- ④ Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".
- ⑥ Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.
- ⑦ Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.
- ⑧ Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.
- ⑨ After installation, inspect the 1/2 inch hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.
- ⑩ At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:
 Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
 Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
 Provide ASTM A307 bolts and nuts.
 Galvanize all steel components, except concrete reinforcing, after fabrication.
 Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:
 Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
 Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
 Payment for riprap and toewall is included in the price bid for each safety end treatment.
 Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

SHEET 2 OF 2

		Bridge Division Standard	
SAFETY END TREATMENT FOR 12" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE			
SETP-CD			
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TABLE OF DIMENSIONS AND REINFORCING STEEL (Wings for one structure end)										
Maximum Wingwall Height Hw	Dimensions				Variable Reinforcing				Estimated Quantities per ft of wing length (2-wings)	
	W	X	Y	Z	Bars J1		Bars J2		Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING (2-wings)			
Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES			
Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION FORMULAS:
(All values are in feet.)

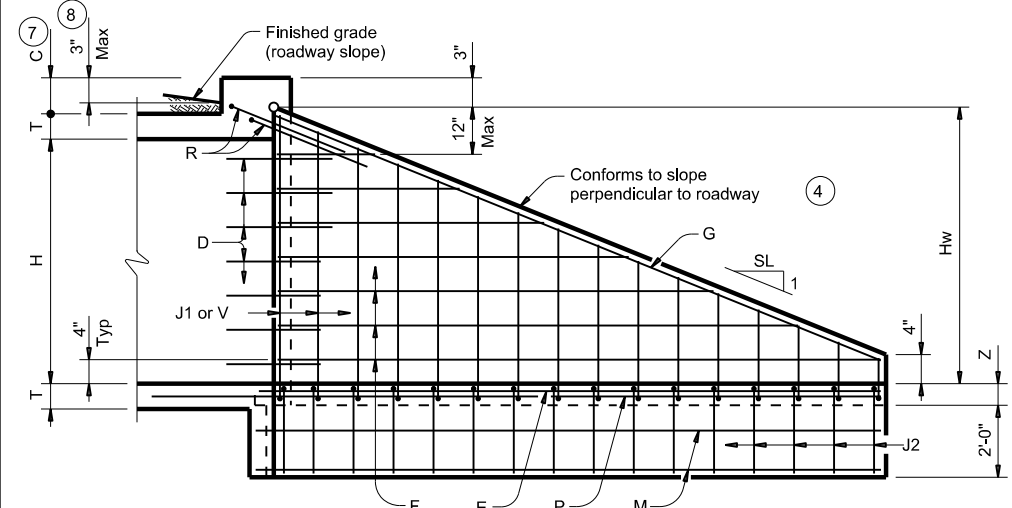
$H_w = H + T + C - 0.250'$
 $A = (H_w - 0.333') (SL)$
 $B = (A) \tan(30^\circ)$
 $L_w = (A) + \cosine(30^\circ)$

For cast-in-place culverts:
 $L_{tw} = (N) (S) + (N + 1) (U)$

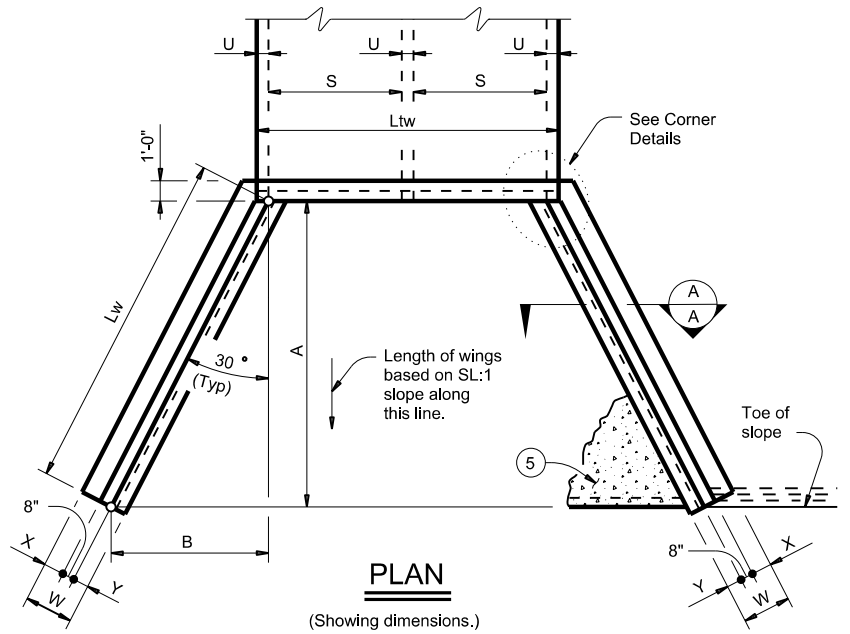
For precast culverts:
 $L_{tw} = (N) (2U + S) + (N - 1) (0.5')$

Total wingwall area (two wings - SF) = $(H_w + 0.333') (L_w)$

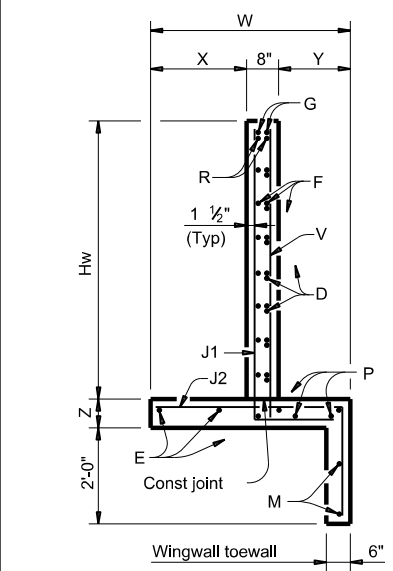
H_w = Height of wingwall
 $SL:1$ = Side slope ratio (horizontal:1 vertical)
 L_w = Length of wingwall
 L_{tw} = Culvert toewall length
 N = Number of culvert spans
 See applicable box culvert standard sheet for H, S, T, and U values.



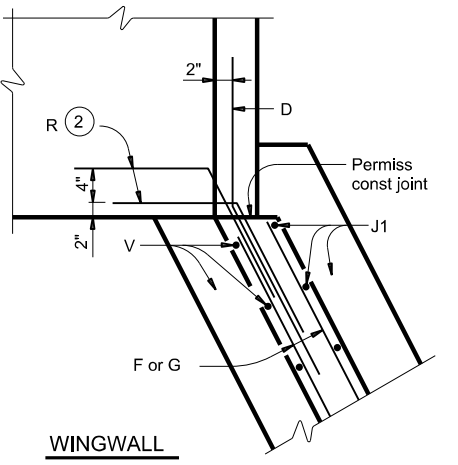
INSIDE ELEVATION
(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)



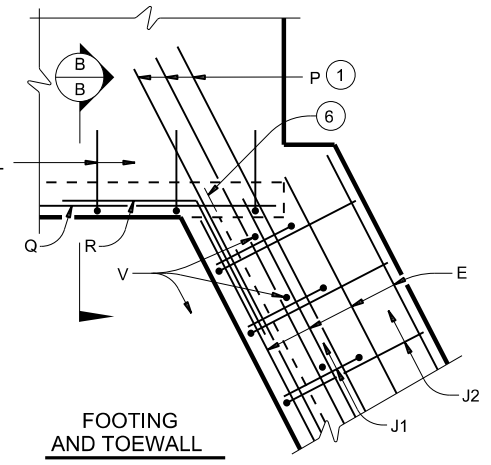
PLAN
(Showing dimensions.)



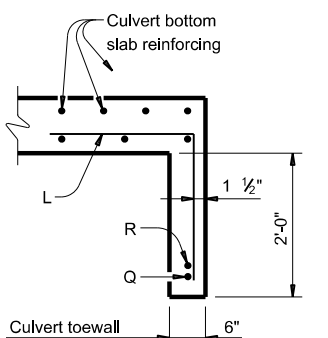
SECTION A-A



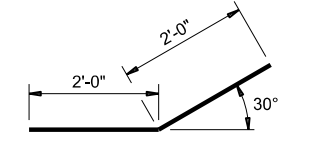
CORNER DETAILS
(Culvert and culvert toewall reinforcing not shown for clarity.)



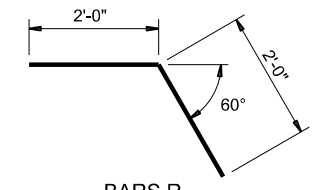
FOOTING AND TOEWALL



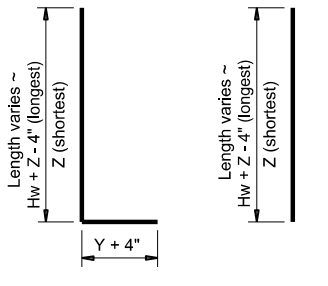
SECTION B-B



BARS D

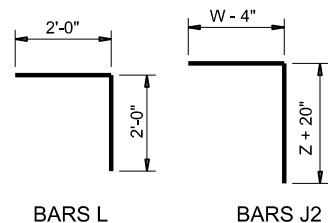


BARS R



BARS J1

BARS V



BARS L

BARS J2

- Extend Bars P 3'-0" minimum into bottom slab of box culvert.
- Adjust as necessary to maintain 1 #2" clear cover and 4" minimum between bars.
- Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by L_w .
- Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.
- When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.
- At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.
- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade.
 Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

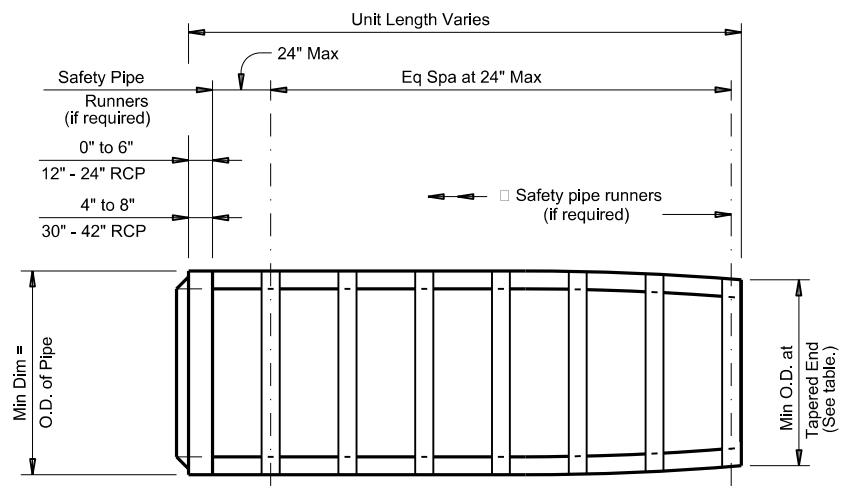
MATERIAL NOTES:
 Provide Class C concrete ($f_c=3,600$ psi).
 Provide Grade 60 reinforcing steel.
 Provide galvanized reinforcing steel if required elsewhere in the plans.
 In riprap concrete synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
 See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
 The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing dimensions are out-to-out of bars.

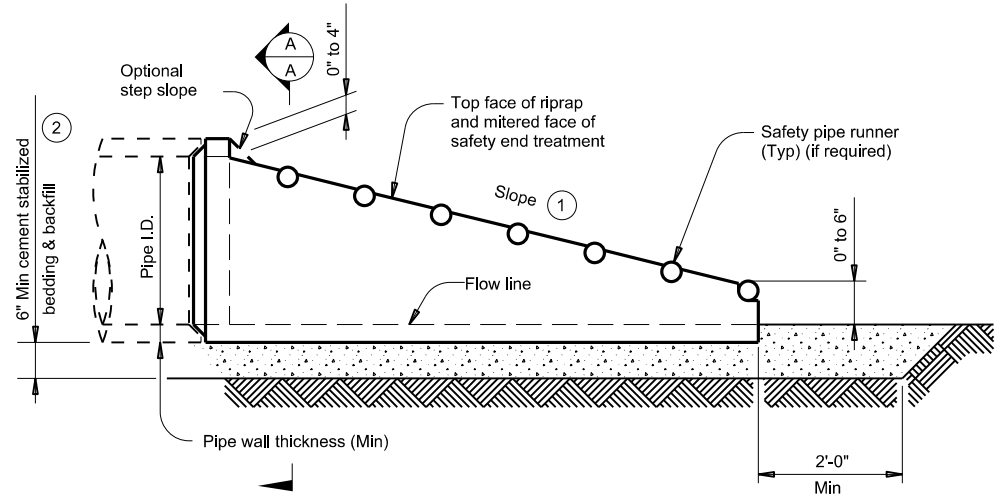
				Bridge Division Standard	
CONCRETE WINGWALLS WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS					
FW-0					
FILE:	fw-0side-20.dgn	DN:	GAF	CK:	CAT
©/TxDOT	February 2020	CON:	0076 06	JOB:	037
REVISIONS		SECT:		HIGHWAY:	US 67
		DIST:	ODA	COUNTY:	UPTON
				SHEET NO.:	209

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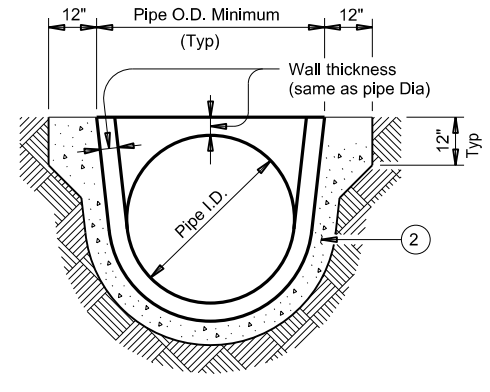
PLAN VIEW - 12" THRU 24"

(Showing spigot end connection.)

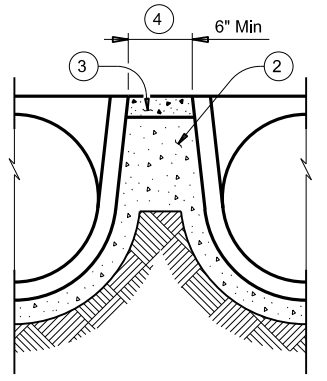


LONGITUDINAL ELEVATION - 12" THRU 24"

(Showing spigot end connection.)

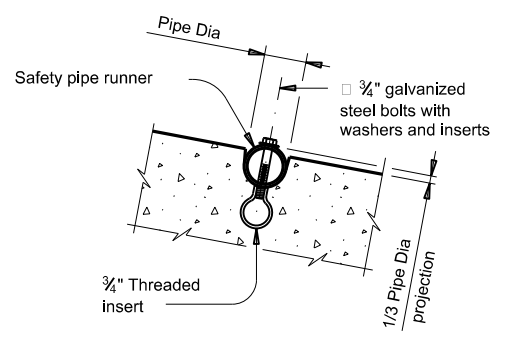


SECTION A-A



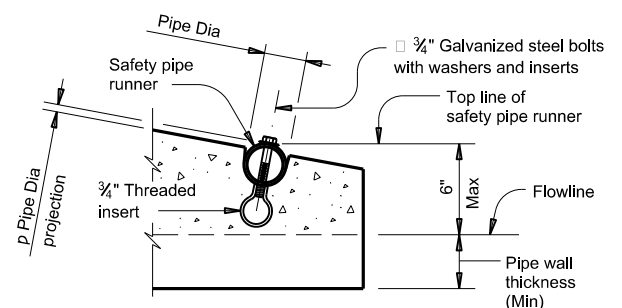
MULTIPLE PIPE INSTALLATION

- ① Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.
Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.
- ③ Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".
- ④ Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.
- ⑤ Safety pipe runners are required for multiple pipe culverts with more than two pipes.

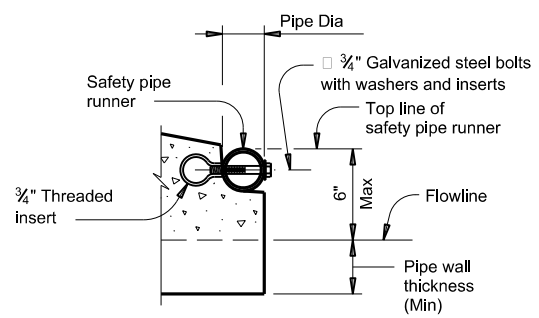


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. per ft. of Pipe)	Max Slope	Min Length of Unit	Pipe Runner Requirements		Required Pipe Runner Sizes		
							Single Pipe	Multiple Pipe	Nominal Dia	O.D.	I.D.
12"	2"	16"	16"	0.07 Circ.	6:1	4' - 0"	No	⑤	3" STD	3.500"	3.068"
15"	2 1/4"	19 1/2"	19"	0.07 Circ.	6:1	5' - 8"	No	⑤	3" STD	3.500"	3.068"
18"	2 1/2"	23"	21 1/2"	0.07 Circ.	6:1	7' - 3"	No	⑤	3" STD	3.500"	3.068"
24"	3"	30"	27"	0.07 Circ.	6:1	10' - 6"	No	⑤	3" STD	3.500"	3.068"
30"	3 1/2"	37"	31"	0.18 Circ.	6:1	12' - 1"	No	Yes	4" STD	4.500"	4.026"
36"	4"	44"	36"	0.19 Ellip.	6:1	15' - 4"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 1/2"	51"	41 1/2"	0.23 Ellip.	6:1	18' - 7"	Yes	Yes	4" STD	4.500"	4.026"

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
 Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
 Galvanize steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".
 When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.
 Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.
 Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.
 Methods of lifting shall be provided by the manufacturer for ease of loading, unloading and installation.
 Pipe runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

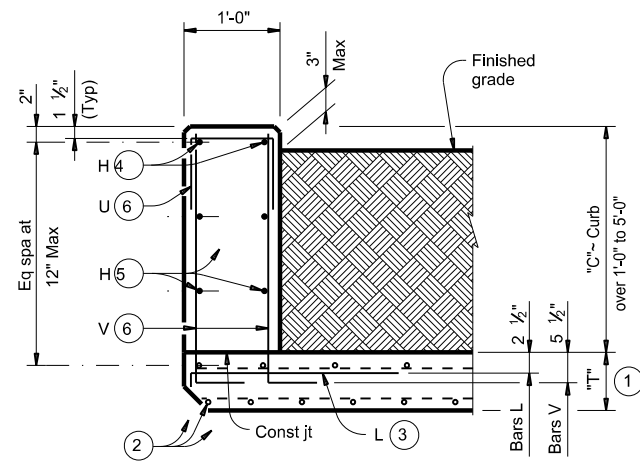
Texas Department of Transportation
Bridge Division Standard

PRECAST SAFETY END TREATMENT
 TYPE II ~ PARALLEL DRAINAGE
 PSET-RP

FILE: psetrps-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076 06	037	US 67	
	DIST	COUNTY	SHEET NO.	
	ODA	UPTON	210	

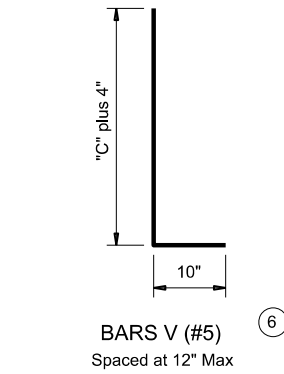
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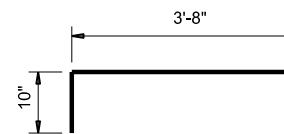


TYPICAL SECTION

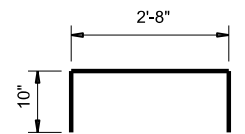
Used for curbs over 1'-0" to 5'-0"



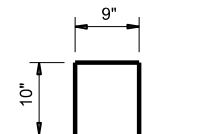
BARS V (#5)
Spaced at 12" Max



BARS L (#5)
Spaced at 12" Max



OPTIONAL BARS L (#5)
Spaced at 12" Max



BARS U (#4)
Spaced at 12" Max

- ① "C" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.
- ② Adjust normal culvert slab bars as necessary to clear obstructions.
- ③ Place bars L as shown. Tilt hook as necessary to maintain cover.
- ④ Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.
- ⑤ Additional bars H(#4) as required to maintain 12" Max spacing.
- ⑥ Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.
- ⑦ Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.
- ⑧ Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES ⑧		
Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'-0"	0.037	10.4
1'-6"	0.056	14.5
2'-0"	0.074	15.6
2'-6"	0.093	18.0
3'-0"	0.111	19.0
3'-6"	0.130	21.3
4'-0"	0.148	22.4
4'-6"	0.167	24.8
5'-0"	0.185	25.9

CONSTRUCTION NOTES:
 Adjust reinforcing steel as necessary to provide 1/4" cover.
 For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:
 Provide Grade 60 reinforcing steel.
 Provide galvanized reinforcing steel if required elsewhere in the plans.
 Provide Class "C" concrete (f'c = 3,600 psi) minimum for curbs.
 Provide bar laps, where required, as follows:
 · Uncoated or galvanized ~ #4 = 1'-8" Min

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.
 This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.

Bridge Division Standard

EXTENDED CURB DETAILS

FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

ECD

FILE: ecdstdel-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076	06	037	US 67
DIST	COUNTY		SHEET NO.	
ODA	UPTON		211	

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TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

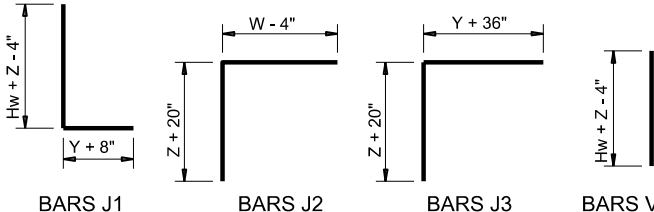
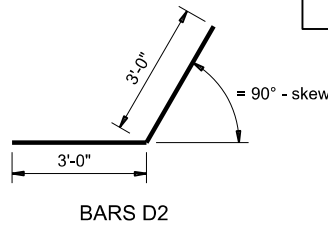
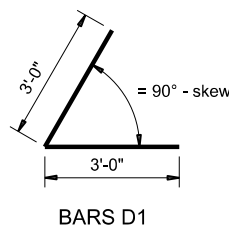
Maximum Wingwall Height Hw	Dimensions				Variable Reinforcing				Estimated Quantities per ft of wing (2-wings)		Estimated Quantities per ft of Toewall (1-toewall)	
	W	X	Y	Z	Bars J1		Bars J2		Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
					Size	Spa	Size	Spa				
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2-wings)

Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



WING DIMENSION FORMULAS:
(All values are in feet.)

$Hw = H + T + C$
 $Lw = (Hw)(SL) \div \cosine(\theta)$ for Type PW-1
 $= (Hw - 1')(SL) \div \cosine(\theta)$ for Type PW-2 and Hw 4'
 $= (Hw - 0.5')(SL) \div \cosine(\theta)$ for Type PW-2 and Hw 4'

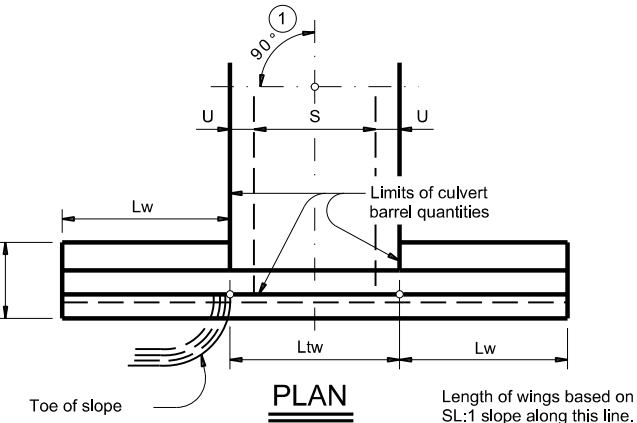
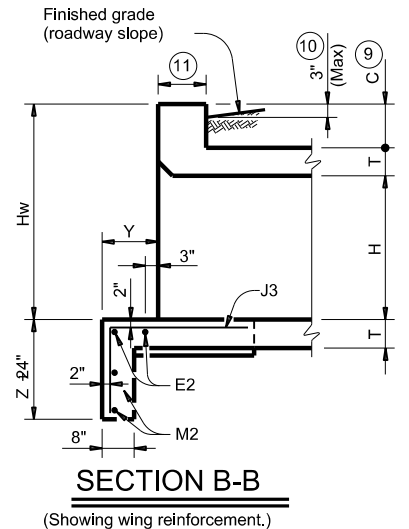
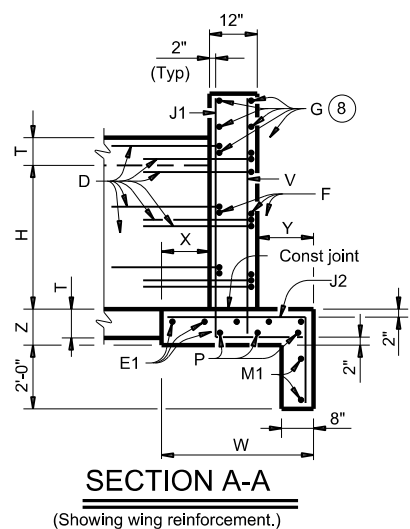
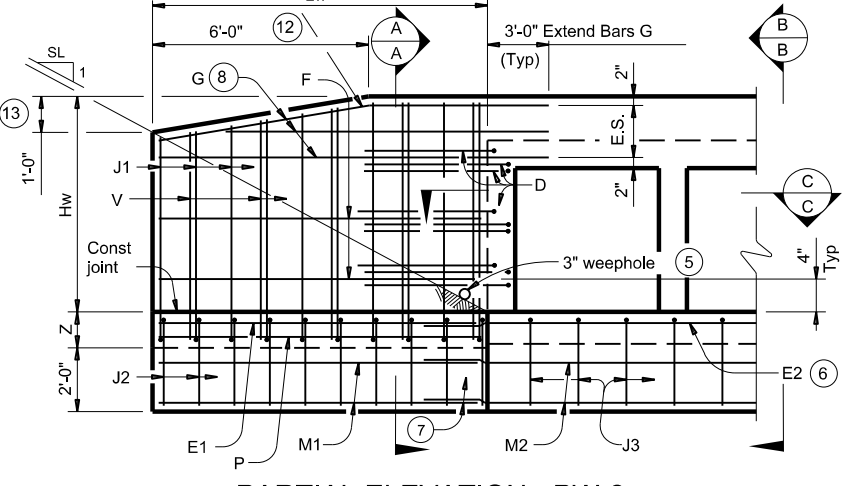
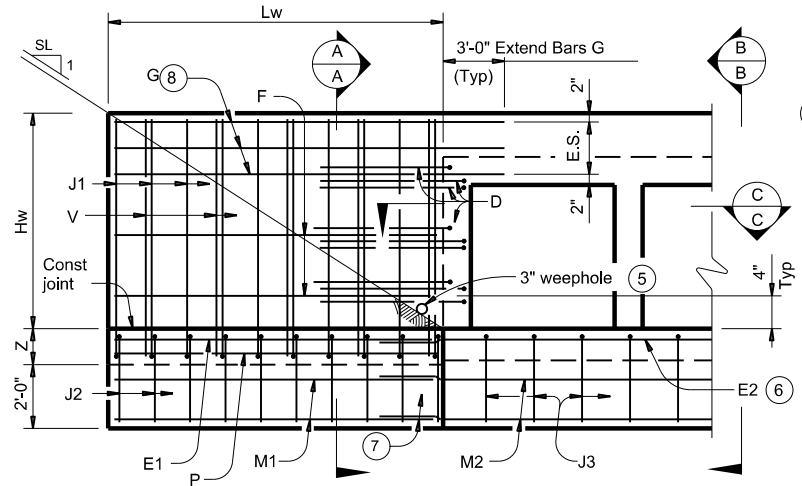
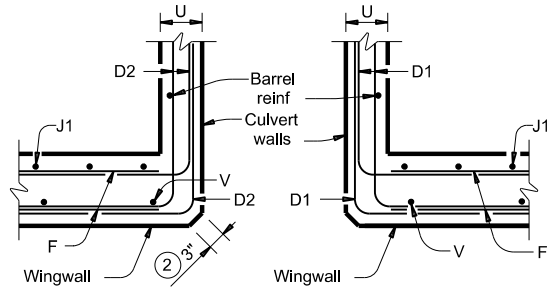
For cast-in-place culverts:
 $Ltw = [(N)(S) + (N + 1)(U)] \div \cosine(\theta)$

For precast culverts:
 $Ltw = [(N)(2U + S) + (N - 1)(0.5')] \div \cosine(\theta)$
 Total Wingwall Area (two wings ~ SF)
 $= (2)(Hw)(Lw)$ for Type PW-1
 $= (2)(Hw)(Lw) - 6 SF$ for Type PW-2 and Hw 4'
 $= (2)(Hw)(Lw) - 1.5 SF$ for Type PW-2 and Hw 4'

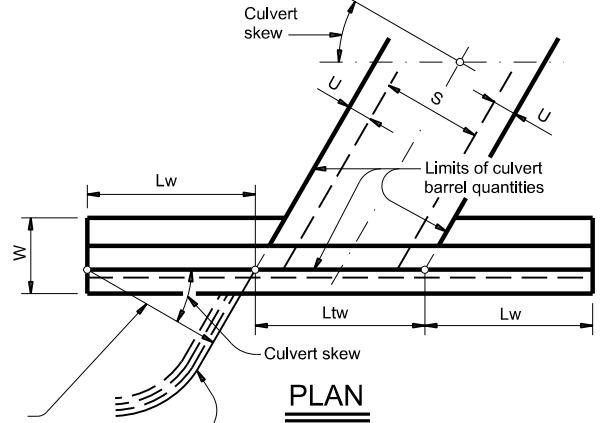
Hw = Height of wingwall
 Lw = Length of wingwall
 Ltw = Culvert toewall length
 N = Number of culvert spans
 SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
 θ = Culvert skew

See applicable box culvert standard sheet for S, H, T, and U values.

- Skew = 0°
- At discharge end, chamfer may be 3/4" minimum.
- For 15° skew ~ 1"
For 30° skew ~ 2"
For 45° skew ~ 3"
- Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
- Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
- Extend Bars E2 1'-6" minimum into the wingwall footing.
- Lap Bars M1 1'-6" minimum with Bars M2.
- Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade.
 Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
- 3'-0" for Hw < 4'.
- 6" for Hw < 4'.



DETAILS FOR NON-SKEWED BOX CULVERTS



DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

DESIGNER NOTES:
 Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall. Type PW-2 can only be used for applications without a railing mounted to the wingwall.

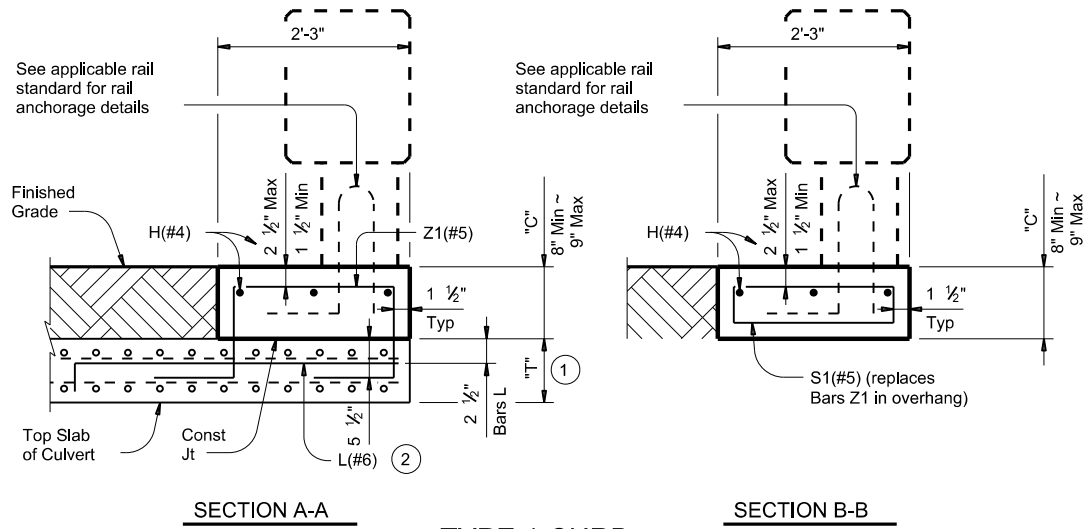
MATERIAL NOTES:
 Provide Class C concrete (f'c=3,600 psi).
 Provide Grade 60 reinforcing steel.
 Provide galvanized reinforcing steel if required elsewhere in the plans.

GENERAL NOTES:
 Designed in accordance with AASHTO LRFD Bridge Design Specifications.
 Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
 See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information. Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing dimensions are out-to-out of bars.

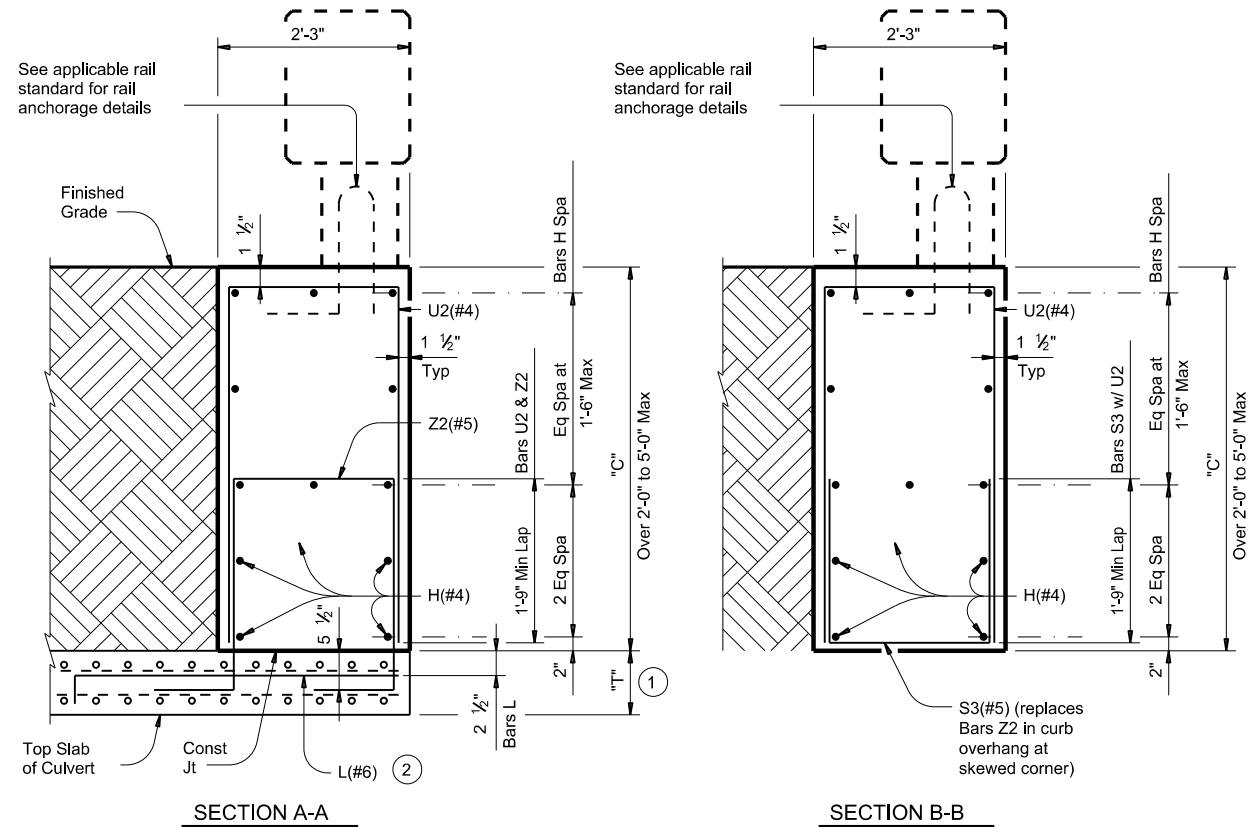
				Bridge Division Standard	
CONCRETE WINGWALLS WITH PARALLEL WINGS FOR BOX CULVERTS TYPES PW-1 AND PW-2					
PW					
FILE:	pwstde01-20.dgn	DN:	GAF	CK:	CAT
REVISIONS:	February 2020	CON:	0076	SECT:	06
		JOB:	037	US:	67
		DIST:	ODA	COUNTY:	UPTON
		SHEET NO.:			212

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 DATE: 10/25/2021 02:48 PM
 FILE: \\twdot.projects\seon\line.com\TXDOT\Documents\06 - ODA\Design Projects\0076060374 - Design\Plan Set\5. Drainage\racste01-20.dgn
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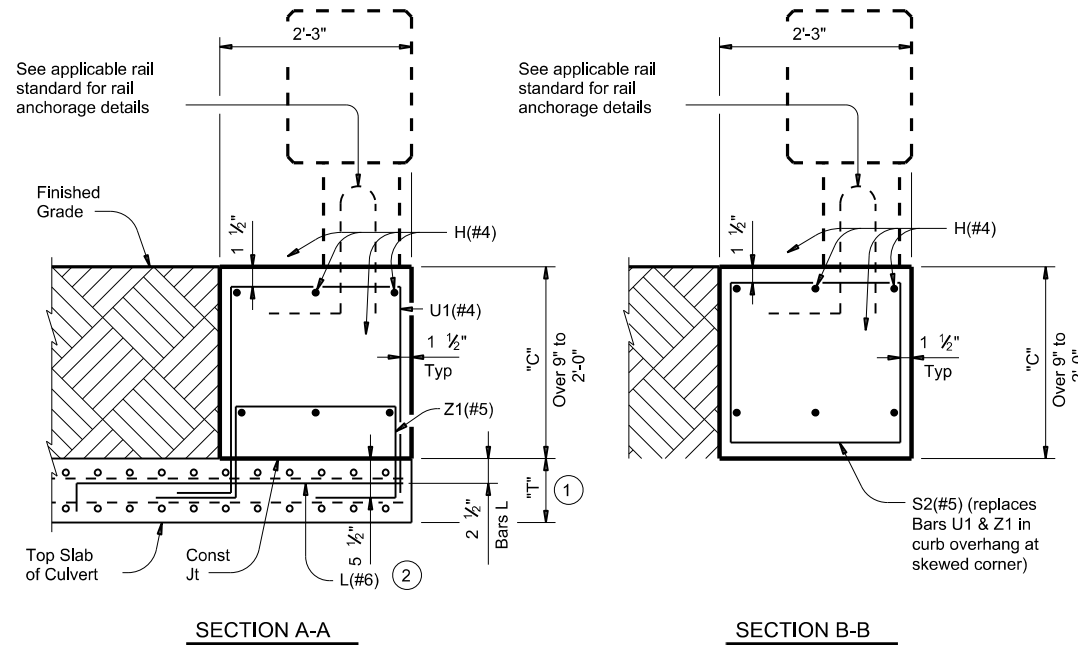
SECTION A-A
TYPE 1 CURB

Used for curbs from 8" to 9" (Showing "C" = 9"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



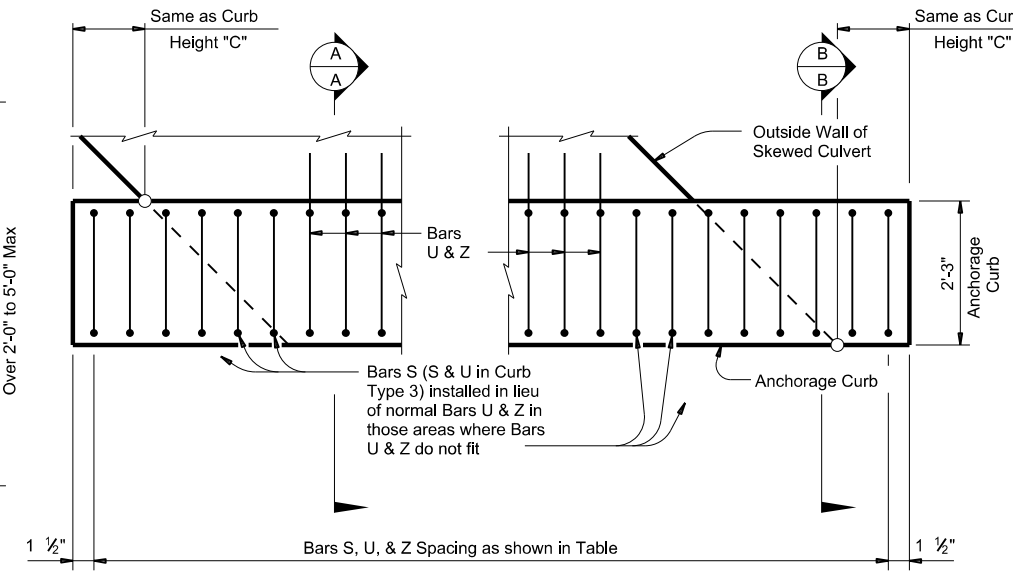
SECTION A-A
TYPE 3 CURB

Used for curbs over 2'-0" to 5'-0" (Showing "C" = 4'-0"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



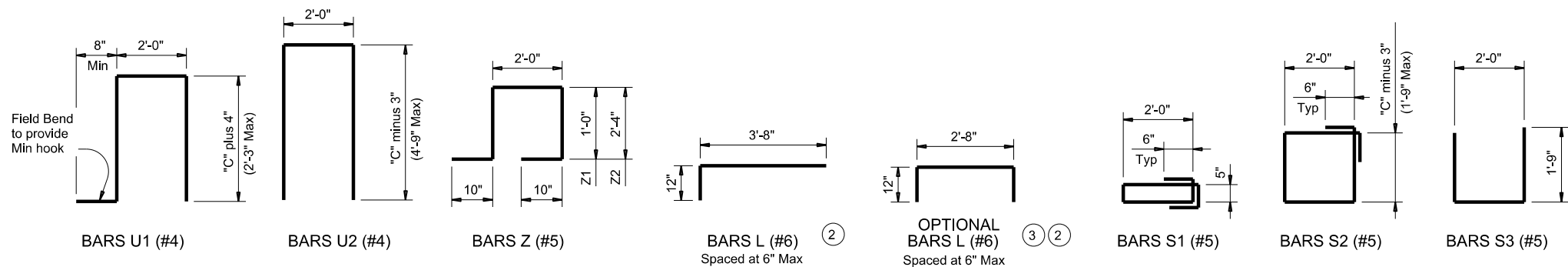
SECTION A-A
TYPE 2 CURB

Used for curbs over 9" to 2'-0" (Showing "C" = 2'-0"). Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



TYPICAL CURB PLAN

Showing typical installation on skewed culvert. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC standard.



Curb Height "C"	Section Type	Bars S, U, & Z Spa
8" to 9"	1	12"
Over 9" to 2'-0"	2	9"
Over 2'-0" to 3'-0"	3	7"
Over 3'-0" to 5'-0"	3	5"

Curb Height "C"	Section Type	Reinf Steel (Lb/LF)	Class "C" Concrete (CY/LF)
8"	1	21.5	0.056
9"	1	21.5	0.063
1'-0"	2	29.7	0.083
1'-6"	2	30.6	0.125
2'-0"	2	31.5	0.167
3'-0"	3	44.6	0.250
4'-0"	3	56.8	0.333
5'-0"	3	60.0	0.417

- "T" is equal to the culvert top slab thickness. For Precast Boxes with slabs less than 8" thick, see SCP-MD Standard for additional details.
- Tilt Bars L hook as necessary to maintain cover.
- Optional Bars L are to be used only for Precast Box Culverts with 3'-0" closure pours.
- Quantities shown are for Contractor's information only. Quantities are per Linear Foot of curb length. The values for each section type in table can be interpolated for intermediate values of Curb Height, "C".

CONSTRUCTION NOTES:

When using this anchorage curb, omit normal culvert curb reinforcing bars K and H shown on the culvert standard sheets. For vehicle safety, the top of the curb must be flush with the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel. Galvanize all reinforcing steel if required elsewhere. Provide bar laps, where required, as follows:
 Uncoated or galvanized ~ #4 = 1'-11"
 Provide Class "C" concrete (f_c=3,600 psi). Provide Class "C" (HPC) concrete if shown elsewhere in the plans.

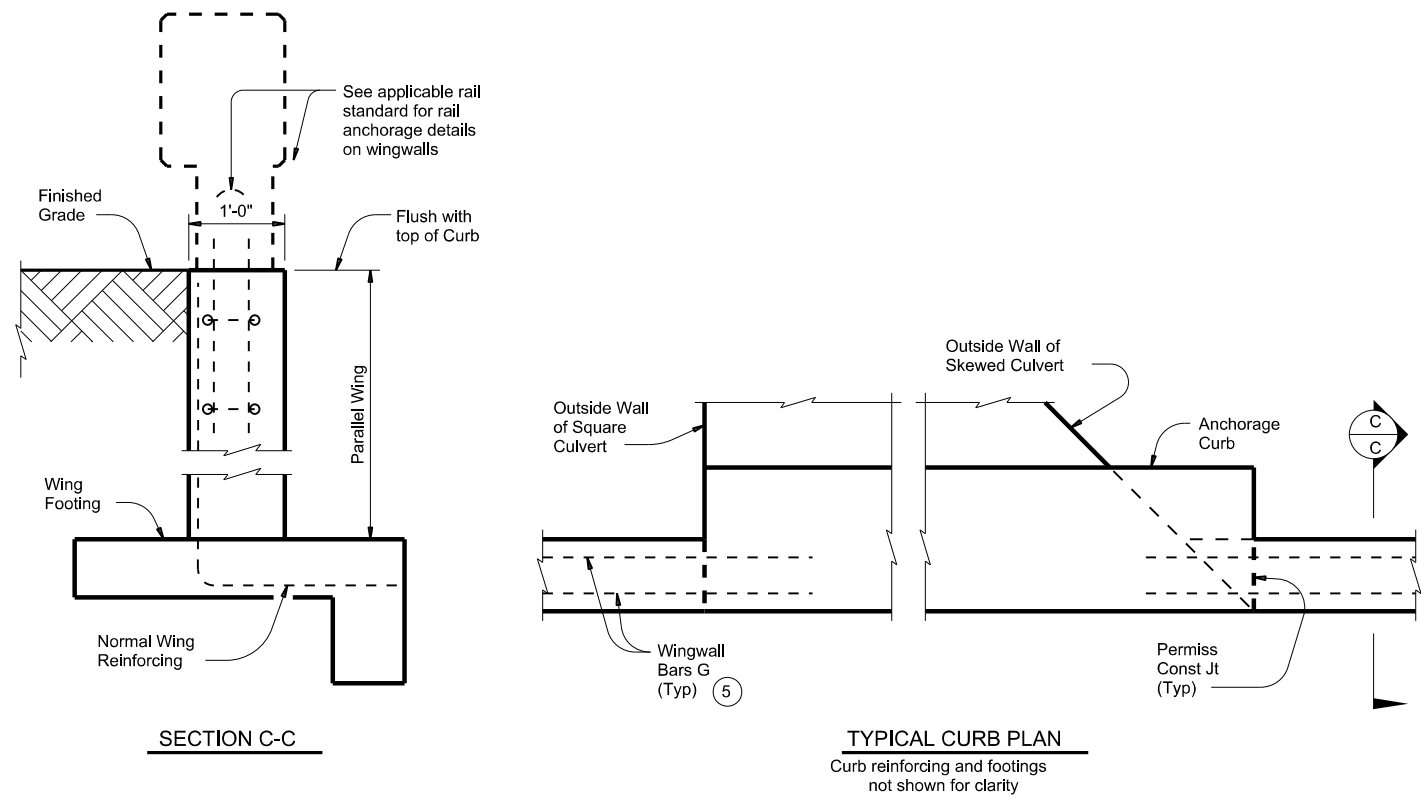
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications. The rail anchorage curb details have sufficient strength for use with all standard rail types. See appropriate rail standard for approved design speed restrictions, notes and details not shown. This anchorage curb is considered part of the Box Culvert for payment. These details are for use with curbs that are 8" to 5'-0" tall only. Curb heights that are less than or greater than those shown will require special design.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

SHEET 1 OF 2

		Bridge Division Standard	
RAIL ANCHORAGE CURB BOX CULVERT RAIL MOUNTING DETAILS (CURBS 8" TO 5'-0" TALL ONLY)			
RAC			
FILE: racste01-20.dgn	DN: GAF	CK: TXDOT	DW: TXDOT
REVISIONS	CONT	SECT	JOB
	0076	06	037
	DIST	COUNTY	SHEET NO.
	ODA	UPTON	213



INSTALLATION AT PARALLEL CULVERT WINGWALLS

See culvert wingwall standard for bars and details not shown.

⑤ Bars G (#5), as identified on the PARALLEL WINGS PW standard sheet, must extend 1'-6" into the Anchorage Curb similar to that shown for a normal culvert curb.

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		<i>Bridge Division Standard</i>	
RAIL ANCHORAGE CURB BOX CULVERT RAIL MOUNTING DETAILS (CURBS 8" TO 5'-0" TALL ONLY)			
RAC			
FILE: racste01-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT
©TxDOT February 2020	CONT	SECT	JOB
REVISIONS	0076	06	037
	DIST	COUNTY	SHEET NO.
	ODA	UPTON	214

SUMMARY OF SMALL SIGNS

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FILE: \\txdotproject\wiseonline.com\TXDOT2\Documents\06 - ODA\Design Projects\0076060374 - Design\Plan Set\8 - Trafficus67M_Small_Sign_Summary_1of4.dgn

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN (* SEE McCAMEY MILL & FILL SIGN & PAVEMENT MARKING DETAILS) (* SEE SIGN & PAVEMENT MARKING DETAILS)	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	PREFABRICATED P = "Plain" T = "T" U = "U"		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
2 OF 2	1A	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	1B	M1-4A2 M6-3 M1-6F M6-1 M1-4A3 M6-6	US HWY 67 <ARROW - VERT> <AUXILIARY SIGN> FARM ROAD 305 <ARROW - HORIZ. STRGHT> <AUXILIARY SIGN> US HWY 385 <ARROW - VERT> <ARROW - HORIZ. STRGHT>	24 x 24 21 x 15 24 x 24 21 x 15 30 x 24 21 x 15	X X X X X X		S80	1	SA	U	1EXT	
	1C	M3-3 M1-6F M6-3 M1-4A2 M6-4 M3-3 M1-4A3 M6-1	SOUTH FARM ROAD 305 <ARROW - VERT> <AUXILIARY SIGN> US HWY 67 <DUAL ARROW - HORIZ. STRGHT> SOUTH US HWY 385 <ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	24 x 12 24 x 24 21 x 15 24 x 24 21 x 15 24 x 12 30 x 24 21 x 15	X X X X X X X X		S80	1	SA	U	1EXT	
	1D	M4-6 M1-6F M1-4A2 M6-4 M1-4A3 M6-1	END FARM ROAD 305 US HWY 67 <DUAL ARROW - HORIZ. STRGHT> US HWY 385 <DUAL ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	24 x 12 24 x 24 24 x 24 21 x 15 30 x 24 21 x 15	X X X X X X		S80	1	SA	U	1EXT	
	1E	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	1F	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	1G	M3-3 M1-6F M6-1 M1-4A2 M6-3 M1-4A3 M6-6	SOUTH FARM ROAD 305 <ARROW - HORIZ. STRGHT> <AUXILIARY SIGN> US HWY 67 <ARROW - VERT> <AUXILIARY SIGN> US HWY 385 <ARROW - VERT> <ARROW - HORIZ. STRGHT>	24 x 12 24 x 24 21 x 15 24 x 24 21 x 15 30 x 24 21 x 15	X X X X X X X		S80	1	SA	U	1EXT	
	1H	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	1I	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	1J	W1-2L	SYMBOL - HORIZ CURVE LEFT	36 x 36	X		10BWG	1	SA	P		
1 OF 24#	1K	W1-2R	SYMBOL - HORIZ CURVE RIGHT	36 x 36	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.
<http://www.txdot.gov/>

- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
 - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

SHEET 1 OF 4



SUMMARY OF SMALL SIGNS

SOSS

FILE: slums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076 06		037	US 67
4-16	DIST	COUNTY	SHEET NO.	
8-16	ODA	UPTON	215	

DATE: 10/22/2021 05:53 PM
 FILE: \\txdotproject\wiseonline.com\TXDOT2\Documents\06 - ODA\Design Projects\0076060374 - Design\Plan Set\8 - Trafficus67M_Small_Sign_Summary_1of4.dgn

SUMMARY OF SMALL SIGNS

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PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
										PREFABRICATED		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
1 OF 24*	1	TO BE REUSED	SOLICITORS PEDDLERS AND VENDORS ORDINANCE ENFORCED									
	2	R5-4aT	NO ENGINE BRAKE BY CITY ORDINANCE	36 x 48	x		10BWG	1	SA	P		
	3	TO BE REUSED	SUPERIOR PUBLIC WATER SYSTEM THE STATE OF TEXAS									
	4	N/A	TROOPER SAMMY LONG MEMORIAL HIGHWAY	132 x 36	x		S80	1	SA	T	2EXT	
	5	W11-10	SYMBOL - TRUCKS ENTERING HIGHWAY	36 x 36	x		10BWG	1	SA	P		
	6	W1-2R	SYMBOL - HORIZ CURVE RIGHT	36 x 36	x		10BWG	1	SA	P		
	7	R2-1	SPEED LIMIT (55)	30 x 36	x		10BWG	1	SA	P		
	8	R2-1	SPEED LIMIT (65)	30 x 36	x		10BWG	1	SA	P		
	9	D7-6aTR	HISTORICAL MARKER 1 MILE ON RIGHT	48 x 48	x		S80	1	SA	T		
	10	M3-3 M1-4A2 D10-7aT D10-7aT	SOUTH US HWY 67 <(792) VERTICAL NUMBER> <(792) VERTICAL NUMBER>	24 x 12 24x24 3 x 10 3 x 10	x x x x		S80	1	SA	P		
2 OF 24	11	R2-1	SPEED LIMIT (65)	30 x 36	x		10BWG	1	SA	P		
	12	R2-1	SPEED LIMIT (75)	30 x 36	x		10BWG	1	SA	P		
	13	W1-2L	SYMBOL - HORIZ CURVE LEFT	36 x 36	x		10BWG	1	SA	P		
	14	W3-5	<SYMBOL - REDUCED SPEED AHEAD> (65)	36 x 36	x		10BWG	1	SA	P		
3 OF 24	15	W11-10	SYMBOL - TRUCKS ENTERING HIGHWAY	36 x 36	x		10BWG	1	SA	P		
	16	R1-1	STOP	36 x 36	x		10BWG	1	SA	P		
	17	R1-1	STOP	36 x 36	x		10BWG	1	SA	P		
	18	R1-1	STOP	36 x 36	x		10BWG	1	SA	P		
	19	D7-6aTR	HISTORICAL MARKER 1 MILE ON RIGHT	48 x 48	x		S80	1	SA	T		
	20	R1-1	STOP	36 x 36	x		10BWG	1	SA	P		
4 OF 24	21	W2-1aT	HIGHWAY INTERSECTION AHEAD	48 x 48	x		S80	1	SA	T		
	22	W11-10	SYMBOL - TRUCKS ENTERING HIGHWAY	36 x 36	x		10BWG	1	SA	P		
	23	D1-1R	<RIGHT ARROW> E 5TH ST	78 x 18	x		10BWG	1	SA	T		
	24	R5-1	DO NOT ENTER	36 x 36	x		10BWG	1	SA	P		
	25	W1-7	LARGE ARROW (2 DIRECTIONS)	48 x 24	x		S80	1	SA	T		
	26	D1-1L	<LEFT ARROW> E 5TH ST	78 x 18	x		10BWG	1	SA	T		
	27	R1-1	STOP	48 x 48	x		S80	1	SA	T		
	28	R5-1	DO NOT ENTER	36 x 36	x		10BWG	1	SA	P		
	29	R1-1	STOP	48 x 48	x		S80	1	SA	T		
	30	R19-8T	FASTEN SAFETY BELTS STATE LAW	30 x 30	x		10BWG	1	SA	P		
	31	D7-7aTL	HISTORICAL MARKER <ARROW LEFT>	48 x 48	x		S80	1	SA	T		
	32	W11-10	SYMBOL - TRUCKS ENTERING HIGHWAY	36 x 36	x		10BWG	1	SA	P		
	33	W2-1aT	HIGHWAY INTERSECTION AHEAD	48 x 48	x		S80	1	SA	T		
5 OF 24	34	R19-6aT	DON'T MESS WITH TEXAS UP TO \$2000 FINE FOR LITTERING	48 x 30	x		10BWG	1	SA	T		
	35	W9-1L	LEFT LANE ENDS	36 x 36	x		10BWG	1	SA	P		
	36	W9-2TR	LANE ENDS MERGE RIGHT	36 x 36	x		10BWG	1	SA	P		
	37	W1-2L	SYMBOL - HORIZ CURVE LEFT	36 x 36	x		10BWG	1	SA	P		
	38	W1-2L W13-1P	SYMBOL - HORIZ CURVE LEFT (65) MPH <ADVISORY SPEED PLAQUE>	36 x 36 18 x 18	x x		S80	1	SA	P		
7 OF 24	39	D7-6aTL	HISTORICAL MARKER 1 MILE ON LEFT	48 x 48	x		S80	1	SA	T		
	40	M3-1 M1-4A2 D10-7aT D10-7aT	NORTH US HWY 67 <(790) VERTICAL NUMBER> <(790) VERTICAL NUMBER>	24 x 12 24 x 24 3 x 10 3 x 10	x x x x		S80	1	SA	P		
	41	W1-2R W13-1P	SYMBOL - HORIZ CURVE RIGHT (65) MPH <ADVISORY SPEED PLAQUE>	36 x 36 18 x 18	x x		S80	1	SA	P		
	42	D15-10T	PASSING LANE 2 MILES	54x42	x		S80	1	SA	T		
	43	R1-1	STOP	36 x 36	x		10BWG	1	SA	P		
	44	R1-1	STOP	36 x 36	x		10BWG	1	SA	P		
	45	W1-2R	SYMBOL - HORIZ CURVE RIGHT	36 x 36	x		10BWG	1	SA	P		
	46	W9-2TR	LANE ENDS MERGE RIGHT	36 x 36	x		10BWG	1	SA	P		
8 OF 24	47	W9-1L	LEFT LANE ENDS	36 x 36	x		10BWG	1	SA	P		
9 OF 24	48	R1-1	STOP	36 x 36	x		10BWG	1	SA	P		
10 OF 24	49	D7-6aTL	HISTORICAL MARKER 1 MILE ON LEFT	48 x 48	x		S80	1	SA	T		
11 OF 24	50	R4-3	SLOWER TRAFFIC KEEP RIGHT	24 x 30	x		10BWG	1	SA	P		

*SIGN NO. 1K SUMMARIZED ON SHEET 1 OF 4

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.
<http://www.txdot.gov/>

- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
 - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

SHEET 2 OF 4



SUMMARY OF SMALL SIGNS

SOSS

FILE: slums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076 06		037	US 67
4-16	DIST	COUNTY	SHEET NO.	
8-16	ODA	UPTON	216	

SUMMARY OF SMALL SIGNS

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 10/22/2021 05:52 PM
 FILE: D:\t\dot\project\wiseonline.com\TXDOT12\Documents\06 - ODA\Design Projects\076060374 - Design\Plan Set\8 - Traffic\us67M_Sign_Summary_3of4.dgn

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	PREFABRICATED P = "Plain" T = "T" U = "U"		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
12 OF 24	51	R4-3	SLOWER TRAFFIC KEEP RIGHT	24 x 30	x		10BWG	1	SA	P		
	52	D2-2	McCamey 5 Fort Stockton 51	108 x 30	x		S80	1	SA	T	2EXT	
	53	W2-1aT	HIGHWAY INTERSECTION AHEAD	48 x 48	x		S80	1	SA	T		
	54	M2-1 M1-6R	JCT RANCH ROAD 2463	21 x 15 24 x 24	x x		10BWG	1	SA	P		
	55	R2-1	SPEED LIMIT (75)	30 x 36	x		10BWG	1	SA	P		
	56	D1-1	<ARROW- VERT> Rankin	66 x 18	x		10BWG	1	SA	T		
	57	M3-3 M1-4A2 D10-7aT D10-7aT	SOUTH US HWY 67 <(788) VERTICAL NUMBER> <(788) VERTICAL NUMBER>	24 x 12 24 x 24 3 x 10 3 x 10	x x x x		S80	1	SA	P		
	58	R1-1	STOP	36 x 36	x		10BWG	1	SA	P		
	59	M3-1 M1-6R M6-1	NORTH RANCH ROAD 2463 <ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	24 x 12 24 x 24 21 x 15	x x x		S80	1	SA	P		
	60	M3-1 M1-4A2 M6-1 M3-3 M1-4A2 M6-1	NORTH US HWY 67 <ARROW - HORIZ. STRGHT> <AUXILIARY SIGN> SOUTH US HWY 67 <ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	24 x 12 24 x 24 21 x 15 24 x 12 24 x 24 21 x 15	x x x x x x		S80	1	SA	U		
	61	R1-2	YIELD	48 x 48 x 48	x		S80	1	SA	T		
	62	R1-1	STOP	36 x 36	x		10BWG	1	SA	P		
	63	M3-1 M1-6R M6-1	NORTH RANCH ROAD 2463 <ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	24 x 12 24 x 24 21 x 15	x x x		S80	1	SA	P		
	64	M3-1 M1-4A2	NORTH US HWY 67	24 x 12 24 x 24	x x		10BWG	1	SA	P		
13 OF 24	65	D7-7aTL	HISTORICAL MARKER <ARROW LEFT>	48 x 48	x		S80	1	SA	T		
	66	W1-2R	SYMBOL - HORIZ CURVE RIGHT	36 x 36	x		10BWG	1	SA	P		
	67	D1-1	<ARROW- VERT> McCamey	78 x 18	x		10BWG	1	SA	T		
	68	W1-2R W13-1P	SYMBOL - HORIZ CURVE RIGHT (60) MPH <ADVISORY SPEED PLAQUE>	36 x 36 18 x 18	x x		S80	1	SA	P		
	69	R2-1	SPEED LIMIT (75)	30 x 36	x		10BWG	1	SA	P		
	70	W1-8 W1-8	CHEVRON ALIGNMENT SIGN CHEVRON ALIGNMENT SIGN	18 x 24 18 x 24	x x		10BWG	1	SA	P		
	71	W1-8 W1-8	CHEVRON ALIGNMENT SIGN CHEVRON ALIGNMENT SIGN	18 x 24 18 x 24	x x		10BWG	1	SA	P		
	72	W1-8 W1-8	CHEVRON ALIGNMENT SIGN CHEVRON ALIGNMENT SIGN	18 x 24 18 x 24	x x		10BWG	1	SA	P		
	73	W1-8 W1-8	CHEVRON ALIGNMENT SIGN CHEVRON ALIGNMENT SIGN	18 x 24 18 x 24	x x		10BWG	1	SA	P		
	74	D2-2	Rankin 14 Big Lake 42	78 x 30	x		S80	1	SA	T		
	75	W1-8 W1-8	CHEVRON ALIGNMENT SIGN CHEVRON ALIGNMENT SIGN	18 x 24 18 x 24	x x		10BWG	1	SA	P		
	76	W1-8 W1-8	CHEVRON ALIGNMENT SIGN CHEVRON ALIGNMENT SIGN	18 x 24 18 x 24	x x		10BWG	1	SA	P		
	77	W1-2L W13-1P	SYMBOL - HORIZ CURVE LEFT (60) MPH <ADVISORY SPEED PLAQUE>	36 x 36 18 x 18	x x		S80	1	SA	P		
	78	W1-2L	SYMBOL - HORIZ CURVE LEFT	36 x 36	x		10BWG	1	SA	P		
	79	M2-1 M1-6R	JCT RANCH ROAD 2463	21 x 15 24 x 24	x x		10BWG	1	SA	P		
	80	W2-1aT	HIGHWAY INTERSECTION AHEAD	48 x 48	x		S80	1	SA	T		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.
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- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
 - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

SHEET 3 OF 4



SUMMARY OF SMALL SIGNS

SOSS

FILE: slums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076	06	037	US 67
4-16	DIST	COUNTY	SHEET NO.	
8-16	ODA	UPTON	217	

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)		
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION			
										PREFABRICATED		1EXT or 2EXT = # of Ext	
15 OF 24	81	R1-1	STOP	36 x 36	x		10BWG	1	SA	P			
	82	D7-6aTR	HISTORICAL MARKER 1 MILE ON RIGHT	48 x 48	x		S80	1	SA	T			
	83	W11-10	SYMBOL - TRUCKS ENTERING HIGHWAY	36 x 36	x		10BWG	1	SA	P			
17 OF 24	84	W9-1L	LEFT LANE ENDS	36 x 36	x		10BWG	1	SA	P			
	85	W11-10	SYMBOL - TRUCKS ENTERING HIGHWAY	36 x 36	x		10BWG	1	SA	P			
	86	W9-2TR	LANE ENDS MERGE RIGHT	36 x 36	x		10BWG	1	SA	P			
	87	R1-1	STOP	36 x 36	x		10BWG	1	SA	P			
	88	M3-1 M1-4A2 D10-7aT D10-7aT	NORTH US HWY 67 <(786) VERTICAL NUMBER> <(786) VERTICAL NUMBER>	24 x 12 24 x 24 3 x 10 3 x 10	x x x x		S80	1	SA	P			
18 OF 24	89	R1-1	STOP	36 x 36	x		10BWG	1	SA	P			
	90	D15-11T	NEXT PASSING LANE 2 MILES	54 x 48	x		S80	1	SA	T			
	91	D15-11T	NEXT PASSING LANE 2 MILES	54 x 48	x		S80	1	SA	T			
20 OF 24	92	W9-2TR	LANE ENDS MERGE RIGHT	36 x 36	x		10BWG	1	SA	P			
	93	R1-1	STOP	36 x 36	x		10BWG	1	SA	P			
	94	W9-1L	LEFT LANE ENDS	36 x 36	x		10BWG	1	SA	P			
	95	D7-6aTR	HISTORICAL MARKERS 2 MILES ON RIGHT	48 x 48	x		10BWG	1	SA	P			
22 OF 24	96	M3-3 M1-4A2 D10-7aT D10-7aT	SOUTH US HWY 67 <(784) VERTICAL NUMBER> <(784) VERTICAL NUMBER>	24 x 12 24 x 24 3 x 10 3 x 10	x x x x		S80	1	SA	P			
23 OF 24	97	D7-7aTL	HISTORICAL MARKER <ARROW LEFT>	48 x 48	x		S80	1	SA	T			
	98	R4-3	SLOWER TRAFFIC KEEP RIGHT	24 x 30	x		10BWG	1	SA	P			
24 OF 24	99	W1-2L	SYMBOL - HORIZ CURVE LEFT	36 x 36	x		10BWG	1	SA	P			
	100	W1-2L W13-1P	SYMBOL - HORIZ CURVE LEFT (60) MPH <ADVISORY SPEED PLAQUE>	36 x 36 18 x 18	x x		S80	1	SA	P			

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DATE: 10/22/2021 05:52 PM
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ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

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<http://www.txdot.gov/>

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 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

SHEET 4 OF 4



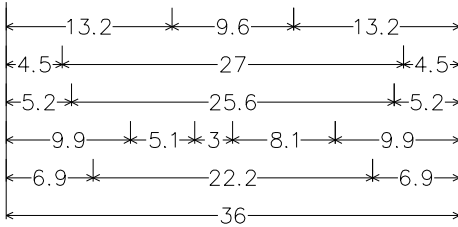
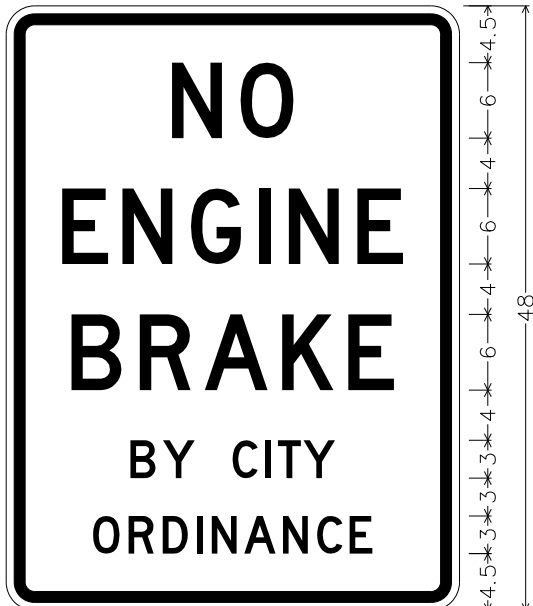
SUMMARY OF SMALL SIGNS

SOSS

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© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076	06	037	US 67
4-16	DIST	COUNTY	SHEET NO.	
8-16	ODA	UPTON	218	

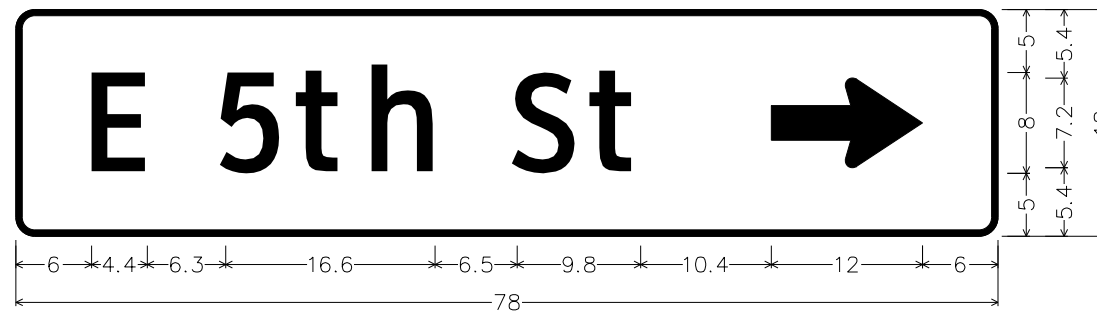
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SIGN NO. 2



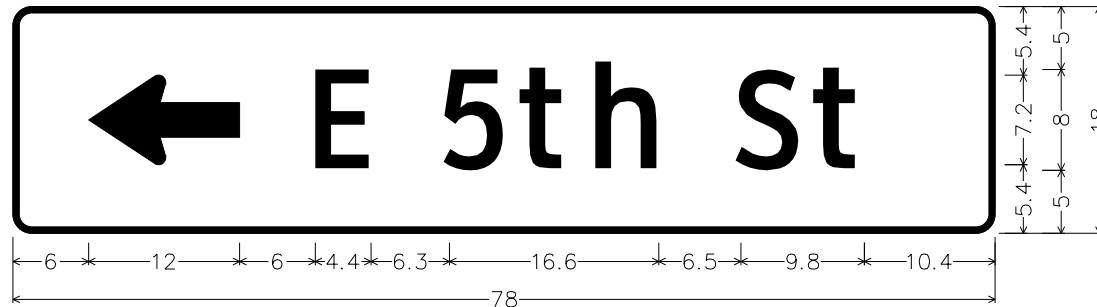
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 [NO] D; [ENGINE] D; [BRAKE] D;
 [BY CITY] D; [ORDINANCE] D;

SIGN NO. 23



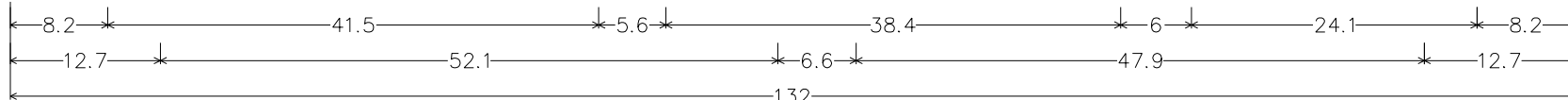
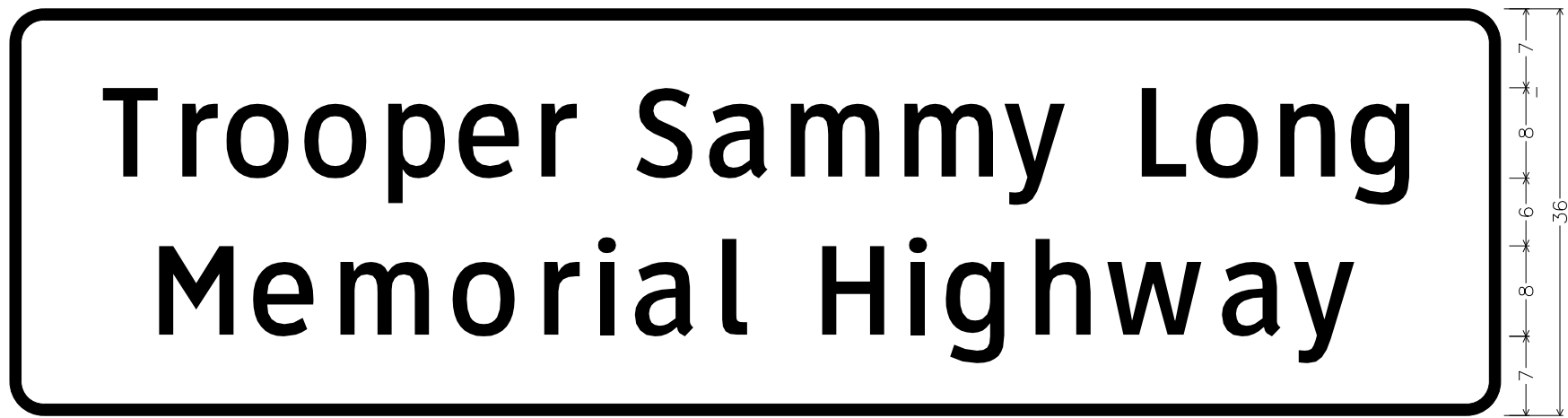
Identifier : D1-1R 8in RT;
 1.5" Radius, 0.5" Border, White on Green;
 [E 5th St] ClearviewHwy-3-W; Standard Arrow Custom 12.0" X 7.1" 0°;

SIGN NO. 26

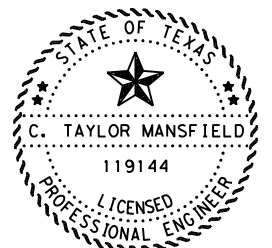


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 1.5" Radius, 0.5" Border, White on Green;
 Standard Arrow Custom 12.0" X 7.1" 180°; [E 5th St] ClearviewHwy-3-W;

SIGN NO. 4



3.0" Radius, 1.0" Border, White on Brown;
 [Trooper Sammy Long] ClearviewHwy-3-W 75% spacing; [Memorial Highway] ClearviewHwy-3-W;



C. Taylor Mansfield 2021.11.01
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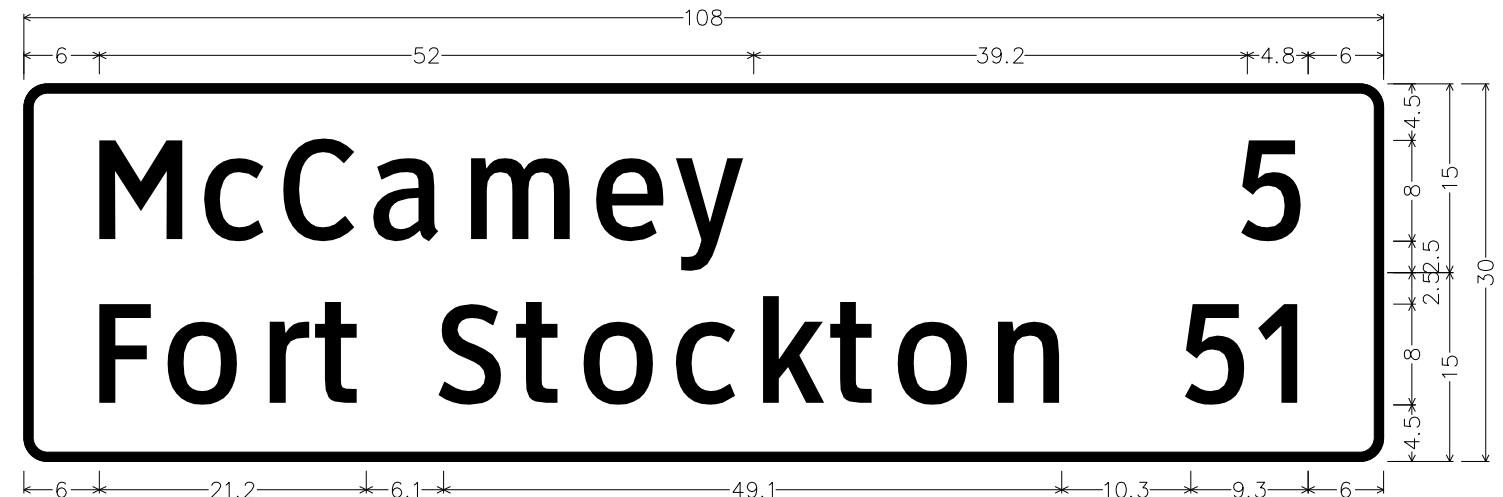
US 67
 SMALL SIGN
 DETAILS

SHEET 1 OF 3

		© 2021
CONT	SECT	HIGHWAY
0076	06	037 US 67
DIST	COUNTY	SHEET NO.
ODA	UPTON	219

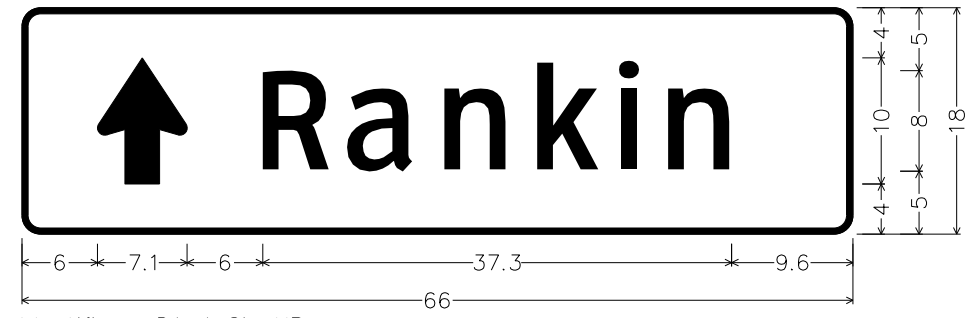
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SIGN NO. 52

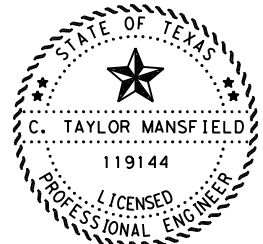


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 1.9" Radius, 0.8" Border, White on Green;
 [McCamey] ClearviewHwy-3-W; [5] ClearviewHwy-3-W;
 1.9" Radius, 0.8" Border, White on Green;
 [Fort Stockton] ClearviewHwy-3-W; [51] ClearviewHwy-3-W;

SIGN NO. 56



Identifier : D1-1 8in UP;
 1.5" Radius, 0.5" Border, White on Green;
 Standard Arrow Custom 10.0" X 7.1" 90"; [Rankin] ClearviewHwy-3-W;



C. Taylor Mansfield 2021.11.01
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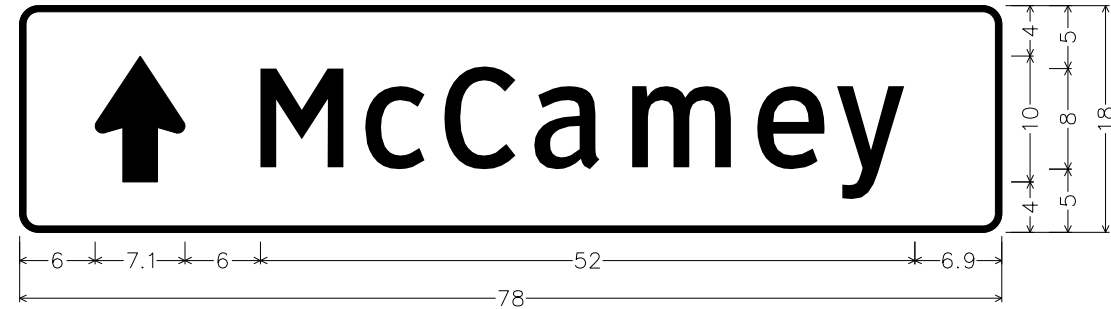
US 67
 SMALL SIGN
 DETAILS

SHEET 2 OF 3



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	220	

SIGN NO. 67

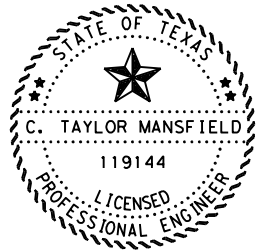


Identifier : D1-1 8in UP;
 1.5" Radius, 0.5" Border, White on Green;
 Standard Arrow Custom 10.0" X 7.1" 90"; [McCamey] ClearviewHwy-3-W;

SIGN NO. 74



Identifier : D2-2 8in;
 1.9" Radius, 0.8" Border, White on Green;
 [Rankin] ClearviewHwy-3-W; [14] ClearviewHwy-3-W;
 1.9" Radius, 0.8" Border, White on Green;
 [Big Lake] ClearviewHwy-3-W; [42] ClearviewHwy-3-W;

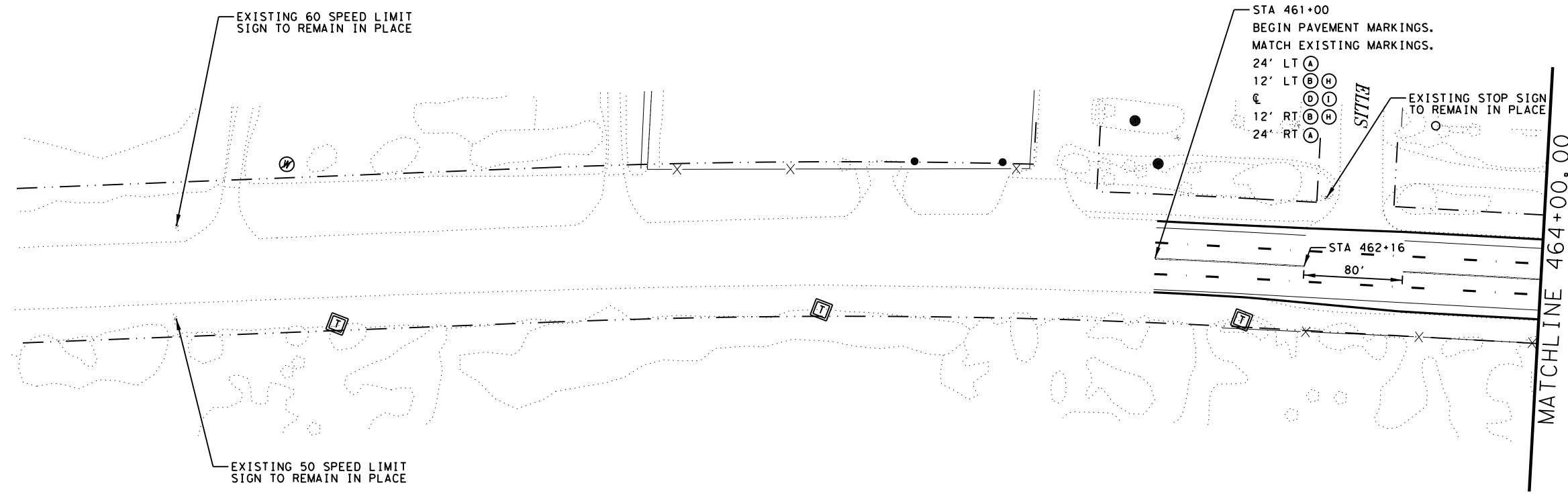


C. Taylor Mansfield 2021.11.01
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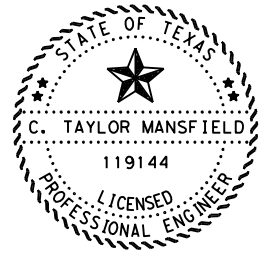
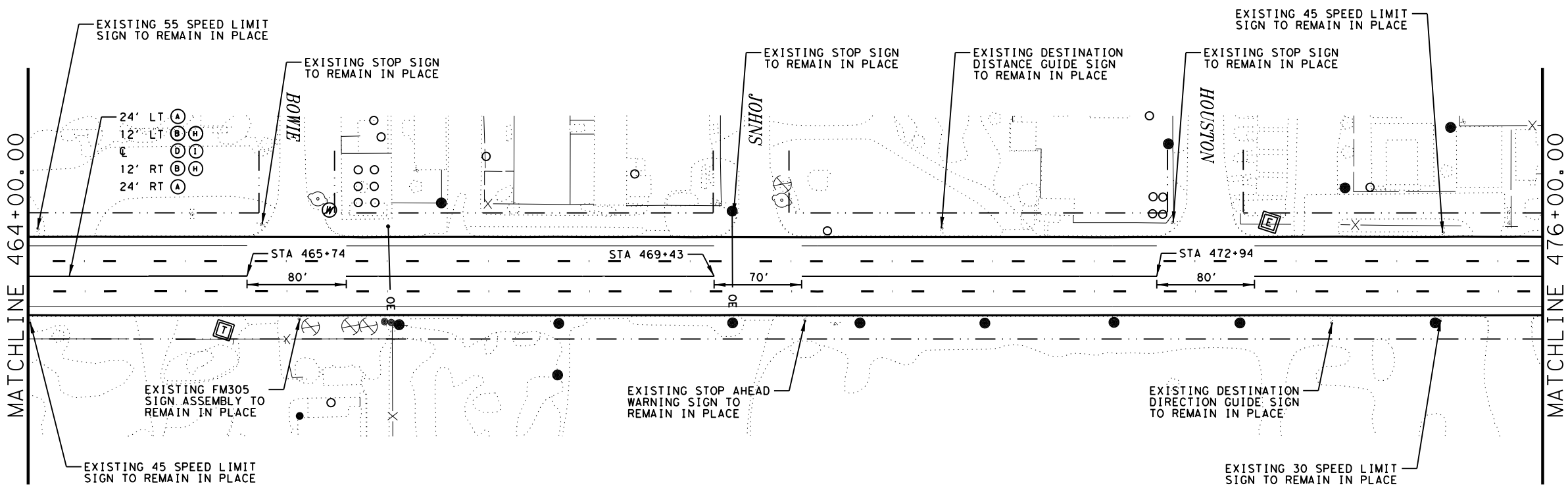
US 67
 SMALL SIGN
 DETAILS

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		221

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LEGEND	
(A)	4" WHITE SOLID
(B)	4" WHITE BROKEN 10' STRIP 30' SKIP
(C)	4" YELLOW SOLID
(D)	4" DOUBLE YELLOW
(H)	TYI I-C
(I)	TYII A-A
(#)	REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
(●)	PROP SIGN ASSEMBLY



C. Taylor Mansfield 2021.11.01
 13:10:55-05'00"

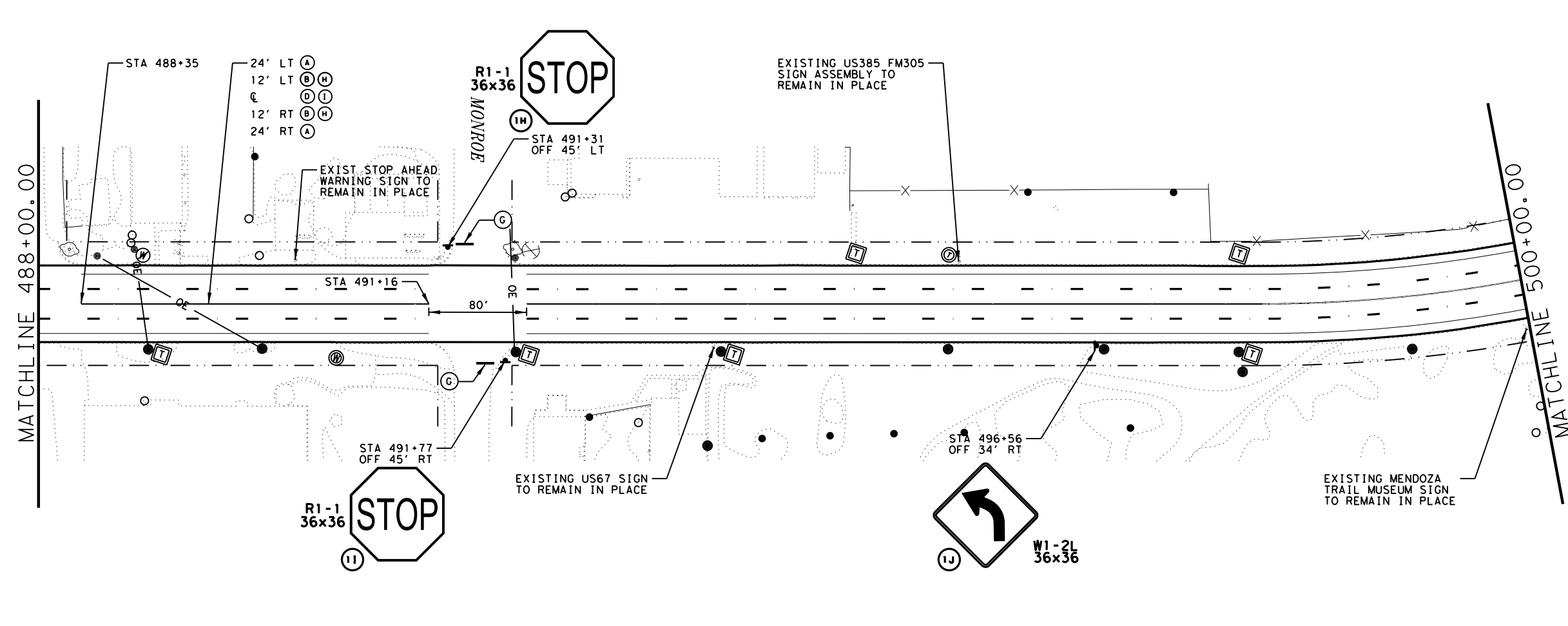
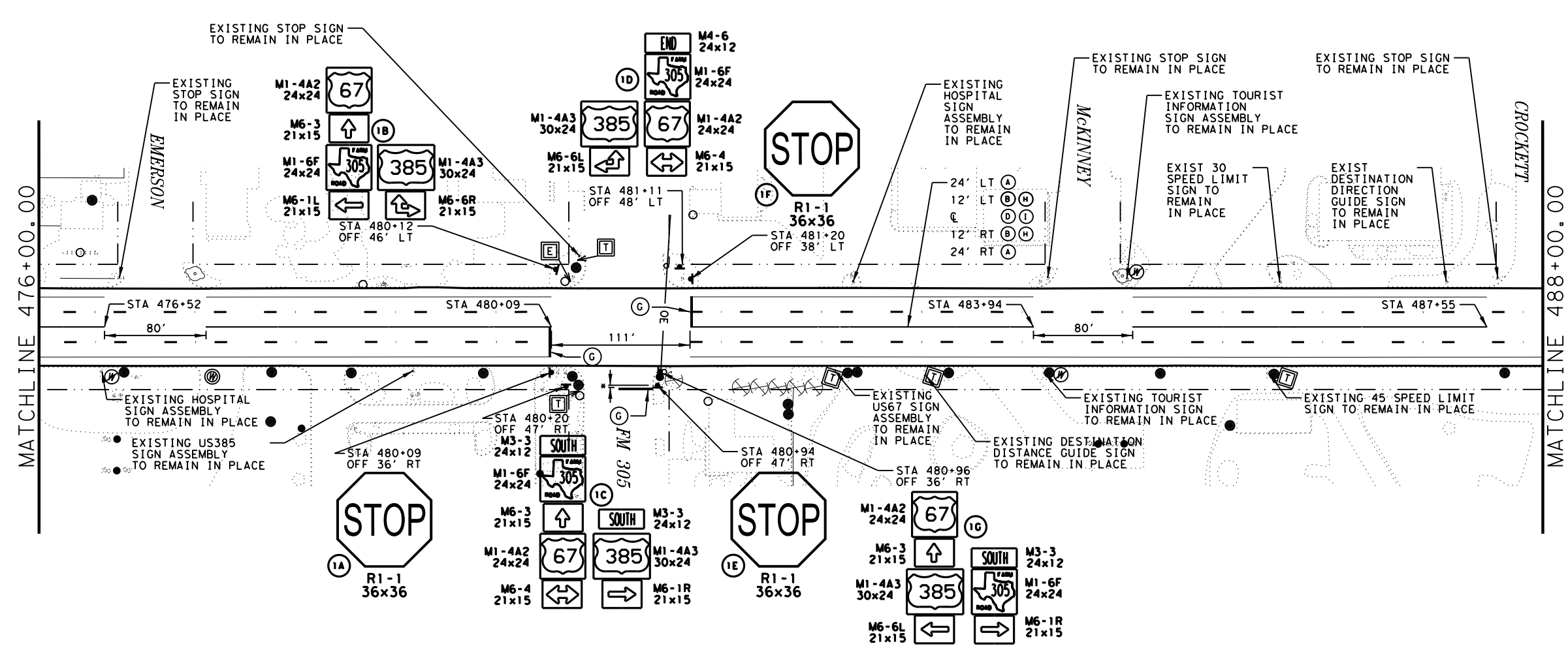
HORIZ SCALE 1"=100'

**US 67
 McCAMEY
 MILL & FILL,
 SIGN & PAVEMENT
 MARKING DETAILS**
 SHEET 1 OF 2



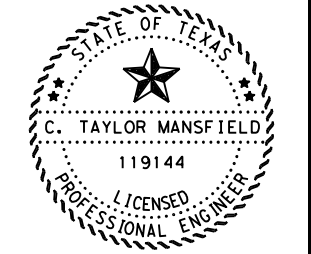
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0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	222	

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LEGEND	
(A)	4" WHITE SOLID
(B)	4" WHITE BROKEN 10' STRIP 30' SKIP
(C)	4" YELLOW SOLID
(D)	4" DOUBLE YELLOW
(G)	24" WHITE STOP BAR
(H)	TYI I-C
(I)	TYII A-A
(#)	REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
(•)	PROP SIGN ASSEMBLY

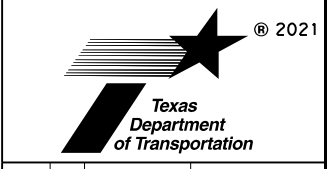
*NOTE: REMOVE EXISTING STOP BAR AND DOUBLE YELLOW PAVEMENT MARKINGS



C. Taylor Mansfield 2021.11.01
 13:10:55-05'00"

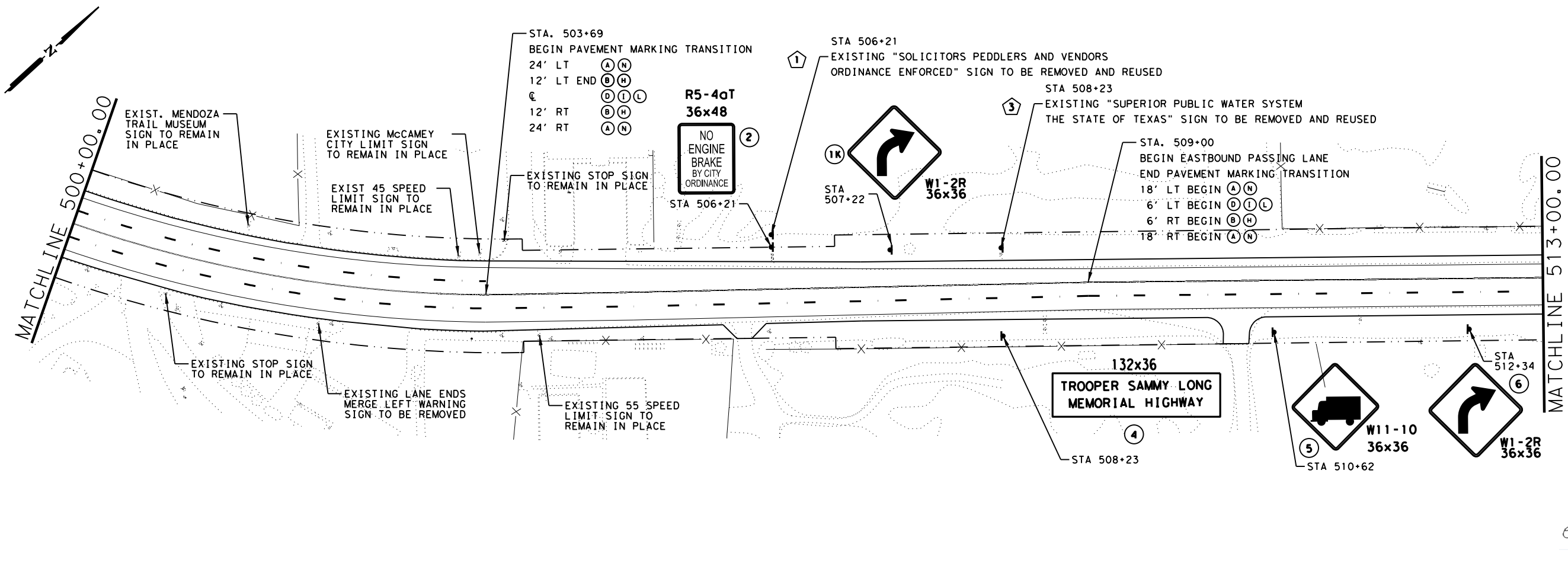
HORIZ SCALE 1"=100'

**US 67
 McCAMEY
 MILL & FILL,
 SIGN & PAVEMENT
 MARKING DETAILS**
 SHEET 2 OF 2

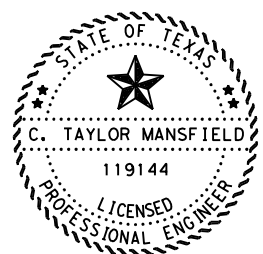
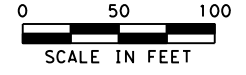


CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY	SHEET NO.	
ODA	UPTON	223	

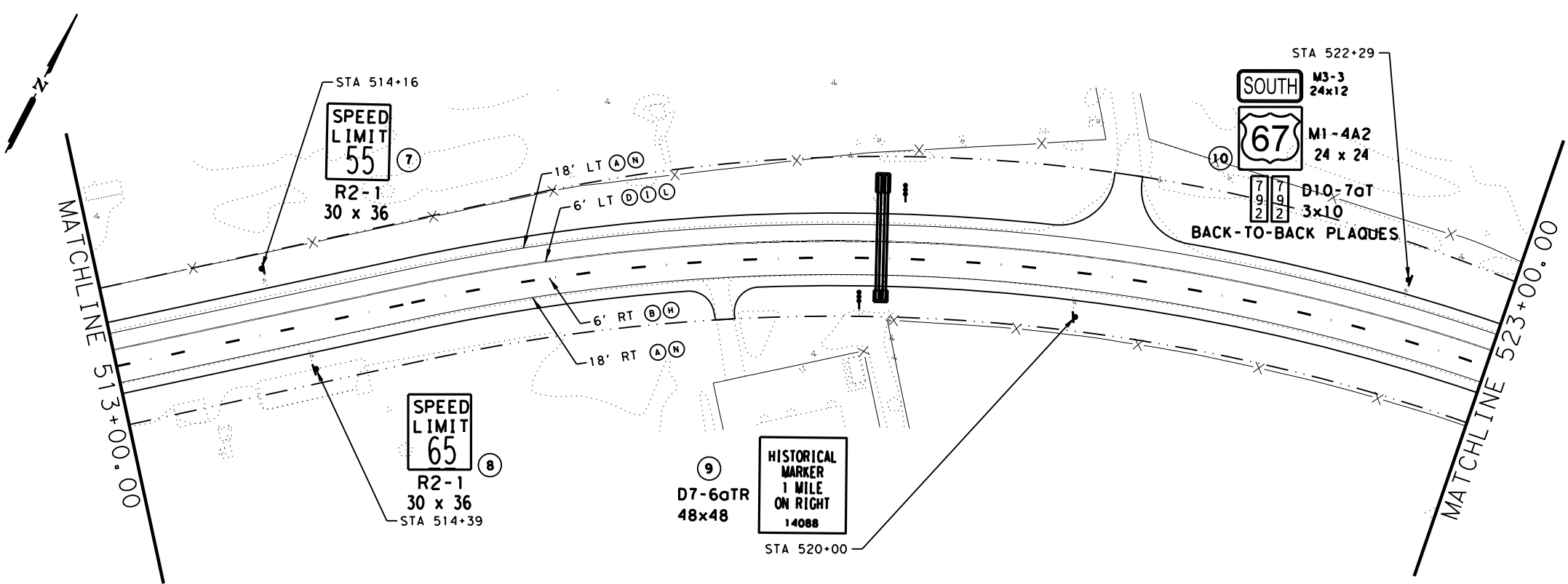
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NOTE:
 BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.



