FED.RD. DIV.NO.	FEDERAL- AID PROJECT NO.		SHEET NO.
6			1
STATE		COUNTY	
TEXAS		CAMERON	
CONT.	SECT.	JOB	HIGHWAY NO.
0921	06	288	SOUTH PORT CONNECTOR

PORT OF BROWNSVILLE
BROWNSVILLE NAVIGATION DISTRICT

PLANS OF PROPOSED
SOUTH PORT CONNECTOR ROAD

CSJ 0921-06-288

NET LENGTH OF PROJECT = 10,472.86 LF = 1.983 MILES

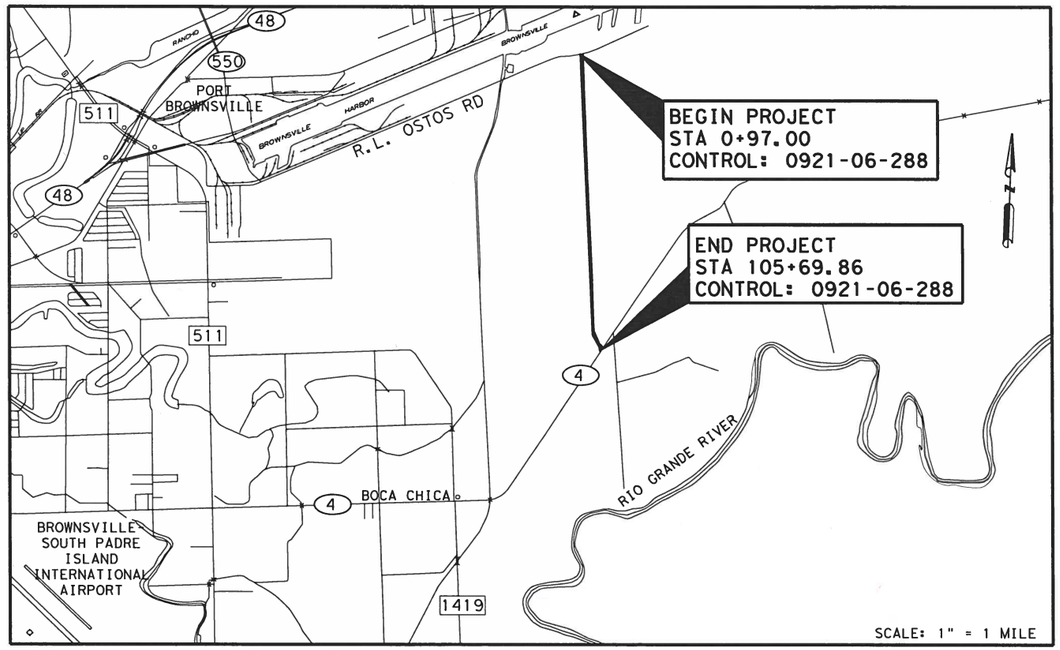
RDWY.	= 6,097.86	= 1.155 MI
BRIDGE	= 4,375.00	= 0.828 MI
TOTAL	= 10,472.86	= 1.983 MI

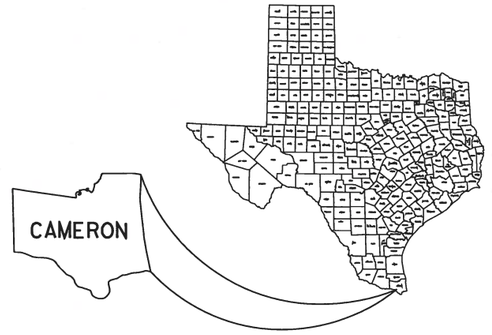
CAMERON COUNTY REGIONAL MOBILITY AUTHORITY
SOUTH PORT CONNECTOR

LIMITS: FROM: R.L. OSTOS ROAD
TO: SH 4

CONSTRUCT SOUTH PORT CONNECTOR AT
PORT OF BROWNSVILLE

CONSTRUCTION OF A NEW NON-FREEWAY FACILITY CONSISTING OF EMBANKMENT, LIMESTONE BASE, CONCRETE PAVEMENT, BRIDGE CONSTRUCTION, AND PAVEMENT MARKINGS





PREPARED BY:

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

Daniel O. Rios, P.E.
DANIEL RIOS, P.E. #79330
PROJECT MANAGER

5/31/2019
DATE

INDEX OF SHEETS
SEE SHEET NO. 2

FINAL PLAN DATA:

FINAL CONTRACT PRICE: _____
CONTRACTOR NAME: _____
CONTRACTOR ADDRESS: _____
LETTING DATE: _____
DATE WORK BEGAN: _____
DATE WORK COMPLETED: _____
DATE OF ACCEPTANCE: _____

CHANGE ORDERS & SUPP. AGREEMENTS

ALL CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS, AND CONTRACT. ALL PROPOSED CONSTRUCTION WAS COMPLETED, UNLESS OTHERWISE NOTED.

NAME _____ DATE _____

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Frank H. Chapa P.E. 128020, on May 31, 2019.

Frank H. Chapa

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT. REQUIRED CONTRACT PROVISIONS FOR FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 2012).

NO T.D.L.R. REVIEW REQUIRED

PROJECT DATA

DESIGN SPEED: 50 MPH
ADT: 5,100 (2020) & 8,800 (2050)
EQUATIONS: N/A
EXCEPTIONS: N/A

RAILROAD CROSSINGS:

NO RAILROAD PERMITS REQUIRED FOR THIS PROJECT

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SUBMITTED FOR LETTING: _____
ADVANCED PROJECT DEVELOPMENT SUPERVISOR

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RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY
PORT OF BROWNSVILLE the port that works

LOCAL ENTITIES

CAMERON COUNTY RMA CONCURRENCE: DATE: _____
NAME _____ TITLE _____

PORT OF BROWNSVILLE CONCURRENCE: DATE: _____
NAME _____ TITLE _____

CAMERON COUNTY CONCURRENCE: DATE: _____
NAME _____ TITLE _____

COUNTY CAMERON
HWY. NO. SOUTH PORT CONNECTOR
DATE ACCEPTED _____
PROJECT NO. _____
LETTING DATE _____

SOUTH PORT CONNECTOR, CSJ:0921-06-288

Plotted on: 5/31/2019
Plotted @: 10:16:39 AM

Plotted by:salinab
Design Filename: N:\Project\u2299\117 WA#17 (Port Connector)\500*PS&E\PlanSet01\Dgn\South Port Connector*Title Sheet.dgn

	SHEET NO.	DESCRIPTION
		GENERAL
	1	TITLE SHEET
	2	INDEX OF SHEETS
	3	PROJECT LAYOUT
	4	EXISTING TYPICAL SECTION
	5 - 6	PROPOSED TYPICAL SECTIONS
	7 - 8	ESTIMATE & QUANTITY SHEETS
	9 - 18	GENERAL NOTES & SPECIFICATIONS
	19 - 20	EARTHWORK SUMMARY SHEETS
	21 - 22	SUMMARY SHEETS
		TRAFFIC CONTROL PLAN
[D]	23	TRAFFIC CONTROL PLAN NOTES (PHARR DISTRICT STANDARD)
	24	SEQUENCE OF CONSTRUCTION
	25	ADVANCE WARNING LAYOUT
		TRAFFIC CONTROL STANDARDS
*	26 - 37	BC (1)-14 THRU BC(12)-14
*	38	TCP(2-1)-18
*	39	TCP(2-2)-18
		ROADWAY DETAILS
	40	HORIZONTAL ALIGNMENT & VERTICAL CONTROL LAYOUT
	41	ALIGNMENT DATA
	42 - 51	ROADWAY PLAN & PROFILE SHEETS
		ROADWAY STANDARDS
*	52	GF(31)-14
*	53	GF(31)TR-14
*	54	GF(31)MS-17
*	55	RS(5)-13
*	56	BED-14
*	57 - 58	CRCP (1)-17
*	59	JS-14
*	60	CCCG-12
*	61	SGT(10S)31-16
*	62	SGT(11S)31-18
*	63	SGT(12S)31-18
		BRIDGE DETAILS
	64	QUANTITIES BRIDGE #1
	65 - 70	BRIDGE LAYOUTS BRIDGE #1
	71	BRIDGE TYPICAL SECTION BRIDGE #1
	72 - 75	BORING LOGS BRIDGE #1
	76 - 77	ABUTMENT #1 AND #17 BRIDGE #1
	78	BENT #2~#16 BRIDGE #1
	79 - 80	FRAMING PLAN BRIDGE #1
	81 - 82	SLAB PLAN BRIDGE #1
	83	BRIDGE SLAB DETAIL BRIDGE #1
	84	BEAM DESIGN BRIDGE #1
	85	QUANTITIES BRIDGE #2
	86 - 92	BRIDGE LAYOUTS: BRIDGE #2
	93	BRIDGE TYPICAL SECTION BRIDGE #2
	94 - 97	BORING LOGS BRIDGE #2
	98 - 99	ABUTMENT #1 AND #20 BRIDGE #2
	100	BENT #2~#19 BRIDGE #2
	101 - 102	FRAMING PLAN BRIDGE #2
	103 - 104	SLAB PLAN BRIDGE #2
	105	BRIDGE SLAB DETAIL BRIDGE #2
	106	BEAM DESIGN BRIDGE #2

	SHEET NO.	DESCRIPTION
		BRIDGE STANDARDS
*	107	CP
*	108	CSAB
*	109 - 110	FD
*	111 - 112	PBC-P
*	113 - 116	PCP
*	117 - 118	SEJ-A
*	119	SGTS
*	120 - 121	SRR
*	122 - 124	TRAFFIC RAIL: TYPE T223
*	125	IGCS
*	126 - 127	IGD
*	128 - 130	IGEB
*	131 - 132	IGMS
*	133	IGTS
*	134 - 135	MEBR (C)
*	136 - 137	PCP(O)
		DRAINAGE DETAILS
	138	DRAINAGE AREA MAP
	139 - 140	ROADWAY CULVERT LAYOUTS
		DRAINAGE STANDARDS
*	141 - 142	SETP-CD
		TRAFFIC DETAILS
	143 - 147	SIGNS & PAVEMENT MARKING LAYOUTS
	148	SOSS
		TRAFFIC STANDARDS
*	149 - 151	PM(1)-12, PM(2)-12, PM(3)-12
*	152	SMD(GEN)-08
*	153 - 155	SMD(SLIP-1)-08 THRU SMD(SLIP-3)-08
*	156 - 158	TSR(3)-13, TSR(4)-13, TSR(5)-13
*	159 - 160	D&OM(1)-15, D&OM(2)-15
*	161 - 164	D&OM(3)-15B, D&OM(4)-15, D&OM(5)-15, D&OM(VIA)-15
		ENVIRONMENTAL DETAILS
*	165	STORM WATER POLLUTION PREVENTION PLAN (SW3P)
*	166	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)
[D]	167 - 168	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)
*	169 - 171	TPWD BMPS
	172 - 176	SW3P LAYOUT SHEETS
		ENVIRONMENTAL STANDARDS
*	177	EC(1)-16
*	178	EC(2)-16
*	179	EC(3)-16

NOTE: [D] REFERS TO DISTRICT OF PHARR STANDARD

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE, WITH AN ASTERISK (*), HAVE BEEN ISSUED BY ME, OR UNDER MY RESPONSIBLE SUPERVISION, AS BEING APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by FRANK H. CHAPA P.E. 128020, on May 17, 2019.

Frank H. Chapa

SOUTH PORT CONNECTOR

INDEX OF SHEETS

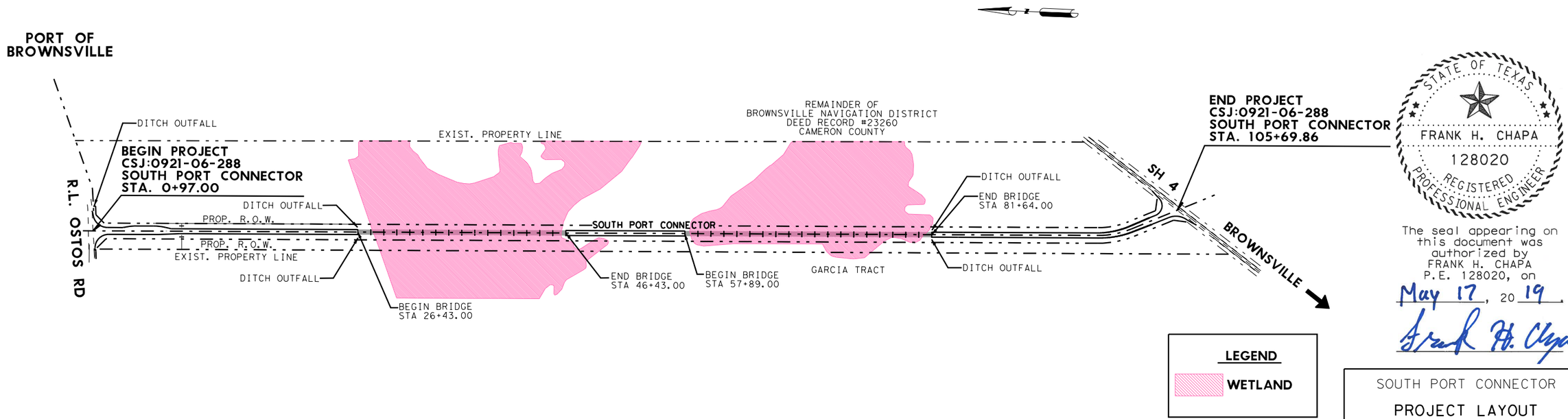
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			2
DGN: JS	STATE	DIST.	COUNTY
CHK. DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB / HIGHWAY NO.
CHK. DWG:	0921	06	288 SOUTH PORT CONNECTOR



LEGEND

WETLAND

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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Frank H. Chapa

SOUTH PORT CONNECTOR

PROJECT LAYOUT

SCALE: PLAN 1"=1000'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			3

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON

DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/17/2019 8:41:48 AM
Plotted by: salinab
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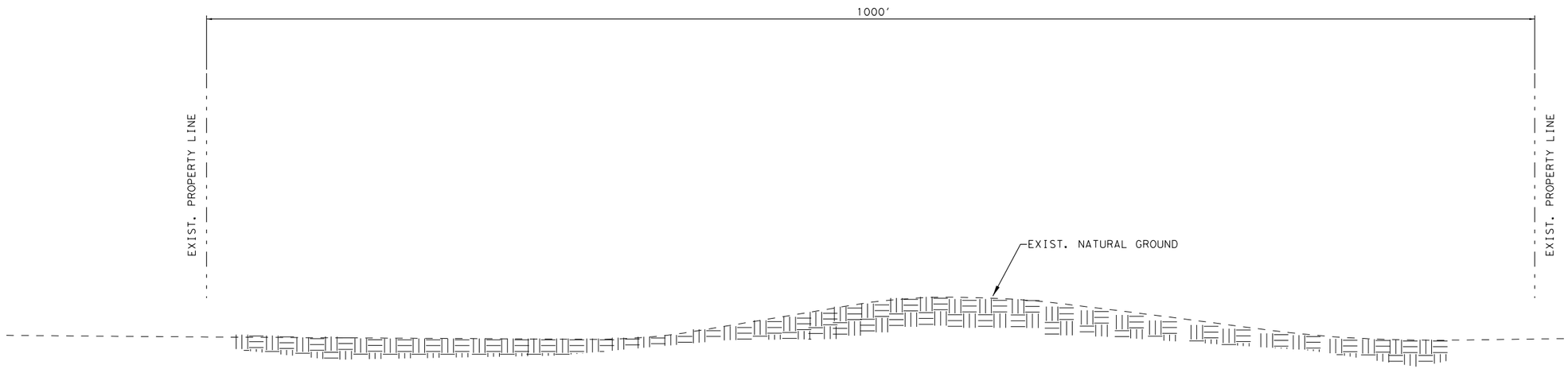

EXISTING TYPICAL SECTION
STA 0+97.00 TO STA 105+69.86
APPROX. 104.7 STA.

STATE OF TEXAS
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SOUTH PORT CONNECTOR

EXISTING TYPICAL SECTION

SCALE: PLAN N.T.S

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		4

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG:	0921	06	288 SOUTH PORT CONNECTOR

Plotted on: 5/17/2019
Plotted @: 8:41:48 AM
Plotted by: salinab
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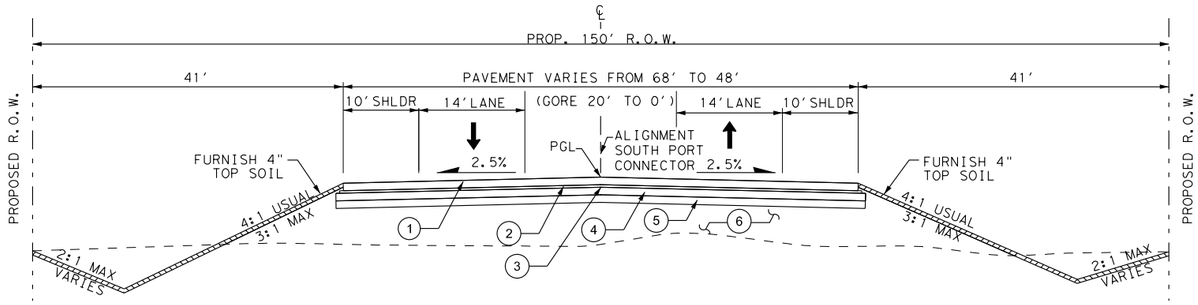
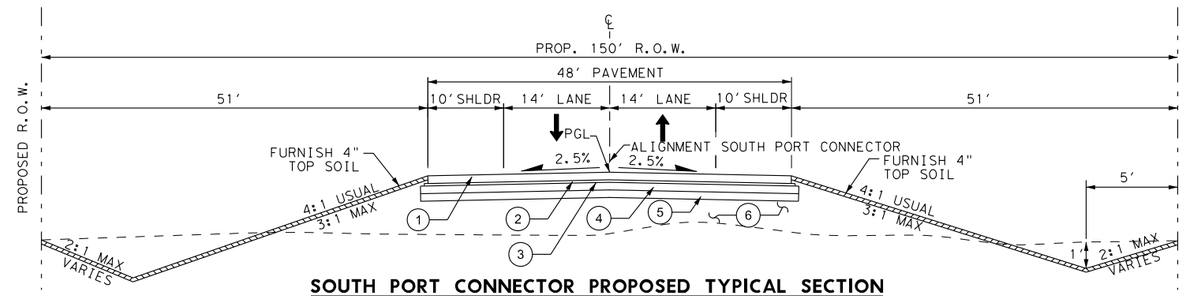


SOUTH PORT CONNECTOR PROPOSED TYPICAL SECTION

STA 0+97.00 TO STA 8+08.00 (GORE 20' TO 0')

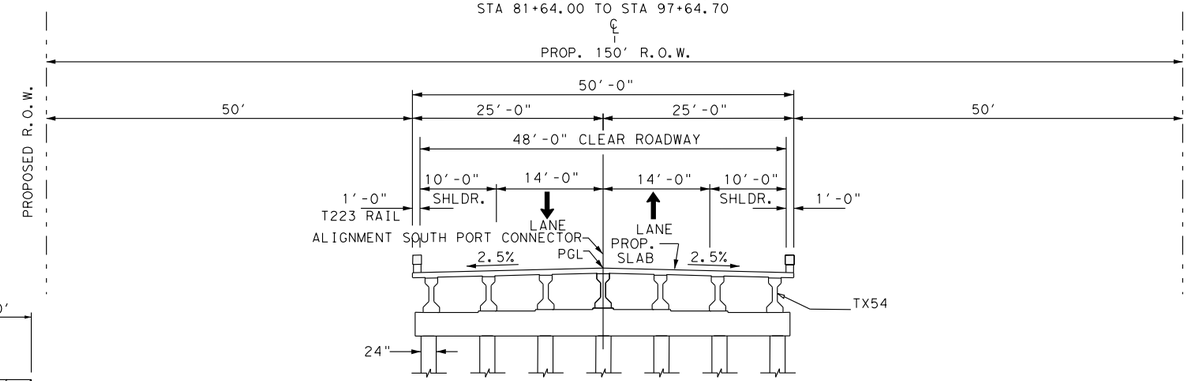
PAVEMENT WIDTH TRANSITION

STA. 3+85.67 TO 5+22.49: 33' TO 48.97' (LT)
STA. 5+22.49 TO 6+75.19: 48.97' (LT)
STA. 6+75.19 TO 8+48.35: 48.97' TO 24' (LT)



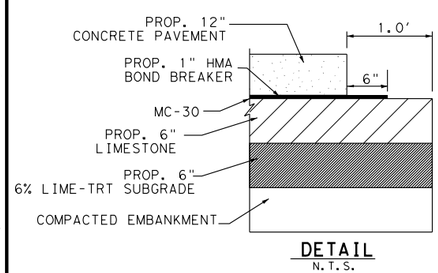
SOUTH PORT CONNECTOR PROPOSED TYPICAL SECTION

STA 8+08.00 TO STA 26+43.00
STA 46+43.00 TO STA 57+89.00
STA 81+64.00 TO STA 97+64.70



SOUTH PORT CONNECTOR TYPICAL SECTION (AT BRIDGE LOCATIONS)

STA 26+43.00 TO STA 46+43.00
STA 57+89.00 TO STA 81+64.00



DETAIL
N.T.S.

NOTES:

WHERE REQUIRED BY FIXTURES OR UNUSUAL CONDITIONS, THE GOVERNING SLOPES MAY VARY WHEN DIRECTED BY THE ENGINEER.

114 #/SY OF ACP IS EQUIVALENT TO 1 INCH IN DEPTH OF ACP.

PGL - DENOTES PROFILE GRADE LINE

SEE ROADWAY PLAN & PROFILE SHEETS FOR ADDITIONAL INFORMATION.

LEGEND

1. 12" CRCP (Epoxy Coated Rebar)
2. 1" HMA Bond Breaker
3. MC-30
4. 6" Limestone Flexbase 4% Cement Treated
5. 6" 6% Lime Treated Subgrade
6. Compacted Embankment

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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Frank H. Chapa

SOUTH PORT CONNECTOR

PROPOSED TYPICAL SECTIONS

SCALE: 1"=20' SHEET 1 OF 2

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

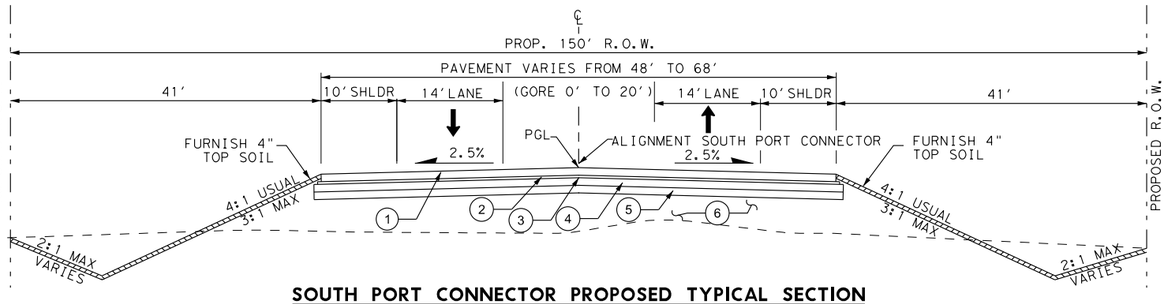
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			5

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON

DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

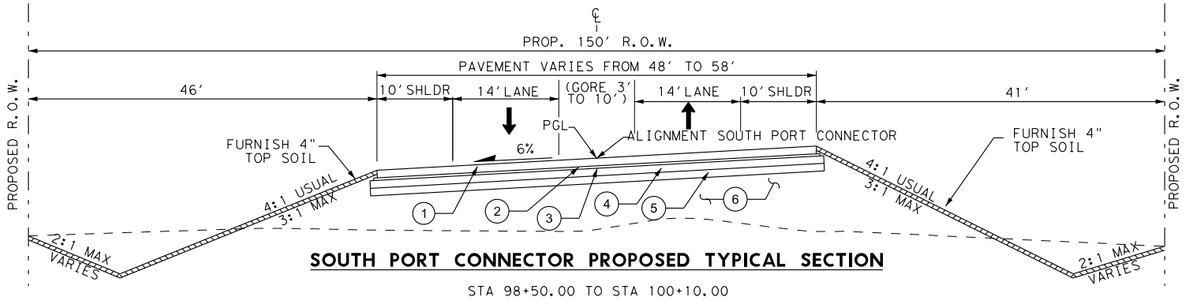
PAVEMENT WIDTH TRANSITION

STA. 97+64.70 TO 103+58.12: 48' TO 68'



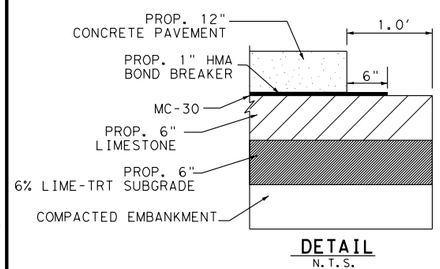
SOUTH PORT CONNECTOR PROPOSED TYPICAL SECTION

STA 97+64.70 TO STA 105+69.86 (GORE 0' TO 20')



SOUTH PORT CONNECTOR PROPOSED TYPICAL SECTION

STA 98+50.00 TO STA 100+10.00
STA 94+40.00 TO 98+50.00 TRANSITIONS 2.5% TO 6%
STA 100+10.00 TO 104+20.00 TRANSITIONS 6% TO 2.5%



DETAIL
N.T.S.

SUPER ELEVATION TRANSITIONS MAX e = 6%

CURVE ID	PI Sta	Radius	Design Speed	e	Begin Transition	PC Sta. of Curve	End Transition	Begin Transition	PT Sta. of Curve	End Transition
		FT	MPH	%						
PORTRD-1	99+30.00	833.00	50	6.00	94+40.00	97+64.70	98+50.00	100+10.00	100+91.06	104+20.00

NOTES:

WHERE REQUIRED BY FIXTURES OR UNUSUAL CONDITIONS, THE GOVERNING SLOPES MAY VARY WHEN DIRECTED BY THE ENGINEER.

114 #/SY OF ACP IS EQUIVALENT TO 1 INCH IN DEPTH OF ACP.

PGL - DENOTES PROFILE GRADE LINE

SEE ROADWAY PLAN & PROFILE SHEETS FOR ADDITIONAL INFORMATION.

LEGEND

1 - 12" CRCP (Epoxy Coated Rebar)
2 - 1" HMA Bond Breaker
3 - MC-30
4 - 6" Limestone Flexbase 4% Cement Treated
5 - 6" 6% Lime Treated Subgrade
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STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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Frank H. Chapa

SOUTH PORT CONNECTOR

PROPOSED TYPICAL SECTIONS

SCALE: 1"=20' SHEET 2 OF 2

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			6

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
---	---	---	---	---
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

SOUTH PORT CONNECTOR ESTIMATE SUMMARY

EST.	FINAL	EST.	FINAL	0921-06-288 EST.	0921-06-288 FINAL	ALT.	ITEM-CODE ITEM NO	ITEM-CODE DESC CODE	ITEM-CODE SP NO	DESCRIPTION	UNIT	TOTAL EST.	TOTAL FINAL
				105.00			100	6002		PREPARING ROW	STA	105.00	
				9,766.00			110	6001		EXCAVATION (ROADWAY)	CY	9,766.00	
				61,819.00			132	6006		EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	61,819.00	
				61.00			134	6001		BACKFILL (TY A)	STA	61.00	
				6.00			150	6001		BLADING	STA	6.00	
				7,291.00			160	6005		FURNISHING AND PLACING TOPSOIL	CY	7,291.00	
				11.00			164	6036		DRILL SEEDING (PERM) (RURAL) (CLAY)	AC	11.00	
				11.00			164	6042		DRILL SEEDING (TEMP) (WARM)	AC	11.00	
				1,684.00			168	6001		VEGETATIVE WATERING	MG	1,684.00	
				6,684.00			247	6236		FL BS (RDWY DEL)(TY A GR 1-2)(FNAL POS)	CY	6,684.00	
				682.00			260	6016		LIME	TON	682.00	
				40,107.00			260	6079		LIME TRT (SUBGRADE)(6")	SY	40,107.00	
				455.00			275	6001		CEMENT	TON	455.00	
				40,107.00			275	6003		CEMENT TREAT (NEW BASE) (6")	SY	40,107.00	
				8,021.00			310	6009		PRIME COAT (MC-30)	GAL	8,021.00	
				2,194.00			340	6104		D-GR HMA(SQ) TY-D SAC-B PG64-22	TON	2,194.00	
				38,486.00			360	6006		CONC PVMT (CONT REINF - CRCP) (12")	SY	38,486.00	
				47.00			400	6001		STRUCT EXCAV	CY	47.00	
				536.00			400	6005		CEM STABIL BKFL	CY	536.00	
				80.00			409	6001		PRESTR CONC PIL (16 IN SQ)	LF	80.00	
				16,646.00			409	6004		PRESTR CONC PIL (24 IN SQ)	LF	16,646.00	
				161.00			420	6013		CL C CONC (ABUT)	CY	161.00	
				735.00			420	6025		CL C CONC (BENT)	CY	735.00	
				218,750.00			422	6001		REINF CONC SLAB	SF	218,750.00	
				30,503.00			425	6039		PRESTR CONC GIRDER (TX54)	LF	30,503.00	
				38,846.00			428	6001		PENETRATING CONCRETE SURFACE TREATMEN	SY	38,846.00	
				348.00			432	6016		RIPRAP (STONE TY R)(DRY)(12 IN)	CY	348.00	
				48.00			432	6045		RIPRAP (MOW STRIP)(4 IN)	CY	48.00	
				8,894.00			450	6006		RAIL (TY T223)	LF	8,894.00	
				700.00			454	6001		SEALED EXPANSION JOINT (4 IN) (SEJ - A)	LF	700.00	
				188.00			464	6005		RC PIPE (CL III)(24 IN)	LF	188.00	
				4.00			467	6394		SET (TY II) (24 IN) (RCP) (6: 1) (C)	EA	4.00	
				1.00			500	6001		MOBILIZATION	LS	1.00	
				12.00			502	6001		BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	12.00	
				410.00			506	6001		ROCK FILTER DAMS (INSTALL) (TY 1)	LF	410.00	
				410.00			506	6011		ROCK FILTER DAMS (REMOVE)	LF	410.00	
				156.00			506	6020		CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	156.00	
				156.00			506	6024		CONSTRUCTION EXITS (REMOVE)	SY	156.00	
				32.00			506	6031		FRNT END LOADER WORK (ERSN & SEDM CONT)	HR	32.00	
				21,072.00			506	6038		TEMP SEDMT CONT FENCE (INSTALL)	LF	21,072.00	
				21,072.00			506	6039		TEMP SEDMT CONT FENCE (REMOVE)	LF	21,072.00	
				200.00			540	6001		MTL W-BEAM GD FEN (TIM POST)	LF	200.00	
				8.00			540	6006		MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	8.00	
				8.00			544	6001		GUARDRAIL END TREATMENT (INSTALL)	EA	8.00	
				160.00			550	6003		CHAIN LINK FENCE (REMOVE)	LF	160.00	
				8.00			644	6001		IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	8.00	
				20.00			644	6004		IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	20.00	
				1.00			644	6007		IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	1.00	
				5.00			644	6030		IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	5.00	
				88.00			658	6014		INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	88.00	

SOUTH PORT CONNECTOR

ESTIMATE & QUANTITY SHEET

SHEET 1 OF 2

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		7

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON

DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

SOUTH PORT CONNECTOR ESTIMATE SUMMARY

EST.	FINAL	EST.	FINAL	0921-06-288 EST.	0921-06-288 FINAL	ALT.	ITEM-CODE ITEM NO	ITEM-CODE DESC CODE	ITEM-CODE SP NO	DESCRIPTION	UNIT	TOTAL EST.	TOTAL FINAL
				4.00			658	6048		INSTL OM ASSM (OM-2Z)(FLX)GND	EA	4.00	
				100.00			658	6067		INSTL DEL ASSM (D-DW)SZ 1(BRF)GF2	EA	100.00	
				827.00			666	6036		REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	827.00	
				616.00			666	6042		REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	616.00	
				38.00			666	6048		REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	38.00	
				1,566.00			666	6141		REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	1,566.00	
				300.00			666	6153		REFL PAV MRK TY I (Y)(ISLAND)(100MIL)	SF	300.00	
				43,803.00			666	6224		PAVEMENT SEALER 4"	LF	43,803.00	
				2,182.00			666	6228		PAVEMENT SEALER 12"	LF	2,182.00	
				21,582.00			666	6303		RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	21,582.00	
				22,221.00			666	6315		RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	22,221.00	
				491.00			672	6009		REFL PAV MRKR TY II-A-A	EA	491.00	
				1,210.00			677	6001		ELIM EXT PAV MRK & MRKS (4")	LF	1,210.00	
				1.00			685	6002		RELOCATE RDSD FLASH BEACON ASSEMBLY	EA	1.00	
				200.00			605	6001		PREFORMED IN-LANE(TRANS) RUMBLE STRIP	LF	200.00	

SOUTH PORT CONNECTOR

ESTIMATE
&
QUANTITY
SHEET

SHEET 2 OF 2

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		8

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON

DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/21/2019
Plotted @: 10:08:24 AM
Plotted by: salinab
Design Filename: n:\project\u2299\117 WA#17 (Port Connector)\500*PS&E\PlanSet01\Dgn\South Port Connector*E&Q SHEET.dgn

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

GENERAL NOTES:

General Requirements and Covenants to Items 1 thru 9:

Provide on a weekly basis a list of equipment, including idle equipment, utilized on the project that week.

The use of prison produced materials is prohibited on the project.

The use of publicly owned equipment is prohibited on the project.

The Contractor must comply with all Occupational Safety and Health Administration (OSHA) Standards.

In the event of a called evacuation, emergencies, impeding adverse weather or as directed, do not perform any work without written authorization. The District reserves the right to suspend all work in support of evacuations or emergencies occurring from other parts of the state. Any work performed, other than work directed by the Department, is unauthorized work in accordance with Item 5.

Sweep, clean and remove any construction waste, surplus materials or debris from the roadway and R.O.W. at the end of each day unless otherwise approved. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Asphalt application season will be established in accordance with Item 316.4.4 Adverse Weather Conditions or as directed by the Engineer.

Cut existing pavement using a saw or other approved method to ensure a neat transverse and/or longitudinal line to assure a smooth tie-in with new pavement. Cut a minimum depth of the final lift thickness. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Promptly pick up and properly dispose of paper and other materials used for pavement joints.

All pavement markings shall be in accordance with the latest edition of the Texas MUTCD.

ITEM 5: Control of the Work

Questions regarding the plan work limits should be brought to the Engineer's attention prior to commencing work. Measuring equipment will be in working condition and calibrated to the manufacturer's specifications.

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

Field verify all dimensions and notify Engineer prior to initiating any work.

Verify the locations of utilities, underground or overhead, shown within the limits of the R.O.W. Adhere to OSHA Standards when working within the vicinity of overhead power lines. Coordinate with the utility companies and notify the Engineer of any possible conflicts. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

The 1-800 call services for utility locations do not include TxDOT facilities. Contact the Pharr District Signal Section (956-702-6225) for coordination with TxDOT underground lines.

Notify the Engineer immediately of utility conflicts in accordance with Item 5.6. Refer to Item 4.5 for consideration of differing site conditions.

The responsibility for the construction surveying on this contract will be in accordance with Article 5.9.3, "Method C". Existing alignment shall be used for horizontal control.

Contractor will mark Stations every 100 feet.

Before any operations begin, the Contractor will be responsible for noting and recording the locations and configuration of all existing pavement markings for use in the placing of the final permanent pavement markings. All roadways are to be striped as existing, unless shown otherwise in the plans, standards, or as directed by the Engineer.

Prior to contract letting, bidders may obtain a free computerized transfer of files (from the Engineer's office) that contains the earthwork information. If copies of the actual cross-sections in addition to, or instead of, the electronic files are requested, they will be available at the Engineer's office for borrowing by copying companies for the purpose of making copies for the bidder at the bidder's expense.

The Contractor shall maintain and preserve the integrity of all "existing survey markers" by avoiding the disturbance of such markers; which include all control points (horizontal and/or vertical), stakes, marks, and right-of-way markers. The Contractor will repair all disturbed control points, stakes, marks, and right-of-way markers. The cost for any, and all repairs to the "existing survey markers", will be deducted from money due or to become due to the Contractor.

ITEM 7: Legal Relations and Responsibilities

No significant traffic generator events identified.

SOUTH PORT CONNECTOR

GENERAL NOTES & SPECIFICATIONS

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			9

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON

DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

404 Permit Requirements:

The Contractor shall note that discharge of permanent or temporary fill material into the waters of the United States (U.S.), including jurisdictional wetlands, as necessary for construction, will require specific approval from the U.S. Army Corps of Engineers (USACE) under section 404 of the Clean Water Act.

Brownsville Navigation District (BND) will obtain the appropriate nationwide or individual permit(s) when necessary as dictated by project specific conditions and the potential to affect USACE jurisdictional areas to address the work detailed in the plans. The Contractor may review the permitted plans at the office of the Area Engineer in charge of construction. BND will hold the Contractor responsible for following all conditions of the approved permit. If the Contractor cannot work within the limits or scope of this permit(s), then it becomes the Contractor's entire responsibility to consult with the USACE on the need for changes or amendments to the conditions of the existing permit(s) as originally obtained by BND. However, the Contractor may request BND to assist in this process by providing complete and specific revised details for BND review and submittal to the USACE. For off project right of way coordination, the Contractor or his agent, shall handle all activities directly with the USACE.

It is essential that any impacts to USACE jurisdictional waters of the U.S., including jurisdictional wetlands, be the minimum necessary to complete the proposed work. If the Contractor needs further explanation of the conditions of the permit, including means of compliance, they may contact the Pharr District Environmental Coordinator.

Project Specific Locations (PSL's) Coordination

The Contractor shall 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 permitting for this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined here includes materials delivered to, or from the PSL. The permit area includes all waters of the U.S., or associated wetlands, affected by activities associated with this project. Special restrictions may be required for such work. The Contractor shall be responsible for any, and all consultations with the USACE regarding activities, including project specific locations (PSLs) that have not been previously evaluated by the USACE.

The Contractor shall provide the department with a copy of all consultation(s), or approval(s), from the USACE prior to initiating activities.

The Contractor may 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

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

part of the permit review of this project. The Contractor is solely responsible for documenting any determination(s) that their activities do not affect a USACE permit area. The Contractor shall maintain copies of their determination(s) for review by the department or any regulatory agency.

The total disturbed area for this project is 36 acres. The disturbed area for all project locations in the Contract, and the Contractor project specific locations (PSLs) within 1 mile of the project limits for the Contract, will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission of Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from TCEQ for Contractor PSLs for construction support activities on or off the R.O.W. When the total area disturbed in the Contract, and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the R.O.W. to the Engineer and to the local government that operates a separate storm sewer system.

Establish uniform perennial vegetative coverage with a density of at least 70% of the native background vegetative cover to achieve final stabilization.

For all pits and quarries, comply with the "Texas Aggregate Quarry and Pit Safety Act".

In order to expedite the approval process for PSLs, or to eliminate or minimize potential impacts to project progress, initiate coordination efforts with the USACE **within 30 days from the date of "Authorization to Begin Work".** If this is not done, the Contractor waives the right to request any contract time considerations if project progress is impacted and PSLs approval is still pending.

Requests submitted to the BND will be evaluated on this basis, and will require documentation showing substantial early coordination efforts to expedite the approval process as herein stated. The request shall include a detailed chronological summary status with dates of coordination activities with the resource agencies, including those occurring after the initial coordination, to be reviewed and confirmed by the district's environmental section.

ITEM 8: Prosecution and Progress

Liquidated damages per Working Day for this project have been set at $1,425.00 per day.

Where road closures or detours around structures are necessary to accomplish proposed work, the removal of existing structures and/or cutting of existing pavement will not be permitted until all pre-cast members for the proposed structure have been cast, tested, and approved for use.

SOUTH PORT CONNECTOR

GENERAL NOTES
&
SPECIFICATIONS

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6				10
DGN: JS	STATE	DIST.	COUNTY	
CHK. DGN: FC	TEXAS	PHARR	CAMERON	
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK. DWG:	0921	06	288	SOUTH PORT CONNECTOR

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

Upon issuance of written authorization to begin work, all of Item 100 work that is in conflict with utilities, "Preparing Right of Way" will commence unless otherwise directed by the Engineer. Contractor shall only perform Prep R.O.W. on the first Phase of construction as much as possible. Item 100 work shall be completed before work begins on other items, unless otherwise authorized by the Engineer. Item 100 will be charged in accordance with Article 8.3.1.4. Standard Workweek.

Prepare the progress schedule using the Critical Path Method (CPM). Submit (2) two 11"x17" hard copies and an electronic file of the original or updated progress schedule. Submit the original progress schedule seven (7) days before the Preconstruction Conference.

Submit an updated progress schedule as directed to show proposed major changes, changes affecting compliance with the contract requirements, or changes affecting the critical path/controlling item of work.

Working days will be computed and charged in accordance with Article 8.3.1.4. Standard Work Week.

Work above traffic is not allowed.

Nighttime work is not permitted unless approved by the Engineer.

Notify the Engineer at least 48 hours in advance of weekend work.

ITEM 100: Preparing Right of Way

Coordinate all R.O.W. preparation activities with the project's Storm Water Pollution Prevention Plan (SW3P) and Environmental Permit Issues, and Commitments Sheet (EPIC) or as approved.

Preparation of R.O.W. will be done in accordance with the construction phasing shown on the Traffic Control Plans. Performance of this item will not be allowed outside of the project's current construction phase without prior approval by the Engineer. Clearing & grubbing shall be executed in accordance with the District Clearing and Grubbing detail sheets.

Note medium to heavy brush from STA 6+75.00 to STA 26+43.00. Remove and dispose of all obstructions shown and not specifically shown in the plans. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

ITEM 110: Excavation

In all excavated areas, broom the existing base or subgrade to remove any loose material. This work is considered subsidiary to this item.

Before excavation and embankment operations begin, windrow all topsoil (approx. 4 inches) to be reused on side slopes. This work is subsidiary to Item 110, "Excavation" and Item 134, "Backfill".

ITEM 132: Embankment

Embankment (DENS CONT) shall be Type C with a max. PI of 35. Material used as embankment material in the top two feet below the bottom of Flexible Base shall meet the following requirements based on preliminary tests and such other tests found necessary by the Engineer.

1. The material shall be such as to produce a well-bonded embankment and shall have a minimum PI of 12 and a maximum PI of 35.

It is the Contractor's responsibility to advise the Engineer of the location of the source sufficiently in advance to avoid delay. The Engineer may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance.

ITEM 134: Backfilling Pavement Edges

Areas to be backfilled shall extend approximately 3-ft out from the edges of the proposed overlay. Final slopes shall be uniform and smooth. The 100-foot station payment includes backfilling of both sides.

Backfill Ty A shall not contain particles more than two inches in size and shall have a minimum PI of 10 and a maximum PI of 20.

Any additional backfill material necessary due to pre-existing edge conditions or to replace existing fill removed during blading operations will not be paid for directly, but will be subsidiary to this bid item.

ITEM 150: Blading

When directed, fill and grade low areas outside the embankment areas to drain.

SOUTH PORT CONNECTOR

GENERAL NOTES
&
SPECIFICATIONS

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

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TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			11
DGN: JS	STATE	DIST.	COUNTY
CHK. DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK. DWG:	0921	06	288	SOUTH PORT CONNECTOR

ITEM 160: Topsoil

Use topsoil as needed and directed by the Engineer for select problem areas. Unless otherwise approved by the Engineer, use topsoil from approved sources outside the R.O.W. as per standard specifications. Existing topsoil is to be salvaged and retained for re-use on the project as topsoil.

ITEM 164: Seeding for Erosion Control

Restore and seed areas not shown in the plans disturbed by the Contractor's operations. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

During drill seeding operations, application methods shall be in accordance with the method shown in the Standard Specification Book.

SS-1 Tacking Agent shall be a ratio of 2:1, two (Emulsion) to one (water) and applied at a rate of 0.05 gallons per square yard. The SS-1 Tacking Agent required for Drill Seed operations, will not be paid for directly, but will be subsidiary to Item 164 "Drill Seeding." Watering shall not be used with the Drill Seed Method. A biodegradable tacking agent may be used in lieu of the SS-1 tacking agent in accordance with the manufacturer's recommendations when approved by the engineer.

Cool Season or Warm Season Grasses shall be included as part of Item 164 (See Table 3 and/or Table 4 in the Standard Specification Manual for dates and seed type).

Seed mixture shall be as specified under Item 164.

The following is a list of seed types that have been found to grow in High Salt Areas and are to be used on South Port Connector Road:

Rhode Grass	2.0 lbs/Acre
Bermuda Grass	1.2 lbs/Acre
Alkali Sacaton	1.9 lbs./Acre
Blue Panic	2.0 lbs/Acre

Notify the Engineer of the unavailability of any seed mix. Make changes to the seed mix as approved.

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

ITEM 166: Fertilizer

Fertilize all areas of the project to be seeded or sodded. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Fertilizer rate is based on a rate of 100 Lbs. of Nitrogen per acre. The Nitrogen-Phosphorous-Potassium (NPK) ratio shall include a minimum of 5 percent phosphorous and 5 percent potassium. Fertilizer shall be homogenized.

ITEM 168: Vegetative Watering

Distribute water to only those areas shown in the plans or as directed. Excessive overspray will not be permitted.

Water all areas of the project to be seeded or sodded every two (2) days for 90 days or as directed. Apply water in a manner to ensure adequate moisture but not to erode the soil in place. During periods of adequate moisture, mechanical watering may not be required as approved. Upon final stabilization, the Engineer may require to continue watering as specified for a period not to exceed 30 days.

ITEM 247: Flexible Base A

Flexible Base Type A will be composed of argillaceous Limestone and may contain stone, conglomerate, gravel, sand or granular materials.

Flexible Base (TY A GR 1-2) shall conform to the following requirements:

Retained on Sq. Sieve	Percent Retained
2-1/2L	0
1-3/4L	0-10
7/8L	10-35
3/8L	30-65
No. 4	40-75
No. 40	65-90
Max. PI:	10
Max. Wet Ball PI:	10
Wet Ball Mill Max Amount:	40
Min. Comp. Strength PSI:	175 at 15 PSI lateral pressure
Triaxial Test	Tex-117-E

SOUTH PORT CONNECTOR

GENERAL NOTES
&
SPECIFICATIONS

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

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TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			12
DGN: JS	STATE	DIST.	COUNTY
CHK. DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

The Wet Ball Test (Tex-116-E) shall be run and the Plasticity Index of the material passing the No. 40 sieve shall be determined (Wet Ball PI).

The percent of density as determined by Compaction Ratio (Tex-113-E) for the new Flexible Base shall be a minimum of 98%.

The Contractor's attention is called to the fact that certain existing and/or proposed structures may be within the limits of the Flexible Base. It shall be the Contractor's responsibility to perform construction operations without damage to these structures.

For water added under Item 247, the sulfate content will not exceed 3000-ppm and the chloride content will not exceed 3000-ppm.

When requested, stake with blue tops, at 100-foot intervals, the lines and grade shown in the plans.

ITEM 260: Lime Treatment (Road Mixed)

The Contractor's attention is called to the fact that certain existing and/or proposed structures are within the limits of the lime-treated Subgrade. Unless otherwise directed by the Engineer, these structures shall be installed before the final rolling of this Subgrade. It shall be the Contractor's responsibility to perform the proper lime treating operation without damage to these structures.

The slurry method of applying lime will be required, except when the lime is to be added to naturally wet materials as directed by the Engineer.

For this project, the Engineer will direct a random number of lime trucks to be check weighed.

The percent of density as determined by Tex-121-E for the new and salvage Flexible Base shall be a minimum of 98% for all courses.

Proof roll all constructed lime treated subgrade and bases courses in accordance with Item 216, "Proof Rolling." Correct soft spots as directed. Correction of soft spots in the subgrade or base courses will be at the Contractor's expense.

ITEM 275: Cement Treatment (Road-Mixed)

The Contractor's attention is called to the fact that certain existing and/or proposed structures are within the limits of the cement-treated Subgrade. Unless otherwise directed by the Engineer, these structures shall be installed before the final rolling of this Subgrade. It shall be the Contractor's responsibility to perform the proper cement treating operation without damage to these structures.

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

The percent of density as determined by Tex-121-E for the new and salvage Flexible Base shall be a minimum of 98% for all courses.

Proof roll all constructed cement treated subgrade and bases courses in accordance with Item 216, "Proof Rolling." Correct soft spots as directed. Correction of soft spots in the subgrade or base courses will be at the Contractor's expense.

ITEM 310: Prime Coat

The Contractor shall exercise diligence in the application of asphalt by the use of flagging and rolling procedures to keep from spraying or splattering the traveling public with asphaltic material.

All existing flexible base, which may become exposed by the milling operation, shall be primed at the rate of 0.2 Gal/SY.

Do not apply subsequent courses over the initial prime coat any earlier than the day after the prime coat was applied, unless otherwise authorized or directed by the Engineer.

ITEM 340: Dense-Graded Hot-Mix Asphalt Small Quantity

The use of Recycled Asphalt Shingles (RAS) will not be allowed.

Provide aggregate with a minimum surface aggregate classification (SAC) of "B" unless otherwise shown. SAC requirements apply to aggregates used on all final roadway surfaces, including shoulders.

Use of Contractor-owned RAP including HMA plant waste will be permitted after the material from Item 354 has been exhausted or as approved by the Engineer.

Any RAP remaining from the contract is to remain with the Contractor.
Use crushed gravel screenings with or in lieu of stone screenings.

Use a cut-off chute when placing hot-mix asphalt on narrow width locations unless approved.

The laboratory-molded density for this project will be 97% in accordance with test method TEXS-207-F.

Contractor will present a contingency plan to be approved by the Engineer in the event of a HMAC facility breakdown prior to pavement operations. No pavement drop-off's of any depth

SOUTH PORT CONNECTOR

GENERAL NOTES
&
SPECIFICATIONS

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6				13
DGN: JS	STATE	DIST.	COUNTY	
CHK DGN: FC	TEXAS	PHARR	CAMERON	
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

will be allowed when opened to traffic unless specifically noted in the plans for a particular location.

Construct longitudinal joints with a joint maker providing a maximum one (1) inch vertical edge (1/2 inch desirable) with an adjacent 6:1 taper. Construct the outside edge with a 6:1 taper, or backfill within the same day.

Unless otherwise approved by the Engineer, a tack coat will be placed on all lifts in accordance to 341.4.7.2 Tack Coat. A non-tracking tack coat shall be used. This work will not be paid for directly, but will be considered subsidiary to Item 341.

ITEM 400: Excavation and Backfill for Structures

If the Contractor elects to cut pavement (existing/detour) for structural work beyond that required by the construction phasing shown in the plans and approved by the Engineer, it shall be restored at the Contractor's expense and backfilled to its original condition or better in accordance with Item 400.

Unless shown otherwise in the plans, use a 1-ft depth for Item 400 Structural Excavation (Special) for gravel bedding needed below drainage structures with unstable material.

Item 404: Driving Piling

Difficult Driving

If it is necessary to advance the piling through a strong or stiff layer where refusal is possible, a pile penetration note may be required. A typical note may read, "The contractor's attention is drawn to the hard material in the soil profile, jetting and/or pilot holes may be necessary to advance the piling to the required penetration depth."

Dynamic Monitoring

Dynamic monitoring of a pile during driving can be accomplished using a Pile Driving Analyzer (PDA) testing system. PDA testing measures the strain and acceleration in the piles as a result of the impact of the hammer. PDA testing of a pile can help to determine the stresses in the pile during and monitor the pile for damage or integrity. The capacity of the pile and the time dependent changes in capacity (if a restrike is undertaken) can be obtained if the PDA testing data is used with the Case Pile Wave Analysis Program (CAPWAP).

Not all piling will require dynamic monitoring. However, for critical structures, projects with a large number of piling, or in difficult soil conditions PDA testing should be considered for use.

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

Consult with the Geotechnical Branch to determine if a specific project might be considered as a candidate for PDA testing.

ITEM 420: Concrete Substructures

Pay bent concrete as plan quantity.

Promptly apply an ordinary surface finish to all concrete surfaces once meeting curing requirements.

Place longitudinal construction joints at the lane line for bridge approach slabs. These construction joints will be subsidiary to Item 420.

ITEM 421: Hydraulic Cement Concrete

Provide Sulfate Resistant Concrete for all concrete piling and drilled shafts.

Provide equipment at the batch plant for determining the free moisture and/or absorption of aggregates in accordance with applicable TXDOT Test.

Provide the following items for concrete batch inspection in accordance with specifications outlined in DMS-10101, "Computer Equipment":

(1) One Desktop Microcomputer or One Laptop Microcomputer
(2) One Integrated Printer/Scanner/Copier/Fax Unit
(3) Contractor-Furnished Software
(4) Hardware

Submit to the Engineer for approval the project locations for all Portland Cement concrete washout areas prior to starting any concrete work.

Use membrane curing, Type 2, for concrete curb, gutter and combined curb and gutter, concrete medians, directional islands and sidewalks.

ITEM 427: Surface Finishes for Concrete

Provide surface finishes for concrete as follows:

(1) Bridge overpass and underpass structures - Surface Area I, opaque sealer coating (color to be determined by the Engineer).

SOUTH PORT CONNECTOR

GENERAL NOTES
&
SPECIFICATIONS

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6				14
DGN: JS	STATE	DIST.	COUNTY	
CHK DGN: FC	TEXAS	PHARR	CAMERON	
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

(1) Bridge waterway crossings and bridge class box culvert structures - Surface Area II, opaque sealer coating (color to be determined by the Engineer).

Concrete traffic barrier/railing (roadway and bridge), and retaining wall coping - opaque sealer coating (color to be determined by the Engineer) to all exposed surfaces.

ITEM 432: Riprap

Provide Class "A" concrete minimum for riprap aprons placed around all box culvert and pipe safety end treatments. Provide 1-inch thick dummy joints at least every 15-ft for riprap aprons placed around box and pipe culverts.

Do not use fiber reinforced concrete riprap on side slopes equal to or steeper than 6:1 unless approved by the Engineer.

ITEM 464: Reinforced Concrete Pipe

Use tongue and groove pipe where the RCP extends into the lime treated subgrade. The 4-foot depth restriction for heavy equipment passage over pipe structures is voided. The Contractor will be responsible for any construction damage to these facilities.

Do not use mortar joints.

All reinforced concrete pipe shall include rubber gaskets unless shown otherwise on the plans or directed by the Engineer.

The work performed for concrete collars will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 467: Safety End Treatment

Place safety end treatments with a uniform slope.

Reinforce concrete riprap with 4x4 - W2.9 x W2.9 welded wire fabric or with No. 3 reinforcing bars spaced at a maximum of 12 inch in each direction.

The work performed for concrete collars will not be measured or paid for directly, but will be subsidiary to pertinent Items.

All Type II SET's shall have riprap, Class "A" minimum, aprons as shown on the plans. The Contractor may submit an alternate precast SET design for approval by the Engineer.

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

The use of precast Type II safety end treatments with integrally cast riprap aprons is allowed as approved. All safety end treatments shall include riprap to the dimensions shown on PSET-RR. This riprap shall be subsidiary to Item 467.

ITEM 502: Barricades, Signs, and Traffic Handling

Furnish additional barricades, signs, and traffic handling as directed. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Traffic control for daytime lane closures shall be in accordance with TCP 1 Series Standards.

Traffic control shall include temporary rumble strips in accordance with WZ (RS)-16.

When advanced warning flashing arrow panels are specified, furnish one (1) standby unit in good condition at the job site for immediate use.

The Contractor's Responsible Person (CRP) or his representative(s) shall be located within one hour of traveling time to the project site. The Contractor shall notify the Engineer in writing of the name, physical address, and telephone number of this employee or these employees. The Engineer shall furnish this information to local law enforcement officials.

Maintain traffic control devices by taking corrective action as soon as possible.

Attach stop/slow paddle to a staff with a minimum length of 6 feet to the bottom of the sign.

Shadow vehicles equipped with Truck-Mounted Attenuators are required.

The use of a pilot vehicle in conjunction with flaggers will be permitted. If used, provide positive and unrestricted communication between the driver of the pilot vehicle and the flaggers. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Replace/relocate all regulatory signs removed due to construction operations with the same sign on fixed support(s) immediately upon its removal. First obtain the Engineer's approval before removing any regulatory roadway signs. Required flaggers are to be available to direct traffic during sign intermediate down time.

Relocate any Directional Sign Assemblies removed during construction operations immediately upon their removal.

These signs shall be relocated to a location in accordance with the latest version of the "Texas Manual on Uniform Traffic Control Devices". In no case will a sign be removed without a

SOUTH PORT CONNECTOR

GENERAL NOTES & SPECIFICATIONS

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			15
DGN: JS	STATE	DIST.	COUNTY
CHK. DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK. DWG:	0921	06	288	SOUTH PORT CONNECTOR

replacement sign and support(s) being readily available and a location established. Removal and relocation of these signs required for traffic control will not be paid for directly, but shall be considered subsidiary to Item 502.

From the beginning to the end of the project, all traffic control devices need to be in acceptable condition as per the Texas Quality Guidelines for Work Zone Traffic Control Devices.

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

All items marked as optional on all traffic control standards shall be required unless otherwise approved by the Engineer.

Trail vehicle shall be required on all mobile traffic control operations.

ITEM 504: Field Office and Laboratory

Furnish (1) Field Office (Type C).

Provide one (1) Type D Structure (Asphalt Mix Laboratory) modified by the following:

> Laboratory room: The other room of this building will be used as a laboratory and will include access to a bathroom facility from the interior. The laboratory and bathroom facility will have the walls, ceiling, and floor insulated such that the air temperature can be maintained at 76 degrees Fahrenheit at all times.

Furnish for the Department's use in the asphalt laboratory one (1) desktop computer.

Apply for and secure permits necessary for the buildings, and pay all utility meter deposits and service bills. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Provide two (2) sets of keys for all facilities.

Maintain all mechanical, electrical and plumbing facilities at all times.

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

Furnish and install adequate equipment, outlets, lighting, air condition, heating, and ventilation as approved. Arrange and install outlets as directed with no less than 1 outlet per wall. Portable toilets will not be allowed.

Provide two (2) standard size office desks, four (4) office chairs, two (2) bookcases, and two (2) filing cabinets as approved. Provide solar screens, blinds, or shades.

Provide high speed internet connectivity, a printer/fax/scan/copier, and one (1) phone line and two (2) phones.

Provide hot water or a hot water dispenser capable of generating one (1) gallon of water at 140 degrees Fahrenheit with acceptable water pressure.

Use support blocks for stability and tied down portable structures according to applicable zoning requirements or as directed.

Provide Safety Equipment as follows:
(1) ONE EYE WASH STATION
(2) ONE FIRE EXTINUGUISHER
(3) ONE FIRST AID KIT

Provide janitorial services as needed.

Provide doors with a minimum width of 36 inches and 80 inches in height. Secure all exterior openings with bars.

Furnish, for the Department's use in the asphalt laboratory, one (1) desktop computer.

Asphalt content will be measured by Ignition Method. Provide electrical service for the asphalt content by Ignition Method.

ITEM 506: Temporary Erosion, Sedimentation, and Environmental Controls

Designate in writing a Contractor Responsible Person (CRP) for implementing, maintaining, and reviewing environmental requirements.

Temporary sediment control fence is to be used around the stockpile location(s) and/or as directed by the Engineer. This will not be paid for directly but shall be subsidiary to pertinent Items.

Biodegradable erosion control logs and/or silt fence will be checked and cleared of debris or sediment, as well as maintained, by the Contractor at least once a week. Biodegradable erosion

SOUTH PORT CONNECTOR

GENERAL NOTES
&
SPECIFICATIONS

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			16
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

control logs will also be checked and cleared of any debris or sediment after ½" rain event or more. These tasks will be considered subsidiary to Item 506.

The Contractor Force Account "Erosion Control Maintenance" that has been established for this project is intended to be utilized for work zone Best Management Practice (BMP) maintenance, to improve the effectiveness of the Environmental Controls that may need maintenance attention and/or require replacement while the project is still under the construction stage. These procedures will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent BMP management reviews on the project. The "Erosion Control Maintenance" is not intended to be used in lieu of bid items established by the contract.

ITEM 540: Metal Beam Guard Fence

The optional terminal anchor post with the terminal connector will be required as shown on the Metal Beam Guard Fence Standard.

Galvanize the rail elements supplied for this project using a Type II Zinc Coating.

ITEM 544: Guardrail End Treatments

Label "end treatment type" on backside of unit at time of installation.

ITEM 644: Small Roadside Sign Assemblies

All signs shall be installed as shown in the plans and in accordance with the current edition of the "Texas Manual on Uniform Traffic Control Devices" and the "Sign Crew Field Book" (SCFB).

All signs shall be erected according to the locations shown on the signing layout sheets except that a sign may be shifted in order to secure a more desirable location. All sign locations will be staked as shown in the plans and as approved. It is the intent of the plans to erect all roadside traffic signs with the sign edge a minimum of 6 feet from the edge of the shoulder, or if none, 12 feet from the edge of the travel lane. In curb and gutter sections the sign edge shall be a minimum of 2 feet from the face of the curb.

For this project, aluminum type sign blanks as provided for under Item 636 will be required for all proposed signing installed under Item 644. Aluminum sign blanks less than 7.5 square feet shall be 0.08 inch thick, sign blanks 7.5 to 15 square feet shall be 0.100 inch thick and sign blanks greater than 15 square feet shall be 0.125 inch thick.

All excess excavation shall be spread uniformly inside the right of way as directed and shall be included in the price of these Items.

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

Sign types which design details are not shown on the plans shall conform with the latest edition of the Department's "Standard Highway Sign Design for Texas" Manual.

Signs shown to be removed shall include the complete sign installation and separate the sign post at the concrete foundation. The concrete foundation shall be disposed in accordance with this Bid Item. Except for concrete foundations, all removed sign panels, sign posts, and hardware shall remain then property of the Department. All removed sign installations shall be completely disassembled. All salvageable sections of sign panels shall be recycled by TxDOT. The removed sign material will be required to be hauled to the maintenance yard closest to the project. No signs shall be removed without prior approval.

ITEM 658: Delineator and Object Marker Assemblies

Delineator assemblies shall be installed 8 feet from the edge of the shoulder unless restricted by some obstruction, in which case, the delineator assembly shall be placed between 2 and 8 feet from the edge of the shoulder.

Bi-directional object markers shall be in accordance with the D&OM standard sheets. The Contractor is directed to the standards when instructed where and how to install the object markers.

ITEM 666: Retro-reflectorized Pavement Markings

All permanent pavement markings for this project under this Item shall be 0.100 inches (100 mil) thick thermoplastic.

Any permanent pavement markings or non-removal work zone pavement markings lacking reflectivity in accordance with the requirements of Tex 828-B, or that fail to meet minimum retro reflectivity requirements for longitudinal pavement markings when required, will be addressed per the requirements of the specification. The roadway will be re-striped at no additional compensation.

Before the roadways are overlaid, the location and configuration of all existing pavement markings shall be recorded for use in installing the final permanent pavement marking. All roadways shall be striped as existing, unless otherwise noted in the plans.

The beads used on this project shall meet the requirements of Departmental Materials Specification DMS-8290, Glass Traffic Beads Texas Type II & III. Use a 50% Type II/ 50% Type III mix utilizing a double drop system with Type III beads dropped first.

SOUTH PORT CONNECTOR

GENERAL NOTES & SPECIFICATIONS

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			17
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

Project Number:

County: Cameron **Control:** 0921-06-288

Highway: South Port Connector

Pavement surface preparation for markings and markers will not be paid for directly, but shall be considered subsidiary to Item 666.

Prior to any striping operations, an on-site coordination meeting between all the parties involved will be required to review striping details and requirements to ensure quality work.

The beads used on this project shall meet the requirements of Departmental Materials Specification DMS-8290, Glass Traffic Beads Texas Type II & III. Use a 50% Type II/ 50% Type III mix utilizing a double drop system with Type III beads dropped first.

ITEM 677: Eliminating Existing Pavement Markings and Markers

Asphalt and aggregate types and grades shall be as approved in writing when a surface treatment is used to eliminate existing pavement markings.

SOUTH PORT CONNECTOR

GENERAL NOTES
&
SPECIFICATIONS

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			18
DGN: JS	STATE	DIST.	COUNTY
CHK. DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK. DWG:	0921	06	288	SOUTH PORT CONNECTOR

Station	Material Name	End Areas (sq. ft.)	Unadjusted Volumes (cu. yd.)	Adjusted Volumes (cu. yd.)	Mult Factor	Mass Ordinate
0+97.00	DIRT					
	Excavation	1096.3	0	0	1.00	
	Fill	0.0	0	0	1.00	0
1+00.00	DIRT					
	Excavation	992.7	116	116	1.00	
	Fill	0.0	0	0	1.00	116
2+00.00	DIRT					
	Excavation	188.6	2188	2188	1.00	
	Fill	0.0	0	0	1.00	2304
3+00.00	DIRT					
	Excavation	149.9	627	627	1.00	
	Fill	0.0	0	0	1.00	2931
4+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	4.4	8	8	1.00	2923
	DIRT					
	Excavation	137.4	532	532	1.00	
	Fill	0.0	0	0	1.00	3455
5+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	6.2	20	20	1.00	3435
	DIRT					
	Excavation	53.1	353	353	1.00	
	Fill	0.0	0	0	1.00	3788
6+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	5.3	21	21	1.00	3767
	DIRT					
	Excavation	71.2	230	230	1.00	
	Fill	0.0	0	0	1.00	3997
7+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	200.0	380	380	1.00	3617
	DIRT					
	Excavation	22.8	174	174	1.00	
	Fill	0.0	0	0	1.00	3791
8+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	393.4	1099	1099	1.00	2692
	DIRT					
	Excavation	31.2	100	100	1.00	
	Fill	0.0	0	0	1.00	2792
9+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	338.9	1356	1356	1.00	1436
	DIRT					
	Excavation	29.3	112	112	1.00	
	Fill	0.0	0	0	1.00	1548
10+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	243.3	1078	1078	1.00	470
	DIRT					
	Excavation	39.6	128	128	1.00	
	Fill	0.0	0	0	1.00	598
11+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	136.0	702	702	1.00	-104
	DIRT					
	Excavation	51.9	169	169	1.00	
	Fill	0.0	0	0	1.00	65
12+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	56.6	357	357	1.00	-292
	DIRT					
	Excavation	42.8	175	175	1.00	
	Fill	0.0	0	0	1.00	-117
13+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	48.7	195	195	1.00	-312
	DIRT					
	Excavation	41.7	156	156	1.00	
	Fill	0.0	0	0	1.00	-156
14+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	27.2	141	141	1.00	-297
	DIRT					
	Excavation	42.3	156	156	1.00	
	Fill	0.0	0	0	1.00	-141
15+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	18.8	85	85	1.00	-226
	DIRT					
	Excavation	53.4	177	177	1.00	
	Fill	0.0	0	0	1.00	-49
16+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	10.2	54	54	1.00	-103
	DIRT					
	Excavation	59.6	209	209	1.00	
	Fill	0.0	0	0	1.00	106
17+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	53.3	118	118	1.00	-12
	DIRT					
	Excavation	27.1	161	161	1.00	
	Fill	0.0	0	0	1.00	149
18+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	23.1	141	141	1.00	8
	DIRT					
	Excavation	42.0	128	128	1.00	
	Fill	0.0	0	0	1.00	136
19+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	0.8	44	44	1.00	92
	DIRT					
	Excavation	133.8	326	326	1.00	
	Fill	0.0	0	0	1.00	418
20+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	9.4	19	19	1.00	399
	DIRT					
	Excavation	65.9	370	370	1.00	
	Fill	0.0	0	0	1.00	769
21+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	11.0	38	38	1.00	731
	DIRT					
	Excavation	52.7	220	220	1.00	
	Fill	0.0	0	0	1.00	951
22+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	10.7	40	40	1.00	911
	DIRT					
	Excavation	60.8	210	210	1.00	
	Fill	0.0	0	0	1.00	1121
23+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	65.9	142	142	1.00	979
	DIRT					
	Excavation	42.8	192	192	1.00	
	Fill	0.0	0	0	1.00	1171
24+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	188.7	471	471	1.00	700
	DIRT					
	Excavation	43.6	160	160	1.00	
	Fill	0.0	0	0	1.00	860
25+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	360.1	1016	1016	1.00	-156
	DIRT					
	Excavation	43.7	162	162	1.00	
	Fill	0.0	0	0	1.00	6
26+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	515.3	1621	1621	1.00	-1615
	DIRT					
	Excavation	44.7	164	164	1.00	
	Fill	0.0	0	0	1.00	-1451
26+43.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	479.2	792	792	1.00	-2243
	DIRT					
	Excavation	0.0	36	36	1.00	
	Fill	0.0	0	0	1.00	-2207
SKIP STATION RANGE = 26+43.10 to 46+42.90						
46+43.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	976.2	5	5	1.00	-2212
47+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	958.6	2042	2042	1.00	-4254
48+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	820.8	3295	3295	1.00	-7549
49+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	547.0	2533	2533	1.00	-10082
50+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	497.1	1934	1934	1.00	-12016
51+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	372.5	1610	1610	1.00	-13626
52+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	328.1	1297	1297	1.00	-14923
53+00.00	SOIL					
	Excavation	0.0	0	0	1.00	
	Fill	358.9	1272	1272	1.00	-16195

Plotted on: 5/30/2019
Plotted @: 2:03:36 PM

Plotted by: salinab
Design Filename: N:\Project\u2299\117 WA#17 (Port Connector)\500*PS&E\PlanSet01\Dgn\South Port Connector Earthwork.dgn

SOUTH PORT CONNECTOR

EARTHWORK SUMMARY

SHEET 1 OF 2

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			19

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

54+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	462.7	1521	1521	1.00	-17716
55+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	588.6	1947	1947	1.00	-19663
56+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	715.0	2414	2414	1.00	-22077
57+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	853.9	2905	2905	1.00	-24982
57+89.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	875.9	2851	2851	1.00	-27833
SKIP STATION RANGE = 57+89.10 to 81+63.90						
81+64.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	848.7	6	6	1.00	-27839
82+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	755.0	1069	1069	1.00	-28908
DIRT						
	Excavation	26.8	18	18	1.00	
	Fill	0.0	0	0	1.00	-28890
83+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	723.7	2738	2738	1.00	-31628
DIRT						
	Excavation	26.6	99	99	1.00	
	Fill	0.0	0	0	1.00	-31529
84+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	642.9	2531	2531	1.00	-34060
DIRT						
	Excavation	27.9	101	101	1.00	
	Fill	0.0	0	0	1.00	-33959
85+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	530.5	2173	2173	1.00	-36132
DIRT						
	Excavation	22.4	93	93	1.00	
	Fill	0.0	0	0	1.00	-36039
86+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	393.5	1711	1711	1.00	-37750
DIRT						
	Excavation	21.4	81	81	1.00	
	Fill	0.0	0	0	1.00	-37669
87+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	296.0	1277	1277	1.00	-38946
DIRT						
	Excavation	19.8	76	76	1.00	
	Fill	0.0	0	0	1.00	-38870
88+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	257.6	1025	1025	1.00	-39895
DIRT						
	Excavation	21.6	77	77	1.00	
	Fill	0.0	0	0	1.00	-39818
89+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	242.4	926	926	1.00	-40744
DIRT						
	Excavation	20.9	79	79	1.00	
	Fill	0.0	0	0	1.00	-40665
90+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	227.1	869	869	1.00	-41534
DIRT						
	Excavation	22.7	81	81	1.00	
	Fill	0.0	0	0	1.00	-41453
91+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	220.0	828	828	1.00	-42281
DIRT						
	Excavation	23.3	85	85	1.00	
	Fill	0.0	0	0	1.00	-42196
92+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	214.4	804	804	1.00	-43000
DIRT						
	Excavation	19.1	79	79	1.00	
	Fill	0.0	0	0	1.00	-42921
93+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	217.0	799	799	1.00	-43720
DIRT						
	Excavation	20.6	74	74	1.00	
	Fill	0.0	0	0	1.00	-43646
94+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	214.2	799	799	1.00	-44445
DIRT						
	Excavation	17.0	70	70	1.00	
	Fill	0.0	0	0	1.00	-44375
95+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	215.4	796	796	1.00	-45171
DIRT						
	Excavation	13.4	56	56	1.00	
	Fill	0.0	0	0	1.00	-45115
96+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	204.5	778	778	1.00	-45893
DIRT						
	Excavation	14.1	51	51	1.00	
	Fill	0.0	0	0	1.00	-45842
97+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	205.6	759	759	1.00	-46601
DIRT						
	Excavation	16.3	56	56	1.00	
	Fill	0.0	0	0	1.00	-46545
98+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	225.0	797	797	1.00	-47342
DIRT						
	Excavation	16.5	61	61	1.00	
	Fill	0.0	0	0	1.00	-47281
99+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	248.4	877	877	1.00	-48158
DIRT						
	Excavation	14.3	57	57	1.00	
	Fill	0.0	0	0	1.00	-48101
100+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	257.1	936	936	1.00	-49037
DIRT						
	Excavation	15.6	55	55	1.00	
	Fill	0.0	0	0	1.00	-48982
101+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	238.2	917	917	1.00	-49899
DIRT						
	Excavation	15.5	58	58	1.00	
	Fill	0.0	0	0	1.00	-49841
102+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	209.8	830	830	1.00	-50671
DIRT						
	Excavation	17.4	61	61	1.00	
	Fill	0.0	0	0	1.00	-50610
103+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	188.0	737	737	1.00	-51347
DIRT						
	Excavation	15.9	62	62	1.00	
	Fill	0.0	0	0	1.00	-51285
104+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	170.7	664	664	1.00	-51949
DIRT						
	Excavation	15.1	57	57	1.00	
	Fill	0.0	0	0	1.00	-51892
105+00.00 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	92.9	488	488	1.00	-52380
DIRT						
	Excavation	96.0	206	206	1.00	
	Fill	0.0	0	0	1.00	-52174
105+69.86 SOIL						
	Excavation	0.0	0	0	1.00	
	Fill	0.3	121	121	1.00	-52295
DIRT						
	Excavation	91.1	242	242	1.00	
	Fill	0.0	0	0	1.00	-52053

* GRAND SUMMARY TOTALS

Material Name		Unadjusted Volumes (cu. yd.)	Adjusted Volumes (cu. yd.)	Mult Factor
SOIL				
	Excavation	0	0	1.00
	Fill	61819	61819	1.00
DIRT				
	Excavation	9766	9766	1.00
	Fill	0	0	1.00

Plotted on: 5/30/2019
Plotted @: 2:03:37 PM

Plotted by: salinab
Design Filename: N:\Project\u2299\117 WA#17 (Port Connector)\500*PS&E\PlanSet01\Dgn\South Port Connector Earthwork.dgn

SOUTH PORT CONNECTOR

EARTHWORK SUMMARY

SHEET 2 OF 2

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			20

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON

DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

SOUTH PORT CONNECTOR ROADWAY SUMMARY

STATION		FOR CONTRACTORS INFORMATION ONLY			100-6002	110-6001	132-6005	134-6001	150-6001	247-6236	260-6016	260-6079	275-6001	275-6003	310-6009	340-6104	360-6006	400-6005
		LENGTH	PROP. PAVEMENT AREA	PROP. BASE AREA	PREPARING R.O.W.	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(ORD COMP) (TY C)	BACKFILL (TY A)	BLADING	FLBS (RDWY DEL) (TY A GR 1-2) (FINAL POS)	LIME (6%)	LIME TRT (SUBGRADE) (6")	CEMENT (4%)	CEMENT TREAT (NEW BASE) (6")	PRIME COAT (MC-30)	D-GR HMA (SQ) TY-D SAC-B PG64-22 (1.0") (BOND BREAKER)	CONC. PVMT. (CONT REINF CRCP) (12")	CEM STABIL BKFL
BEGIN	END	LF	SY	SY	STA	CY	CY	STA	STA	CY	TON	SY	TON	SY	GAL	TON	SY	CY
															(0.2 GAL/SY)	(114 LBS/SY)		
0+97.00	8+00.00	703.00	6,889	7,046	7.0	4,220	429	7	3	1,174	120	7,046	79.9	7,046	1,409	393	6,889	
8+00.00	19+00.00	1,100.00	5,938	6,183	11.0	1,671	5,326	11		1,030	105	6,183	70.1	6,183	1,237	338	5,938	
19+00.00	26+43.00	743.00	3,963	4,129	7.4	1,840	4,183	7		688	70	4,129	46.8	4,129	826	226	3,963	134
26+43.00	46+43.00	2,000.00			20.0													
46+43.00	52+00.00	557.00	2,971	3,094	5.6		11,419	6		516	53	3,094	35.1	3,094	619	169	2,971	134
52+00.00	57+89.00	589.00	3,141	3,272	5.9		14,207	6		545	56	3,272	37.1	3,272	654	179	3,141	134
57+89.00	81+64.00	2,375.00			23.8													
81+64.00	85+00.00	336.00	1,762	1,866	3.4	218	6,344	3		311	32	1,866	21.2	1,866	373	100	1,762	134
85+00.00	96+00.00	1,100.00	5,866	6,111	11.0	851	12,007	11		1,019	104	6,111	69.3	6,111	1,222	334	5,866	
96+00.00	105+69.86	969.86	7,955	8,406	9.7	966	7,904	10	3	1,401	143	8,406	95.3	8,406	1,681	453	7,955	
PROJECT TOTAL		**10,473**	**38,486**	**40,107**	**105**	**9,766**	**61,819**	**61**	**6**	**6,684**	**682**	**40,107**	**455**	**40,107**	**8,021**	**2,194**	**38,486**	**536**

SOUTH PORT CONNECTOR ROADWAY SUMMARY - CONTINUED

STATION		428-6001	550-6003
		PENETRATING CONCRETE SURFACE TREATMENT	CHAIN LINK FENCE (REMOVE)
BEGIN	END	SY	LF
0+97.00	8+00.00	6,889	
8+00.00	19+00.00	5,938	
19+00.00	26+43.00	3,963	160
26+43.00	46+43.00		
46+43.00	52+00.00	2,971	
52+00.00	57+89.00	3,141	
57+89.00	81+64.00		
81+64.00	85+00.00	1,762	
85+00.00	96+00.00	5,866	
96+00.00	105+69.86	7,955	
PROJECT TOTAL		**38,486**	**160**

NOTE: 1) UNIT WT OF EXISTING MATERIAL 2970 LB/CY
2) UNIT WT OF NEW BASE 3375 LB/CY

SOUTH PORT CONNECTOR SW3P SUMMARY

FROM STATION	TO STATION	160-6005	164-6036	164-6042	168-6001	506-6001	506-6011	506-6020	506-6024	506-6031	506-6038	506-6039
		FURNISHING AND PLACING TOPSOIL	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEEDING (TEMP) (WARM)	VEGETATIVE WATERING	ROCK FILTER DAMS (INSTALL) (TY 1)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	FRNT END LOADER WORK (EROSION & SEDM CONT)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
		CY	AC	AC	(MG)	LF	LF	SY	SY	HR	LF	LF
0+97.00	22+00.00	2,437	5	5	762			78	78	14	4,284	4,284
22+00.00	44+00.00	533	1	1	116	100	100			3	4,400	4,400
44+00.00	66+00.00	1,393				200	200				4,400	4,400
66+00.00	88+00.00	776	1	1	219	110	110			4	4,400	4,400
88+00.00	105+69.86	2,153	4	4	588			78	78	11	3,588	3,588
THROUGH OUT PROJECT												
PROJECT TOTAL		**7,291**	**11**	**11**	**1,684**	**410**	**410**	**156**	**156**	**32**	**21,072**	**21,072**

SOUTH PORT CONNECTOR

SUMMARY SHEETS

SHEET 1 OF 2

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			21
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

SOUTH PORT CONNECTOR METAL BEAM GUARD FENCE SUMMARY

FROM STATION	TO STATION	432-6045	540-6001	540-6006	544-6001
		RIPRAP (MOW STRIP) (4IN)	MTL W-BEAM GD FEN (TIM POST)	MTL W-BEAM GD FEN TRANS (THRIE-BEAM)	GUARDRAIL END TRT (INSTALL)
		CY	LF	EA	EA
0+97.00	8+00.00				
8+00.00	19+00.00				
19+00.00	30+00.00	12	50	2	2
30+00.00	41+00.00				
41+00.00	52+00.00	12	50	2	2
52+00.00	63+00.00	12	50	2	2
63+00.00	74+00.00				
74+00.00	85+00.00	12	50	2	2
85+00.00	96+00.00				
96+00.00	105+69.86				
PROJECT TOTAL		**48**	**200**	**8**	**8**

SOUTH PORT CONNECTOR DRAINAGE SUMMARY

STATION	400-6001	464-6005	467-6394
	STRUCT EXCAV	RC PIPE (CL III) (24 IN)	SET (TY II) (24 IN) (RCP) (6: 1) (C)
	CY	LF	EA
2+00.00	24.00	96	2
104+00.00	23.00	92	2
PROJECT TOTAL	**47**	**188**	**4**

SOUTH PORT CONNECTOR SMALL SIGNS SUMMARY

FROM STATION	TO STATION	644-6001	644-6004	644-6007	644-6030	658-6014	658-6048	658-6067	685-6002
		IN SM RD SN SUP & AM TY10BWG (1) SA (P)	IN SM RD SN SUP & AM TY10BWG (1) SA (T)	IN SM RD SN SUP & AM TY10BWG (1) SA (U)	IN SM RD SN SUP & AM TYS80 (1) SA (T)	INSTL DEL ASSM (D-SW)SZ (BRF)CTB(BI)	INSTL OM ASSM (OM-2Z)(FLX)GND	INSTL DEL ASSM (D-DW)SZ 1 (BRF)GF2	RELOCATE RDSD FLASH BEACON ASSEMBLY
		EA	EA	EA	EA	EA	EA	EA	EA
0+97.00	22+00.00	4	2		4		2		
22+00.00	44+00.00		2			36			
44+00.00	66+00.00		3			20			
66+00.00	88+00.00		2			32			
88+00.00	105+69.86	4	11	1	1		2		1
ENTIRE PROJECT								100	
PROJECT TOTAL		**8**	**20**	**1**	**5**	**88**	**4**	**100**	**1**

SOUTH PORT CONNECTOR PAVEMENT MARKINGS SUMMARY

FROM STATION	TO STATION	666-6036	666-6042	666-6141	666-6224	666-6228	666-6303	666-6315	666-6048	666-6153	672-6009	677-6001	6056-6001
		REFL PAV MRK TY I (W) 8" SLD (100 MIL)	REFL PAV MRK TY I (W) 12" SLD (100 MIL)	REFL PAV MRK TY I (Y) 12" SLD (100 MIL)	PAVEMENT SEALER 4"	PAVEMENT SEALER 12"	RE PM W/RET REQ TY I (W) 4"(SLD) (100 MIL)	RE PM W/RET REQ TY I (Y) 4"(SLD) (100 MIL)	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)	REFL PAV MRK TY I (Y) (ISLAND) (100 MIL)	REFL PAV MRK TY II A-A	ELIM EXT PAV MRK & MRKS (4")	PREFORMED IN-LANE (TRANS) RUMBLE STRIP
		LF	LF	LF	LF	LF	LF	LF	LF	SF	EA	LF	LF
0+97.00	22+00.00	392	203	836	9,935	1,039	4,462	5,473	14	142	149	580	120
22+00.00	44+00.00				8,800		4,400	4,400			56		
44+00.00	66+00.00				8,800		4,400	4,400			56		
66+00.00	88+00.00				8,800		4,400	4,400			56		
88+00.00	105+69.86	435	413	730	7,468	1,143	3,920	3,548	24	158	174	630	80
PROJECT TOTAL		**827**	**616**	**1,566**	**43,803**	**2,182**	**21,582**	**22,221**	**38**	**300**	**491**	**1,210**	**200**

SOUTH PORT CONNECTOR

SUMMARY SHEETS

SHEET 2 OF 2

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			22

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON

DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

GENERAL NOTES AND SPECIFICATIONS DATA:

USE A POWER-BROOM WHEN CLEANING THE ROADWAY AS NEEDED.

