STATE PROJECT NO.			
C 98 -11 -5			
CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		1

PR 62 @ DEVIL'S CREEK

PROJECT: C 98 -11 -5 CONTROL: 0098-11-005

NET LENGTH OF ROADWAY= 200.00 FT.= 0.038 MI.
NET LENGTH OF BRIDGE = 50.00 FT.= 0.009 MI.
NET LENGTH OF PROJECT= 250.00 FT.= 0.047 MI.

MINIMUM DESIGN SPEED = 50 MPH (MEETS EXISTING CRITERIA)
2019 ADT - 61
2039 ADT - 73

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE AID PROJECT NO. C 98 -11 -5
CSJ: 0098-11-005

~HARDEMAN COUNTY~
PR 62 @ DEVIL'S CREEK

FOR THE CONSTRUCTION OF BRIDGE FACILITIES

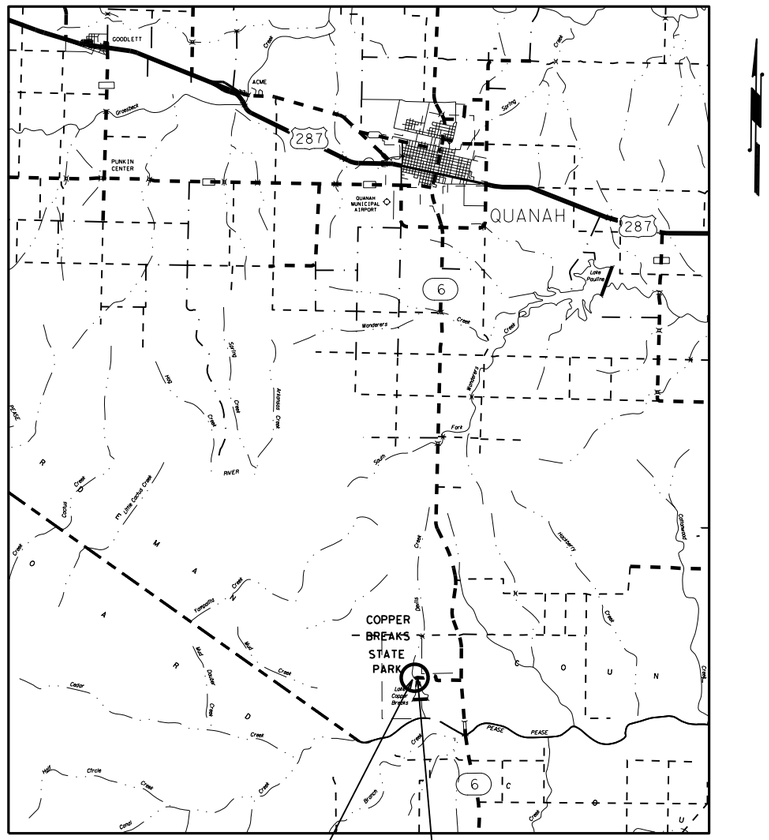
CONSISTING OF: CONCRETE BRIDGE CONSTRUCTION, EMBANKMENT, ETC.

08/04/2021

THE TCP HAS BEEN REVIEWED BY
THE TRAFFIC SAFETY COMMITTEE:

Jack R. Lewis, P.E.
TRAFFIC SAFETY CHAIRMAN

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC (1)- 21 THRU BC (12)- 21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".



END PROJECT
CSJ: 0098-11-005
STA: 100+50.00

BEGIN PROJECT
CSJ: 0098-11-005
STA: 100+00.00

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

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 SPECIAL LABOR PROVISIONS FOR ALL STATE CONSTRUCTION PROJECTS. (SP 000--008)

FINAL PLANS

CONTRACTOR NAME: _____

CONTRACTOR ADDRESS: _____

_____

LETTING DATE: _____

DATE TIME CHARGES BEGAN: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED: _____

DATE OF WORK ACCEPTANCE: _____

I, _____, P.E. DO HEREBY CERTIFY THAT THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS, CONTRACT, AND CHANGES THERETO.

_____ AREA ENGINEER

_____ DATE

RECOMMENDED FOR LETTING: 07/26/2021
Matthew J. Herbstritt, P.E.
AREA ENGINEER

APPROVED FOR LETTING: _____
DIRECTOR, BRIDGE DIVISION

SUBMITTED FOR LETTING: 07/26/2021
Charles B. Stead, P.E.
DIRECTOR, TP&D

RECOMMENDED FOR LETTING: 7/28/21
Martin R. Smith, P.E.
DISTRICT ENGINEER

APPROVED FOR LETTING: _____
DIRECTOR, DESIGN DIVISION

DATE: 7/9/2021 5:24:15 PM
FILE: T:\CHSDES\PROJECTS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\Plan Set\Roadway\001 TITLE.dgn

STATE OF TEXAS
RYAN J. REID
139507
LICENSED PROFESSIONAL ENGINEER

*THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET HAVE BEEN ISSUED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Ryan J Reid P.E. — 11/01/2021

DESIGN ENGINEER — DATE

INDEX OF SHEETS

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		2

DATE: 7/21/2021 3:43:59 PM
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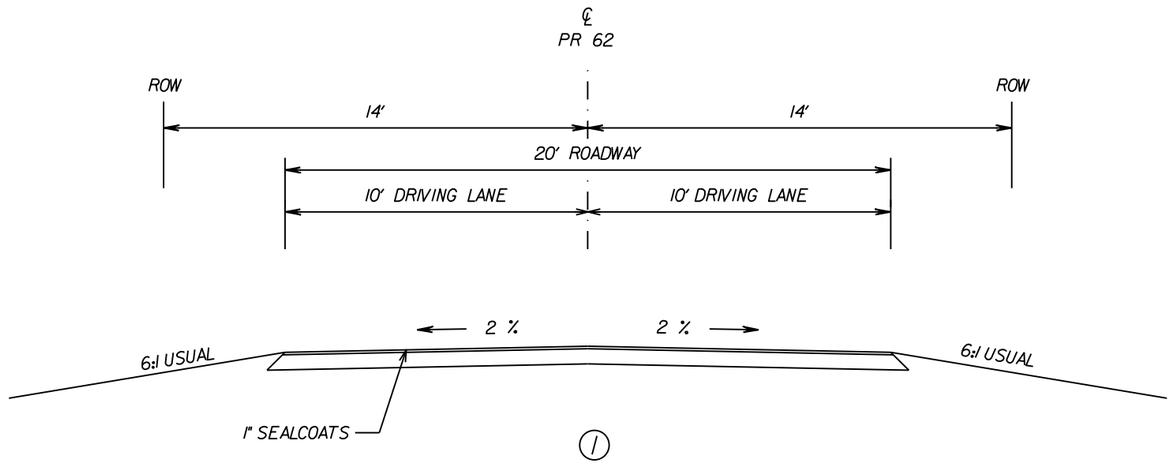


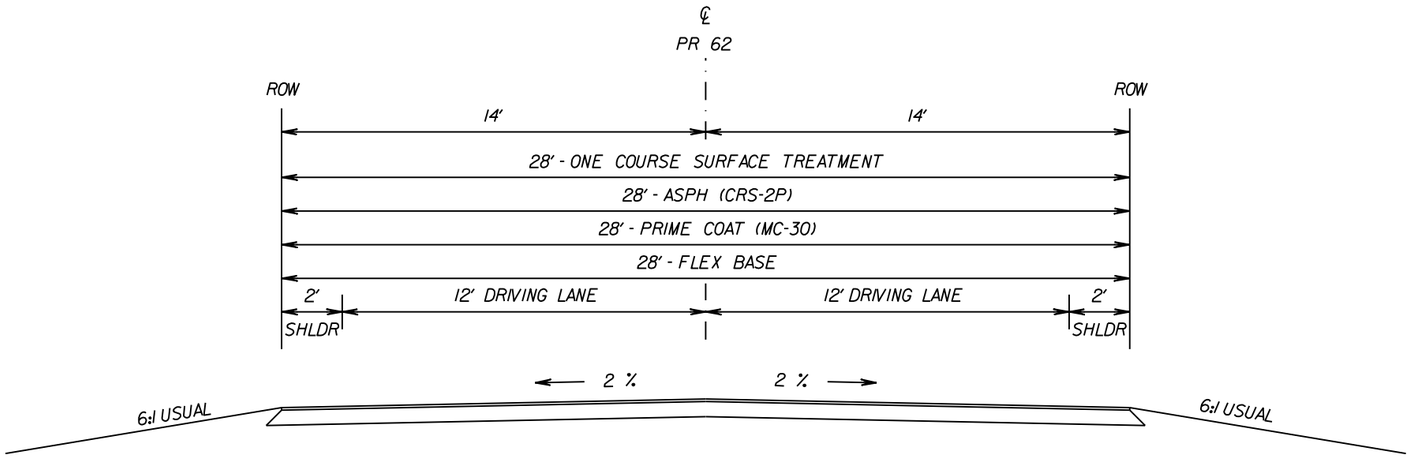
1

EXISTING SECTION

STA. 99+00.00 - STA. 100+01.32 = 101.32 FT.
STA. 100+47.32 - STA. 101+50.00 = 102.68 FT.

EXISTING BRIDGE STATIONS

STA. 100+01.32 TO STA. 100+47.32 = 46.00 FT.



1

PROPOSED SECTION

STA. 99+00.00 - STA. 100+00.00 = 100.00 FT.
STA. 100+50.00 - STA. 101+50.00 = 100.00 FT.

PROPOSED BRIDGE STATIONS

STA. 100+00.00 TO STA. 100+50.00 = 50.00 FT.

STATE OF TEXAS
RYAN J. REID
139507
LICENSED
PROFESSIONAL ENGINEER

Ryan J Reid P.E.
10/06/2021

TYPICAL SECTIONS

PR 62
@
DEVIL'S DRAW

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		3

DATE: 7/8/2021 4:33:44 PM
FILE: T:\CHS\DES\PROJECTS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\Plan Set\Roadway\003 TYPICAL SECTIONS.dgn

GENERAL NOTES AND SPECIFICATION DATA:

BASIS FOR ESTIMATE		
ITEM	**DESCRIPTION**	**RATE**
150	BLADING	2 HR/1000 FT
168	VEGETATIVE WATERING	39,000 GAL/ACRE
314	EMULSIFIED ASPH (CSS-1H)(EROSION CONTROL)	0.20 GAL/SY
310	PRIME COAT	0.20 GAL/SY
316	ASPH (AC-5)	0.40 GAL/SY
316	AGGR (TY B, GR 4)	1:115 CY/SY

*FOR CONTRACTOR'S INFORMATION ONLY, WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO PERTINENT BID ITEMS.
** SEE SPECIFICATIONS FOR SEED TYPES AND RATES.

CONTRACTOR QUESTIONS ON THIS PROJECT ARE TO BE ADDRESSED TO THE FOLLOWING INDIVIDUAL(S):

MATTHEW.HERBSTRITT@TXDOT.GOV

CONTRACTOR QUESTIONS WILL BE ACCEPTED THROUGH EMAIL, PHONE, AND IN PERSON TO THE ABOVE INDIVIDUAL(S).

ALL CONTRACTOR QUESTIONS WILL BE REVIEWED BY THE AREA ENGINEER. ONCE A RESPONSE IS DEVELOPED, IT WILL BE POSTED TO TXDOT'S PUBLIC FTP AT THE FOLLOWING ADDRESS: HTTPS://FTP.DOT.STATE.TX.US/PUB/TXDOT-INFO/PRE-LETTING RESPONSES/

ALL QUESTIONS SUBMITTED THAT GENERATE A RESPONSE WILL BE POSTED THROUGH THIS SITE. THE SITE IS ORGANIZED BY DISTRICT, PROJECT TYPE (CONSTRUCTION OR MAINTENANCE), LETTING DATE, CCSJ/PROJECT NAME.

PRIOR TO BEGINNING WORK, THE CONTRACTOR, TXDOT, AND TPWD WILL HOLD A PROJECT SAFETY MEETING TO DISCUSS WORK ZONE SAFETY, THE PROJECT'S TRAFFIC CONTROL PLAN, AND ANY OTHER PROJECT SAFETY ISSUES. ALL SUBCONTRACTORS WILL BE REQUIRED TO ATTEND THIS SAFETY MEETING.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISPOSAL OF ALL LITTER AND CONSTRUCTION DEBRIS GENERATED BY THE WORK UNDER THIS CONTRACT. DISPOSAL SHALL BE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL PROCEDURES. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR DISPOSE OF THE LITTER OR CONSTRUCTION DEBRIS IN THE RIGHT OF WAY OR WITHIN THE PARK BOUNDARIES.

Project Number: C 98 -11 -5 **Sheet**

County: Hardeman **Control:** 0098-11-005

Highway: PR 62

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES THAT OCCUR TO EXISTING APPURTENANCES CAUSED BY THE CONTRACTOR'S EQUIPMENT AND/OR PERSONNEL. ANY DAMAGES CAUSED BY THE CONTRACTOR SHALL BE REPAIRED IMMEDIATLEY TO THEIR ORIGINAL OR BETTER CONDITION AT THE CONTRACTOR'S EXPENSE.

EGRESS AND INGRESS WILL BE MAINTAINED AT ALL TIMES.

MAINTAIN THE ENTIRE ROADWAY, INCLUDING THE WORK ROAD, WITHIN THE PROJECT LIMITS DURING CONSTRUCTION OPERATIONS. MAKE REPAIRS DEEMED NECESSARY BY THE ENGINEER AT THE CONTRACTOR'S EXPENSE.

CAREFULLY REMOVE SIGNS AFFECTED BY THE CONSTRUCTION AND PROPERLY STORE THEM FOR LATER REINSTALLATION. ANY DAMAGE TO EXISTING SIGNS WILL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT HIS EXPENSE.

NO VEGETATIVE COVER WILL BE DISTURBED WITHOUT PRIOR APPROVAL. REQUIRED DISTURBANCE WILL BE KEPT TO A MINIMUM.

FAILURE TO MAKE NECESSARY CORRECTIONS TO SW3P OR TRAFFIC CONTROL ITEMS BASED ON SW3P OR BARRICADE INSPECTIONS WILL BE CAUSE FOR WITHHOLDING THE MONTHLY ESTIMATE UNTIL SUCH CORRECTIONS HAVE BEEN MADE.

THE CONTRACTOR IS REQUIRED TO COORDINATE WITH THE TEXAS PARKS AND WILDLIFE DEPARTMENT AND ADJUST CONSTRUCTION EFFORTS WITH THE DAILY OPERATIONS OF THE PARK. ESTABLISHMENT OF ANY MATERIAL AND/OR EQUIPMENT STAGING OR STORAGE AREAS OTHER THAN THOSE SHOWN ON THE PLANS MUST BE APPROVED BY THE ENGINEER AND THE PARK SUPERINTENDENT PRIOR TO THE START OF WORK AND THEREAFTER IF A CHANGE OF LOCATION BECOMES NECESSARY. AS PART OF THIS COORDINATION THE CONTRACTOR WILL BE REQUIRED TO:

- HOLD WEEKLY MEETINGS WITH TXDOT REPRESENTATIVE, THE PARK SUPERINTENDENT, AND THE CONTRACTOR'S SUPERINTENDENT TO REVIEW AND DISCUSS THE CONSTRUCTION WORK AND TRAFFIC CONTROL PROCEDURES PLANNED FOR THE FOLLOWING TWO WEEK PERIOD.
- PRIOR TO THE START OF CONSTRUCTION, DELINEATE THE LIMITS OF THE WORK AREA WITH STAKES AND FLAGGING TO IDENTIFY WHERE NON-WORK AREAS BEGIN SO THAT DAMAGE TO ADJACENT PARK PROPERTY BY CONSTRUCTION EQUIPMENT AND OTHER VEHICLES IS AVOIDED.
- NOT BE AUTHORIZED TO WORK ON WEEKENDS OR MAJOR HOLIDAYS WITHOUT PRIOR WRITTEN APPROVAL OF BOTH THE ENGINEER AND THE PARK SUPERINTENDENT.
- MITIGATE OR REPLACE UNNECESSARY DAMAGE TO TREES OR SHRUBS WITHIN AND ADJACENT TO THE LIMITS OF CONSTRUCTION. THE CONTRACTOR SHALL REPLACE OR MITIGATE DAMAGED TREES OR SHRUBS WITH LIKE SIZE AND TYPES OF TREES OR SHRUBS DAMAGED. FINAL DETERMINATION OF THE REPLACEMENT OR MITIGATION REQUIREMENTS WILL BE DETERMINED BY THE TXDOT LANDSCAPE ARCHITECT. ALL COST ASSOCIATED WITH THE REPLACEMENT OR MITIGATION COST WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

- REPAIR OR REPLACE ANY UNNECESSARY DAMAGE TO APPURTENANCES OR UTILITIES WITHIN AND ADJACENT TO THE LIMITS OF CONSTRUCTION. ANY REPLACEMENT COST WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

IF ARCHEOLOGICAL ARTIFACTS ARE DISCOVERED DURING CONSTRUCTION, THE CONTRACTOR WILL CEASE WORK AND CONTACT TPWD PARK SUPERINTENDENT.

CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS.

CONTRACTOR SHALL MAINTAIN THE WORKSITE IN A CLEAN AND PROFESSIONAL MANNER. REMOVE ALL TRASH AND DEBRIS FROM THE WORK AREA ON A DAILY BASIS.

ITEM 5 - CONTROL OF THE WORK

CONSTRUCTION SURVEYING ON THIS CONTRACT WILL BE IN ACCORDANCE WITH ARTICLE 5.9.3, "METHOD C".

BIDDERS MAY REQUEST ELECTRONIC OR PAPER COPIES OF THE EARTHWORK DATA.

WHEN A PRECAST OR CAST-IN-PLACE CONCRETE ELEMENT IS INCLUDED IN TH 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. AN ACCEPTANCE OR DENIAL OF AN ALTERNATE IS AT THE SOLE DESCRETION 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 7 - LEGAL RELATIONS AND RESPONSIBILITIES

DO NOT INITIATE ACTIVITIES IN A PROJECT SPECIFIC LOCATION (PSL) ASSOCIATED WITH A U.S. ARMY CORPS OF ENGINEERS (USACE) PERMIT AREA THAT HAS NOT BEEN PREVIOUSLY EVALUATED BY THE USACE AS PART OF THE PERMIT REVIEW FOR THIS PROJECT. SUCH ACTIVITIES INCLUDE BUT ARE NOT LIMITED TO, HAUL ROADS, EQUIPMENT STAGING AREAS, BORROW AND DISPOSAL SITES. "ASSOCIATED", AS DEFINED HEREIN, INCLUDES MATERIALS DELIVERED TO OR FROM THE PSL. THE PERMIT AREA INCLUDES ALL WATERS OF THE U.S. OR ASSOCIATED WETLANDS AFFECTED BY PROJECT ACTIVITIES. SPECIAL RESTRICTIONS MAY BE REQUIRED FOR SUCH WORK. CONSULT WITH THE USACE REGARDING ACTIVITIES, INCLUDING PROJECT SPECIFIC LOCATIONS (PSLS) THAT HAVE NOT BEEN PREVIOUSLY EVALUATED BY THE USACE. PROVIDE THE DEPARTMENT WITH A COPY OF ALL CONSULTATION(S) OR APPROVAL(S) FROM THE USACE PRIOR TO INITIATING ACTIVITIES.

PROCEED WITH ACTIVITIES IN PSLS THAT DO NOT AFFECT A USACE PERMIT AREA IF A SELF DETERMINATION HAS BEEN MADE THAT THE PSL IS NON-JURISDICTIONAL OR PROPER USACE CLEARANCES HAVE BEEN OBTAINED IN JURISDICTIONAL AREAS OR HAVE BEEN PREVIOUSLY EVALUATED BY THE USACE AS PART OF THE PERMIT REVIEW FOR THIS PROJECT. DOCUMENT ANY DETERMINATION(S) THAT PROJECT ACTIVITIES DO NOT AFFECT A USACE PERMIT AREA. MAINTAIN COPIES OF DETERMINATION(S) FOR REVIEW BY THE DEPARTMENT OR ANY REGULATORY AGENCY.

Project Number: C 98 -11 -5 **Sheet**

County: Hardeman **Control:** 0098-11-005

Highway: PR 62

DOCUMENT AND COORDINATE WITH THE USACE, IF REQUIRED, PRIOR TO ANY EXCAVATION HAULED FROM OR EMBANKMENT HAULED INTO A USACE PERMIT AREA BY EITHER (1) OR (2) BELOW.

1. RESTRICTED USE OF MATERIALS FOR THE PREVIOUSLY EVALUATED PERMIT AREAS.

DOCUMENT BOTH THE PROJECT SPECIFIC LOCATION (PSL) AND AUTHORIZATION. MAINTAIN COPIES FOR REVIEW BY THE DEPARTMENT OR ANY REGULATORY AGENCY. WHEN AN AREA WITHIN THE PROJECT LIMITS HAS BEEN EVALUATED BY THE USACE AS PART OF THE PERMIT PROCESS FOR THIS PROJECT:

- SUITABLE EXCAVATION OF REQUIRED MATERIAL IN THE AREAS SHOWN ON THE PLANS AND CROSS SECTIONS AS SPECIFIED IN ITEM 110 IS USED FOR PERMANENT OR TEMPORARY FILL (ITEM 132, EMBANKMENT) WITHIN A USACE PERMIT AREA.

- SUITABLE EMBANKMENT (ITEM 132) FROM WITHIN THE USACE PERMIT AREA IS USED AS FILL WITHIN A USACE EVALUATED AREA; AND,

- UNSUITABLE EXCAVATION OR EXCESS EXCAVATION ["WASTE"] (ITEM 110) THAT IS DISPOSED OF AT A LOCATION APPROVED BY THE ENGINEER WITHIN A USACE EVALUATED AREA.

2. CONTRACTOR MATERIALS FROM AREAS OTHER THAN PREVIOUSLY EVALUATED AREAS.

PROVIDE THE DEPARTMENT WITH A COPY OF ALL USACE COORDINATION OR APPROVAL(S) PRIOR TO INITIATING ANY ACTIVITIES FOR AN AREA WITHIN THE PROJECT LIMITS THAT HAS NOT BEEN EVALUATED BY THE USACE OR FOR ANY OFF RIGHT OF WAY LOCATIONS USED FOR THE FOLLOWING, BUT NOT LIMITED TO, HAUL ROADS, EQUIPMENT STAGING AREAS, BORROW AND DISPOSAL SITES:

- ITEM 132, EMBANKMENT, USED FOR TEMPORARY OR PERMANENT FILL WITHIN A USACE PERMIT AREA; AND,

- UNSUITABLE EXCAVATION OR EXCESS EXCAVATION ["WASTE"] (ITEM 110, EXCAVATION) THAT IS DISPOSED OF OUTSIDE A USACE EVALUATED AREA.

THE TOTAL DISTURBED AREA FOR THIS PROJECT IS 0.12 ACRES.

THE DISTURBED AREA IN THIS PROJECT, ALL PROJECT LOCATIONS IN THE CONTRACT, AND THE CONTRACTOR'S PROJECT SPECIFIC LOCATIONS (PSLS), WITHIN ONE (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 REQUIRED AUTHORIZATION FROM THE TCEQ FOR CONTRACTOR PSLS FOR CONSTRUCTION SUPPORT ACTIVITIES ON OR OFF THE ROW. WHEN THE TOTAL AREA DISTURBED IN THE CONTRACT AND PSLS WITHIN ONE (1) MILE OF THE PROJECT LIMITS EXCEEDS FIVE (5) ACRES, PROVIDE A COPY OF THE CONTRACTOR'S NOI FOR PSLS ON THE ROW TO THE ENGINEER AND TO THE LOCAL GOVERNMENT THAT OPERATES A SEPARATE STORM SEWER SYSTEM.

"NO SIGNIFICANT TRAFFIC GENERATOR EVENTS IDENTIFIED"

ITEM 8 – PROSECUTION AND PROGRESS

FOR THIS PROJECT, STANDARD WORKWEEK CHARGES WILL BE CHARGED IN ACCORDANCE WITH SECTION 8.3.1.4.

ITEM 164 – SEEDING FOR EROSION CONTROL

WEEPING LOVE GRASS SHALL NOT BE PART OF THE PERMANENT SEED MIXTURE. INSTEAD, SUBSTITUTE 1.8 PLS SAND BLUESTEM.

ITEM 166 - FERTILIZER

ALL AREAS OF THE PROJECT WILL BE **FERTILIZED** WITH 60 POUNDS OF NITROGEN PER ACRE. FERTILIZER IS SUBSIDIARY TO SEEDING.

ITEM 316 - SURFACE TREATMENTS

THE ENGINEER MUST AUTHORIZE WORK IF THE WIND EXCEEDS 20 MPH.

ITEM 400 – CEMENT STABILIZED BACKFILL

CEMENT STABILIZED BACKFILL TO BE CONSTRUCTED BENEATH APPROACH SLABS AS DETAILED ON BAS-A (CHS) WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

ITEM 420 - CONCRETE STRUCTURES

PROVIDE A THERMOMETER THAT RECORDS THE TEMPERATURE OF MOIST ROOMS AND/OR CURING TANKS. THE THERMOMETER MUST HAVE THE CAPABILITY TO CHART TEMPERATURE FOR A 24-HOUR, 7-DAY, OR 30-DAY TIME PERIOD. ANY ONE OF THESE TIME CHARTING METHODS IS ACCEPTABLE BUT IT MUST BE MONITORED AND KEPT CURRENT. THE THERMOMETER WILL BE CONSIDERED SUBSIDIARY TO ITEM 420. ALSO PROVIDE A THERMOMETER TO RECORD TEMPERATURE OF CONCRETE PLACED DURING COLD WEATHER.

ITEM 421 – HYDRAULIC CEMENT CONCRETE

THE CONTRACTOR WILL SAMPLE ALL CONCRETE AND TEST ACCORDING TO TEX-414-A OR TEX-416-A, TEX-415-A, TEX-422-A, AND TEX-447-A. CONTRACTOR PERSONNEL PERFORMING TESTING MUST BE ACI CERTIFIED. PERSONNEL PERFORMING THESE TESTS ARE SUBJECT TO DEPARTMENT APPROVAL. USE OF A COMMERCIAL LABORATORY IS PERMITTED. THE CONTRACTOR WILL NOT BE REQUIRED TO SUPPLY COMPRESSION TESTING EQUIPMENT. TXDOT PERSONNEL WILL PERFORM THE COMPRESSION TESTING. PROVIDE THE ENGINEER WITH ACI CERTIFICATES AND THE EMAIL ADDRESS OF TESTING PERSONNEL.

ITEM 422 – REINFORCED CONCRETE SLAB

PLACE THE CONCRETE SLAB AT A MINIMUM RATE OF 30 FT OF FINISHED SLAB PER HOUR.

Project Number: C 98 -11 -5 **Sheet**

County: Hardeman **Control:** 0098-11-005

Highway: PR 62

ITEM 427 – SURFACE FINISHES FOR CONCRETE

THE APPROACH SLABS AND BRIDGE DECK SHALL HAVE A -HEAVY BROOM FINISH.

APPLY SURFACE AREA I FINISH WITH AN OPAQUE SEALER OF THE COLORS CHOSEN BY THE ENGINEER TO COLUMN AND BENT CAP SURFACES, EXCEPT FOR THE TOPS OF BENT CAPS.

ENSURE THAT SURFACES ARE FREE OF WEAK SURFACE MATERIAL, CURING COMPOUNDS AND OTHER CONTAMINANTS PRIOR TO COATING.

THIS WORK WILL BE SUBSIDIARY.

ITEM 440 – REINFORCING STEEL

ALL REINFORCING STEEL LOCATED IN THE APPROACH SLAB, ABUTMENT, BRIDGE DECK AND CAP WILL BE EPOXY COATED.

ITEM 450 – RAILING

PAINT ALL STEEL COMPONENTS IN ACCORDANCE WITH ITEM 446, CLEANING AND PAINTING STEEL, USING FEDERAL STANDARD 595B, BROWN #30122. PAINTING WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

ALL WORK SHALL BE PERFORMED UNDER EXISTING TRAFFIC CONDITIONS WITH A MINIMUM OF INTERFERENCE TO TRAFFIC.

THE CONTRACTOR'S PERSON RESPONSIBLE FOR TCP COMPLIANCE SHALL BE AVAILABLE AND HAVE A RESPONSE TIME OF 45 MINUTES.

THE CONTRACTOR'S WORK ROAD ON THE SOUTH SIDE OF THE SITE SHALL ALSO BE USED FOR LOCAL PARK TRAFFIC. KEEP THE WORK ROAD IN GOOD CONDITION THROUGHOUT THE DURATION OF THE PROJECT.

ALL EQUIPMENT AND MATERIALS SHALL BE STORED OUTSIDE THE ROADWAY CLEAR ZONE AND AT LOCATIONS APPROVED BY THE ENGINEER AND TPWD SUPERINTENDANT.

EQUIP ALL WORK VEHICLES WITH A FUNCTIONING AMBER STROBE LIGHT OR ROTATING BEACON VISIBLE FROM ALL DIRECTIONS.

IF ANY BARRICADE DEFICIENCIES ARE FOUND DURING INSPECTION, DETERMINE WHETHER THE DEFICIENCY IS PRIORITY 1 OR PRIORITY 2, ACCORDING TO TXDOT FORM 599. CONTRACTOR SHALL TAKE IMMEDIATE ACTION AT THE TIME OF THE INSPECTION OR UPON NOTIFICATION FOR A PRIORITY 1 DEFICIENCY, OR WITHIN 7 CALENDAR DAYS OF NOTIFICATION FOR A PRIORITY 2 DEFICIENCY. FAILURE TO COMPLY WILL CEASE ALL WORK UNTIL BARRICADES ARE REPAIRED TO THE SATISFACTION OF THE DEPARTMENT. FAILURE TO COMPLY WILL ALSO BE CAUSE FOR WITHHOLDING A MONTH OF BARRICADES AS DETERMINED BY THE ENGINEER.

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 FORSEEN 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.

ITEM 506 – TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

THIS WORK WILL BE PAID FOR UNDER THE RESPECTIVE BID ITEMS. SW3P MAINTENANCE REPORTS ARE TO BE PERFORMED EVERY 14 CALENDAR DAYS OR EVERY ½" RAIN. MAKE CORRECTIONS AS SOON AS POSSIBLE BEFORE THE NEXT ANTICIPATED RAIN EVENT OR WITHIN SEVEN CALENDAR DAYS AFTER BEING ABLE TO ENTER THE LOCATION OF EACH BMP. A BMP SITE BEING "TOO WET TO WORK" IS THE ONLY ACCEPTABLE REASON FOR NOT ACCOMPLISHING THE CORRECTIONS WITHIN THE SEVEN CALENDAR DAYS TIME LIMIT AND SHOULD BE THOROUGHLY DOCUMENTED ON FORM 2118. IF MAINTENANCE CORRECTIONS ARE NOT MADE WITHIN THIS TIME FRAME THEN ALL WORK WILL CEASE, TIME CHARGES WILL CONTINUE UNTIL SW3P IS BROUGHT INTO COMPLIANCE AND IS DOCUMENTED ON FORM 2118 AFTER TXDOT REVIEW. THIS IN NO WAY RELEASES THE CONTRACTOR OF LIABILITY FOR NONCOMPLIANCE.

ITEM 540 – MTL BEAM GD FEN TRANS (THRIE-BEAM)

PAINT ALL STEEL COMPONENTS IN ACCORDANCE WITH ITEM 446, CLEANING AND PAINTING STEEL, USING FEDERAL STANDARD 595B, BROWN #30122. PAINTING WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

ITEM 544 – GUARDRAIL END TREATMENT (INSTALL)

PAINT ALL STEEL COMPONENTS IN ACCORDANCE WITH ITEM 446, CLEANING AND PAINTING STEEL, USING FEDERAL STANDARD 595B, BROWN #30122. PAINTING WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0098-11-005 **DISTRICT** Childress **COUNTY** Hardeman
HIGHWAY PR 62

		CONTROL SECTION JOB		**0098-11-005**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00176725**			
		COUNTY		**Hardeman**			
		HIGHWAY		**PR 62**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	110-6001	EXCAVATION (ROADWAY)	CY	177.000		177.000	
	132-6004	EMBANKMENT (FINAL)(DENS CONT)(TY B)	CY	720.000		720.000	
	164-6034	DRILL SEEDING (PERM) (RURAL) (SANDY)	AC	0.580		0.580	
	164-6042	DRILL SEEDING (TEMP) (WARM)	AC	0.290		0.290	
	164-6044	DRILL SEEDING (TEMP) (COOL)	AC	0.290		0.290	
	168-6001	VEGETATIVE WATERING	MG	23.000		23.000	
	247-6047	FL BS (CMP IN PLC)(TY B GR 3)(FNAL POS)	CY	103.000		103.000	
	310-6009	PRIME COAT (MC-30)	GAL	93.000		93.000	
	314-6013	EMULS ASPH (EROSN CONT)(CSS-1H)	GAL	562.000		562.000	
	316-6010	ASPH (AC-5)	GAL	187.000		187.000	
	316-6078	AGGR(TY-B GR-4 SAC-A)	CY	8.000		8.000	
	400-6005	CEM STABIL BKFL	CY	23.400		23.400	
	416-6002	DRILL SHAFT (24 IN)	LF	192.000		192.000	
	420-6013	CL C CONC (ABUT)	CY	17.400		17.400	
	422-6007	REINF CONC SLAB (SLAB BEAM)	SF	1,300.000		1,300.000	
	422-6015	APPROACH SLAB	CY	41.700		41.700	
	425-6012	PRESTR CONC SLAB BEAM (5SB15)	LF	247.500		247.500	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	14.000		14.000	
	450-6003	RAIL (TY T1W)	LF	124.000		124.000	
	454-6018	SEALED EXPANSION JOINT (4 IN) (SEJ - M)	LF	52.000		52.000	
	459-6008	GABION MATTRESSES (GALV)(18 IN)	SY	685.000		685.000	
	459-6009	GABIONS (3' X 3')(GALV)	CY	104.000		104.000	
	496-6016	REMOV STR (PIPE)	EA	3.000		3.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	4.000		4.000	
	506-6042	BIODEG EROSN CONT LOGS (INSTL) (18")	LF	280.000		280.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4.000		4.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		4.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	6.000		6.000	
	658-6016	INSTL DEL ASSM (D-SW)SZ (BRF)GF1 (BI)	EA	6.000		6.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

TxDOTCONNECT

DISTRICT	COUNTY	CCSJ	SHEET
Childress	Hardeman	0098-11-005	8

ROADWAY SUMMARY - PR 62 @ DEVIL'S CREEK

LOCATION	104 6009	110 6001	132 6004	247 6047	310 6009	316 6010	316 6078	432 6044	432 6045	496 6016	540 6006	544 6001
	REMOVING CONC (RIPRAP)	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY B)	FL BS (COMP IN PLC) (TY B GR 3) (FNAL POS) (8")	PRIME COAT (MC-30) (0.2 GAL/SY)	ASPH (AC-5) (0.4 GAL/SY)	AGGR (TY-B GR-4 SAC-A) 115 SY/CY	RIPRAP (CONC) (FLUME)	RIPRAP (MOW STRIP) (4 IN)	REMOV STR (PIPE)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	GUARDRAIL END TREATMENT (INSTALL)
	SY	CY	CY	CY	GAL	GAL	CY	CY	CY	EA	EA	EA
STA. 99+00.00 TO STA. 100+00.00	81	131	350	69	62	124	3	~	7	~	2	2
STA. 100+50.00 TO STA. 101+50.00	75	74	369	69	62	124	3	18	7	3	2	2
PROJECT TOTALS	**156**	**205**	**719**	**138**	**124**	**249**	**6**	**18**	**14**	**3**	**4**	**4**

BRIDGE SUMMARY - PR 62 @ DEVIL'S CREEK

LOCATION	400 6005	416 6002	420 6013	422 6007	422 6015	425 6012	459 6008	459 6009	450 6019	454 6018
	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM (5SBI5)	GABION MATTRESSES (GALV) (18 IN)	GABIONS (3' X 3') (GALV)	RAIL (TY T1W)	SEALED EXPANSION JOINT (4 IN) (SEJ - M)
	CY	LF	CY	SF	CY	LF	SY	CY	LF	LF
2 - ABUTMENTS	23.4	192	17.4				685	104	24	52
1 - 50' PRESTRESSED CONCRETE SLAB BEAM UNIT (5SBI5)				1300	41.7	247.50			100	
PROJECT TOTALS	**23.4**	**192**	**17.4**	**1300**	**41.7**	**247.50**	**685**	**104**	**124**	**52**

EROSION CONTROL SUMMARY - PR 62 @ DEVIL'S CREEK

LOCATION	164 6034	164 6042	164 6044	168 6001	314 6013	506 6042
	DRILL SEEDING (PERM) (RURAL) (SANDY)	DRILL SEEDING (TEMP) (WARM)	DRILL SEEDING (TEMP) (COOL)	VEGETATIVE WATERING	EMULS ASPH (EROSN CONT) (CSS-1H) (0.2 GAL/SY)	BIODEG EROSN CONT LOGS (INSTL) (18")
	AC	AC	AC	MG	GAL	LF
STA. 99+00.00 TO STA. 101+50.00	0.58	0.29	0.29	23	562	280
PROJECT TOTALS	**0.58**	**0.29**	**0.29**	**23**	**562**	**280**

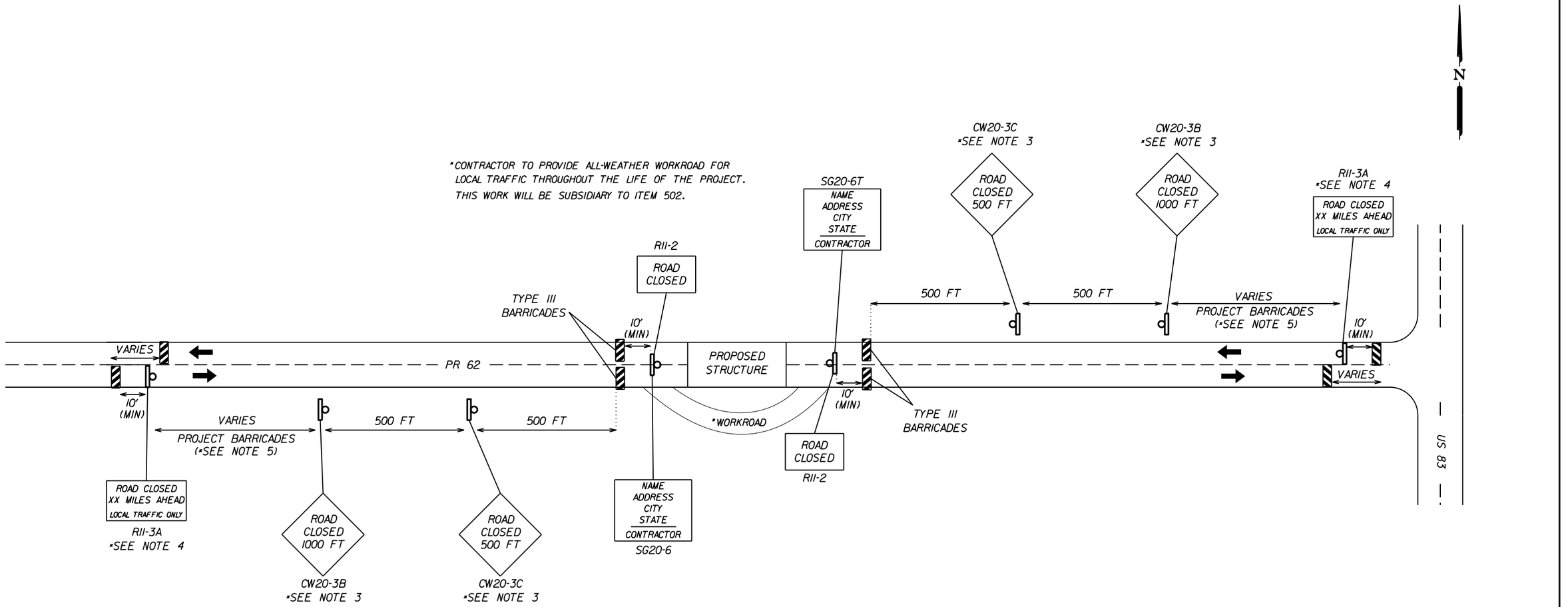
DELINEATOR SUMMARY - PR 62 @ DEVIL'S CREEK

LOCATION	658 6014	658 6016
	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	INSTL DEL ASSM (D-SW)SZ (BR)GF1(BI)
	EA	EA
STA. 99+00.00 TO STA. 101+50.00	6	6
PROJECT TOTALS	**6**	**6**

QUANTITY SUMMARY

PR 62
@
DEVIL'S CREEK

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		9



NOTES:

1) SIGN LOCATIONS AS SHOWN ON THIS LAYOUT ARE FOR THE CONTRACTOR'S INFORMATION ONLY. ACTUAL FIELD LOCATIONS SHALL BE DETERMINED BY THE ENGINEER.

2) THIS LAYOUT SHOWS ONLY THE MINIMUM SIGNING REQUIRED. AS FIELD CONDITIONS WARRANT, THE ENGINEER SHALL RETAIN THE RIGHT TO MOVE, ADD OR DELETE SIGNS AS DEEMED NECESSARY.

3) FOR AREAS WHERE THERE IS A SHORTER DISTANCE BETWEEN THE INTERSECTION AND THE ACTUAL CLOSURE LOCATION, THE ROAD CLOSED XX FT AHEAD SIGNS MAY BE REPLACED WITH A SINGLE ROAD CLOSED AHEAD (CW20-3D) SIGN.

4) IF THE ROAD IS OPEN FOR A SIGNIFICANT DISTANCE BEYOND THE INTERSECTION OR THERE ARE SIGNIFICANT ORIGIN/DESTINATION POINTS BEYOND THE INTERSECTION, THE SIGNS AND BARRICADES AT THIS LOCATION SHOULD BE LOCATED AT THE EDGE OF THE TRAVEL WAY.

5) SEE THE BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS FOR ADDITIONAL PROJECT BARRICADES, SIGNS, AND SPACING.