C. Taylor Mansfield 2021.11.01
 13:22:36-05'00



LEGEND:

- (A) 4" WHITE SOLID
 - (B) 4" WHITE BROKEN
 - (C) 4" YELLOW SOLID
 - (D) DOUBLE YELLOW
 - (E) 8" WHITE SOLID
 - (F) 4" WHITE DOT
 - (G) 24" WHITE STOP BAR
 - (H) TYI I-C
 - (I) TYII A-A
 - (J) TYC ARROW
 - (K) TYC WORD
 - (L) CENTER LINE RUMBLE STRIP
 - (M) TYC ARROW (LNDP)
 - (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
 - (O) WHITE RR XING
 - (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY AND REUSE
 - (+) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
 - (#) NEW SIGN ASSEMBLY
 - (P) PROP SIGN ASSEMBLY
 - (C) CULVERT STRUCTURE
 - (M) OBJECT MARKER ASSEMBLY

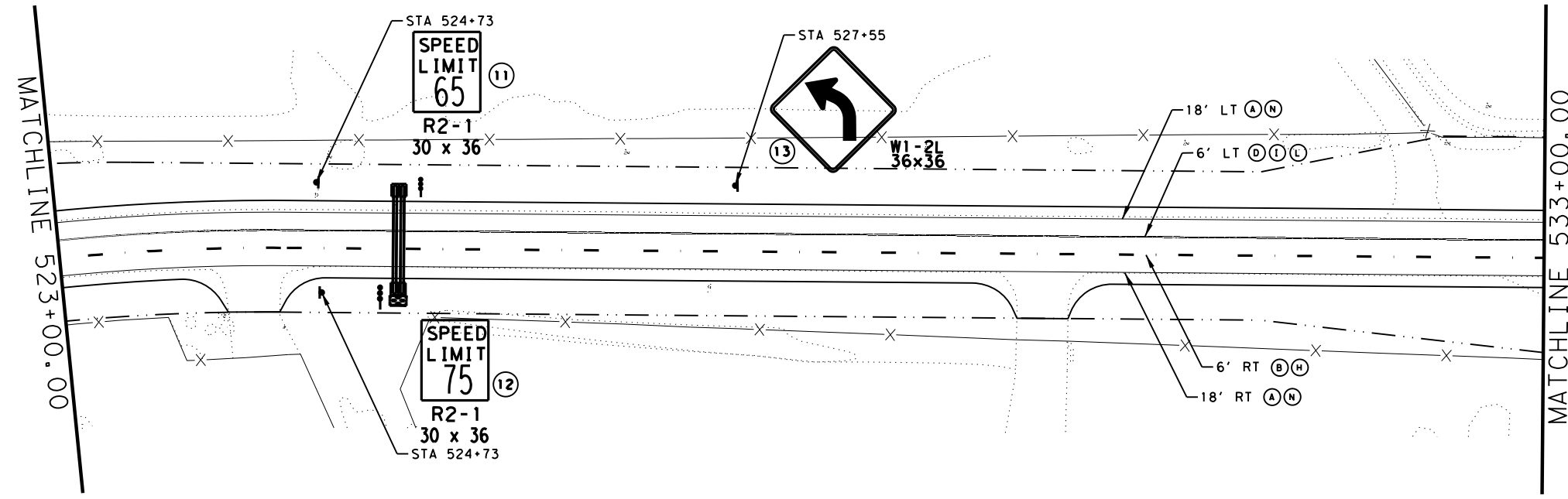
US 67
 SIGN & PAVEMENT MARKING DETAILS

SHEET 1 OF 24

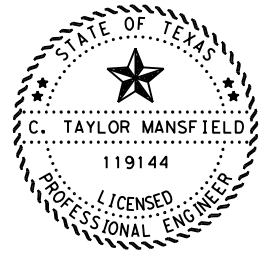
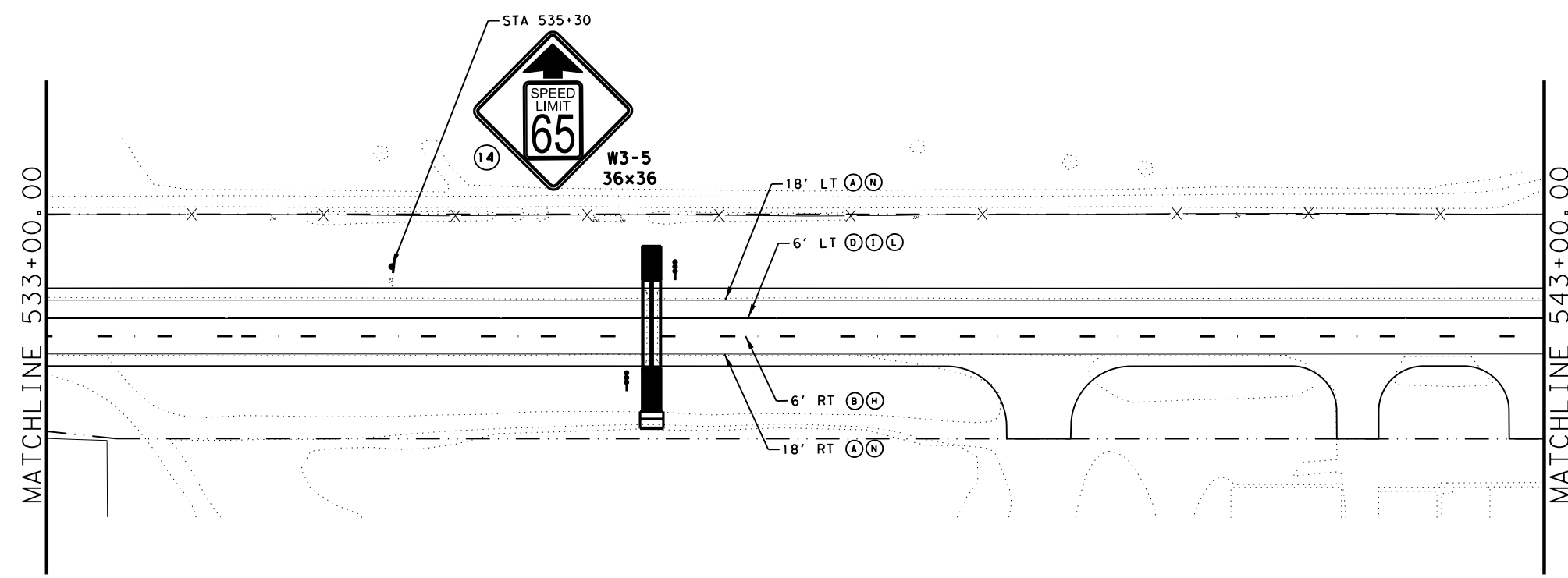
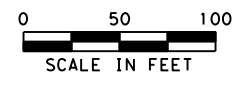


CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	224	

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- NOTE:**
 BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.
- LEGEND:**
- (A) 4" WHITE SOLID
 - (B) 4" WHITE BROKEN
 - (C) 4" YELLOW SOLID
 - (D) 4" DOUBLE YELLOW
 - (E) 8" WHITE SOLID
 - (F) 4" WHITE DOT
 - (G) 24" WHITE STOP BAR
 - (H) TYI I-C
 - (I) TYII A-A
 - (J) TYC ARROW
 - (K) TYC WORD
 - (L) CENTER LINE RUMBLE STRIP
 - (M) TYC ARROW (LNDR)
 - (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
 - (O) WHITE RR XING
 - (P) 36" WHITE YIELD TRIANGLE
 - (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
 - (#) REMOVE EXISTING SIGN ASSEMBLY
 - (#) NEW SIGN ASSEMBLY
 - (#) PROP SIGN ASSEMBLY
 - (#) OBJECT MARKER ASSEMBLY



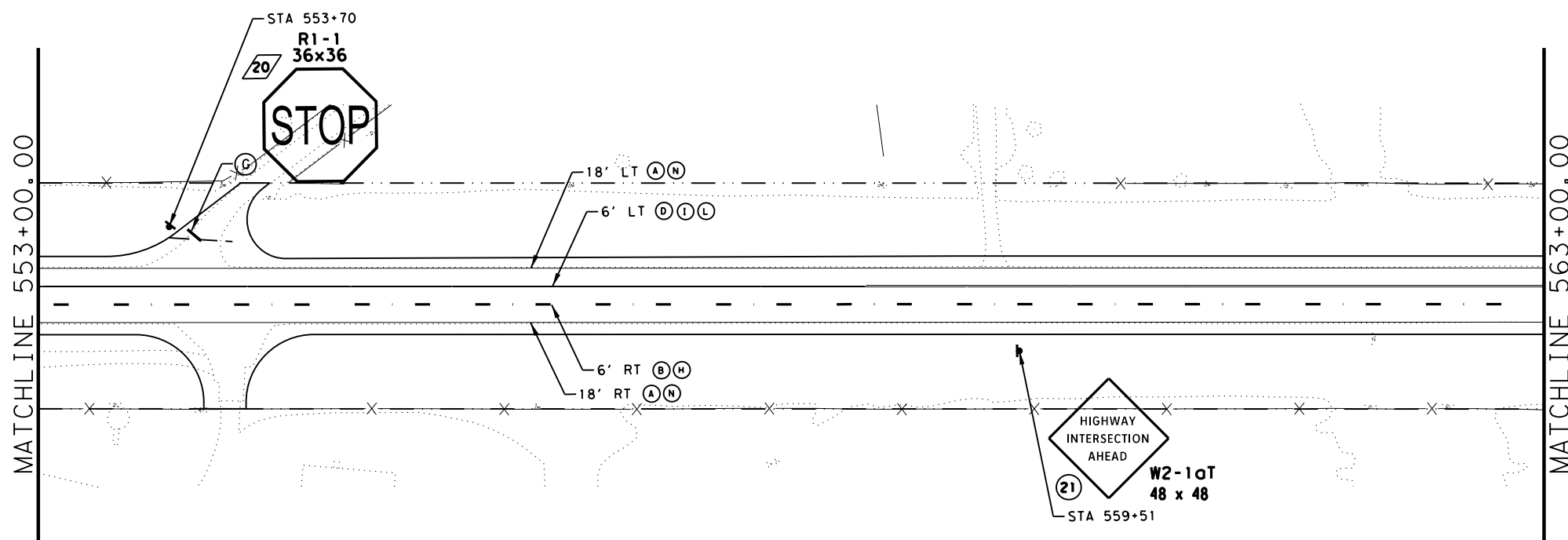
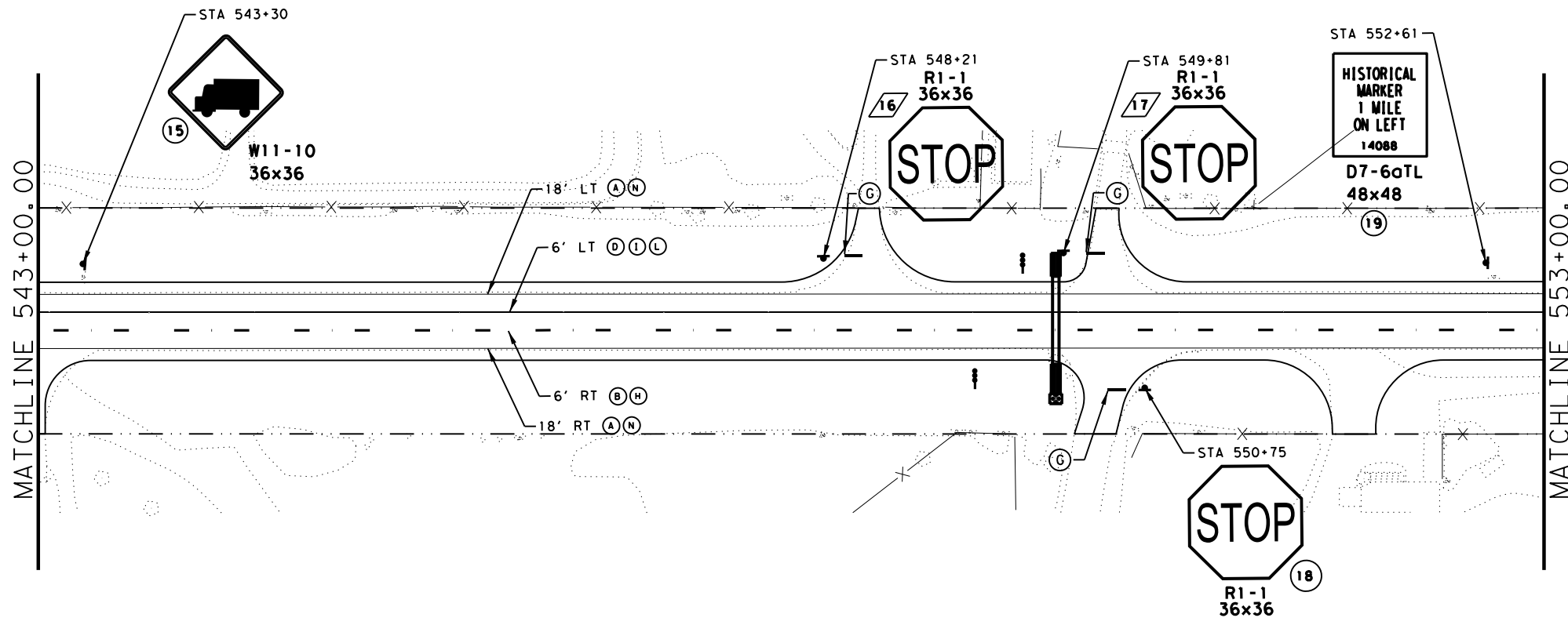
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 2 OF 24

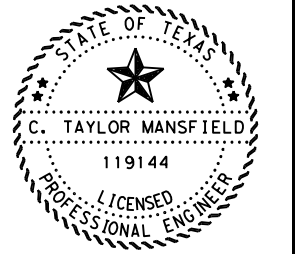
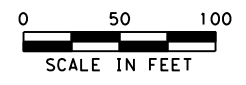
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0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	225	

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NOTE:
 BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

- LEGEND:**
- (A) 4" WHITE SOLID
 - (B) 4" WHITE BROKEN
 - (C) 4" YELLOW SOLID
 - (D) 4" DOUBLE YELLOW
 - (E) 8" WHITE SOLID
 - (F) 4" WHITE DOT
 - (G) 24" WHITE STOP BAR
 - (H) TYI I-C
 - (I) TYII A-A
 - (J) TYC ARROW
 - (K) TYC WORD
 - (L) CENTER LINE RUMBLE STRIP
 - (M) TYC ARROW (LNDP)
 - (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
 - (O) WHITE RR XING
 - (P) 36" WHITE YIELD TRIANGLE
 - (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
 - (#) REMOVE EXISTING SIGN ASSEMBLY
 - (#) NEW SIGN ASSEMBLY
 - (#) PROP SIGN ASSEMBLY
 - (#) CULVERT STRUCTURE
 - (#) OBJECT MARKER ASSEMBLY



C. Taylor Mansfield 2021.11.01
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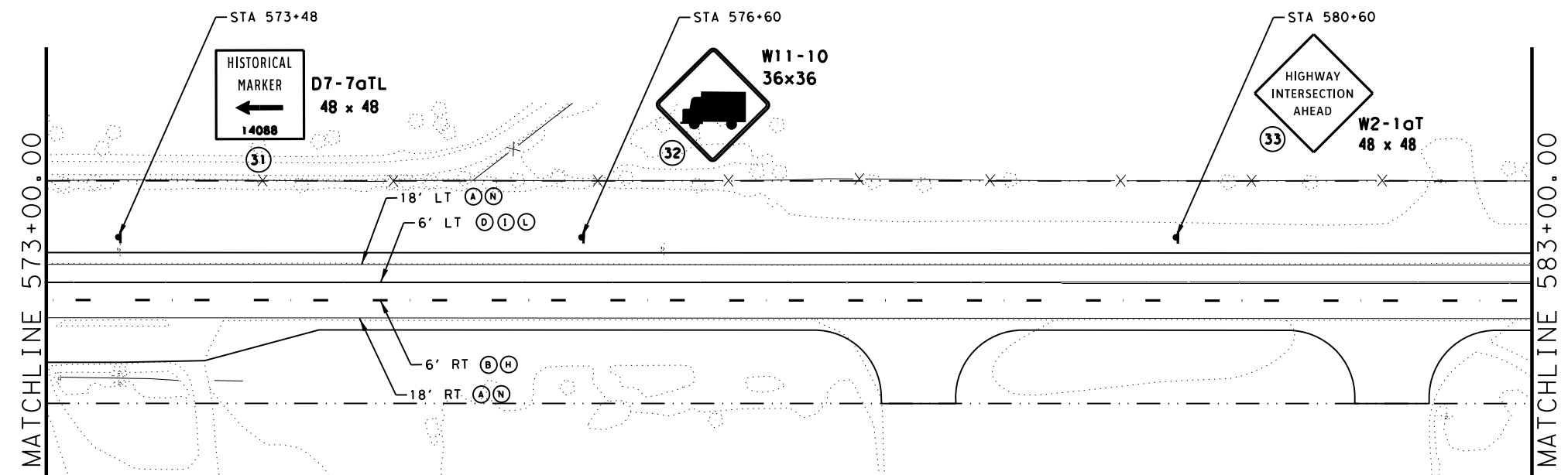
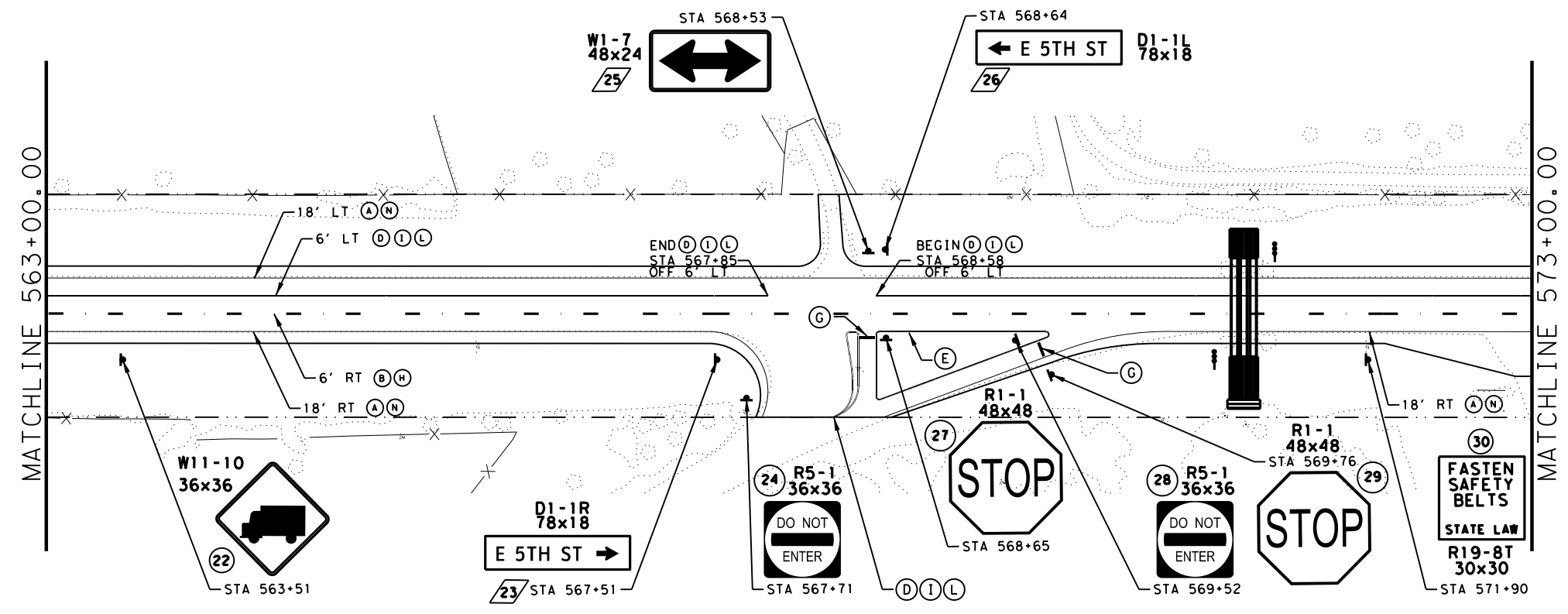
**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 3 OF 24



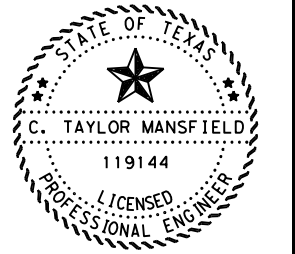
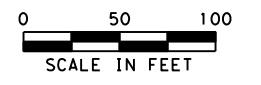
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	226	

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NOTE:
 BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

- LEGEND:**
- (A) 4" WHITE SOLID
 - (B) 4" WHITE BROKEN
 - (C) 4" YELLOW SOLID
 - (D) 4" DOUBLE YELLOW
 - (E) 8" WHITE SOLID
 - (F) 4" WHITE DOT
 - (G) 24" WHITE STOP BAR
 - (H) TYI I-C
 - (I) TYII A-A
 - (J) TYC ARROW
 - (K) TYC WORD
 - (L) CENTER LINE RUMBLE STRIP
 - (M) TYC ARROW (LNDR)
 - (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
 - (O) WHITE RR XING
 - (P) 36" WHITE YIELD TRIANGLE
 - (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
 - (#) REMOVE EXISTING SIGN ASSEMBLY
 - (#) NEW SIGN ASSEMBLY
 - (#) PROP SIGN ASSEMBLY
 - (#) CULVERT STRUCTURE
 - (#) OBJECT MARKER ASSEMBLY



C. Taylor Mansfield
 2021.11.01
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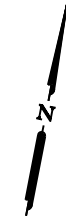
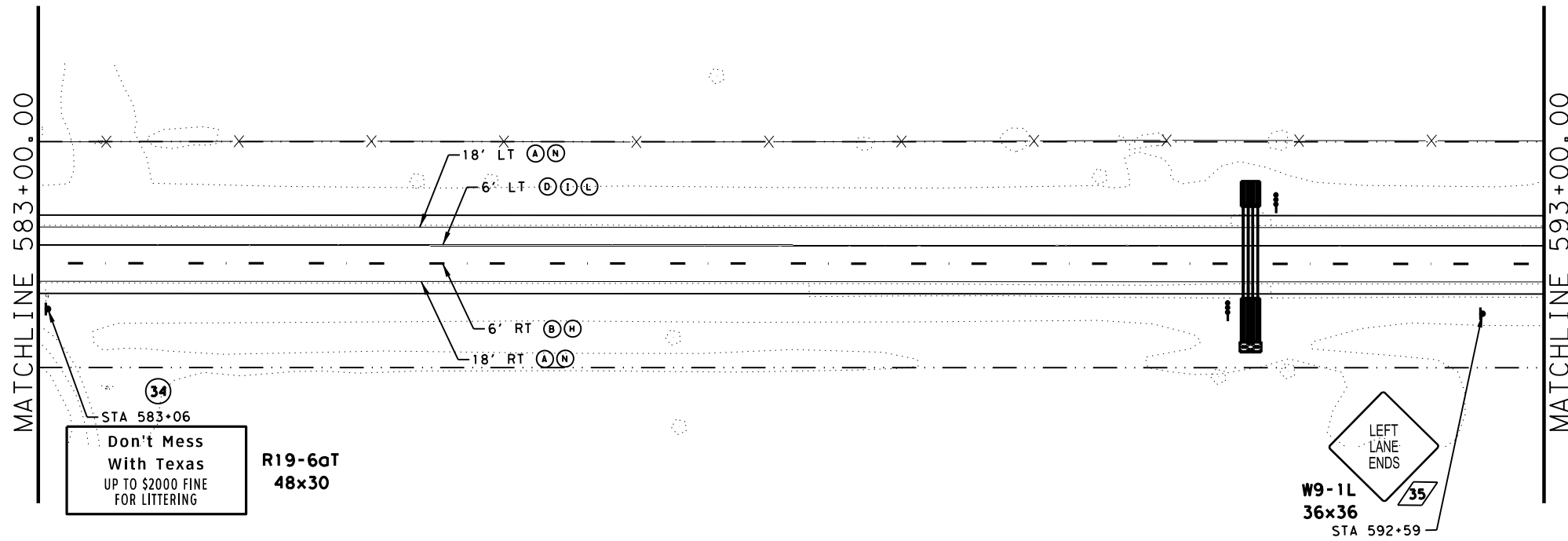
**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 4 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	227	

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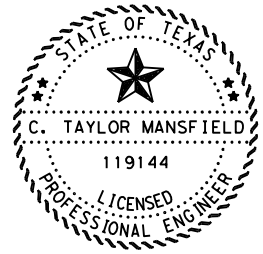
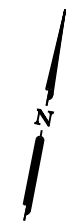
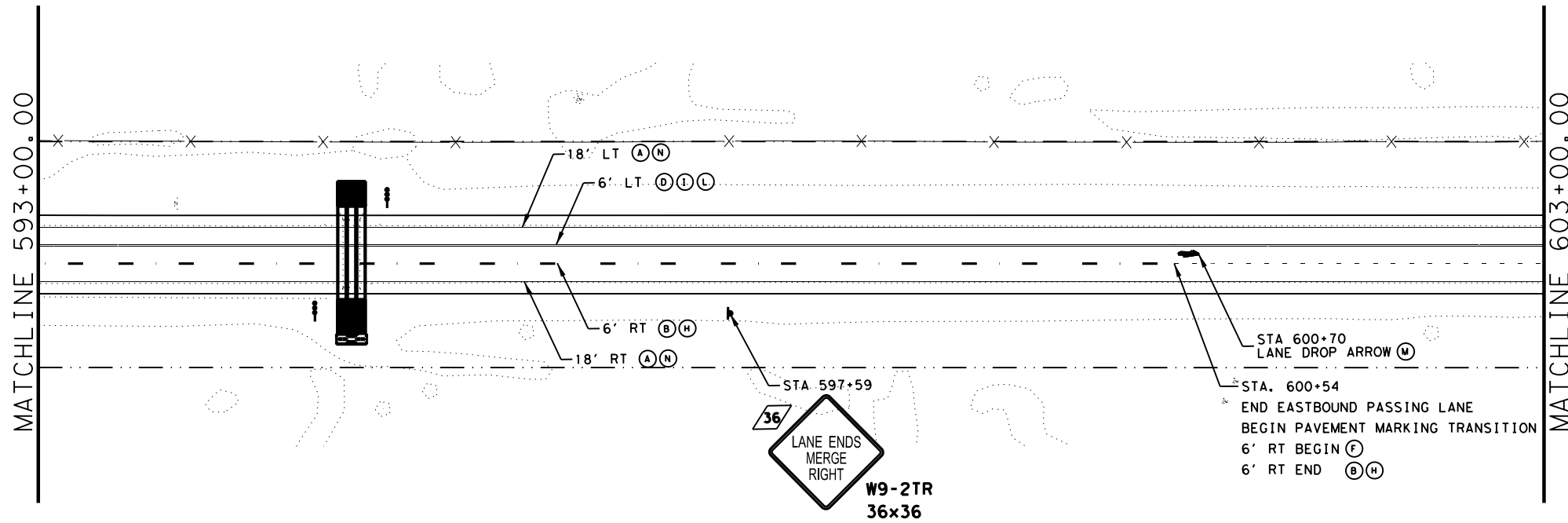
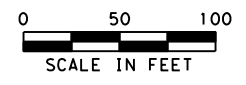


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
10' STRIP 30' SKIP
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDR)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (•) PROP SIGN ASSEMBLY
- (▭) CULVERT STRUCTURE
- (•) OBJECT MARKER ASSEMBLY



C. Taylor Mansfield 2021.11.01
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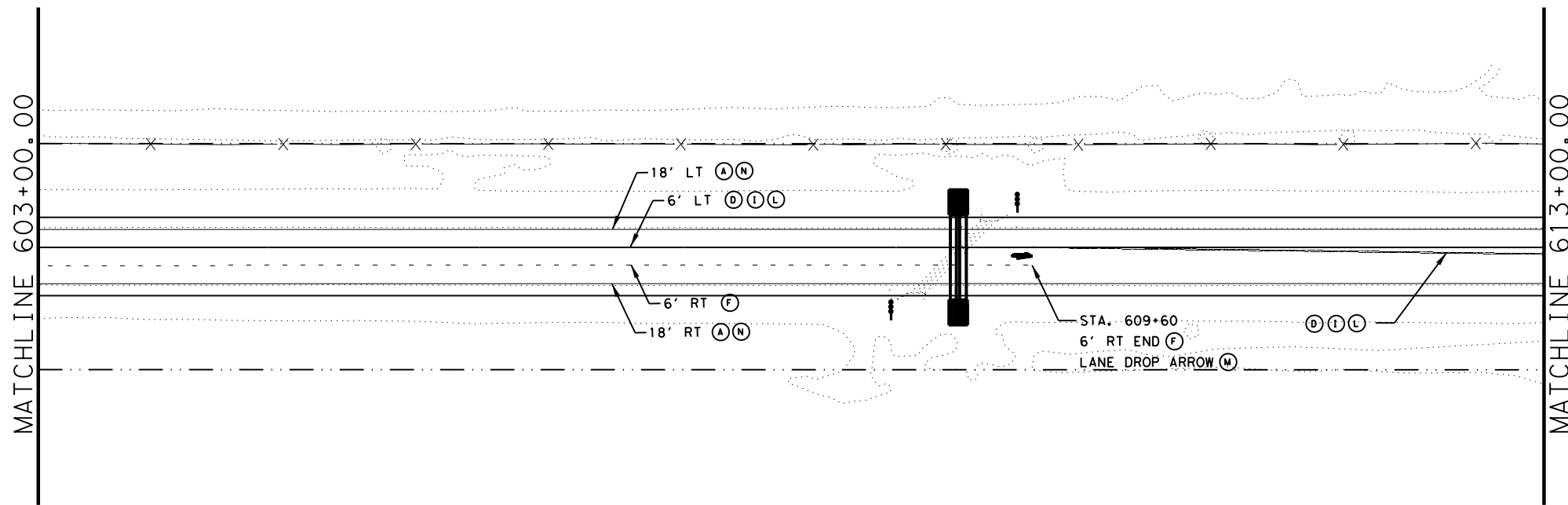
**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 5 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	228	

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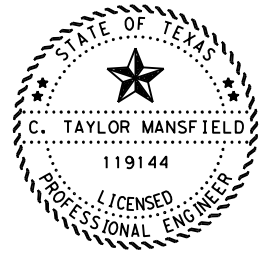
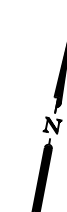
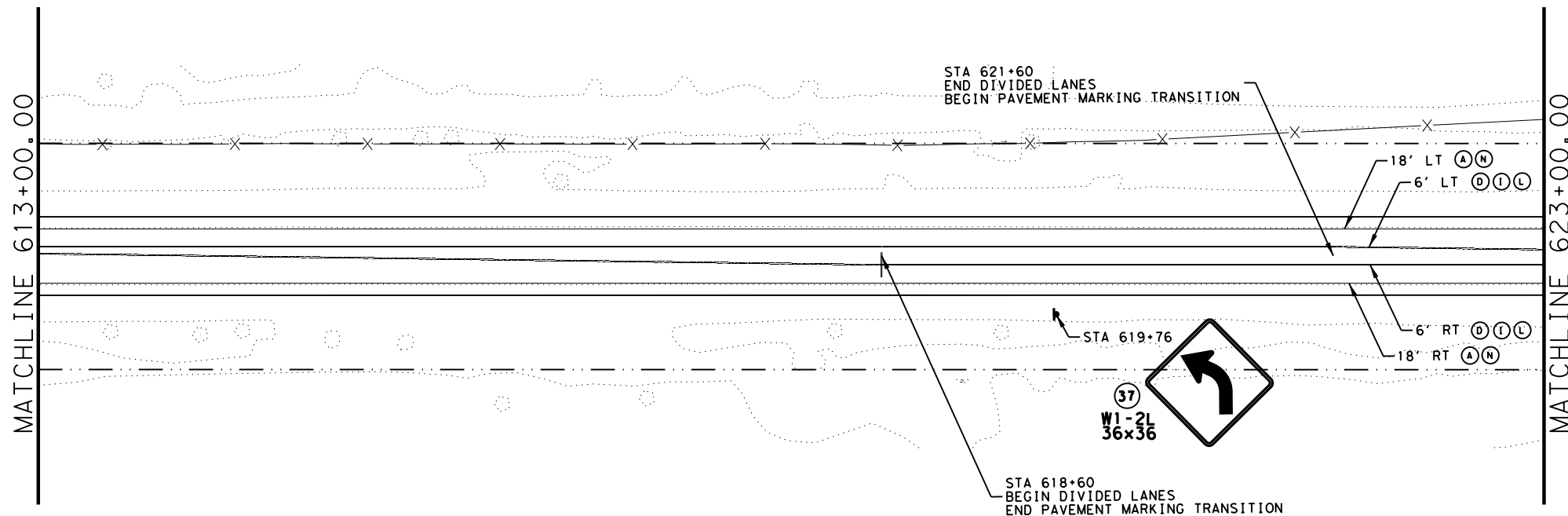
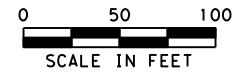


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (•) PROP SIGN ASSEMBLY
- (▬▬▬) CULVERT STRUCTURE
- (|) OBJECT MARKER ASSEMBLY



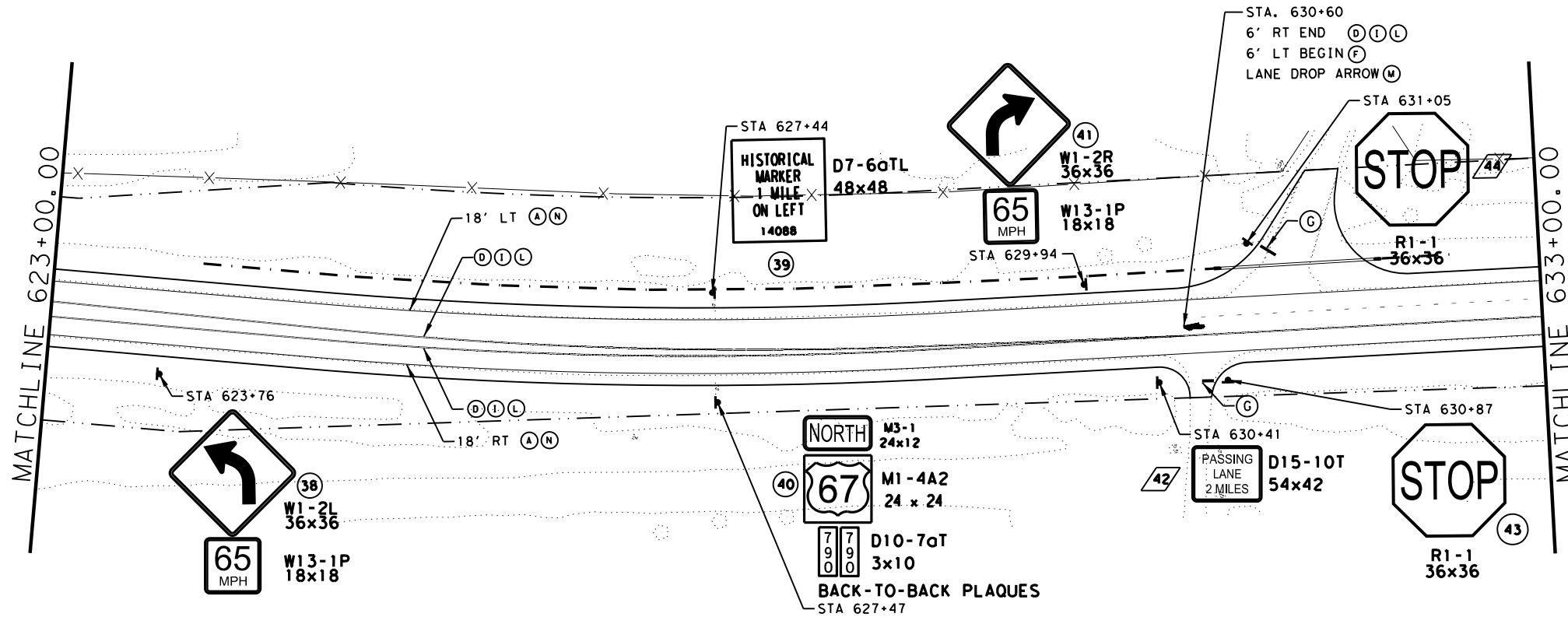
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

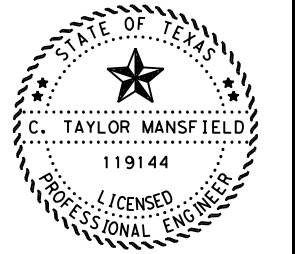
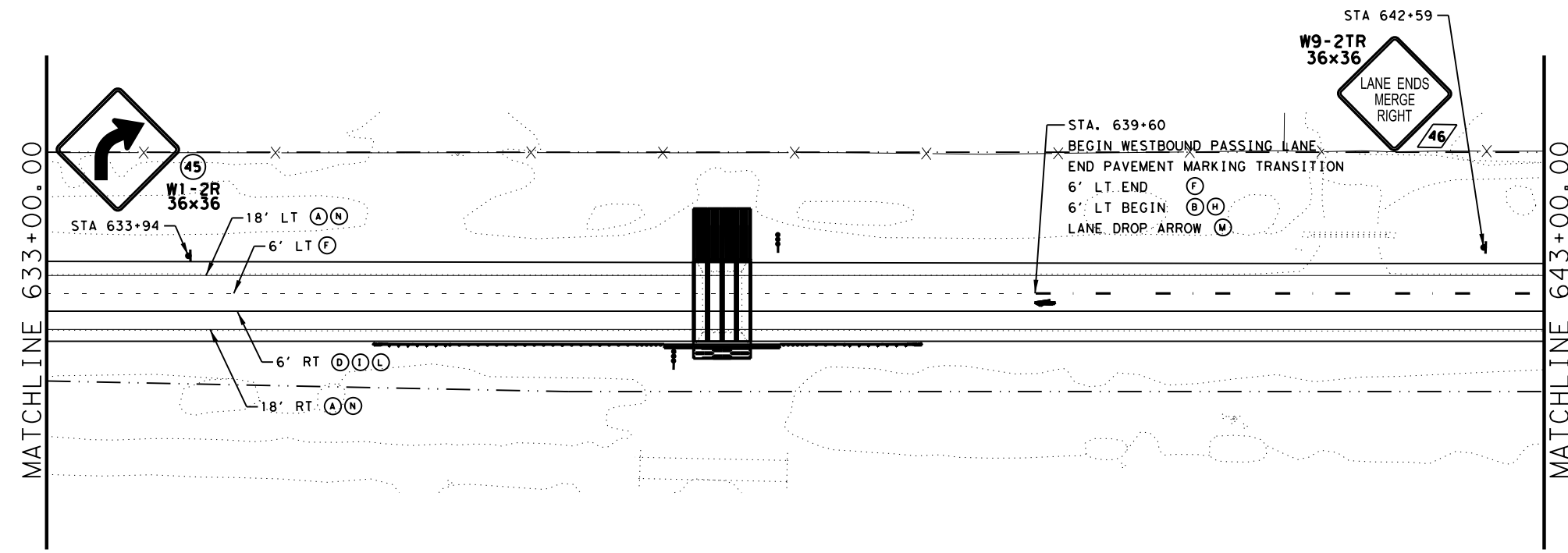
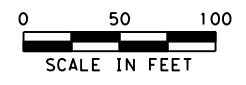
SHEET 6 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	229	

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- NOTE:**
 BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.
- LEGEND:**
- (A) 4" WHITE SOLID
 - (B) 4" WHITE BROKEN
 - (C) 4" YELLOW SOLID
 - (D) 4" DOUBLE YELLOW
 - (E) 8" WHITE SOLID
 - (F) 4" WHITE DOT
 - (G) 24" WHITE STOP BAR
 - (H) TYI I-C
 - (I) TYII A-A
 - (J) TYC ARROW
 - (K) TYC WORD
 - (L) CENTER LINE RUMBLE STRIP
 - (M) TYC ARROW (LNDRP)
 - (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
 - (O) WHITE RR XING
 - (P) 36" WHITE YIELD TRIANGLE
 - (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
 - (#) REMOVE EXISTING SIGN ASSEMBLY
 - (#) NEW SIGN ASSEMBLY
 - (#) PROP SIGN ASSEMBLY
 - (#) CULVERT STRUCTURE
 - (#) OBJECT MARKER ASSEMBLY



C. Taylor Mansfield
 2021.11.01
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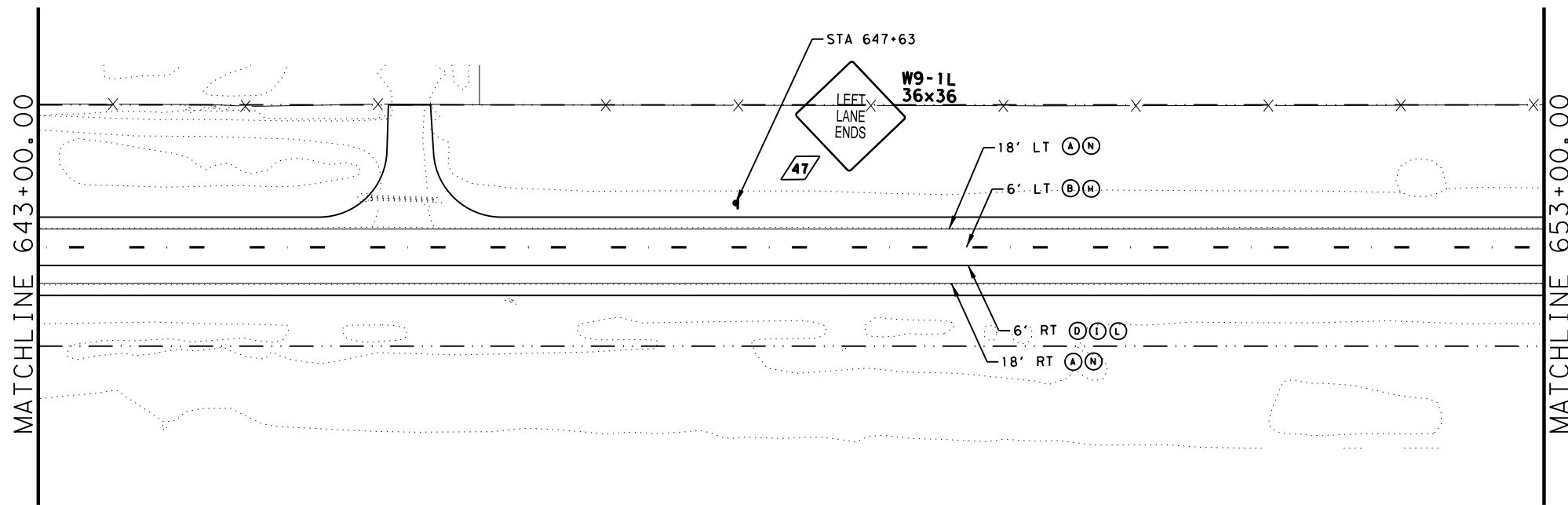
**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 7 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	230	

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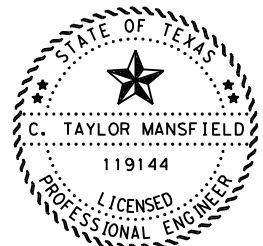
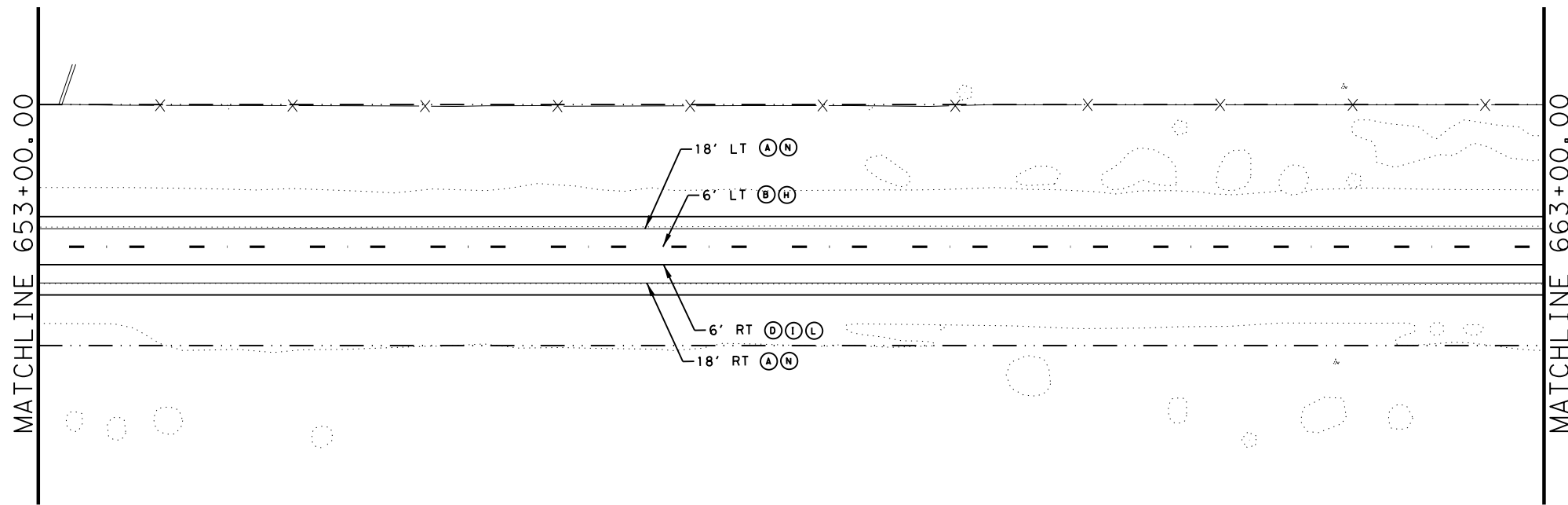
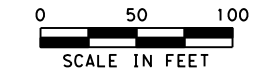


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (#) PROP SIGN ASSEMBLY
- (#) OBJECT MARKER ASSEMBLY



C. Taylor Mansfield 2021.11.01
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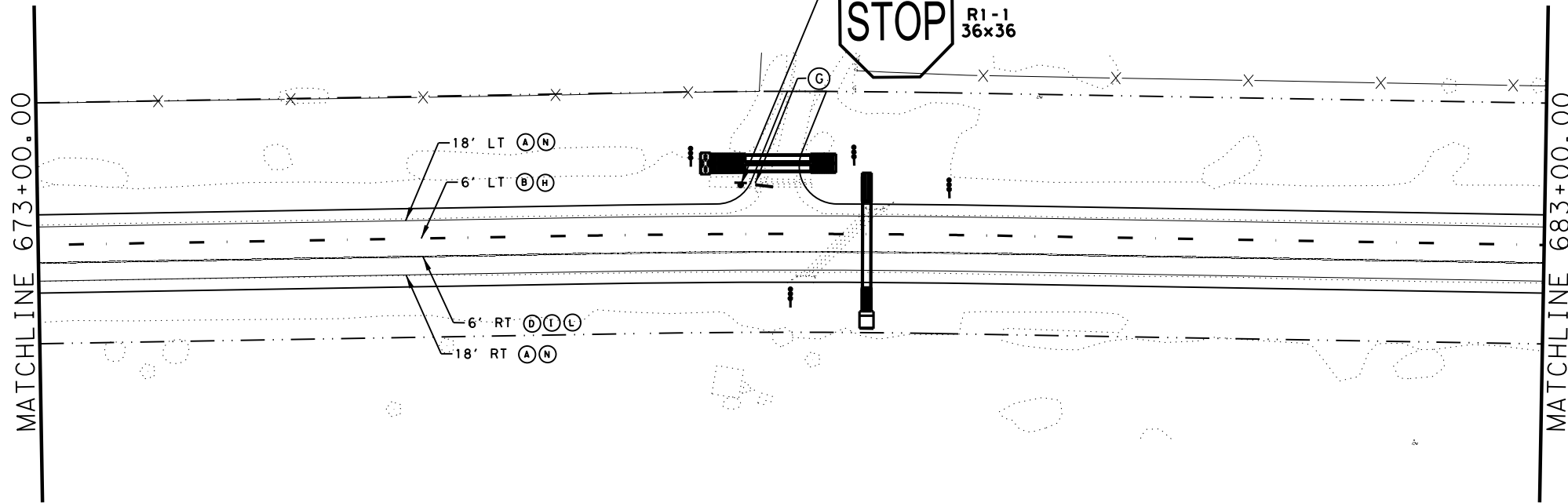
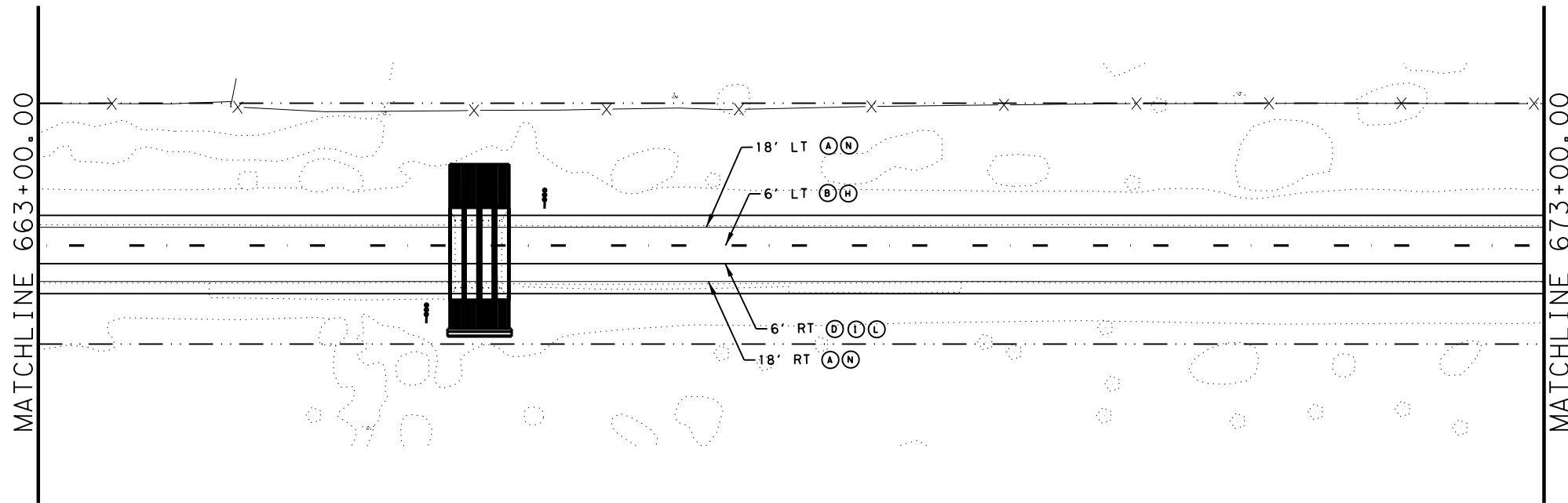
**US 67
SIGN & PAVEMENT
MARKING DETAILS**

SHEET 8 OF 24

© 2021

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		231

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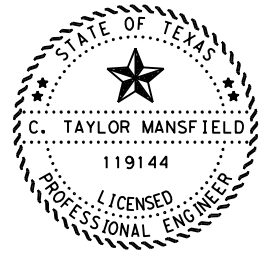
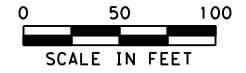


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (●) PROP SIGN ASSEMBLY
- (▭) CULVERT STRUCTURE
- (|) OBJECT MARKER ASSEMBLY



C. Taylor Mansfield 2021.11.01
 13:10:56-05'00"

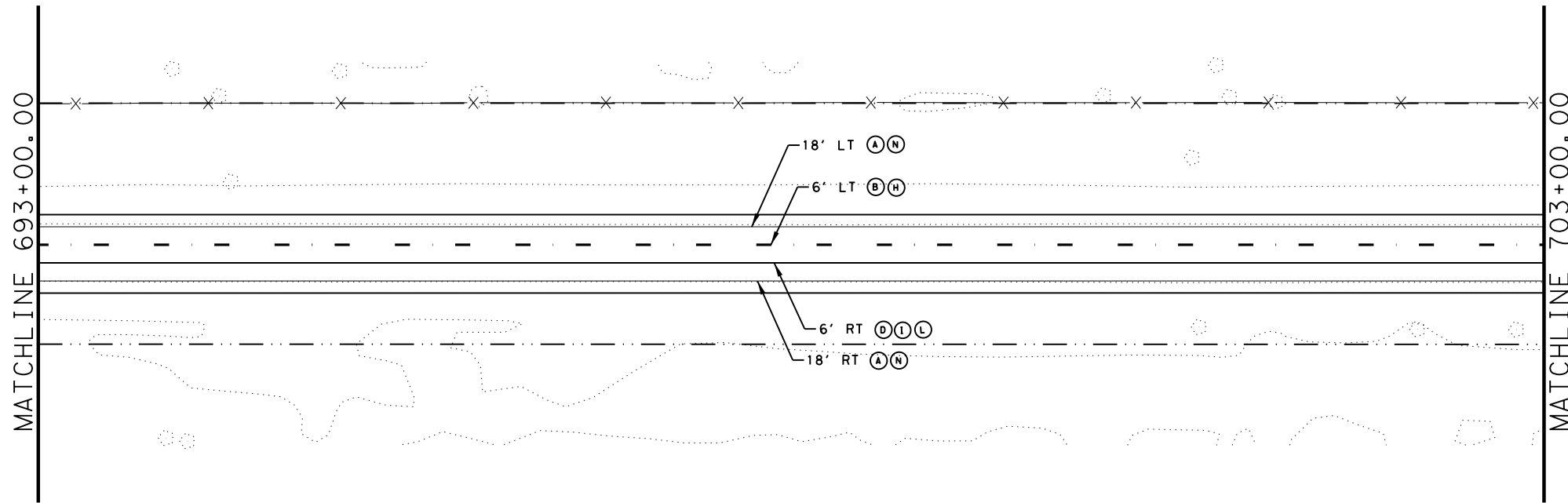
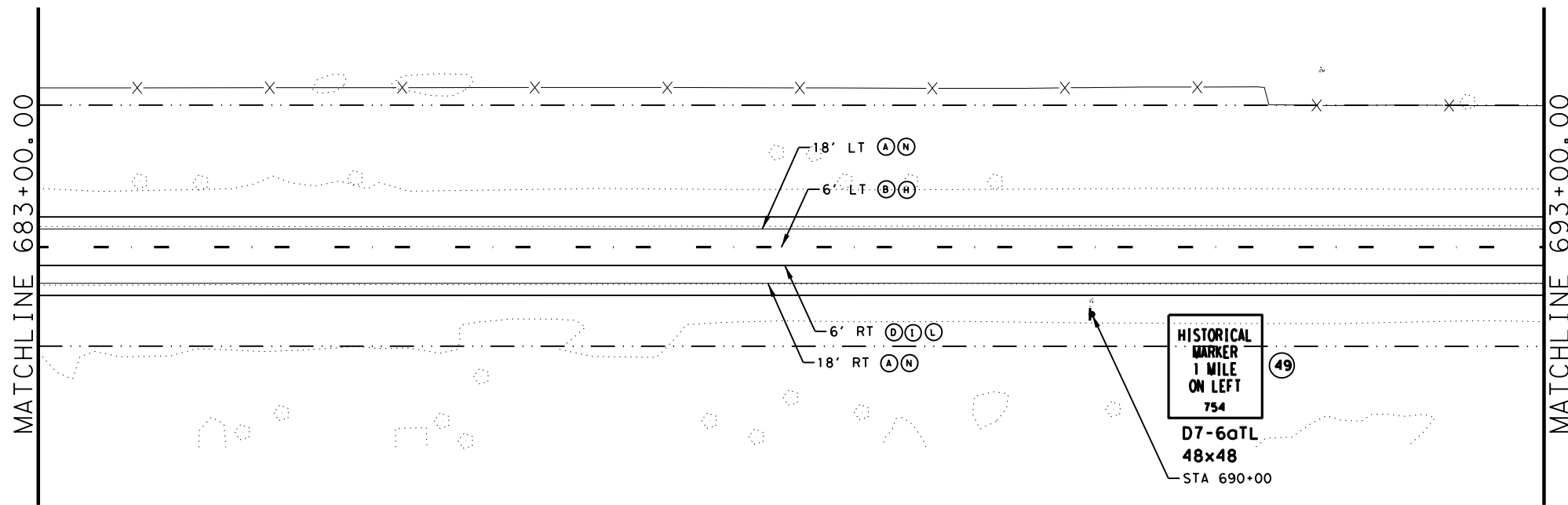
**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 9 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	232	

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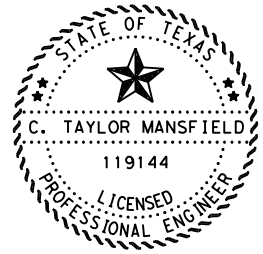


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (●) PROP SIGN ASSEMBLY
- (▬▬▬) CULVERT STRUCTURE
- (|) OBJECT MARKER ASSEMBLY



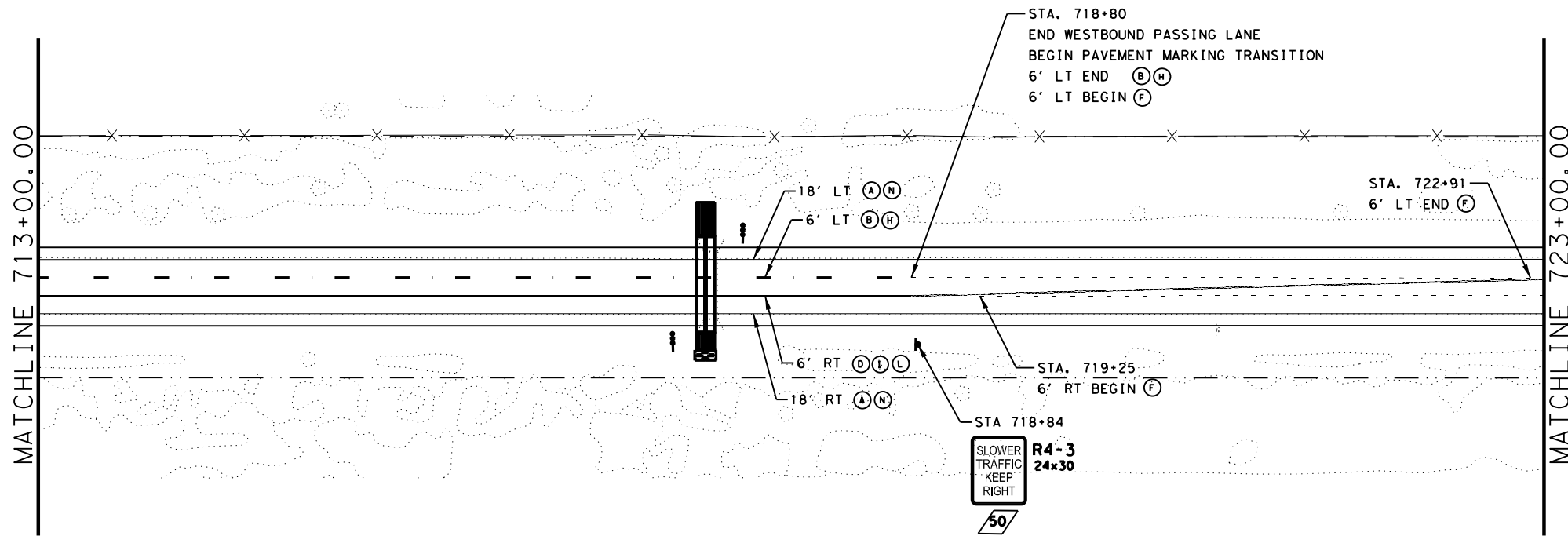
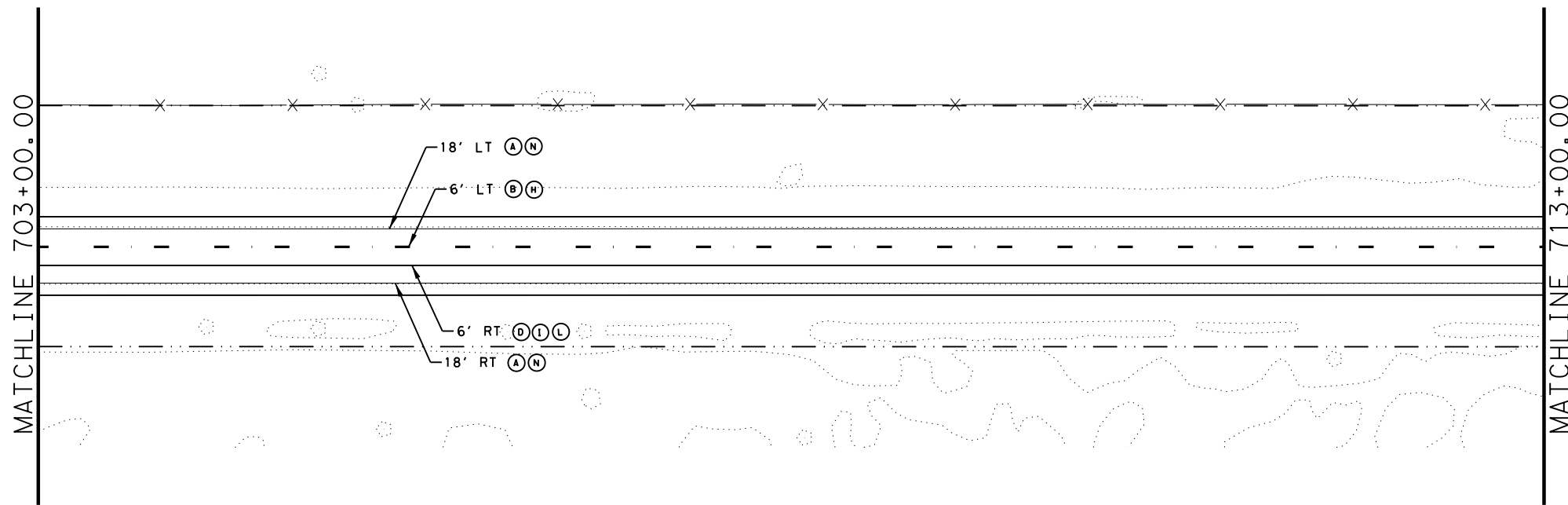
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 10 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		233

DATE: 10/22/2021 05:52 PM
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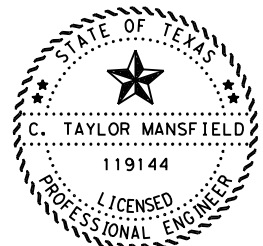
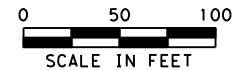


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (•) PROP SIGN ASSEMBLY
- (▬▬▬) CULVERT STRUCTURE
- (|) OBJECT MARKER ASSEMBLY



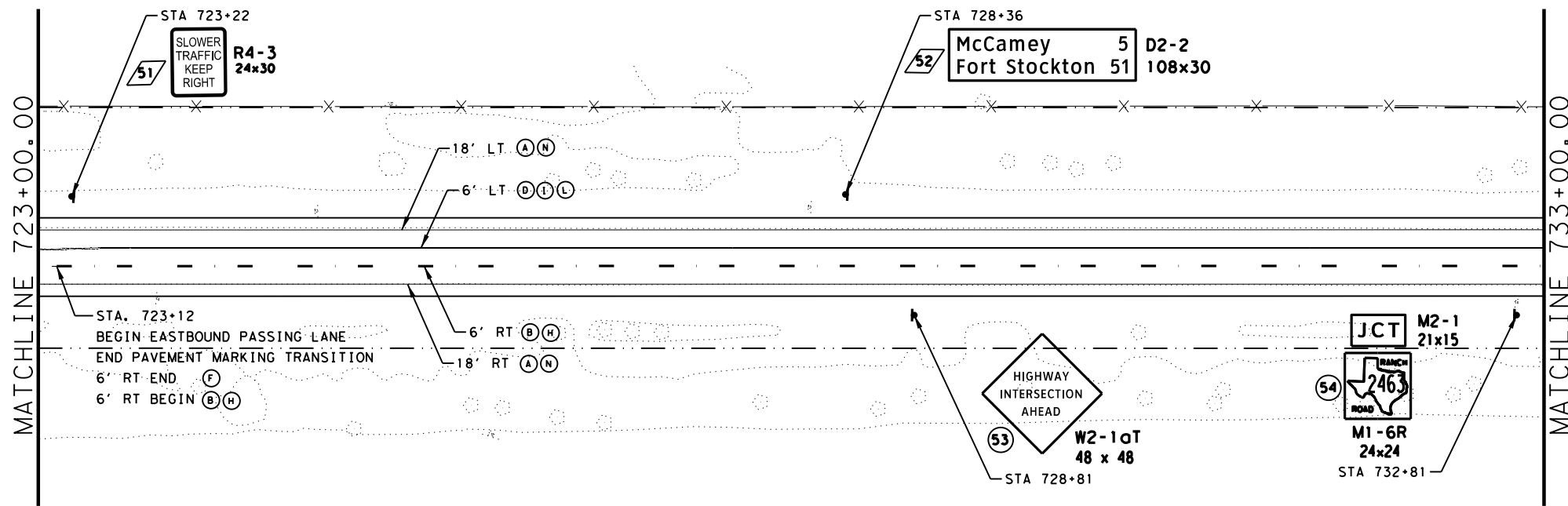
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 11 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	234	

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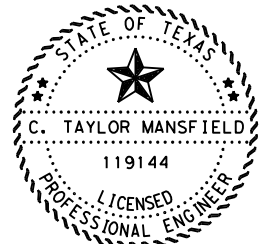
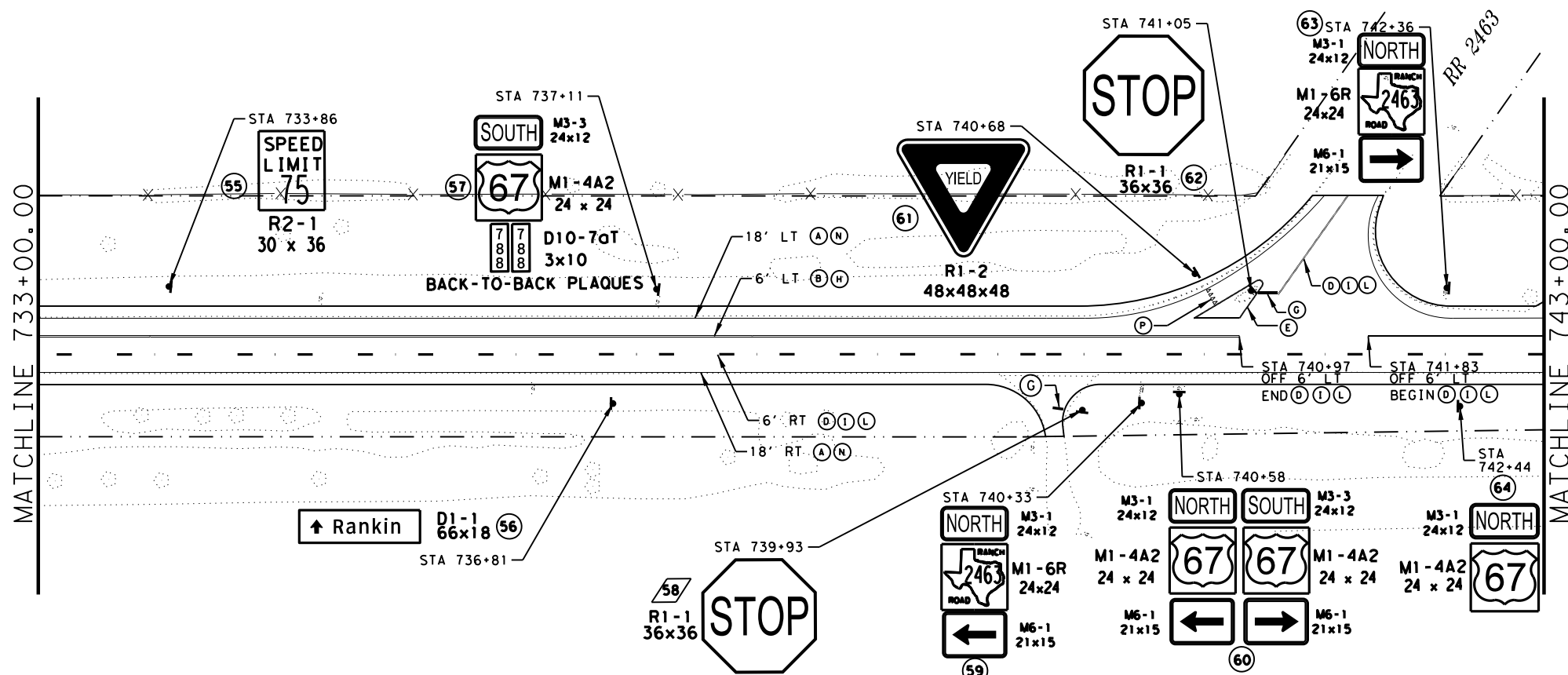


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (#) PROP SIGN ASSEMBLY
- (#) OBJECT MARKER ASSEMBLY



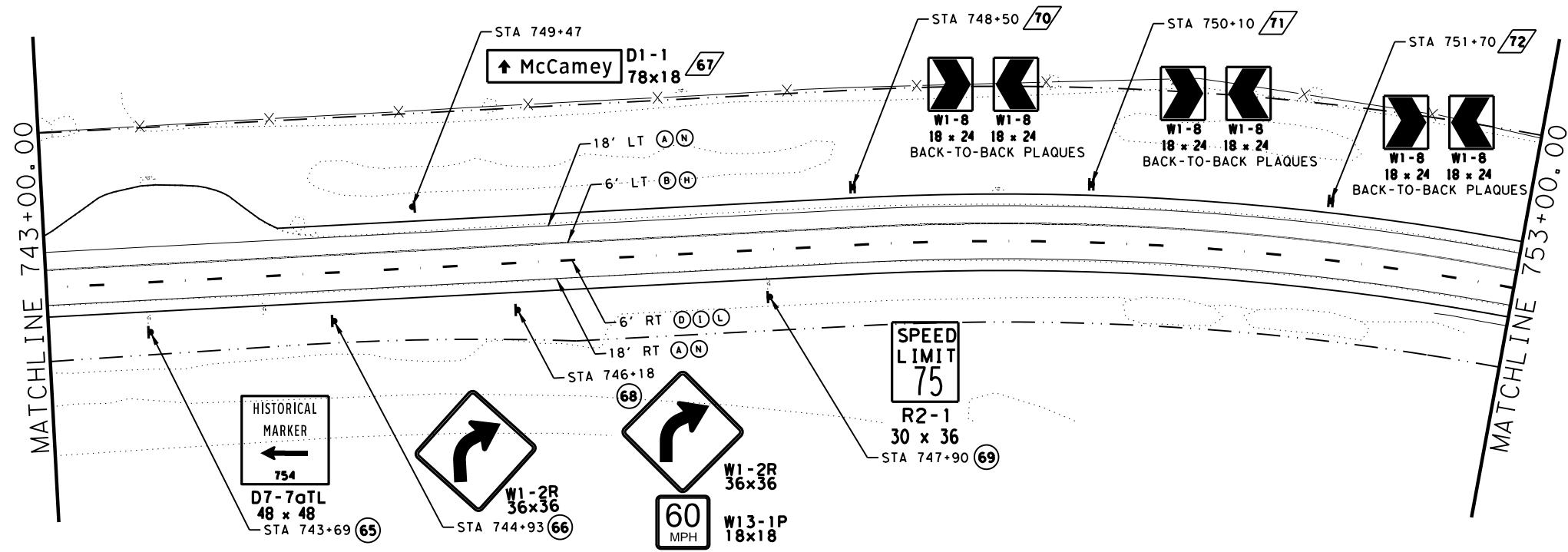
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

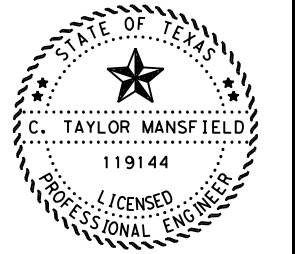
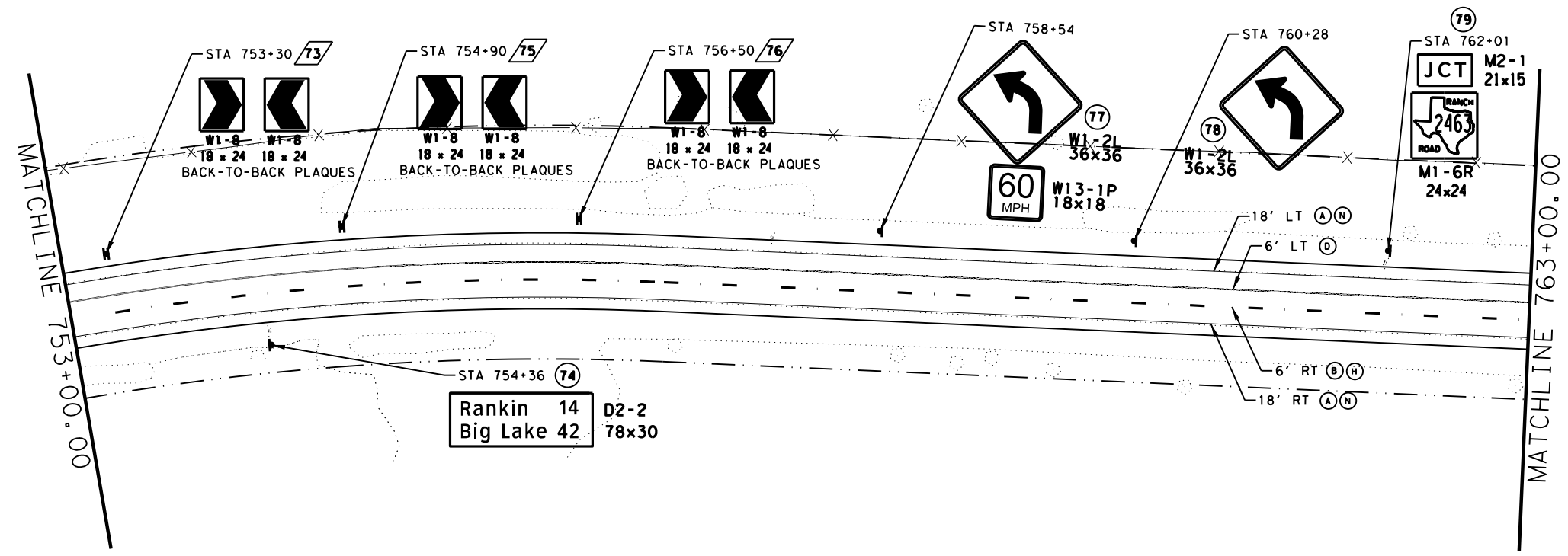
SHEET 12 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	235	

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- NOTE:**
 BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.
- LEGEND:**
- (A) 4" WHITE SOLID
 - (B) 4" WHITE BROKEN
 - (C) 4" YELLOW SOLID
 - (D) 4" DOUBLE YELLOW
 - (E) 8" WHITE SOLID
 - (F) 4" WHITE DOT
 - (G) 24" WHITE STOP BAR
 - (H) TYI I-C
 - (I) TYII A-A
 - (J) TYC ARROW
 - (K) TYC WORD
 - (L) CENTER LINE RUMBLE STRIP
 - (M) TYC ARROW (LNPD)
 - (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
 - (O) WHITE RR XING
 - (P) 36" WHITE YIELD TRIANGLE
 - (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
 - (#) REMOVE EXISTING SIGN ASSEMBLY
 - (#) NEW SIGN ASSEMBLY
 - (#) PROP SIGN ASSEMBLY
 - (#) CULVERT STRUCTURE
 - (#) OBJECT MARKER ASSEMBLY



C. Taylor Mansfield 2021.11.01
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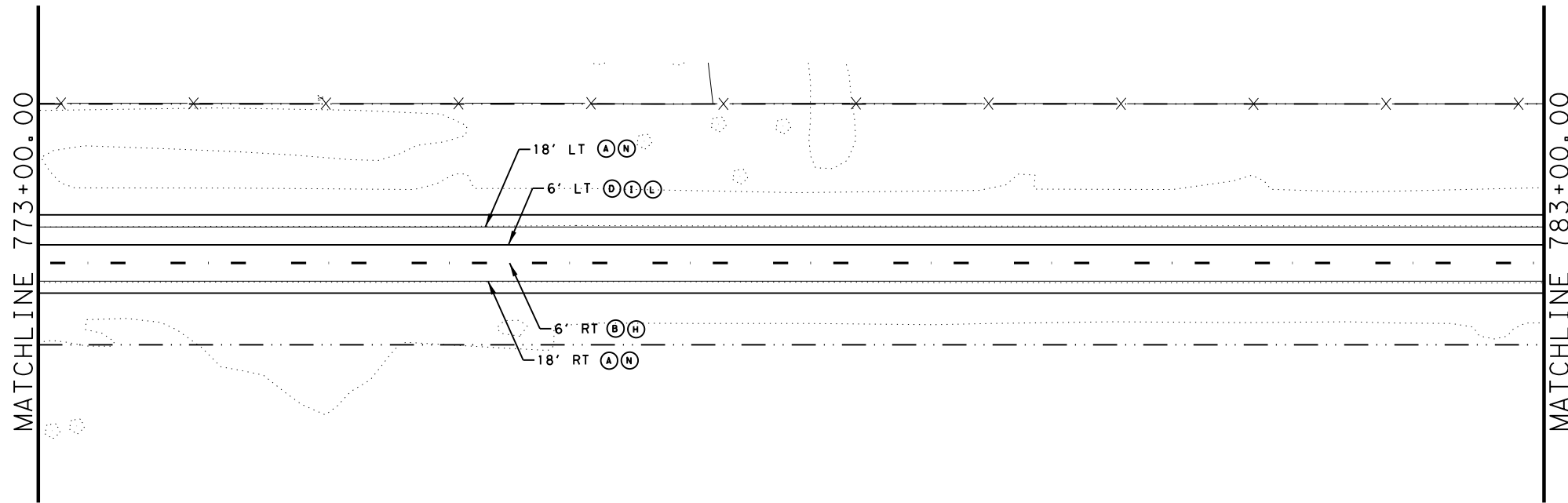
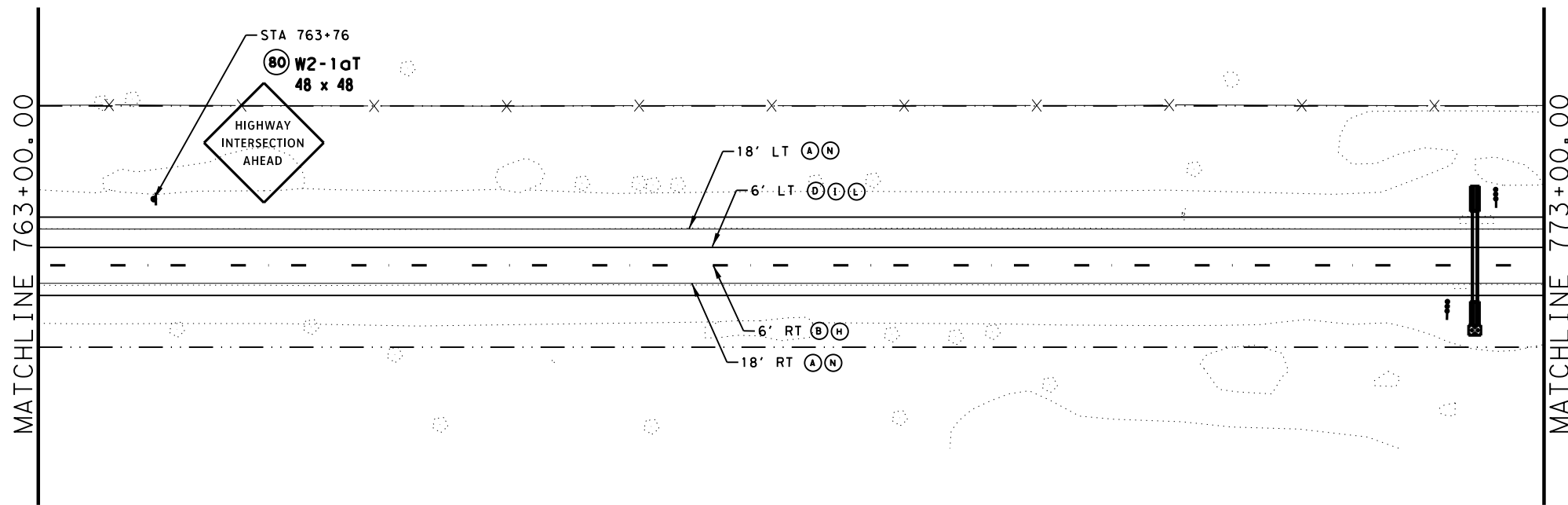
**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 13 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	236	