REMOVE & DISPOSE ALL MATERIAL NOT DEEMED SALVAGEABLE BY THE ENGINEER, UNLESS OTHERWISE SHOWN ON THE PLANS.

ON EXISTING PAVEMENT THAT WILL REMAIN IN PLACE, SAND BLAST OR SURFACE TREAT IN ORDER TO REMOVE EXISTING STRIPING.

DO NOT BLOCK DRAINAGE WHEN HANDLING & STOCKPILING EXCAVATED MATERIAL.

MAINTAIN ACCESS TO DRIVEWAYS AND INTERSECTIONS THROUGH ALL PHASES OF CONSTRUCTION.

MAINTAIN POSITIVE DRAINAGE DURING ALL PHASES OF CONSTRUCTION.

TRAFFIC CONTROL DEVICES:

AT THE COMMENCEMENT OF THE PROJECT, ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCEPTABLE CONDITION, AND MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT, AS PER GUIDELINES FOR TEMPORARY TRAFFIC CONTROL DEVICES AND FEATURES.

NOTIFY THE AREA ENGINEER(AE) IN WRITING(E-MAIL IS ACCEPTABLE) ONCE THE TRAFFIC CONTROL PLAN(TCP) AND ALL TRAFFIC CONTROL DEVICES HAVE BEEN INSTALLED AS PER PLANS ON THE PROJECT SO THAT THE DEPARTMENT'S RESPONSIBLE PERSON ACCOMPANIED BY THE CONTRACTOR'S RESPONSIBLE PERSON CAN CONDUCT A NIGHT INSPECTION ON THE SAID TCP AND TRAFFIC CONTROL DEVICES. COMMENCEMENT OF WORK WILL NOT BE AUTHORIZED NOR ALLOWED UNTIL THE AE NOTIFIES THE CONTRACTOR IN WRITING(E-MAIL IS ACCEPTABLE) TO PROCEED WITH THE WORK.

CONTRACTOR SHALL HAVE A SUFFICIENT AMOUNT OF TRAFFIC CONTROL DEVICES IN ACCEPTABLE CONDITION TO REPLACE ANY DAMAGED TRAFFIC CONTROL DEVICE WITHIN 24 HOURS OF NOTIFICATION.

PROVIDE ADDITIONAL SIGNS AND BARRICADES AS NECESSARY TO ADDRESS FIELD CONSTRUCTIBILITY & VISIBILITY. THESE ADDITIONAL SIGNS WILL BE CONSIDERED SUBSIDIARY TO ITEM 502.

REMOVE OR COMPLETELY COVER ALL EXISTING SIGNS WHICH ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLAN.

ADJUST STOP SIGNS AS NEEDED ON INTERSECTING STREETS DURING THE VARIOUS CONSTRUCTION PHASES. DO NOT REMOVE ANY EXISTING STOP SIGNS UNTIL TEMPORARY SIGNS ARE IN PLACE.

COORDINATE THE TRAFFIC CONTROL PLAN AND THE VARIOUS SEQUENCES OF CONSTRUCTION WITH ADJACENT CONSTRUCTION PROJECTS IF APPLICABLE, TO ENSURE THE UNINTERRUPTED AND SAFE FLOW OF TRAFFIC.

NOTIFY THE ENGINEER IN WRITING WHEN MAJOR TRAFFIC CHANGES ARE TO BE MADE. NOTIFICATIONS MUST BE GIVEN A MINIMUM OF THREE WORKING DAYS PRIOR TO THE CHANGE.

ALL WORK ZONE PAVEMENT MARKINGS FOR THIS PROJECT SHALL BE 0.100 INCHES (100 MIL) THICK THERMOPLASTIC.

SAFETY:

PROTECT EXPOSED PITS THAT MUST REMAIN OPEN DURING NON-WORKING HOURS AS PER OSHA REQUIREMENTS.

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by FRANK H. CHAPA P.E. 128020, on May 17, 2019.

Frank H. Chapa

TRAFFIC CONTROL PLAN NOTES

SHEET 1 OF 1 SHEETS

PHARR DISTRICT STANDARD

Texas Department of Transportation

Rev 05/08/2015

STATE	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
TEXAS	6				23
DIST.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
PHR	CAMERON	0921	06	288	SOUTH PORT CONNECTOR

CONSTRUCTION SEQUENCE

THE FOLLOWING WORK WILL BE PERFORMED ALONG THE PROPOSED SOUTH PORT CONNECTOR.

REFER TO THE TCP PHASES, TCP GENERAL NOTES, AND CORRESPONDING PLAN SHEETS FOR MORE DETAILED INFORMATION.

THE CONTRACTOR MAY BE REQUIRED TO FURNISH ADDITIONAL SIGNS AND BARRICADES IN ADDITION TO THE ONES SHOWN ON THE TRAFFIC CONTROL PLAN, TCP STANDARD SHEETS, AND BC STANDARD SHEETS TO MAINTAIN TRAFFIC AND PROMOTE MOTORISTS' SAFETY. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS. ALL SIGNS, BARRICADES AND PAVEMENT MARKINGS SHALL CONFORM WITH THE BC STANDARD SHEETS, TCP STANDARD SHEETS, AND THE LATEST EDITION OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

FOR THIS PROJECT, ALL TEMPORARY LANE CLOSURES SHALL BE IN ACCORDANCE WITH THE APPLICABLE STANDARD SHEETS SHOWN IN THE PLANS.

THE CONTRACTOR MAY VARY THE SPACING OF SIGNS TO MEET TRAFFIC CONDITIONS AS APPROVED AND DIRECTED BY THE ENGINEER.

ALL SIGNS AND BARRICADES SHALL BE NEW AND CLEAN FOR THE DURATION OF THE PROJECT.

ALL BEGINNING AND ENDING BARRICADES ARE TO REMAIN IN PLACE FOR THE DURATION OF THE PROJECT.

PHASE I:

1.PRIOR TO CONSTRUCTION, ADVANCE WARNING SIGNS SHALL BE IN PLACE; REFER TO ADVANCE WARNING LAYOUTS. ALL SIGNING SHALL BE IN ACCORDANCE WITH APPLICABLE STANDARD SHEETS.

2. PLACE EROSION CONTROL DEVICES, AS SHOWN IN THE PLANS IN ACCORDANCE WITH THE TEMPORARY EROSION, SEDIMENT & WATER POLLUTION CONTROL MEASURES STANDARD SHEETS. REFER TO SW3P SUMMARY SHEET.

PHASE I: CONTINUED

CONSTRUCT NEW SOUTH PORT CONNECTOR:

1. PREPARE AND CLOSE SHOULDERS ON R.L. OSTOS RD. AND SH 4; REFER TO TCP(2-1)-18.

2. PREPARE SUBGRADE, PLACE EMBANKMENT, PLACE NEW BASE IN 2 LIFTS, APPLY MC-30 PRIME COAT, 1 COURSE SURFACE TREATMENT AND PLACE CONCRETE PAVEMENT, AS PER PROPOSED TYPICAL SECTION SHEETS. PROTECT THE EDGE DROP-OFF AS NEEDED PER THE TXDOT EDGE CONDITION STANDARD. SIGNING FOR PAVEMENT DROP-OFF (CW8-9A) SHOULD BE INSTALLED IN ADVANCE OF THE CONDITION AND REPEATED EVERY ONE (1) MILE, AS NECESSARY.

3. CONSTRUCT PROPOSED BRIDGE STRUCTURES.

PHASE II:

1. CONSTRUCT TIE INTO EXISTING R.L. OSTOS RD. AND SH 4.

* PHASE II SHALL BE COMPLETED PRIOR TO STARTING PHASE III.

PHASE III

COMPLETION OF ROADWAY:

1. AFTER COMPLETION OF ROADWAY, INSTALL NEW SIGNS AND PLACE PERMANENT STRIPING IN ACCORDANCE WITH ALL APPLICABLE STANDARDS.

2. REMOVE ALL SW3P DEVICES.

3. PERFORM FINAL CLEAN-UP.

4. REMOVE ALL TRAFFIC CONTROL DEVICES.

*THE ABOVE NARRATIVE IS THE SUGGESTED CONSTRUCTION SEQUENCE. ANY DEVIATION FROM THE SUGGESTED CONSTRUCTION SEQUENCE AND TRAFFIC CONTROL PLAN SHALL BE APPROVED IN WRITING BY THE ENGINEER PRIOR TO IMPLEMENTATION.

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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Frank H. Chapa

SOUTH PORT CONNECTOR

SEQUENCE OF CONSTRUCTION

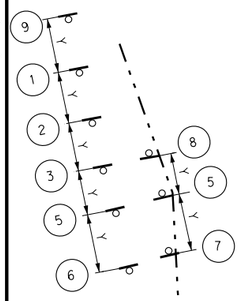
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

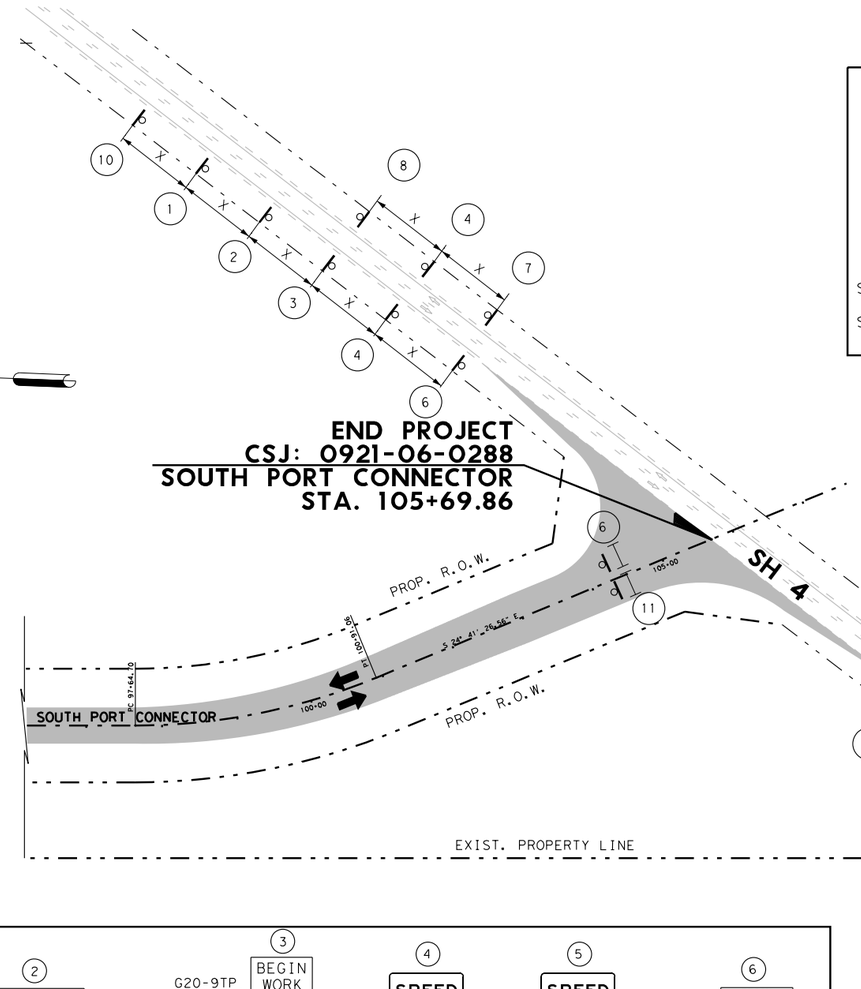
PORT OF BROWNSVILLE the port that works

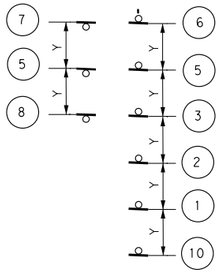
S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6				24
DGN: JS	STATE	DIST.	COUNTY	
CHK DGN: FC	TEXAS	PHARR	CAMERON	
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR







LEGEND:

- SIGN ASSEMBLY
- WORK AREA
- TYPE 3 BARRICADE
- TRAFFIC DIRECTIONAL ARROW

SIGN SPACING "X" = 500'
SIGN SPACING "Y" = 120'

1. OBEY WARNING SIGNS STATE LAW — R20-3T (48"X42")
2. STAY ALERT / TALK OR TEXT LATER — G20-10T (60"X48")
3. G20-9TP (24"X24") BEGIN WORK ZONE; R20-5T (24"X30") TRAFFIC FINES DOUBLE; R20-5aTP (24"X12") WHEN WORKERS ARE PRESENT
4. SPEED LIMIT 55 — R2-1 36"X48"
5. SPEED LIMIT 30 — R2-1 36"X48"
6. G20-5T (48"X24") BEGIN ROAD WORK NEXT 2 MILES; G20-6T (48"X30") NAME ADDRESS CITY STATE CONTRACTOR
7. END ROAD WORK — G20-2 (36"x18")
8. END WORK ZONE — G20-2bT (36"X18")
9. ROAD WORK ←NEXT 2 MILES — G20-1bL (72"X24")
10. ROAD WORK NEXT 2 MILES→ — G20-1bR (72"X24")
11. ROAD CLOSED — R11-2 48"X30"

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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Frank H. Chapa

SOUTH PORT CONNECTOR

ADVANCE WARNING LAYOUT

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			25
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

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DATE:
FILE:

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. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

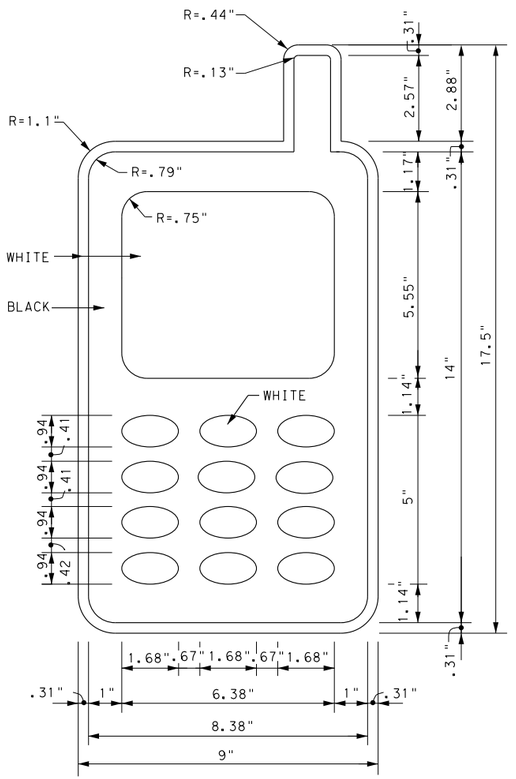
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

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 APPAREL 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.



3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

SIGN DETAIL (G20-10T)

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

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

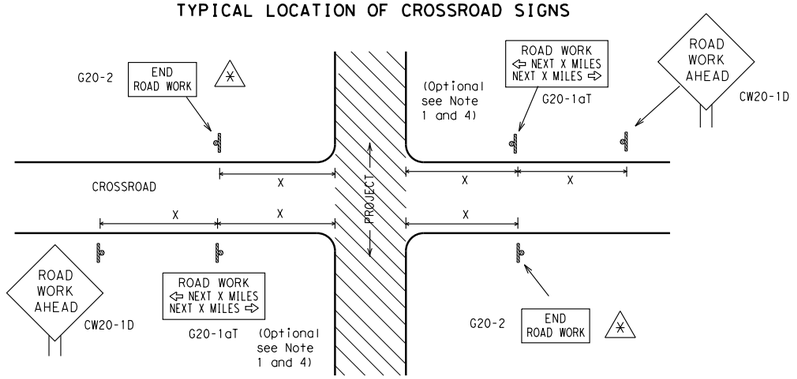
Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	PHR	CAMERON		26

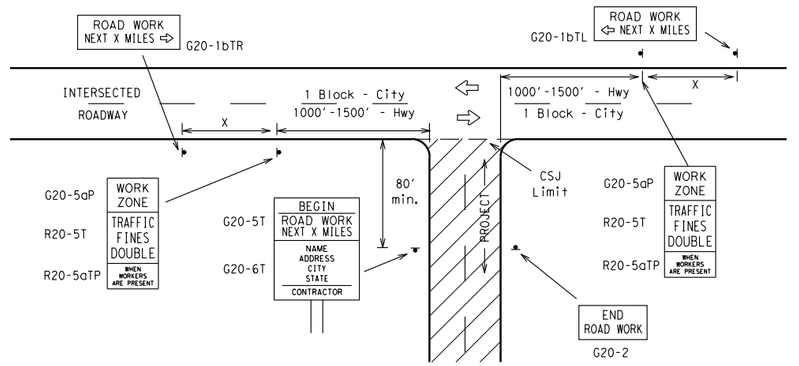
TYPICAL LOCATION OF CROSSROAD SIGNS



✳ 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. 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]

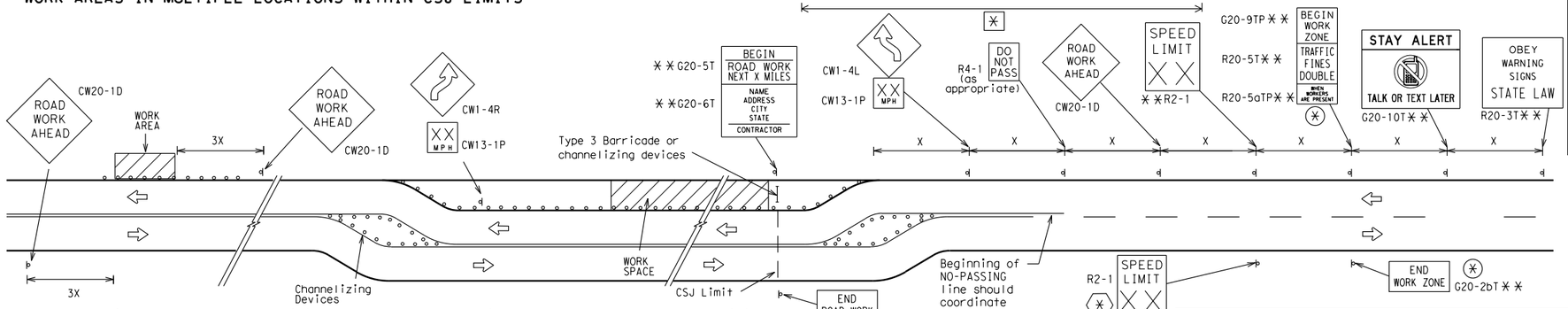
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

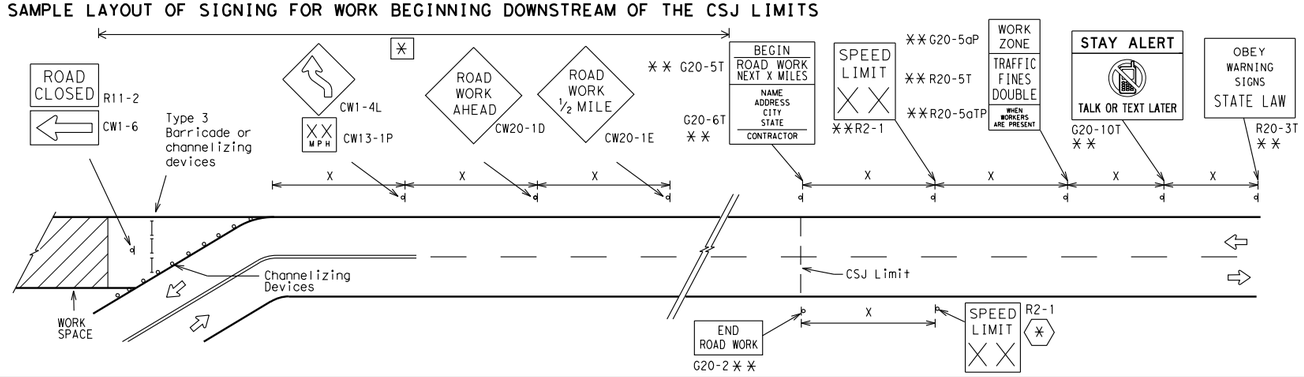
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer. 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 DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT 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.

✳✳ Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

✳ 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 Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	PHR	CAMERON		27

DATE:
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DATE:
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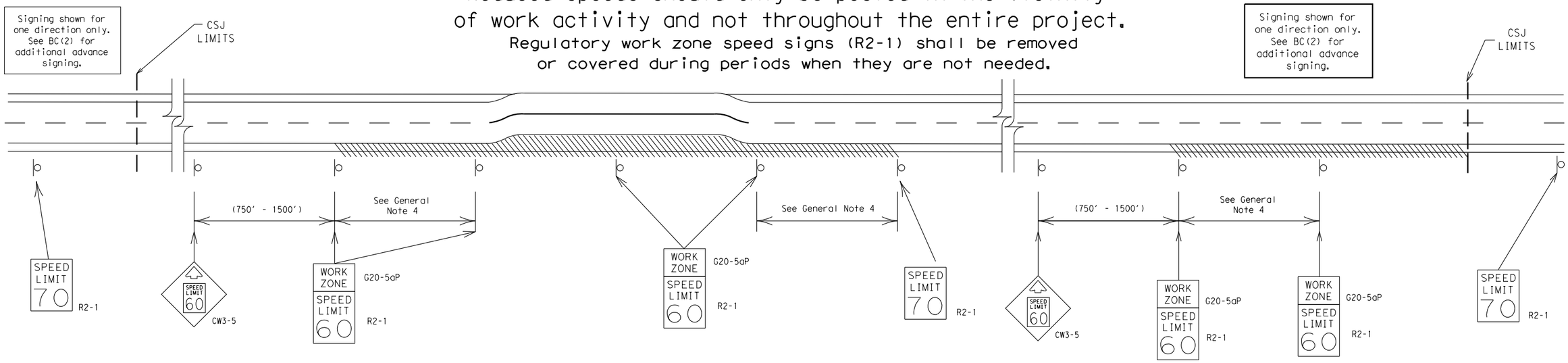
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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 travelled 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 Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

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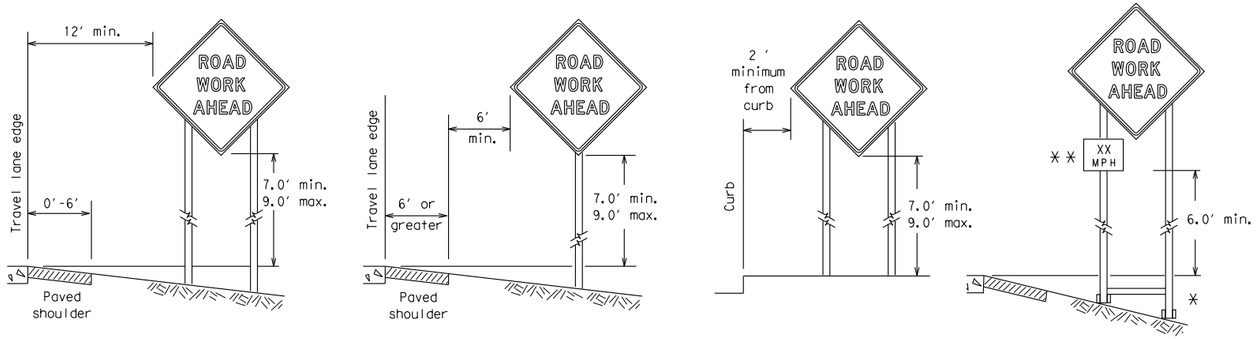
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		28

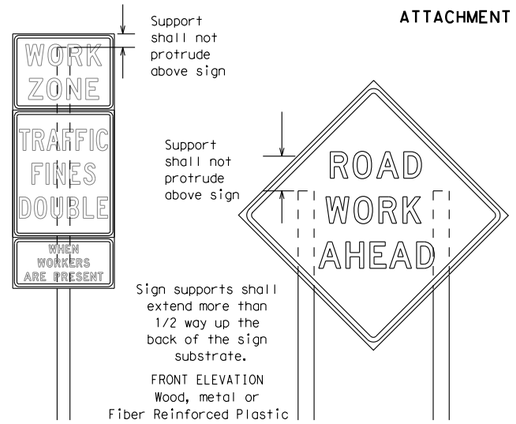
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

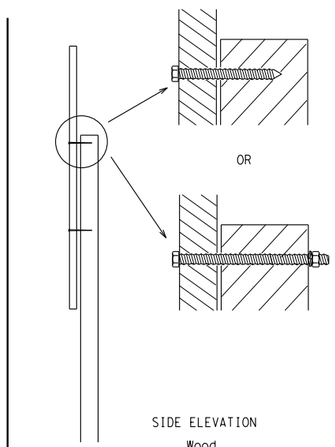


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ 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





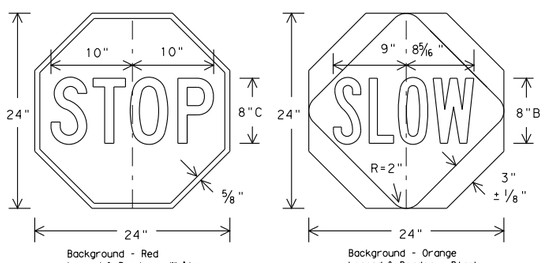
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
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.



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, 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.
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 sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards 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). 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 Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

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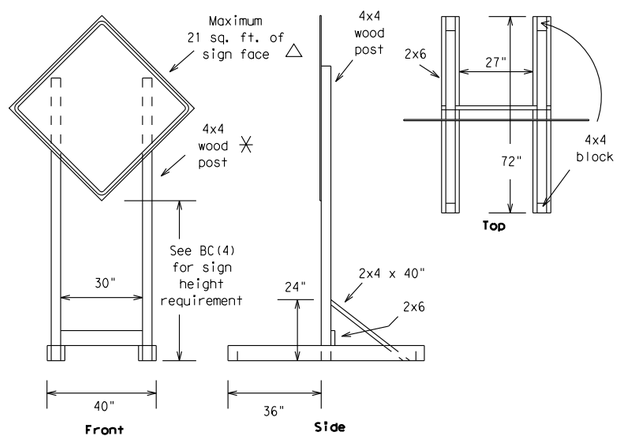
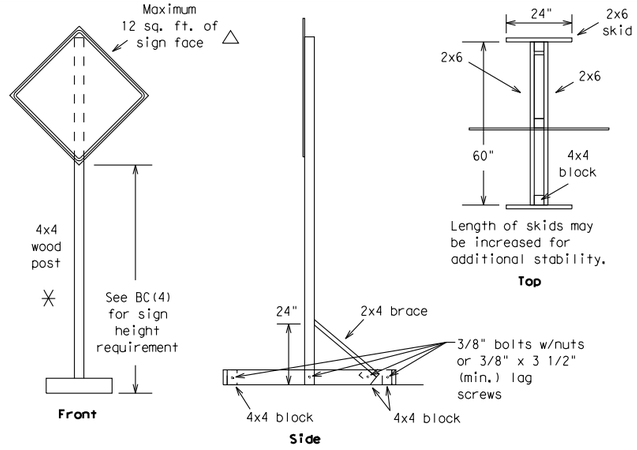
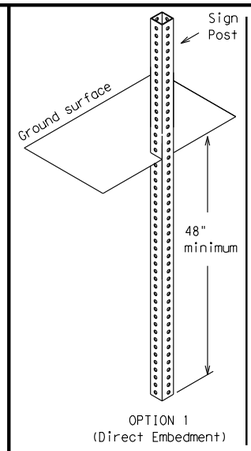


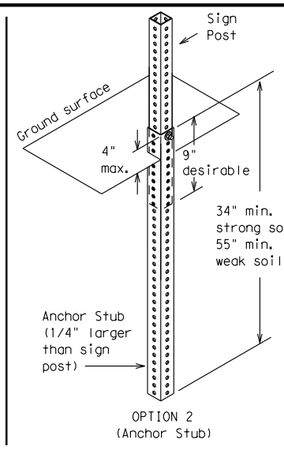


SKID MOUNTED WOOD SIGN SUPPORTS

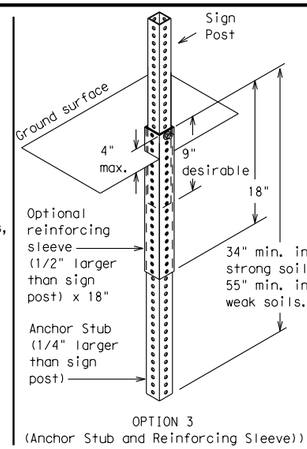
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □



OPTION 1
(Direct Embedment)

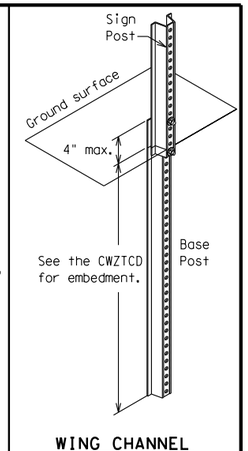


OPTION 2
(Anchor Stub)



OPTION 3
(Anchor Stub and Reinforcing Sleeve))

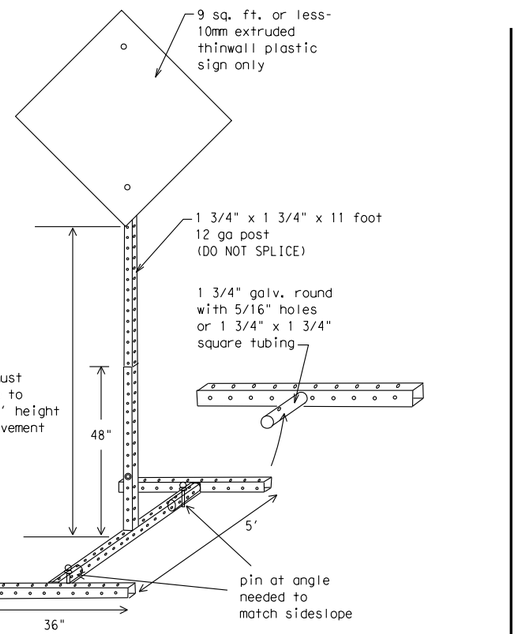
PERFORATED SQUARE METAL TUBING

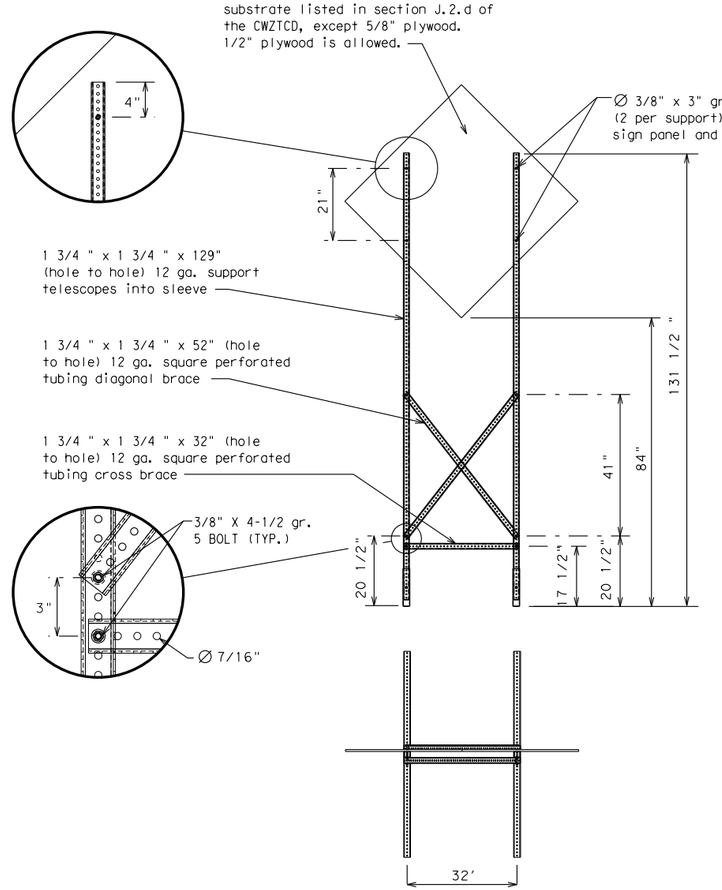


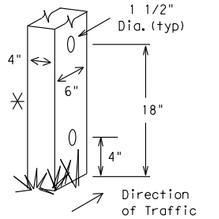
WING CHANNEL
Lap-splice/base bolted anchor

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.

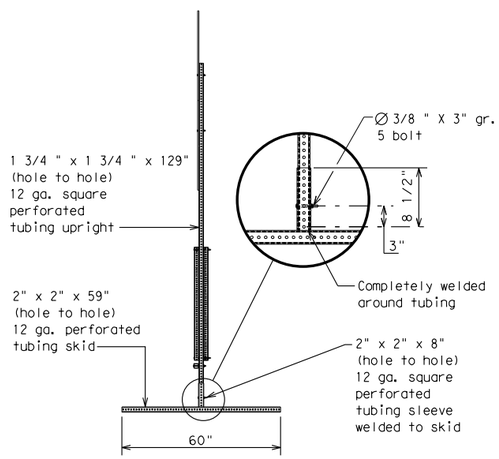






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



SKID MOUNTED PERFORATED SQUARE STEEL TUBING 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 506.

□ 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.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

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DATE:
FILE:

DATE:
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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

WORD OR PHRASE	ABBREVIATION
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

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

** 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 Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

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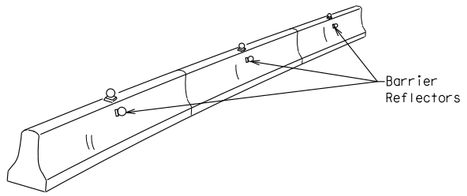
7-13	PHR	CAMERON		31

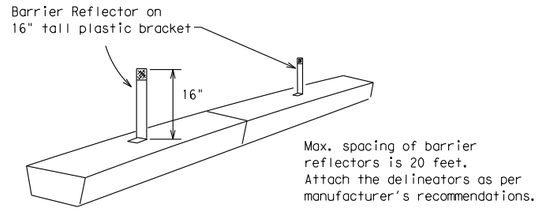
100

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.

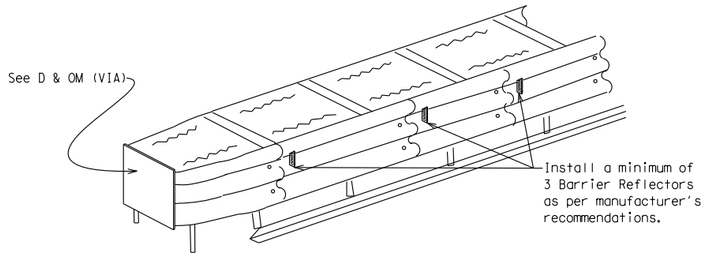


CONCRETE TRAFFIC BARRIER (CTB)

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.



LOW PROFILE CONCRETE BARRIER (LPCB)

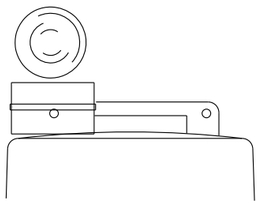


DELINEATION OF END TREATMENTS

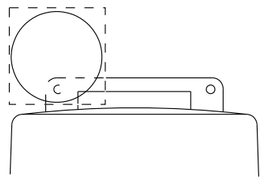
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. 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

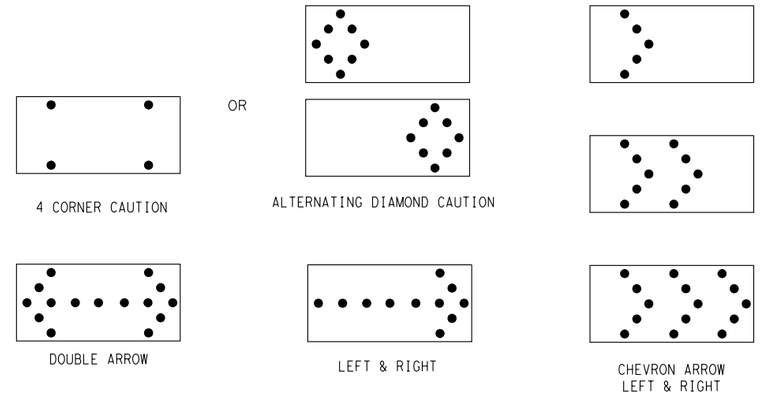
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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 National Cooperative Highway Research Report No. 350 (NCHRP 350) or 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 Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	PHR	CAMERON		32

101

DATE:
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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:

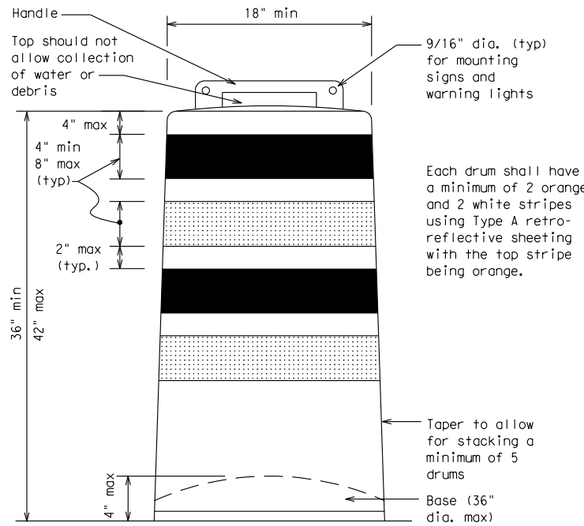
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

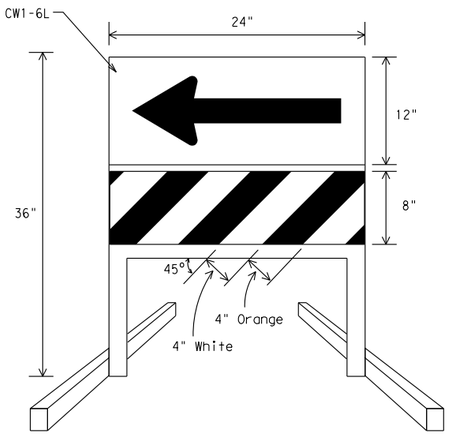
RETROREFLECTIVE SHEETING

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 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.

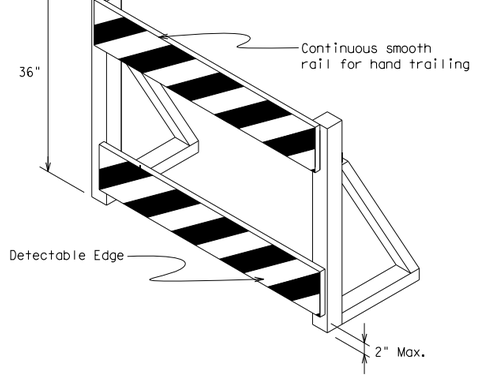




DIRECTION INDICATOR BARRICADE

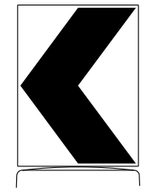
1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

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

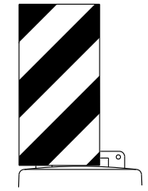


DETECTABLE PEDESTRIAN BARRICADES

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.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
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 for Buildings and Facilities (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 may 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 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 Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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9-07 8-14	PHR	CAMERON		33

DATE:
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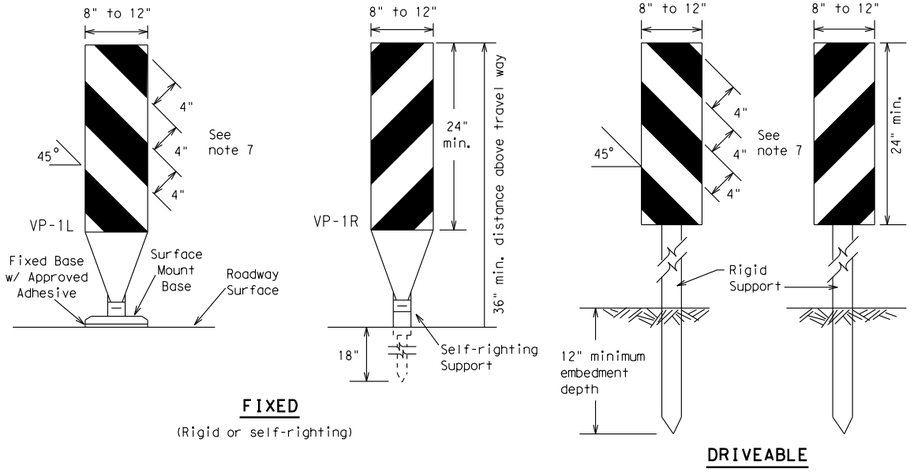
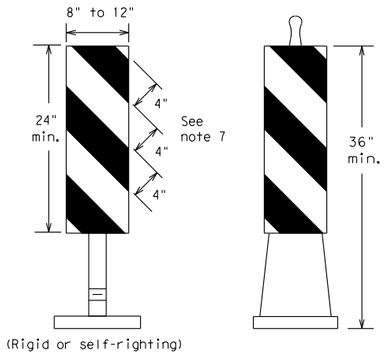


FIXED
(Rigid or self-righting)

DRIVEABLE

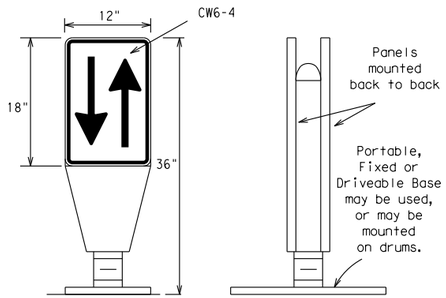


(Rigid or self-righting)

PORTABLE

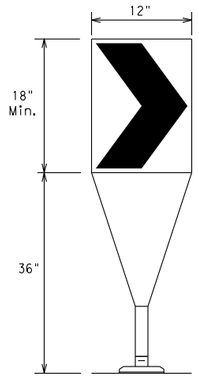
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of 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 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.

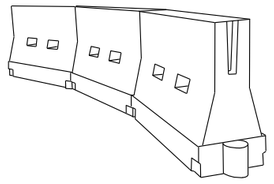
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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



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) placed 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 NCHRP 350 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

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.

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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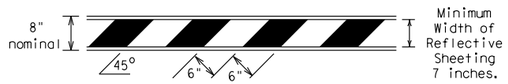
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	PHR	CAMERON		34

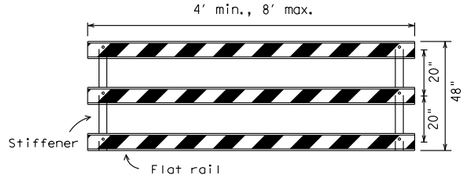
TYPE 3 BARRICADES

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 conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



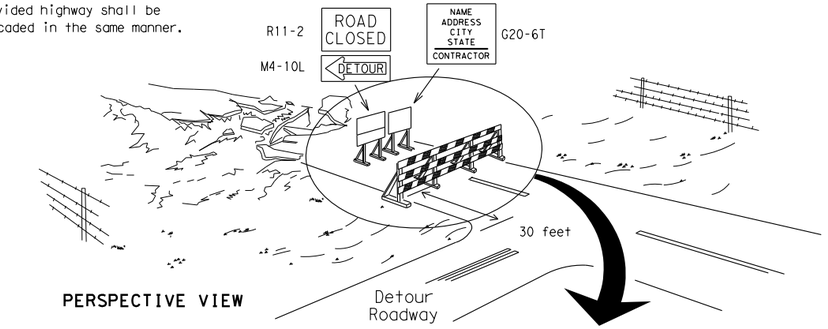
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

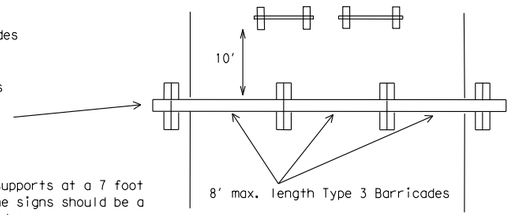
Each roadway of a divided highway shall be barricaded in the same manner.



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.

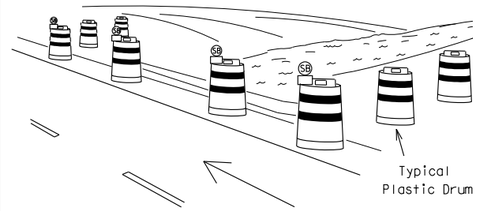
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

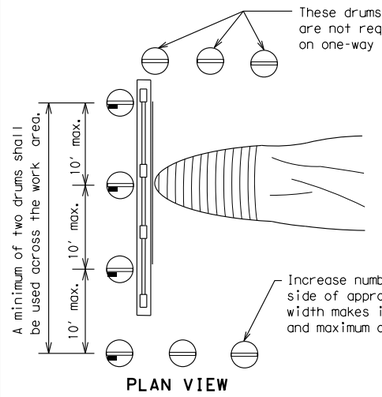
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

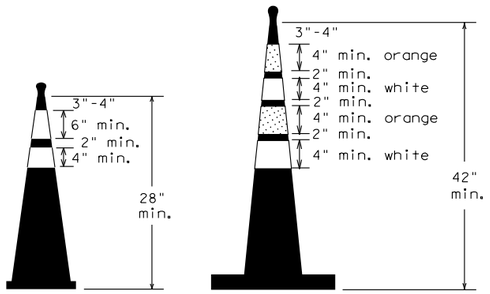
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones

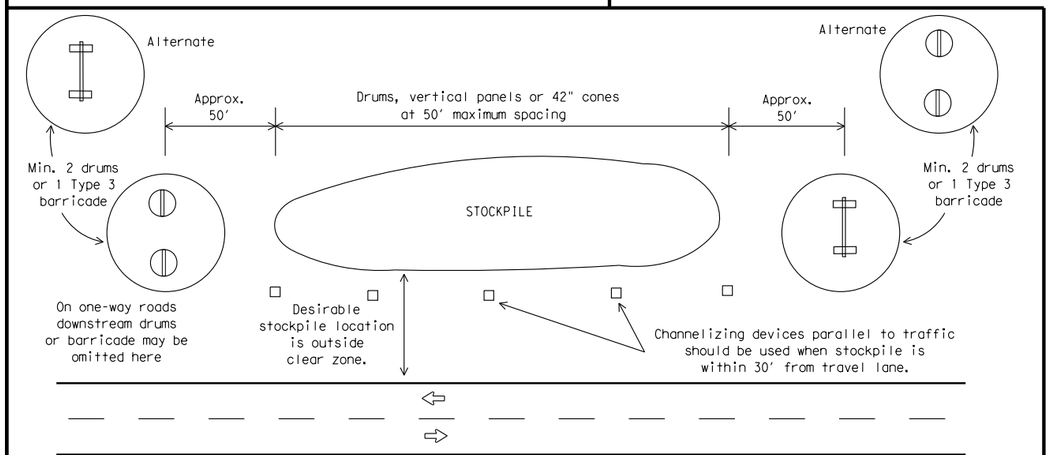
One-Piece cones

Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

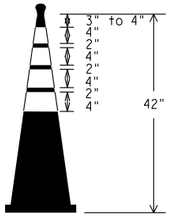
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night 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.
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

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	PHR	CAMERON		35

DATE:
FILE:

DATE:
FILE:

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.

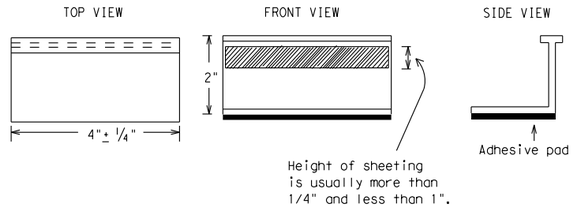
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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 Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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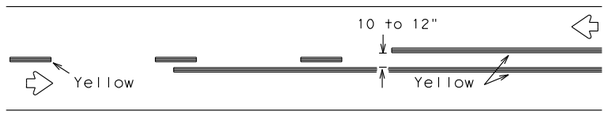
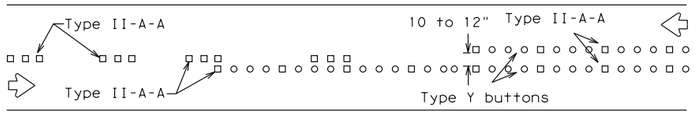
2-98 9-07	DIST	COUNTY		SHEET NO.
1-06 7-13	PHR	CAMERON		36
11-06 8-14				

DATE:
FILE:

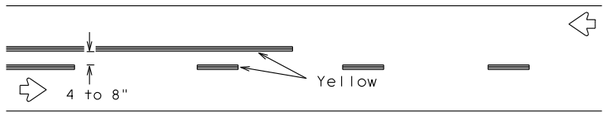
PAVEMENT MARKING PATTERNS



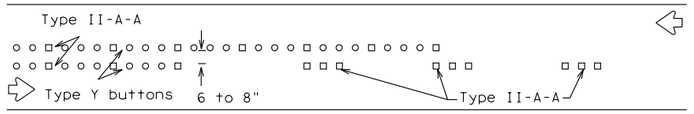
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



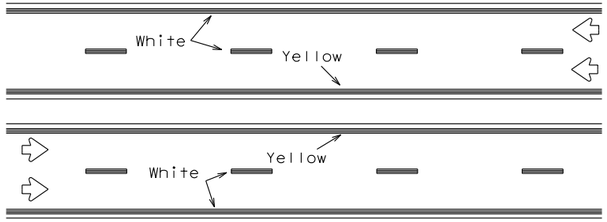
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



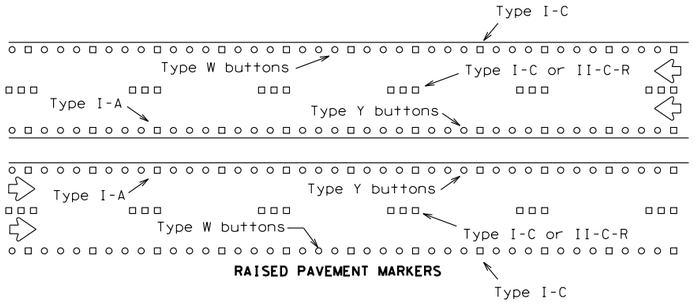
RAISED PAVEMENT MARKERS - PATTERN B

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



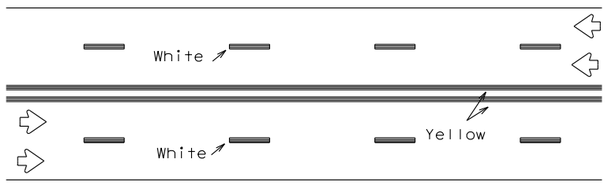
REFLECTORIZED PAVEMENT MARKINGS



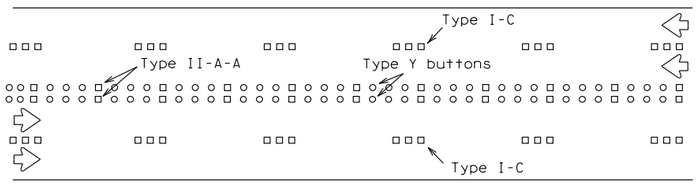
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



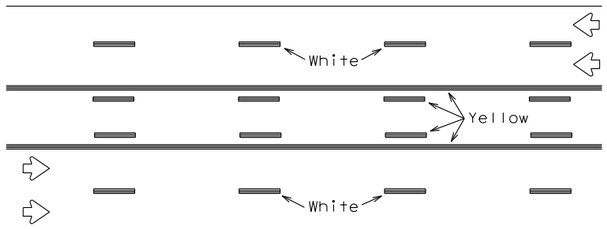
REFLECTORIZED PAVEMENT MARKINGS



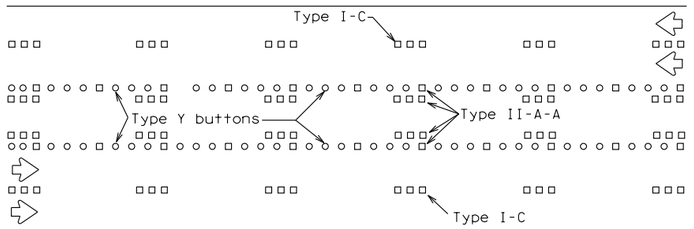
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

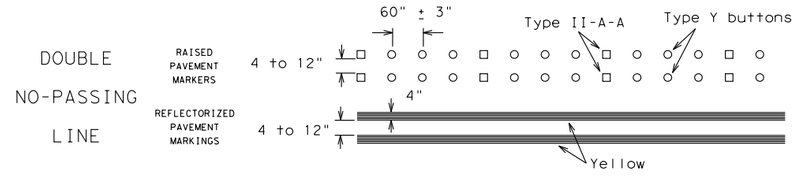
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

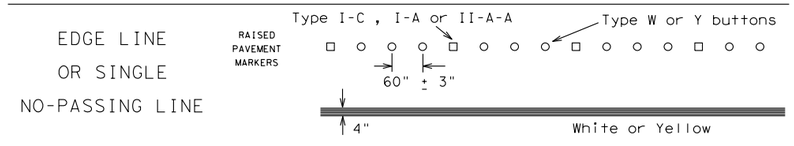
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

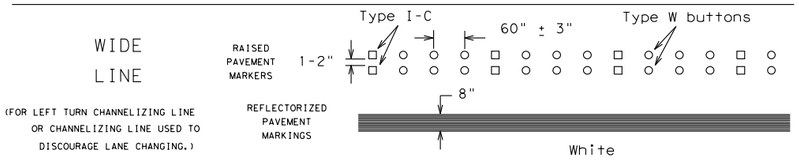


EDGE LINE OR SINGLE NO-PASSING LINE



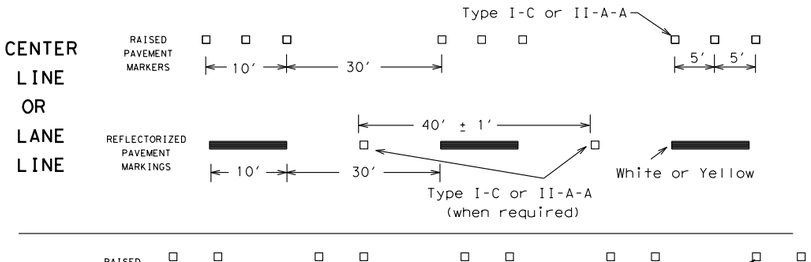
WIDE LINE

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

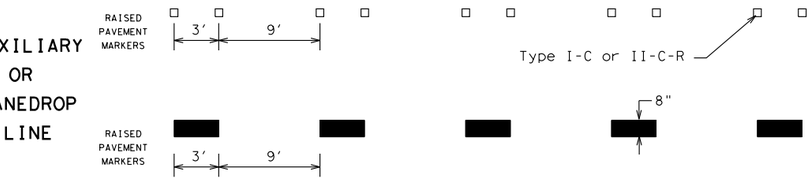


BROKEN LINES

CENTER LINE OR LANE LINE

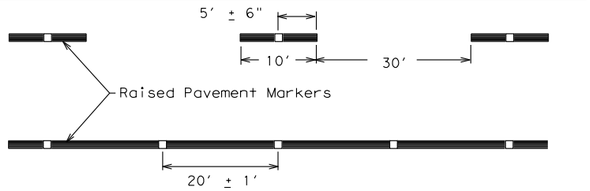


AUXILIARY OR LANEDROP LINE



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 Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

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©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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11-06 8-14				

106

DATE:
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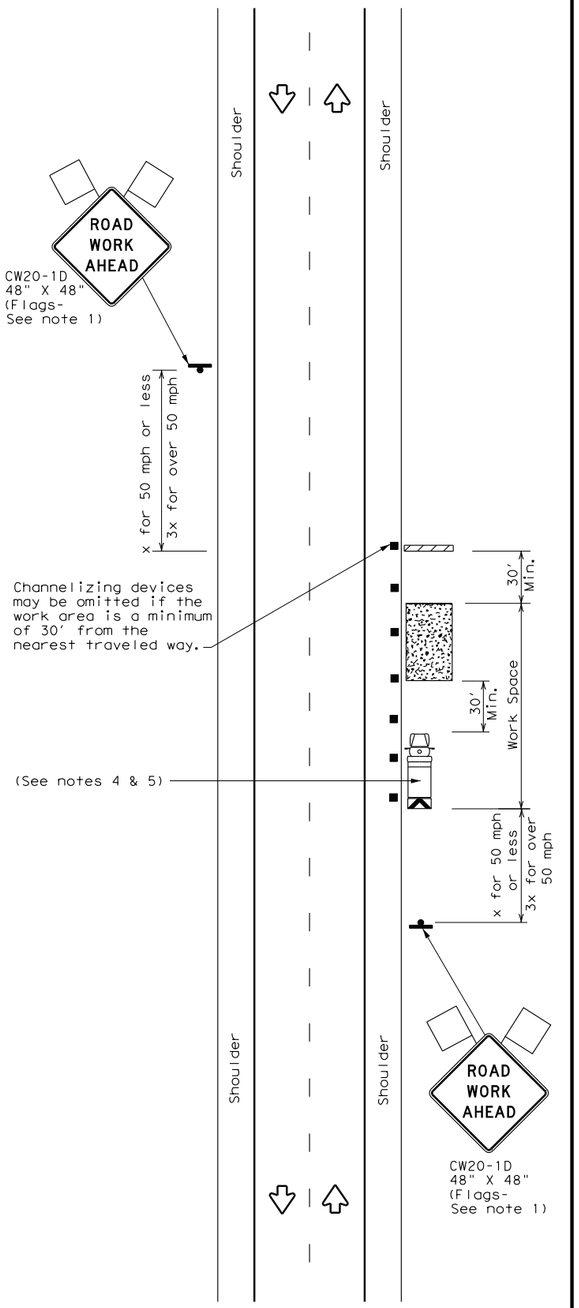
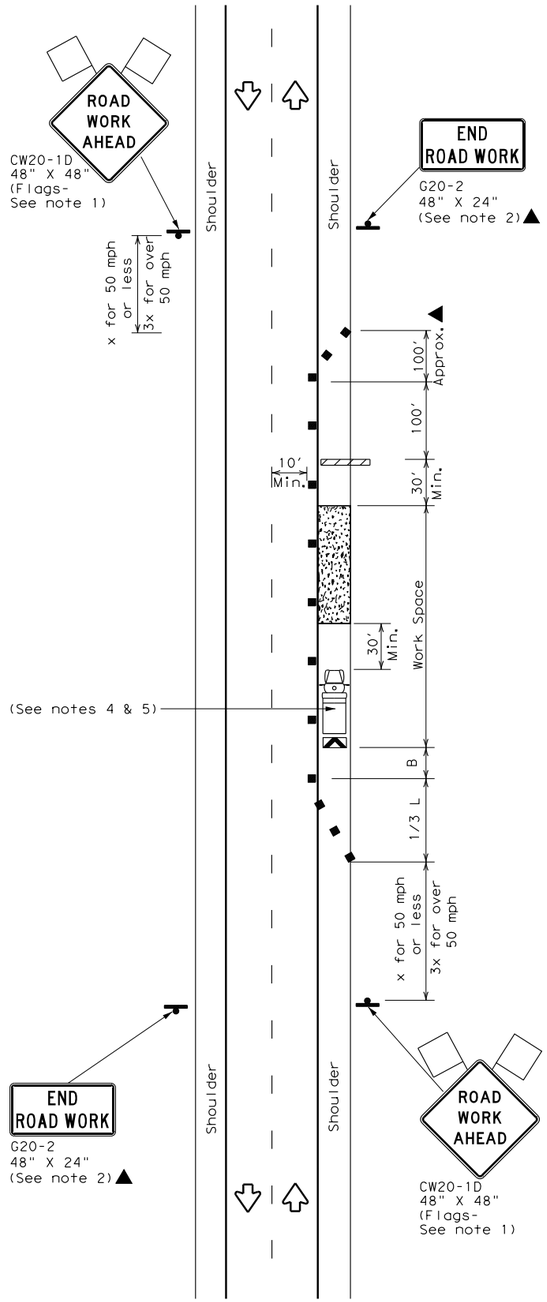


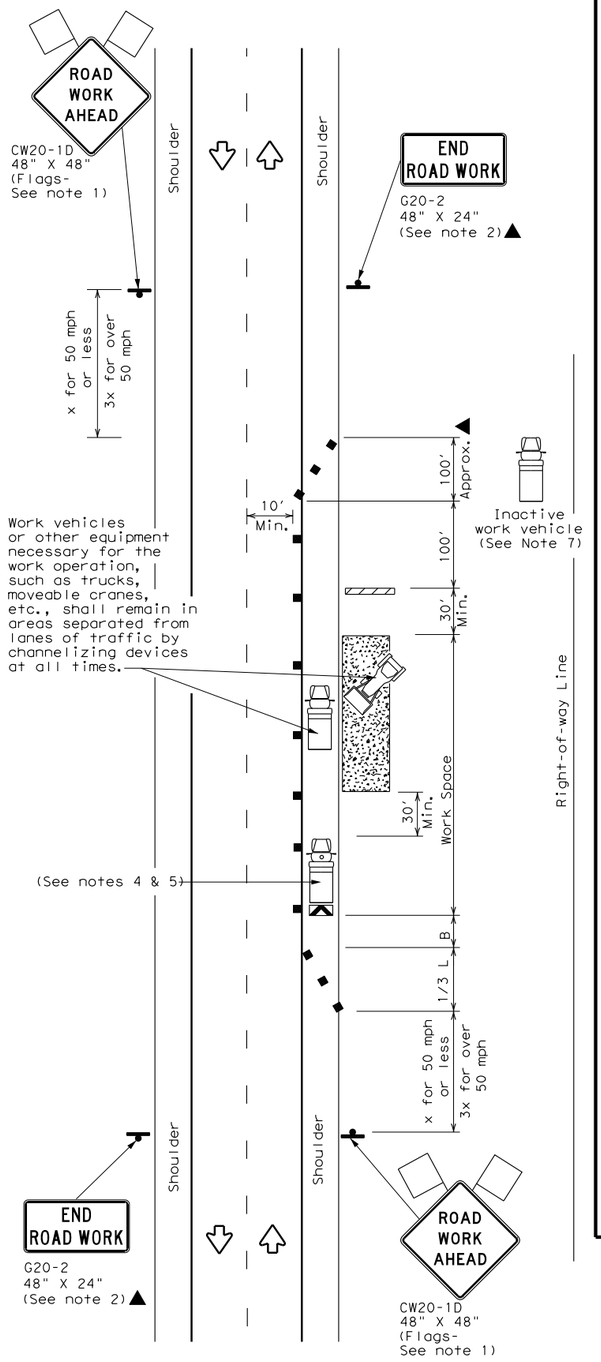
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

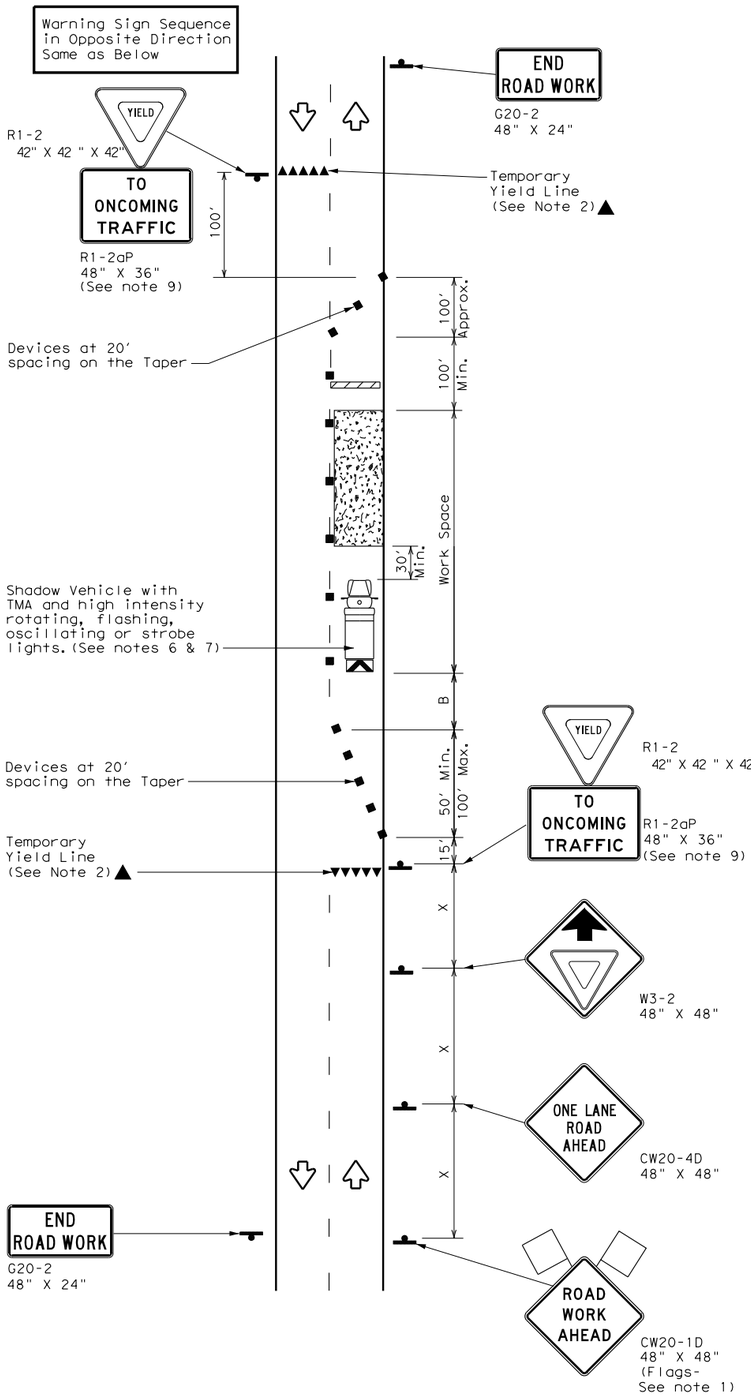
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

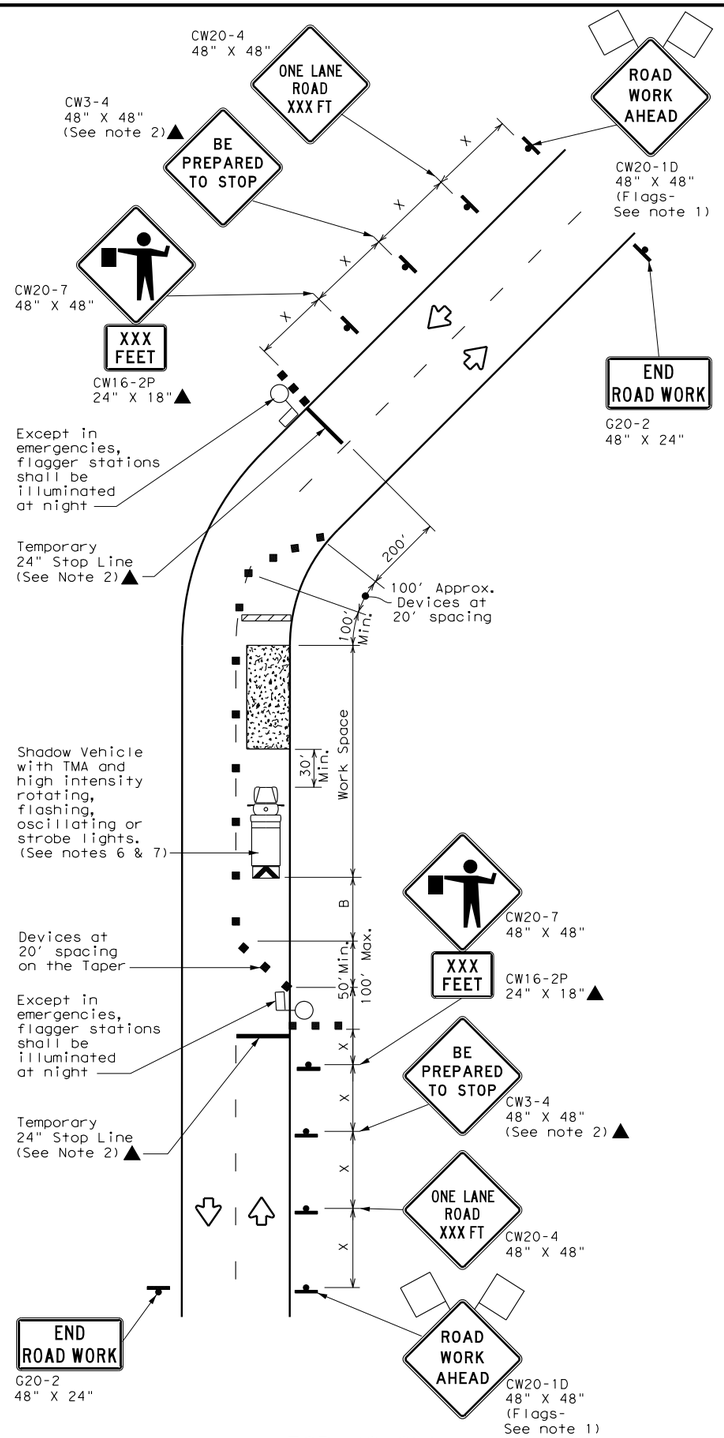
TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTIOR
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	PHR	CAMERON		38
1-97 2-18				

DATE:
FILE:



TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

LEGEND

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

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	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

TYPICAL USAGE

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

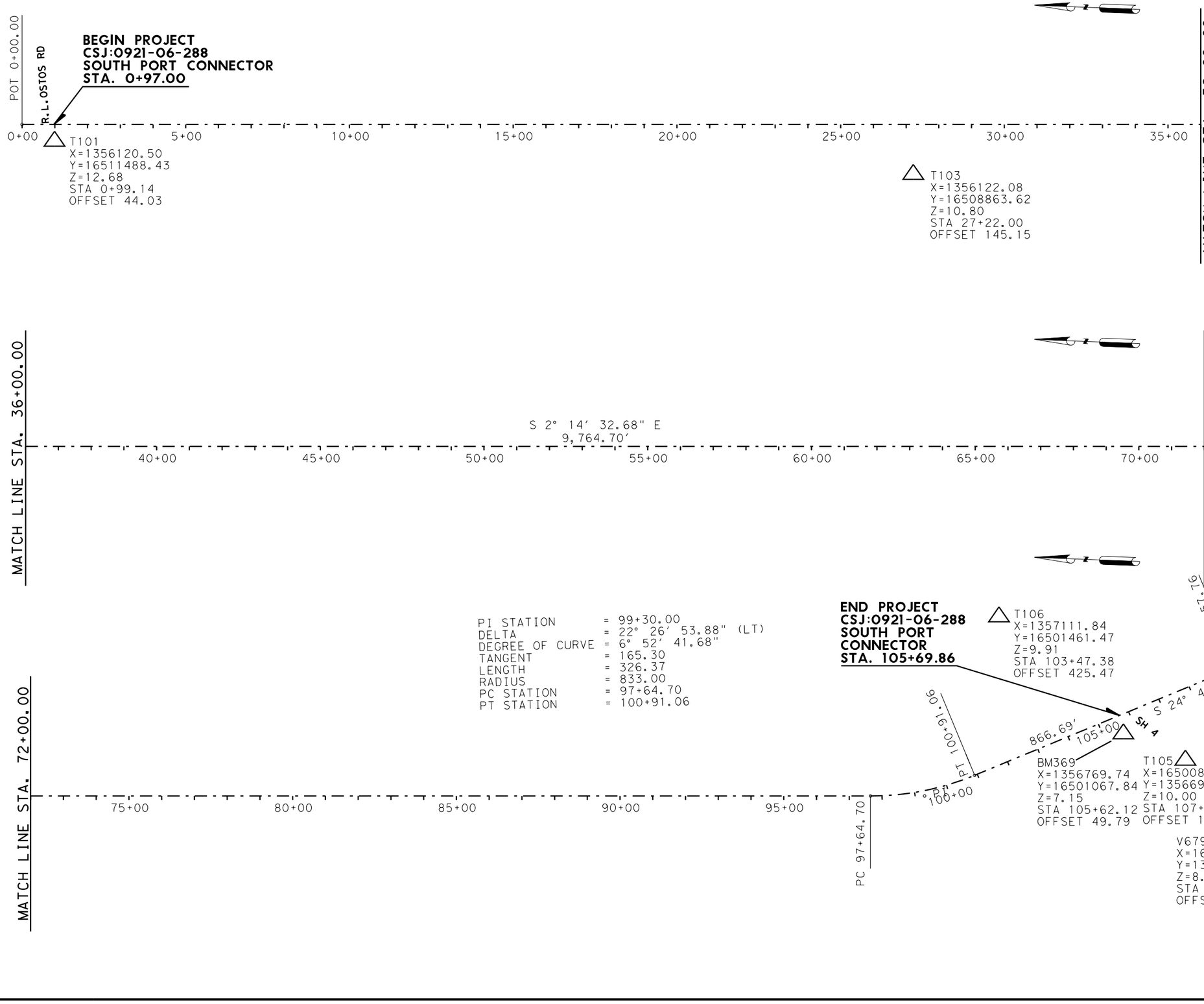
10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	PHR	CAMERON		39
4-98 2-18				



NOTES:
1. HORIZONTAL DAUM-NAV83 (CORS 96) CONVERTED TO SURFACE VALUES. TEXAS SOUTH ZONE (4205).