PR 62 @ DEVIL'S CREEK

TRAFFIC CONTROL PLAN LAYOUT

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		10

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. 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).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. 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:

1. 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.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. 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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	CHS	HARDEMAN		11
5-10 5-21				

DATE: 11/1/2021 3:16:09 PM
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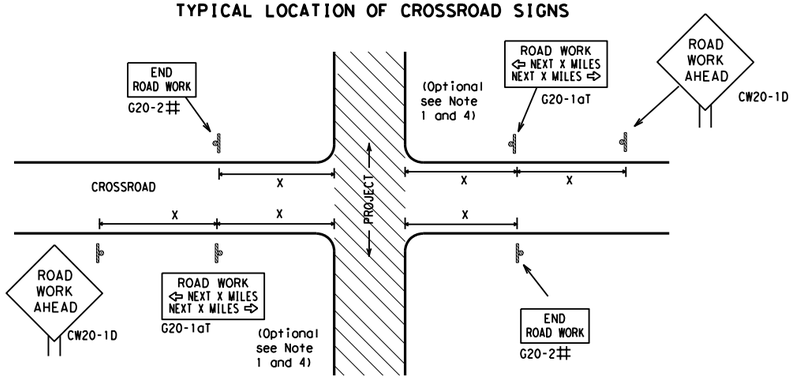
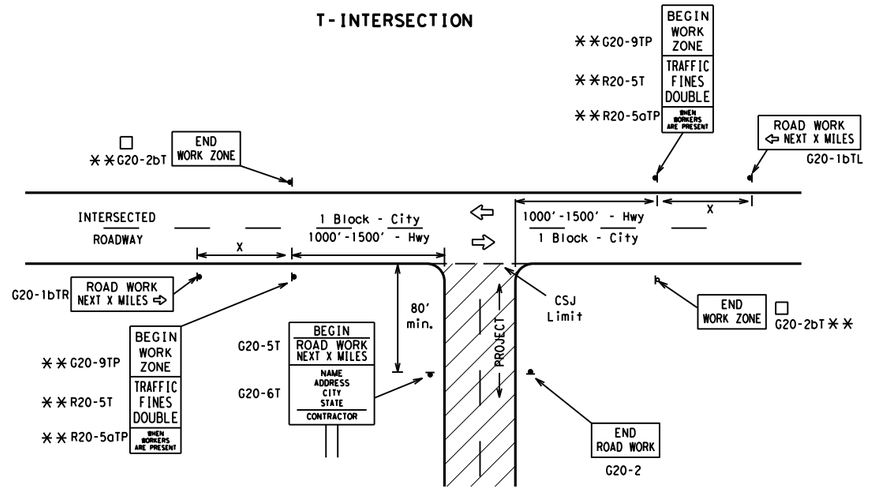
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. 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.
2. 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.
3. 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.
4. 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.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. 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

1. 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.
2. 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]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

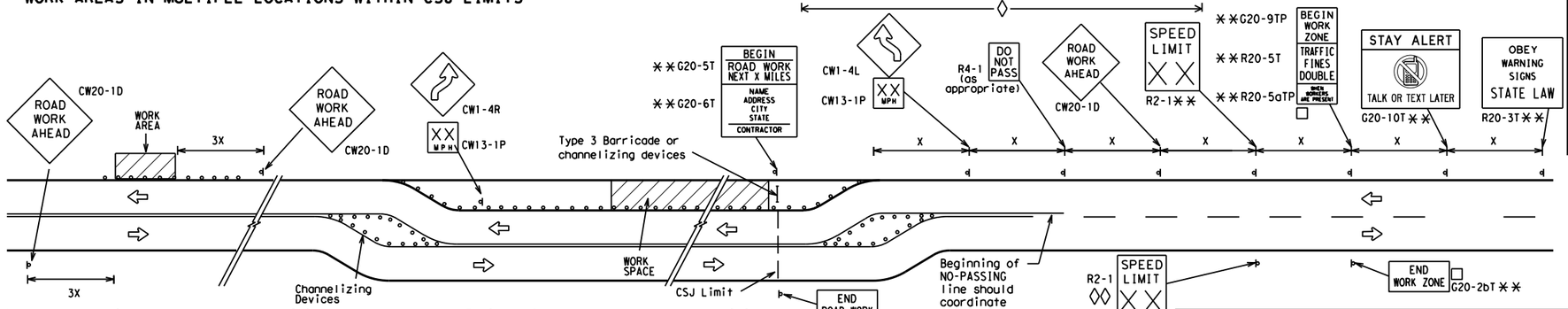
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 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".
5. Only diamond shaped warning sign sizes are indicated.
6. 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.

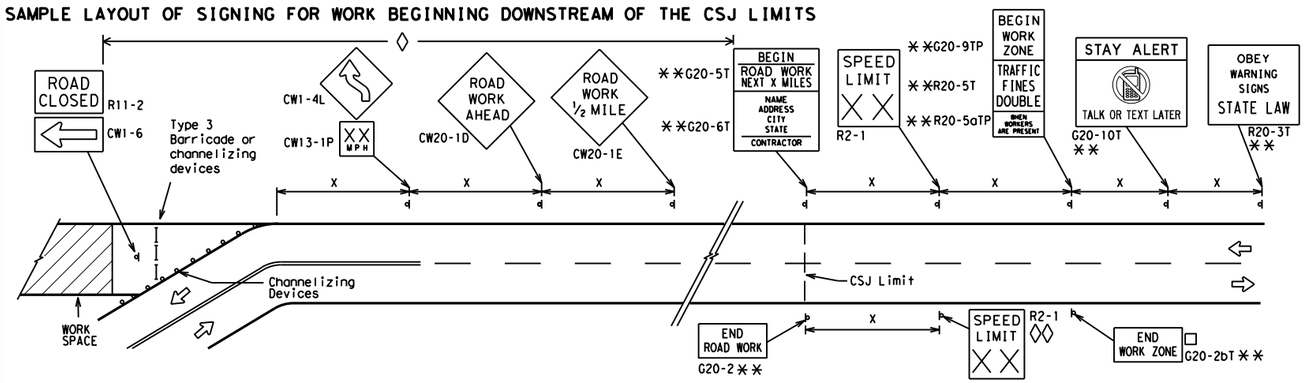
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	CHS	HARDEMAN		12

DATE: 11/1/2021 3:16:26 PM
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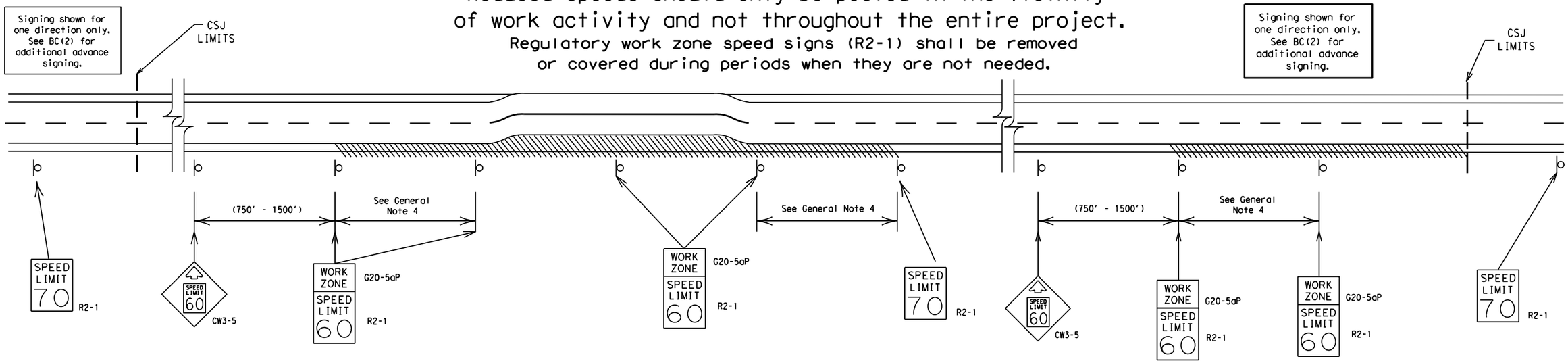
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) 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

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. 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
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. 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.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. 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.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	CHS	HARDEMAN		13

DATE: 11/1/2021 3:16:44 PM
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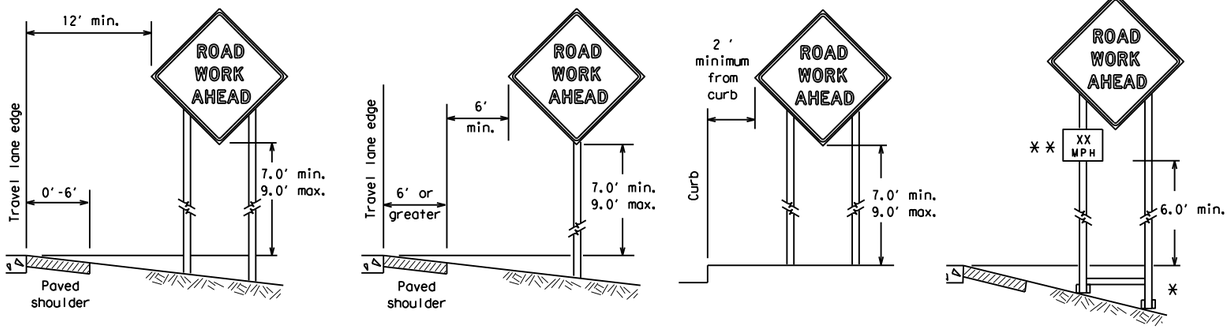
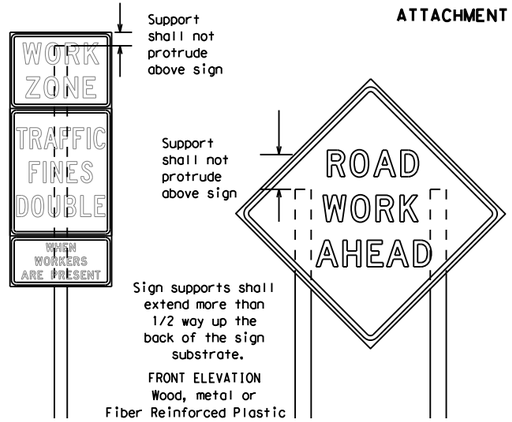
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

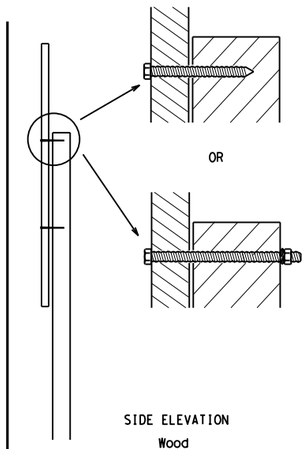


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





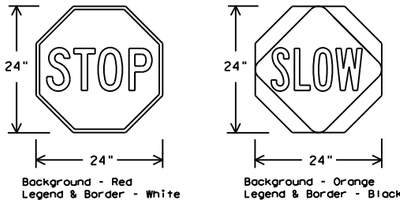
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectorized when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. 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

1. 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.
2. 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.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. 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.
5. 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.
6. 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.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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)

1. 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.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. 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.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. 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.
2. 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.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. 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.
5. 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

1. 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

1. 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.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. 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

1. 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).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. 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

1. 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

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. 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.
3. 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.
4. 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.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. 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.
7. 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.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. 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.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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7-13 5-21	CHS	HARDEMAN		14

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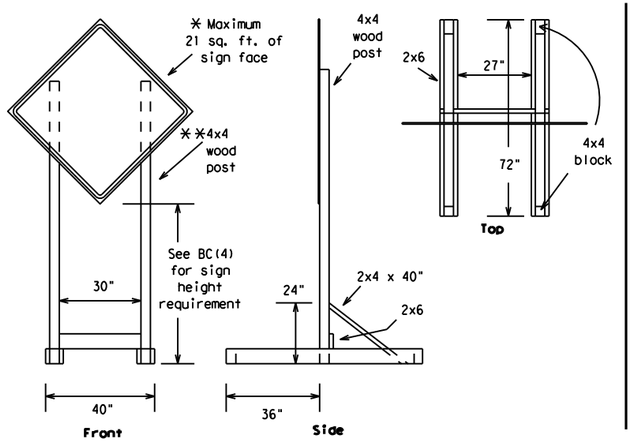
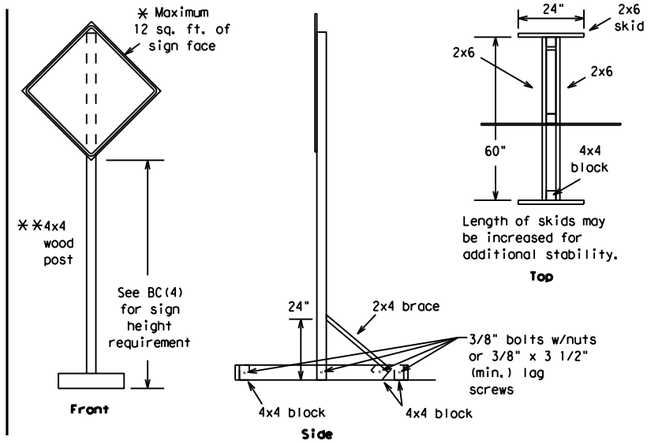
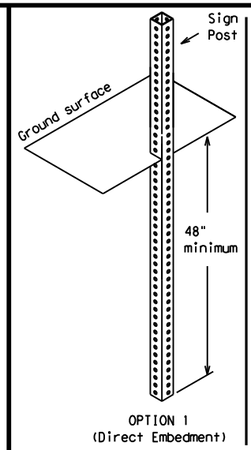
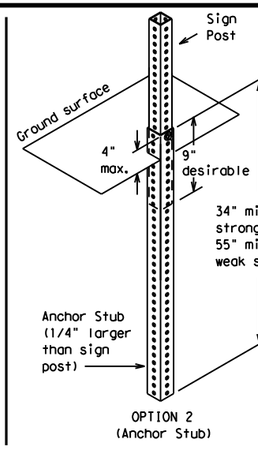


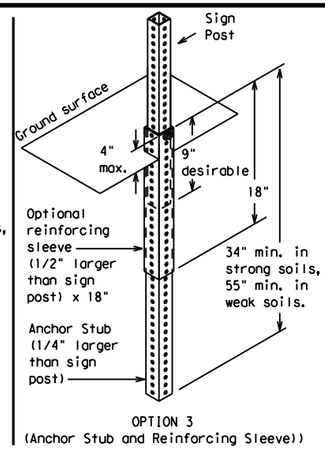


SKID MOUNTED WOOD SIGN SUPPORTS

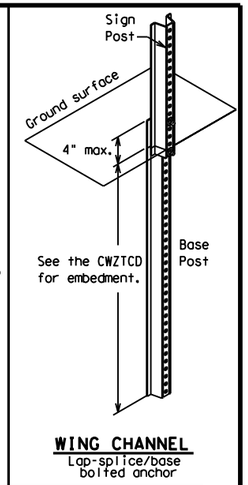
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







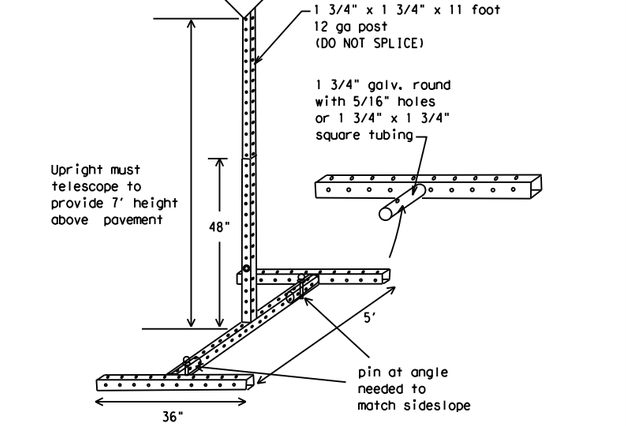
PERFORATED SQUARE METAL TUBING

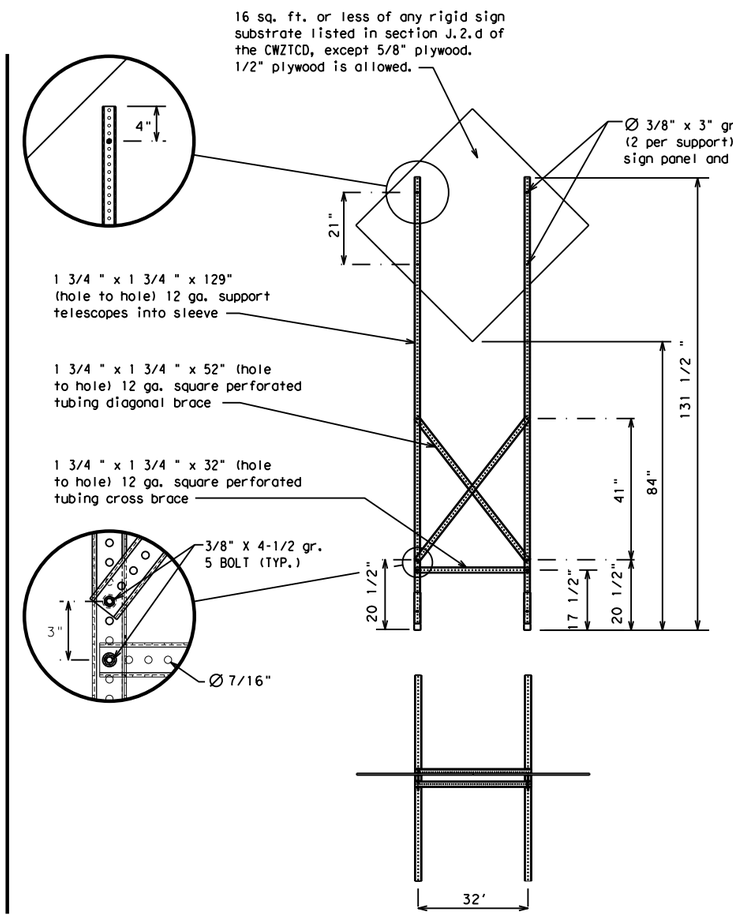


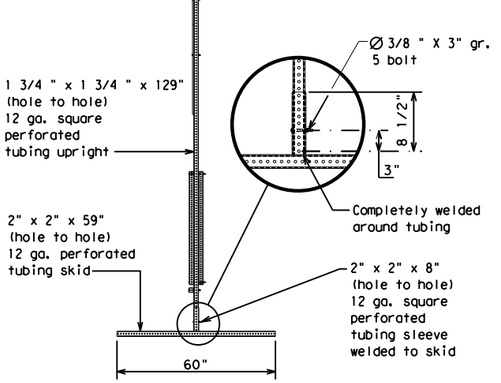
WING CHANNEL
Lap-splice/base bolted anchor

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

1. 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.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. 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.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	CHS	HARDEMAN		15

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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

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. 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.
3. 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.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. 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.
8. 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.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. 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.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. 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.
15. 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.
16. Each line of text should be centered on the message board rather than left or right justified.
17. 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
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
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
- FRONTAGE ROAD CLOSED
- ROAD CLOSED AT SH XXX
- SHOULDER CLOSED XXX FT
- ROAD CLSD AT FM XXXX
- RIGHT LN CLOSED XXX FT
- RIGHT X LANES CLOSED
- RIGHT X LANES OPEN
- CENTER LANE CLOSED
- DAYTIME LANE CLOSURES
- NIGHT LANE CLOSURES
- I-XX SOUTH EXIT CLOSED
- VARIOUS LANES CLOSED
- EXIT XXX CLOSED X MILE
- EXIT CLOSED
- RIGHT LN TO BE CLOSED
- MALL DRIVEWAY CLOSED
- X LANES CLOSED TUE - FRI
- XXXXXXXX BLVD CLOSED

Other Condition List

- ROADWORK XXX FT
- ROAD REPAIRS XXXX FT
- FLAGGER XXXX FT
- LANE NARROWS XXXX FT
- RIGHT LN NARROWS XXXX FT
- TWO-WAY TRAFFIC XX MILE
- MERGING TRAFFIC XXXX FT
- CONST TRAFFIC XXX FT
- LOOSE GRAVEL XXXX FT
- UNEVEN LANES XXXX FT
- DETOUR X MILE
- ROUGH ROAD XXXX FT
- ROADWORK PAST SH XXXX
- ROADWORK NEXT FRI-SUN
- BUMP XXXX FT
- US XXX EXIT X MILES
- TRAFFIC SIGNAL XXXX FT
- LANES SHIFT *

* 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
- FORM X LINES RIGHT
- DETOUR NEXT X EXITS
- USE XXXXX RD EXIT
- USE EXIT XXX
- USE EXIT I-XX NORTH
- STAY ON US XXX SOUTH
- USE I-XX E TO I-XX N
- TRUCKS USE US XXX N
- WATCH FOR TRUCKS
- WATCH FOR TRUCKS
- EXPECT DELAYS
- EXPECT DELAYS
- PREPARE TO STOP
- REDUCE SPEED XXX FT
- END SHOULDER USE
- USE OTHER ROUTES
- WATCH FOR WORKERS
- STAY IN LANE *

Location List

- AT FM XXXX
- BEFORE RAILROAD CROSSING
- NEXT X MILES
- PAST US XXX EXIT
- XXXXXXX TO XXXXXXX
- 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

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. 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.
6. 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

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. 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

1. 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.
2. 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.
3. 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.
4. 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.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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7-13 5-21	CHS	HARDEMAN		16

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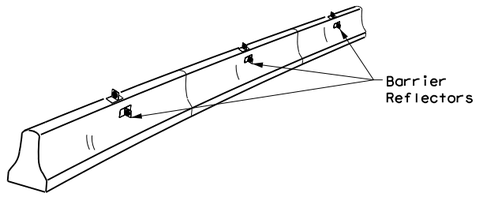
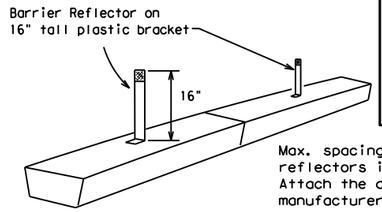
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

3. 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.
4. 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.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.

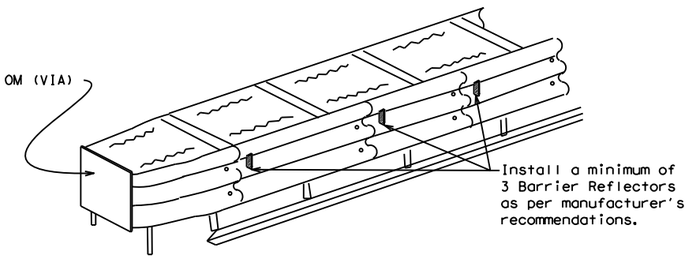


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

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.

LOW PROFILE CONCRETE BARRIER (LPCB)

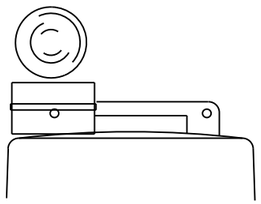


DELINEATION OF END TREATMENTS

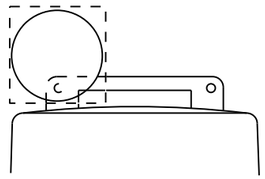
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate 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



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

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. 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.
4. 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".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. 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.
7. 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.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

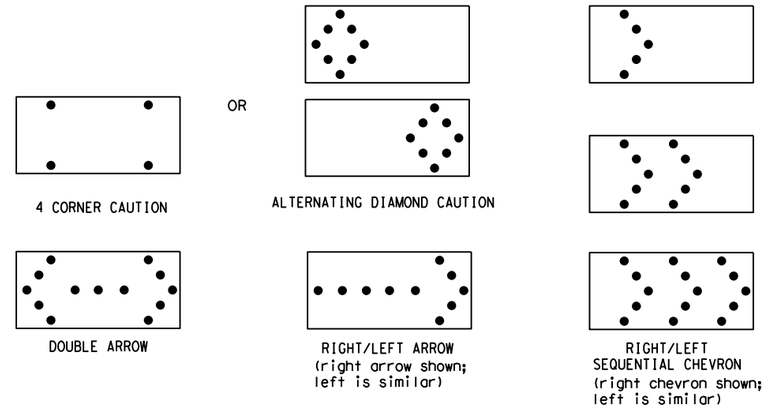
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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.
4. 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.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. 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

1. 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.
2. 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.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. 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.
6. 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.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

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.

1. 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.
2. 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.
3. 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.
4. The Flashing Arrow Board should be able to display the following symbols:



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. 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.
8. 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.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. 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.
14. 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

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. 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.
6. 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.

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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7-13 5-21	CHS	HARDEMAN		17

DATE: 11/1/2021 3:18:50 PM
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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. 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.
3. 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.
4. 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).
5. 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.
6. 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:

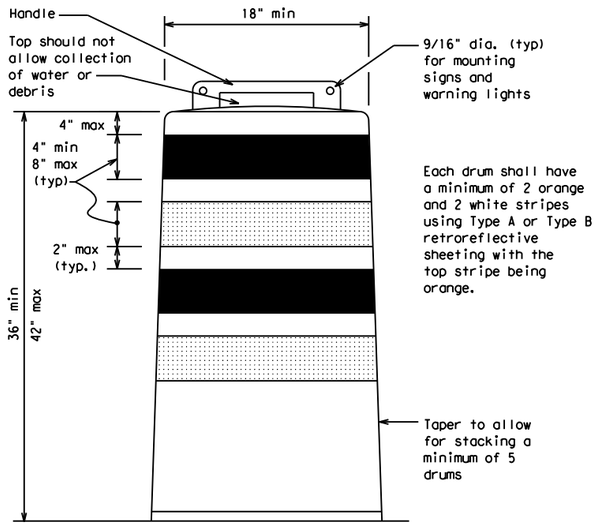
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

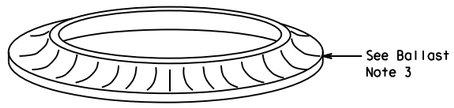
RETROREFLECTIVE SHEETING

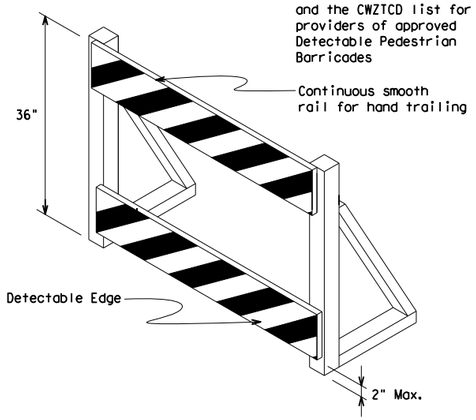
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall 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

1. 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.
2. 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.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. 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.
5. 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.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.





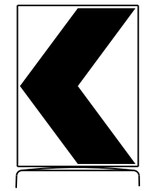


This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades

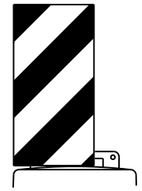
Continuous smooth rail for hand trailing

DETECTABLE PEDESTRIAN BARRICADES

1. 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.
2. 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.
3. 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.
4. 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.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. 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

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. 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.
3. 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.
4. 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.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. 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.
8. 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.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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9-07 5-21	CHS	HARDEMAN		18
7-13				

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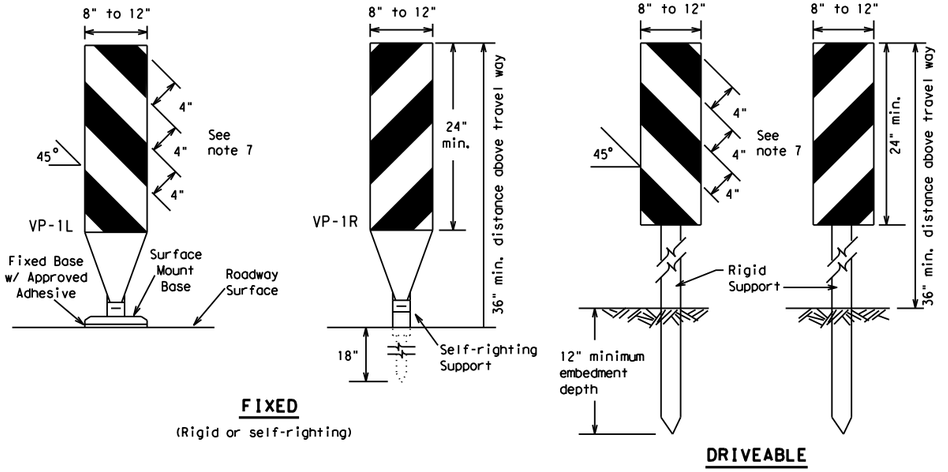
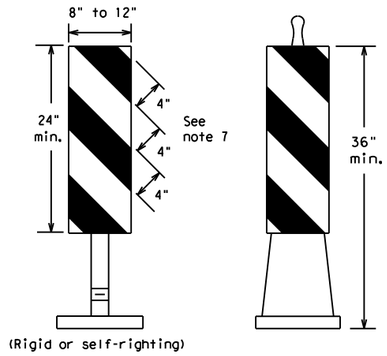


FIXED
(Rigid or self-righting)

DRIVEABLE

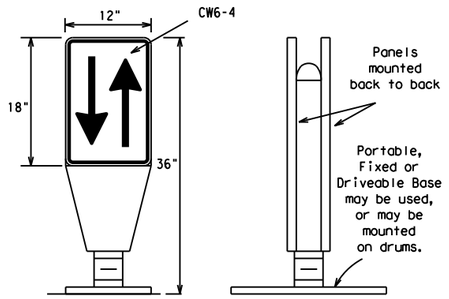


(Rigid or self-righting)

PORTABLE

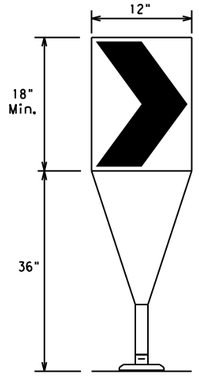
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. 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.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. 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.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. 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.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



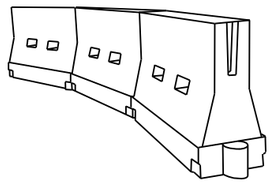
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. 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.
3. 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.
4. To be effective, the chevron should be visible for at least 500 feet.
5. 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.
6. 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

GENERAL NOTES

1. 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).
2. 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.
3. 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).
4. 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.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. 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.
7. 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.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. 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.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. 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

1. 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.
2. 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.
3. 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.
4. 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.
5. 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

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	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

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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7-13 5-21	CHS	HARDEMAN		19

DATE: 11/1/2021 3:19:32 PM
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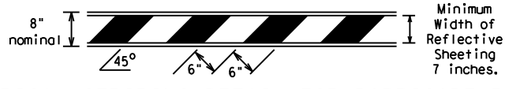
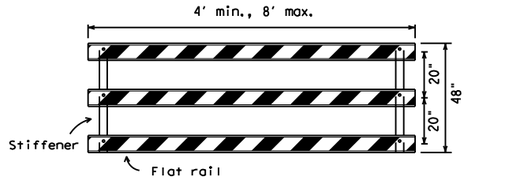
TYPE 3 BARRICADES

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.



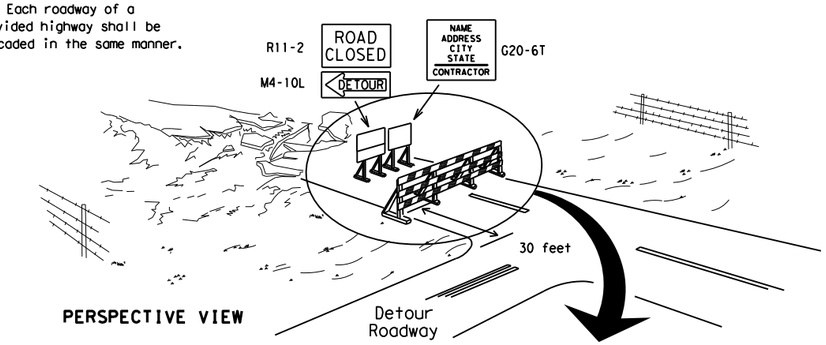
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

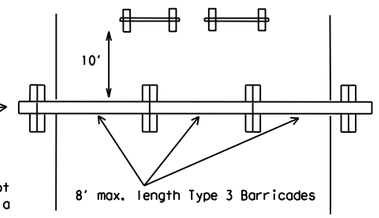
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

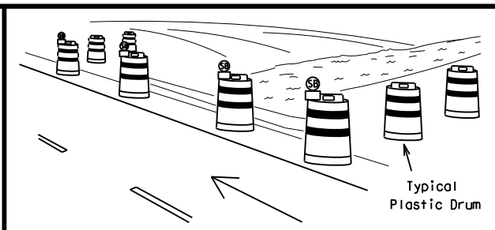
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

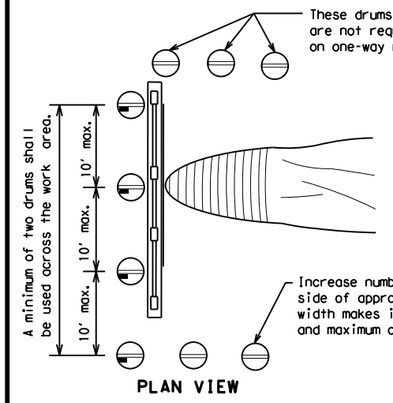
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

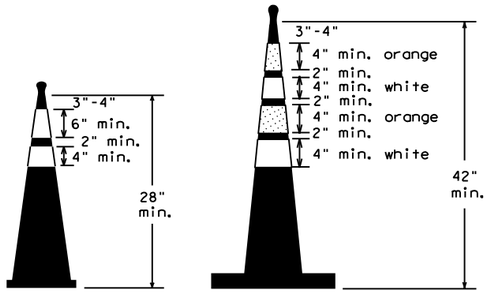
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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
SB	Steady burn warning light or yellow warning reflector

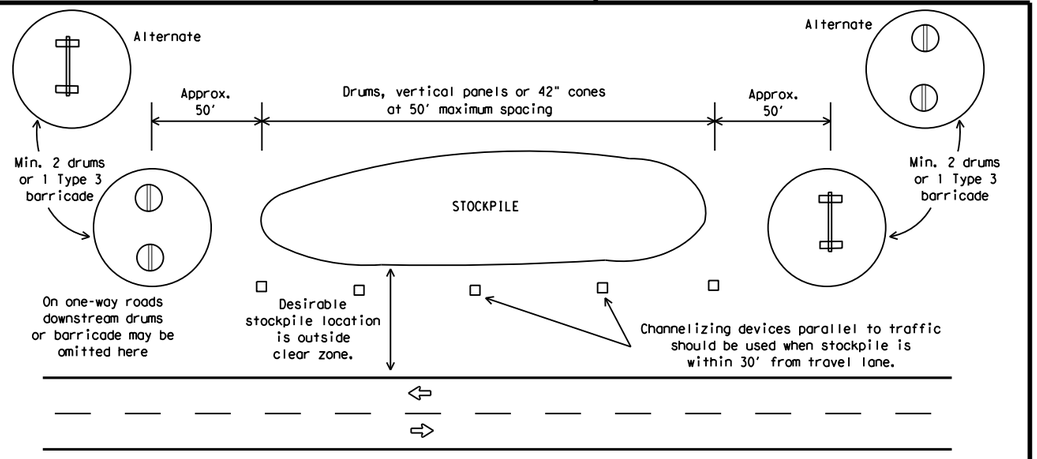
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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104

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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. 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.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. 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).
6. 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.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. 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

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

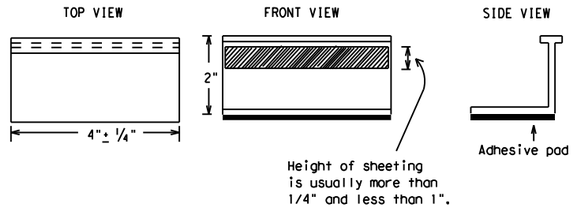
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. 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.
3. 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.
4. 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

1. 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.
2. 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.
3. 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".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. 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.
10. 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

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. 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.
   A. 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.
   B. 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.
3. Small design variances may be noted between tab manufacturers.
4. 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

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. 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).

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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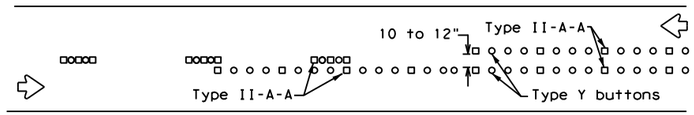
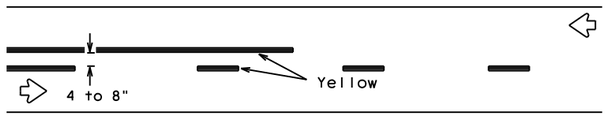
PAVEMENT MARKING PATTERNS

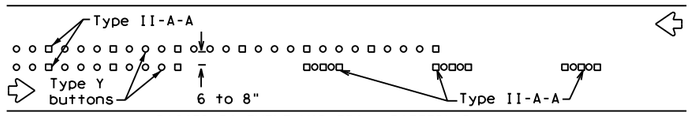
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



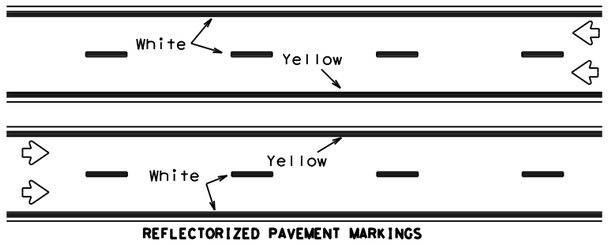
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



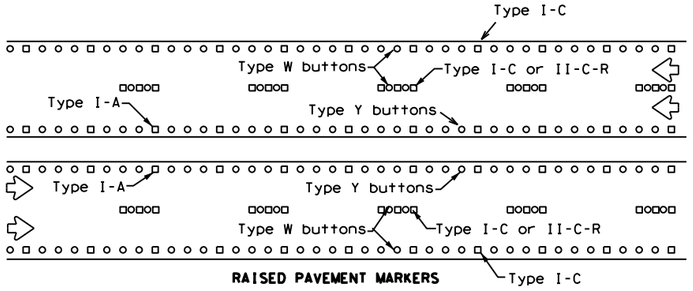
RAISED PAVEMENT MARKERS - PATTERN B

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.

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



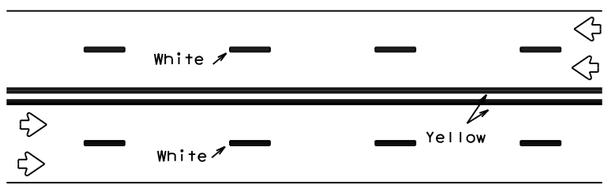
REFLECTORIZED PAVEMENT MARKINGS



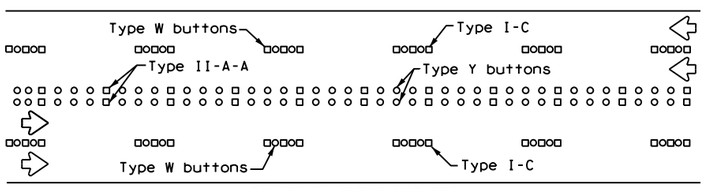
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



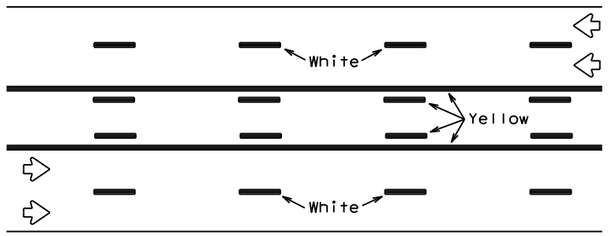
REFLECTORIZED PAVEMENT MARKINGS



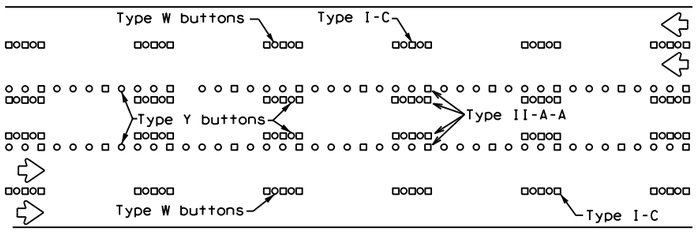
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

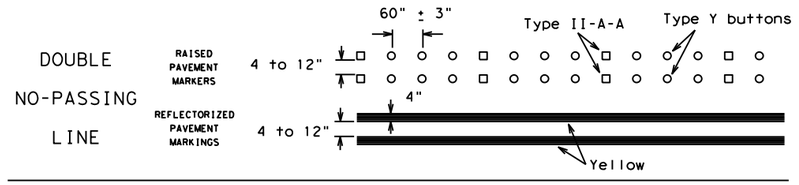
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

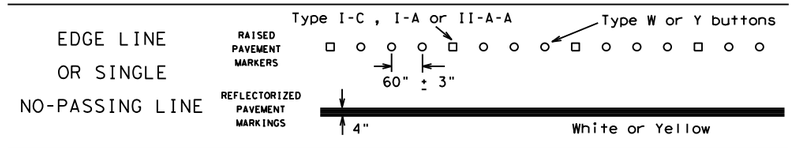
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

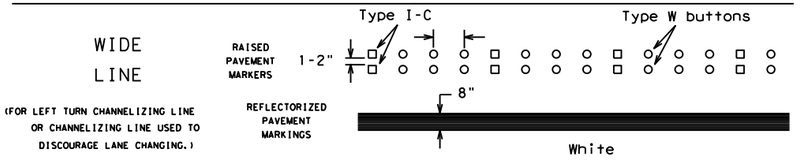


EDGE LINE OR SINGLE NO-PASSING LINE



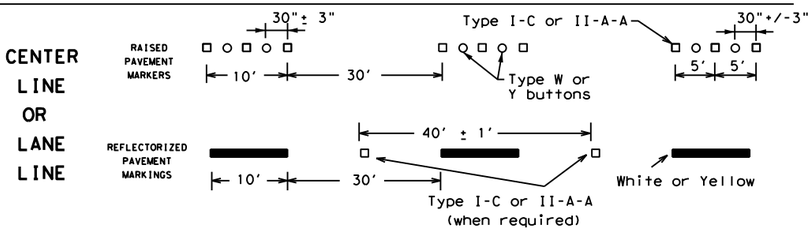
WIDE LINE

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

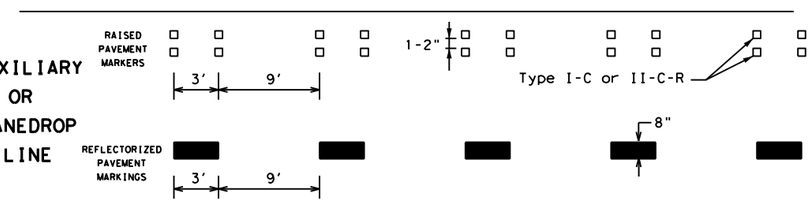


BROKEN LINES

CENTER LINE OR LANE LINE

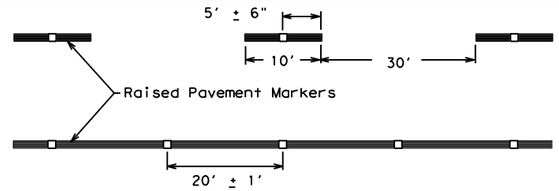


AUXILIARY OR LANEDROP LINE



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.



Centerline only - not to be used on edge lines

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."