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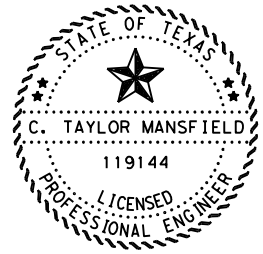


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (|) PROP SIGN ASSEMBLY
- (|) OBJECT MARKER ASSEMBLY



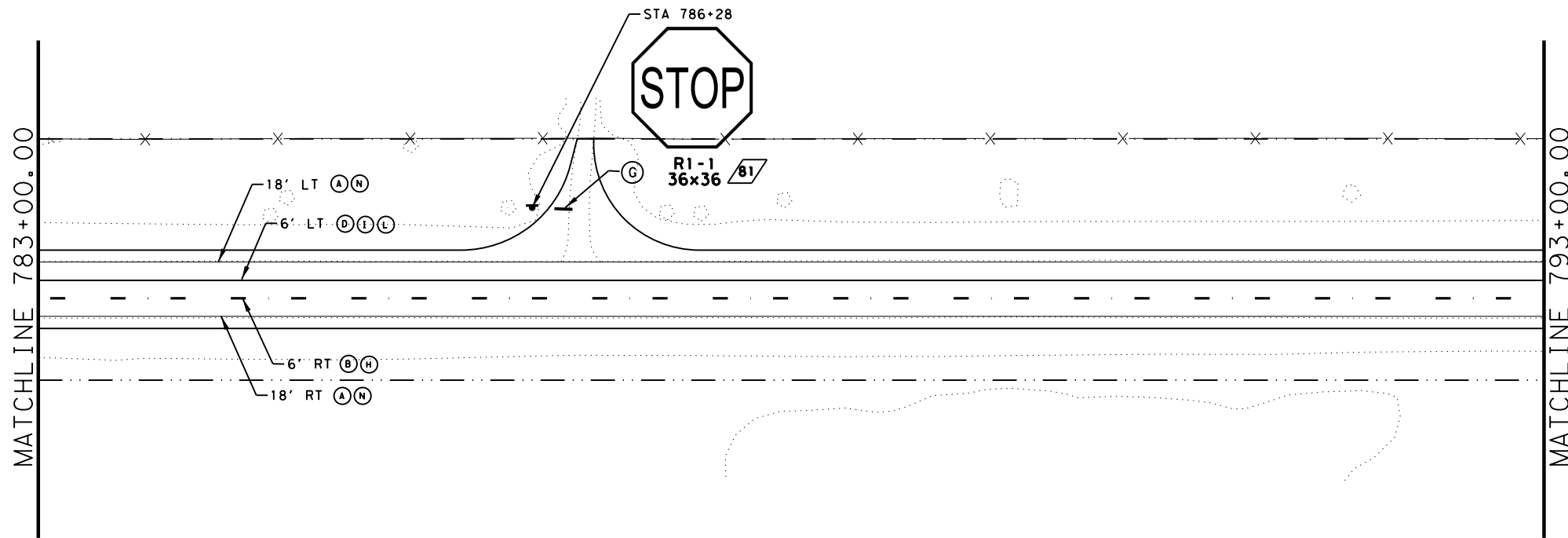
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

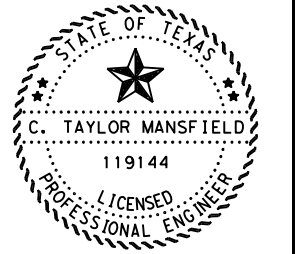
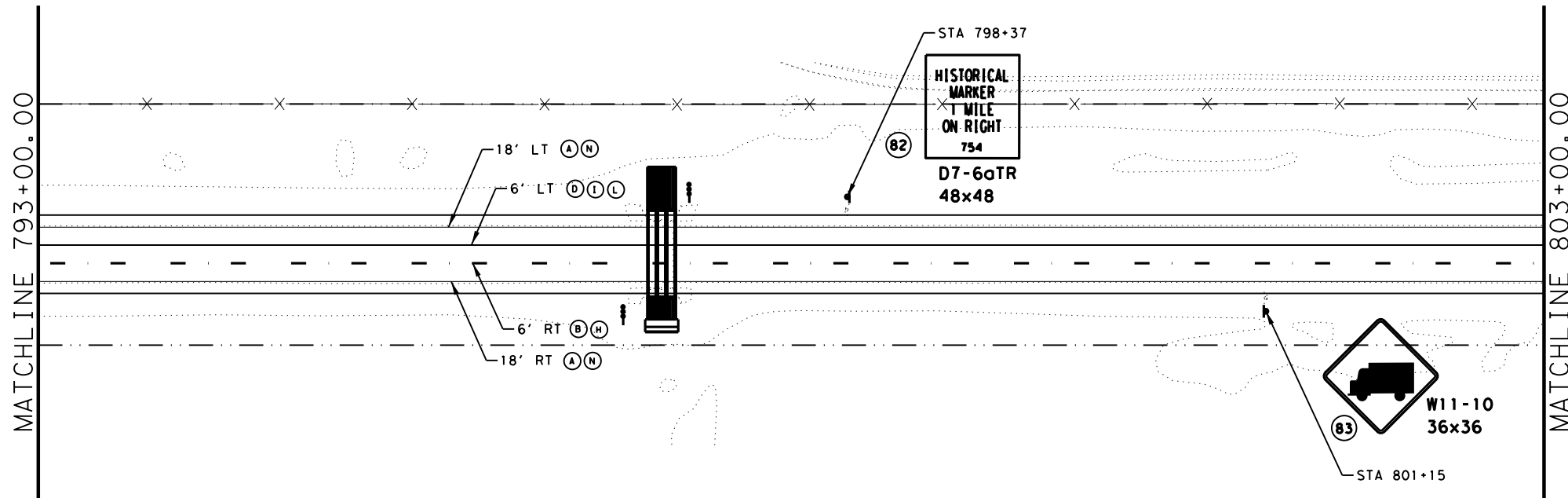
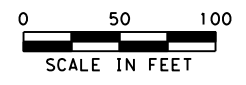
SHEET 14 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	237	



- NOTE:**
 BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.
- LEGEND:**
- (A) 4" WHITE SOLID
 - (B) 4" WHITE BROKEN
 - (C) 4" YELLOW SOLID
 - (D) 4" DOUBLE YELLOW
 - (E) 8" WHITE SOLID
 - (F) 4" WHITE DOT
 - (G) 24" WHITE STOP BAR
 - (H) TYI I-C
 - (I) TYII A-A
 - (J) TYC ARROW
 - (K) TYC WORD
 - (L) CENTER LINE RUMBLE STRIP
 - (M) TYC ARROW (LNDR)
 - (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
 - (O) WHITE RR XING
 - (P) 36" WHITE YIELD TRIANGLE
 - (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
 - (#) REMOVE EXISTING SIGN ASSEMBLY
 - (#) NEW SIGN ASSEMBLY
 - (#) PROP SIGN ASSEMBLY
 - (#) OBJECT MARKER ASSEMBLY



C. Taylor Mansfield 2021.11.01
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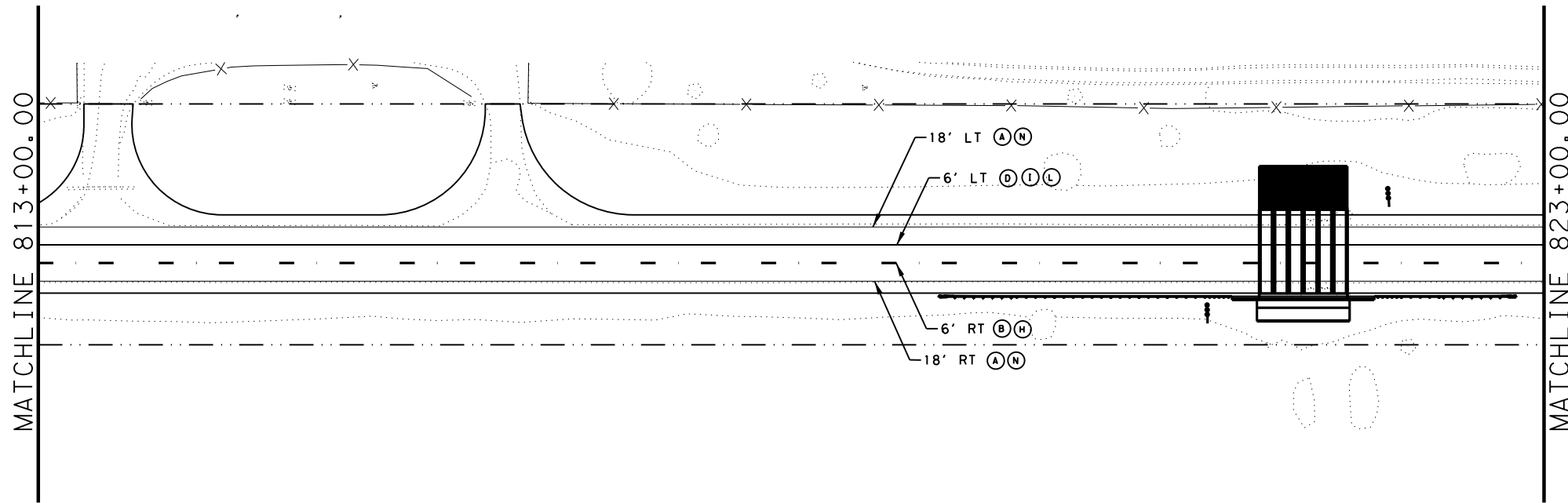
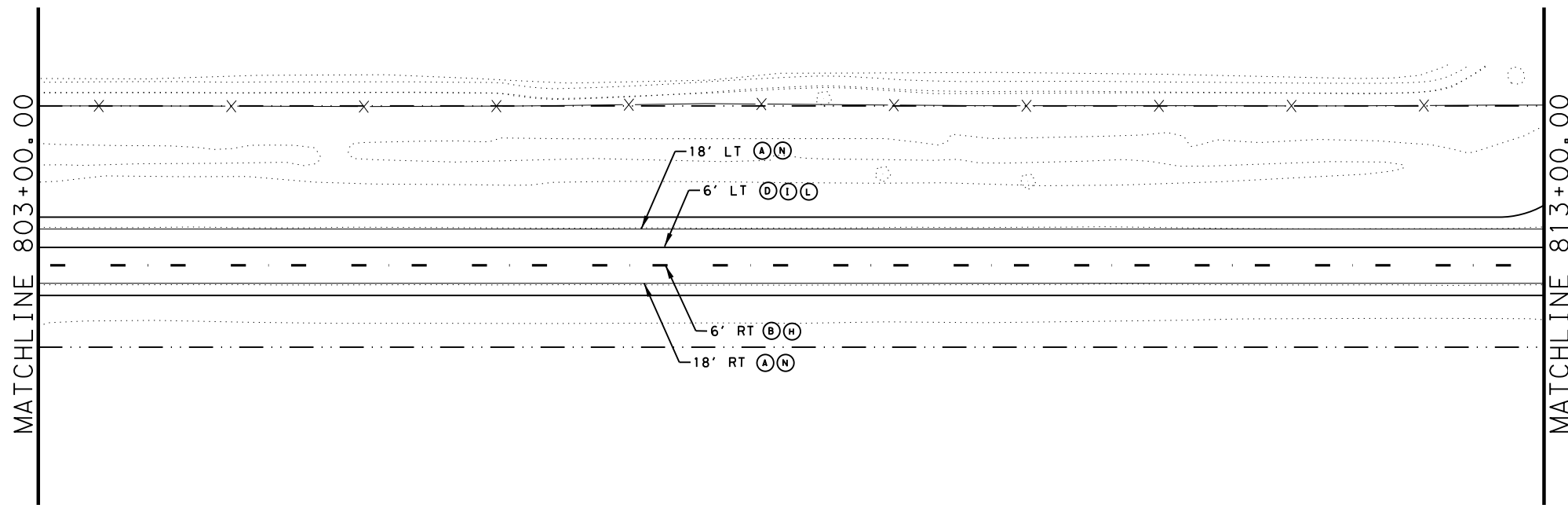
**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 15 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	238	

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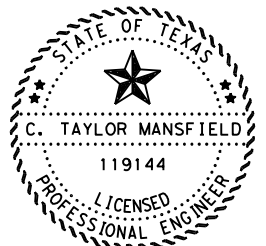
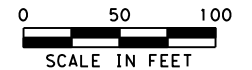


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
10' STRIP 30' SKIP
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE
RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS
(RUMBLE STRIPS) USE OPTION 3 FROM
STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD
TRIANGLE
- (#) REMOVE EXISTING
SIGN ASSEMBLY & REPLACE WITH
NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING
SIGN ASSEMBLY
- (#) NEW SIGN
ASSEMBLY
- (•) PROP SIGN ASSEMBLY
- (▭) CULVERT STRUCTURE
- (|) OBJECT MARKER ASSEMBLY



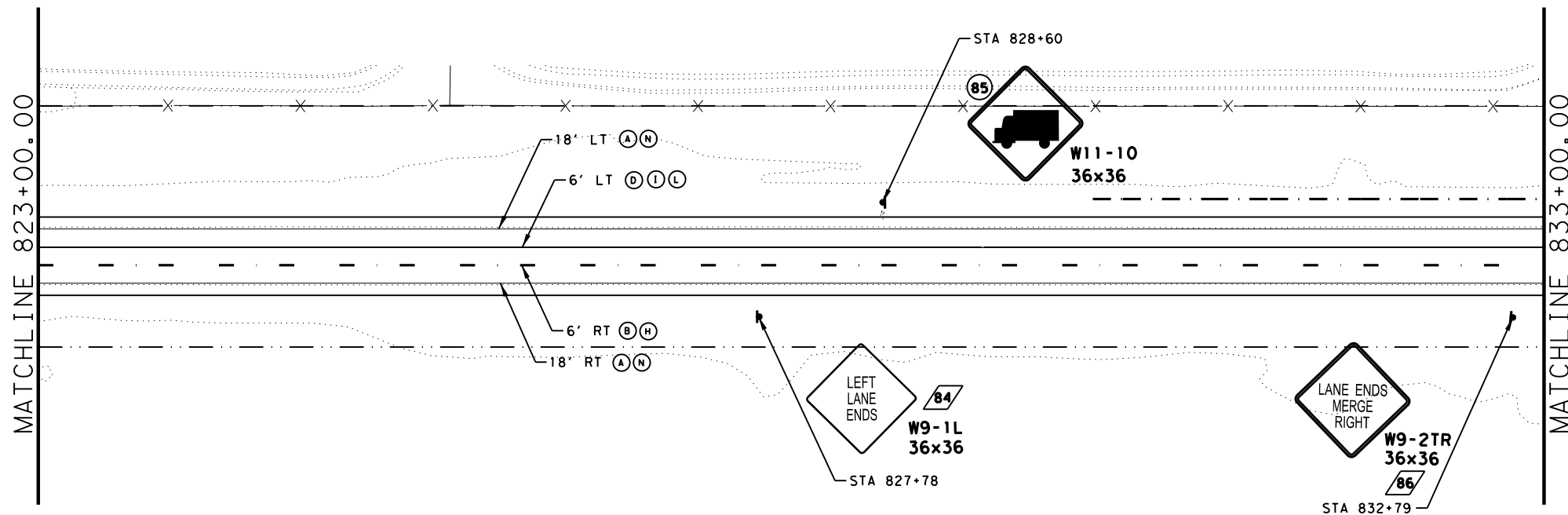
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

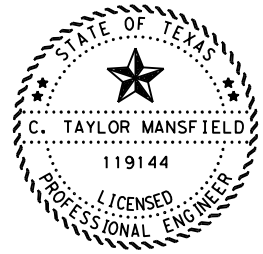
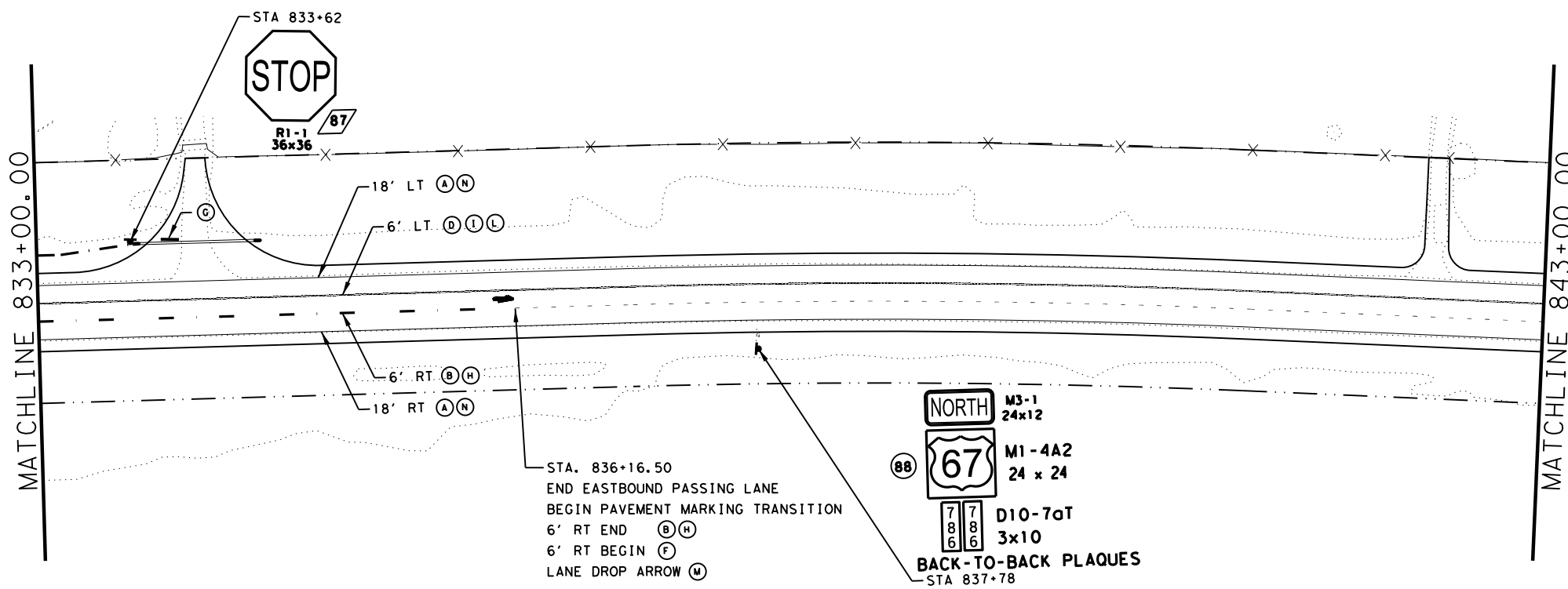
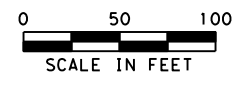
SHEET 16 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		239

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- NOTE:**
 BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.
- LEGEND:**
- (A) 4" WHITE SOLID
 - (B) 4" WHITE BROKEN
 - (C) 4" YELLOW SOLID
 - (D) 4" DOUBLE YELLOW
 - (E) 8" WHITE SOLID
 - (F) 4" WHITE DOT
 - (G) 24" WHITE STOP BAR
 - (H) TYI I-C
 - (I) TYII A-A
 - (J) TYC ARROW
 - (K) TYC WORD
 - (L) CENTER LINE RUMBLE STRIP
 - (M) TYC ARROW (LNDP)
 - (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
 - (O) WHITE RR XING
 - (P) 36" WHITE YIELD TRIANGLE
 - (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
 - (#) REMOVE EXISTING SIGN ASSEMBLY
 - (#) NEW SIGN ASSEMBLY
 - (●) PROP SIGN ASSEMBLY
 - (▬) CULVERT STRUCTURE
 - (⊙) OBJECT MARKER ASSEMBLY



C. Taylor Mansfield 2021.11.01
 13:10:57-05'00"

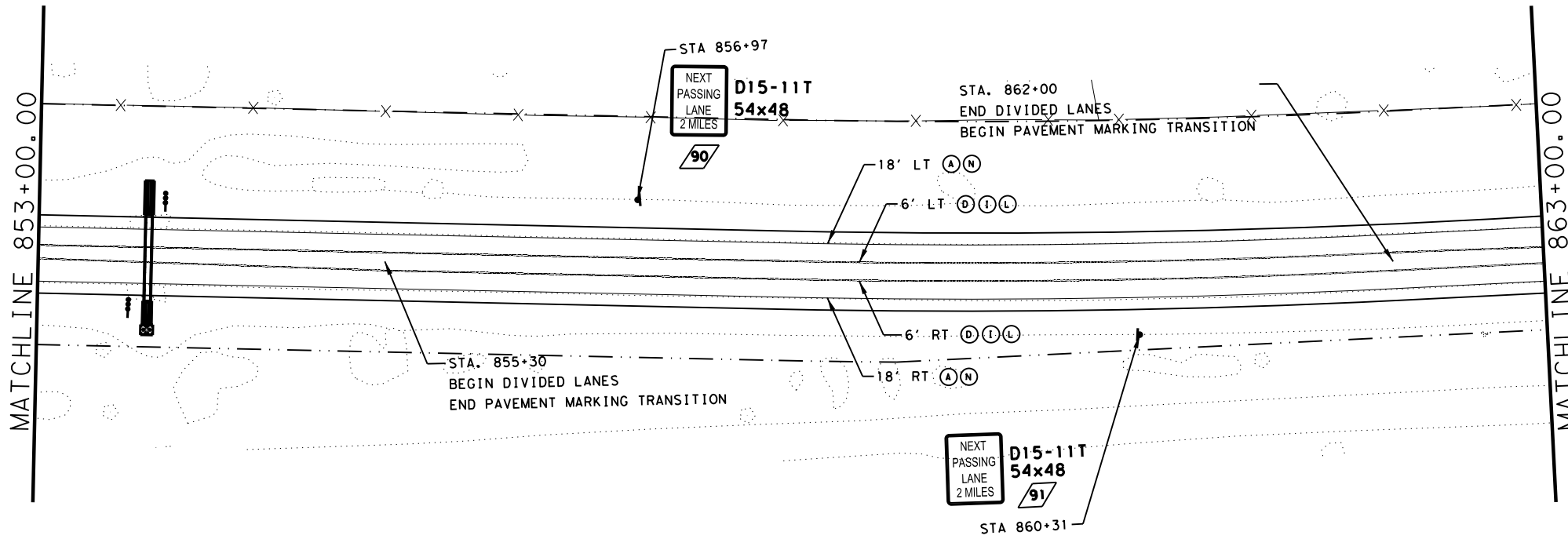
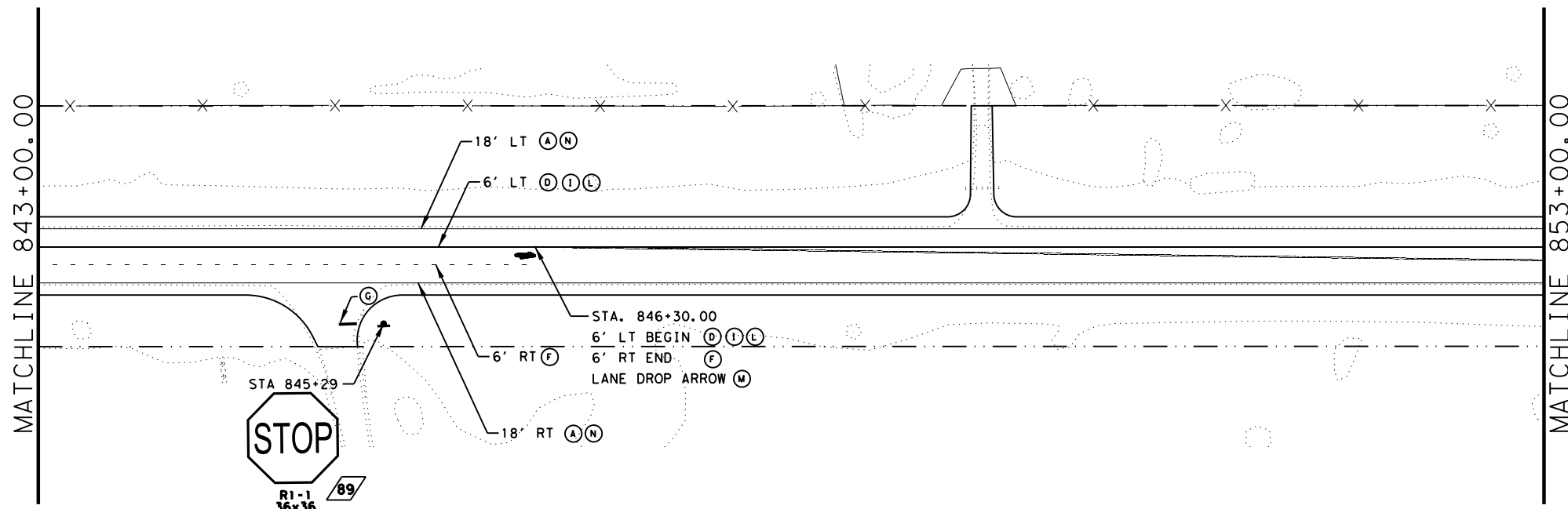
**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 17 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	240	

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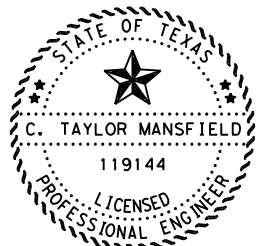
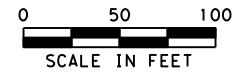


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (#) PROP SIGN ASSEMBLY
- [Symbol] CULVERT STRUCTURE
- [Symbol] OBJECT MARKER ASSEMBLY



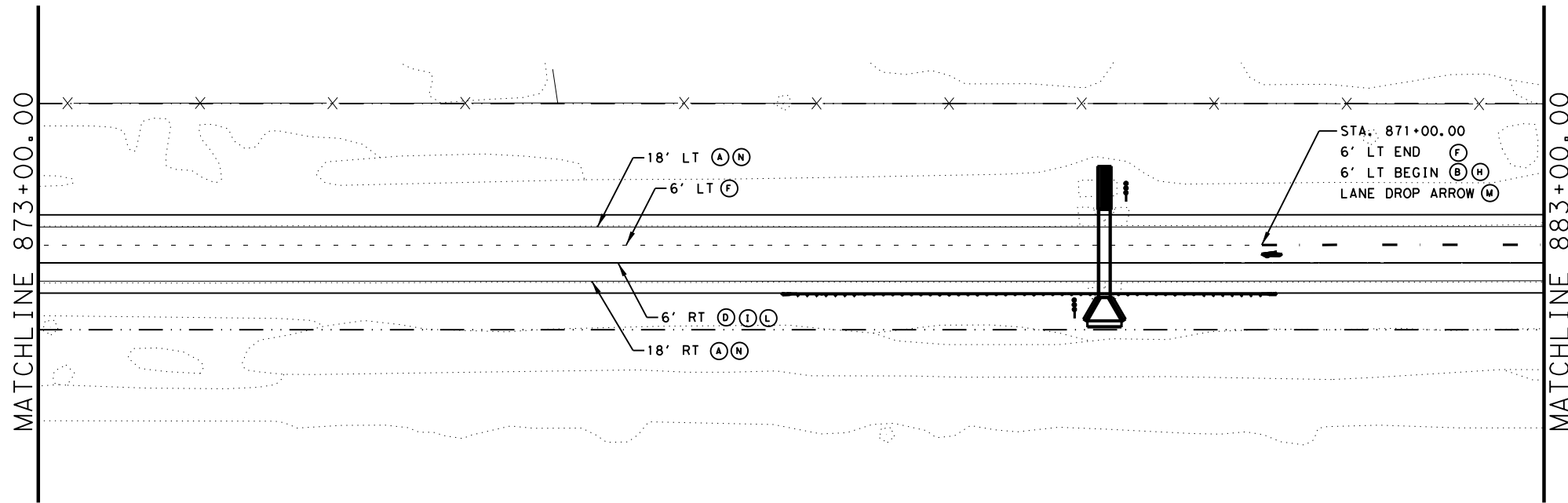
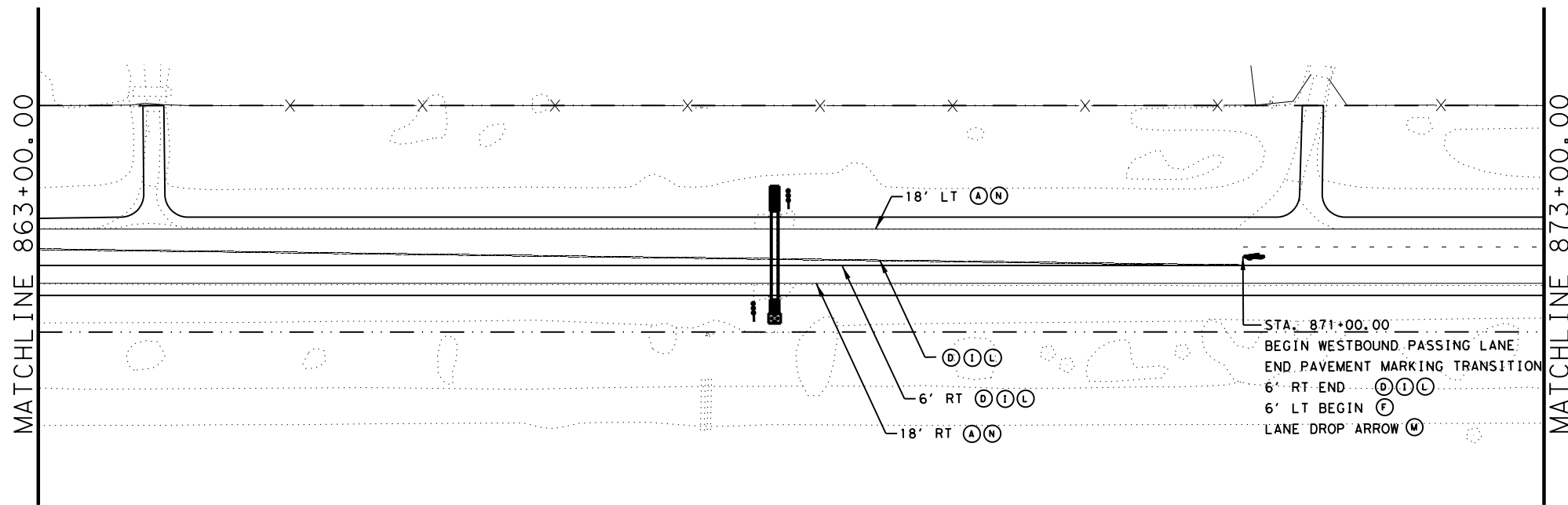
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 18 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		241

DATE: 10/22/2021 05:52 PM
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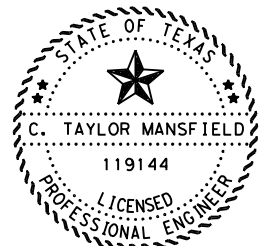
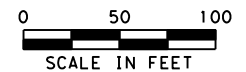


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (•) PROP SIGN ASSEMBLY
- CULVERT STRUCTURE
- (•) OBJECT MARKER ASSEMBLY



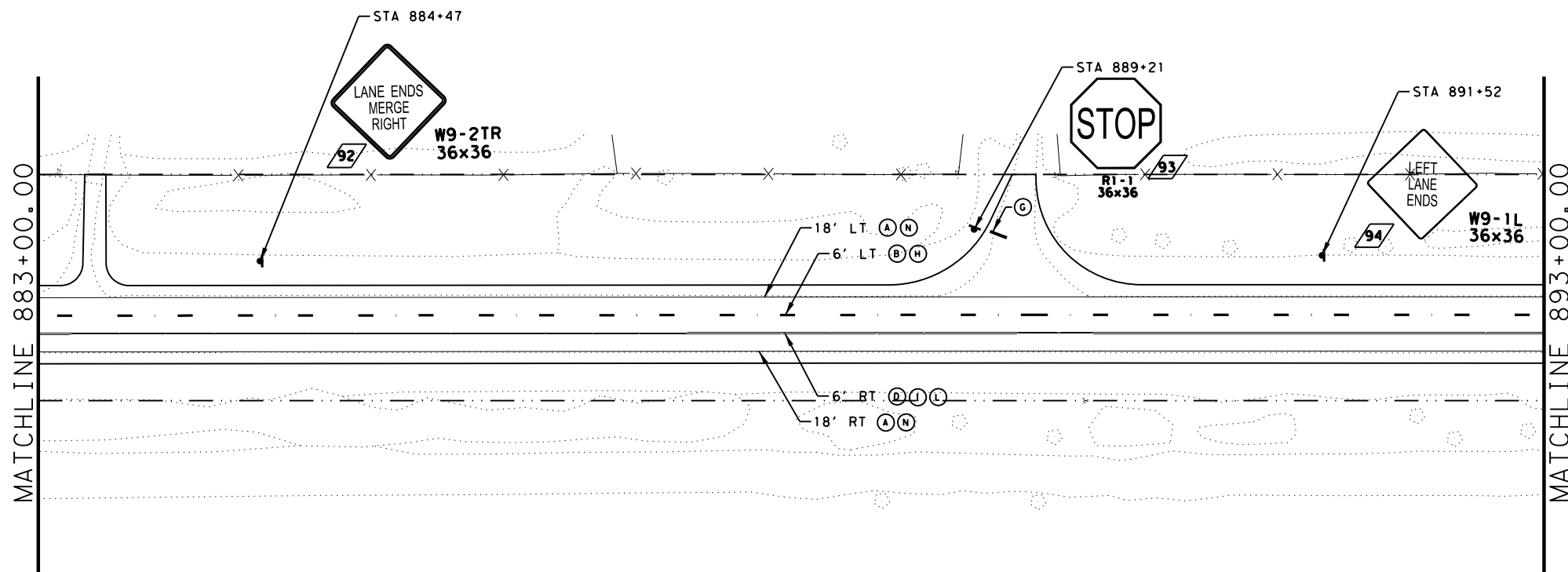
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 19 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	242	

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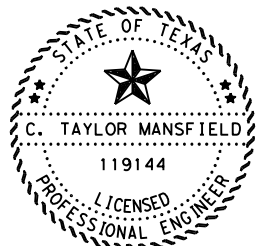
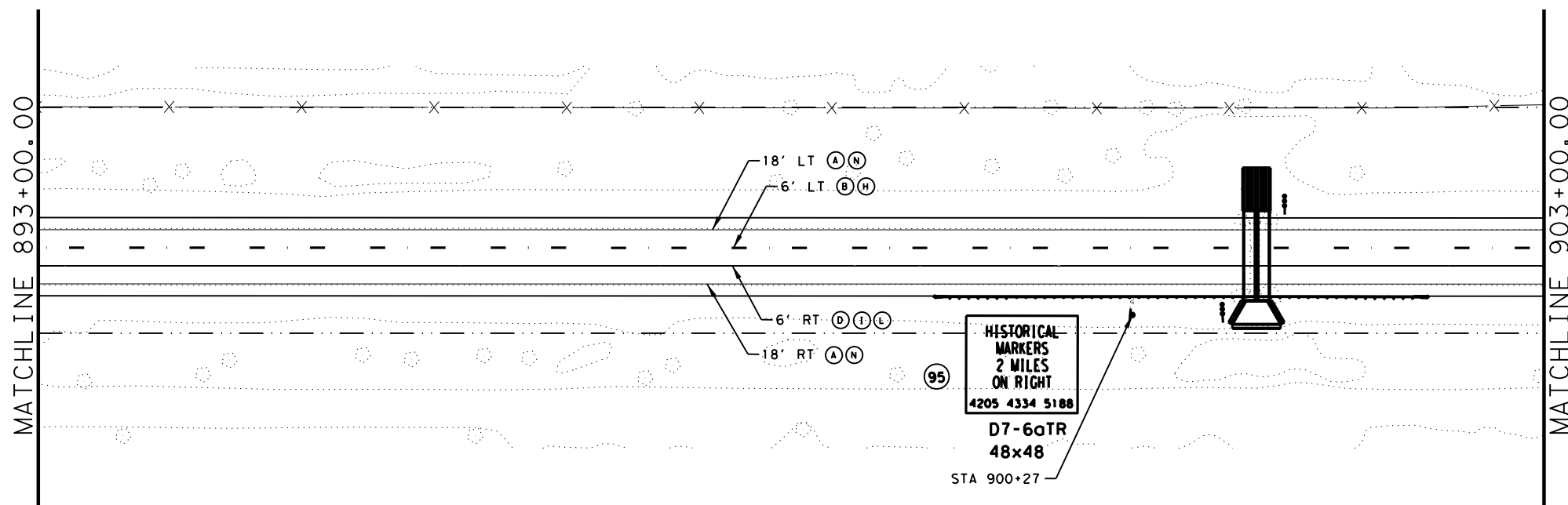
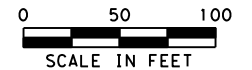


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (●) PROP SIGN ASSEMBLY
- (▭) CULVERT STRUCTURE
- (⋈) OBJECT MARKER ASSEMBLY



C. Taylor Mansfield 2021.11.01
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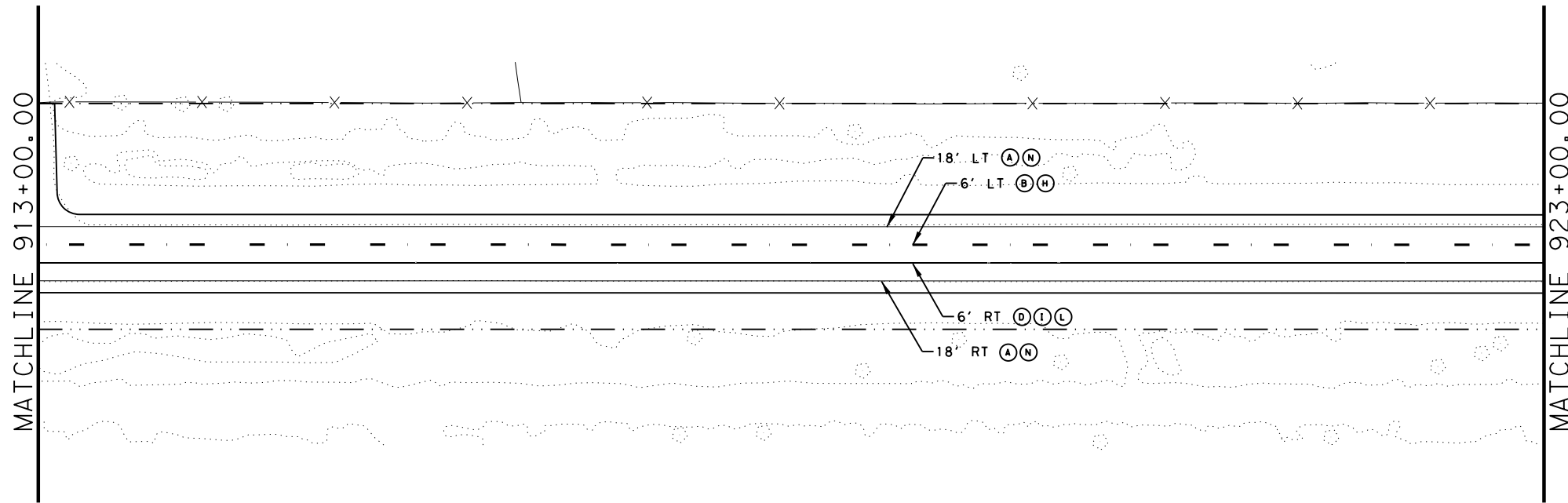
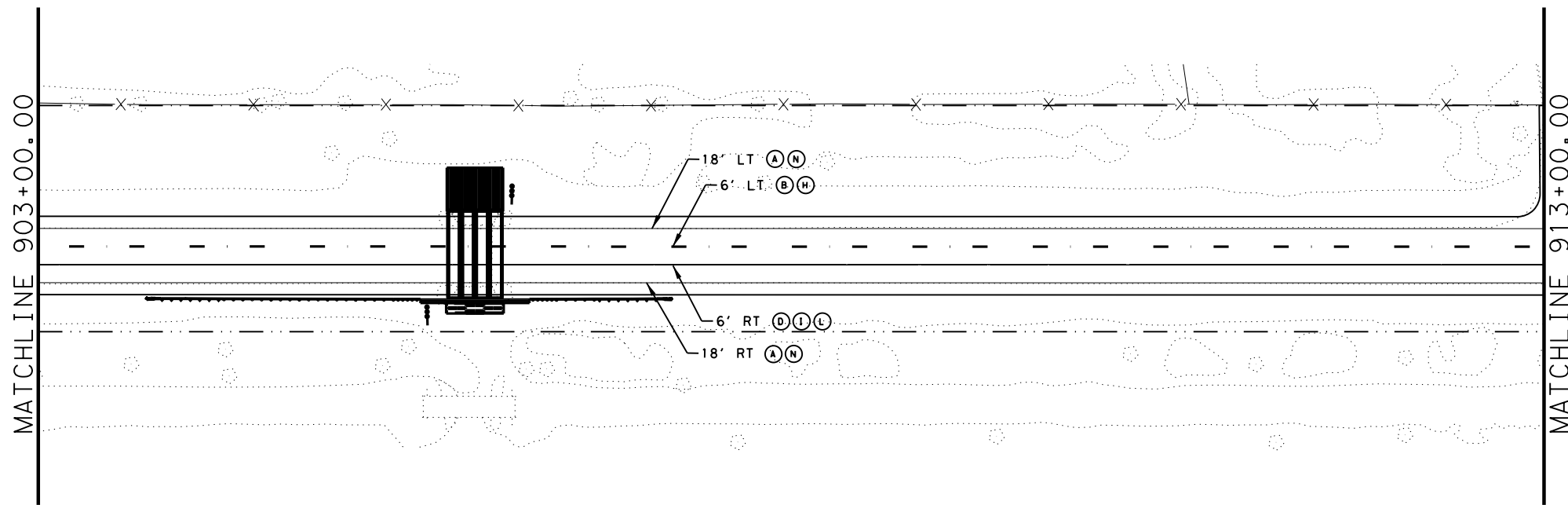
**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 20 OF 24

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CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		243

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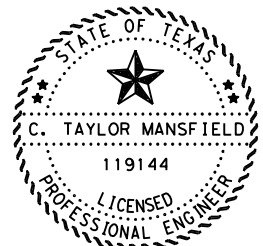
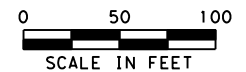


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
10' STRIP 30' SKIP
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE
RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS
(RUMBLE STRIPS) USE OPTION 3 FROM
STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD
TRIANGLE
- (#) REMOVE EXISTING
SIGN ASSEMBLY & REPLACE WITH
NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING
SIGN ASSEMBLY
- (#) NEW SIGN
ASSEMBLY
- (●) PROP SIGN ASSEMBLY
- CULVERT STRUCTURE
- OBJECT MARKER ASSEMBLY

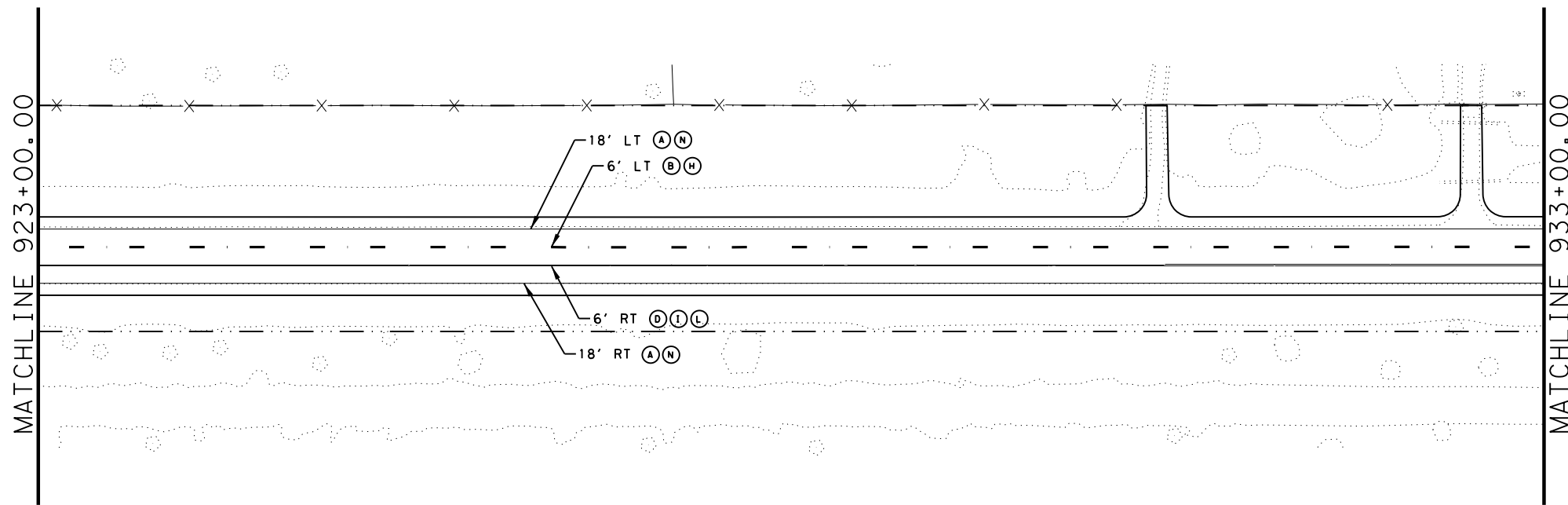


C. Taylor Mansfield 2021.11.01
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**US 67
SIGN & PAVEMENT
MARKING DETAILS**

SHEET 21 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	244	

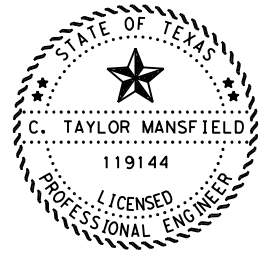
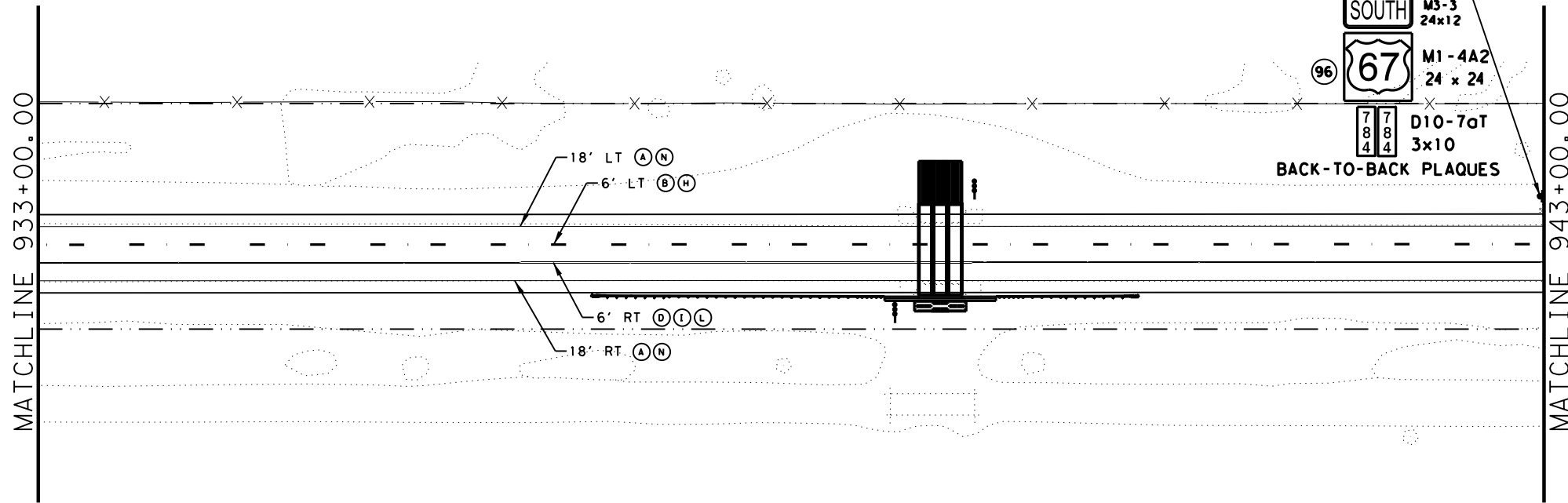


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (●) PROP SIGN ASSEMBLY
- (▬) CULVERT STRUCTURE
- (⌋) OBJECT MARKER ASSEMBLY



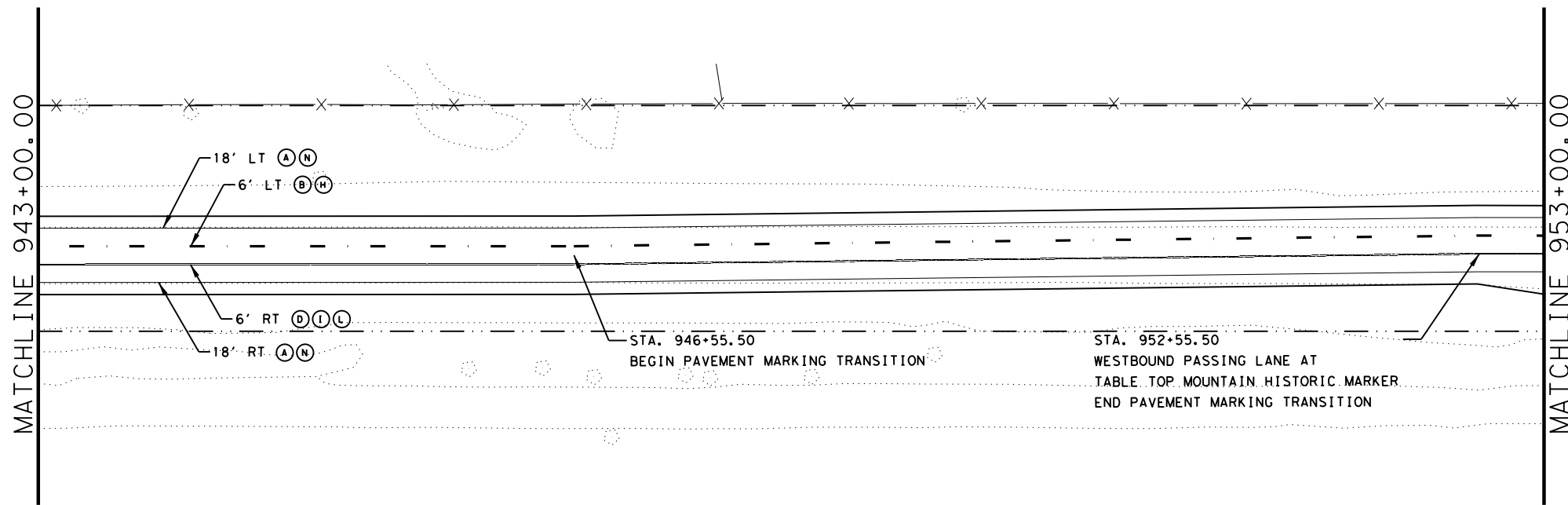
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 22 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	245	

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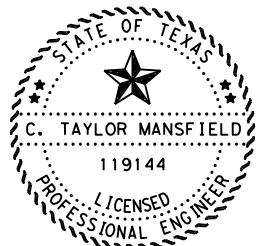
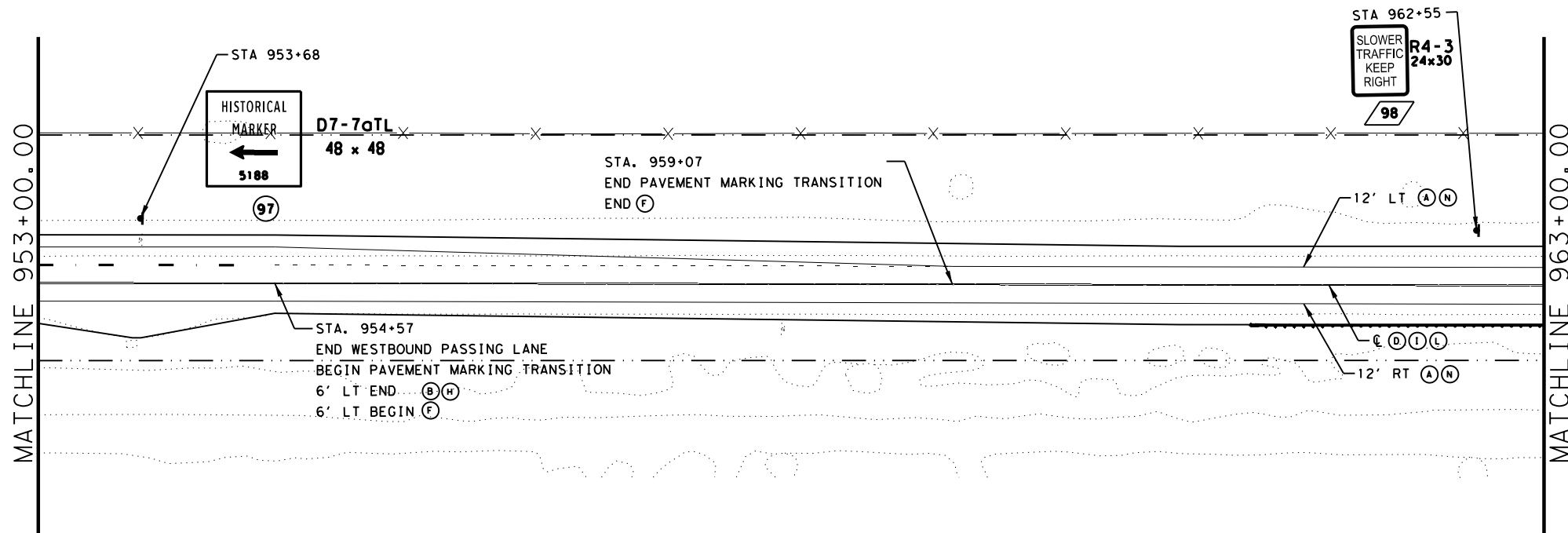
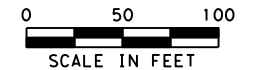


NOTE:

BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

LEGEND:

- (A) 4" WHITE SOLID
- (B) 4" WHITE BROKEN
- (C) 4" YELLOW SOLID
- (D) 4" DOUBLE YELLOW
- (E) 8" WHITE SOLID
- (F) 4" WHITE DOT
- (G) 24" WHITE STOP BAR
- (H) TYI I-C
- (I) TYII A-A
- (J) TYC ARROW
- (K) TYC WORD
- (L) CENTER LINE RUMBLE STRIP
- (M) TYC ARROW (LNDP)
- (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
- (O) WHITE RR XING
- (P) 36" WHITE YIELD TRIANGLE
- (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
- (#) REMOVE EXISTING SIGN ASSEMBLY
- (#) NEW SIGN ASSEMBLY
- (●) PROP SIGN ASSEMBLY
- (▭) CULVERT STRUCTURE
- (⋈) OBJECT MARKER ASSEMBLY



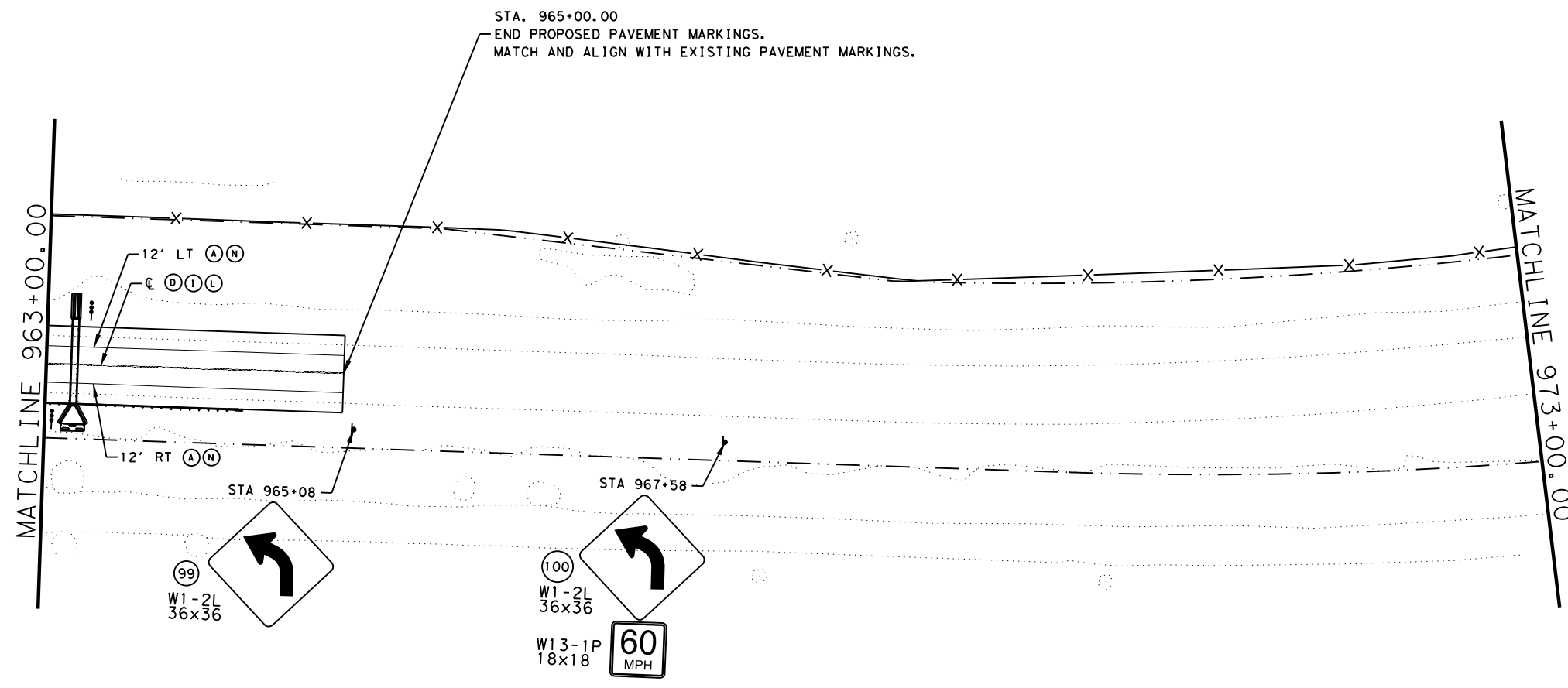
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 23 OF 24

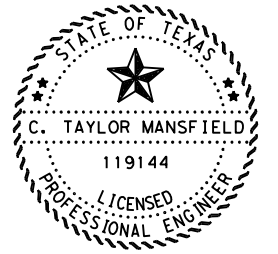
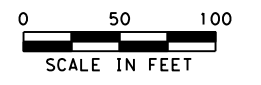
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	246	

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NOTE:
 BEGIN & END RUMBLE STRIP AT THE TANGENT POINT OF EACH RADIUS OF ALL INTERSECTION AND DRIVEWAY STUBS SUCH THAT TRAFFIC DOES NOT DRIVE OVER RUMBLE STRIP WHEN TURNING THROUGH AN INTERSECTION OR DRIVEWAY.

- LEGEND:**
- (A) 4" WHITE SOLID
 - (B) 4" WHITE BROKEN 10' STRIP 30' SKIP
 - (C) 4" YELLOW SOLID
 - (D) 4" DOUBLE YELLOW
 - (E) 8" WHITE SOLID
 - (F) 4" WHITE DOT
 - (G) 24" WHITE STOP BAR
 - (H) TYI I-C
 - (I) TYII A-A
 - (J) TYC ARROW
 - (K) TYC WORD
 - (L) CENTER LINE RUMBLE STRIP
 - (M) TYC ARROW (LNDP)
 - (N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
 - (O) WHITE RR XING
 - (P) 36" WHITE YIELD TRIANGLE
 - (#) REMOVE EXISTING SIGN ASSEMBLY & REPLACE WITH NEW SIGN ASSEMBLY
 - (#) REMOVE EXISTING SIGN ASSEMBLY
 - (#) NEW SIGN ASSEMBLY
 - (•) PROP SIGN ASSEMBLY
 - [Symbol] CULVERT STRUCTURE
 - [Symbol] OBJECT MARKER ASSEMBLY



C. Taylor Mansfield 2021.11.01
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**US 67
 SIGN & PAVEMENT
 MARKING DETAILS**

SHEET 24 OF 24



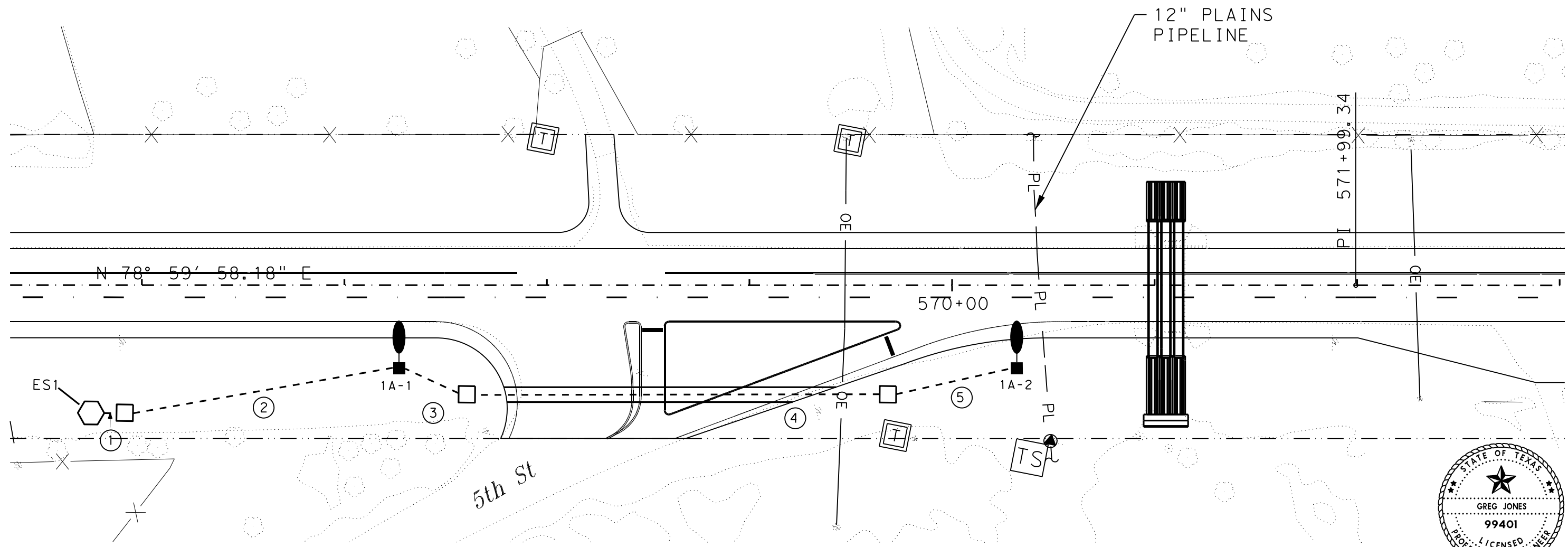
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		247

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LEGEND	
	ELECTRICAL SERVICE
	CONDUIT AND CONDUCTOR (TRENCHED)
	CONDUIT AND CONDUCTOR (BORED)
	CONDUIT RUN NUMBER
	GROUND BOX TY A (122311) W/APRON
	ROADWAY ILLUMINATION POLE
POLE DESIGNATION	
	POLE or LUMINAIRE NO.
	CIRCUIT NO.
	SERVICE NO.

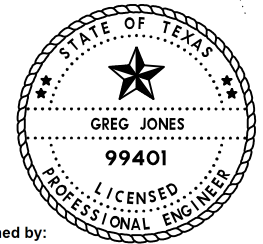
CONDUIT AND CONDUCTOR RUNS				
RUN NO.	GROUND LENGTH (FEET)	CONDUCTOR NO. & LENGTH (FEET)	CONDUIT (FEET)	CONDUIT (FEET)
	#10 BARE	#10 XHHW INSULATED	2 IN. PVC SCH 40	2 IN. PVC SCH 40 (BORE)
1	5	2 - 5 (A)	5	
2	130	2 - 130 (A)	130	
3	30	2 - 30 (A)	30	
4	200	2 - 200 (A)	50	150
5	60	2 - 60 (A)	60	

SHEET 1 OF 3 SUMMARY			
ITEM	DESCRIPTION	UNIT	QUANTITY
416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	16
432 6001	RIPRAP (CONC) (4 IN)	CY	0.70
610 6214	IN RD IL (TY SA) 40T - 8 (250W EQ) LED	EA	2
618 6023	CONDT (PVC) (SCHD 40) (2")	LF	275
618 6024	CONDT (PVC) (SCHD 40) (2") (BORE)	LF	150
620 6005	ELEC CONDR (NO. 10) BARE	LF	425
620 6006	ELEC CONDR (NO.10) INSULATED	LF	850
624 6002	GROUND BOX TY A (122311) W/APRON	EA	3
628 6009	ELC SRV TY A 120 / 240 060 (NS) SS (E) SP (O)	EA	1



LUMINAIRE TABLE			
POLE	LOCATION		FOUNDATION DEPTH
	STA. NO.		
1A-1	567+27	15' from edge of main lane	8'
1A-2	570+32	15' from edge of main lane	8'

ELECTRICAL SERVICE DATA												
Electrical Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Lighting Contactor Amps	Panel/bd/ Loadcenter	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
ES1	1	ELC SRV TY A 120/240 060 (NS)SS(E)SP(O)	1 1/4"	3/#6	N/A	2P/60	2P/60	N/A	A	2P/20	1.42	0.34



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 Greg Jones 10/27/2021
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US 67
 ILLUMINATION
 AT 5TH STREET
 SHEET 1 OF 1

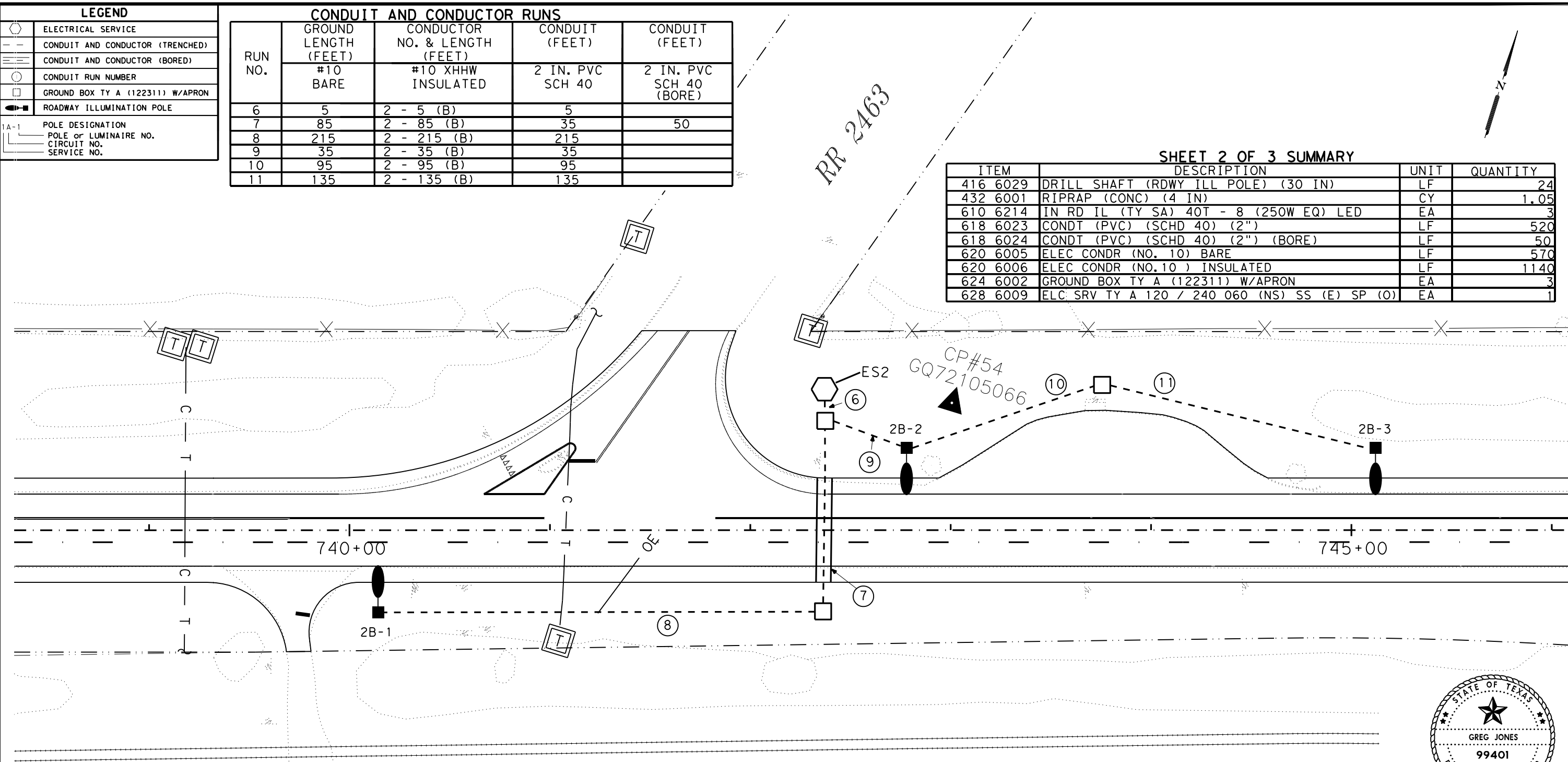
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 Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	248	

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LEGEND	
	ELECTRICAL SERVICE
	CONDUIT AND CONDUCTOR (TRENCHED)
	CONDUIT AND CONDUCTOR (BORED)
	CONDUIT RUN NUMBER
	GROUND BOX TY A (122311) W/APRON
	ROADWAY ILLUMINATION POLE
	POLE DESIGNATION
	POLE or LUMINAIRE NO.
	CIRCUIT NO.
	SERVICE NO.

CONDUIT AND CONDUCTOR RUNS				
RUN NO.	GROUND LENGTH (FEET)	CONDUCTOR NO. & LENGTH (FEET)	CONDUIT (FEET)	CONDUIT (FEET)
	#10 BARE	#10 XHHW INSULATED	2 IN. PVC SCH 40	2 IN. PVC SCH 40 (BORE)
6	5	2 - 5 (B)	5	
7	85	2 - 85 (B)	35	50
8	215	2 - 215 (B)	215	
9	35	2 - 35 (B)	35	
10	95	2 - 95 (B)	95	
11	135	2 - 135 (B)	135	



SHEET 2 OF 3 SUMMARY

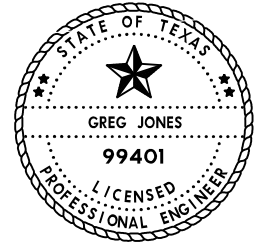
ITEM	DESCRIPTION	UNIT	QUANTITY
416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	24
432 6001	RIPRAP (CONC) (4 IN)	CY	1.05
610 6214	IN RD IL (TY SA) 40T - 8 (250W EQ) LED	EA	3
618 6023	CONDT (PVC) (SCHD 40) (2")	LF	520
618 6024	CONDT (PVC) (SCHD 40) (2") (BORE)	LF	50
620 6005	ELEC CONDR (NO. 10) BARE	LF	570
620 6006	ELEC CONDR (NO. 10) INSULATED	LF	1140
624 6002	GROUND BOX TY A (122311) W/APRON	EA	3
628 6009	ELC SRV TY A 120 / 240 060 (NS) SS (E) SP (O)	EA	1

ELECTRICAL SERVICE DATA

Electrical Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Lighting Contactor Amps	Panelbd/ Loadcenter	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
ES2	2	ELC SRV TY A 120/240 060 (NS)SS(E)SP(O)	1 1/4"	3/#6	N/A	2P/60	2P/60	N/A	A	2P/20	2.13	0.51

LUMINAIRE TABLE

POLE	LOCATION		FOUNDATION DEPTH
	STA. NO.		
2B-1	741+33	15' from edge of main lane	8'
2B-2	742+78	15' from edge of main lane	8'
2B-3	745+11	15' from edge of main lane	8'



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Greg Jones 10/27/2021
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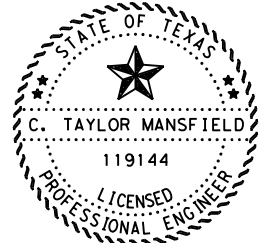
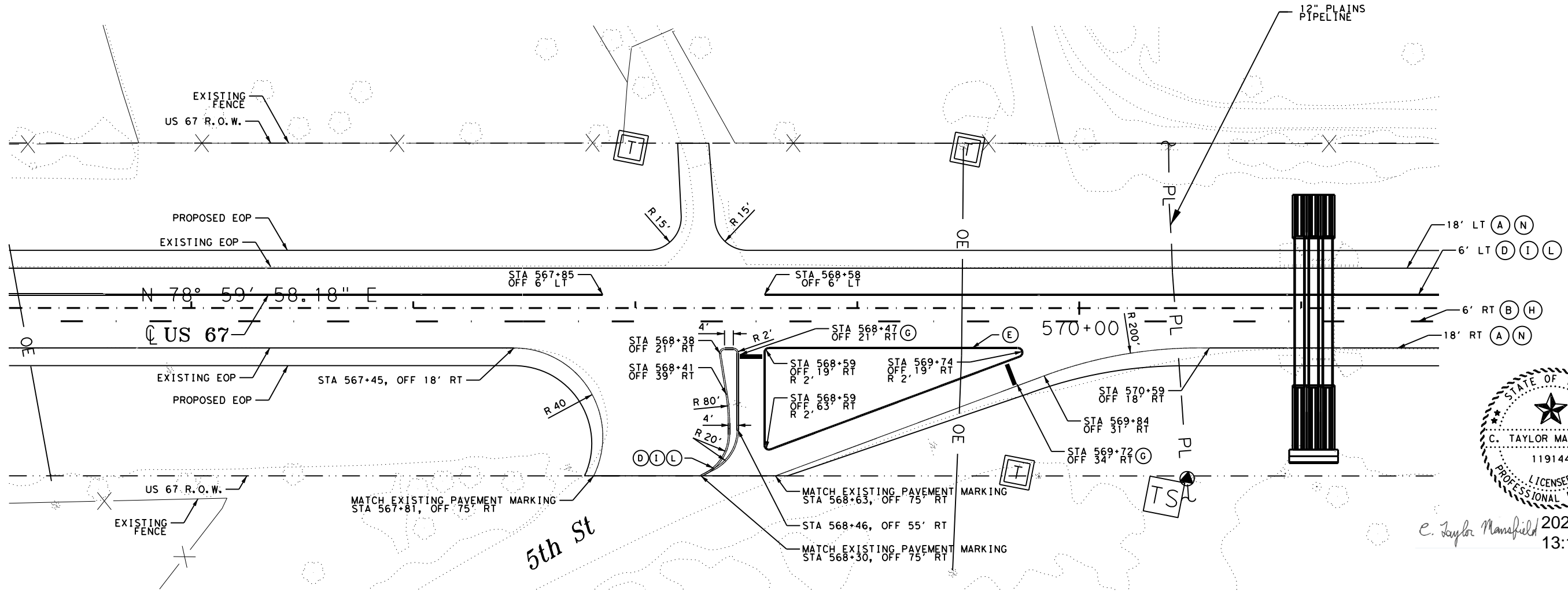
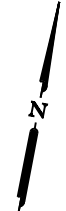
US 67
 ILLUMINATION
 AT RR 2463
 SHEET 1 OF 1



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	249	

DATE: 10/22/2021 05:52 PM
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LEGEND			
— OE —	OVERHEAD ELECTRIC	(A) 4" WHITE SOLID	(H) TYI I-C
— PL —	PIPELINE	(B) 4" WHITE BROKEN 10' STRIP 30' SKIP	(I) TYII A-A
[T]	TELEPHONE PEDESTAL	(D) 4" DOUBLE YELLOW	(L) CENTER LINE RUMBLE STRIP
●	GAS VENT PIPE	(E) 8" WHITE SOLID	(N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
[TS]	TRANSMISSION SENSOR	(G) 24" WHITE STOP BAR	



C. Taylor Mansfield 2021.11.01
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**US 67
 INTERSECTION
 LAYOUT
 AT 5TH STREET**



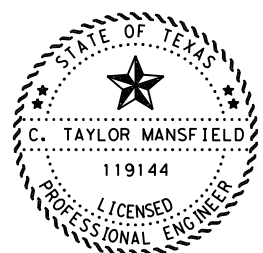
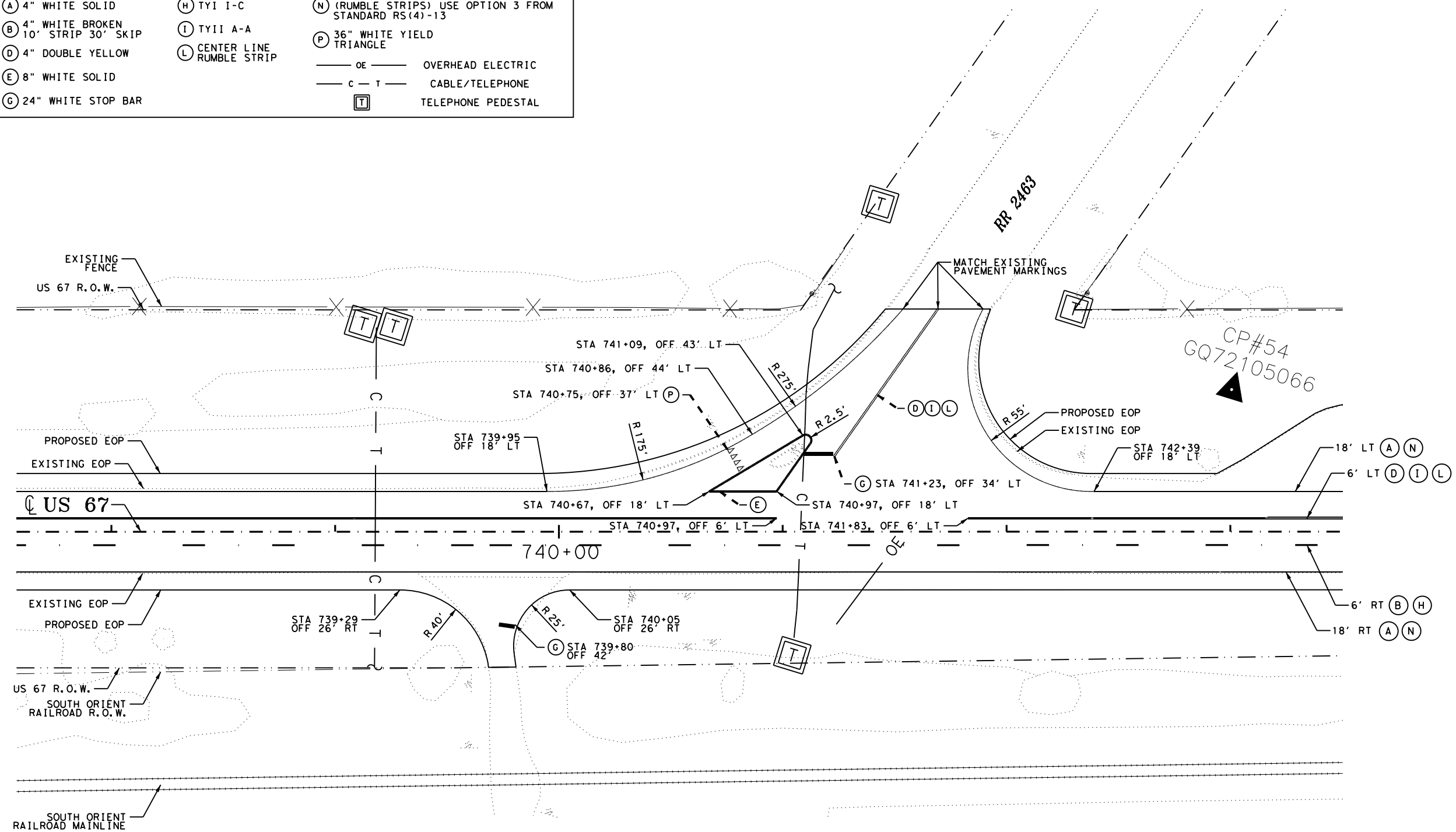
SHEET 1 OF 1



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	250	

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LEGEND		
(A) 4" WHITE SOLID	(H) TY I-C	(N) CONTINUOUS MILLED DEPRESSIONS (RUMBLE STRIPS) USE OPTION 3 FROM STANDARD RS(4)-13
(B) 4" WHITE BROKEN 10' STRIP 30' SKIP	(I) TY II A-A	(P) 36" WHITE YIELD TRIANGLE
(D) 4" DOUBLE YELLOW	(L) CENTER LINE RUMBLE STRIP	— OE — OVERHEAD ELECTRIC
(E) 8" WHITE SOLID		— C — T — CABLE/TELEPHONE
(G) 24" WHITE STOP BAR		[T] TELEPHONE PEDESTAL



e. Taylor Mansfield 2021.11.01
 13:17:51-05'00"

**US 67
 INTERSECTION
 LAYOUT
 AT RR 2463**



SHEET 1 OF 1

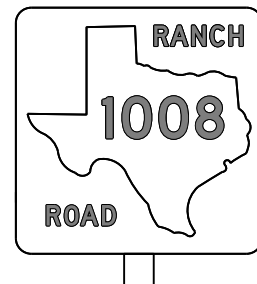
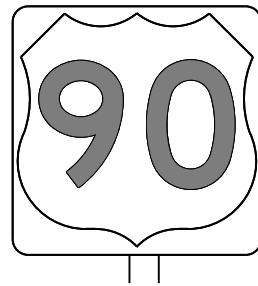
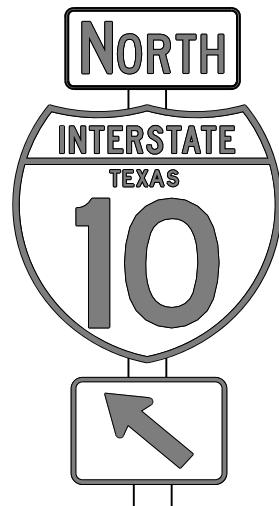
CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	251	

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REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

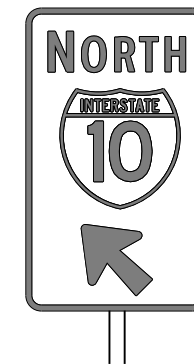
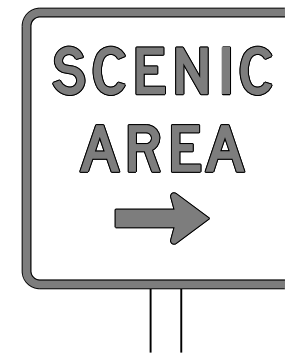
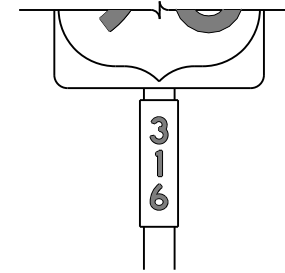
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

- Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
- White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

- Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).
- Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
- Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.
- Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.
- Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
- Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website:
<http://www.txdot.gov/>



TYPICAL SIGN REQUIREMENTS

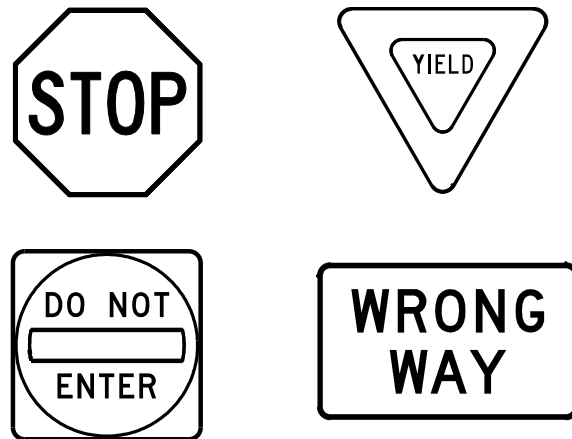
TSR(3) - 13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076	06	037	US 67
12-03 7-13	DIST	COUNTY	SHEET NO.	
9-08	ODA	UPTON	252	

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REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

GENERAL NOTES

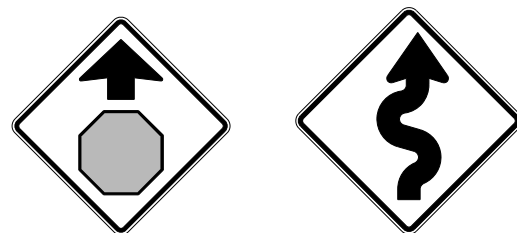
- Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
- Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
- Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
- Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
- White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
- Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
- Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
- Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website:
<http://www.txdot.gov/>

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B _{FL} OR C _{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B _{FL} OR C _{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

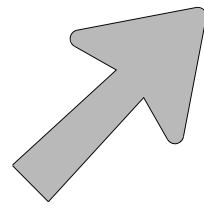
		<i>Traffic Operations Division Standard</i>	
<h2>TYPICAL SIGN REQUIREMENTS</h2>			
<h3>TSR(4) - 13</h3>			
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© TxDOT	October 2003	CK:	TxDOT
REVISIONS		DW:	TxDOT
		CK:	TxDOT
12-03	7-13	CONT	SECT
9-08		0076	06
		JOB	037
		HIGHWAY	US 67
		DIST	COUNTY
		ODA	UPTON
		SHEET NO.	253

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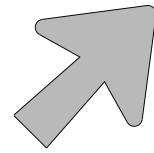
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ARROW DETAILS

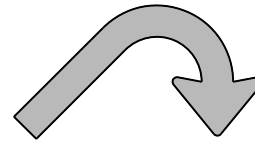
for Large Ground-Mounted and Overhead Guide Signs



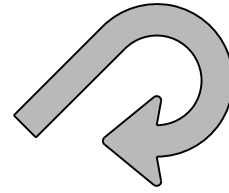
Type A



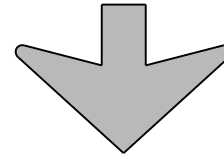
Type B



E-3



E-4



Down Arrow

TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

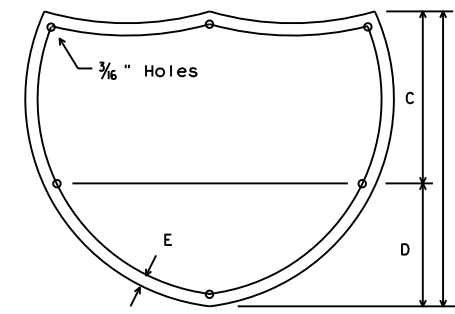
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

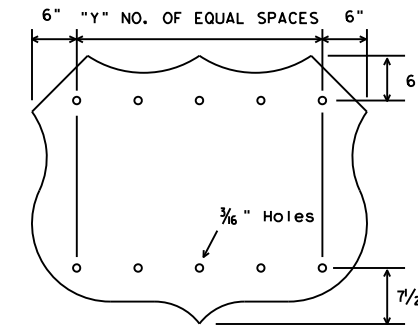
<http://www.txdot.gov/>

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)



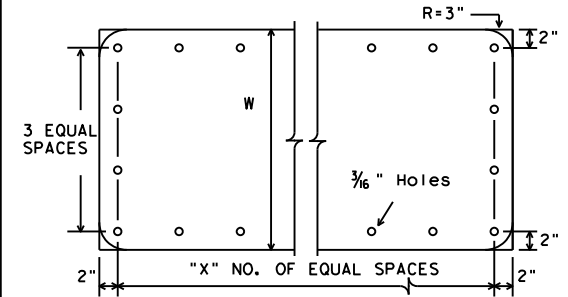
INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4



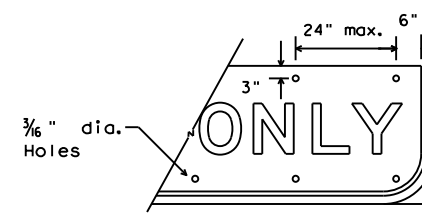
U.S. ROUTE MARKERS

Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



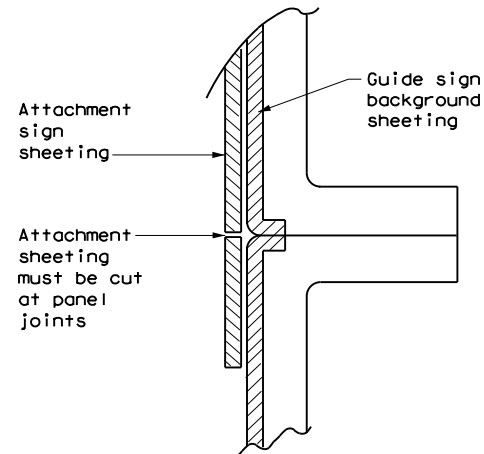
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5



EXIT ONLY PANEL

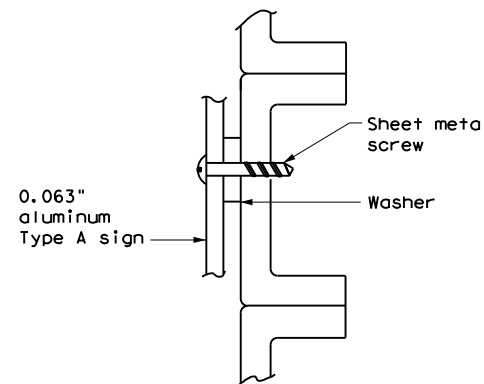
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



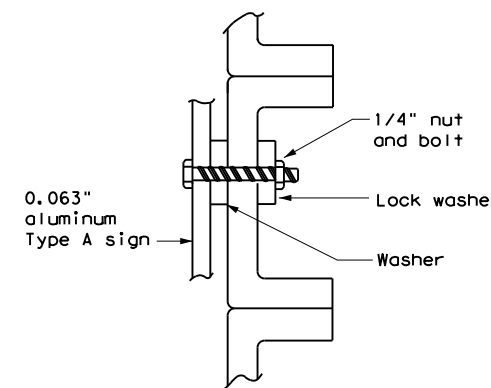
DIRECT APPLIED ATTACHMENT

NOTE:

- Sheeting for legend, symbols, and borders must be cut at panel joints.
- Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT

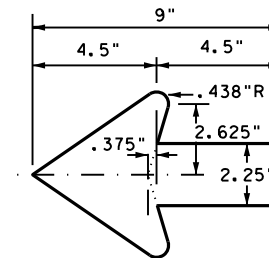


NUT/BOLT ATTACHMENT

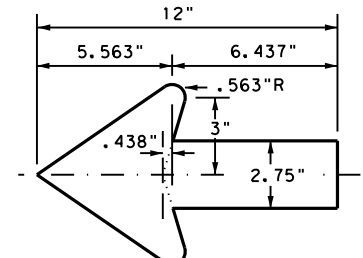
NOTE:

Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.