2. VERTICAL DATUN NAVD88.

3. COORDINATES AND DISTANCES ARE US SURVEY FEET, DISPLAYED IN SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT SURFACE ADJUSTMENT FACTOR OF 0.99996

4. ALL STATION AND OFFSETS ARE BASE ON FINAL ROADWAY BASELINE.

LEGEND

△ CONTROL POINT

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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Frank H. Chapa

SOUTH PORT CONNECTOR
HORIZONTAL ALIGNMENT
&
VERTICAL CONTROL
LAYOUT

SCALE: PLAN 1"=300'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT of BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			40

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/17/2019
Plotted by: salinab
Design Filename: n:\project\u2299\117 WA#17 (Port Connector)\500*PS&E\PlanSet01\Dgn\South Port Connector Horizontal Alignment Layout.dgn Plotted @: 8:42:26 AM

ALIGNMENT SOUTH PORT CONNECTOR

Chain PORTRD contains:
P1 CUR PORTRD-1 P2

Beginning chain PORTRD description

Point P1 X 1,356,160.62 Y 16,511,589.21 Sta 0+00.00

Course from P1 to PC PORTRD-1 S 2° 14′ 32.68" E Dist 9,764.70

Curve Data					
Curve PORTRD-1					
P.I. Station	99+30.00	X	1,356,549.15	Y	16,501,666.82
Delta =	22° 26′ 53.88" (LT)				
Degree =	6° 52′ 41.68"				
Tangent =	165.30				
Length =	326.37				
Radius =	833.00				
External =	16.24				
Long Chord =	324.28				
Mid. Ord. =	15.93				
P.C. Station	97+64.70	X	1,356,542.69	Y	16,501,831.99
P.T. Station	100+91.06	X	1,356,618.20	Y	16,501,516.63
C.C.		X	1,357,375.05	Y	16,501,864.59
Back = S	2° 14′ 32.68" E				
Ahead = S	24° 41′ 26.56" E				
Chord Bear = S	13° 27′ 59.62" E				

Course from PT PORTRD-1 to P2 S 24° 41′ 26.56" E Dist 866.69

Point P2 X 1,356,980.24 Y 16,500,729.17 Sta 109+57.76

Ending chain PORTRD description

STATE OF TEXAS
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128020
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SOUTH PORT CONNECTOR

ALIGNMENT DATA

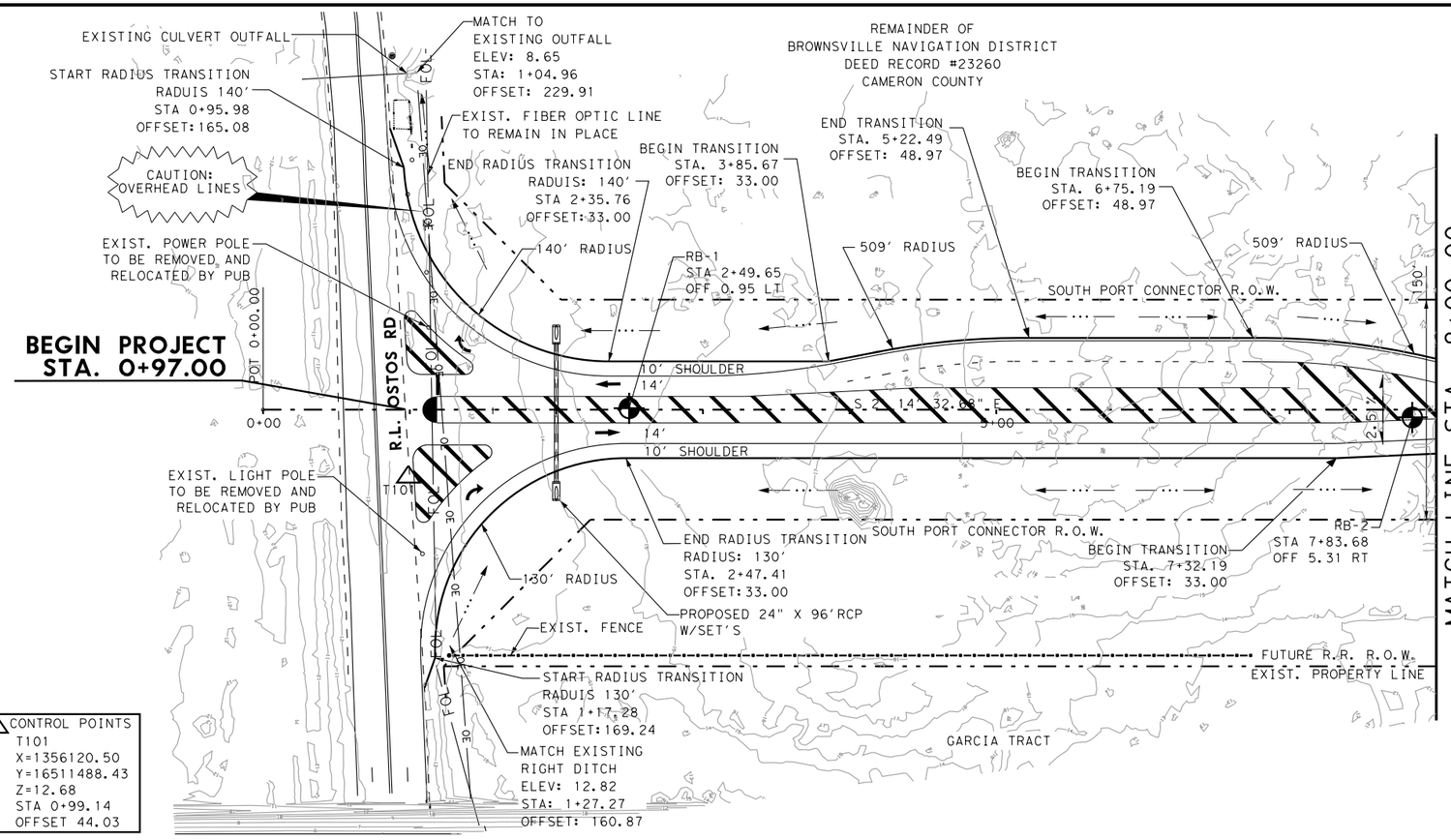
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6				41
DGN: JS	STATE	DIST.	COUNTY	
CHK DGN: FC	TEXAS	PHARR	CAMERON	
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR



ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	400	STRUCT EXCAV	CY	24
	400	CEM STABIL BKFL	CY	
	432	RIRRAP (MOW STRIP)(4IN)	CY	
	464	RC PIPE(CL III)(24IN)	LF	96
	467	SET (SET II)(24IN)(RCP)(6:1)(C)	EA	2
	540	MTL W-BEAM GD FEN (TIM POST)	LF	
	540	MTL W-BEAM GD FEN TRANS(THRIE-BEAM)	EA	
	544	GUARDRAIL END TRT (INSTALL)	EA	
	550	CHAIN LINK FENCE (REMOVE)	LF	

LEGEND

PGL= PROPOSED GRADE LINE
EL= ELEVATION
STA= STATION
R.O.W= RIGHT-OF-WAY
PROPOSED TRAFFIC DIRECTION
EXISTING TRAFFIC DIRECTION
FLOW DIRECTION
BORING LOGS
GAS LINE
FIBER OPTIC LINE
POWER LINE
WETLAND LIMITS

NOTE:
ALL UTILITIES SHOWN ARE APPROXIMATE. COORDINATE WITH APPROPRIATE UTILITY OWNERS TO FIELD VERIFY THE ACTUAL HORIZONTAL AND VERTICAL LOCATIONS.

EXIST. DITCH TO BE BLADED 3 STA.RT/LT FROM STA. 2+34.50 TO EXIST. PAVEMENT TIE-IN

STATE OF TEXAS
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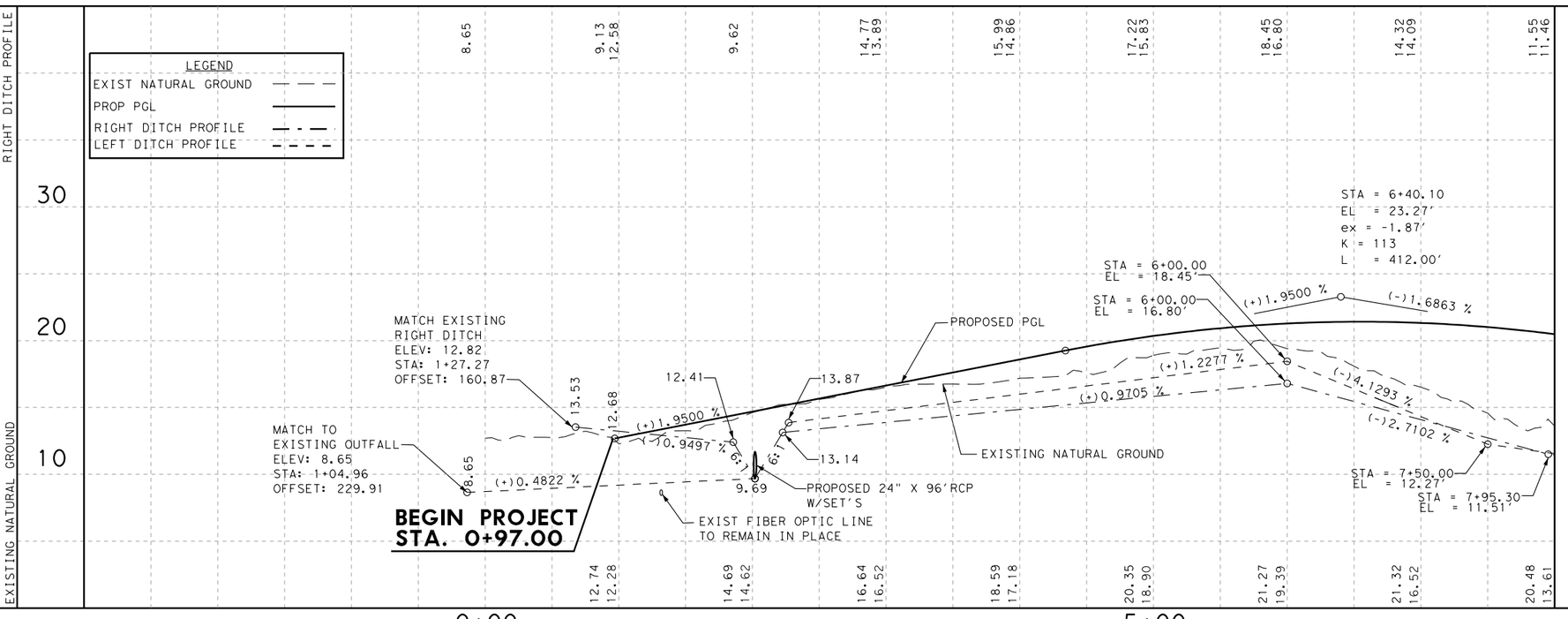


SOUTH PORT CONNECTOR

ROADWAY
PLAN & PROFILE

STA 0+97.00 TO
STA 8+00.00

SHEET 1 OF 10
SCALE: PLAN: 1"=100'
PROFILE: 1"=10'

RMA REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

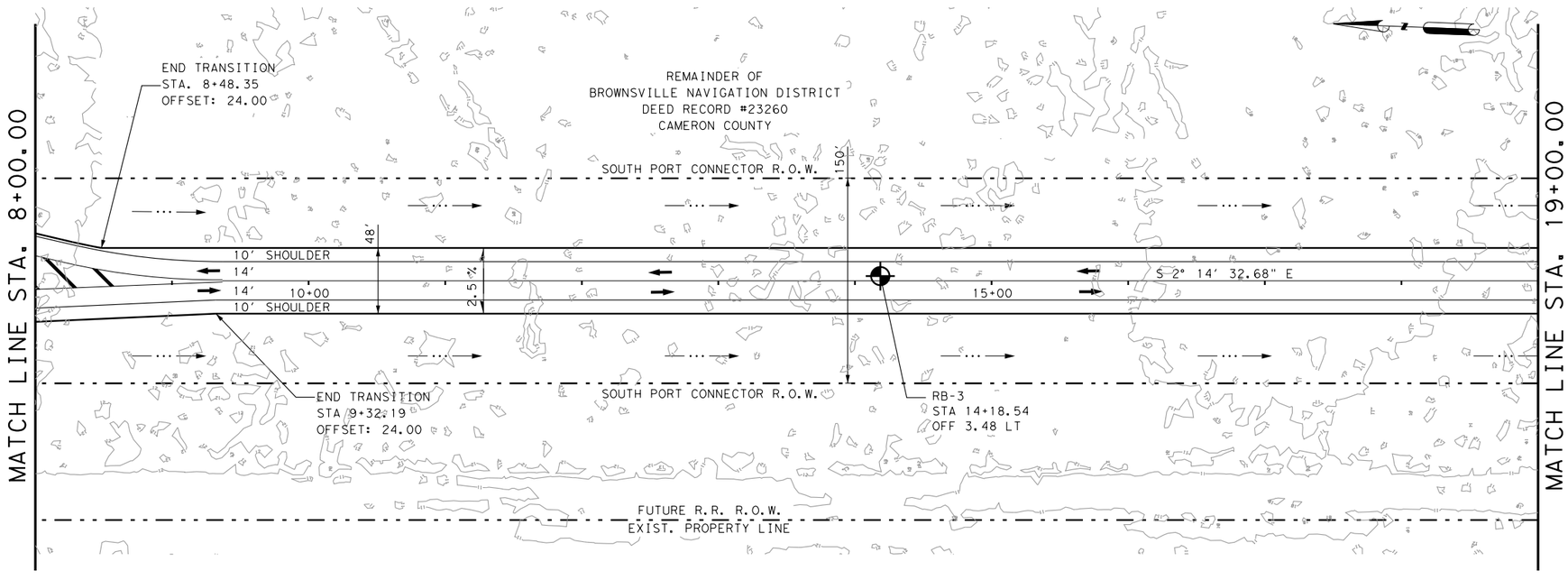
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			42

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/17/2019
Plotted @: 8:42:29 AM

Plotted by: salinab
Design Filename: n:\project\u2299\117 WA#17 (Port Connector)\500+PS&E\PlanSet01\Dgn\SouthPort Connector PP01.dgn

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	400	STRUCT EXCAV	CY	
	400	CEM STABIL BKFL	CY	
	432	RIRRAP (MOW STRIP)(4IN)	CY	
	464	RC PIPE(CL III)(24IN)	LF	
	467	SET (SET II)(24IN)(RCP)(6:1)(C)	EA	
	540	MTL W-BEAM GD FEN (TIM POST)	LF	
	540	MTL W-BEAM GD FEN TRANS(THRIE-BEAM)	EA	
	544	GUARDRAIL END TRT (INSTALL)	EA	
	550	CHAIN LINK FENCE (REMOVE)	LF	



LEGEND
PGL= PROPOSED GRADE LINE
EL= ELEVATION
STA= STATION
R.O.W= RIGHT-OF-WAY
PROPOSED TRAFFIC DIRECTION
EXISTING TRAFFIC DIRECTION
FLOW DIRECTION
BORING LOGS
GAS LINE
FIBER OPTIC LINE
POWER LINE
WETLAND LIMITS

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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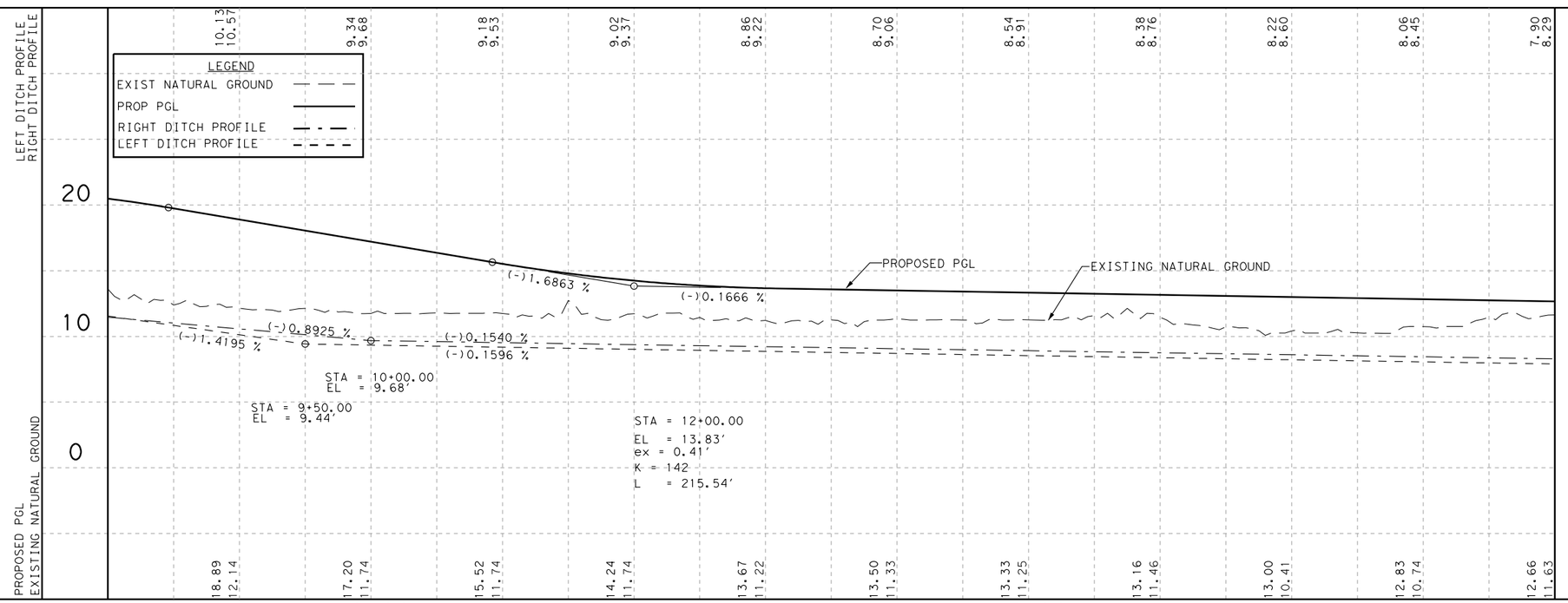


SOUTH PORT CONNECTOR

ROADWAY
PLAN & PROFILE

STA 8+00.00 TO
STA 19+00.00

SHEET 2 OF 10
SCALE: PLAN: 1"=100'
PROFILE: 1"=10'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

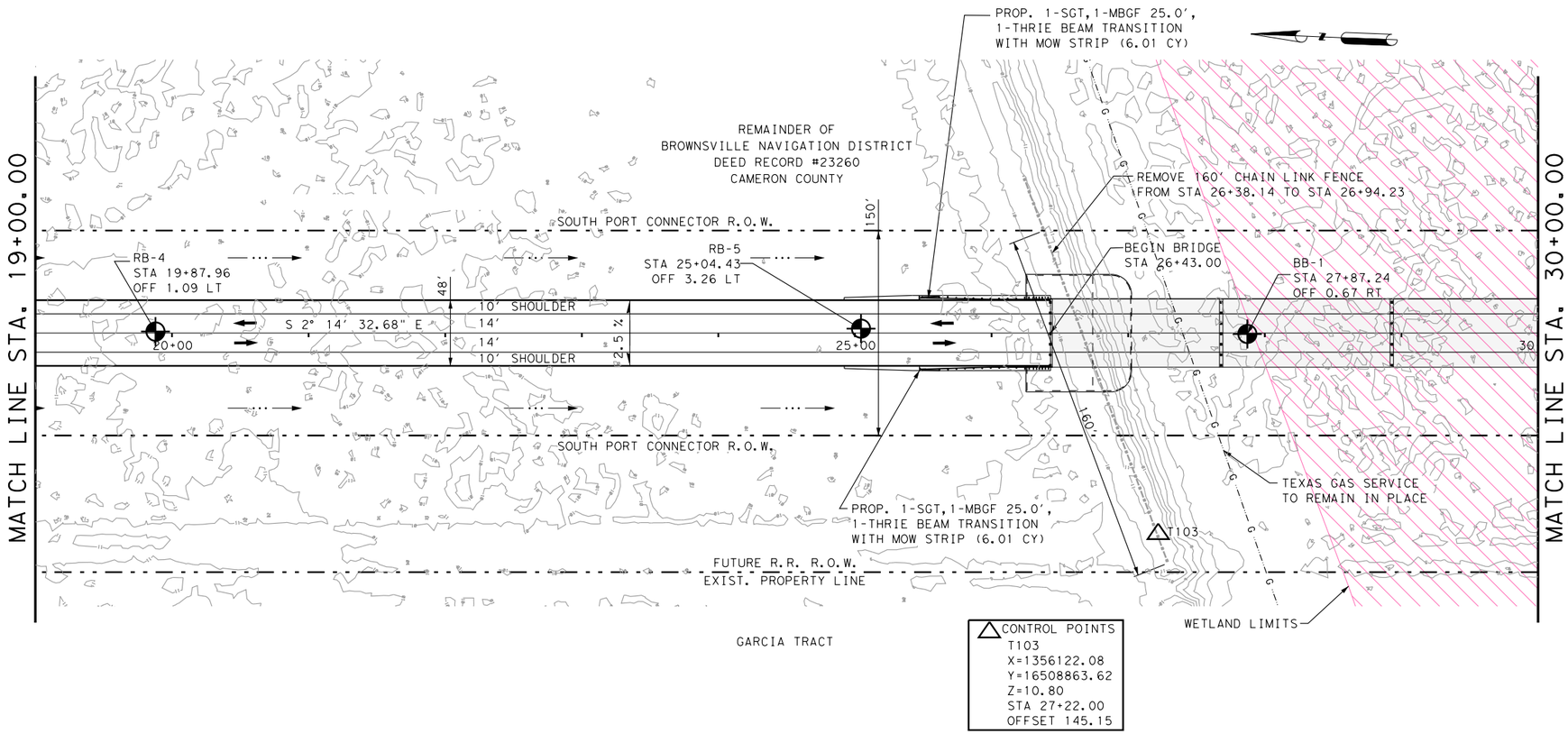
S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			43

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	400	STRUCT EXCAV	CY	
	400	CEM STABIL BKFL	CY	134
	432	RIPRAP (MOW STRIP)(4IN)	CY	12
	464	RC PIPE(CL III)(24IN)	LF	
	467	SET (SET II)(24IN)(RCP)(6:1)(C)	EA	
	540	MTL W-BEAM GD FEN (TIM POST)	LF	50
	540	MTL W-BEAM GD FEN TRANS(THRIE-BEAM)	EA	2
	544	GUARDRAIL END TRT (INSTALL)	EA	2
	550	CHAIN LINK FENCE (REMOVE)	LF	160



△CONTROL POINTS
T103
X=1356122.08
Y=16508863.62
Z=10.80
STA 27+22.00
OFFSET 145.15

LEGEND
PGL= PROPOSED GRADE LINE
EL= ELEVATION
STA= STATION
R.O.W= RIGHT-OF-WAY
PROPOSED TRAFFIC DIRECTION
EXISTING TRAFFIC DIRECTION
FLOW DIRECTION
BORING LOGS
GAS LINE
FIBER OPTIC LINE
POWER LINE
WETLAND LIMITS

NOTE:
ALL UTILITIES SHOWN ARE APPROXIMATE. COORDINATE WITH APPROPRIATE UTILITY OWNERS TO FIELD VERIFY THE ACTUAL HORIZONTAL AND VERTICAL LOCATIONS.

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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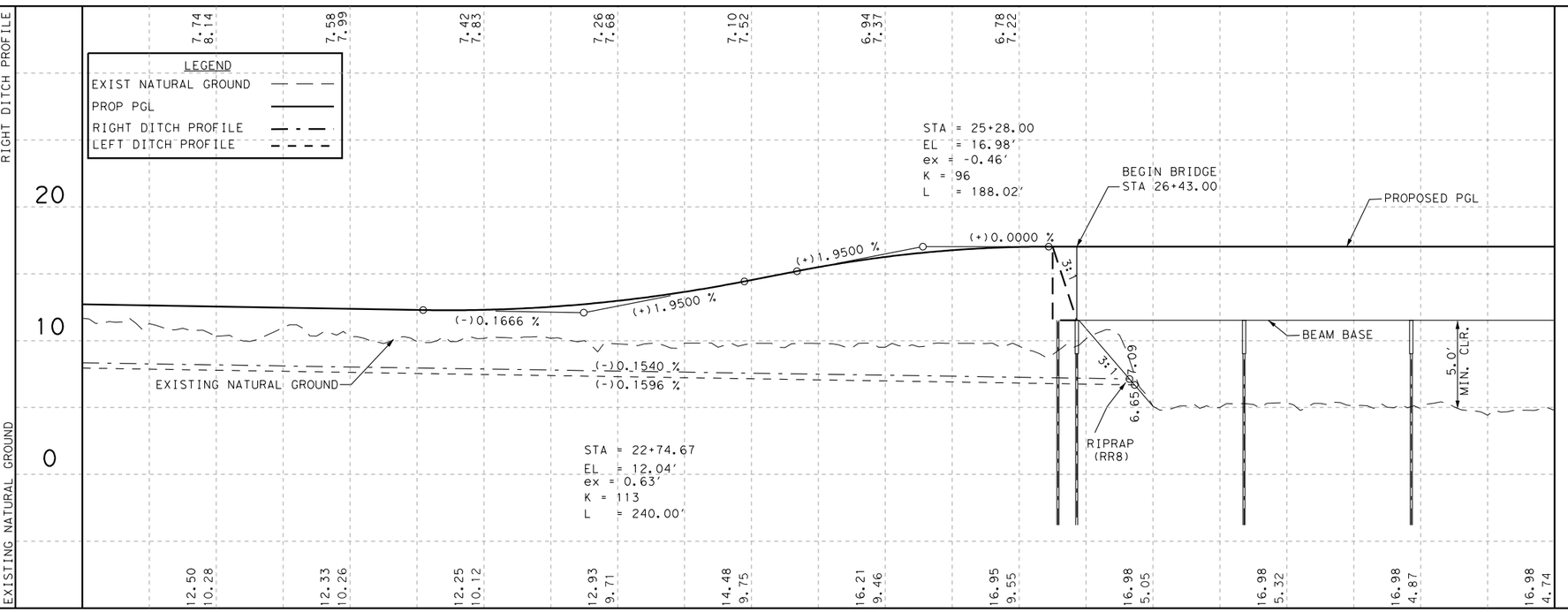


SOUTH PORT CONNECTOR

ROADWAY PLAN & PROFILE

STA 19+00.00 TO STA 30+00.00

SHEET 3 OF 10
SCALE: PLAN: 1"=100'
PROFILE: 1"=10'

RMA CAMERON REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

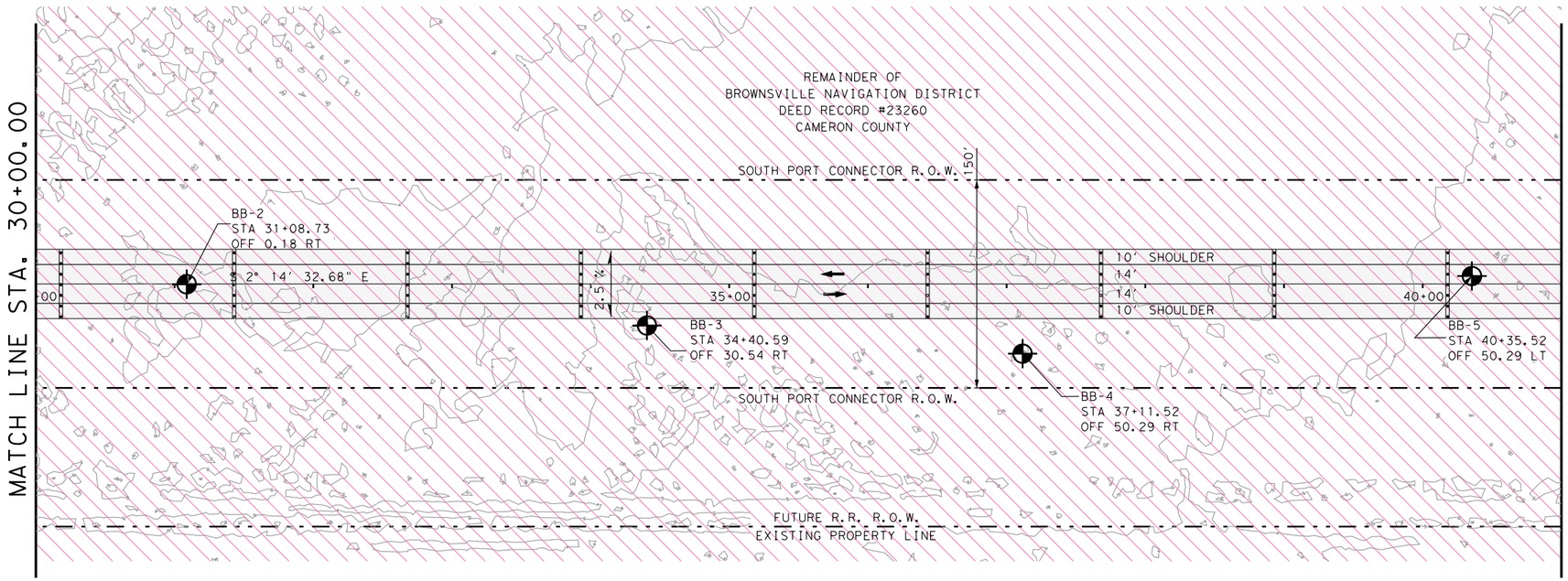
S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		44

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	400	STRUCT EXCAV	CY	
	400	CEM STABIL BKFL	CY	
	432	RIPRAP (MOW STRIP)(4IN)	CY	
	464	RC PIPE(CL III)(24IN)	LF	
	467	SET (SET II)(24IN)(RCP)(6:1)(C)	EA	
	540	MTL W-BEAM GD FEN (TIM POST)	LF	
	540	MTL W-BEAM GD FEN TRANS(THRIE-BEAM)	EA	
	544	GUARDRAIL END TRT (INSTALL)	EA	
	550	CHAIN LINK FENCE (REMOVE)	LF	



LEGEND
PGL= PROPOSED GRADE LINE
EL= ELEVATION
STA= STATION
R.O.W= RIGHT-OF-WAY
PROPOSED TRAFFIC DIRECTION
EXISTING TRAFFIC DIRECTION
FLOW DIRECTION
BORING LOGS
GAS LINE
FIBER OPTIC LINE
POWER LINE
WETLAND LIMITS

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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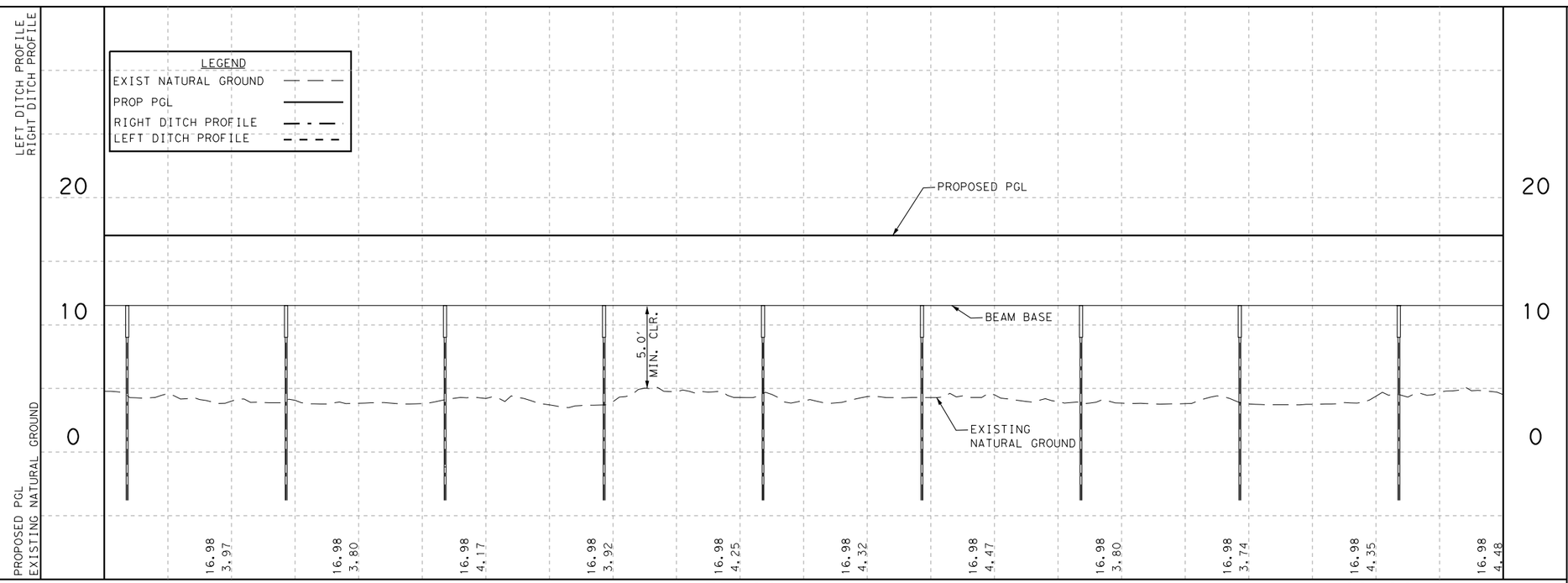
Frank H. Chapa



SOUTH PORT CONNECTOR

ROADWAY PLAN & PROFILE

STA 30+00.00 TO
STA 41+00.00

SHEET 4 OF 10
SCALE: PLAN: 1"=100'
PROFILE: 1"=10'

RMA CAMERON REGIONAL MOBILITY AUTHORITY

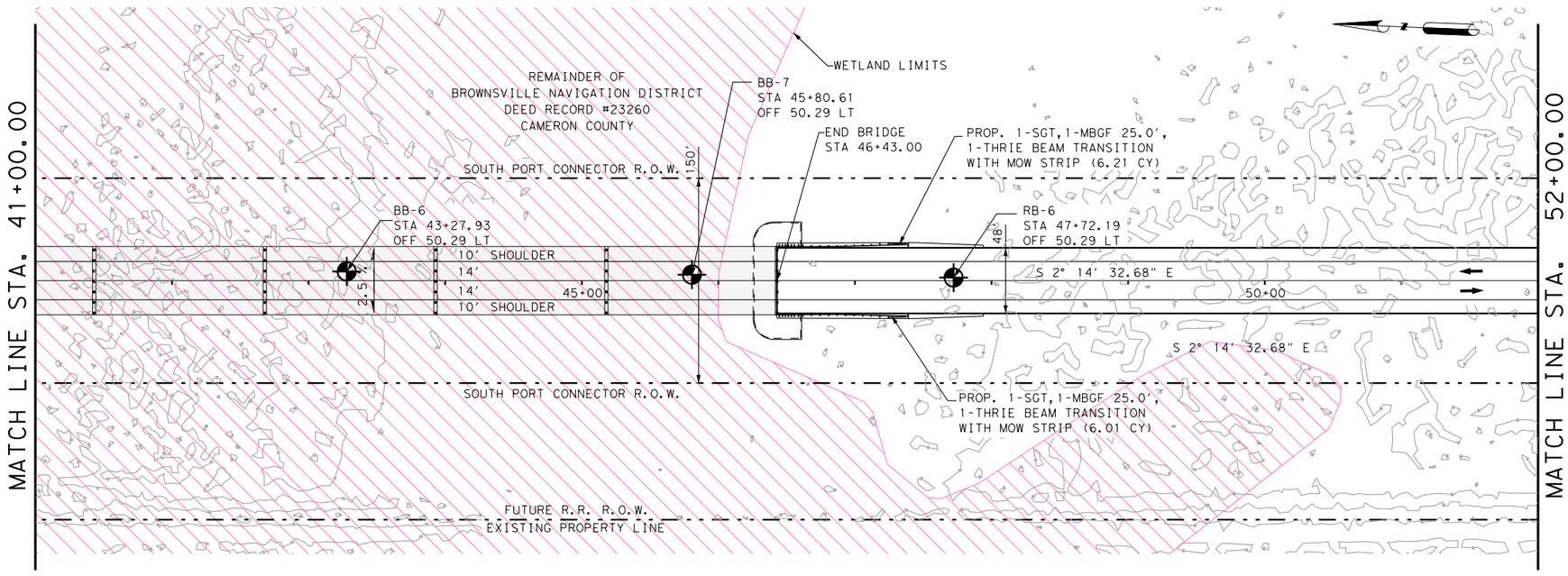
PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6				45
DGN: JS	STATE	DIST.	COUNTY	
CHK DGN: FC	TEXAS	PHARR	CAMERON	
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	400	STRUCT EXCAV	CY	
	400	CEM STABIL BKFL	CY	134
	432	RIRRAP (MOW STRIP)(4IN)	CY	12
	464	RC PIPE(CL III)(24IN)	LF	
	467	SET (SET II)(24IN)(RCP)(6:1)(C)	EA	
	540	MTL W-BEAM GD FEN (TIM POST)	LF	50
	540	MTL W-BEAM GD FEN TRANS(THRIE-BEAM)	EA	2
	544	GUARDRAIL END TRT (INSTALL)	EA	2
	550	CHAIN LINK FENCE (REMOVE)	LF	



LEGEND

PGL= PROPOSED GRADE LINE
EL= ELEVATION
STA= STATION
R.O.W= RIGHT-OF-WAY
PROPOSED TRAFFIC DIRECTION
EXISTING TRAFFIC DIRECTION
FLOW DIRECTION
BORING LOGS
GAS LINE
FIBER OPTIC LINE
POWER LINE
WETLAND LIMITS

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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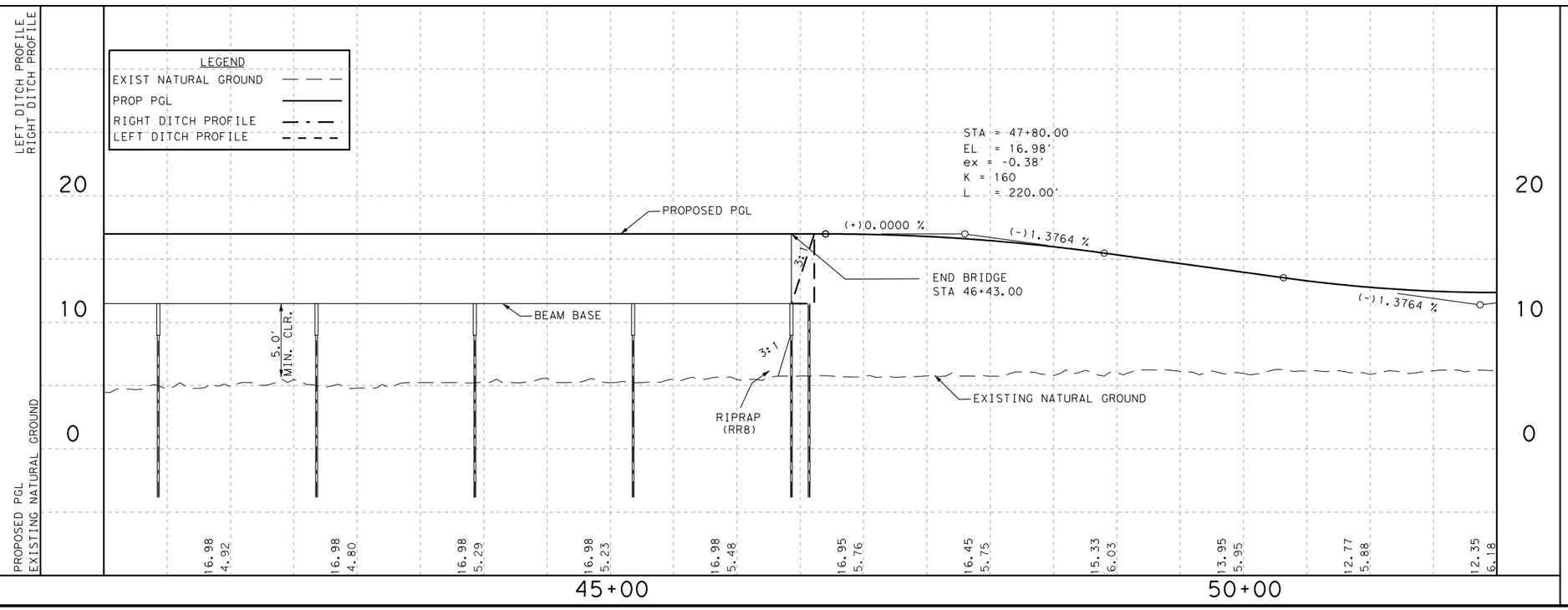


SOUTH PORT CONNECTOR

ROADWAY
PLAN & PROFILE

STA 41+00.00 TO
STA 52+00.00

SHEET 5 OF 10
SCALE: PLAN: 1"=100'
PROFILE: 1"=10'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

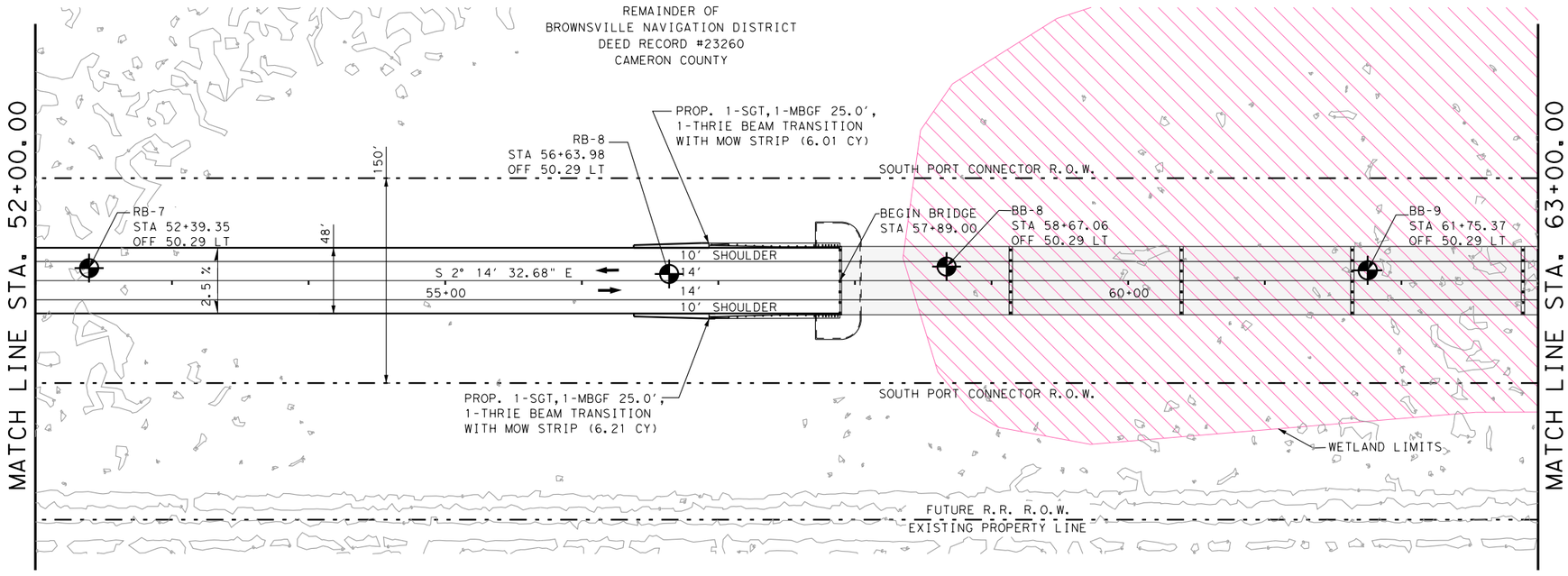
DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			46
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

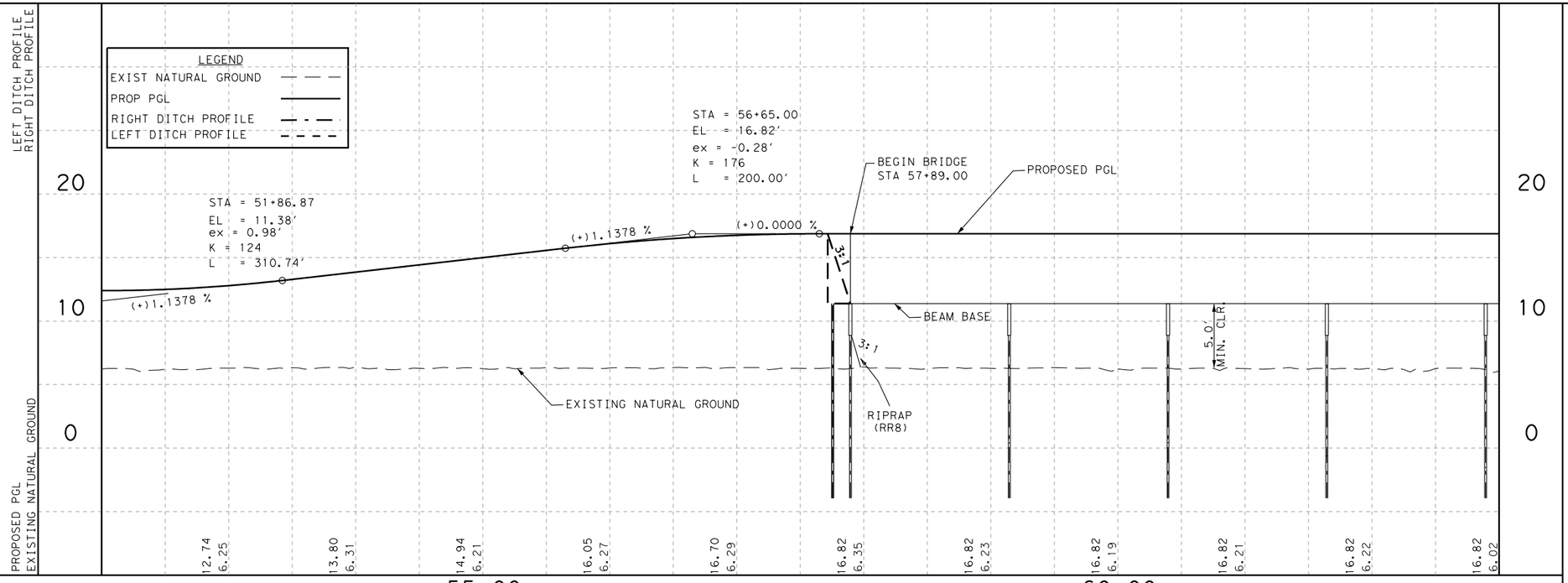
Plotted on: 5/17/2019
Plotted @: 8:42:33 AM

Plotted by: salinab
Design Filename: n:\project\u2299\117 WA#17 (Port Connector)\500*PS&E\PlanSet01\Dgn\South Port Connector PP06.dgn

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	400	STRUCT EXCAV	CY	
	400	CEM STABIL BKFL	CY	134
	432	RIPRAP (MOW STRIP)(4IN)	CY	12
	464	RC PIPE(CL III)(24IN)	LF	
	467	SET (SET II)(24IN)(RCP)(6:1)(C)	EA	
	540	MTL W-BEAM GD FEN (TIM POST)	LF	50
	540	MTL W-BEAM GD FEN TRANS(THRIE-BEAM)	EA	2
	544	GUARDRAIL END TRT (INSTALL)	EA	2
	550	CHAIN LINK FENCE (REMOVE)	LF	



LEGEND
PGL= PROPOSED GRADE LINE
EL= ELEVATION
STA= STATION
R.O.W= RIGHT-OF-WAY
PROPOSED TRAFFIC DIRECTION
EXISTING TRAFFIC DIRECTION
FLOW DIRECTION
BORING LOGS
GAS LINE
FIBER OPTIC LINE
POWER LINE
WETLAND LIMITS



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Frank H. Chapa

SOUTH PORT CONNECTOR

ROADWAY PLAN & PROFILE

STA 52+00.00 TO
STA 63+00.00

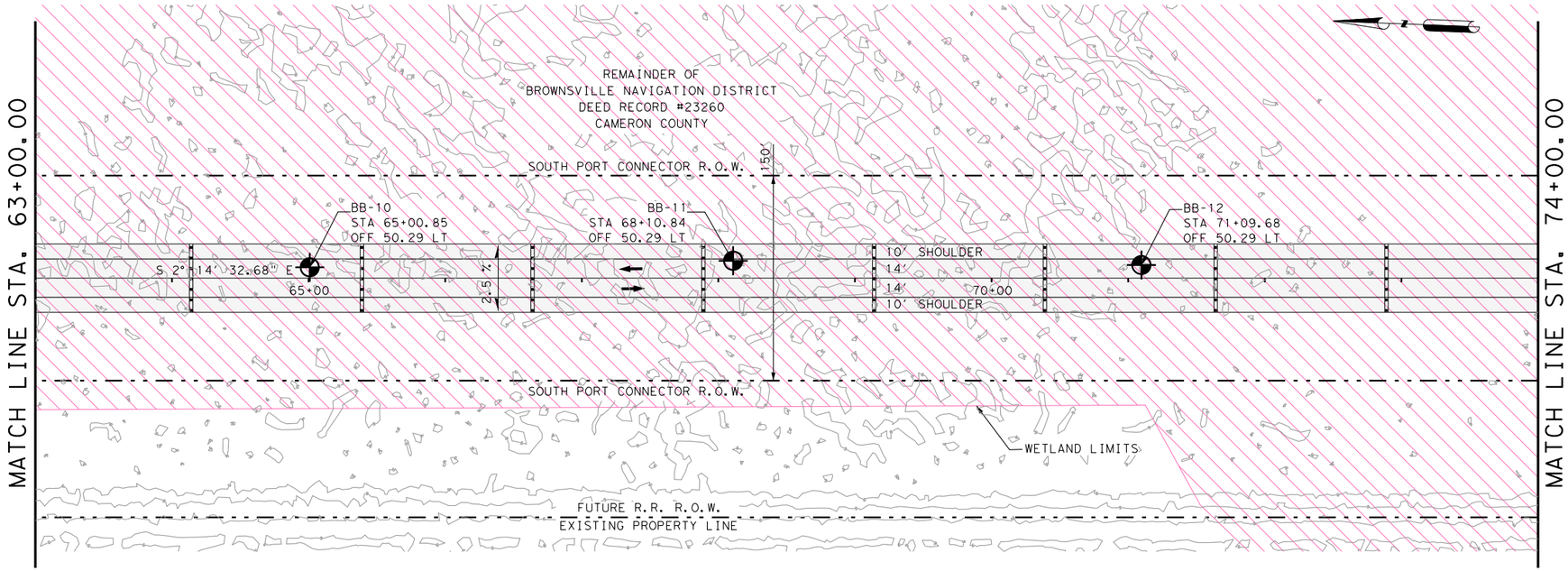
SHEET 6 OF 10
SCALE: PLAN: 1"=100'
PROFILE: 1"=10'

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			47
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	400	STRUCT EXCAV	CY	
	400	CEM STABIL BKFL	CY	
	432	RIPRAP (MOW STRIP)(4IN)	CY	
	464	RC PIPE(CL III)(24IN)	LF	
	467	SET (SET II)(24IN)(RCP)(6:1)(C)	EA	
	540	MTL W-BEAM GD FEN (TIM POST)	LF	
	540	MTL W-BEAM GD FEN TRANS(THRIE-BEAM)	EA	
	544	GUARDRAIL END TRT (INSTALL)	EA	
	550	CHAIN LINK FENCE (REMOVE)	LF	



LEGEND
PGL= PROPOSED GRADE LINE
EL= ELEVATION
STA= STATION
R.O.W= RIGHT-OF-WAY
PROPOSED TRAFFIC DIRECTION
EXISTING TRAFFIC DIRECTION
FLOW DIRECTION
BORING LOGS
GAS LINE
FIBER OPTIC LINE
POWER LINE
WETLAND LIMITS

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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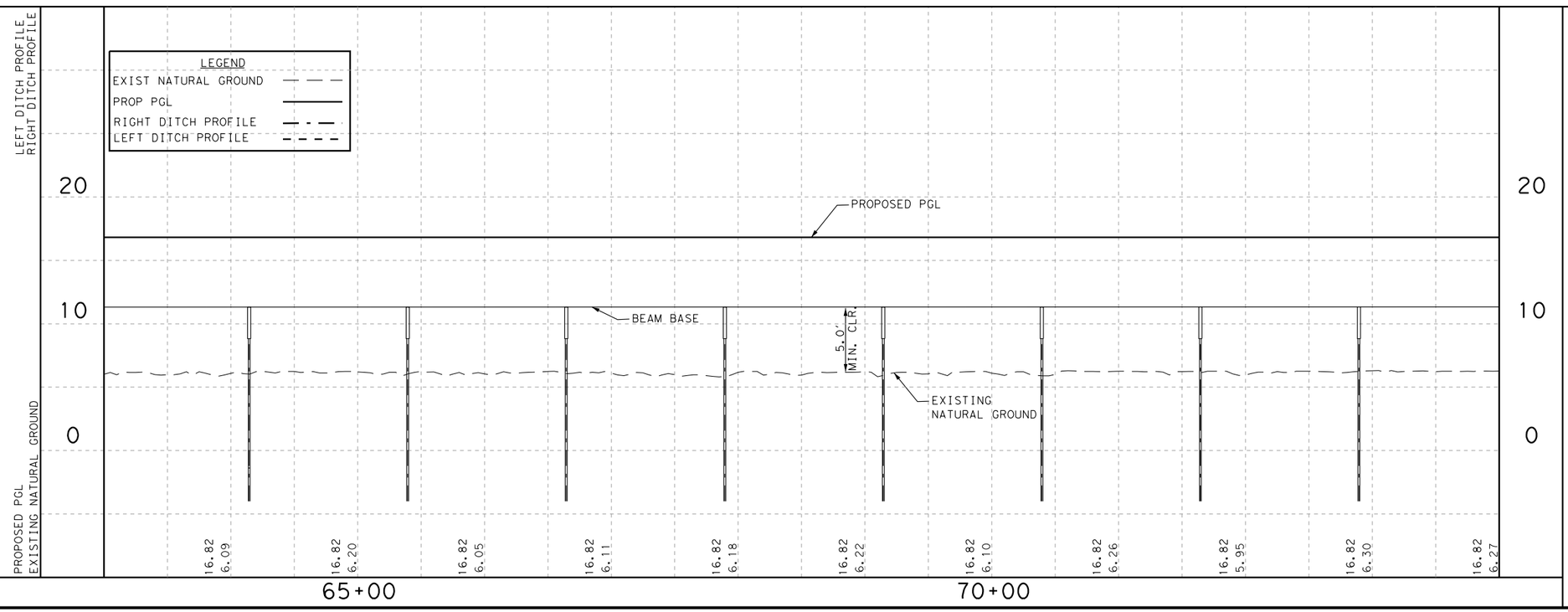
Frank H. Chapa



SOUTH PORT CONNECTOR

ROADWAY
PLAN & PROFILE

STA 63+00.00 TO
STA 74+00.00

SHEET 7 OF 10
SCALE: PLAN: 1"=100'
PROFILE: 1"=10'

RMA
CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE
the port that works

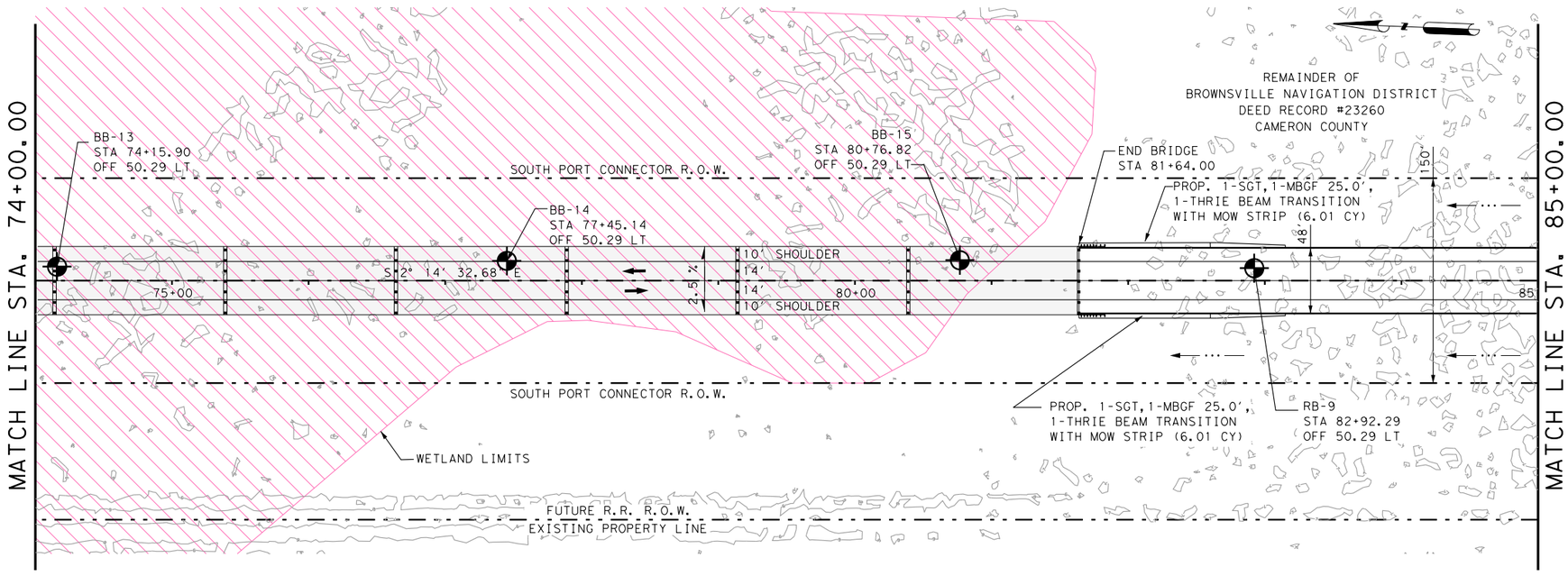
S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			48

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	400	STRUCT EXCAV	CY	
	400	CEM STABIL BKFL	CY	134
	432	RIRRAP (MOW STRIP)(4IN)	CY	12
	464	RC PIPE(CL III)(24IN)	LF	
	467	SET (SET II)(24IN)(RCP)(6:1)(C)	EA	
	540	MTL W-BEAM GD FEN (TIM POST)	LF	50
	540	MTL W-BEAM GD FEN TRANS(THRIE-BEAM)	EA	2
	544	GUARDRAIL END TRT (INSTALL)	EA	2
	550	CHAIN LINK FENCE (REMOVE)	LF	



LEGEND
PGL= PROPOSED GRADE LINE
EL= ELEVATION
STA= STATION
R.O.W= RIGHT-OF-WAY
PROPOSED TRAFFIC DIRECTION
EXISTING TRAFFIC DIRECTION
FLOW DIRECTION
BORING LOGS
GAS LINE
FIBER OPTIC LINE
POWER LINE
WETLAND LIMITS

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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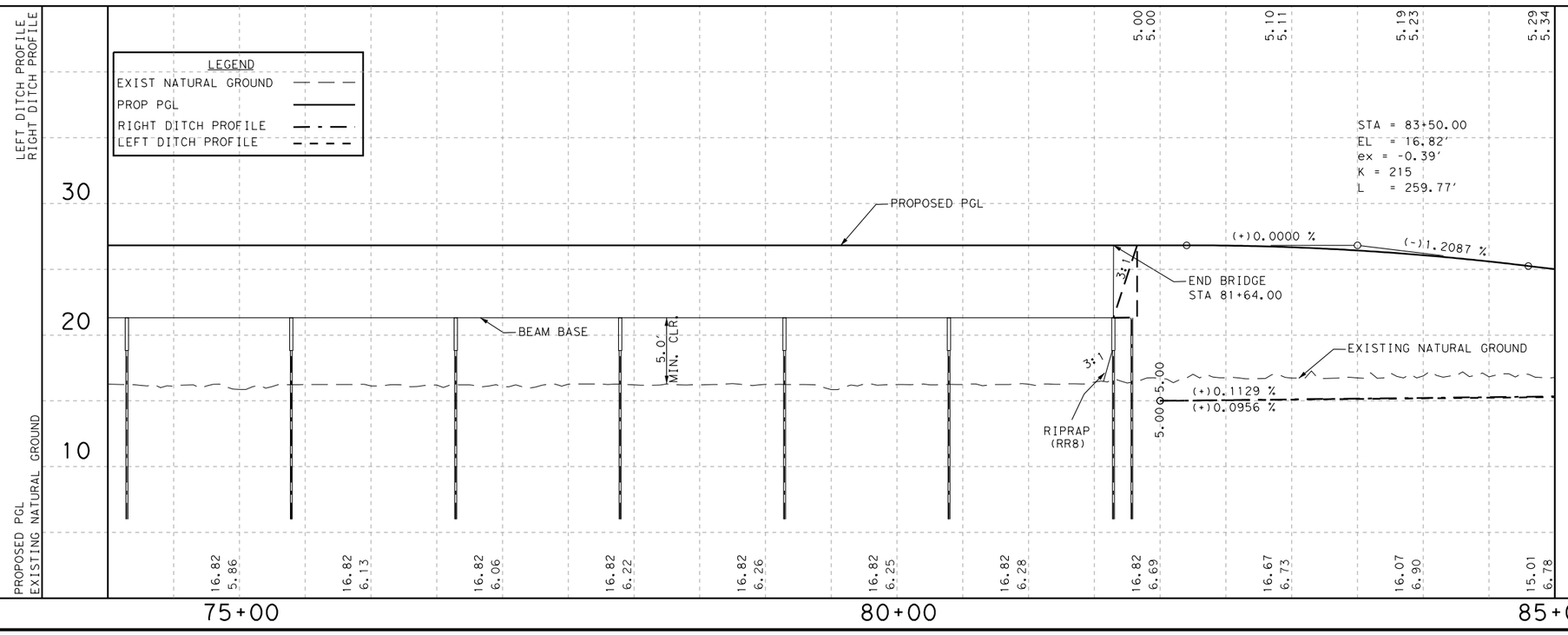


SOUTH PORT CONNECTOR

ROADWAY PLAN & PROFILE

STA 74+00.00 TO STA 85+00.00

SHEET 8 OF 10
SCALE: PLAN: 1"=100'
PROFILE: 1"=10'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

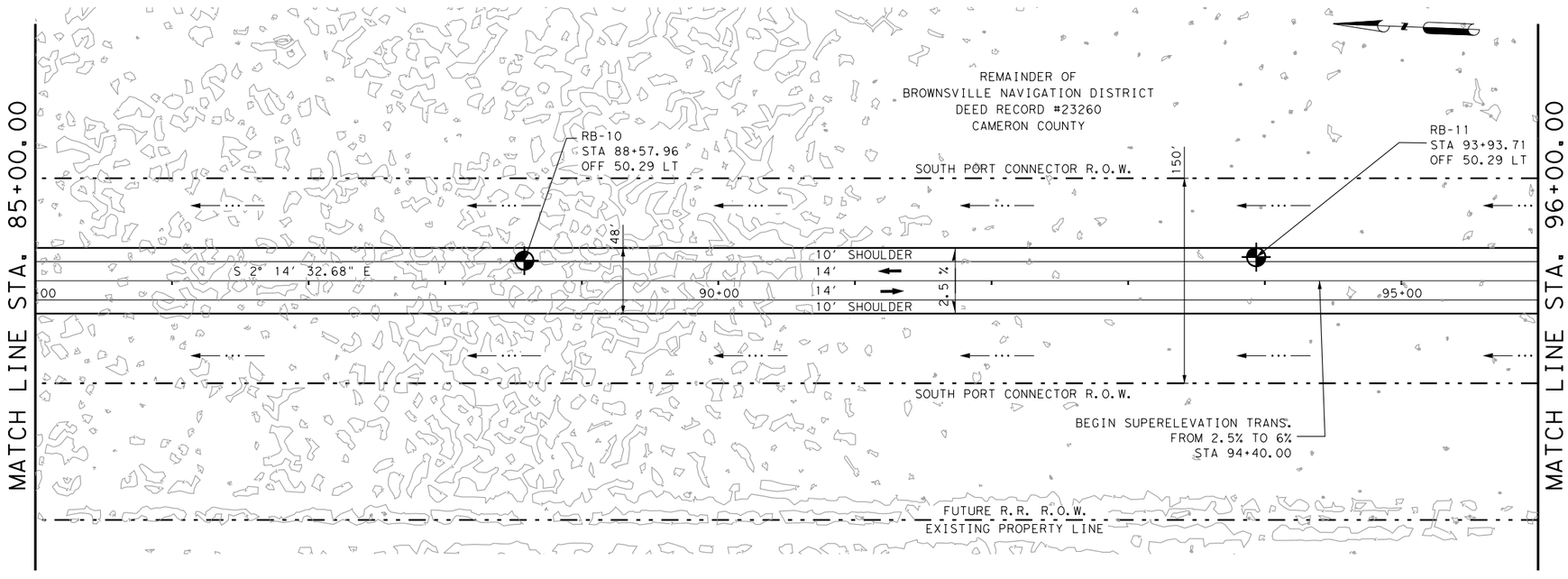
PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			49
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	400	STRUCT EXCAV	CY	
	400	CEM STABIL BKFL	CY	
	432	RIPRAP (MOW STRIP)(4IN)	CY	
	464	RC PIPE(CL III)(24IN)	LF	
	467	SET (SET II)(24IN)(RCP)(6:1)(C)	EA	
	540	MTL W-BEAM GD FEN (TIM POST)	LF	
	540	MTL W-BEAM GD FEN TRANS(THRIE-BEAM)	EA	
	544	GUARDRAIL END TRT (INSTALL)	EA	
	550	CHAIN LINK FENCE (REMOVE)	LF	



LEGEND
PGL= PROPOSED GRADE LINE
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PROPOSED TRAFFIC DIRECTION
EXISTING TRAFFIC DIRECTION
FLOW DIRECTION
BORING LOGS
GAS LINE
FIBER OPTIC LINE
POWER LINE
WETLAND LIMITS

STATE OF TEXAS
FRANK H. CHAPA
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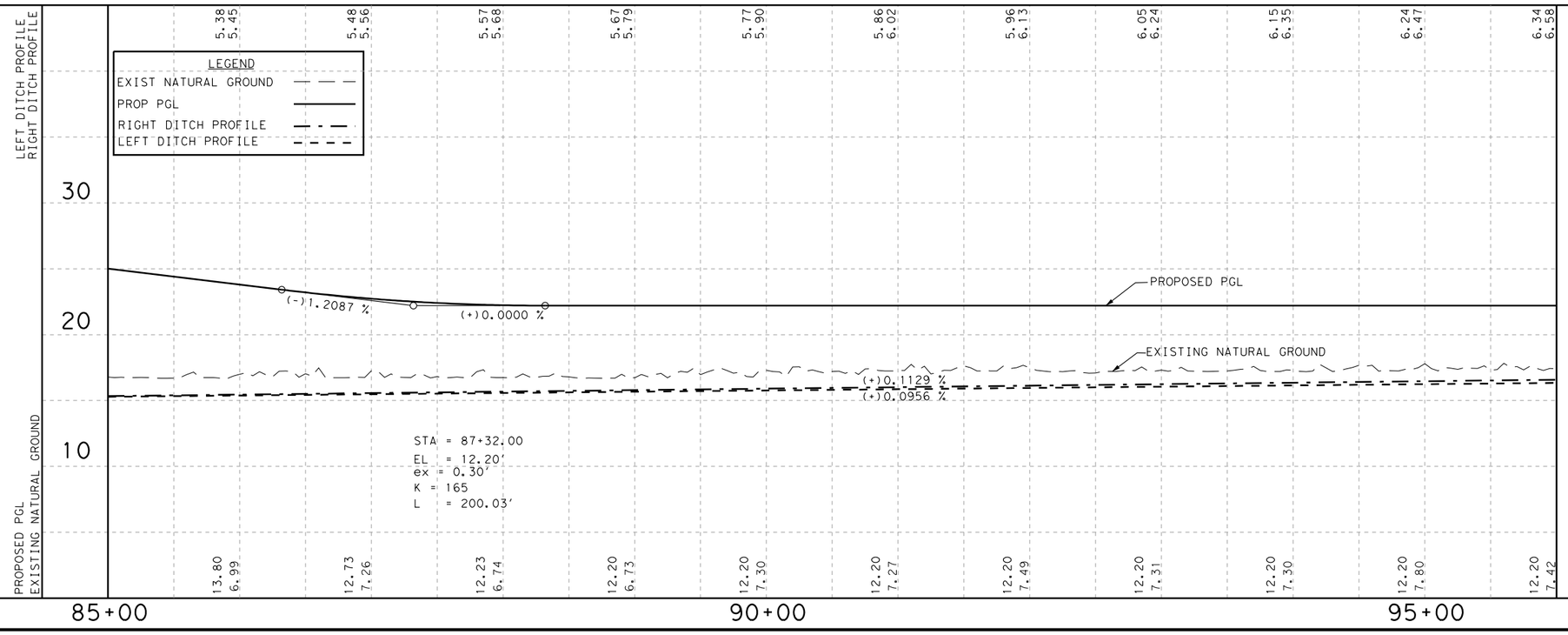


SOUTH PORT CONNECTOR

ROADWAY
PLAN & PROFILE

STA 85+00.00 TO
STA 96+00.00

SHEET 9 OF 10
SCALE: PLAN: 1"=100'
PROFILE: 1"=10'

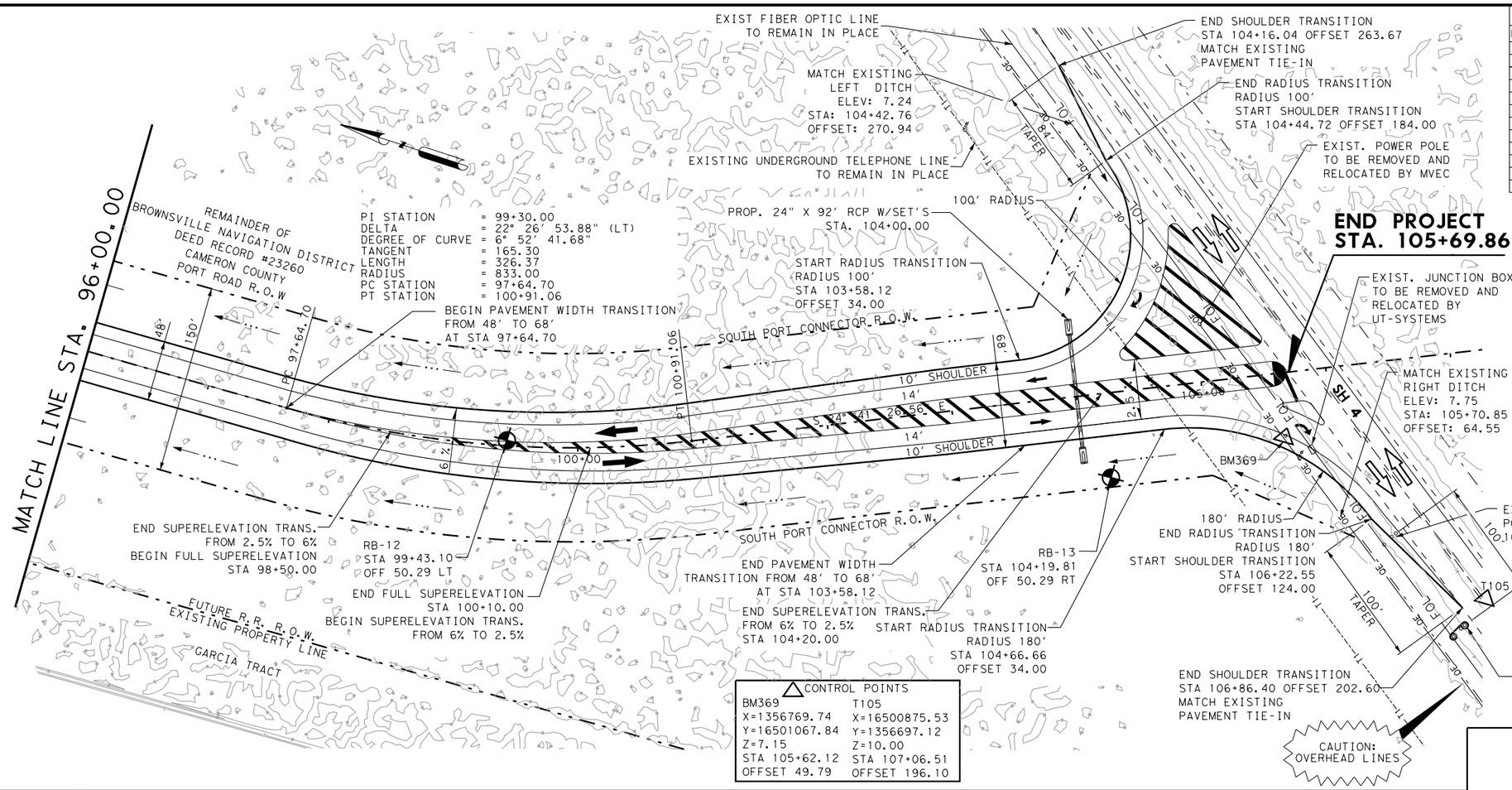
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE
the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6				50
DGN: JS	STATE	DIST.		COUNTY
CHK DGN: FC	TEXAS	PHARR		CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR



△ CONTROL POINTS

BM369	T105
X=1356769.74	X=16500875.53
Y=16501067.84	Y=1356697.12
Z=7.15	Z=10.00
STA 105+62.12	STA 107+06.51
OFFSET 49.79	OFFSET 196.10

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	400	STRUCT EXCAV	CY	23
	400	CEM STABIL BKFL	CY	
	432	RIPRAP (MOW STRIP)(4IN)	CY	
	464	RC PIPE(CL III)(24IN)	LF	92
	467	SET (SET II)(24IN)(RCP)(6:1)(C)	EA	2
	540	MTL W-BEAM GD FEN (TIM POST)	LF	
	540	MTL W-BEAM GD FEN TRANS(THRIE-BEAM)	EA	
	544	GUARDRAIL END TRT (INSTALL)	EA	
	550	CHAIN LINK FENCE (INSTALL)(6')	LF	
	550	CHAIN LINK FENCE (REMOVE)	LF	
	550	GATE (INSTALL)(CHAIN LINK)(MANUAL)(SLIDING)	EA	

LEGEND

PGL= PROPOSED GRADE LINE
EL= ELEVATION
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R.O.W= RIGHT-OF-WAY
PROPOSED TRAFFIC DIRECTION
EXISTING TRAFFIC DIRECTION
FLOW DIRECTION
BORING LOGS
GAS LINE
FIBER OPTIC LINE
POWER LINE
WETLAND LIMITS
EXIST. SIGN AND FLASHER
PROP. SIGN AND FLASHER

NOTE:
ALL UTILITIES SHOWN ARE APPROXIMATE. COORDINATE WITH APPROPRIATE UTILITY OWNERS TO FIELD VERIFY THE ACTUAL HORIZONTAL AND VERTICAL LOCATIONS.
EXIST. DITCH TO BE BLADED 3 STA.RT/LT FROM STA. 104+00.00 TO EXIST. PVMT TIE-IN

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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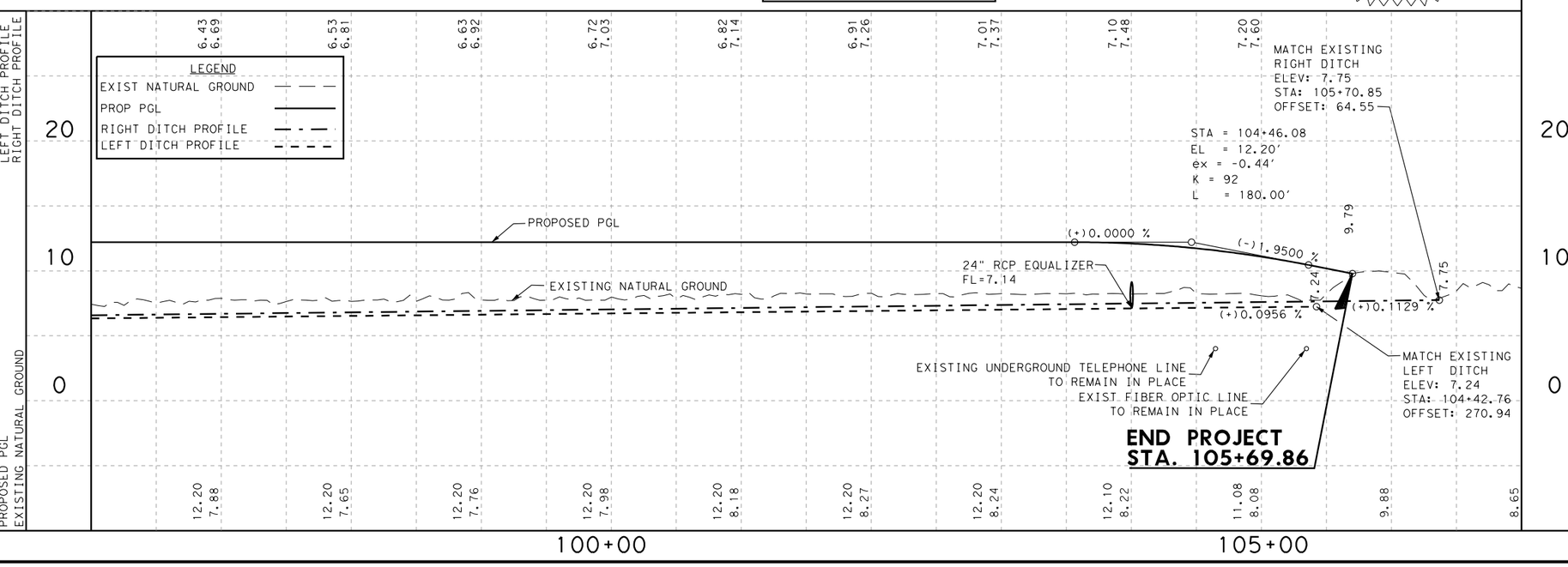


SOUTH PORT CONNECTOR

ROADWAY
PLAN & PROFILE

STA 96+00.00 TO
STA 105+69.86

SHEET 10 OF 10
SCALE: PLAN: 1"=100'
PROFILE: 1"=10'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

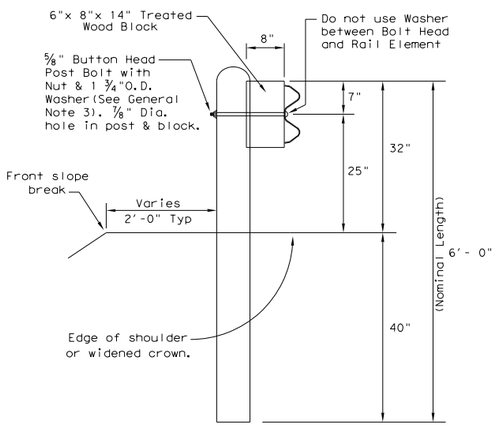
PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS R F-1582

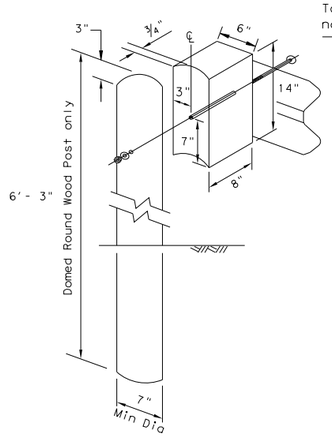
DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			51
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

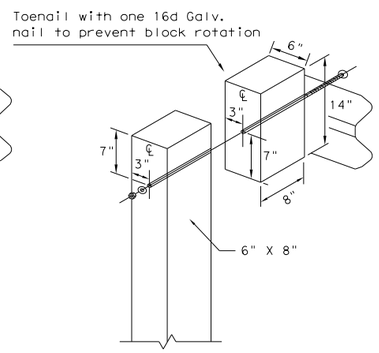
DATE:
FILE:



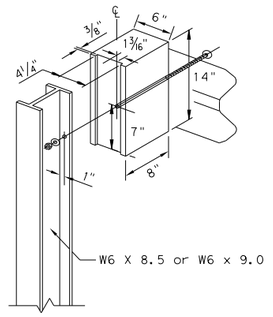
TYPICAL POST



WOOD BLOCK TO ROUND WOOD POST



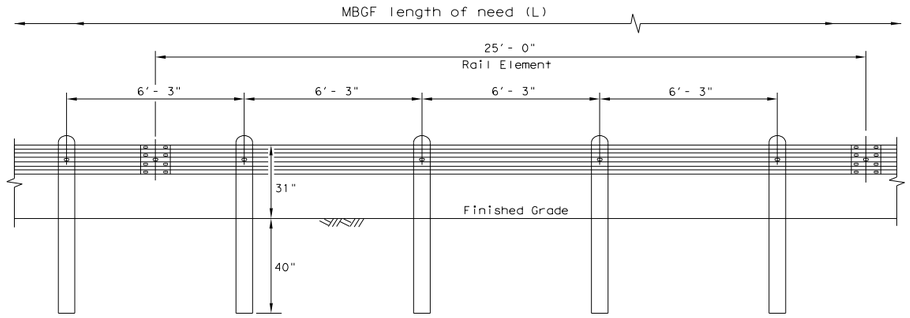
WOOD BLOCK TO RECTANGULAR WOOD POST



WOOD BLOCK TO STEEL POST

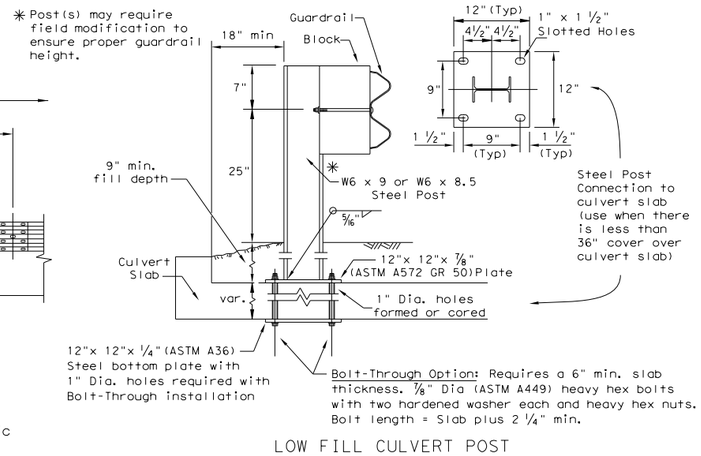
GENERAL NOTES

1. The type of post (round wood post, rectangular wood post, or steel post) will be as shown in the plans. The exact position of MBGF shall be shown in the plans or as directed by the Engineer. Steel posts to be galvanized in accordance with Item 445, "Galvanizing."
2. Rail element 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'-1½" 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 (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and Type A (1 ¾" O.D.)washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) are ⅝" x 1 ¼" (or 2" long at triple rail splices) with a ⅝" double recessed nut (ASTM A563). Thrie beam "connection" ⅞" dia. (ASTM A325) hex bolts shall be of sufficient length to extend through the full thickness of the rail, washers, and nuts.
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. If solid rock is encountered within 0 to 18" of the finished grade, drill a 22" dia. hole, or drill two 12" dia. front to back overlapping holes, 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 a cohesionless material.
10. Posts shall not be set in concrete, of any depth.
11. Special fabrication will be required at installations having a curvature of less than 150 ft. radius.
12. Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210,"Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or 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 posts and/or blocks.
13. For posts located partially or wholly between precast box culvert units, the use of a cast-in-place concrete closure between boxes is required. See Detail "A" on Bridge Standard SCP-MD.