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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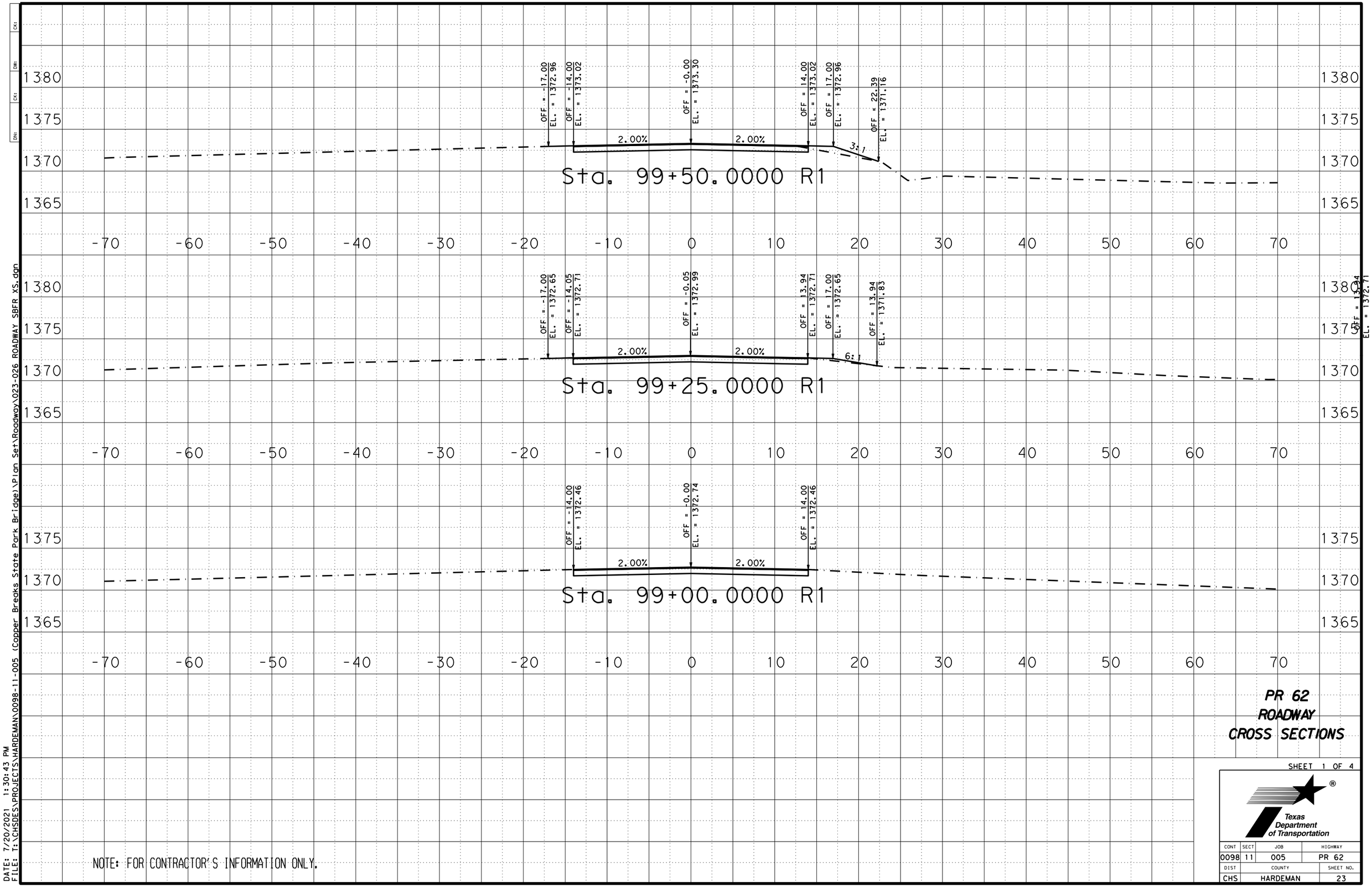

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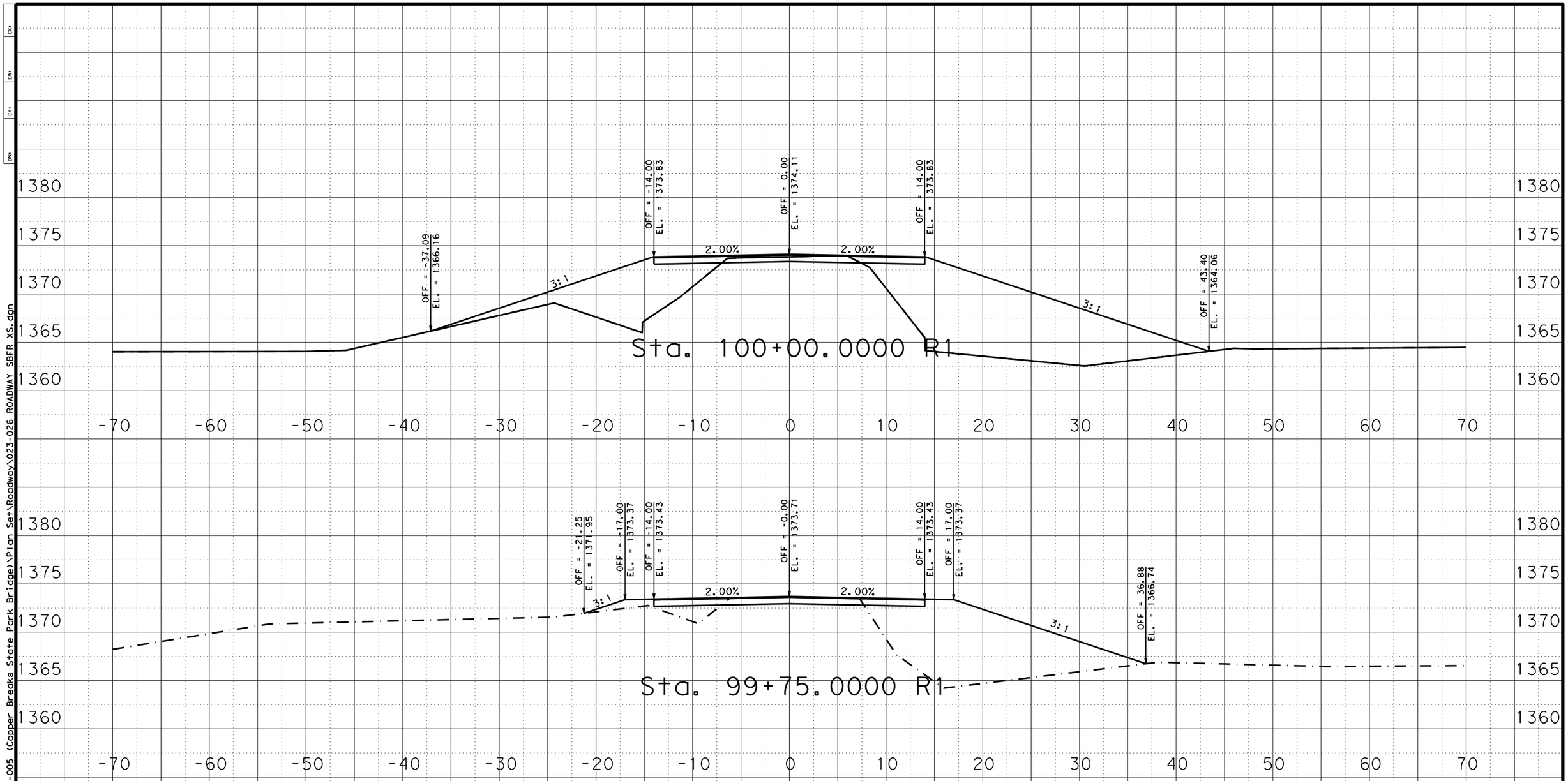
NOTE: FOR CONTRACTOR'S INFORMATION ONLY.

PR 62
ROADWAY
CROSS SECTIONS

SHEET 1 OF 4

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		23



NOTE: FOR CONTRACTOR'S INFORMATION ONLY.

PR 62
ROADWAY
CROSS SECTIONS

SHEET 2 OF 4

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		24

DATE: 7/20/2021 1:30:56 PM
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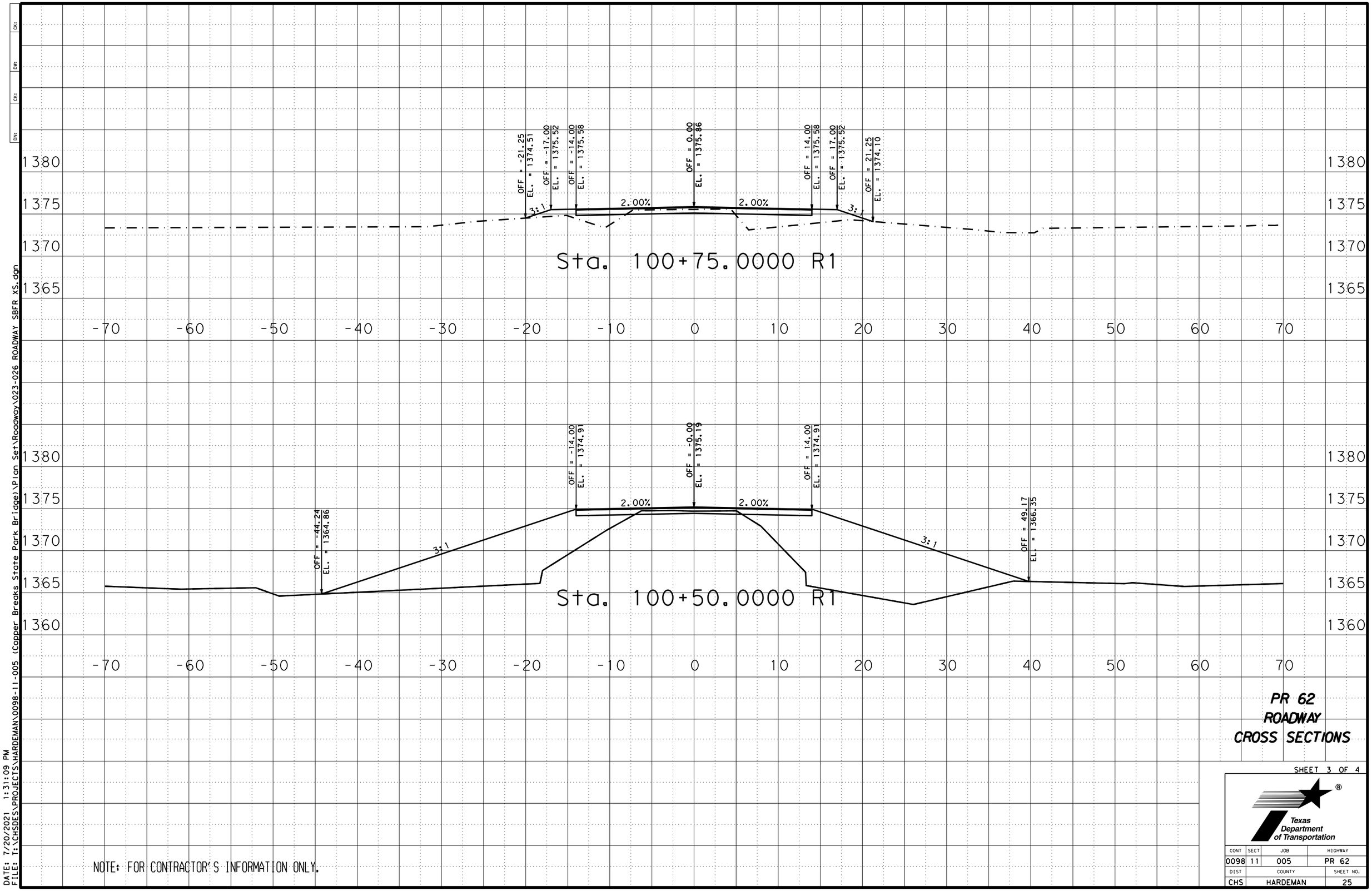

NOTE: FOR CONTRACTOR'S INFORMATION ONLY.

PR 62
ROADWAY
CROSS SECTIONS

SHEET 3 OF 4

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		25

DATE: 7/20/2021 1:31:09 PM
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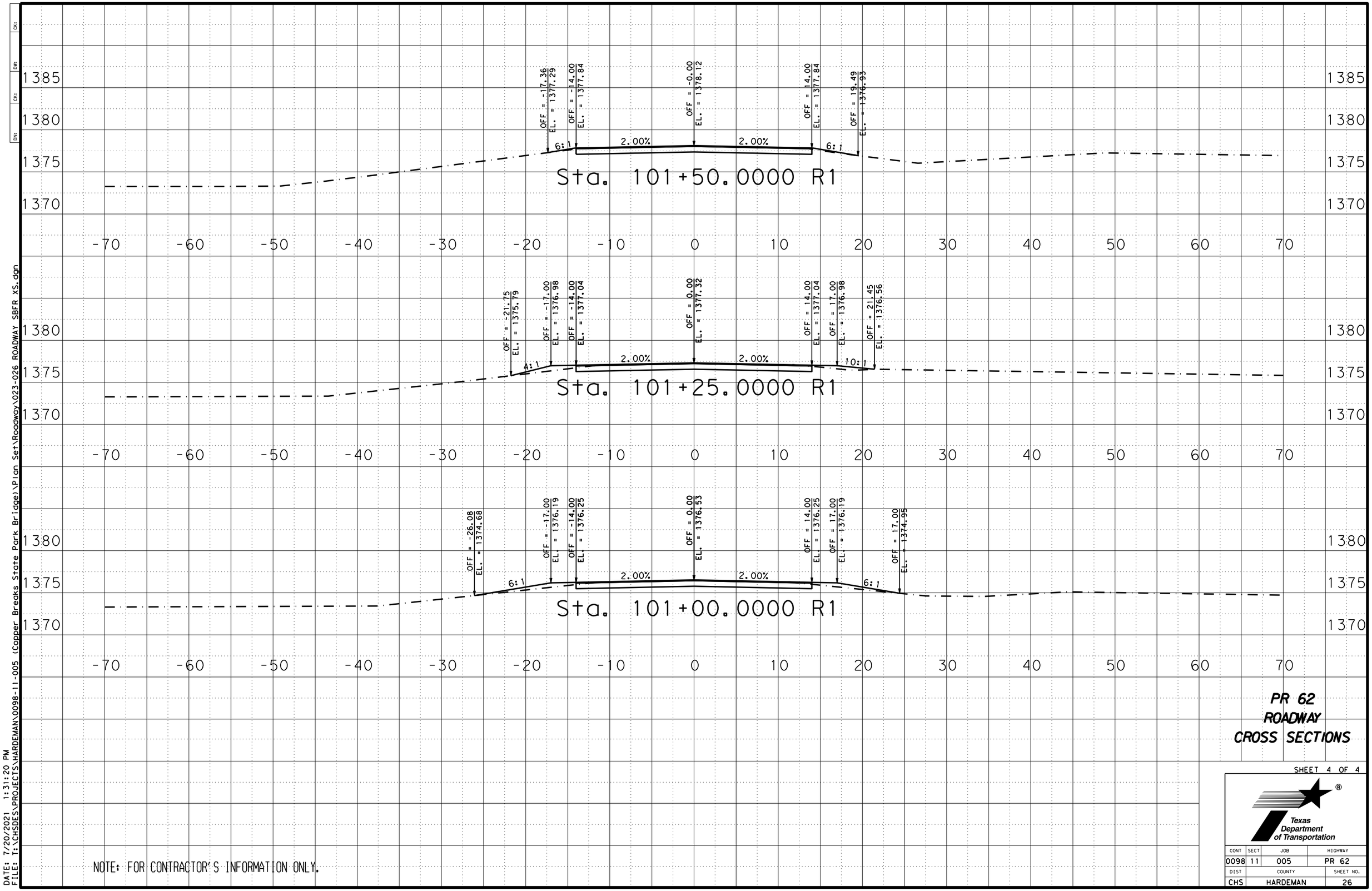

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NOTE: FOR CONTRACTOR'S INFORMATION ONLY.

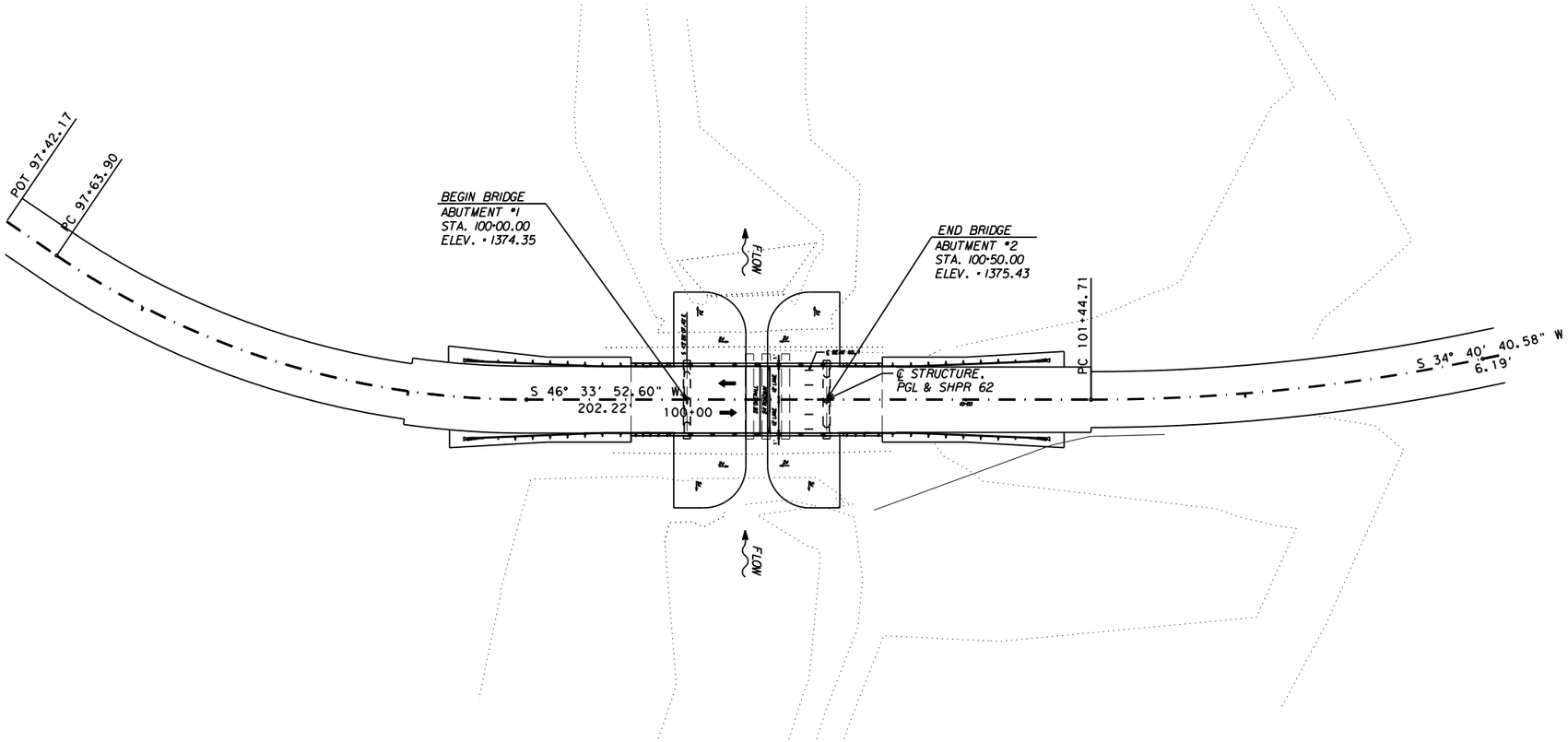
PR 62
ROADWAY
CROSS SECTIONS

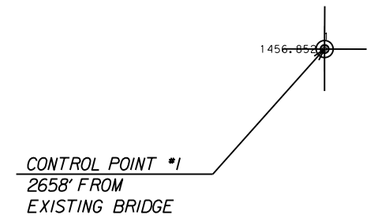
SHEET 4 OF 4

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		26

HORIZONTAL AND VERTICAL CONTROL MAP
PR 62 @ DEVIL'S CREEK
HARDEMAN COUNTY, TEXAS





CONTROL POINT	NORTHING	EASTING	ELEVATION
CP#1	1588697.4069	7452985.1365	1456.8521

THE PROJECT UNIT OF MEASURE IS U.S. SURVEY FEET. THE SURVEY WAS COMPLETED IN 2020.

COORDINATE SYSTEM :U.S. STATE PLANE 1983
HORIZONTAL DATUM :NORTH AMERICAN DATUM (NAD83)(CONUS)(MOL)
VERTICAL DATUM :NORTH AMERICAN DATUM OF 1988 (NAVD88)
GEODETIC ZONE :TEXAS NORTH (4201)
GEOID MODEL :TXGI2AUS
SURFACE ADJUSTMENT FACTOR (SAF):1.00 (NOT ADJUSTED)

NOTE: CONTROL POINTS ARE IRON RODS WITH PLASTIC YELLOW CAPS LABELED "TXDOT" ON TOP.

Ryan J Reid P.E.
10/06/2021

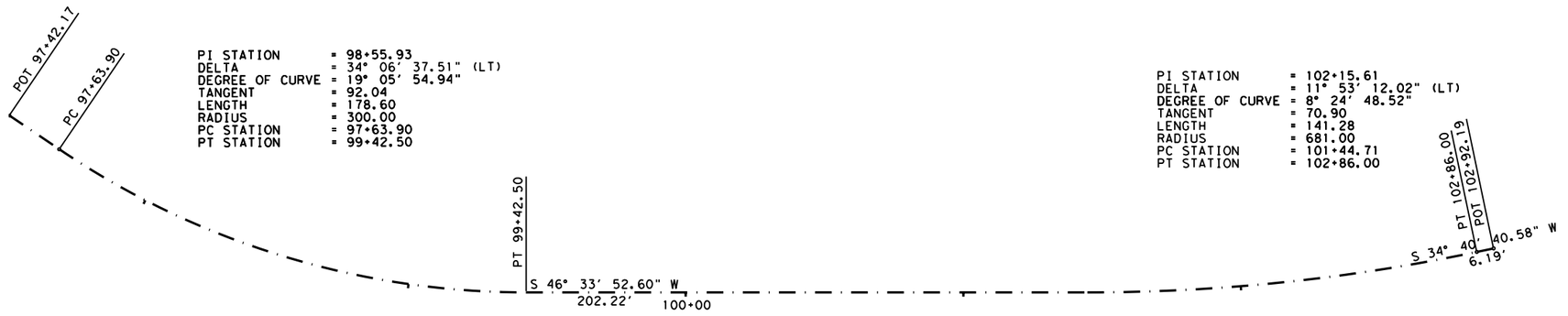
SURVEY CONTROL DATA

PR 62 @ DEVIL'S CREEK

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		26A

DATE:
FILE:



Point RDCBFL1 N 7,454,022.2179 E 1,589,912.5608 Sta 97+42.17

Course from RDCBFL1 to PC RDCBFL*3 S 80° 40' 30.10" W Dist 21.7268

		Curve Data		
Curve RDCBFL*3				
P.I. Station	98+55.93	N 7,454,003.7846	E	1,589,800.3019
Delta =	34° 06' 37.51" (LT)			
Degree =	19° 05' 54.94"			
Tangent =	92.0354			
Length =	178.6017			
Radius =	300.0000			
External =	13.8001			
Long Chord =	175.9758			
Mid. Ord. =	13.1932			
P.C. Station	97+63.90	N 7,454,018.6974	E	1,589,891.1211
P.T. Station	99+42.50	N 7,453,940.5069	E	1,589,733.4704
C.C.		N 7,453,722.6619	E	1,589,939.7313
Back = S	80° 40' 30.11" W			
Ahead = S	46° 33' 52.60" W			
Chord Bear = S	63° 37' 11.35" W			

Course from PT RDCBFL*3 to PC RDCBFL*6 S 46° 33' 52.60" W Dist 202.2169

		Curve Data		
Curve RDCBFL*6				
P.I. Station	102+15.61	N 7,453,752.7325	E	1,589,535.1501
Delta =	11° 53' 12.02" (LT)			
Degree =	8° 24' 48.52"			
Tangent =	70.8951			
Length =	141.2813			
Radius =	681.0000			
External =	3.6803			
Long Chord =	141.0281			
Mid. Ord. =	3.6605			
P.C. Station	101+44.71	N 7,453,801.4755	E	1,589,586.6306
P.T. Station	102+86.00	N 7,453,694.4310	E	1,589,494.8134
C.C.		N 7,453,306.9672	E	1,590,054.8427
Back = S	46° 33' 52.60" W			
Ahead = S	34° 40' 40.58" W			
Chord Bear = S	40° 37' 16.59" W			

Course from PT RDCBFL*6 to RDCBFL8 S 34° 40' 40.58" W Dist 6.1941

Point RDCBFL8 N 7,453,689.3372 E 1,589,491.2892 Sta 102+92.19

==========

Ending chain RDCBFL description

STATE OF TEXAS
RYAN J. REID
139507
LICENSED
PROFESSIONAL ENGINEER

Ryan J Reid P.E.

10/06/2021

HORIZONTAL ALIGNMENT DATA

PR 62 @ DEVIL'S CREEK

SCALE:
1" = 100' PLAN VIEW

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		27

DN: | CK: | DW: | CK:

STA. 97+42.17

POT 97+42.17

PC 97+63.90

PI STATION = 98+55.93
DELTA = 34° 06' 37.51" (LT)
DEGREE OF CURVE = 19° 05' 54.94"
TANGENT = 92.04
LENGTH = 178.60
RADIUS = 300.00
PC STATION = 97+63.90
PT STATION = 99+42.50

PT 99+42.50

BEGIN BRIDGE
ABUTMENT #1
STA. 100+00.00
ELEV. = 1374.35

FLOW

END BRIDGE
ABUTMENT #2
STA. 100+50.00
ELEV. = 1375.43

PC 101+44.71

PI STATION = 102+15.61
DELTA = 11° 53' 12.02" (LT)
DEGREE OF CURVE = 8° 24' 48.52"
TANGENT = 70.90
LENGTH = 141.28
RADIUS = 681.00
PC STATION = 101+44.71
PT STATION = 102+86.00

PT 102+86.00

POT 102+92.19

STA. 102+92.19

S 46° 33' 52.60" W
202.22

100.00

℄ STRUCTURE.
PGL & SHPR 62

S 34° 40' 08.58" W
6.19

BEGIN PROJECT
STA. 99+00.00

APPROACH SLAB
BAS-A (CHS)
STA. 99+80.00
ELEV. = 1373.98

APPROACH SLAB
BAS-A (CHS)
STA. 100+70.00
ELEV. = 1375.92

END PROJECT
STA. 101+50.00

N

103	74		
351	369		
59	44		
4	4		
3			

SHEET TOTALS

EST.	FINAL	UNIT	DESCRIPTION
177		CY	EXCAVATION (ROADWAY)
720		CY	EMBANKMENT (FINAL)(DENSCONT.)(TY B)
103		CY	FL BS(CMP IN PLC)(TY B GR3)(FNAL POS)(8")
8		CY	AGGR (TY-B GR-4 SAC-A)(2CRSE)
3		EA	REMOV STR (PIPE)

STA = 100+17.18
EL = 1,371.15'
ex = 3.54'
K = 107
L = 550.02'

(-)0.4935 %

(+)4.6613 %

BEGIN BRIDGE
ABUTMENT #1
STA. 100+00.00
ELEV. = 1374.35

END BRIDGE
ABUTMENT #2
STA. 100+50.00
ELEV. = 1375.43

END PROJECT
STA. 101+50.00

BEGIN PROJECT
STA. 99+00.00

1385
1380
1375
1370
1365
1360
1355

	PROPOSED	EXISTING
98+00	1,372.47	1,372.55
	1,372.39	1,372.52
	1,372.37	1,372.46
	1,372.42	1,372.40
	1,372.52	1,372.30
	1,372.67	1,372.45
99+00	1,372.75	1,372.75
	1,373.17	1,373.16
	1,373.50	1,373.77
	1,373.89	1,373.98
100+00	1,374.35	1,374.79
	1,374.86	1,375.01
	1,375.42	1,375.37
101+00	1,376.05	1,375.54
	1,376.74	1,376.42
	1,377.48	1,377.24
	1,378.25	1,378.25
	1,379.15	1,379.39
102+00	1,380.07	1,380.22
	1,381.05	1,381.19
	1,382.08	1,382.14
	1,383.18	1,383.07
103+00		

STATE OF TEXAS
RYAN J. REID
139507
LICENSED
PROFESSIONAL ENGINEER

Ryan J. Reid P.E.

10/06/2021

PR 62 @ DEVIL'S CREEK

PLAN & PROFILE

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		028

DATE: 7/20/2021 1:38:33 PM
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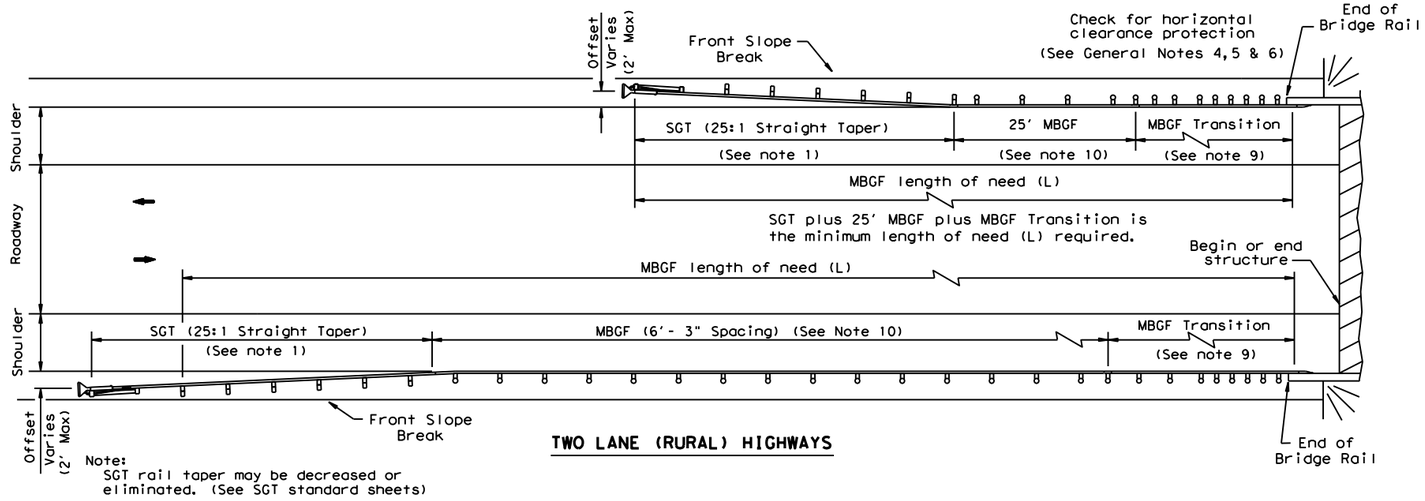
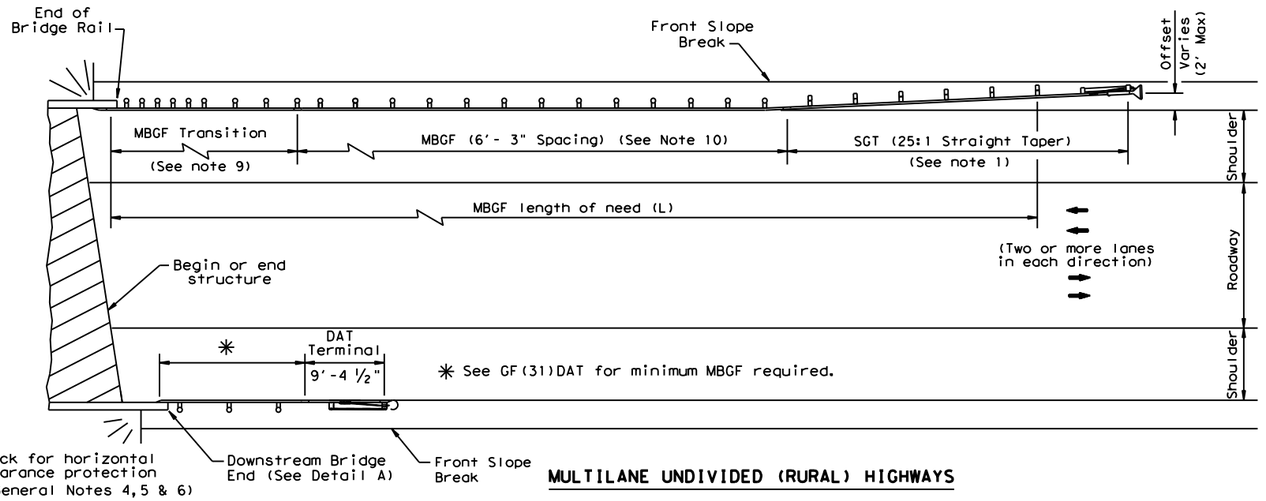
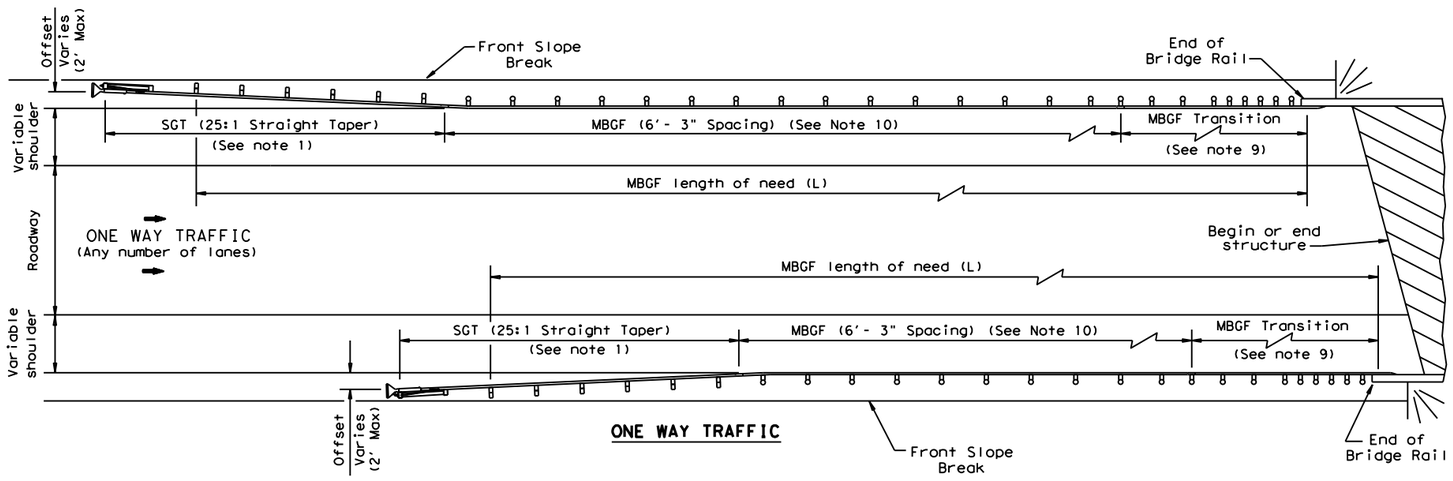


Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)

TWO LANE (RURAL) HIGHWAYS



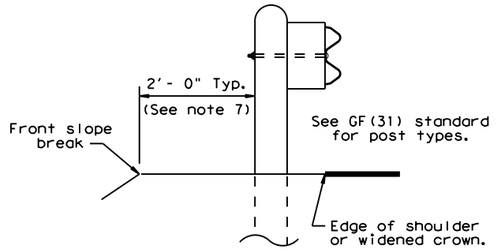
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



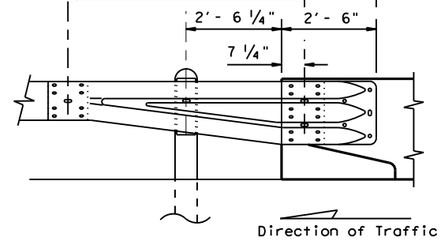
ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. <u>For restrictive bridge widths:</u> The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF



Note:
All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

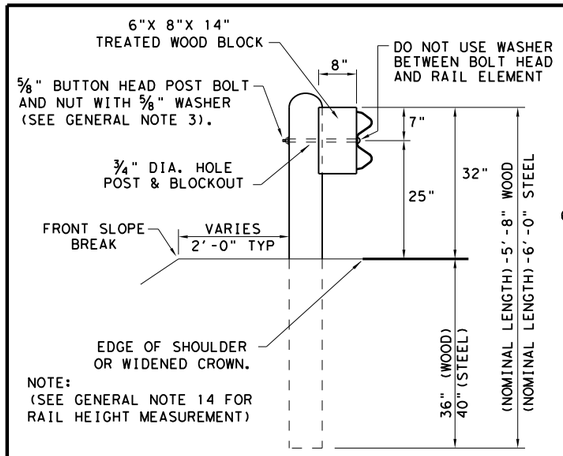
BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

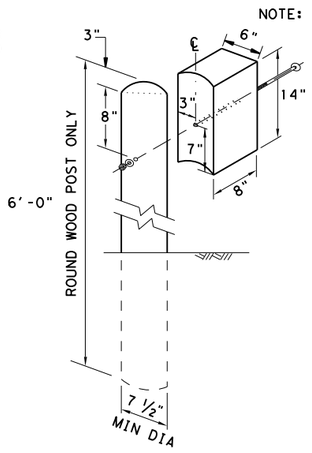
BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
04-2014 Added 25' MBGF to Two Lane (Rural) Highway section. Eng. CGL, Cad. VP	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		29

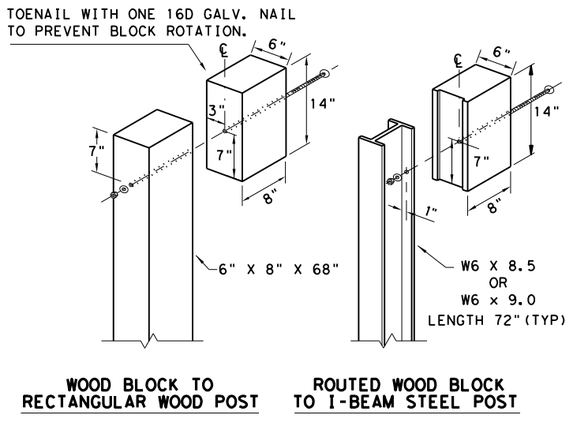
DATE: 7/9/2021
FILE: T:\CHSDES\PROJECTS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\Plan Set\Standards\030 GF(31)-19.dgn



TYPICAL POST PLACEMENT



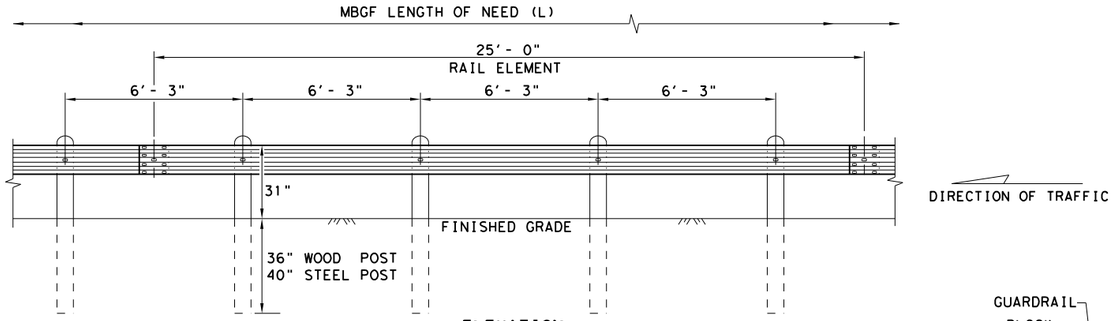
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

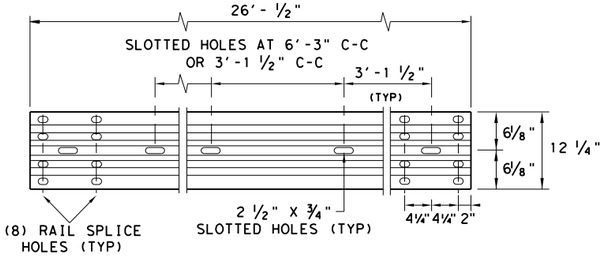
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



ELEVATION MID-SPAN RAIL SPLICE

SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.

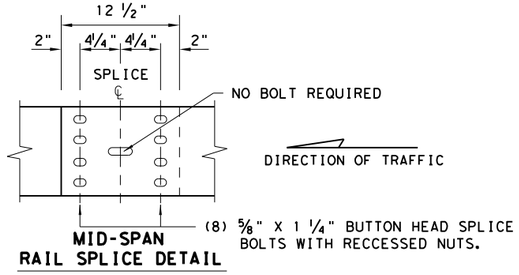
SPLICE BOLT LENGTH — VARIES

FBB01 = 1 1/4"
FBB02 = 2"
5/8"

POST & BLOCK LENGTH
FBB03 = 10"
FBB04 = 18"

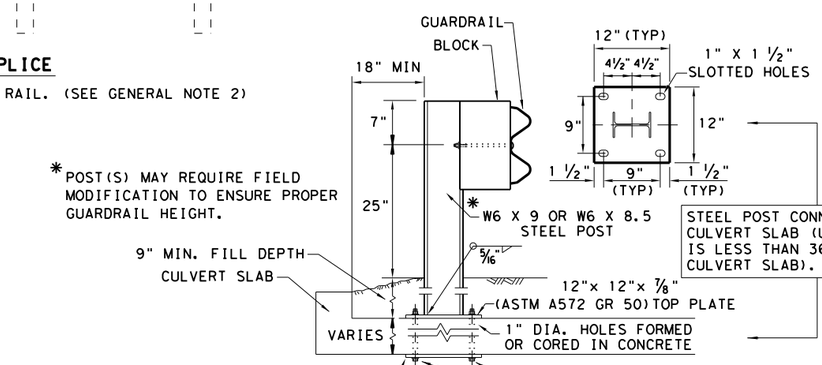
BUTTON HEAD BOLT

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.

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

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.

NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

GENERAL NOTES

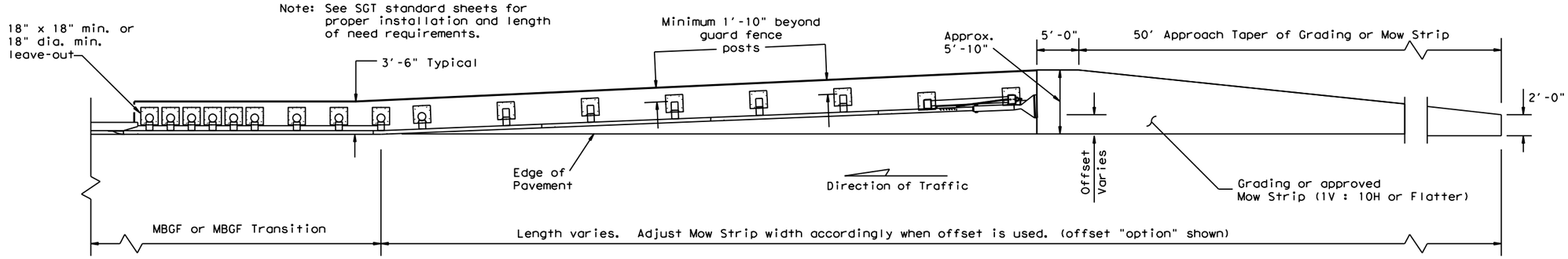
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS 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 5/8" WASHER (FWC16a) 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.