TYPICAL SIGN REQUIREMENTS

TSR (5) - 13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
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REVISIONS	0076	06	037	US 67
12-03 7-13	DIST	COUNTY	SHEET NO.	
9-08	ODA	UPTON	254	

DATE: 10/22/2021 05:53 PM
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REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS				DELINEATORS				D & OM DESCRIPTIVE CODES		
DEVICE	SIZE 1	SIZE 2	SIZE 3	SIZE 4	SINGLE		DOUBLE		INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX) NUMBER OF REFLECTORS S = Single D = Double COLOR OF REFLECTORS W = White Y = Yellow R = Red REFLECTOR UNIT SIZE 1 or 2 TYPE OF POST OR DELINEATOR WC = Wing Channel Post YFLX = Yellow Flexible Post WFLX = White Flexible Post BRFL = Barrier Reflector TYPE OF MOUNT GND = Embedded (drivable or set in concrete) CTB = Concrete Barrier Mount GF1 or GF2 = Guard Fence Attachment SRF = Surface Mount DIRECTION If Required BI = Bi-Directional BR = Bi-Directional with red on back	
SHEETING	Yellow, White or Red Type B or C reflective sheeting				Yellow, White or Red Type B or C Reflective Sheeting					
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (fix). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.				POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX	INSTL OM ASSM (OM-XX) (XXXX)XXX(XX) TYPE OF OBJECT MARKER 1, 2, 3, or 4 NUMBER OF REFLECTORS OR DIRECTION X = 3-Size 2 reflector unit (Type 2 only) Y = 1-Size 3 reflector unit (Type 2 only) Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only) L = Left Side (Type 3 Object Marker only) R = Right Side (Type 3 Object Marker only) C = Center (Type 3 Object Marker only) TYPE OF POST WC = Wing Channel Post WFLX = White Flexible Post TWT = Thin Walled Tubing TYPE OF MOUNT GND = Embedded (drivable) SRF = Surface Mount WAS = Wedge Anchor Steel WAP = Wedge Anchor Plastic DIRECTION If Required BI = Bi-Directional
					MOUNT TYPE	GND	GND, SRF	GND	GND, SRF	

OBJECT MARKERS										
DEVICE	Type 1 (OM-1)		Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)	
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4		
	Yellow-Type B _{FL} or C _{FL} Sheeting		Yellow - Type B or C Sheeting			Alternating acrylic black and retroreflective yellow - Type B _{FL} or C _{FL} Sheeting			Red -Type B _{FL} or C _{FL} Sheeting	
SHEETING	Yellow-Type B _{FL} or C _{FL} Sheeting		Yellow - Type B or C Sheeting			Alternating acrylic black and retroreflective yellow - Type B _{FL} or C _{FL} Sheeting			Red -Type B _{FL} or C _{FL} Sheeting	
POST TYPE	TWT		WC	WC	WFLX	TWT			TWT	
MOUNT TYPE	WAS, WAP		GND	GND	GND, SRF	WAS, WAP			WAS, WAP	

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)			CHEVRONS				ONE DIRECTION LARGE ARROW		NOTE: Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.
DEVICE	GF1	GF2	CTB	W1-8		W1-6			
	Yellow, White, Red								
NOTE	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).						
SHEETING	Yellow, White, Red								
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.								
	SIZE (W x L)	18" x 24" (Conventional)	24" x 30" (Conventional Oversize)	30" x 36" (Expressway)	36" x 48" (Freeway)	SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)	
	MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only		MOUNTING HEIGHT	7'-0"		

Texas Department of Transportation
 Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

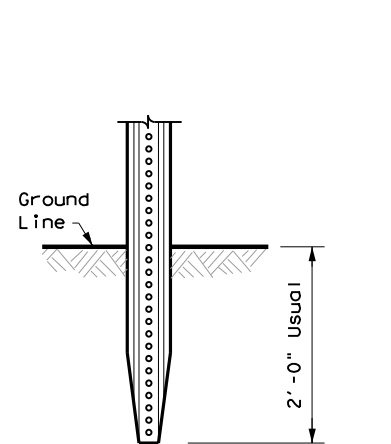
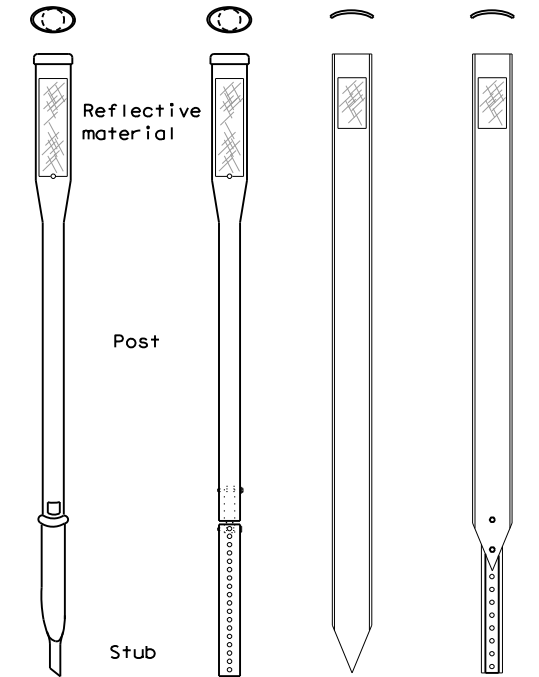
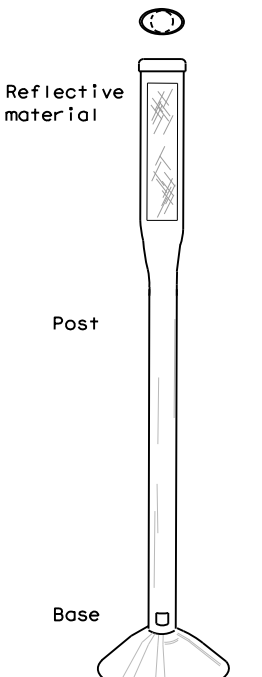
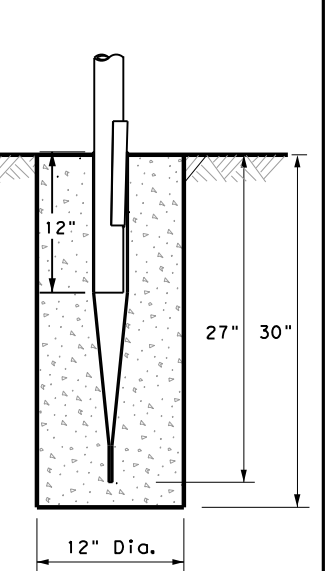
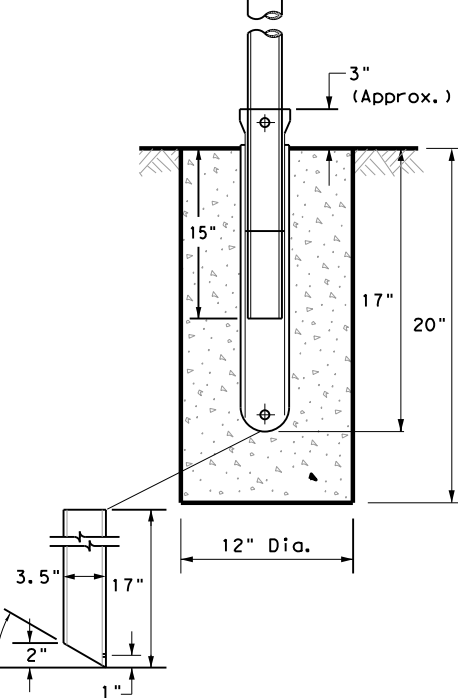
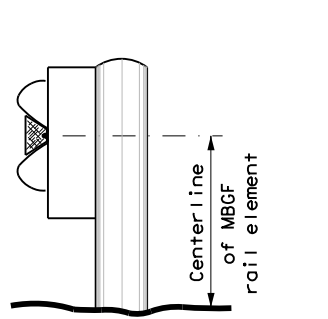
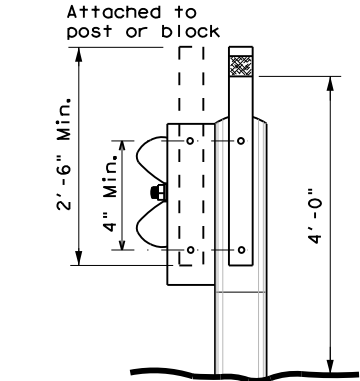
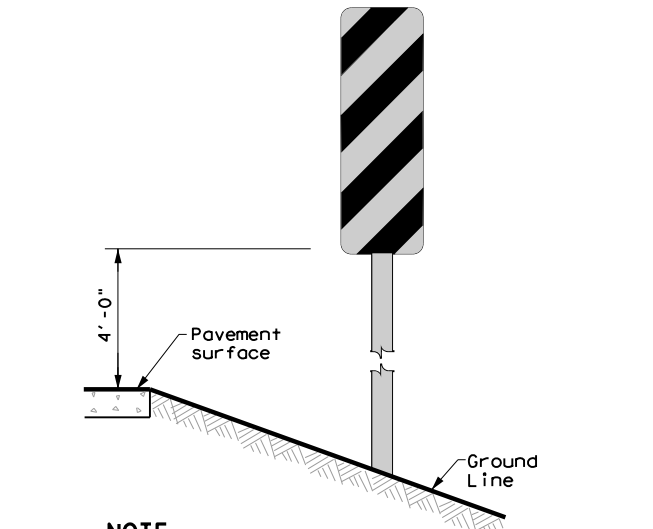
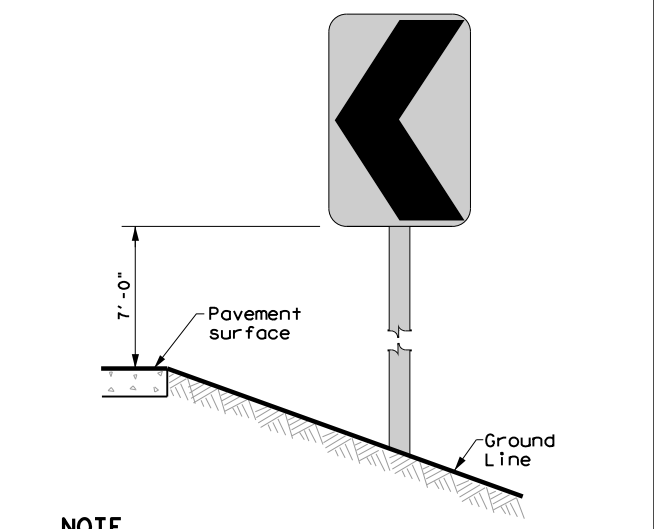
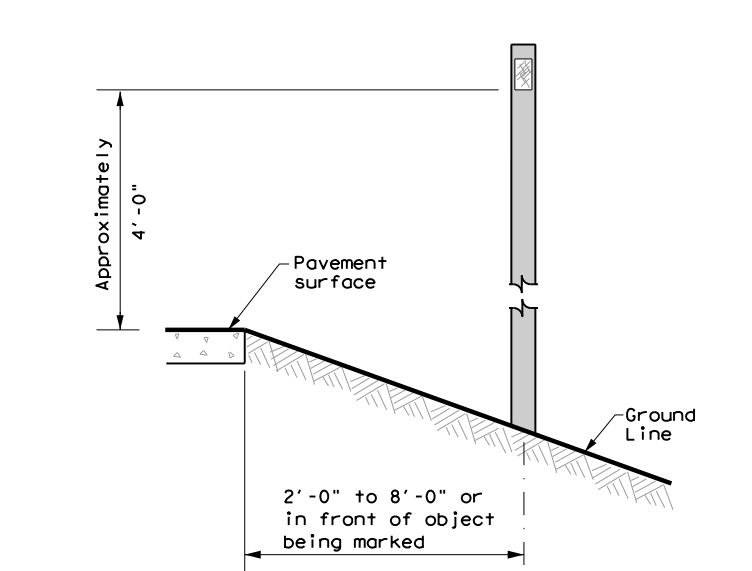

D & OM(1)-20

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10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	ODA	UPTON	255	

20A

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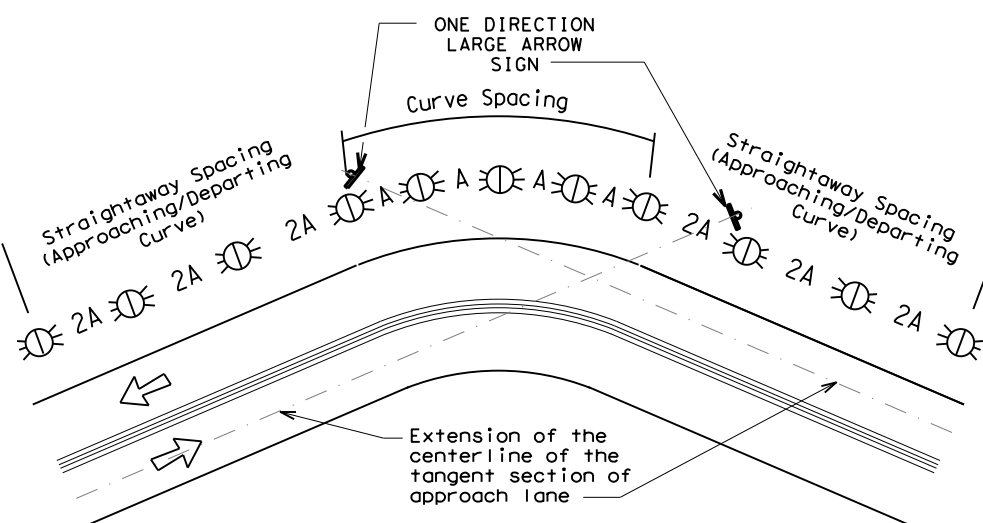
POST TYPE AND SUPPORT FOUNDATION DETAILS				TYPE OF BARRIER MOUNTS																										
WING CHANNEL (WC)	FLEXIBLE POSTS (YFLX, WFLX)		WEDGE ANCHOR SYSTEMS		GUARD FENCE ATTACHMENT																									
GND	GND	SRF	WAS	WAP	GF 1																									
																														
	EMBEDDED	SURFACE MOUNT	STEEL	PLASTIC	CONCRETE TRAFFIC BARRIER (CTB)																									
NOTES 1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only. 2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.		NOTES 1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices. 2. Install per manufacturer's recommendations. 3. Post length may vary to meet field conditions. 4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.		NOTE 1. Install per manufacturer's recommendations.																										
TYPES 1,3, AND 4 OBJECT MARKERS AND CHEVRONS		CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN		DELINEATORS AND TYPE 2 OBJECT MARKERS																										
																														
NOTE Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)		NOTE Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.		See general notes 1, 2 and 3.																										
GENERAL NOTES																														
1. Place delineators on a section of roadway at a consistent distance from the edge of pavement. 2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction. 3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible. 4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation. 5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface. 6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.																														
 Traffic Safety Division Standard																														
DELINEATOR & OBJECT MARKER INSTALLATION D & OM(2)-20																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>FILE: dcm2-20.dgn</td> <td>DN: TXDOT</td> <td>CK: TXDOT</td> <td>DW: TXDOT</td> <td>CK: TXDOT</td> </tr> <tr> <td>© TxDOT August 2004</td> <td>CONT</td> <td>SECT</td> <td>JOB</td> <td>HIGHWAY</td> </tr> <tr> <td>REVISIONS</td> <td>0076 06</td> <td></td> <td>037</td> <td>US 67</td> </tr> <tr> <td>10-09 3-15</td> <td>DIST</td> <td>COUNTY</td> <td></td> <td>SHEET NO.</td> </tr> <tr> <td>4-10 7-20</td> <td>ODA</td> <td>UPTON</td> <td></td> <td>256</td> </tr> </table>						FILE: dcm2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT	© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY	REVISIONS	0076 06		037	US 67	10-09 3-15	DIST	COUNTY		SHEET NO.	4-10 7-20	ODA	UPTON		256
FILE: dcm2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT																										
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY																										
REVISIONS	0076 06		037	US 67																										
10-09 3-15	DIST	COUNTY		SHEET NO.																										
4-10 7-20	ODA	UPTON		256																										

DATE: 10/22/2021 05:53 PM
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MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

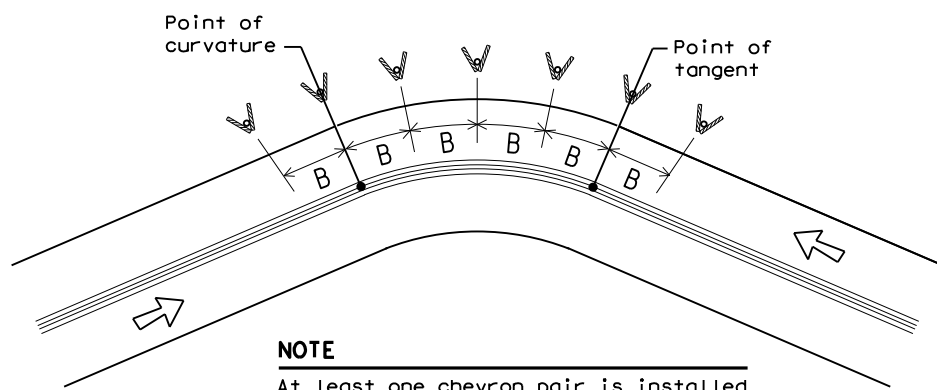
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN				
Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	—
2	2865	160	320	—
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN			
Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp. Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete) and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100' max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100' max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

- Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
- Barrier reflectors may be used to replace required delineators.
- Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation
Traffic Safety Division Standard

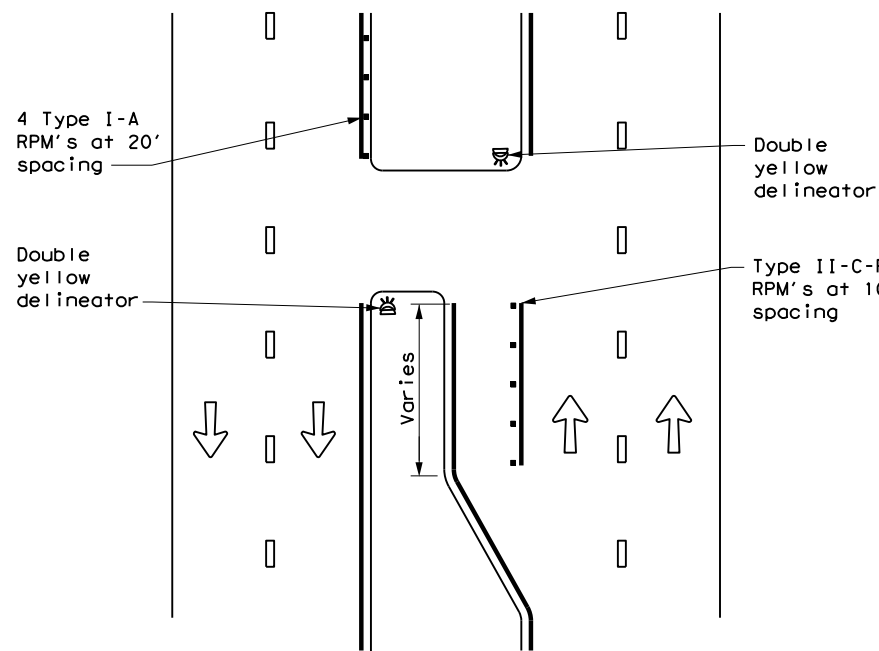
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

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© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
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8-15 7-20	ODA	UPTON	257	

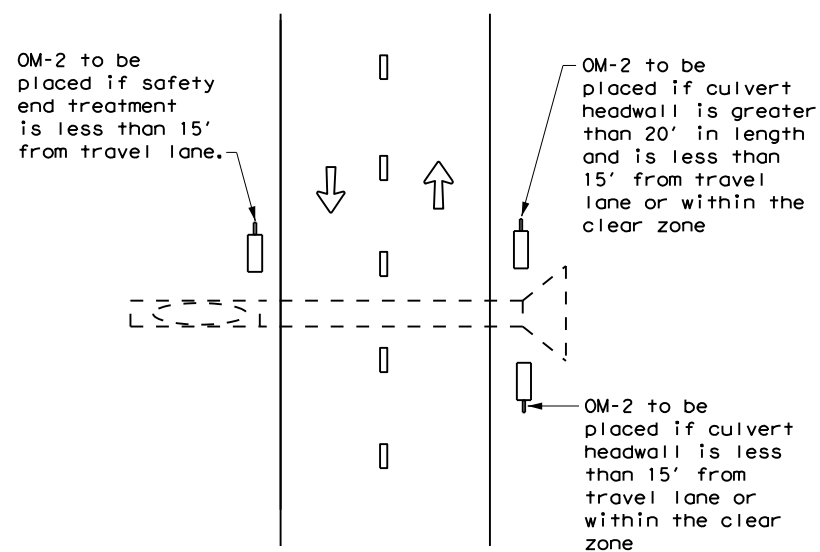
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CROSSOVERS



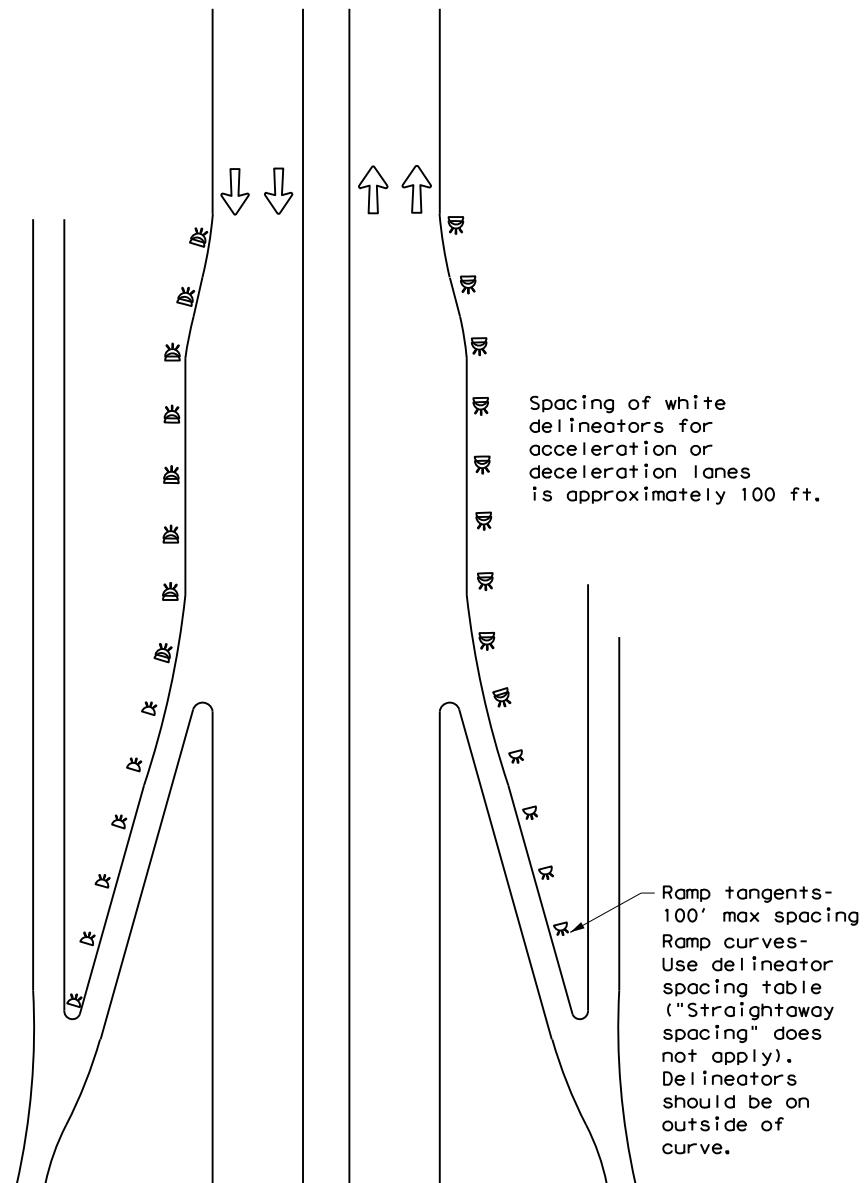
DETAIL 1

FOR CULVERTS WITHOUT MBGF



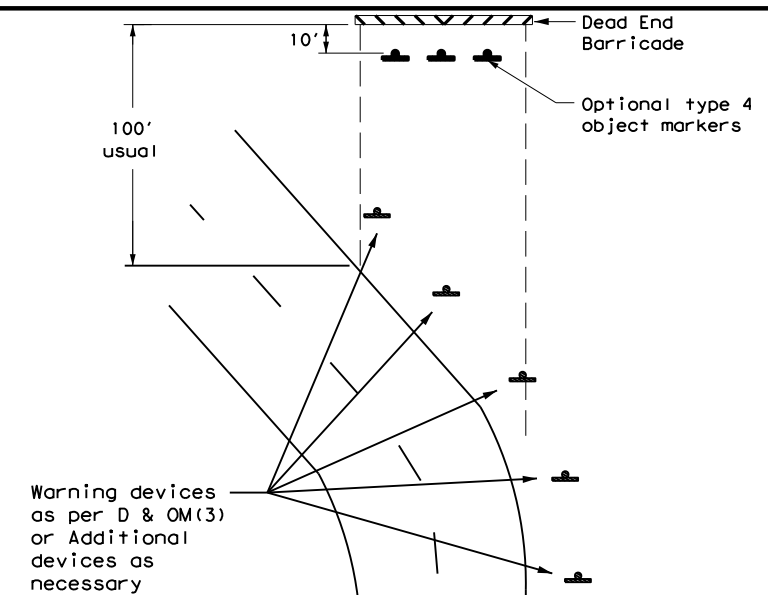
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



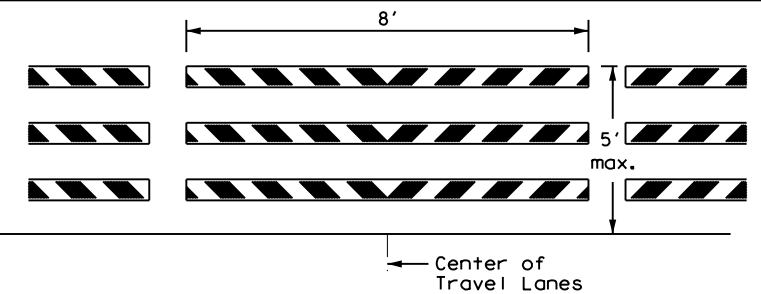
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

- Barricade striping shall be red and white reflective sheeting for all permanent road closures.
- Barricade striping is red and white sloping toward the center of the roadway.
- Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

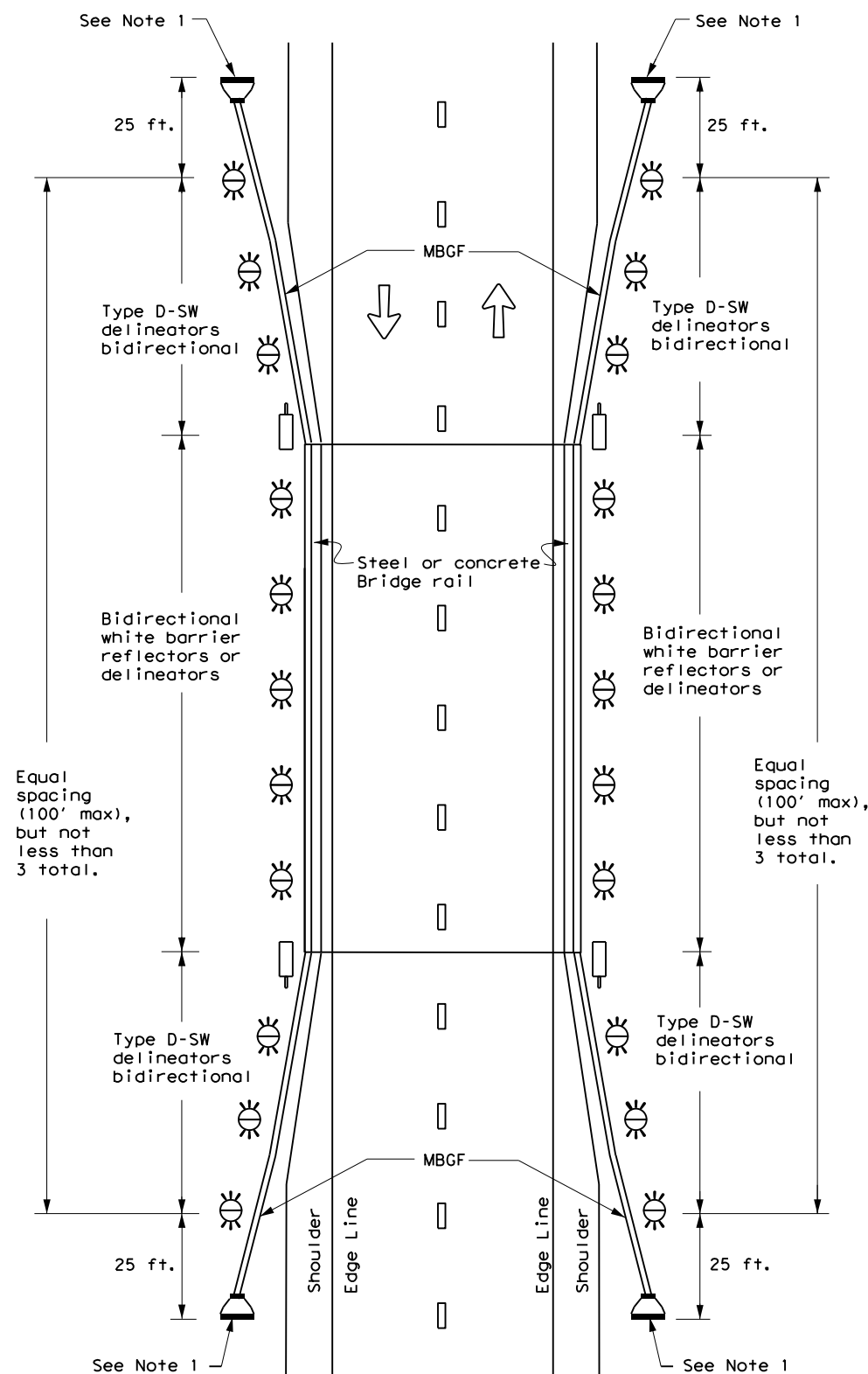


DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4) -20

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7-20	ODA	UPTON	258	

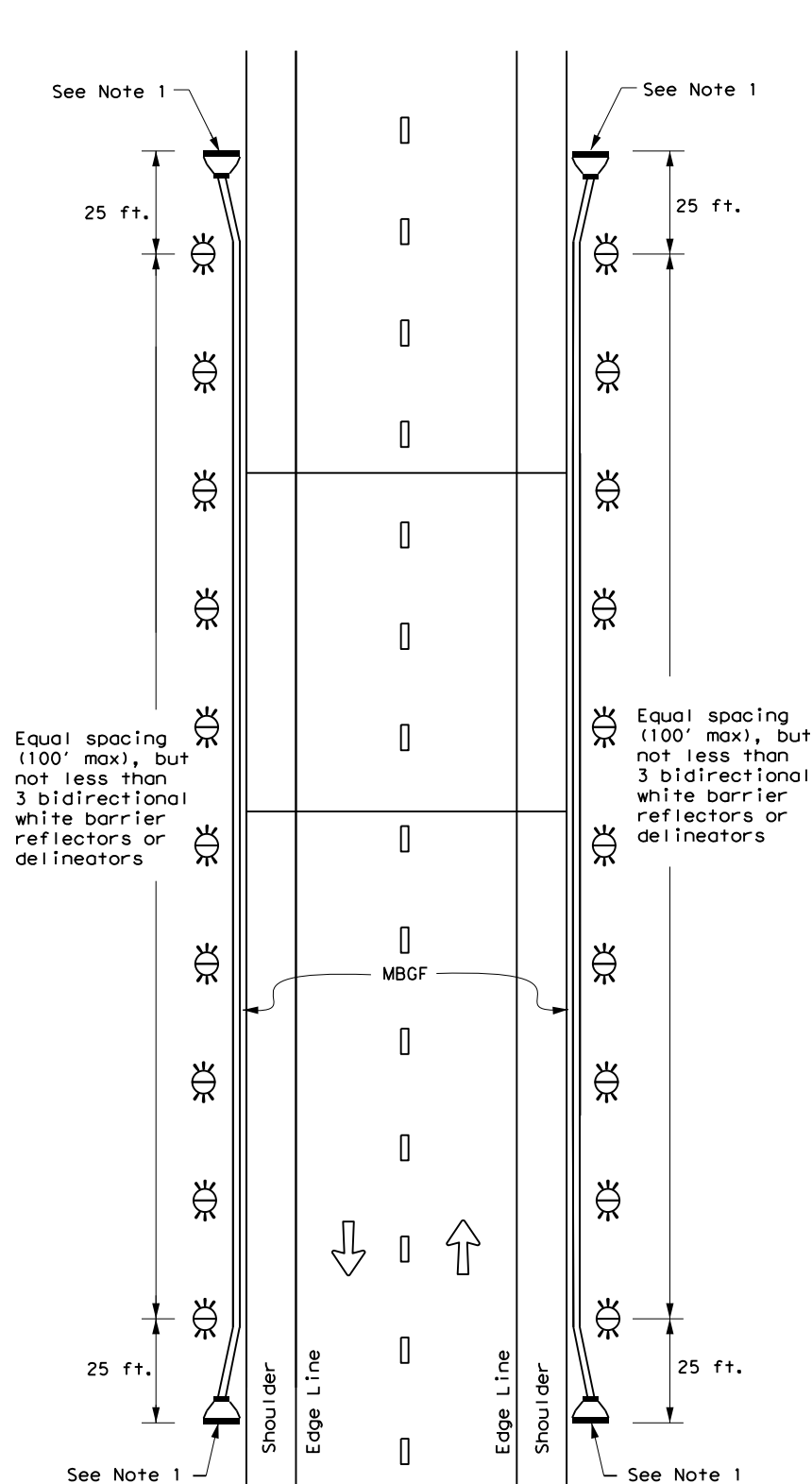
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

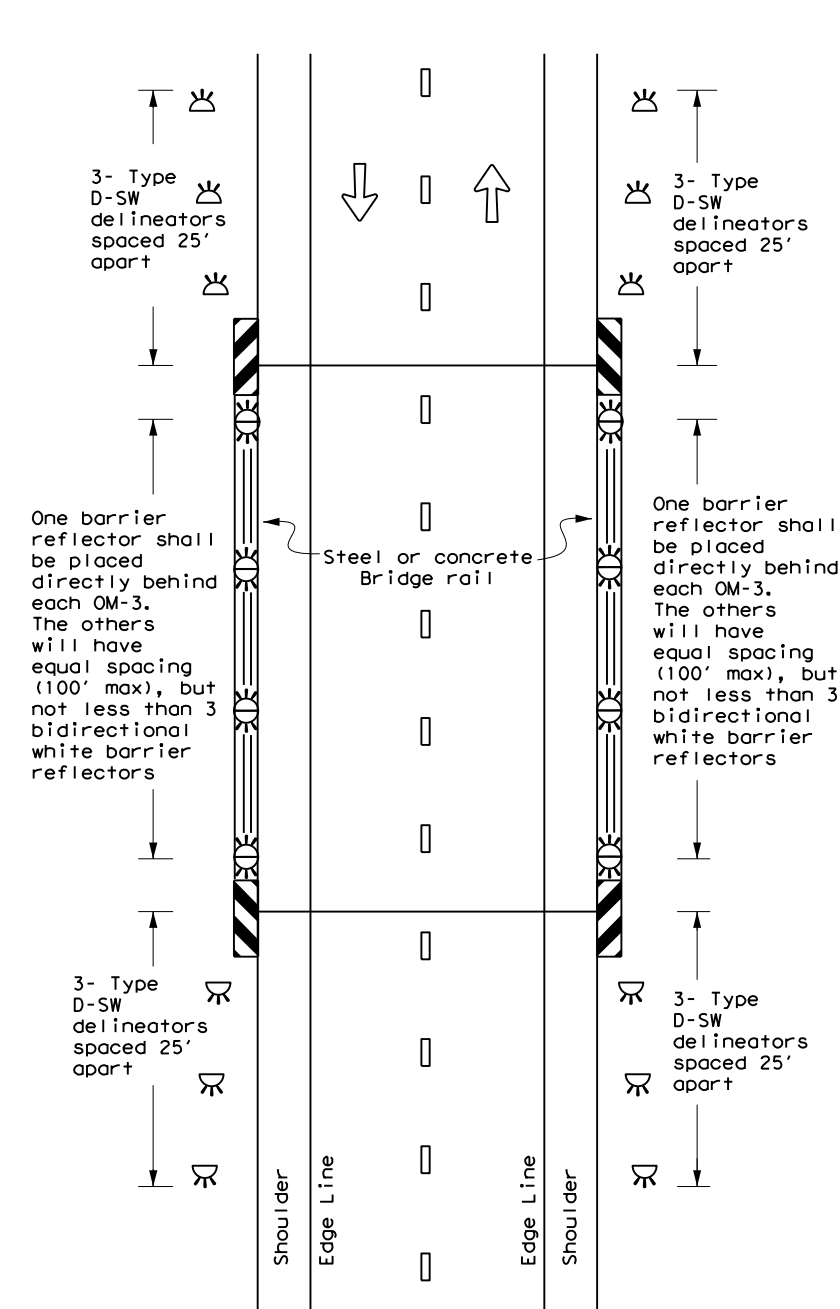
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow



DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5) - 20

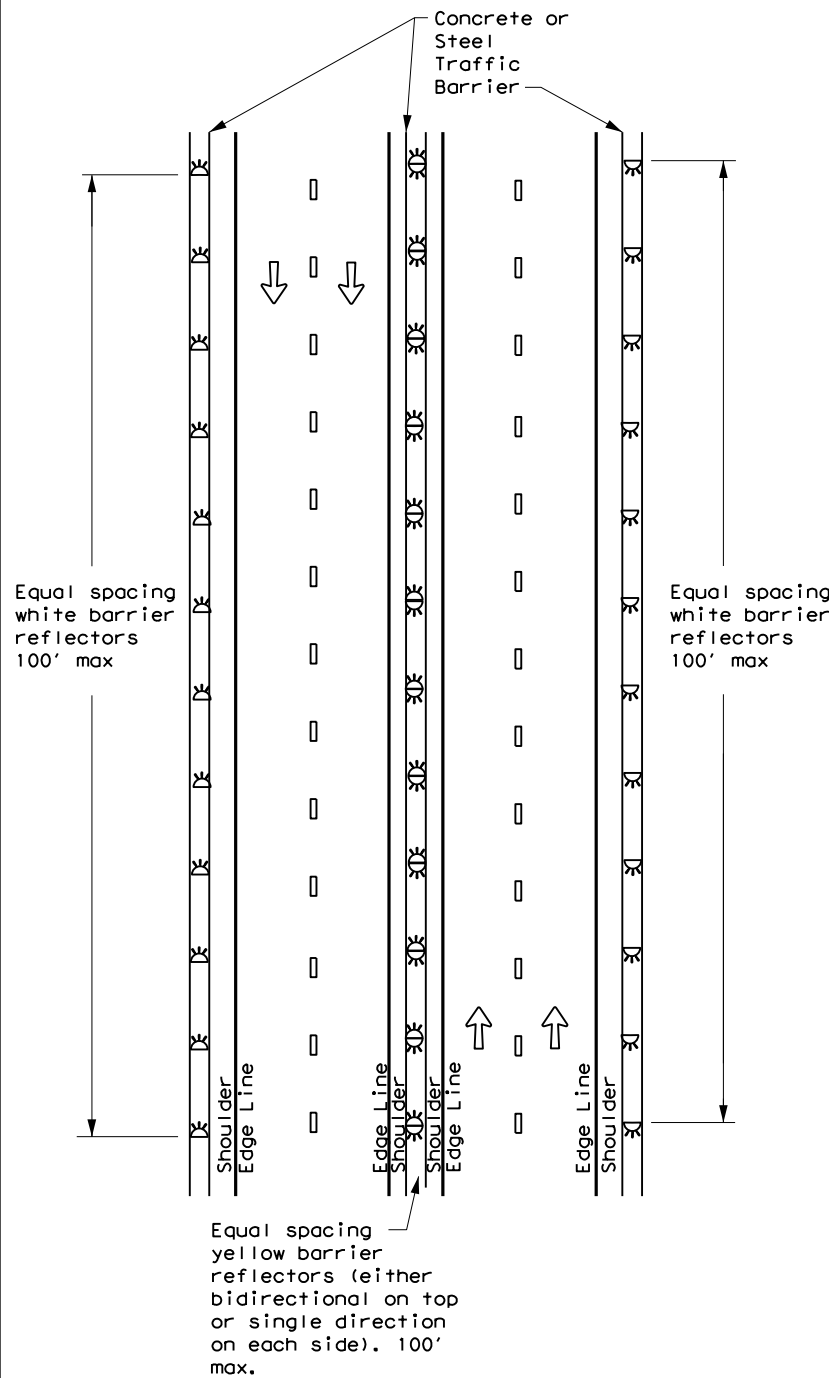
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	ODA	UPTON	259	

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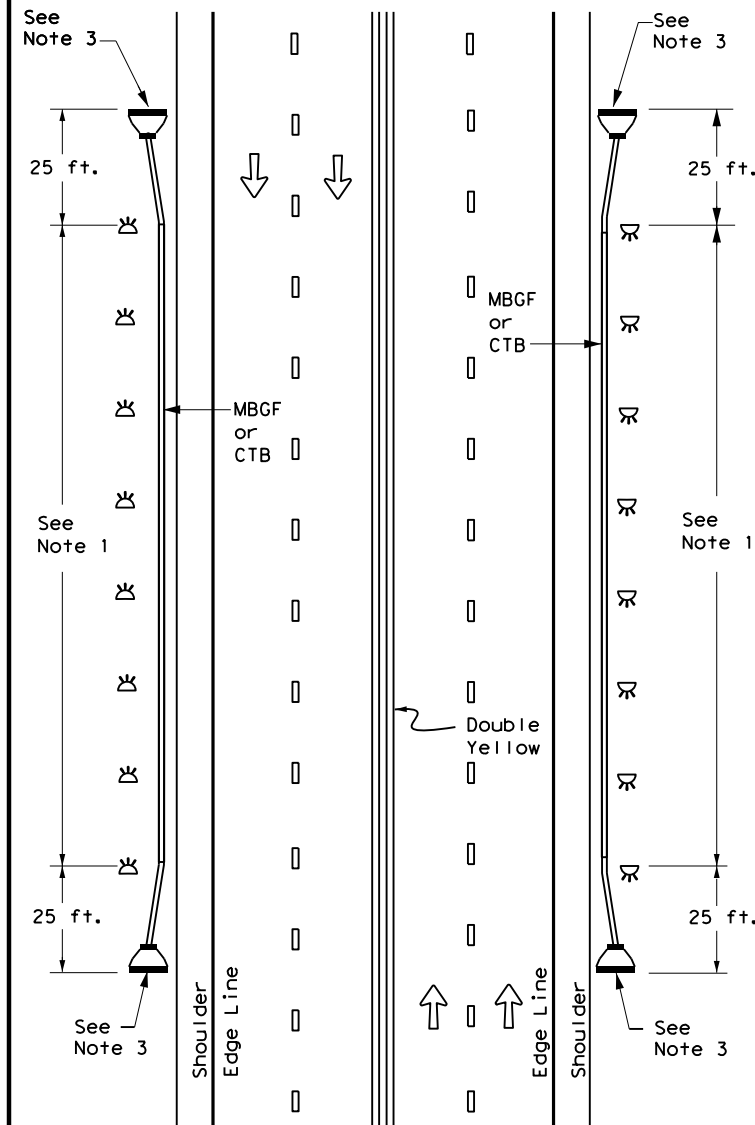
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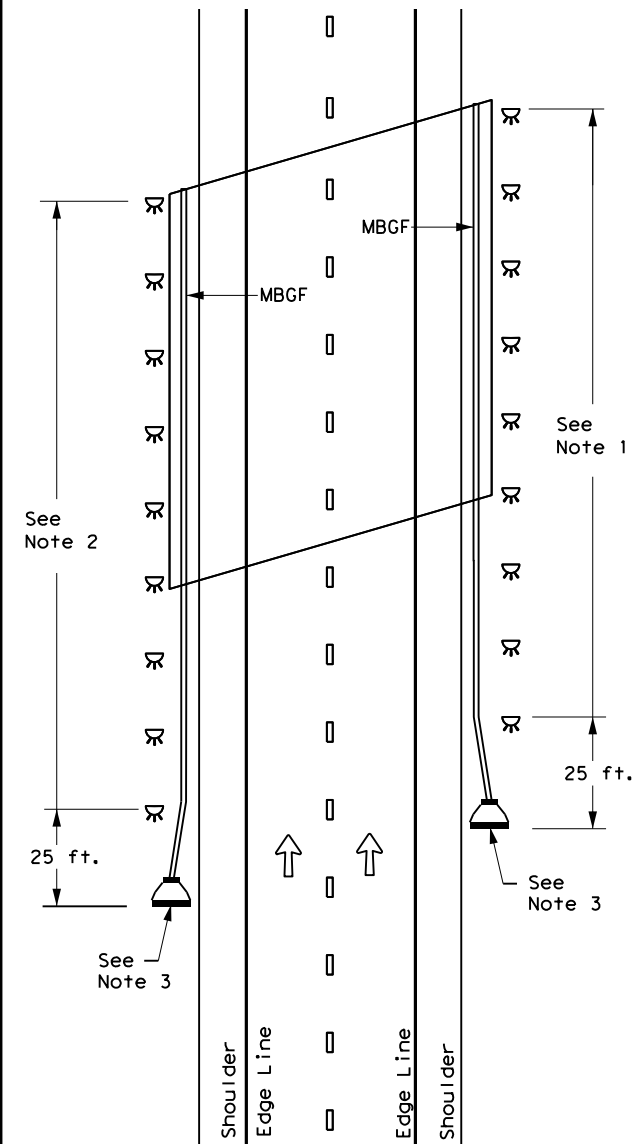
CONTINUOUS CONCRETE OR STEEL BARRIER



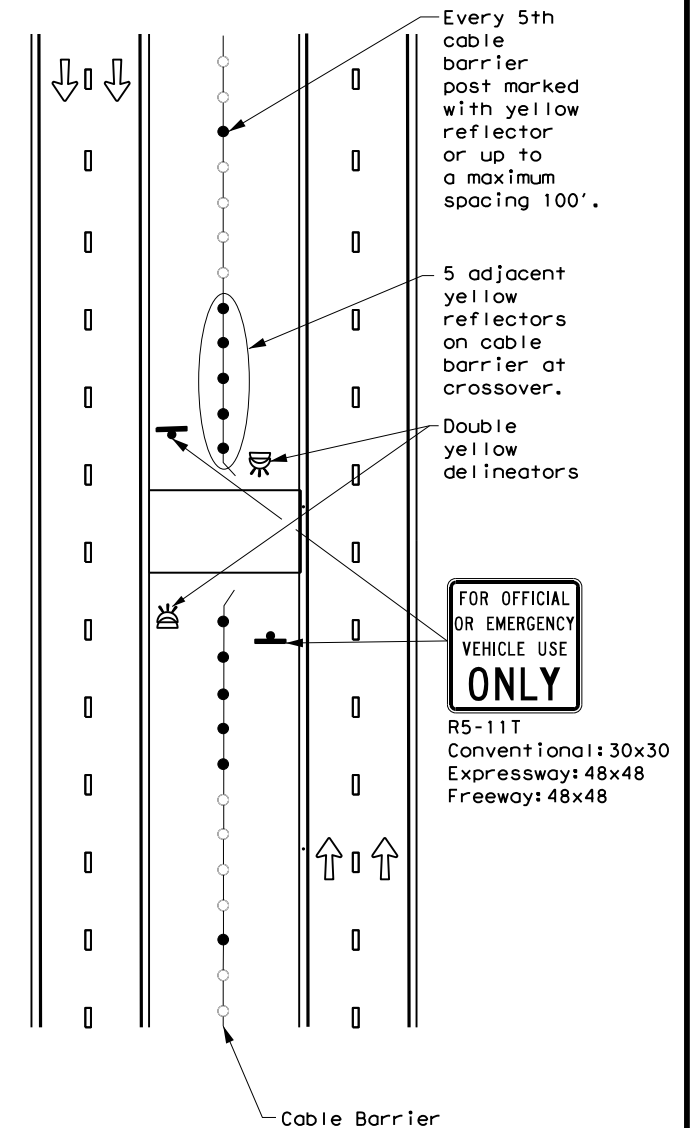
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuous Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation
 Traffic Safety Division Standard

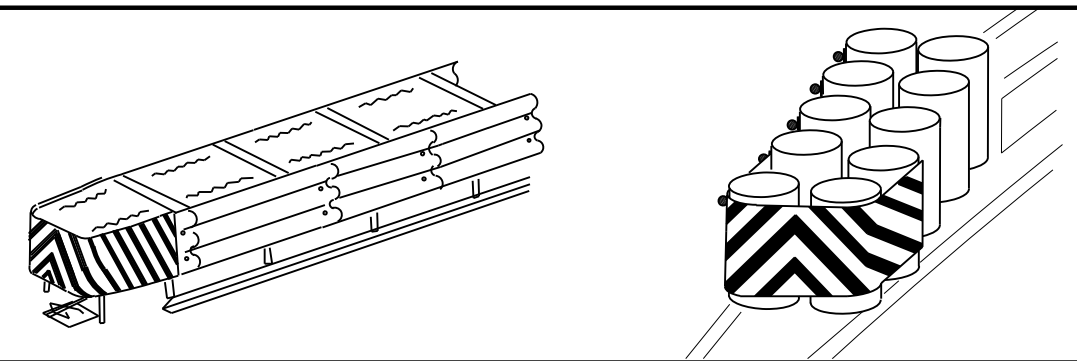
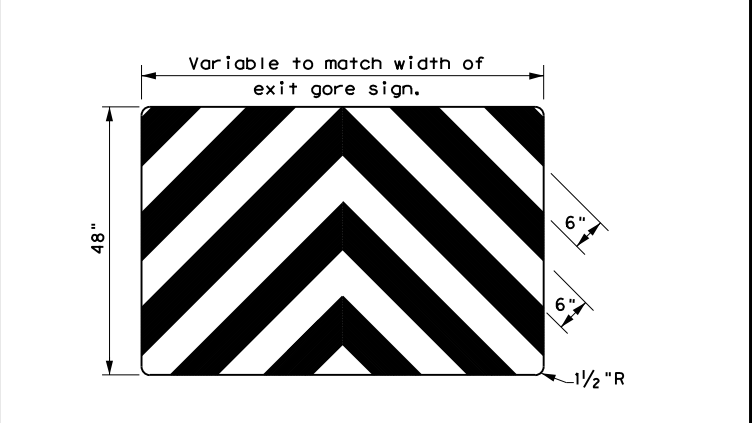
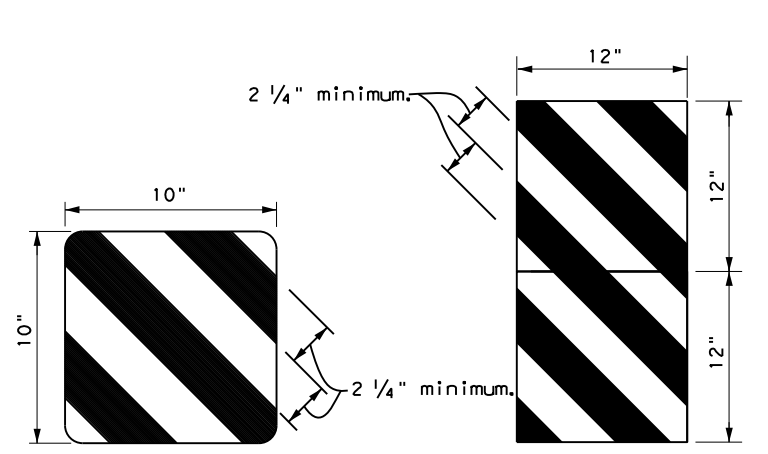
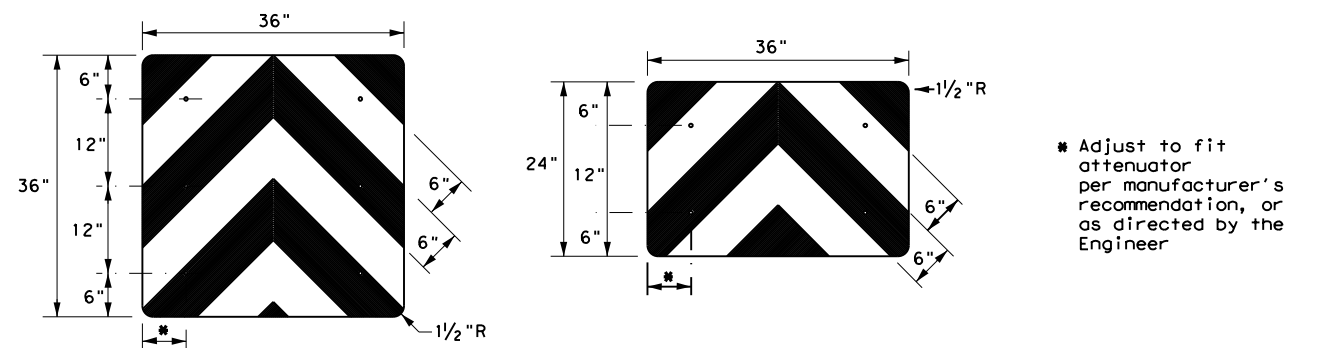
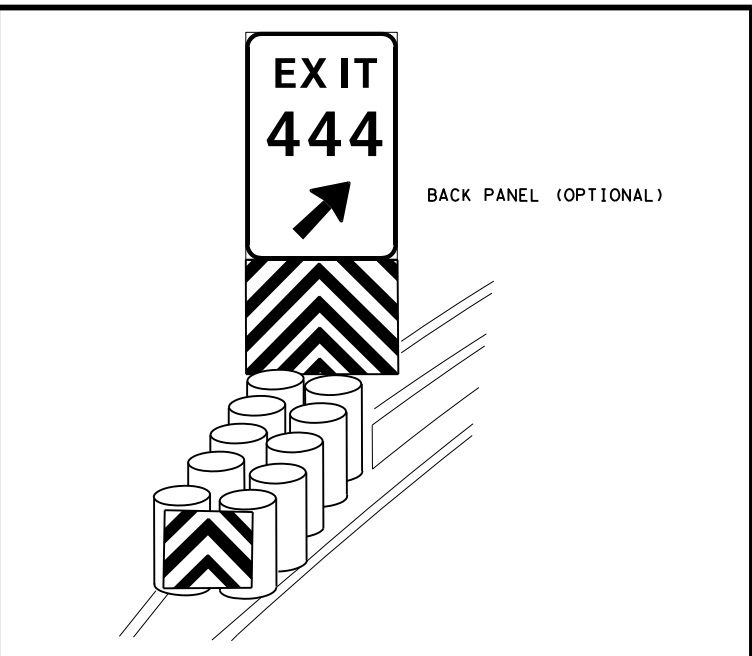
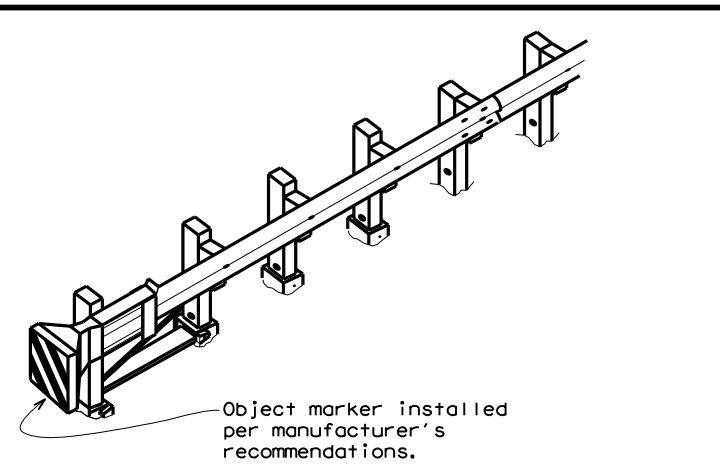
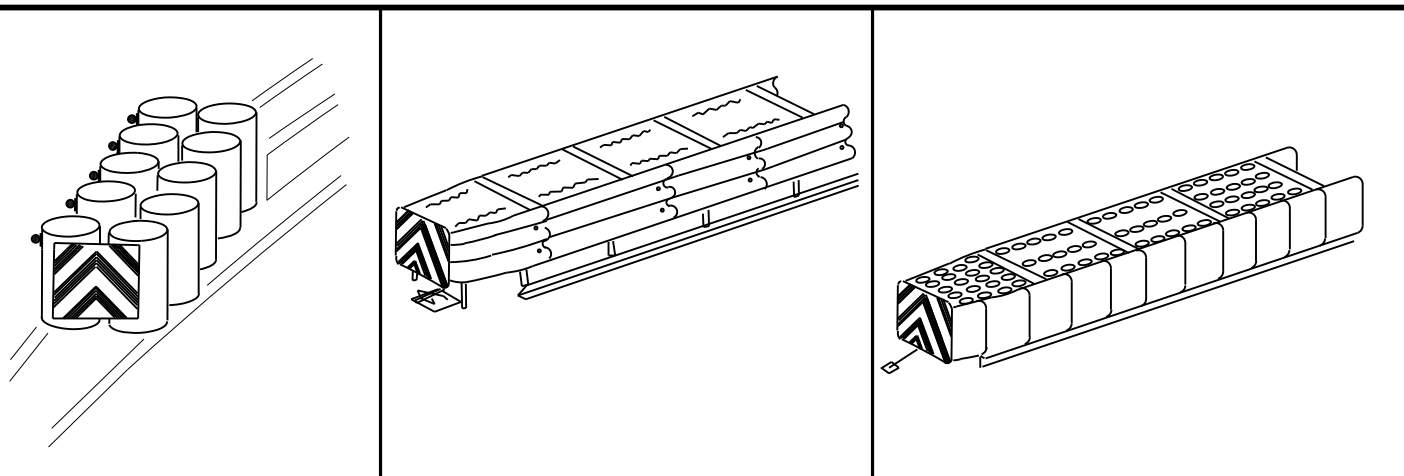
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

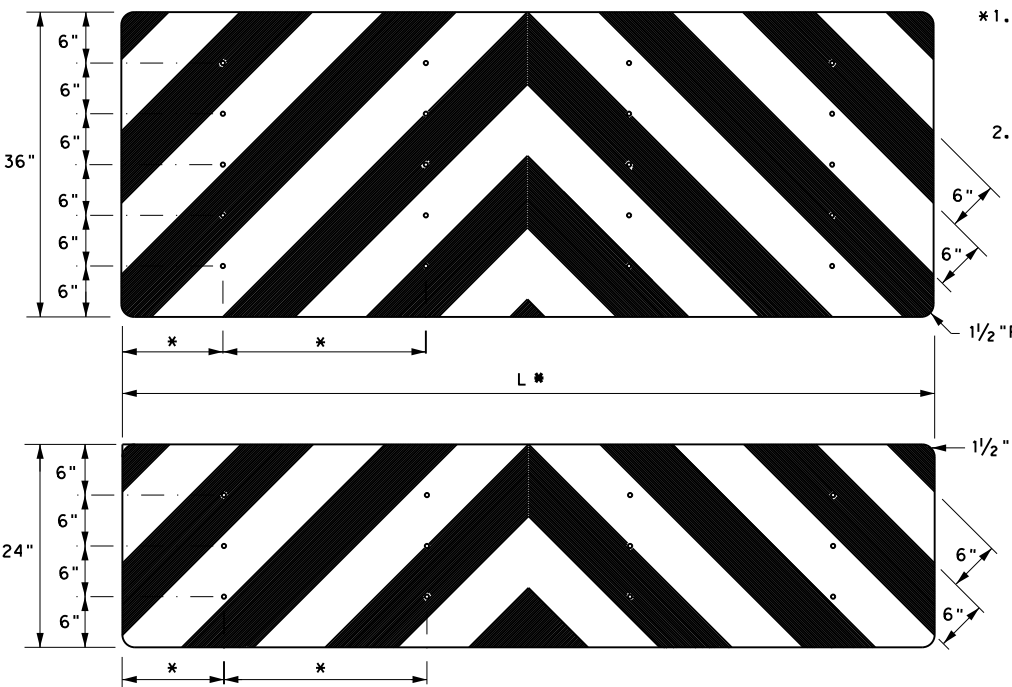
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	ODA	UPTON	260	

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OBJECT MARKERS SMALLER THAN 3 FT²



- NOTES**
- Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturer's recommendation, or as directed by the Engineer.
 - Mounting should be flush with top of attenuator. Minimum size 96" x 24".

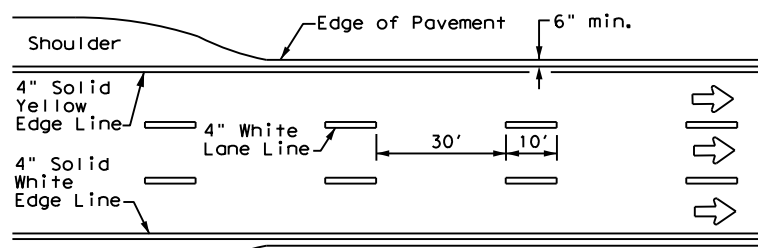
NOTES

- Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.
- Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.
- Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 1/4".
- Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.
- Object Marker at nose of attenuator is subsidiary to the attenuator.
- See D & OM (1-4) for required barrier reflectors.

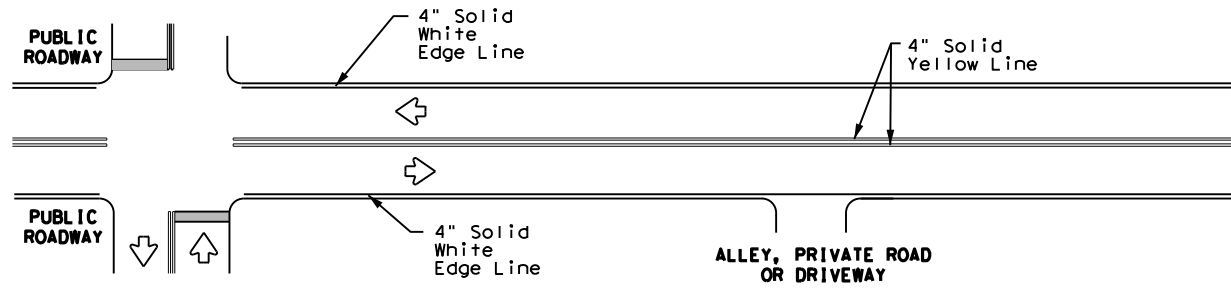
<p>DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS</p> <p>D & OM(VIA) -20</p>			
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8-95 3-15	ODA	UPTON	261
4-98 7-20			
20G			

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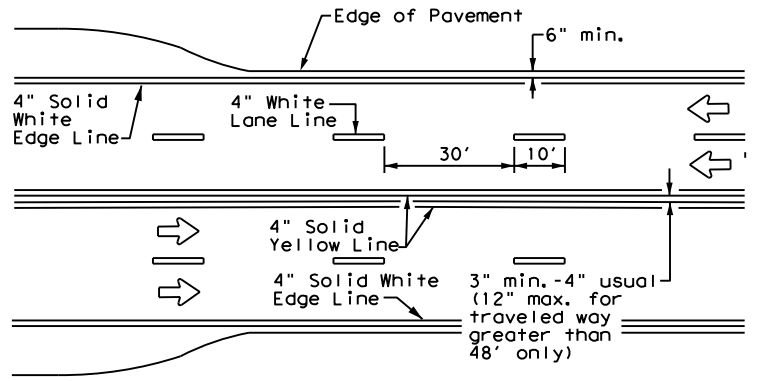
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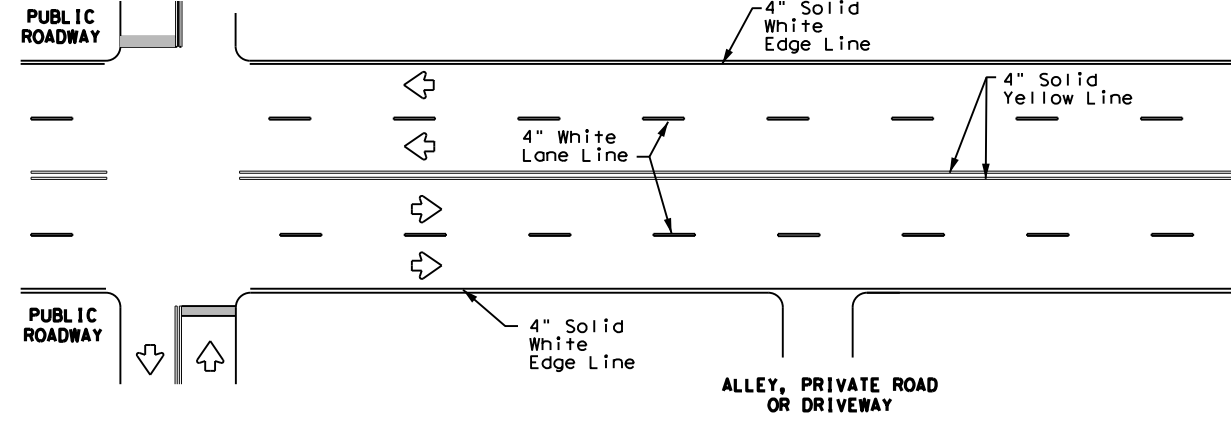
**EDGE LINE AND LANE LINES
 ONE-WAY ROADWAY
 WITH OR WITHOUT SHOULDERS**



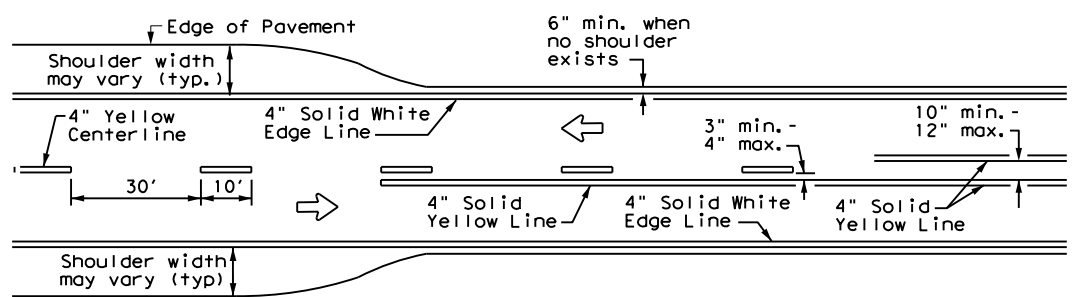
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
 MARKINGS THROUGH INTERSECTIONS**



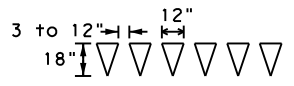
**CENTERLINE AND LANE LINES
 FOUR LANE TWO-WAY ROADWAY
 WITH OR WITHOUT SHOULDERS**



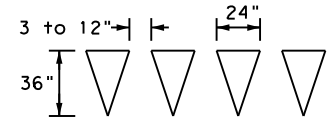
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
 MARKINGS THROUGH INTERSECTIONS**



**TWO LANE TWO-WAY ROADWAY
 WITH OR WITHOUT SHOULDERS**

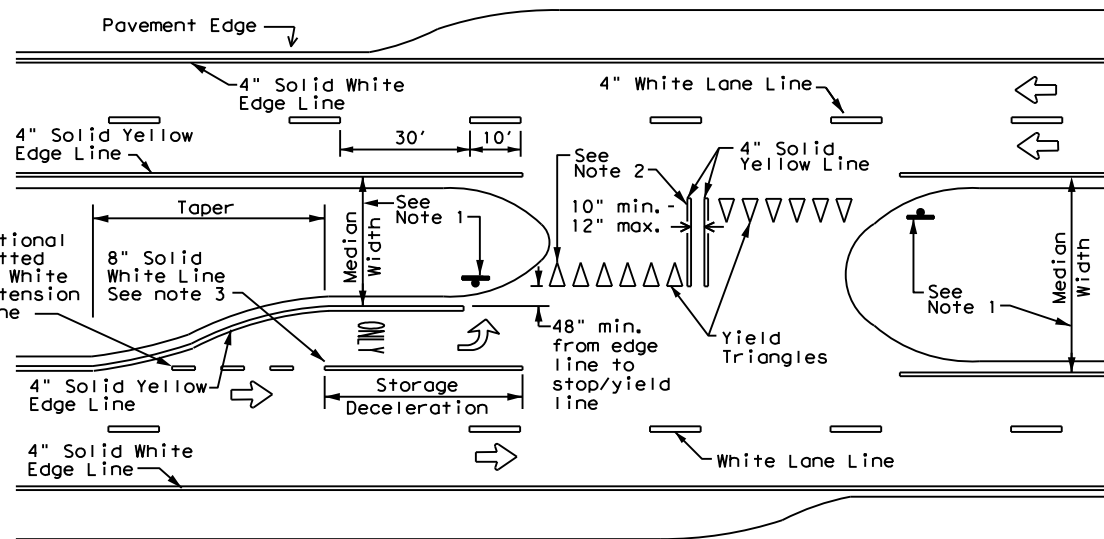


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

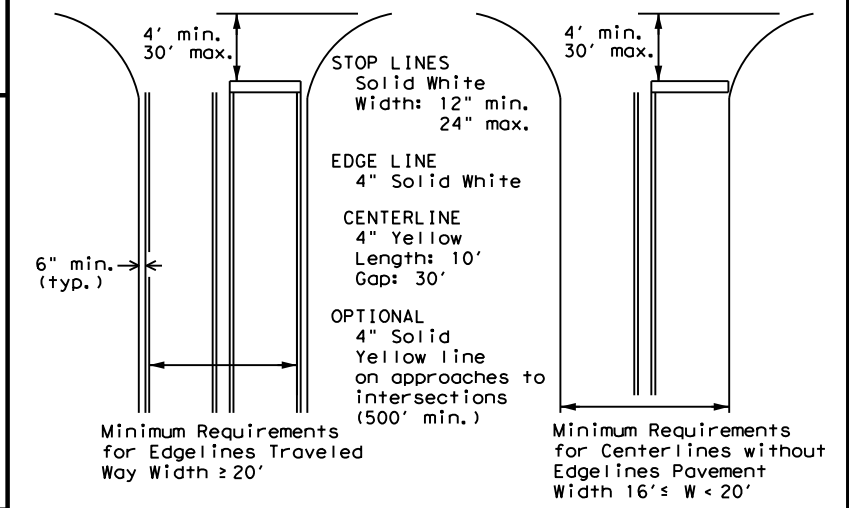
- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
- Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield triangles shall only be used with yield signs.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown in the plans or as directed by the Engineer.

GENERAL NOTES

- Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
- The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



**GUIDE FOR PLACEMENT OF STOP LINES,
 EDGE LINE & CENTERLINE**

Based on Traveled Way and Pavement Widths for Undivided Highways



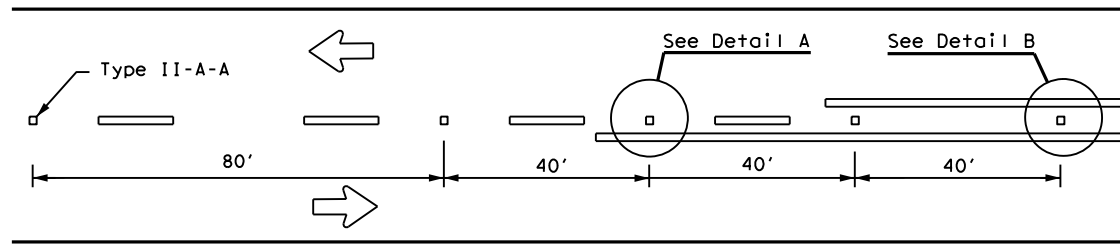
**TYPICAL STANDARD
 PAVEMENT MARKINGS**

PM(1) - 20

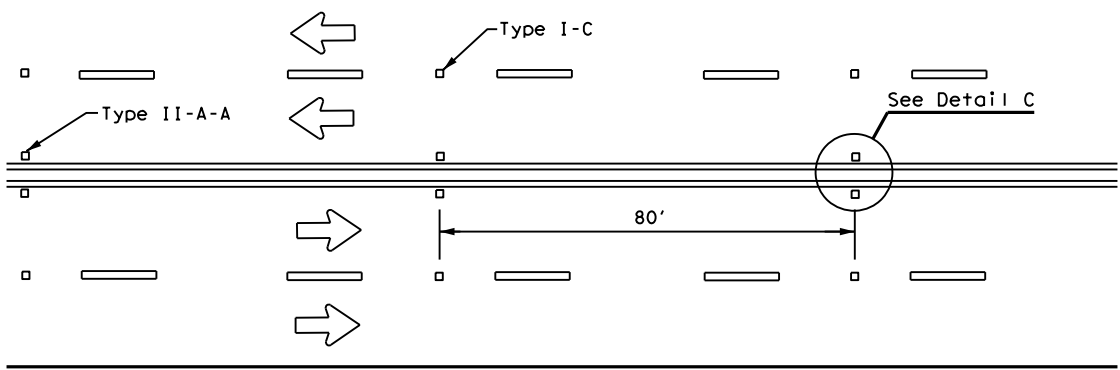
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© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
8-95 3-03 REVISIONS	0076	06	037	US 67
5-00 2-12	DIST	COUNTY	SHEET NO.	
8-00 6-20	ODA	UPTON	262	

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

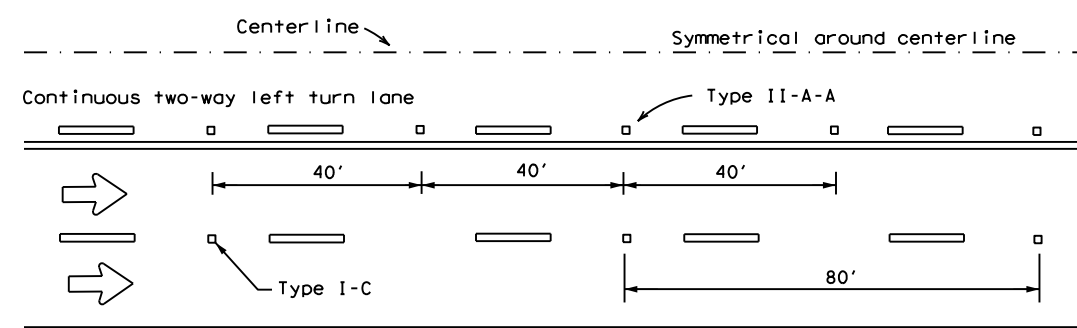
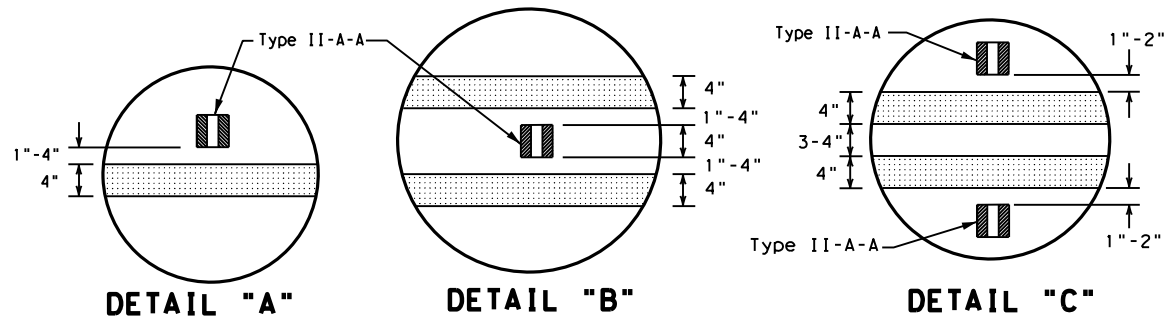
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 DATE: 10/22/2021 05:53 PM
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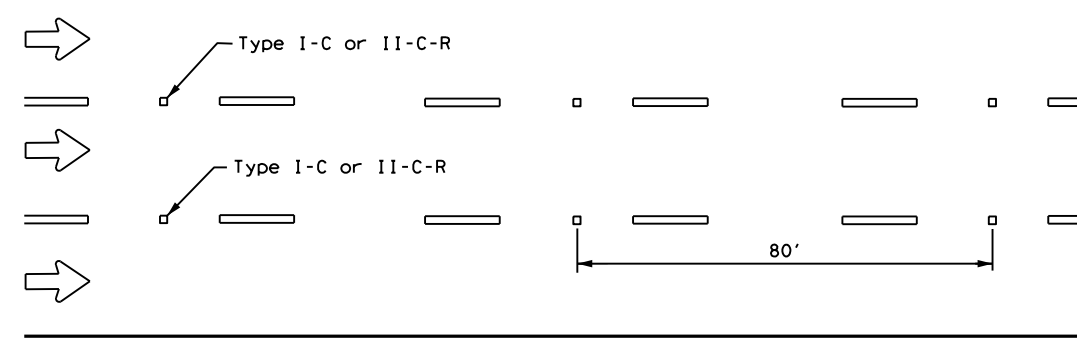
CENTERLINE FOR ALL TWO LANE ROADWAYS



**CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

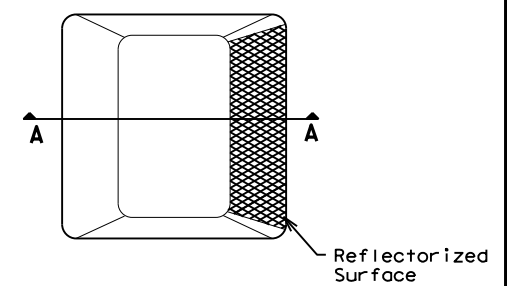


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

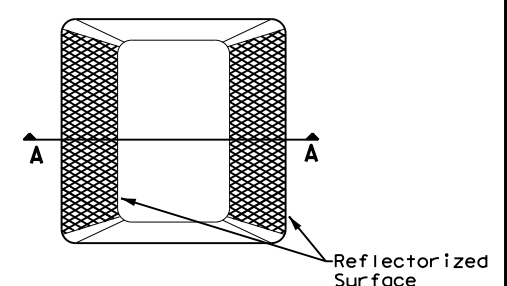
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

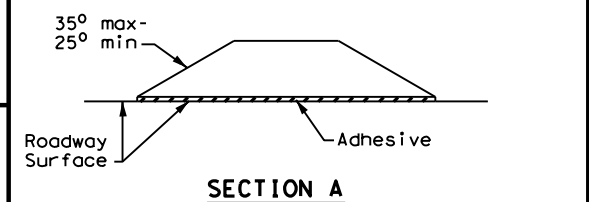
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



RAISED PAVEMENT MARKERS

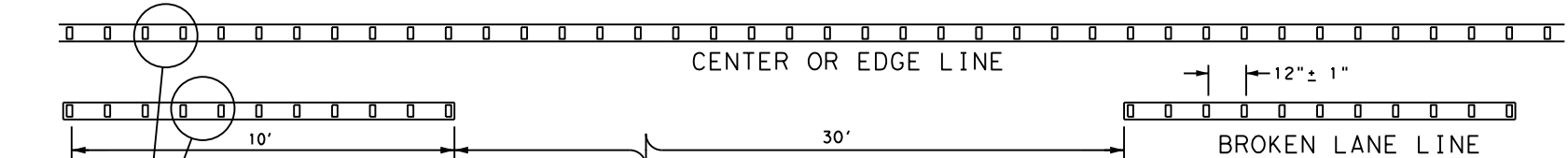
GENERAL NOTES

1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.