ELEVATION
MID-SPAN RAIL SPLICE

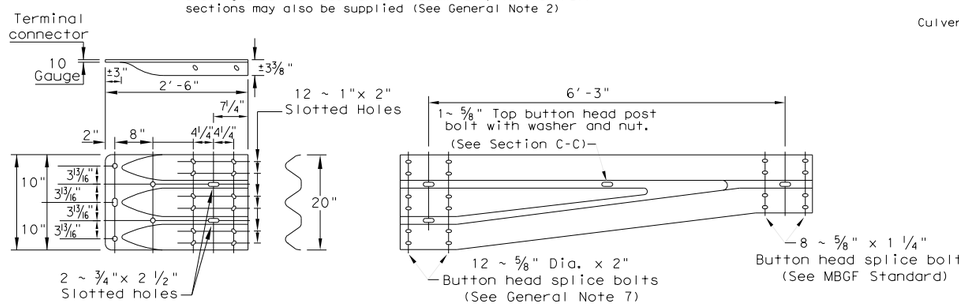
Showing a 25'- 0" section of W-Beam rail, 12'- 6" rail sections may also be supplied (See General Note 2)



LOW FILL CULVERT POST

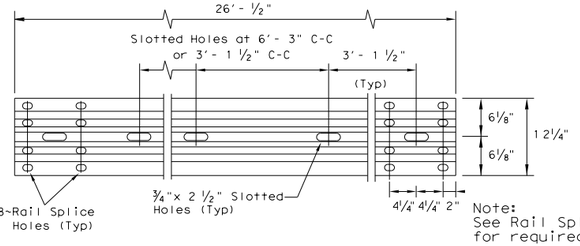
Culverts of 25 ft. or less, see GF(31)LS standard for "Long Span" option.

Epoxy Note:
Epoxy Anchor Option: This option may only be used if the culvert slab is 8" min. thick. Threaded anchor rods must be ⅞" 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 ¼" min. beyond nut.



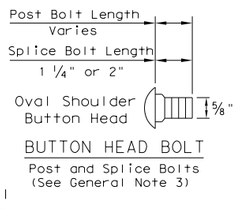
THRIE-BEAM TERMINAL CONNECTION
(SEE GENERAL NOTES 6 & 7 FOR REQUIRED HARDWARE)

NON-SYMMETRICAL TRANSITION TO W-BEAM (10 Gauge)

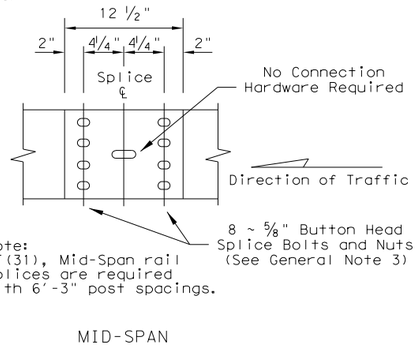


Note:
See Rail Splice Detail for required hardware.

ELEVATION 25'- 0"(NOM.) W-BEAM SECTION
12'- 6" RAIL SECTIONS MAY ALSO BE SUPPLIED (SEE GENERAL NOTE 2)

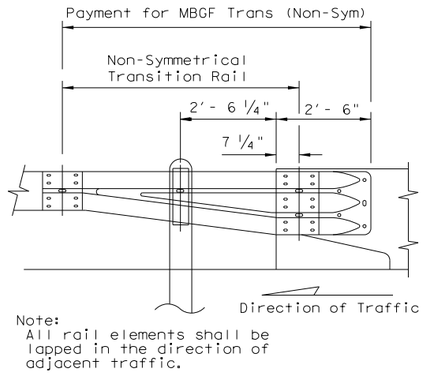


BUTTON HEAD BOLT
Post and Splice Bolts (See General Note 3)



Note:
GF(31), Mid-Span rail splices are required with 6'-3" post spacings.

MID-SPAN
RAIL SPLICE DETAIL



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

DOWNSTREAM RAIL ATTACHMENT

Texas Department of Transportation

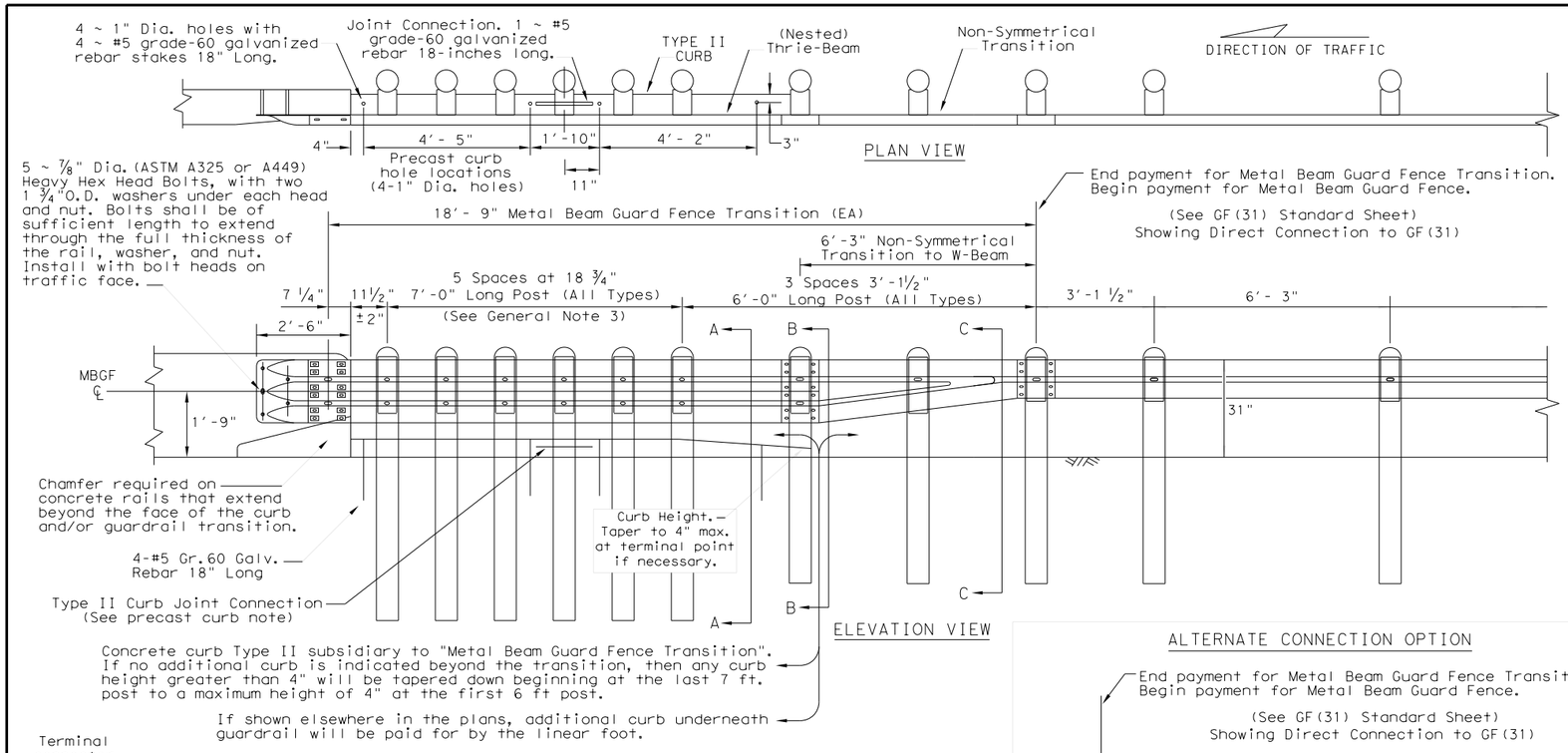
Design Division Standard

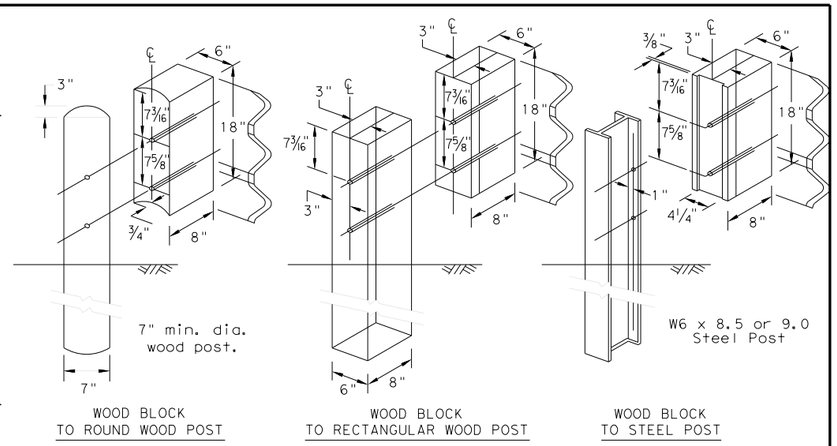
METAL BEAM GUARD FENCE

GF(31)-14

FILE: gf3114.dgn	DN: TxDOT	CK: AM	DW: VP	CK: CGL
©TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		52

DATE:
FILE:





GENERAL NOTES

1. Concrete curb may be cast-in-place or precast as shown on this sheet. When used in conjunction with thrie-beam guard fence transitions, curb shall be Type II (Typically 5-3/4" height above surface; See CCCG standard sheet) unless otherwise shown in the plans. 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.

   Contact the Design Division for drainage cut out options needed within the curb section of the transition.

2. The type of post (round wood post, rectangular wood post or steel post) will be as shown in the plans.

3. The post length shall be marked on all 7'- 0" long posts by the Manufacturer. The mark shall be located within the top 1 ft. region of the post, at least 5/8" in height, and visible after installation. Wooden posts shall be marked with a brand, and steel posts with a stencil before galvanizing.

4. Rail element 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.

5. Unless otherwise shown in the plans, transitions shall be placed with the block face in front of or directly above the curb face.

6. Galvanized washers used with the 5/8" dia. post bolts shall be Type A 1-3/4" O.D. washers. The (12) plate washers (FWR03) required at the terminal connector splice.

7. Button head "post" bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) 5/8" dia.x 2" (at triple rail splices) with 5/8" double recessed nuts.

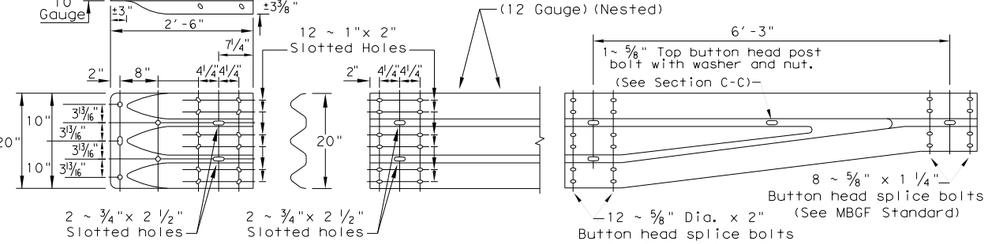
8. Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445,"Galvanizing". Fittings shall be subsidiary to the bid item.

9. Crown shall be widened to accommodate transitions.

10. If solid rock is encountered. See the MBGF standard sheet for the proper installation guidance.

11. Posts shall not be set in concrete.

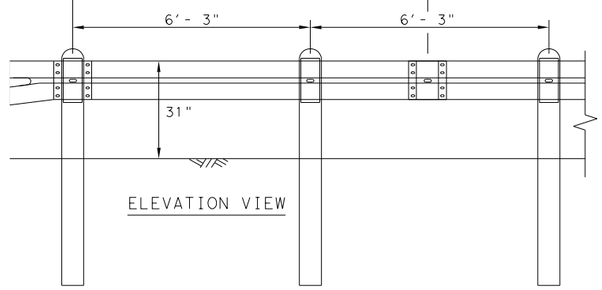
12. Unless otherwise shown in the plans, a composite material (post or block) that meets the requirements of DMS-7210, "Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for (post or block) of similar dimensions. TxDOT's Construction Division maintains a Material Producer List (MPL) for producers of materials conforming to DMS-7210. Only producers on the MPL can furnish composite material posts and/or blocks.



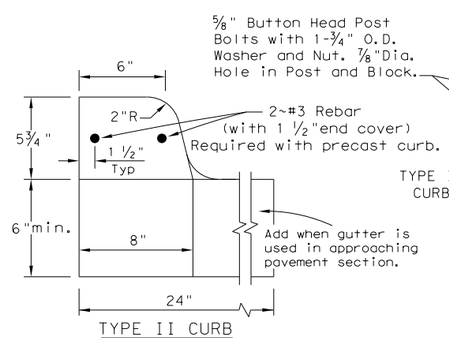
THRIE-BEAM TERMINAL CONNECTION
(See General Notes 6 & 7 for required hardware)

NON-SYMMETRICAL TRANSITION TO W-BEAM (10 Gauge)

ALTERNATE CONNECTION OPTION

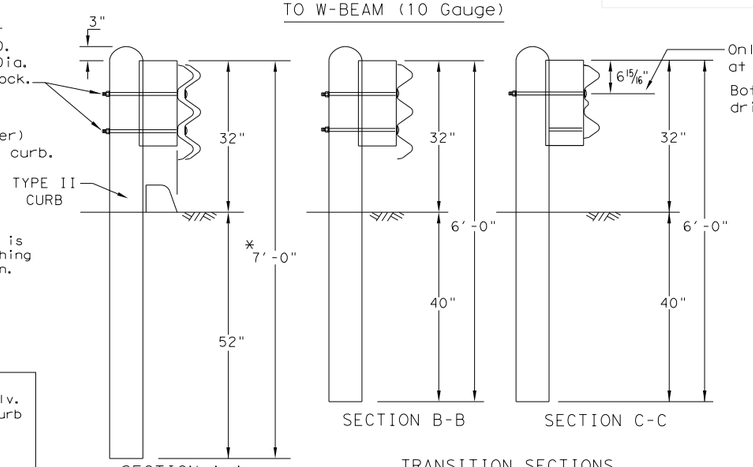


ELEVATION VIEW



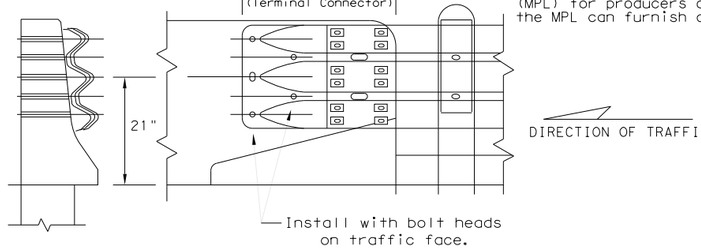
TYPE II CURB
Cast-in-Place or Precast

PRECAST CURB:
Type II Precast Curb secured with 4~#5 Gr.60 Galv. Rebar stakes 18" long. The 12'- 2" section of curb may be cast in two sections.
Section ① 5'- 8" long
Section ② 6'- 6" long with the last 3'- 6" of curb tapered to a 4" height.
The Joint Connection is two 9" long 1" Dia. female ends connected with 1~#5 Gr.60 Galv.Rebar 18" long.



*Note: (All post types) (See General Note 3)

TRANSITION SECTIONS



CONNECTION TO CONCRETE BRIDGE RAIL AND TRAFFIC BARRIERS

(12) Galvanized rectangular washers (FWR03) are required under the recessed nut at the terminal connector splice to nested thrie-beam. (See General Notes 6 & 7).

DIRECTION OF TRAFFIC

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE TRANSITION
(Thrie-Beam Transition)
GF(31)TR-14

FILE: gf31tr14.dgn	DN: TxDOT	CK: AM	DW: VP	CK: CGL
©TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
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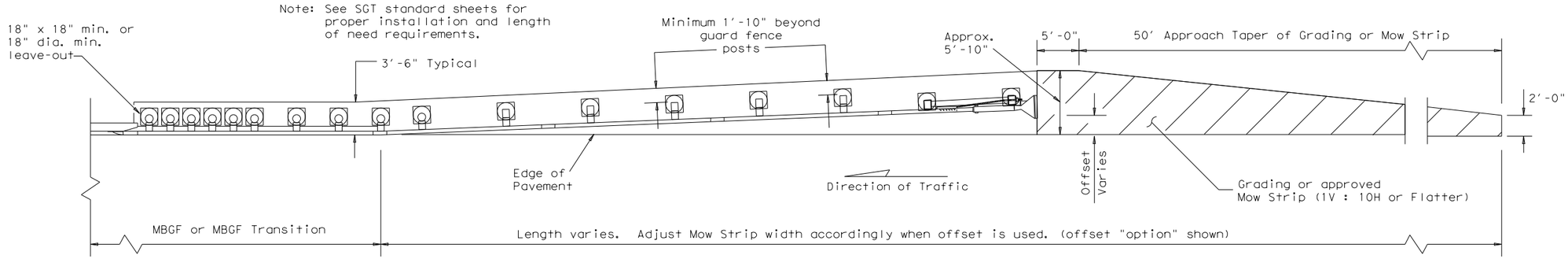
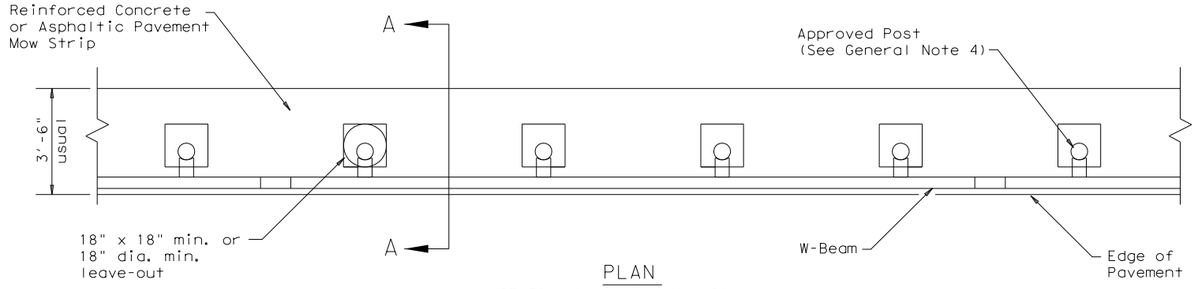
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		53

DATE:
FILE:

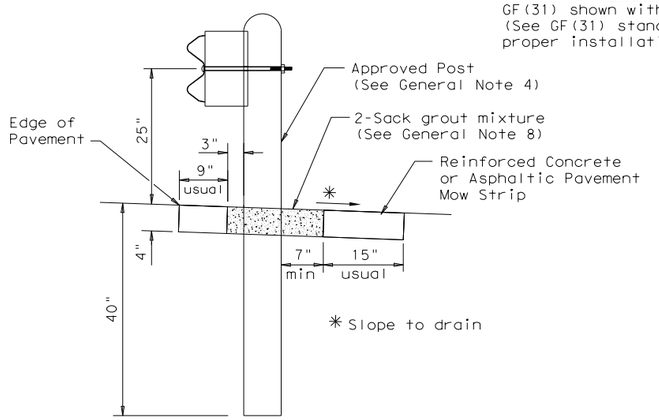


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



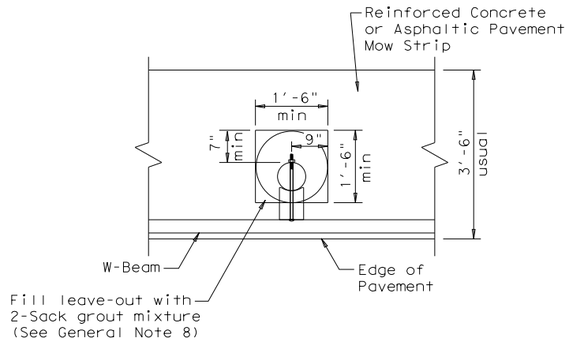
PLAN

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



SECTION A-A

Typical



MOW STRIP DETAIL

Reinforced Concrete or Asphaltic Pavement Mow Strip with 18" x 18" or 18" dia. minimum leave-out.

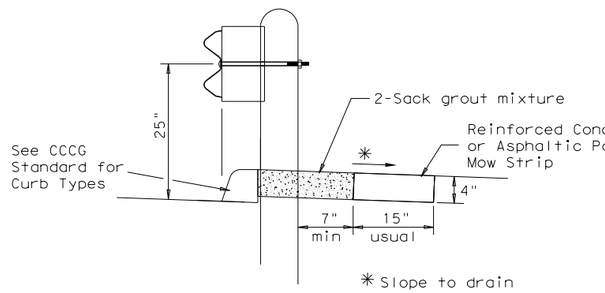
Note: Site Condition(s)

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.

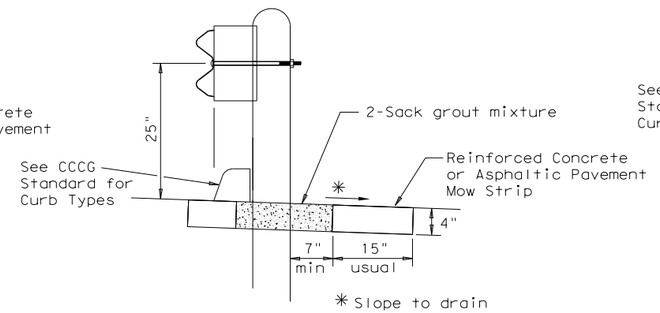
GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments (See SGT standards for proper SGT installation).
2. Mow strips shall be asphaltic pavement or reinforced concrete (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Asphaltic pavement shall meet the requirements of the item, and be placed in accordance with the pertinent bid item as shown in the plans. 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. The type of approved post will be as shown in the plans. See the applicable standard sheets for additional details and information.
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 asphaltic pavement or reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with no more than a 2-sack grout mixture (1 part cement, 5 parts water, and 14 parts sand by volume) with a 28-day compressive strength of approximately 120 psi or less. Provide grout of a consistency that will flow into and completly 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 rip rap mow strip.



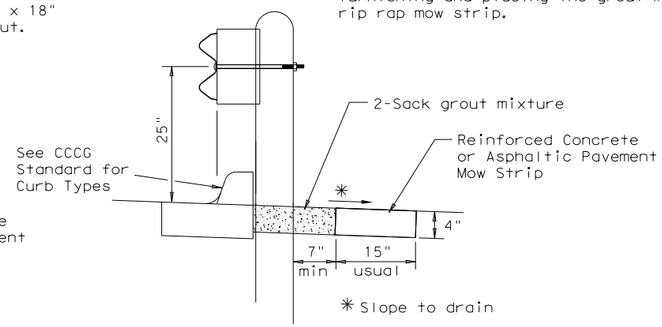
CURB OPTION (1)

This option will increase the post embedment through out the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Texas Department of Transportation

Design Division Standard

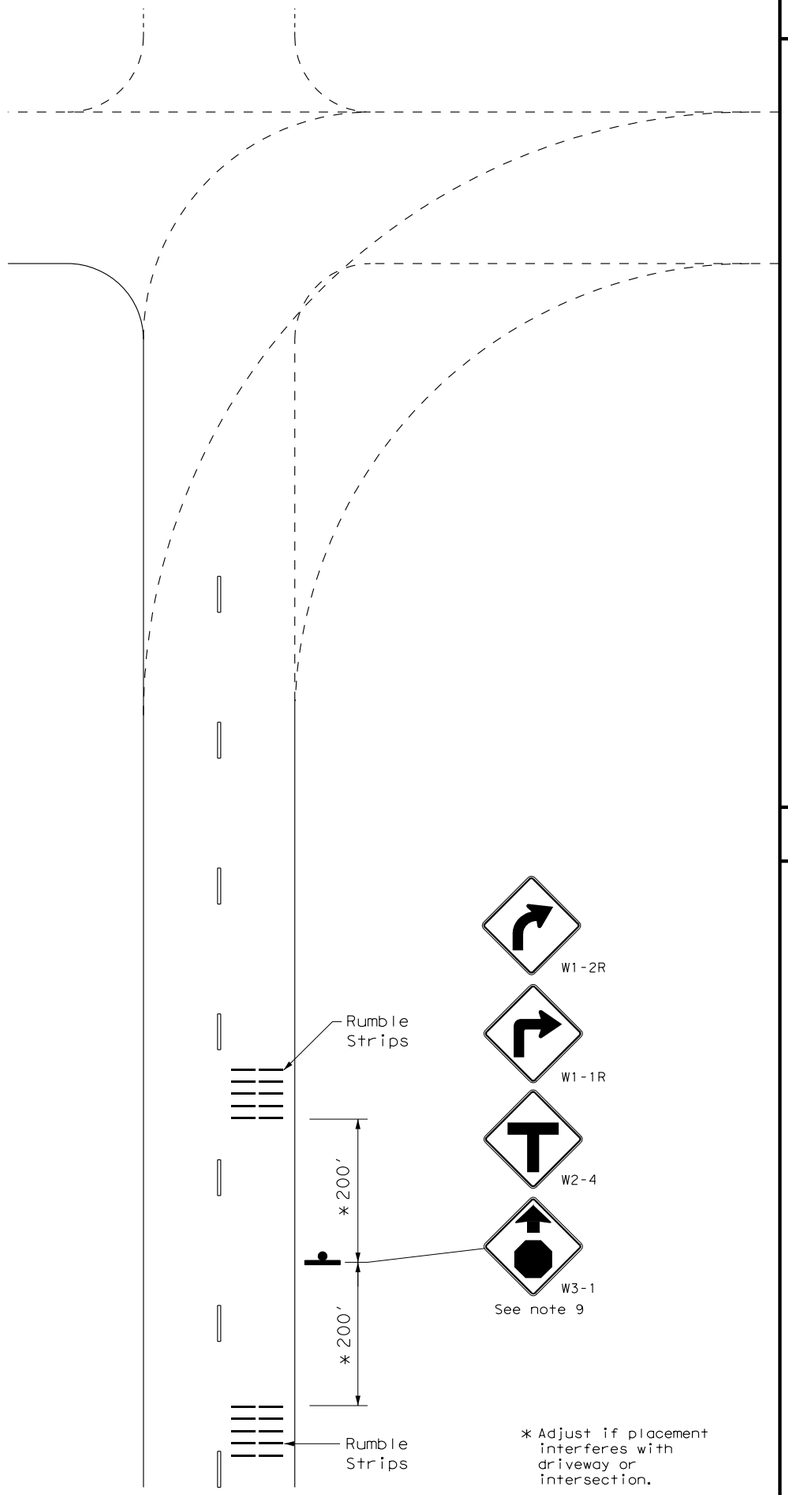
METAL BEAM GUARD FENCE

(MOW STRIP)

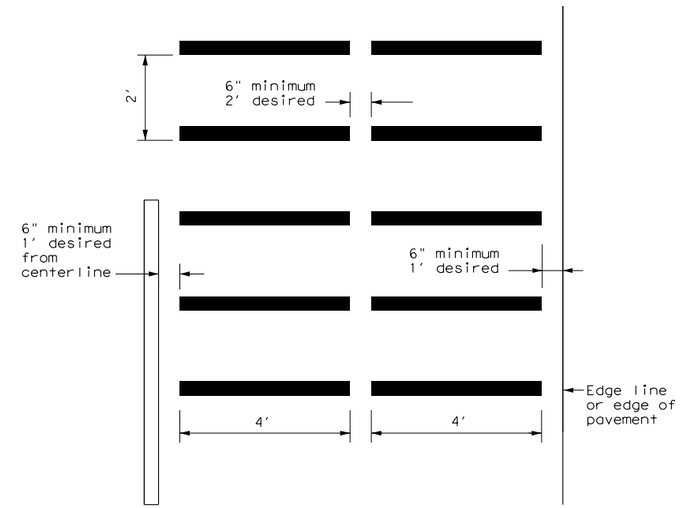
GF(31)MS-17

FILE: gf31ms17.dgn	DN: TxDOT	CK: KM	DW: TXDOT	CK: CL
© TxDOT December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
Revised 12, 2017 KM	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		54

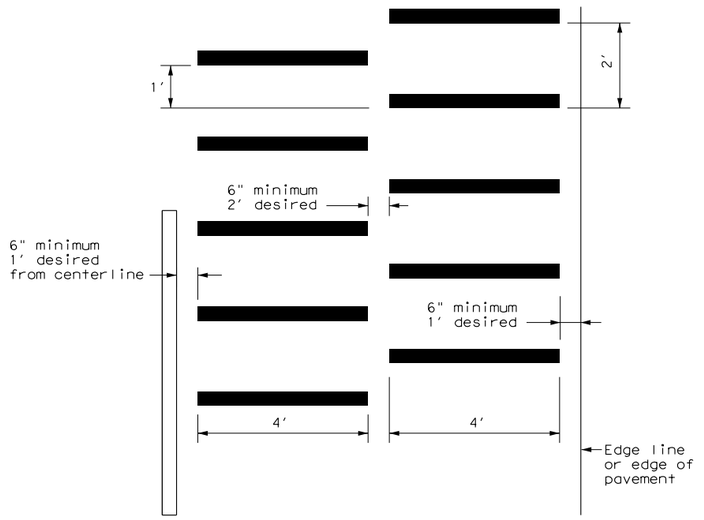
DATE:
FILE:



STANDARD PATTERN



ALTERNATIVE PATTERN



GENERAL NOTES

1. Transverse or in-lane rumble strips should only be used at high incident and special geometric locations. These special geometric locations may include: approaches to rural, high speed signalized or Stop -controlled intersections with sight restrictions and/or high crash rates, approaches to unexpected urban intersections, approaches to newly installed Stop or signalized controlled intersections, approaches to toll plazas, approaches to hazardous horizontal curves, and approaches to railroad grade crossings.

2. When used, the rumble strips shall be placed 200 feet prior to and after the placement of the warning device.

3. The use of rumble strips should not be widespread or used indiscriminately.

4. Preformed black raised rumble strips should be used. They should be installed in accordance with the manufacturer's recommendations.

5. A list of approved, preformed raised rumble strips can be obtained from the Traffic Operations Division.

6. Consideration should be given to noise levels when in -lane or transverse rumble strips are installed near residential areas, schools, churches, etc.

7. The use of the "Rumble Strips Ahead" sign may be used in advance of in -lane or transverse rumble strips, based on engineering judgement. This sign is typically not necessary for rumble strip installations built to the guidelines on this standard sheet. When used, this sign should be spaced in advance of the rumble strips based on the guidelines for advance placement of warning sign included in the "Texas Manual on Uniform Traffic Control Devices".

W17-2T

8. Consideration should be given to bicyclists. A 12 inch gap from the edge line may be used to accommodate bicyclists when a usable shoulder is not available. Additional gaps in the in -lane or transverse rumble strips are not recommended since they could cause motorists to swerve to avoid the rumble strips.

9. Other signs can be used as conditions warrant.

Texas Department of Transportation

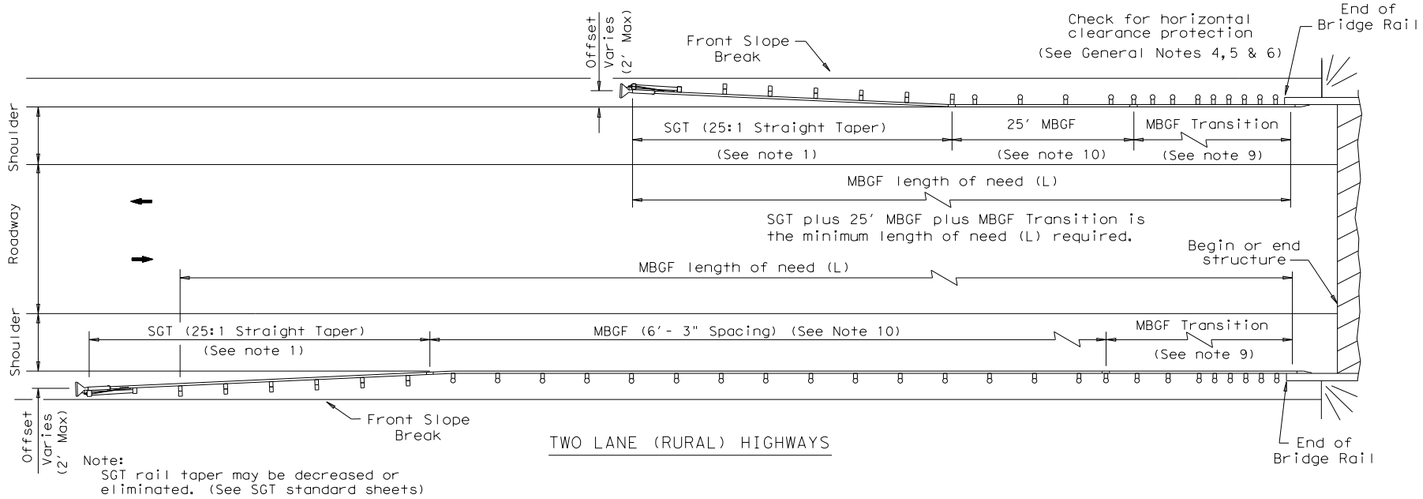
Traffic Operations Division Standard

TRANSVERSE OR IN-LANE RUMBLE STRIPS

RS(5)-13

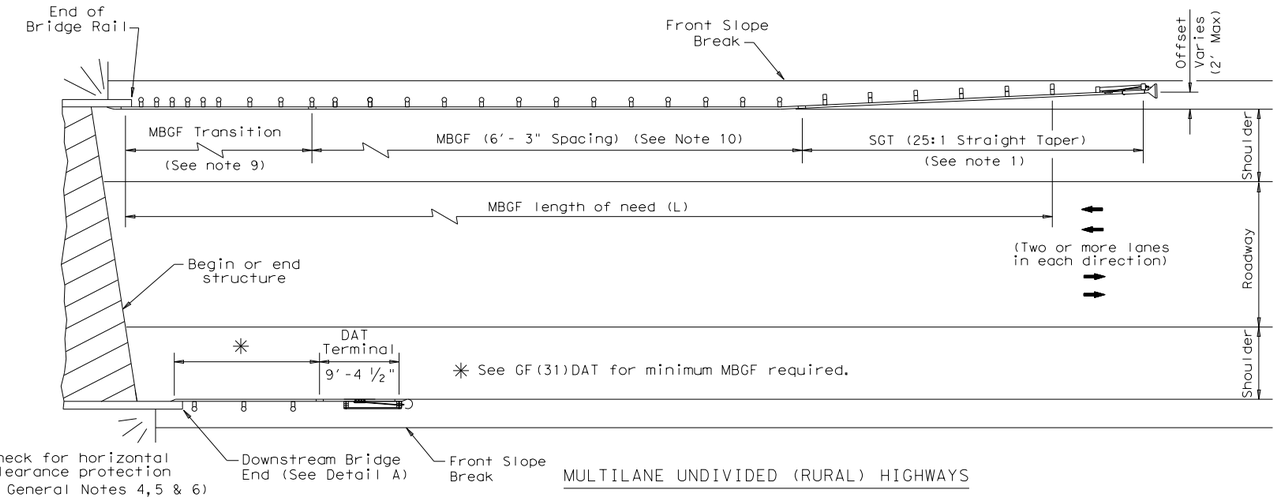
FILE: rs(5)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
2-10	DIST	COUNTY		SHEET NO.
10-13	PHR	CAMERON		55

DATE:
FILE:

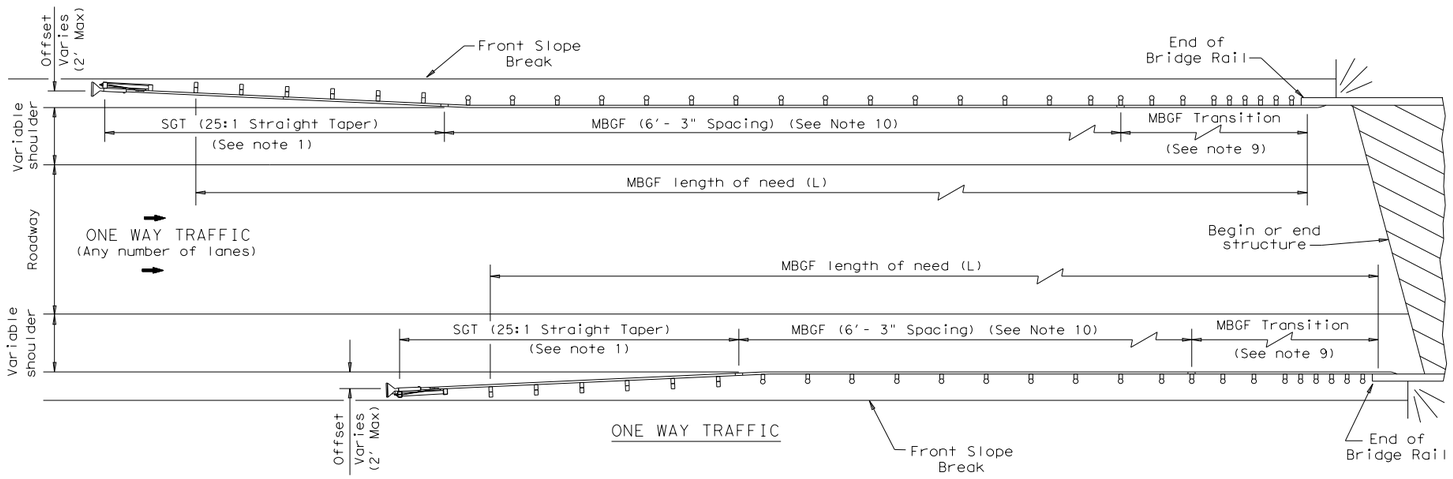


TWO LANE (RURAL) HIGHWAYS

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



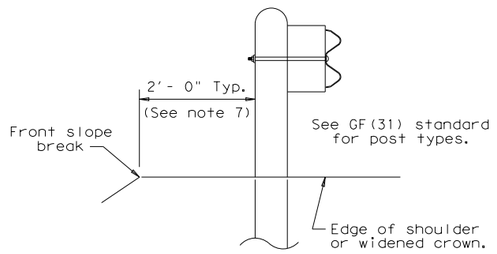
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



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. For restrictive bridge widths: 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)

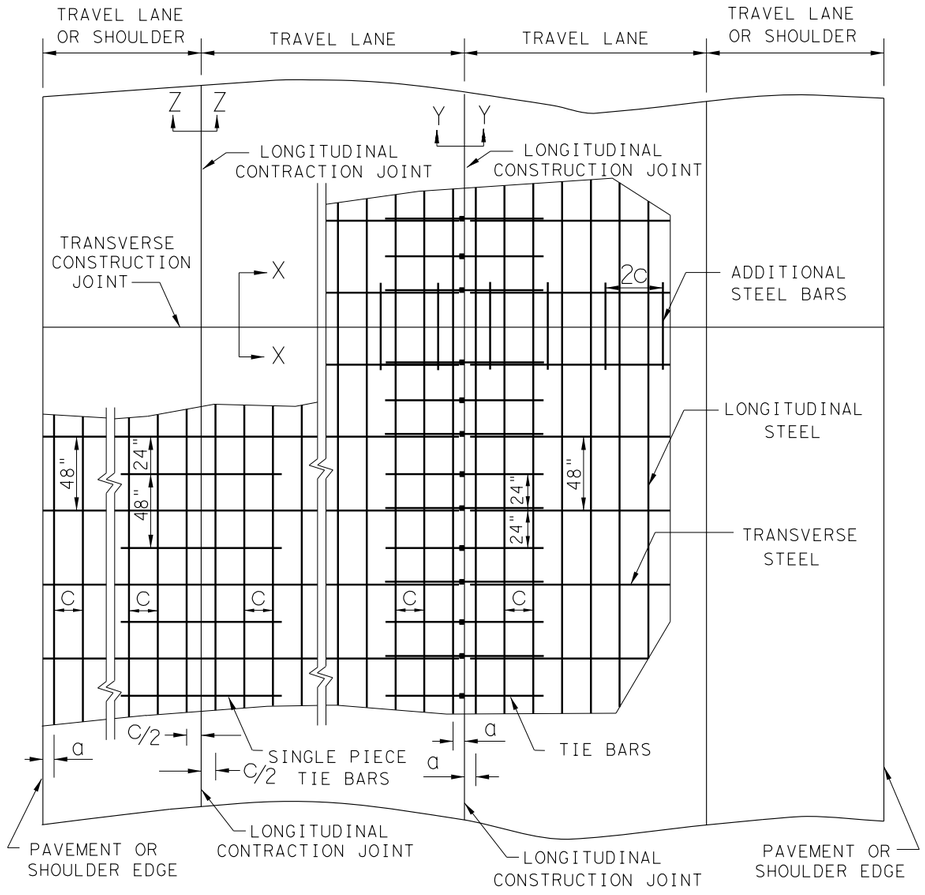
BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED APRIL 2014 SEE (MEMO 0414)	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		56

DATE:
FILE:

TABLE NO. 1 LONGITUDINAL STEEL					
SLAB THICKNESS AND BAR SIZE		REGULAR STEEL BARS	FIRST SPACING AT EDGE OR JOINT	ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X)	
T (IN.)	BAR SIZE	SPACING C (IN.)	SPACING a (IN.)	SPACING 2 X C (IN.)	LENGTH L (IN.)
7.0	#5	6.5	3 TO 4	13	50
7.5	#5	6.0	3 TO 4	12	50
8.0	#6	9.0	3 TO 4	18	50
8.5	#6	8.5	3 TO 4	17	50
9.0	#6	8.0	3 TO 4	16	50
9.5	#6	7.5	3 TO 4	15	50
10.0	#6	7.0	3 TO 4	14	50
10.5	#6	6.75	3 TO 4	13.5	50
11.0	#6	6.5	3 TO 4	13	50
11.5	#6	6.25	3 TO 4	12.5	50
12.0	#6	6.0	3 TO 4	12	50
12.5	#6	5.75	3 TO 4	11.5	50
13.0	#6	5.5	3 TO 4	11	50

TABLE NO. 2 TRANSVERSE STEEL AND TIE BARS						
SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
7.0 - 7.5	#5	48	#5	48	#5	24
8.0 - 13.0	#5	48	#6	48	#6	24

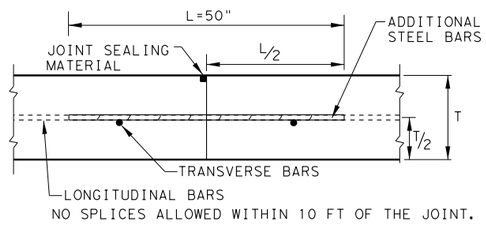


TYPICAL PAVEMENT LAYOUT

PLAN VIEW (NOT TO SCALE)

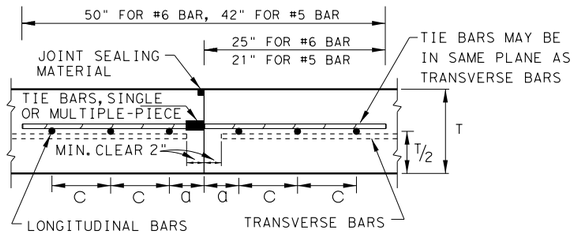
GENERAL NOTES

1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT ARE NOT COVERED BY THIS STANDARD.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (CoTE) OF NOT MORE THAN 5.5 X 10^{-6} IN/IN/ °F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO.1 AND TABLE NO.2.
4. WHEN COARSE AGGREGATE WITH A RATED CoTE OF NOT MORE THAN 4.3 X 10^{-6} IN/IN/ °F IS USED, TABLE NO.1A MAY BE USED FOR LONGITUDINAL STEEL AS APPROVED BY THE ENGINEER.
5. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO.1 OR TABLE NO.1A.
6. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
7. THE SAW CUT DEPTH FOR THE LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) SHALL BE ONE THIRD OF THE SLAB THICKNESS (T/3).
8. WHEN TYING CONCRETE GUTTER AT A LONGITUDINAL JOINT, THE TIE BAR LENGTH OR POSITION MAY BE ADJUSTED. PROVIDE 3 IN. OF CONCRETE COVER FROM THE BACK OF GUTTER TO THE END OF TIE BAR.
9. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN.10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
10. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
11. LONGITUDINAL REINFORCING STEEL SPLICES SHALL BE A MINIMUM OF 25 IN. STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT.
12. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



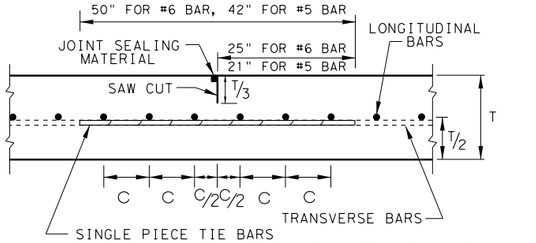
TRANSVERSE CONSTRUCTION JOINT

SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT

SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT

SECTION Z - Z

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT T - 7 to 13 INCHES

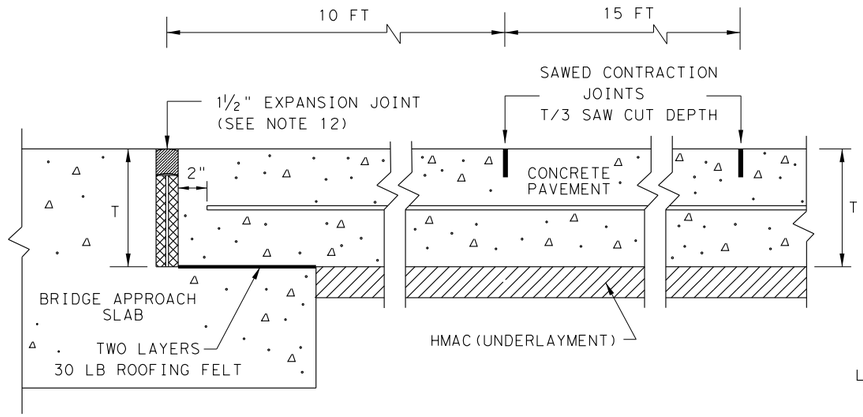
CRCP(1)-17

FILE: crcp117.dgn	DN: TxDOT	CK: AN	DW: HC	CK:VP/KM
© TxDOT: May 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10/10/2011 ADD GN #12 04/09/2013 REMOVE 6" AND 6.5" ADD CTE REQUIREMENTS 05/05/2017 CoTE AS RATED 4.3	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		57

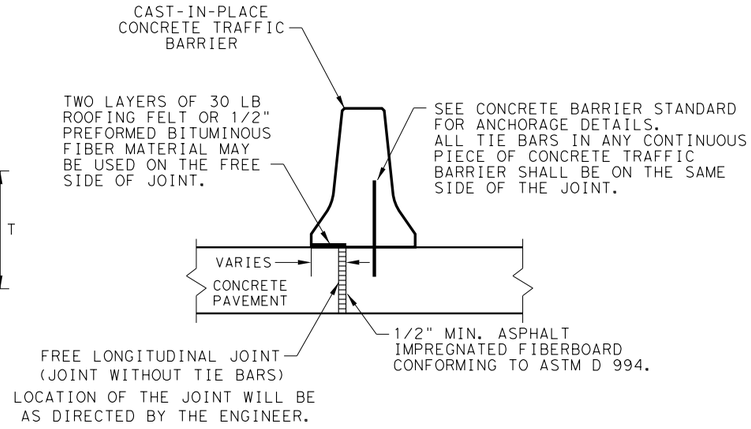
DATE:
FILE:

TABLE NO. 1A LONGITUDINAL STEEL FOR LOW CoTE CONCRETE AS APPROVED BY THE ENGINEER

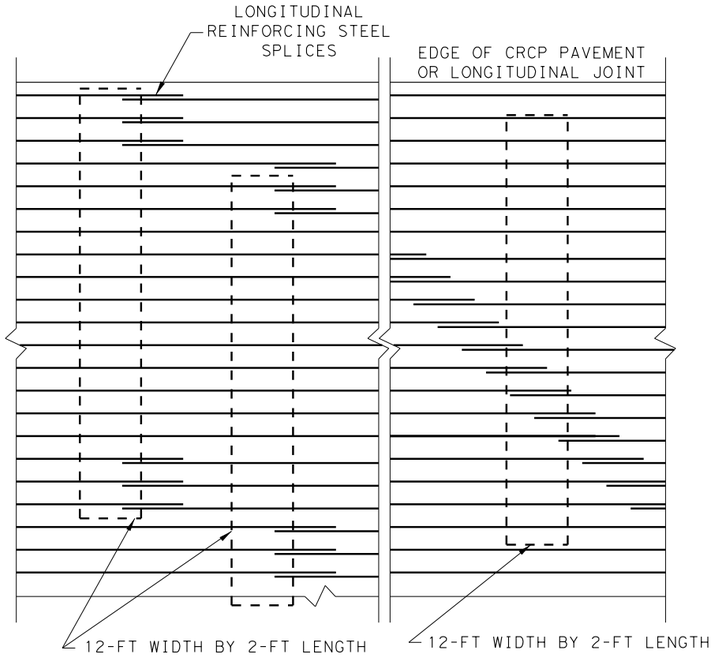
SLAB THICKNESS AND BAR SIZE		REGULAR STEEL BARS	FIRST SPACING AT EDGE OR JOINT	ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X)	
T (IN.)	BAR SIZE	SPACING c (IN.)	SPACING a (IN.)	SPACING 2 x c (IN.)	LENGTH L (IN.)
7.0	#5	7.5	3 TO 4	15	50
7.5	#5	7.0	3 TO 4	14	50
8.0	#6	10.0	3 TO 4	20	50
8.5	#6	9.5	3 TO 4	19	50
9.0	#6	9.0	3 TO 4	18	50
9.5	#6	8.5	3 TO 4	17	50
10.0	#6	8.0	3 TO 4	16	50
10.5	#6	7.5	3 TO 4	15	50
11.0	#6	7.0	3 TO 4	14	50
11.5	#6	6.75	3 TO 4	13.5	50
12.0	#6	6.50	3 TO 4	13	50
12.5	#6	6.25	3 TO 4	12.5	50
13.0	#6	6.0	3 TO 4	12	50



TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH

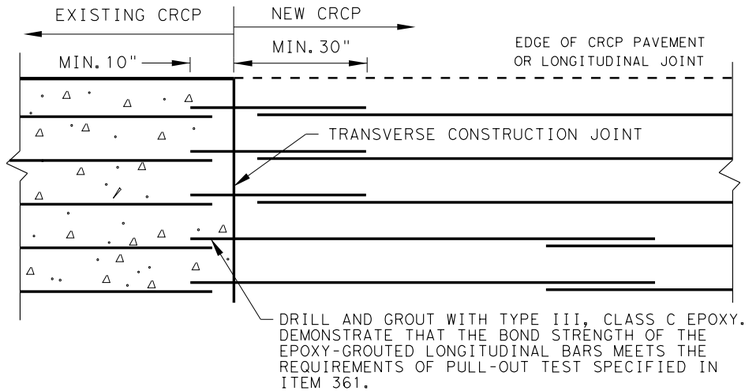


FREE LONGITUDINAL JOINT DETAIL

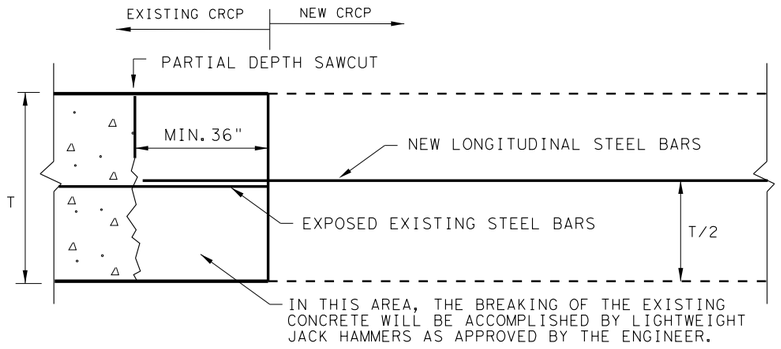


STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)

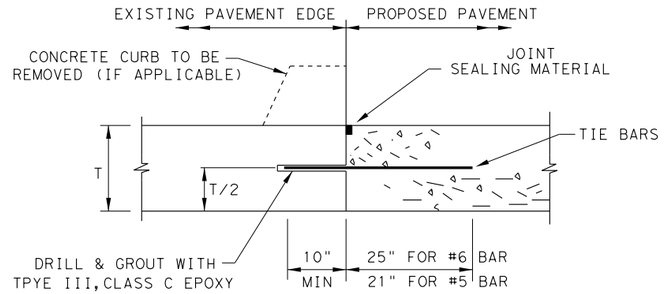


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
EXISTING CRCP TO NEW CRCP



1. BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQURIMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER SLABS, USE #5 TIE BARS FOR LESS THAN 8" THICK SLABS.

LONGITUDINAL WIDENING JOINT DETAIL

Texas Department of Transportation

Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

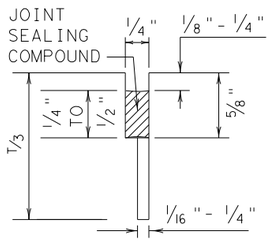
ONE LAYER STEEL BAR PLACEMENT T - 7 to 13 INCHES

CRCP(1)-17

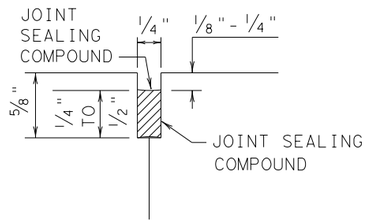
FILE: crcp117.dgn	DN: TxDOT	CK: AN	DW: HC	CK: VP/KM	
©TxDOT: May 2017	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR	
	DIST	COUNTY		SHEET NO.	
	PHR	CAMERON		58	

DATE:
FILE:

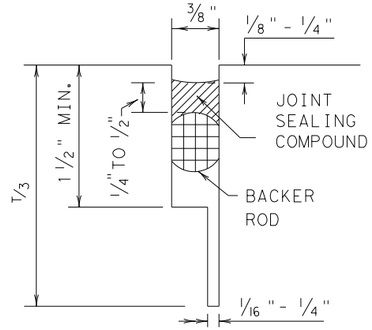
METHOD B: JOINT SEALING COMPOUND



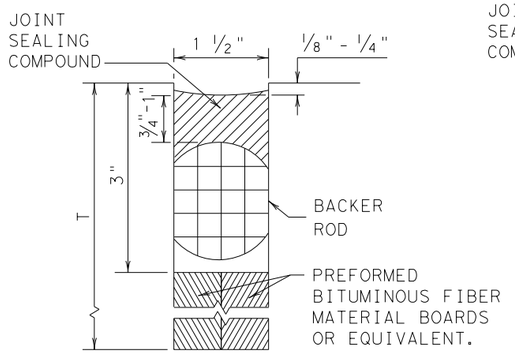
LONGITUDINAL SAWED CONTRACTION JOINT



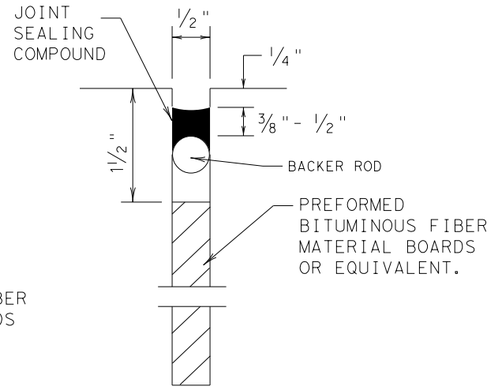
LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT

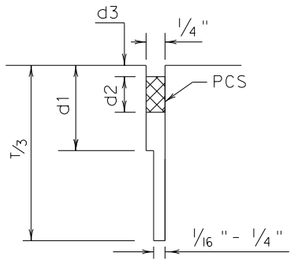


TRANSVERSE FORMED EXPANSION JOINT

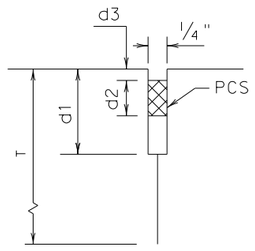


FORMED ISOLATION JOINT

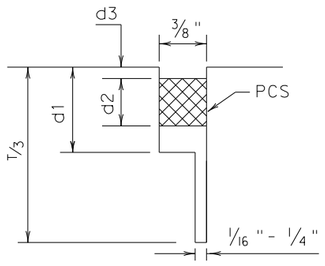
METHOD A: PREFORMED COMPRESSION SEALS (PCS)(DMS-6310 CLASS 6)



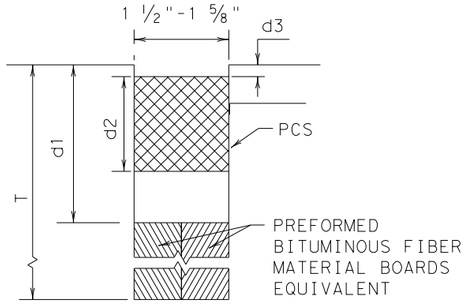
LONGITUDINAL SAWED CONTRACTION JOINT



LONGITUDINAL CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT



TRANSVERSE FORMED EXPANSION JOINT

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
4. DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
5. REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
6. FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
7. FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4,5,7,OR 8 FOR MAINTAINING EXISTING JOINTS.
8. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
9. ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.

Texas Department of Transportation

Design Division Standard

CONCRETE PAVING DETAILS

JOINT SEALS

JS-14

FILE: js14.dgn	DN: TxDOT		DN: HC	DW: HC		CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0921	06	288		SOUTH PORT CONNECTOR	
	DIST	COUNTY			SHEET NO.	
	PHR	CAMERON			59	

DATE:
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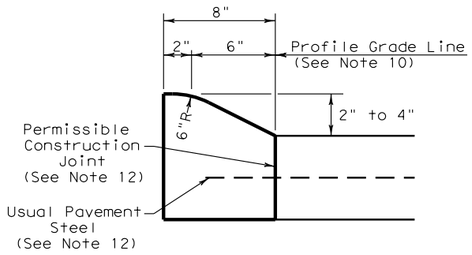
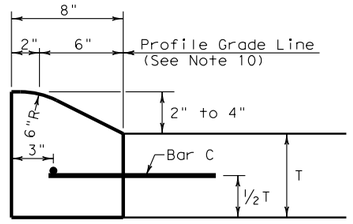


TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



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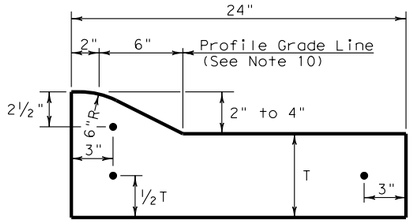
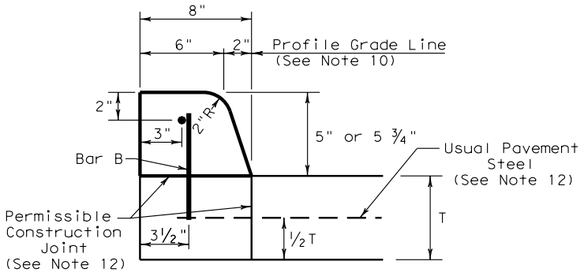
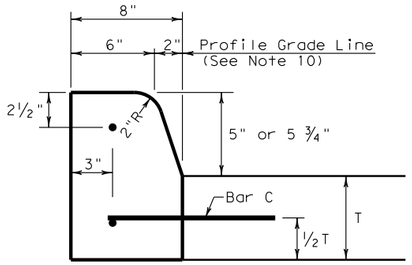


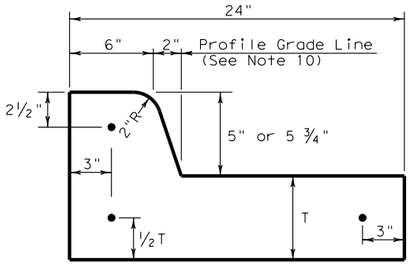
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



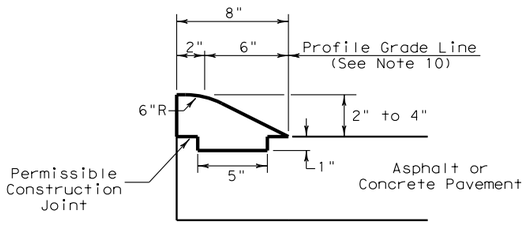
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



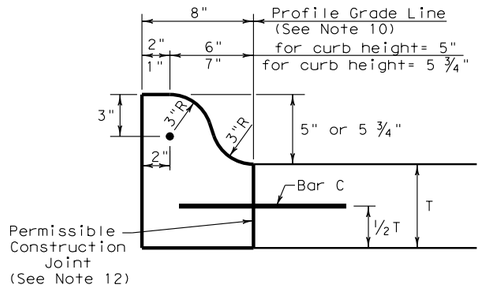
TYPE II CURB
5" - 5 ¾" HEIGHT



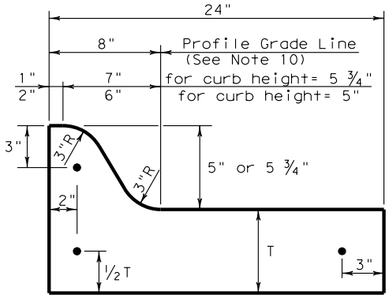
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



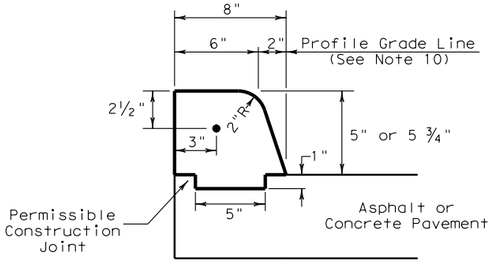
TYPE III CURB (KEYED)
2" - 4" HEIGHT



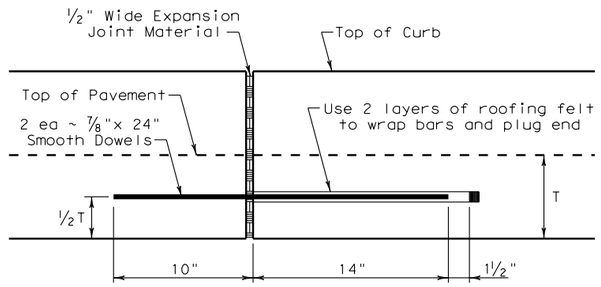
TYPE IIa CURB
5" - 5 ¾" HEIGHT



TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

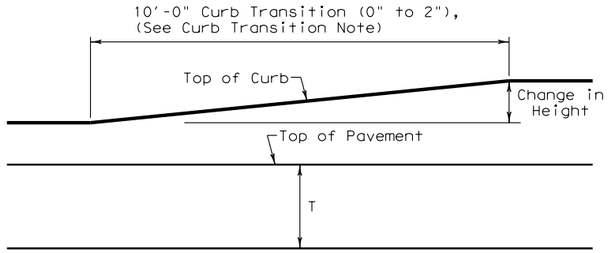


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

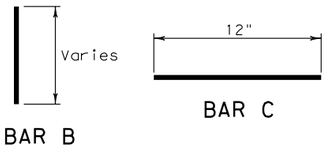
Curb Transition Note:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

General Notes

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No. 4 unless otherwise shown. The use of synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Producer List (MPL), maintained by TxDOT, Construction Division.
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is placed on existing concrete pavement, the pavement shall be drilled and the reinforcing bars grouted in place.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C-C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When vertical permissible construction joints are used, resulting in a longitudinal construction joint in the pavement, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans for longitudinal construction joints. Reinforcing steel for curb section shall then conform to that required for concrete curb.



BAR B
BAR C

Texas Department of Transportation
Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-12

FILE: cccg12.dgn	DN: TxDOT	CK: AM	DW: VP	CK: VP	
©TxDOT: 1995	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR	
UPDATED 2012 - VP	DIST	COUNTY		SHEET NO.	
	PHR	CAMERON		60	

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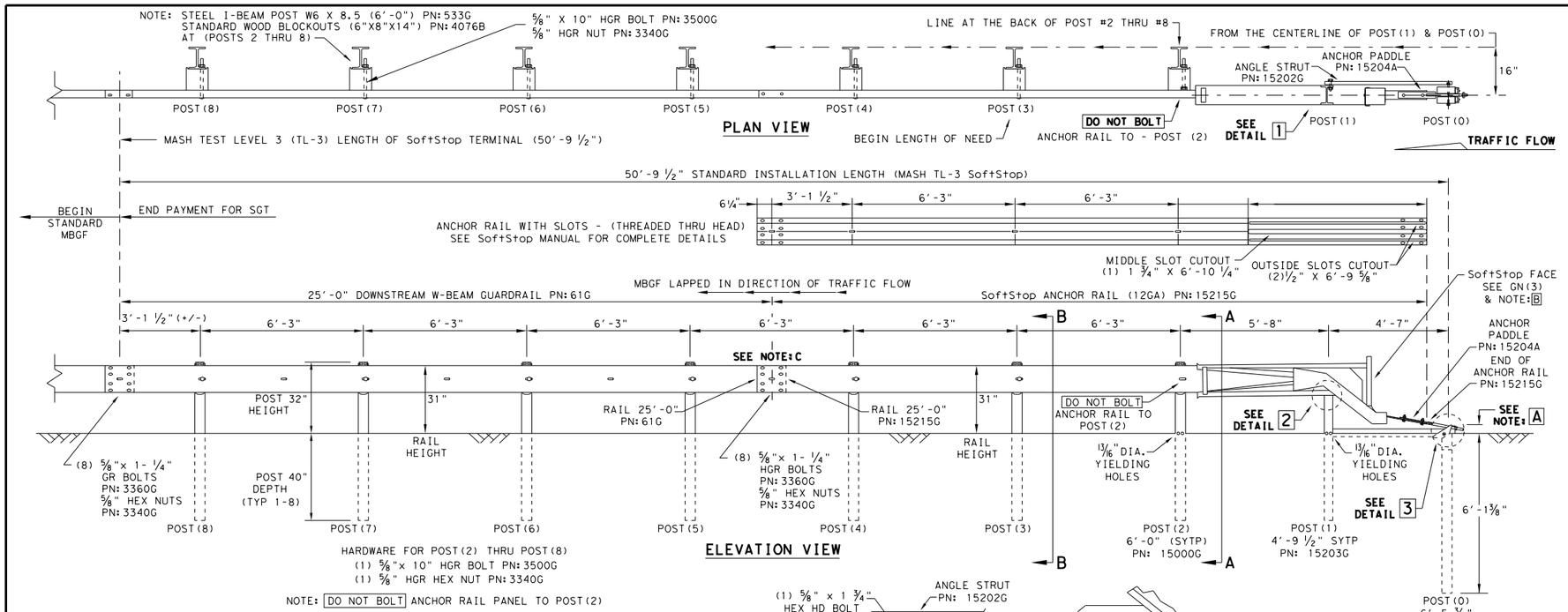


GENERAL NOTES

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 ⅜")
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	⅞" 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.