Texas Department of Transportation — Design Division Standard

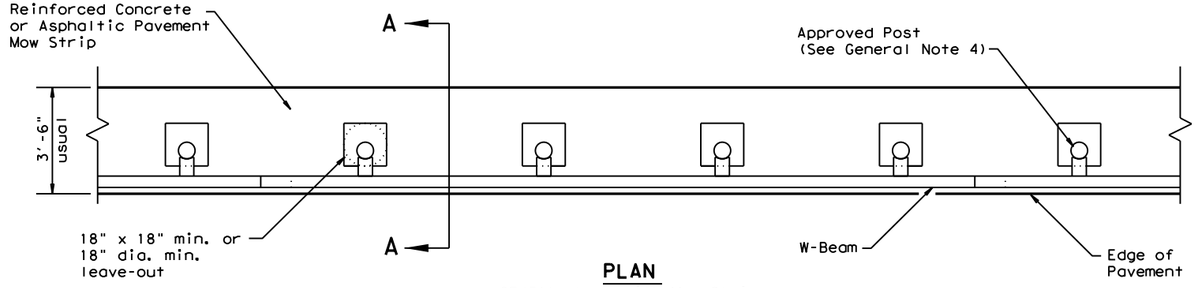
METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		30

DATE: 7/9/2021
FILE: T:\CHSDES\PROJECTS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\Plan Set\Standards\031 GF(31)MS-19.dgn

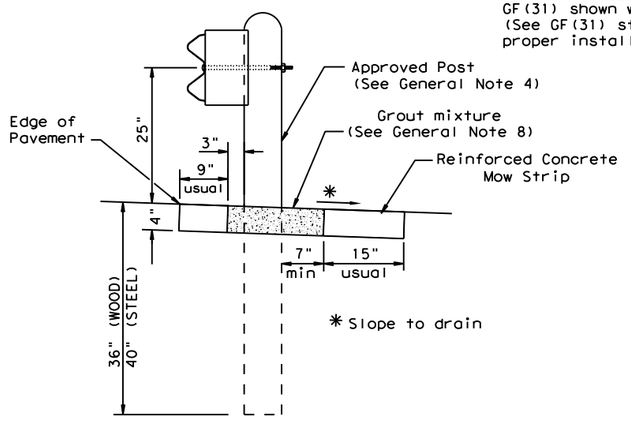


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



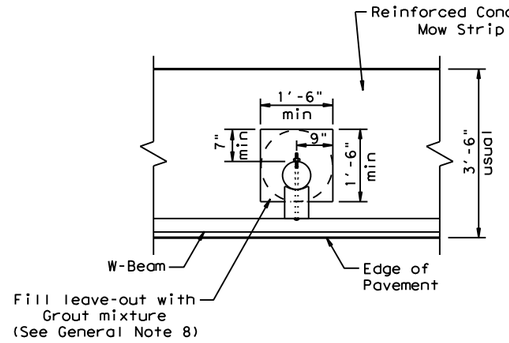
PLAN

GF(31) shown with Mow Strip
(See GF(31) standard sheet for proper installation)



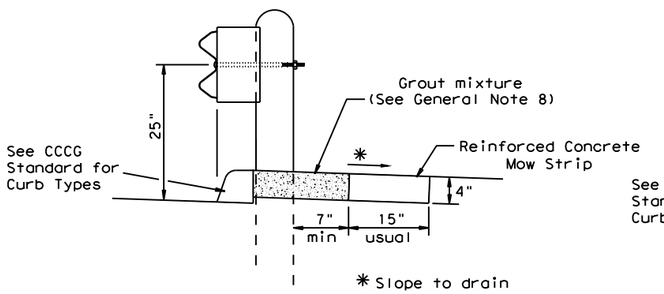
SECTION A-A

Typical



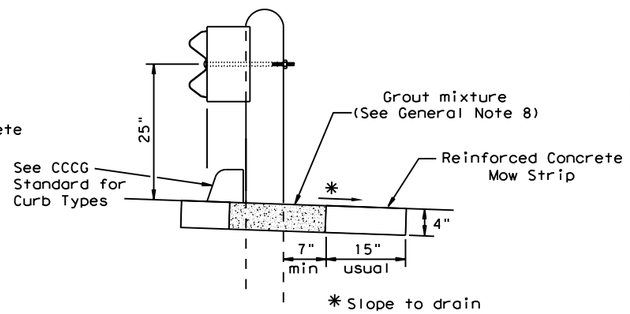
MOW STRIP DETAIL

Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.



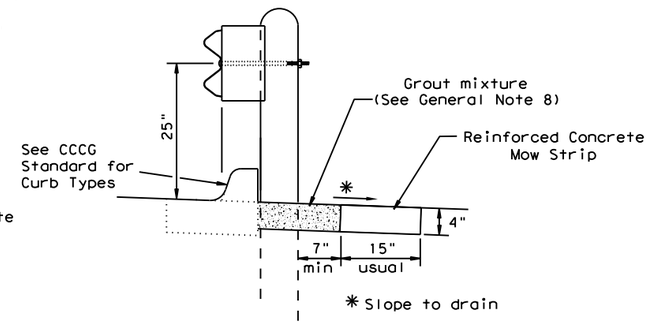
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

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.

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 ½" 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 1 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.

Texas Department of Transportation

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	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		31

DATE: 7/9/2021
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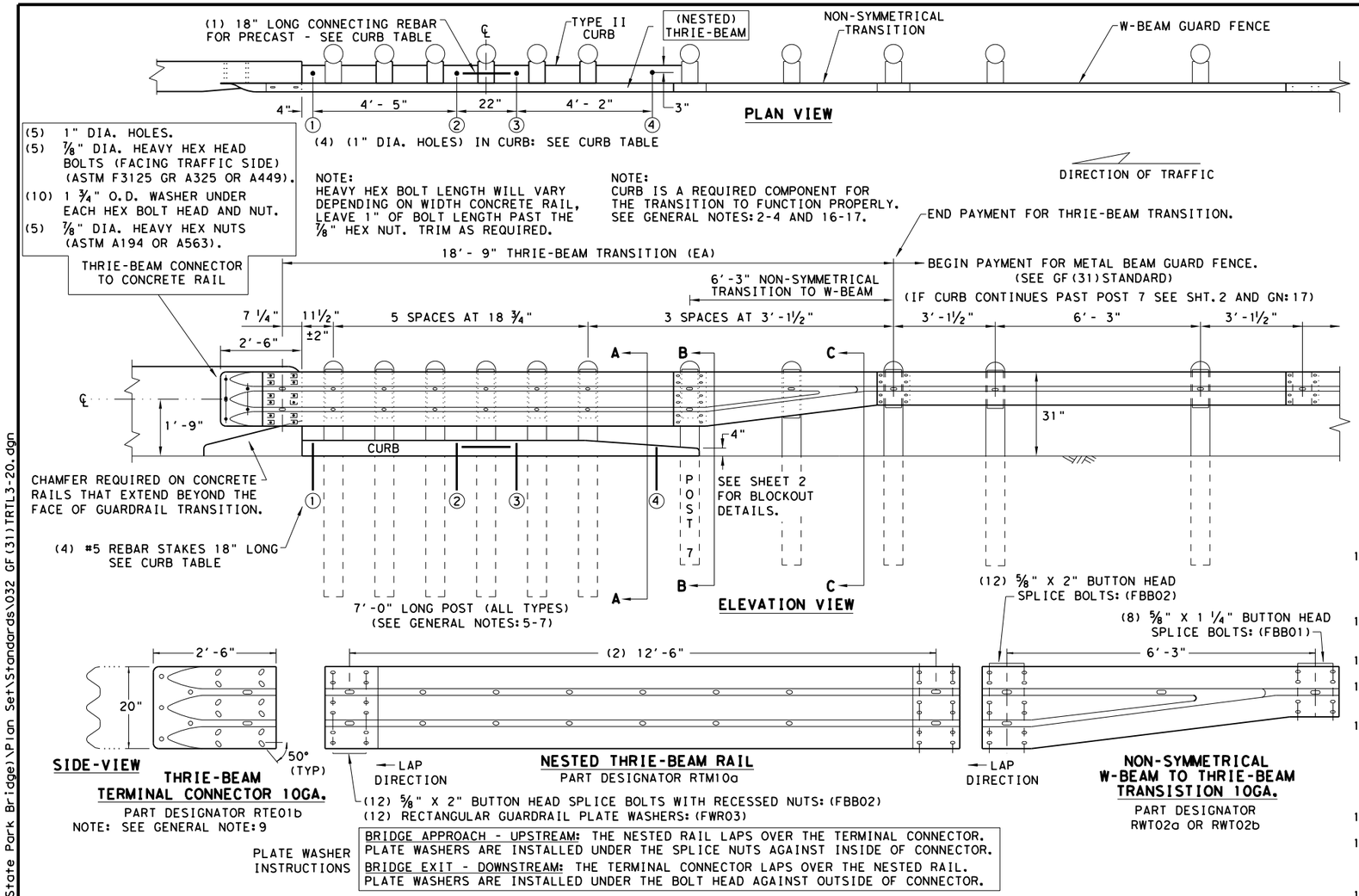


GENERAL NOTES

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- ¾" HEIGHT); SEE CURRENT CCCG 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 ½" 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 ⅝" 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 ⅝" WASHER (FWC16a) 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.

THRIE-BEAM TERMINAL - CURB TABLE

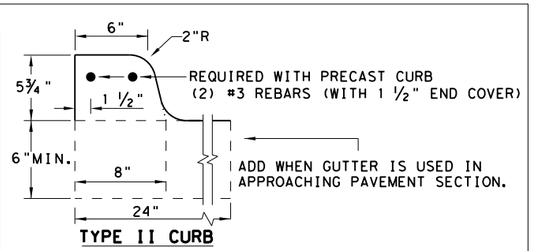
PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

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 ½" 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.



TYPE II CURB

NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

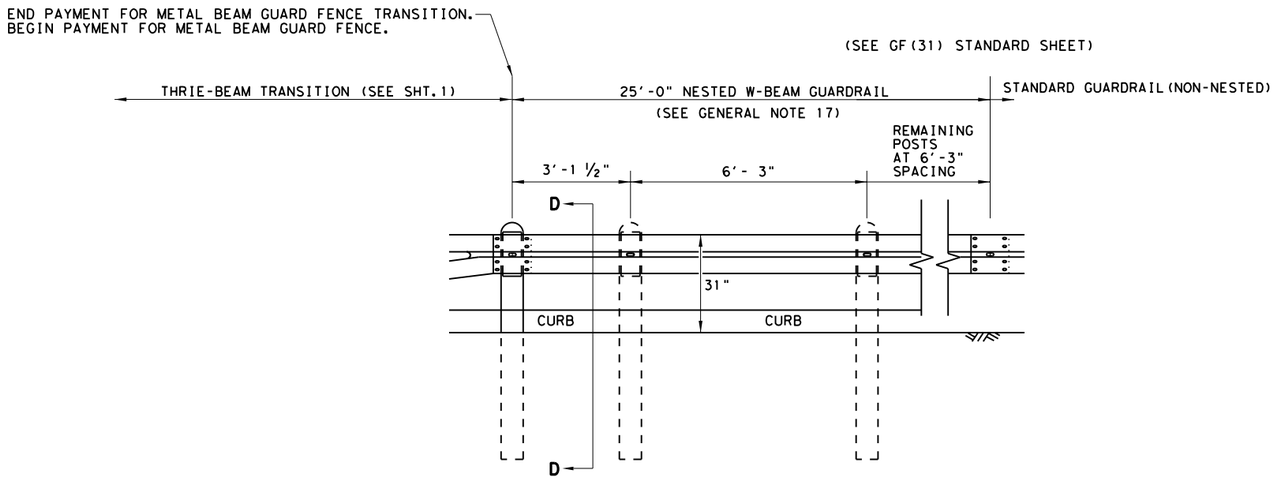
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

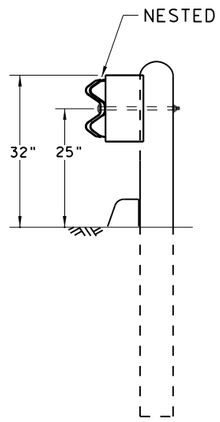
FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		32

DATE: 7/9/2021
FILE: T:\CHSDES\PROJECTS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\Plan Set\Standards\032 GF(31)TRTL3-20.dgn

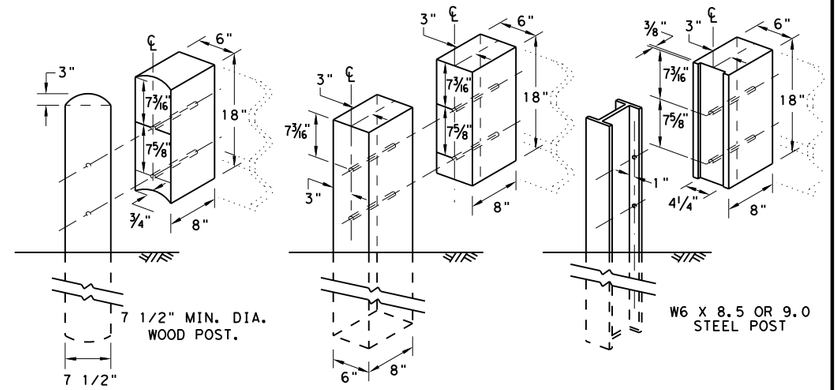
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0098	11	005	PR 62	
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	CHS	HARDEMAN		33	

DATE: 7/9/2021 11:52:34 AM
FILE: T:\CHSDES\PROJECTS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\pw\sgt10s3116.dgn

NOTE: STEEL I-BEAM POST W6 X 8.5 (6'-0") PN: 533G
STANDARD WOOD BLOCKOUTS (6"X8"X14") PN: 4076B
AT (POSTS 2 THRU 8)

⅝" X 10" HGR BOLT PN: 3500G
⅝" HGR NUT PN: 3340G

LINE AT THE BACK OF POST #2 THRU #8

FROM THE CENTERLINE OF POST(1) & POST(0)

ANCHOR PADDLE PN: 15204A

ANGLE STRUT PN: 15202G

16"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3)

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

POST(1)

POST(0)

TRAFFIC FLOW

PLAN VIEW

MASH TEST LEVEL 3 (TL-3) LENGTH OF SoftStop TERMINAL (50'-9 ½")

BEGIN LENGTH OF NEED

50'-9 ½" STANDARD INSTALLATION LENGTH (MASH TL-3 SoftStop)

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼" 3'-1 ½" 6'-3" 6'-3"

ANCHOR RAIL WITH SLOTS - (THREADED THRU HEAD)
SEE SoftStop MANUAL FOR COMPLETE DETAILS

MIDDLE SLOT CUTOUT (1) 1 ¾" X 6'-10 ¼"

OUTSIDE SLOTS CUTOUT (2)1½" X 6'-9 ⅝"

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

25'-0" DOWNSTREAM W-BEAM GUARDRAIL PN: 61G

SoftStop ANCHOR RAIL (12GA) PN: 15215G

SoftStop FACE SEE GN(3) & NOTE:B

3'-1 ½"(+/-) 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 5'-8" 4'-7"

ANCHOR PADDLE PN: 15204A

END OF ANCHOR RAIL PN: 15215G

SEE NOTE:A

SEE NOTE:C

POST 32" HEIGHT

31"

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

31"

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

13/16" DIA. YIELDING HOLES

13/16" DIA. YIELDING HOLES

SEE DETAIL 3

6'-1⅜"

(8) ⅝"x 1-¼" GR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST 40" DEPTH (TYP 1-8)

RAIL HEIGHT

(8) ⅝"x 1-¼" HGR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

RAIL HEIGHT

POST(2) 6'-0" (SYTP) PN: 15000G

POST(1) 4'-9 ½" SYTP PN: 15203G

POST(0) 6'-5 ⅜" PN: 15205A

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3)

ELEVATION VIEW

HARDWARE FOR POST(2) THRU POST(8)
(1) ⅝"x 10" HGR BOLT PN: 3500G
(1) ⅝" HGR HEX NUT PN: 3340G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

(1) ⅝" x 1 ¾" HEX HD BOLT PN 3391G

ANGLE STRUT PN: 15202G

(2) ⅝" WASHERS PN 4372G

(1) ⅝" HGR HEX NUT PN 3340G

DETAIL 1

SHOWN AT POST(1) NEAR GROUND

(1) ⅝" HEX NUT

(1) ⅝" x 1-½" HEX HD BOLT-GR-5 PN: 105286

(2) ⅝" ROUND WASHERS PN: 3240G

DETAIL 2

SHOWN AT POST(1)

ANCHOR KEEPER PLATE (24 GA) PN: 15207G

ANCHOR PLATE WASHER ½" THICK PN: 15206G

1" ROUND WASHER F463 PN: 4902G

(2) ⅝" x 2 ½" HEX HD BOLT GR-5 PN: 105285G

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

1" NUT PN: 3908G SHALL BE SECURELY TIGHTENED AFTER FINAL ASSEMBLY, BUT NOT DEFORMING THE KEEPER PLATE.

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR.DH PN: 3245G

W-BEAM FLATTENED (4 PLIES)

ANGLE STRUT PN: 15202G

SEE NOTE:A

(2) ¾" x 2 ½" HEX BOLT (TYP) PN: 3717G

(4) ¾" FLAT WASHER (TYP) PN: 3701G

(2) ¾" HEX NUT (TYP) PN: 3704G

6'-1 ⅜" POST DEPTH

(2) ANCHOR POST ANGLE PN: 15201G

DETAIL 3 AT POST(0)

6'-5 ⅜" (W6 X 15) I-BEAM POST PN: 15205A

TRAFFIC FLOW

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

4" X 7 ½" X 14" BLOCKOUT COMPOSITE PN: 6777B

6" X 8" X 14" BLOCKOUT WOOD PN: 4076B

NOTE: DO NOT BOLT ANCHOR RAIL TO POST(2)

8" 6" 14"

⅝" HGR NUT PN: 3340G

⅝" X 10" HGR POST BOLT PN: 3500G

13/16" DIAMETER YIELDING HOLES LOCATED IN FLANGES

FINISHED GRADE

(HOLES APROXIMATELY CENTERED AT FINISHED GRADE)

ISOMETRIC VIEW POST(1 & 2)

W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

LINE POST (3, 4, 5, 6, 7 & 8)

FINISHED GRADE

SECTION VIEW B-B

6'-0" (W6 X 8.5) I-BEAM POST PN: 533G

6" X 8" X 14" BLOCKOUT WOOD

W-BEAM RAIL 25'-0"

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

POST(2)

FINISHED GRADE

SECTION VIEW A-A

6'-0" (W6 X 8.5) (SYTP) I-BEAM POST PN: 15000G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

POST HEIGHT 17"- ½"

4'-9 ½"

13/16" DIA. YIELDING HOLES

40"

POST(1)

FRONT VIEW POST(1)

4'-9 ½" (W6 X 8.5) (SYTP) I-BEAM POST PN: 15203G

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

APPROX 5'-10"

STANDARD MBGF

5'-0"

50' APPROACH GRADING

2'-0"

EDGE OF PAVEMENT

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

2'-0" MAX. RAIL OFFSET

APPROACH GRADING (1V:10H OR FLATTER) SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

GENERAL NOTES

1. 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
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN: 620237B
3. 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.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. 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.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
12. 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 3-¾" 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 ⅞")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
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 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" 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	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR.DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE:B

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SoftStop END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

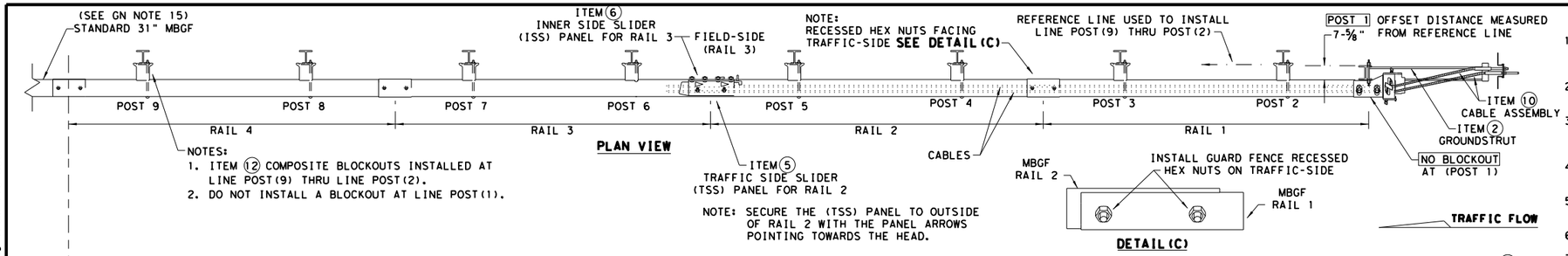
Texas Department of Transportation

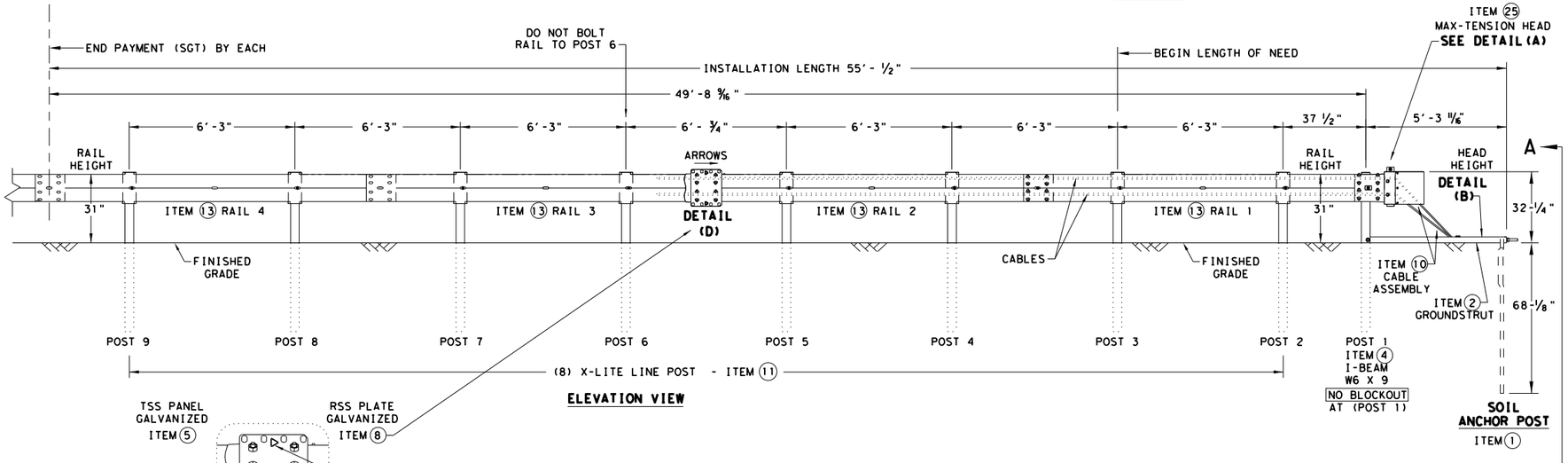
Design Division Standard

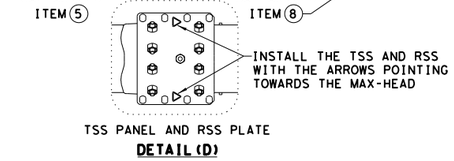
TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

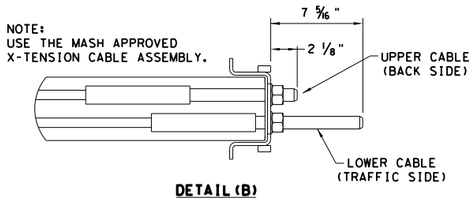
FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		34

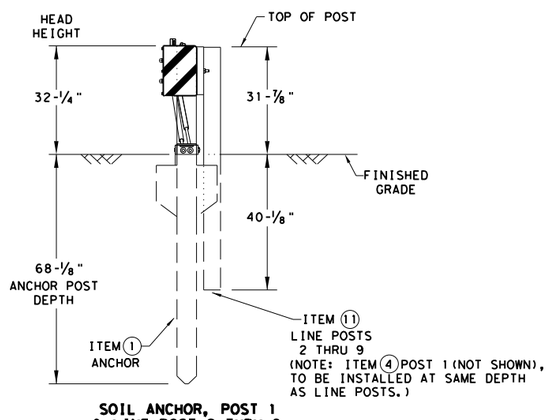
DATE: 7/9/2021
FILE: I:\CHSDES\PROJECTS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\sgt11s3118.dgn

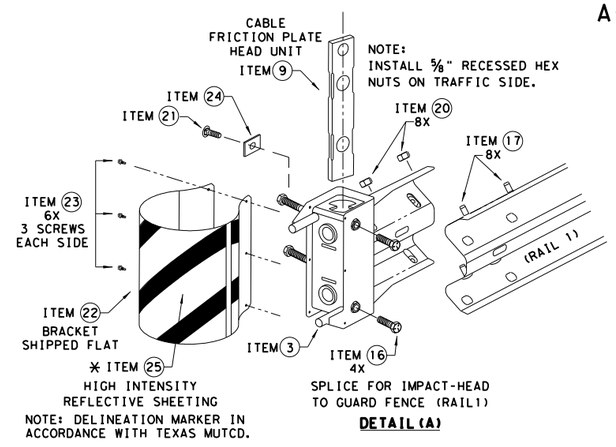


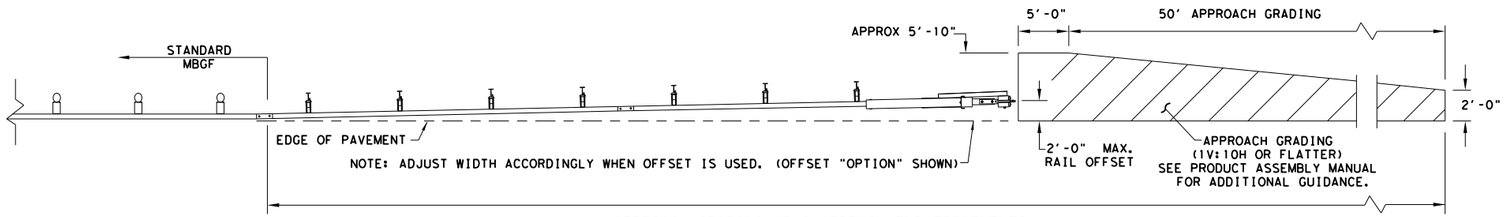












GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. 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.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. 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.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. 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	⅝" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	¼" X ¾" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	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

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		35

DATE: 7/9/2021
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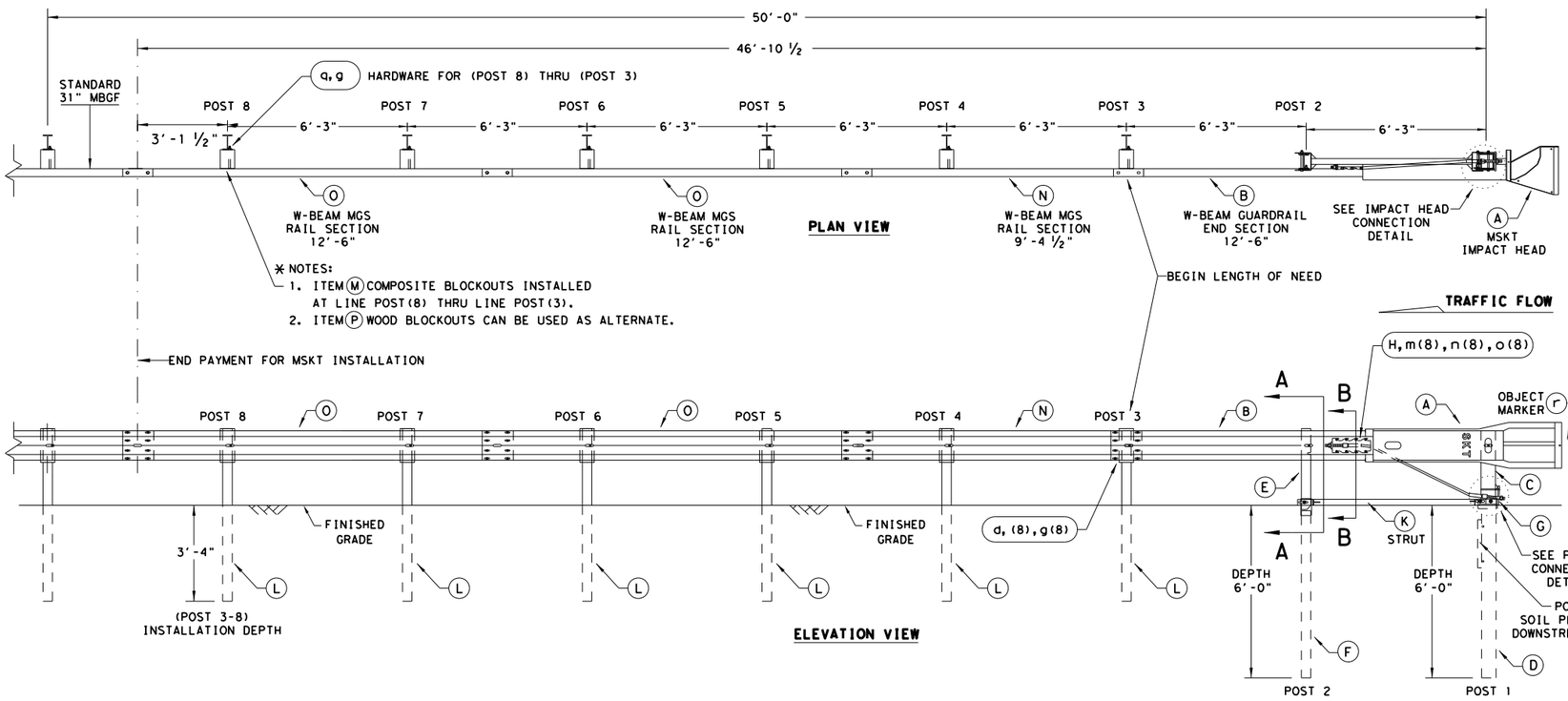
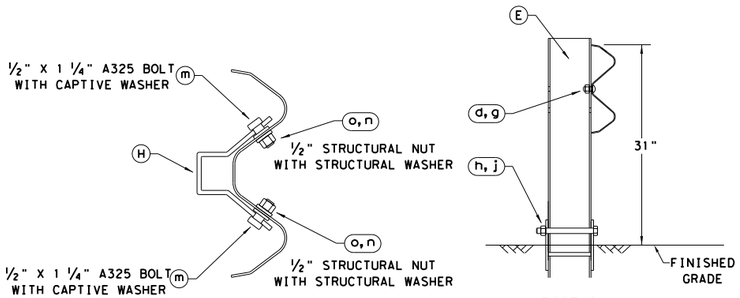
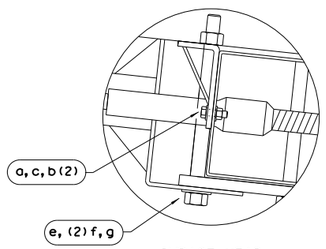


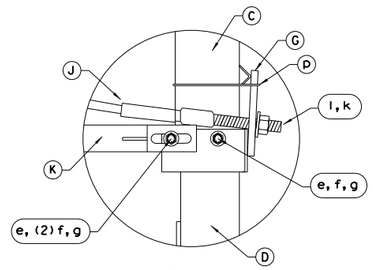


SECTION B-B
ANCHOR BRACKET

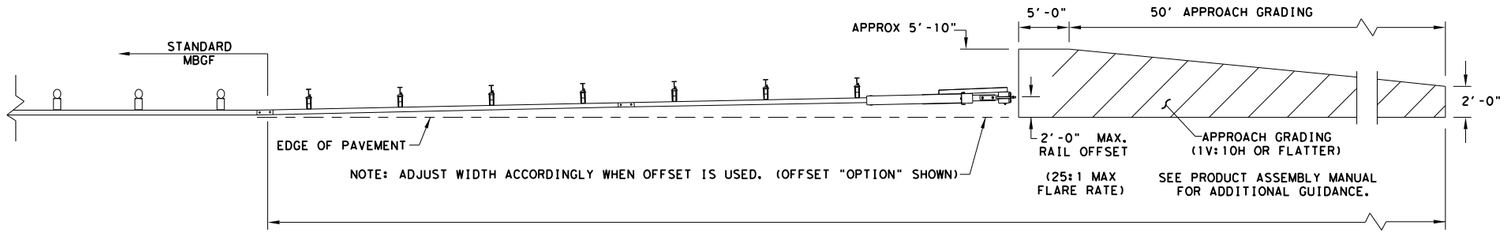
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

TRAFFIC FLOW

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

GENERAL NOTES

1. 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
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. 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.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. 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.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. 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.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. 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 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X ⅛" 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 ½")	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	
a	2	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 ⅛" O.D. x ⅜" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: *

ALTERNATIVE ITEMS NOT SHOWN. * *
* ITEM(P) 8" WOOD-BLOCKOUT
* * ITEM(Q) 25'GUARD FENCE PANEL

Texas Department of Transportation

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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	CHS	HARDEMAN		36

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REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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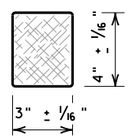
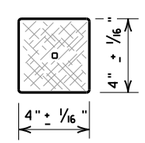
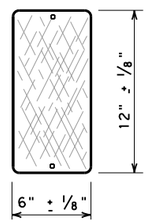
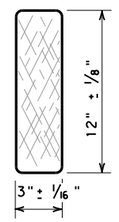
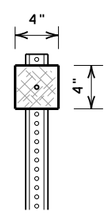
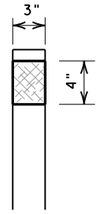
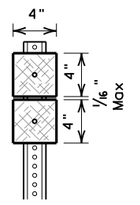
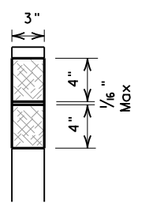
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

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
BRF = 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

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

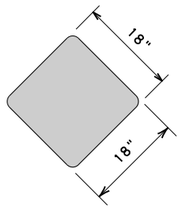
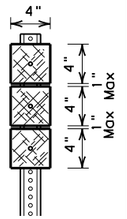
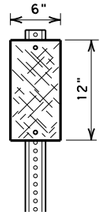
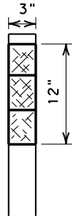
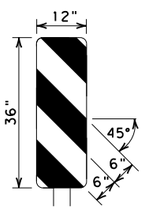
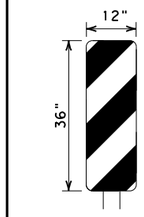
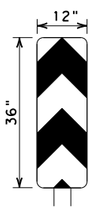
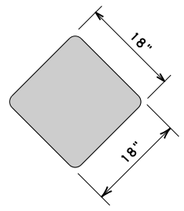
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

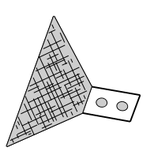
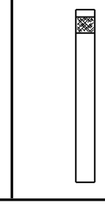
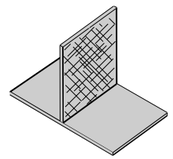
TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

OBJECT MARKERS

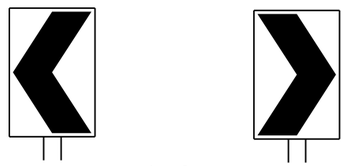
	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective 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

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
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.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



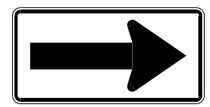
W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
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).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

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

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.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

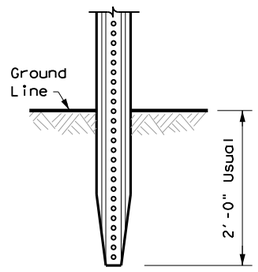
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	CHS	HARDEMAN		36A

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

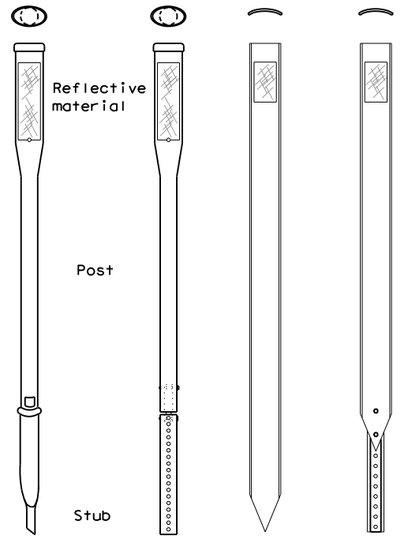


NOTES

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.

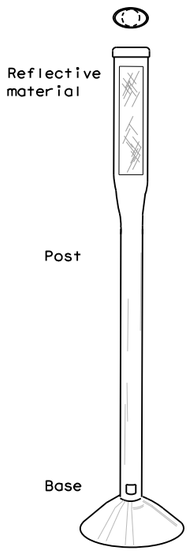
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



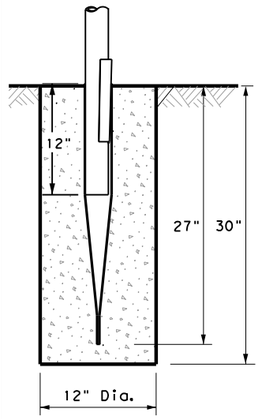
SURFACE MOUNT

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.

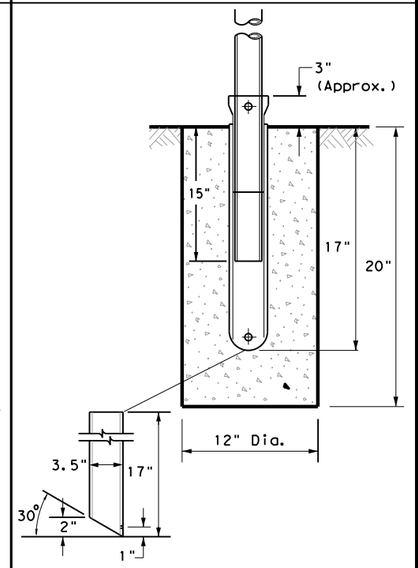
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

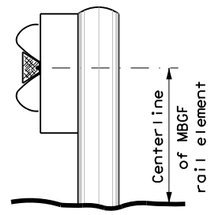
NOTE

1. Install per manufacturer's recommendations.

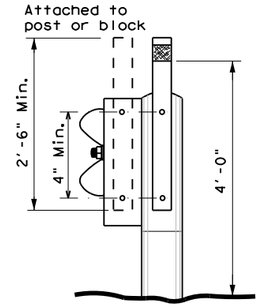
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

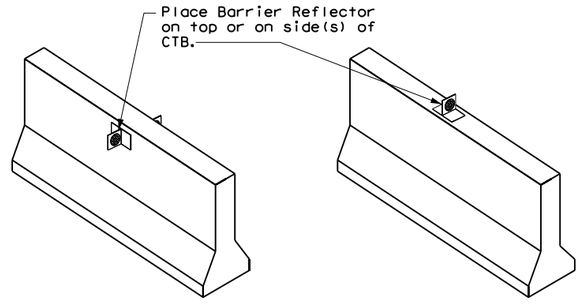
GF1



GF2



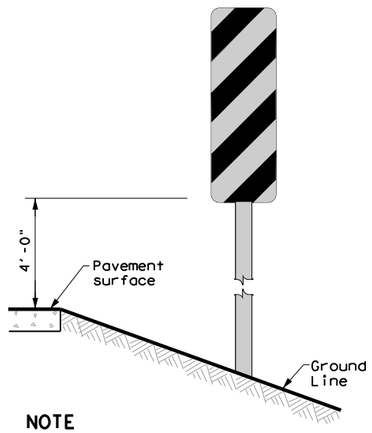
CONCRETE TRAFFIC BARRIER (CTB)



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.