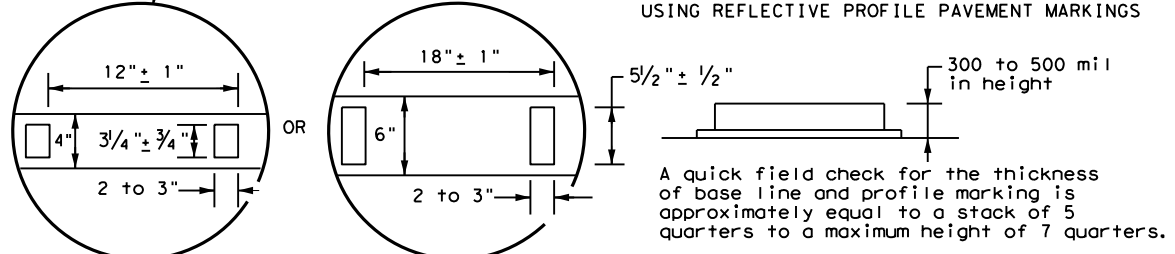
POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2) - 20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
4-92 2-10 REVISIONS	0076	06	037	US 67
5-00 2-12	DIST	COUNTY	SHEET NO.	
8-00 6-20	ODA	UPTON	263	



**REFLECTORIZED PROFILE
PATTERN DETAIL**

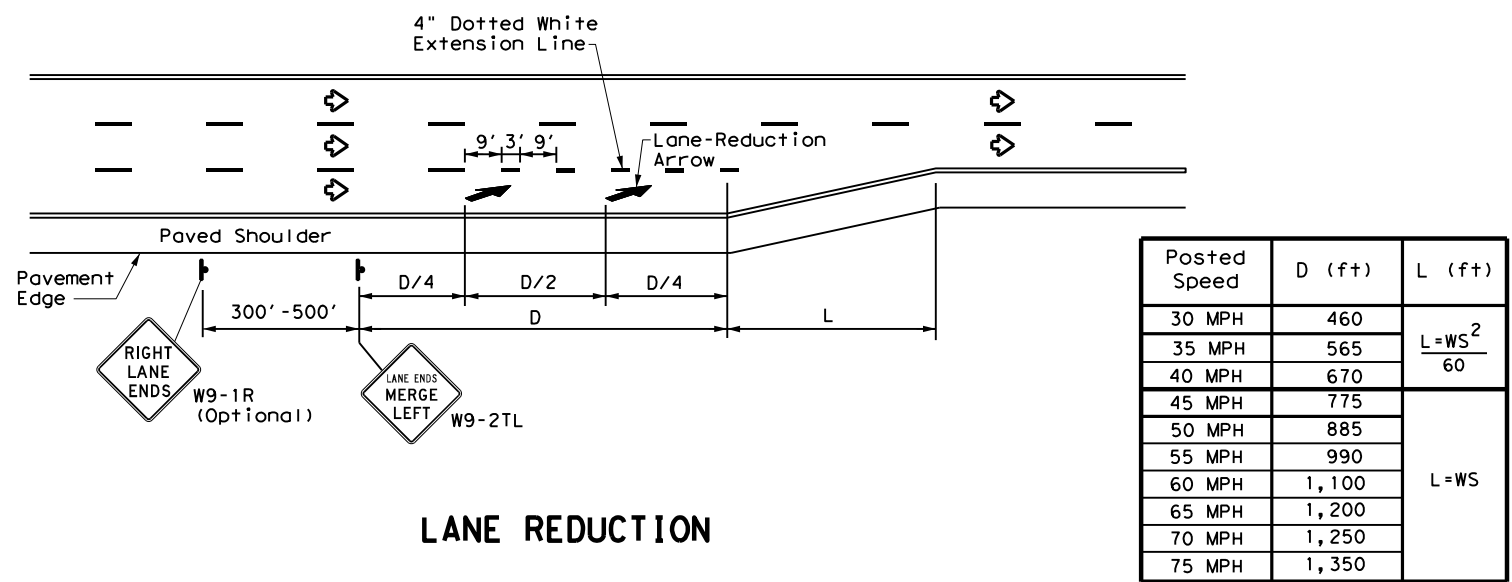
USING REFLECTIVE PROFILE PAVEMENT MARKINGS



NOTE
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

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Posted Speed	D (ft)	L (ft)
30 MPH	460	$L = \frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	L = WS
45 MPH	775	
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

LANE REDUCTION

NOTES

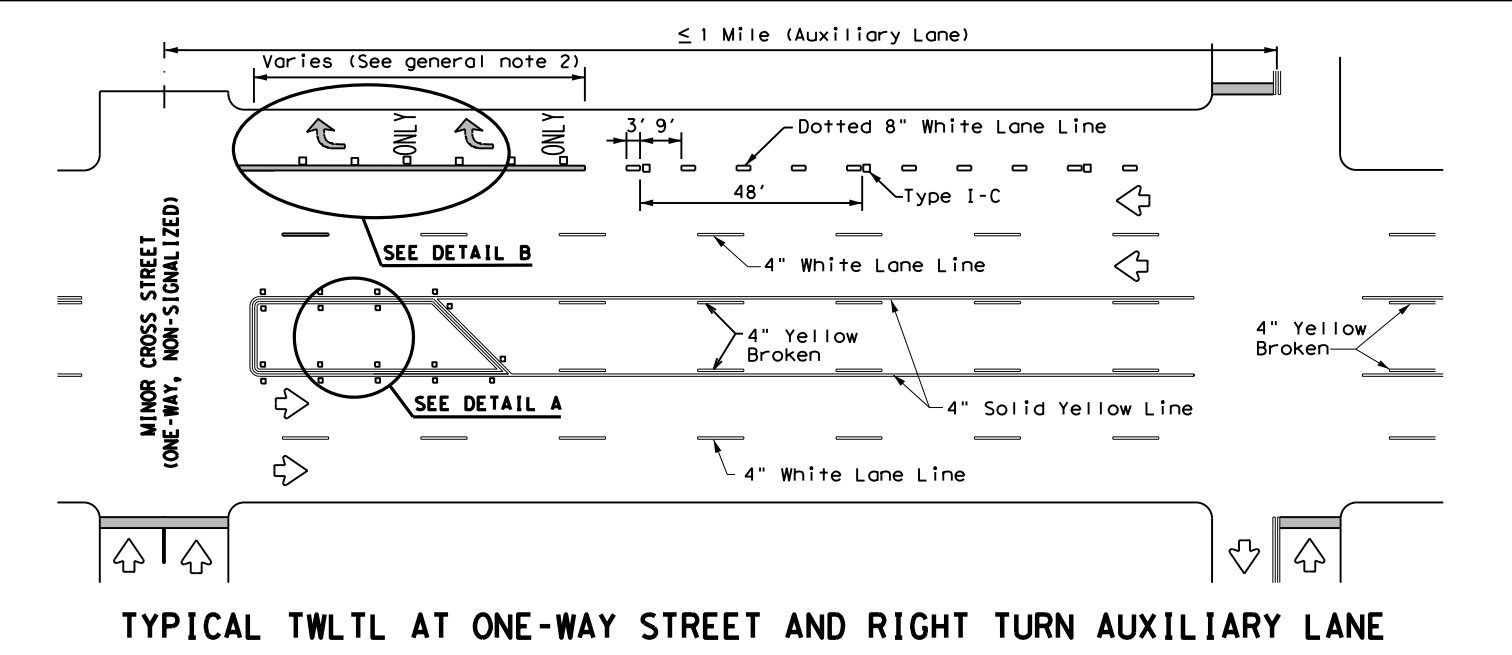
- Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
- On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
- Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
- For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

GENERAL NOTES

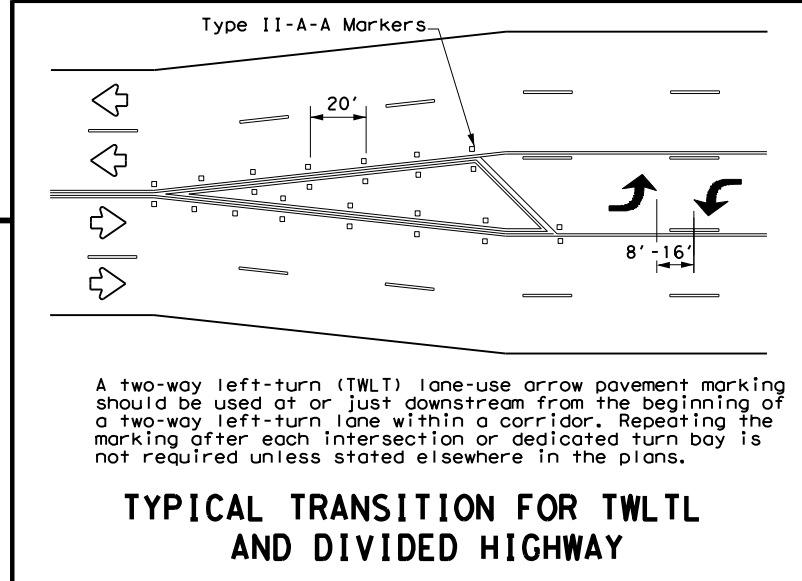
- Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
- When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
- Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

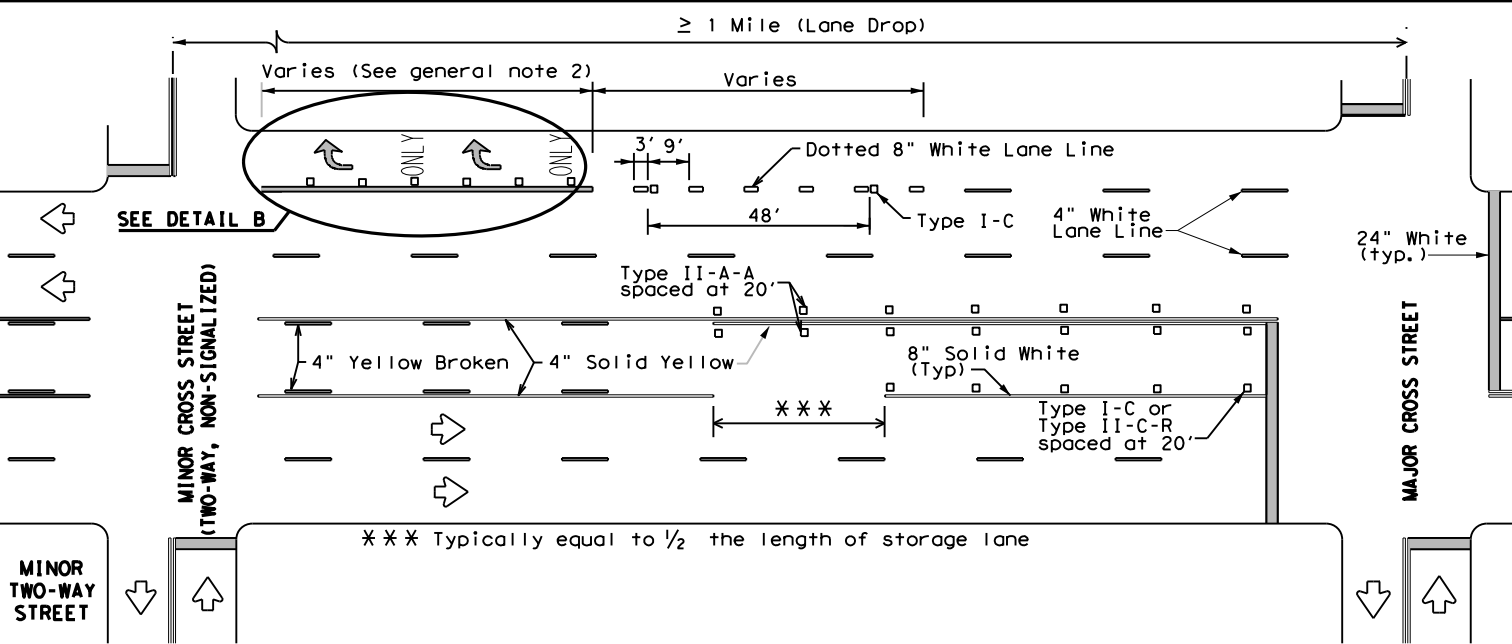
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



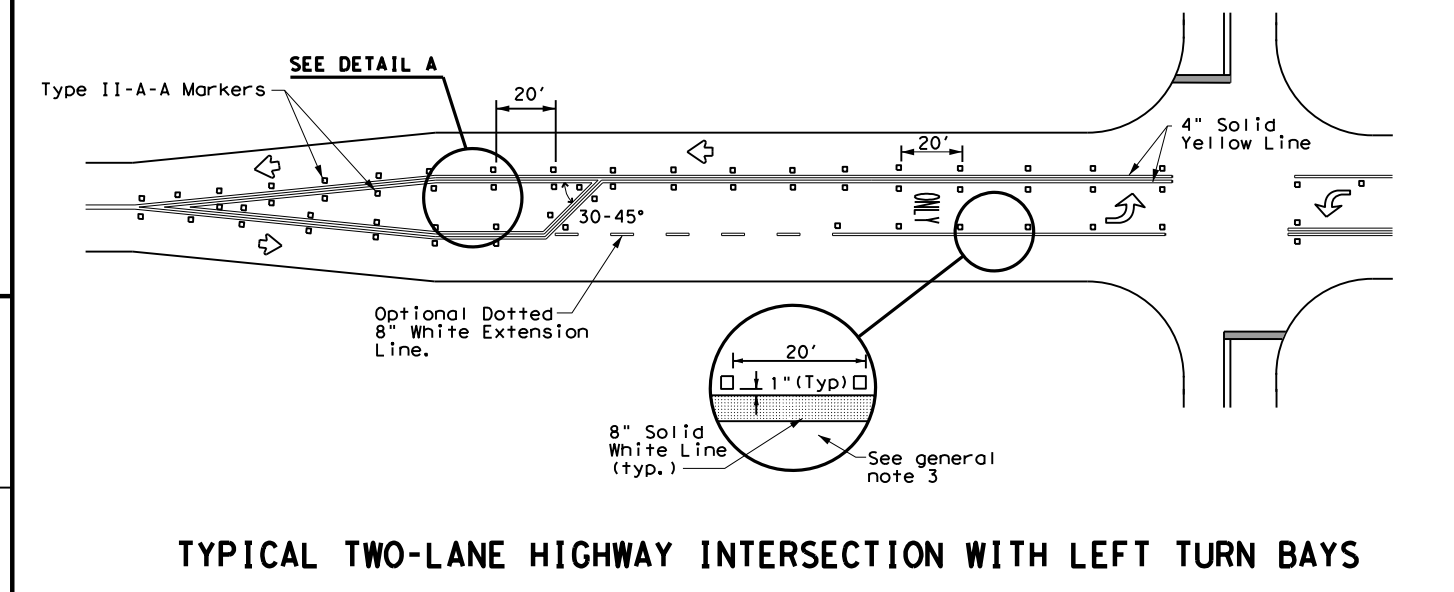
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



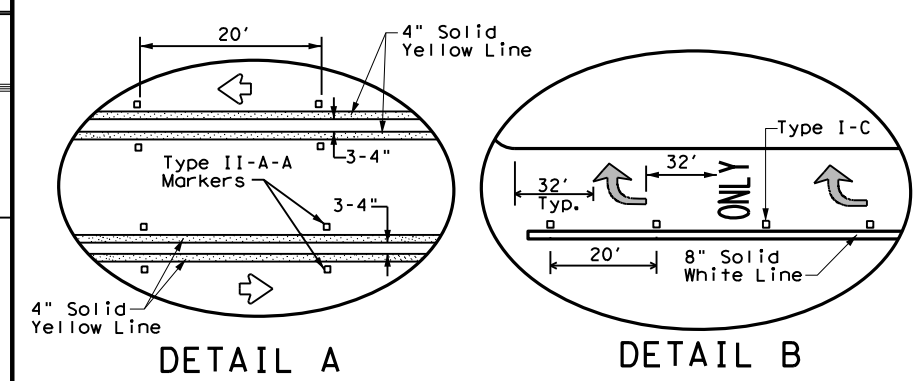
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A

DETAIL B

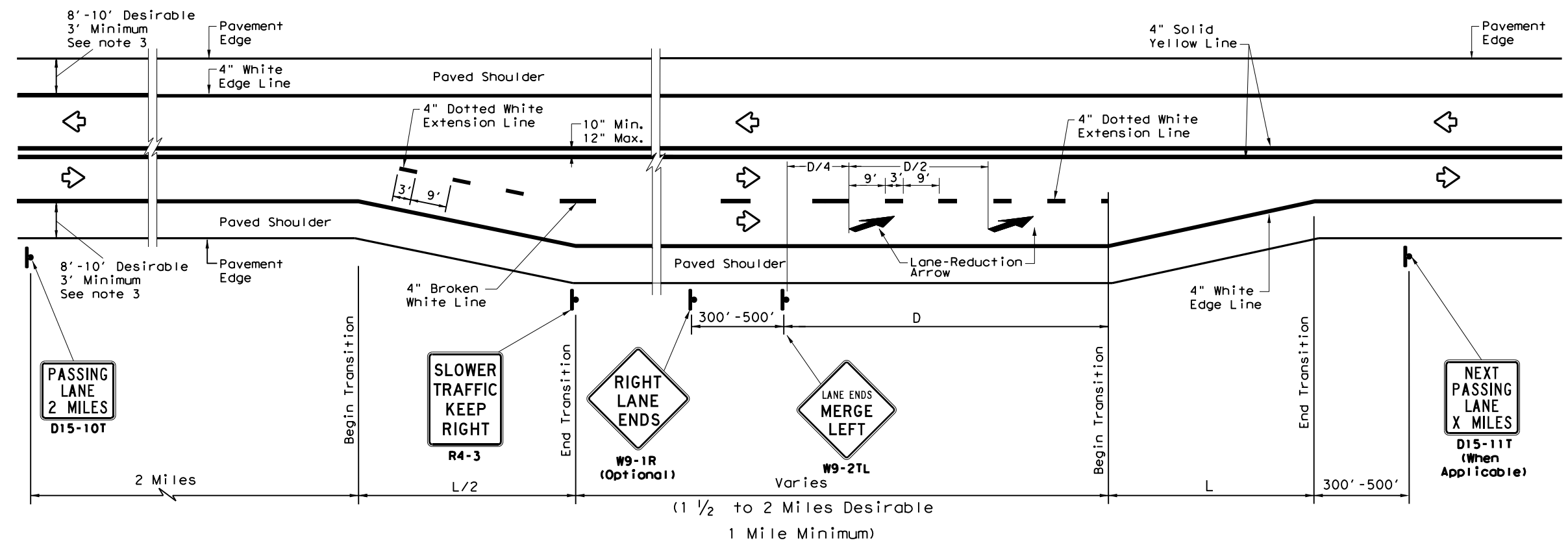
Texas Department of Transportation
 Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3) - 20

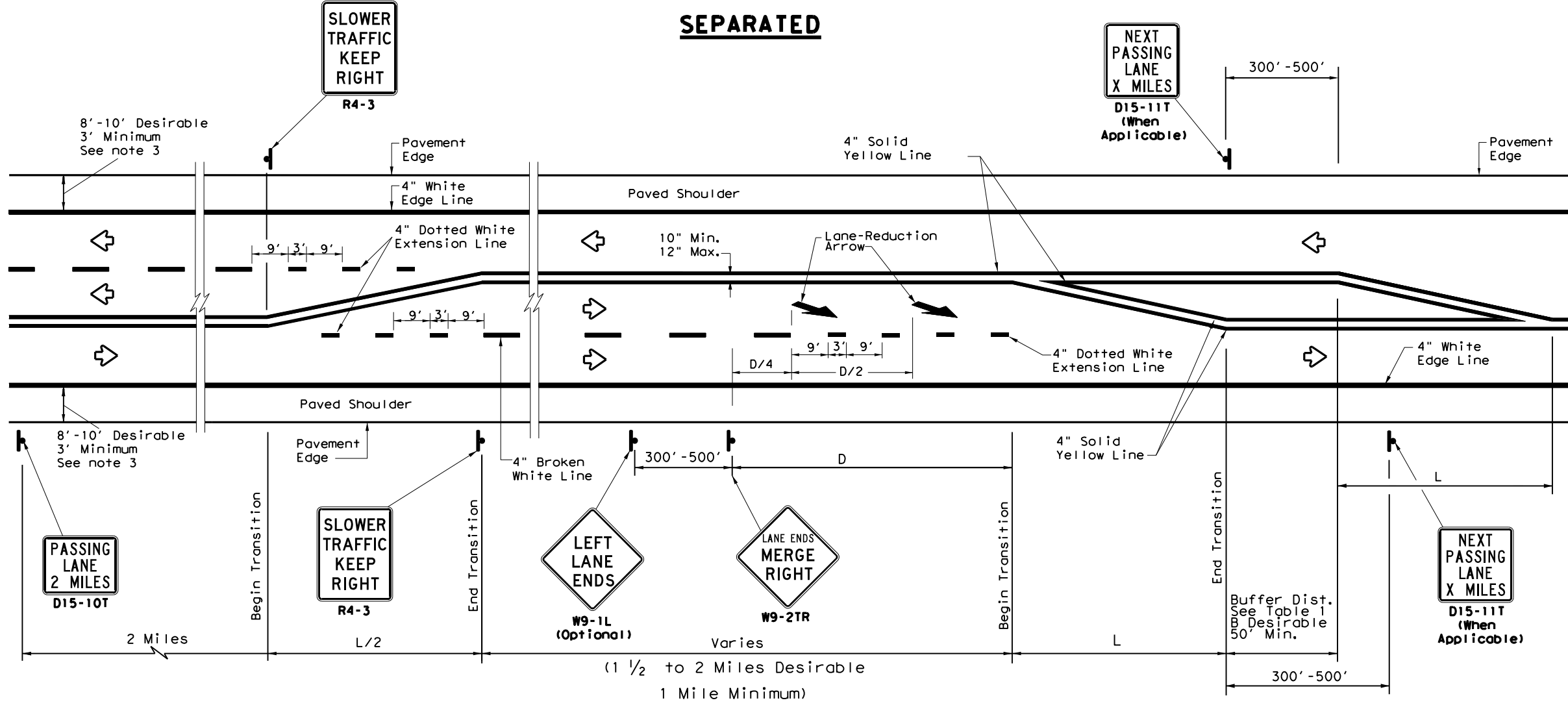
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© TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
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5-00 2-10	DIST	COUNTY	SHEET NO.	
8-00 2-12	ODA	UPTON	264	
3-03 6-20				

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SEPARATED



ALTERNATING

LEGEND	
	Sign
	Traffic Flow

TYPICAL TAPER LENGTH (L)	
Formula *	$L = WS$

* Transition length should be rounded up to nearest 5 foot increment.

L=Length of Transition (FT)
 W=Width of Offset (FT)
 S=Posted Speed (MPH)

EXAMPLE
 A 12 foot lane is added on a 70 mph roadway. The length of the transition should be:
 $L = 12 \times 70 = 840 \text{ ft}$

**TABLE 1
 ADVANCE WARNING SIGN
 DISTANCE (D)
 AND BUFFER DISTANCE (B)**

Posted Speed	D (FT)	B (FT)
40	670	305
45	775	360
50	885	425
55	990	495
60	1100	570
65	1200	645
70	1250	730
75	1350	820

GENERAL NOTES

- For minimum and desirable design details, see the Roadway Design Manual, Chapter 4, Section 6, Super 2 Highways.
- For Raised Pavement Markers (RPM) details, see Pavement Markings Standard sheet, PM(2). Note that RPMs are not recommended on the 4" dotted white extension lines.
- For rumble strip options available for the designed shoulder width, see rumble strip standard sheet RS(4).



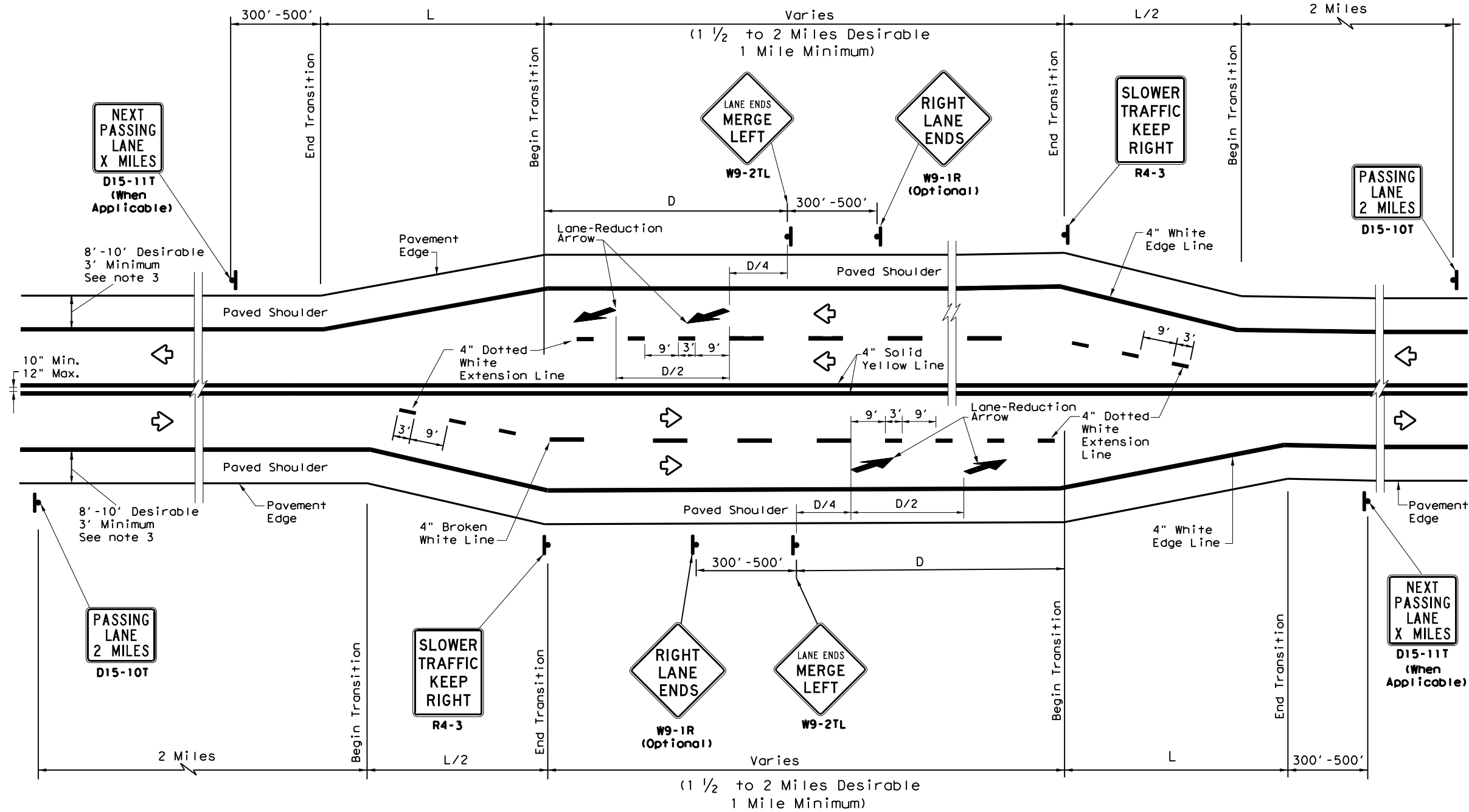
**TEXAS SUPER 2
 PASSING LANES**

TS2 (PL-1) - 18

FILE: ts2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT May 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076	06	037	US 67
2-12	DIST	COUNTY	SHEET NO.	
3-12	ODA	UPTON	265	
3-18				

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SIDE BY SIDE PASSING LANES

LEGEND	
	Sign
	Traffic Flow

TYPICAL TAPER LENGTH (L)	
Formula *	L = WS

* Transition length should be rounded up to nearest 5 foot increment.

L=Length of Transition (FT)
 W=Width of Offset (FT)
 S=Posted Speed (MPH)

EXAMPLE
 A 12 foot lane is added on a 70 mph roadway. The length of the transition should be:
 L=12x70=840 ft

TABLE 1 ADVANCE WARNING SIGN DISTANCE (D)	
Posted Speed	D (FT)
40	670
45	775
50	885
55	990
60	1100
65	1200
70	1250
75	1350

- GENERAL NOTES**
- For minimum and desirable design details, see the Roadway Design Manual, Chapter 4, Section 6, Super 2 Highways.
 - For Raised Pavement Markers (RPM) details, see Pavement Markings Standard sheet, PM(2). Note that RPMs are not recommended on the 4" dotted white extension lines.
 - For rumble strip options available for the designed shoulder width, see rumble strip standard sheet RS(4).



TEXAS SUPER 2 PASSING LANES

TS2 (PL-2) - 18

FILE: ts2-2-18.dgn	DN:	CK:	DW:	CK:
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REVISIONS	0076	06	037	US 67
2-12	DIST	COUNTY	SHEET NO.	
3-12	ODA	UPTON	266	
3-18				

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
 TWT = Thin-Walled Tubing (see SMD(TWT))
 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
 S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

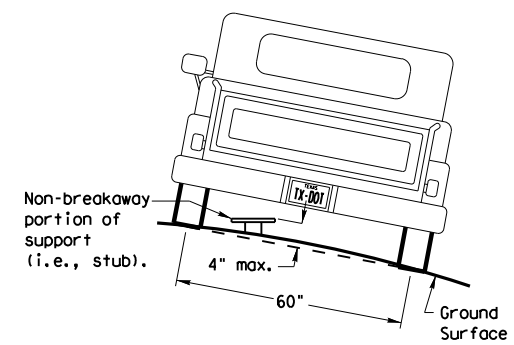
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
 UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
 WS = Wedge Anchor Steel - (see SMD(TWT))
 WP = Wedge Anchor Plastic (see SMD(TWT))
 SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
 SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

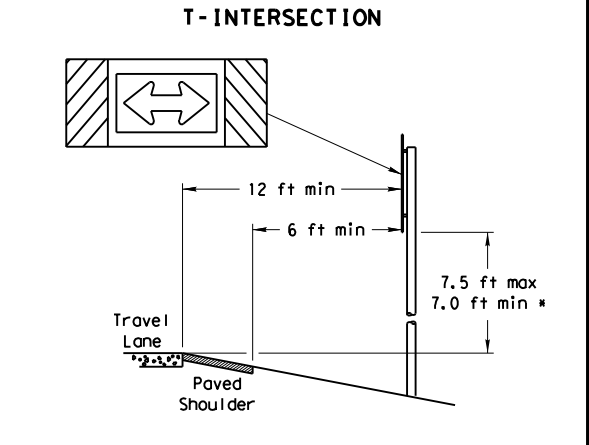
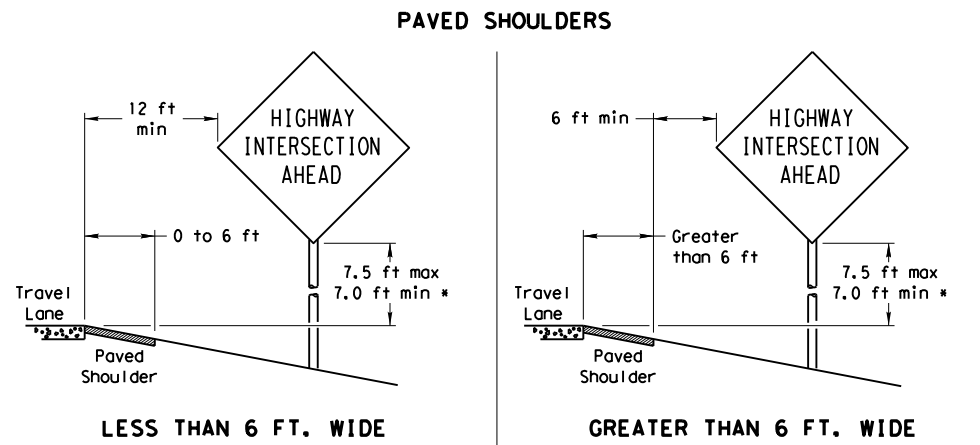
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
 T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
 U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
 IF REQUIRED
 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
 BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
 WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
 EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



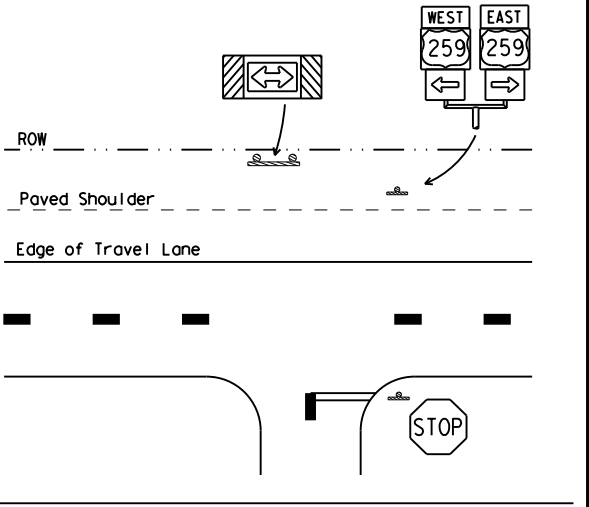
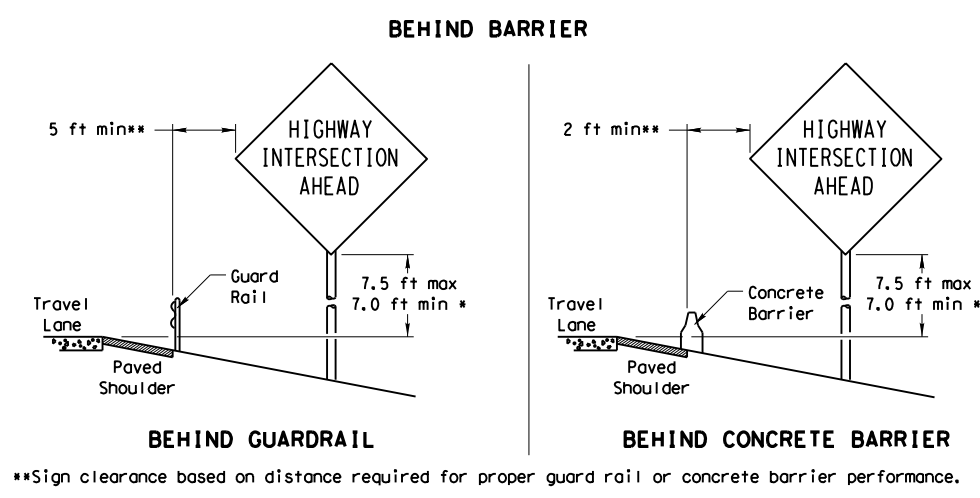
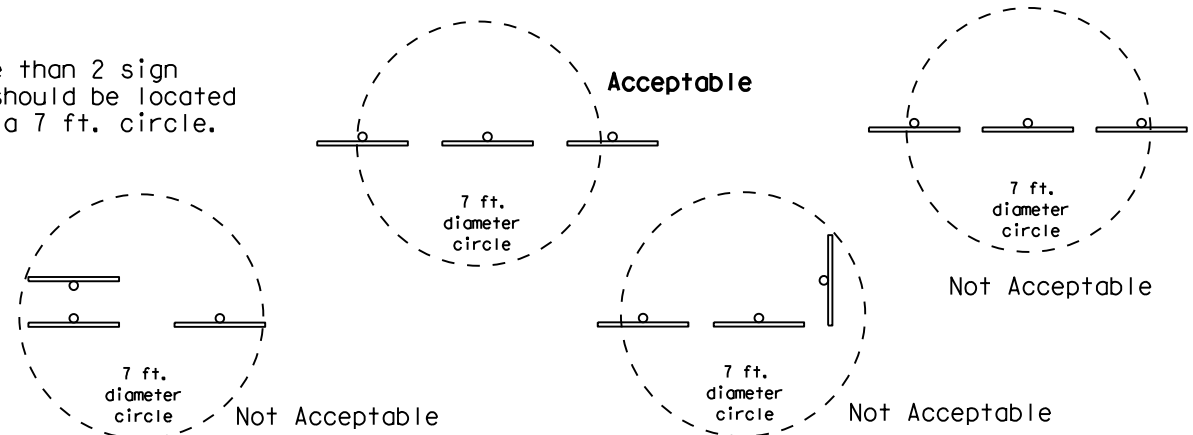
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

SIGN LOCATION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

No more than 2 sign posts should be located within a 7 ft. circle.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

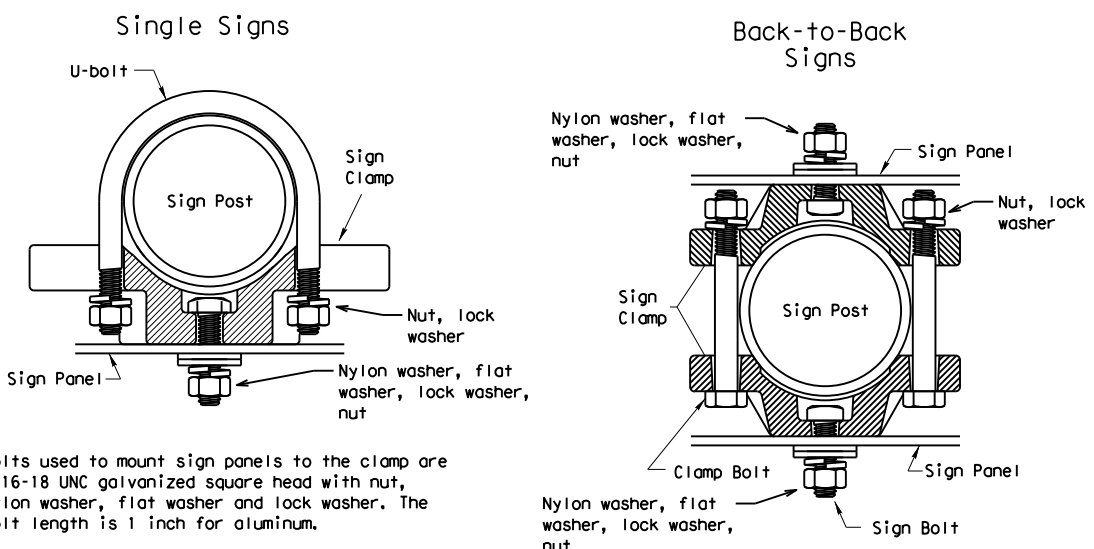
- a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
- a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
<http://www.txdot.gov/publications/traffic.htm>

TYPICAL SIGN ATTACHMENT DETAIL



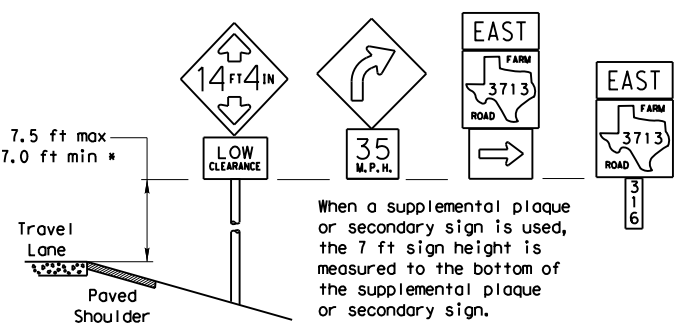
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

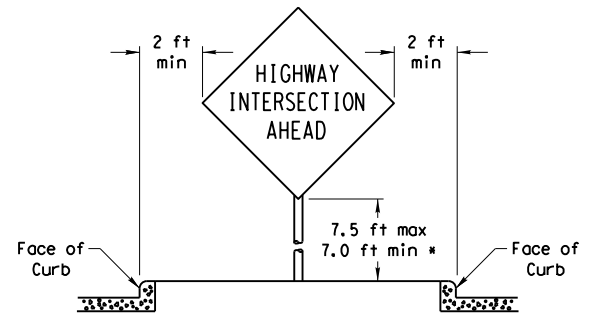
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

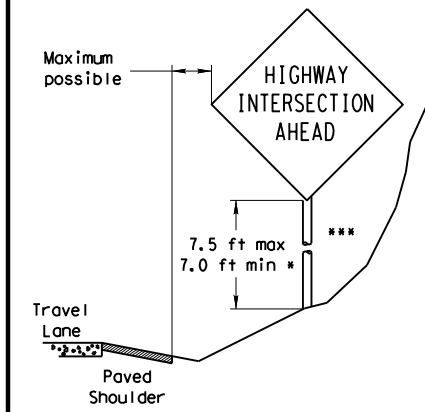


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

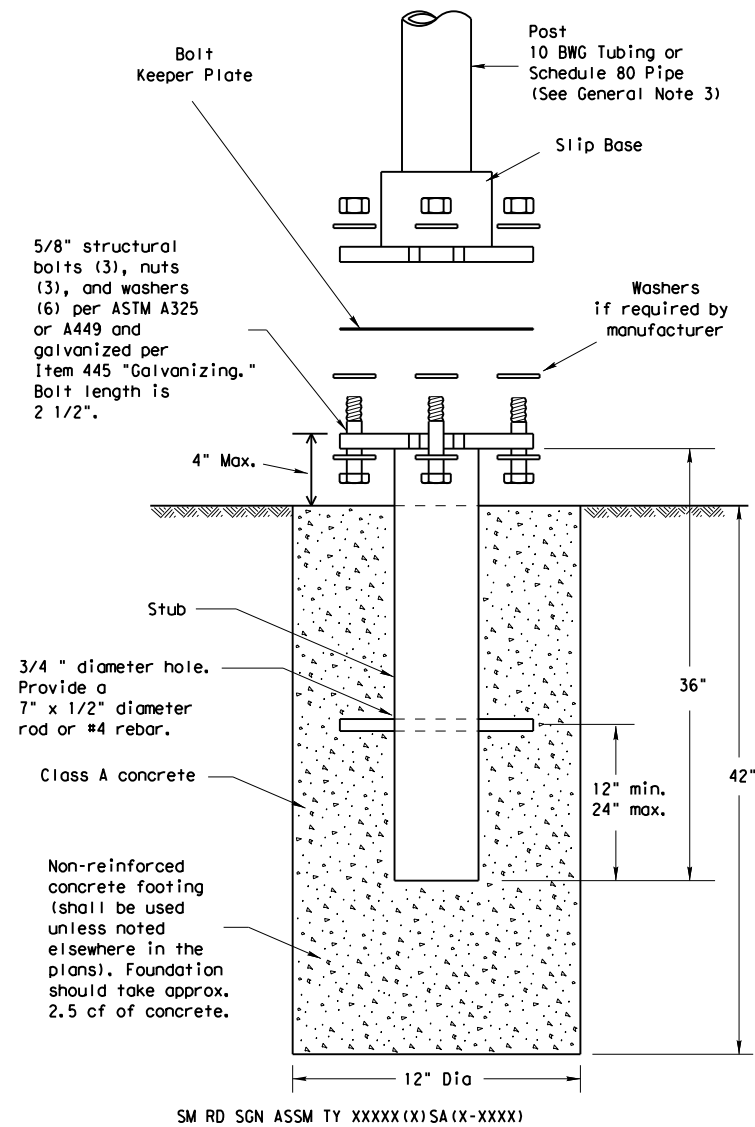


SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS SMD(GEN) - 08

© TxDOT July 2002		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
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		DIST	COUNTY		SHEET NO.
		ODA	UPTON		267

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TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm
 The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

- Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
- Material used as post with this system shall conform to the following specifications:
 - 10 BWG Tubing (2.875" outside diameter)
 - 0.134" nominal wall thickness
 - Seamless or electric-resistance welded steel tubing or pipe
 - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
 - Other steels may be used if they meet the following:
 - 55,000 PSI minimum yield strength
 - 70,000 PSI minimum tensile strength
 - 20% minimum elongation in 2"
 - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
 - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
 - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
 - Schedule 80 Pipe (2.875" outside diameter)
 - 0.276" nominal wall thickness
 - Steel tubing per ASTM A500 Gr C
 - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
 - 46,000 PSI minimum yield strength
 - 62,000 PSI minimum tensile strength
 - 21% minimum elongation in 2"
 - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
 - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
 - Galvanization per ASTM A123
- See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: <http://www.txdot.gov/publications/traffic.htm>
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

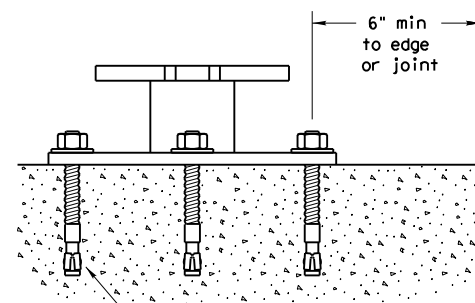
Foundation

- Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
- The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
- Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
- Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
- The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support

- Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
- Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



5/8" diameter Concrete Anchor - 8 places (embed a minimum of 5 1/2" and torque to min. of 50 ft-lbs). Anchor may be expansion or adhesive type.

SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxyes and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.



SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

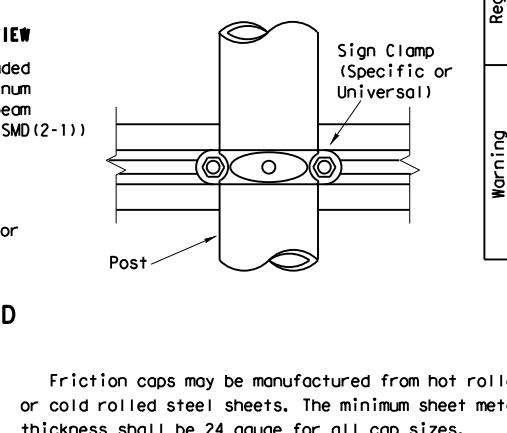
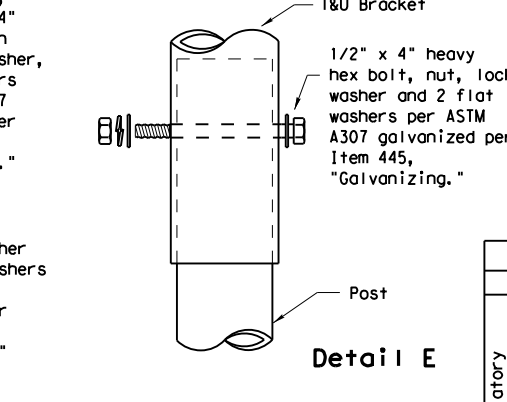
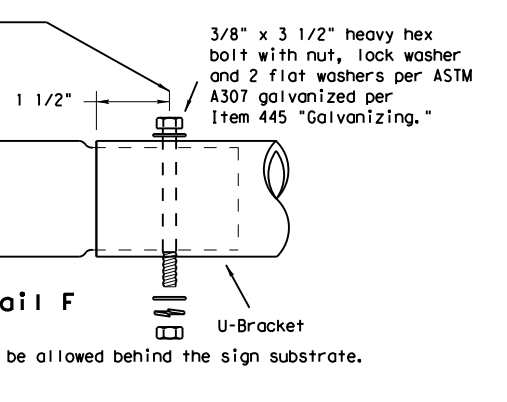
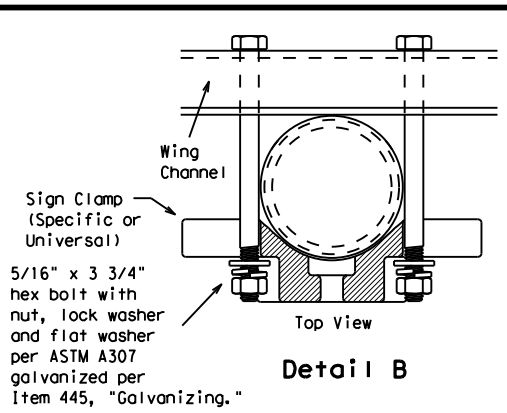
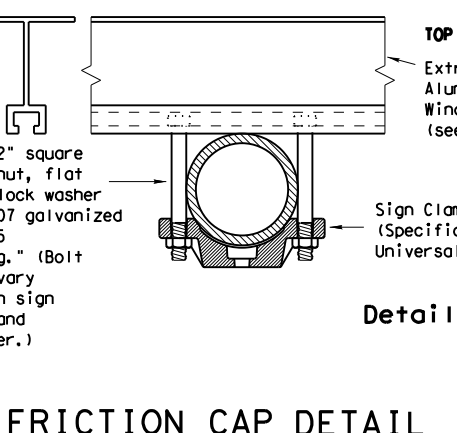
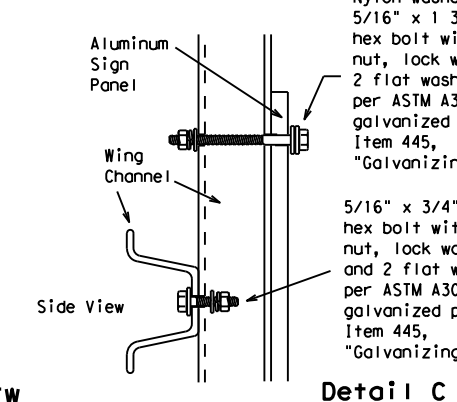
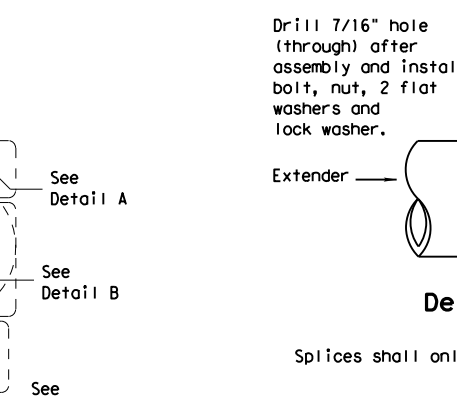
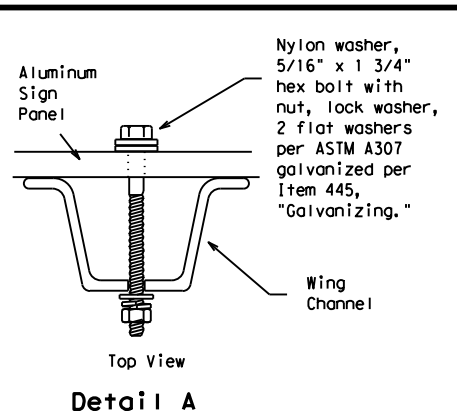
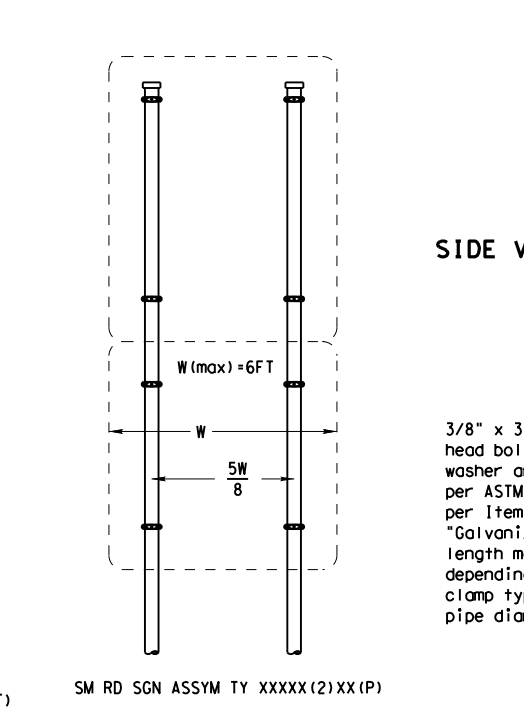
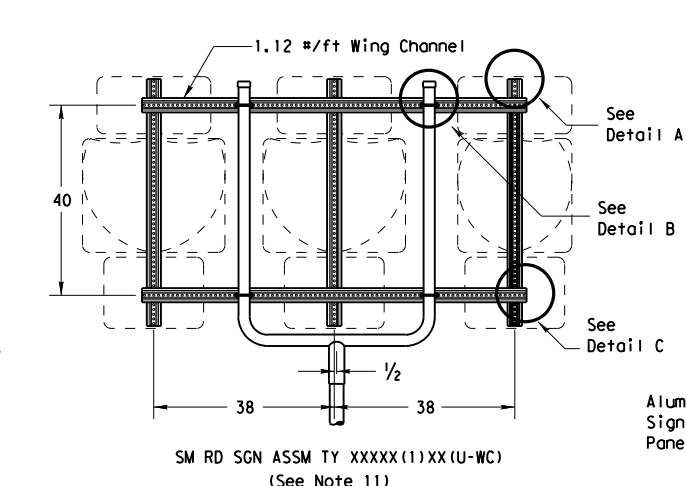
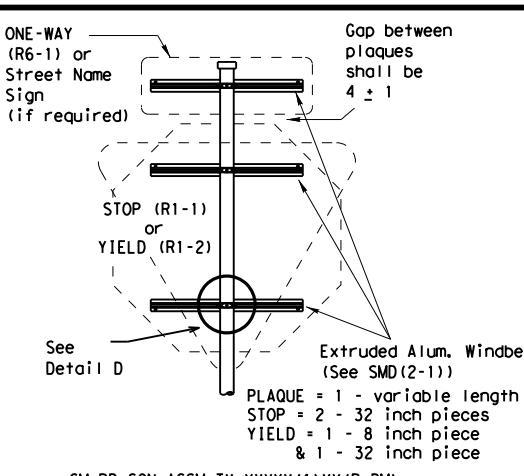
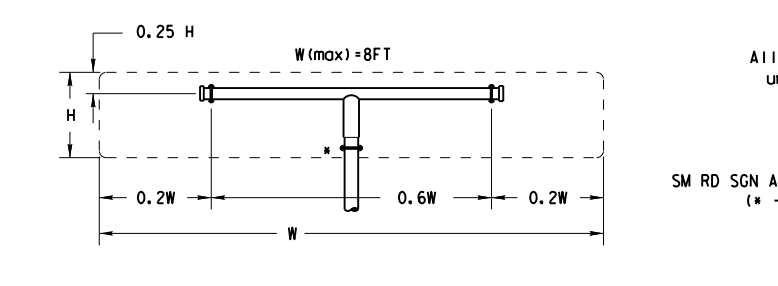
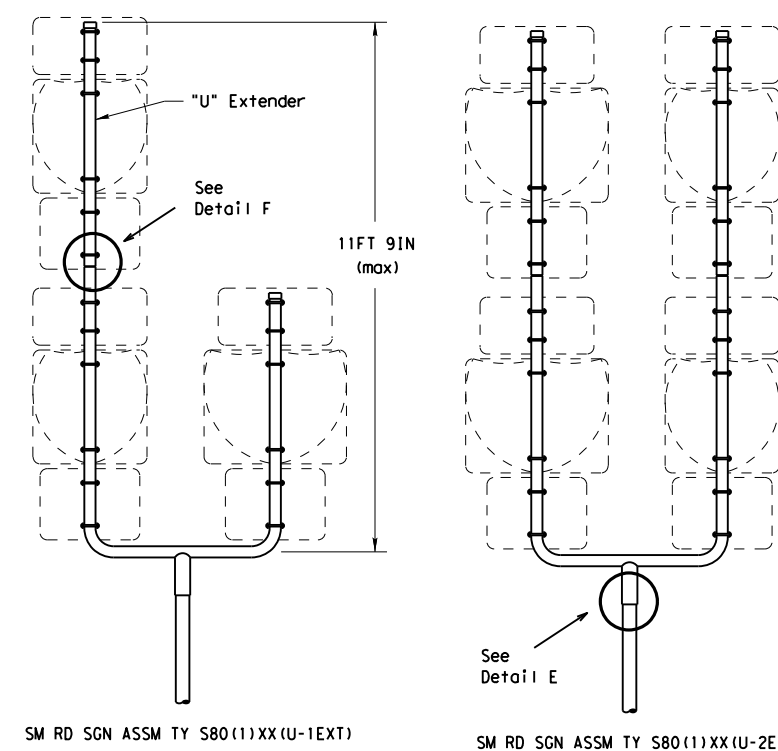
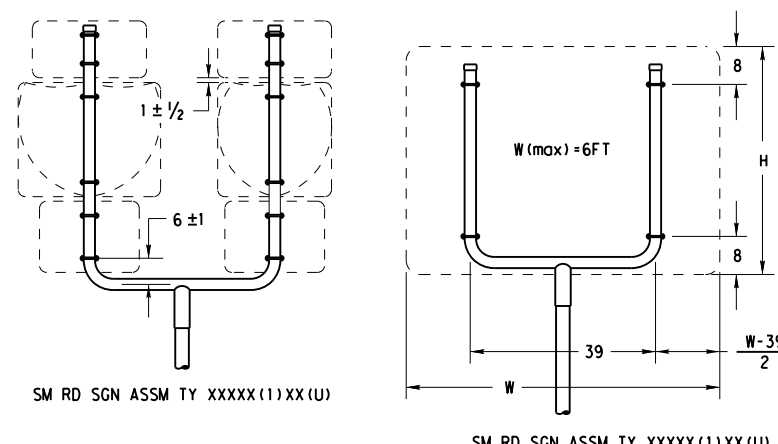
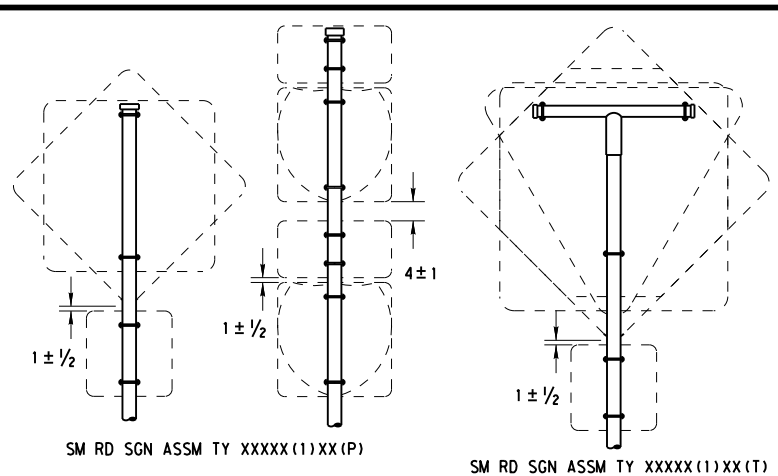
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	DIST		COUNTY		SHEET NO.	
ODA		UPTON		268		

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GENERAL NOTES:

1. SIGN SUPPORT # OF POSTS MAX. SIGN AREA

10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT	
SIGN DESCRIPTION	SUPPORT
48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T)
	TY 10BWG(1)XX(P-BM)
60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T)
	TY 10BWG(1)XX(P-BM)
48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T)
48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(P-BM)
36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
48x60-inch signs	TY S80(1)XX(T)
48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
48x60-inch signs	TY S80(1)XX(T)
48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

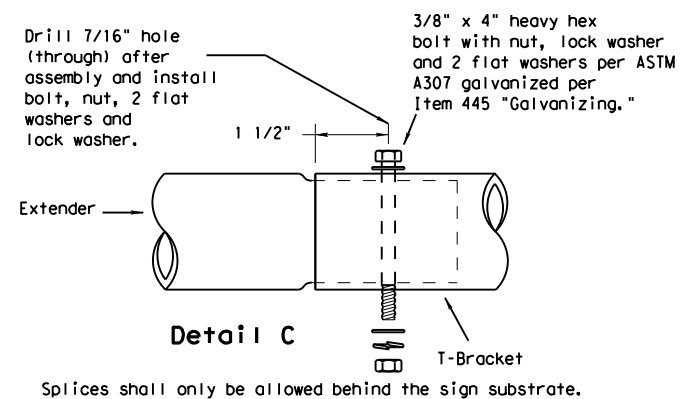
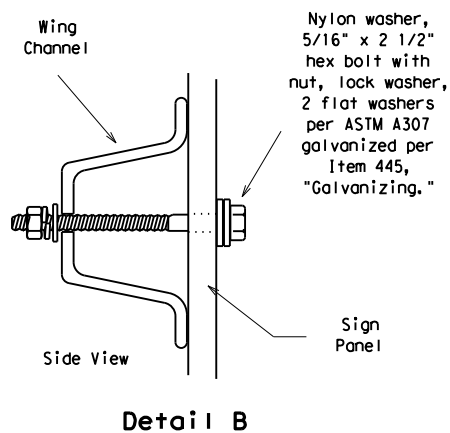
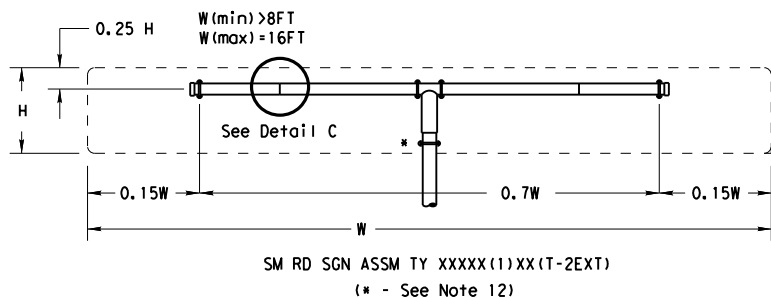


SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD(SLIP-2)-08

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		DIST: ODA	COUNTY: UPTON	SHEET NO. 269	

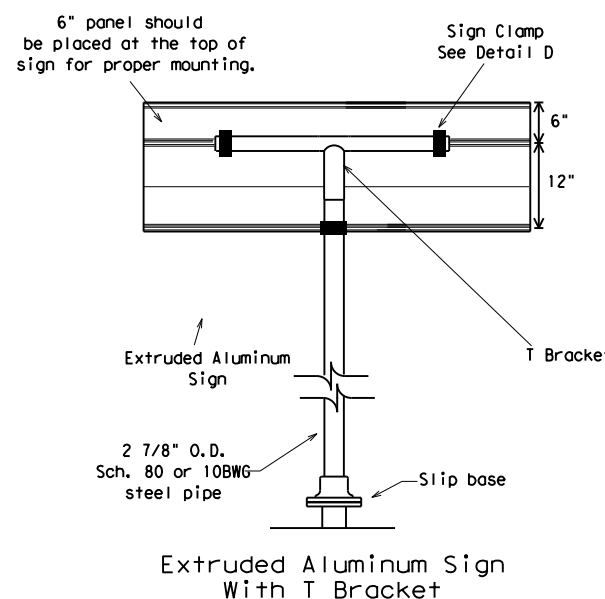
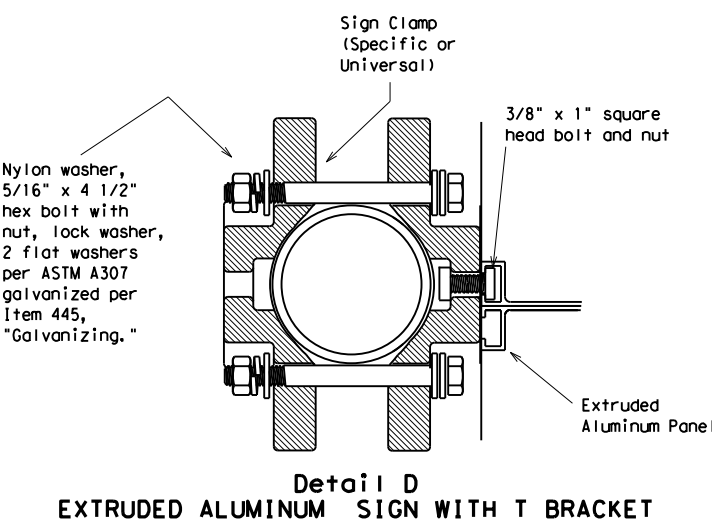
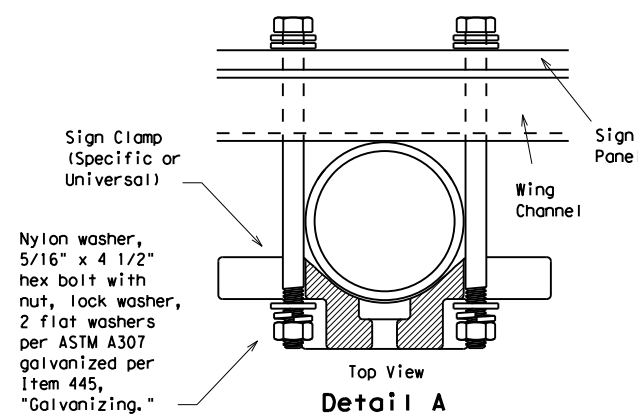
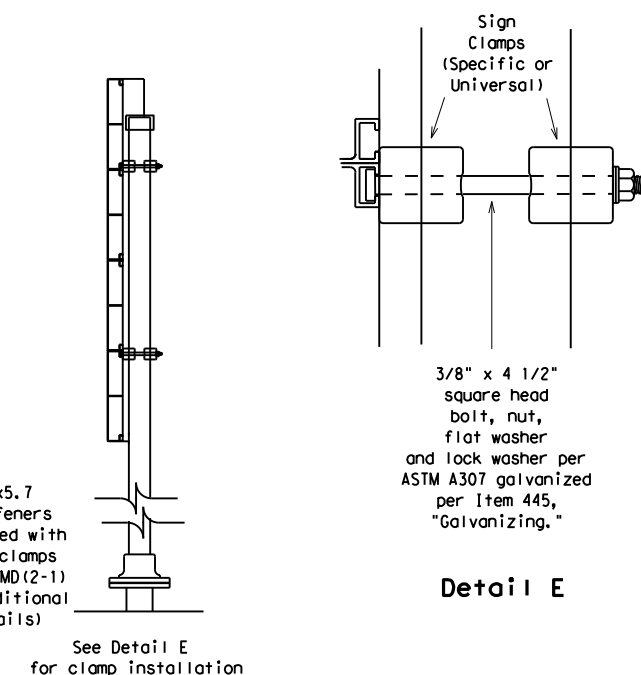
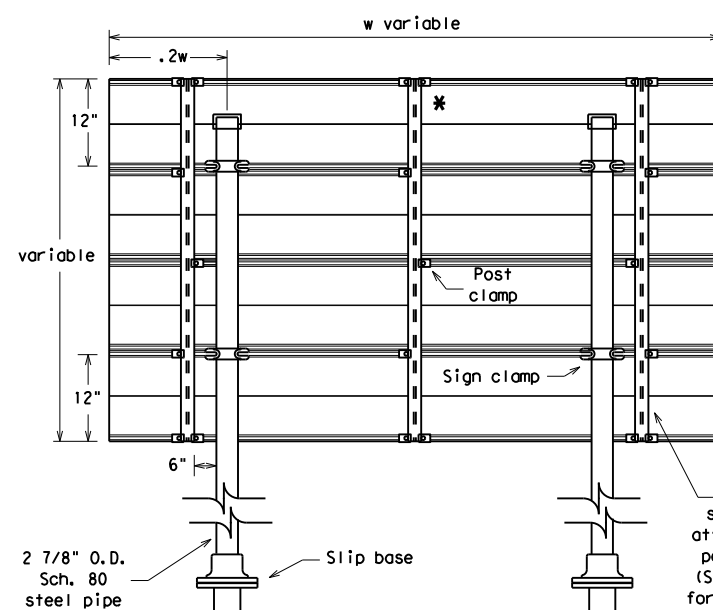
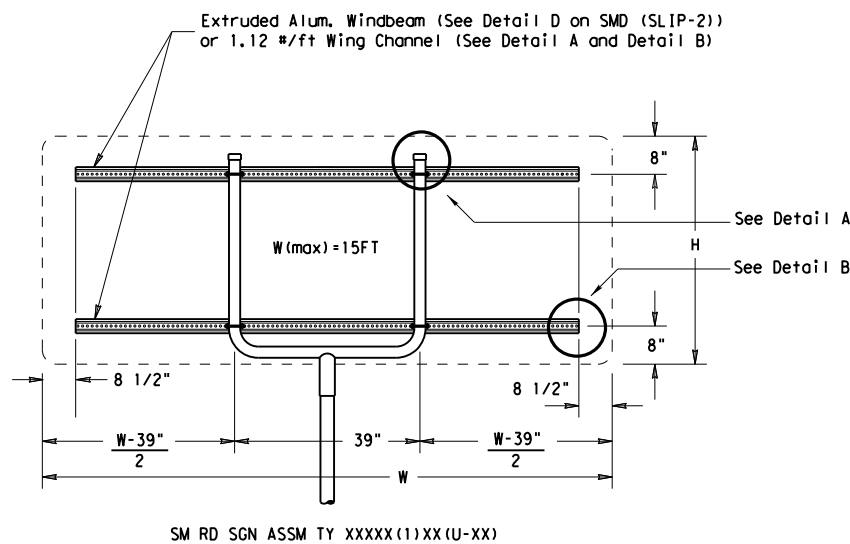
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GENERAL NOTES:

- | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
|--------------|------------|----------------|
| 10 BWG | 1 | 16 SF |
| 10 BWG | 2 | 32 SF |
| Sch 80 | 1 | 32 SF |
| Sch 80 | 2 | 64 SF |
- The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
- When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
- Sign blanks shall be the sizes and shapes shown on the plans.
- Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
- Post open ends shall be fitted with Friction Caps.



		REQUIRED SUPPORT	
		SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)	
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)	
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)	
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)	
	48x60-inch signs	TY S80(1)XX(T)	
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)	
	48x60-inch signs	TY S80(1)XX(T)	
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)	
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)	
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)	

Use Extruded Alum. Windbeam as stiffeners See SMD (2-1) for additional details
 See Detail E for clamp installation

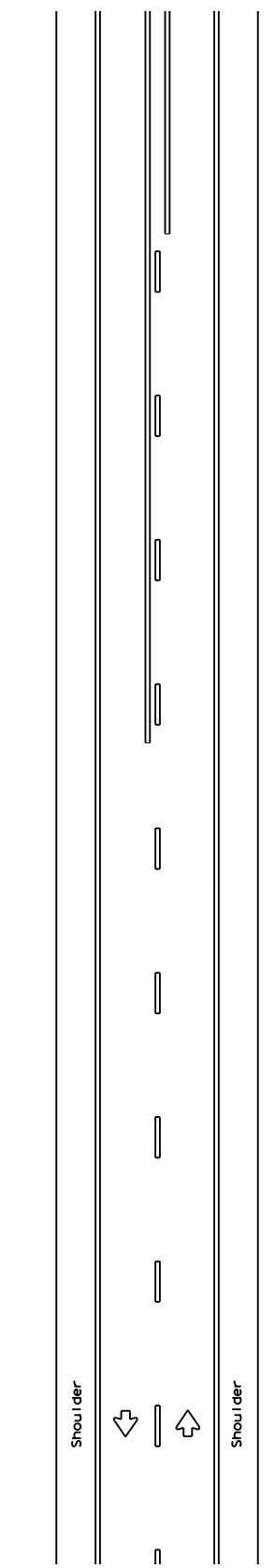


**SIGN MOUNTING DETAILS
 SMALL ROADSIDE SIGNS
 TRIANGULAR SLIPBASE SYSTEM
 SMD(SLIP-3)-08**

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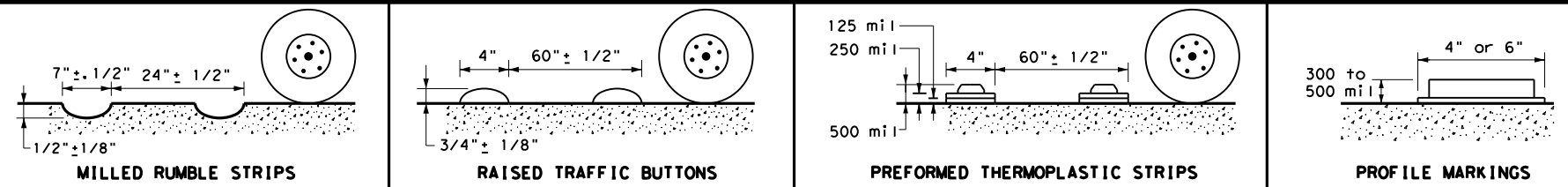
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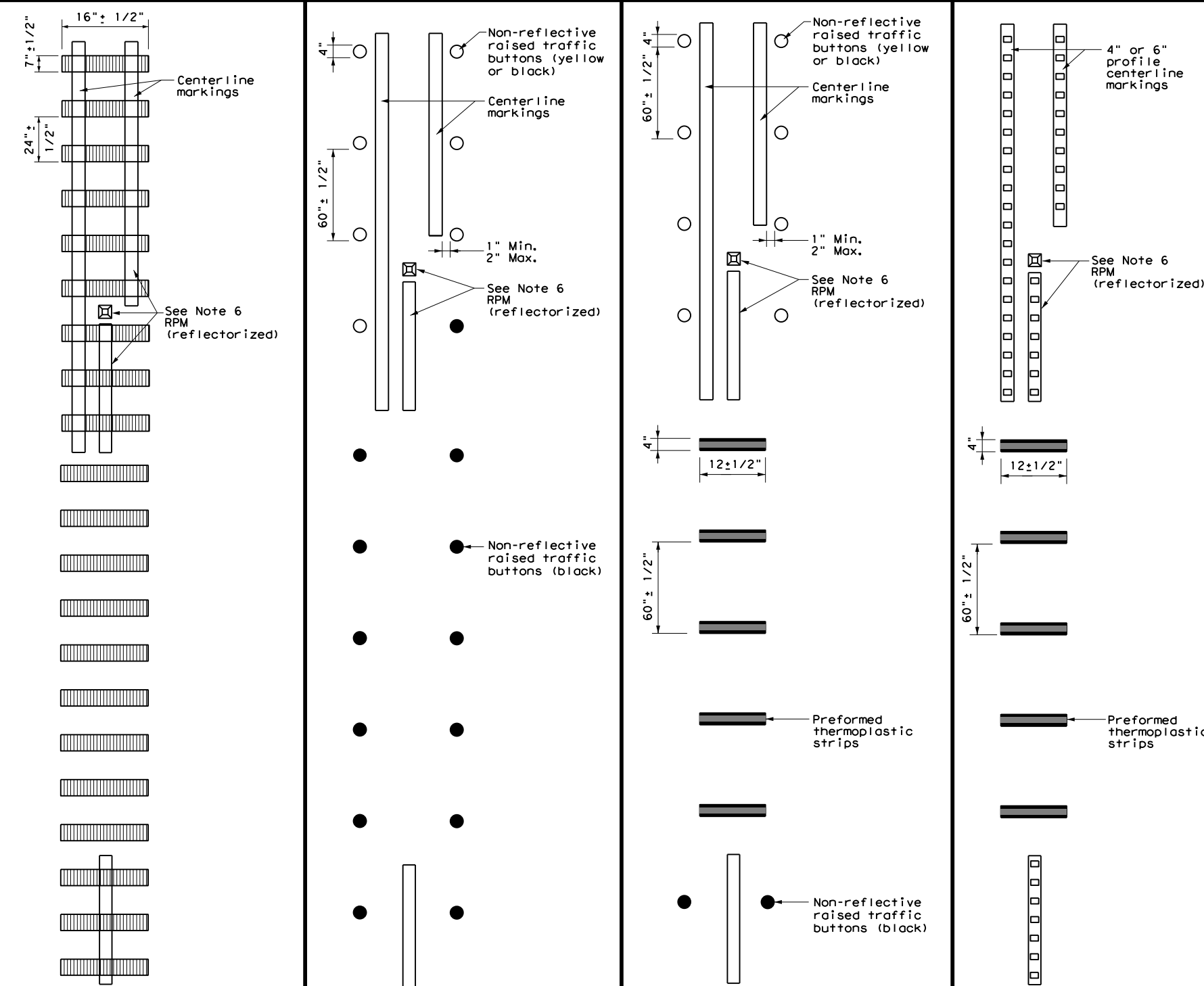


TWO LANE TWO-WAY ROADWAYS

CENTERLINE RUMBLE STRIPS



PROFILE VIEW



PLAN VIEW OPTION 1: MILLED CENTERLINE RUMBLE STRIPS

PLAN VIEW OPTION 2: RAISED CENTERLINE RUMBLE STRIPS

PLAN VIEW OPTION 3: RAISED CENTERLINE RUMBLE STRIPS AND PREFORMED THERMOPLASTIC STRIPS

PLAN VIEW OPTION 4: PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC STRIPS

GENERAL NOTES

- This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
 - Centerline and edgeline rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
 - Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
 - See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
 - Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks.
 - Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, and dimensions pavement markings and profile markings.
 - Consideration should be given to noise levels when centerline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inch depth of milled rumble strip may be considered in these areas.
 - Pavement markings must be applied over milled centerline rumble strips.
- WHEN INSTALLING CENTERLINE RUMBLE STRIPS:**
- Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
 - When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
 - The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.
- WHEN INSTALLING EDGELINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:**
- See standard sheet RS(4).

Texas Department of Transportation
 Traffic Operations Division Standard

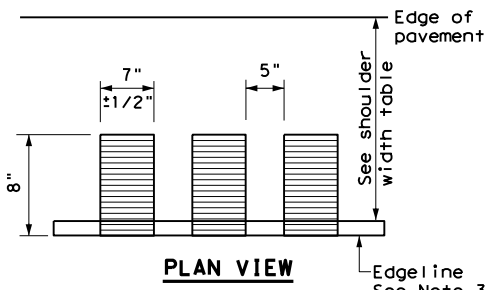
CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS

RS(3) - 13

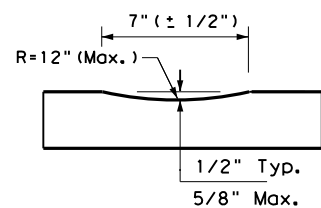
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REVISIONS	0076	06	037	US 67
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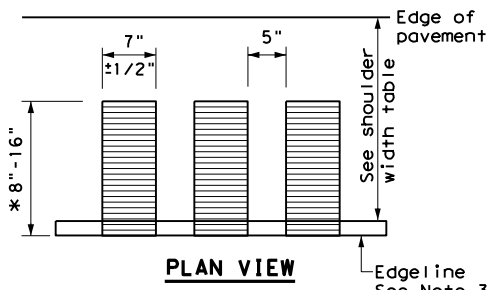


PLAN VIEW

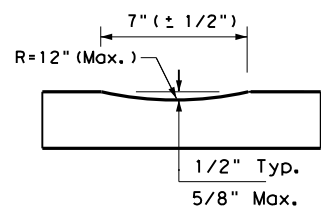


PROFILE VIEW
OPTION 1

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)

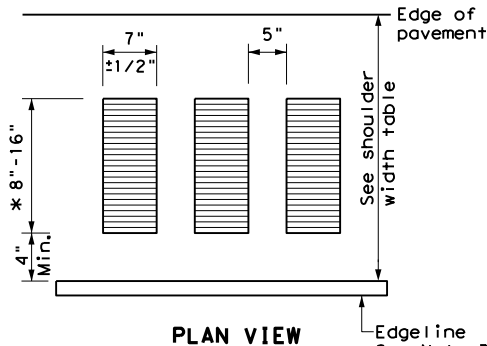


PLAN VIEW



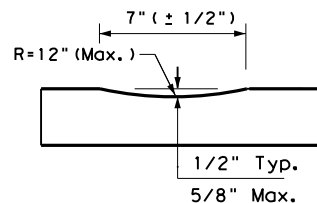
PROFILE VIEW
OPTION 2

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



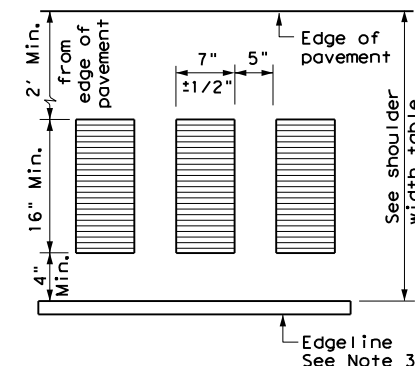
PLAN VIEW

* This distance may vary based on width of shoulder

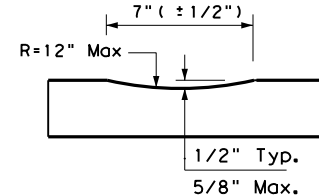


PROFILE VIEW
OPTION 3

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



PLAN VIEW



PROFILE VIEW
OPTION 4

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)

GENERAL NOTES

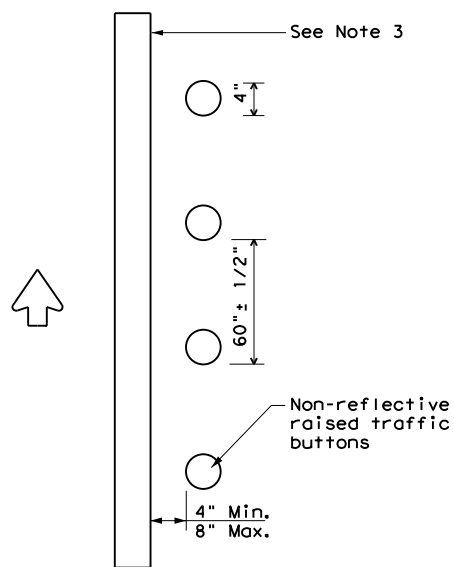
- Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
- Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
- Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
- See the table below for determining what options may be used for edgeline rumble strips.

WHEN INSTALLING MILLED DEPRESSION EDGELINE RUMBLE STRIPS:

- See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
- Pavement markings can be applied over milled shoulder rumble strips to create an edgeline rumble stripe.
- Breaks in edgeline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks when installed on conventional highways.
- Rumble strips shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
- Consideration should be given to noise levels when edgeline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inches depth of milled rumble strip may be considered in these areas.
- On roadways with high bicycle activity, consideration should be given before the installation of edgeline rumble strips. Things to consider include size of rumble strips, rumble strip material and location of rumble strips on the shoulder. If the designer determines that gaps are needed in the rumble strips due to bicycle use of the road, then follow the requirement shown in FHWA Technical Advisory T5040.39, or latest version. A detail of the spacing shall be included in the plans.

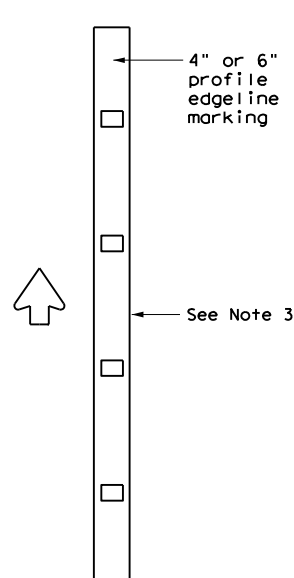
WHEN INSTALLING RAISED OR PROFILE EDGELINE RUMBLE STRIPS:

- Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
- Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edgeline when used as a rumble strip. The color of the button should match the color of the adjacent edgeline marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
- Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
- Breaks in edgeline rumble strips using raised traffic buttons shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossing, intersections and driveways with high usage of large trucks when installed on conventional highways.
- The minimum distance between the edgeline and the buttons should be used if the shoulder is less than 8 feet in width.
- Raised profile thermoplastic markings used as edgelines may substitute for buttons.



PLAN VIEW
OPTION 5

RAISED EDGELINE RUMBLE STRIPS



PLAN VIEW
OPTION 6

PROFILE EDGELINE MARKINGS

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5 OR 6	Option 1, 2, 3 5 OR 6	Option 2, 4, 5 OR 6

Texas Department of Transportation
 Traffic Operations Division Standard

EDGELINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS RS(4)-13

FILE: rs(4)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076 06	037	US 67	
DIST	COUNTY	SHEET NO.		
ODA	UPTON	272		

ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.
2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.
3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.
4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.
5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.
 - a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.
 - b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, provide poles meeting the following requirements:
 - i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).
 - ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.
6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.
7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.
8. Install T-Base with following procedure:
 - a. Anchor Bolt Tightening.
 - i. Coat the threads of the anchor bolts with electrically conductive lubricant.
 - ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.
 - iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.
 - iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.
 - v. Check top of T-base for level. If not level then foundation must be leveled.
 - b. Top Bolt Procedure
 - i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

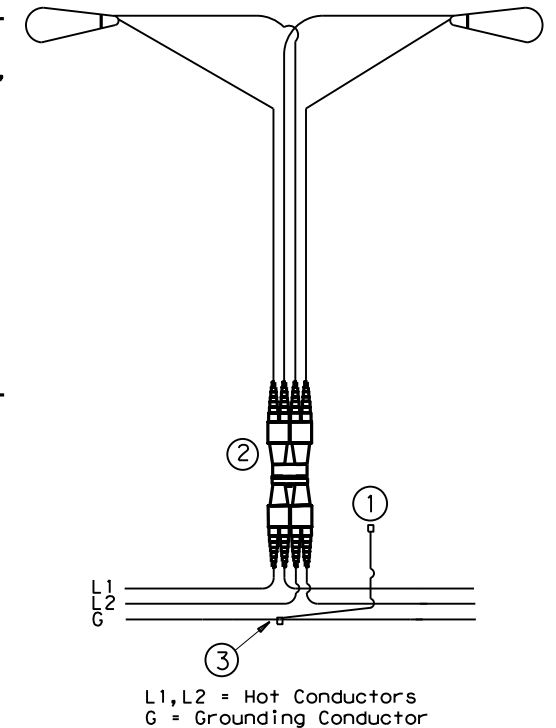
- ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."
 - iii. Tighten each nut to 150 ft-lb. using a torque wrench.
- c. Level and Plumb
- i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.
9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).
 10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.
 11. Mount luminaires on arms level as shown by the luminaire level indicator.
 12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

- ① Use 1/2 in. -13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.
- ② Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.
- ③ Split Bolt or other connector.

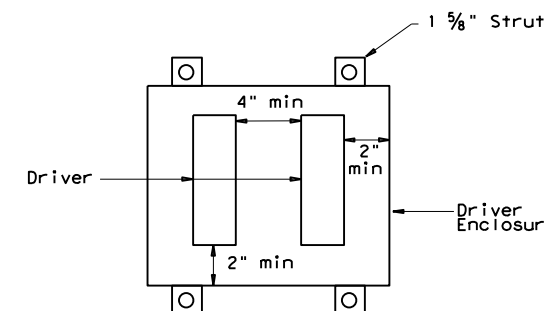
Decorative LED Lighting Notes:

1. LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):
 - a. Provide NEMA 3R outdoor enclosure or as approved.
 - b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.
 - c. Install drivers with at least 2 inches of space from enclosure walls.
 - d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment
 - e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.
 - f. Provide remote drivers with a maximum of 100 watts
 - g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.



Driver Spacing In Remote Enclosure

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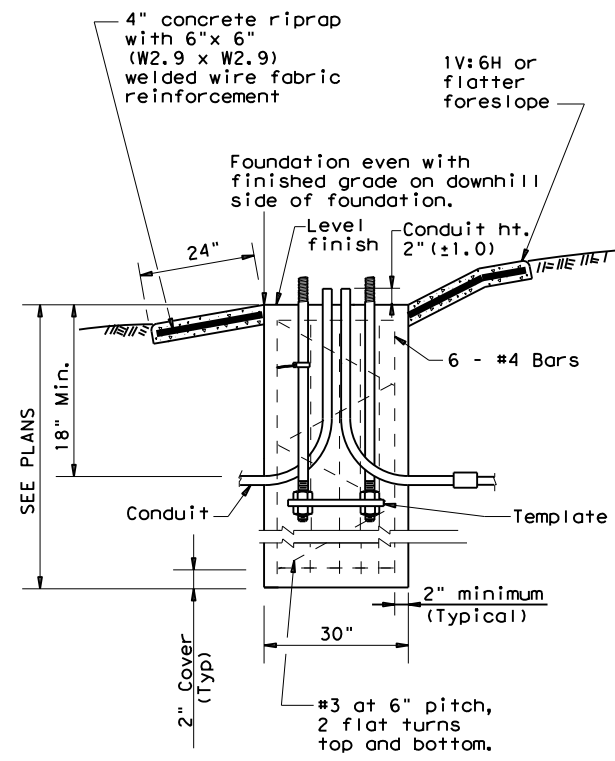
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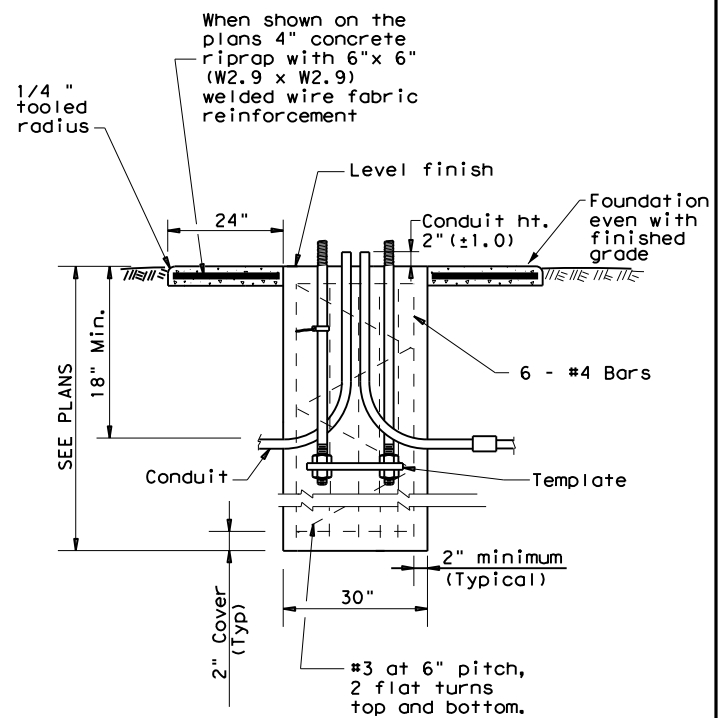
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<h1>ROADWAY ILLUMINATION DETAILS</h1> <h2>RID(1)-20</h2>					
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© TxDOT	January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS		0076	06	037	US 67
7-17		DIST	COUNTY		SHEET NO.
12-20		ODA	UPTON		273

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SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE

TABLE 1

ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1 in. x 30 in.
40-50 ft.	15 in.	17 1/4 in.	1 1/4 in. x 30 in.

TABLE 2

RECOMMENDED FOUNDATION LENGTHS
(See note 1)

MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
<20 ft.	6'	6'	6'
>20 ft. to 30 ft.	8'	6'	6'
>30 ft. to 40 ft.	8'	8'	6'
>40 ft. to 50 ft.	10'	8'	6'

TABLE 3

PAY QUANTITY OF RIPRAP PER FOUNDATION
(Install only when shown on the plans)

Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

GENERAL NOTES:

1. "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
2. Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
3. Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
4. Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the Department.
5. Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
6. Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
7. Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
8. Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
9. Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
10. Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
11. Grade earthwork around T-base foundations even with the finished grade as shown in Section A-A to ensure proper function of the breakaway device. Use riprap on T-base foundations that are located on sloped grades, and as shown on the plans for level grades.

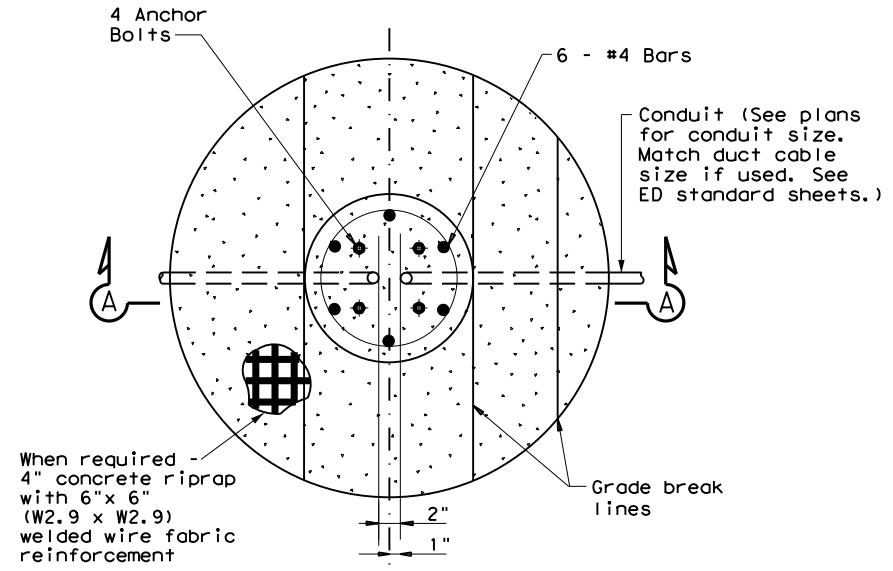
TABLE 4

BREAKAWAY POLE PLACEMENT (See note 6)

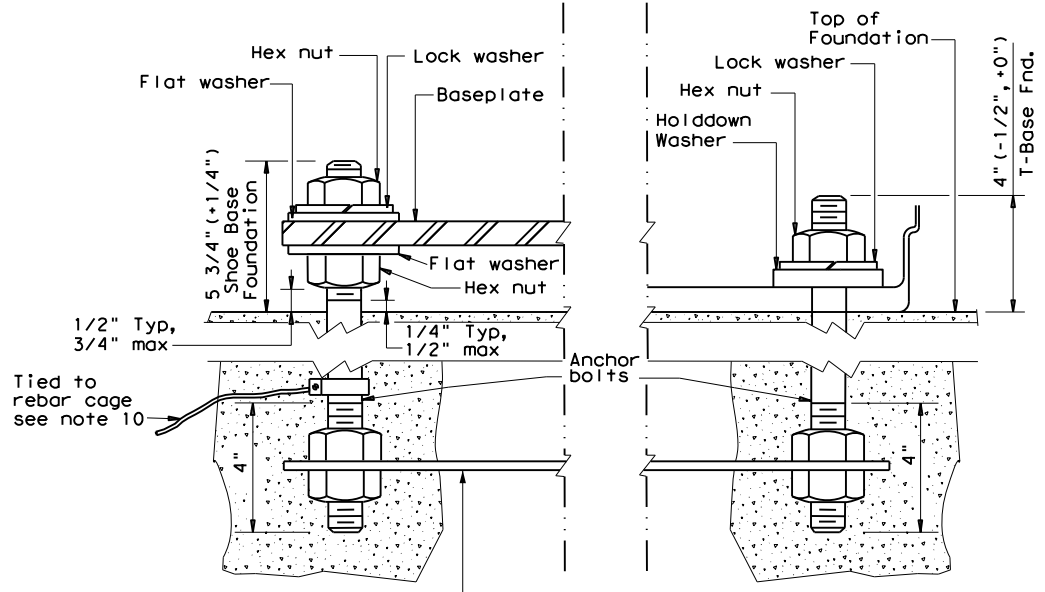
ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

Texas Department of Transportation
 Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS (RDWY ILLUM FOUNDATIONS)

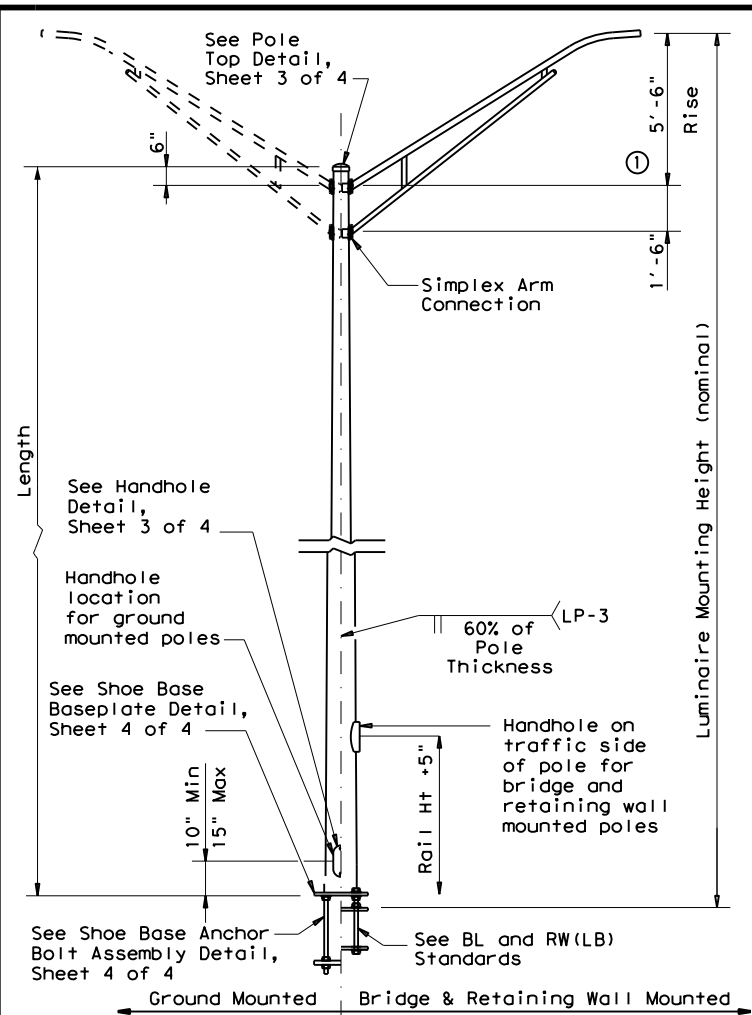
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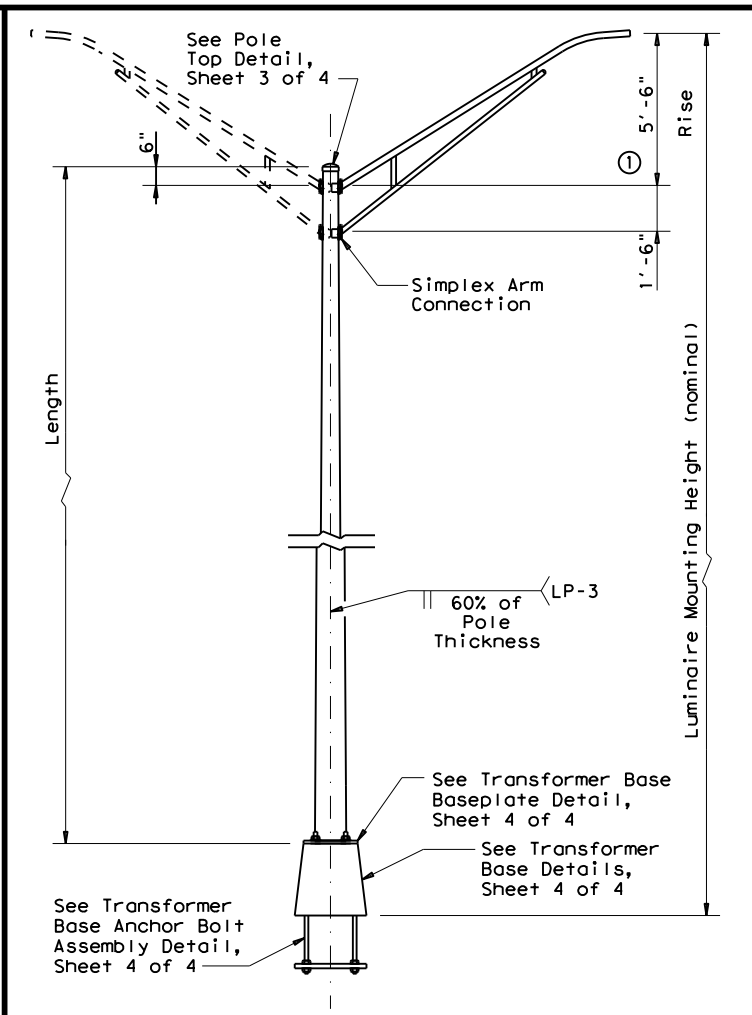
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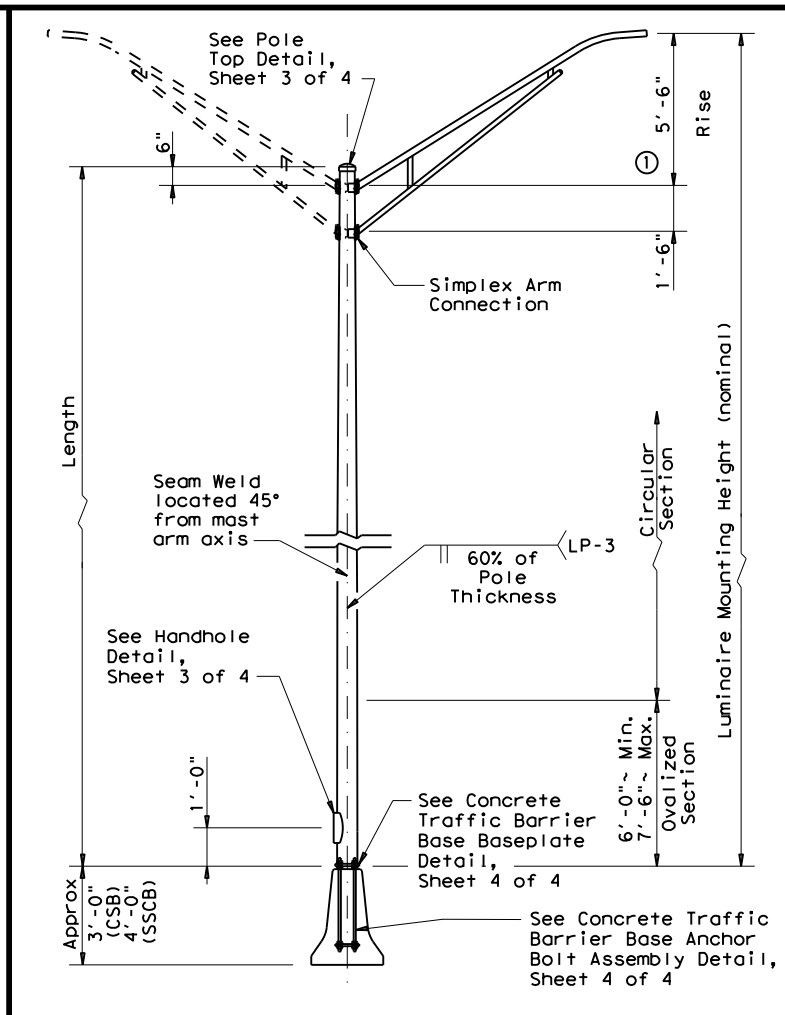
SHOE BASE POLE

Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	4.90	15.00	0.1196	7.1
30.00	7.50	4.00	25.00	0.1196	13.2
31.00-39.00	8.00	4.36-3.24	26.00-34.00	0.1196	20.7
40.00	8.50	3.60	35.00	0.1196	20.7
50.00	10.50	4.20	45.00	0.1196	30.3



TRANSFORMER BASE POLE

Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	5.11	13.50	0.1196	7.1
30.00	7.50	4.21	23.50	0.1196	13.2
31.00-39.00	8.00	4.57-3.45	24.50-32.50	0.1196	20.7
40.00	8.50	3.81	33.50	0.1196	20.7
50.00	10.00	3.91	43.50	0.1196	30.3



CONCRETE TRAFFIC BARRIER BASE POLE

Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)	
					About C of Rail	Perp. to Rail
28.00	9.00	5.78	23.00	0.1196	10.3	13.2
38.00	9.00	4.38	33.00	0.1196	16.6	20.8
48.00	10.50	4.48	43.00	0.1345	25.1	30.5

GENERAL NOTES:

- Designs conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. Design 3-Second Gust Wind Speed equals 110 mph with a 1.14 gust factor. A wind importance factor of 0.80 is applied to adjust the wind speed to a 25 year recurrence interval. Design moments listed in tables assume base of pole is 25' above natural ground level.
- Structures are designed to support two 12' luminaire mast arms and luminaires. Mast arms are designed to support a 60-pound luminaire having an effective projected area of 1.6 square feet.
- Fabrication shall be in accordance with the Specifications and with the details, dimensions, and weld procedures shown herein. Do not submit shop drawings for roadway illumination pole assemblies fabricated in accordance with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of these sheets and the Specifications. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
- For mounting heights between values shown in the tables, use base diameter and thickness values for the larger height.
- Unless otherwise noted, all steel parts shall be galvanized in accordance with Item 445, "Galvanizing."
- Steel poles shall be fabricated in accordance with Item 441, "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. All welding shall be in accordance with AWS D1.1, Structural Welding Code-Steel.
- Two-section poles joined by circumferential welds will not be permitted, unless otherwise shown on the plans. Poles may be fabricated in two sections and field-assembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1-1/2 times the shaft diameter at the lap joint.
- Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.
- Lubricate and tighten anchor bolts, when erecting shoe base poles and concrete traffic barrier base poles, in accordance with Item 449, "Anchor Bolts."
- All poles, except Transformer Base Poles, shall have hand holes with reinforcing frames and covers. For ground mounted shoe base poles, hand holes shall be placed 90 degrees to mast arm unless otherwise noted on the plans. For poles mounted on a concrete traffic barrier with one luminaire arm, hand holes shall be located 180 degrees from luminaire arm. For poles mounted on a concrete traffic barrier with two luminaire arms, all hand holes shall be on the same side of the barrier. For poles mounted on a bridge lighting bracket or a retaining wall lighting bracket, hand hole shall be on traffic side of the pole, at a height that will clear the barrier.
- The finished pole shall have a smooth, uniform finish free of pits, blisters, or other defects. Scratched, chipped, and other damaged galvanized areas on poles and mast arms shall be repaired in accordance with Item 445, "Galvanizing."
- Pole length is based on a 5'-6" luminaire arm rise. 4 ft. luminaire arms have a 2'-6" rise. A pole with 4 ft. luminaire arms will have an actual mounting height 3'-0" less than the nominal mounting height. Increasing the pole length to meet the nominal mounting height is allowed, but unnecessary unless otherwise directed by the engineer.
- Erect transformer base poles in accordance with sheet RID(1).