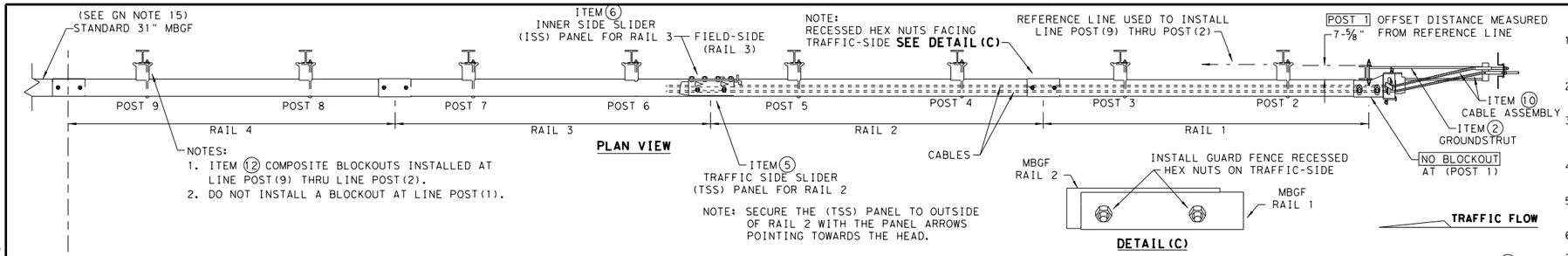
Texas Department of Transportation

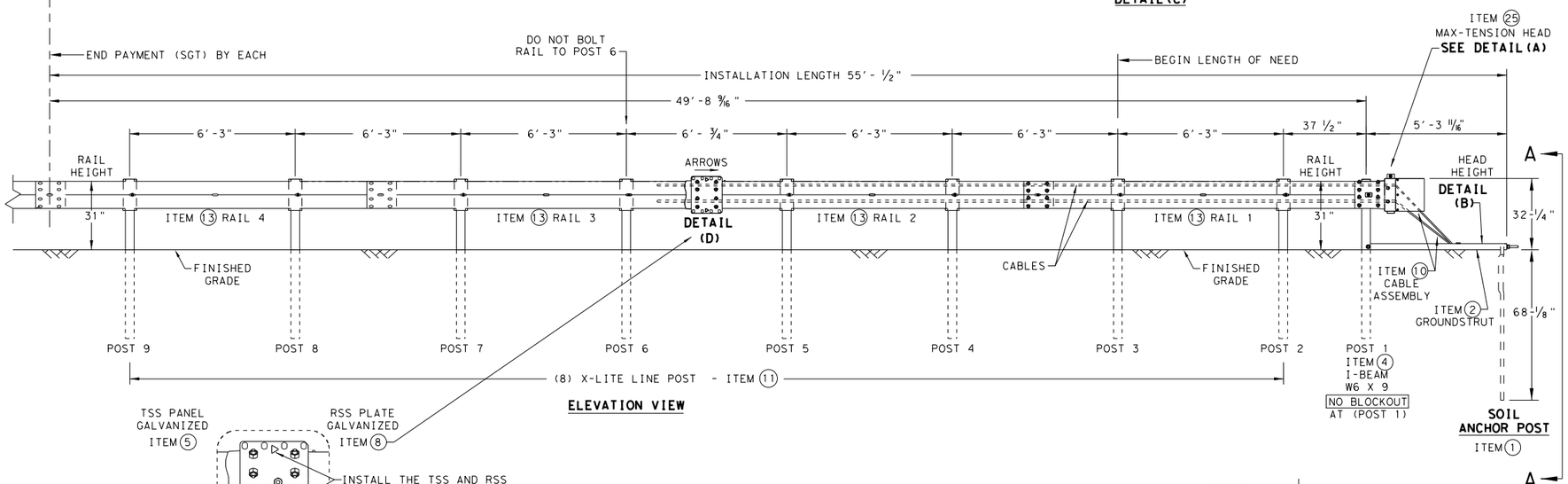
Design Division Standard

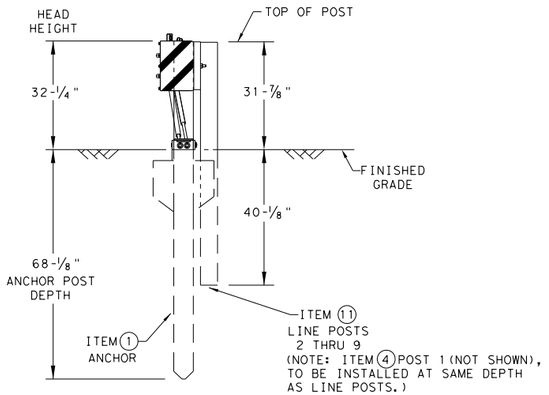
TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

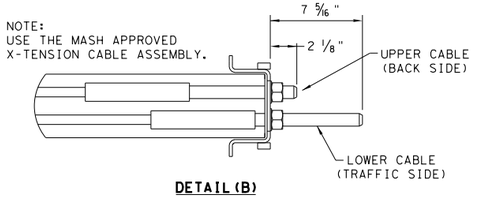
FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		61

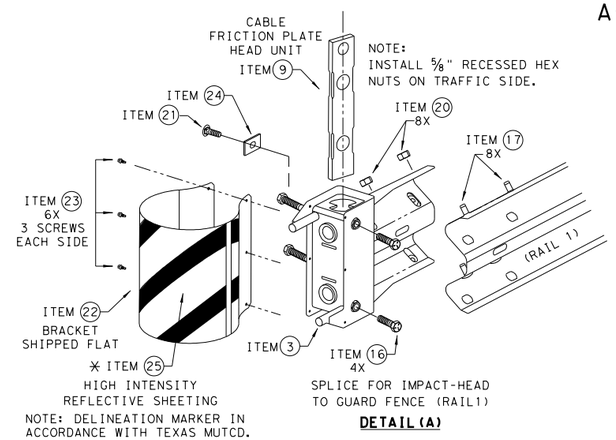
DATE:
FILE:

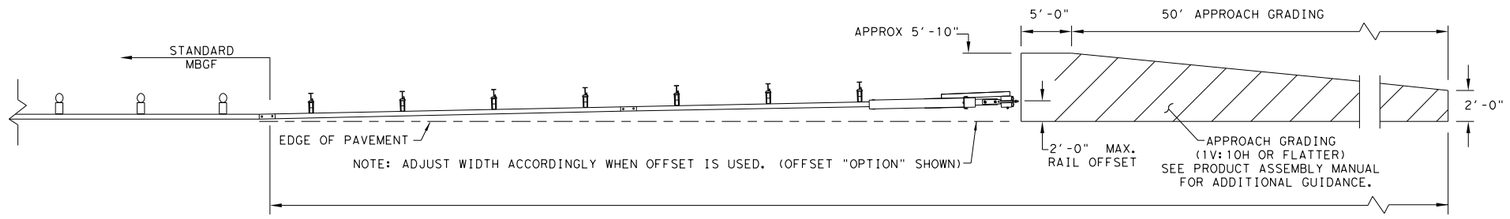












TRAFFIC FLOW

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION 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: 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	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO 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

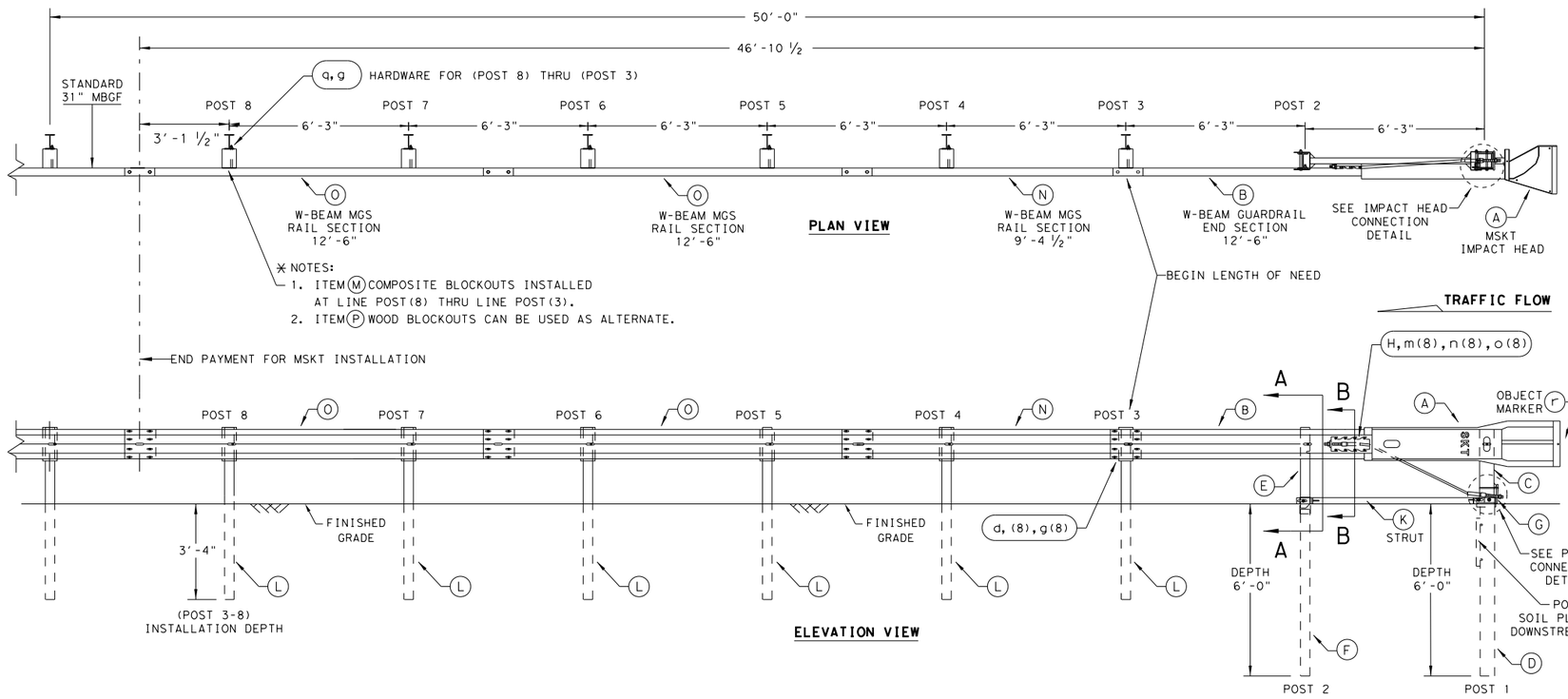
Texas Department of Transportation

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	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		62

DATE:
FILE:



NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

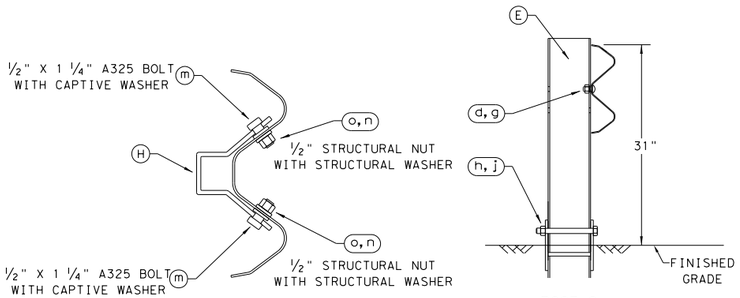
GENERAL NOTES

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 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	5/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/16" WASHER	W0516
c	2	5/16" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 3/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

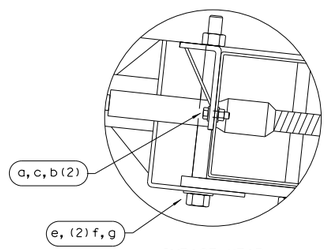
SEE NOTES: ✳

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

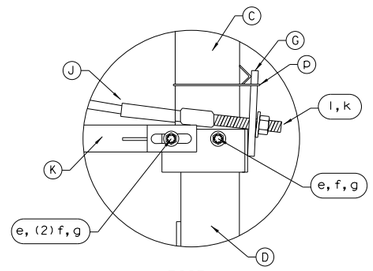


SECTION B-B
ANCHOR BRACKET

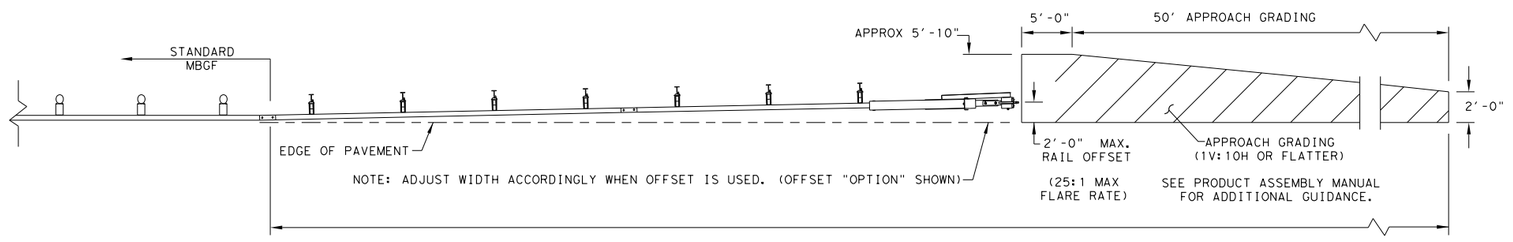
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

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

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

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		
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR		
	DIST	COUNTY		SHEET NO.		
	PHR	CAMERON		63		

SUMMARY OF BRIDGE QUANTITIES - BRIDGE #1(SOUTH PORT CONNECTOR)									
BID ITEM	409 - 6001	409 - 6004	420 - 6013	420 - 6025	422-6001	425 - 6039	432 - 6016	450 - 6006	454 - 6001
DESCRIPTION	PRESTR CONC PIL (16 IN SQ)	PRESTR CONC PIL (24 IN SQ)	CL C CONC (ABUT)	CL C CONC (BENT)	REINF CONC SLAB	PRESTR CONC GIRDER (TX54)	RIPRAP (STONE TYR) (DRY) (12IN)	RAIL (TY T223)	SEALED EXPANSION JOINT (4 IN) (SEJ-A)
	LF	LF	CY	CY	SF	LF	CY	LF	LF
2 - ABUTMENTS	40	1,008	80.6				174		
15 - INTERIOR BENTS		6,930		334.5					
2- 250.000' PRESTR CONC GIRDER UNIT					25,000.00	3,486.00		1,072.00	
4- 375.000' PRESTR CONC GIRDER UNIT					75,000.00	10,458.00		3,000.00	
TOTAL	40	7,938	80.6	334.5	100,000.00	13,944.00	174	4,072.00	350.00

BEARING SEAT ELEVATIONS

		GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7
ABUT 1 & 17	(FWD)	11.034	11.217	11.401	11.584	11.401	11.217	11.034
BENT 2~16	(BK)	11.034	11.217	11.401	11.584	11.401	11.217	11.034
	(FWD)	11.034	11.217	11.401	11.584	11.401	11.217	11.034
ABUT 17	(BK)	11.034	11.217	11.401	11.584	11.401	11.217	11.034

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

QUANTITIES
BRIDGE #1

SCALE:

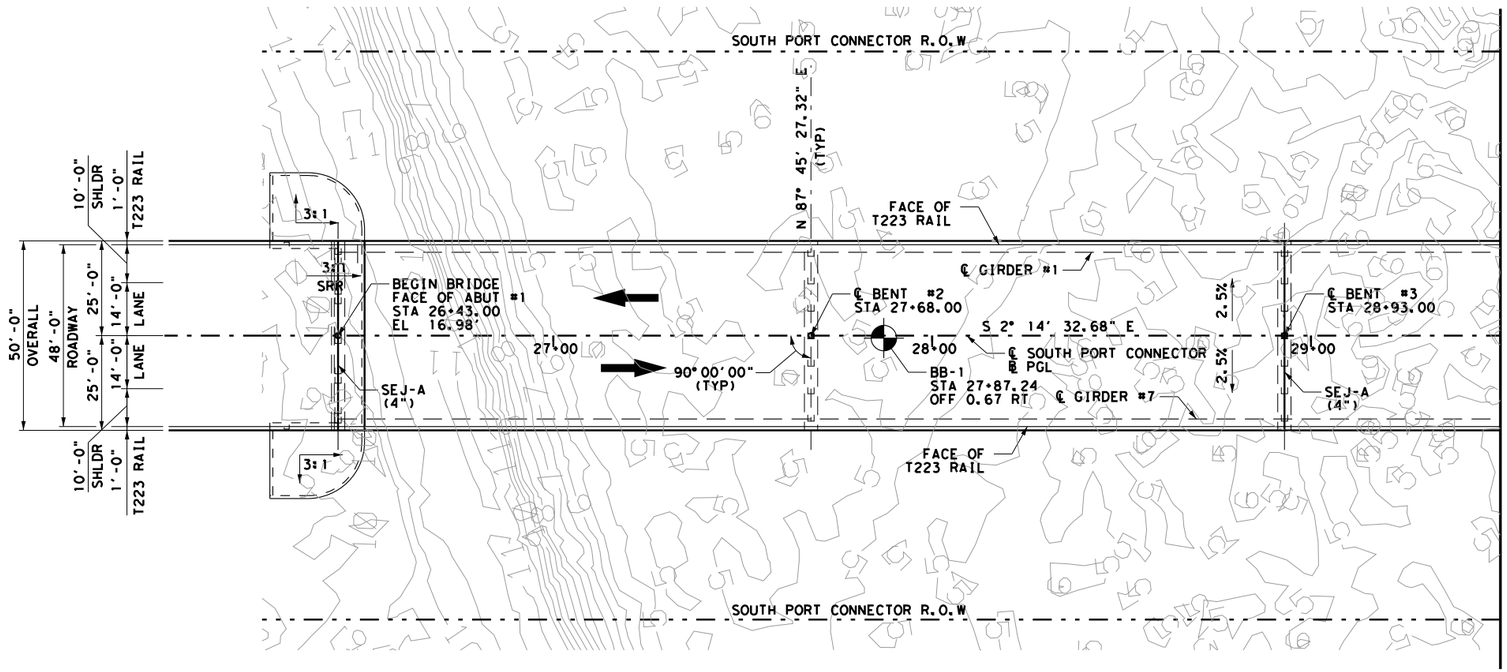
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 1
6			64
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7th EDITION (2014)
2. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL, MUST BE CORRECTED FOR GRADE CROWN AND/OR SUPERELEVATION.
3. PRESTRESSED CONC. I GIRDERS SUPPORT CONDITIONS: D: DENOTES GUIDED EXPANSION BEARING.
4. SEE "TYPICAL SECTIONS" SHEET FOR TYPICAL SECTIONS.
5. SEE "BORING LOGS" SHEET FOR BORING LOGS.
6. BORING LOG INFORMATION IS BASED ON PSI GEOTECHNICAL REPORT NO. 03282115 DATED DEC 18, 2018.
7. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION OR FABRICATION.

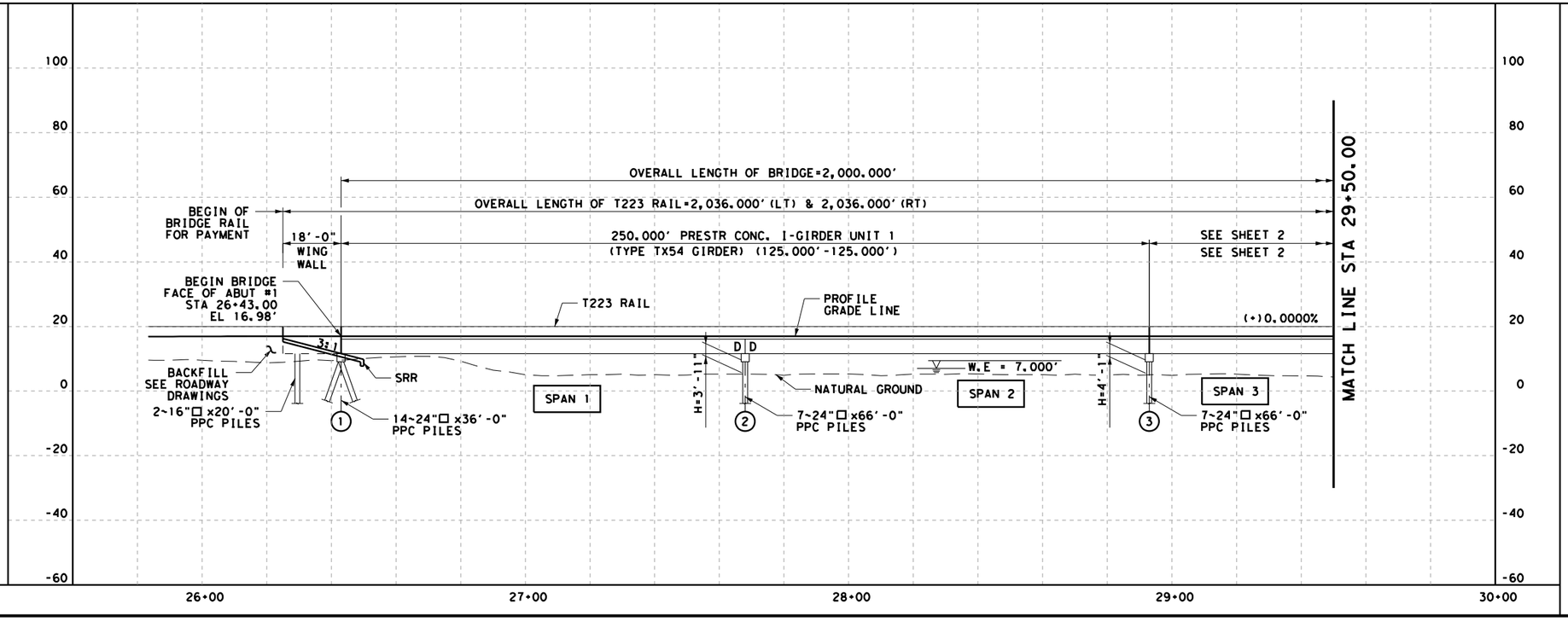
REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-001

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet, cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #1

SCALE: 1" = 40'

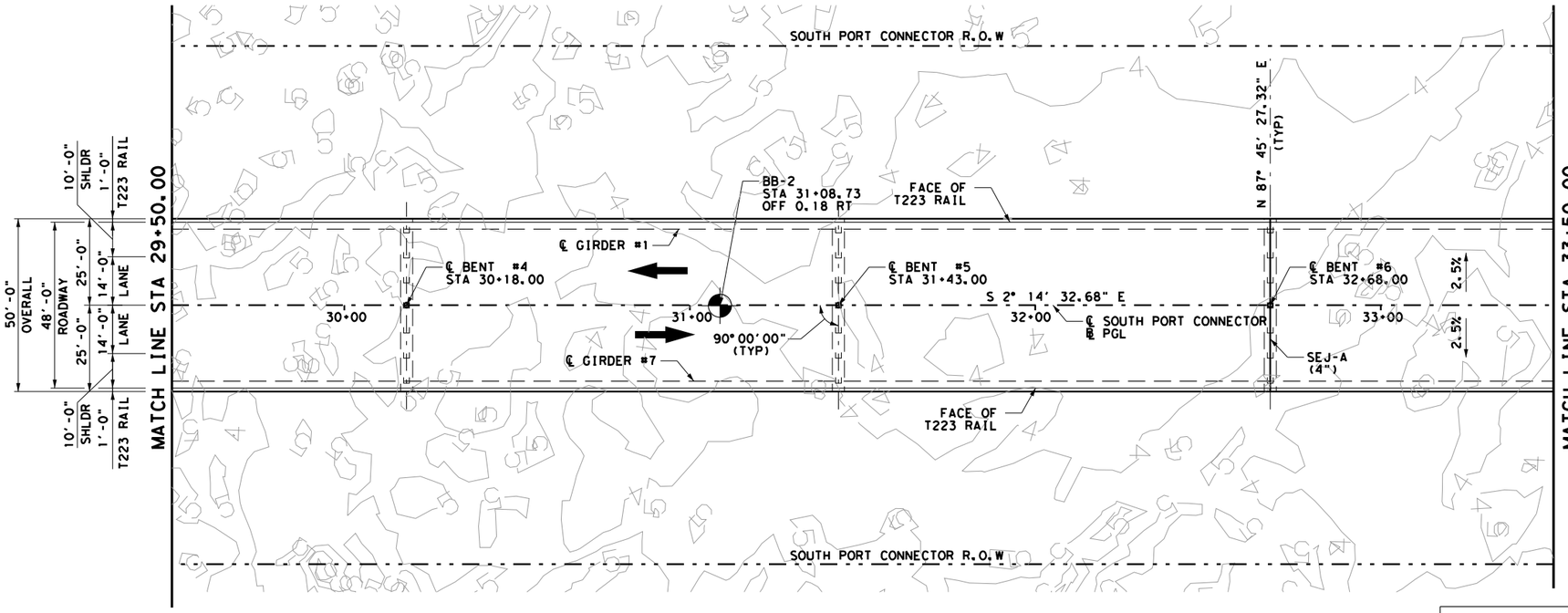
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 6
6			65
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



NOTES

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3. PRESTRESSED CONC. I GIRDERS SUPPORT CONDITIONS: D: DENOTES GUIDED EXPANSION BEARING.
4. SEE "TYPICAL SECTIONS" SHEET FOR TYPICAL SECTIONS.
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REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-001

HYDRULIC DATA				
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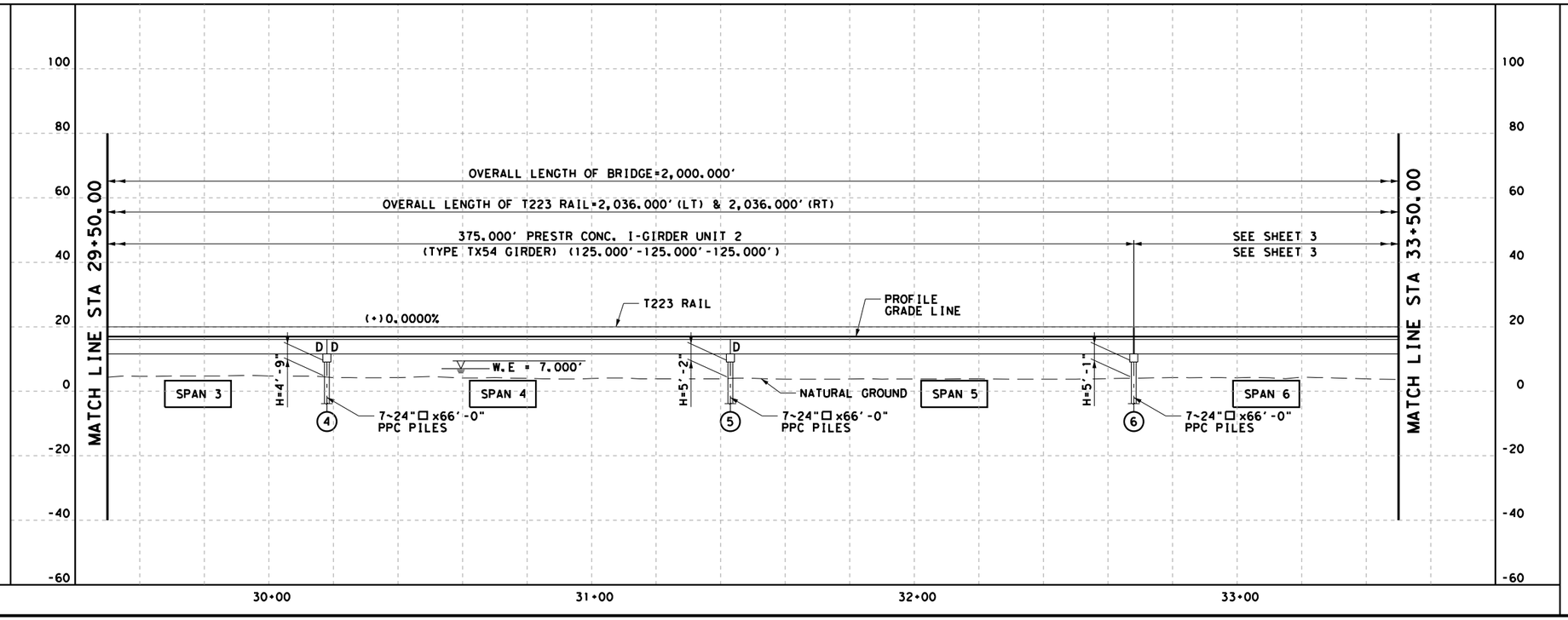
FREQ	cfs	Elev	Elev	Outlet,cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #1

SCALE: 1" = 40'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

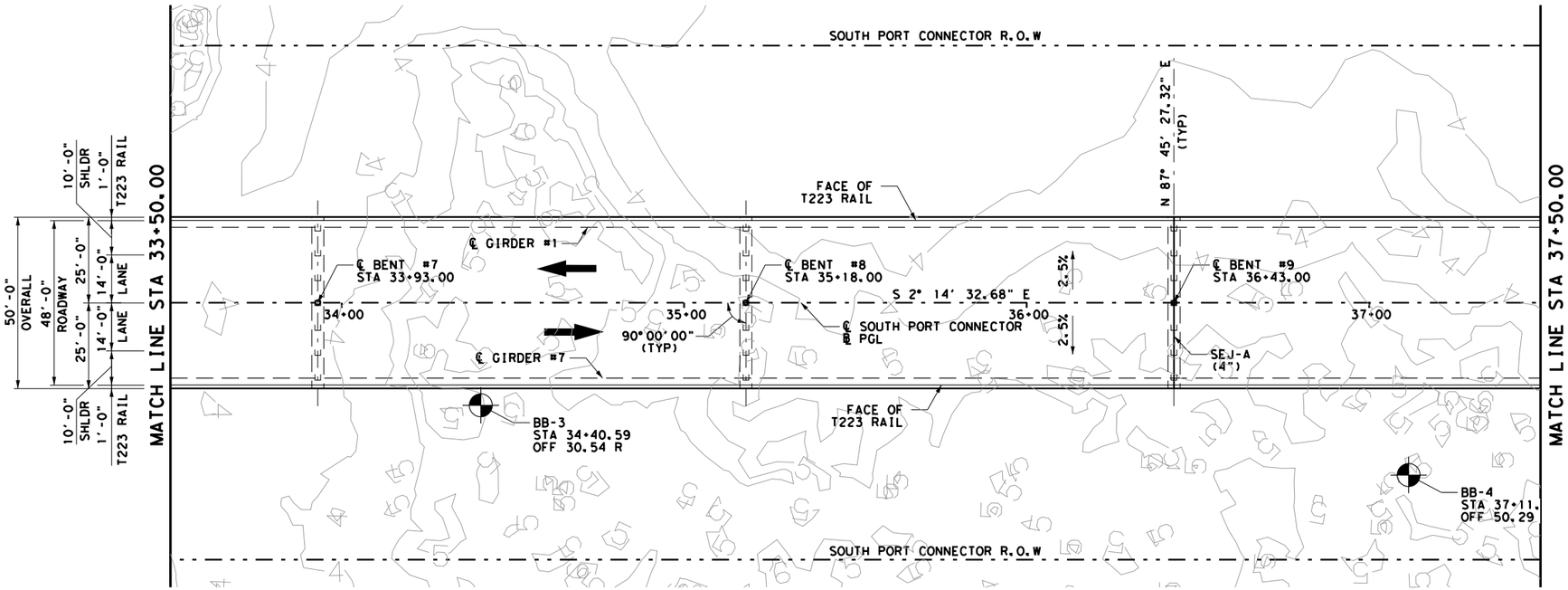
PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO. 2 OF 6
6		66

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR



NOTES

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2. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL, MUST BE CORRECTED FOR GRADE CROWN AND/OR SUPERELEVATION.
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4. SEE "TYPICAL SECTIONS" SHEET FOR TYPICAL SECTIONS.
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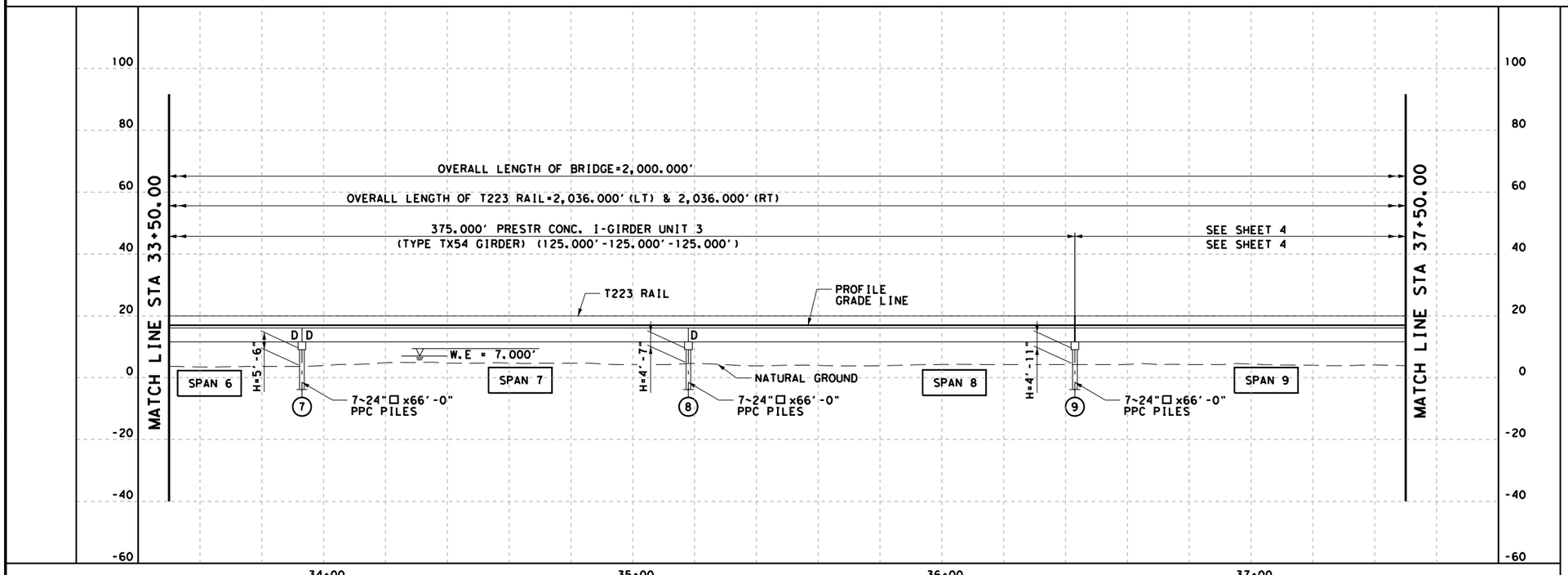
REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-001

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet,cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38



T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #1

SCALE: 1" = 40'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

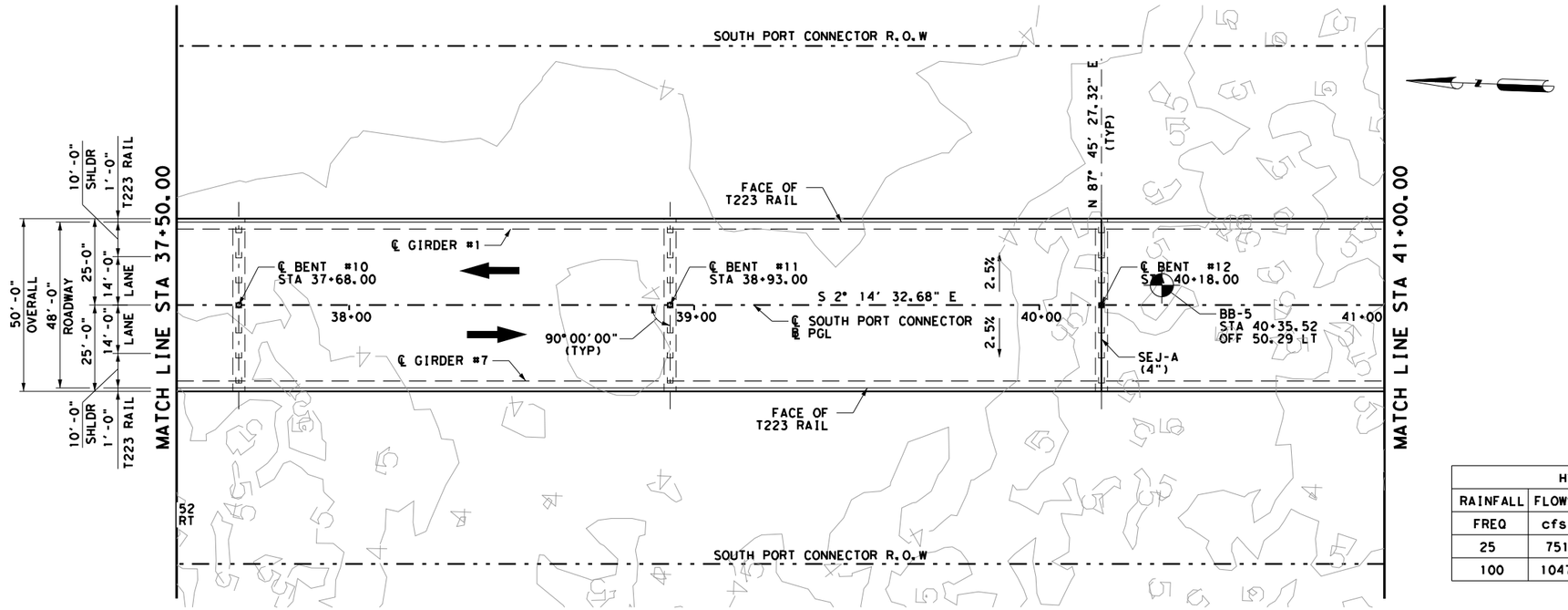
PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO. 3 OF 6
6		67

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR



NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7th EDITION (2014)
2. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL, MUST BE CORRECTED FOR GRADE CROWN AND/OR SUPERELEVATION.
3. PRESTRESSED CONC. I GIRDERS SUPPORT CONDITIONS: D: DENOTES GUIDED EXPANSION BEARING.
4. SEE "TYPICAL SECTIONS" SHEET FOR TYPICAL SECTIONS.
5. SEE "BORING LOGS" SHEET FOR BORING LOGS.
6. BORING LOG INFORMATION IS BASED ON PSI GEOTECHNICAL REPORT NO. 03282115 DATED DEC 18, 2018.
7. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION OR FABRICATION.

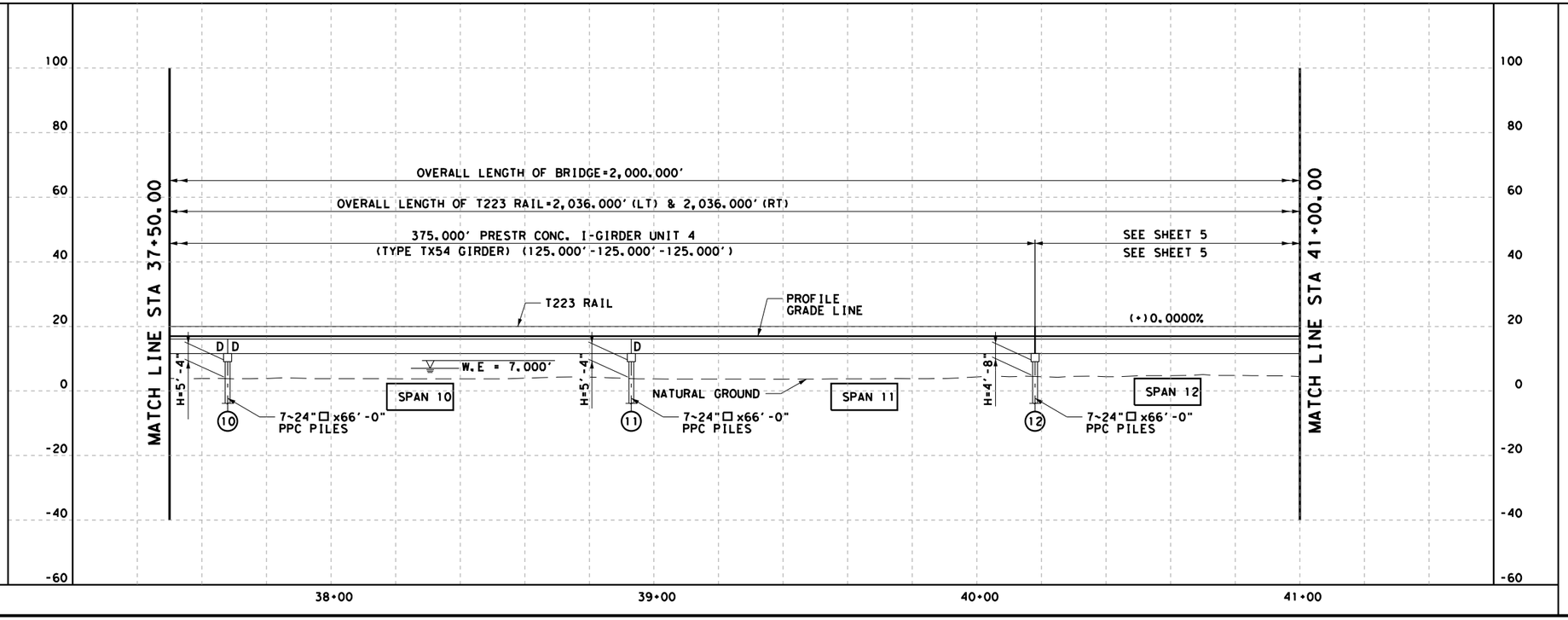
REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-001

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet,cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #1

SCALE: 1" = 40'

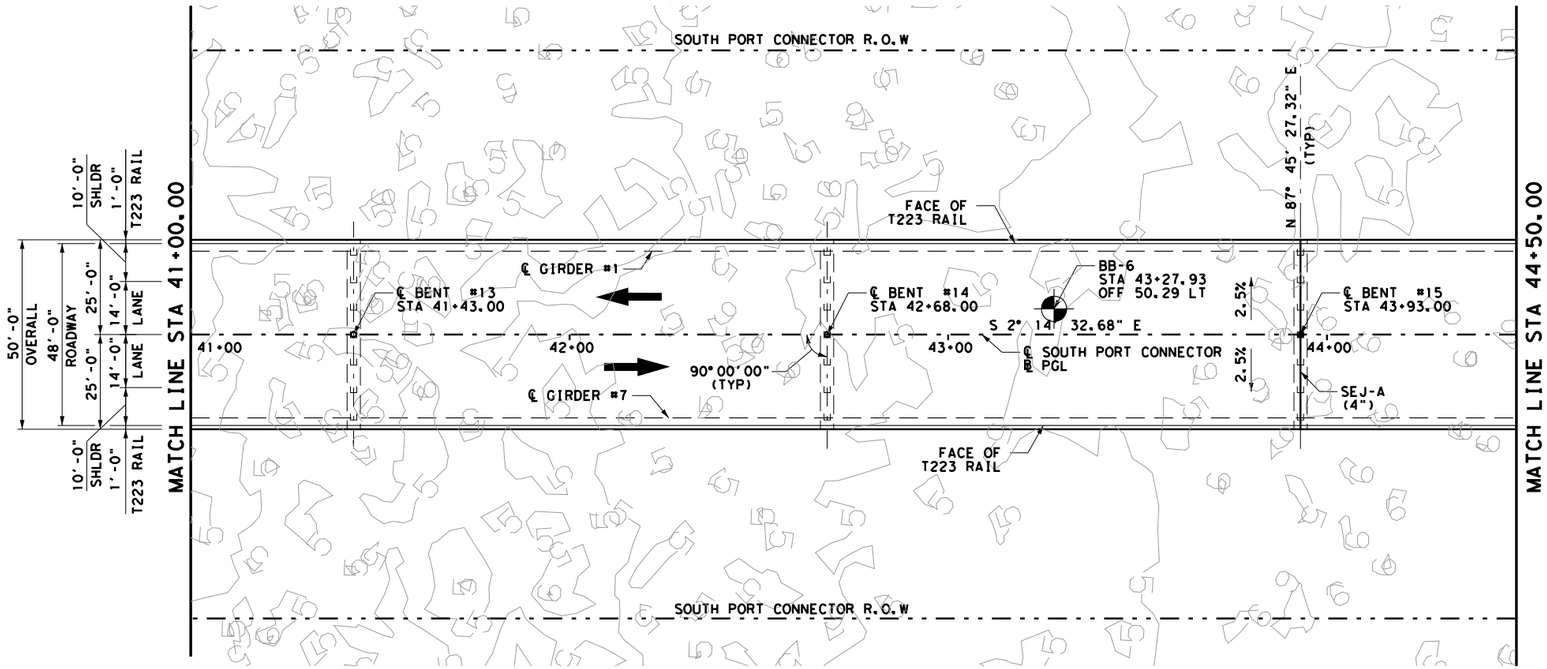
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 4 OF 6
6			68
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



NOTES

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3. PRESTRESSED CONC. I GIRDERS SUPPORT CONDITIONS: D: DENOTES GUIDED EXPANSION BEARING.
4. SEE "TYPICAL SECTIONS" SHEET FOR TYPICAL SECTIONS.
5. SEE "BORING LOGS" SHEET FOR BORING LOGS.
6. BORING LOG INFORMATION IS BASED ON PSI GEOTECHNICAL REPORT NO. 03282115 DATED DEC 18, 2018.
7. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION OR FABRICATION.

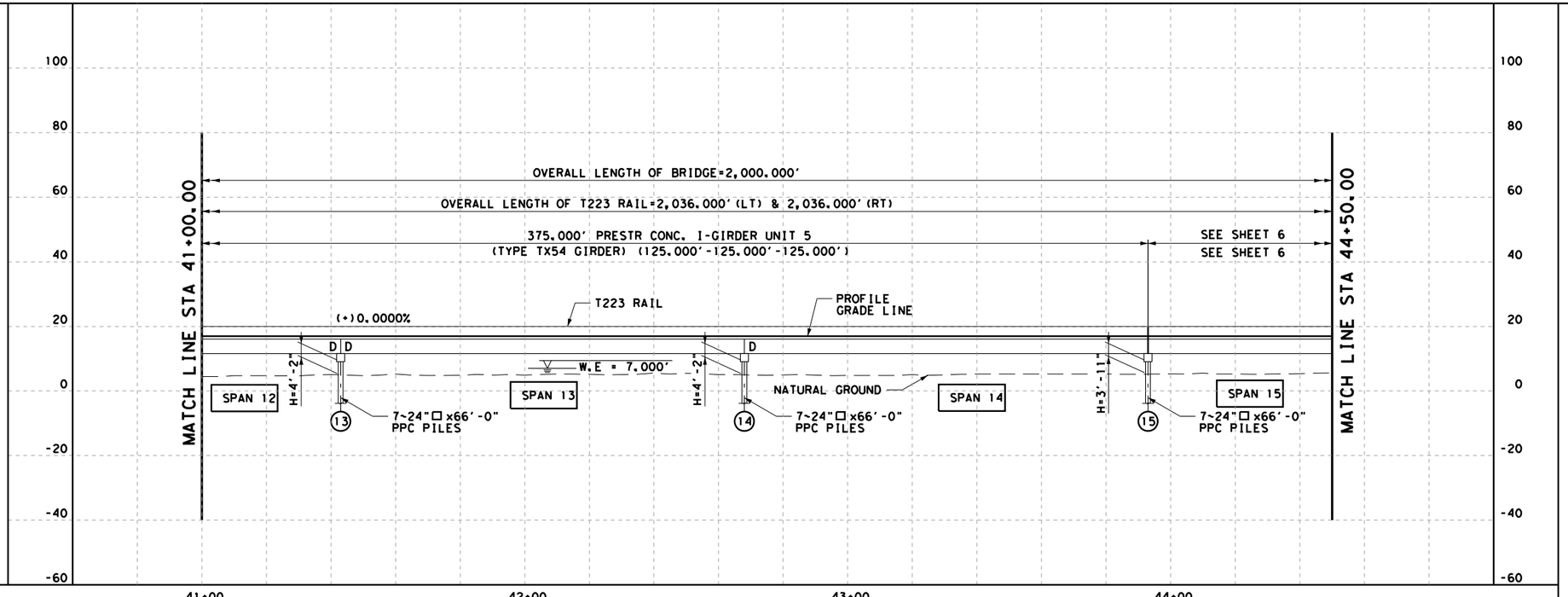
REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-001

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet,cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #1

SCALE: 1" = 40'

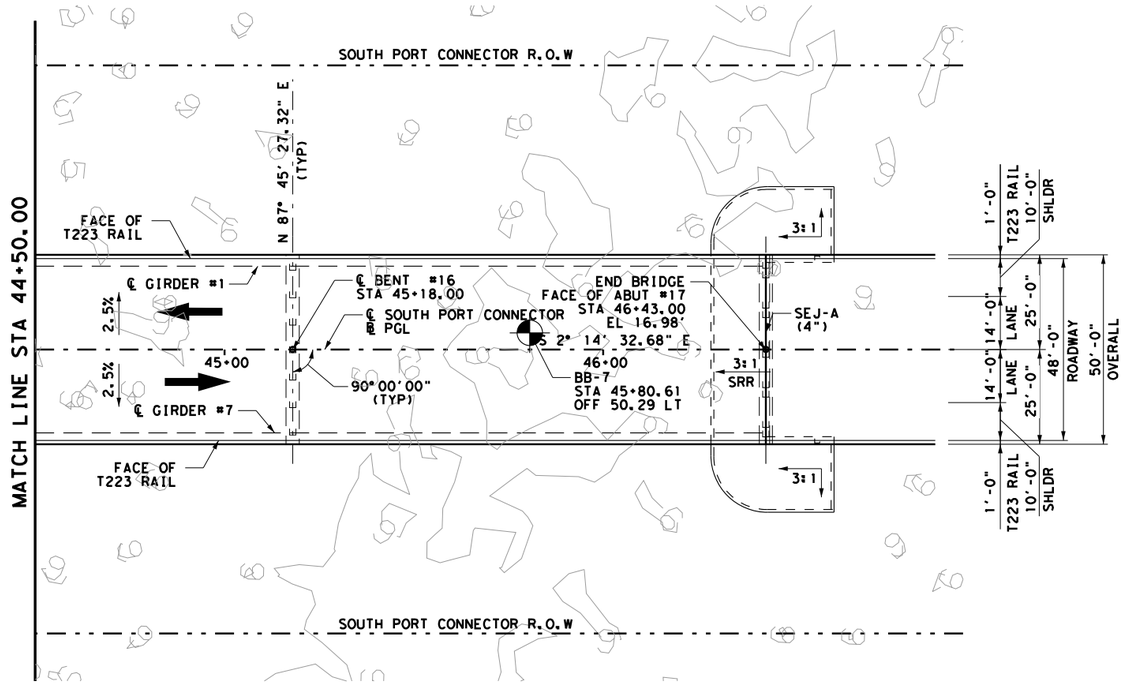
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 5 OF 6
6			69
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



NOTES

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3. PRESTRESSED CONC. I GIRDERS SUPPORT CONDITIONS: D: DENOTES GUIDED EXPANSION BEARING.
4. SEE "TYPICAL SECTIONS" SHEET FOR TYPICAL SECTIONS.
5. SEE "BORING LOGS" SHEET FOR BORING LOGS.
6. BORING LOG INFORMATION IS BASED ON PSI GEOTECHNICAL REPORT NO. 03282115 DATED DEC 18, 2018.
7. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION OR FABRICATION.

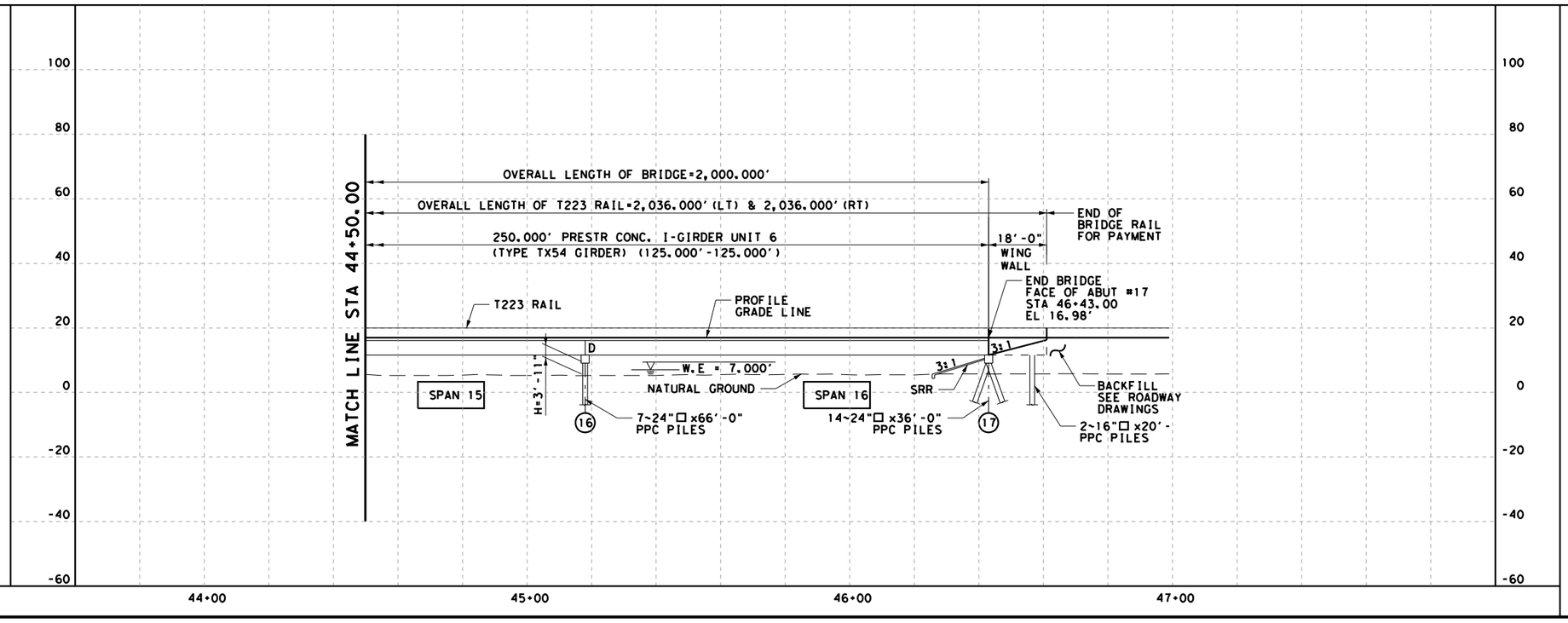
REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-001

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet,cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #1

SCALE: 1" = 40'

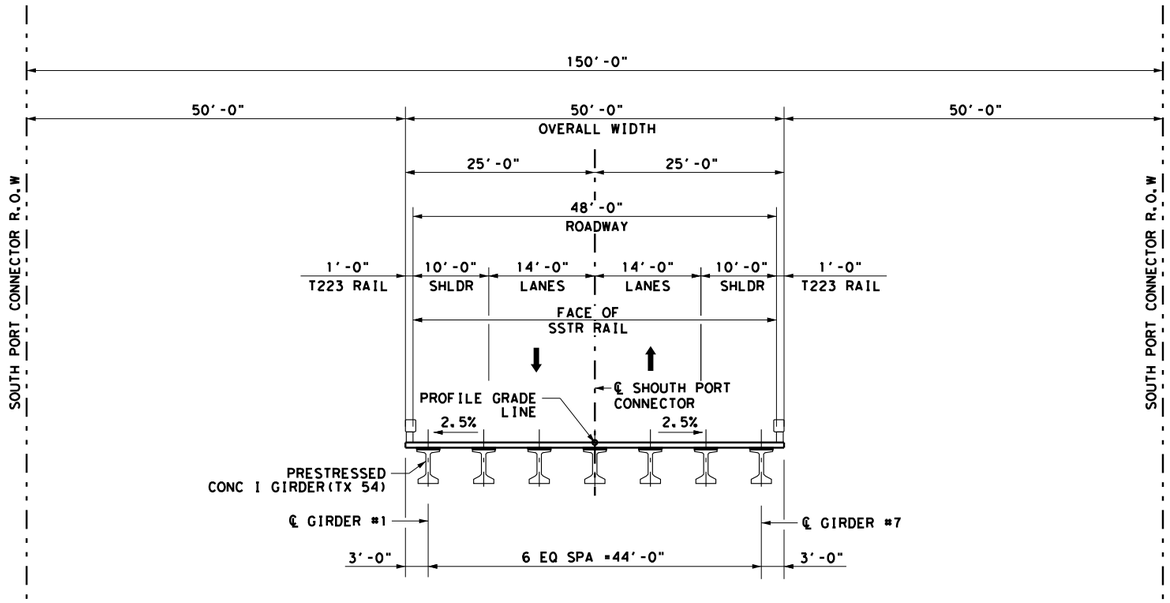
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 6 OF 6
6			70
DGN: JL	STATE	DIST.	COUNTY
CHK. DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK. DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



TYPICAL SECTION

SPAN 1~16

STATE OF TEXAS
JIE LIU
96367
LICENSED
PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

BRIDGE
TYPICAL SECTION
BRIDGE #1

SCALE: 1" = 20'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE
the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 1
6			71

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON

DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

DRILLING LOG

1 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-1
Structure
Station 28+00
Offset

District Pharr
Date 8/13/2018
Grnd. Elev. 5.00 ft
GW Elev. -4.50 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
		2 (6) 1 (6)	CLAY, sandy lean (CL), dark brown, firm, moist			27	35	22		-#200=52% / HP=0.25 tsf
						31				HP=0.75 tsf
5		2 (6) 2 (6)								
-3.			CLAY, fat (CH), brown, stiff, moist			37	70	47		-#200=90% / HP=2.0 tsf
-5. 10		4 (6) 4 (6)	SAND, clayey (SC), lt. brown, med. dense, moist							
						18				-#200=30% / HP=4.5+ tsf
15		17 (6) 17 (6)								
						15				HP=4.5+ tsf
-15. 20		9 (6) 8 (6)	CLAY, fat (CH), lt. brown, very stiff, moist							
						24	64	43		-#200=97% / HP=4.0 tsf
25		15 (6) 14 (6)								
						18				HP=4.0 tsf
-25. 30		13 (6) 15 (6)								
			CLAY, sandy lean (CL), brown, stiff, moist							
						21		129		-#200=69% / UC=3.59 tsf
35		15 (6) 17 (6)								
				19.50	12.98	24				HP=1.0 tsf
40		25 (6) 50 (3.5)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

2 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-1
Structure
Station 28+00
Offset

District Pharr
Date 8/13/2018
Grnd. Elev. 5.00 ft
GW Elev. -4.50 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, sandy lean (CL), brown, stiff, moist							
-40. 45		10 (6) 12 (6)				22				HP=3.25 tsf
			CLAY, fat (CH), lt. brown, very stiff, moist							
						23	59	38		-#200=100% / HP=4.5 tsf
50		15 (6) 16 (6)								
						23				HP=3.25 tsf
-50. 55		19 (6) 20 (6)								
			CLAY, sandy lean (CL), lt. brown, very stiff, moist							
						25				-#200=63%
60		12 (3) 50 (5)								
						24				SPT=35 b/ft
65		20 (6) 21 (6)								
						24				SPT=23 b/ft
70		26 (6) 20 (6)								
-70. 75		17 (6) 16 (6)		33.20	24.45	28	50	30		-#200=99% / HP=2.0 tsf
-72.			CLAY, fat (CH), lt. brown, stiff, moist							
			CLAY, sandy lean (CL), lt. brown, very stiff, moist			25				-#200=51%
80		45 (6) 50 (4)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

3 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-1
Structure
Station 28+00
Offset

District Pharr
Date 8/13/2018
Grnd. Elev. 5.00 ft
GW Elev. -4.50 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, sandy lean (CL), lt. brown, very stiff, moist							
85		12 (3.5) 50 (4.5)								
						29				SPT=39 b/ft
-85. 90		18 (6) 20 (6)								
			CLAY, fat (CH), lt. brown, very stiff, moist			25	58	37		-#200=100% / SPT=22 b/ft
-88.			CLAY, lean (CL), dark brown, very stiff, moist			23				-#200=90% / HP=3.75 tsf
95		44 (6) 35 (6)								
						23				SPT=31 b/ft
100		18 (6) 20 (6)								
						28	35	14		-#200=98% / SPT=15 b/ft
-102. 105		16 (6) 20 (6)								
			SAND, clayey (SC), dark gray, dense, moist			27				-#200=42% / SPT=42 b/ft
110		26 (6) 24 (6)								
						26				SPT=50 b/ft
115		12 (2) 50 (3.5)								
-115. 120		50 (6) 50 (6)				26				SPT=31 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

1 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-2
Structure
Station 31+25
Offset

District Pharr
Date 8/21/2018
Grnd. Elev. 4.00 ft
GW Elev. -2.50 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
		2 (6) 2 (6)	CLAY, fat with sand (CH), dark brown, firm, moist			27	52	36		-#200=71% / HP=1.75 tsf
5		3 (6) 3 (6)								
						32				HP=0.5 tsf
-6. 10		2 (6) 3 (6)								
			SAND, clayey (CL-SC), lt. gray, medium dense, moist							
						19				-#200=34% / HP=4.5 tsf
15		11 (6) 14 (6)								
						16				HP=4.5+ tsf
-16. 20		17 (6) 17 (6)								
			CLAY, fat (CH), lt. brown, hard to very stiff, moist							
						24	58	40		-#200=99% / HP=4.5 tsf
25		12 (6) 14 (6)								
						23				-#200=92% / HP=3.0 tsf
30		20 (6) 20 (6)								
						23	62	43		-#200=100% / HP=4.5+ tsf
35		22 (6) 20 (6)								
						24				-#200=87% / HP=1.5 tsf
40		12 (6) 17 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

2 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-2
Structure
Station 31+25
Offset

District Pharr
Date 8/21/2018
Grnd. Elev. 4.00 ft
GW Elev. -2.50 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, fat (CH), lt. brown, hard to very stiff, moist			25				HP=0.75 tsf
45		13 (6) 14 (6)								
						23	68	48		-#200=100% / SPT=20 b/ft
50		16 (6) 24 (6)								
						24		128		UC=2.77 tsf
-51. 55		10 (6) 14 (6)								
			SAND, clayey (SC), lt. brown, medium dense, moist							
60		12 (1.5) 50 (3)				24				-#200=15% / SPT=31 b/ft
				32.60	6.56	26				HP=1.0 tsf
65		14 (6) 10 (6)								
						25	45	28		-#200=100% / SPT=15 b/ft
-66. 70		19 (6) 20 (6)								
			CLAY, lean (CL), lt. brown, stiff to very stiff, moist			24		124		UC=2.49 tsf
75		16 (6) 21 (6)								
						24				-#200=99% / HP=1.75 tsf
-76. 80		19 (6) 18 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

3 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-2
Structure
Station 31+25
Offset

District Pharr
Date 8/21/2018
Grnd. Elev. 4.00 ft
GW Elev. -2.50 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, fat (CH), lt. brown, hard, moist							
85		19 (6) 18 (6)				33	65	44		-#200=100% / SPT=19 b/ft
						25				HP=4.5 tsf
90		26 (6) 25 (6)								
						26				HP=4.5 tsf
-91. 95		27 (6) 22 (6)								
			CLAY, fat (CH), dark brown, very stiff, moist			18	67	45		-#200=100% / HP=3.25 tsf
100		33 (6) 42 (6)								
						31				SPT=22 b/ft
105		23 (6) 23 (6)								
						34				HP=3.5 tsf
110		17 (6) 20 (6)								
						23				HP=4.5+ tsf
-111. 115		45 (6) 50 (6)								
			SAND, clayey (SC), dark gray, medium dense, sat							
120		12 (2) 50 (5)				25				-#200=22% / SPT=43 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

P:\2018\Geotechnical\03282115 Port Connector\Port Connector 03282115.CLG

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR
BORING LOGS
BRIDGE #1

SCALE:

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO. 1 OF 4
6		72

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:11:43 PM

Plotted by: todv
Design Filename: S:\project\u2299\500*PS&E\PlanSet01\Dgn\brg\BRIDGE 1\2299100SB0R01SB-BOR.dgn

DRILLING LOG

1 of 3

WinCore Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-3
Structure
Station 34+25
Offset

District Pharr
Date 8/22/2018
Grnd. Elev. 4.00 ft
GW Elev. -5.00 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
		2 (6) 2 (6)	CLAY, fat (CH), brown, frim, moist			37	74	51		-#200=96% / HP=1.0 tsf
1.						30	57	40		-#200=75% / HP=0.75 tsf
	5	2 (6) 2 (6)	CLAY, fat with sand (CH), lt. gray, firm, moist			35				HP=1.0 tsf
						25				HP=0.5 tsf
-6.	10	2 (6) 3 (6)								
			CLAY, fat (CH), lt. brown, stiff, moist			38	78	54		-#200=97% / HP=2.0 tsf
	15	3 (6) 6 (6)								
						18			133	UC=3.59 tsf
	20	6 (6) 8 (6)								
						27				HP=3.75 tsf
-21.	25	14 (6) 13 (6)								
			CLAY, lean (CL), lt. brown, very stiff, moist			22				-#200=87% / HP=2.5 tsf
	30	20 (6) 20 (6)								
						18				HP=4.5 tsf
	35	16 (6) 15 (6)								
						22				HP=3.5 tsf
-36.	40	17 (6) 30 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

2 of 3

WinCore Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-3
Structure
Station 34+25
Offset

District Pharr
Date 8/22/2018
Grnd. Elev. 4.00 ft
GW Elev. -5.00 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, fat (CH), lt. brown, hard, moist							
	45	10 (6) 12 (6)				23	52	33		-#200=100% / HP=4.5 tsf
	50	16 (6) 17 (6)				24				HP=4.5 tsf
	55	12 (6) 18 (6)				25				HP=4.5 tsf
-56.	60	12 (4.5) 50 (2.5)				26				-#200=22% / SPT=24 b/ft
			SAND, clayey (SC), lt. brown, medium dense, wet							
-61.	65	15 (6) 17 (6)				27	54	36		-#200=100% / HP=2.25 tsf
			CLAY, fat (CH), lt. brown, stiff to very stiff, moist							
	70	15 (6) 24 (6)				25				-#200=99% / SPT=18 b/ft
	75	21 (6) 19 (6)				23	61	41		-#200=100% / HP=4.0 tsf
						27				HP=2.0 tsf
	80	20 (6) 22 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

3 of 3

WinCore Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-3
Structure
Station 34+25
Offset

District Pharr
Date 8/22/2018
Grnd. Elev. 4.00 ft
GW Elev. -5.00 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, fat (CH), lt. brown, stiff to very stiff, moist							
	85	23 (6) 23 (6)				28				HP=4.5 tsf
						29				HP=4.0 tsf
-86.	90	21 (6) 25 (6)								
			CLAY, lean (CL), lt. brown, very stiff, wet			31	41	25		-#200=100% / HP=2.25 tsf
	95	18 (6) 21 (6)								
	100	20 (6) 22 (6)				35				HP=3.25 tsf
						24				-#200=97% / HP=3.75 tsf
	105	29 (6) 28 (6)								
-106.	110	19 (6) 19 (6)				35	65	45		SPT=18 b/ft
			CLAY, fat (CH), dark brown, very stiff, wet			29				HP=4.0 tsf
-111.	115	22 (6) 24 (6)								
			SAND, clayey (SW-SC), dark gray, dense, sat			31				-#200=9%
-116.	120	12 (2) 50 (2.5)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

1 of 3

WinCore Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-4
Structure
Station 37+25
Offset

District Pharr
Date 8/24/18
Grnd. Elev. 4.00 ft
GW Elev. -1.50 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
		1 (6) 1 (6)	CLAY, sandy lean (CL), lt. brown, soft, moist			23	40	28		-#200=55% / HP=0.5 tsf
	5	2 (6) 2 (6)				23				HP=0.5 tsf
-6.	10	4 (6) 5 (6)	SAND, clayey (SC), lt. gray, loose, moist							
						25				-#200=25%
-11.	15	3 (6) 5 (6)								
			CLAY, sandy lean (CL), lt. gray, stiff, moist			16				-#200=52% / HP=4.5+ tsf
-16.	20	12 (6) 13 (6)								
			CLAY, lean with sand (CL), tl. brown, stiff to very stiff, moist			20	45	32		-#200=75% / HP=4.5+ tsf
	25	15 (6) 13 (6)								
						21				HP=4.5 tsf
	30	27 (6) 25 (6)								
-31.	35	20 (6) 18 (6)				23			130	UC=2.22 tsf
			CLAY, sandy lean (CL), lt. brown, very stiff, moist							
						24				-#200=50% / HP=0.75 tsf
-36.	40	10 (6) 12 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

2 of 3

WinCore Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-4
Structure
Station 37+25
Offset

District Pharr
Date 8/24/18
Grnd. Elev. 4.00 ft
GW Elev. -1.50 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, fat (CH), lt. brown, very stiff, moist							
	45	21 (6) 20 (6)				22	52	35		-#200=100% / SPT=21 b/ft
	50	17 (6) 18 (6)				22				HP=4.25 tsf
-51.	55	14 (6) 17 (6)				25				HP=4.5 tsf
			SAND, clayey (SC), lt. brown, medium dense, wet							
	60	12 (4) 50 (5)				28				-#200=35% / SPT=33 b/ft
	65	26 (6) 19 (6)				24				SPT=18 b/ft
-66.	70	14 (6) 16 (6)				20			130	UC=3.93 tsf
			CLAY, fat (CH), lt. brown, very stiff, moist							
	75	19 (6) 23 (6)				23	51	33		-#200=100% / HP=3.25 tsf
	80	19 (6) 24 (6)				28				SPT=17 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

3 of 3

WinCore Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-4
Structure
Station 37+25
Offset

District Pharr
Date 8/24/18
Grnd. Elev. 4.00 ft
GW Elev. -1.50 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, fat (CH), lt. brown, very stiff, moist							
	85	19 (6) 19 (6)				27				HP=4.5+ tsf
						26				HP=4.5+ tsf
-86.	90	25 (6) 25 (6)								
			CLAY, sandy lean (CL), lt. brown, medium dense, wet			25				-#200=67%
-91.	95	14 (6) 16 (6)								
			CLAY, fat (CH), dark brown, very stiff, wet							
	100	19 (6) 21 (6)				30	68	47		-#200=100% / SPT=23 b/ft
						32				HP=3.5 tsf
	105	16 (6) 16 (6)								
						31				HP=3.25 tsf
	110	20 (6) 19 (6)								
						28				HP=3.0 tsf
-111.	115	24 (6) 29 (6)								
			SAND, clayey (SC), dark gray, medium dense, sat							
-116.	120	12 (2) 50 (4.5)				30				-#200=26% / SPT=25 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR
BORING LOGS
BRIDGE #1

SCALE:

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO. 2 OF 4
6		73

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:11:46 PM

DRILLING LOG

1 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-5	District	Pharr
Highway	South Port Connector	Structure		Date	8/9/18
CSJ	0921-06-288	Station	40+50	Grnd. Elev.	4.00 ft
		Offset		GW Elev.	-2.00 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
		1 (6) 1 (6)	CLAY, fat with sand (CH), lt. brown, firm, moist			25	53	35		-#200=80% / HP=0.25 tsf
						29				HP=1.5 tsf
5		2 (6) 3 (6)								
						31				HP=0.5 tsf
-6.	10	3 (6) 3 (6)	SAND, clayey (SC), lt. gray, hard, moist							
15		15 (6) 17 (6)				14				-#200=29% / HP=4.5 tsf
						15				HP=4.5 tsf
-16.	20	20 (6) 21 (6)	CLAY, fat (CH), lt. brown, hard, moist							
25		15 (6) 16 (6)				25	62	45		-#200=99% / HP=4.25 tsf
						19				HP=4.5+ tsf
-26.	30	17 (6) 19 (6)	CLAY, fat (CH), lt. brown, hard, moist							
35		11 (6) 12 (6)				21				-#200=92% / HP=3.5 tsf
						27				HP=2.0 tsf
40		12 (6) 11 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression (tsf)

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

2 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-5	District	Pharr
Highway	South Port Connector	Structure		Date	8/9/18
CSJ	0921-06-288	Station	40+50	Grnd. Elev.	4.00 ft
		Offset		GW Elev.	-2.00 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, fat (CH), lt. brown, hard, moist							
45		9 (6) 11 (6)				21	62	40		-#200=99% HP=4.5 tsf
50		15 (6) 17 (6)				23				HP=4.0 tsf
						23				HP=4.25 tsf
-51.	55	14 (6) 16 (6)	SAND, clayey (SC), lt. brown, medium to dense, moist							
60		17 (6) 28 (6)				31				
						27				SPT=31 b/ft
-61.	65	41 (6) 17 (6)	CLAY, lean (CL), lt. brown, hard, moist			22	44	27		-#200=99% / SPT=16 b/ft
70		11 (6) 11 (6)				25				HP=4.5 tsf
75		17 (6) 18 (6)				25				HP=2.0 tsf
						26				HP=4.0 tsf
80		19 (6) 18 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression (tsf)

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

3 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-5	District	Pharr
Highway	South Port Connector	Structure		Date	8/9/18
CSJ	0921-06-288	Station	40+50	Grnd. Elev.	4.00 ft
		Offset		GW Elev.	-2.00 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, lean (CL), lt. brown, hard, moist							
-81.	85	16 (6) 20 (6)				25				HP=4.0 tsf
			CLAY, fat (CH), dark brown, very stiff, moist							
90		16 (6) 20 (6)				22	53	31		-#200=99% / HP=3.0 tsf
						26				-#200=99% / HP=3.5 tsf
95		22 (6) 21 (6)								
						31	53	27		-#200=99% / HP=3.5 tsf
100		19 (6) 20 (6)								
						24				-#200=99% / HP=1.25 tsf
105		22 (6) 21 (6)								
						31	60	36		-#200=99% / HP=2.5 tsf
110		16 (6) 26 (6)								
						21				HP=4.5+ tsf
115		21 (6) 22 (6)								
						26				-#200=89% HP=2.5 tsf
-116.	120	23 (6) 24 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression (tsf)

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: EnviroCore **Logger: CO** **Organization: PSI**

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Plotted by: todv
Design Filename: S:\project\u2299\500*PS&E\PlanSet01\Dgn\brg\BRIDGE 1\2299100SB0R01SB-BOR.dgn

DRILLING LOG

1 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-6	District	Pharr
Highway	South Port Connector	Structure		Date	9/5/2018
CSJ	0921-06-288	Station	43+50	Grnd. Elev.	5.00 ft
		Offset		GW Elev.	0.50 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
		2 (6) 2 (6)	CLAY, lean (CL), brown, firm, moist			23				SPT=4 b/ft
						23	44	31		HP=1.25 tsf
5		4 (6) 5 (6)								
						27				HP=0.5 tsf
-5.	10	2 (6) 3 (6)	SAND, clayey (SC), lt. brown, medium dense, moist							
15		20 (6) 20 (6)				18				-#200=25% / HP=0.25 tsf
						14				HP=4.5+ tsf
-15.	20	15 (6) 16 (6)	CLAY, fat (CH), lt. brown, very stiff, moist							
25		6 (6) 7 (6)				22	53	37		HP=4.5 tsf
						24				HP=4.5+ tsf
30		20 (6) 15 (6)								
-30.	35	30 (6) 35 (6)	CLAY, lean with sand (CL), lt. brown, very stiff, moist			28				-#200=83% / SPT=16 b/ft
40		16 (6) 22 (6)				28				SPT=6 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

2 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-6	District	Pharr
Highway	South Port Connector	Structure		Date	9/5/2018
CSJ	0921-06-288	Station	43+50	Grnd. Elev.	5.00 ft
		Offset		GW Elev.	0.50 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, lean with sand (CL), lt. brown, very stiff, moist							
-40.	45	14 (6) 17 (6)				28	53	34		SPT=15 b/ft
			CLAY, fat (CH), lt. brown, very stiff, moist							
50		11 (6) 14 (6)				23				HP=4.25 tsf
						22				HP=4.25 tsf
55		9 (6) 8 (6)								
-55.	60	20 (6) 22 (6)	SAND, clayey (SC), lt. brown, medium dense, sat			27				-#200=24% / SPT=29 b/ft
-60.	65	20 (6) 12 (6)	CLAY, fat (CH), lt. borwn, very stiff to hard, moist			30	62	43		SPT=19 b/ft
70		10 (6) 12 (6)				26		128		UC=2.96 tsf
75		17 (6) 20 (6)				24				HP=4.0 tsf
						23	55	38		HP=4.25 tsf
80		16 (6) 20 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

3 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-6	District	Pharr
Highway	South Port Connector	Structure		Date	9/5/2018
CSJ	0921-06-288	Station	43+50	Grnd. Elev.	5.00 ft
		Offset		GW Elev.	0.50 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, fat (CH), lt. borwn, very stiff to hard, moist							
85		17 (6) 20 (6)				26				HP=4.5 tsf
						19				HP=4.5 tsf
90		12 (6) 14 (6)								
-90.	95	29 (6) 50 (3.5)				20				-#200=24% / SPT=23 b/ft
-92.			SAND, clayey (SC), lt. brown, medium dense, moist							
			CLAY, fat (CH), lt. brown, hard to very stiff, moist			26	62	41		HP=4.5+ tsf
100		16 (6) 18 (6)								
-100.	105	20 (6) 22 (6)	CLAY, sandy lean (CL), dark gray, very stiffo hard, moist			26				HP=4.0 tsf
						26				-#200=56% / HP=0.75 tsf
-105.	110	40 (6) 30 (6)	CLAY, lean (CL), dark brown, very stiff, moist							
115		15 (6) 18 (6)				30	40	25		SPT=20 b/ft
-115.	120	43 (6) 50 (6)				25				-#200=82% / SPT=54 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore **Logger: CO** **Organization: PSI**

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T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR
BORING LOGS
BRIDGE #1

SCALE:

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO. 3 OF 4
6		74

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

DRILLING LOG

WinCore Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-7
Structure
Station 46+00
Offset

District Pharr
Date 9/11/2018
Grnd. Elev. 5.00 ft
GW Elev. -1.50 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
		3 (6) 3 (6)	CLAY, fat (CH), lt. brown, firm, moist			30	58	40		-#200=97% / HP=1.25 tsf
						30				HP=0.75 tsf
5		2 (6) 2 (6)								
						29				HP=1.25 tsf
10		4 (6) 3 (6)								
						28				HP=0.75 tsf
-10. 15		10 (6) 14 (6)	SAND, clayey (SC), lt. gray, medium dense, moist							
20		12 (6) 14 (6)				23				-#200=29% / SPT=22 b/ft
						15				HP=4.5+ tsf
25		15 (6) 15 (6)								
-25. 30		11 (6) 12 (6)				26				SPT=20 b/ft
			CLAY, silty (CL-ML), lt. brown, stiff, moist			24	27	7		-#200=98% / HP=1.75 tsf
-30. 35		21 (6) 23 (6)								
			CLAY, lean (CL), lt. brown, very stiff, moist							
						24				-#200=88% / HP=1.0 tsf
40		16 (6) 14 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore Logger: CO Organization: PSI

P:\2018\Geotechnical\03282115 Port Connector\Port Connector 03282115 Continued.CLG

DRILLING LOG

WinCore Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-7
Structure
Station 46+00
Offset

District Pharr
Date 9/11/2018
Grnd. Elev. 5.00 ft
GW Elev. -1.50 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, lean (CL), lt. brown, very stiff, moist							
-40. 45		20 (6) 16 (6)				25	64	42		-#200=99% / SPT=16 b/ft
			CLAY, fat (CH), lt. brown, very stiff, moist			23				HP=4.25 tsf
50		14 (6) 17 (6)								
						25			133	UC=4.75 tsf
-50. 55		15 (6) 17 (6)								
			CLAY, lean with sand (Cl), lt. brown, stiff, moist							
60		20 (6) 50 (5.5)				23				-#200=72% / HP=1.25 tsf
65		24 (6) 50 (4)				27				SPT=20 b/ft
-65. 70		10 (6) 15 (6)				26				SPT=23 b/ft
			CLAY, fat (CH), lt. brown, very stiff, moist			22	57	40		-#200=100% / HP=4.5 tsf
75		20 (6) 22 (6)								
						26			125	UC=4.44 tsf
80		15 (6) 17 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore Logger: CO Organization: PSI

P:\2018\Geotechnical\03282115 Port Connector\Port Connector 03282115 Continued.CLG

DRILLING LOG

WinCore Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-7
Structure
Station 46+00
Offset

District Pharr
Date 9/11/2018
Grnd. Elev. 5.00 ft
GW Elev. -1.50 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, fat (CH), lt. brown, very stiff, moist							
						25				HP=4.0 tsf
85		16 (6) 19 (6)								
						21				HP=4.25 tsf
-85. 90		20 (6) 18 (6)								
			SAND, clayey (SC), lt. brown, medium dense, moist							
						30				-#200=12%
95		24 (6) 22 (6)								
-95. 100		16 (6) 17 (6)				33	71	48		-#200=100% / SPT=17 b/ft
			CLAY, fat (CH), dark brown, very stiff, moist							
						30				HP=4.0 tsf
-100. 105		16 (6) 18 (6)								
			SAND, clayey (SC), dark gray, medium dense, wet							
						25				-#200=15%
110		13 (6) 15 (6)								
-110. 115		27 (6) 18 (6)				32	60	40		-#200=98% / SPT=11 b/ft
			CLAY, fat (CH), dark brown, stiff, wet							
						34				SPT=13 b/ft
-115. 120		13 (6) 16 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore Logger: CO Organization: PSI

P:\2018\Geotechnical\03282115 Port Connector\Port Connector 03282115 Continued.CLG

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

BORING LOGS
BRIDGE #1

SCALE:

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

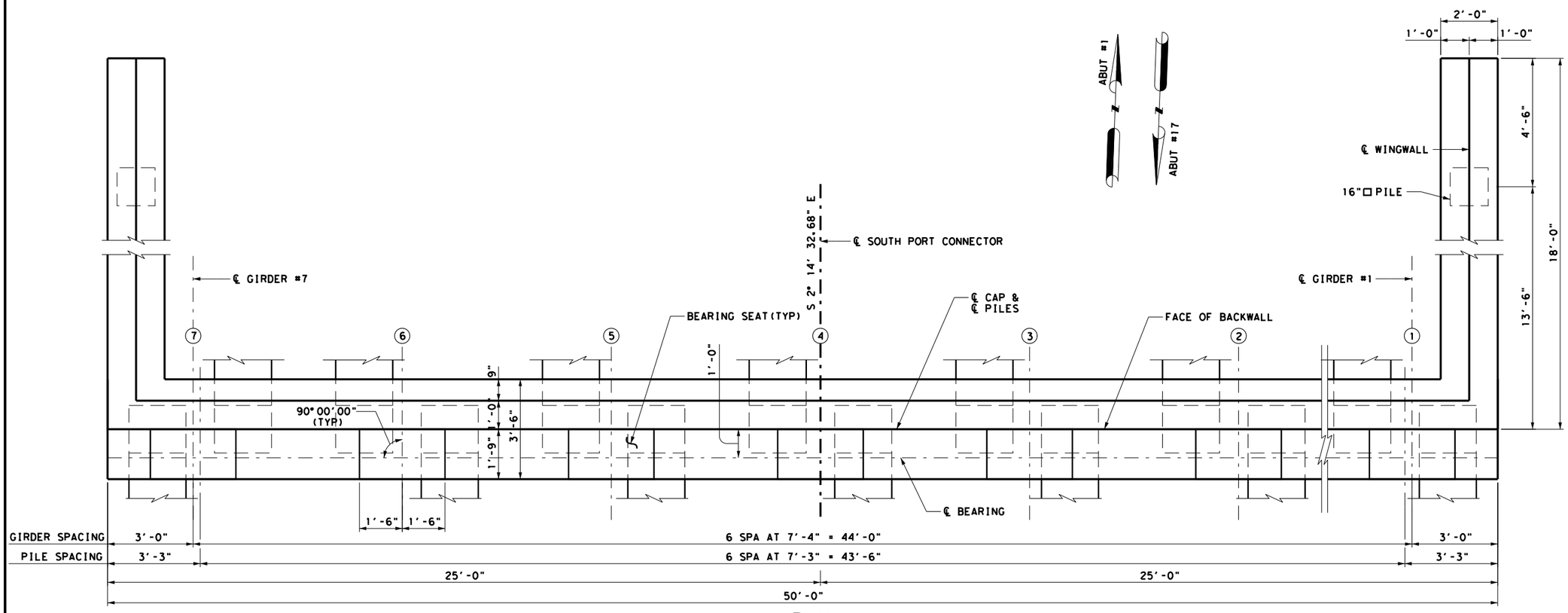
S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO. 4 OF 4
6		75

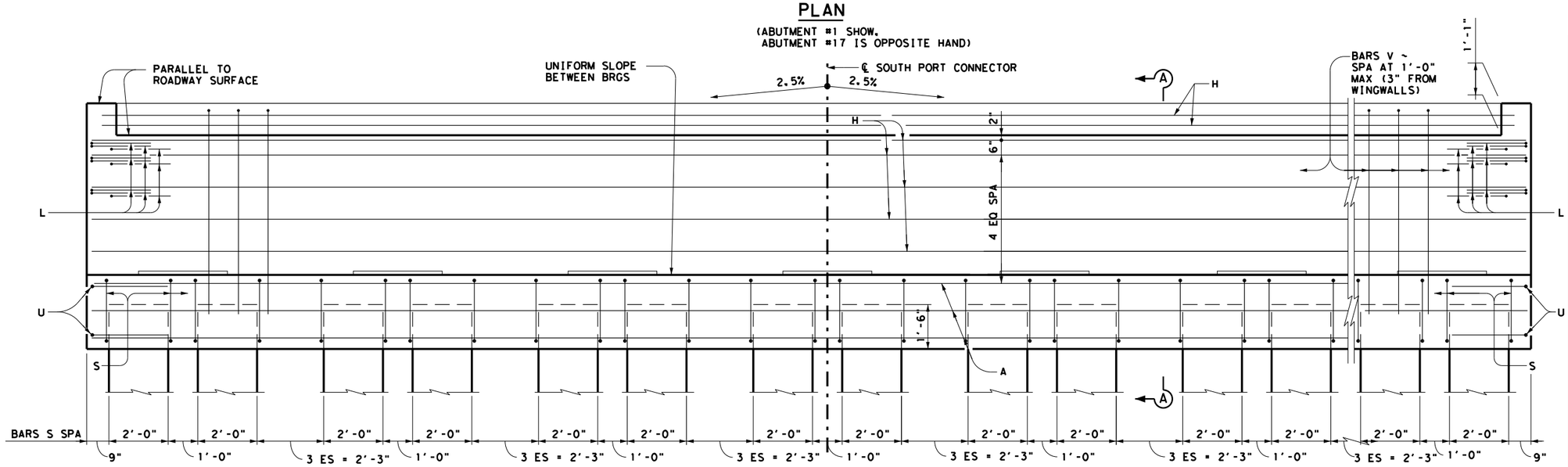
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON

DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR



PLAN

(ABUTMENT #1 SHOW. ABUTMENT #17 IS OPPOSITE HAND)



ELEVATION

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

ABUTMENT #1 AND #17
BRIDGE #1

SCALE: 1/4" = 1'-0"

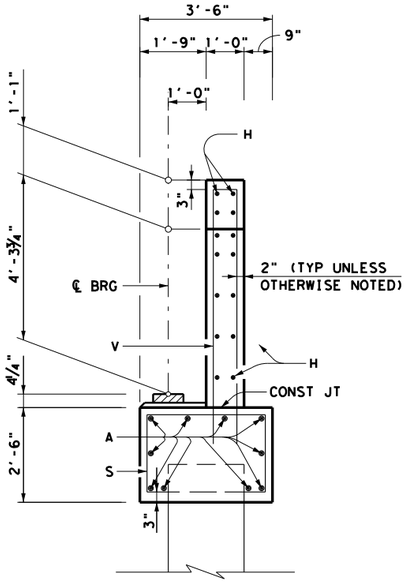
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

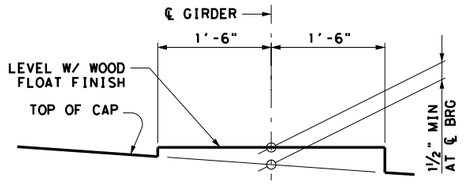
S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 2
6			76
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR



SECTION A-A



BEARING SEAT DETAIL

NOTE :
(BEARING SURFACE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)

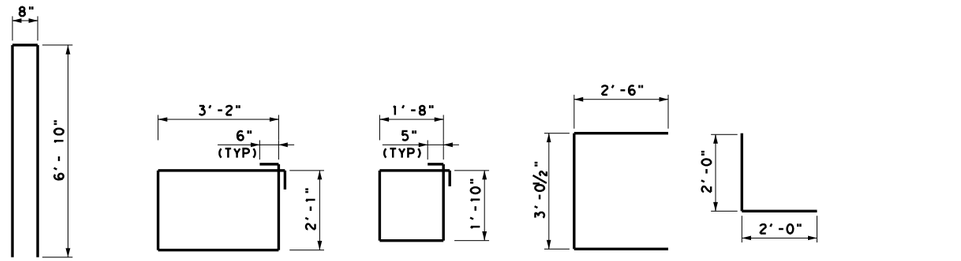
TABLE OF ESTIMATED QUANTITIES FOR ONE CAP

BAR	NO	SIZE	LENGTH	WEIGHT
A	10	#11	49'-0"	2604
H	14	#6	49'-8"	1045
L	18	#6	4'-0"	109
S	40	#5	11'-6"	480
U	4	#6	8'-1"	49
V	49	#6	14'-4"	1055
WH1	14	#6	19'-5"	409
WH2	24	#6	17'-8"	637
WS	38	#4	7'-10"	199
WV	38	#5	14'-4"	569
* REINFORCING STEEL (EPOXY)			LB	7,156
CLASS "C" CONCRETE (CAP)			CY	40.3

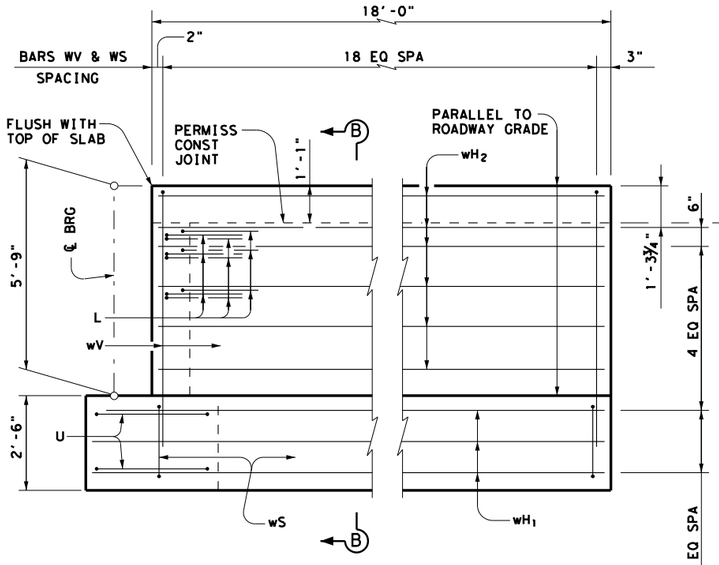
* FOR CONTRACTOR'S INFORMATION ONLY.