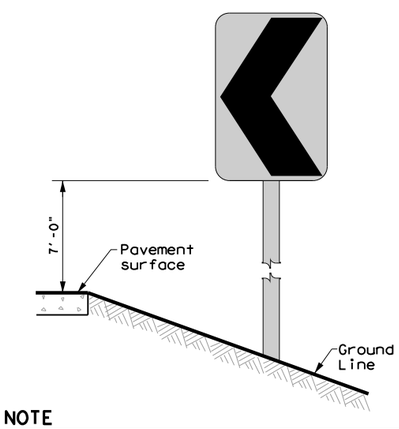
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

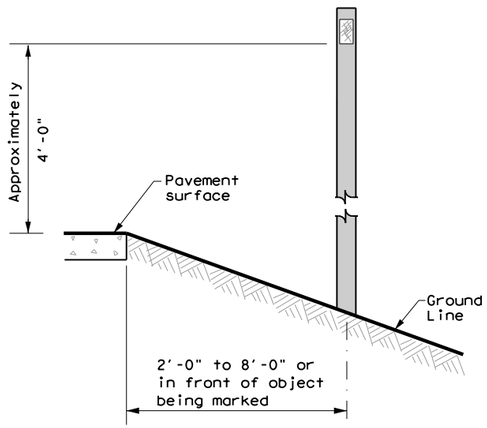
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation — Traffic Safety Division Standard

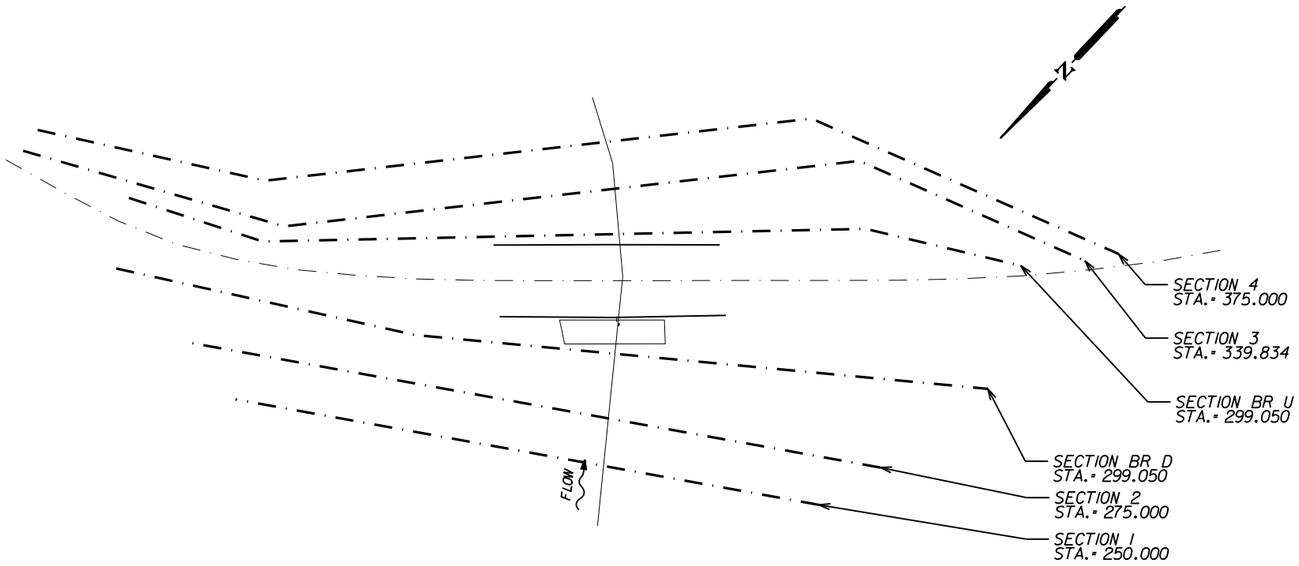
DELINEATOR & OBJECT MARKER INSTALLATION

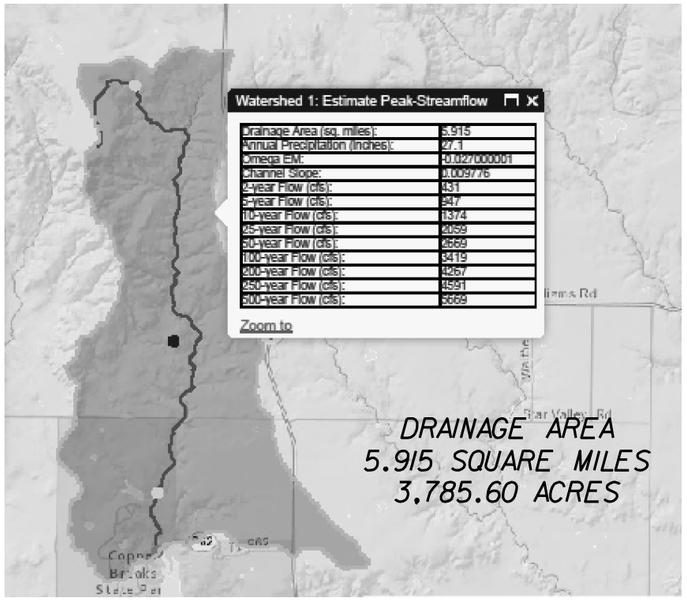
D & OM(2)-20

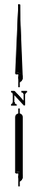
FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	CHS	HARDEMAN		36B

20B

DATE: 7/20/2021 3:16:07 PM
FILE: T:\CHSDES\PROJECTS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\Roadway\Signs\dom2-20.dgn







DESIGN CONDITION FREQUENCY=25 YEAR

	STA.	Q (CFS)	VEL (FPS)	WSEL (FT)
SECTION 4 (U.S. BOUNDARY)	375.000	2059.00	1.21	1373.16
SECTION 3 (U.S. OF BRIDGE)	339.834	2059.00	1.62	1373.11
UPSTREAM BRIDGE FACE	299.05 BR U	2059.00	7.37	1372.07
DWNSTREAM BRIDGE FACE	299.05 BR D	2059.00	7.85	1371.73
SECTION 2 (D.S. OF BRIDGE)	275.000	2059.00	2.96	1372.12
SECTION 1(D.S.BOUNDARY)	250.000	2059.00	2.84	1372.11

EXISTING CONDITION FREQUENCY=25 YEAR

	STA.	Q (CFS)	VEL (FPS)	WSEL (FT)
SECTION 4 (U.S. BOUNDARY)	375.000	2059.00	1.25	1374.85
SECTION 3 (U.S. OF BRIDGE)	339.834	2059.00	1.78	1374.83
UPSTREAM BRIDGE FACE	299.05 BR U	2059.00	2.16	1374.83
DWNSTREAM BRIDGE FACE	299.05 BR D	2059.00	2.16	1371.68
SECTION 2 (D.S. OF BRIDGE)	275.000	2059.00	3.16	1371.68
SECTION 1(D.S.BOUNDARY)	250.000	2059.00	3.11	1371.67

DESIGN CONDITION FREQUENCY=100 YEAR

	STA.	Q (CFS)	VEL (FPS)	WSEL (FT)
SECTION 4 (U.S. BOUNDARY)	375.000	3419.00	1.32	1374.71
SECTION 3 (U.S. OF BRIDGE)	339.834	3419.00	1.75	1374.64
UPSTREAM BRIDGE FACE	299.05 BR U	3419.00	0.00	1374.64
DWNSTREAM BRIDGE FACE	299.05 BR D	3419.00	0.00	1374.05
SECTION 2 (D.S. OF BRIDGE)	275.000	3419.00	3.14	1373.64
SECTION 1(D.S.BOUNDARY)	250.000	3419.00	2.57	1373.63

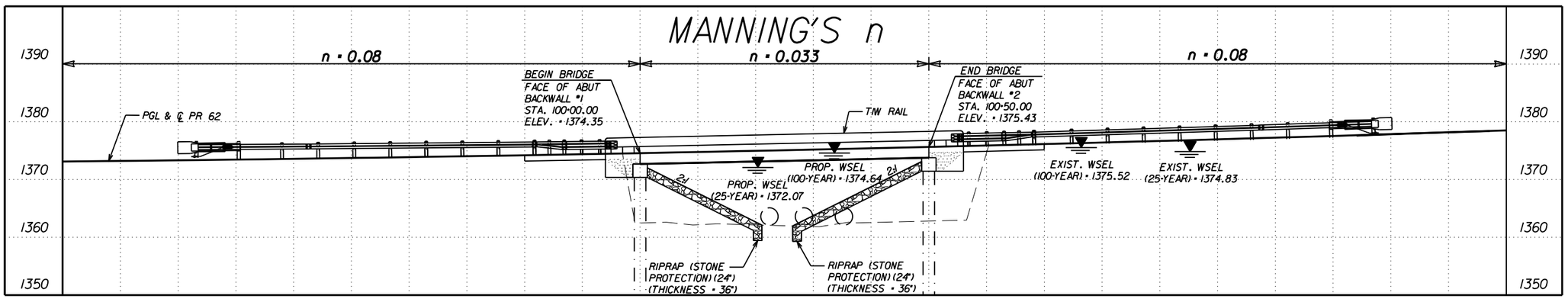
EXISTING CONDITION FREQUENCY=100 YEAR

	STA.	Q (CFS)	VEL (FPS)	WSEL (FT)
SECTION 4 (U.S. BOUNDARY)	375.000	3419.00	1.86	1375.56
SECTION 3 (U.S. OF BRIDGE)	339.834	3419.00	2.64	1375.52
UPSTREAM BRIDGE FACE	299.05 BR U	3419.00	1.61	1375.52
DWNSTREAM BRIDGE FACE	299.05 BR D	3419.00	1.61	1373.71
SECTION 2 (D.S. OF BRIDGE)	275.000	3419.00	3.73	1373.71
SECTION 1(D.S.BOUNDARY)	250.000	3419.00	3.68	1373.70

A = CONTRIBUTING DRAINAGE AREA (SQ. MI.)	5.915
S = SLOPE (FT/FT)	0.009776
P = ANNUAL PRECIPITATION (IN.)	27.10
Ω = OMEGA (Ω)	-0.027
Q (2 YEAR)	431 cfs
Q (5 YEAR)	947 cfs
Q (10 YEAR)	1,374 cfs
Q (25 YEAR)	2,059 cfs
Q (50 YEAR)	2,669 cfs
Q (100 YEAR)	3,419 cfs
Q (500 YEAR)	5,669 cfs

NOTES:

HEC-RAS USED FOR HYDRAULIC ANALYSIS AND DESIGN.
STEADY FLOW BOUNDARY CONDITIONS ARE BASED ON
NORMAL DEPTH WITH A DOWNSTREAM SLOPE OF 0.083 PERCENT.



STATE OF TEXAS
RYAN J. REID
139507
LICENSED
PROFESSIONAL ENGINEER

Ryan J Reid P.E.
10/06/2021

HYDRAULIC DATA SHEET

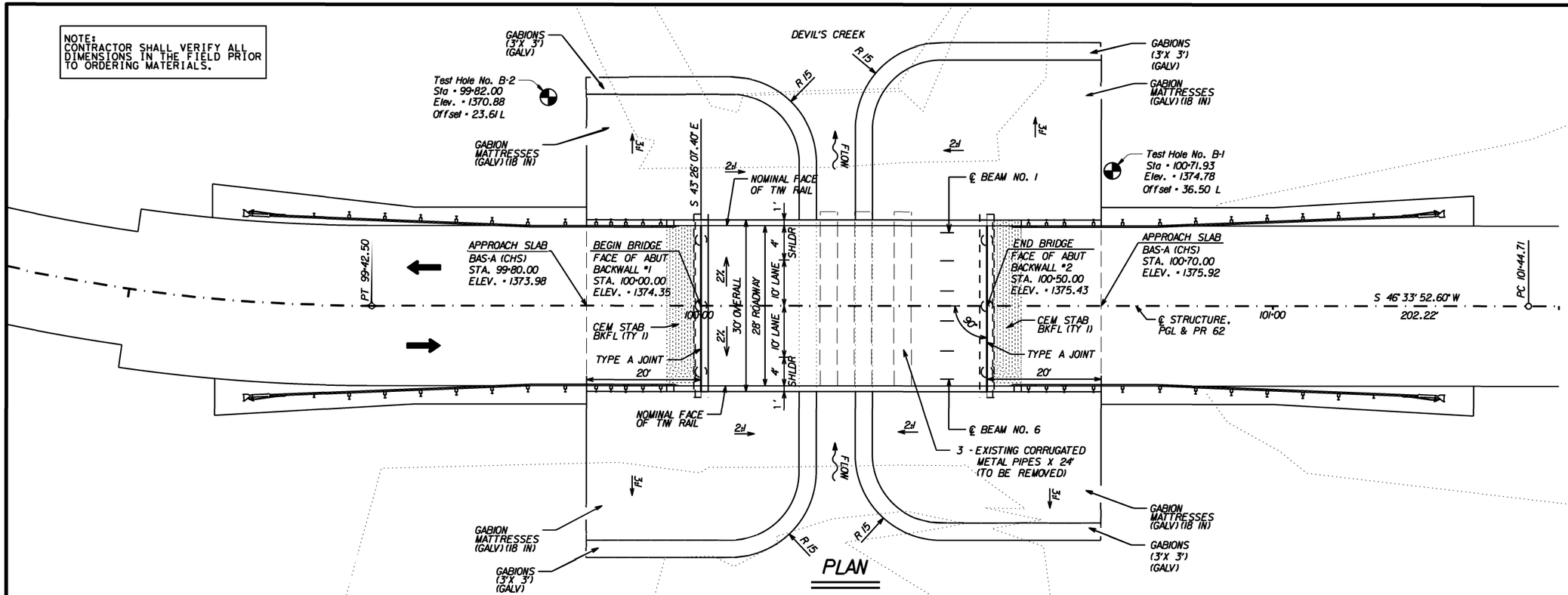
PR 62
DEVIL'S CREEK CROSSING

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		37

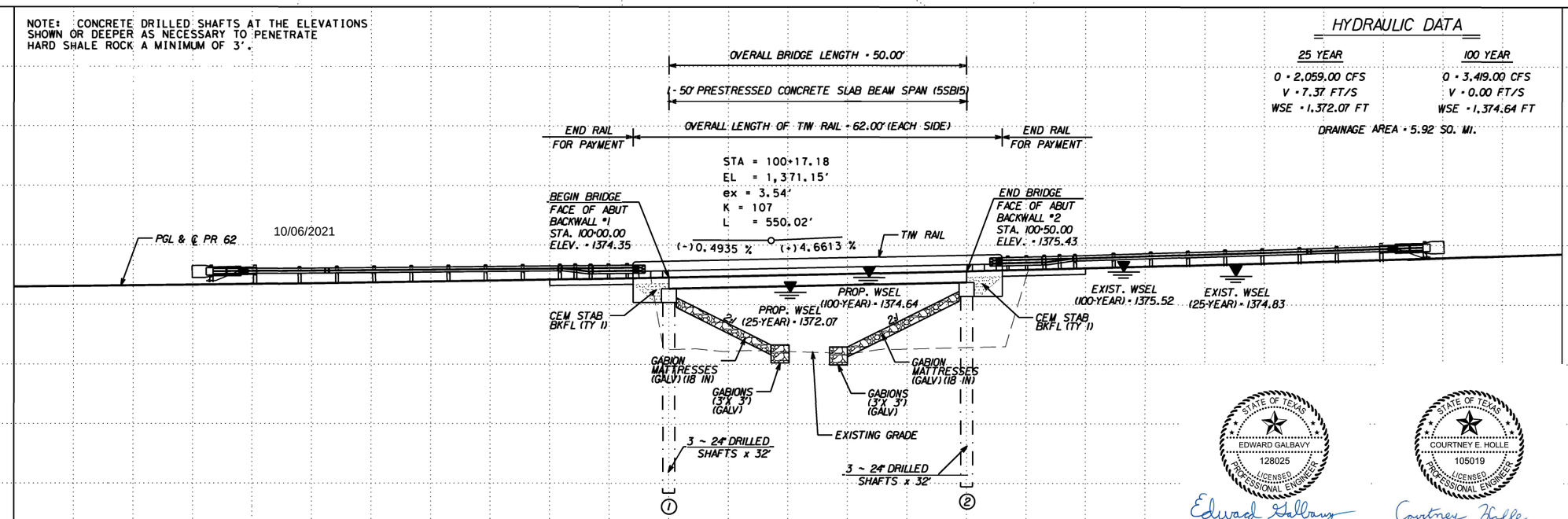
DATE: 9/8/2021 1:23:33 PM
FILE: T:\ROW\Design\CHS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\Plan Set\Roadway\038 BRIDGE HYDRAULIC DATA.dgn

NOTE:
CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD PRIOR TO ORDERING MATERIALS.



HL-93 LOADING

NOTE: CONCRETE DRILLED SHAFTS AT THE ELEVATIONS SHOWN OR DEEPER AS NECESSARY TO PENETRATE HARD SHALE ROCK A MINIMUM OF 3'.



ELEVATION

HYDRAULIC DATA

25 YEAR	100 YEAR
Q = 2,059.00 CFS	Q = 3,419.00 CFS
V = 7.37 FT/S	V = 0.00 FT/S
WSE = 1,372.07 FT	WSE = 1,374.64 FT

DRAINAGE AREA = 5.92 SQ. MI.

STATE OF TEXAS
RYAN J. REID
139507
LICENSED PROFESSIONAL ENGINEER

Ryan J Reid P.E.

STATE OF TEXAS
EDWARD GALBAVY
128025
LICENSED PROFESSIONAL ENGINEER

Edward Galbavy

FOUNDATION DESIGN

10/01/2021

STATE OF TEXAS
COURTNEY E. HOLLE
105019
LICENSED PROFESSIONAL ENGINEER

Courtney Holle

10/01/2021

BRIDGE LAYOUT
PR 62
@
DEVIL'S CREEK

STA. 100+00.00
TO
STA. 100+50.00

NBI NO. 25-100-0-0098-11-043

DESIGN SPEED = 25 MPH
ADT (2021) = 61
ADT (2041) = 73
FUNCTIONAL CLASS: MINOR COLLECTOR

SCALE:
1" = 20' HORIZONTAL
1" = 20' VERTICAL

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	II	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		38

DRILLING LOG

WinCore Version 3.3	County	Hardeman	Hole	B-1	District	Childress
	Highway	SH Park RD 62	Structure	Bridge	Date	4/26/2021
	CSJ	0098-11-005	Station	100+71.93	Grnd. Elev.	1374.78 ft
			Offset	23.61 L	GW Elev.	1366.78 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
1373.3			CLAY, reddish brown and brown, sandy, w/ calcareous nodules and gravel (FILL) (CL)			12				-#200=55.5%
			CLAY, soft to stiff, reddish brown and gray, sandy, w/ calcareous nodules and deposits and occasional gravel (CL)			13	29	14		-#200=58.3%
5		8 (6) 7 (6)				11	22	10		
1368.8			CLAY, moist, reddish brown and gray, silty, sandy, w/ calcareous nodules and gypsum crystals (CL)	6.1	14.3	17	25	12	133	
1365.8			CLAY, stiff to very stiff, moist, reddish brown and gray, silty, w/ calcareous nodules (CL)	7.8	10.6	19	24	11	134	
10		20 (6) 50 (1)								
1364.3			CLAY, very hard, reddish brown, sandy, w/ very hard sandstone and cemented sand seams and layers (CL)							
15		50 (0.5) 50 (0.5)				10				-#200=79.5%
20		50 (1.5) 50 (1)								

Remarks: Northing: 3774898.33 Easting:430687.52

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Scott **Logger: Cameron Oswald** **Organization: AGG**

Reviewed By: EG

DRILLING LOG

WinCore Version 3.3	County	Hardeman	Hole	B-1	District	Childress
	Highway	SH Park RD 62	Structure	Bridge	Date	4/26/2021
	CSJ	0098-11-005	Station	100+71.93	Grnd. Elev.	1374.78 ft
			Offset	23.61 L	GW Elev.	1366.78 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, very hard, reddish brown, sandy, w/ very hard sandstone and cemented sand seams and layers (CL)							
1351.8			SILTSONE, hard to very hard, reddish brown and gray, w/ hard mudstone layers and gypsum crystal							
25		50 (1) 50 (0.5)				11			147	QU= 222.3 ksf at 1.2%
										REC 98% RQD 95%
30		50 (0.25) 50 (0.25)				14			141	REC 100% RQD 80% Qu=37.4 ksf at 0.8%
35		50 (0.25) 50 (0.25)				13			143	Qu=149 ksf at 1.1% REC 90% RQD 80%
1334.840		50 (0.5) 50 (0.25)								

Remarks: Northing: 3774898.33 Easting:430687.52

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Scott **Logger: Cameron Oswald** **Organization: AGG**

Reviewed By: EG

As shown boring logs are produced without modification of the preliminary boring logs provided by Alliance Geotechnical Group on May 13, 2021. TxDOT Contract Number 88-7IDP5045, work authorization #6-5, under the supervision of Mr. Michael Roland, P.E. Vice President of AGG. TxDOT is not liable for the accuracy of the boring logs performed by others.

STATE OF TEXAS
EDWARD GALBAVY
128025
LICENSED PROFESSIONAL ENGINEER

Edward Galbavy
09/30/2021

DATE:
FILE:

SHEET 1 OF 2

Texas Department of Transportation — Bridge Division

BORING LOGS
PR 62 at DEVIL'S CREEK

FILE: SHPR62_BRG_8186_bd01.dgn	DN: DHW	CK:	DW: NRE	CK: DHW
©TxDOT August 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		38A

DRILLING LOG

WinCore Version 3.3	County	Hardeman	Hole	B-2	District	Childress
	Highway	SH Park RD 62	Structure	Bridge	Date	4/26/2021
	CSJ	0098-11-005	Station	99+82.00	Grnd. Elev.	1370.88 ft
			Offset	36.50 L	GW Elev.	1359.88 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
1369.4			CLAY, reddish brown and brown, sandy, w/ calcareous nodules and gravel (FILL) (CL)							-#200=56.4%
			CLAY, soft, reddish brown and gray, sandy, w/ calcareous nodules and deposits (CL)			14				
						11	27	13		
5		7 (6) 8 (6)								
1364.9			CLAY, moist, reddish brown and gray, silty, sandy, w/ calcareous nodules (CL)							-#200=70.5%
						17	28	14		
1361.9			CLAY, soft to stiff, moist, reddish brown and gray, silty, w/ calcareous nodules (CH)	7.8	27	19	30	15	134	
10		10 (6) 10 (6)								
1356.9			CLAY, soft to stiff, reddish brown, sandy, w/ occasional gravel (CL) (CL)							-#200=65.7%
15		12 (6) 8 (6)				18				
1353.9			CLAY, hard, reddish brown and gray, w/ calcareous nodules and gypsum crystals (CH) (CH)							
20		22 (6) 50 (3.5)		16.9	134	17	38	23	140	

Remarks: Northing:3774913.58 Easting:430702.24

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Scott **Logger: Cameron Oswald** **Organization: AGG**

Reviewed By: EG

DRILLING LOG

WinCore Version 3.3	County	Hardeman	Hole	B-2	District	Childress
	Highway	SH Park RD 62	Structure	Bridge	Date	4/26/2021
	CSJ	0098-11-005	Station	99+82.00	Grnd. Elev.	1370.88 ft
			Offset	36.50 L	GW Elev.	1359.88 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, hard, reddish brown and gray, w/ calcareous nodules and gypsum crystals (CH) (CH)							
1346.4										
25		50 (0.25) 50 (0.5)	SILTSTONE, very hard, reddish brown and gray, w/ hard mudstone layers and gypsum crystals			9			148	Qu=282.2 at ksf 1.3%
										REC 84% RQD 62%
30		50 (0.5) 50 (0.25)				14			143	Qu=74.4 ksf at 1.2%
										REC 97% RQD 86%
35		50 (0.25) 50 (0.25)				17			141	Qu=25 ksf at 1.1%
										REC 61% RQD 61%
1330.940		50 (0.25) 50 (0.25)								

Remarks: Northing:3774913.58 Easting:430702.24

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Scott **Logger: Cameron Oswald** **Organization: AGG**

Reviewed By: EG

As shown boring logs are produced without modification of the preliminary boring logs provided by Alliance Geotechnical Group on May 13, 2021. TxDOT Contract Number 88-7IDP5045, work authorization #6-5, under the supervision of Mr. Michael Roland, P.E. Vice President of AGG. TxDOT is not liable for the accuracy of the boring logs performed by others.

STATE OF TEXAS
EDWARD GALBAVY
128025
LICENSED PROFESSIONAL ENGINEER

09/30/2021

SHEET 2 OF 2

Texas Department of Transportation — Bridge Division

BORING LOGS
PR 62 at DEVIL'S CREEK

FILE: SHPR62_BRG_8186_bd02.dgn	DN: DHW	CK:	DW: NRE	CK: DHW
©TxDOT August 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		38B

DATE:
FILE:

SUMMARY OF ESTIMATED QUANTITIES

BRIDGE ELEMENT / BID ITEM DESCRIPTION	0400 6005	0416 6002	0420 6013	0422 6007	0422 6015	0425 6012	0450 6003	0454 6021	0459 6008	0459 6009
	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT)	REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM (5SB15)	RAIL (TY T1W)	TYPE A JOINT	GABION MATTRESSES (GALV)(18 IN)	GABIONS (3' X 3')(GALV)
	CY	LF	CY	SF	CY	LF	LF	LF	SY	CY
2 - ABUTMENTS	27	192	19.6				24		685	104
1 - 50.00' PRESTRESSED CONC. SLAB BEAM SPAN				1504	48.1	297.00	100.0	60		
OVERALL TOTALS:	27	192	19.6	1504	48.1	297.00	124.0	60	685	104

TABLE OF CAP ELEVATIONS

LOCATION		CAP ELEVATION		
		1	2	3
ABUT 1	FORWARD	1372.085	1372.385	1372.085
ABUT 2	BACK	1373.132	1373.433	1373.132

STATE OF TEXAS
COURTNEY E. HOLLE
105019
LICENSED PROFESSIONAL ENGINEER

Courtney Holle

10/01/2021

Texas Department of Transportation

Bridge Division

ESTIMATED QUANTITIES AND CAP ELEVATIONS

DEVIL'S CREEK BRIDGE

FILE: SHPR62_BRG_8186_eq01.dgn	DN: DHW	CK: HSW	DW: MRE	CK: DHW
©TxDOT August 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		39

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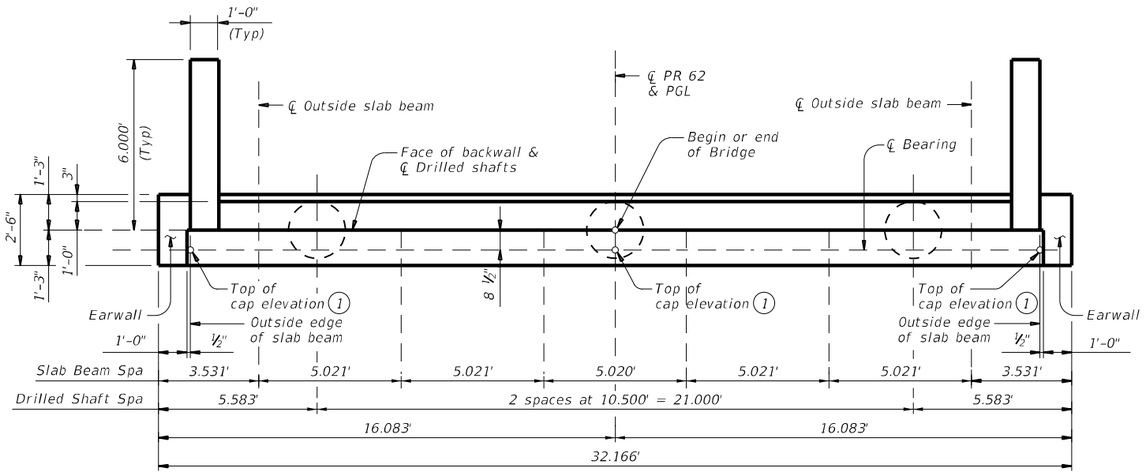
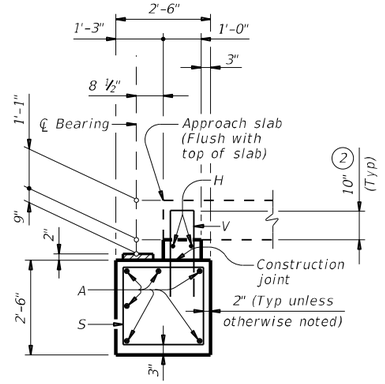


PLAN

(Showing Abutment No. 1; Abutment No. 2 symetrical by opposite hand.)



SECTION A-A

Note: At Contractor's option, backwall may be cast with approach slab.

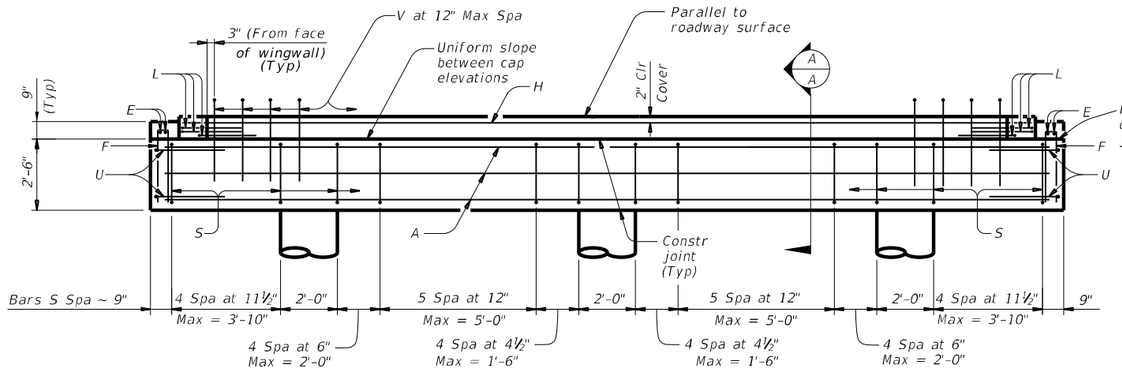
TABLE OF ESTIMATED QUANTITIES (3)				
Bar	No.	Size	Length	Weight
A	6	#11	31'-2"	994
E	4	#4	2'-2"	6
F	10	#4	6'-4"	43
H	2	#5	29'-9"	62
L	6	#6	4'-0"	36
S	38	#4	9'-4"	237
U	4	#6	7'-1"	43
V	29	#5	7'-10"	237
wH1	4	#6	5'-8"	34
wH2	8	#6	6'-11"	83
wU	8	#4	1'-8"	9
wV	28	#5	4'-1"	119
Reinforcing Steel			Lb	1,903
Cl "C" Conc (Abut)			CY	9.8

(1) See Table of Cap Elevation on Estimated Quantities and Cap Elevation sheet.

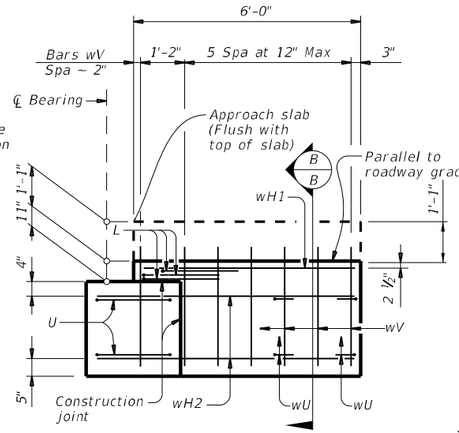
(2) Increase as required to maintain 3" from finished grade.

(3) Quantities shown are for one abutment only.

(4) ½" preformed bituminous fiber material between slab beam and earwall. Bond to earwall with an approved adhesive. Cast inside face of earwall perpendicular to cap. (Typ)

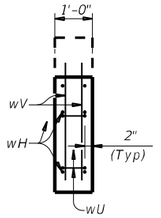


ELEVATION



WINGWALL ELEVATION

(Earwall not shown for clarity.)



SECTION B-B

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 8th Edition (2017).

See Bridge Layout for foundation type, size, and length.

See Common Foundation Details (FD) standard sheet for all foundation details and notes.

See Stone Riprap (SRR) standard sheet for riprap attachment details.

See applicable rail details for rail anchorage in wingwalls.

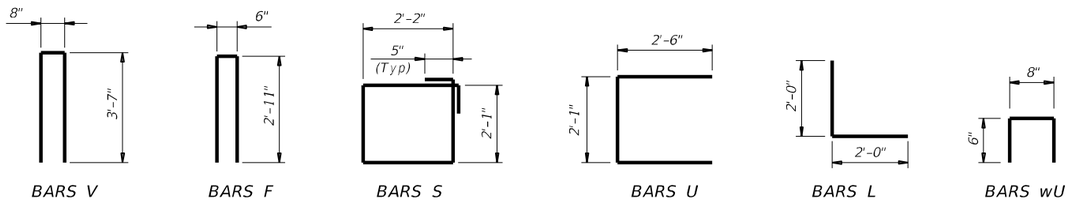
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

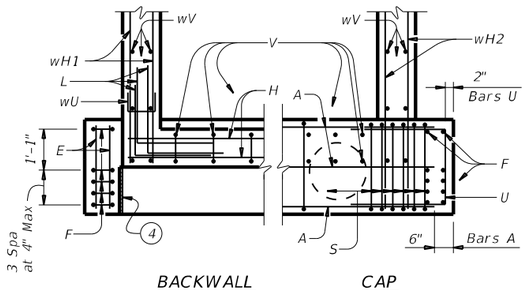
Calculated Foundation Loads = 69 Tons/DS

MATERIAL NOTES:

Provide Class C concrete (f'c = 3,600 psi).
Provide Grade 60 epoxy coated reinforcing steel.

HL93 LOADING





BACKWALL CAP

CORNER DETAILS

STATE OF TEXAS
COURTNEY E. HOLLE
105019
LICENSED PROFESSIONAL ENGINEER

Courtney Holle

10/01/2021

Texas Department of Transportation | Bridge Division

ABUTMENT
NO. 1 OR 2

DEVIL'S CREEK BRIDGE

FILE: SHPR62_BRG_8186_ab01.dgn	DN: DHW	CK: HSW	DW: NRE	CK: DHW
©TxDOT August 2021	CONT	SECT	JOB	HIGHWAY
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	CHS	HARDEMAN		40

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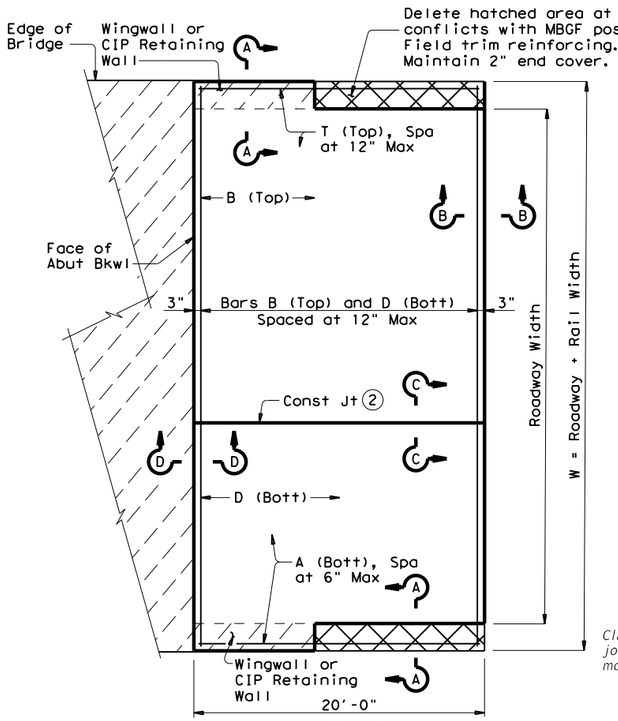
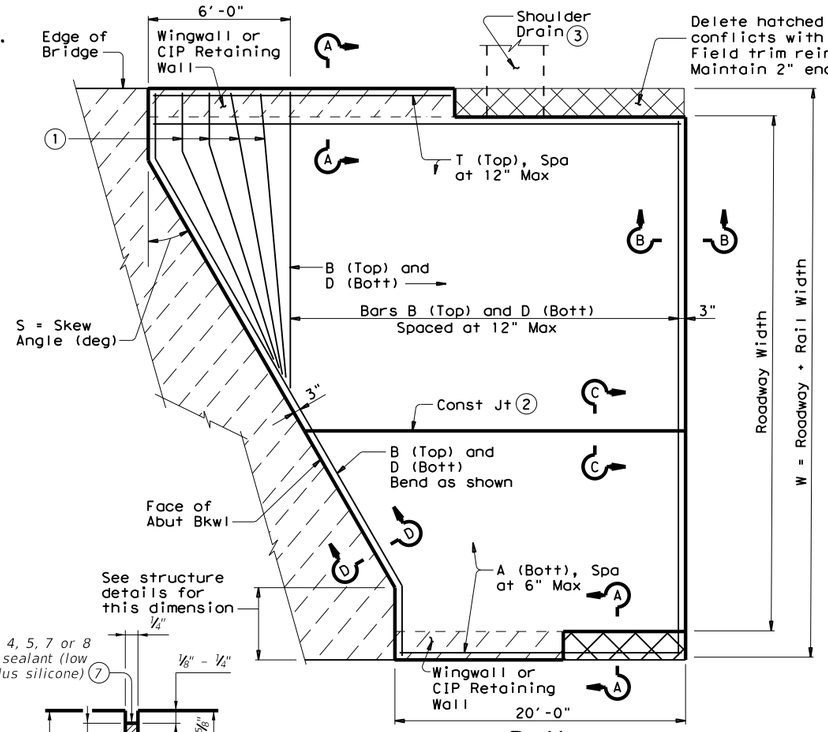


PLAN

(Showing Non-Skewed Approach Slab)



PLAN

(Showing Skewed Approach Slab)

LONGITUDINAL SAW CUT JOINT DETAIL

BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
T	#5

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab

Volume of Appr Slab Conc (CY) = $0.802W + 0.02W^2 \tan S$

W = Width of Approach Slab (ft)

S = Skew Angle (deg)

(1) Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.

(2) Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.

(3) See details elsewhere in plans for shoulder drain location and details.

(4) For Contractor's information only. Quantities shown are for one approach slab only.

(5) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

(6) See details elsewhere in plans for required cross-slope.

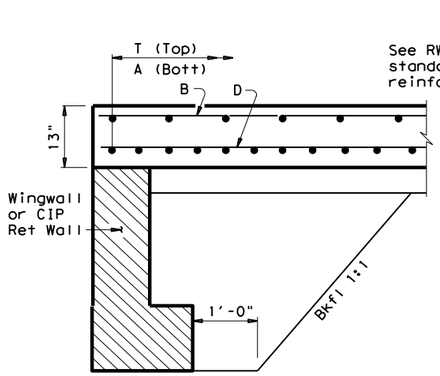
(7) Place in accordance with Item 438.

(8) OMITTED

GENERAL NOTES:

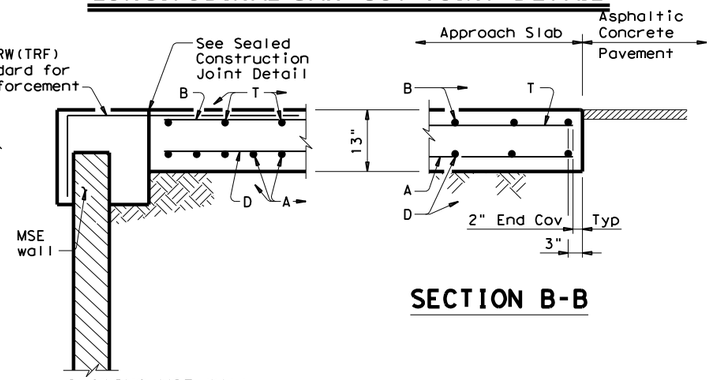
1. Construct approach slab in accordance with Item 422.
2. Concrete shall be Class "S" with a minimum compressive strength of 4,000 psi.
3. All reinforcing steel shall be Grade 60.
4. Construct the subgrade or subbase from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.
5. Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.
6. Cure for 4 days using water or membranE curing per Item 422.
7. All details shown herein are subsidiary to bridge approach slab.

Cover dimensions are clear dimensions, unless noted otherwise.



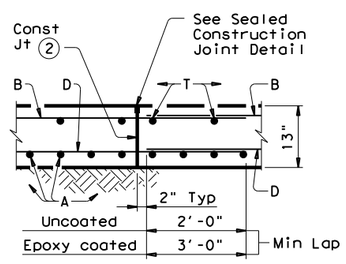
SHOWING WINGWALL OR CIP RETAINING WALL

SECTION A-A



SHOWING MSE WALL

SECTION B-B



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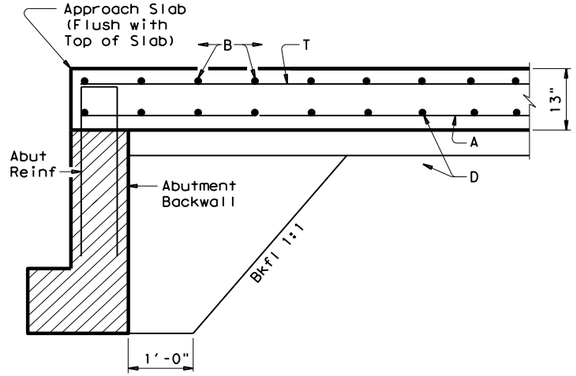
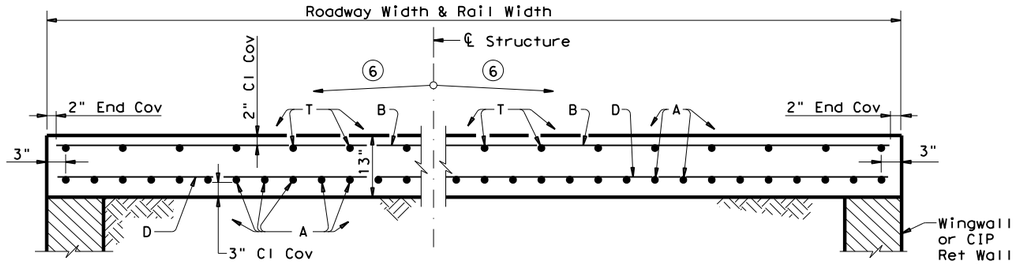
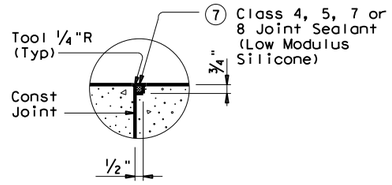


SECTION D-D



TYPICAL TRANSVERSE SECTION



SEALED CONSTRUCTION JOINT DETAIL

STATE OF TEXAS
RYAN J. REID
139507
LICENSED PROFESSIONAL ENGINEER

Ryan J Reid P.E.