MATERIAL DATA

COMPONENT	ASTM DESIGNATION	MIN. YIELD (ksi)
Pole Shaft (0.14"/ft. Taper)	A572 Gr 50, A595 Gr A, A1011 HSLAS Gr 50 Cl 2 ③, or A1008 HSLAS Gr 50 Cl 2	50
Base Plate and Handhole Frame	A572 Gr.50, or A36	36
T-Base Connecting Bolts	F3125 Gr A325	92
Anchor Bolts	F1554 Gr 55, A193-B7 or A321	55 105
Anchor Bolt Templates	A36	36
Heavy Hex (H.H.) Nuts	A194 Gr 2H, or A563 Gr DH	
Flat Washers	F436	

NOTES:

- 2'-6" rise for 4 ft. luminaire arms.
- Before ovalized as shown on Concrete Traffic Barrier Base Baseplate details, Sheet 4 of 4.
- A1011 SS Gr 50 may be used instead of HSLAS, provided the material meets the elongation requirements for HSLAS.

POLE ASSEMBLY FABRICATION TOLERANCES TABLE

DIMENSION	TOLERANCE
Shaft length	+1"
I.D. of outside piece of slip fitting pieces	+1/8", -1/16"
O.D. of inside piece of slip fitting pieces	+1/32", -1/8"
Shaft diameter: other	+3/16"
Out of "round"	1/4"
Straightness of shaft	±1/4" in 10 ft
Twist in multi-sided shaft	4° in 50 ft
Perpendicular to baseplate	1/8" in 24"
Pole centered on baseplate	±1/4"
Location of Attachments	±1/4"
Bolt hole spacing	±1/16"

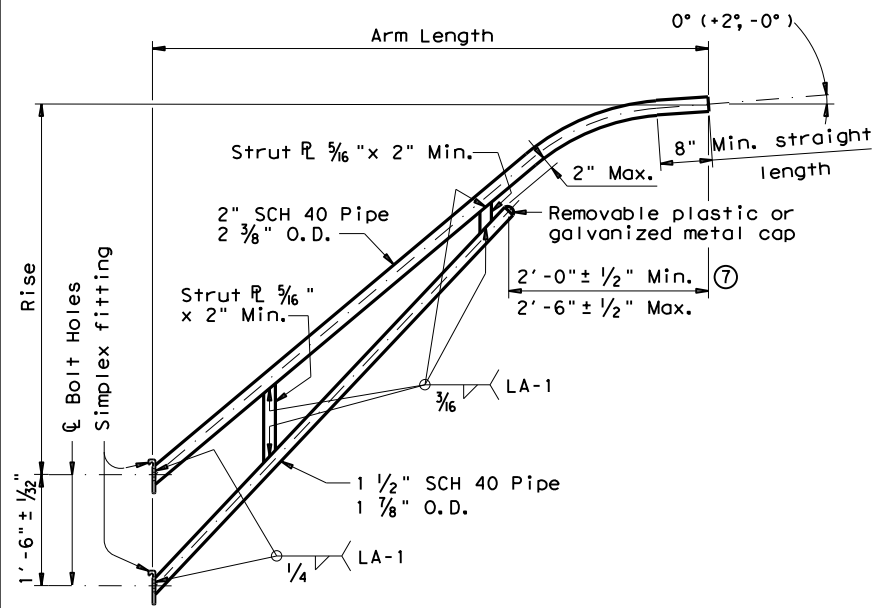


**ROADWAY ILLUMINATION POLES
RIP(2) - 19**

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12-19	ODA	UPTON	276	

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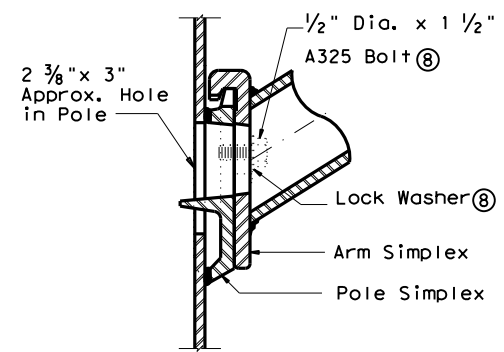
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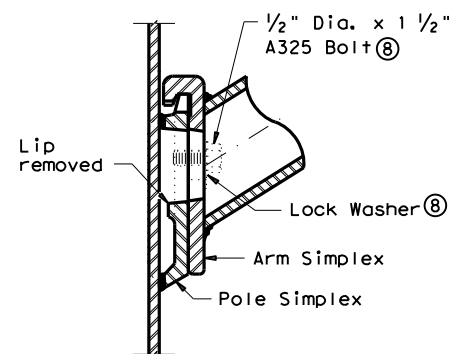
LUMINAIRE ARM

LUMINAIRE ARM DIMENSIONS		
Nominal Arm Length	Arm Length	Rise
4'-0"	3'-6"	2'-6"
6'-0"	5'-6"	5'-6"
8'-0"	7'-6"	5'-6"
10'-0"	9'-6"	5'-6"
12'-0"	11'-6"	5'-6"

ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±1"
Arm Rise	±1"
Deviation from flat	1/8" in 12"
Spacing between holes	±1/32"

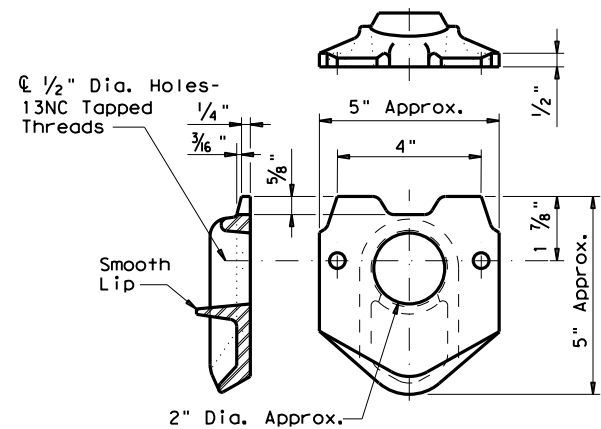


UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

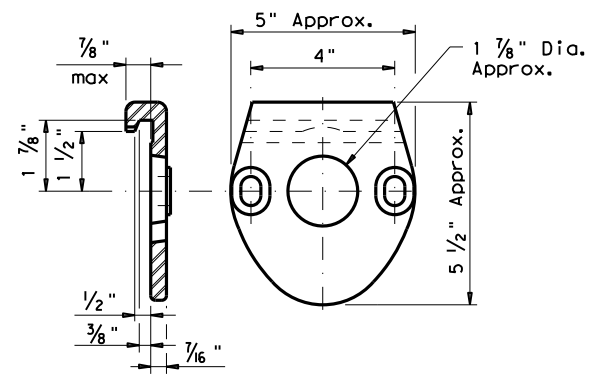


LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

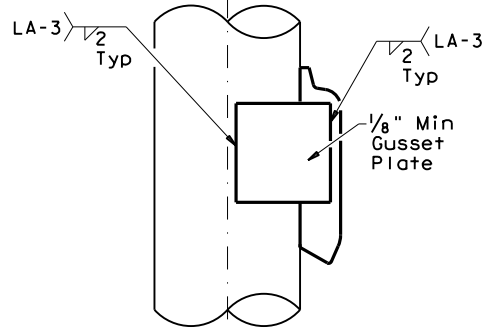
SECTION B-B



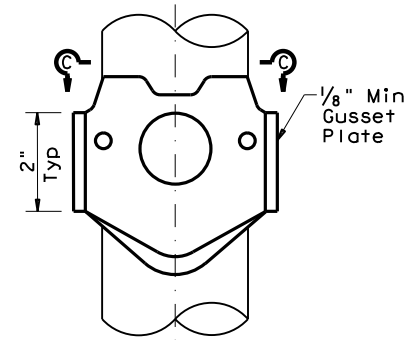
POLE SIMPLEX DETAIL



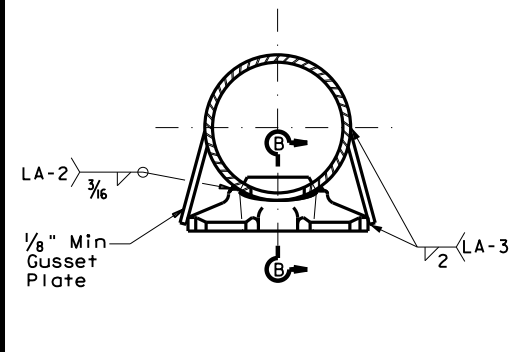
ARM SIMPLEX DETAIL



SIDE

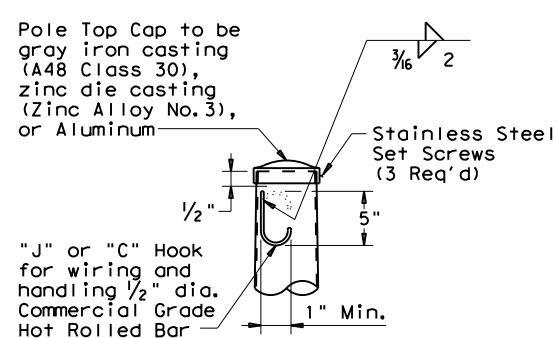


ELEVATION

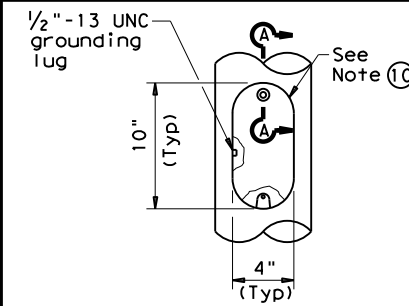


SECTION C-C

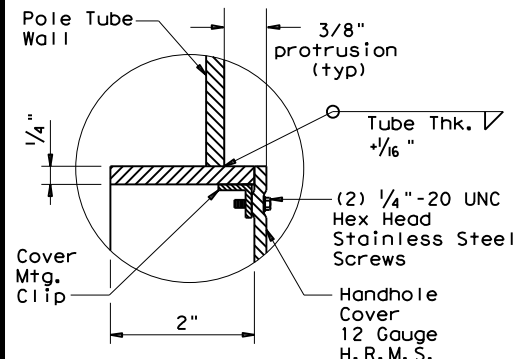
SIMPLEX ATTACHMENT DETAIL



POLE TOP



ELEVATION



SECTION A-A

HANDHOLE

NOTES:

- ④ Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.
- ⑤ A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.
- ⑥ A572, A1008 HSLAS-F, and A1011 HSLAS-F materials may have higher yield strengths but shall not have less elongation than the grade indicated.
- ⑦ Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.
- ⑧ Each pole simplex fitting shall be supplied with 2 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans.
- ⑨ Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.
- ⑩ A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

MATERIALS

Pole or Arm Simplex	ASTM A27 Gr 65-35 or Gr 70-36, A148 Gr 80-50, A576 Gr 1021 ⑤, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 ⑥, or A1011 HSLAS-F Gr 50 ⑥
Arm Struts and Gusset Plates ④	ASTM A36, A572 Gr 50 ⑥, or A588
Misc.	ASTM designations as noted

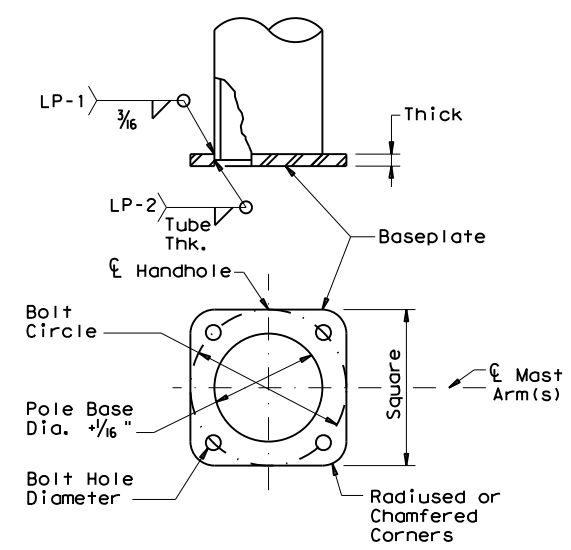
SHEET 3 OF 4



ROADWAY ILLUMINATION POLES
RIP(3) - 19

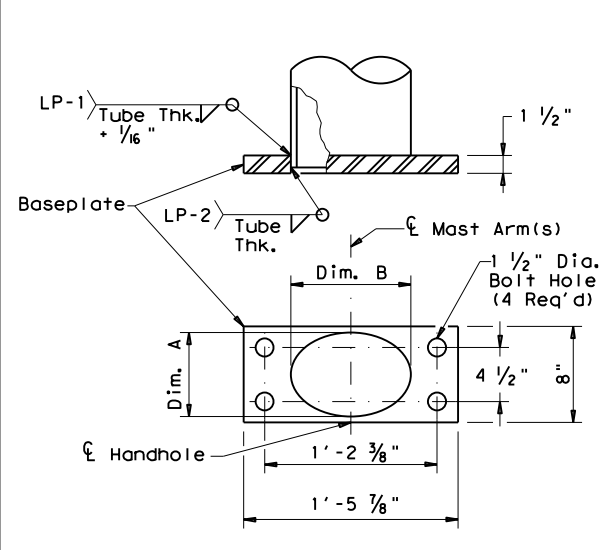
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©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0076 06	037	US 67	
7-17	DIST	COUNTY	SHEET NO.	
12-19	ODA	UPTON	277	

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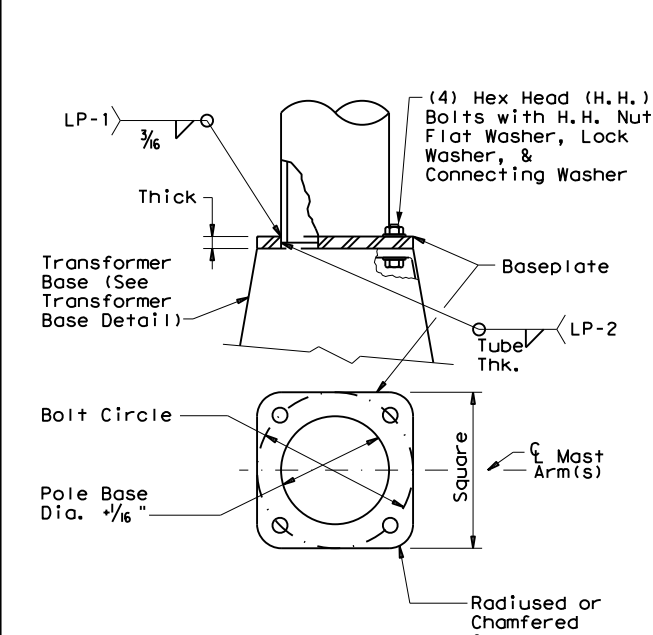
**SHOE BASE
BASEPLATE**

SHOE BASE BASEPLATE TABLE				
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	BOLT HOLE DIAMETER
20' - 39'	13"	13"	1 1/4"	1 1/4"
40'	15"	15"	1 1/4"	1 1/2"
50'	15"	15"	1 1/2"	1 1/2"



**CONCRETE TRAFFIC
BARRIER BASE BASEPLATE**

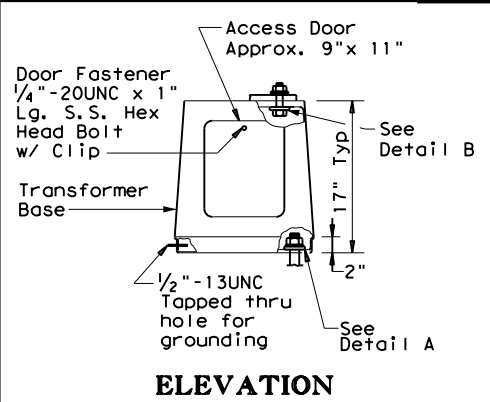
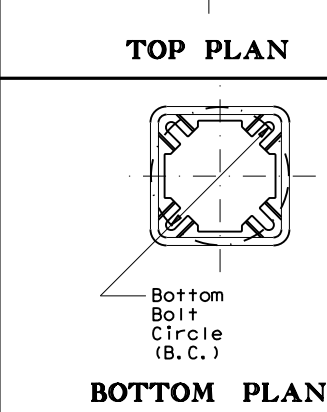
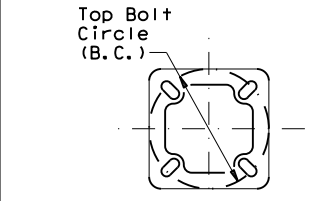
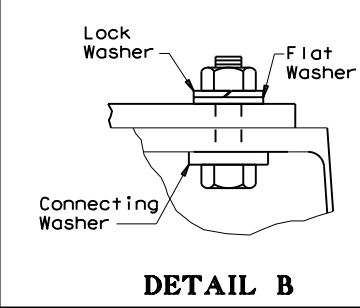
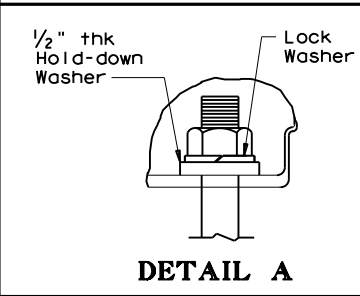
CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE			
MOUNTING HEIGHTS (nominal)	POLE DIA. (12)	DIM. A	DIM. B
28' - 38'	9"	7" ± 1/4"	10" ± 1/4"
48'	10 1/2"	7" ± 1/4"	13" ± 1/4"



**TRANSFORMER
BASE BASEPLATE**

TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFORMER BASE TYPE
20' - 39'	13"	13"	1 1/4"	1"	1 1/4"	A
40'	15"	15"	1 1/4"	1 1/4"	1 1/2"	B
50'	15"	15"	1 1/2"	1 1/4"	1 1/2"	B

TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



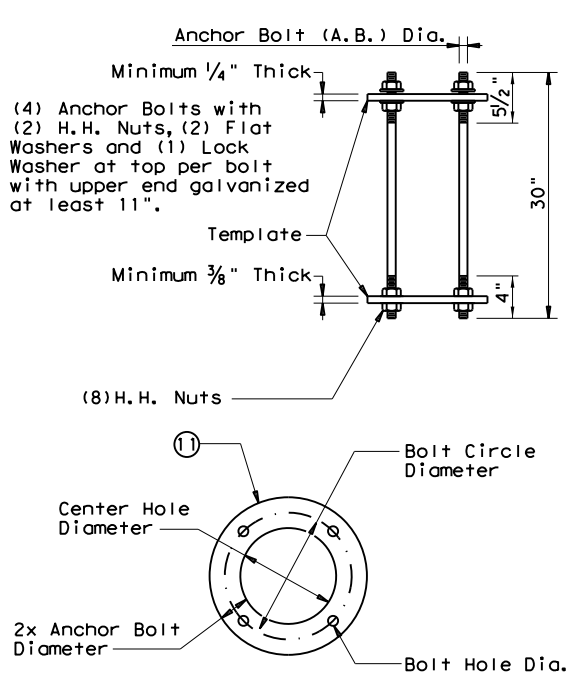
**TRANSFORMER BASE
DETAILS**

- GENERAL NOTES:**
- For mounting heights between those shown in the table, use the values in the table for the larger mounting height.
 - All breakaway bases shall meet the breakaway requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto, and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to resist 150% of the design moment.
 - Transformer bases shall be cast from aluminum, ASTM B108 or B26 Alloy 356.0-T6, or other material approved by the Engineer. Four Hex Head (H.H.) bolts with four H.H. nuts, four lock washers, four flat washers, and connecting and hold-down washers as recommended by the manufacturer, galvanized to ASTM A153 Class C or D, or B695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A563 grade DH galvanized.
 - Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.
 - Doors for transformer bases shall be made of plastic, fiberglass or other non-metallic material approved by the Engineer and shall be attached with stainless steel screws or bolts. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing.

NOTES:

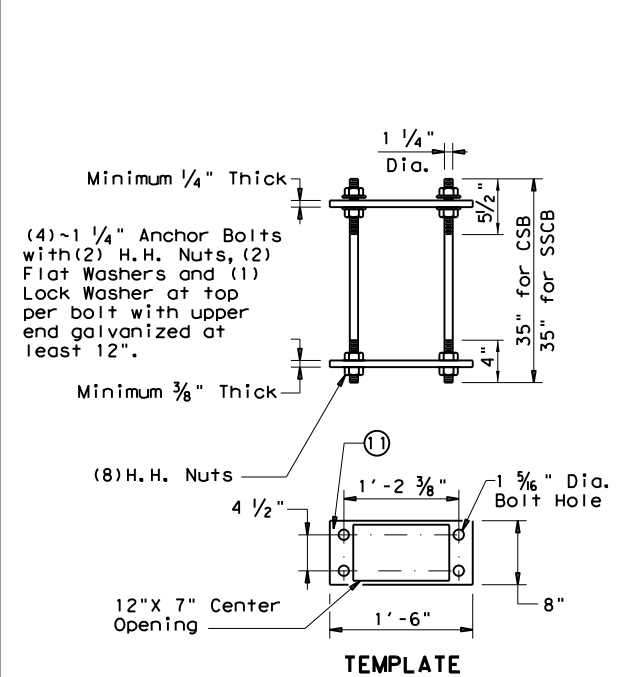
- Anchor Bolt Templates do not need to be galvanized.
- Pole diameter before ovalized.

ANCHOR BOLT FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Length	± 1/2"
Threaded length	± 1/2"
Galvanized length (if required)	- 1/4"



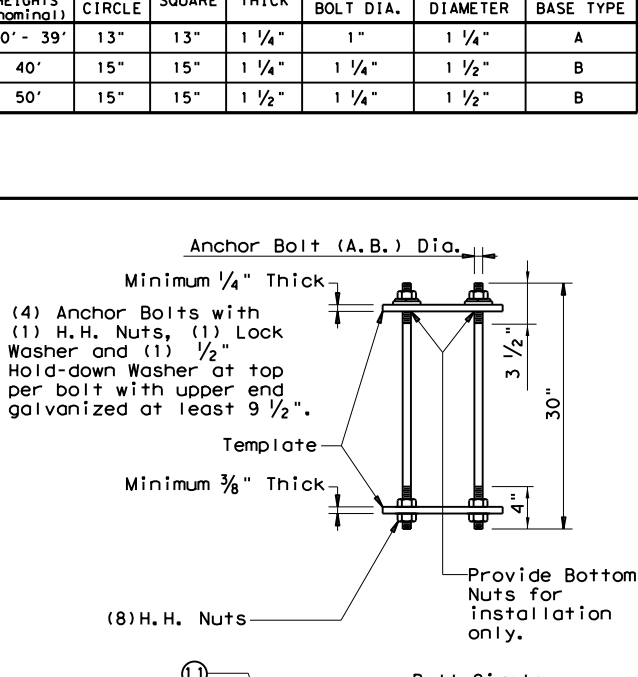
**SHOE BASE
ANCHOR BOLT ASSEMBLY**

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1"	13"	11"	1 1/16"
40' - 50'	1 1/4"	15"	12 1/2"	1 5/16"



**CONCRETE TRAFFIC BARRIER
BASE ANCHOR BOLT ASSEMBLY**

CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1"	14"	12"	1 1/16"
40' - 50'	1 1/4"	17 1/4"	14 3/4"	1 5/16"



**TRANSFORMER BASE
ANCHOR BOLT ASSEMBLY**

SHEET 4 OF 4

Texas Department of Transportation
 Traffic Safety Division Standard

ROADWAY
ILLUMINATION
POLES

RIP(4)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
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REVISIONS	0076 06	037	US 67	
7-17	DIST	COUNTY	SHEET NO.	
12-19	ODA	UPTON	278	

GENERAL NOTES FOR ALL ELECTRICAL WORK

- The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
- Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.
- Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
- Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
- Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
- When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

- Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.
- Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
- Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"


- Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.
- Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.
- Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.
- Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

- Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.
- When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.
- Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

- Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.
- Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.
- Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
- Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.
- When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."
- Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
- During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
- Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.
- Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
- Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.
- At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
- Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).
- Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.
- File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

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		Traffic Operations Division Standard	
<h1>ELECTRICAL DETAILS CONDUITS & NOTES</h1>			
<h2>ED(1) - 14</h2>			
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		DIST	COUNTY
		ODA	UPTON
		SHEET NO.	
		279	

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS) 11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight seal. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

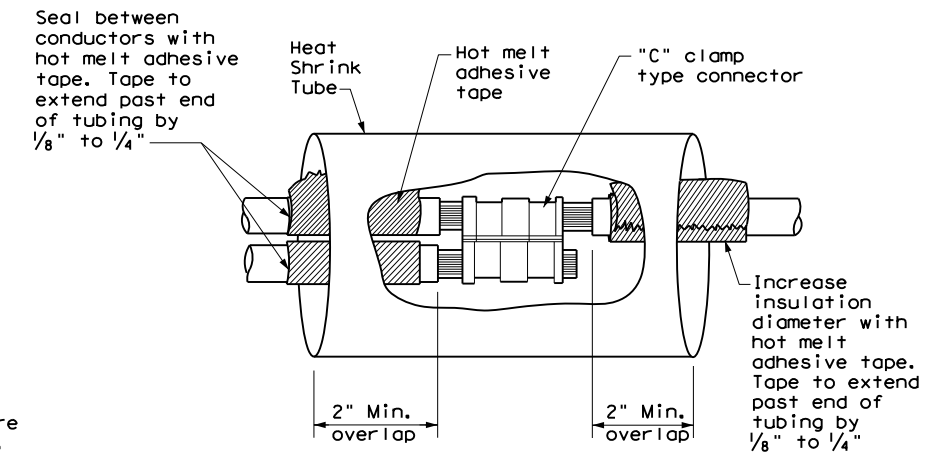
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

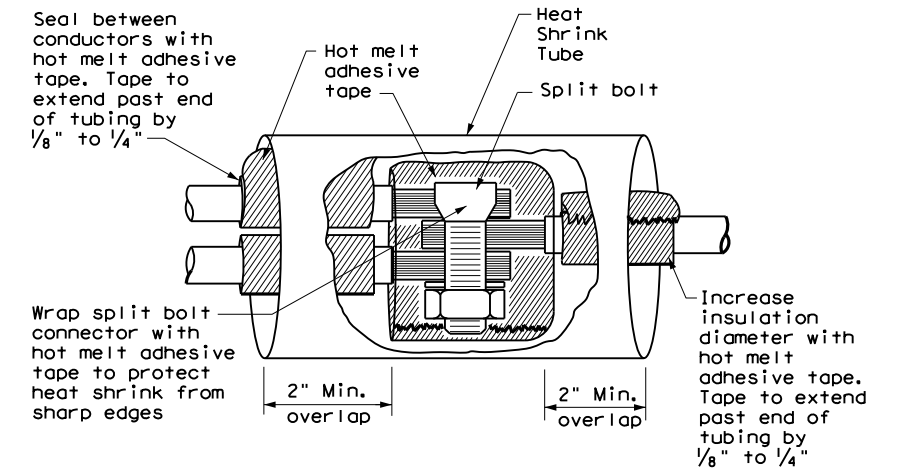
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

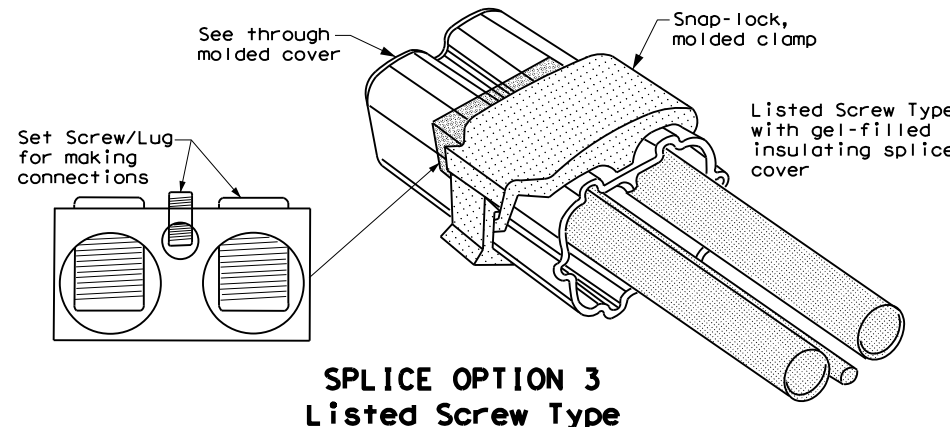
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



**SPLICE OPTION 1
Compression Type**



**SPLICE OPTION 2
Split Bolt Type**

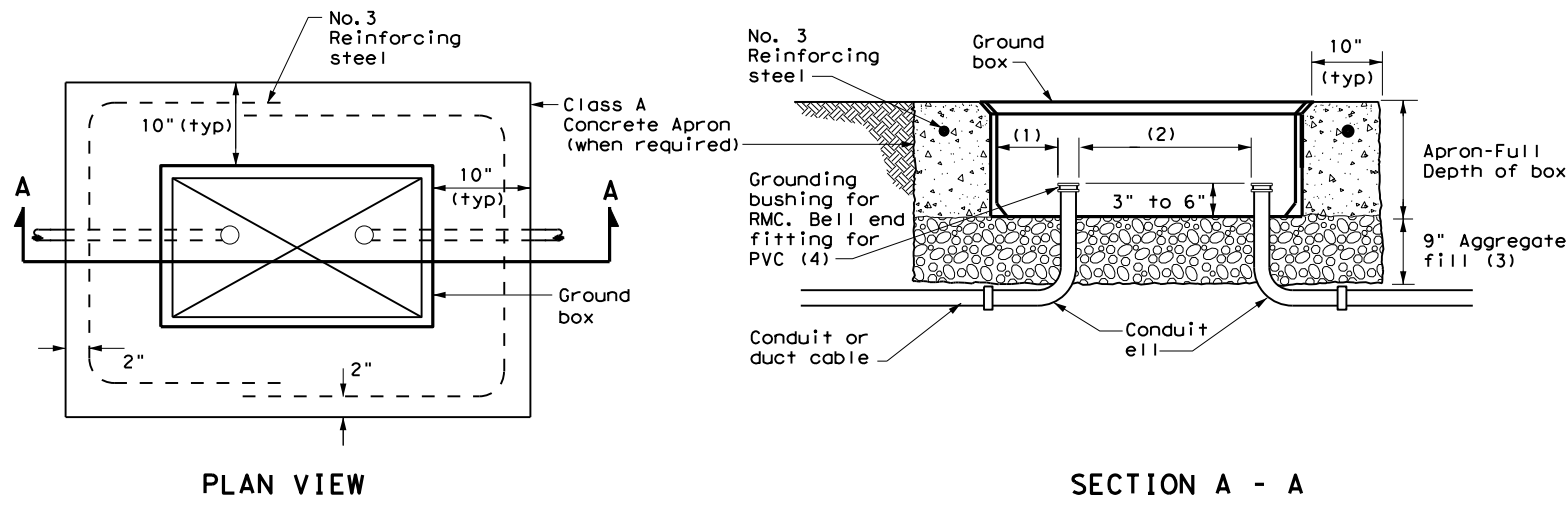


**SPLICE OPTION 3
Listed Screw Type**

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		Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS CONDUCTORS</h2>			
<h3>ED(3) - 14</h3>			
FILE: ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
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REVISIONS	0076 06	037	US 67
	DIST	COUNTY	SHEET NO.
	ODA	UPTON	280

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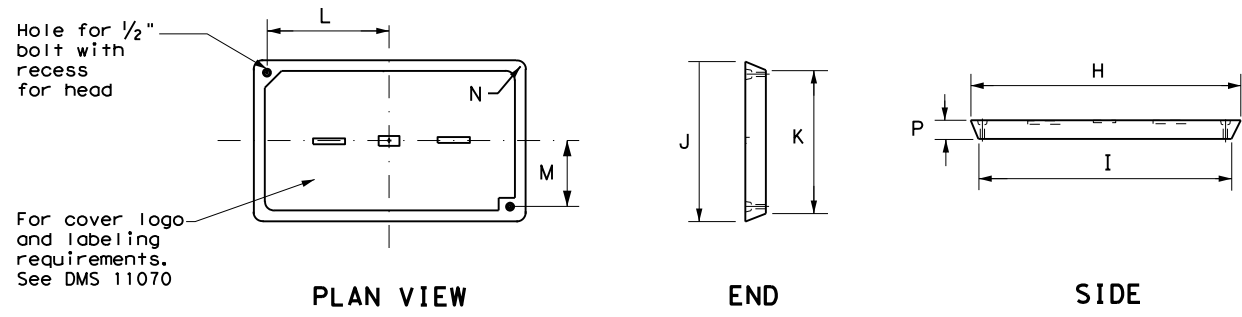


APRON FOR GROUND BOX

- (1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushing.
- (3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.
- (4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.
3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.
4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.
2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.
3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.
4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.
5. Temporarily seal all conduits in the ground box until conductors are installed.
6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.
7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.
8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.
9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.
10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

				Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS</h2> <h3>GROUND BOXES</h3> <h4>ED(4) - 14</h4>					
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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.
2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.
3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.
4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.
6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.
9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.
10. Provide rigid metal conduit (RMC) for all conduits on service, except for the 1/2 in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.
11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.
12. Ensure all mounting hardware and installation details of services conform to utility company specifications.
13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.
15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.
2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photoceII or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.
3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.
4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.
2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

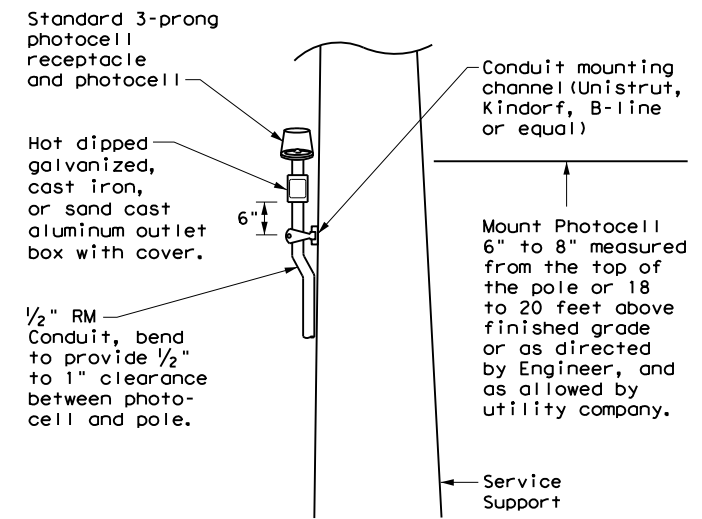
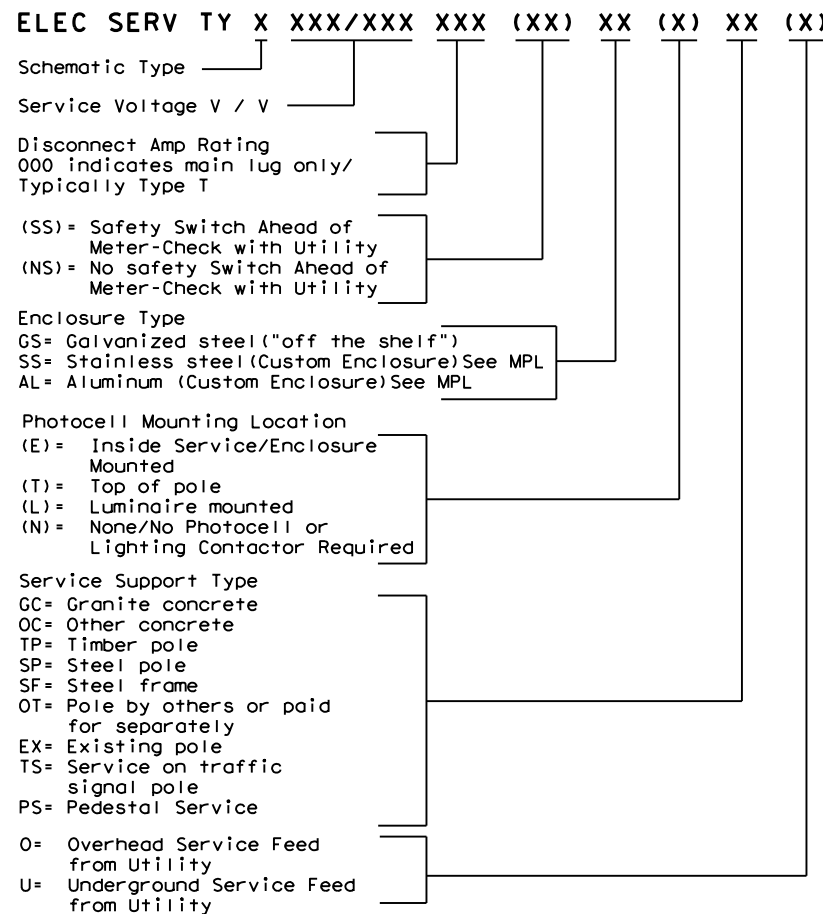
PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA												
Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit *xSize	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 1/4"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminares	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 1/4"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.
 ** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National Electrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE



TOP MOUNTED PHOTOCCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation
 Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

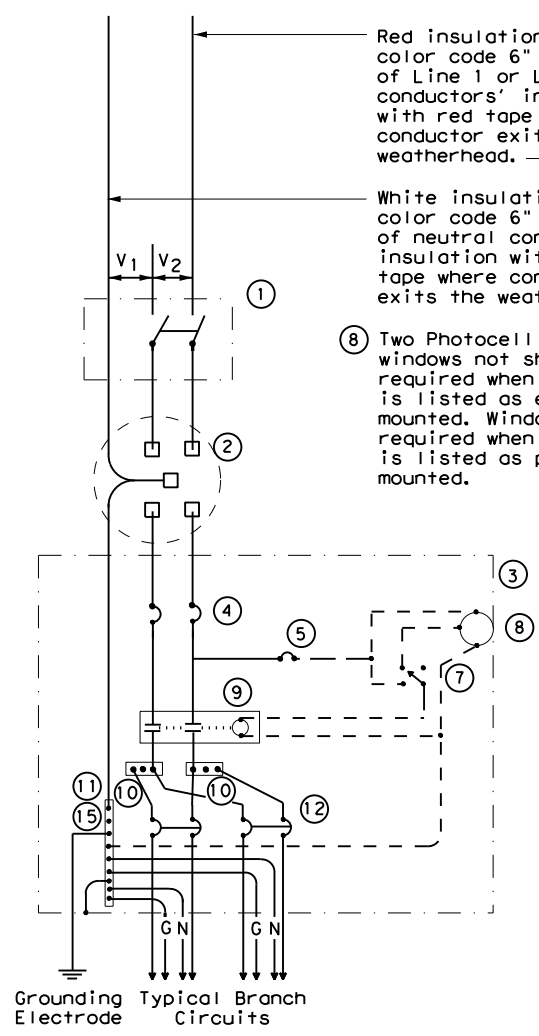
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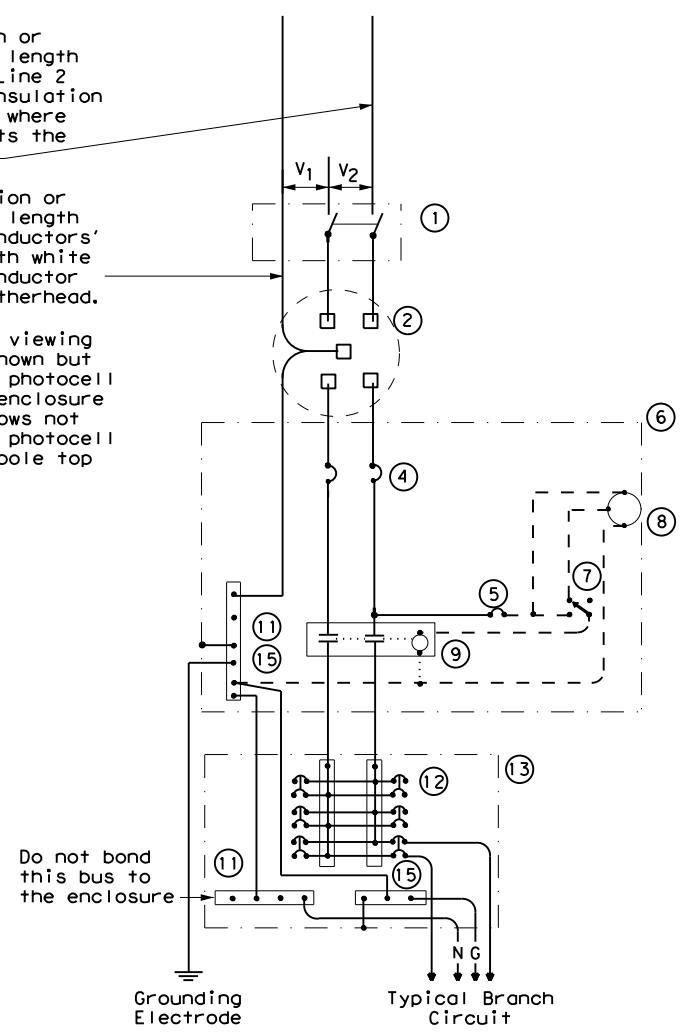
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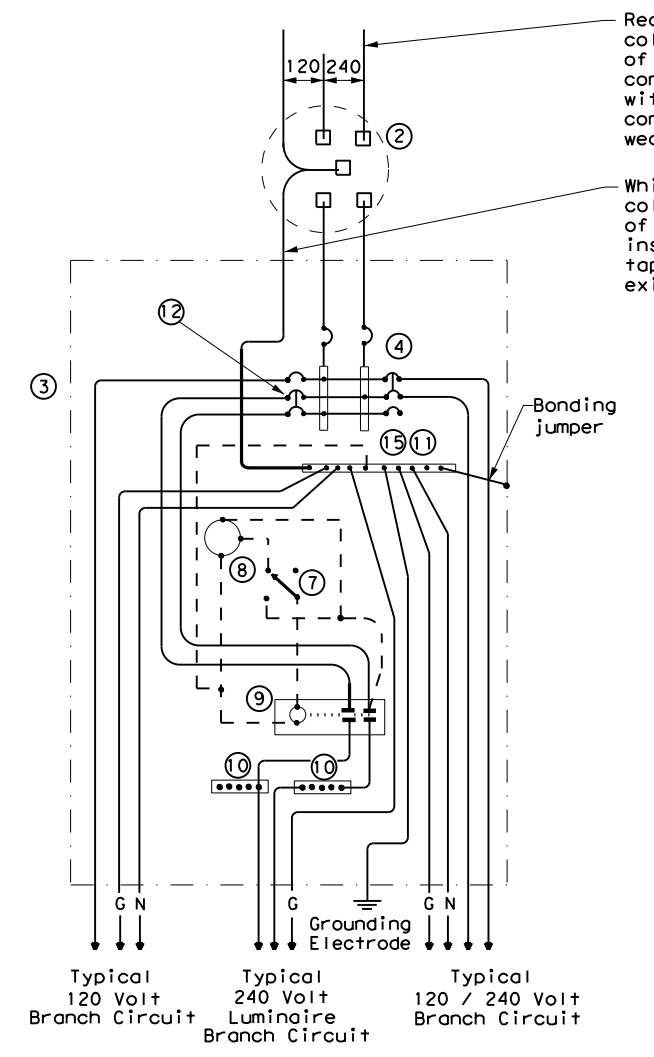
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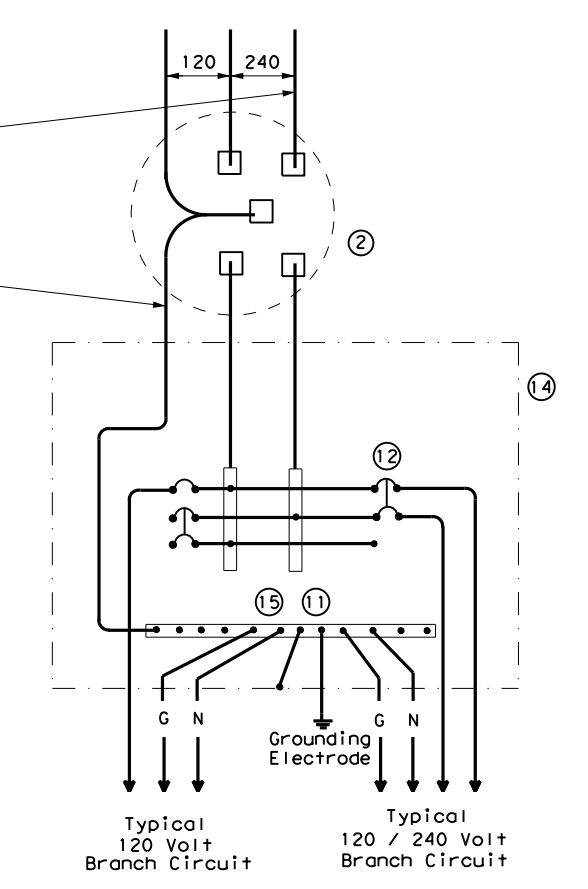
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE
 Galvanized steel - "Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
————	Power Wiring
- - - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

		Traffic Operations Division Standard	
ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES			
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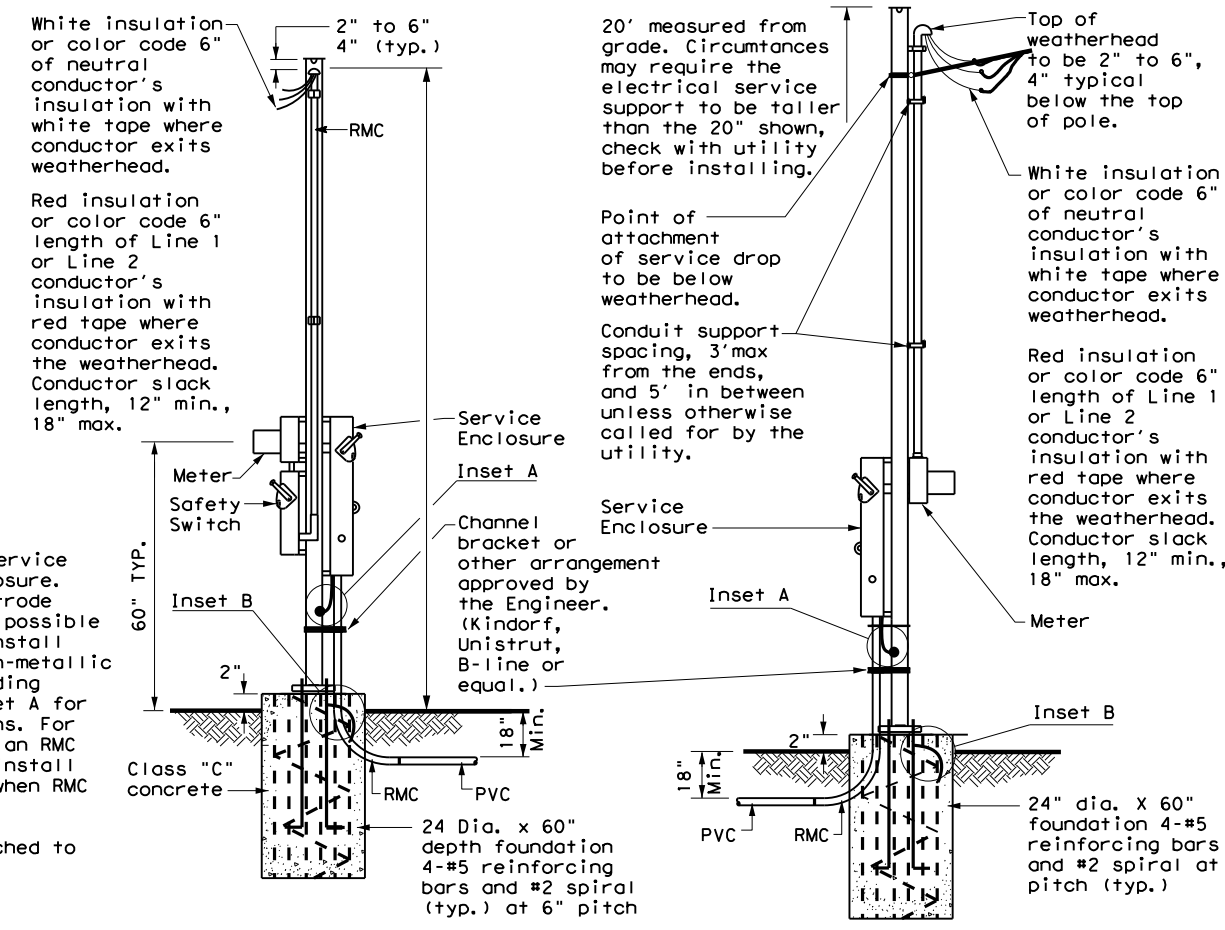
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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 1/2 in. or 1 3/8 in. wide by 1 in. up to 3 3/4 in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.
2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.
3. Provide and install galvanized 3/4 in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized 3/4 in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in. of thread, with 3 1/4 in. to 3 1/2 in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.
4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.
5. Furnish and install rigid metallic ellis in all steel pole and steel frame foundations for all conduits entering the service from underground.
6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.
7. Drill and tap steel poles and frames for 1/2 in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.
8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.
9. Provide 1/4" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.
10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.
11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

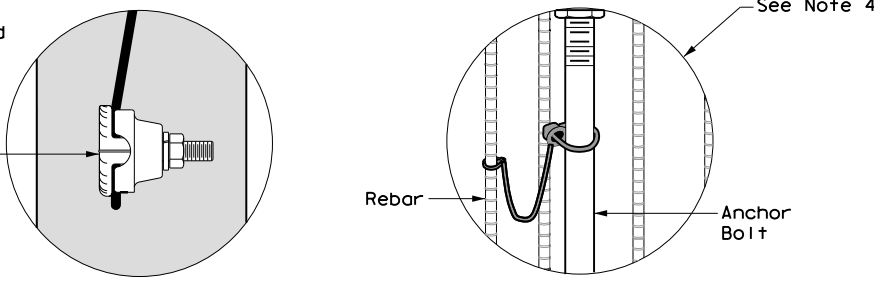
White insulation or color code 6" of neutral conductor's insulation with white tape where conductor exits weatherhead.

Red insulation or color code 6" length of Line 1 or Line 2 conductor's insulation with red tape where conductor exits the weatherhead. Conductor slack length, 12" min., 18" max.

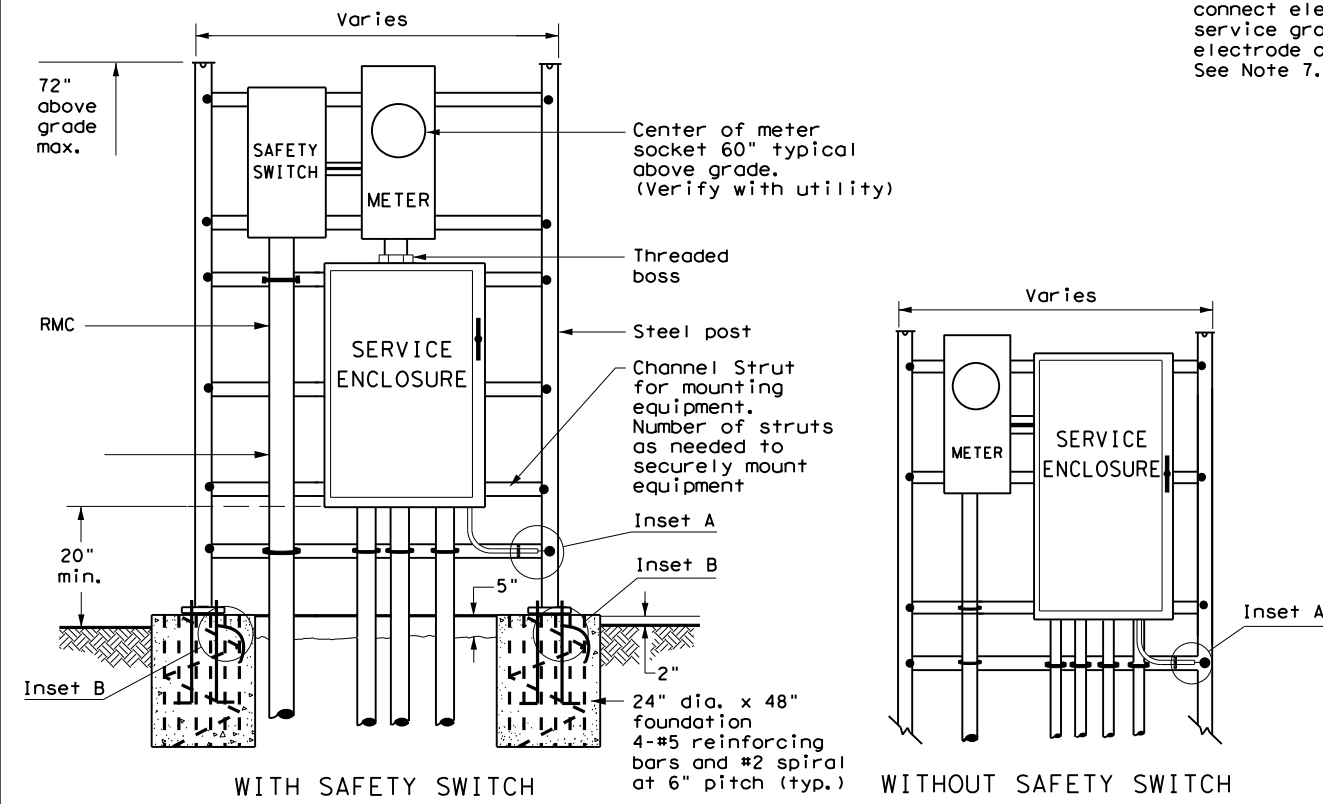


WITH SAFETY SWITCH WITHOUT SAFETY SWITCH
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE

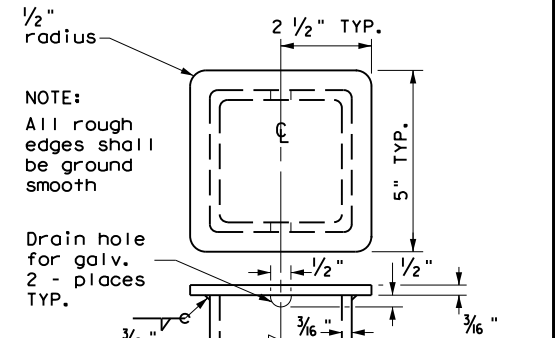
Drill, tap, and thread 1/2" X 13 UNC. Install tank ground fitting, connect electrical service grounding electrode conductor. See Note 7.



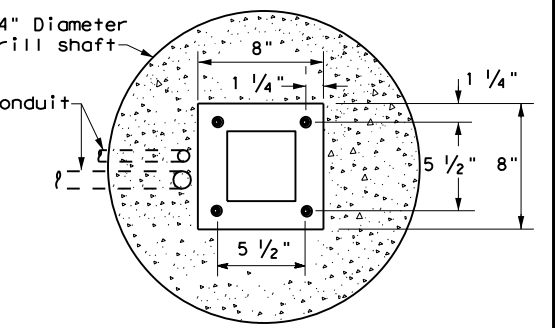
FRONT VIEW INSET A INSET B HOOKED ANCHOR DETAIL
SERVICE SUPPORT TYPE SP (U) - UNDERGROUND SERVICE



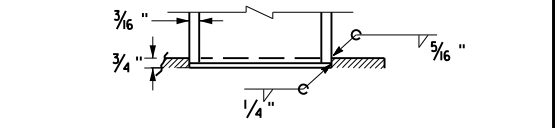
WITH SAFETY SWITCH WITHOUT SAFETY SWITCH
SERVICE SUPPORT TYPE SF (U) - UNDERGROUND SERVICE



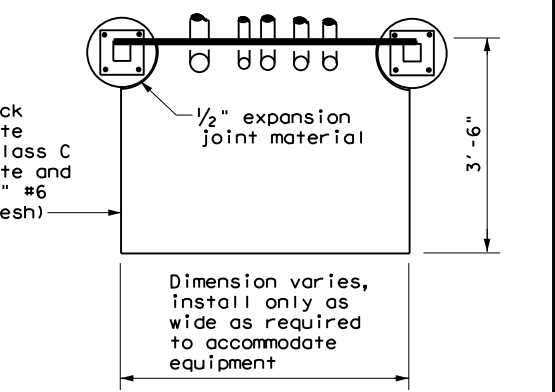
POLE TOP PLATE



BASE PLATE DETAIL



BOTTOM OF POLE



TOP VIEW
SERVICE SUPPORT TY SF (O) & SF (U)

		Traffic Operations Division Standard	
ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP ED(7)-14			
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STORM WATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TPDES General Permit TXR150000. The operator, The Texas Department of Transportation ensures that Project specifications provide that adequate BMPs have been developed for this project. The contractor shall be the party responsible for implementing the BMPs described herein. The contractor shall implement changes approved by the Project Engineer to the SWP3 within the times specified in the SWP3 or the TPDES General Permit. Operators affected by modifications to specifications will be notified in a timely manner.

1. SITE OR PROJECT DESCRIPTION:

NATURE OF THE CONSTRUCTION ACTIVITY: SEE TITLE SHEET

POTENTIAL POLLUTANTS AND SOURCES:

<i>Sediment laden storm water</i>	<i>Storm water conveyance over disturbed areas</i>
<i>Fuels, oils, and lubricants</i>	<i>Construction vehicles and storage areas</i>
<i>Transported soil</i>	<i>Off site vehicle tracking</i>
<i>Construction debris and waste</i>	<i>Various construction activities</i>
<i>Sanitary waste</i>	<i>Restroom facilities</i>
<i>Trash</i>	<i>Construction site and Receptacles</i>

SEQUENCE OF ACTIVITIES THAT WILL DISTURB SOILS:

1. *Blade existing topsoil into windrows, prep ROW, clear and grub*
2. *Grading operations, excavation, and embankment*
3. *Remove existing MBGF, bridge rail and install mowstrip, new MBGF and bridge rail*
4. *Remove existing culverts and SETs, install proposed culverts, culvert extensions and SETs*
5. *Place flexbase*
6. *Example: Rework slopes, grade ditches*
7. *Example: Blade windrowed material back across slopes*
8. _____

AREAS:

TOTAL AREA OF PROJECT:	175.40 ACRES
TOTAL AREA OF SOIL DISTURBANCE:	129.57 ACRES
TOTAL AREA OFF-SITE:	No off-site areas

DATA DESCRIBING THE SOIL: *Hydrologic soil groups A, B, C and mostly D are located within the project limits from the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey of Pecos, Crockett Crane and Upton Counties. Since hydrologic soil Group D is the predominant soil on the map, a very slow infiltration rate and high runoff potential are assumed when wet.*

GENERAL LOCATION MAP: SEE TITLE SHEET

DETAILED SITE MAP: SEE SWP3 SITE MAP/S SHEET/S

THE LOCATION AND DESCRIPTION OF CONCRETE AND ASPHALT PLANTS:

Supporting Concrete Plant Facilities shall be located off site. See note DEDICATED CONCRETE PLANTS.

Supporting Asphalt Plant Facilities shall be located off site. See note DEDICATED ASPHALT PLANTS.

NAME OF RECEIVING WATERS: *Storm Water from this project will enter into the Upper Pecos River which is segment number 2311 of the Rio Grande Basin.*

A COPY OF TPDES CGP TXR150000 IS INCLUDED IN THE SWP3 FILE.

REMARKS:

401 WATER QUALITY CERTIFICATION: YES X NO _____

2. BEST MANAGEMENT PRACTICES (BMPs):

EROSION AND SEDIMENT CONTROLS: Erosion and sediment controls have been designed to retain sediment on-site. Controls shall be utilized to reduce off site transport of suspended sediments and pollutants if it is necessary to pump water from the site. Control measures shall be installed per specifications or as directed. Sediment must be removed from controls per the plan requirements or manufacturer's recommendations, but no later than the time that design capacity has been reduced by 50%. If sediment escapes the site, accumulations will be removed to minimize further negative effects. Controls will be developed to limit the off site transportation of litter, construction debris, and construction materials.

INTERIM (INT), PERMANENT (PER), AND 401 CERTIFICATION BMP'S:

EROSION CONTROLS:	401	INT	PER	SEDIMENT CONTROLS:	401	INT	PER
<input type="checkbox"/> Blankets and Matting	—	—	—	<input type="checkbox"/> Silt Fence	—	—	—
<input type="checkbox"/> Sod	—	—	—	<input type="checkbox"/> Rock Berm	—	—	—
<input type="checkbox"/> Preserve Existing Vegetation	—	—	—	<input type="checkbox"/> Buffer Zones	—	—	—
<input type="checkbox"/> Soil Stabilization	—	—	—	<input type="checkbox"/> Vegetative Filter Strips	—	—	—
<input checked="" type="checkbox"/> Permanent Vegetation	—	—	X	<input checked="" type="checkbox"/> Ditch Block	—	—	X
<input checked="" type="checkbox"/> Compost Filter Berms and Socks	X	X	—	<input checked="" type="checkbox"/> Compost Filter Berms and Socks	X	X	—
<input type="checkbox"/> No Erosion Controls are Required.				<input type="checkbox"/> No Sediment Controls are Required.			

POST CONSTRUCTION TSS CONTROL (401 CERTIFICATION ONLY):

- | | |
|----------------------------------------------------------|--------------------------------------------------------------------------------|
| <input type="checkbox"/> Vegetation Lined Drainage Ditch | <input type="checkbox"/> Grassy Swales |
| <input type="checkbox"/> Retention/Irrigation | <input type="checkbox"/> Vegetative Filter Strips |
| <input type="checkbox"/> Erosion Control Compost | <input checked="" type="checkbox"/> No Post Construction TSS Control Required. |

SEQUENCE OR SCHEDULE OF IMPLEMENTATION:

1. *Windrow topsoil*
2. *Install biodegradable erosion control logs*
3. *Maintain biodegradable erosion control logs*
4. *Inspect until 70% cover is attained or as approved by the Engineer*
5. _____
6. _____
7. _____
8. _____

The dates of major grading activities, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization practices are initiated, are available in the project diary or SWP3. Stabilization measures must be initiated as soon as practicable in portions of the site where construction has temporarily or permanently ceased. The Odessa District is located in a semi-arid area and the 14 and 21 day requirements are not applicable except, as directed by the Engineer.

3. STRUCTURAL CONTROL PRACTICES: Structural control practices for this project are listed elsewhere herein.

4. PERMANENT STORM WATER CONTROLS: Structural control practices installed during construction will be maintained and inspected after construction has ceased on the site and until final stabilization is attained. Unless specified in the plans, after project acceptance TxDOT will assume maintenance responsibilities for the controls and measures. Other permanent controls include existing and proposed riprap at culvert inlets and outlets, diversion dikes, swales, retaining walls, and other similar devices.

5. OTHER CONTROLS:
OFF-SITE VEHICLE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST: The off site vehicle tracking of sediments shall be minimized by removal of excess dirt from the road and at entrances to the work site. Stabilized Construction Entrances and Exits shall be constructed per the plans or as directed by the Project Engineer. The generation of dust will be minimized as directed by the Project Engineer by dampening haul roads and covering haul trucks with a tarpaulin.

CONSTRUCTION AND WASTE MATERIALS: The contractor will maintain a clean, orderly construction site. Construction waste including trash, rubble, scrap and vegetation shall be disposed of in lidded dumpsters or in a manner approved by the Project Engineer. Disposal methods must meet Federal, State, and Local waste management guidelines. No construction waste will be buried or burned on site. Spoils disposal, material storage, and materials resulting from the destruction of existing roads and structures shall be stored in areas designated by the Project Engineer and protected from run-off. All waterways shall be cleared of temporary embankment, temporary bridges, matting, false work, piling, debris, or other obstructions placed during construction operations, that are not part of the finished work, as soon as practicable. All excess soil generated by the construction will be collected and disposed of by the contractor. Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body, or stream bed.

POLLUTANT SOURCES FROM AREAS OTHER THAN CONSTRUCTION: Staging areas and vehicle maintenance areas shall be located and constructed in a manner to minimize the runoff of pollutants. If potential pollutant sources are identified after the start of construction, controls and measures shall be implemented as directed by the Project Engineer.

5. OTHER CONTROLS (CONT):

DEDICATED ASPHALT PLANTS: Asphalt or asphaltic material for this project will be produced off site. If the project requires a dedicated asphalt plant and the plant within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to an on site plant and storage facilities and measures implemented as directed by the Project Engineer.

DEDICATED CONCRETE PLANTS: Cement or Concrete material for this project will be produced off site. If the project requires a dedicated concrete plant and the plant is within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to on site plant and storage facilities and measures implemented as directed by the Project Engineer. Concrete trucks shall be washed or washed out in locations designated by the Project Engineer. The locations shall be protected by a berm sufficient to contain all waste and wash water. Wash water shall not be allowed to enter any storm drainage system or waterway. The residual material and contaminated soil shall be collected and disposed of in accordance with Federal, State, and Local guidelines. Staging areas and vehicle maintenance areas shall be located and constructed in a manner to minimize the runoff of pollutants.

HAZARDOUS MATERIALS AND SPILL REPORTING: The contractor shall take appropriate measures to prevent, minimize, and control the spillage or leakage of hazardous materials and any associated wastes on site and in maintenance and staging areas. Hazardous materials shall include but are not limited to paints, acids, solvents, asphalt products, chemical additives, curing compounds, oils, fuels, and lubricants. Hazardous materials shall not be stored, accumulated, or transported in open containers subject to precipitation or spillage, but shall be stored, accumulated, or transported in closed containers of the type recommended by the manufacturer. In the event of a spill the Project Engineer should be contacted immediately. All spills shall be immediately cleaned and any contaminated soil removed and disposed of in accordance with Local, State, and Federal laws. Fuel tanks shall be protected by a secondary containment, such as a lined berm, capable of containing 1.5 times the capacity of the tank, or as approved by the Project Engineer.

OFF SITE PSLs: All off site project specific locations including dedicated asphalt plants, concrete plants, or utility installations, required by the contractor, are the contractor's responsibility. The contractor shall secure all permits required by local, state, or federal laws for off site PSLs. The contractor shall provide diagrams and areas of disturbance for all PSL's within 1 mile of the project.

SANITARY FACILITIES: All sanitary or septic wastes that are generated onsite shall be treated and disposed of in accordance with state and local regulations. Raw sewage or septage shall not be discharged or buried on site. Precaution shall be taken to prevent illicit discharges to storm water. Licensed waste management contractors shall be required to dispose of sanitary waste. Porta johns will be required for the laboratory and construction site or as directed by the Project Engineer.

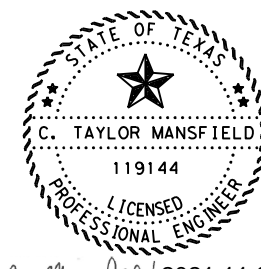
VELOCITY DISSIPATION DEVICES: Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as shown in the plans or as directed by the Project Engineer to provide a non-erosive flow velocity from the structure to a watercourse so that the natural physical and biological characteristics and functions are maintained and protected.

6. APPROVED STATE AND LOCAL PLANS: This SWP3 is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or storm water management site plans or permits approved by federal, state, or local officials.

7. MAINTENANCE: Control measures shall be properly installed according to specifications. If inspections or other information indicates a control has been installed, used, or is performing inadequately, the contractor must replace or modify the control as soon as practicable after discovery. Control measures shall be maintained in effective operating condition. If inspections determine that BMPs are not operating effectively maintenance will be performed as necessary to continue the effectiveness of the controls. Maintenance must be accomplished as soon as practicable. Controls adjacent to creeks, culverts, bridges, and water crossings shall have priority. Controls that have been disabled, run over, removed, or otherwise rendered ineffective must be corrected immediately upon discovery.

8. INSPECTION OF CONTROLS: A TxDOT inspector will inspect disturbed areas of the site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, and structural controls for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion controls measures identified in the SWP3 will be inspected to ensure that they are operating correctly. Locations where vehicles enter or exit the site will be inspected for evidence of off-site vehicle tracking. Inspections will be conducted every month and within 24 hours after the end of a storm event of 0.5 inches or greater. The SWP3 will be modified based on the result of these inspections. Revisions will be completed within 7 Calendar days following the inspection. Revised implementation schedules will be described in the SWP3 and implemented as soon as practicable. Rain gages will be maintained on site for the duration of the project. Reports summarizing the scope of the inspections are included in the SWP3 file.

9. NON-STORM WATER COMPONENTS: The contractor shall be required to implement appropriate pollution prevention controls and measures for all eligible non-storm water components of the discharge as approved and directed by the Project Engineer.



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SWP3 NOTES

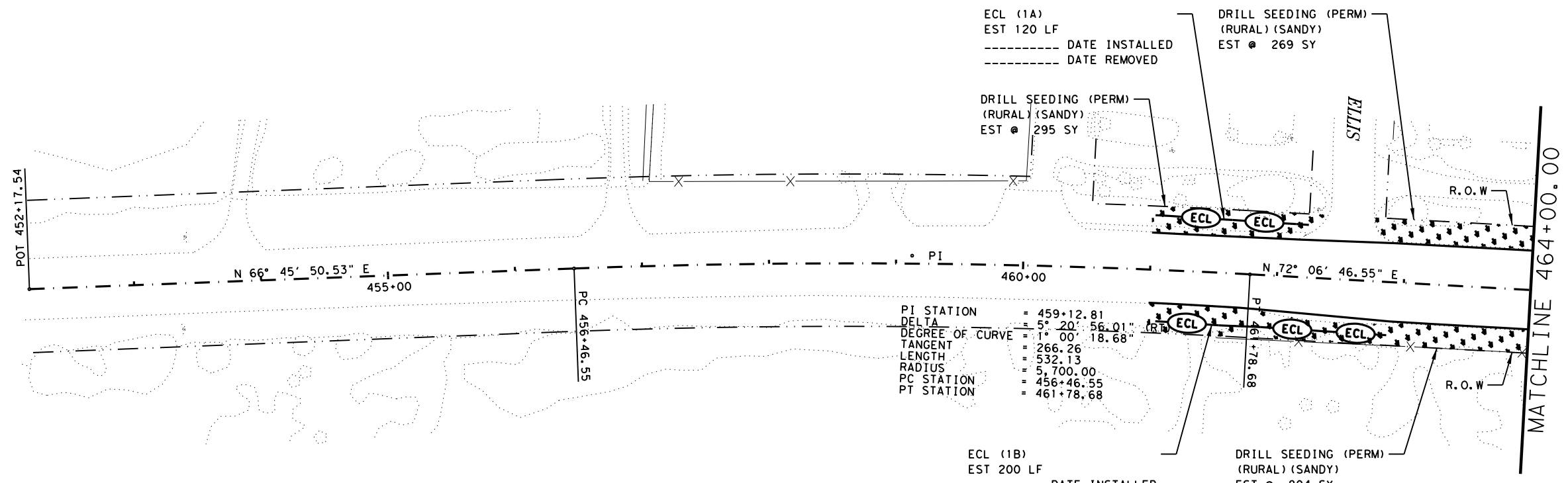
Texas Department of Transportation

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REV: 10-25-16

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.	
6	NH 2019 ()	285	
STATE	STATE DIST.	COUNTY	
TEXAS	ODA	UPTON	
CONT.	SECT.	JOB	HIGHWAY NO.
0076	06	037	US 67

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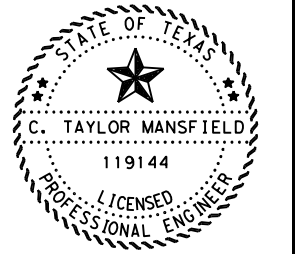
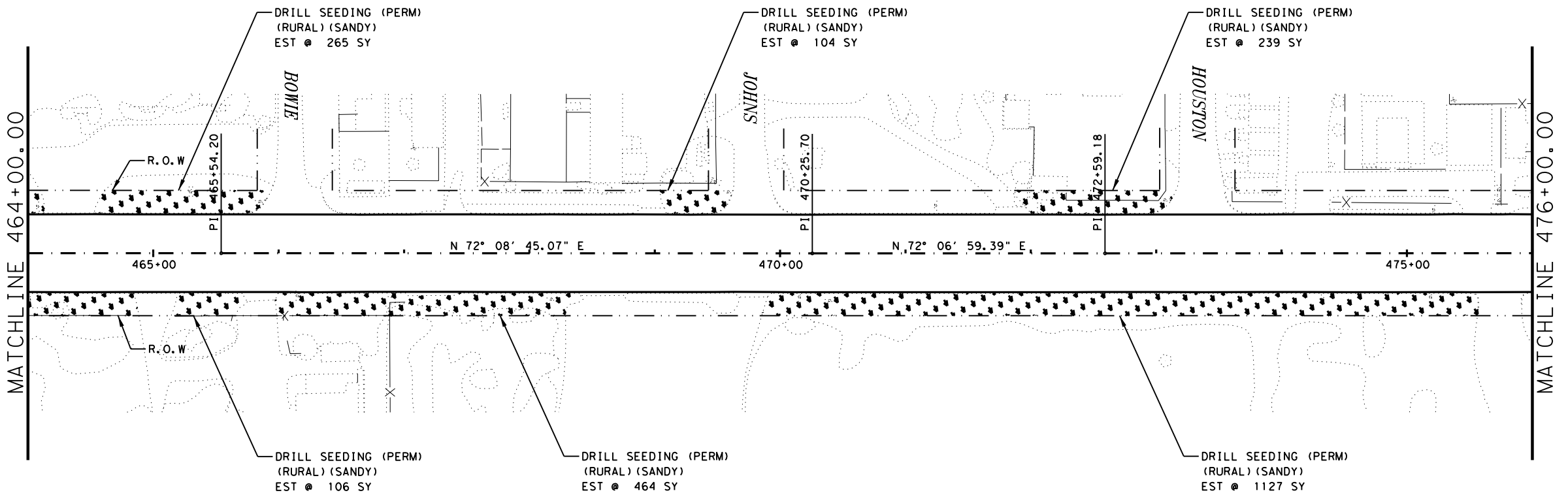
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(ECL) EROSION CONTROL LOG

[Hatched Area] DRILL SEEDING AREA

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.

SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	3673	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
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0506 6043	320	LF	BIODEG EROSN CONT LOGS (REMOVE)	



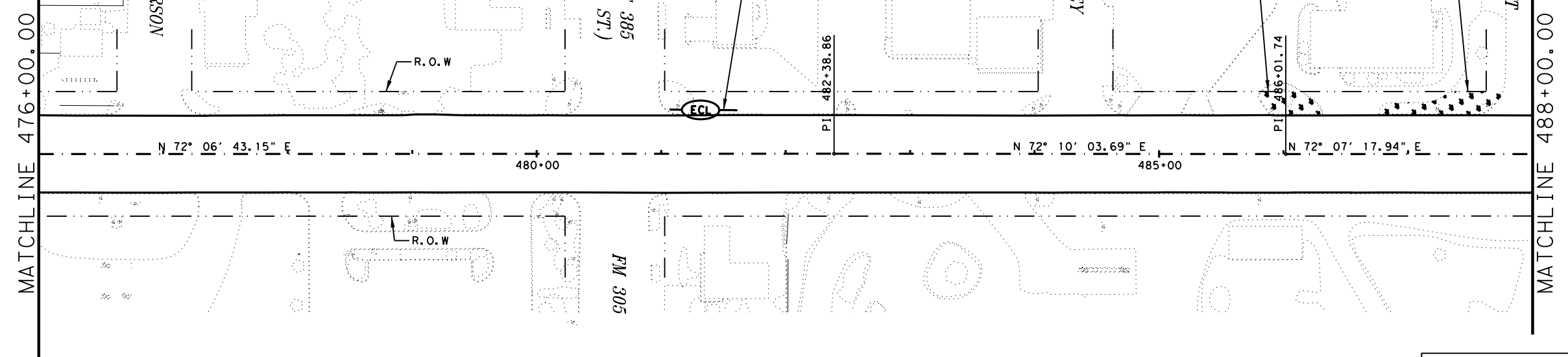
C. Taylor Mansfield 2021.11.01
 13:21:04-05'00"

**US 67
 McCAMEY
 MILL & FILL
 SWP3 LAYOUT**
 HORIZ SCALE 1"=100'

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		286

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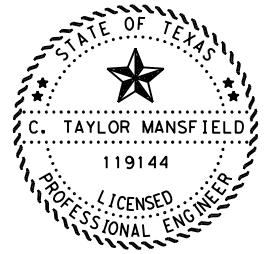
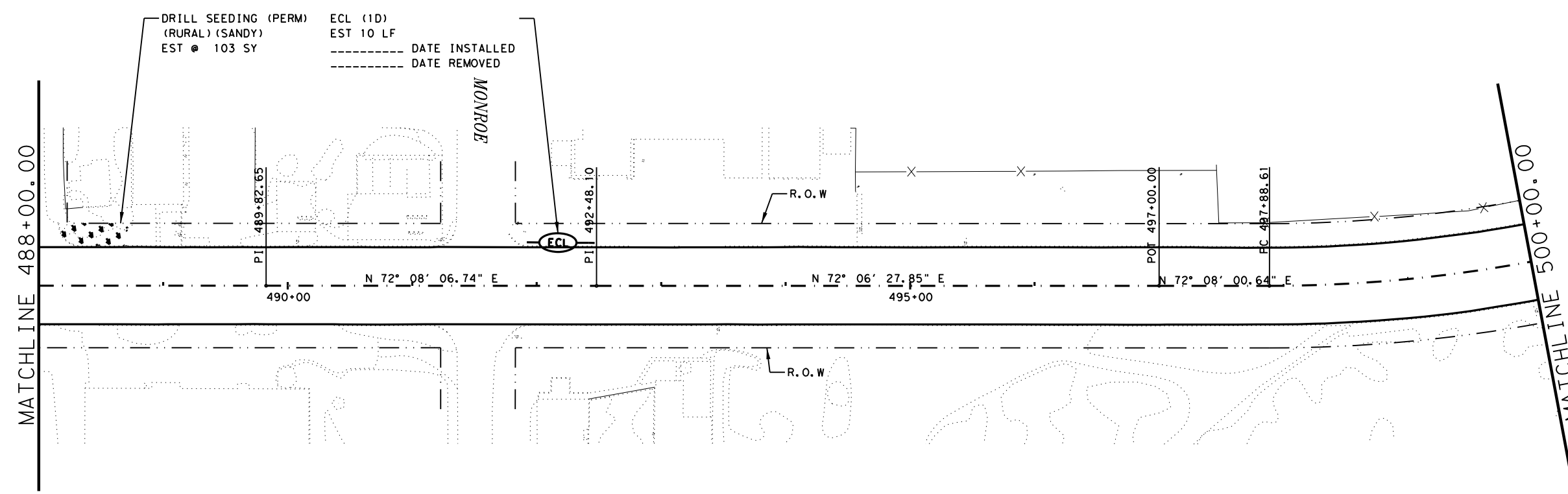
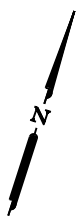
LEGEND

EROSION CONTROL LOG

DRILL SEEDING AREA

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.