INTERIOR BENT NOTES :

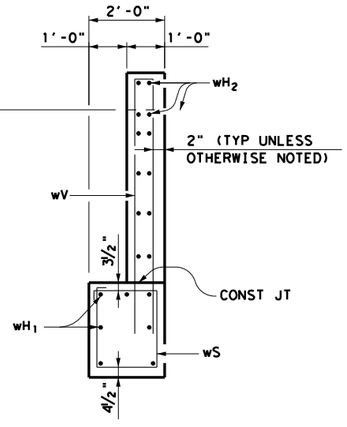
1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE SPECIFICATIONS, 7TH EDITION (2014).
2. ALL CONCRETE SHALL BE CLASS C CONCRETE (f'c= 3600 PSI)
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED ¾", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M A615 GRADE 60 STEEL (EPOXY).
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CACULATED FOUNDATION LOADS : 45 TONS PER PILE. 10 TONS PER WINGWALL PILE.
8. THE PRECAST BENT CAP OPTION IS PERMITTED.
9. PPC PILE SHOULD USE SULFACE RESISTANT CONCRETE.



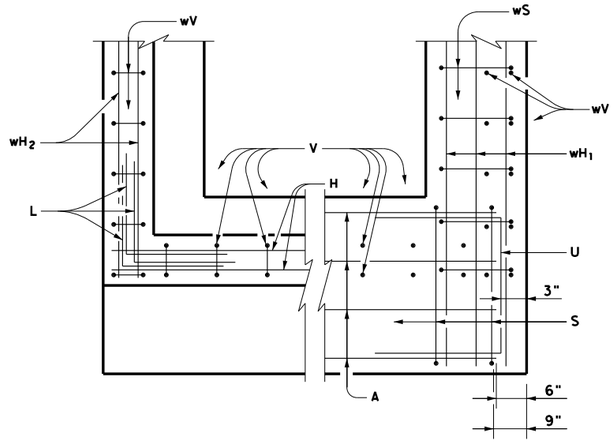
BARS V & wV | BARS S | BARS wS | BARS U | BARS L



WINGWALL ELEVATION



SECTION B-B



BACK WALL | CAP

CORNER DETAILS

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

ABUTMENT #1 AND #17
BRIDGE #1

SCALE: 1/4" = 1'-0"

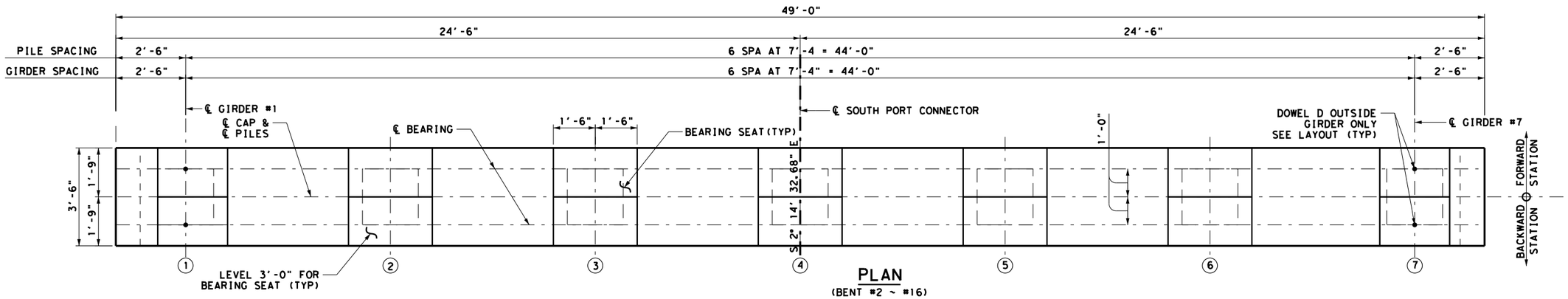
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

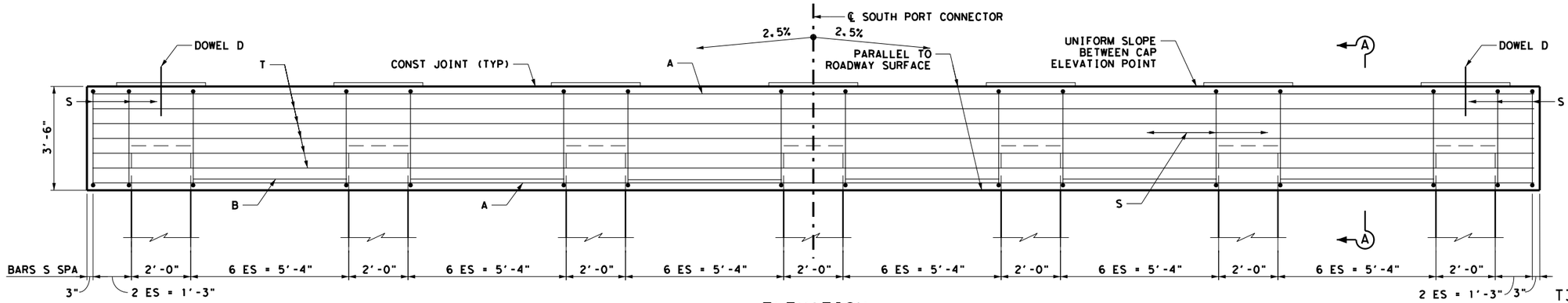
S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

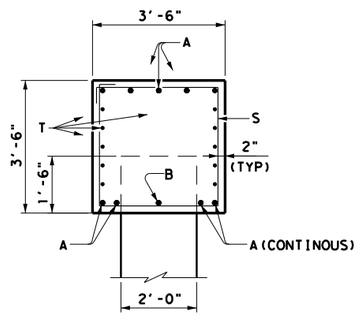
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 2 OF 2
6			77
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



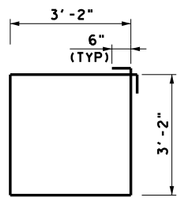
PLAN
(BENT #2 ~ #16)



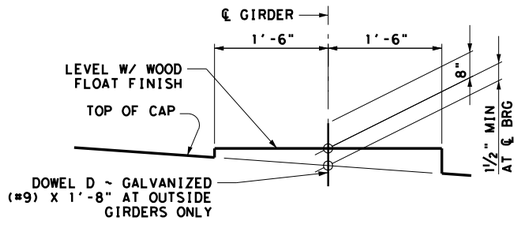
ELEVATION



BENT CAP SECTION



BARS S



BEARING SEAT DETAIL

NOTE :
(BEARING SURFACE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)

TABLE OF ESTIMATED QUANTITIES FOR ONE CAP				
BAR	NO	SIZE	LENGTH	WEIGHT
A	9	#9	48'-6"	1485
B	6	#9	5'-4"	109
S	48	#5	13'-8"	685
T	10	#5	48'-6"	506
* REINFORCING STEEL (EPOXY)			LB	3,041
CLASS "C" CONCRETE (CAP)			CY	22.3

* FOR CONTRACTOR'S INFORMATION ONLY.

TABLE FOR DOWEL "D" (1¼" D, 1'-8")			
BENT	FW	BK	WEIGHT
BENT 2	2	2	28
BENT 3			
BENT 4	2	2	28
BENT 5		2	14
BENT 6			
BENT 7	2	2	28
BENT 8		2	14
BENT 9			
BENT 10	2	2	28
BENT 11		2	14
BENT 12			
BENT 13	2	2	28
BENT 14		2	14
BENT 15			
BENT 16	2	2	28
* REINFORCING STEEL (EPOXY)		LB	224

* FOR CONTRACTOR'S INFORMATION ONLY.

INTERIOR BENT NOTES :

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE SPECIFICATIONS, 7TH EDITION (2014).
2. ALL CONCRETE SHALL BE CLASS C CONCRETE (f'c= 3600 PSI)
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED ¾", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M A615 GRADE 60 STEEL (EPOXY).
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CACULATED FOUNDATION LOADS : 160 TONS PER PILE.
8. THE PRECAST BENT CAP OPTION IS PERMITTED.
9. PPC PILE SHOULD USE SULFACE RESISTANT CONCRETE

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

BENT #2 ~ #16
BRIDGE #1

SCALE: 1/4" = 1'-0"

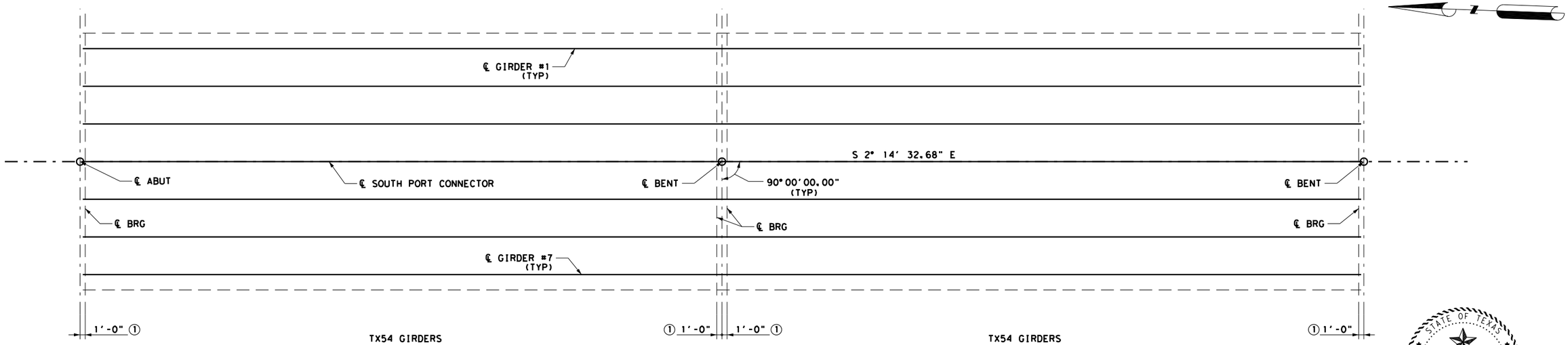
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 1
6			78
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 SOUTH PORT CONNECTOR



PLAN

BENT REPORT

BENT NO. ALL (N 87° 45' 67.32" E)
DISTANCE BETWEEN THE STATION LINE TO GIRDER 1 22.000 L

		GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D. M. S.
SPAN ALL	GIRDER 1	0.000	90 00 00.00
	GIRDER 2	7.333	90 00 00.00
	GIRDER 3	7.333	90 00 00.00
	GIRDER 4	7.333	90 00 00.00
	GIRDER 5	7.333	90 00 00.00
	GIRDER 6	7.333	90 00 00.00
	GIRDER 7	7.333	90 00 00.00
	TOTAL	44.000	

GIRDER REPORT

GIRDER REPORT SPAN ALL

	HONRIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GIR. FLG. ②	GIRDER SLOP
GIRDER 1	125.000	123.000	124.500	0.000
GIRDER 2	125.000	123.000	124.500	0.000
GIRDER 3	125.000	123.000	124.500	0.000
GIRDER 4	125.000	123.000	124.500	0.000
GIRDER 5	125.000	123.000	124.500	0.000
GIRDER 6	125.000	123.000	124.500	0.000
GIRDER 7	125.000	123.000	124.500	0.000

① SEE IGEB STANDAR FOR ORIENTATION OF DIMENSION.

② GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

FRAMING PLAN
(2 SPANS UNIT)
BRIDGE #1

SCALE: 1" = 20'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 2
6			79
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR

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Plotted @: 1:12:02 PM
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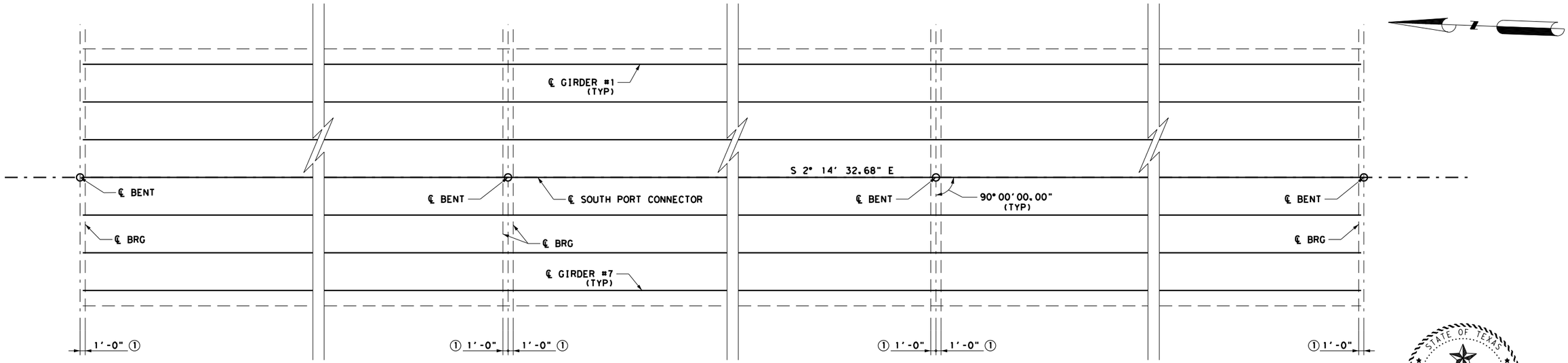

TX54 GIRDERS

TX54 GIRDERS

TX54 GIRDERS

PLAN

BENT REPORT

BENT NO. ALL (N 87° 45' 67.32" E)
DISTANCE BETWEEN THE STATION LINE TO GIRDER 1 22.000 L

		GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D. M. S.
SPAN ALL	GIRDER 1	0.000	90 00 00.00
	GIRDER 2	7.333	90 00 00.00
	GIRDER 3	7.333	90 00 00.00
	GIRDER 4	7.333	90 00 00.00
	GIRDER 5	7.333	90 00 00.00
	GIRDER 6	7.333	90 00 00.00
	GIRDER 7	7.333	90 00 00.00
	TOTAL	44.000	

GIRDER REPORT

	GIRDER REPORT SPAN ALL HONRIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT.GIR.FLG.②	GIRDER SLOP
GIRDER 1	125.000	123.000	124.500	0.000
GIRDER 2	125.000	123.000	124.500	0.000
GIRDER 3	125.000	123.000	124.500	0.000
GIRDER 4	125.000	123.000	124.500	0.000
GIRDER 5	125.000	123.000	124.500	0.000
GIRDER 6	125.000	123.000	124.500	0.000
GIRDER 7	125.000	123.000	124.500	0.000

① SEE IGEB STANDAR FOR ORIENTATION OF DIMENSION.

② GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

FRAMING PLAN
(3 SPANS UNIT)
BRIDGE #1

SCALE: 1" = 20'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 2 OF 2
6			80
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:12:03 PM
Plotted by: tody
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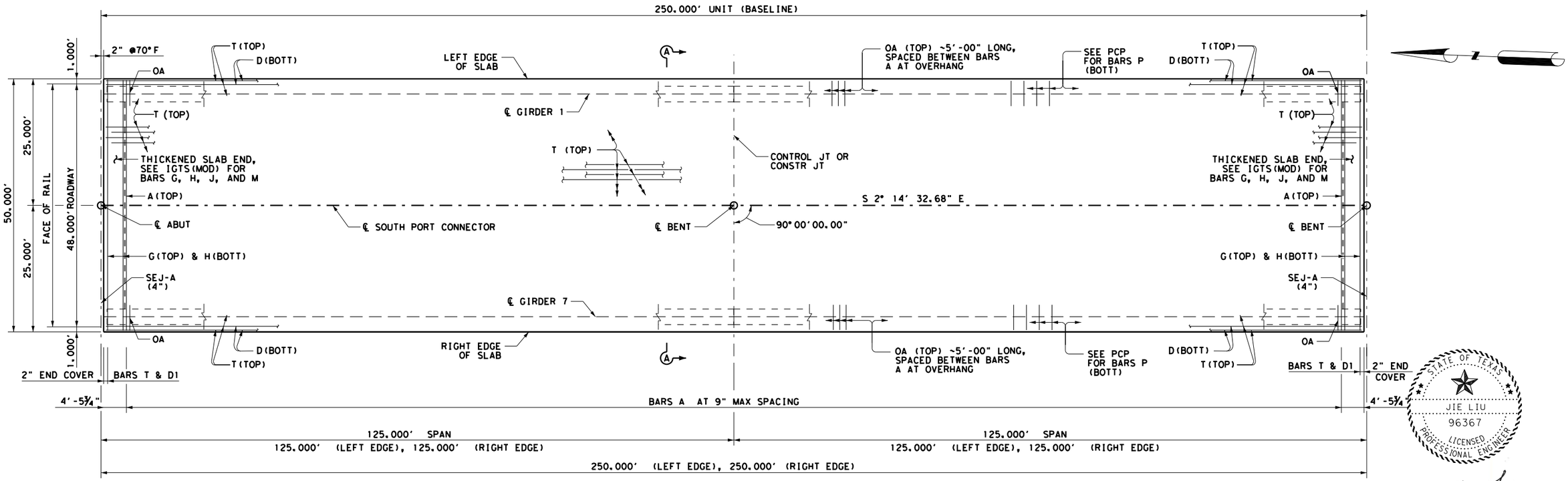

PLAN

(2 SPANS TYP - 2 UNITS)

TABLE OF ESTIMATED QUANTITIES UNIT (2 SPAN)			
SPAN	REINF. CONCRETE SLAB	PRESTR CONC GIRDER (TX54) ①	REINF. STEEL * ②
NO.	SF	LF	LB
1	6,250.0	871.5	14,375.0
2	6,250.0	871.5	14,375.0
TOTAL	12,500.0	1,743.0	28,750.0

* FOR CONTRACTOR'S INFORMATION ONLY.

① BEAM LENGTHS SHOWN ARE BOTTOM FLANGE LENGTH WITH ADJUSTMENTS MADE FOR BEAM SLOPES.

② REINF STEEL QUANTITY IS CALCULATED BY USING APPROX 2.3 LB/SF OF BRIDGE DECK.

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

SLAB PLAN
(2 SPANS UNIT)
BRIDGE #1

SCALE: 1" = 20'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 2
6			81
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:12:04 PM
Plotted by: tody
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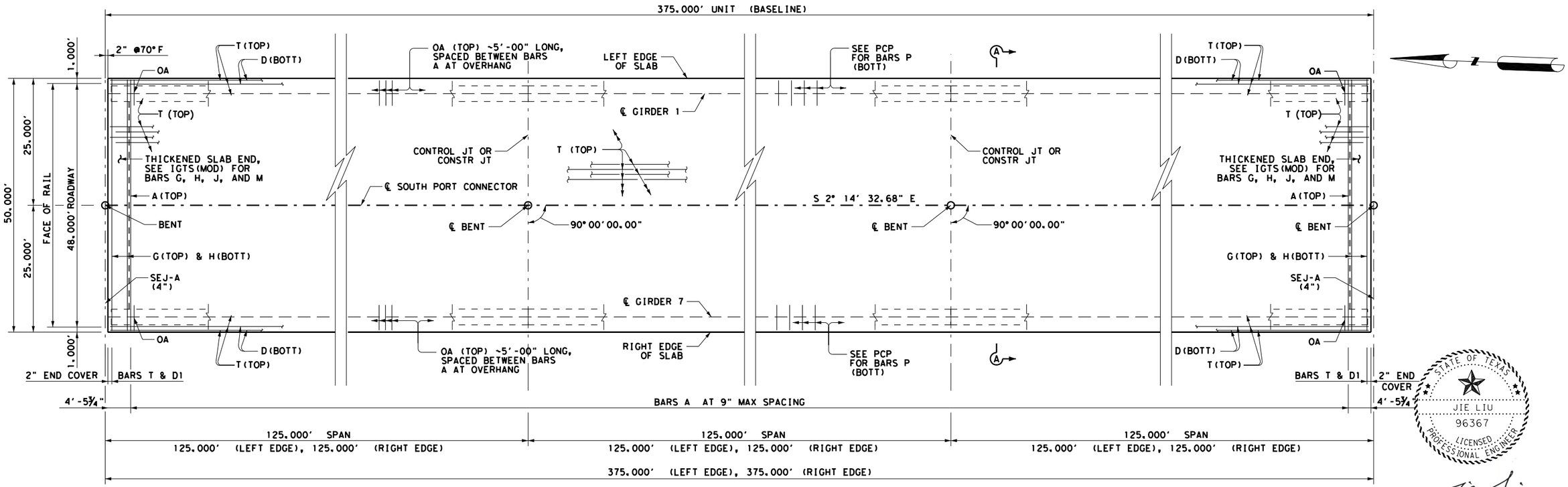


PLAN
(3 SPANS TYP - 4 UNITS)

TABLE OF ESTIMATED QUANTITIES UNIT (3 SPAN)			
SPAN	REINF. CONCRETE SLAB	PRESTR CONC GIRDER (TX54) ①	REINF. STEEL * ②
NO.	SF	LF	LB
3	6,250.0	871.5	14,375.0
4	6,250.0	871.5	14,375.0
5	6,250.0	871.5	14,375.0
TOTAL	18,750.0	2,614.5	43,125.0

* FOR CONTRACTOR'S INFORMATION ONLY.

① BEAM LENGTHS SHOWN ARE BOTTOM FLANGE LENGTH WITH ADJUSTMENTS MADE FOR BEAM SLOPES.

② REINF STEEL QUANTITY IS CALCULATED BY USING APPROX 2.3 LB/SF OF BRIDGE DECK.

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

SLAB PLAN
(3 SPANS UNIT)
BRIDGE #1

SCALE: 1" = 20'

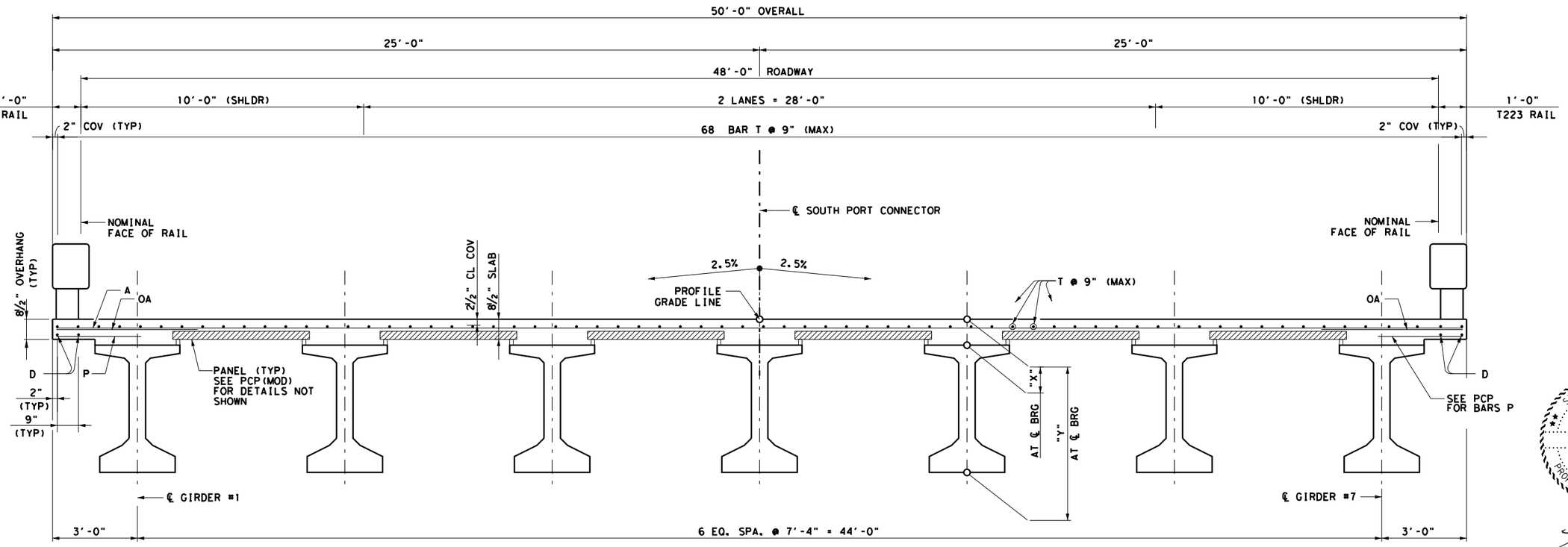
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 2 OF 2
6			82
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



TYPICAL TRANSVERSE SECTION

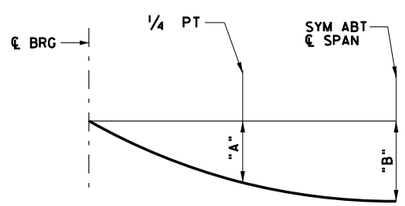
(SPAN 1~16 - 7 GIRDERS)

TABLE OF SECTION DEPTHS			
SPAN NO.	GIRDER NO.	"X" AT CL BRG	"Y" AT CL BRG ①
1~16	ALL	10¾"	5'-4¾"

① "Y" VALUE SHOWN IS BASED ON THEORETICAL GIRDER CAMBER, DEAD LOAD DEFLECTION FROM AN 8½" CONCRETE SLAB, A CONSTANT ROADWAY GRADE, AND USING PRECAST PANELS (PCP). THE CONTRACTOR WILL ADJUST THIS VALUE AS NECESSARY FOR ANY ROADWAY VERTICAL CURVE AND/OR IF PRECAST OVERHANG PANEL (PCP(O)) OPTION IS USE.

BAR TABLE	
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

SPAN	BEAM	"A" (ft)	"B" (ft)
1~16	ALL	0.157	0.223



DEAD LOAD DEFLECTION DIAGRAM

NOTE: DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST - IN PLACE SLAB ONLY. (Ec=5000 ksi) ADJUSTED DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEED.

GENERAL NOTES

DESIGN ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7th EDITION (2014)

MULTI-SPAN UNITS, WITH SLAB CONTINOUS OVER INTERIOR BENTS, MAY BE FORMED WITH THE DETAIL SHOW OON THIS SHEET AND STANDARD IGCS

SEE PCP AND PCP-FAB FOR PANEL DETAILS NOT SHOWN

SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS

SEE IGMS STANDARD FOR MISCELLANEOUS DETAILS

SEE RAILING STANDARD FOR RAIL ANCHORAGE IN SLAB

SEE PMDF STANDARD FOR DETAILS AND QUNTITY ADJUSTMENTS IF THIS OPTION IS USED

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE

MATERIAL NOTES

PROVIDE CLASS S CONCRETE (F'C = 4000 PSI)

PROVIDE GRADE 60 REINFORCING STEEL

PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS: UNCOATED ~ #4 = 1'-7"

DEFORMED WELDED WIRE REINFORCEMENT (WWR)

(ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS

STATE OF TEXAS
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96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

BRIDGE SLAB DETAIL
BRIDGE #1

SCALE: 1/4" = 1'-0"

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 1
6			83

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:12:06 PM
Plotted by: tadv
Design Filename: S:\project\u2299\500*PS&E\PlanSet01\Dgn\brg\BRIDGE 1\2299100SBR01SB-ABUT-BENT.dgn

STRUCTURE	DESIGNED GIRDERS									STRAIGHT STRAND PATTERN									DEPRESSED STRAND PATTERN (1)			CONCRETE		OPTIONAL DESIGN				
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS						TOT NO. DEB	DEBONDED STRANDS PER ROW								NO.	TO END (in)	TO ℄ (in)	RELEASE STRGTH (2) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (3)	
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (In)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (In)		DIST FROM BOTTOM (in)	NO. OF STRANDS TOTAL	NO. OF STRANDS DE-BONDED	NUMBER OF STRANDS DEBONDED TO (ft from end) 3	6	9	12	15								Moment	Shear
BRIDGE #1	ALL	ALL	TX54		50	0.6	270	16.928	7.808										12	50.5	12.5	5.500	7.400	4.704	-4.652	9307.30	0.579	0.767

NON-STANDARD STRAND PATTERNS	
PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER

(1) When TO END (in) equals TO ℄ (in), place these straight strands at the defined TO values. Fill the lower rows with the remainder of the total number of strands in accordance with the Debonded Strand Designs notes.

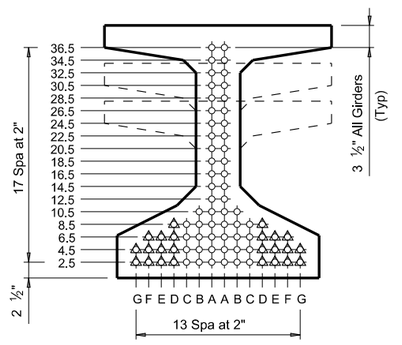
(2) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

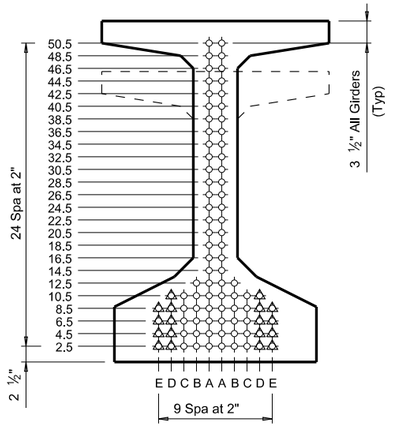
Tension = 0.24 $f'_{ci}\sqrt{f'_{ci}}$

Optional designs must likewise conform.

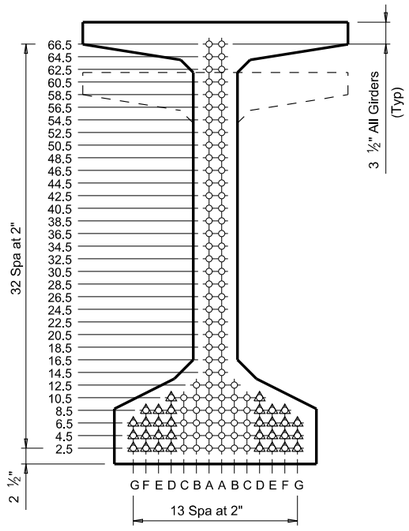
(3) Portion of full T3-S3



TYPE Tx28, Tx34 & Tx40



TYPE Tx46 & Tx54



TYPE Tx62 & Tx70

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.

Prestress losses for the designed girders have been calculated for a relative humidity of 75% percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel bars.

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

Strand debonding must comply with Item 424.4.2.2.2.4. Full-length debonded strands are only permitted in positions marked △. Double wrap full-length debonded strands in outer most position of each row.

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

DEBONDED STRAND DESIGNS:

Locate strands for the designed girder 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", then row "6.5", etc. Place strands within a row as follows:

1) Locate a strand in each "A" and outer most positions.
2) Place strand symmetrically about vertical centerline of girder.
3) Space strands as equally as possible across the entire width.

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

DEPRESSED STRAND DESIGNS:

Locate strands for the designed girder 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", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

BEAM DESIGN
BRIDGE #1

SCALE:

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 1
6			84
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:12:07 PM

Plotted by: tody
Design Filename: S:\project\u2299\500*PS&E\PlanSet01\Dgn\brg\BRIDGE 1\2299100SBR01SB-ABUT-BENT.dgn

SUMMARY OF BRIDGE QUANTITIES - BRIDGE #2(SOUTH PORT CONNECTOR)									
BID ITEM	409 - 6001	409 - 6004	420 - 6013	420 - 6025	422 - 6001	425 - 6039	432 - 6016	450 - 6006	454 - 6001
DESCRIPTION	PRESTR CONC PIL (16 IN SQ)	PRESTR CONC PIL (24 IN SQ)	CL C CONC (ABUT)	CL C CONC (BENT)	REINF CONC SLAB	PRESTR CONC GIRDER (TX54)	RIPRAP (STONE TYR) (DRY) (12IN)	RAIL (TY T223)	SEALED EXPANSION JOINT (4 IN) (SEJ-A)
	LF	LF	CY	CY	SF	LF	CY	LF	LF
2 - ABUTMENTS	40	896	80.6				174		
18 - INTERIOR BENTS		7,812		400.2					
2- 250.000' PRESTR CONC GIRDER UNIT					25,000.00	3,486.00		1,072.00	
5- 375.000' PRESTR CONC GIRDER UNIT					93,750.00	13,072.50		3,750.00	
TOTAL	40	8,708	80.6	400.2	118,750.00	16,558.50	174	4,822.00	350.00

BEARING SEAT ELEVATIONS

		GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7
ABUT 1	(FWD)	10.874	11.057	11.241	11.424	11.241	11.057	10.874
		GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7
BENTS 2~19	(BK)	10.874	11.057	11.241	11.424	11.241	11.057	10.874
	(FWD)	10.874	11.057	11.241	11.424	11.241	11.057	10.874
ABUT 20	(BK)	10.874	11.057	11.241	11.424	11.241	11.057	10.874

STATE OF TEXAS
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96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

QUANTITIES
BRIDGE #2

SCALE:

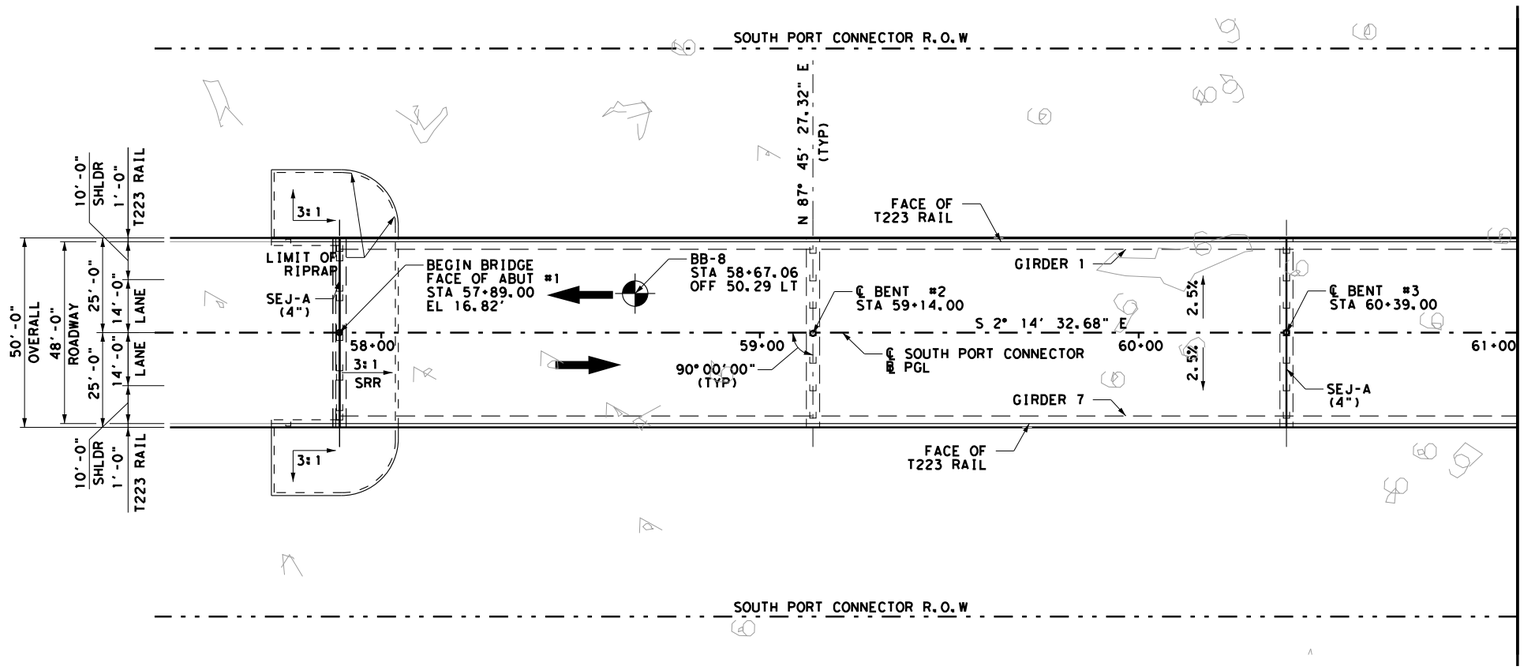
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 1
6			85
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR


SOUTH PORT CONNECTOR R.O.W
N 87° 45' 27.32" E (TYP)
FACE OF T223 RAIL
GIRDER 1
GIRDER 7
LIMIT OF RIPRAP
BEGIN BRIDGE FACE OF ABUT #1 STA 57+89.00 EL 16.82'
BB-8 STA 58+67.06 OFF 50.29 LT
℄ BENT #2 STA 59+14.00
℄ BENT #3 STA 60+39.00
S 2° 14' 32.68" E
℄ SOUTH PORT CONNECTOR PGL
90° 00' 00" (TYP)
SEJ-A (4")
3:1
SRR
2.5%
58+00
59+00
60+00
61+00
10'-0" SHLDR
1'-0" T223 RAIL
25'-0"
14'-0" LANE
50'-0" OVERALL
48'-0" ROADWAY
MATCH LINE STA 61+00.00

NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7th EDITION (2014)
2. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL, MUST BE CORRECTED FOR GRADE CROWN AND/OR SUPERELEVATION.
3. PRESTRESSED CONC. I GIRDERS SUPPORT CONDITIONS: D: DENOTES GUIDED EXPANSION BEARING.
4. SEE "TYPICAL SECTIONS" SHEET FOR TYPICAL SECTIONS.
5. SEE "BORING LOGS" SHEET FOR BORING LOGS.
6. BORING LOG INFORMATION IS BASED ON PSI GEOTECHNICAL REPORT NO. 03282115 DATED DEC 18, 2018.
7. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION OR FABRICATION.

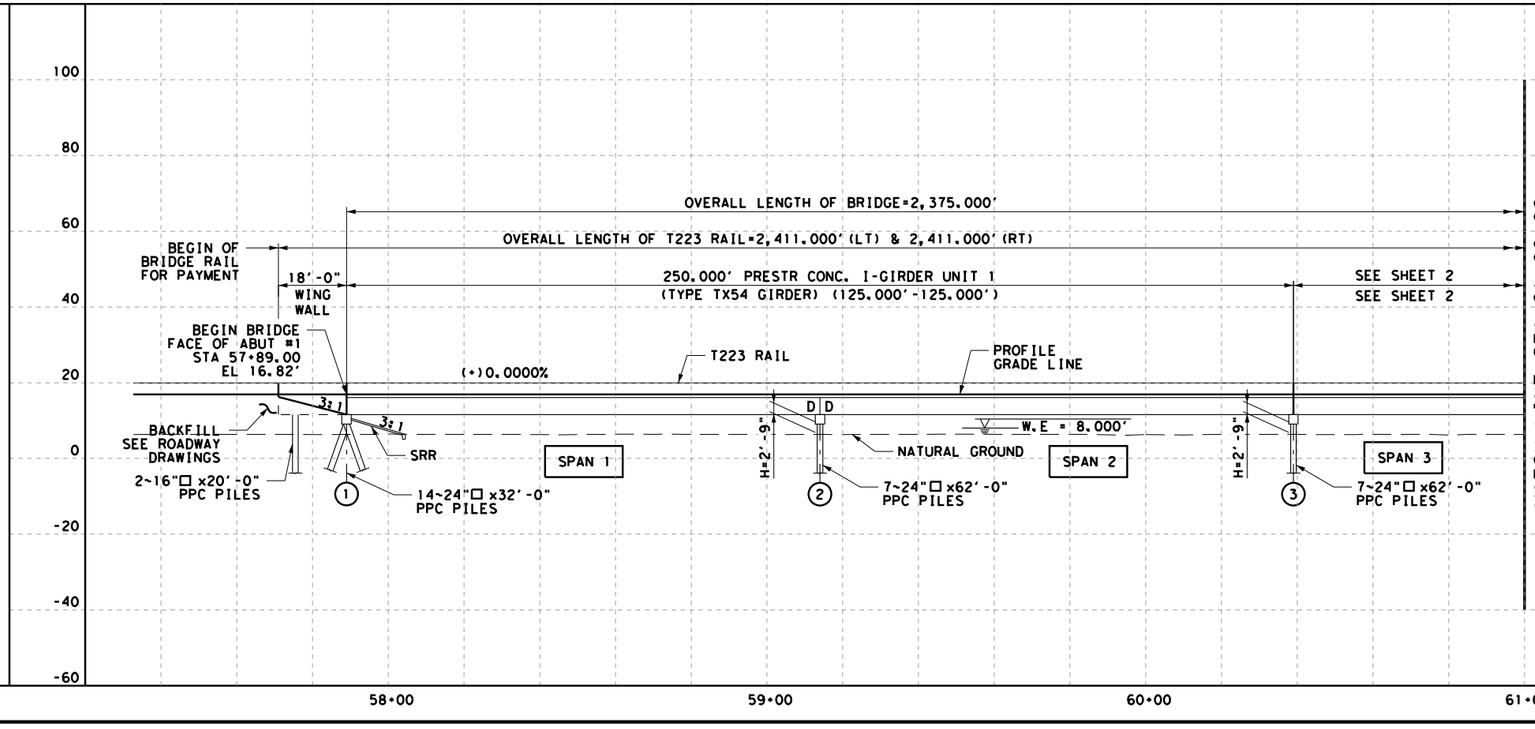
REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-002

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet,cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #2

SCALE: 1" = 40'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 7
6			86
DGN: JL	STATE	DIST.	COUNTY
CHK. DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK. DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:20:05 PM
Plotted by: tady
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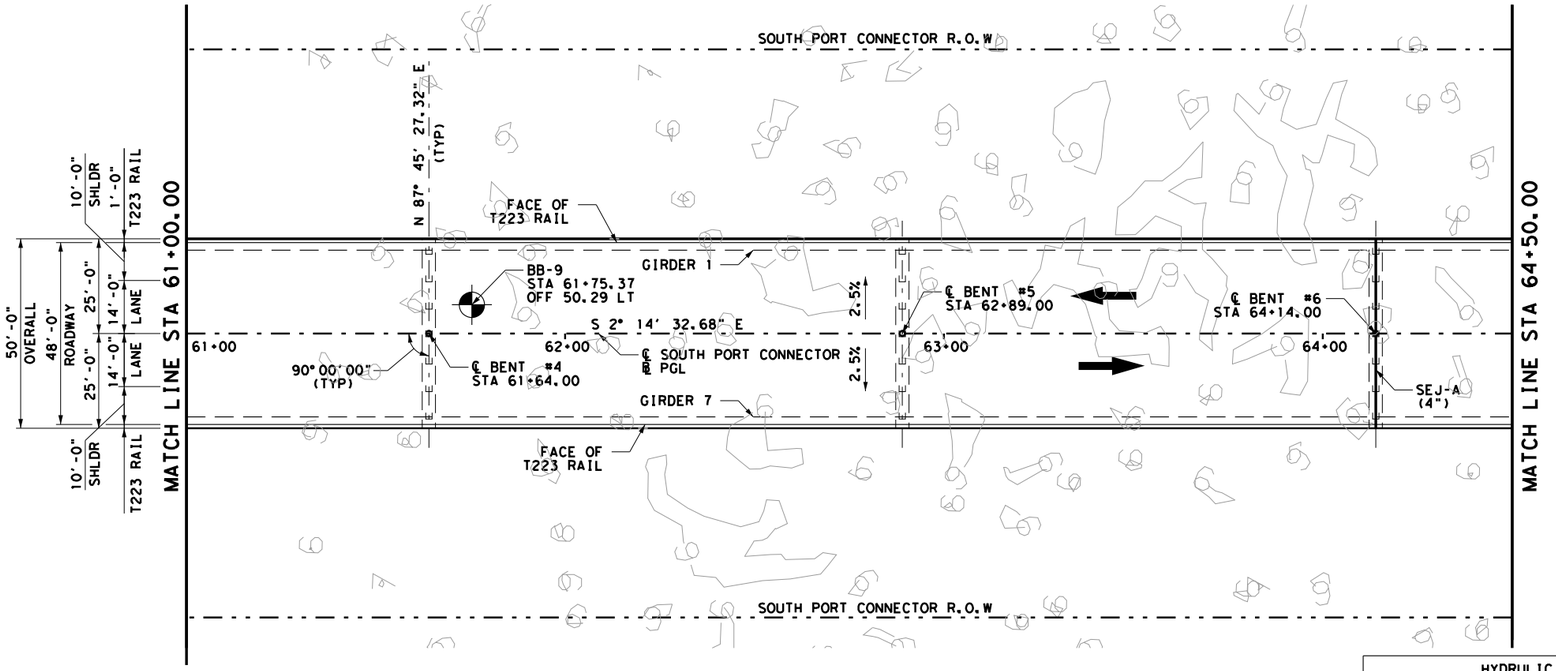

NOTES

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3. PRESTRESSED CONC. I GIRDERS SUPPORT CONDITIONS: D: DENOTES GUIDED EXPANSION BEARING.
4. SEE "TYPICAL SECTIONS" SHEET FOR TYPICAL SECTIONS.
5. SEE "BORING LOGS" SHEET FOR BORING LOGS.
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7. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION OR FABRICATION.

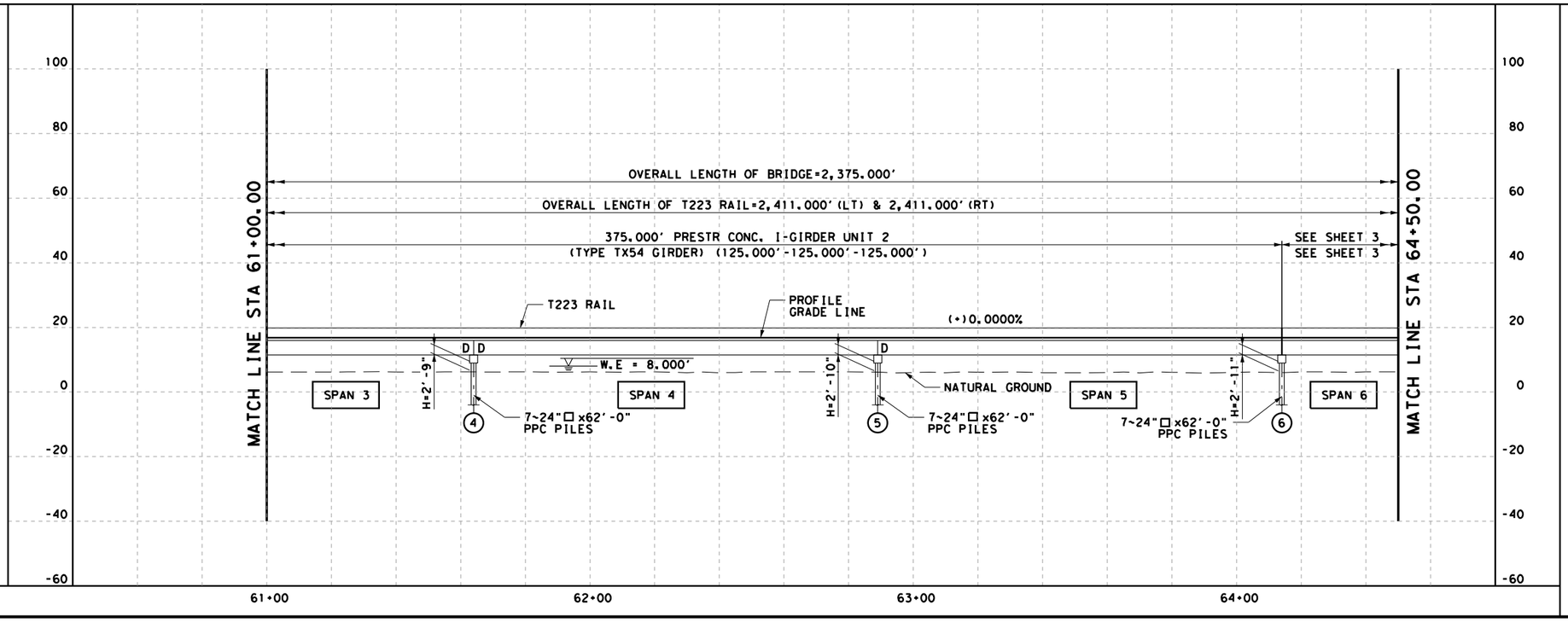
REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-002

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet,cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #2

SCALE: 1" = 40'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

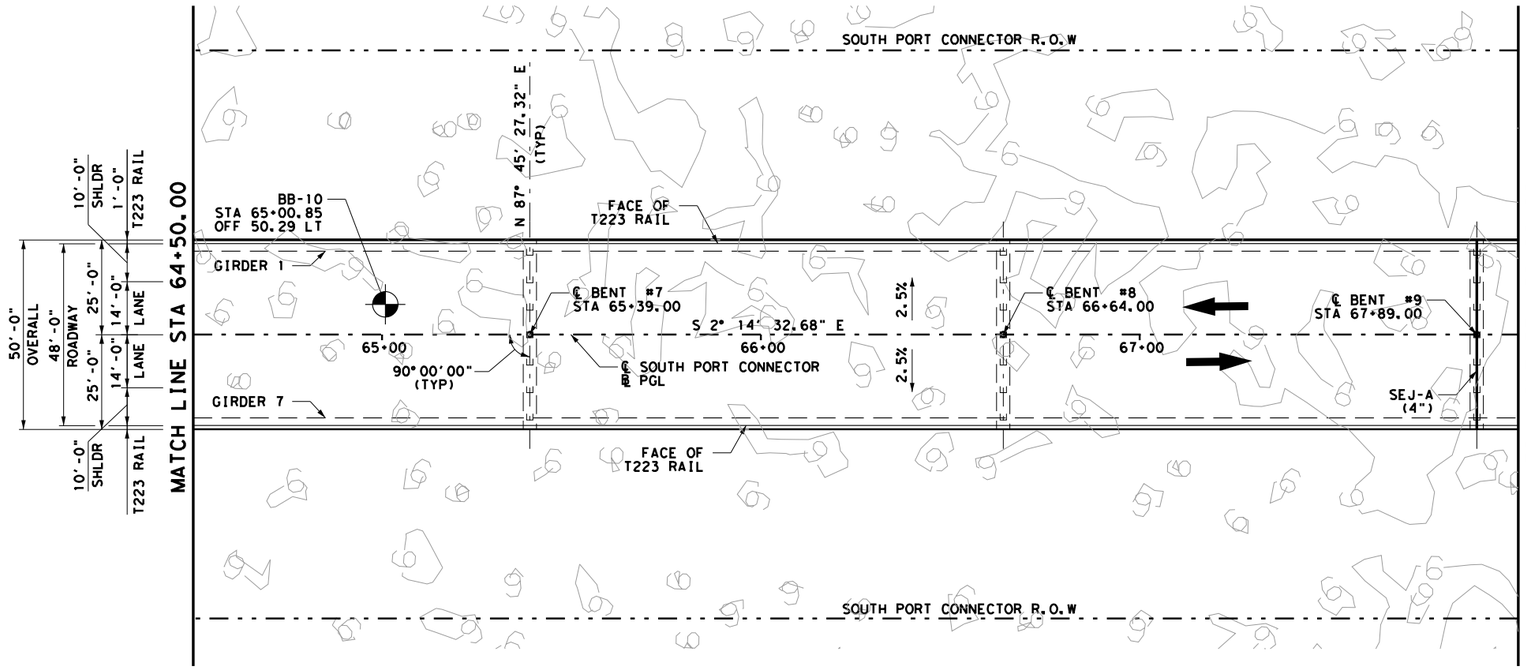
PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO. 2 OF 7
6				87
DGN: JL	STATE	DIST.	COUNTY	
CHK DGN: WC	TEXAS	PHARR	CAMERON	
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:20:06 PM
Plotted by: tadv
Design Filename: S:\project\u2299\500*PS&E\PlanSet01\Dgn\brg\BRIDGE 2\2299100SBR02LT.dgn



NOTES

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2. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL, MUST BE CORRECTED FOR GRADE CROWN AND/OR SUPERELEVATION.
3. PRESTRESSED CONC. I GIRDERS SUPPORT CONDITIONS: D: DENOTES GUIDED EXPANSION BEARING.
4. SEE "TYPICAL SECTIONS" SHEET FOR TYPICAL SECTIONS.
5. SEE "BORING LOGS" SHEET FOR BORING LOGS.
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7. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION OR FABRICATION.

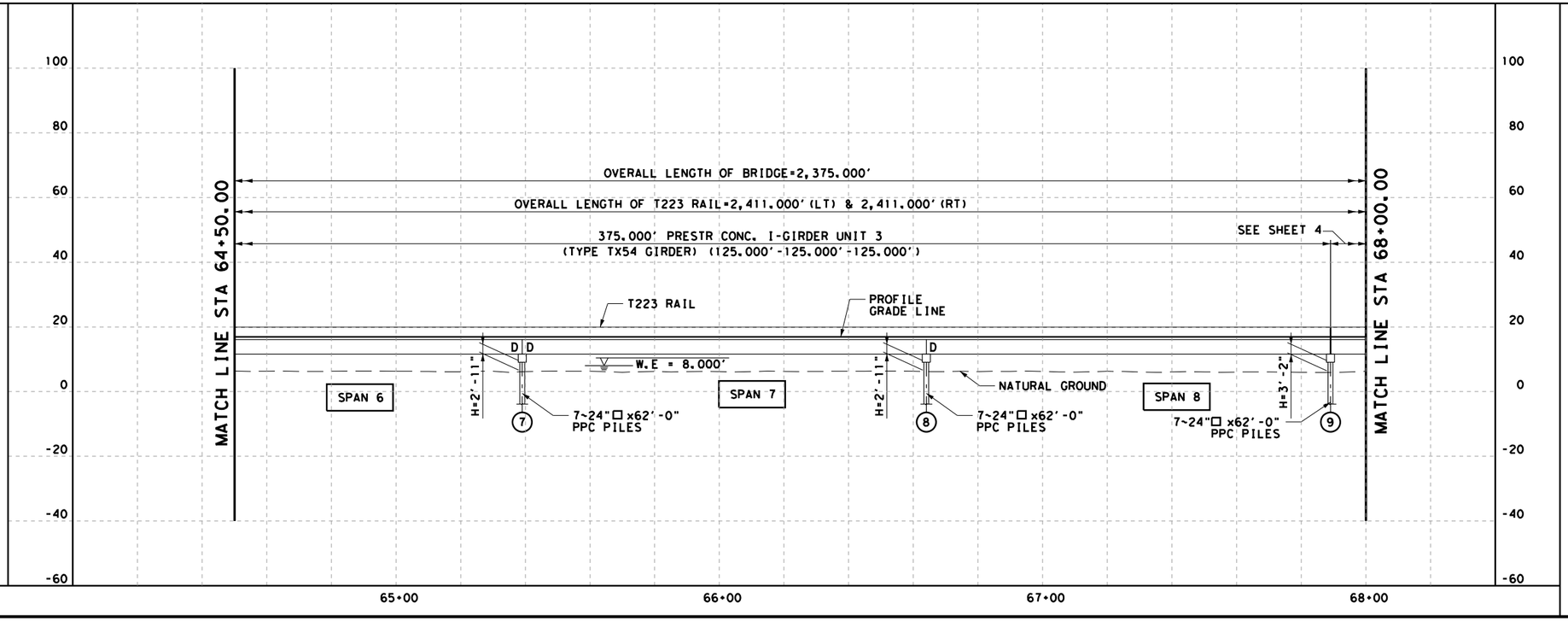
REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-002

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet,cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #2

SCALE: 1" = 40'

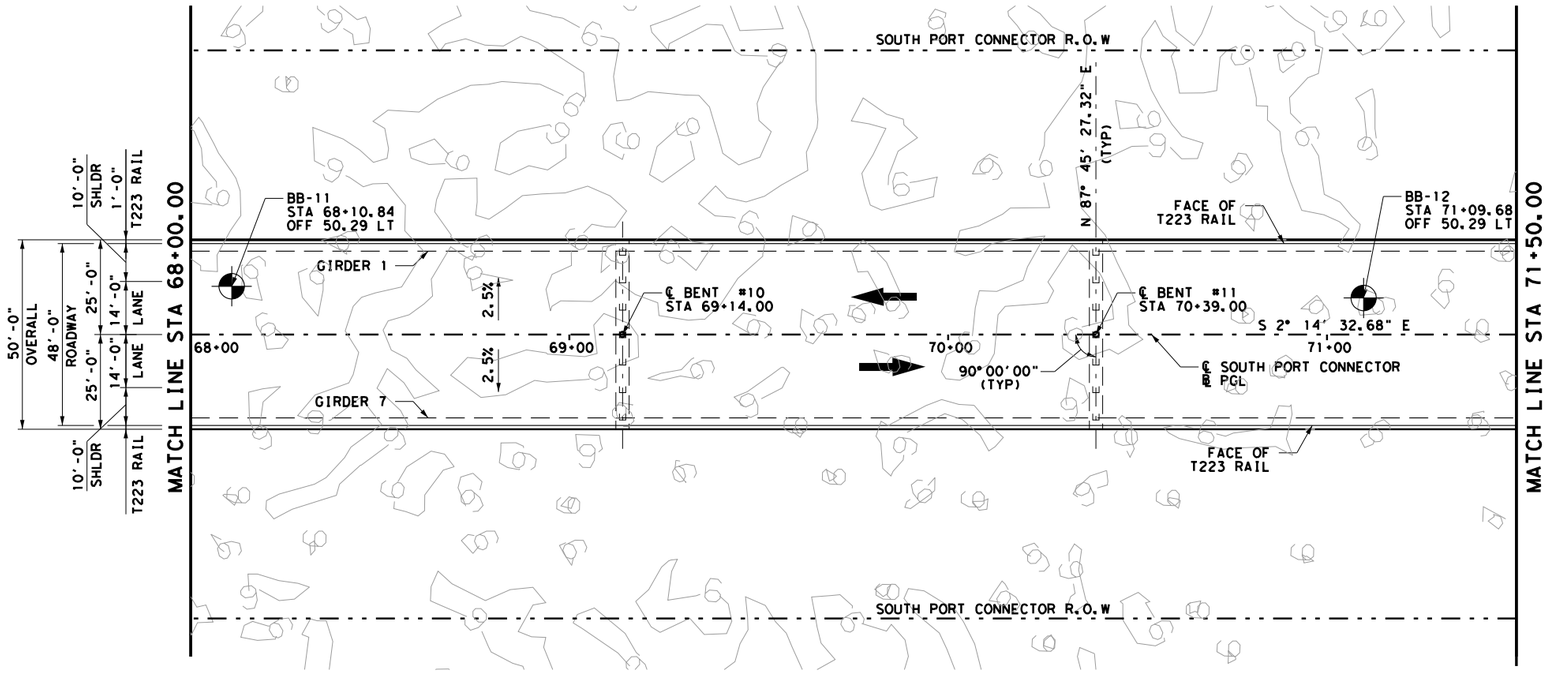
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 3 OF 7
6			88
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR



NOTES

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2. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL, MUST BE CORRECTED FOR GRADE CROWN AND/OR SUPERELEVATION.
3. PRESTRESSED CONC. I GIRDERS SUPPORT CONDITIONS: D: DENOTES GUIDED EXPANSION BEARING.
4. SEE "TYPICAL SECTIONS" SHEET FOR TYPICAL SECTIONS.
5. SEE "BORING LOGS" SHEET FOR BORING LOGS.
6. BORING LOG INFORMATION IS BASED ON PSI GEOTECHNICAL REPORT NO. 03282115 DATED DEC 18, 2018.
7. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION OR FABRICATION.

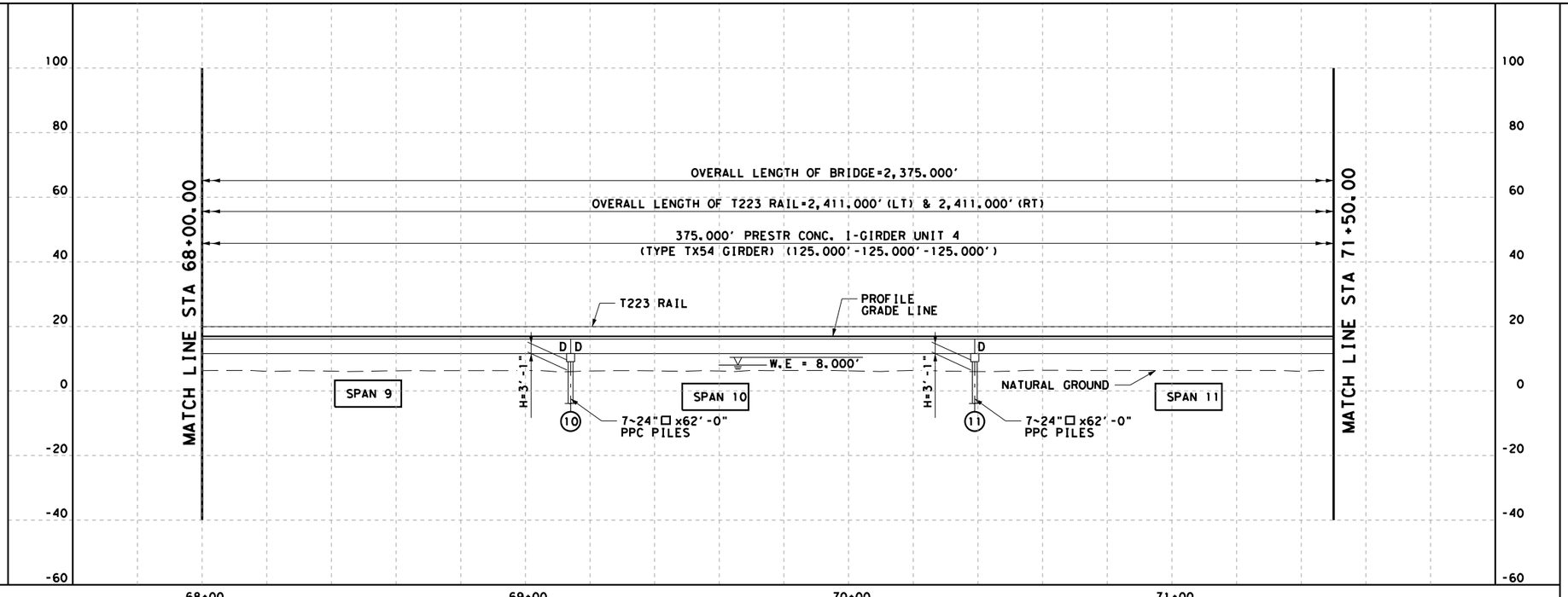
REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-002

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet,cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #2

SCALE: 1" = 40'

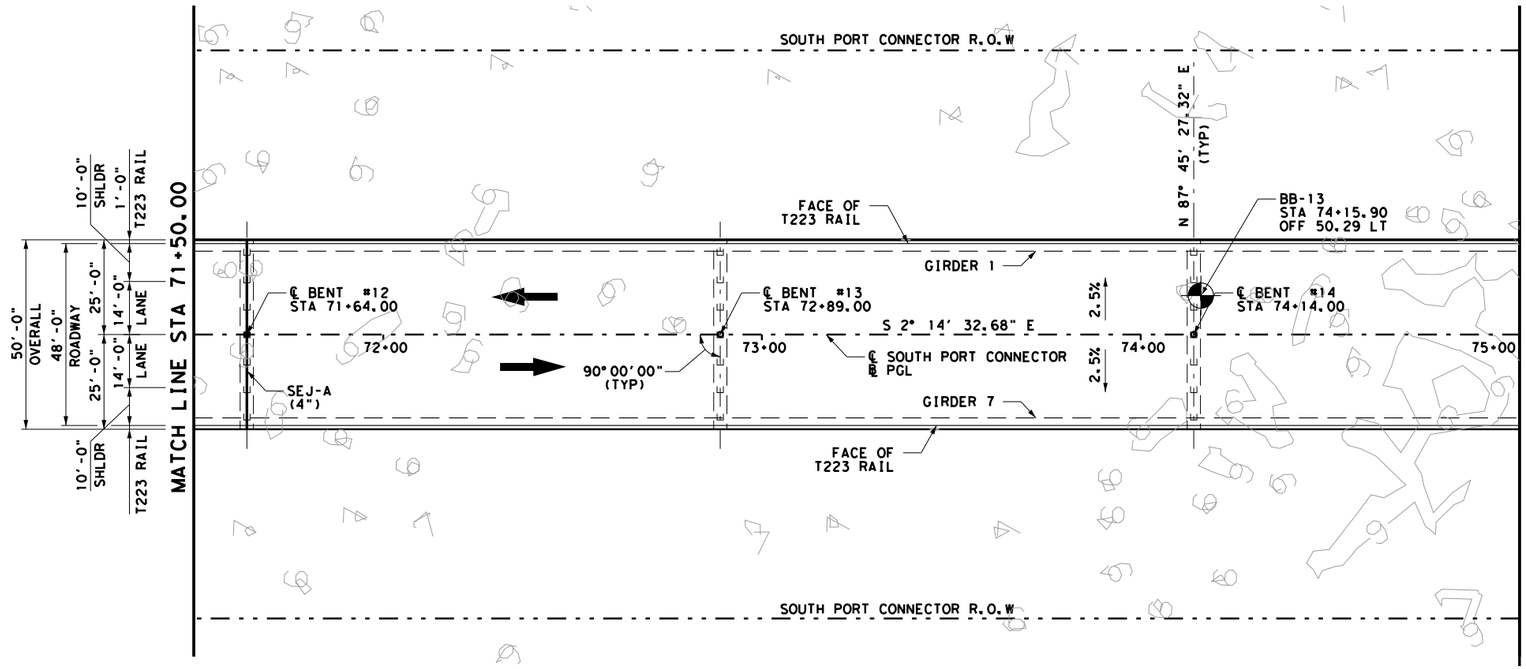
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 4 OF 7
6			89
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



NOTES

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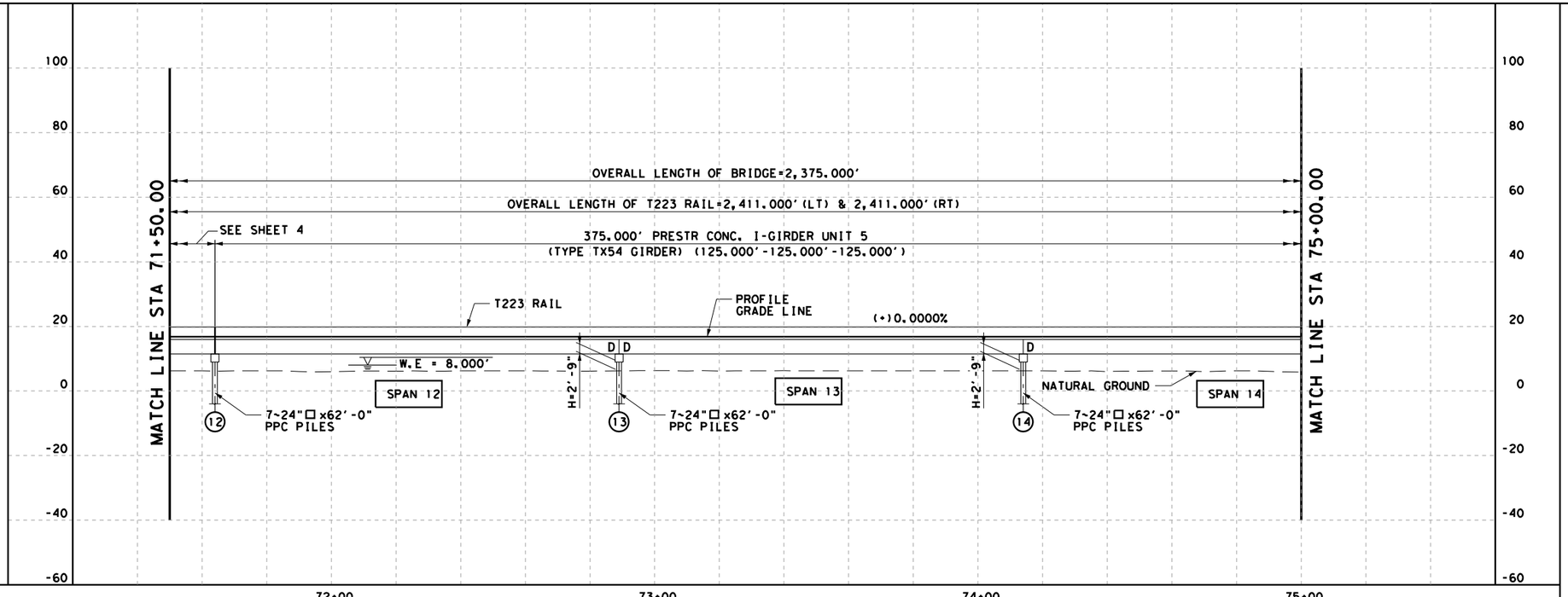
REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-002

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet,cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #2

SCALE: 1" = 40'

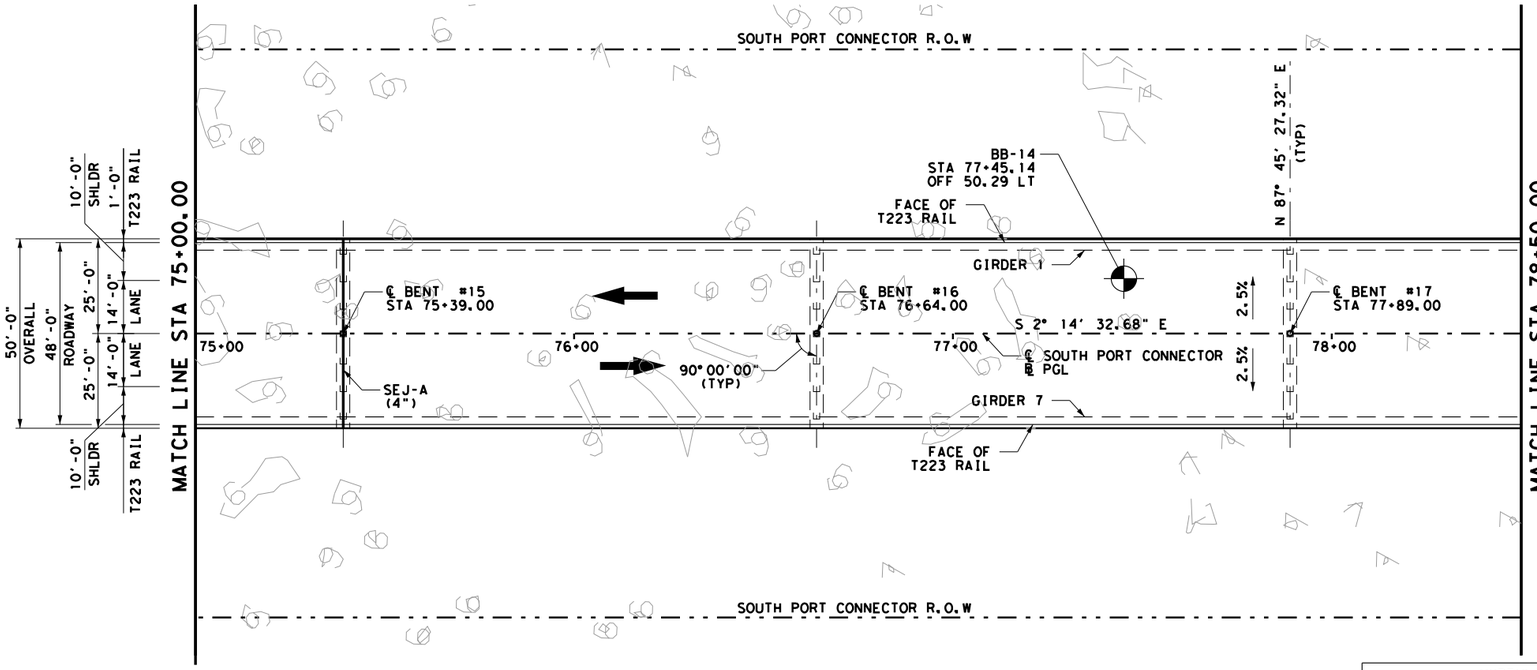
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 5 OF 7
6			90
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



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REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-002

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet,cfs
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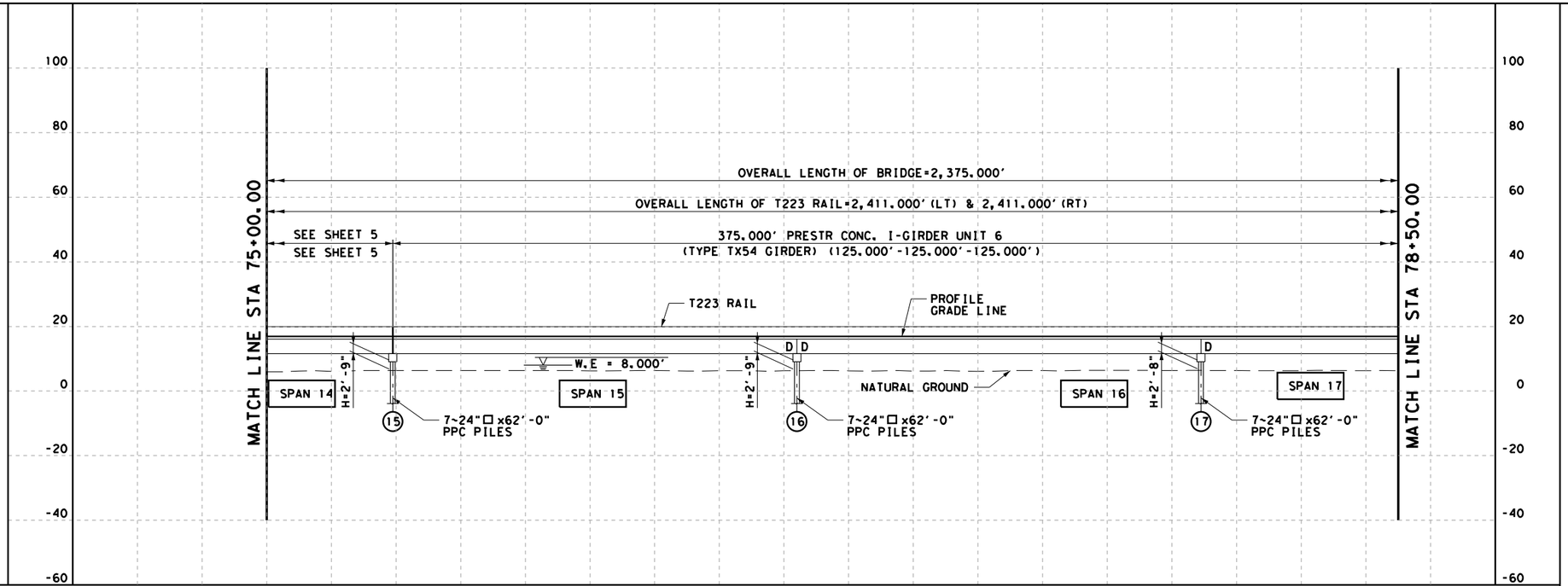
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #2

SCALE: 1" = 40'