10/06/2021

Texas Department of Transportation

BRIDGE APPROACH SLAB

ASPHALTIC CONCRETE PAVEMENT

BAS-A (CHS)

FILE: STDB10A.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 2006	DISTRICT	STATE AID PROJECT		SHEET
REVISIONS 7/19/2021 Revised for Statewide Standard	CHS	C 98-11-5		41
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARDEMAN	0098	11	005	PR62

STDB10A

PATH:

LEVELS DISPLAYED

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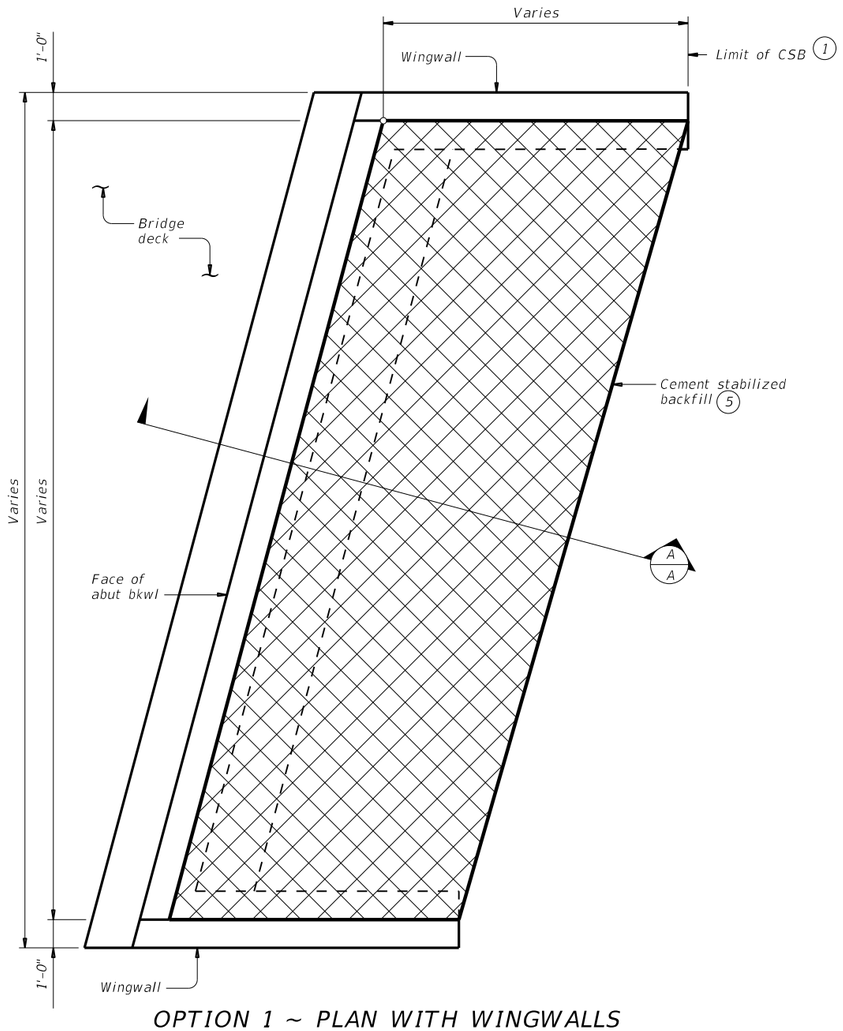
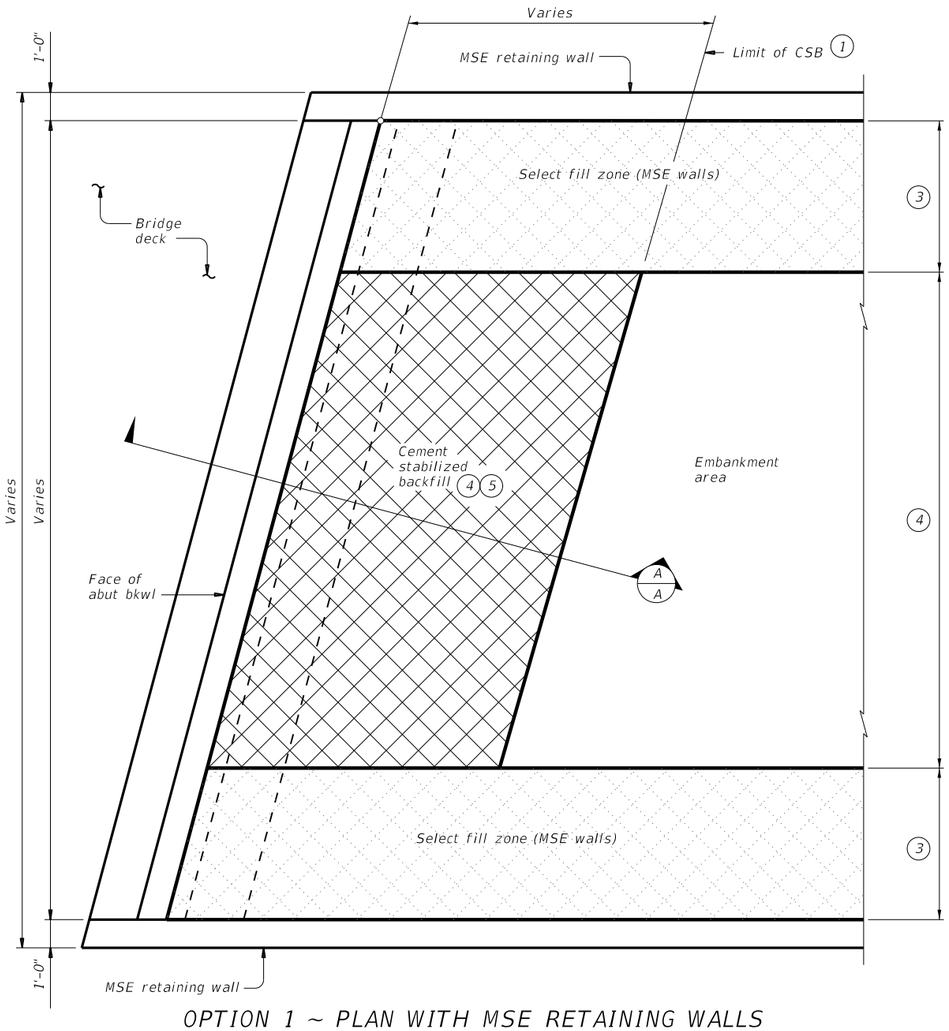


OPTION 1 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



OPTION 1 ~ PLAN WITH MSE RETAINING WALLS

1. Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
2. Bench backfill as shown with 12" (approximate) bench depths.
3. Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
4. When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
5. If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
   a). If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
   b). Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

GENERAL NOTES:

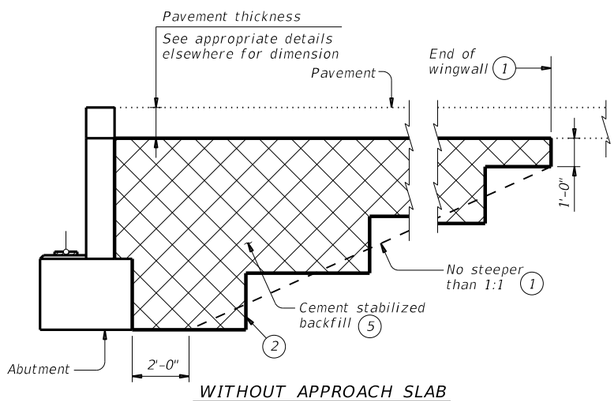
See the Bridge Layout for selected Option. Option 2 is intended for new construction requiring high plasticity embankment fill with a plasticity index (PI) greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays. Option 1 is intended for construction only requiring PI controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment.

Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments.

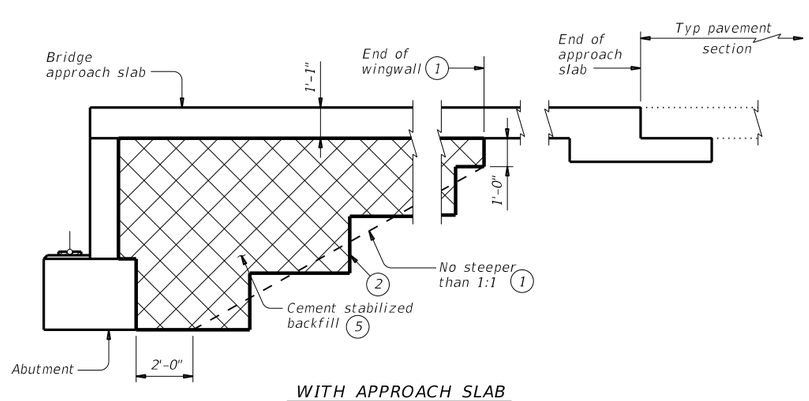
If required elsewhere in the plans, provide Flowable Backfill meeting the requirements of Item 401, "Flowable Backfill", to the limits shown at bridge abutments.

Details are drawn showing left forward skew. See Bridge Layout for actual skew direction.

These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.



WITHOUT APPROACH SLAB



WITH APPROACH SLAB

(Showing BAS-C, BAS-A similar.)

SECTION A-A

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

FILE: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
02-20: Added Option 2.	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		42

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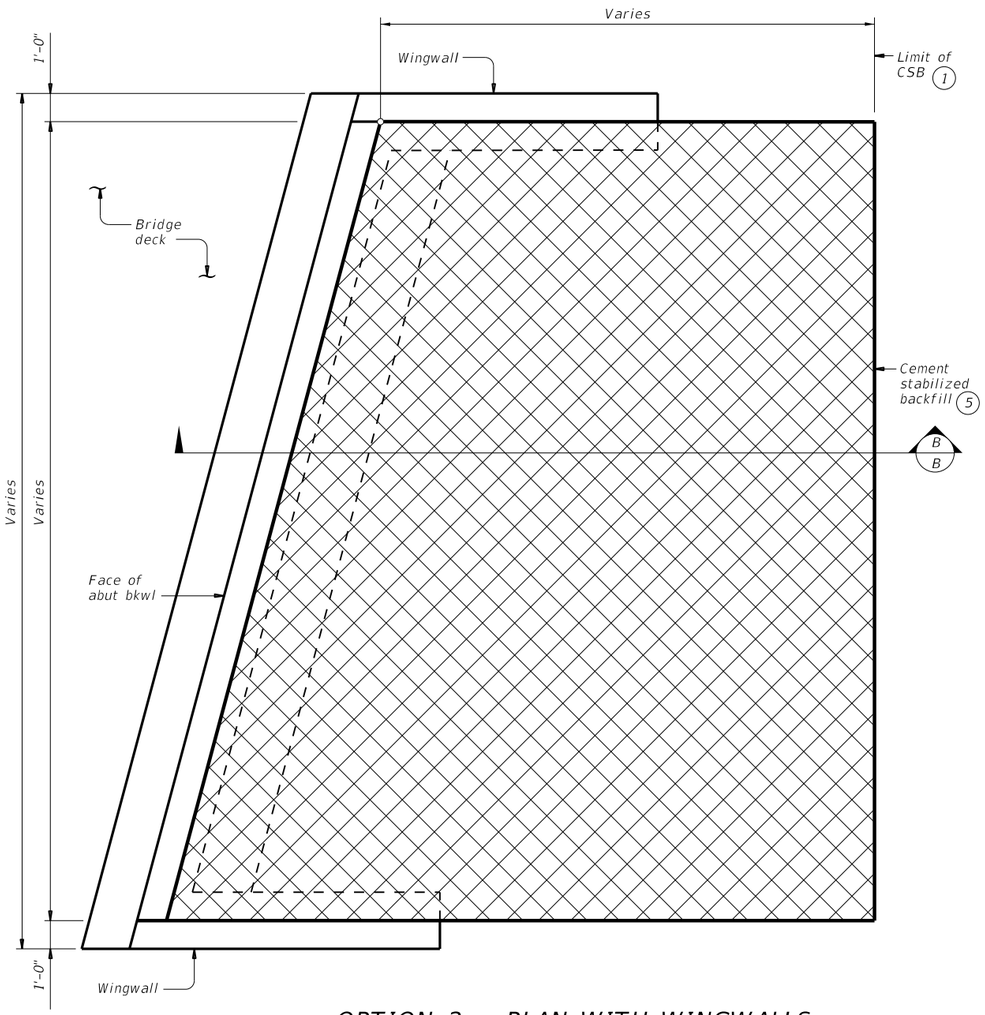
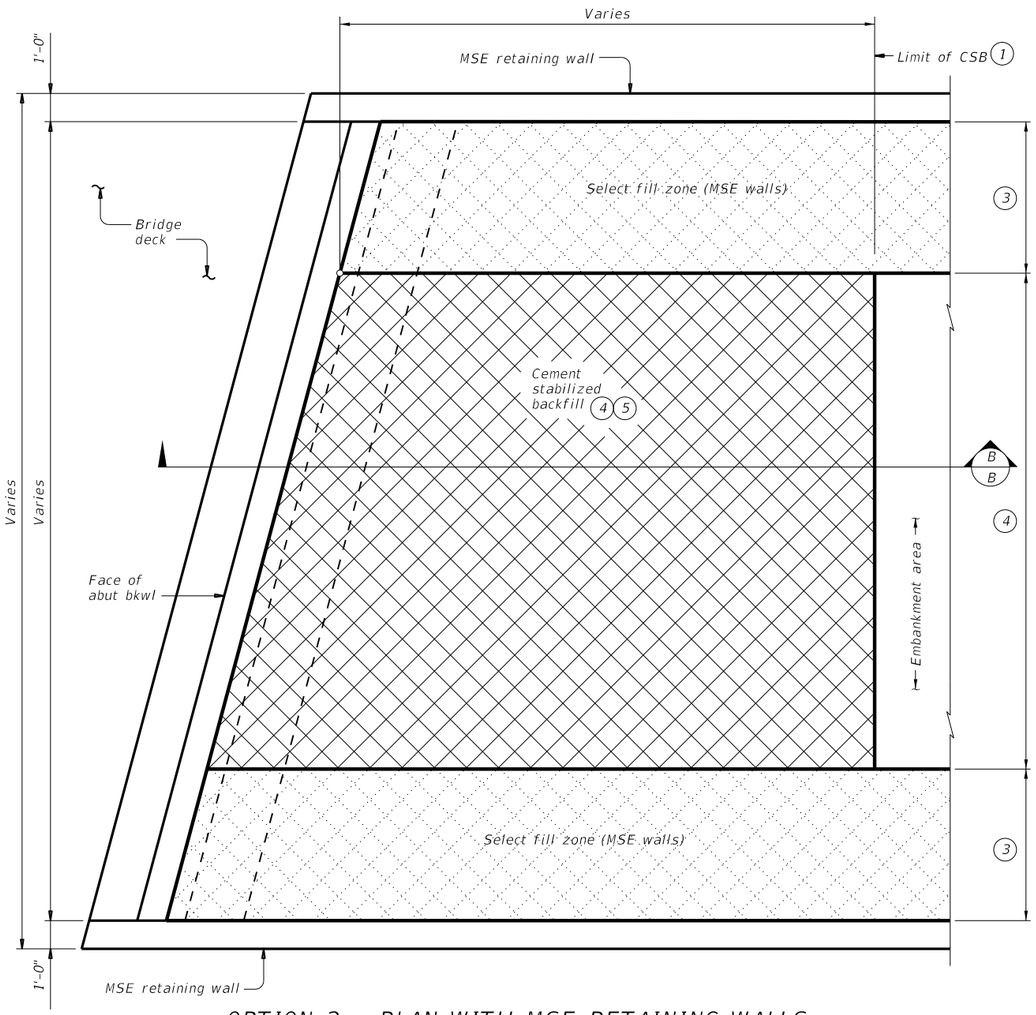


OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

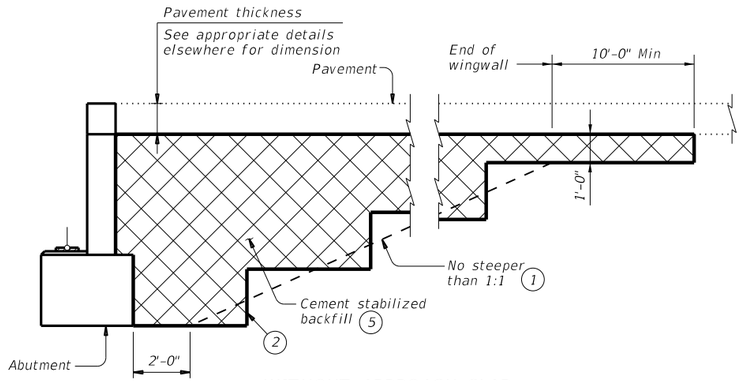
(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

(2) Bench backfill as shown with 12" (approximate) bench depths.

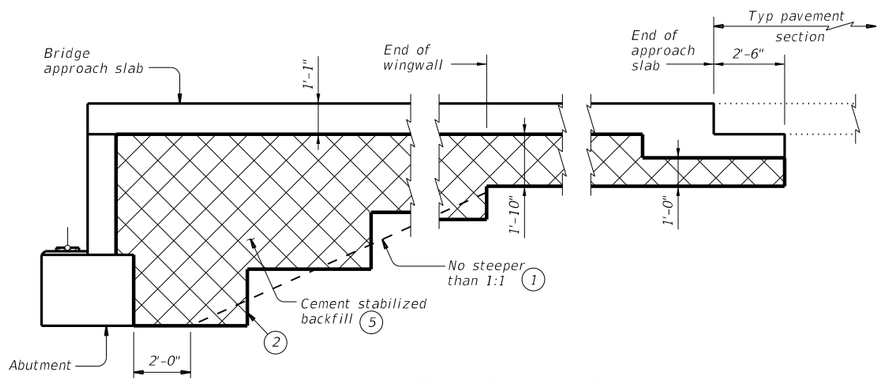
(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

(4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

(5) If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
a). If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
b). Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).



WITHOUT APPROACH SLAB



WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SECTION B-B

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

FILE: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
02-20: Added Option 2.	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		43

DATE: 7/22/2021 3:29:45 PM
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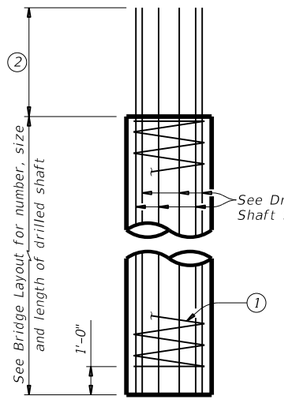
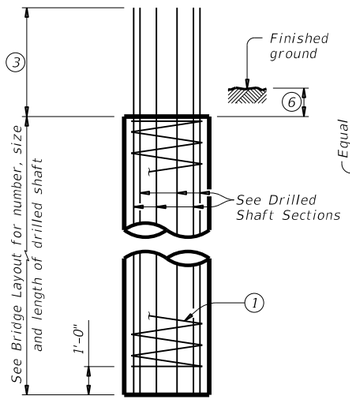
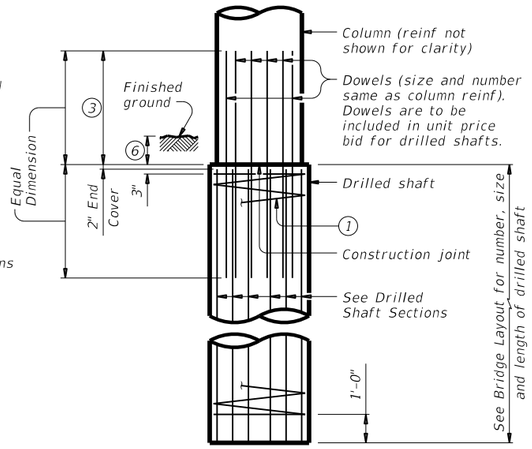


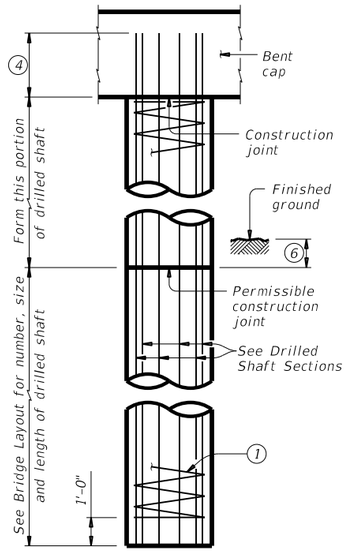
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



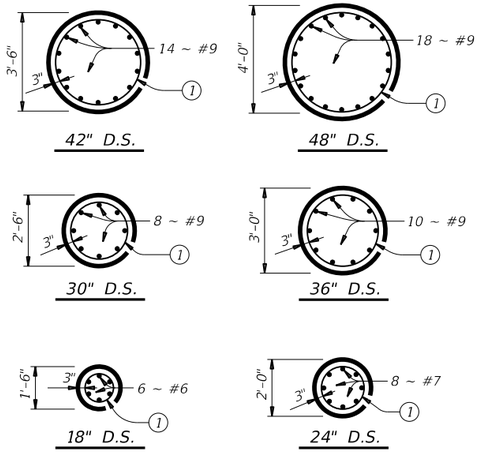
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

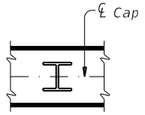


DRILLED SHAFT SECTIONS

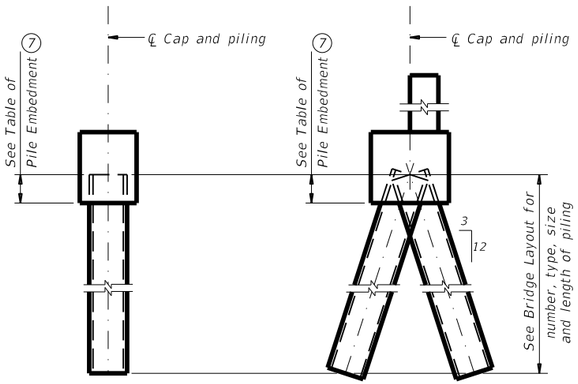
DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

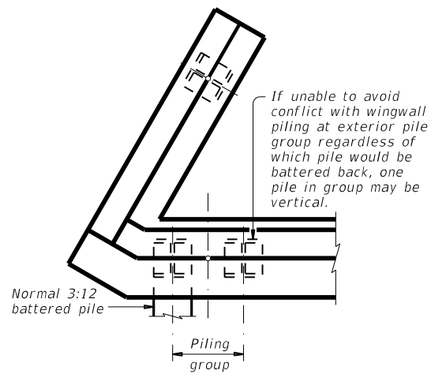
See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.



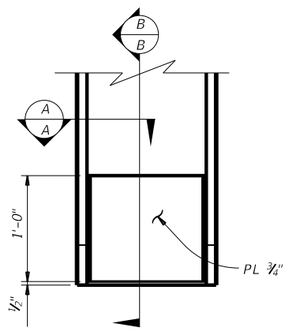
ORIENTATION OF STEEL H-PILING



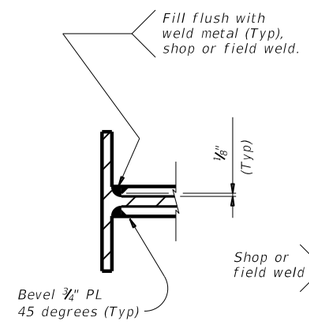
PILING DETAILS
(Concrete or steel H)



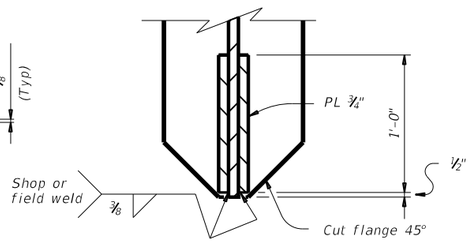
DETAIL "A"
(Showing plan view of a 30° skewed abutment)



ELEVATION



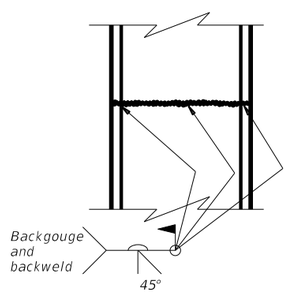
SECTION A-A

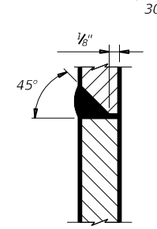


SECTION B-B

STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.





SECTION THRU FLANGE OR WEB

STEEL H-PILE SPLICE DETAIL

Use when required.

(1) #3 spiral at 6" pitch (one and a half flat turns top and bottom).

(2) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"

(3) Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(4) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"

(5) Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

Texas Department of Transportation

Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		44

DATE: 7/22/2021 3:29:45 PM
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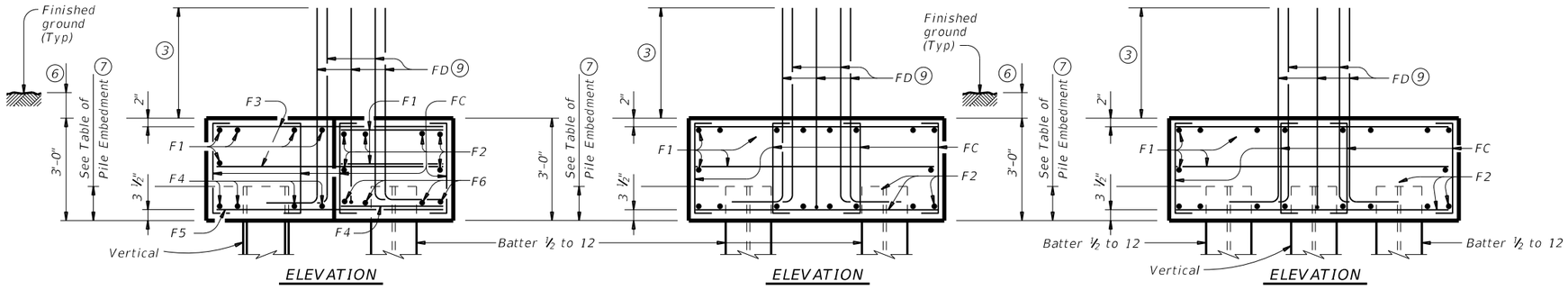
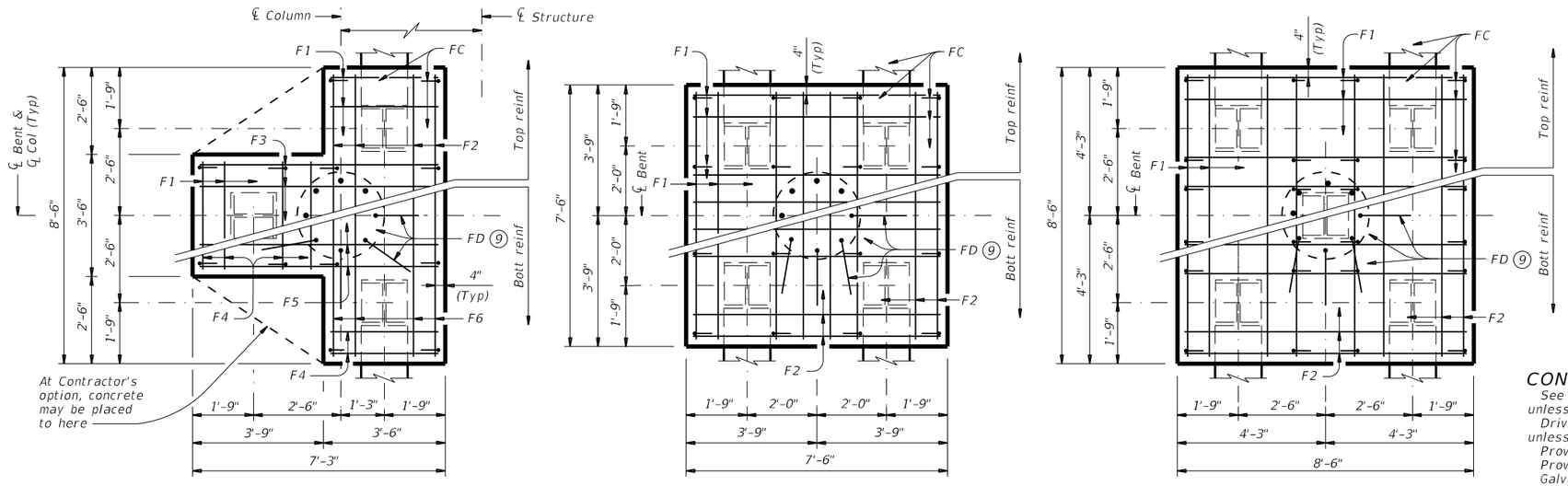




THREE PILE FOOTING (8)

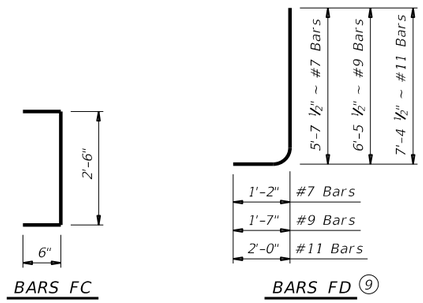
For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.



(3) Min lap with column reinforcing:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

(8) See Bridge Layout for type, size and length of piling.

(9) Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.

(10) Adjust FD quantity, size and weight as needed to match column reinforcing.

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING

Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	623
Class "C" Concrete			CY	4.8

ONE 4 PILE FOOTING

Bar	No.	Size	Length	Weight
F1	20	#4	7'- 2"	96
F2	16	#8	7'- 2"	306
FC	16	#4	3'- 6"	37
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	659
Class "C" Concrete			CY	6.3

ONE 5 PILE FOOTING

Bar	No.	Size	Length	Weight
F1	20	#4	8'- 2"	109
F2	16	#9	8'- 2"	444
FC	24	#4	3'- 6"	56
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	829
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:

See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.

Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.

Provide Class C Concrete (f'c = 3,600 psi), unless shown otherwise.

Provide Grade 60 reinforcing steel.

Galvanize reinforcing if shown elsewhere in the plans.

Provide bar laps for drilled shaft reinforcing, where required, as follows:

Uncoated or galvanized (#6) ~ 2'-6"
Uncoated or galvanized (#7) ~ 2'-11"
Uncoated or galvanized (#9) ~ 3'-9"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

DESIGNER NOTES:

Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.

Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.

Maximum allowable pile loads for the footings shown are:

72 Tons/Pile with 24" Dia Columns
80 Tons/Pile with 30" Dia Columns
100 Tons/Pile with 36" Dia Columns
120 Tons/Pile with 42" Dia Columns

Texas Department of Transportation

Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		45

DATE: 7/22/2021 3:29:49 PM
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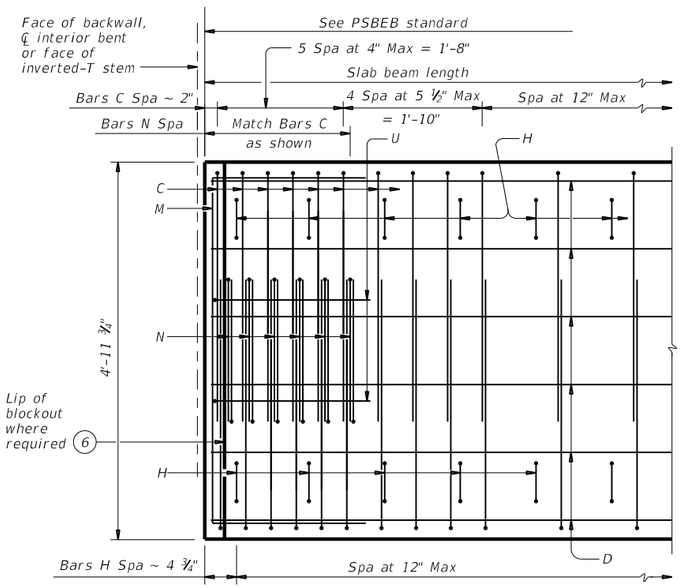
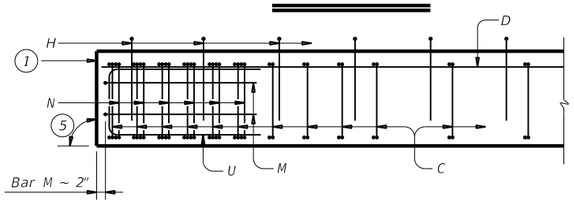


PART PLAN



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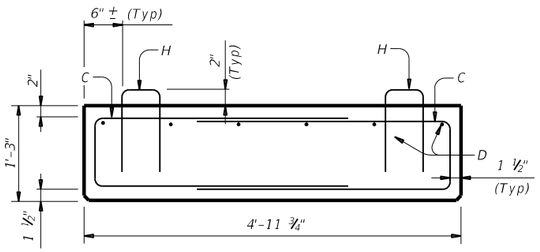
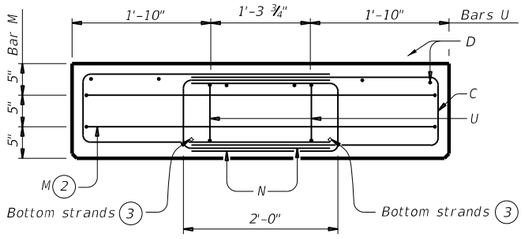
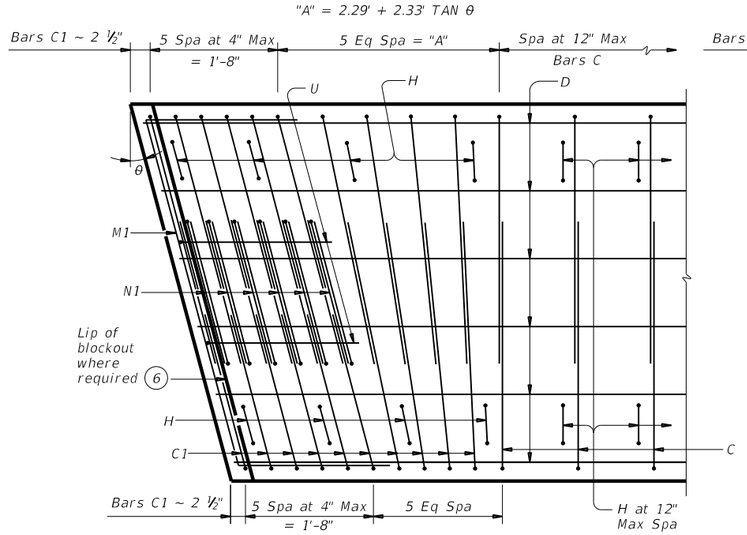


SECTION



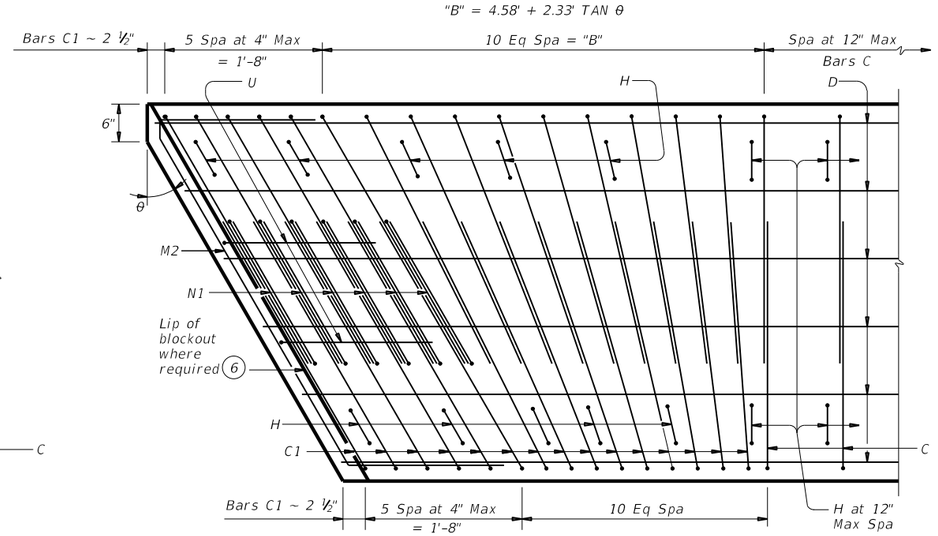
END MAT REINFORCING

Bars H not shown for clarity.



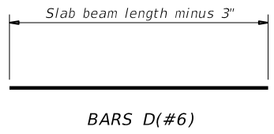
PART SKEW PLAN

(Showing θ over 0° to 15° skew)

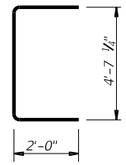


PART SKEW PLAN

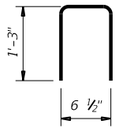
(Showing θ over 15° to 30° skew)



BARS D(#6)



BARS M(#4)



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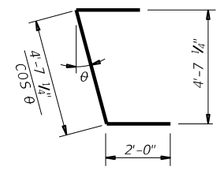

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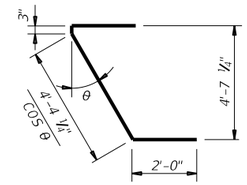

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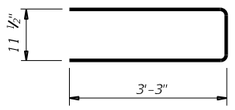
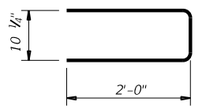
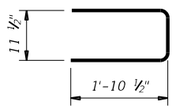


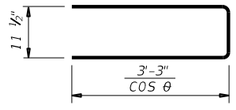
BARS C(#4)



BARS U(#5)



BARS N(#4)



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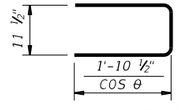
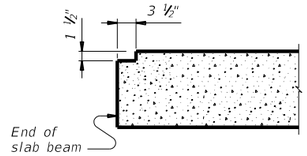


BARS N1(#4)



ELEVATION OF BLOCKOUT (6)

BEAM PROPERTIES		
Area	in^2	896.2
Y top	in	7.50
Y bott	in	7.50
I	in^4	16,805
Weight (4)	lb/ft	934

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.
An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.
These details can be used for any skew angle up to a maximum of 30 degrees.
Chamfer all exposed corners ¾" or round to a ¾" radius.
Details are drawn showing right forward skew. See Bridge Layout for actual direction.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

(1) See End Mat Reinforcing detail.
(2) Adjust bars M vertically to avoid strands.
(3) See sheet PSBND or PSBSD for strand locations.
(4) Assumes 150 pcf weight density of concrete.
(5) 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.
(6) Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DETAILS

(TYPE 5SB15)

PSB-5SB15

FILE: psbsts04-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		46

DATE: 7/22/2021 3:29:53 PM
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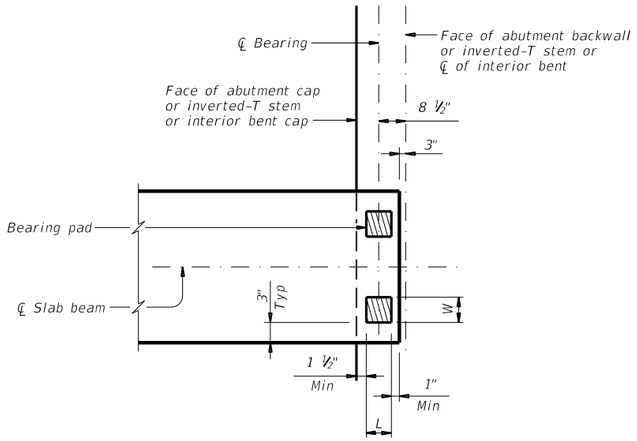
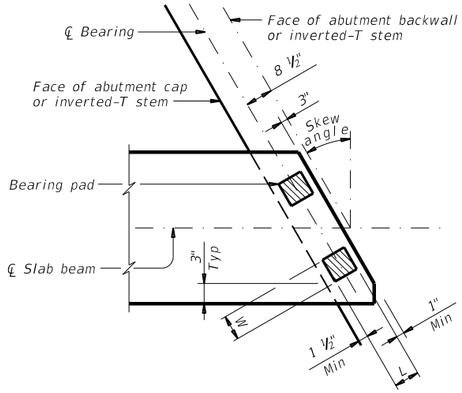
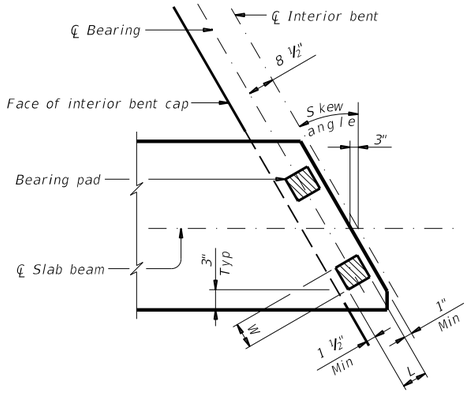


TWO-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



TWO-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



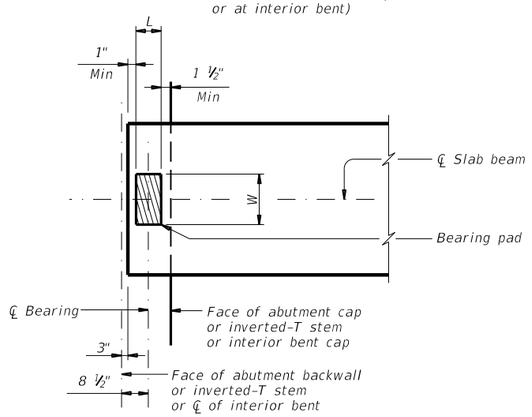
TWO-PAD DETAIL SKEW PLAN
(At interior bent)

TABLE OF BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)

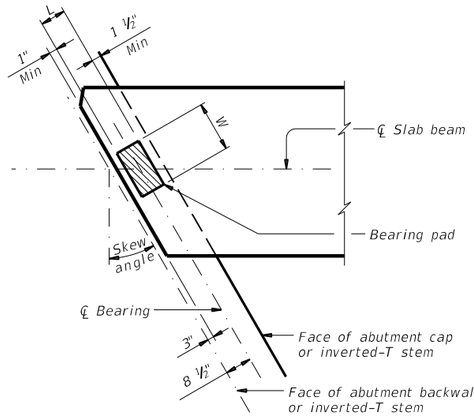
One-Pad (Ty SB1-"N") (2)			Two-Pad (Ty SB2-"N") (2)		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

Pad sizes shown are applicable for the following conditions:

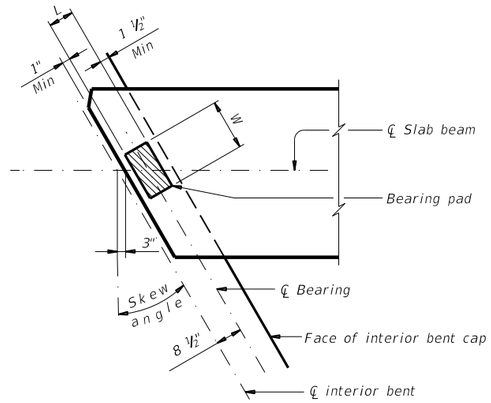
(1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
(2) Skews less than or equal to 30°.



ONE-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



ONE-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)

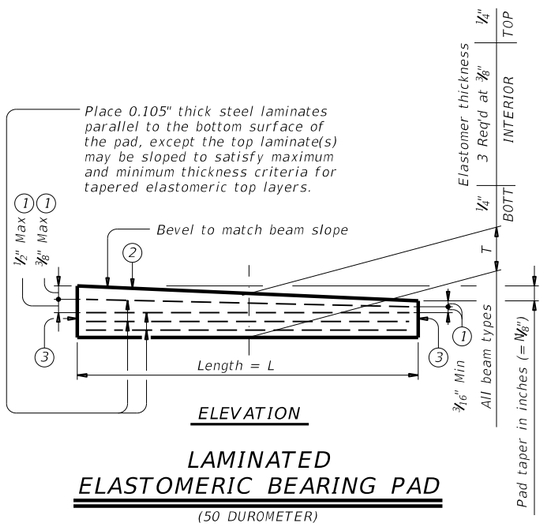


ONE-PAD DETAIL SKEW PLAN
(At interior bent)

ELASTOMERIC BEARING PAD PLACEMENT AND BEAM END DIAGRAMS

Place one bearing pad at forward station beam end.
Place two bearing pads at back station beam end.

GENERAL NOTES:
These details accommodate skew angles up to 30°.
Shop drawings for approval are required.
A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.
Cost of furnishing and installing elastomeric bearings must be included in unit price bid for "Prestressed Concrete Slab Beams".



ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)

(1) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(2) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in ⅛" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for ⅛" taper)
N=2, (for ¼" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan beam slope by more than $\left(\frac{0.0625"}{Length}\right)$ IN/IN.