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C. Taylor Mansfield 2021.11.01
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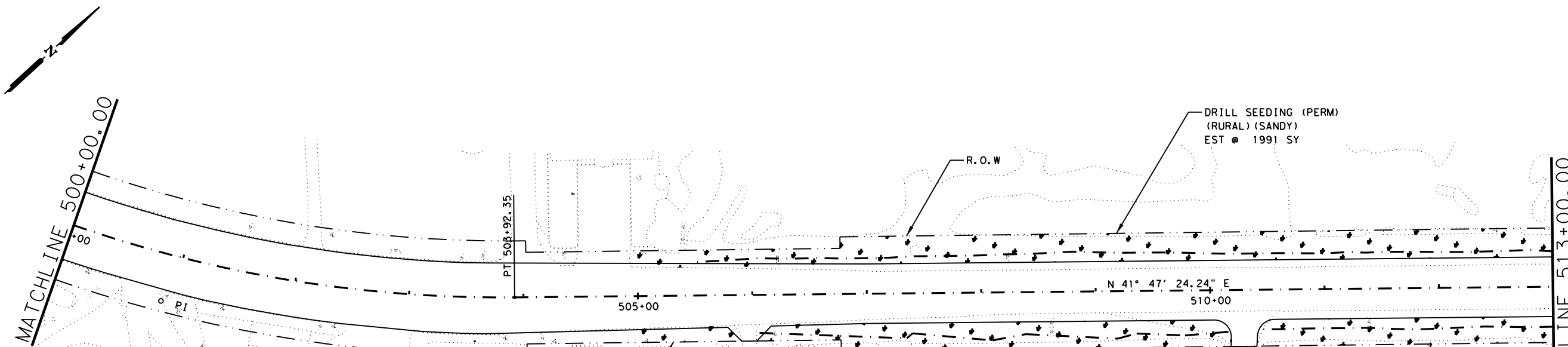
**US 67
 McCAMEY
 MILL & FILL
 SWP3 LAYOUT**
 HORIZ SCALE 1"=100'

SHEET 2 OF 2



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		287

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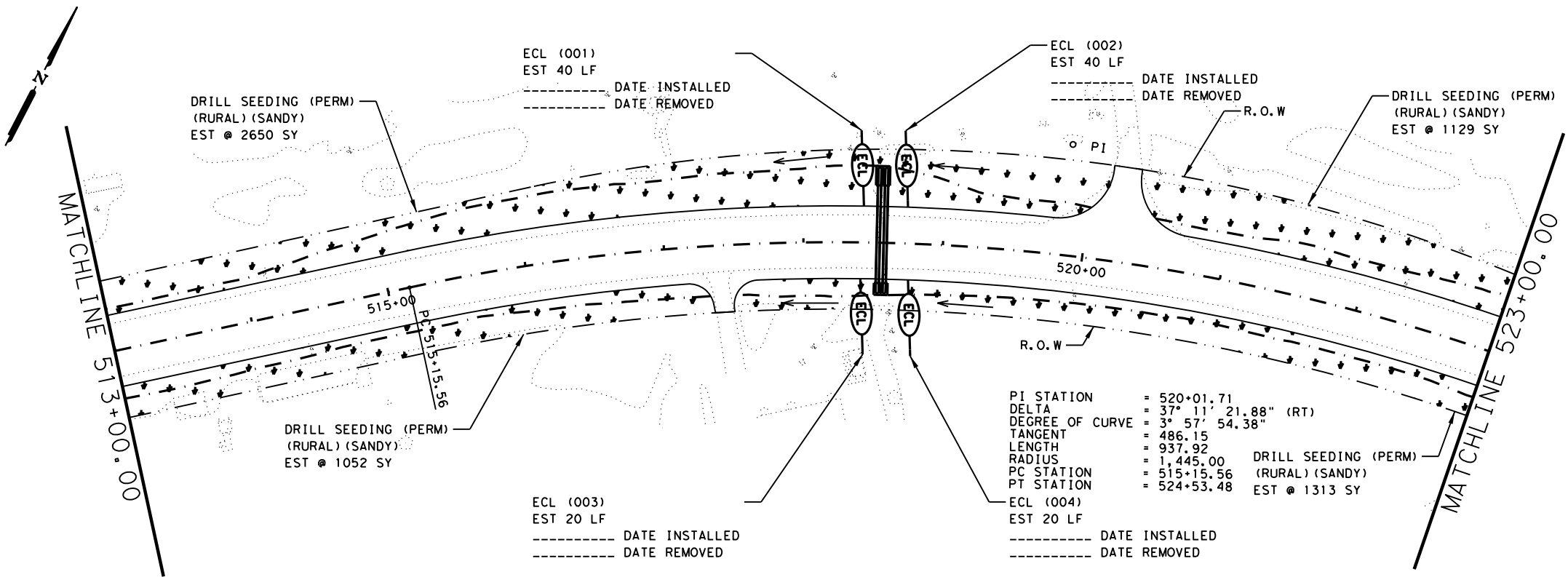
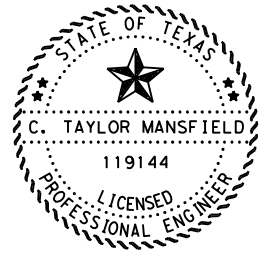
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 PT STATION = 503+92.35

DRILL SEEDING (PERM)
 (RURAL) (SANDY)
 EST @ 122 SY

DRILL SEEDING (PERM)
 (RURAL) (SANDY)
 EST @ 1005 SY

DRILL SEEDING (PERM)
 (RURAL) (SANDY)
 EST @ 656 SY

C. Taylor Mansfield 2021.11.01
 13:28:41-05'00'



DRILL SEEDING (PERM)
 (RURAL) (SANDY)
 EST @ 2650 SY

DRILL SEEDING (PERM)
 (RURAL) (SANDY)
 EST @ 1052 SY

ECL (003)
 EST 20 LF
 ----- DATE INSTALLED
 ----- DATE REMOVED

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 RADIUS = 1,445.00
 PC STATION = 515+15.56
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DRILL SEEDING (PERM)
 (RURAL) (SANDY)
 EST @ 1313 SY

ECL (004)
 EST 20 LF
 ----- DATE INSTALLED
 ----- DATE REMOVED

SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	9918	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	120	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	120	LF	BIODEG EROSN CONT LOGS (REMOVE)	

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



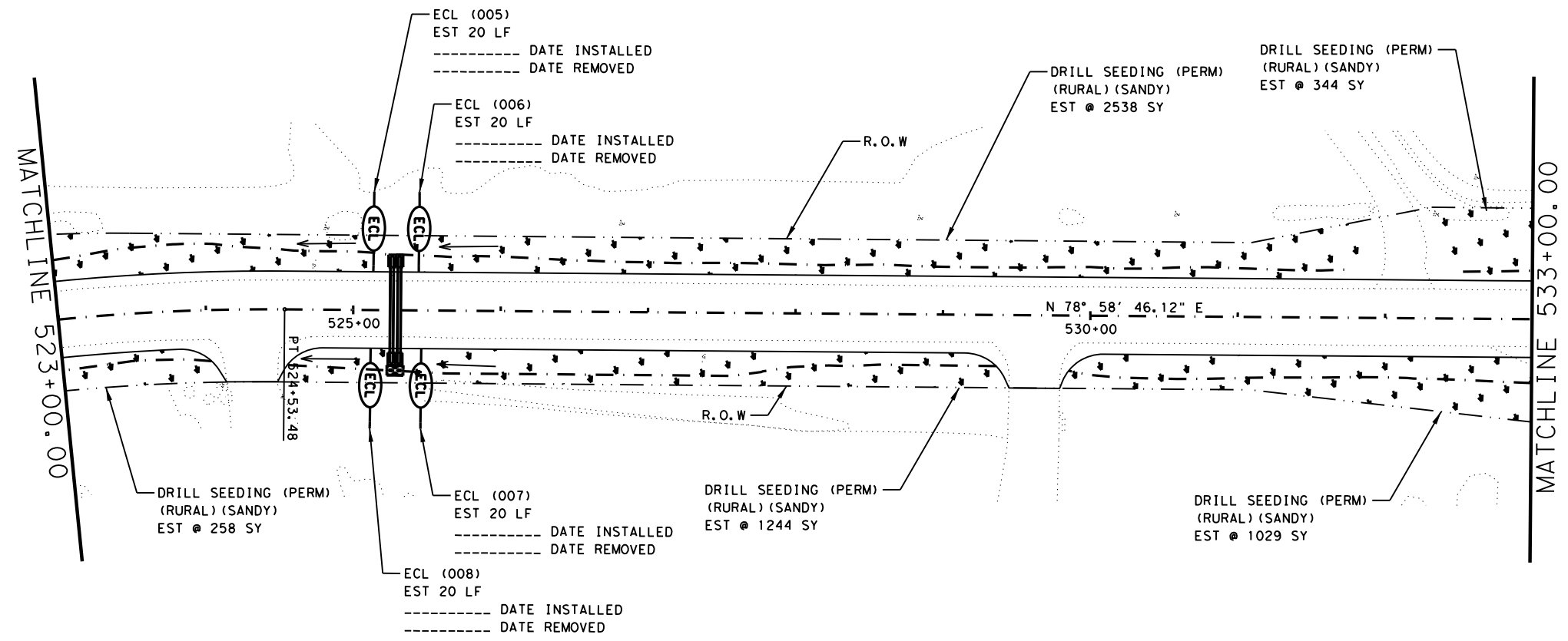
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	EROSION CONTROL LOG
	DRILL SEEDING AREA
	DITCH FLOW DIRECTION

US 67
SWP3 LAYOUT
 SHEET 1 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	288	

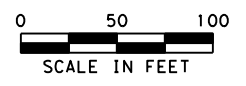
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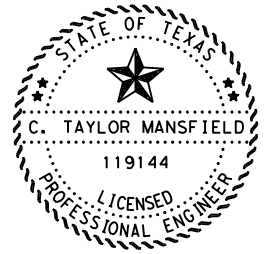
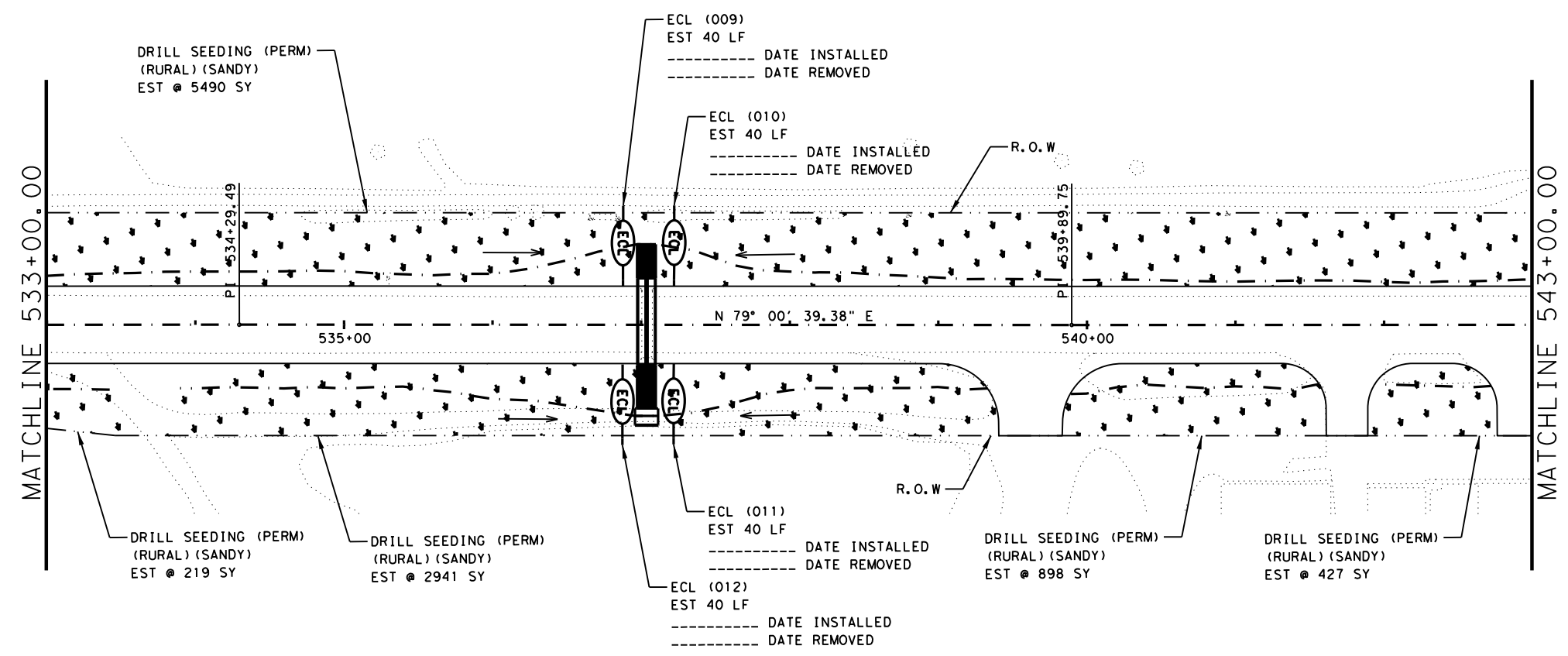
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



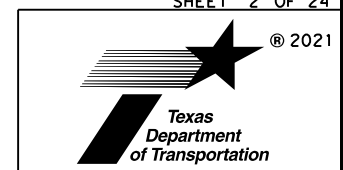
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C. Taylor Mansfield 2021.11.01
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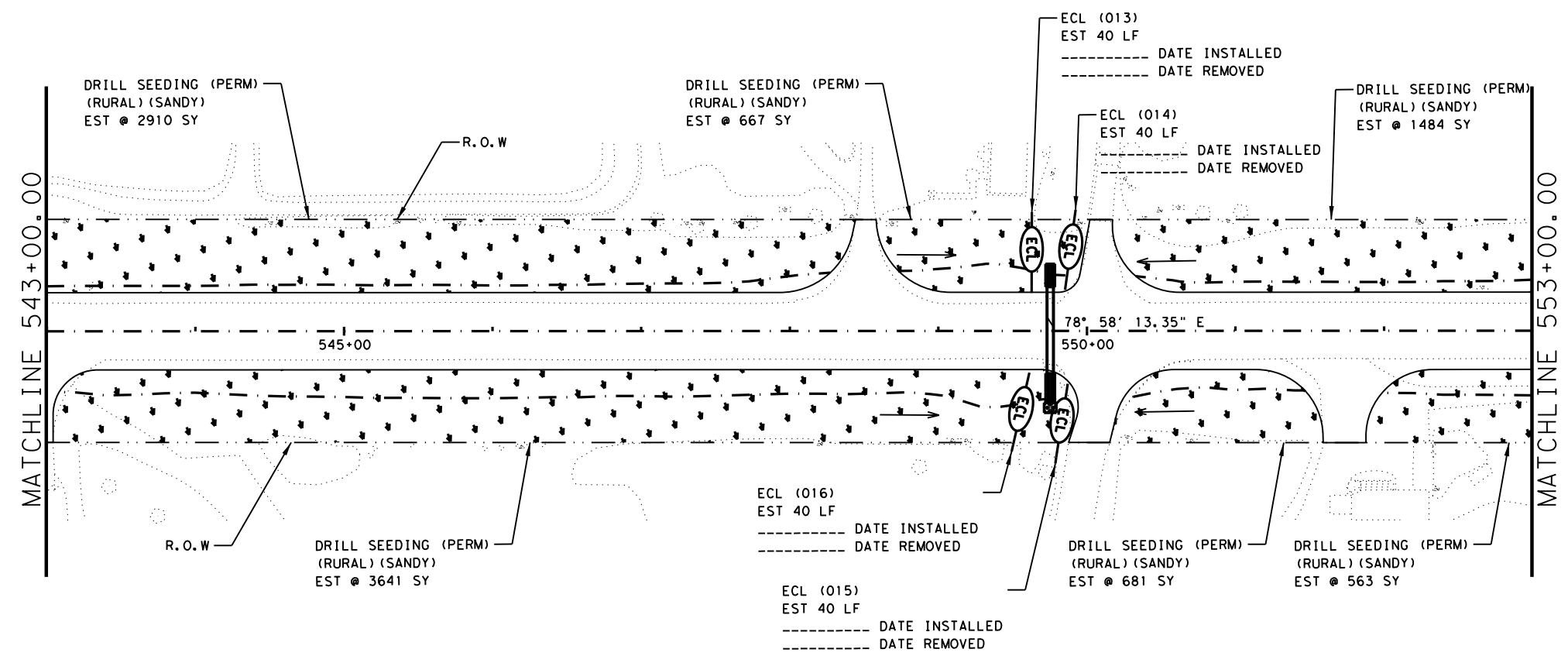
**US 67
SWP3 LAYOUT**

SHEET 2 OF 24



CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY	SHEET NO.	
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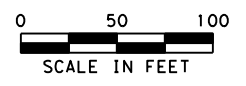
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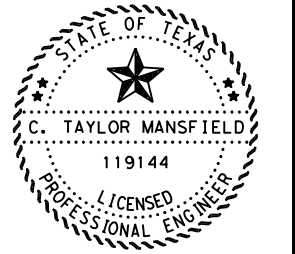
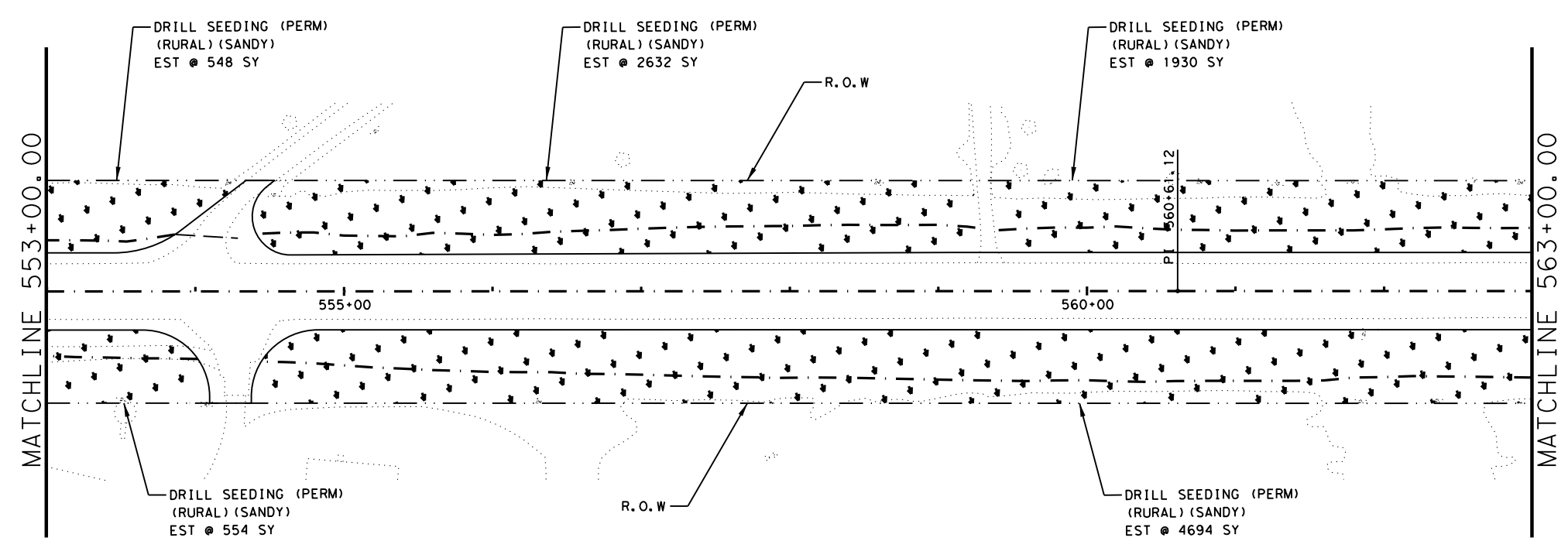
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- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



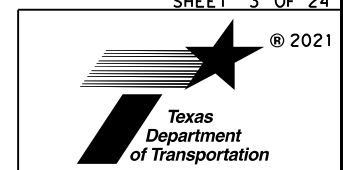
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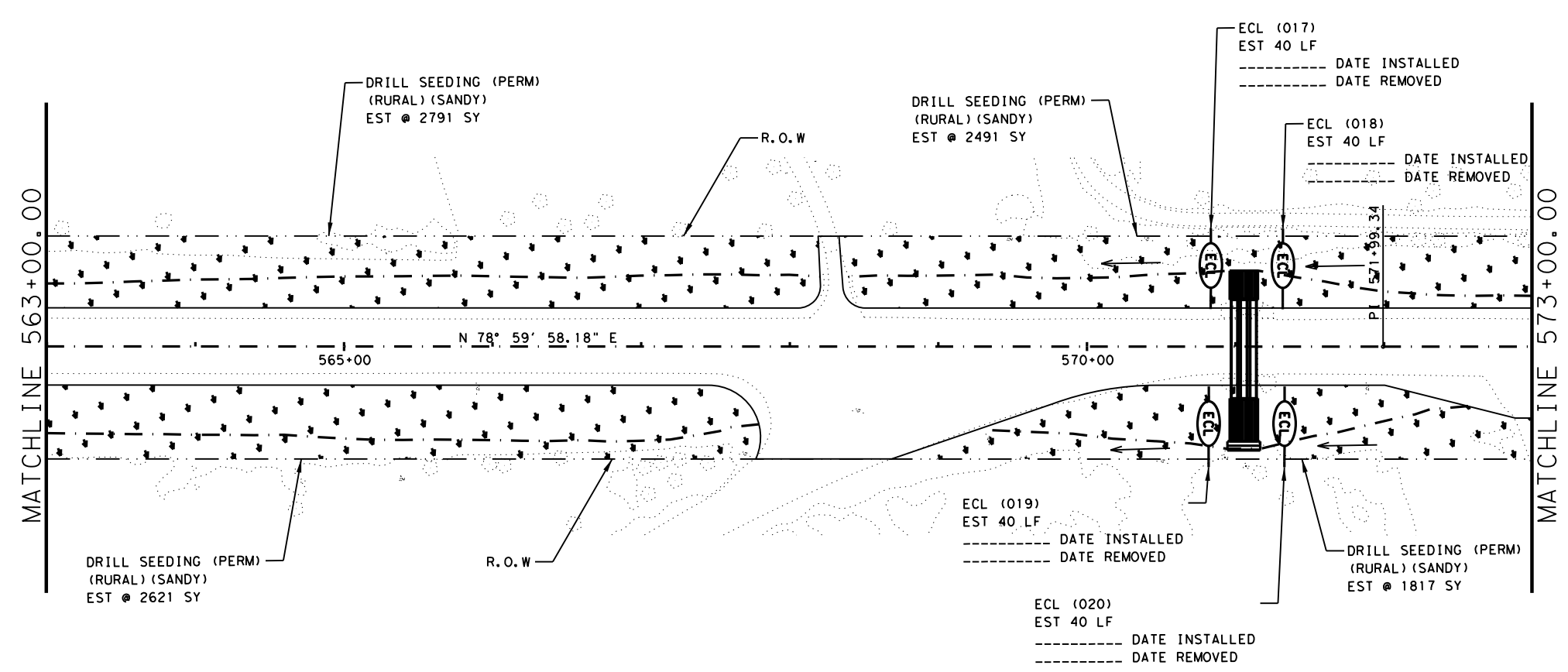
**US 67
SWP3 LAYOUT**

SHEET 3 OF 24



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DIST	COUNTY	SHEET NO.	
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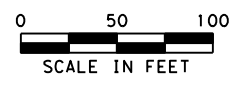
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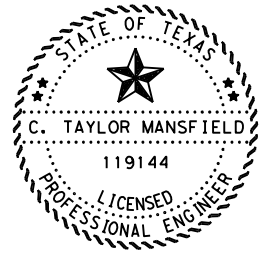
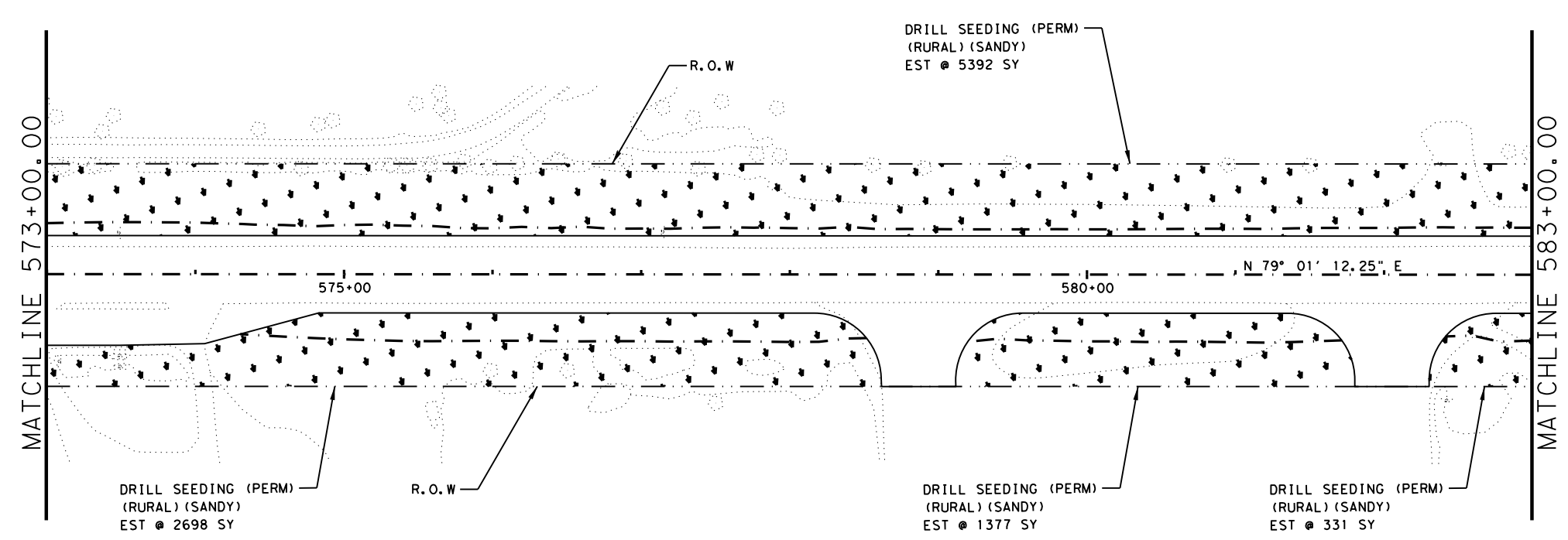
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- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



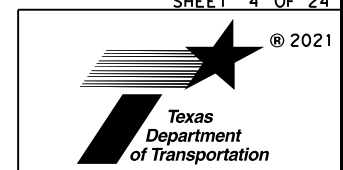
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C. Taylor Mansfield 2021.11.01
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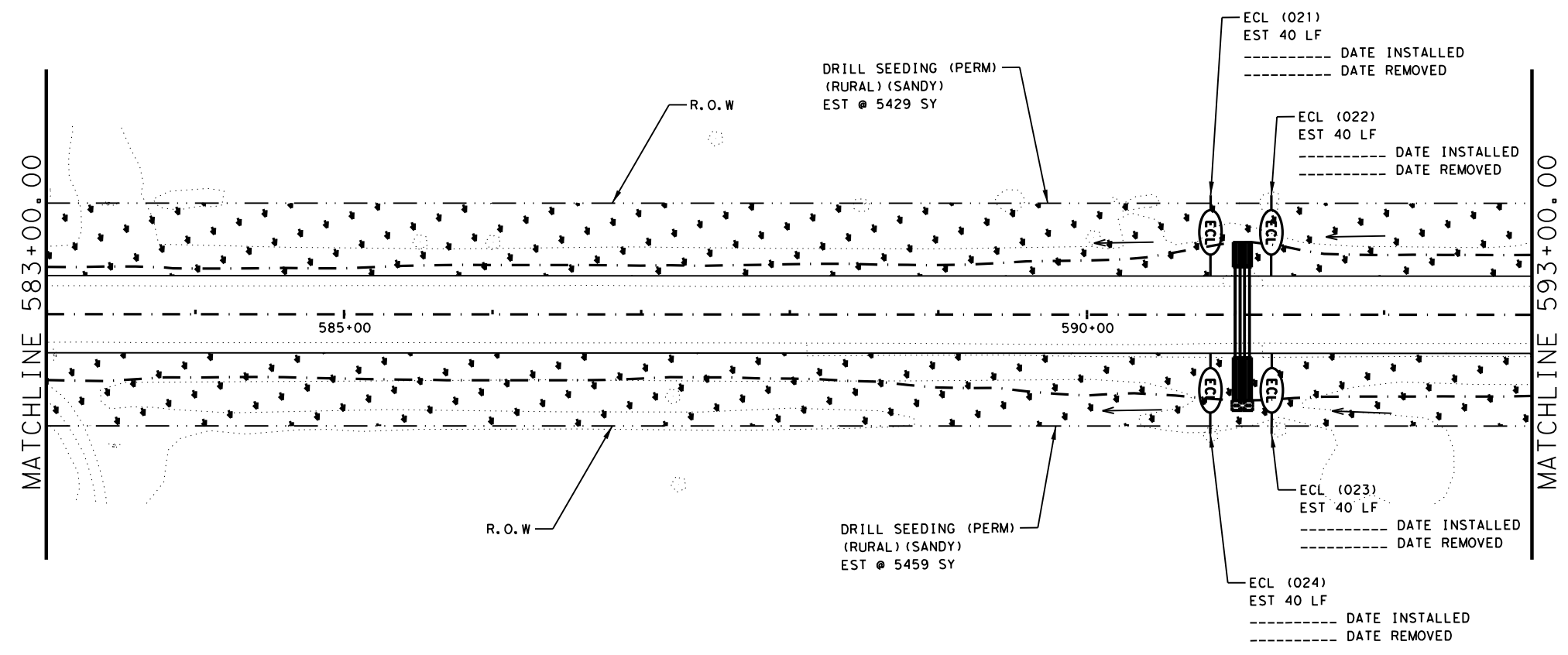
**US 67
SWP3 LAYOUT**

SHEET 4 OF 24



CONT	SECT	JOB	HIGHWAY
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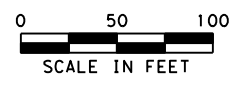
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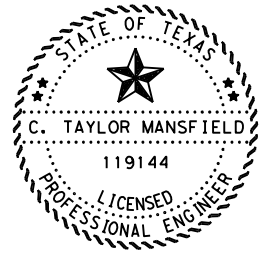
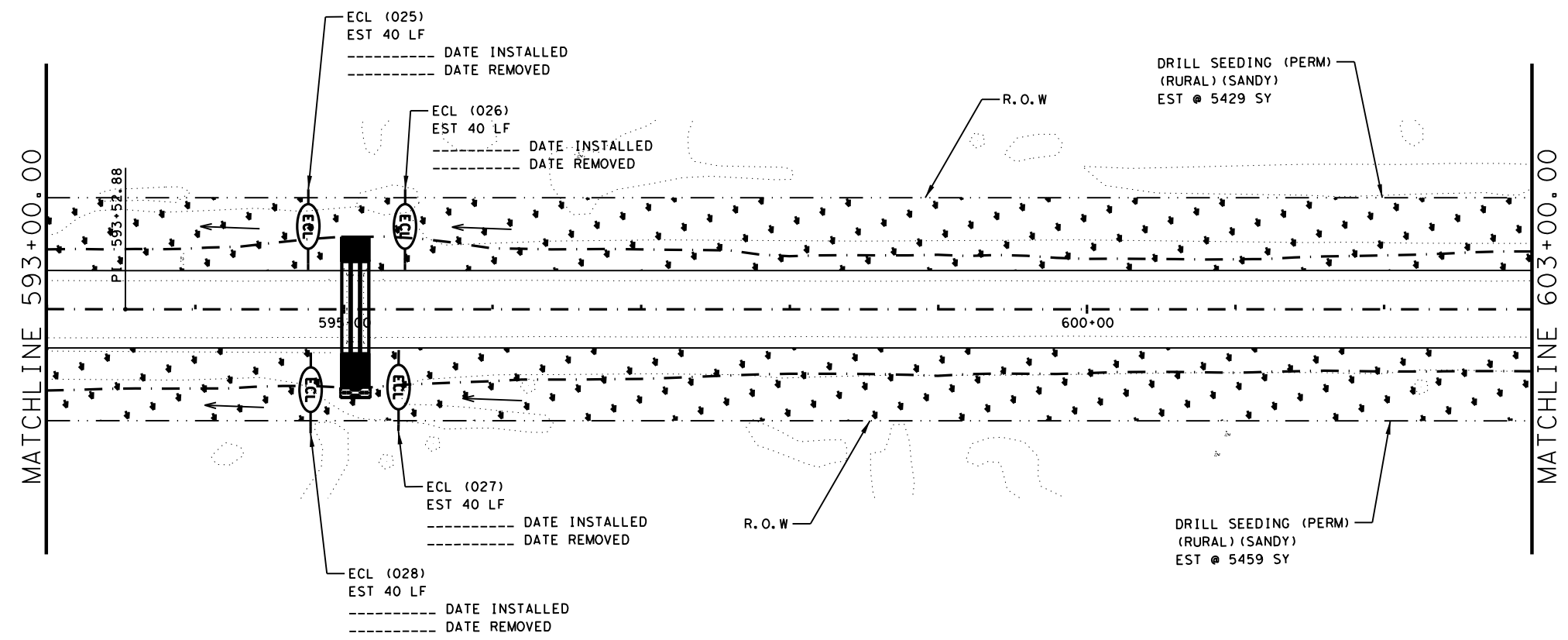
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- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



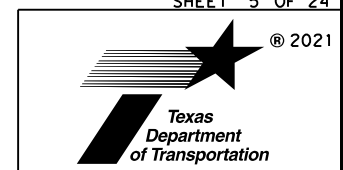
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C. Taylor Mansfield 2021.11.01
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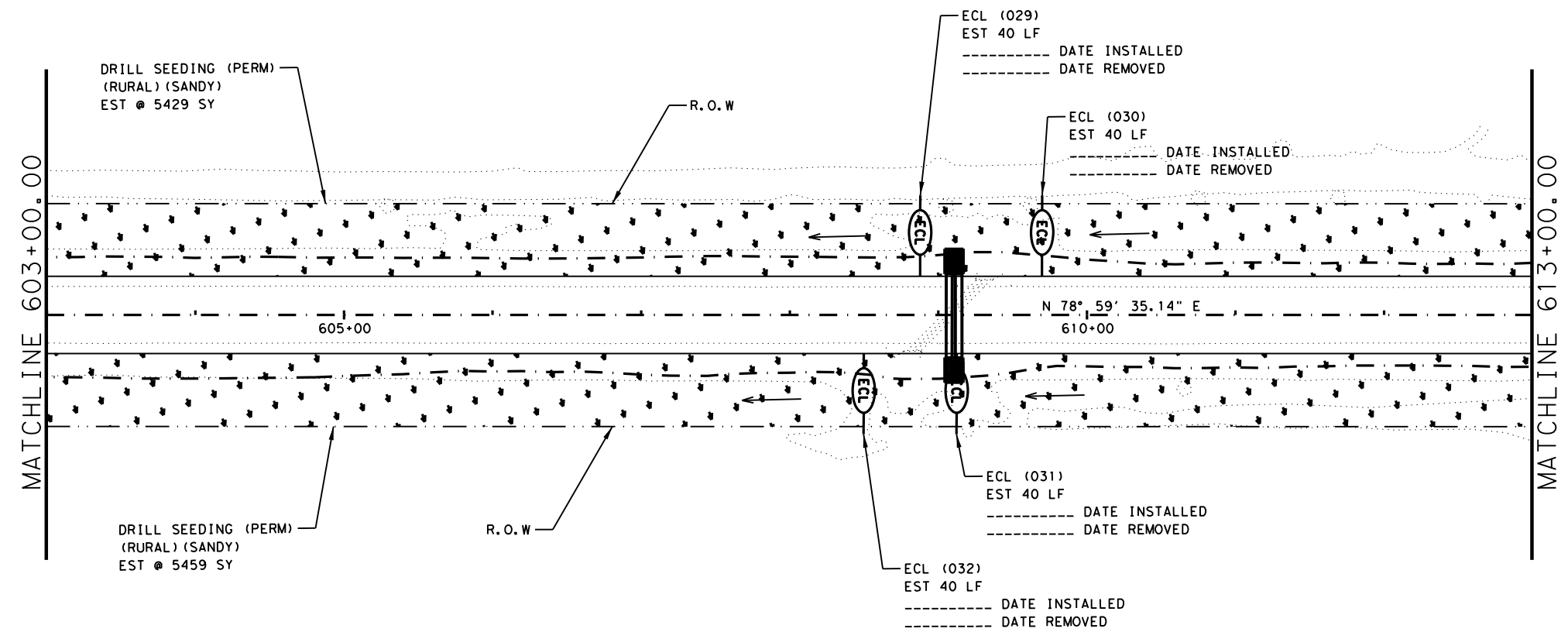
US 67
SWP3 LAYOUT

SHEET 5 OF 24



CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY	SHEET NO.	
ODA	UPTON	292	

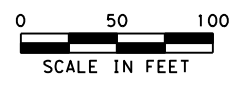
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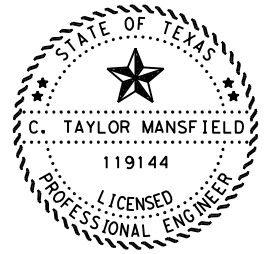
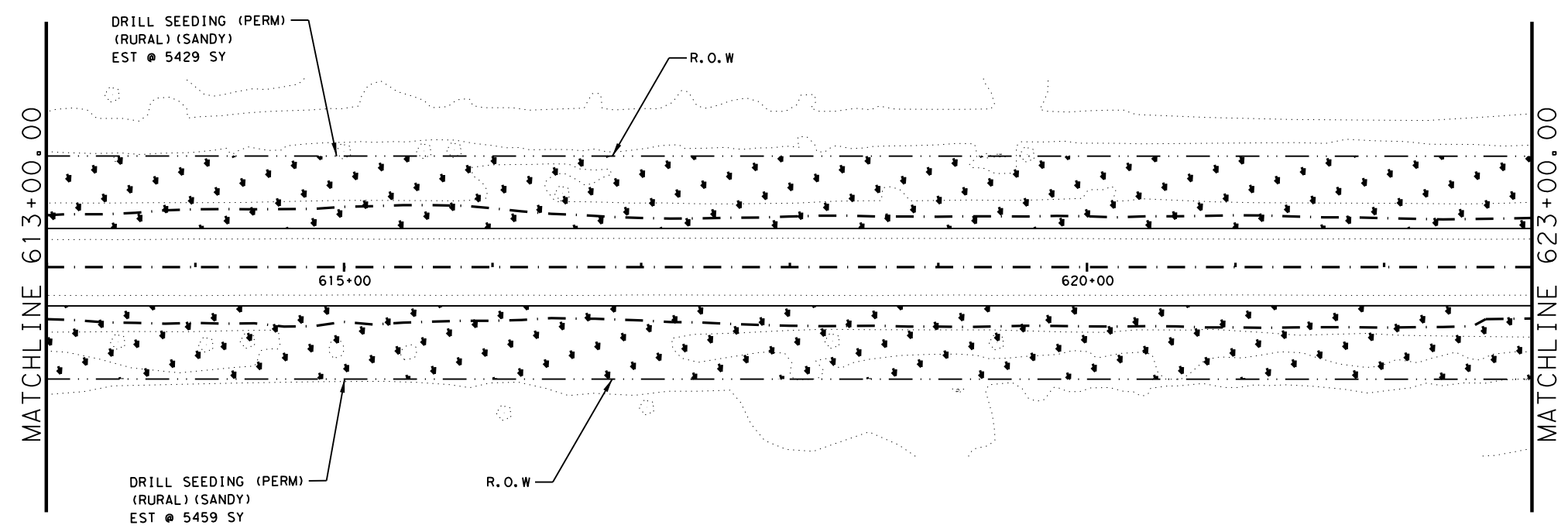
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



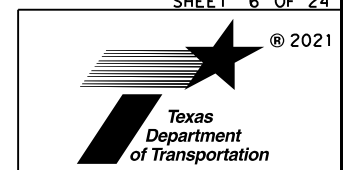
SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	21776	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	120	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	120	LF	BIODEG EROSN CONT LOGS (REMOVE)	



C. Taylor Mansfield 2021.11.01
13:21:05-05'00"

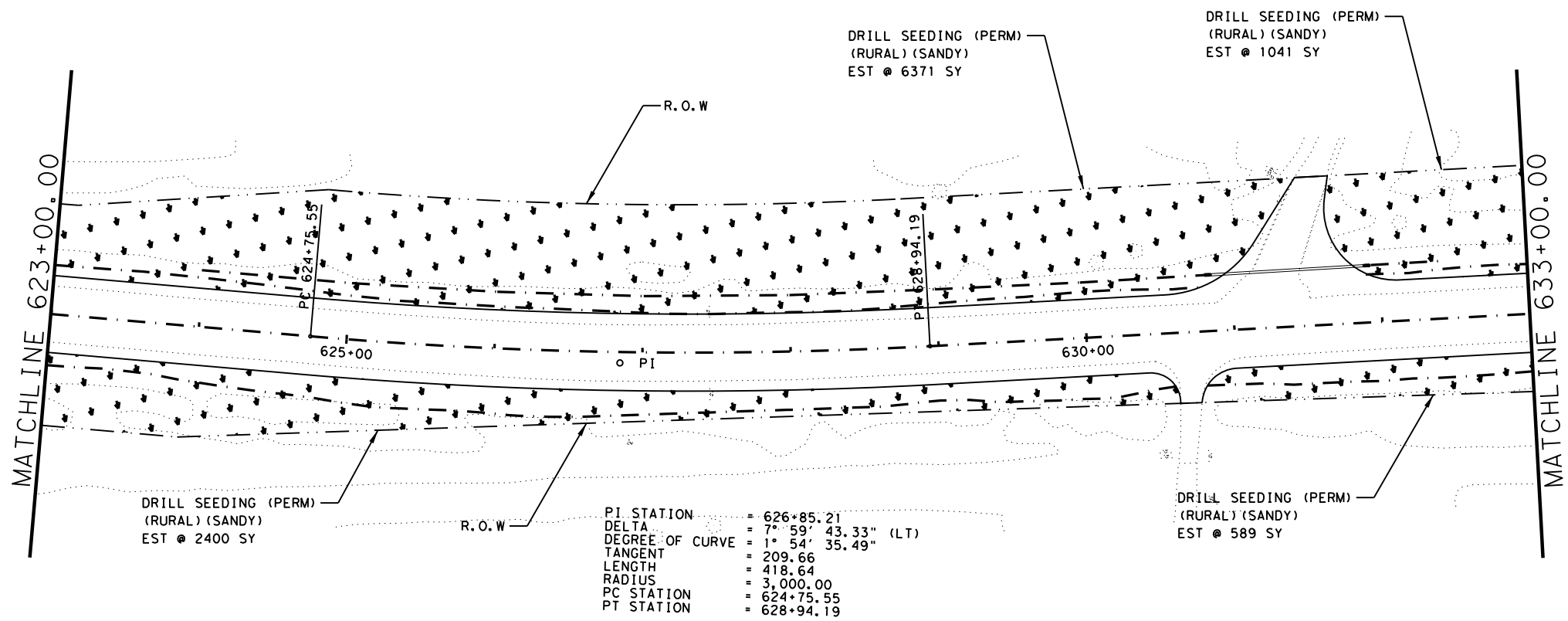
US 67
SWP3 LAYOUT

SHEET 6 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		293

DATE: 10/22/2021 05:31 PM
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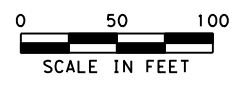


PI STATION = 626+85.21
 DELTA = 7° 59' 43.33" (LT)
 DEGREE OF CURVE = 1° 54' 35.49" (LT)
 TANGENT = 209.66
 LENGTH = 418.64
 RADIUS = 3,000.00
 PC STATION = 624+75.55
 PT STATION = 628+94.19

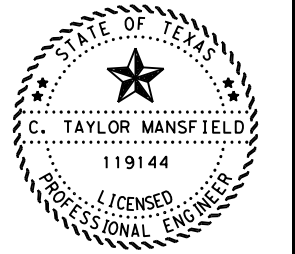
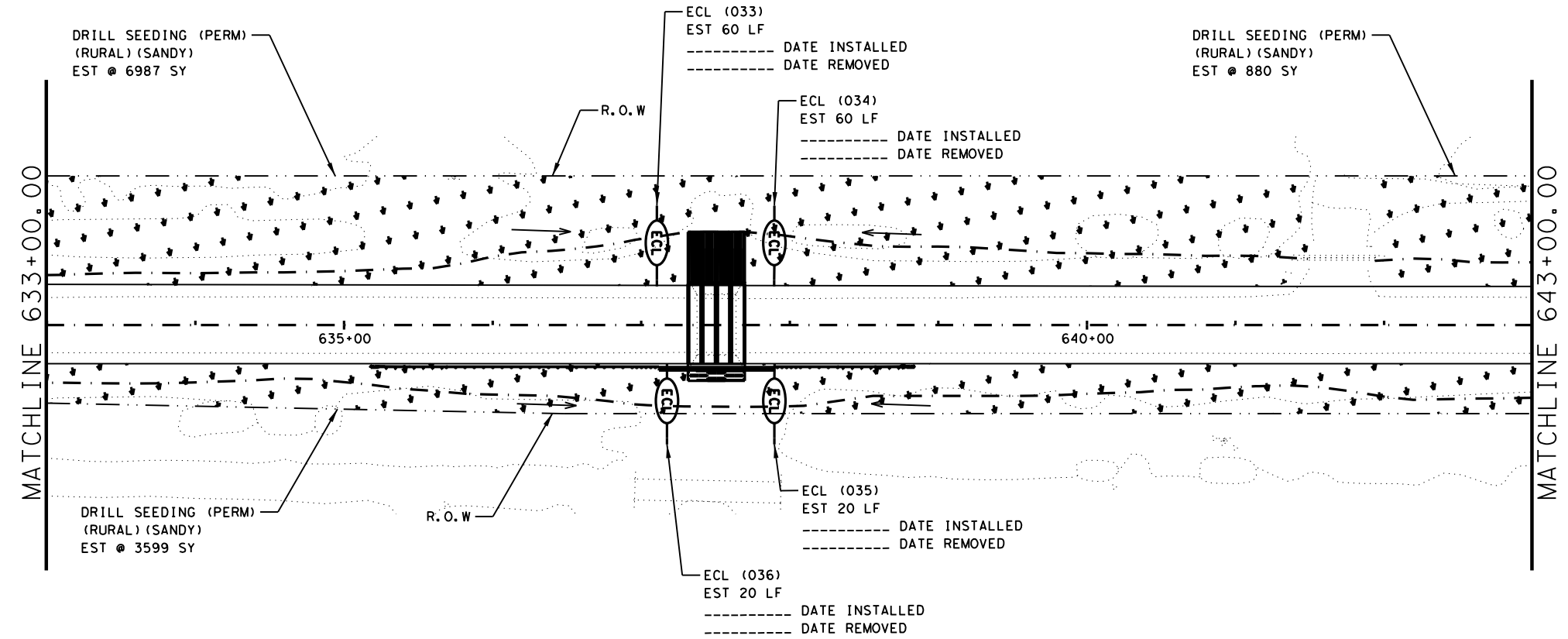
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	21867	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	160	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	160	LF	BIODEG EROSN CONT LOGS (REMOVE)	



C. Taylor Mansfield 2021.11.01
13:21:05-05'00"

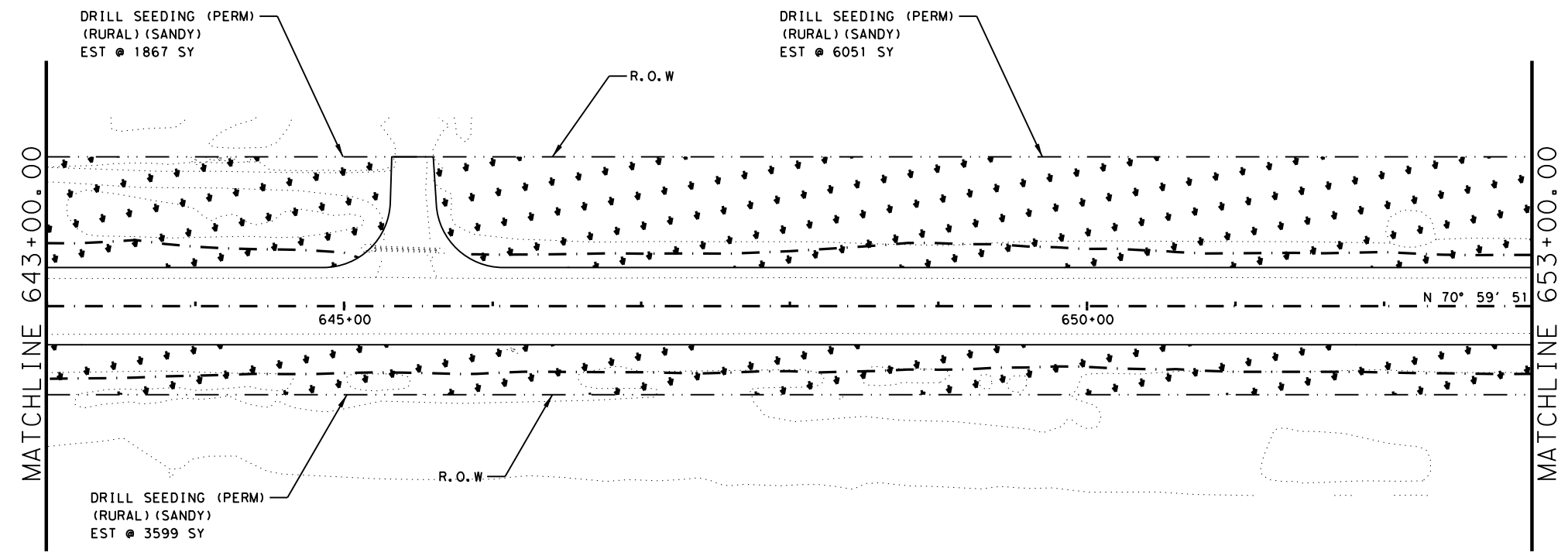
**US 67
SWP3 LAYOUT**

SHEET 7 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		294

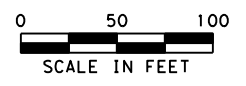
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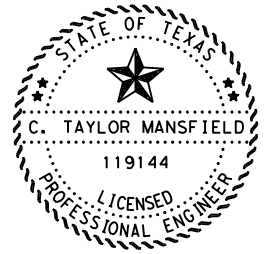
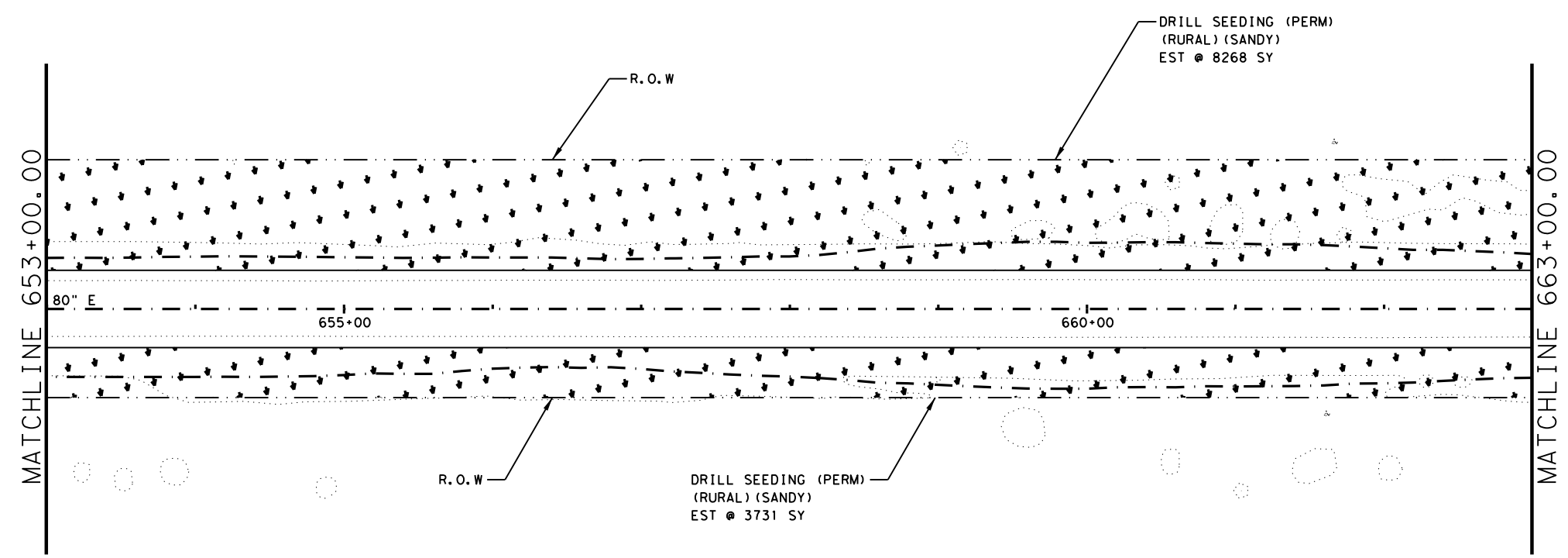
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



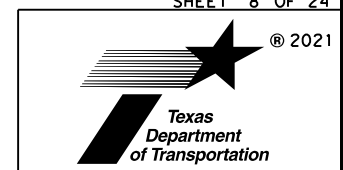
SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
0164 6033	23516	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)



C. Taylor Mansfield 2021.11.01
 13:21:05-05'00"

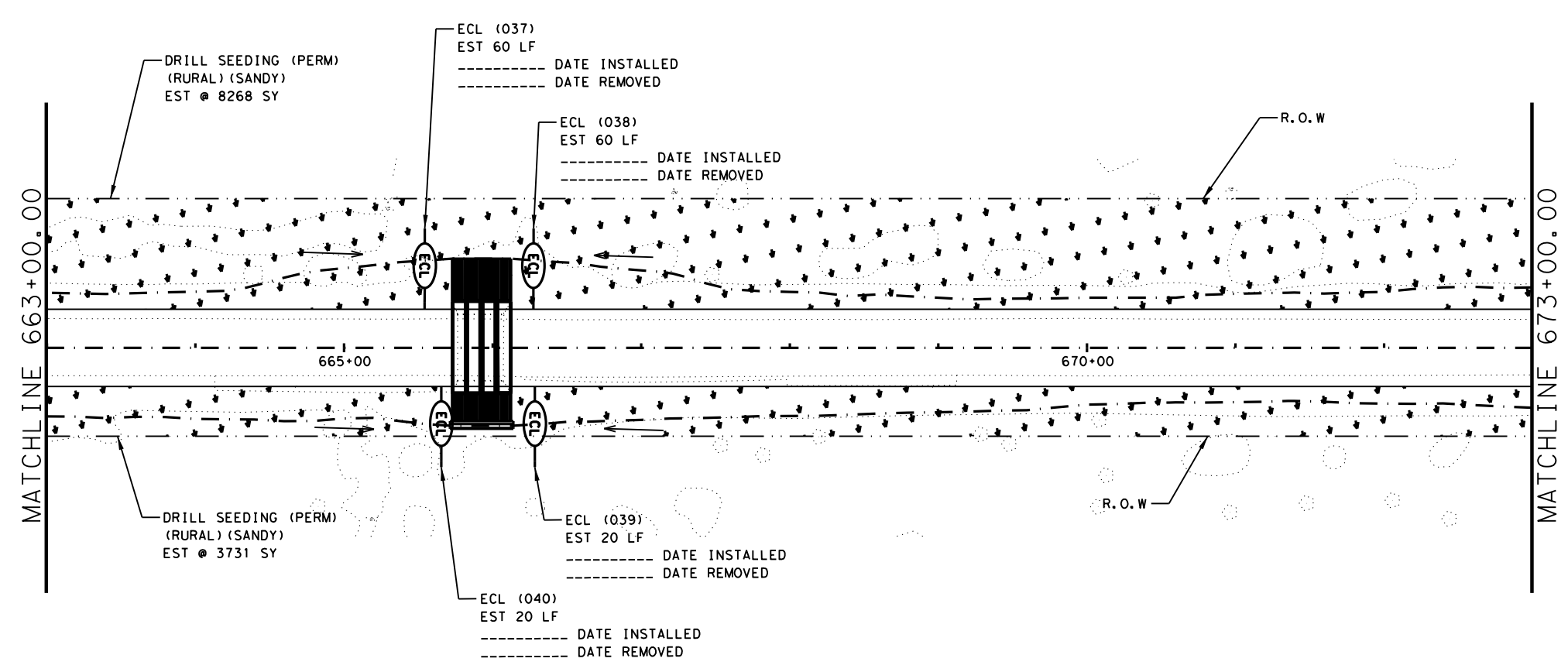
US 67
 SWP3 LAYOUT

SHEET 8 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	295	

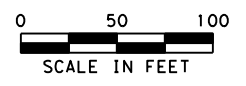
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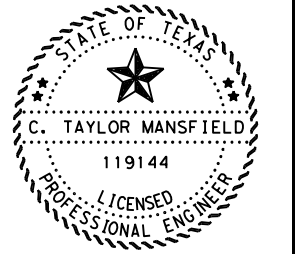
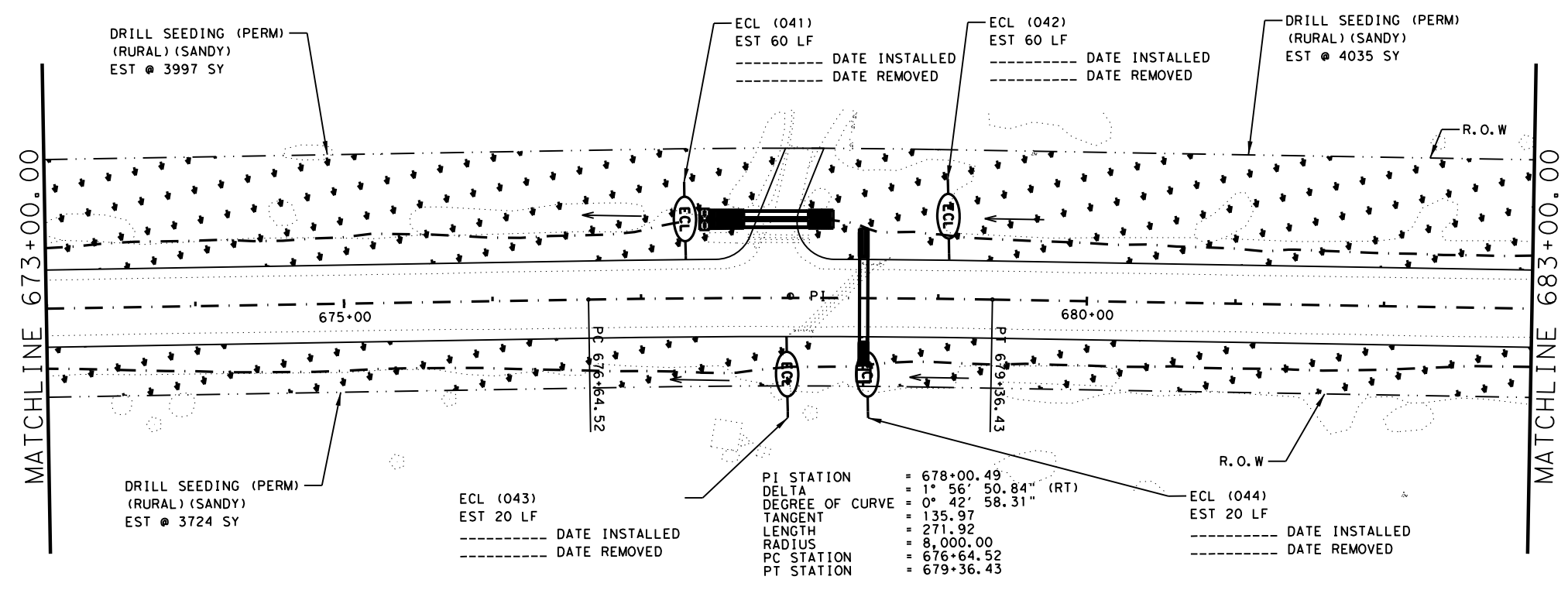
LEGEND

EROSION CONTROL LOG
 DRILL SEEDING AREA
 DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	23755	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	320	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	320	LF	BIODEG EROSN CONT LOGS (REMOVE)	



C. Taylor Mansfield 2021.11.01
13:21:05-05'00"

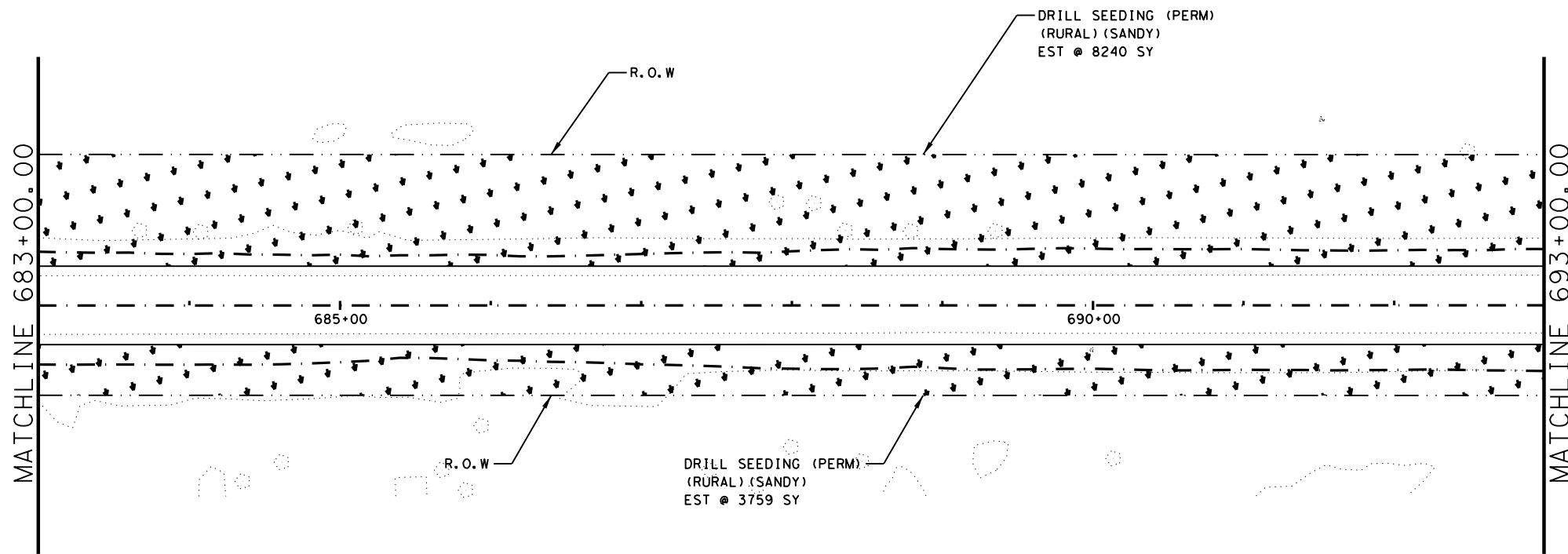
**US 67
SWP3 LAYOUT**

SHEET 9 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	296	

DATE: 10/22/2021 05:31 PM
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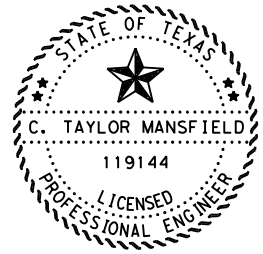
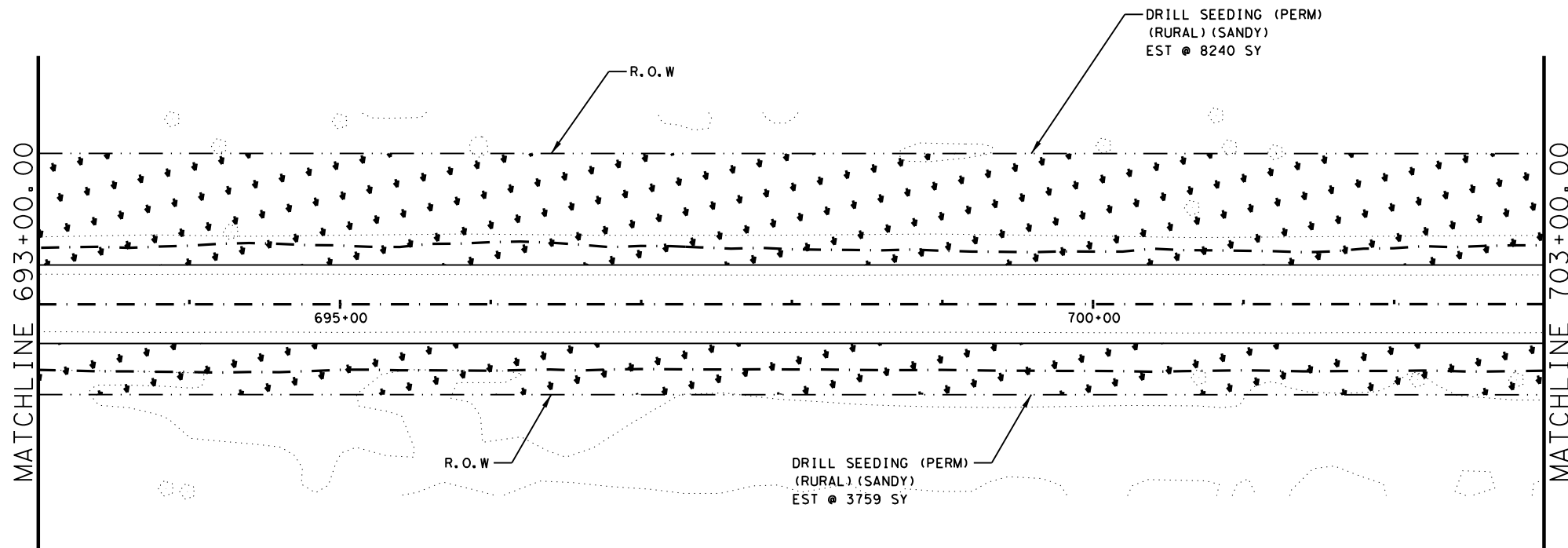


LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.

SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
0164 6033	23998	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)



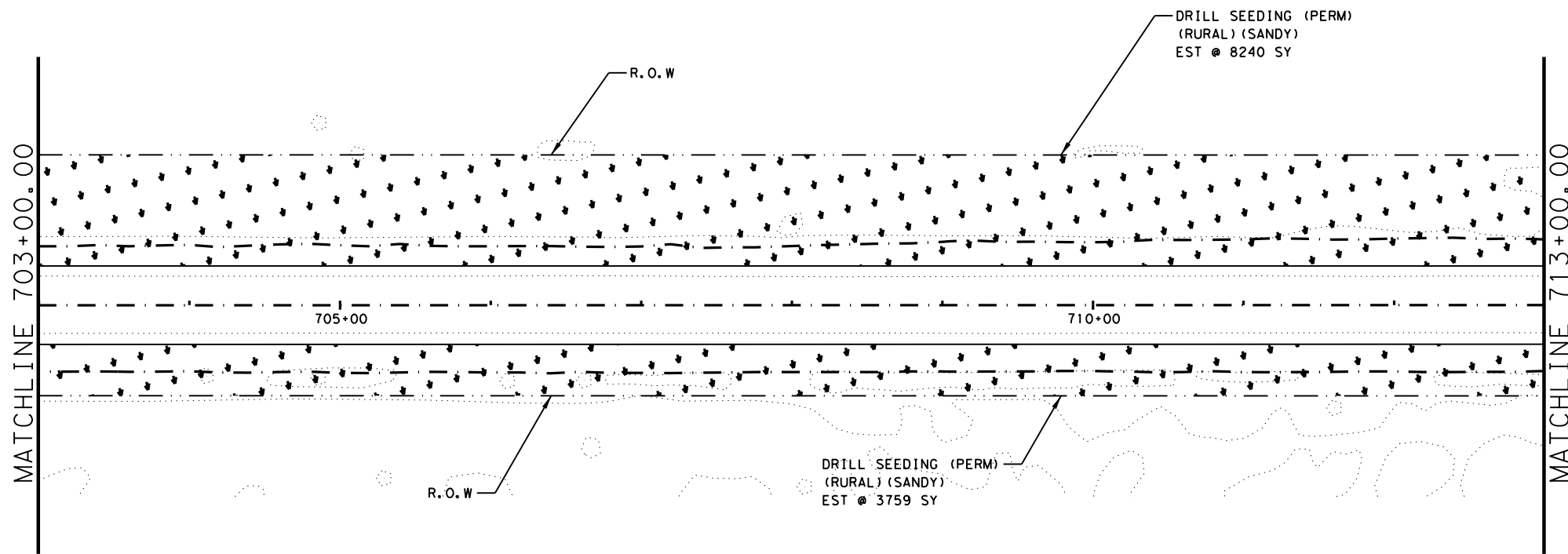
C. Taylor Mansfield 2021.11.01
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US 67
 SWP3 LAYOUT

SHEET 10 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	297	

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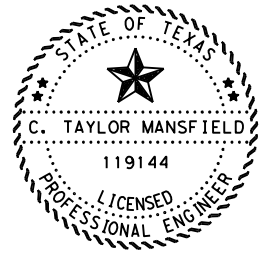
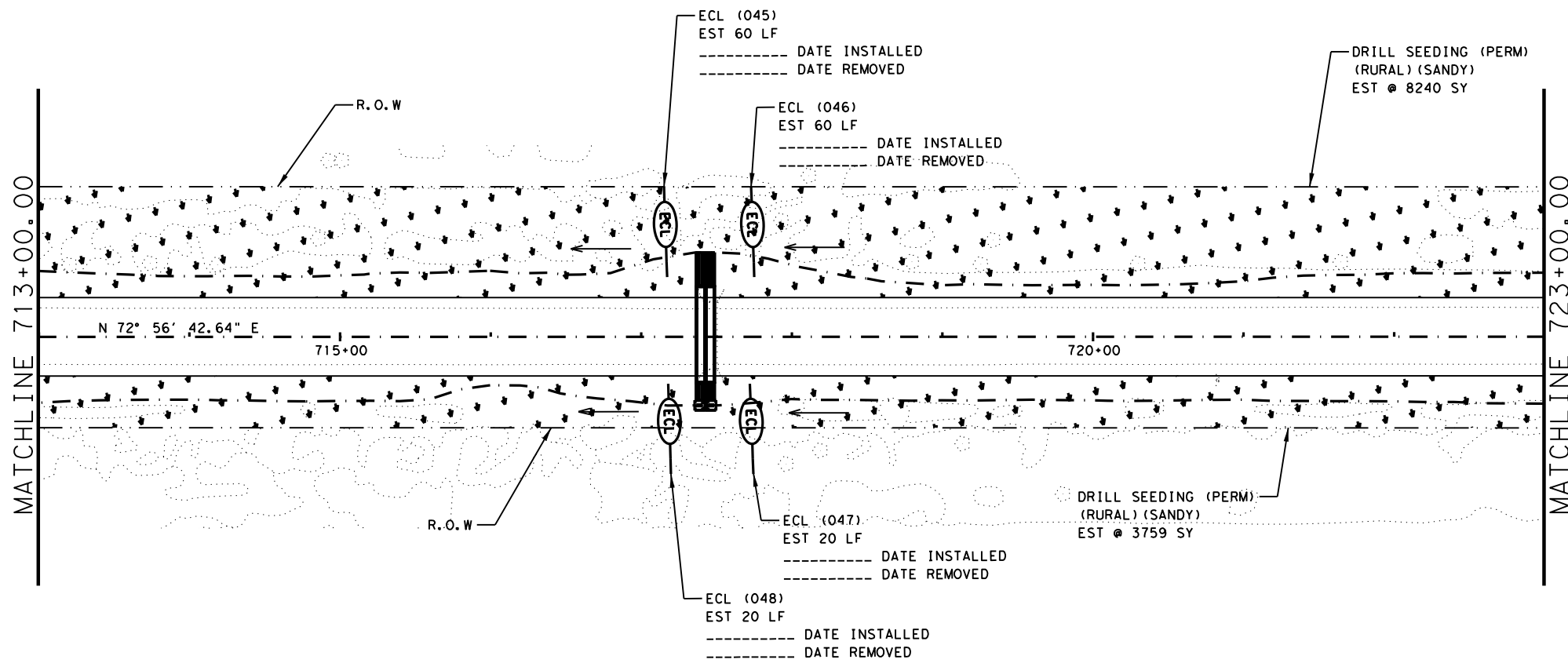
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	23998	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	160	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	160	LF	BIODEG EROSN CONT LOGS (REMOVE)	



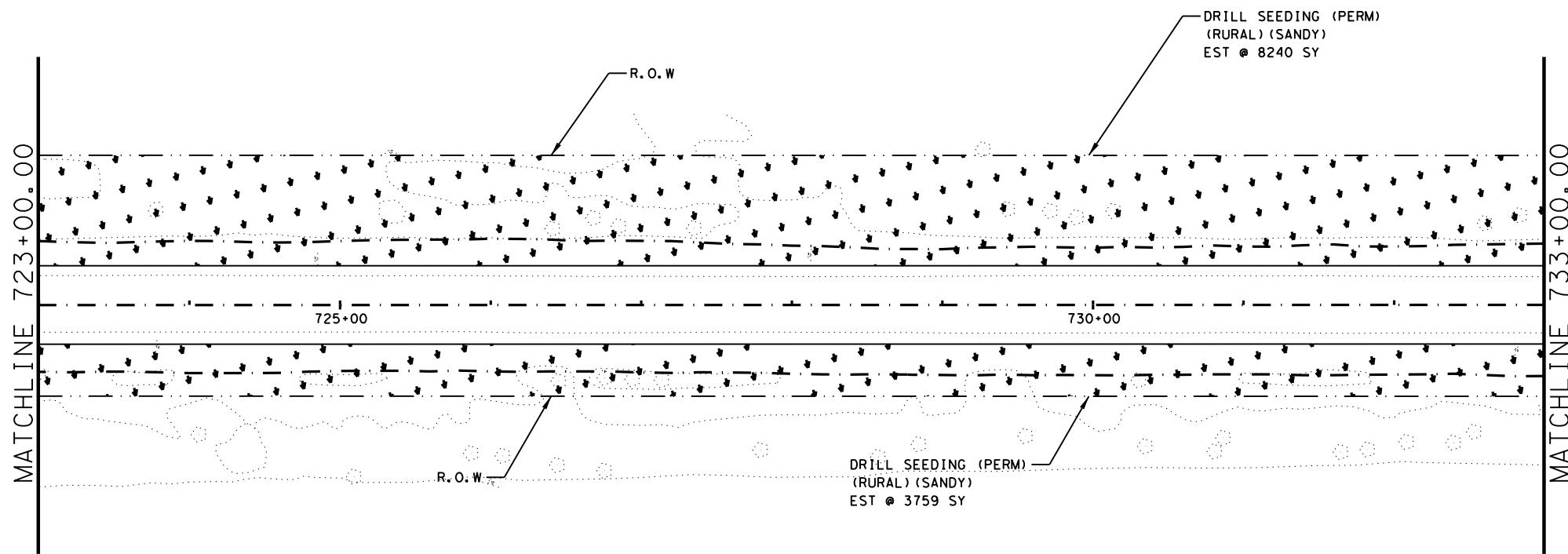
C. Taylor Mansfield 2021.11.01
13:21:05-05'00"

**US 67
SWP3 LAYOUT**

SHEET 11 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	298	

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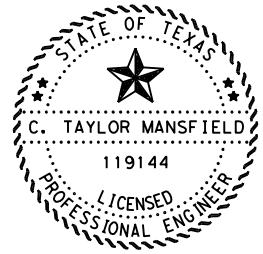
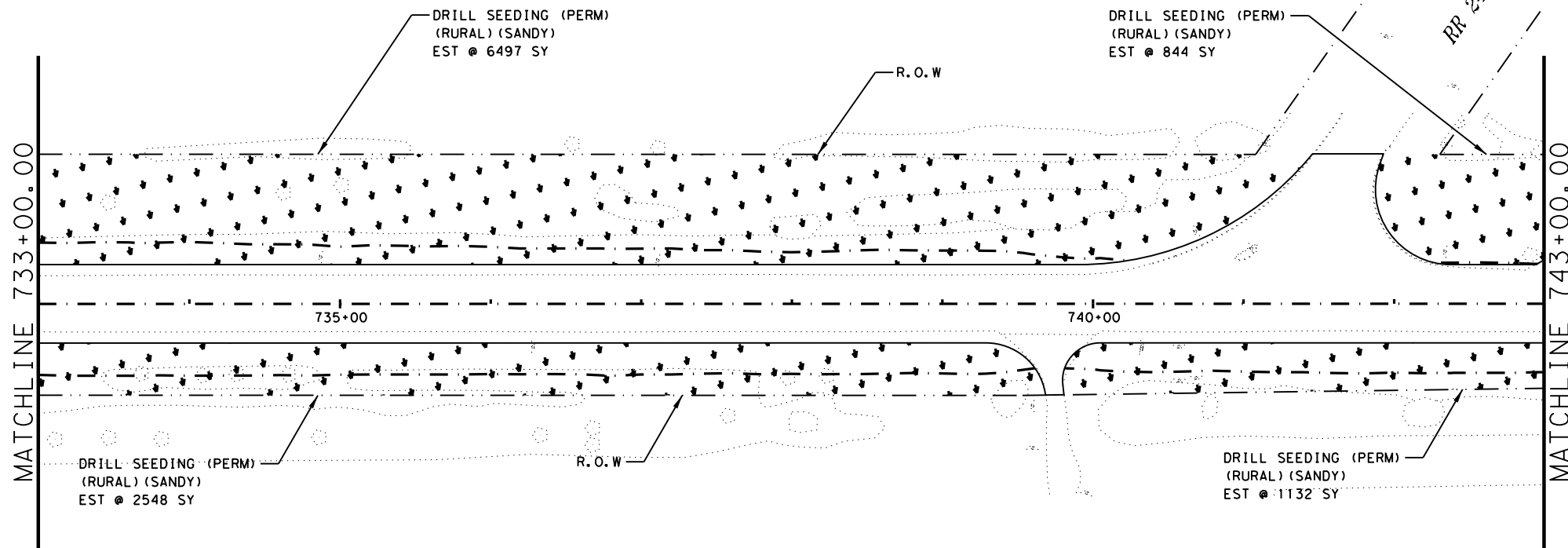
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	23020	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	



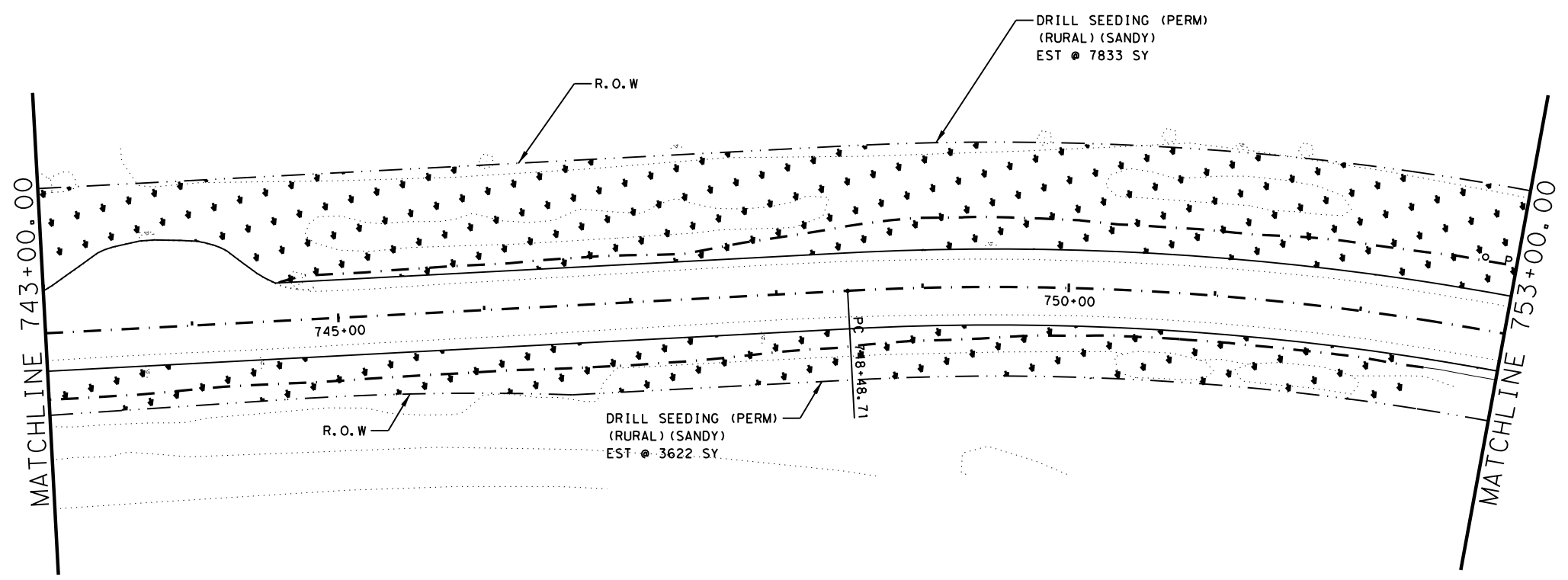
C. Taylor Mansfield 2021.11.01
 13:21:05-05'00"

**US 67
 SWP3 LAYOUT**

SHEET 12 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	299	

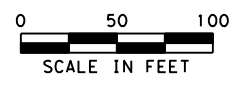
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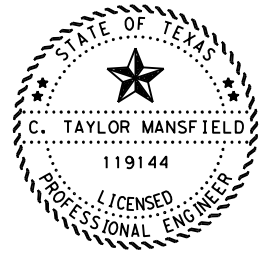
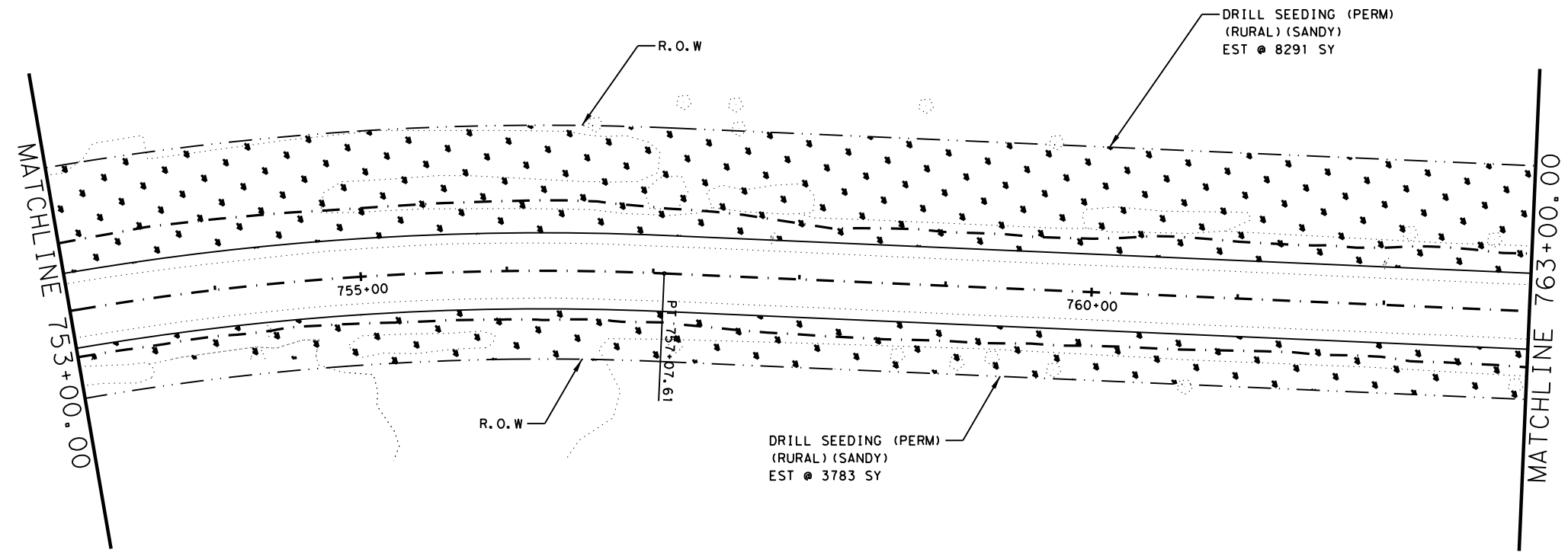
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
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C. Taylor Mansfield 2021.11.01
 13:21:05-05'00"

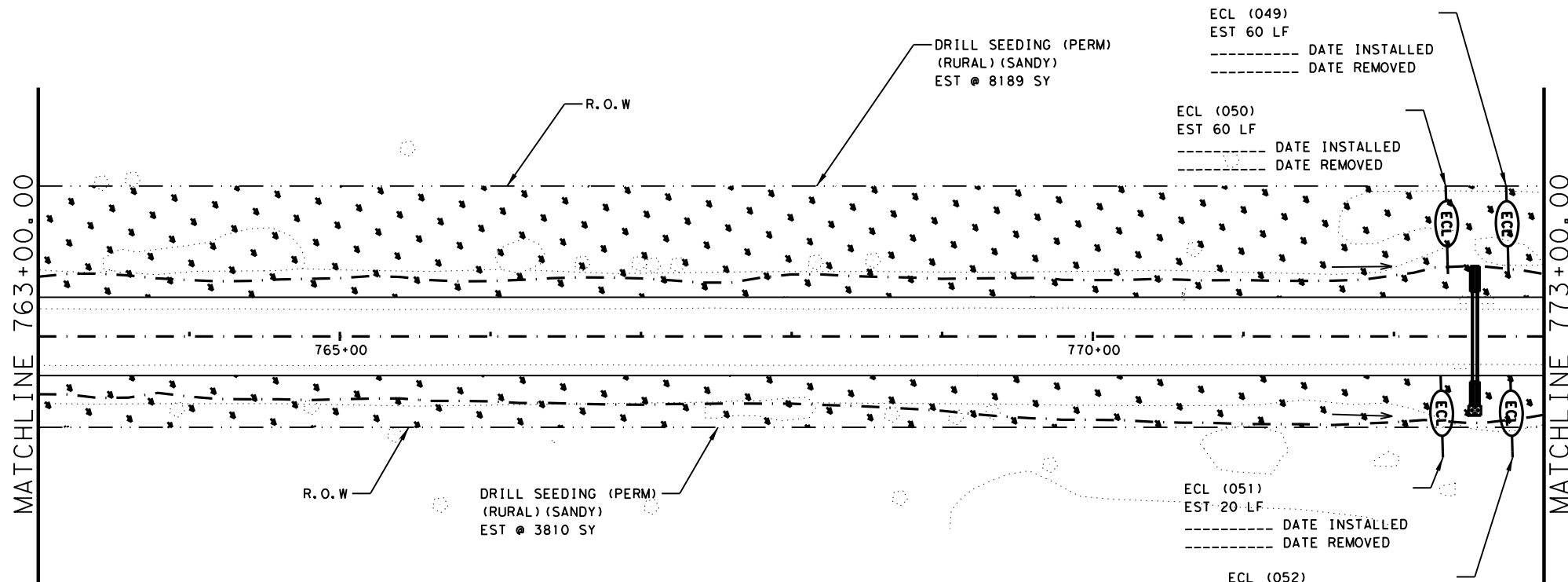
US 67
 SWP3 LAYOUT

SHEET 13 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	300	

DATE: 10/22/2021 05:31 PM
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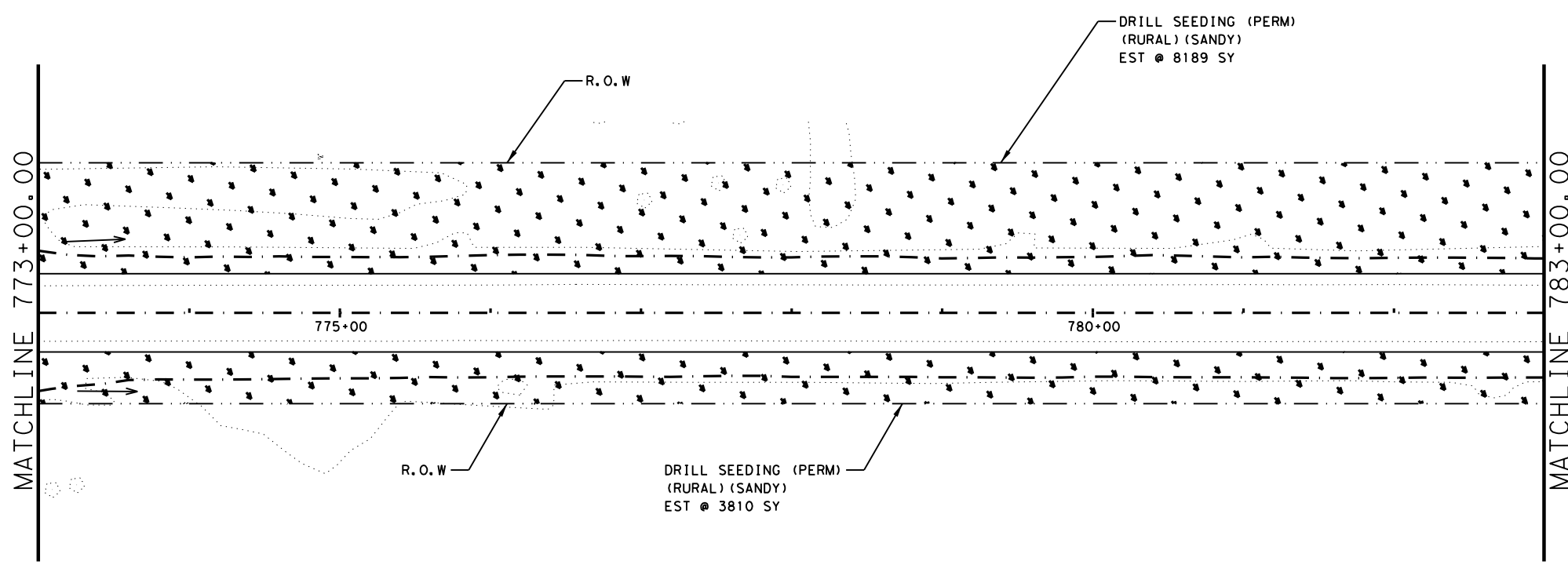
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	23998	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	160	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	160	LF	BIODEG EROSN CONT LOGS (REMOVE)	



C. Taylor Mansfield 2021.11.01
 13:21:05-05'00"

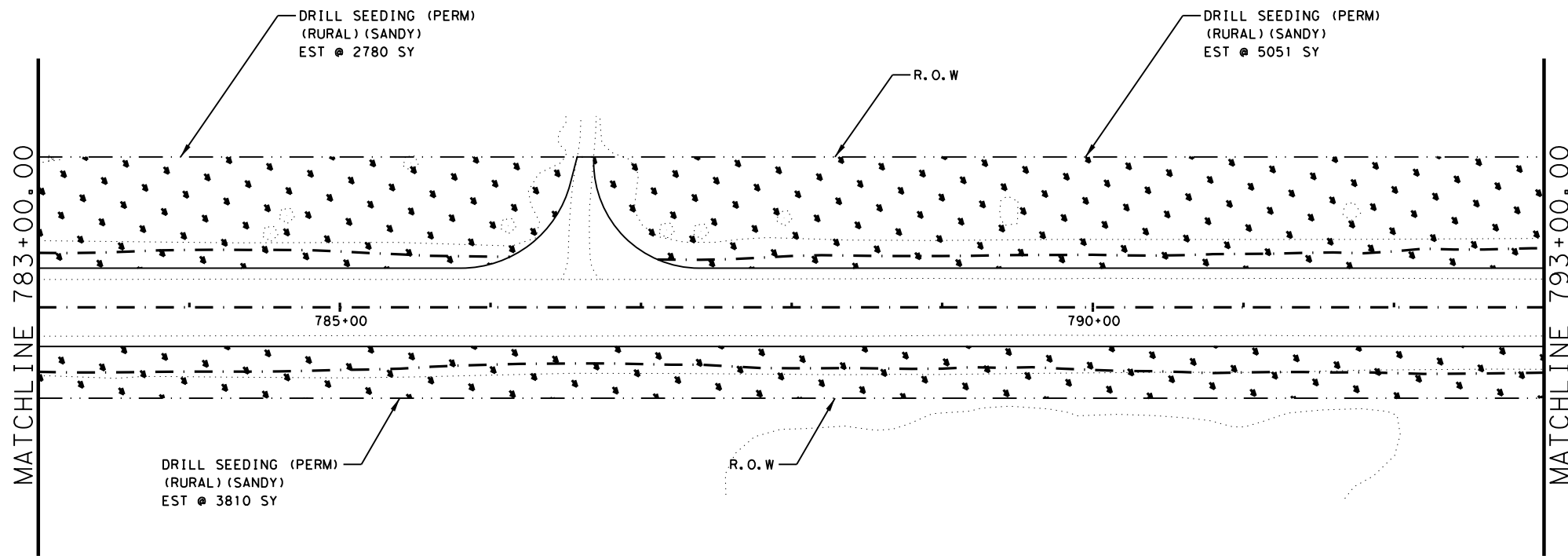
**US 67
 SWP3 LAYOUT**

SHEET 14 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	301	

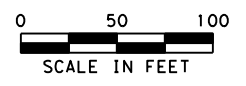
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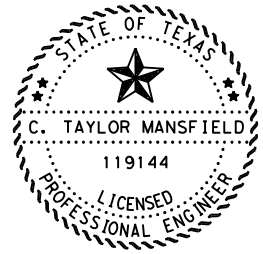
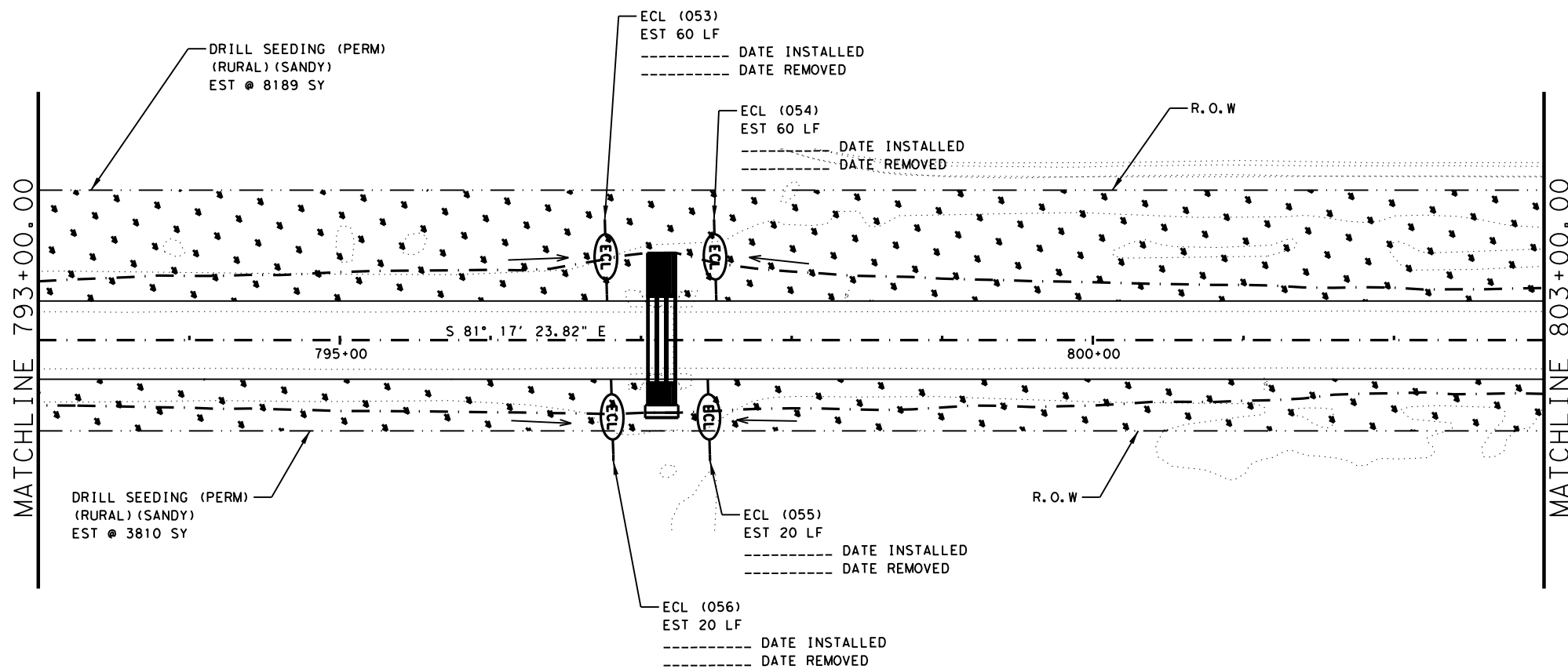
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	23640	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	160	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	160	LF	BIODEG EROSN CONT LOGS (REMOVE)	