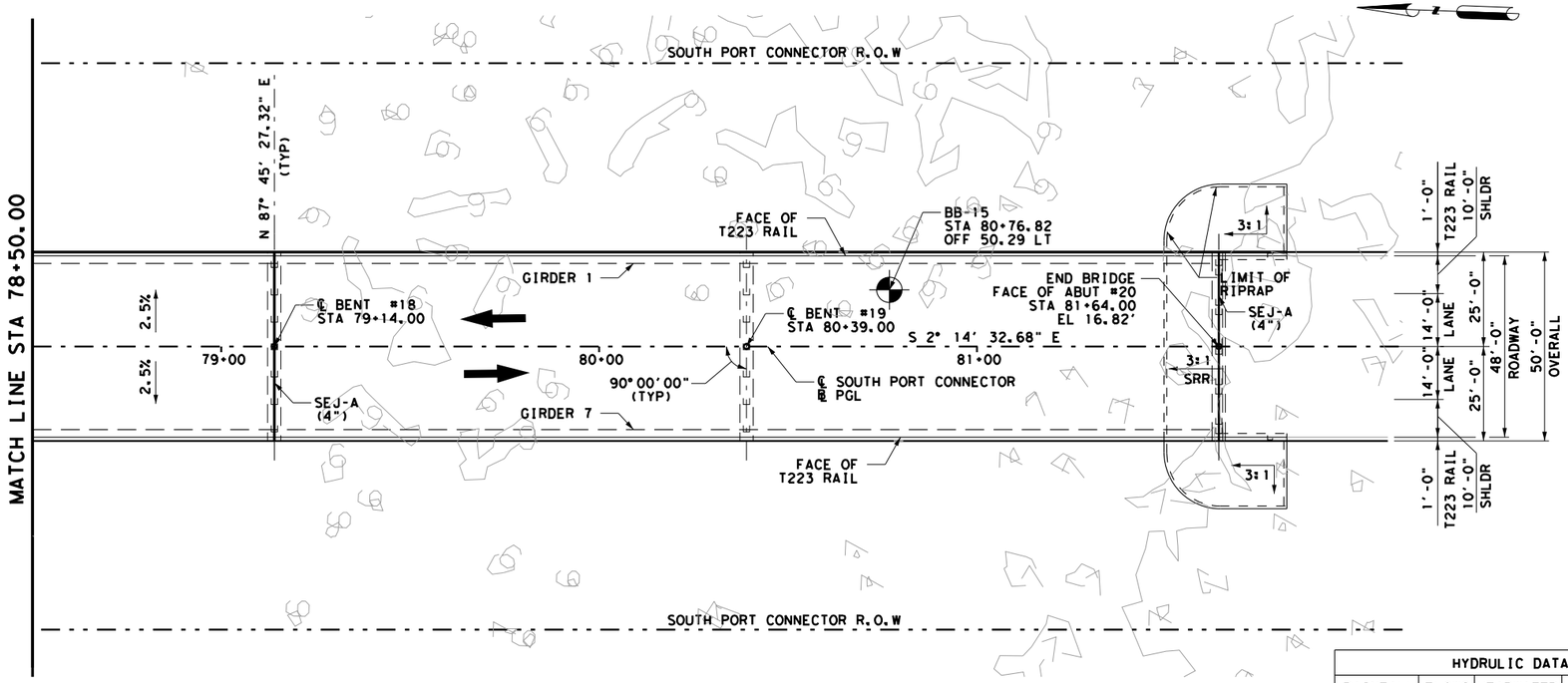
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE
the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 6 OF 7
6			91
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



NOTES

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REC : RURAL MAJOR COLLECTOR
DESIGN SPEED : 60MPH
ADT : 0 (2018)
ADT : 7,500 (2040)
NBI# : 21-031-0- AA02-91-002

HYDRULIC DATA				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet,cfs
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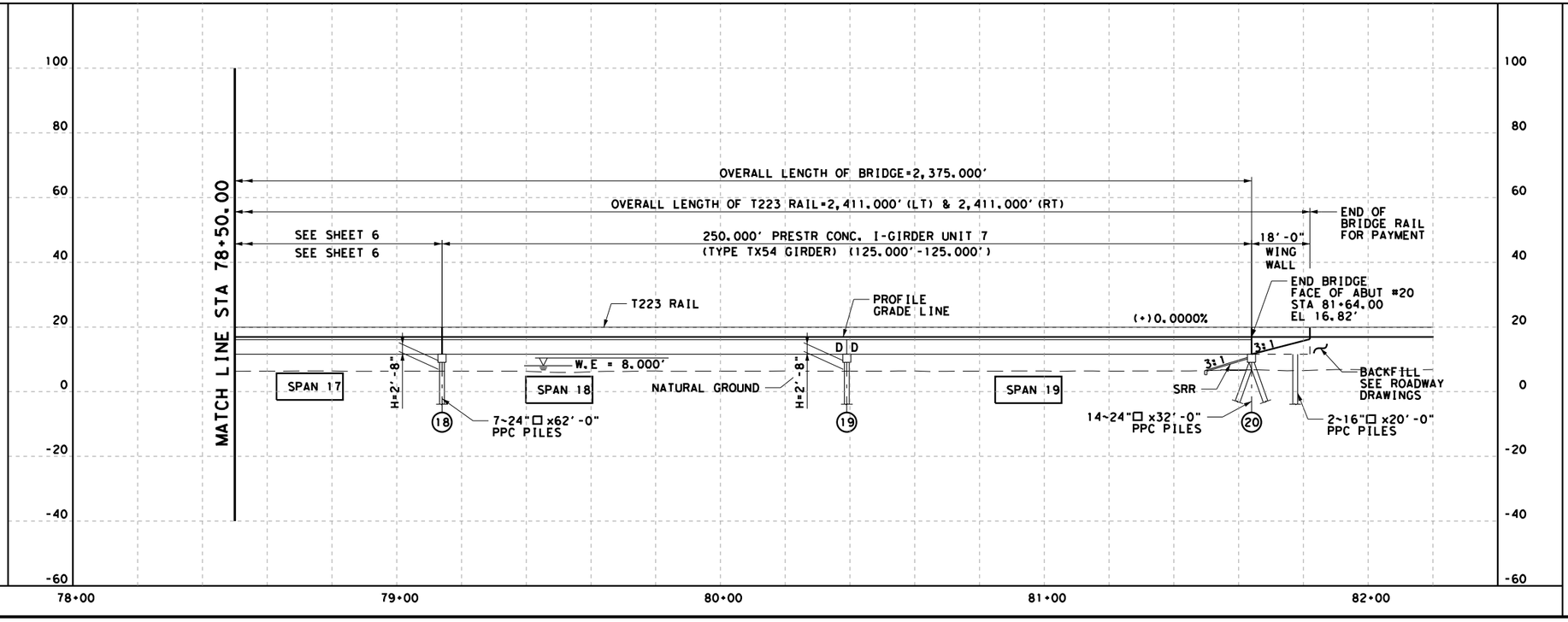
100	1047	4.99	4.6	1.38

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING



SOUTH PORT CONNECTOR

BRIDGE LAYOUT
BRIDGE #2

SCALE: 1" = 40'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 7 OF 7
6			92
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:20:11 PM
Plotted by: tadv
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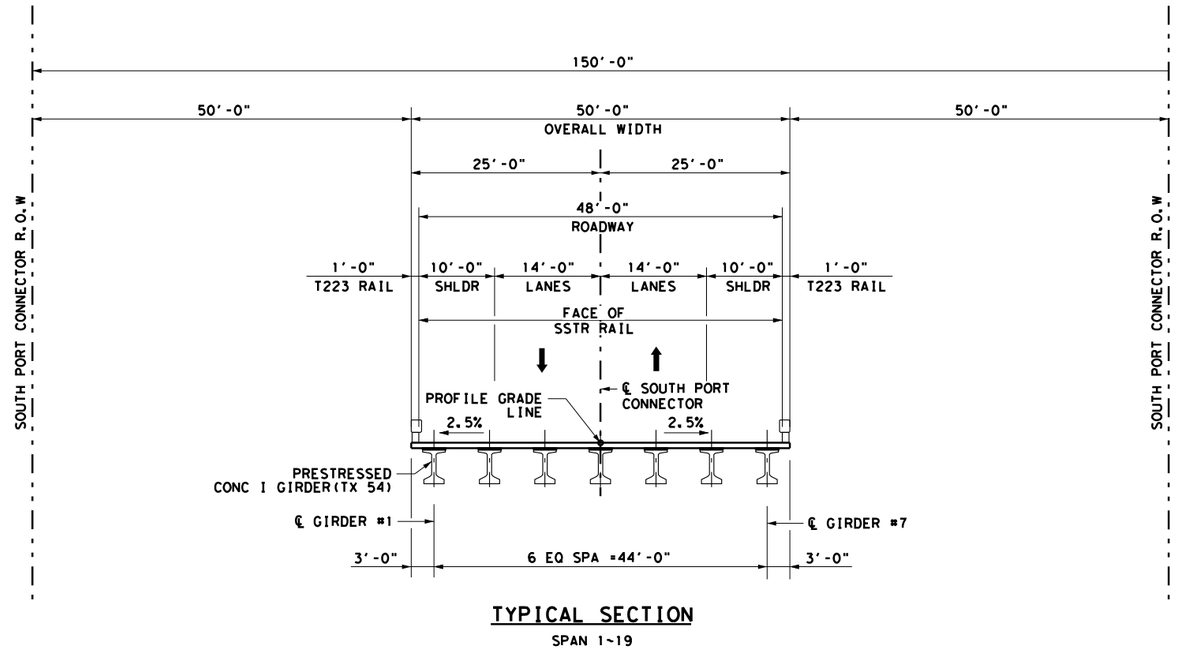

TYPICAL SECTION

SPAN 1~19

STATE OF TEXAS
JIE LIU
96367
LICENSED
PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

BRIDGE
TYPICAL SECTION
BRIDGE #2

SCALE: 1" = 20'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE
the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 1
6			93

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON

DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

DRILLING LOG

1 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-8	District	Pharr
Highway	South Port Connector	Structure		Date	9/12/18
CSJ	0921-06-288	Station	58+75	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	3.50 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
		1 (6) 1 (6)	CLAY, lean (CL), lt. brown, soft, moist			23	32	17		-#200=92% / HP=0.5 tsf
5		1 (6) 1 (6)								
						25				HP=0.25 tsf
-4. 10		1 (6) 1 (6)	CLAY, sandy lean (CL), lt. brown, soft, moist							
						22				-#200=52% / HP=0.5 tsf
-9. 15		5 (6) 7 (6)	SAND, clayey (SC), lt. gray, very dense, moist							
						16				HP=4.5+ tsf
-14. 20		10 (6) 13 (6)	CLAY, lean with sand (CL), lt. brown, hard, moist							
						19	46	34		-#200=84% / HP=4.5+ tsf
-19. 25		10 (6) 13 (6)	CLAY, lean (CL), lt. brown, stiff, mosit							
						31				-#200=97% / HP=0.75 tsf
30		8 (6) 7 (6)								
-29. 35		14 (6) 16 (6)				22	34	18		-#200=99% / SPT=16 b/ft
			CLAY, lean (CL), lt. brown, very stiff, moist							
-34. 40		24 (6) 22 (6)				24				-#200=39% / SPT=22 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

2 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-8	District	Pharr
Highway	South Port Connector	Structure		Date	9/12/18
CSJ	0921-06-288	Station	58+75	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	3.50 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
			SAND, clayey (SC), lt. brown, medium to dense, wet							
45		30 (6) 32 (6)				20				SPT=12 b/ft
-44. 50		8 (6) 10 (6)	CLAY, lean (CL), lt. brown, very stiff, moist			20	36	22		-#200=90% / SPT=17 b/ft
-46.			CLAY, lean with sand (CL), lt. brown, stiff, moist							
55		12 (6) 14 (6)				23				-#200=81% / HP=1.5 tsf
60		14 (6) 14 (6)		26.50	16.54	22				HP=1.75 tsf
65		38 (6) 30 (6)				26				SPT=16 b/ft
70		14 (6) 14 (6)				26				SPT=13 b/ft
-66.			CLAY, fat (CH), lt. brown, hard, moist							
75		21 (6) 18 (6)				24	62	44		-#200=96% / HP=4.5+ tsf
80		16 (6) 17 (6)				26			124	UC=2.98 tsf

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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Driller: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

3 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-8	District	Pharr
Highway	South Port Connector	Structure		Date	9/12/18
CSJ	0921-06-288	Station	58+75	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	3.50 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, fat (CH), lt. brown, hard, moist							
85		11 (6) 18 (6)				25				-#200=94% / HP=1.0 tsf
-84. 90		15 (6) 20 (6)	CLAY, sandy lean (CL), lt. brown, firm, moist			23	59	42		-#200=100% / HP=3.75 tsf
-89. 95		23 (6) 50 (6)				24				-#200=54% / HP=1.0 tsf
			SAND, clayed sand, lt. brown, dense, wet (SW-SC)							
100		46 (6) 50 (6)				24				-#200=11% / SPT=38 b/ft
-96.			CLAY, fat (CH), dark brown, hard, moist							
105		18 (6) 18 (6)				27	73	52		-#200=100% / HP=4.5+ tsf
-104. 110		20 (6) 22 (6)				30				HP=3.5 tsf
			SAND, clayey (SC), dark gray, dense, moist							
115		23 (6) 26 (6)				25				-#200=49% / HP=2.5 tsf
-114. 120		20 (6) 50 (6)				25				SPT=50 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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Driller: EnviroCore **Logger: CO** **Organization: PSI**

P:\2018\Geotechnical\03282115 Port Connector\Port Connector 03282115 Continued.CLG

DRILLING LOG

1 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-9	District	Pharr
Highway	South Port Connector	Structure		Date	9/12/18
CSJ	0921-06-288	Station	62+00	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	3.50 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
		2 (6) 2 (6)	CLAY, sandy lean (CL), lt. brown, firm, moist to wet			23	29	13		-#200=51% / HP=1.0 tsf
5		2 (6) 3 (6)								
						36				
-4. 10		3 (6) 4 (6)	SAND, clayey (SC), dark gray to lt. gray, medium, moist							
						26				-#200=18% / HP=0.25 tsf
15		5 (6) 6 (6)								
						14				HP=4.25 tsf
-14. 20		13 (6) 14 (6)	CLAY, lean (CL), lt. brown, very stiff, moist							
						22	49	30		-#200=92% / HP=4.5 tsf
25		14 (6) 16 (6)								
						23				HP=4.0 tsf
30		9 (6) 13 (6)								
						22				HP=4.5 tsf
-29. 35		15 (6) 20 (6)								
			CLAY, sandy lean (CL), lt. brown, stiff, moist							
-34. 40		28 (6) 21 (6)				24				-#200=58% / HP=1.5 tsf

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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Driller: EnviroCore **Logger: CO** **Organization: PSI**

P:\2018\Geotechnical\03282115 Port Connector\Port Connector 03282115 Continued.CLG

DRILLING LOG

2 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-9	District	Pharr
Highway	South Port Connector	Structure		Date	9/12/18
CSJ	0921-06-288	Station	62+00	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	3.50 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, fat (CH), lt. brown, stiff to hard, moist							
45		13 (6) 11 (6)				29	68	41		-#200=98% / SPT=18 b/ft
50		18 (6) 10 (6)				21				HP=1.6 tsf
55		6 (6) 9 (6)				24				SPT=20 b/ft
60		14 (6) 12 (6)				24				-#200=99% / HP=1.25 tsf
65		20 (6) 18 (6)				28				HP=1.5 tsf
70		17 (6) 16 (6)				25	54	34		-#200=100% / SPT=25 b/ft
75		19 (6) 21 (6)				26				HP=4.25 tsf
80		19 (6) 20 (6)				25				HP=4.5+ tsf

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

P:\2018\Geotechnical\03282115 Port Connector\Port Connector 03282115 Continued.CLG

DRILLING LOG

3 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-9	District	Pharr
Highway	South Port Connector	Structure		Date	9/12/18
CSJ	0921-06-288	Station	62+00	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	3.50 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, fat (CH), lt. brown, stiff to hard, moist							
85		13 (6) 17 (6)				25				-#200=100% / HP=3.0 tsf
90		19 (6) 21 (6)				23				SPT=22 b/ft
-89. 95		36 (6) 50 (3.5)				25				-#200=26% / SPT=29 b/ft
			SAND, clayey (SC), lt. brown, dense, moist							
-94. 100		40 (6) 50 (3.5)				24				SPT=30 b/ft
			CLAY, fat (CH), dark brown, very stiff, moist							
105		17 (6) 21 (6)				29	61	37		-#200=100% / HP=3.5 tsf
-104. 110		18 (6) 22 (6)				29				SPT=30 b/ft
			SAND, clayey (SC), dark gray, dense, moist							
115		16 (6) 20 (6)				27				-#200=28% / HP=1.75 tsf
-114. 120		36 (6) 50 (3)				23				SPT=62 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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Driller: EnviroCore **Logger: CO** **Organization: PSI**

P:\2018\Geotechnical\03282115 Port Connector\Port Connector 03282115 Continued.CLG

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR
BORING LOGS
BRIDGE #2

SCALE:

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO. 1 OF 4
6		94

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

DRILLING LOG

1 of 1

WinCore Version 3.3

County	Cameron	Hole	BB-10	District	Pharr
Highway	South Port Connector	Structure		Date	9/26/2018
CSJ	0921-06-288	Station	65+10	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	1.00 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
		2 (6) 2 (6)	CLAY, lean (CL), dark brown, firm, moist			26	32	14		-#200=85% / HP=0.5 tsf
5		2 (6) 2 (6)								
						31				HP=0.75 tsf
-4. 10		3 (6) 5 (6)	SAND, clayey (SC), dark gray to lt. gray, stiff, moist							
						40				-#200=42%
15		6 (6) 8 (6)								
						17				HP=3.5 tsf
-14. 20		10 (6) 11 (6)								
25										
30										
35										
40										

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

1 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-11	District	Pharr
Highway	South Port Connector	Structure		Date	9/26/2018
CSJ	0921-06-288	Station	68+25	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	1.00 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
		2 (6) 1 (6)	CLAY, lean (CL), dark brown, firm, moist			26	35	18		-#200=87% / HP=1.0 tsf
5		3 (6) 3 (6)								
						25				HP=0.75 tsf
-4. 10		5 (6) 7 (6)	SAND, clayey (SC), lt. gray, medium, moist							
						22				-#200=29% / HP=0.5 tsf
15		5 (6) 4 (6)								
						19				-#200=33% / HP=4.5+ tsf
20		21 (6) 22 (6)								
25		20 (6) 21 (6)				15				SPT=30 b/ft
30		8 (6) 12 (6)				21				SPT=18 b/ft
		13 (6) 17 (6)				28				-#200=99% / HP=4.0 tsf
-29. 35			CLAY, lean (CL), lt. brown, very stiff to stiff, moist							
						25	46	29		HP=4.5 tsf
40		22 (6) 35 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

2 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-11	District	Pharr
Highway	South Port Connector	Structure		Date	9/26/2018
CSJ	0921-06-288	Station	68+25	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	1.00 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, lean (CL), lt. brown, very stiff to stiff, moist							
-39. 45		21 (6) 19 (6)				26				HP=3.5 tsf
			SAND, clayey (SC), lt. brown, dense, moist							
						29				-#200=47%
-44. 50		16 (6) 45 (6)								
			CLAY, lean (CL), lt. brown, very stiff, moist							
55		9 (6) 15 (6)				22	47	28		-#200=100% / SPT=21 b/ft
-51.			CLAY, lean with sand (CL), lt. brown, very stiff, moist							
60		14 (6) 20 (6)				25				-#200=78% / SPT=26 b/ft
-56.			CLAY, fat (CH), lt. brown, stiff, moist							
65		24 (6) 26 (6)				26	52	30		-#200=100% / SPT=15 b/ft
-61.			SAND, clayey (SC), lt. brown, medium, moist							
70		13 (6) 12 (6)				29				-#200=39% / SPT=29 b/ft
-66.			CLAY, fat (CH), lt. brown, very stiff, moist							
75		20 (6) 21 (6)				27	62	38		-#200=99% / HP=3.5 tsf
80		17 (6) 16 (6)				31				SPT=24 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

3 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-11	District	Pharr
Highway	South Port Connector	Structure		Date	9/26/2018
CSJ	0921-06-288	Station	68+25	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	1.00 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
-76.			CLAY, fat (CH), lt. brown, very stiff, moist							
			SAND, clayey (SC), lt. brown, medium, moist			27				-#200=44% / HP=1.25 tsf
-79. 85		13 (6) 14 (6)								
			CLAY, fat (CH), lt. brown, very stiff, moist							
90		12 (6) 18 (6)				32	61	37		-#200=100% / SPT=20 b/ft
-87.						25				-#200=46% / HP=1.5 tsf
95		44 (6) 50 (3)	SAND, clayey (SC), dark brown to dark gray, very dense, moist							
100		50 (4) 50 (3.5)				23				SPT=92 b/ft
105		20 (6) 21 (6)				26				SPT=41 b/ft
110		26 (6) 34 (6)				25				SPT=60 b/ft
115		50 (4) 50 (3.5)				25				SPT=51 b/ft
-114. 120		36 (6) 50 (2.5)				23				-#200=24% / SPT=58 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test

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 conditicns, and/or construction activity.

Driller: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

1 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-12	District	Pharr
Highway	South Port Connector	Structure		Date	9/18/2018
CSJ	0921-06-288	Station	71+45	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	0.50 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
		1 (6) 1 (6)	CLAY, fat (CH), dark brown, firm, moist			28	56	36		-#200-95% / HP=1.5 tsf
5		2 (6) 2 (6)								
						26				HP=1.0 tsf
-4. 10		2 (6) 2 (6)	SAND, clayey (SC), dark gray to lt. gray, loose to medium							
15		5 (6) 5 (6)								
						18				-#200-32% / HP=4.5 tsf
-14. 20		16 (6) 13 (6)	CLAY, fat (CH), lt. brown, hard to stiff, moist							
						25	68	48		-#200-94% HP=4.25 tsf
25		15 (6) 13 (6)								
						26				-#200-99% / HP=1.5 tsf
30		12 (6) 11 (6)								
						21	59	39		-#200-99% / SPT=14 b/ft
-29. 35		11 (6) 11 (6)	CLAY, fat (CH), lt. brown, stiff, moist							
				18.60	12.67	23				-#200-95% HP=0.5 tsf
40		13 (6) 15 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore **Logger: CO** **Organization: PSI**

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DRILLING LOG

2 of 3

WinCore Version 3.3

County	Cameron	Hole	BB-12	District	Pharr
Highway	South Port Connector	Structure		Date	9/18/2018
CSJ	0921-06-288	Station	71+45	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	0.50 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, fat (CH), lt. brown, stiff, moist							
45		8 (6) 9 (6)				23				SPT=10 b/ft
50		9 (6) 11 (6)				33				SPT=21 b/ft
55		15 (6) 12 (6)				25				SPT=7 b/ft
-54. 60		14 (6) 16 (6)	CLAY, lean (CL), lt. brown, stiff, moist			23	37	21		-#200-97% / SPT=17 b/ft
						28				-#200-52% HP=0.25 tsf
-59. 65		20 (6) 25 (6)	CLAY, sandy lean (CL), lt. brown, hard, moist							
-64. 70		15 (6) 17 (6)	CLAY, fat (CH), lt. brown, very stiff, moist			27	64	41		-#200-100% / SPT=22 b/ft
						27		127		UC=1.71 tsf
75		17 (6) 20 (6)								
						27				HP=4.5 tsf
80		19 (6) 18 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore **Logger: CO** **Organization: PSI**

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T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR
BORING LOGS
BRIDGE #2

SCALE:

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO. 2 OF 4
6		95

DGN: JL	STATE	DIST.	COUNTY	
CHK DGN: WC	TEXAS	PHARR	CAMERON	
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

DRILLING LOG

3 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-12
Structure
Station 71+45
Offset

District Pharr
Date 9/18/2018
Grnd. Elev. 6.00 ft
GW Elev. 0.50 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, fat (CH), lt. brown, very stiff, moist							
85		24 (6) 18 (6)				26				-#200-100% / SPT=16 b/ft
90		18 (6) 19 (6)				28				-#200-90% / SPT=28 b/ft
95		20 (6) 25 (6)				26				SPT=26 b/ft
100		19 (6) 22 (6)				25				SPT=29 b/ft
-99. 105		18 (6) 28 (6)	CLAY, fat (CH), dark gray, hard to very stiff, moist			33	60	29		-#200-100% / SPT=29 b/ft
						25				-#200-95% / HP=1.0 tsf
110		25 (6) 25 (6)								
115		41 (6) 33 (6)				36	64	39		-#200-100% / SPT=21 b/ft
-114. 120		19 (6) 23 (6)				42				HP=4.5 tsf

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore Logger: CO Organization: PSI

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DRILLING LOG

1 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-13
Structure
Station 74+50
Offset

District Pharr
Date 8/8/18
Grnd. Elev. 6.00 ft
GW Elev. -2.00 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
		3 (6) 3 (6)	CLAY, fat (CL), dark brown, firm, moist			29	74	51		-#200=98% / HP=1.5 tsf
5		3 (6) 4 (6)								
						23				HP=4.5 tsf
10		1 (6) 1 (6)								
						28				HP=4.0 tsf
-9. 15		3 (6) 6 (6)								
			SAND, clayey (SC), lt. brown, very stiff, moist							
						24				-#200=35% / HP=4.5 tsf
-14. 20		12 (6) 10 (6)								
			CLAY, fat (CH), lt. brown, very stiff, moist							
						21	55	37		-#200=88% / HP=4.5+ tsf
25		4 (6) 8 (6)								
						29				HP=3.75 tsf
-24. 30		9 (6) 14 (6)								
			CLAY, sandy lean (CL), lt. gray, very stiff, moist							
						14				-#200=61% / HP=4.0 tsf
-29. 35		11 (6) 12 (6)								
			CLAY, fat (CH), lt. brown, very stiff, moist							
						23	61	42		-#200=100% / HP=4.5+ tsf
40		13 (6) 14 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore Logger: CO Organization: PSI

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DRILLING LOG

2 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-13
Structure
Station 74+50
Offset

District Pharr
Date 8/8/18
Grnd. Elev. 6.00 ft
GW Elev. -2.00 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, fat (CH), lt. brown, very stiff, moist							
45		17 (6) 21 (6)				26				-#200=98% / HP=2.5 tsf
-44. 50		12 (6) 17 (6)								
			SAND, clayey (SC), lt. brown, dense, moist			22	51	33	134	-#200=96% / UC=4.81 tsf
-49. 55		42 (6) 50 (4)				26				-#200=45%
			CLAY, fat (CH), lt. brown, very stiff, moist							
-54. 60		16 (6) 18 (6)				26	50	29		-#200=99% / SPT=15 b/ft
			SAND, clayey (SC), lt. brown, medium dense, wet							
		30 (6) 24 (6)				26				-#200=93% / HP=0.5 tsf
-59. 65			CLAY, fat (CL), lt. brown to dark brown, very stiff to hard, moist							
70		17 (6) 19 (6)				27	69	45		-#200=100% / SPT=20 b/ft
75		16 (6) 20 (6)				24			130	UC=4.48 tsf
80		25 (6) 16 (6)				26				HP=4.5 tsf

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore Logger: CO Organization: PSI

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DRILLING LOG

3 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-13
Structure
Station 74+50
Offset

District Pharr
Date 8/8/18
Grnd. Elev. 6.00 ft
GW Elev. -2.00 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, fat (CL), lt. brown to dark brown, very stiff to hard, moist							
85		19 (6) 13 (6)				26				-#200=96% / HP=3.5 tsf
90		18 (6) 24 (6)				27				HP=2.5 tsf
95		43 (6) 21 (6)				24				HP=3.0 tsf
100		22 (6) 18 (6)				28				HP=3.75 tsf
105		21 (6) 19 (6)				27	68	47		-#200=99% / HP=3.5 tsf
110		12 (3) 50 (3)				27				HP=4.25 tsf
115		28 (6) 20 (6)				28				
-114. 120		22 (6) 20 (6)				25				HP=4.0 tsf

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore Logger: CO Organization: PSI

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DRILLING LOG

1 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-283

Hole BB-14
Structure
Station 77+60
Offset

District Pharr
Date 9/21/2018
Grnd. Elev. 6.00 ft
GW Elev. -1.50 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
		2 (6) 3 (6)	CLAY, fat (CH), brown, firm, moist			27	61	42		-#200=88% / HP=2.25 tsf
5		1 (6) 1 (6)								
						28				HP=1.5 tsf
-4. 10		2 (6) 3 (6)								
			SAND, clayey (SC), dark to lt. gray, loose to medium, moist			21				-#200=16% / HP=0.25 tsf
15		4 (6) 4 (6)								
						15				-#200=26% / HP=4.5+ tsf
-14. 20		14 (6) 16 (6)								
			CLAY, fat (CH), lt. brown, hard to very stiff, moist			17	55	38		-#200=88% / HP=4.5+ tsf
25		15 (6) 17 (6)								
						26				HP=4.25 tsf
30		11 (6) 14 (6)								
						27			131	UC=5.31 tsf
35		11 (6) 13 (6)								
40		13 (6) 15 (6)				24				SPT=24 b/ft

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore Logger: CO Organization: PSI

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DRILLING LOG

2 of 3

WinCore
Version 3.3

County Cameron
Highway South Port Connector
CSJ 0921-06-288

Hole BB-14
Structure
Station 77+60
Offset

District Pharr
Date 9/21/2018
Grnd. Elev. 6.00 ft
GW Elev. -1.50 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, fat (CH), lt. brown, hard to very stiff, moist							
45		15 (6) 16 (6)				26				HP=3.0 tsf
-44. 50		11 (6) 12 (6)								
			CLAY, lean with sand (CL), lt. brown, very stiff, moist			22				-#200=72% / SPT=14 b/ft
55		29 (6) 22 (6)				22				SPT=23 b/ft
60		13 (6) 12 (6)				24				SPT=36 b/ft
65		9 (6) 18 (6)				20				SPT=28 b/ft
-64. 70		21 (6) 20 (6)				24	57	36		-#200=98% / SPT=21 b/ft
			CLAY, fat (CH), lt. brown, very stiff, moist							
75		21 (6) 22 (6)				24			128	UC=3.75 tsf
-74. 80		20 (6) 16 (6)				26				HP=4.5 tsf

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore Logger: CO Organization: PSI

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T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR
BORING LOGS
BRIDGE #2

SCALE:

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO. 3 OF 4
6		96

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

DRILLING LOG

WinCore Version 3.3

County	Cameron	Hole	BB-14	District	Pharr
Highway	South Port Connector	Structure		Date	9/21/2018
CSJ	0921-06-288	Station	77+60	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	-1.50 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, lean with sand (CL), lt. brown, stiff, moist							
		13 (6) 8 (6)				24				-#200=77% / HP=0.75 tsf
85										
		37 (6) 14 (6)				23	42	18		-#200=97% / SPT=21 b/ft
-84. 90			CLAY, lean (CL), lt. brown, firm to stiff, moist							
		24 (6) 20 (6)				23				HP=0.75 tsf
95										
		19 (6) 20 (6)				29				HP=2.0 tsf
-94. 100			CLAY, fat (CH), dark brown, very stiff, moist							
		29 (6) 20 (6)				27	51	26		-#200=99% / HP=3.5 tsf
-99. 105			SAND, clayey (SC), dark gray, medium, moist							
		36 (6) 50 (3)				25				-#200=14% / HP=0.25 tsf
110										
		21 (6) 22 (6)				28	52	32		-#200=95% / SPT=22 b/ft
-109. 115			CLAY, fat (CH), dark gray, very stiff, moist							
		39 (6) 33 (6)								
-114. 120										

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore **Logger: CO** **Organization: PSI**

P:\2018\Geotechnical\03282115 Port Connector\Port Connector 03282115 Continued.CLG

DRILLING LOG

WinCore Version 3.3

County	Cameron	Hole	BB-15	District	Pharr
Highway	South Port Connector	Structure		Date	8/1/18
CSJ	0921-06-288	Station	80+75	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	-4.50 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
		6 (6) 5 (6)	CLAY, fat (CH), lt. brown, firm, moist							
						30	61	52		-#200=91% / HP=1.5 tsf
5		3 (6) 5 (6)								
						30				SPT=7 b/ft
						29				HP=1.5 tsf
-4. 10		2 (6) 2 (6)	CLAY, fat with sand (CH), lt. brown, firm, moist							
						28				-#200=78% / HP=1.75 tsf
-9. 15		5 (6) 9 (6)	SAND, clayey (SC), lt. gray, medium, moist							
						20				-#200=28% / SPT=15
20		11 (6) 10 (6)								
						20				HP=4.5+ tsf
-19. 25		16 (6) 15 (6)	CLAY, lean (CL), lt. brown, very stiff, moist							
						29	49	29		-#200=99% / SPT=14 b/ft
30		13 (6) 15 (6)								
						26				HP=3.5 tsf
35		12 (6) 15 (6)								
						24		129		UC=2.04 tsf
-34. 40		15 (6) 19 (6)								

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore **Logger: CO** **Organization: PSI**

P:\2018\Geotechnical\03282115 Port Connector\Port Connector 03282115.CLG

DRILLING LOG

WinCore Version 3.3

County	Cameron	Hole	BB-15	District	Pharr
Highway	South Port Connector	Structure		Date	8/1/18
CSJ	0921-06-288	Station	80+75	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	-4.50 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, fat (CH), lt. brown, very stiff, moist							
		13 (6) 16 (6)				24	76	51		-#200=100% / HP=4.0 tsf
45										
		11 (6) 19 (6)				21				HP=4.25 tsf
-44. 50			SAND, clayey (SC), lt. brown, medium dense, moist							
		5 (6) 10 (6)				26				-#200=29% / SPT=29 b/ft
-49. 55			CLAY, fat (CH), lt. brown, stiff, moist							
		20 (6) 21 (6)				27	63	41		-#200=100% / SPT=12 b/ft
-54. 60			CLAY, fat with sand (CH), lt. brown, very stiff, moist							
		12 (6) 19 (6)				26				-#200=82% / HP=0.5 tsf
65										
		16 (6) 18 (6)				28				SPT=8 b/ft
-64. 70			CLAY, fat (CH), lt. brown, very stiff, moist							
		20 (6) 22 (6)				23	50	30		-#200=99% / SPT=17 b/ft
75										
		14 (6) 17 (6)				22				HP=3.5 tsf
80										

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore **Logger: CO** **Organization: PSI**

P:\2018\Geotechnical\03282115 Port Connector\Port Connector 03282115.CLG

DRILLING LOG

WinCore Version 3.3

County	Cameron	Hole	BB-15	District	Pharr
Highway	South Port Connector	Structure		Date	8/1/18
CSJ	0921-06-288	Station	80+75	Grnd. Elev.	6.00 ft
		Offset		GW Elev.	-4.50 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, fat (CH), lt. brown, very stiff, moist							
		13 (6) 14 (6)		37.60	25.00	23				HP=0.75 tsf
85										
		18 (6) 22 (6)				28				HP=2.25 tsf
-84. 90			SAND, clayey (SC), lt. brown, medium to dense, moist							
		50 (5) 50 (6)				24				-#200=23% / SPT=38 b/ft
-89. 95			CLAY, fat (CH), dark brown, very stiff, moist							
		50 (4) 44 (6)				24	50	27		-#200=99% / SPT=26 b/ft
100										
		21 (6) 22 (6)				29				SPT=24 b/ft
105										
		50 (3) 50 (4)				28				HP=4.5+ tsf
110										
		24 (6) 22 (6)				28				HP=4.25 tsf
115										
		39 (6) 39 (6)				31				HP=2.75 tsf
-114. 120										

Remarks: (HP): Hand Penetrometer, (SPT): Standard Penetration Test, (UC): Unconfined Compression

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: EnviroCore **Logger: CO** **Organization: PSI**

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T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

BORING LOGS
BRIDGE #2

SCALE:

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO. 4 OF 4
6		97

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:20:49 PM

Plotted by: todv
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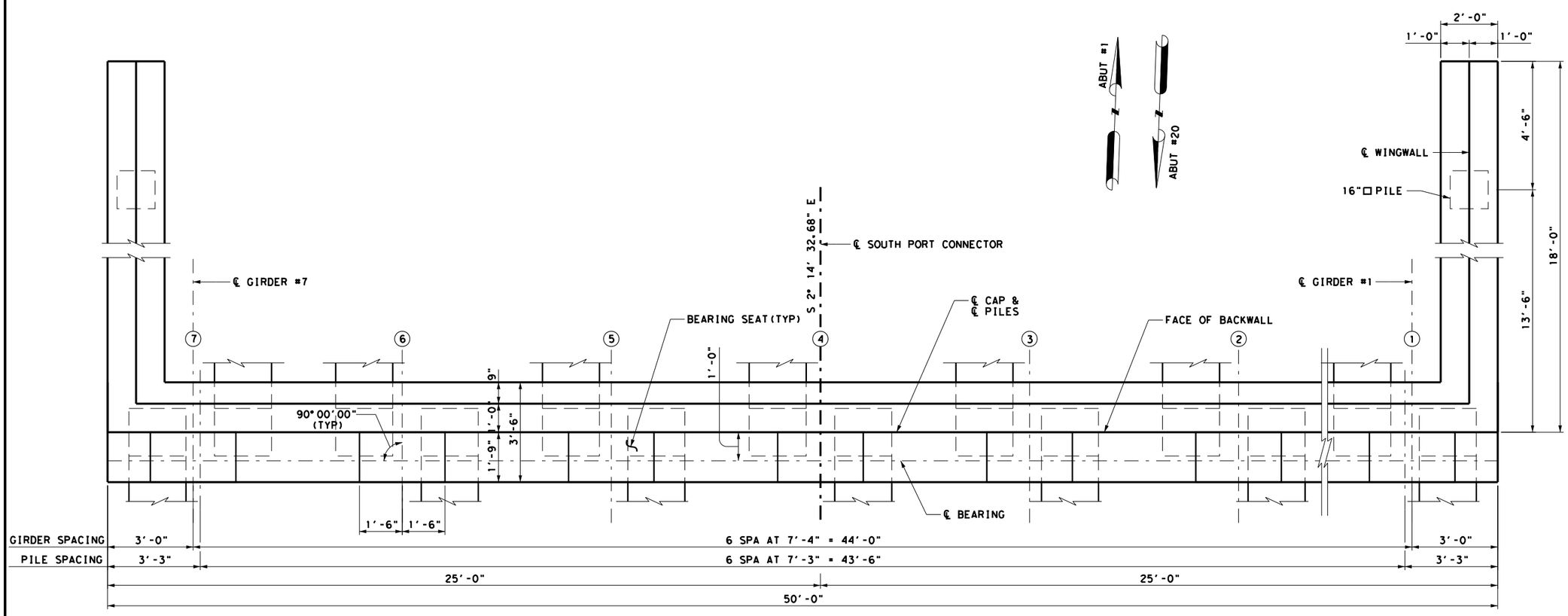
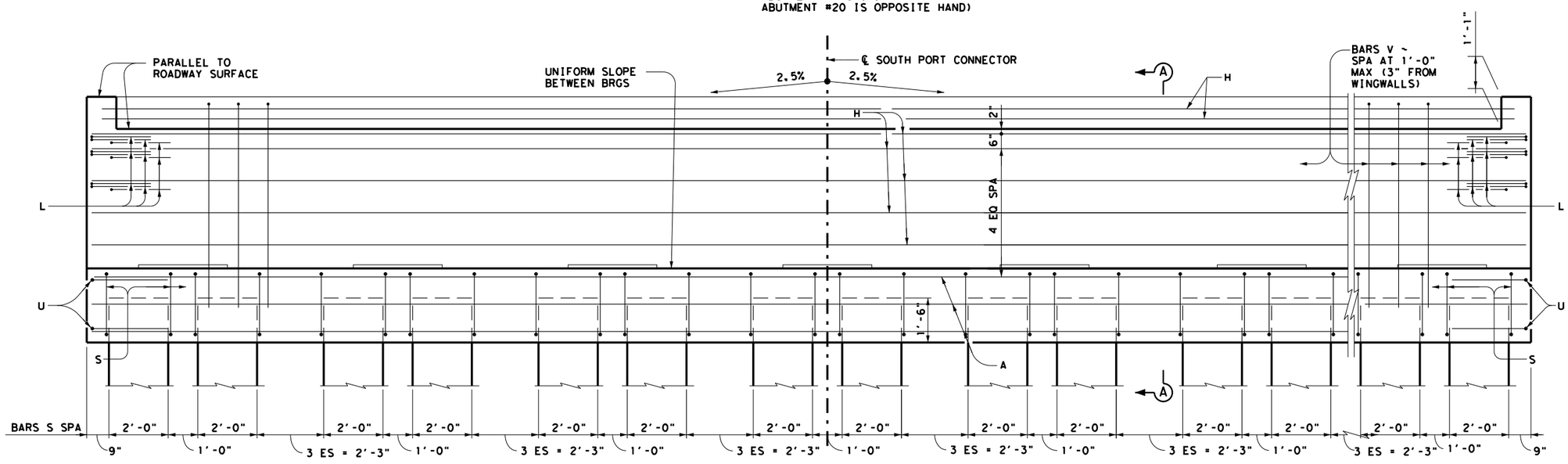


PLAN

(ABUTMENT #1 SHOW,
ABUTMENT #20 IS OPPOSITE HAND)



ELEVATION

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

ABUTMENT #1 AND #20
BRIDGE #2

SCALE: 1/4" = 1'-0"

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE
the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 2
6			98
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:21:04 PM
Plotted by: todv
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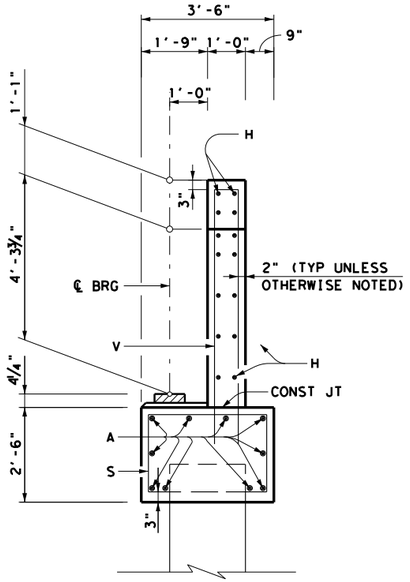
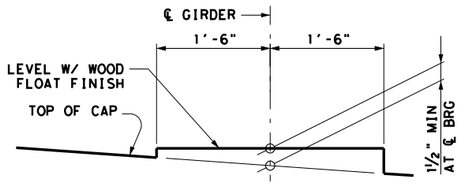


SECTION A-A



BEARING SEAT DETAIL

NOTE :
(BEARING SURFACE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)

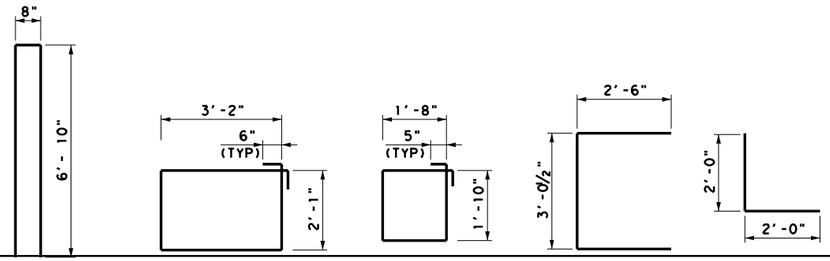
TABLE OF ESTIMATED QUANTITIES FOR ONE CAP

BAR	NO	SIZE	LENGTH	WEIGHT
A	10	#11	49'-0"	2604
H	14	#6	49'-8"	1045
L	18	#6	4'-0"	109
S	40	#5	11'-6"	480
U	4	#6	8'-1"	49
V	49	#6	14'-4"	1055
WH1	14	#6	19'-5"	409
WH2	24	#6	17'-8"	637
WS	38	#4	7'-10"	199
WV	38	#5	14'-4"	569
* REINFORCING STEEL (EPOXY)			LB	7,156
CLASS "C" CONCRETE (CAP)			CY	40.3

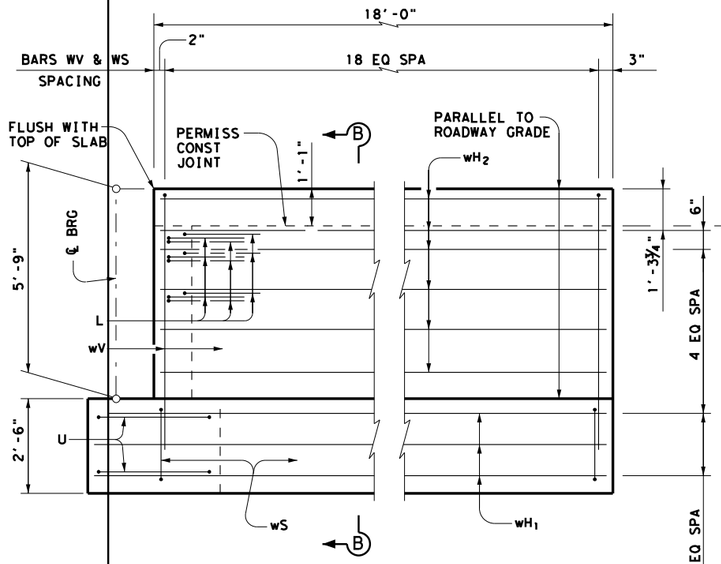
* FOR CONTRACTOR'S INFORMATION ONLY.

INTERIOR BENT NOTES :

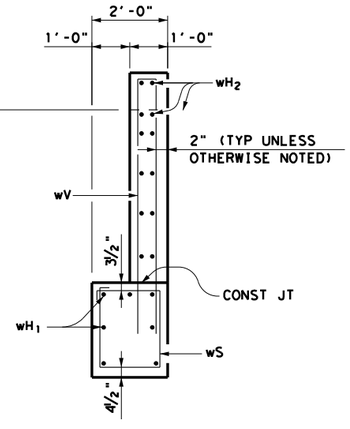
1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE SPECIFICATIONS, 7TH EDITION (2014).
2. ALL CONCRETE SHALL BE CLASS C CONCRETE (f'c= 3600 PSI)
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED ¾", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M A615 GRADE 60 STEEL (EPOXY).
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CACULATED FOUNDATION LOADS : 45 TONS PER PILE. 10 TONS PER WINGWALL PILE.
8. THE PRECAST BENT CAP OPTION IS PERMITTED.
9. PPC PILE SHOULD USE SULFACE RESISTANT CONCRETE.



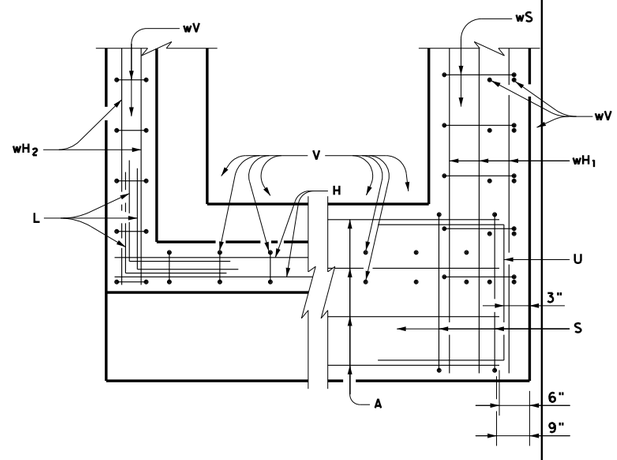
BARS V & wV BARS S BARS wS BARS U BARS L



WINGWALL ELEVATION



SECTION B-B



BACK WALL CAP

CORNER DETAILS

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

ABUTMENT #1 AND #20
BRIDGE #2

SCALE: 1/4" = 1'-0"

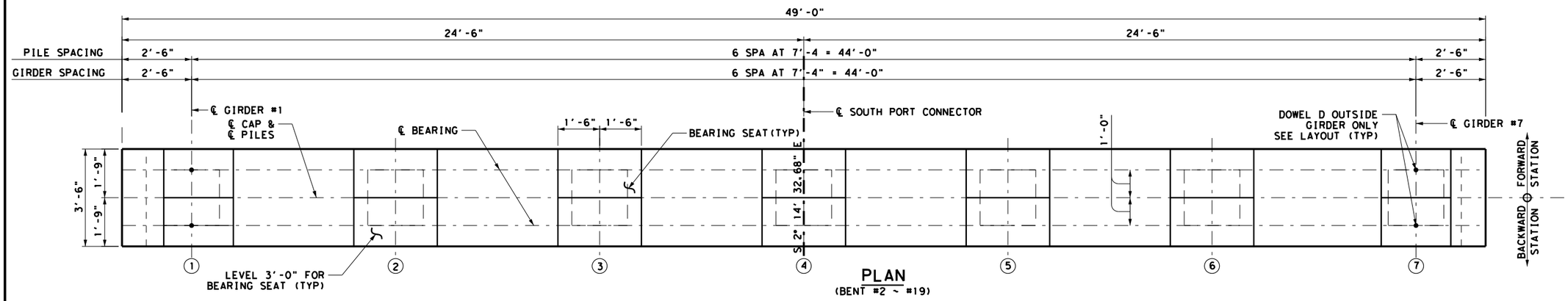
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

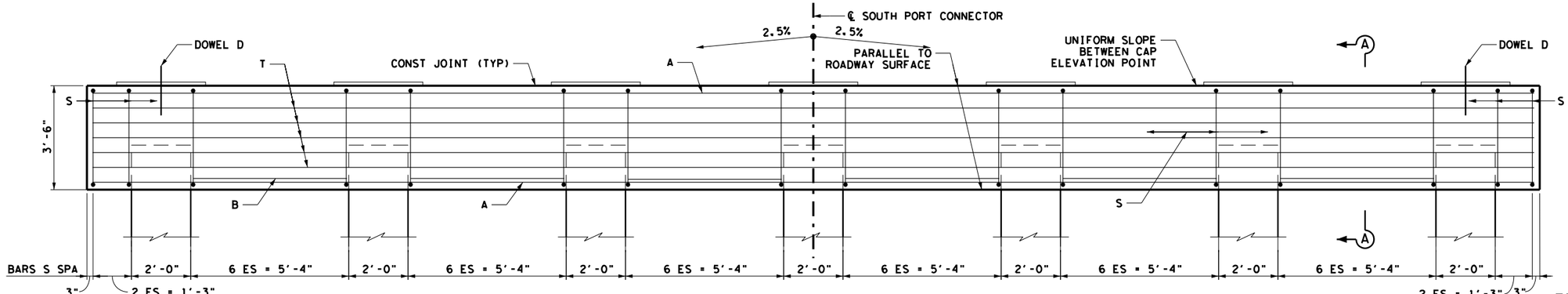
S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

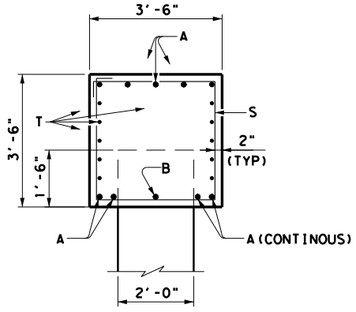
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 2 OF 2
6			99
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



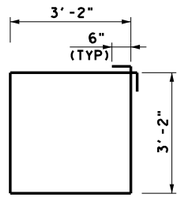
PLAN
(BENT #2 ~ #19)



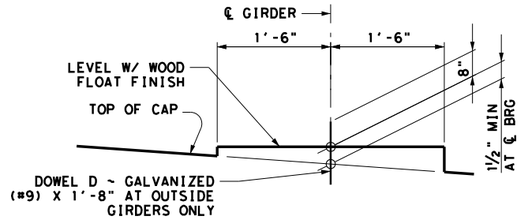
ELEVATION



BENT CAP SECTION



BARS S



BEARING SEAT DETAIL

NOTE :
(BEARING SURFACE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)

TABLE OF ESTIMATED QUANTITIES FOR ONE CAP				
BAR	NO	SIZE	LENGTH	WEIGHT
A	9	#9	48'-6"	1485
B	6	#9	5'-4"	109
S	48	#5	13'-8"	685
T	10	#5	48'-6"	506
* REINFORCING STEEL (EPOXY)			LB	3,041
CLASS "C" CONCRETE (CAP)			CY	22.3

* FOR CONTRACTOR'S INFORMATION ONLY.

TABLE FOR DOWEL "D" (1¼" D, 1'-8")			
BENT	FW	BK	WEIGHT
BENT 2	2	2	28
BENT 3			
BENT 4	2	2	28
BENT 5		2	14
BENT 6			
BENT 7	2	2	28
BENT 8		2	14
BENT 9			
BENT 10	2	2	28
BENT 11		2	14
BENT 12			
BENT 13	2	2	28
BENT 14		2	14
BENT 15			
BENT 16	2	2	28
BENT 17		2	14
BENT 18			
BENT 19	2	2	28
* REINFORCING STEEL (EPOXY)		LB	266

* FOR CONTRACTOR'S INFORMATION ONLY.

INTERIOR BENT NOTES :

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE SPECIFICATIONS, 7TH EDITION (2014).
2. ALL CONCRETE SHALL BE CLASS C CONCRETE (f'c= 3600 PSI)
3. ALL EXPOSED CORNERS SHALL BE CHAMFERED ¾", UNLESS OTHERWISE NOTED.
4. ALL REINFORCING STEEL SHALL BE A.S.T.M A615 GRADE 60 STEEL (EPOXY).
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS, UNLESS OTHERWISE NOTED.
6. SEE COMMON FOUNDATION DETAILS FOR ADDITIONAL INFORMATION.
7. MAXIMUM CACULATED FOUNDATION LOADS : 160 TONS PER PILE.
8. THE PRECAST BENT CAP OPTION IS PERMITTED.
9. PPC PILE SHOULD USE SULFACE RESISTANT CONCRETE

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

BENT #2 ~ #19
BRIDGE #2

SCALE: 1/4" = 1'-0"

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

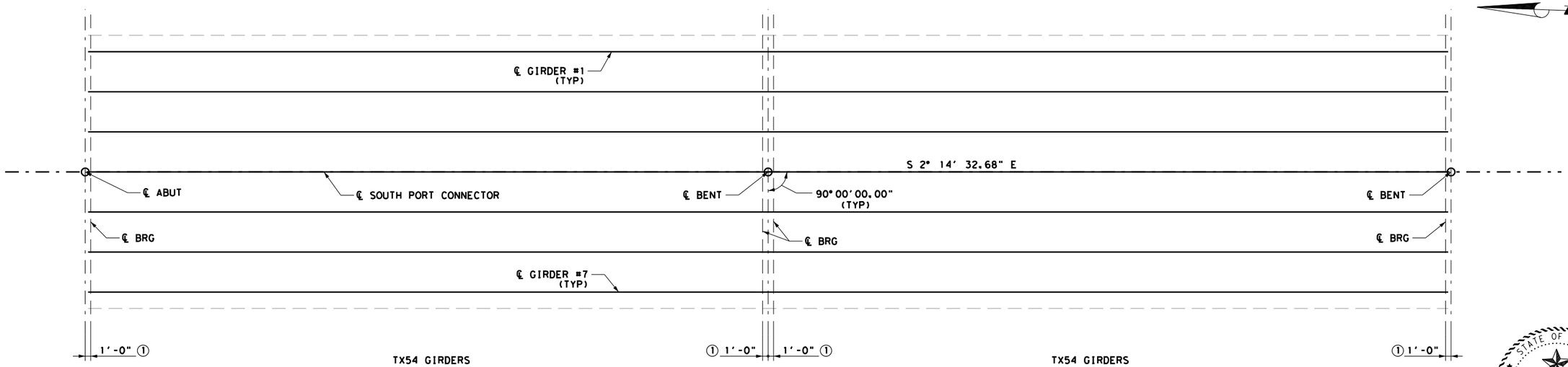
PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO. 1 OF 1
6		100

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG: MW	0921	06	288	SOUTH PORT CONNECTOR



PLAN

BENT REPORT

BENT NO. ALL (N 87° 45' 67.32" E)
DISTANCE BETWEEN THE STATION LINE TO GIRDER 1 22.000 L

		GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D. M. S.
SPAN ALL	GIRDER 1	0.000	90 00 00.00
	GIRDER 2	7.333	90 00 00.00
	GIRDER 3	7.333	90 00 00.00
	GIRDER 4	7.333	90 00 00.00
	GIRDER 5	7.333	90 00 00.00
	GIRDER 6	7.333	90 00 00.00
	GIRDER 7	7.333	90 00 00.00
	TOTAL	44.000	

GIRDER REPORT

GIRDER REPORT SPAN ALL

	HONRIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GIR. FLG. ②	GIRDER SLOP
GIRDER 1	125.000	123.000	124.500	0.000
GIRDER 2	125.000	123.000	124.500	0.000
GIRDER 3	125.000	123.000	124.500	0.000
GIRDER 4	125.000	123.000	124.500	0.000
GIRDER 5	125.000	123.000	124.500	0.000
GIRDER 6	125.000	123.000	124.500	0.000
GIRDER 7	125.000	123.000	124.500	0.000

① SEE IGEB STANDAR FOR ORIENTATION OF DIMENSION.

② GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

FRAMING PLAN
(2 SPANS UNIT)
BRIDGE #2

SCALE: 1" = 20'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 2
6			101
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR

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Plotted @: 1:21:10 PM
Plotted by: tody
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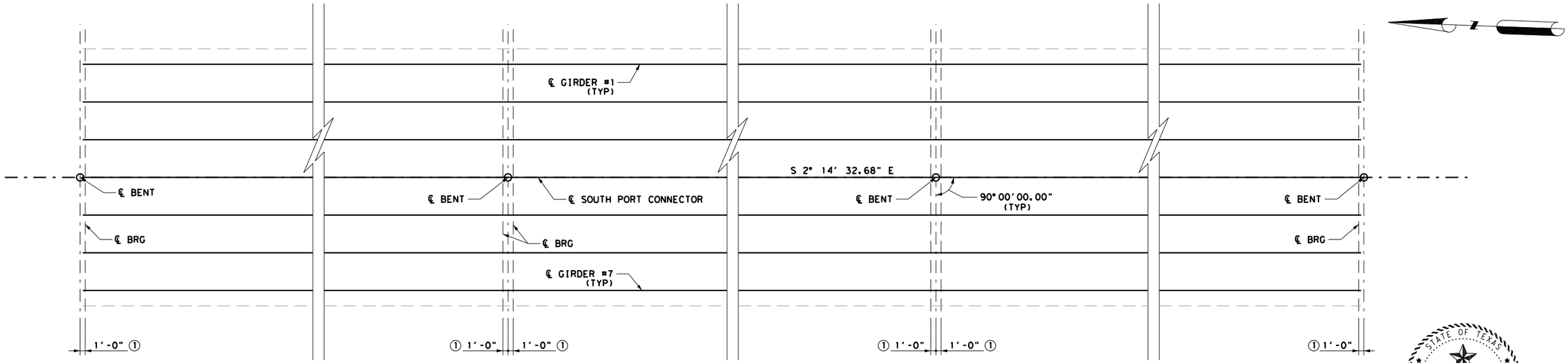


TX54 GIRDERS

TX54 GIRDERS

TX54 GIRDERS

PLAN

BENT REPORT

BENT NO. ALL (N 87° 45' 67.32" E)
DISTANCE BETWEEN THE STATION LINE TO GIRDER 1 22.000 L

		GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D. M. S.
SPAN ALL	GIRDER 1	0.000	90 00 00.00
	GIRDER 2	7.333	90 00 00.00
	GIRDER 3	7.333	90 00 00.00
	GIRDER 4	7.333	90 00 00.00
	GIRDER 5	7.333	90 00 00.00
	GIRDER 6	7.333	90 00 00.00
	GIRDER 7	7.333	90 00 00.00
	TOTAL	44.000	

GIRDER REPORT

GIRDER REPORT SPAN ALL

	HONRIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT.GIR.FLG.②	GIRDER SLOP
GIRDER 1	125.000	123.000	124.500	0.000
GIRDER 2	125.000	123.000	124.500	0.000
GIRDER 3	125.000	123.000	124.500	0.000
GIRDER 4	125.000	123.000	124.500	0.000
GIRDER 5	125.000	123.000	124.500	0.000
GIRDER 6	125.000	123.000	124.500	0.000
GIRDER 7	125.000	123.000	124.500	0.000

① SEE IGEB STANDAR FOR ORIENTATION OF DIMENSION.

② GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

FRAMING PLAN
(3 SPANS UNIT)
BRIDGE #2

SCALE: 1" = 20'

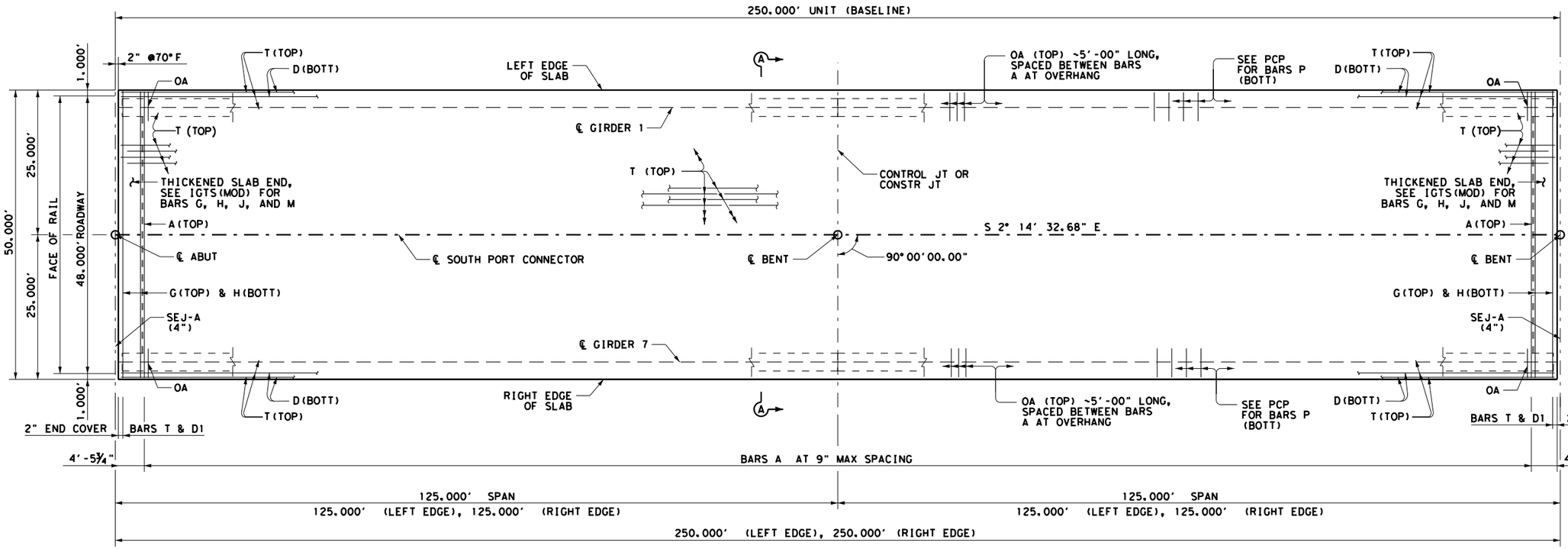
RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 2 OF 2
6			102
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR



PLAN

(2 SPANS TYP - 2 UNITS)

TABLE OF ESTIMATED QUANTITIES UNIT (2 SPAN)			
SPAN	REINF. CONCRETE SLAB	PRESTR CONC GIRDER (TX54) ①	REINF. STEEL * ②
NO.	SF	LF	LB
1	6,250.0	871.5	14,375.0
2	6,250.0	871.5	14,375.0
TOTAL	12,500.0	1,743.0	28,750.0

* FOR CONTRACTOR'S INFORMATION ONLY.

① BEAM LENGTHS SHOWN ARE BOTTOM FLANGE LENGTH WITH ADJUSTMENTS MADE FOR BEAM SLOPES.

② REINF STEEL QUANTITY IS CALCULATED BY USING APPROX 2.3 LB/SF OF BRIDGE DECK.

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

SLAB PLAN
(2 SPANS UNIT)
BRIDGE #2

SCALE: 1" = 20'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 2
6			103
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 11:21:12 PM
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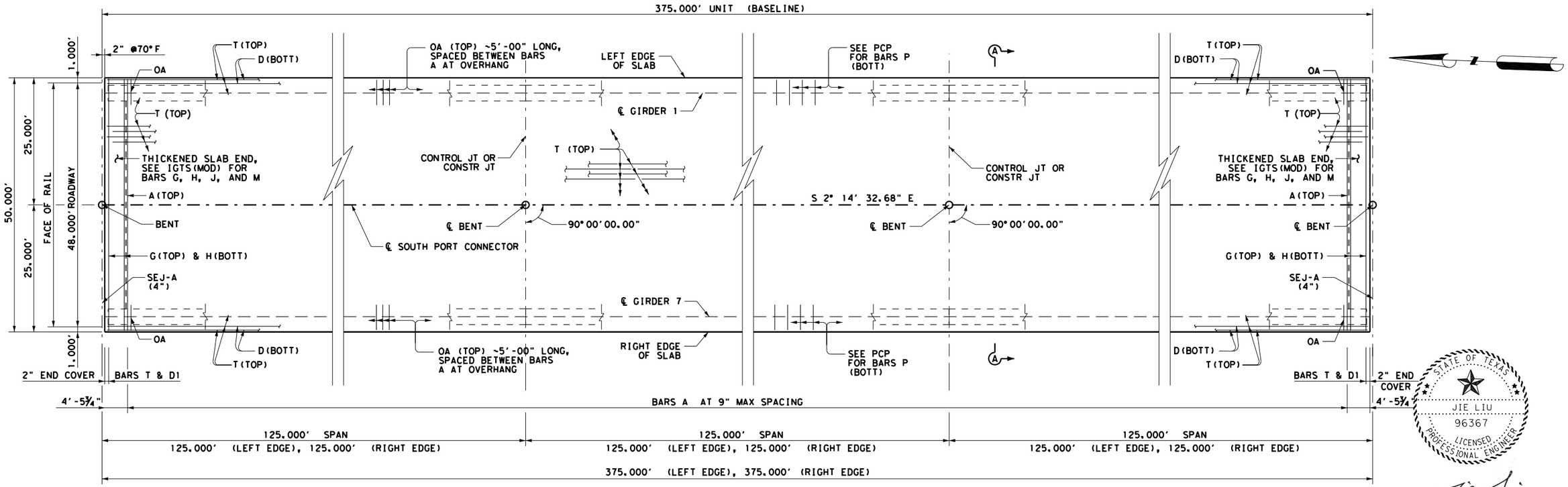

PLAN
(3 SPANS TYP - 5 UNITS)

TABLE OF ESTIMATED QUANTITIES UNIT (3 SPAN)			
SPAN	REINF. CONCRETE SLAB	PRESTR CONC GIRDER (TX54) ①	REINF. STEEL * ②
NO.	SF	LF	LB
3	6,250.0	871.5	14,375.0
4	6,250.0	871.5	14,375.0
5	6,250.0	871.5	14,375.0
TOTAL	18,750.0	2,614.5	43,125.0

* FOR CONTRACTOR'S INFORMATION ONLY.

① BEAM LENGTHS SHOWN ARE BOTTOM FLANGE LENGTH WITH ADJUSTMENTS MADE FOR BEAM SLOPES.

② REINF STEEL QUANTITY IS CALCULATED BY USING APPROX 2.3 LB/SF OF BRIDGE DECK.

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

SLAB PLAN
(3 SPANS UNIT)
BRIDGE #2

SCALE: 1" = 20'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 2 OF 2
6			104
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR

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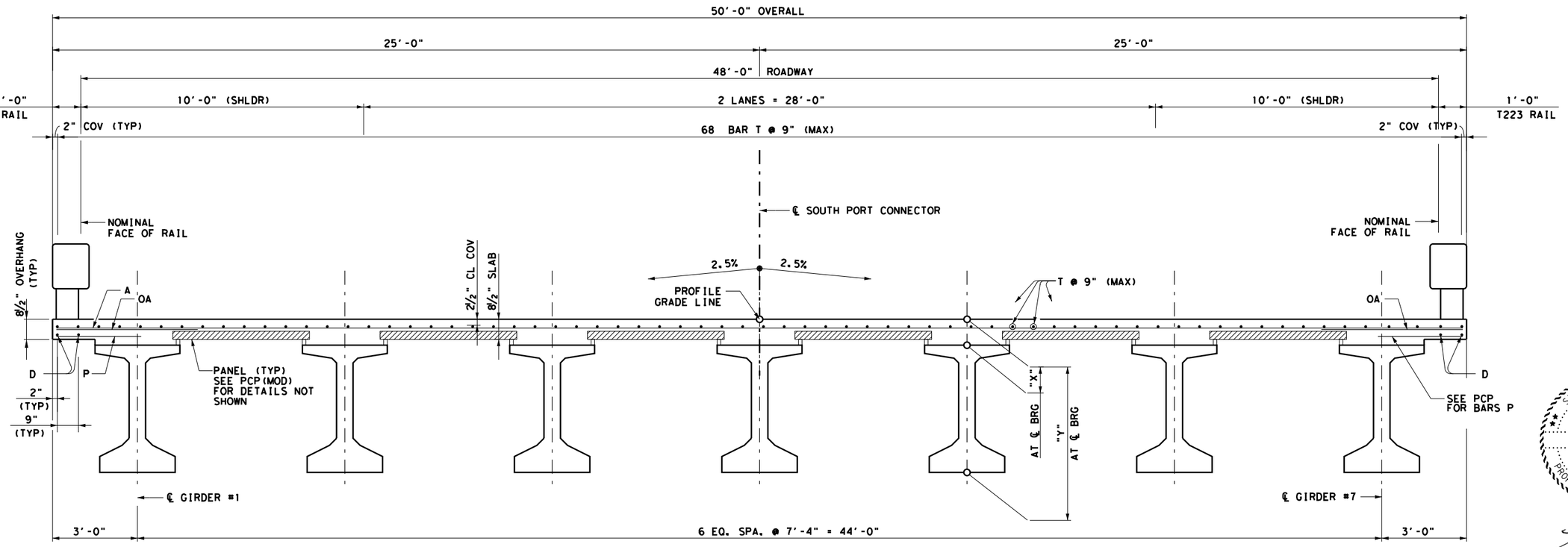


TYPICAL TRANSVERSE SECTION

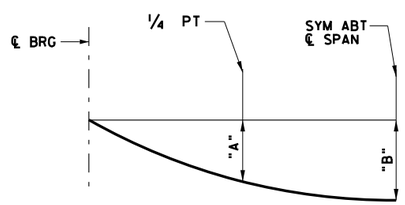
(SPAN 1~19 - 7 GIRDERS)

TABLE OF SECTION DEPTHS			
SPAN NO.	GIRDER NO.	"X" AT CL BRG	"Y" AT CL BRG ①
1~19	ALL	10¾"	5'-4¾"

① "Y" VALUE SHOWN IS BASED ON THEORETICAL GIRDER CAMBER, DEAD LOAD DEFLECTION FROM AN 8½" CONCRETE SLAB, A CONSTANT ROADWAY GRADE, AND USING PRECAST PANELS (PCP). THE CONTRACTOR WILL ADJUST THIS VALUE AS NECESSARY FOR ANY ROADWAY VERTICAL CURVE AND/OR IF PRECAST OVERHANG PANEL (PCP(O)) OPTION IS USE.

BAR TABLE	
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

SPAN	BEAM	"A" (ft)	"B" (ft)
1~19	ALL	0.157	0.223



DEAD LOAD DEFLECTION DIAGRAM

NOTE: DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST - IN PLACE SLAB ONLY. (Ec=5000 ksi) ADJUSTED DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEED.

GENERAL NOTES

DESIGN ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7th EDITION (2014)

MULTI-SPAN UNITS, WITH SLAB CONTINOUS OVER INTERIOR BENTS, MAY BE FORMED WITH THE DETAIL SHOW OON THIS SHEET AND STANDARD IGCS

SEE PCP AND PCP-FAB FOR PANEL DETAILS NOT SHOWN

SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS

SEE IGMS STANDARD FOR MISCELLANEOUS DETAILS

SEE RAILING STANDARD FOR RAIL ANCHORAGE IN SLAB

SEE PMDF STANDARD FOR DETAILS AND QUNTITY ADJUSTMENTS IF THIS OPTION IS USED

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE

MATERIAL NOTES

PROVIDE CLASS S CONCRETE (F'C = 4000 PSI)

PROVIDE GRADE 60 REINFORCING STEEL

PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS: UNCOATED ~ #4 = 1'-7"

DEFORMED WELDED WIRE REINFORCEMENT (WWR)

(ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

BRIDGE SLAB DETAIL
BRIDGE #2

SCALE: 1/4" = 1'-0"

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY:S&BI

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 1
6			105

DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 1:21:14 PM
Plotted by: tadv
Design Filename: S:\project\u2299\500*PS&E\PlanSet01\Dgn\brg\BRIDGE 2\2299100SBR02SB-ABUT-BENT.dgn

STRUCTURE	DESIGNED GIRDERS									STRAIGHT STRAND PATTERN									DEPRESSED STRAND PATTERN (1)			CONCRETE		OPTIONAL DESIGN				
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS						TOT NO. DEB	DEBONDED STRANDS PER ROW								NO.	TO END (in)	TO ℄ (in)	RELEASE STRGTH (2) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (3)	
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (In)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (In)		DIST FROM BOTTOM (in)	NO. OF STRANDS TOTAL	NO. OF STRANDS DE-BONDED	NUMBER OF STRANDS DEBONDED TO (ft from end) 3	6	9	12	15								Moment	Shear
BRIDGE #2	ALL	ALL	TX54		50	0.6	270	16.928	7.808										12	50.5	12.5	5.500	7.400	4.704	-4.652	9307.30	0.579	0.767

NON-STANDARD STRAND PATTERNS	
PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER

(1) When TO END (in) equals TO ℄ (in), place these straight strands at the defined TO values. Fill the lower rows with the remainder of the total number of strands in accordance with the Debonded Strand Designs notes.

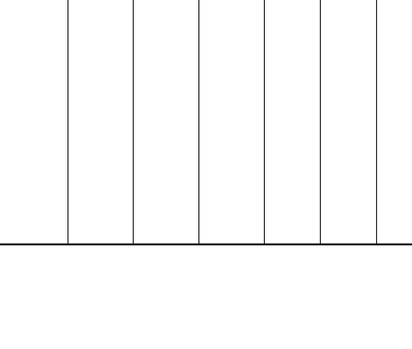
(2) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

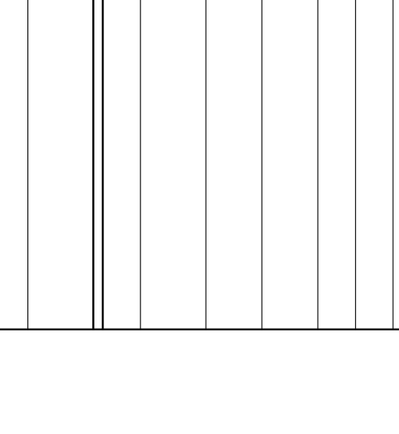
Tension = 0.24 $f'_{ci}\sqrt{f'_{ci}}$

Optional designs must likewise conform.

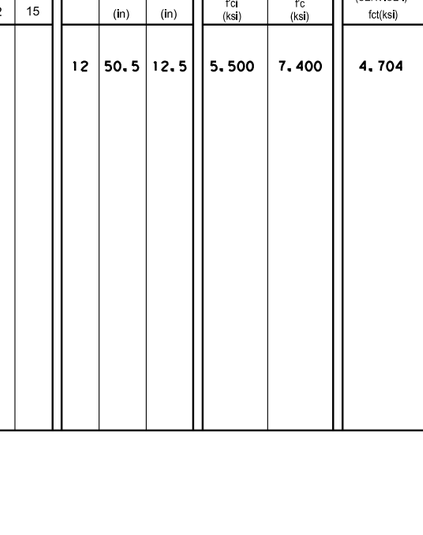
(3) Portion of full T3-S3.



TYPE Tx28, Tx34 & Tx40



TYPE Tx46 & Tx54



TYPE Tx62 & Tx70

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.

Prestress losses for the designed girders have been calculated for a relative humidity of 75% percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel bars.

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

Strand debonding must comply with Item 424.4.2.2.2.4. Full-length debonded strands are only permitted in positions marked △. Double wrap full-length debonded strands in outer most position of each row.

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

DEBONDED STRAND DESIGNS:

Locate strands for the designed girder 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", then row "6.5", etc. Place strands within a row as follows:

1) Locate a strand in each "A" and outer most positions.
2) Place strand symmetrically about vertical centerline of girder.
3) Space strands as equally as possible across the entire width.

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

DEPRESSED STRAND DESIGNS:

Locate strands for the designed girder 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", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.