(3) Locate permanent mark here.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND BEAM END DETAILS

PRESTR CONCRETE SLAB BEAM

PSBEB

FILE: psbste06-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		47

DATE: 7/22/2021 3:29:58 PM
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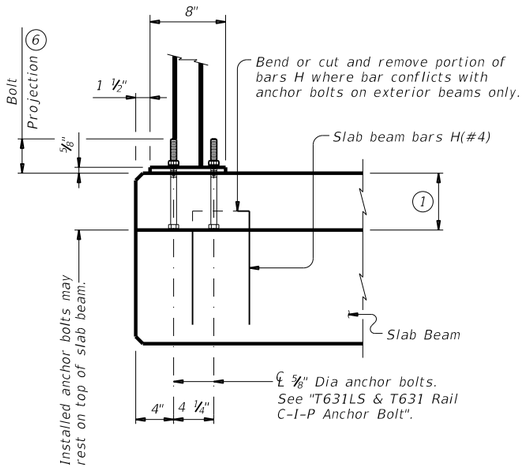
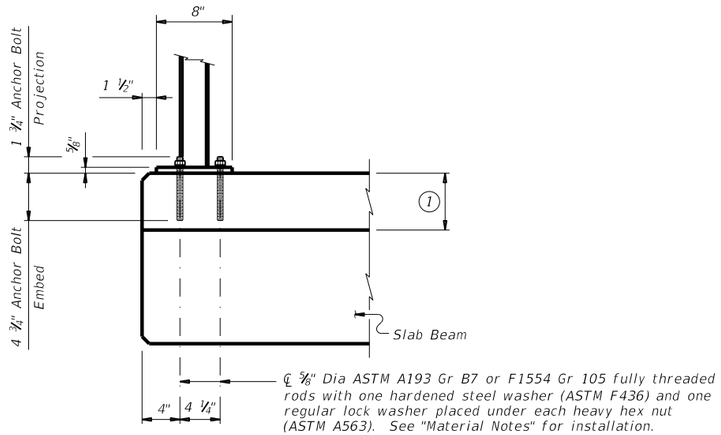
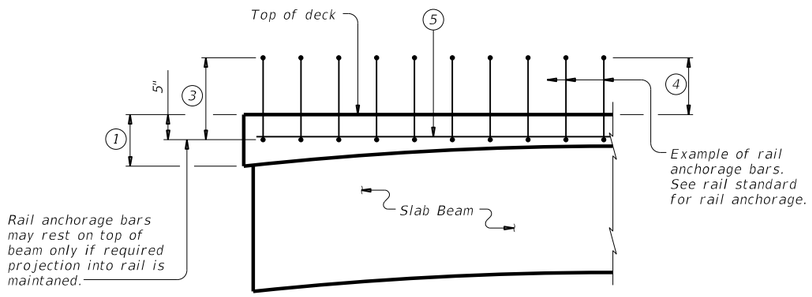


CAST-IN-PLACE ANCHORAGE OPTION

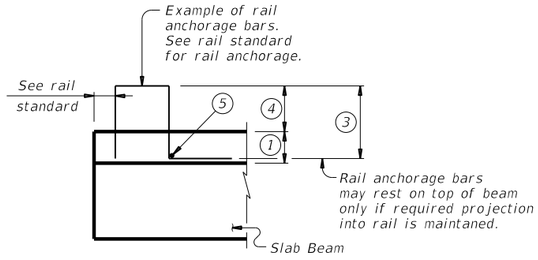


ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT (2)(7)



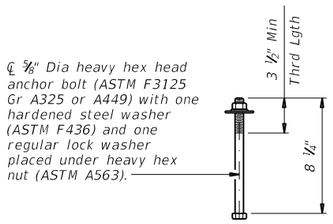
PART SPAN ELEVATION



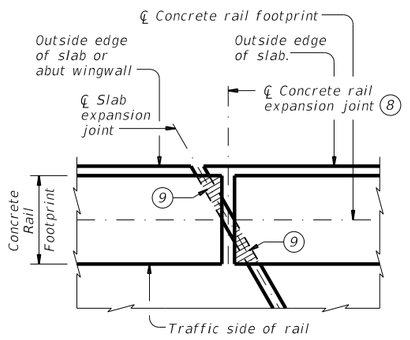
SECTION

TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)



T631LS & T631 RAIL C-I-P ANCHOR BOLT



PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

(1) Cast-in-place slab thickness varies due to beam camber (5" minimum).

(2) Replace cast-in-place anchor bolts shown on T631LS and T631 Rail standard with an adhesive anchor system or cast-in-place anchor bolts shown on this sheet.

(3) Bar length shown on rail standard, minus 1 ¼". Adjust bar length for a raised sidewalk.

(4) See rail standard for projection from finished grade or top of sidewalk.

(5) Place additional (#5) longitudinal bar.

(6) Excess bolt length has been provided to accommodate a variable slab thickness due to beam camber. If slab thickness on span details exceed 7", bolt length must be increased accordingly. After posts have been set and bolts tightened, bolt projection above nuts of more than ½" must be cut off and painted with two coats of zinc-rich paint conforming to the Item 445 "Galvanizing".

(7) Distance from end of top outside edge of slab to center of first bolt group can not be less than 9", except: 15° Skew: 1'-0" (acute corner only)
30° Skew: 1'-3" (acute corner only)

(8) Location of rail expansion joint must be at the intersection of ℄ slab expansion joint, ℄ rail footprint and perpendicular to slab outside edge.

(9) Cross-hatched area must have ½" preformed bituminous fiber material under concrete rail, as shown.

CONSTRUCTION NOTES:

Rail anchorage bars may be field bent as required to clear rail reinforcing or provide minimum cover shown on standard rail detail sheets.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components of steel rail system.

Provide Grade 60 reinforcing steel.

Cast-in-place anchorage system for T631LS and T631 Rail must be ⅝" Dia heavy hex head anchor bolts (ASTM F3125 Gr 325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed anchor bolts 4 ½" minimum.

Adhesive anchors for T631LS and T631 Rail must be ⅝" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 ¾". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

Epoxy coat or galvanize reinforcing steel shown on this standard if rail reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

This standard is for use with structures with a 5" minimum cast-in-place concrete slab.

This standard may require modification for interior rails. This standard does not apply to median barriers.

This standard does not provide details for Type T221P, T224, T80HT, T80SS, C412, PR11, PR22 and PR3 rails on slab beam bridges.

See rail standards for approved speed restrictions, notes and details not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation

Bridge Division Standard

RAIL ANCHORAGE DETAILS

PRESTR CONCRETE SLAB BEAMS

PSBRA

FILE: psbste07-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
03-18: Updated adhesive anchor notes.	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		48

DESIGNED BEAMS (STRAIGHT STRANDS)

STRUCTURE	SPAN LENGTH (ft)	BEAM NO.	BEAM TYPE	PRESTRESSING STRANDS: NON-STD STRAND PATTERN	PRESTRESSING STRANDS: TOTAL NO.	PRESTRESSING STRANDS: SIZE (in)	PRESTRESSING STRANDS: STRGTH fpu (ksi)	PRESTRESSING STRANDS: "e" ℄ (in)	PRESTRESSING STRANDS: "e" END (in)	PRESTRESSING STRANDS: TOT NO. DEB	DEBONDED STRANDS PER ROW: DIST FROM BOTTOM (in)	DEBONDED STRANDS PER ROW: NO. OF STRANDS: TOTAL	DEBONDED STRANDS PER ROW: NO. OF STRANDS: DE-BONDED	DEBONDED STRANDS PER ROW: NUMBER OF STRANDS DEBONDED TO (ft from end): 3	6	9	12	15	CONCRETE: RELEASE STRGTH ① f'ci (ksi)	CONCRETE: MINIMUM 28 DAY COMP STRGTH f'c (ksi)	OPTIONAL DESIGN: DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct (ksi)	OPTIONAL DESIGN: DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb (ksi)	OPTIONAL DESIGN: REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	OPTIONAL DESIGN: LIVE LOAD DISTRIBUTION FACTOR ② Moment	OPTIONAL DESIGN: LIVE LOAD DISTRIBUTION FACTOR ② Shear	LOAD RATING: STRENGTH I Inv	LOAD RATING: STRENGTH I Opr	LOAD RATING: SERVICE III Inv
24' ROADWAY SB12 BEAM	25	ALL	5SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.914	-1.217	448	0.450	0.450	1.40	1.82	1.71
	30	ALL	5SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.292	-1.685	530	0.450	0.450	1.25	1.62	1.29
	35	ALL	5SB12		14	0.6	270	3.50	3.50	0	2.5	14	0	0	0	0	0	0	4.000	5.000	1.730	-2.219	675	0.450	0.450	1.33	1.73	1.23
	40	ALL	5SB12		18	0.6	270	3.50	3.50	0	2.5	18	0	0	0	0	0	0	4.000	5.000	2.218	-2.796	820	0.440	0.440	1.34	1.74	1.12
24' ROADWAY SB15 BEAM	25	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.725	-0.897	551	0.450	0.450	1.77	2.29	2.41
	30	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.020	-1.244	574	0.450	0.450	1.23	1.59	1.45
	35	ALL	5SB15		10	0.6	270	5.00	5.00	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.361	-1.640	708	0.450	0.450	1.15	1.49	1.14
	40	ALL	5SB15		14	0.6	270	5.00	5.00	0	2.5	14	0	0	0	0	0	0	4.000	5.000	1.739	-2.068	864	0.440	0.440	1.32	1.71	1.19
	45	ALL	5SB15		18	0.6	270	5.00	5.00	2	2.5	18	2	2	0	0	0	0	4.000	5.000	2.179	-2.574	1054	0.440	0.440	1.34	1.73	1.08
	50	ALL	5SB15		24	0.6	270	5.00	5.00	8	2.5	24	8	4	4	0	0	0	4.000	5.000	2.680	-3.153	1276	0.440	0.440	1.33	1.72	1.11
28' ROADWAY SB12 BEAM	25	ALL	5SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.903	-1.184	444	0.430	0.430	1.47	1.91	1.80
	30	ALL	5SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.276	-1.639	508	0.430	0.430	1.32	1.71	1.37
	35	ALL	5SB12		12	0.6	270	3.50	3.50	0	2.5	12	0	0	0	0	0	0	4.000	5.000	1.708	-2.159	647	0.430	0.430	1.18	1.53	1.02
	40	ALL	5SB12		18	0.6	270	3.50	3.50	0	2.5	18	0	0	0	0	0	0	4.000	5.000	2.200	-2.744	799	0.430	0.430	1.37	1.78	1.17
28' ROADWAY SB15 BEAM	25	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	0.716	-0.874	529	0.430	0.430	1.85	2.40	2.53
	30	ALL	5SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.007	-1.212	570	0.430	0.430	1.29	1.67	1.53
	35	ALL	5SB15		10	0.6	270	5.00	5.00	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.343	-1.598	680	0.430	0.430	1.21	1.57	1.22
	40	ALL	5SB15		14	0.6	270	5.00	5.00	0	2.5	14	0	0	0	0	0	0	4.000	5.000	1.725	-2.032	842	0.430	0.430	1.36	1.76	1.24
	45	ALL	5SB15		18	0.6	270	5.00	5.00	2	2.5	18	2	2	0	0	0	0	4.000	5.000	2.149	-2.508	1013	0.420	0.420	1.41	1.82	1.16
	50	ALL	5SB15		22	0.6	270	5.00	5.00	6	2.5	22	6	4	2	0	0	0	4.000	5.000	2.643	-3.073	1227	0.420	0.420	1.33	1.72	1.01
30' ROADWAY SB12 BEAM	25	ALL	4SB12		6	0.6	270	3.50	3.50	0	2.5	6	0	0	0	0	0	0	4.000	5.000	0.904	-1.187	341	0.340	0.340	1.38	1.79	1.67
	30	ALL	4SB12		8	0.6	270	3.50	3.50	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.277	-1.646	407	0.340	0.340	1.32	1.71	1.37
	35	ALL	4SB12		10	0.6	270	3.50	3.50	0	2.5	10	0	0	0	0	0	0	4.000	5.000	1.711	-2.169	518	0.340	0.340	1.24	1.60	1.08
	40	ALL	4SB12		14	0.6	270	3.50	3.50	0	2.5	14	0	0	0	0	0	0	4.000	5.000	2.205	-2.758	640	0.340	0.340	1.34	1.73	1.11
30' ROADWAY SB15 BEAM	25	ALL	4SB15		6	0.6	270	5.00	5.00	0	2.5	6	0	0	0	0	0	0	4.000	5.000	0.723	-0.888	431	0.350	0.350	1.69	2.19	2.32
	30	ALL	4SB15		6	0.6	270	5.00	5.00	0	2.5	6	0	0	0	0	0	0	4.000	5.000	1.017	-1.231	438	0.350	0.350	1.16	1.50	1.37
	35	ALL	4SB15		8	0.6	270	5.00	5.00	0	2.5	8	0	0	0	0	0	0	4.000	5.000	1.346	-1.605	545	0.340	0.340	1.21	1.57	1.21
	40	ALL	4SB15		12	0.6	270	5.00	5.00	0	2.5	12	0	0	0	0	0	0	4.000	5.000	1.729	-2.043	675	0.340	0.340	1.47	1.91	1.38
	45	ALL	4SB15		14	0.6	270	5.00	5.00	2	2.5	14	2	2	0	0	0	0	4.000	5.000	2.166	-2.542	823	0.340	0.340	1.33	1.73	1.06
	50	ALL	4SB15		18	0.6	270	5.00	5.00	4	2.5	18	4	2	2	0	0	0	4.000	5.000	2.665	-3.115	998	0.340	0.340	1.32	1.71	1.02

① Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

② Portion of full HL93.

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Load rated using Load and Resistance Factor Rating according to AASTHO Manual for Bridge Evaluation.

Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

Full-length debonded strands are not permitted in positions "A" and "B".

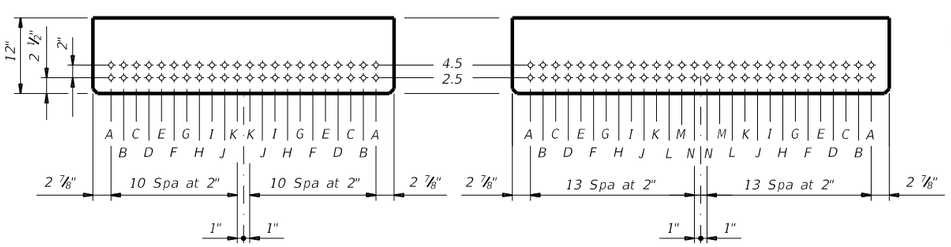
Strand debonding must comply with Item 424.4.2.2.2.4.

When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

Locate strands for the designed beam as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5". Place strands within a row as follows:

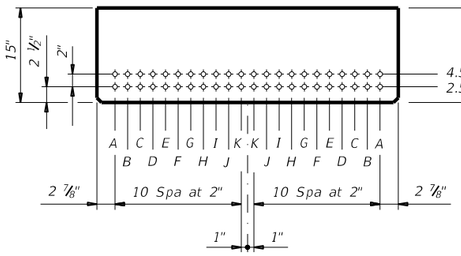
1) Locate a strand in each "A" position.
2) Place strand symmetrically about vertical centerline of beam.
3) Space strands as equally as possible across the entire width.

Do not debond strands in position "A". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.

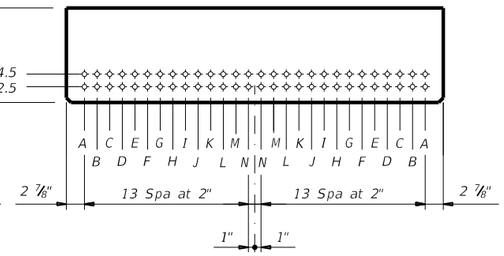


TxDOT 4SB12 SLAB BEAM

TxDOT 5SB12 SLAB BEAM



TxDOT 4SB15 SLAB BEAM



TxDOT 5SB15 SLAB BEAM

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM STD DESIGNS

(TY SB12 OR SB15)

24', 28' & 30' ROADWAY

PSBSD

FILE: psbsts08-21.dgn	DN: SRW	CK: BMP	DW: SFS	CK: SDB
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-21: Added load rating.	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		49

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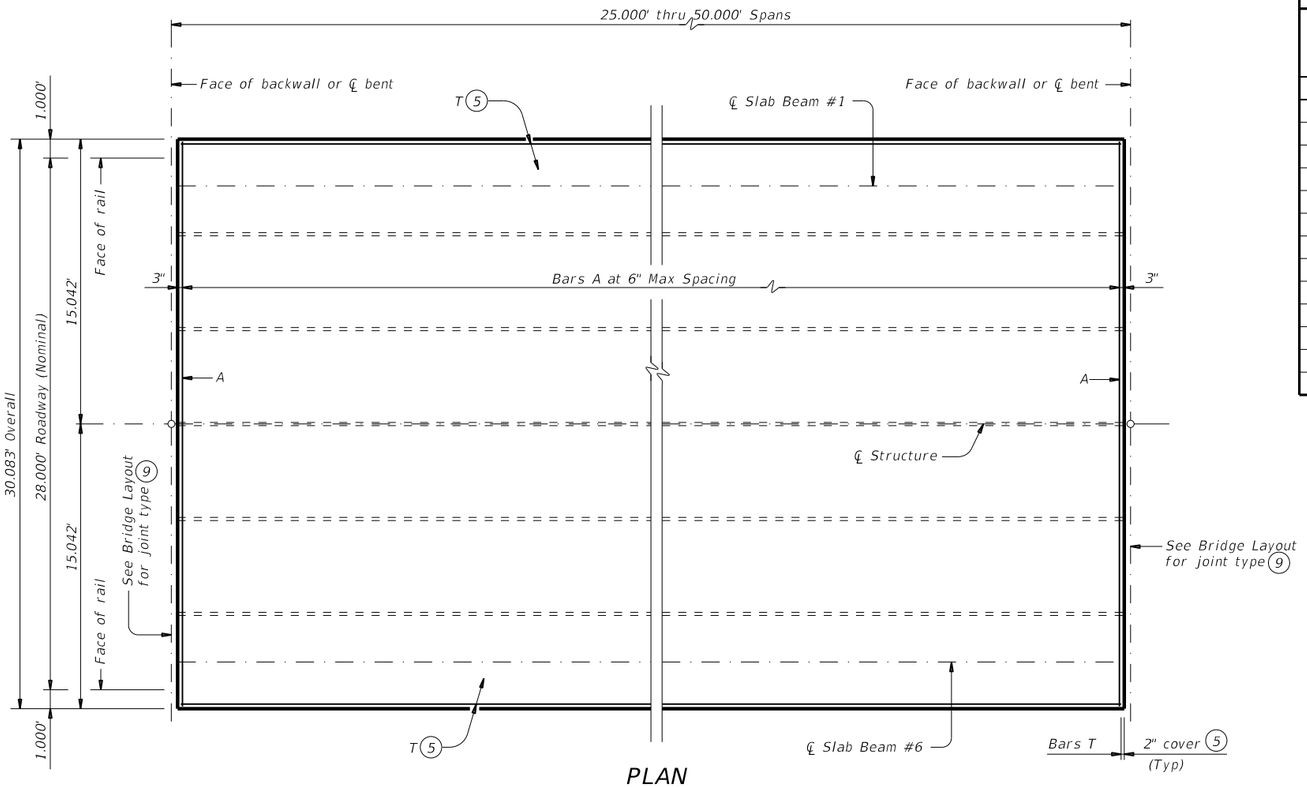
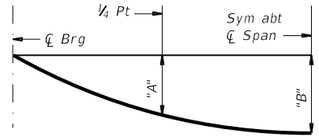


PLAN

TABLE OF VARIABLE VALUES

Span Length	Beam Type	Dead Load Deflection		Section Depths (3)	
		"A"	"B"	"X"	"Y"
Ft	(1)	Ft	Ft	In	Ft/In
25	5SB12	0.003	0.005	5 ¼"	1'-5 ¼"
30	5SB12	0.007	0.010	5 ½"	1'-5 ½"
35	5SB12	0.014	0.020	6"	1'-6"
40	5SB12	0.025	0.035	6 ½"	1'-6 ½"
25	5SB15	0.002	0.003	5 ¼"	1'-8 ¼"
30	5SB15	0.004	0.005	5 ½"	1'-8 ½"
35	5SB15	0.007	0.010	5 ½"	1'-8 ½"
40	5SB15	0.013	0.018	5 ¾"	1'-8 ¾"
45	5SB15	0.021	0.029	6 ¼"	1'-9 ¼"
50	5SB15	0.032	0.045	6 ¾"	1'-9 ¾"



DEAD LOAD DEFLECTION DIAGRAM

NOTE: Deflections shown are due to concrete slab only (E_C = 5,000 ksi). Calculated deflections shown are theoretical and actual dimensions may vary. Adjust based on field verification.

TABLE OF ESTIMATED QUANTITIES

SPAN LENGTH	REINF CONCRETE SLAB (SLAB BEAM)	PRESTR CONC SLAB BEAM (5SB12 OR 5SB15) (1)			TOTAL REINF STEEL (2)
		ABUT TO INT BT	INT BT TO INT BT	ABUT TO ABUT	
Ft	SF	LF (4)	LF (4)	LF (4)	Lb
25	752	147.00	147.00	147.00	2,110
30	903	177.00	177.00	177.00	2,530
35	1,053	207.00	207.00	207.00	2,950
40	1,203	237.00	237.00	237.00	3,370
45	1,354	267.00	267.00	267.00	3,790
50	1,504	297.00	297.00	297.00	4,210

(1) See Bridge Layout for beam type used in the superstructure. These standards do not provide for the use of both SB12 and SB15 beams within the same structure.

(2) Reinforcing steel weight is calculated using an approximate factor of 2.8 Lbs/SF.

(3) Based on theoretical beam camber, dead load deflections of 5" cast-in-place concrete slab and a constant grade. The Contractor will adjust these values for any vertical curve.

(4) Fabricator will adjust beam lengths for beam slopes as required.

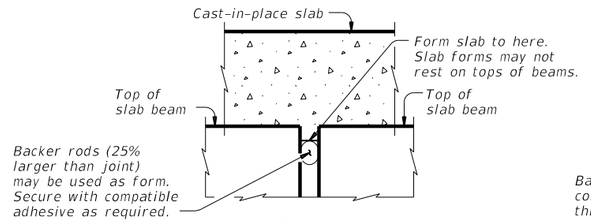
(5) Where slab is continuous over Interior Bents, Bars T are continuous through Joint. See "Continuous Slab Detail".

(6) This standard does not provide for changes in roadway cross-slopes within the structure.

(7) 1 ¼" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(8) Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.

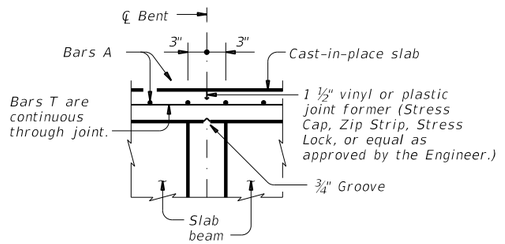
(9) See Bridge Layout for expansion joint locations. If using Type A expansion joints, the maximum distance between joints is 100 feet. Type A joints are subsidiary to Item 422, "Concrete Superstructures".



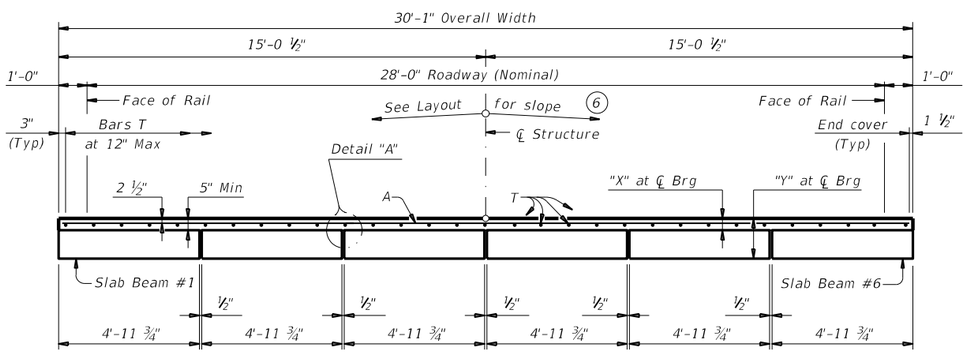
DETAIL "A"

BAR TABLE

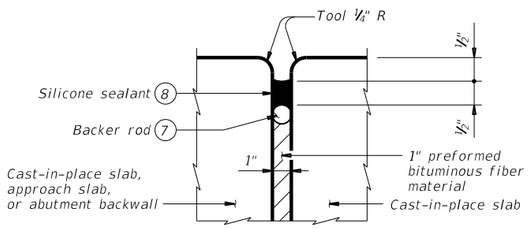
BAR	SIZE
A	#5
T	#4



CONTINUOUS SLAB DETAIL



TYPICAL TRANSVERSE SECTION



TYPE A JOINT DETAIL (9)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Two- or three-span units, with slab continuous over interior bents, may be formed with the details shown on this sheet.
See applicable rail details for rail anchorage in slab.
This standard does not support the use of transition bents.

Cover dimensions are clear dimensions, unless noted otherwise.

MATERIAL NOTES:

Provide Class S concrete (f'c = 4,000 psi).
Provide Class S (HPC) concrete if shown elsewhere in the plans.
Provide Grade 60 reinforcing steel.
Provide bar laps, where required, as follows:

Uncoated ~ #4 = 1'-7"
~ #5 = 2'-0"
Epoxy coated ~ #4 = 2'-5"
~ #5 = 3'-0"

Deformed welded wire reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars A or T unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM SPANS (TY SB12 OR SB15)

28' ROADWAY

SPSB-28

FILE: psbste33-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
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	CHS	HARDEMAN		50

DATE: 7/22/2021 3:30:16 PM
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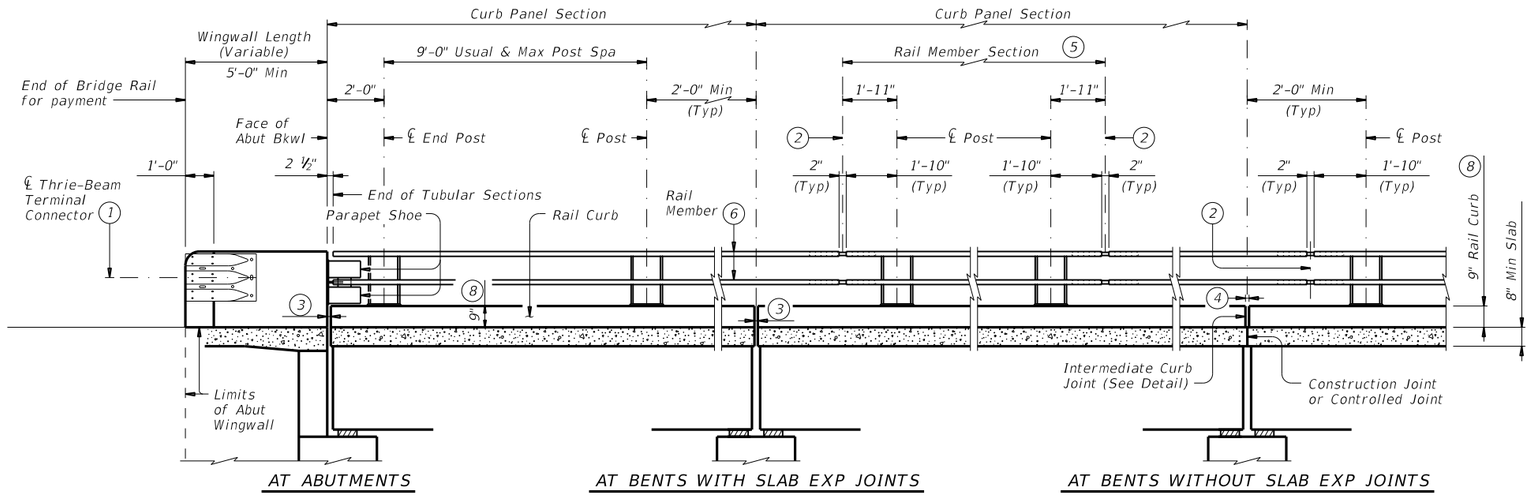
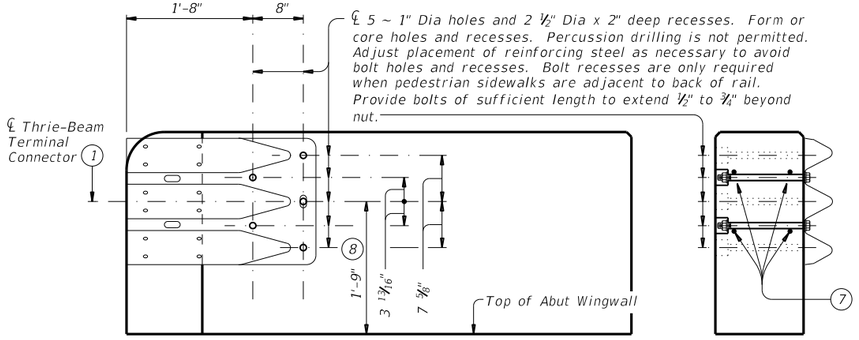
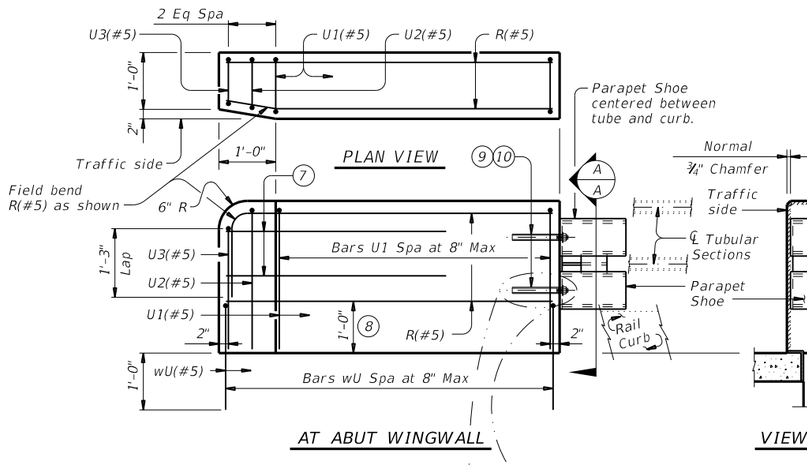


ROADWAY ELEVATION OF RAIL

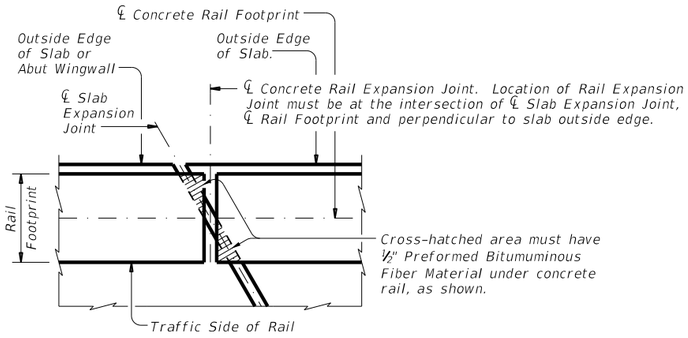
1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. ℄ Expansion Joint or Splice Joint as required.
3. Same as slab joint opening. (5" Max Expansion Joint).
4. ¼" Min, ¾" Max.
5. Rail member sections must have at least two posts but not more than four.
6. HSS 6 x 2 x ¼ (ASTM A1085 or A500 Gr B).
7. Place 4 additional Bars R(#5) 3'-8" in length inside Bars U(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
8. Increase 2" for structures with overlay.
9. Anchor bolts must be ⅞" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with heavy hex nuts and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
10. Install Parapet Shoe after rail has been placed. To ease installation, temporarily brace parapet shoe until the anchorage system achieves manufacturer's recommended curing time. Anchorage system must be assembled with one hardened steel washer (ASTM F436) and one heavy hex nut (ASTM A563) each. Remove temporary bracing after anchorage systems has been firmly tightened.



TERMINAL CONNECTION DETAILS

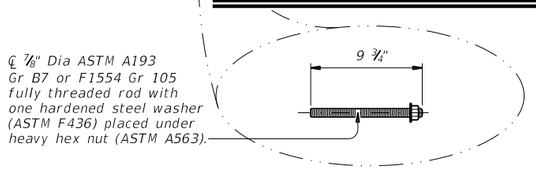


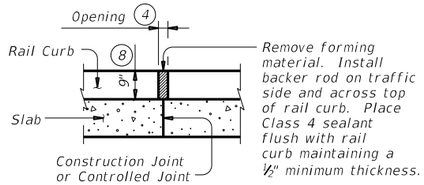
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.





INTERMEDIATE CURB JOINT DETAIL

Provide at all interior bents without slab expansion joints.

SHEET 1 OF 4

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T1W

FILE: rlstd002-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		53

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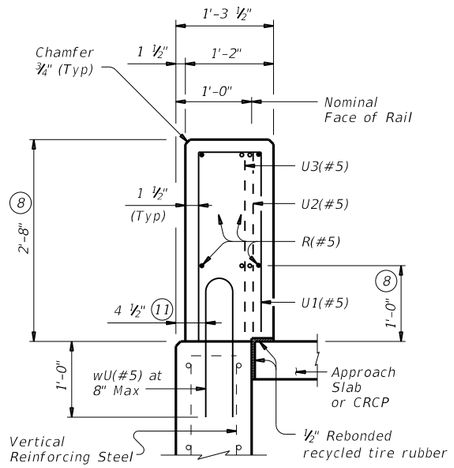
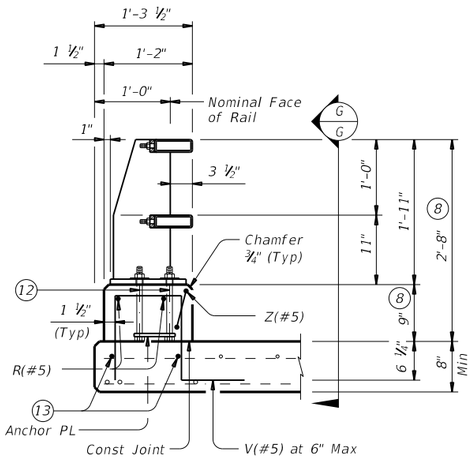
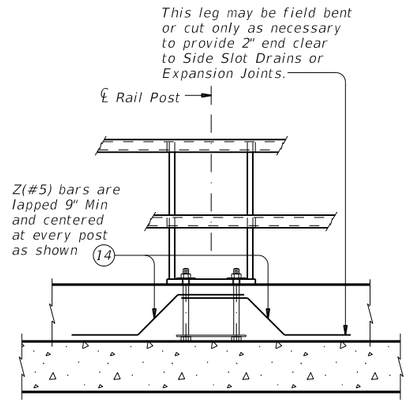


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

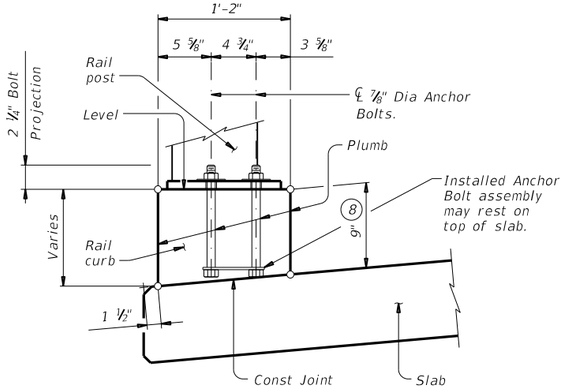


ON BRIDGE SLAB



VIEW G-G

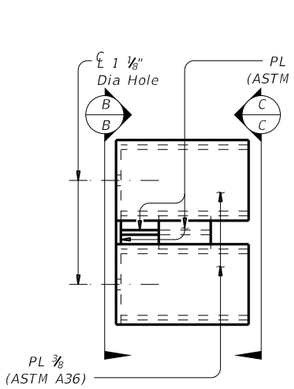
Bars V and R omitted for clarity.



RAIL CURB FORMING DETAIL

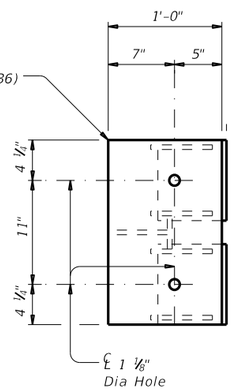
Reinforcing steel and rail curb chamfers not shown for clarity.

SECTIONS THRU RAIL

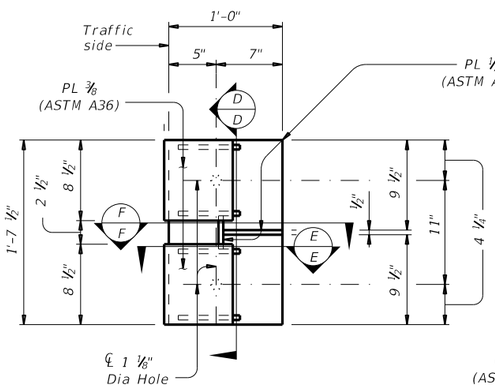


PARAPET SHOE

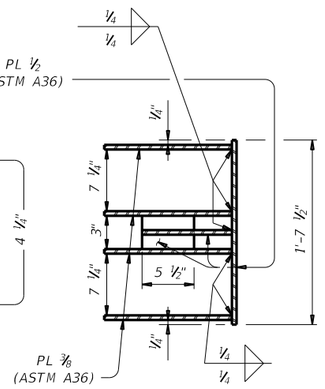
(Parapet Shoe weight = 92 lb each, for contractor's information only).



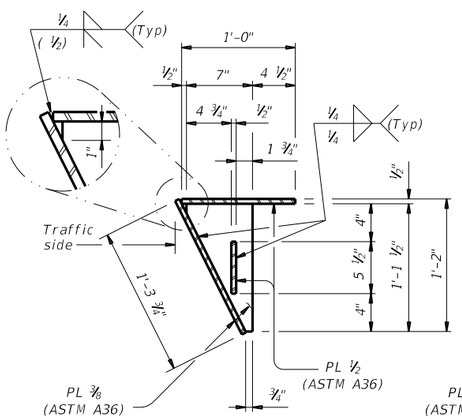
VIEW B-B



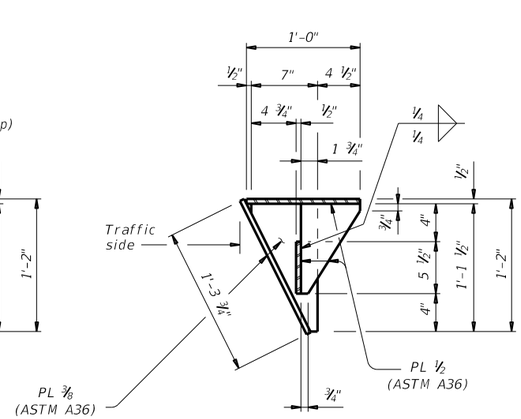
VIEW C-C



SECTION D-D



SECTION E-E



SECTION F-F

(8) Increase 2" for structures with overlay.

(11) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

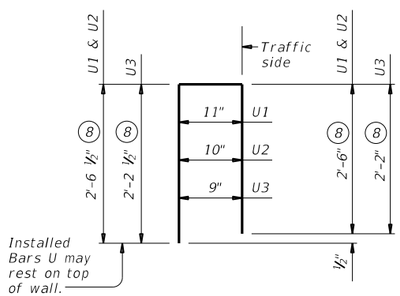
(12) ℄ ⅞" Dia Anchor Bolts. See "Anchor Bolt Assembly Details".

(13) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

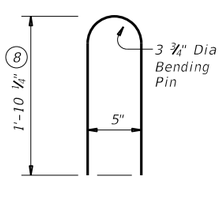
(14) Adjust Bars Z(#5) as necessary to avoid Bars V(#5).

(15) Length shown for 6 ¼" Min bar embedment with no overlay. Adjust as required.

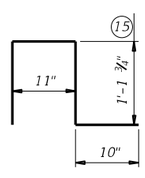
(16) Increase 2 ¾" for structures with overlay.



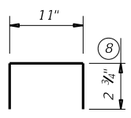
BARS U(#5)



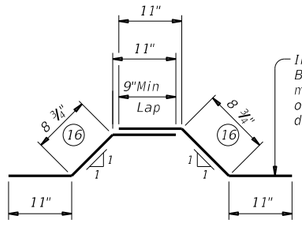
BARS wU(#5)



BARS V(#5)



BARS VS(#5)



BARS Z(#5)

SHEET 2 OF 4

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T1W

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	CHS	HARDEMAN		54

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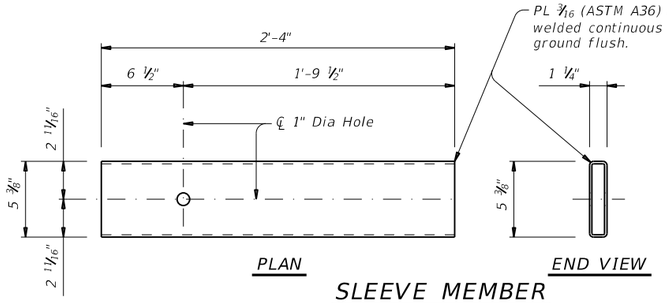
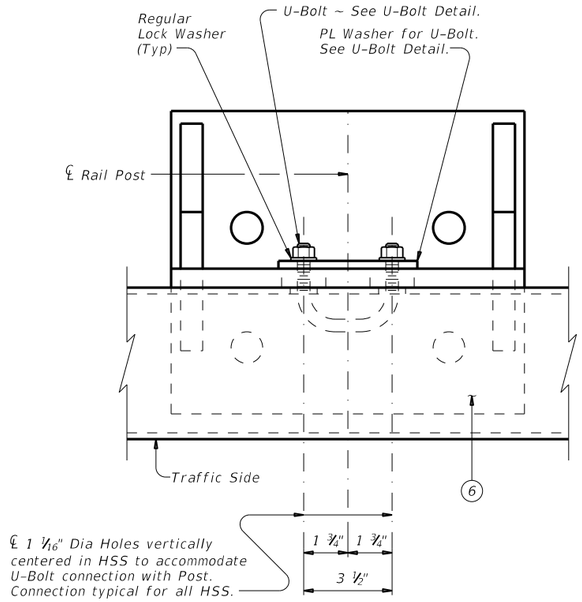
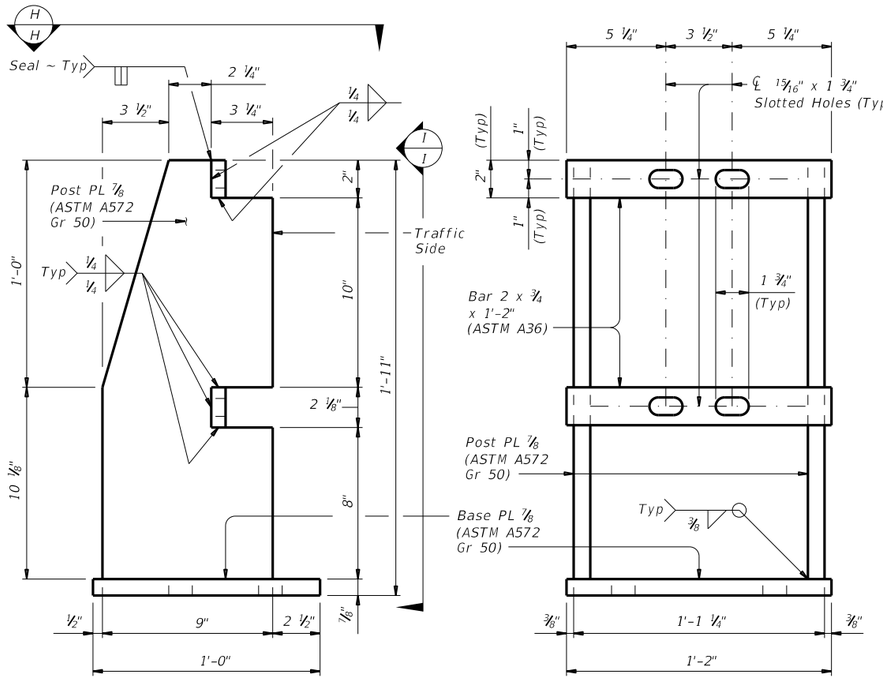


SLEEVE MEMBER



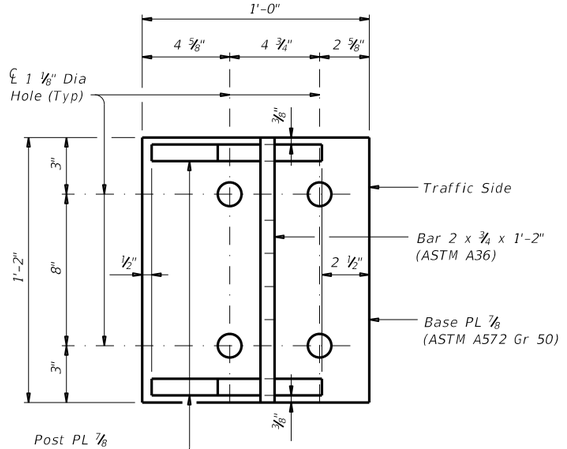
TOP VIEW OF RAIL POST

(Showing connection for rail post and HSS.)