C. Taylor Mansfield 2021.11.01
13:21:05-05'00"

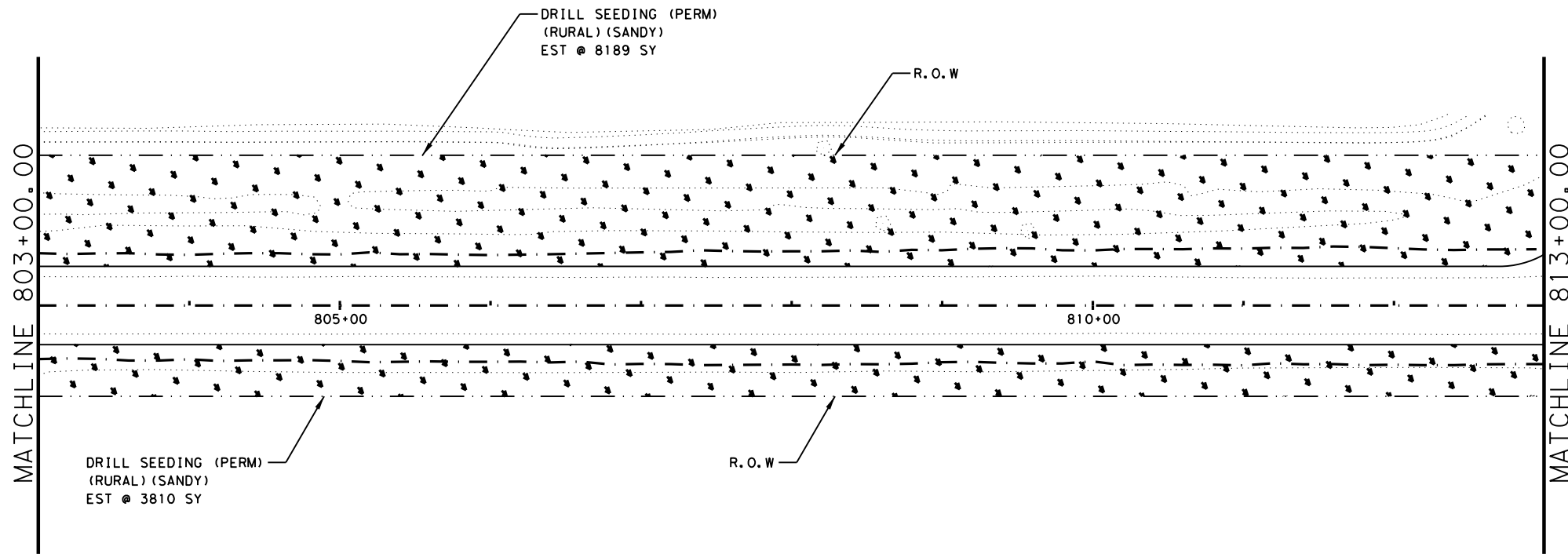
**US 67
SWP3 LAYOUT**

SHEET 15 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	302	

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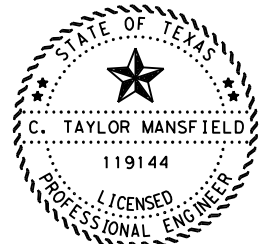
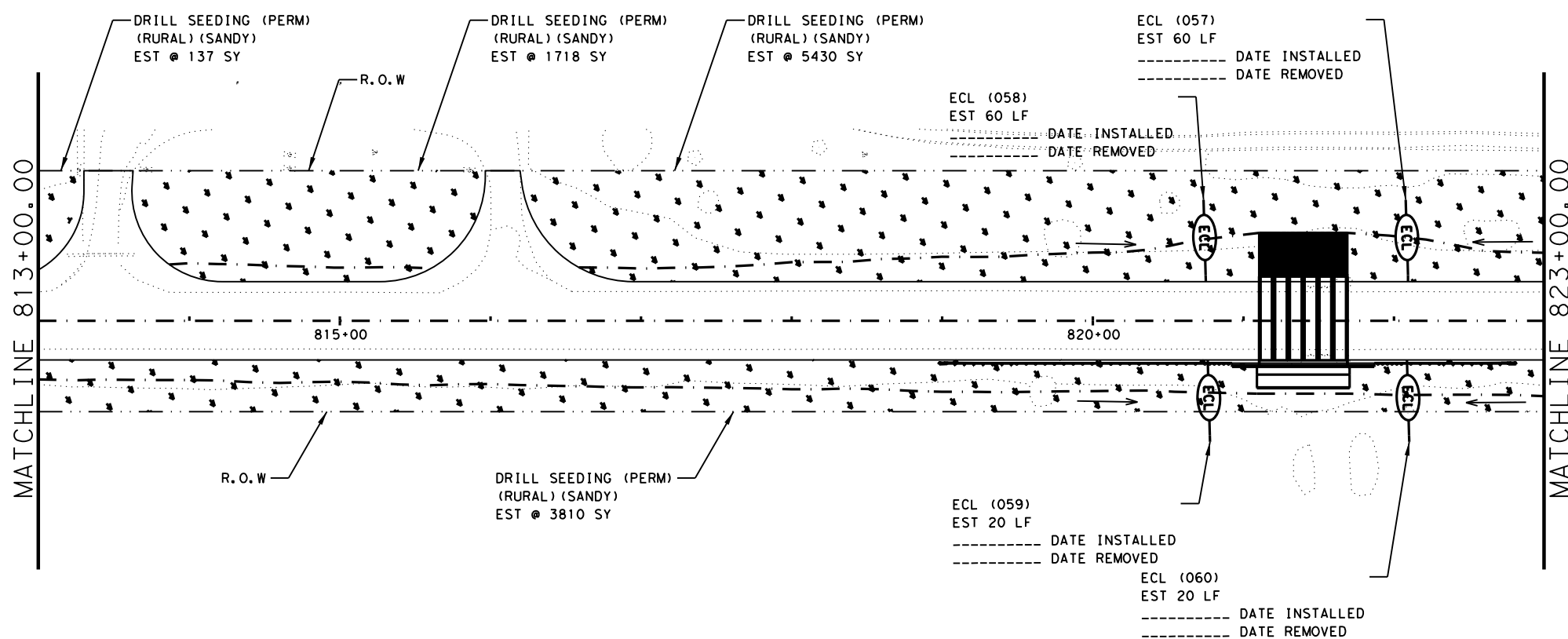
LEGEND

- (ECL) EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	23094	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	160	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	160	LF	BIODEG EROSN CONT LOGS (REMOVE)	



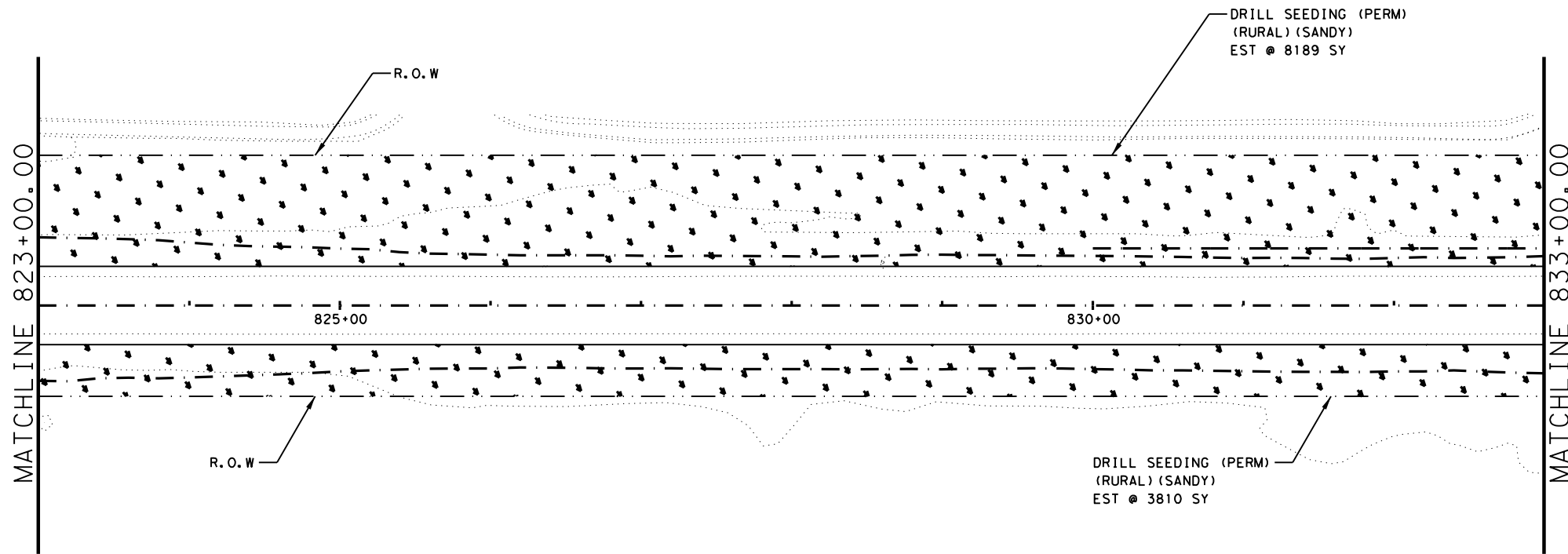
C. Taylor Mansfield 2021.11.01
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US 67
 SWP3 LAYOUT

SHEET 16 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		303

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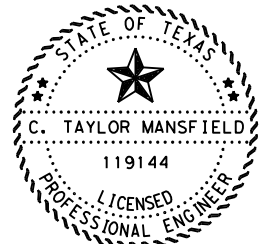
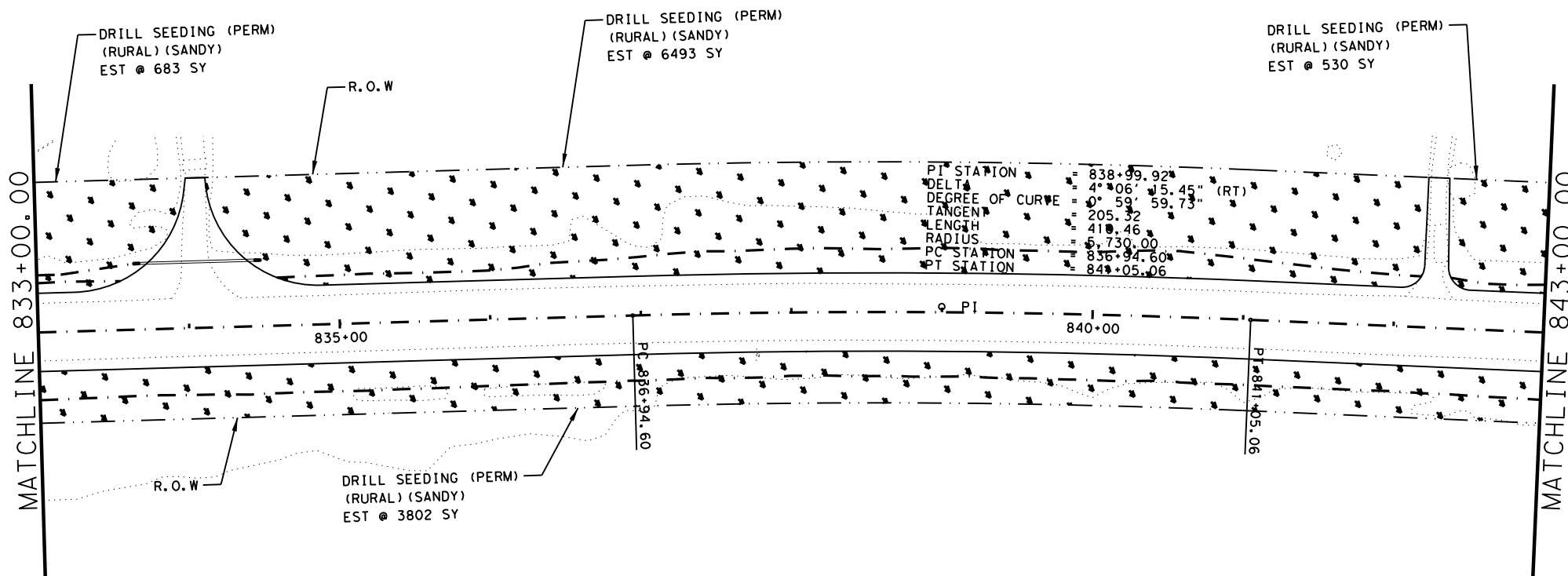
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
0164 6033	23507	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)



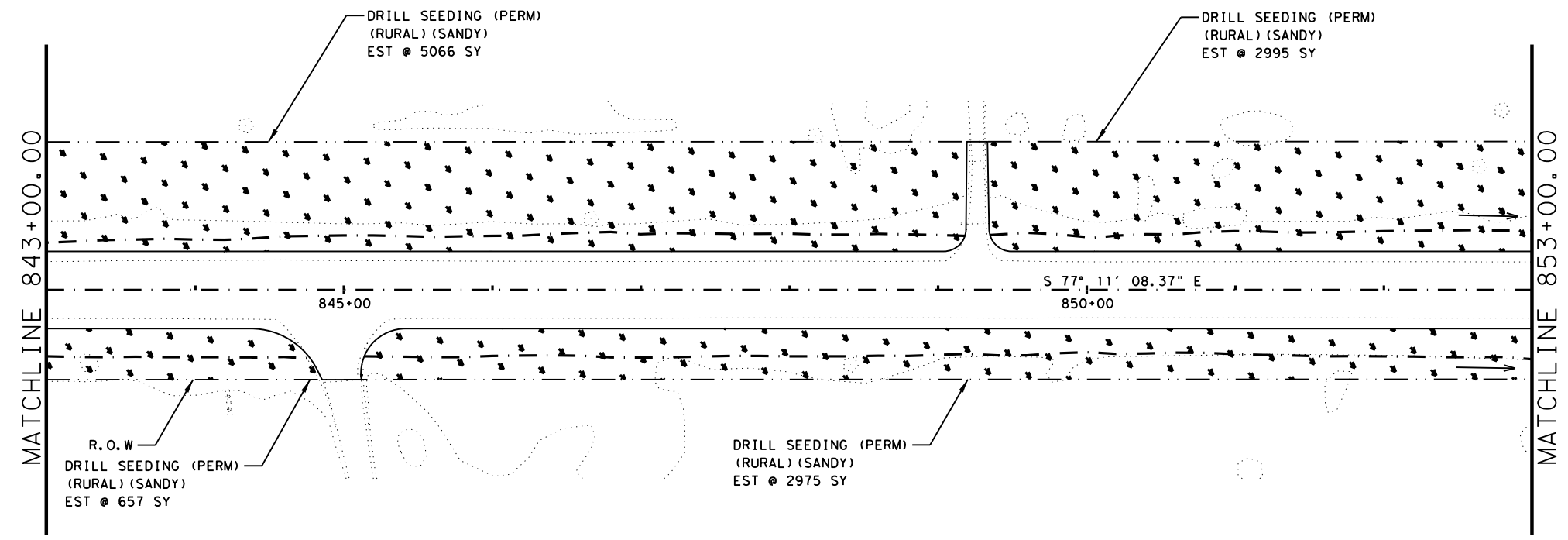
C. Taylor Mansfield 2021.11.01
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US 67
 SWP3 LAYOUT

SHEET 17 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	304	

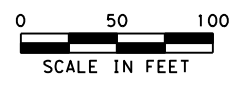
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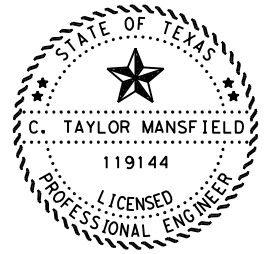
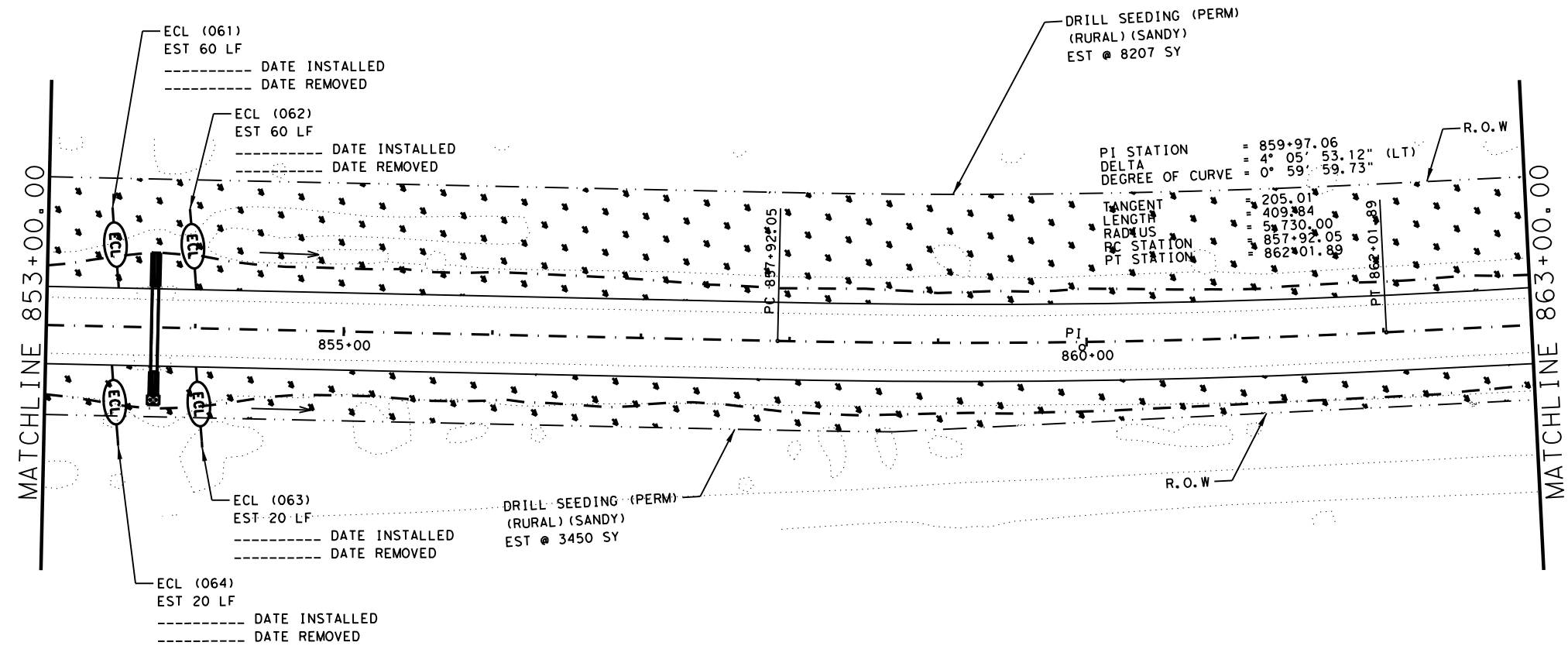
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	23350	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	160	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	160	LF	BIODEG EROSN CONT LOGS (REMOVE)	



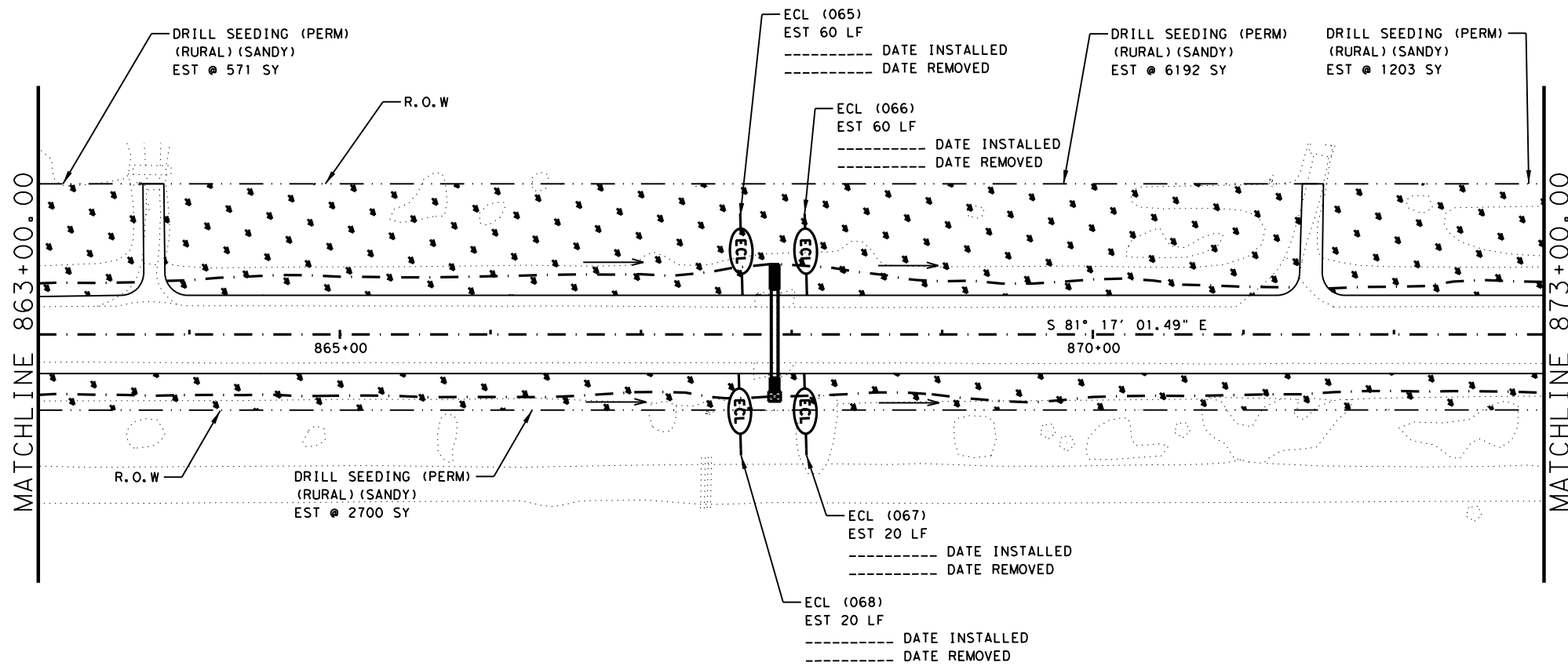
C. Taylor Mansfield 2021.11.01
 13:21:05-05'00"

US 67
 SWP3 LAYOUT

SHEET 18 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	305	

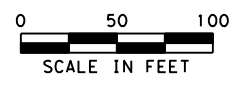
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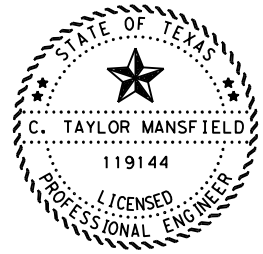
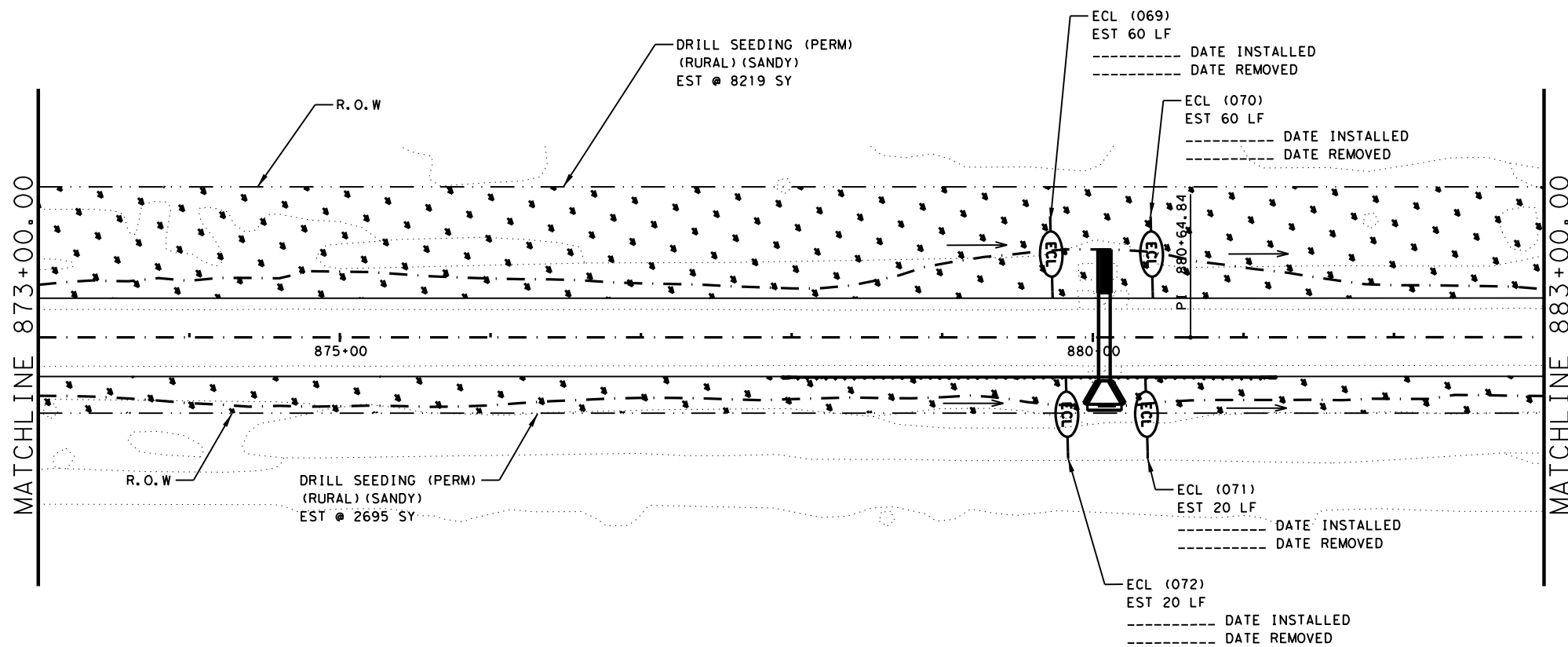
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	21580	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	320	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	320	LF	BIODEG EROSN CONT LOGS (REMOVE)	



C. Taylor Mansfield 2021.11.01
13:21:06-05'00"

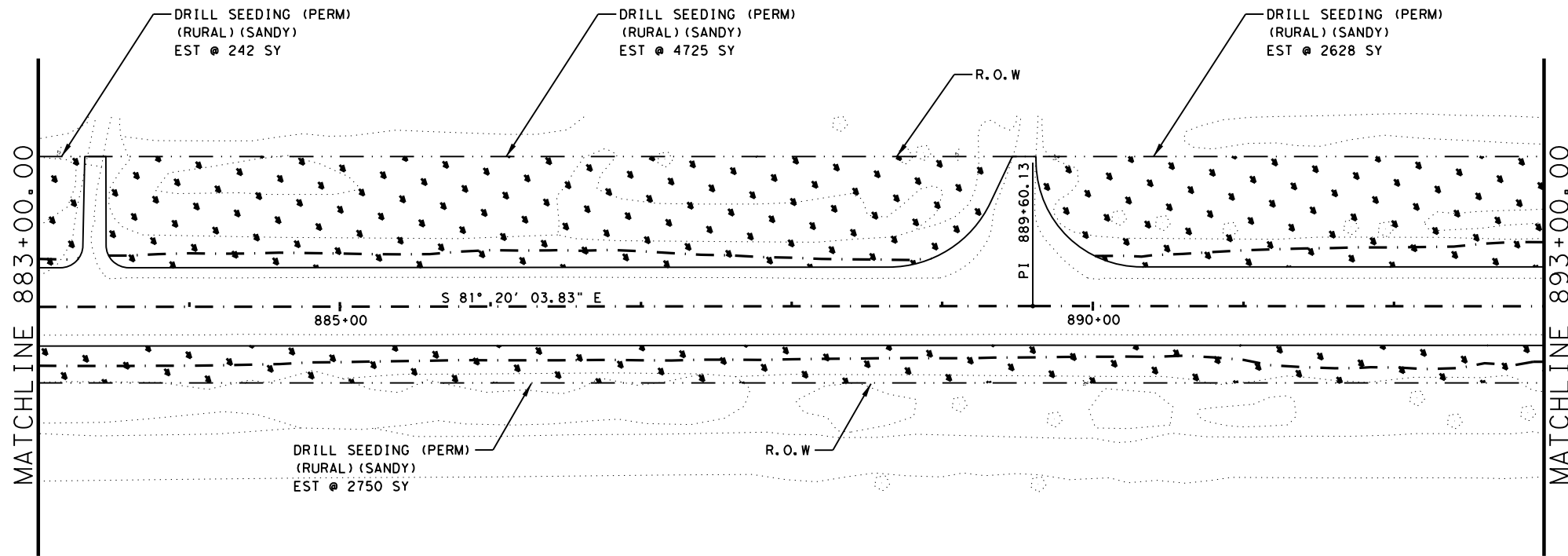
**US 67
SWP3 LAYOUT**

SHEET 19 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	306	

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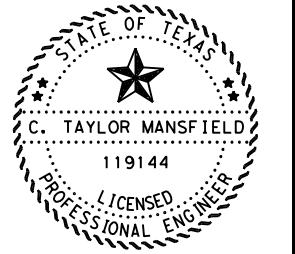
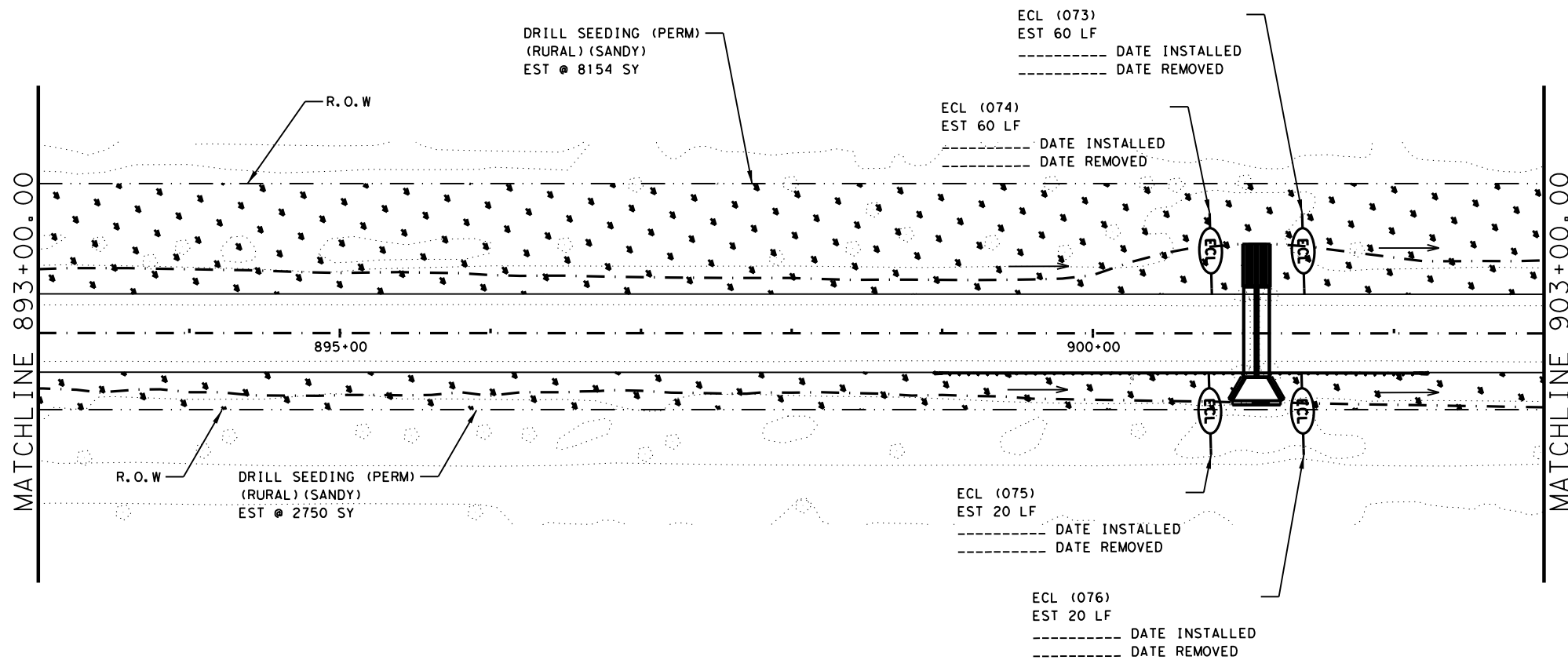
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	21249	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	160	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	160	LF	BIODEG EROSN CONT LOGS (REMOVE)	



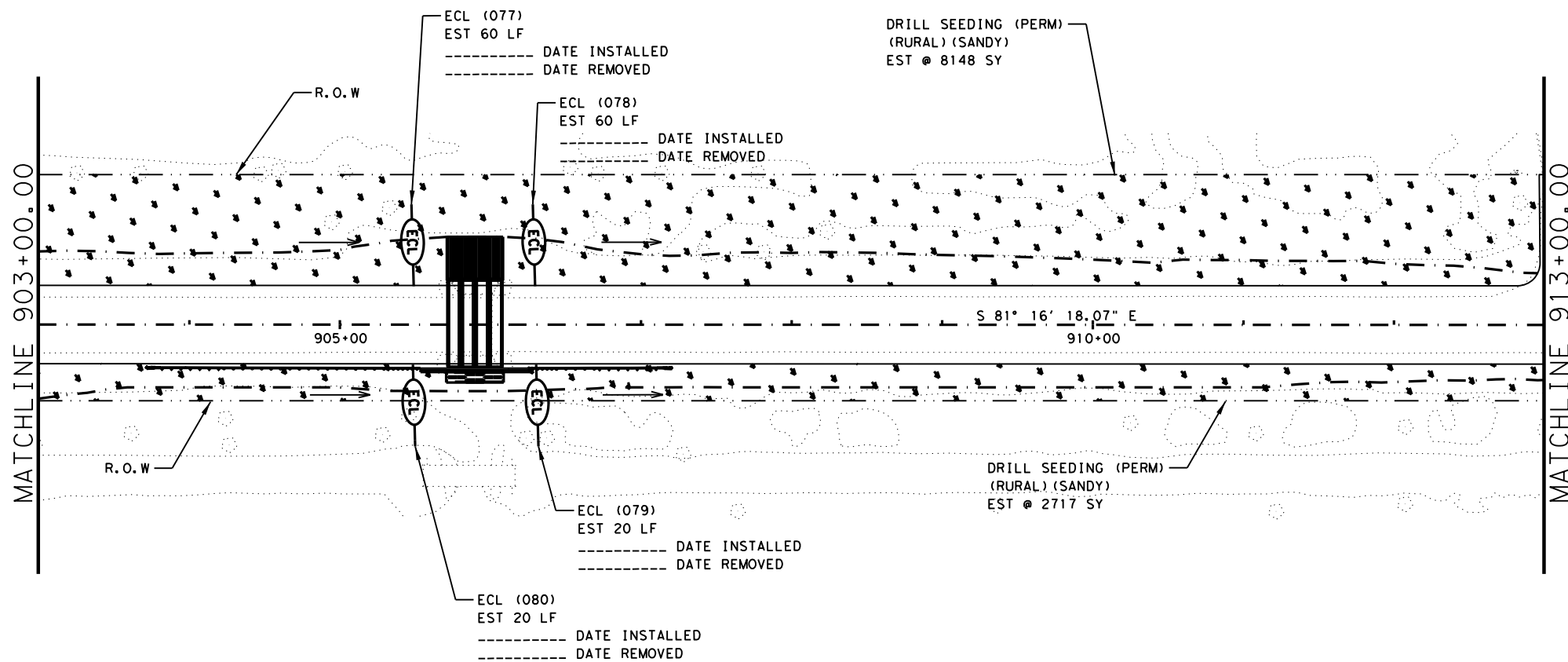
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**US 67
SWP3 LAYOUT**

SHEET 20 OF 24

CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		307

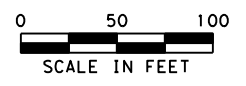
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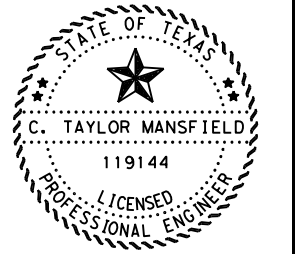
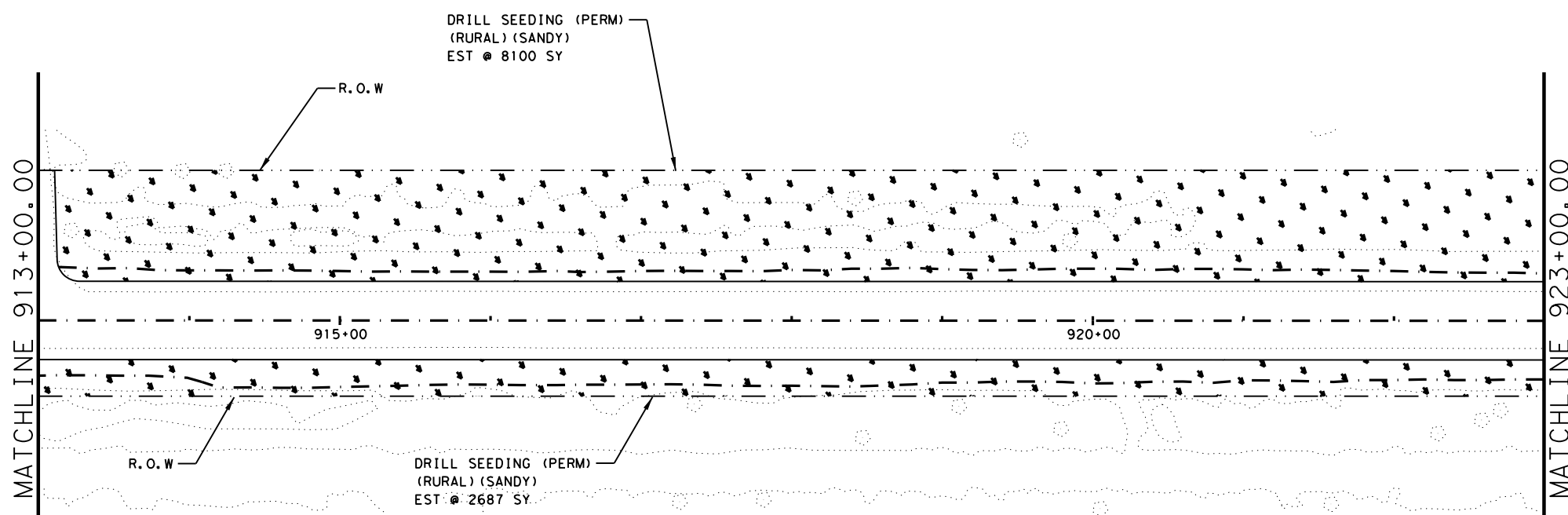
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	21688	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	160	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	160	LF	BIODEG EROSN CONT LOGS (REMOVE)	



C. Taylor Mansfield 2021.11.01
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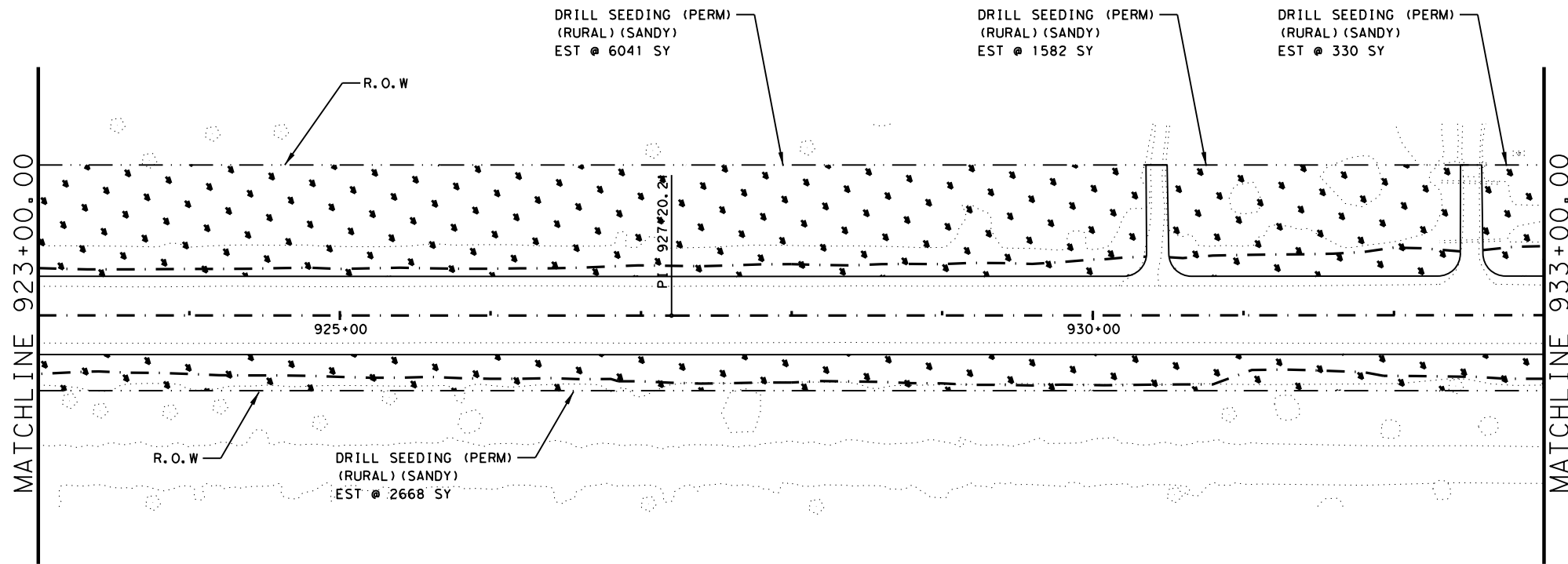
US 67
SWP3 LAYOUT

SHEET 21 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		308

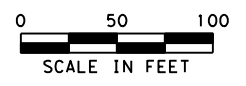
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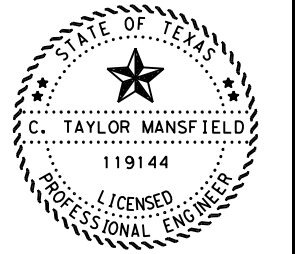
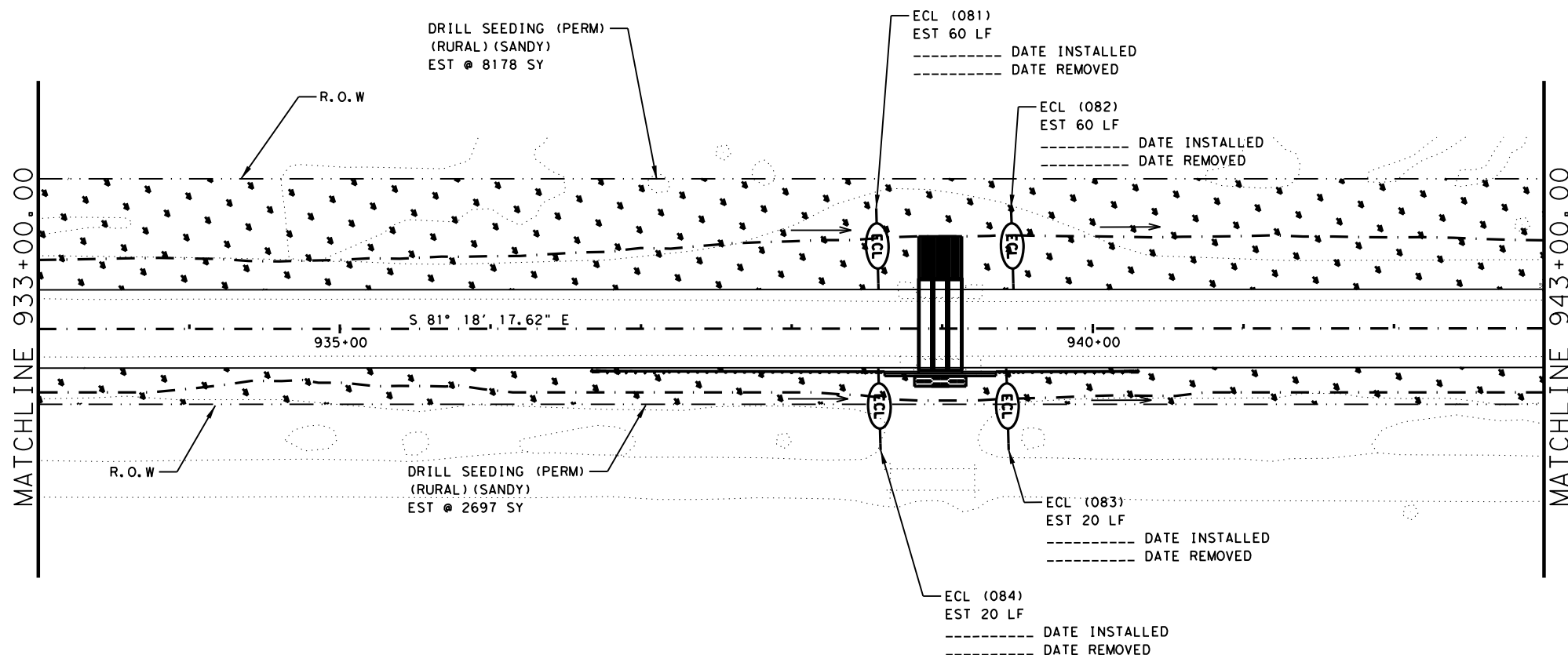
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	21496	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	160	LF	BIODEG EROSN CONT LOGS (IN STL) (18")	
0506 6043	160	LF	BIODEG EROSN CONT LOGS (REMOVE)	



C. Taylor Mansfield 2021.11.01
 13:21:06-05'00"

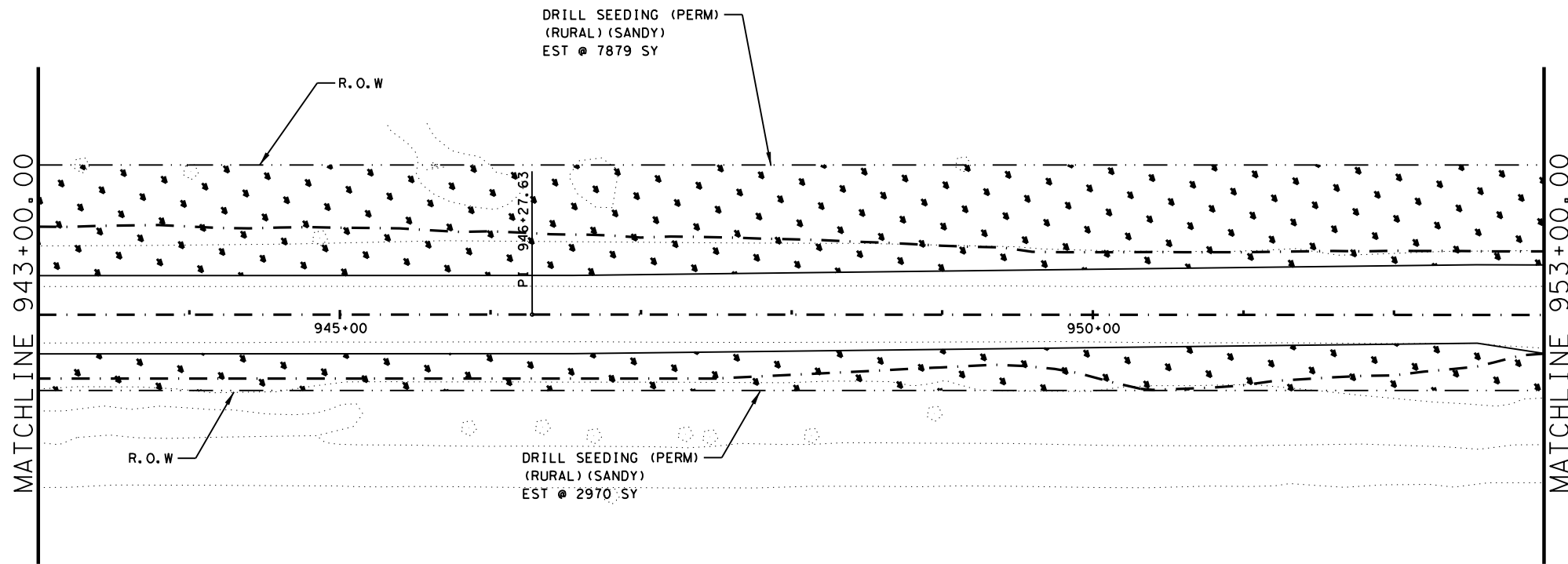
**US 67
 SWP3 LAYOUT**

SHEET 22 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	309	

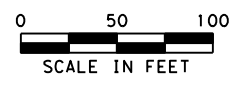
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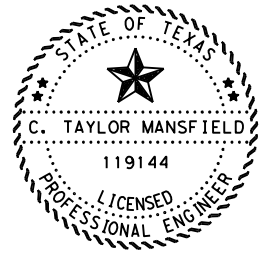
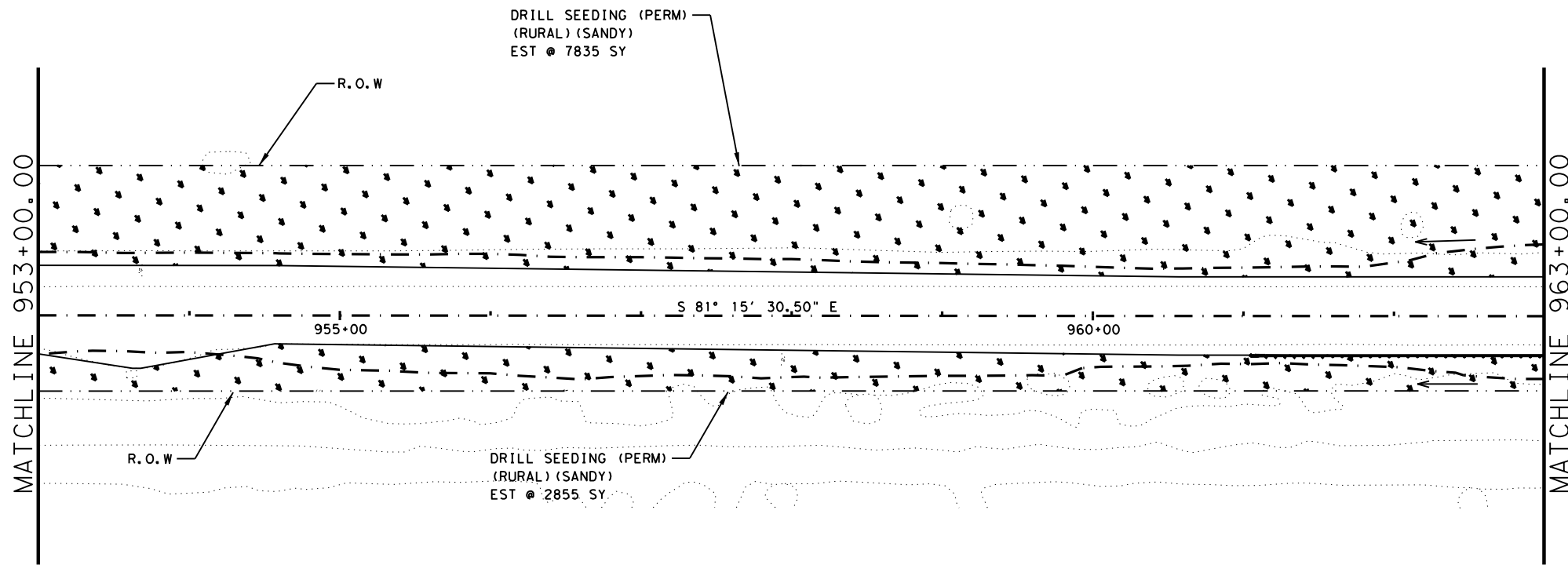
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS			
BID CODE	QTY	UNIT	DESCRIPTION
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C. Taylor Mansfield 2021.11.01
 13:21:06-05'00"

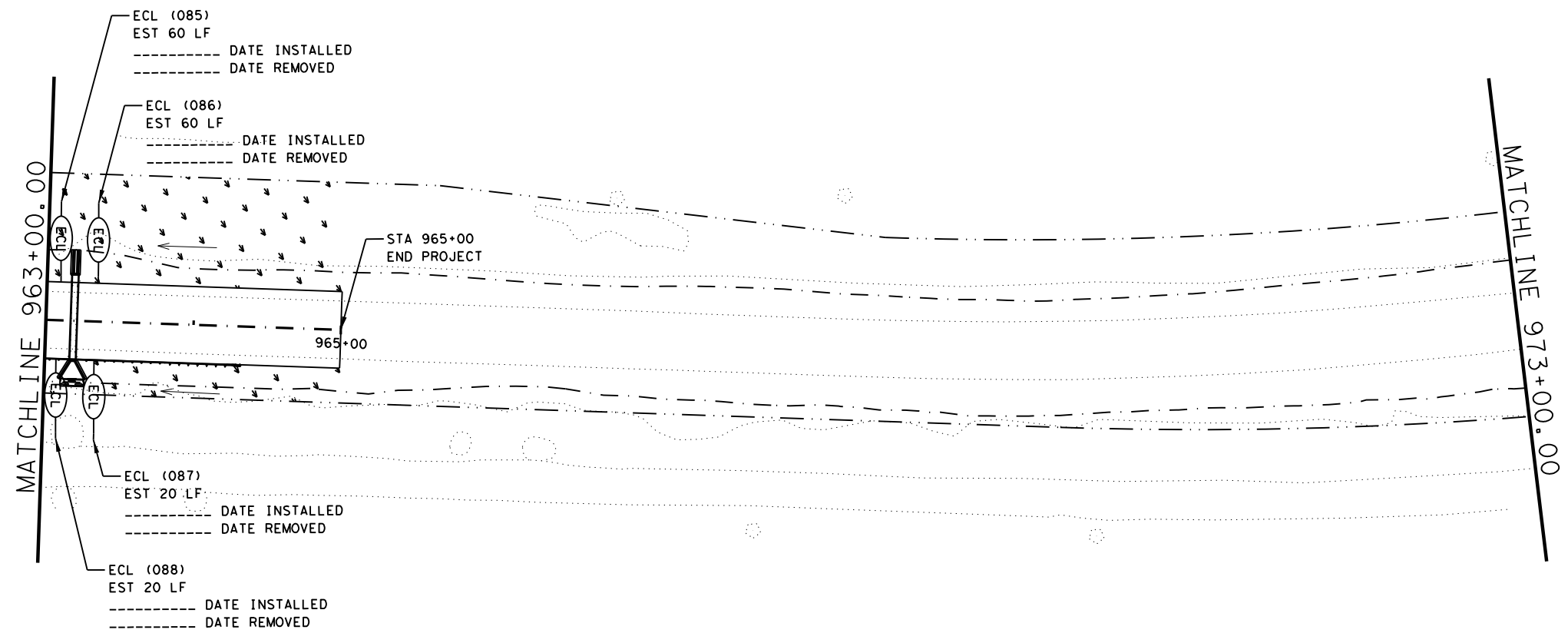
US 67
 SWP3 LAYOUT

SHEET 23 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY	SHEET NO.	
ODA	UPTON	310	

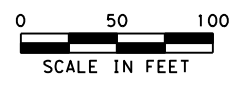
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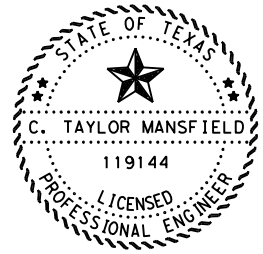
LEGEND

- EROSION CONTROL LOG
- DRILL SEEDING AREA
- DITCH FLOW DIRECTION

NOTE: LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATION ONLY. FINAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD AS NEEDED.



SHEET TOTALS				
BID CODE	QTY	UNIT	DESCRIPTION	
0164 6033	20282	SY	DRILL SEEDING (PERM) (RURAL) (SANDY)	
0506 6042	320	LF	BIODEG EROSN CONT LOGS (INSTL) (18")	
0506 6043	320	LF	BIODEG EROSN CONT LOGS (REMOVE)	



C. Taylor Mansfield 2021.11.01
 13:21:06-05'00"

US 67
 SWP3 LAYOUT

SHEET 24 OF 24



CONT	SECT	JOB	HIGHWAY
0076	06	037	US 67
DIST	COUNTY		SHEET NO.
ODA	UPTON		311

DATE: 07/08/2022 05:44 PM
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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

No Action Required Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000

2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.

3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.

4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

No Permit Required

Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

Individual 404 Permit Required

Other Nationwide Permit Required: NWP# **3(a) 3(c)**

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
<input type="checkbox"/> Temporary Vegetation	<input type="checkbox"/> Silt Fence	<input type="checkbox"/> Vegetative Filter Strips
<input type="checkbox"/> Blankets/Matting	<input type="checkbox"/> Rock Berm	<input type="checkbox"/> Retention/Irrigation Systems
<input type="checkbox"/> Mulch	<input type="checkbox"/> Triangular Filter Dike	<input type="checkbox"/> Extended Detention Basin
<input type="checkbox"/> Sodding	<input type="checkbox"/> Sand Bag Berm	<input type="checkbox"/> Constructed Wetlands
<input type="checkbox"/> Interceptor Swale	<input type="checkbox"/> Straw Bale Dike	<input type="checkbox"/> Wet Basin
<input type="checkbox"/> Diversion Dike	<input type="checkbox"/> Brush Berms	<input type="checkbox"/> Erosion Control Compost
<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Mulch Filter Berm and Socks
<input checked="" type="checkbox"/> Mulch Filter Berm and Socks	<input checked="" type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks
<input checked="" type="checkbox"/> Compost Filter Berm and Socks	<input checked="" type="checkbox"/> Compost Filter Berm and Socks	<input checked="" type="checkbox"/> Vegetation Lined Ditches
	<input type="checkbox"/> Stone Outlet Sediment Traps	<input type="checkbox"/> Sand Filter Systems
	<input type="checkbox"/> Sediment Basins	<input type="checkbox"/> Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

No Action Required Required Action

Action No.

1. AVOID HISTORICAL MARKERS

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

No Action Required Required Action

Action No.

1. ONLY DISTURB THE AMOUNT OF VEGETATION NECESSARY FOR CONSTRUCTIONS.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

No Action Required Required Action

Action No.

1. TEXAS HORNED LIZARD - CONTRACTORS WILL BE ADVISED OF POTENTIAL OCCURRENCE IN THE PROJECT AREA, AND TO AVOID HARMING THE SPECIES IF ENCOUNTERED. THIS SHOULD INCLUDE AVOIDING HARVESTER ANT MOUNDS IN THE SELECTION OF PROJECT SPECIFIC LOCATIONS (PSL) WHERE FEASIBLE.

2. SPOT-TAILED EARLESS LIZARD - CONTRACTORS WILL BE ADVISED OF POTENTIAL OCCURRENCE IN THE PROJECT AREA, AND TO AVOID HARMING THE SPECIES IF ENCOUNTERED.

3. INACTIVE NESTS AND/OR VEGETATION SUSPECTED TO CONTAIN NESTS SHOULD BE REMOVED OUTSIDE OF NESTING SEASON. NESTING SEASON IS TYPICALLY MARCH 15 TO SEPTEMBER 15.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP: Best Management Practice	SPCC: Spill Prevention Control and Countermeasure
CGP: Construction General Permit	SW3P: Storm Water Pollution Prevention Plan
DSHS: Texas Department of State Health Services	PCN: Pre-Construction Notification
FHWA: Federal Highway Administration	PSL: Project Specific Location
MOA: Memorandum of Agreement	TCEQ: Texas Commission on Environmental Quality
MOU: Memorandum of Understanding	TPDES: Texas Pollutant Discharge Elimination System
MS4: Municipal Separate Stormwater Sewer System	TPWD: Texas Parks and Wildlife Department
MBTA: Migratory Bird Treaty Act	TxDOT: Texas Department of Transportation
NOT: Notice of Termination	T&E: Threatened and Endangered Species
NWP: Nationwide Permit	USACE: U.S. Army Corps of Engineers
NOI: Notice of Intent	USFWS: U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act. Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

- * Dead or distressed vegetation (not identified as normal)
- * Trash piles, drums, canister, barrels, etc.
- * Undesirable smells or odors
- * Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

Yes No

If "No", then no further action is required.

If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

Yes No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

No Action Required Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)


No Action Required Required Action

Action No.

1.

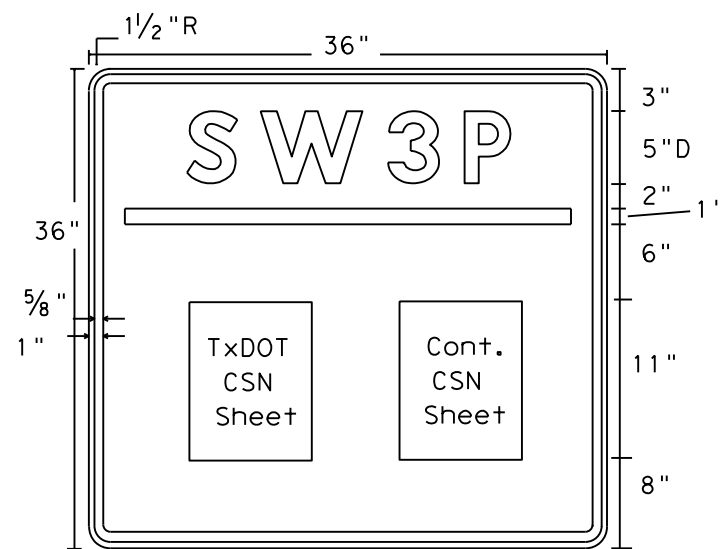
2.

3.

 Texas Department of Transportation		Design Division Standard	
ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC			
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP
©TxDOT: February 2015	CONT	SECT	JOB
12-12-2011 (DS) REVISIONS	0076	06	037
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY	SHEET NO.
01-23-2015 SECTION I CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	ODA	UPTON	312A

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LEVELS DISPLAYED	1
PATH:	



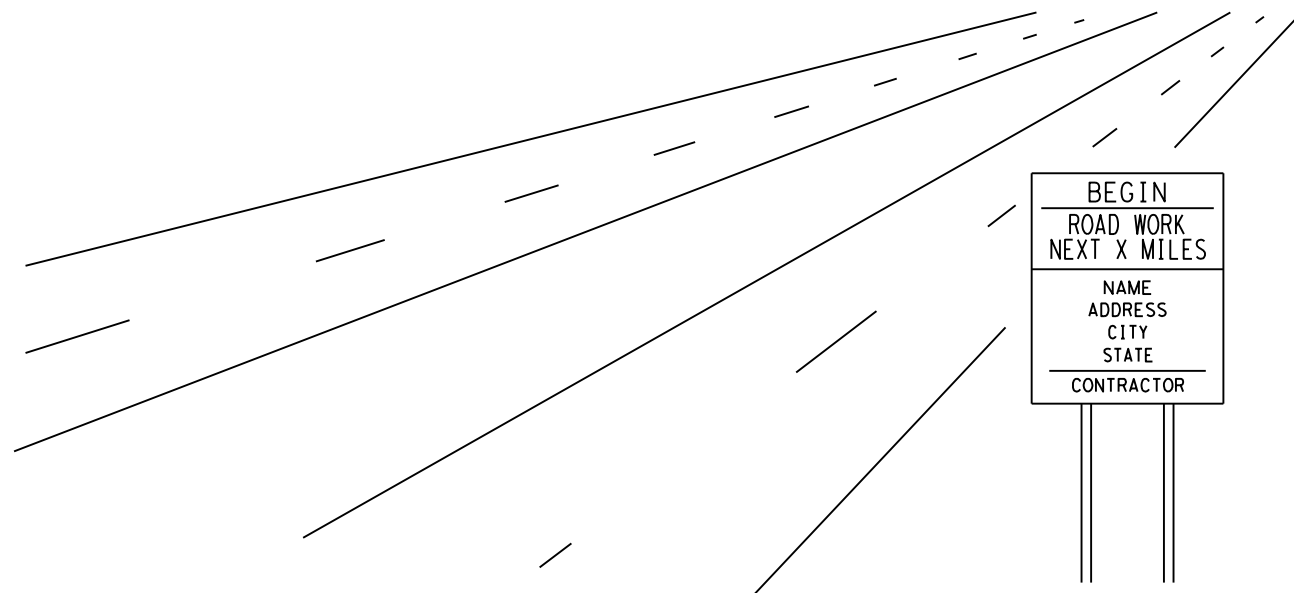
Sign Dimensions

36" X 36"

- Letters - White
- Numbers - White
- Border - White
- Background - Blue

SW3P SIGN

TxDOT & Contractor
Construction Site Note
(CSN)



GENERAL NOTES:

- The alphabets and lateral spacing between letters and numerals shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways", (TMUTCD) latest edition, and the "Compliant Work Zone Traffic Control Devices List". Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.
- Legend and border may be applied by reverse screening process with transparent colored ink, cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting Type C.
- CSN Sheets will be laminated and attached to the sign with an adhesive. Ensure sheets remain dry. (See Figure 1).
- SW3P Signs should be placed just inside the ROW line at the project limits at a readable height. It may be placed perpendicular or parallel to ROW line. If the sign cannot be placed outside the clear zone, it will be mounted per TMUTCD requirements.
- Final location of the signs will be as approved by the Engineer.

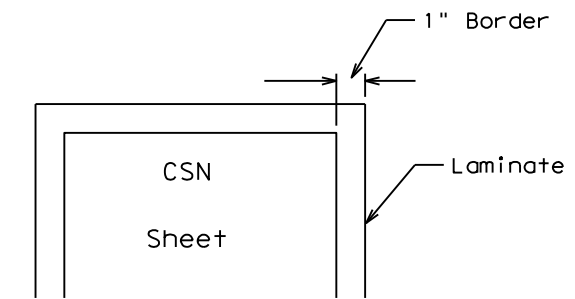


Figure 1

DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

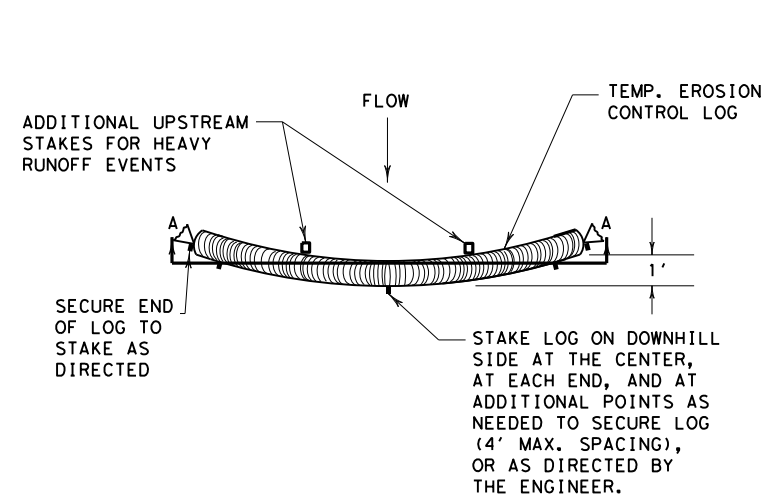
COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
BLUE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
WHITE	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

Texas Department of Transportation
DALLAS DISTRICT STANDARD

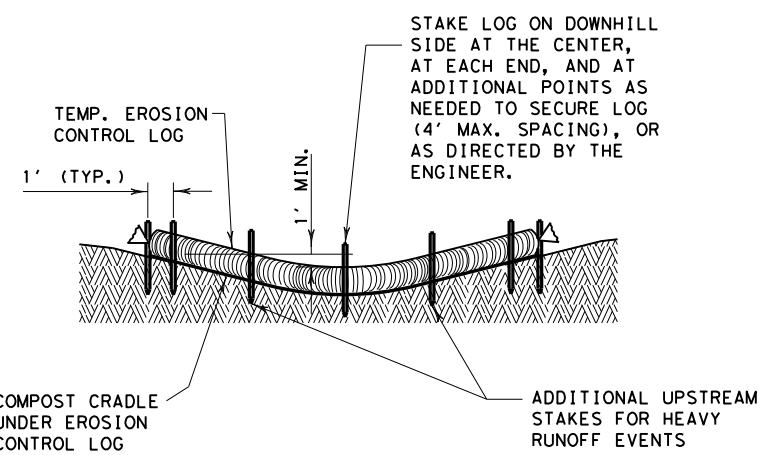
SW3P SIGN SHEET

FILE:	DN: I&D	CK:	DN:	CK:
©TxDOT 2016	DISTRICT	FEDERAL AID PROJECT		SHEET
	ODA			312B
REVISION DATE: 10-16-15	COUNTY	CONTROL	SECT	JOB
	UPTON	0076	06	037 US 67

DATE: 10/22/2021 05:32 PM
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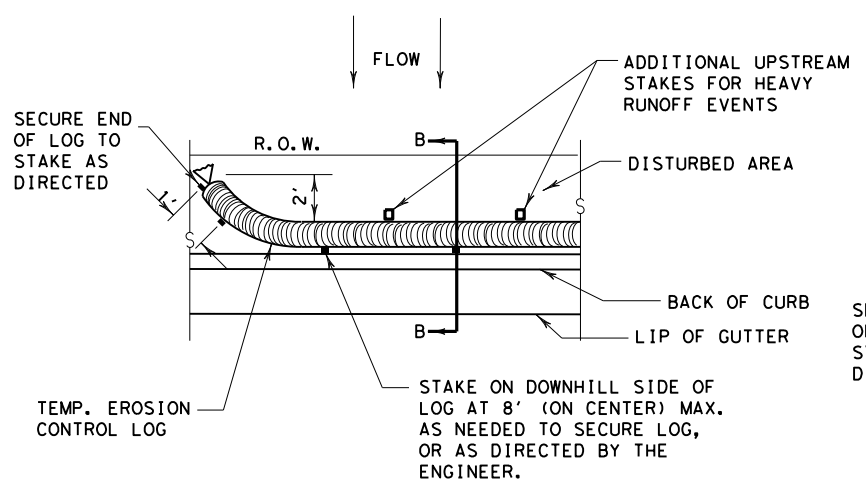


PLAN VIEW

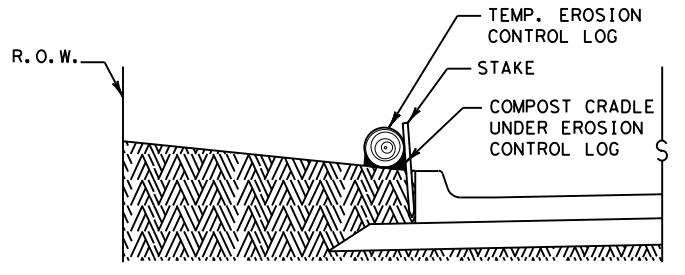


SECTION A-A
EROSION CONTROL LOG DAM

CL-D



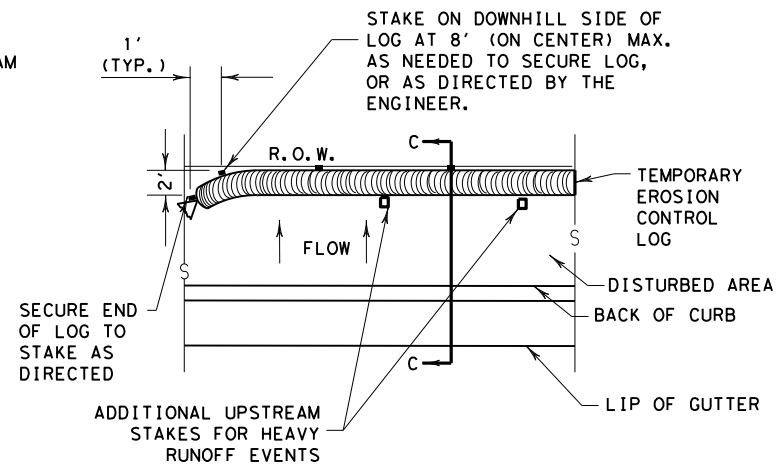
PLAN VIEW



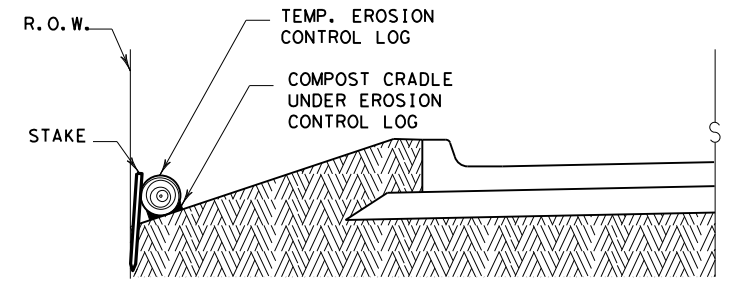
SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



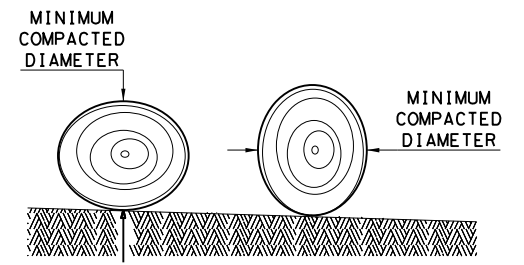
PLAN VIEW



SECTION C-C

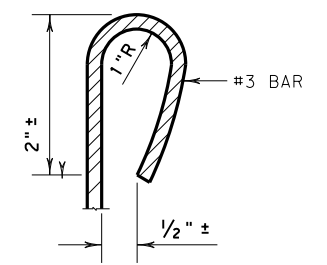
EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

- LEGEND**
- CL-D EROSION CONTROL LOG DAM
 - CL-BOC EROSION CONTROL LOG AT BACK OF CURB
 - CL-ROW EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
 - CL-SST EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
 - CL-SSL EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
 - CL-DI EROSION CONTROL LOG AT DROP INLET
 - CL-CI EROSION CONTROL LOG AT CURB INLET
 - CL-GI EROSION CONTROL LOG AT CURB & GRATE INLET



REBAR STAKE DETAIL

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

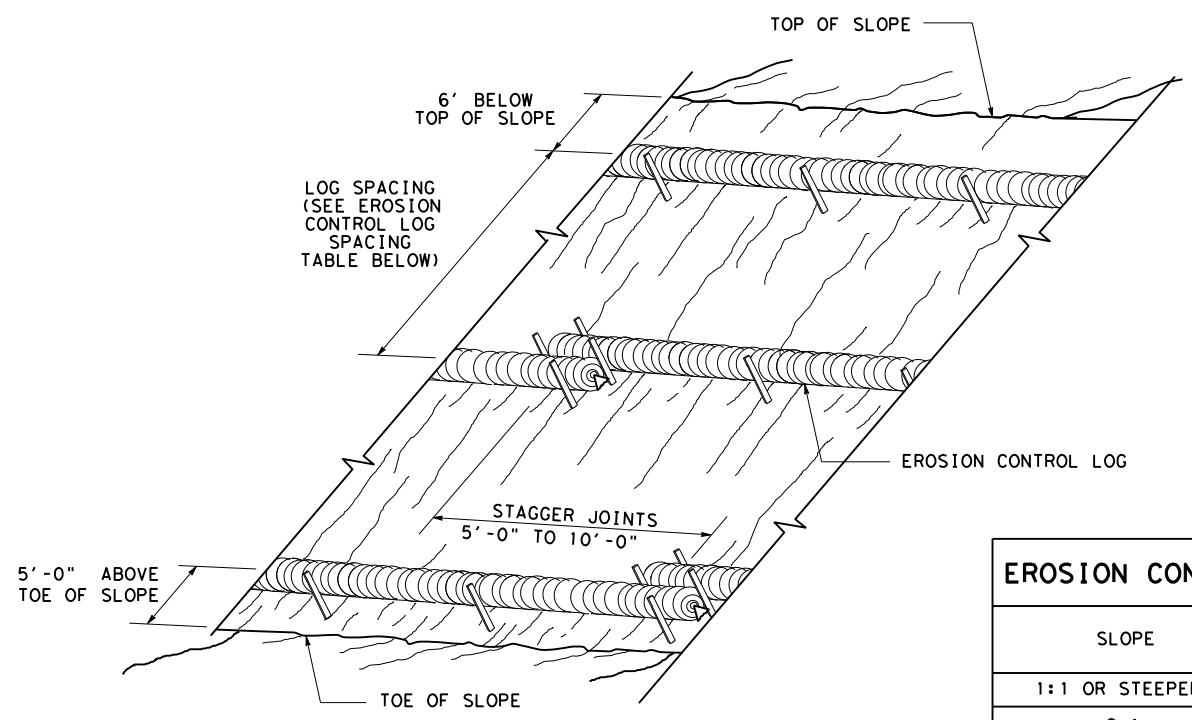
GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SHEET 1 OF 3

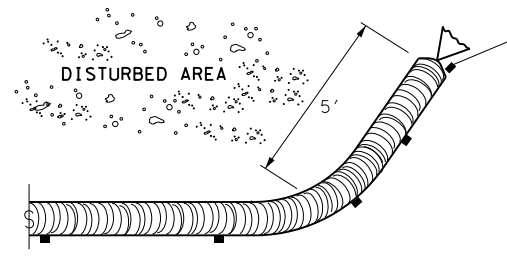
		<i>Design Division Standard</i>	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16			
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT
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REVISIONS	0076	06	037
	DIST	COUNTY	SHEET NO.
	ODA	UPTON	313

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**EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING**

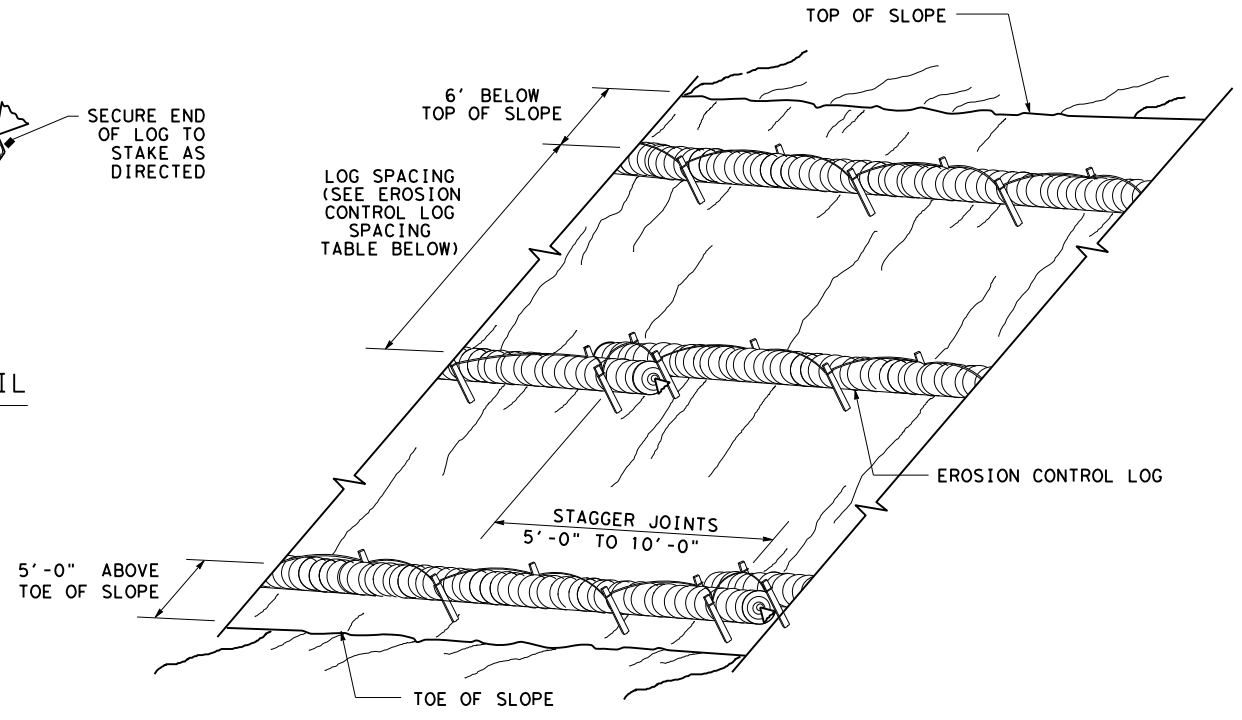
CL-SST



END SECTION RAP DETAIL

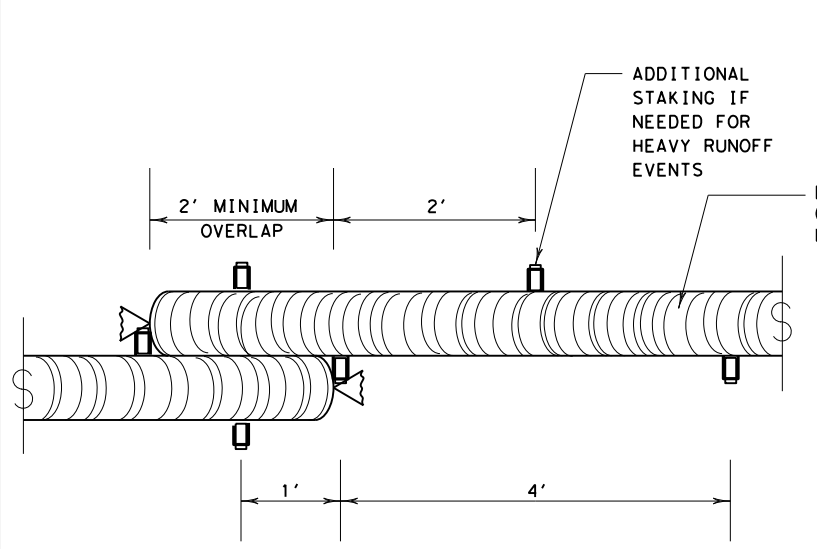
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



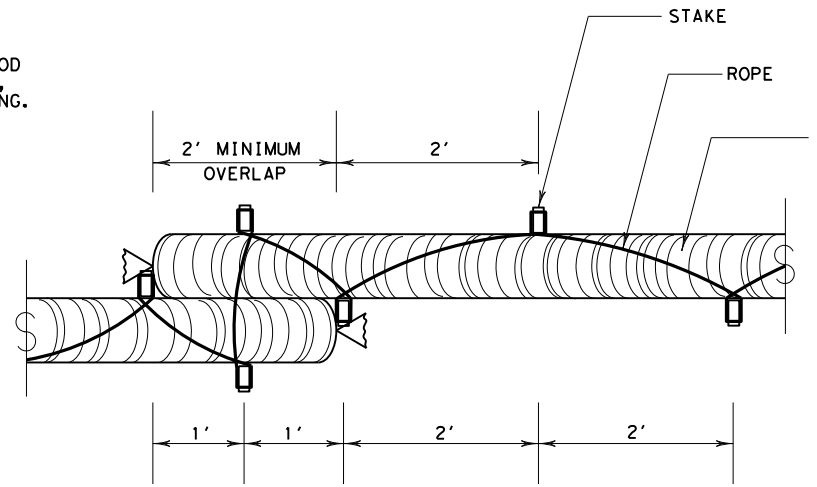
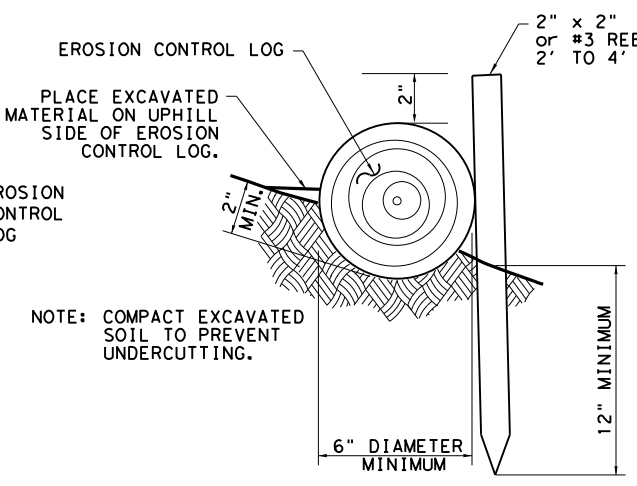
**EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING**

CL-SSL



STAKE AND TRENCHING ANCHORING DETAIL

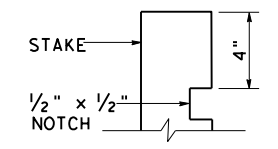
CL-SST



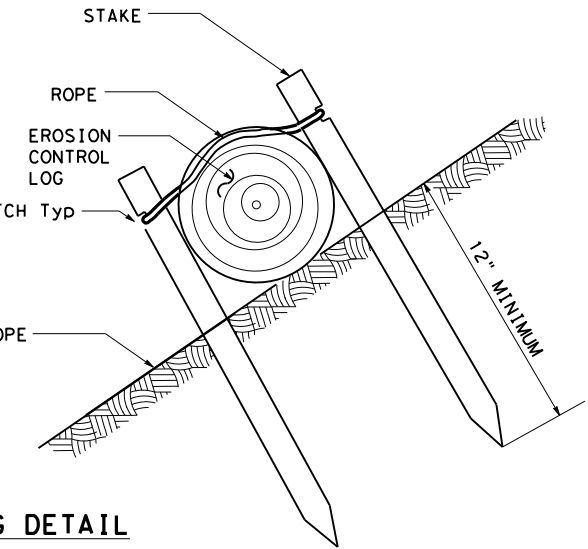
STAKE AND LASHING ANCHORING DETAIL

CL-SSL

TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"



STAKE NOTCH DETAIL

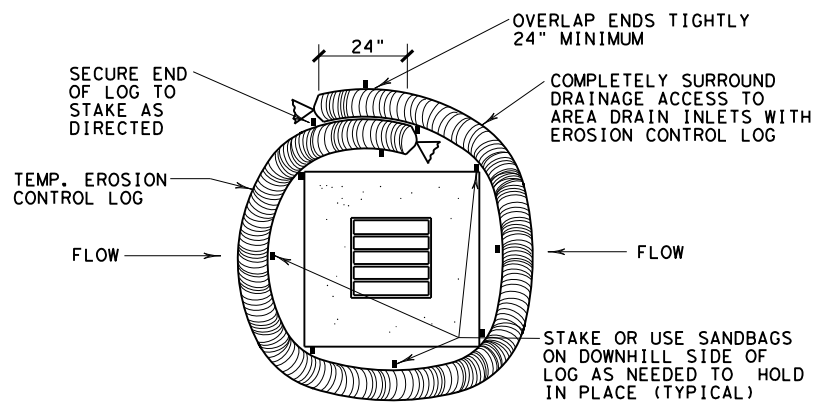


SHEET 2 OF 3

		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16			
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REVISIONS	JJTC JC	J37	US C7
DIST	COUNTY	SHEET NO.	
JJA	UPTJI	314	

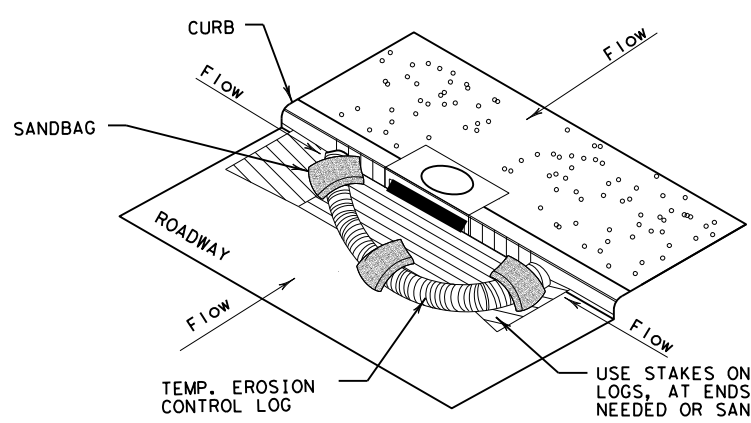
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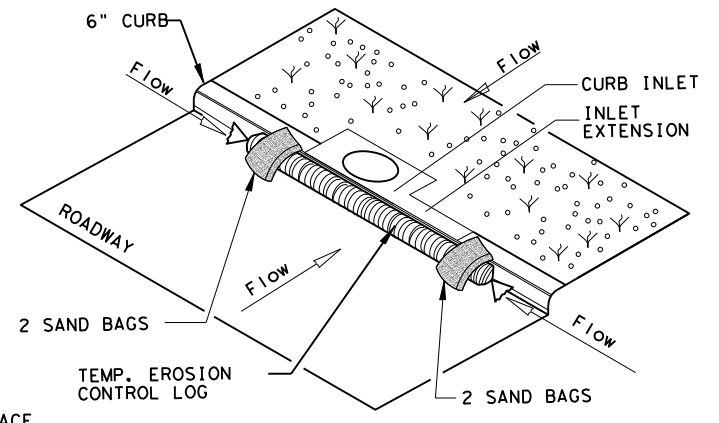
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

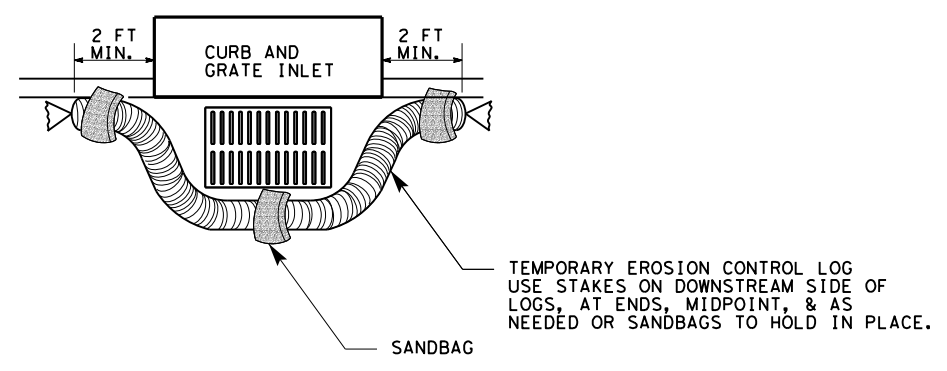
CL-CI



EROSION CONTROL LOG AT CURB INLET

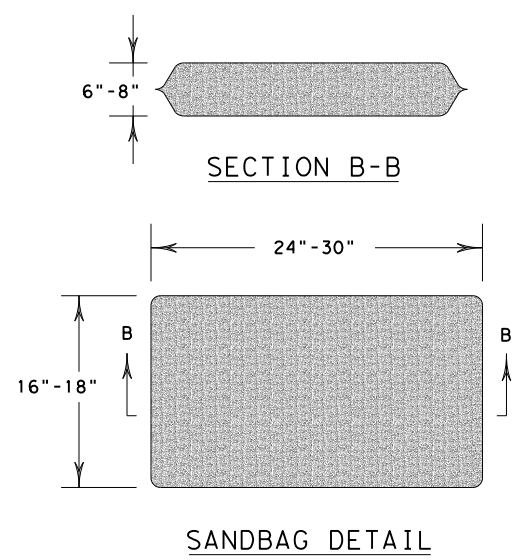
CL-CI

NOTE:
 EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SHEET 3 OF 3

		<i>Design Division Standard</i>	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16			
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT
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REVISIONS	JJTC	JC	J37
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