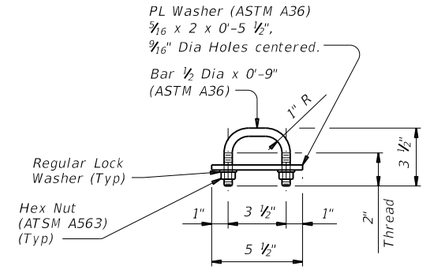
POST DETAIL

VIEW I-I



VIEW H-H

(Showing Hole location in Base PL)

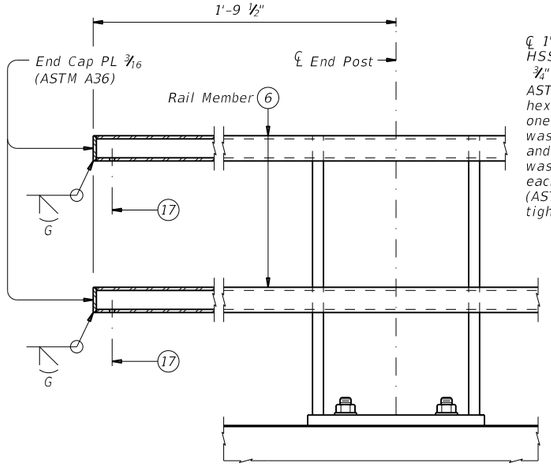


U-BOLT DETAIL

(Showing U-Bolt for rail post and HSS.)

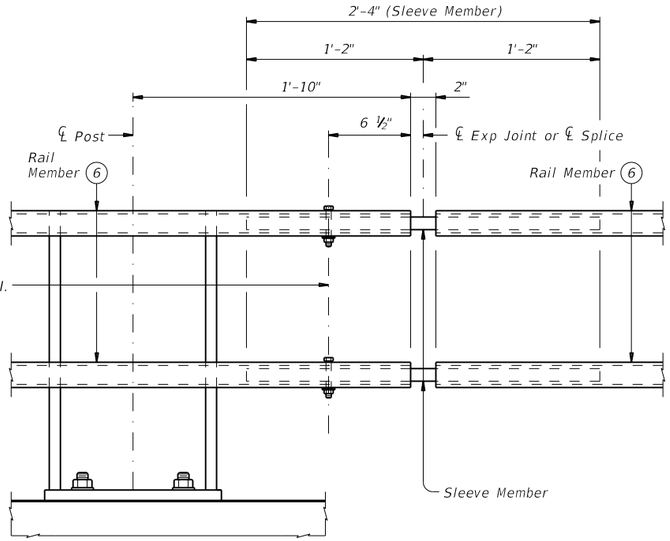
⑥ HSS 6 x 2 x ¼ (ASTM A1085 or A500 Gr B).

⑰ ℄ ⅜" Dia Drain Hole in bottom of HSS.



℄ 1" Dia holes in HSS centered for ¾" Dia x 3 ½" ASTM F3125 Gr A325 hex head bolts with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut (ASTM A563). Wrench tight, do not crush rail.

END CAPS ON HSS AT END POST



EXPANSION JOINT OR SPLICE

SHEET 3 OF 4

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T1W

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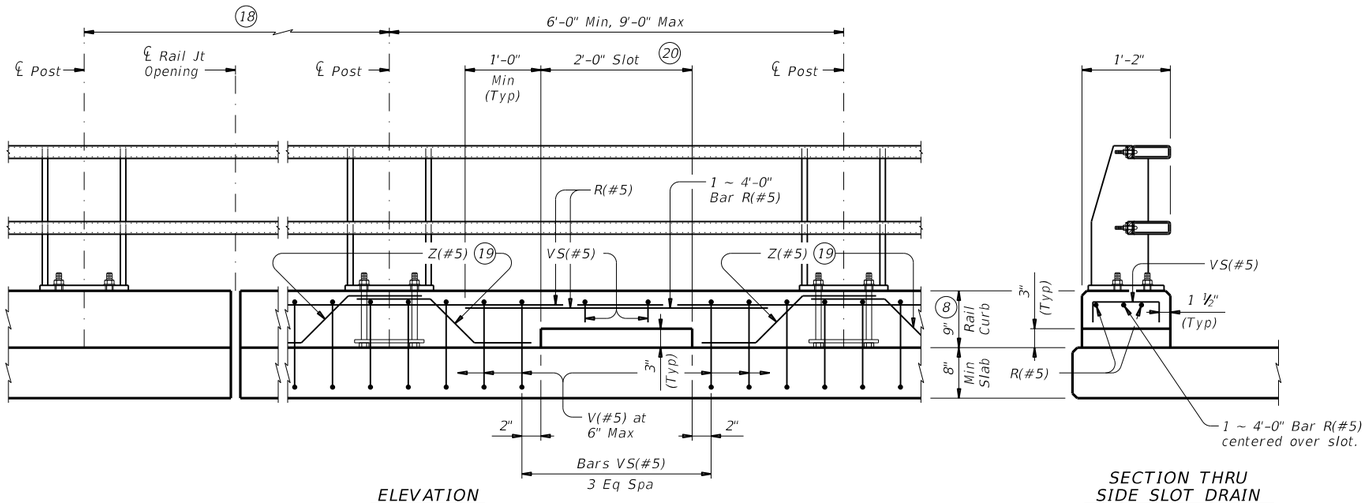
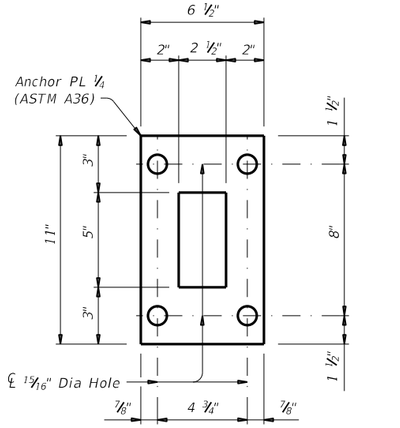


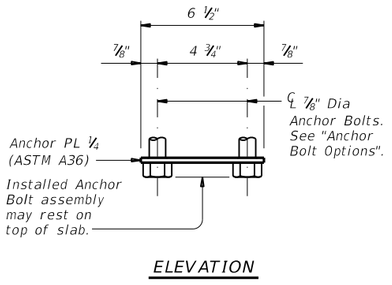
ELEVATION

SECTION THRU SIDE SLOT DRAIN

OPTIONAL SIDE SLOT DRAIN DETAILS 21



PLAN OF ANCHOR PLATE



ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS

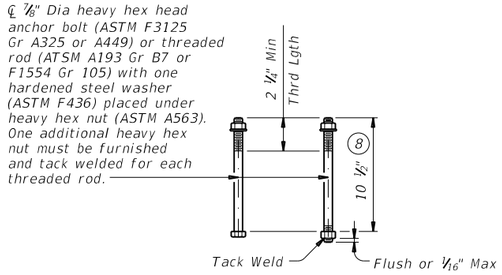
(8) Increase 2" for structures with Overlay.

(18) Side slot drains are not allowed in areas where there is a joint in the concrete curb between rail posts.

(19) Bars Z(#5). See "Section Thru Rail" and "View G-G" for Bar Z placement and spacing.

(20) Center side slot drain between posts within the limits shown.

(21) Side slot drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway and a sidewalk, side slot drains are not permitted.



ANCHOR BOLT OPTIONS

(Showing Anchor Bolts for Base Plate)

CONSTRUCTION NOTES:

The face of tubular sections and rail curb must be plumb unless otherwise approved. Steel posts must be square to the top of curb. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist.

Bend tubes to required radius for curved rails. Shop drawings for approval are required for curved rails.

One shop splice per rail member section is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

Round or chamfer exposed edges of rail members and rail posts to approximately 1/16" by grinding.

Chamfer all exposed concrete corners.

MATERIAL NOTES:

Provide ASTM A1085 or A500 Gr B for all HSS.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over gavanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Anchor bolts for base plate must be ⅞" Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.

Provide ¾" Dia x 3 ½" hex head bolts (ASTM F3125 Gr A325) for expansion or splice joints in HSS with one regular washer and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.

Provide ½" Dia round bar U-bolts (ASTM A36) with plate washer (ASTM A36) and regular lock washers placed under hex nuts that conform to ASTM A563 requirements. See "U-Bolt Detail".

Provide Class "S" concrete. When Class "S" concrete for slab is HPC, include a minimum of 3 gallons of calcium nitrite inorganic corrosion inhibitor per cubic yard of Class "S" concrete.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-0"
Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

This railing cannot be used on bridges with expansion joints providing more than 5" movement or on cast-in-place retaining walls, unless otherwise noted.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting, to the Engineer for approval.

Average weight of railing with no overlay: 173 plf total
131 plf (Conc)
42 plf (Steel).

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T1W

FILE: rlstd002-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		56

DATE: 7/20/2021 2:05:57 PM
FILE: T:\CHSDES\PROJECTS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\Plan Set\Standards\057 STRUCTURE*ID.dgn

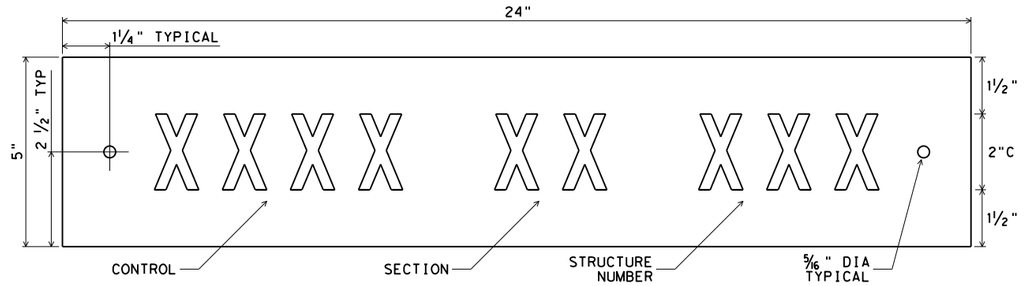
STRUCTURE ID TEMPLATE NUMBERS

NBI NUMBER	LOCATION	STRUCTURE NUMBER	"WL"	"Lw"	"Hw"	"FBW"	"FTS"
25-100-0-0098-11-043	PR 62 @ DEVIL'S CREEK	0098-11-005	7'	NA	1'-9"	1'-8"	1'-1"

SPECIFICATION REFERENCE TABLE
MATERIALS AND TESTS DIVISION SPECIFICATIONS

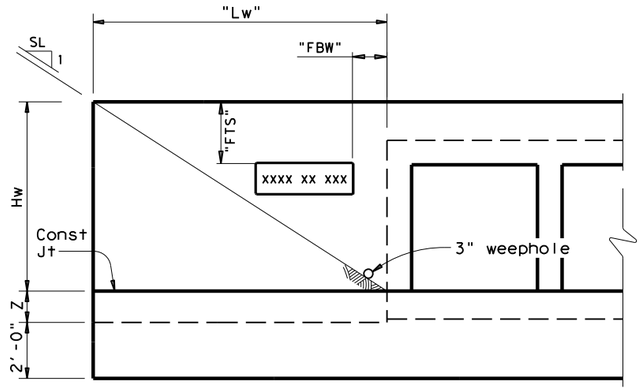
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300
BACKGROUND - WHITE - TYPE C SHEETING	
LEGEND - BLACK - ACRYLIC NON-REFLECTIVE FILM	

PSN Sign
Legend - Black
Background - White Reflec.

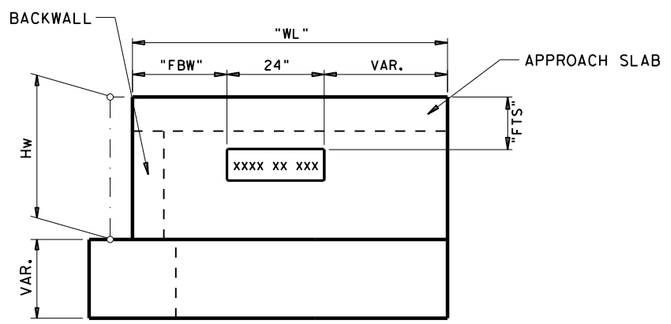


GENERAL NOTES:

1. Mount permanent structure number signs to non-prestressed concrete structural elements (e.g. backwalls, wingwalls and headwalls) using ¼ x 1¾" concrete wedge anchors.
2. Background sheeting shall be applied to the substrate per sheeting manufacturer's recommendations.
3. Black legend shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
4. Black legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod, or F).
5. 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.
6. Placement of this sign will be subsidiary to pertinent bid items.

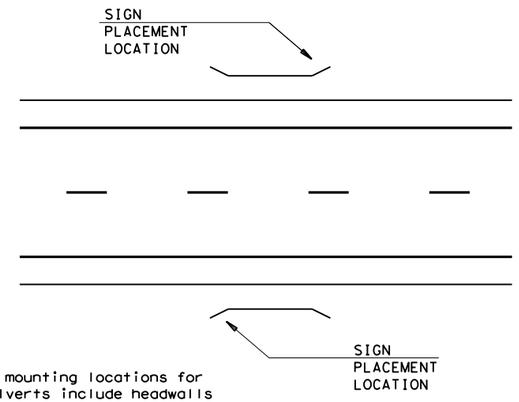


PARALLEL WING ELEVATION



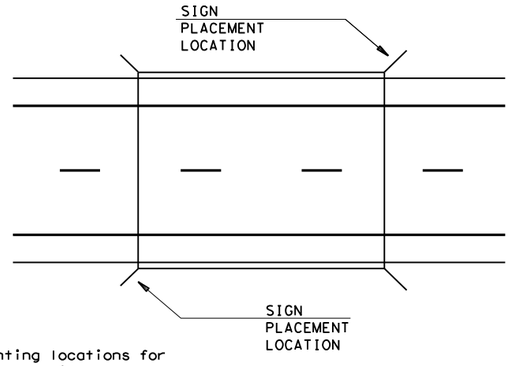
WINGWALL ELEVATION

BRIDGE CLASS CULVERTS



Acceptable sign mounting locations for bridge class culverts include headwalls and wingwalls.

BRIDGES



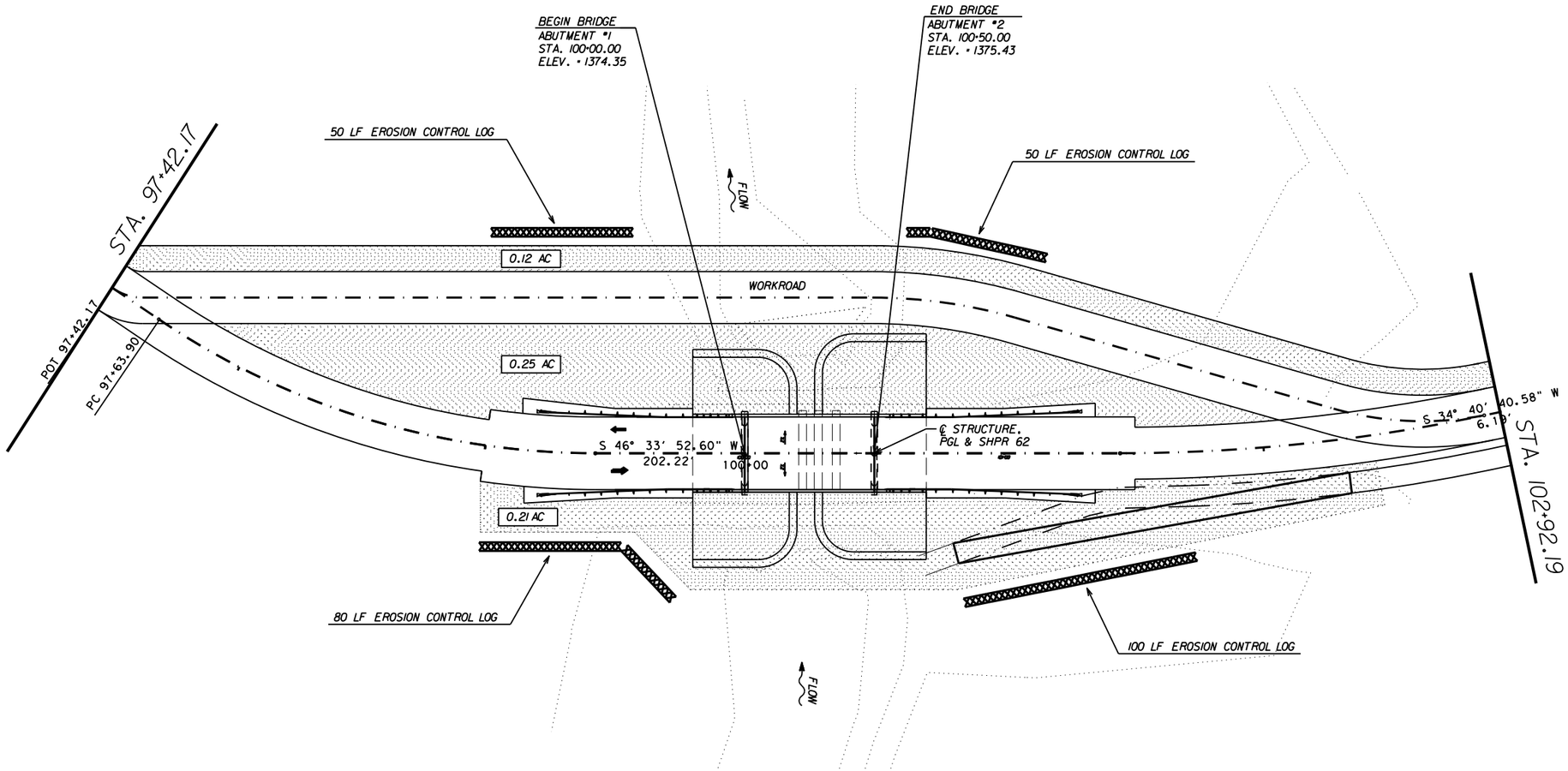
Acceptable sign mounting locations for bridges include abutment wingwalls, abutment backwalls.

STRUCTURE ID DETAILS

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		57

EROSION CONTROL SUMMARY

LOCATION	164 6034	164 6042	164 6044	168 6001	314 6013	506 6042
	DRILL SEEDING (PERM) (RURAL) (SANDY)	DRILL SEEDING (TEMP) (WARM)	DRILL SEEDING (TEMP) (COOL)	VEGETATIVE WATERING	EMULS ASPH (EROSN CONT) (CSS-1H) (0.2 GAL/SY)	BIOGRD EROSN CONT LOGS (18" DIA) INSTALL
	AC	AC	AC	MG	GAL	LF
STA. 97+42.17 TO STA. 102+92.19	0.58	0.29	0.29	23	562	280
PROJECT TOTALS	**0.58**	**0.29**	**0.29**	**23**	**562**	**280**



STATE OF TEXAS
RYAN J. REID
139507
LICENSED
PROFESSIONAL ENGINEER

Ryan J Reid P.E.
10/26/2021

SW3P LAYOUT

PR 62 @ DEVIL'S CREEK

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		58

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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 this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

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.

☒ 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# _____

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.

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
☒ Temporary Vegetation	☒ Erosion Control Logs	☐ Erosion Control Compost
☐ Blankets/Matting	☐ Rock Filter Dams	☐ Mulch Filter Berm and Socks
☐ Mulch	☐ Construction Exits	☐ Compost Filter Berm and Socks
☐ Sodding	☐ Sand Bag Berm	☒ Vegetation Lined Ditches

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.

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. Minimize impacts to existing vegetation in the project area; impacted vegetation should be replaced with in-kind native vegetation. Trim trees instead of removal (when possible). Re-vegetation proposed for the project would be in compliance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscapes.

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. Migratory birds Do not disturb, destroy, or remove active nests including nesting birds during the nesting season. Avoid impacts to birds, their eggs, and their young. Avoid the removal of unoccupied, inactive nests, as practicable.

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.

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.

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 [continued]

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.

STATE OF TEXAS
RYAN J. REID
139507
LICENSED PROFESSIONAL ENGINEER

Ryan J Reid P.E.
10/06/2021

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
© TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.
05-07-14 ADDED NOTE SECTION IV.	CHS	HARDEMAN		59
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.				

SITE DESCRIPTION

PROJECT LIMITS: PR 62 @ DEVIL'S CREEK

PROJECT DESCRIPTION: THE REPLACEMENT OF AN EXISTING BRIDGE FACILITY CONSISTING OF: CONCRETE BRIDGE CONSTRUCTION AND EARTHWORK

MAJOR SOIL DISTURBING ACTIVITIES: EXCAVATION AND EMBANKMENT

TOTAL PROJECT AREA: 0.12 ACRES

TOTAL AREA TO BE DISTURBED: 0.12 ACRES

WEIGHTED RUNOFF COEFFICIENT (AFTER CONSTRUCTION): 0.45

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
THE LIMITS PRIMARILY CONSIST OF LATOM-ROCK OUTCROP COMPLEX SOILS. TYPICAL SOIL PROFILE IS: FINE SANDY LOAM WITH BEDROCK BELOW 6 INCH DEPTHS. 3% TO 20% SLOPES. EXISTING VEGETATIVE COVER IS APPROXIMATELY 80% WITH NATIVE GRASSES.

NAME OF RECEIVING WATERS: SEGMENT ID: 0230, PEASE RIVER, RED RIVER BASIN

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- [X] TEMPORARY SEEDING
- [X] PERMANENT PLANTING, SODDING, OR SEEDING
- [ ] MULCHING
- [ ] SOIL RETENTION BLANKET
- [ ] BUFFER ZONES
- [X] PRESERVATION OF NATURAL RESOURCES

OTHER: STABILIZATION OF DISTURBED AREAS MUST BE INITIATED IMMEDIATELY WHENEVER CONSTRUCTION ACTIVITY HAS CEASED (TEMPORARILY OR PERMANENTLY) AND WILL NOT RESUME WITHIN 14 DAYS.

STRUCTURAL PRACTICES:

- [X] EROSION CONTROL LOGS
- [ ] SILT FENCE
- [ ] ROCK FILTER DAMS
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [ ] PIPE SLOPE DRAINS
- [ ] PAVED FLUMES
- [ ] ROCK BEDDING AT CONSTRUCTION EXIT
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS
- [ ] SEDIMENT BASINS
- [ ] STORM INLET SEDIMENT TRAP
- [ ] STONE OUTLET STRUCTURES
- [ ] CURBS AND GUTTERS
- [ ] STORM SEWERS
- [ ] VELOCITY CONTROL DEVICES

OTHER: THE LOCATION OF EACH STRUCTURAL PRACTICE NOTED ABOVE SHALL BE DETERMINED BY THE ENGINEER UNLESS SPECIFICALLY SPECIFIED IN THE PLANS. THE ENGINEER MAY MODIFY THE LOCATION OF THE STRUCTURAL PRACTICES AS THE CONTRACTOR'S OPERATION REQUIRE THE USE OF BEST MANAGEMENT PRACTICES.

EROSION AND SEDIMENT CONTROLS

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:
1) SET UP TCP AND EROSION CONTROL DEVICES
2) REMOVE EXISTING BRIDGE
3) PERFORM EARTHWORK
4) CONSTRUCT NEW STRUCTURE
5) FINAL PROJECT CLEANUP

STORM WATER MANAGEMENT: STORM WATER DRAINAGE IS PROVIDED BY DITCHES RUNNING ADJACENT TO THE ROADWAY.

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: ALL EROSION AND SEDIMENT CONTROLS WILL BE MAINTAINED IN GOOD WORKING ORDER. IF A REPAIR IS NECESSARY, IT WILL BE DONE AT THE EARLIEST DATE POSSIBLE, BUT NO LATER THAN 7 CALENDAR DAYS AFTER THE SURROUNDING EXPOSED GROUND HAS DRIED SUFFICIENTLY TO PREVENT FURTHER DAMAGE FROM HEAVY EQUIPMENT. THE AREAS ADJACENT TO CREEKS AND DRAINAGEWAYS SHALL HAVE PRIORITY FOLLOWED BY DEVICES PROTECTING STORM SEWER INLETS.

INSPECTION: AN INSPECTION WILL BE PERFORMED BY A TXDOT INSPECTOR EVERY 14 CALENDAR DAYS AS WELL AS AFTER EVERY HALF INCH OR MORE OF RAIN (AS RECORDED ON A RAIN GAUGE TO BE LOCATED AT THE PROJECT SITE). AN INSPECTION AND MAINTENANCE REPORT WILL BE MADE PER EACH INSPECTION. BASED ON THE INSPECTION RESULTS, THE CONTROLS SHALL BE REVISED PER THE INSPECTION REPORT WITHIN 7 CALENDAR DAYS OF THE INSPECTION. ALL CHANGES MADE AS A RESULT OF THE INSPECTION SHALL BE UPDATED ON THE SW3P.

WASTE MATERIALS: ALL WASTE MATERIAL WILL BE REMOVED FROM PROJECT AND DISPOSED OF AS DIRECTED BY THE ENGINEER. NO CONSTRUCTION WASTE MATERIAL WILL BE BURIED ON SITE.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): AT A MINIMUM, ANY PRODUCT IN THE FOLLOWING CATEGORIES ARE CONSIDERED TO BE HAZARDOUS: PAINTS, ACIDS FOR CLEANING MASONRY SURFACES, CLEANING SOLVENTS, ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SOIL STABILIZATION, OR CONRETE CURING COMPOUNDS AND ADDITIVES. IN THE EVENT OF A SPILL WHICH MAY BE HAZARDOUS, THE SPILL COORDINATOR SHOULD BE CONTACTED IMMEDIATELY.

SANITARY WASTE: ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

OFFSITE VEHICLE TRACKING:

- [ ] HAUL ROADS DAMPENED FOR DUST CONTROL
- [ ] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [X] EXCESS DIRT ON ROAD REMOVED DAILY
- [X] STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: 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, WATERBODY OR STREAMBED. CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED BY THE CONTRACTOR, OFF THE R.O.W. IN A MANNER TO MINIMIZE THE RUNOFF OF POLLUTANTS. ALL WATERWAYS SHALL BE CLEARED, AS SOON AS PRACTICABLE, OF TEMPORARY EMBANKMENT, TEMPORARY BRIDGES, MATTING, FALSEWORK, PILING, DEBRIS OR OTHER OBSTRUCTIONS PLACED DURING CONSTRUCTION OPERATIONS THAT ARE NOT A PART OF THE FINISHED WORK.

JOB SPECIFIC:

NOTES:

STATE OF TEXAS
RYAN J. REID
139507
LICENSED PROFESSIONAL ENGINEER

Ryan J. Reid P.E.

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

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Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0098	11	005	PR 62
DIST	COUNTY		SHEET NO.
CHS	HARDEMAN		60

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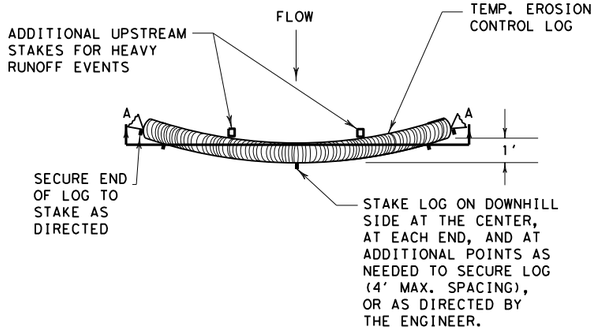
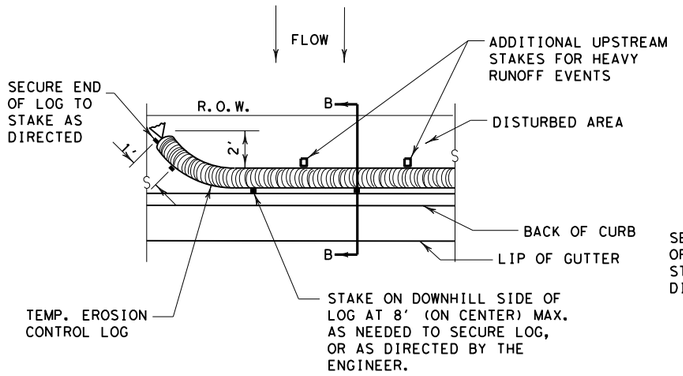
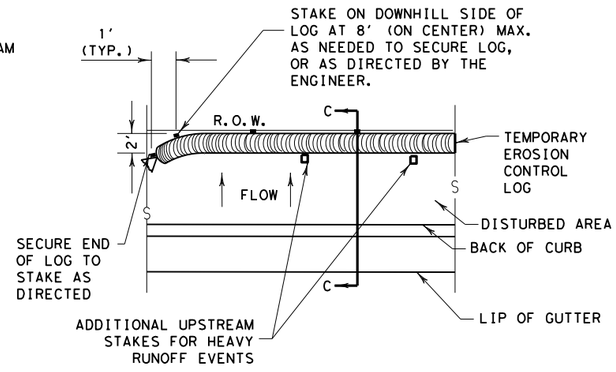


PLAN VIEW



PLAN VIEW



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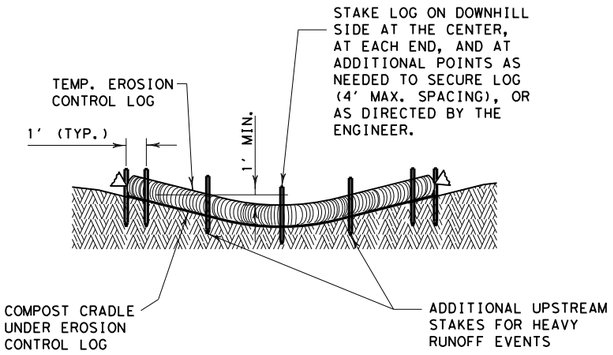
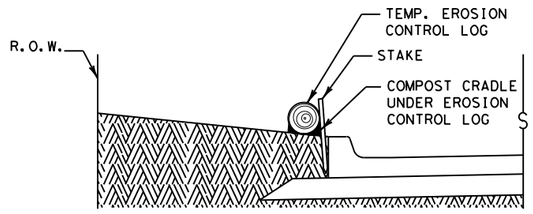


SECTION A-A

EROSION CONTROL LOG DAM

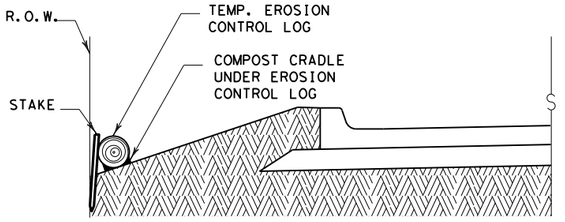
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

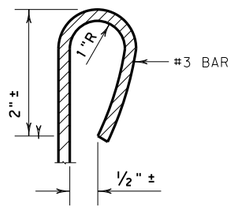
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

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

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'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.

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.

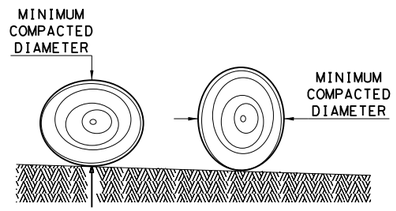
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

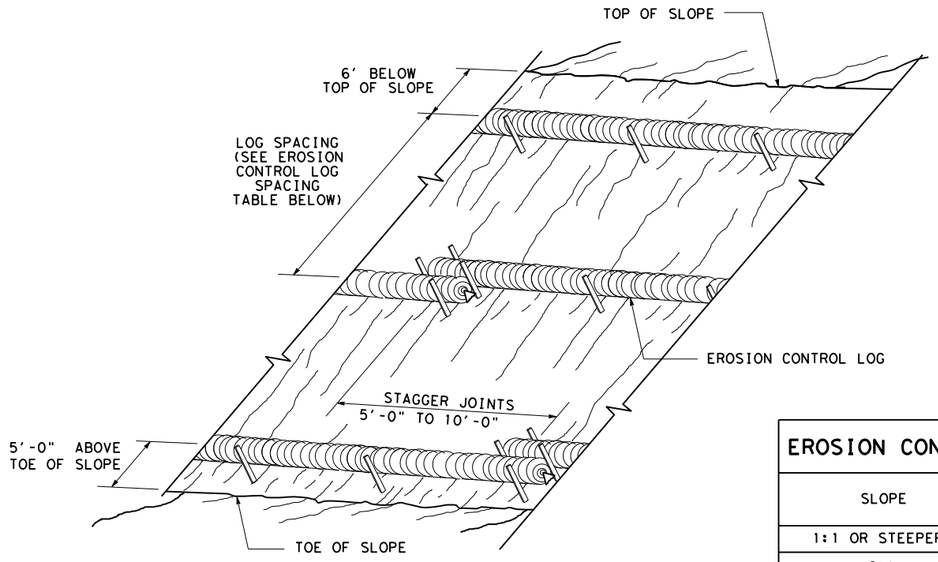
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

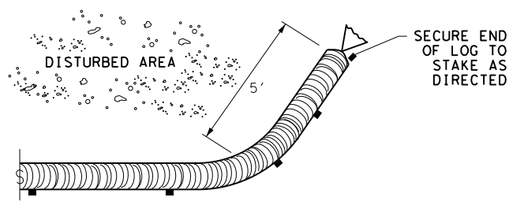
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		61

DATE: 7/9/2021
FILE: T:\CHSDES\PROJECTS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\Plan Set\Standards\061-063 EC(9)-16.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

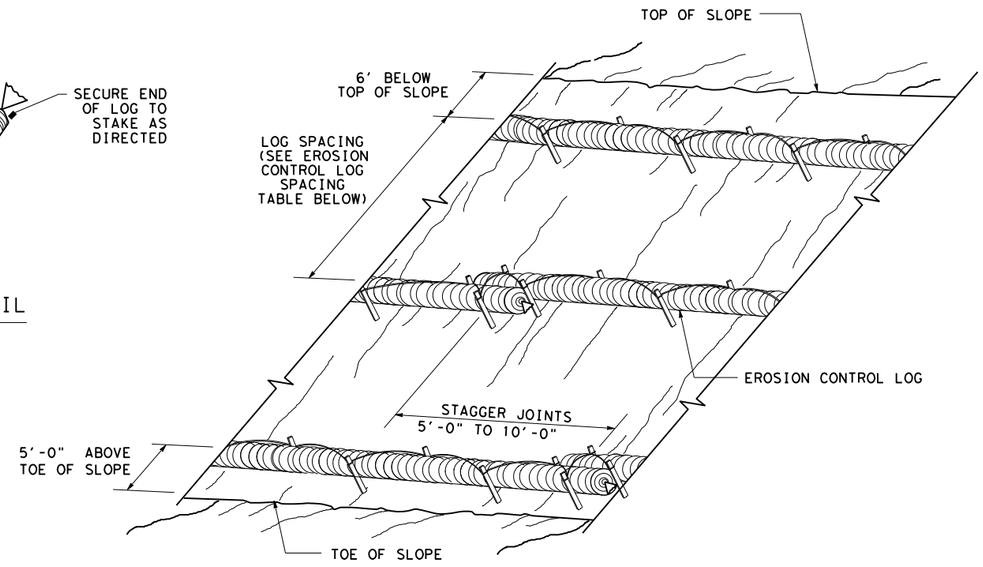
CL-SST



END SECTION RAP DETAIL

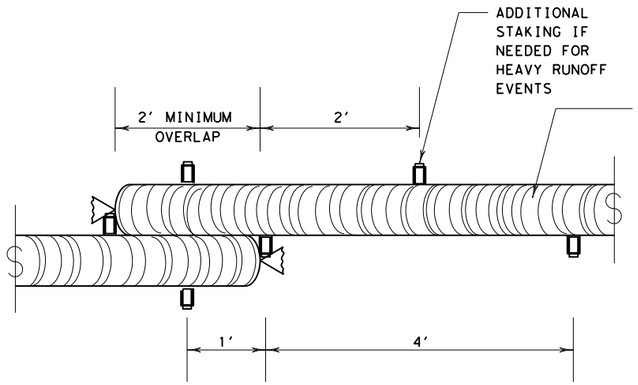
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

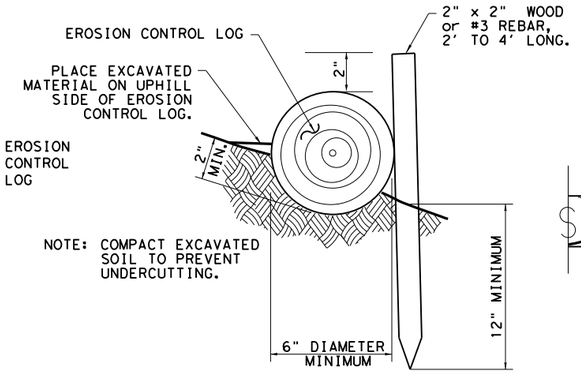
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

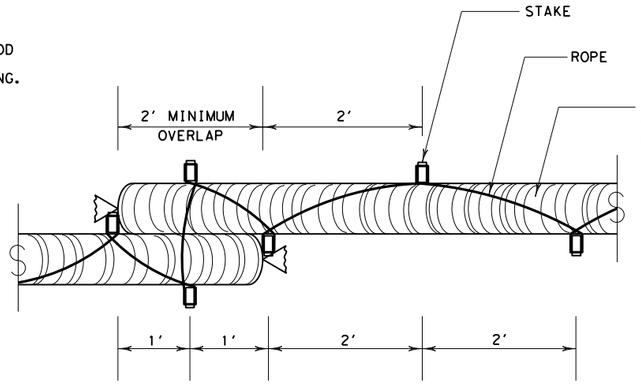


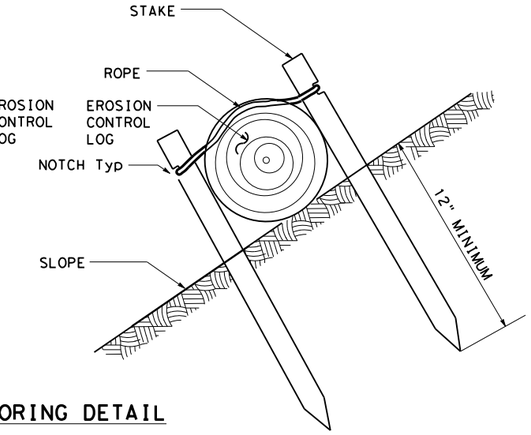


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

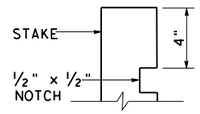
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

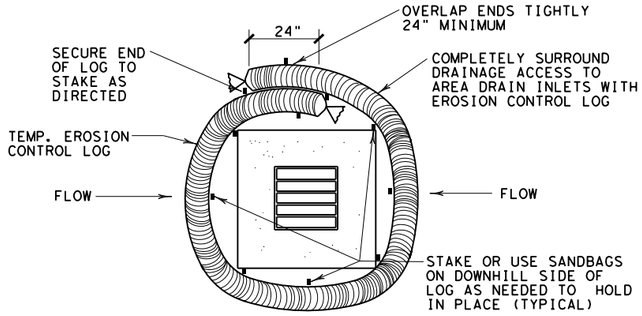
SHEET 2 OF 3

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

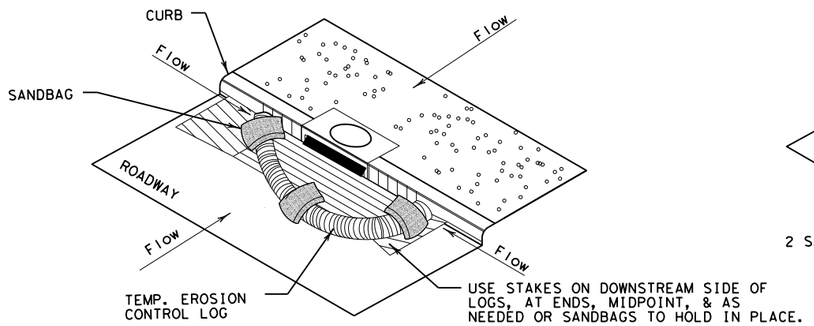
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0098	11	005	PR 62
	DIST	COUNTY		SHEET NO.
	CHS	HARDEMAN		62

DATE: 7/9/2021
FILE: T:\CHSDES\PROJECTS\HARDEMAN\0098-11-005 (Copper Breaks State Park Bridge)\Plan Set\Standards\061-063 EC(9)-16.dgn



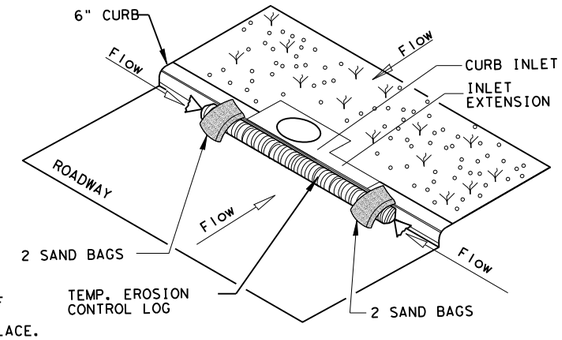
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

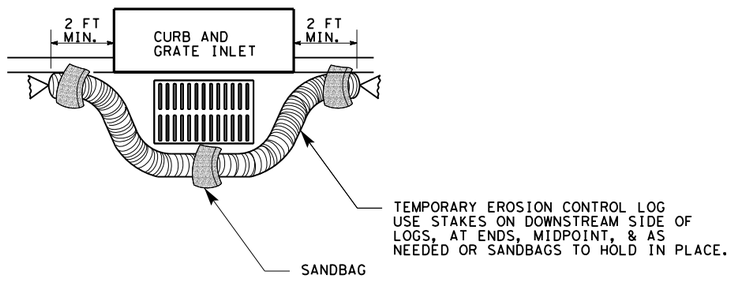
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

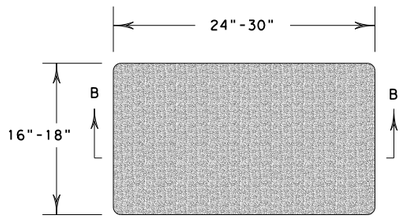
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
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REVISIONS	0098	11	005		PR 62		
	DIST	COUNTY					SHEET NO.
	CHS	HARDEMAN					63