STATE OF TEXAS
JIE LIU
96367
LICENSED PROFESSIONAL ENGINEER

5/29/2019

T3-S3 TYPE I LOADING

SOUTH PORT CONNECTOR

BEAM DESIGN BRIDGE #2

SCALE:

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

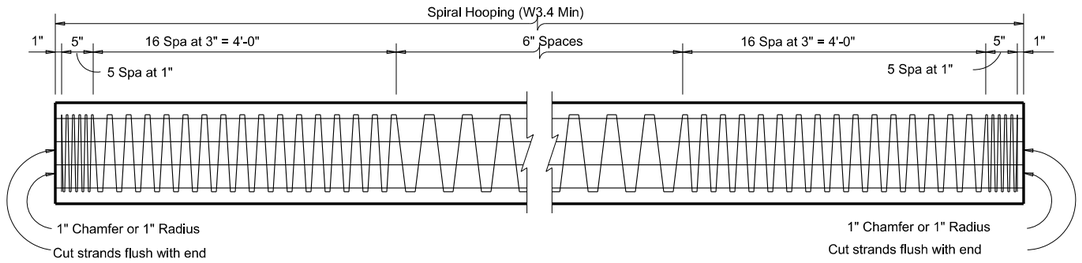
S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&BI

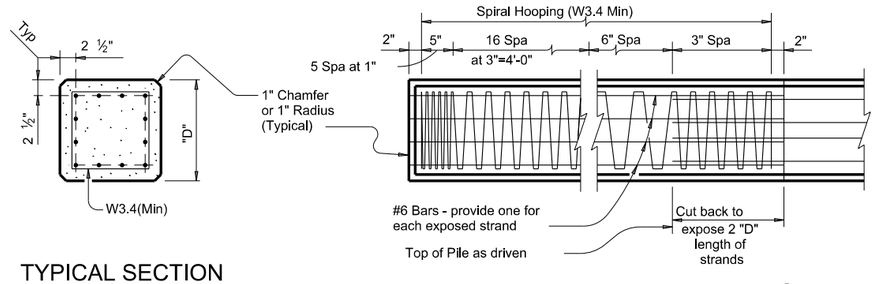
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO. 1 OF 1
6			106
DGN: JL	STATE	DIST.	COUNTY
CHK DGN: WC	TEXAS	PHARR	CAMERON
DWG: DT	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG: MW	0921	06	288 / SOUTH PORT CONNECTOR

Plotted on: 5/29/2019
Plotted @: 11:21:15 PM
Plotted by: tody
Design Filename: S:\project\u2299\500*PS&E\PlanSet01\Dgn\brg\BRIDGE 2\2299100SBR025B-ABUT-BENT.dgn

DATE:
FILE:

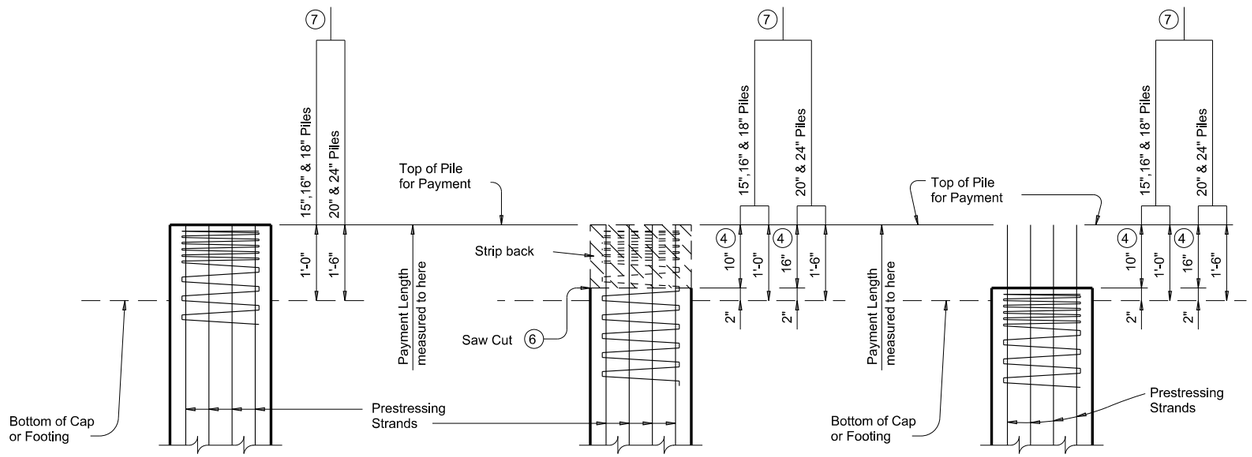


PILE DETAILS



TYPICAL SECTION THRU PILE (1)

PILE BUILD-UP DETAIL (2)



TYPICAL PILE EMBEDMENT

PILE STRIPPED BACK AFTER DRIVING

PILE CAST WITH PRESTRESSING STRANDS PROTRUDING

PILE EMBEDMENT DETAILS (3)

TABLE OF PROPERTIES FOR PRESTRESSED CONCRETE PILES

Pile Size "D"	Area of Pile Section	I	Weight	Prestressing (5)		
				No.	Initial Prestress Force	Concrete Final Prestress (15% Loss)
	Sq In	In 4	Lb/Ft		Kips	psi
16"	254	5,340	265			
18"	322	8,600	336			
20"	398	13,150	415			
24"	574	27,380	598			

(1) Locate strands symmetrically about the axis of the pile, with no more than one strand difference between any two adjacent sides.

(2) Provide Class S Concrete for pile build-ups.

(3) Payment for piles will be in accordance with the details shown. Strip back piling and extend prestressing strands into substructure when piling conflicts with substructure reinforcing or when the side cover from pile edge to substructure edge is less than 4" after driving.

(4) Provide more strip back if indicated. When stripped back piles are required,strip back piling after driving or cast short with strands protruding from top of piling as shown.

(5) Provide ½" 270 ksi low relaxation strands tensioned to 28.9 kips each. If an optional design is used, provide a minimum Concrete Final Prestress of 750 psi. Submit optional designs for approval.

(6) Saw cut ½" deep around perimeter of pile at the breakback line.

(7) Unless shown otherwise.

FABRICATION NOTES:

Provide Class H Concrete. Provide sulfate resistant concrete when required.

Minimum release strength, f'ci = 4000 psi.
Minimum 28-day strength, f'c = 5000 psi.

All dimensions relating to prestressing steel are to centers of strands or bars.

See Layout for size, number, and length of piling.

Shop drawing submittal and approval is not required if fabrication is in accordance with the details shown on this standard.

Texas Department of Transportation

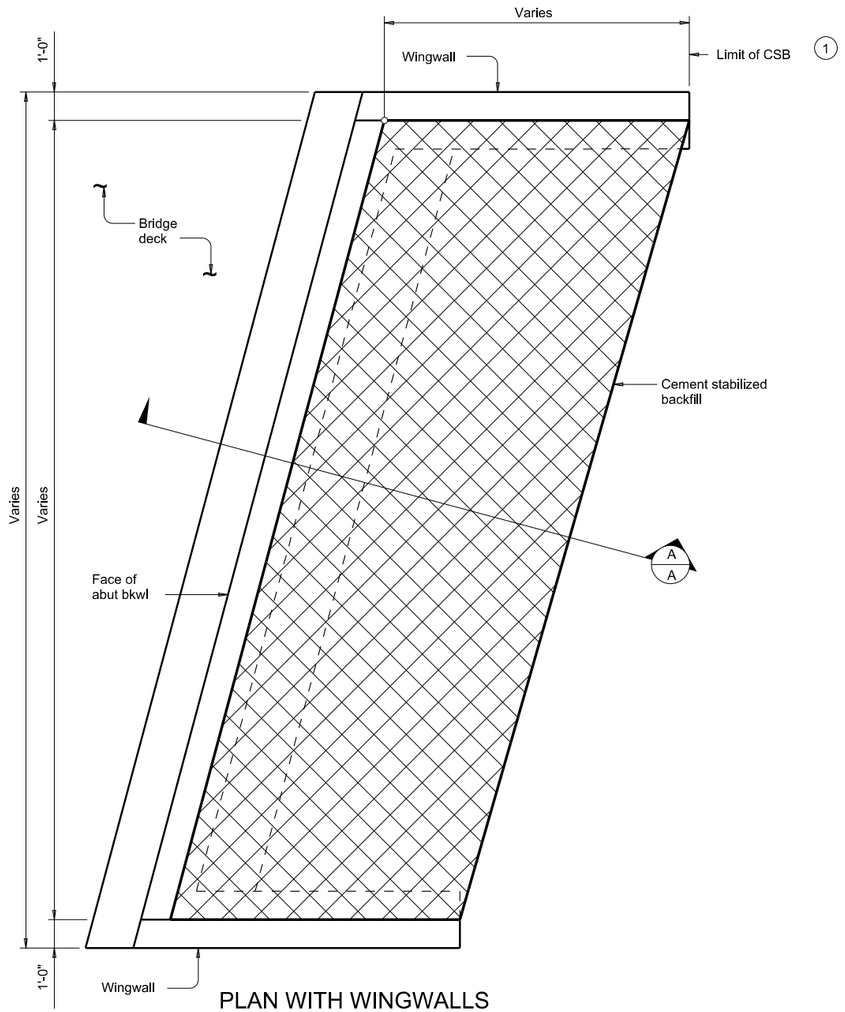
Bridge Division Standard

PRESTRESSED CONCRETE PILING

CP

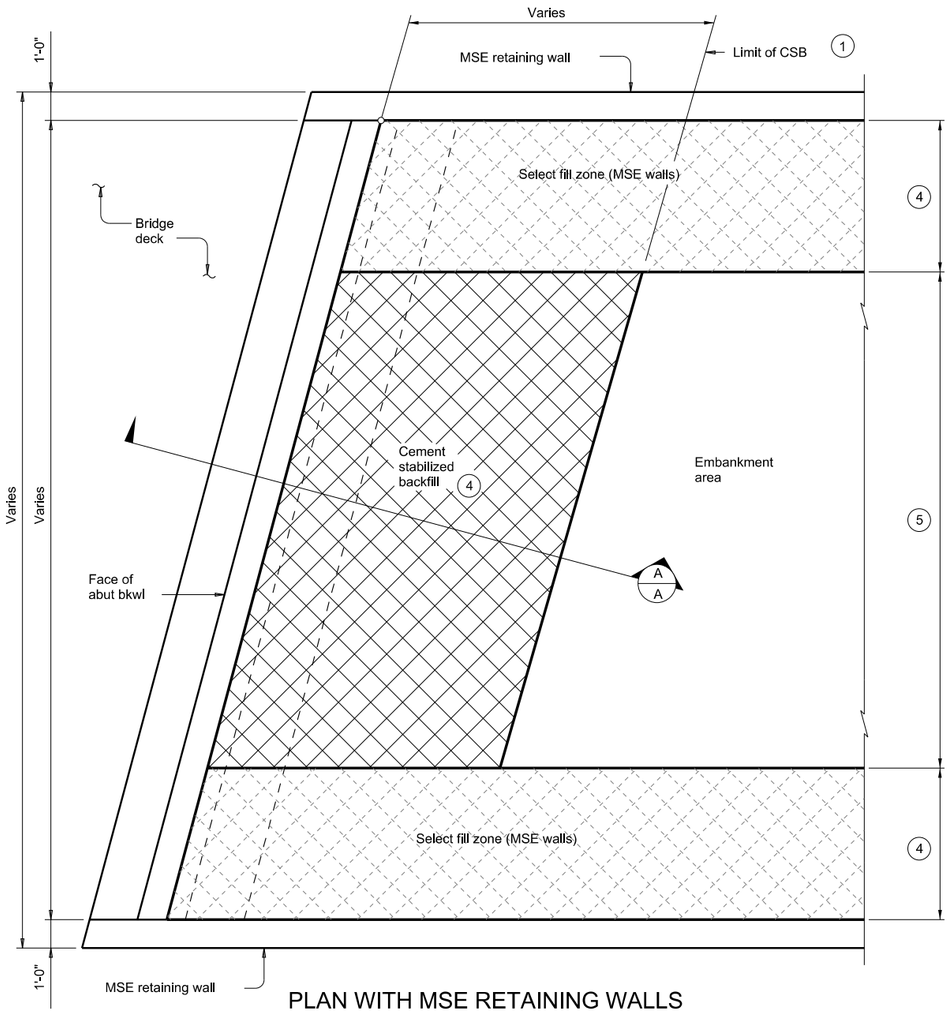
FILE: cpstde01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		107

DATE:
FILE:



PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



PLAN WITH MSE RETAINING WALLS

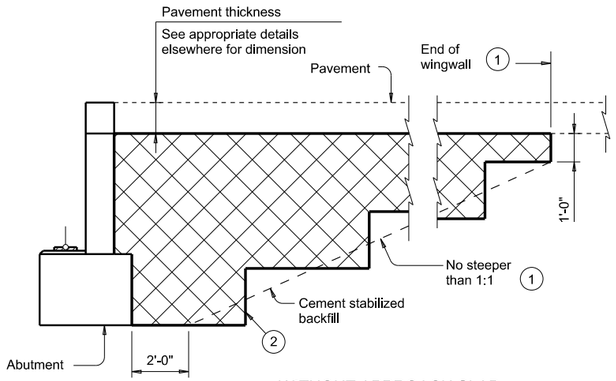
1. Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
2. Bench backfill as shown with 12" (approximate) bench depths.
3. Other materials can be used as a bond breaker if permitted by the Engineer. 2 layers of 30 Lb roofing felt or 2 layers of heavy mil polyethylene sheeting are examples.
4. Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
5. 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.

GENERAL NOTES:

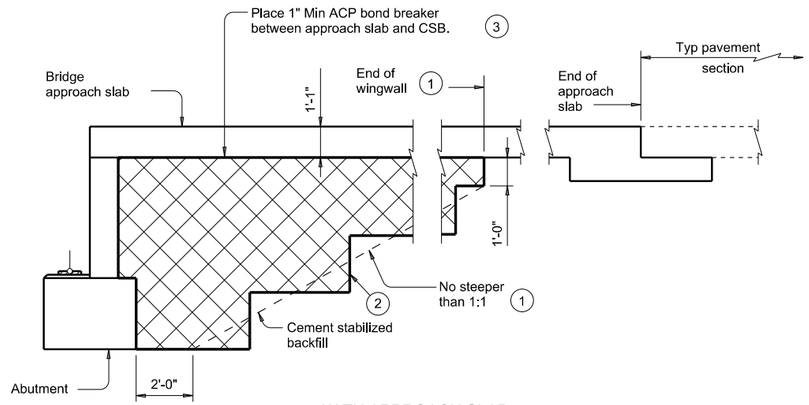
Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments.

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

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

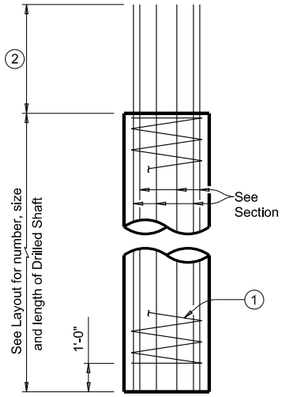
CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

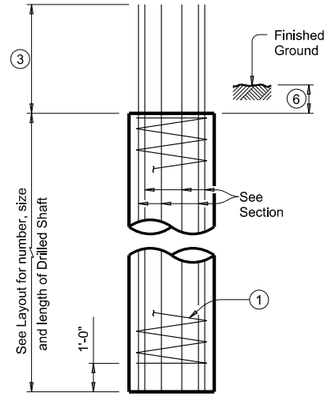
CSAB

FILE: csabste1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 01-16: Add MSE wall details.	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		108

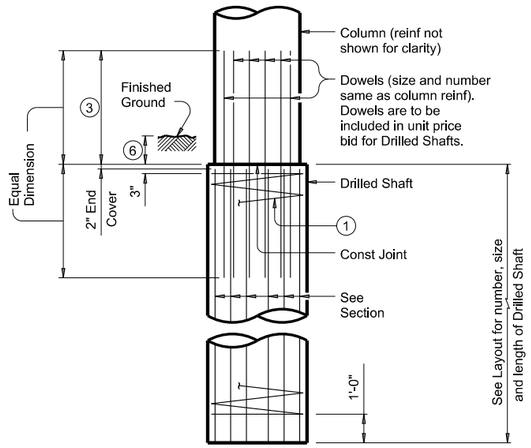
DATE:
FILE:



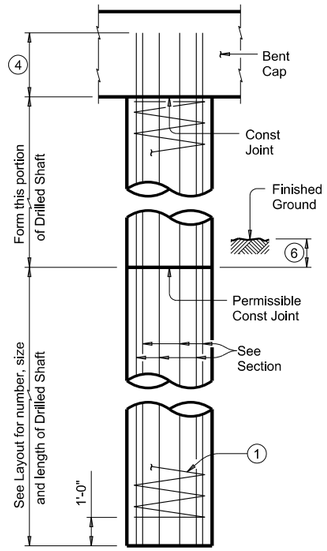
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



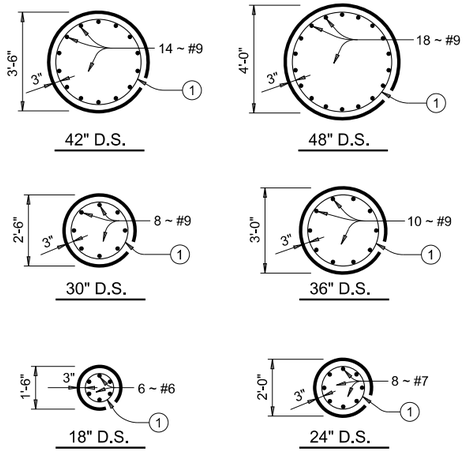
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

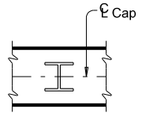


DRILLED SHAFT SECTIONS

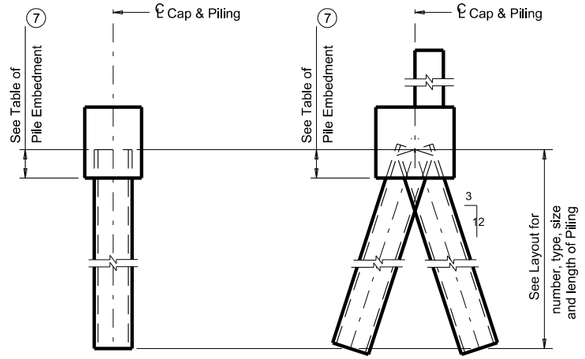
DRILLED SHAFT DETAILS

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 standard CP for additional details on concrete pile embedment.



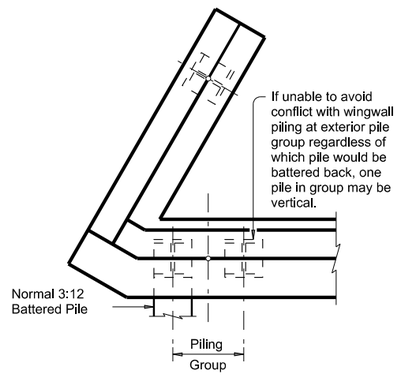
ORIENTATION OF STEEL H-PILING



VERTICAL PILE BATTERED PILE

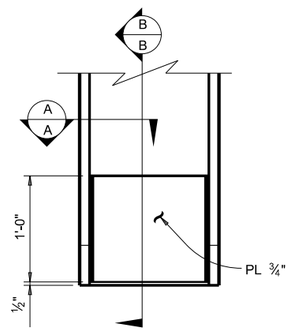
PILING DETAILS

(Concrete or Steel H)

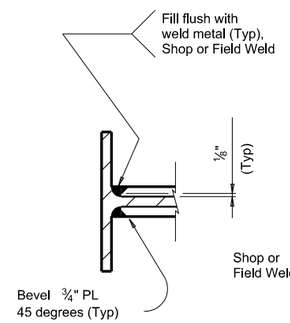


DETAIL "A"

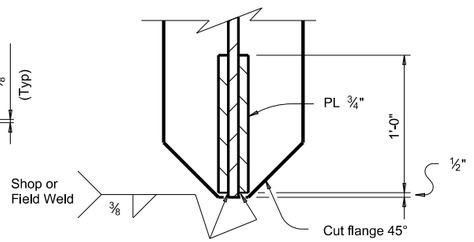
(Showing Plan View of a 30° Skewed Abutment)



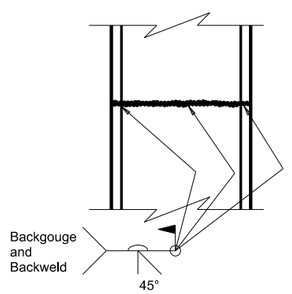
ELEVATION

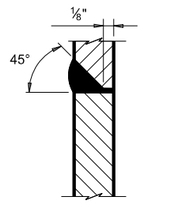


SECTION A-A



SECTION B-B





SECTION THRU FLANGE OR WEB

STEEL H-PILE TIP REINFORCEMENT

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

STEEL H-PILE SPLICE DETAIL

Use when required.

(1) #3 Spiral at 6" pitch (One and a half flat turns top & bottom).

(2) Min extension into supported element:
#6 Bars = 1'-6"
#7 Bars = 1'-8"
#9 Bars = 2'-3"

(3) Min lap with Column reinf:
#7 Bars = 2'-9"
#9 Bars = 4'-6"

(4) Min extension into supported element:
#6 Bars = 1'-6"
#7 Bars = 1'-8"
#9 Bars = 2'-8"

(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

(7) Or as shown on plans.

Texas Department of Transportation

Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		109

DATE:
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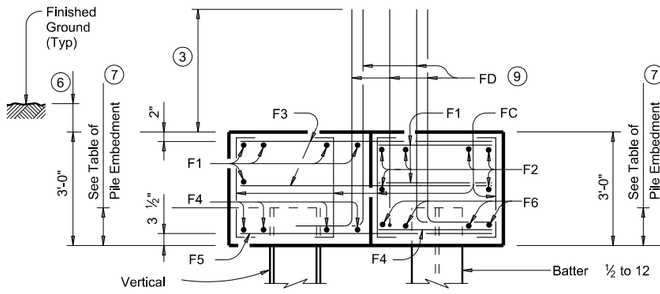

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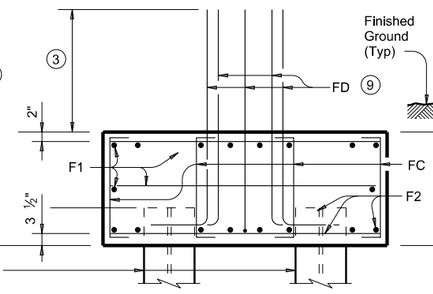

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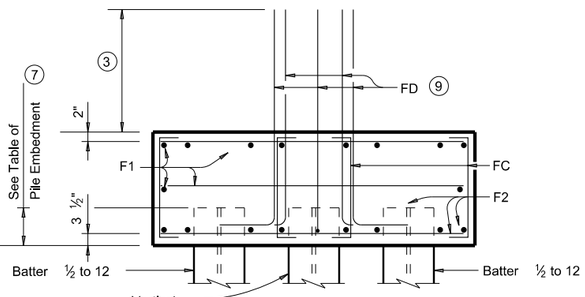

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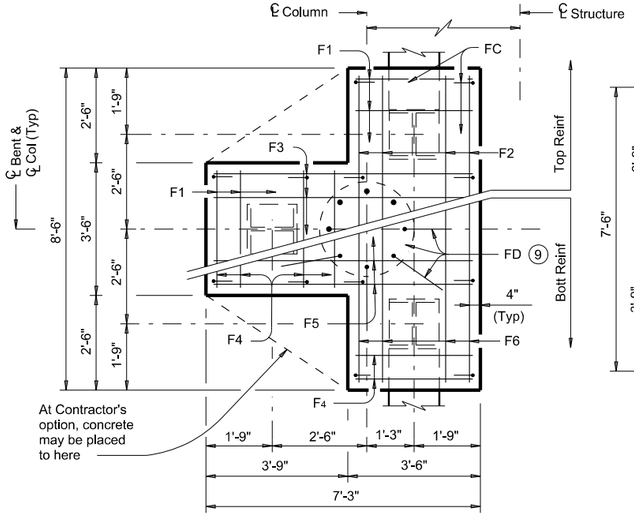
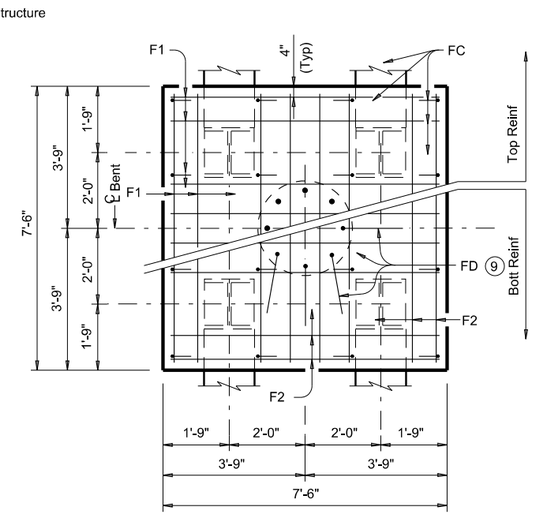


PLAN

THREE PILE FOOTING (8)

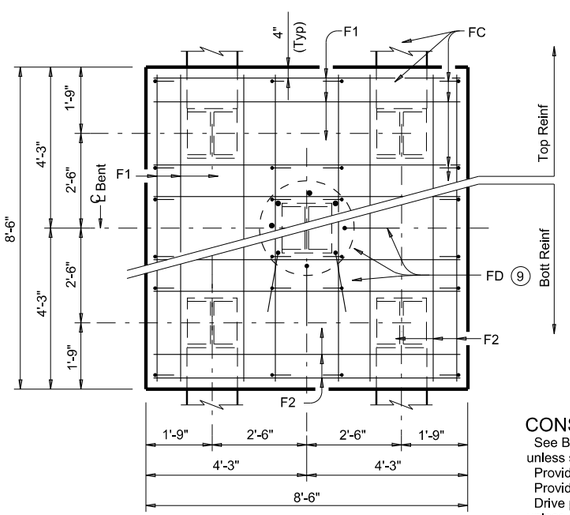
For 36" Dia and smaller columns.



PLAN

FOUR PILE FOOTING (8)

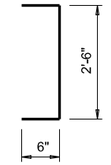
For 42" Dia and smaller columns.



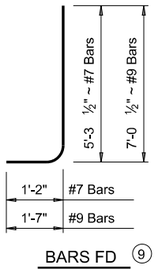
PLAN

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.



BARS FC



BARS FD (9)

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'- 8"	236
Reinforcing Steel			Lb	639
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 (11)	8	#9	8'- 8"	236
Reinforcing Steel			Lb	675
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 (11)	8	#9	8'- 8"	236
Reinforcing Steel			Lb	845
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:

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

Provide Class C Concrete (f'c = 3600 psi), unless shown otherwise.

Provide Grade 60 reinforcing steel.

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

GENERAL NOTES:

Designed according to AASHTO LRFD 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

(3) Min lap with Column reinf:
#7 Bars = 2'-9"
#9 Bars = 4'-6"

(6) 1'-0" Min

(7) Or as shown on plans.

(8) See 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) For 24" Columns, use #7 FD bars (6'-6") in place of #9 bars and deduct 130 lbs.
For 36" Columns, add 2 FD bars (59 lbs).

(11) For 24" Columns, use #7 FD bars (6'-6") in place of #9 bars and deduct 130 lbs.
For 36" Columns, add 2 FD bars (59 lbs).
For 42" Columns, add 6 FD bars (177 lbs)
(42" Columns disallowed on 3 Pile Footings)

Texas Department of Transportation

Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		110

DATE:
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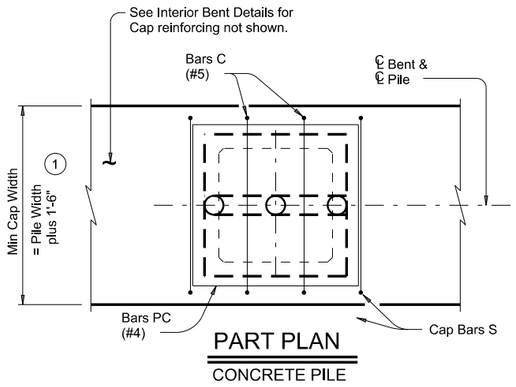
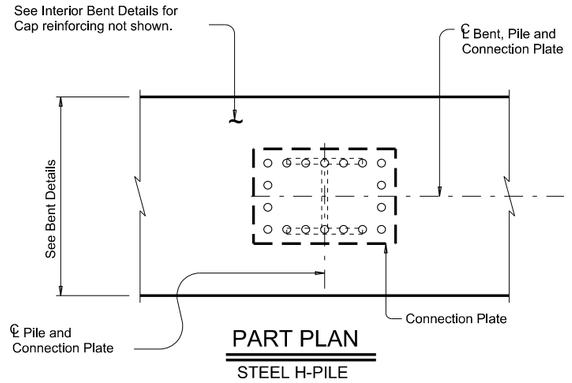
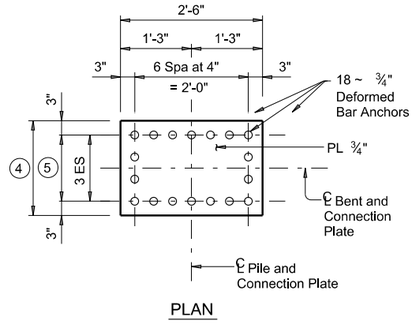


PART PLAN
CONCRETE PILE

1. Provide wider cap if necessary. Adjust cap bars S dimensions accordingly. All quantity adjustments are at the Contractor's expense.
2. 1'-0" (+2 ½", -0") with 16" and 18" piles;
   1'-6" (+2 ½", -0") with 20" and 24" piles
3. 1'-3" with 16" and 18" piles;
   1'-9" with 20" and 24" piles



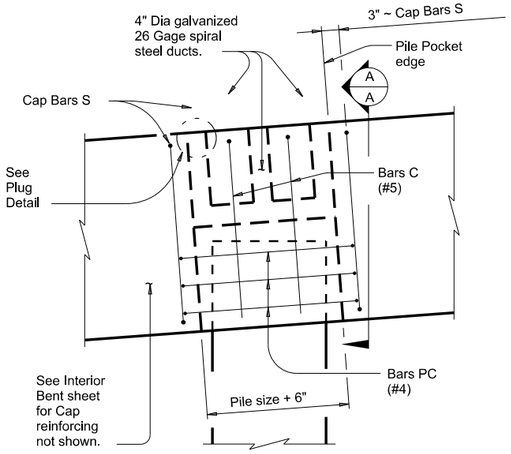
PART PLAN
STEEL H-PILE



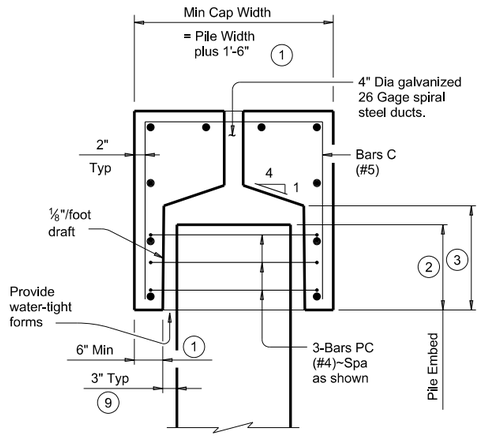
PLAN

CONNECTION PLATE DETAIL

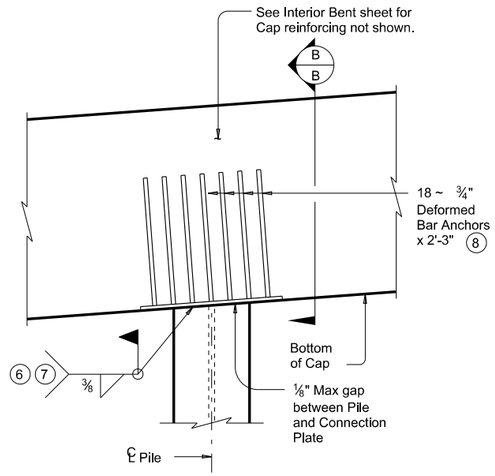
Electric arc end weld deformed bar anchors with complete fusion.



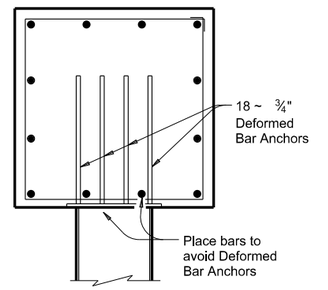
PART ELEVATION
CONCRETE PILE



SECTION A-A
Showing example Cap reinforcing

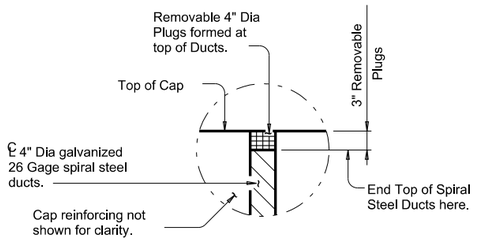


PART ELEVATION
STEEL H-PILE

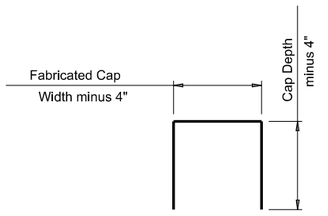


SECTION B-B
Showing example Cap reinforcing

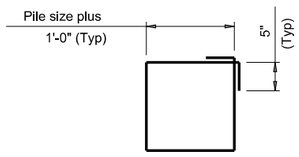
4. Pile size plus 6"
5. Pile size (Example: 1'-2" for HP14)
6. Increase weld size by amount of gap.
7. A certified welder is required.
8. If Cap height is less than 2'-9", Deformed Bar Anchor length is 6" less than Cap height.
9. 1" Min between pile and cap pocket for grout placement, typical all sides.



PLUG DETAIL
(To keep concrete out of ducts during concrete placement. Remove prior to grouting)



BARS C (#5)
2 Required per Pile Pocket



BARS PC (#4)
3 Required per Pile Pocket

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST CONCRETE BENT CAP OPTION
FOR CONCRETE PILES AND STEEL H-PILES

PBC-P

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REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
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	PHR	CAMERON		111

DATE:
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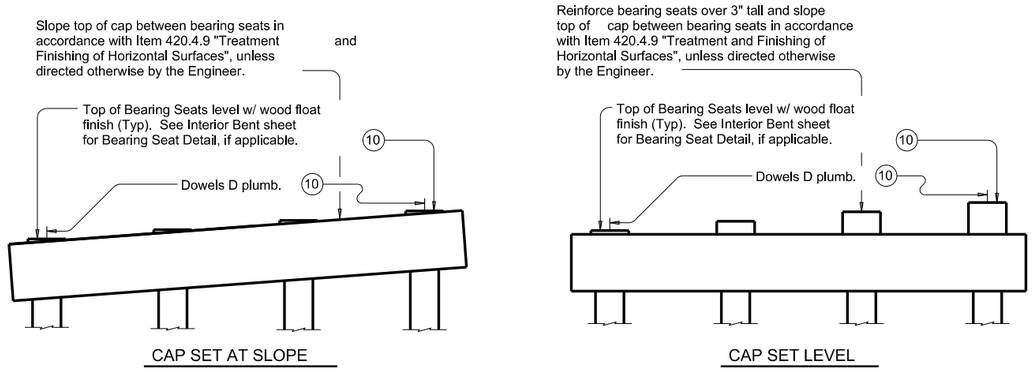

EXAMPLES OF PRECAST BENTS WITH DOWELS D

(10) Unless otherwise shown

GROUTING NOTES FOR CONCRETE PILES:

Make a trial batch of grout using the same material, equipment and personnel to be used for actual grouting operations and grout a mock-up of the connection at least one week before grouting and in the presence of the Engineer. This mock-up test must demonstrate the reliability of the Contractor's grouting procedures to provide a connection free of voids. Field test the trial batch grout to the same level required for the actual grouting.

Surfaces in contact with grout must be clean and in a saturated, surface-dry condition, immediately prior to grouting. Provide water tight forms. Fill the forms with water and drain just prior to grouting. Ponding or free-standing water is not permitted. Use compressed air to blow out excess water.

Mix grout in accordance with the manufacturer's directions. Evidence of frothing, foaming, or segregation is cause for rejection. Transport grout from mixer to final location by wheel barrow, bucket or pumping.

Perform sampling and testing of grout by trained personnel at the Contractor's expense and while witnessed by the Engineer. Grouted connections must be free of voids.

Trowel finish top surface of cap anchorage ducts flush with top of cap. Wet mat cure these locations for at least 48 hours. When lifting loops are removed, remove them to a point 1" below cap surface and patch with a pre-qualified material conforming to DMS-4655, "Concrete Repair Material."

Friction collars may be removed, if used, and beams placed on the cap after the grout obtains a compressive strength of 2500 psi. Subsequent loading can occur when the grout reaches its final required 28 day compressive strength.

WELDING NOTES FOR STEEL H-PILES:

After field welding is complete, clean and paint top of pile and connection plate as specified in Item 407.3.2.

Beams may be set on Cap after all Cap to Pile welds are complete.

CONSTRUCTION NOTES:

Submit shop drawings of precast caps for approval prior to construction. Indicate lifting attachments and locations on the shop drawings.

Construct and cure cap in accordance with Item 420, "Concrete Substructures". Secure ducts, pile pockets and connection plates to prevent their movement during concrete placement. Location tolerance of ducts, pile pockets and connection plates is ¼" from plan location, transversely and longitudinally. Seal ducts and pile pockets to prevent intrusion of concrete.

Bearing seats may be precast with the cap. Bearing seats over 3" in height must be reinforced as per Item 420.4.9. Do not locate lift points at bearing seats if bearing seats are precast.

Cap concrete must achieve a compressive strength of 2500 psi prior to lifting. Limit flexural stress in cap to 250 psi during handling and storage. Store and handle caps in accordance with Item 424,"Precast Concrete Structural Members (Fabrication)". Do not stack caps. Caps that become cracked or otherwise damaged may be rejected.

Top of piling may be no more than 2" from plan location, both transverse and longitudinal to bent centerline, after driving.

MATERIAL NOTES:

Provide a pre-qualified grout from TxDOT's Material Producer List "Cementitious Grouts and Mortars for Miscellaneous Applications", conforming to DMS-4675.

Provide semi-rigid spirally crimped, corrugated duct of galvanized, cold rolled steel conforming to ASTM A 653. Corrugations must have a minimum amplitude of 0.094".

Grout tubes and forms must be approved prior to grouting.

Provide deformed bar anchors conforming to ASTM A496 and connection plates conforming to ASTM A36.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

The Contractor has the option to provide precast bent caps in accordance with the details shown. No additional payment will be made if the Contractor uses precast caps.

Precast Bent Cap Option shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

See Bent Details for details and notes not shown.

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

PRECAST CONCRETE BENT CAP OPTION
FOR CONCRETE PILES AND STEEL H-PILES

PBC-P

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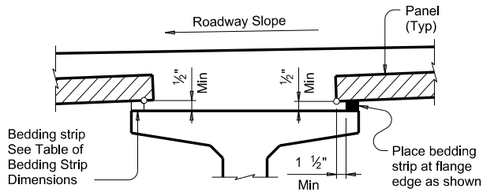
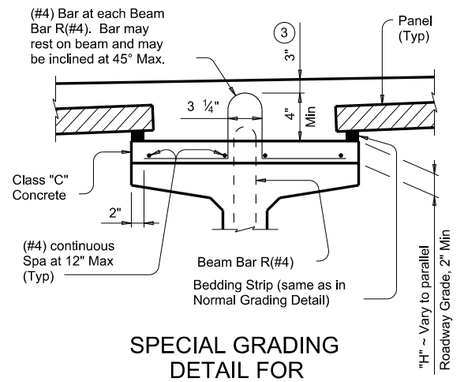


NORMAL GRADING DETAIL (1)

Showing Prestressed Concrete I-Girders.
(Other Beam Types Similar)



SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing Prestressed Concrete I-Girders.
(Other Beam Types Similar)

TABLE OF BEDDING STRIP DIMENSIONS		
WIDTH	HEIGHT (2)	
	Min	Max
1" (Min)	½"	2"
1 ¼"	½"	2 ½"
1 ½"	½"	3"
1 ¾"	½"	3 ½"
2" (Max)	½"	4"

(1) To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in ¼" increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is ¼". Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 4" high, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge Division for approval.

(2) Height must not exceed twice the width.

(3) Provide clear cover as indicated unless otherwise shown on Span Details.

(4) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(5) Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3" or 3 ½" with Prestressed Concrete I-Girders. Epoxy coating for Bars UP is not required.

(6) Do not locate construction Joints on top of a panel.

(7) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

CONSTRUCTION NOTES:

Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges.

If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction.

Bars U, shown on PCP-FAB, may be bent over or cut off if necessary.

Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete mortar under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 ½" under the panels as the slab concrete is placed.

To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least ½". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required.

For clear span between U-beams less than or equal to 18", see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement.

If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated.

Provide bar Laps, where required, as follows:
Uncoated ~ #4 = 1'-5"
Epoxy Coated ~ #4 = 2'-1"

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

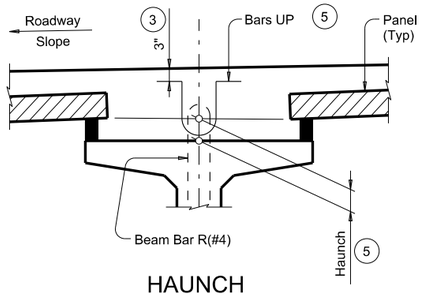
Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees.

Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use.

These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable Standard drawings.

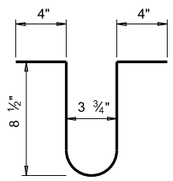
Any additional reinforcement or concrete required on this standard is considered subsidiary to the bid Item "Reinforced Concrete Slab".

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

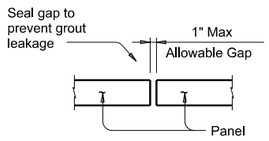


HAUNCH REINFORCING DETAIL

Showing Prestressed Concrete I-Girders.
(Other Beam Types Similar)

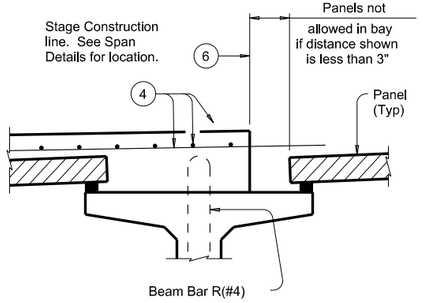


BARS UP (#4) (5)

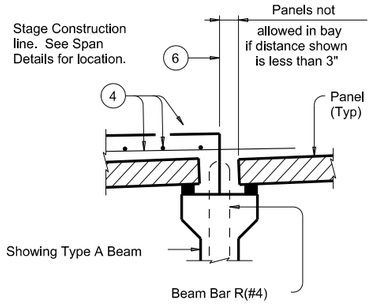


TYPICAL SECTION AT PANEL JOINT

(Panel reinforcing not shown for clarity.)
The gap cannot be considered as a panel fabrication tolerance.



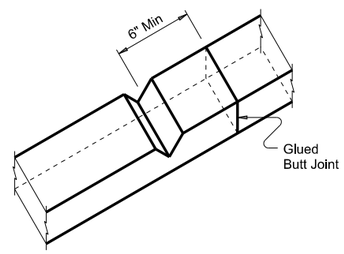
PRESTR CONC I-GIRDERS



PRESTR CONC I-BEAMS

STAGE CONSTRUCTION LIMITATIONS

(Other Beam Types Similar)



BEDDING STRIP DETAIL (7)

HL93 LOADING SHEET 1 OF 4

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

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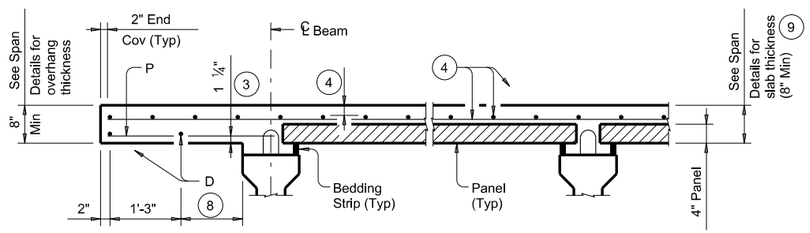
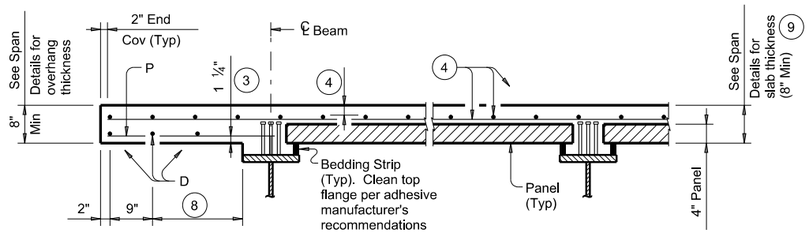
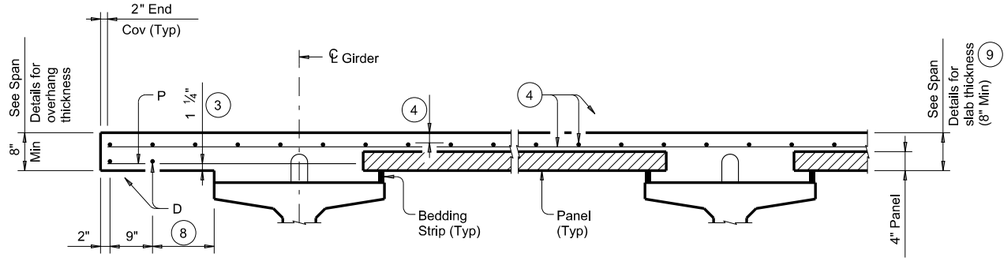


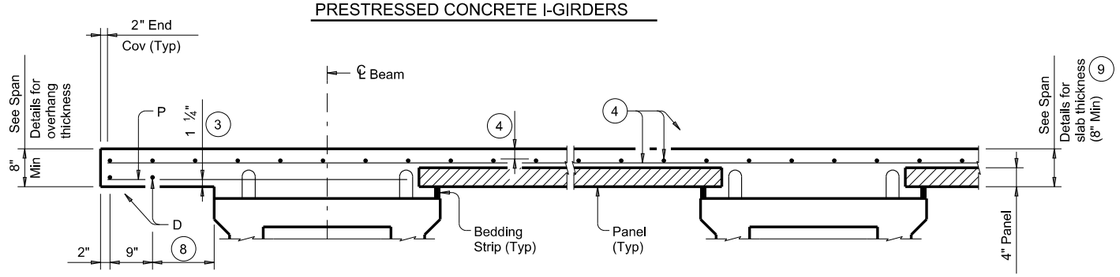
PRESTRESSED CONCRETE I-BEAMS



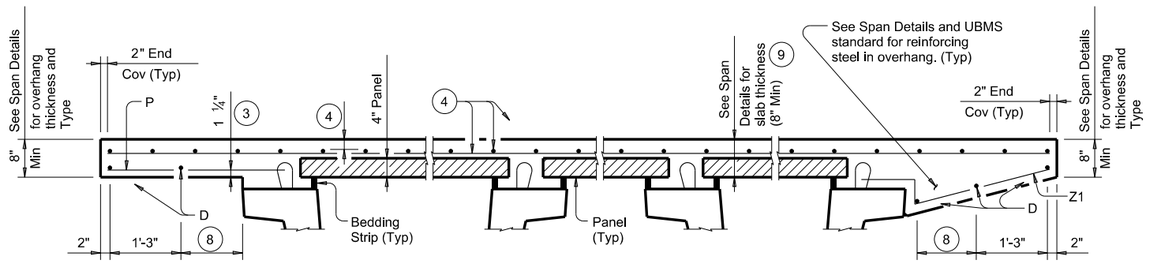
STEEL BEAMS



PRESTRESSED CONCRETE I-GIRDERS



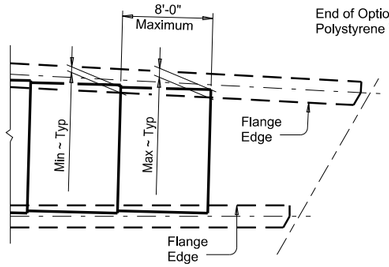
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

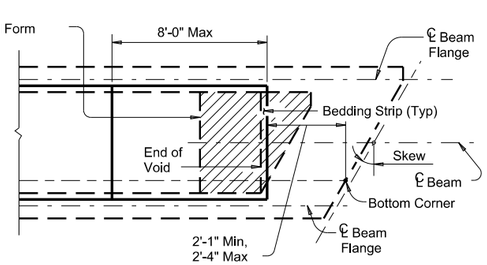
SLOPED OVERHANG WITH PRESTR CONC U-BEAMS

TYPICAL PART TRANSVERSE SECTIONS

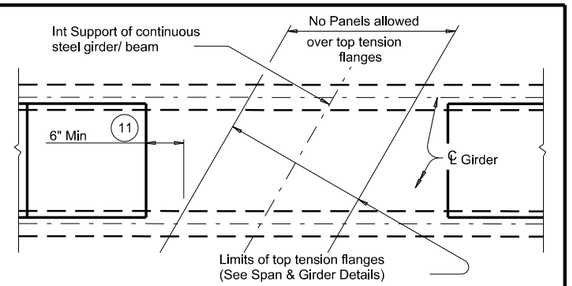


AT FLARED BEAMS OR GIRDERS

See PCP-FAB standard for Min and Max dimensions based on Bm/Girder type.



OVER CONC U-BEAMS



AT INT SUPPORTS OF CONTINUOUS STEEL GIRDERS

PART PLANS OF PANEL PLACEMENT

(3) Provide clear cover as indicated unless otherwise shown on Span Details.

(4) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

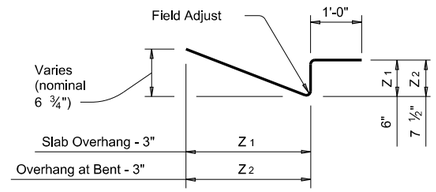
(7) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

(8) Equally space additional bar if more than 1'-3" Max.

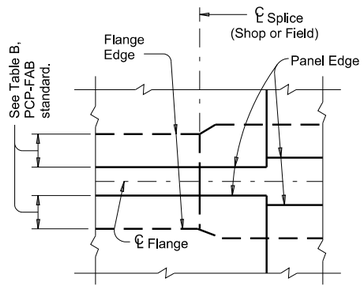
(9) The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for Prestressed Concrete U-Beams and Steel Beams). Bearing Seat Elevations or finished grade may be adjusted.

(10) Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inv-T stems only.

(11) Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.

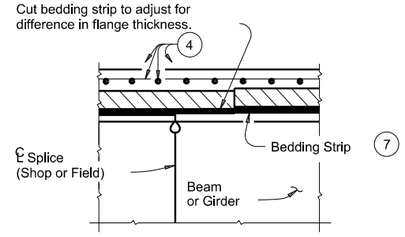


BARS Z (#4) (10)



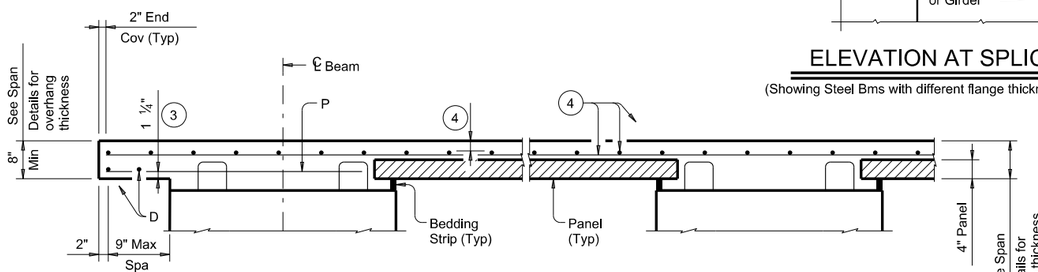
PLAN AT SPLICE

(Showing Steel Bms with flange width transition)



ELEVATION AT SPLICE

(Showing Steel Bms with different flange thickness)



PRESTRESSED CONCRETE SPREAD SLAB BEAMS

Bars P over exterior beams are still required when no overhang is used. In this case, only one Bar D, 2" from slab edge, is required.

HL93 LOADING SHEET 2 OF 4

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

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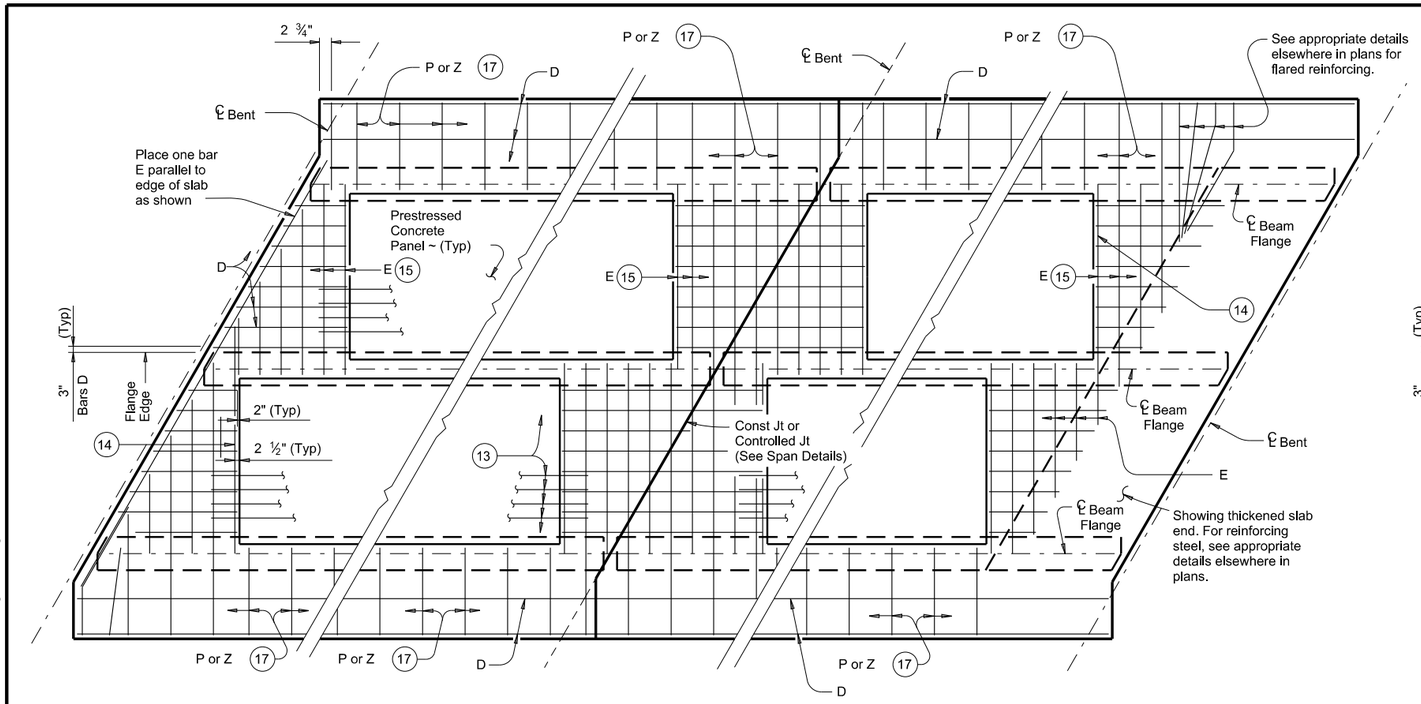
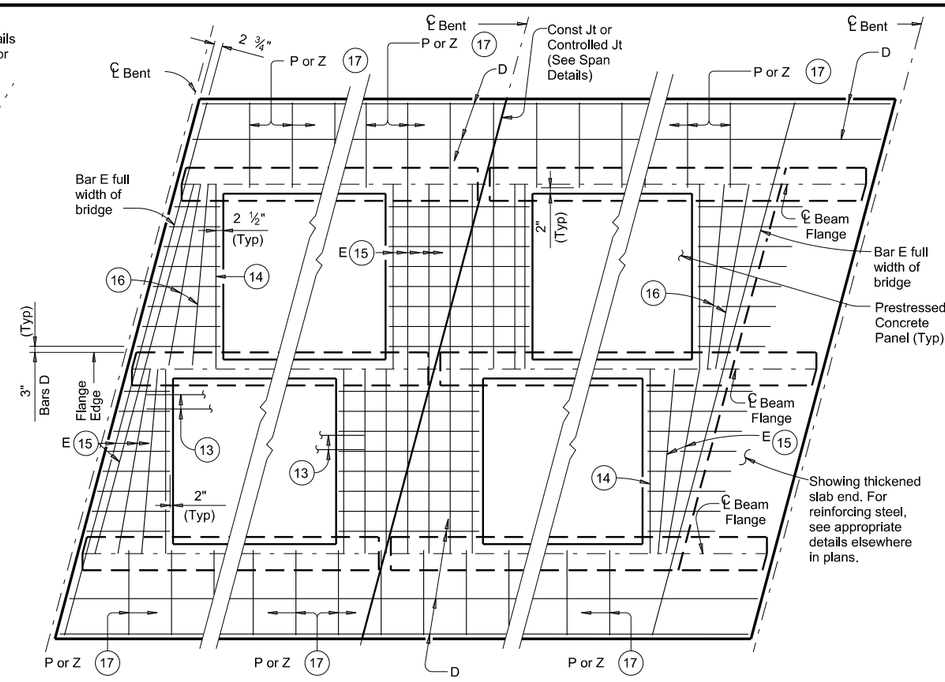


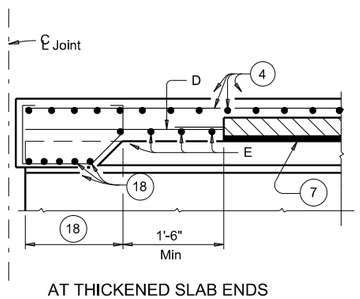
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

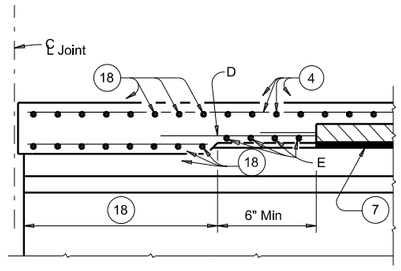


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

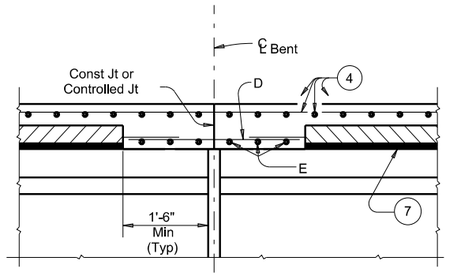
OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



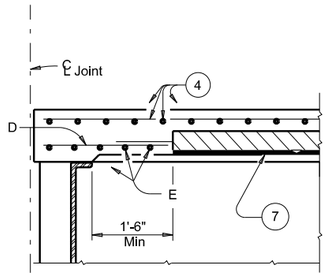
AT THICKENED SLAB ENDS FOR PRESTR CONC U-BMS



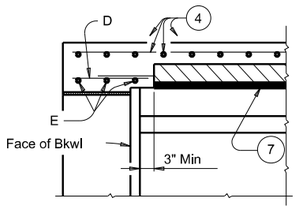
AT THICKENED SLAB ENDS FOR PRESTR CONC I-BMS AND STEEL BMS



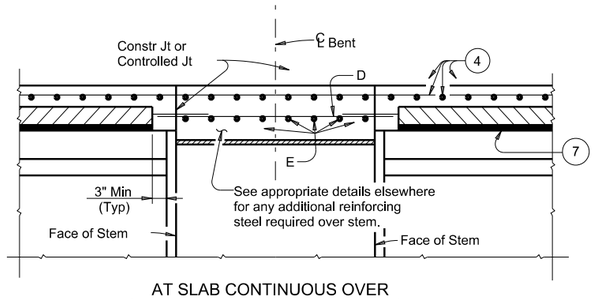
AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BMS



AT CONVENTIONAL END DIAPHRAGMS FOR STEEL BMS



AT SLAB OVER ABUTMENT BACKWALL FOR ALL BMS



AT SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BMS

OPTION 1 ~ ELEVATIONS AT BEAM ENDS

4. See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
7. Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c.
12. Max Spacing as listed unless otherwise shown.
13. At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.
14. Maintain one Bar E(#4) parallel to panel ends (Typ).
15. Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.
16. Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.
17. Where possible, Bars E(#4) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.
18. See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

TABLE OF REINFORCING STEEL (12)

BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18

HL93 LOADING SHEET 3 OF 4

Texas Department of Transportation | Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

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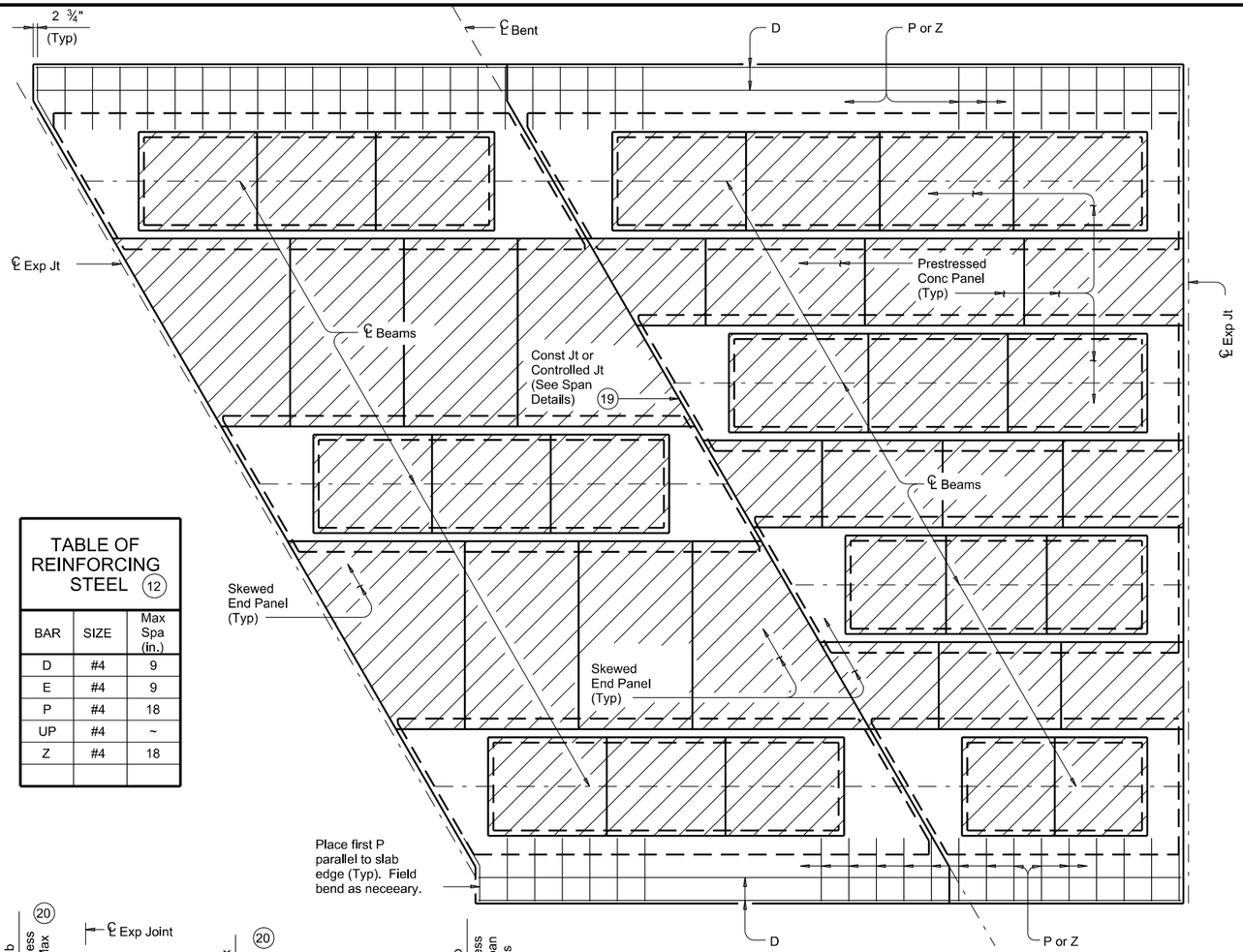
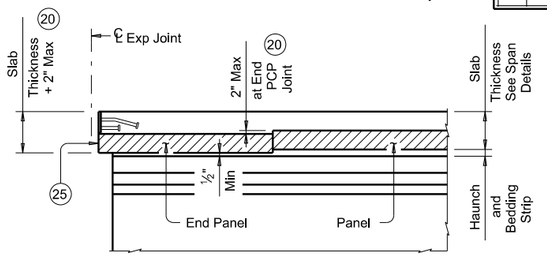


OPTION 2 ~ PLAN OF SLAB

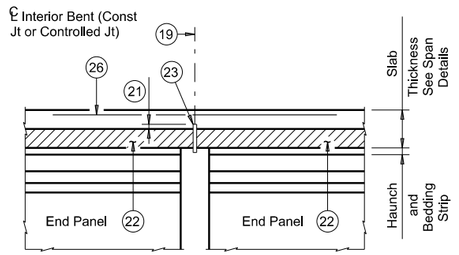
(Showing U-Beams; other beams similar)

TABLE OF REINFORCING STEEL (12)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18	



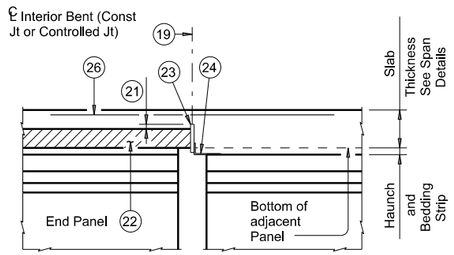
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)

For SEJ-A, SEJ-S(O), AJ and Type A Expansion Joints only.



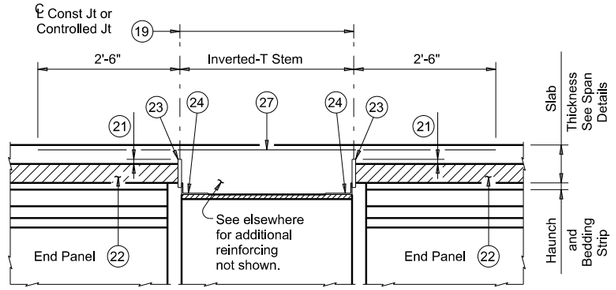
CONVENTIONAL INTERIOR BENT

Panel against Panel between Bms/Girders.



CONVENTIONAL INTERIOR BENT

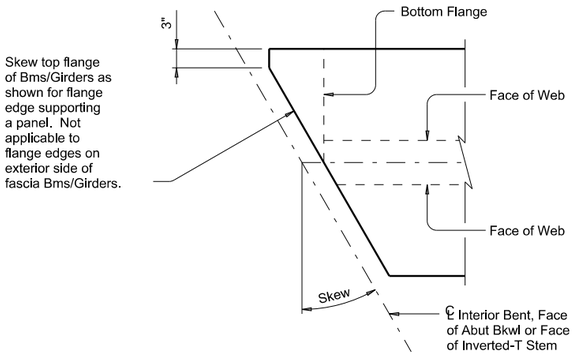
Panel against Bm/Girder End in Adacent Span.



INVERTED-T BENT

Panels against Inverted-T Stem

OPTION 2 ~ ELEVATIONS AT BEAM ENDS (4)



Skew top flange of Bms/Girders as shown for flange edge supporting a panel. Not applicable to flange edges on exterior side of fascia Bms/Girders.

OPTION 2 ~ SHOWING MODIFICATION TO BEAM/GIRDER TOP FLANGE FOR SKEWS OVER 5°

Showing I-Bm/I-Girder, U-Bms and Steel Bms similar.

(4) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(12) Max Spacing as listed unless otherwise shown.

(19) Top Plastic Joint Former at Controlled Joints (Stress Cap, Zip Strip, Stress Lock, etc.) is not required with these Details.

(20) End panel may be set up to 2" lower to accommodate expansion joint hardware, provided bedding strip is not less than ½" thick.

(21) 1" Min, 1 ½" Max, support as necessary.

(22) Place panel within ½" of ¾" thick board.

(23) ¾" thick timber board, leave in place. Place straight, within ¼" of Centerline of Bent or face of Invt-T, across bridge width and end board at exterior flange edge of fascia beams/girders. Do not extend into overhang.

(24) Permanent galvanized steel sheet form. Removable formwork is acceptable.

(25) Place end panel within ½" of expansion joint opening. End panel cannot encroach on required expansion joint opening.

(26) Place additional (#4) bar 5'-0" in length between every slab bars T. Center (#4) bar on Joint.

(27) Place additional (#4) bar continuous 2'-6" beyond each side of Inverted-T Stem between every slab bars T.

SPECIAL OPTION 2 CONSTRUCTION NOTES:

Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 ½".

Do not extend the longitudinal panel reinforcement into the cast-in-place slab.

Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.

Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.

Bending of anchor studs of expansion joints shown on standards AJ, SEJ-A and SEJ-S(O) is permissible if necessary to clear top of end panels. The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.

Bedding strips under skewed end panels must conform to the requirements of Item 425 except their minimum compressive strength must be 60 psi.

Provide Bars AA, G, K and OA from standard IGTS(MOD) in the slab.

HL93 LOADING SHEET 4 OF 4

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

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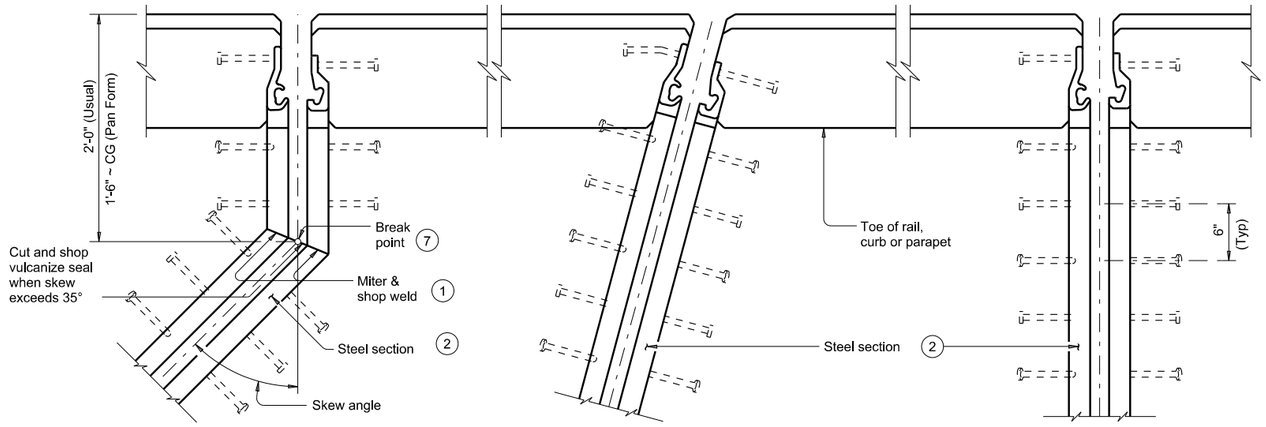


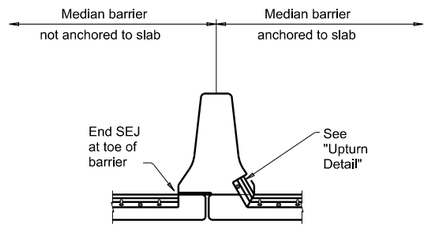
SHOWING SKEWS WITH SLAB BREAKBACKS

SHOWING SKEWS WITHOUT SLAB BREAKBACKS

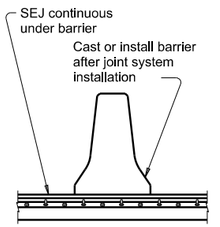
SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

PLANS OF END CONDITIONS

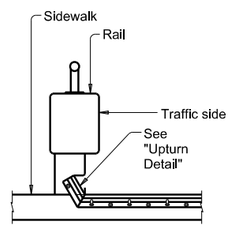
Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.
Shown with upturns



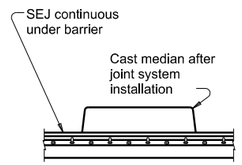
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



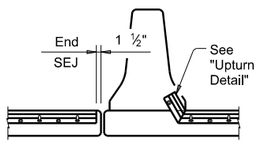
AT MEDIAN BARRIER



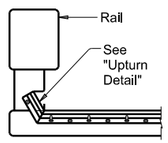
AT SIDEWALK BEHIND BRIDGE RAIL



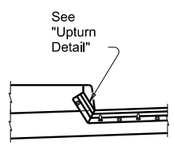
AT RAISED MEDIAN



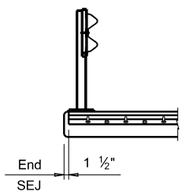
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL



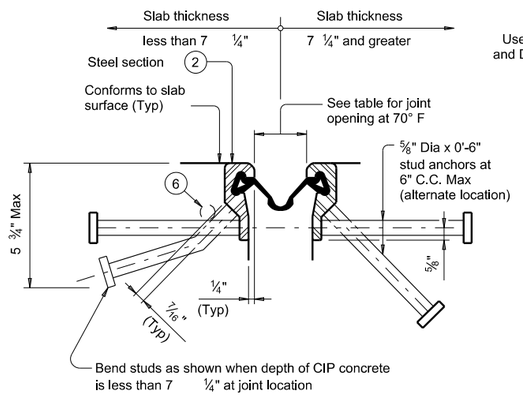
AT SIDEWALK



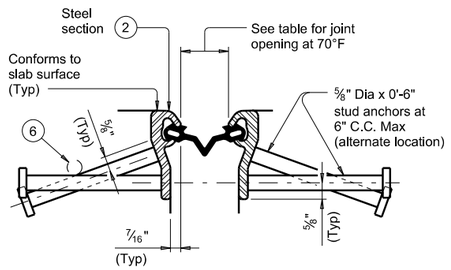
AT STEEL POST BRIDGE RAIL

TYPICAL SECTIONS (5)

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.



SECTION THRU WATSON BOWMAN ACME (SE-400 OR SE-500) JOINTS



SECTION THRU D.S. BROWN (A2R-400 OR A2R-XTRA) JOINTS

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION (2)	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening (3)	Seal Type	Joint Opening (3)
D.S. Brown	Type SSCM2	A2R-400	1 ¾"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 ¾"	SE-500	2"
Watson Bowman Acme	As Shown	SPS-400	2"	N/A	N/A
R.J. Watson	As Shown	SF-400	2 ½"	N/A	N/A

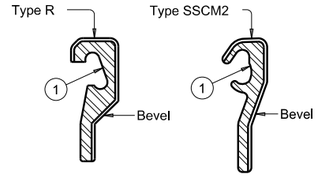
REDUCED LONGITUDINAL MOVEMENT RANGE

SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

DESIGN NOTES:

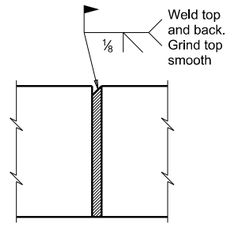
Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.

For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).



WELD LIMITS

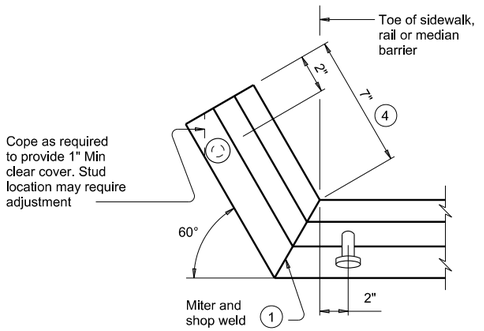
WELD LIMITS



REAR VIEW

FIELD SPLICE DETAIL

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.



UPTURN DETAIL

Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of Sealed Expansion Joints, check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for Sealed Expansion Joint.

Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint portions of steel sections not in contact with concrete with the primer specified for System II paint.

Shop drawings for the fabrication of Sealed Expansion Joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure the Sealed Expansion Joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Sealed Expansion Joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

GENERAL NOTES:

Provide Sealed Expansion Joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-A is 6 ½".

1. Remove all burrs which will be in contact with seal prior to making splice.
2. Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.
3. These openings are also the recommended minimum installation openings.
4. Reduce for sidewalk or parapet heights less than 6".
5. Other conditions affecting the joint profile should be noted elsewhere.
6. Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.
7. See span details for location of break point.

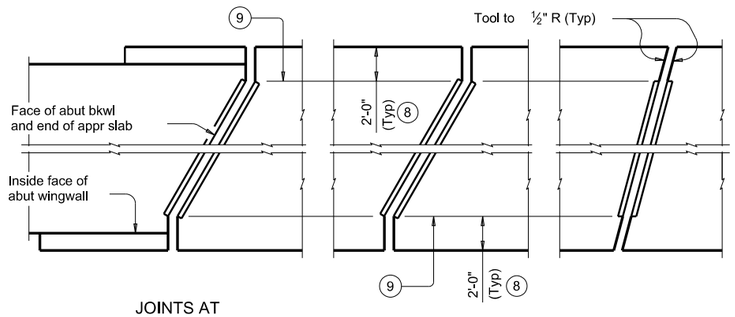
Texas Department of Transportation

Bridge Division Standard

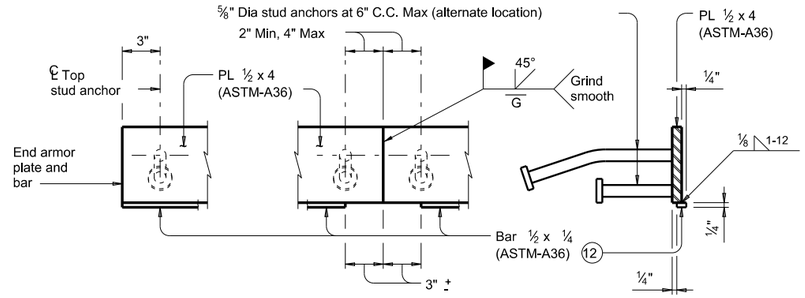
SEALED EXPANSION JOINT TYPE A WITHOUT OVERLAY

SEJ-A

FILE: sejaste1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
01-16: Addition of stitp seal type, dimension armor plate. Joint Seal splice note.	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		117



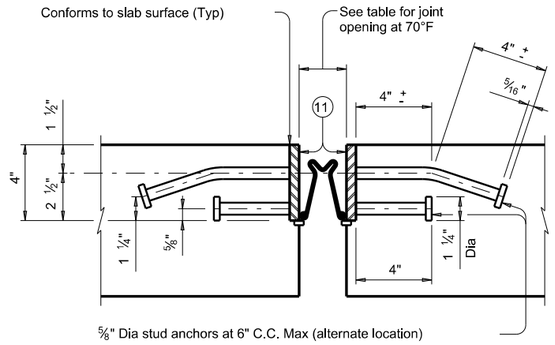
JOINTS AT ABUTMENTS — SKEWS OVER 15° — SKEWS THRU 15°



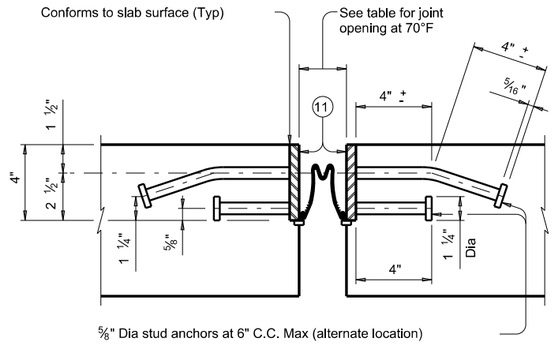
END VIEW — FIELD SPLICE (Studs not shown for clarity) — SECTION

ELEVATION OF ARMOR PLATE

Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems



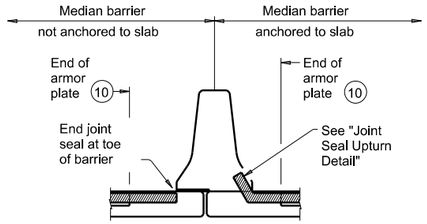
SECTION THRU R J WATSON (SF-400) JOINT



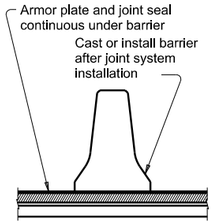
SECTION THRU WATSON BOWMAN ACME (SPS-400) JOINT

PLANS OF ARMOR PLATES

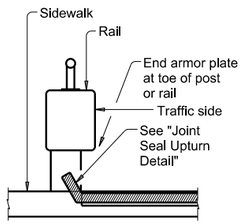
Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems



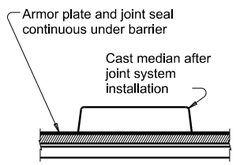
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



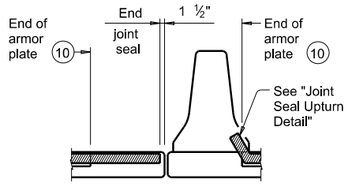
AT MEDIAN BARRIER



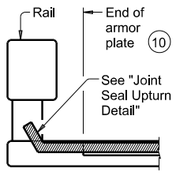
AT SIDEWALK BEHIND BRIDGE RAIL



AT RAISED MEDIAN

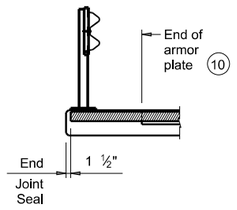


WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

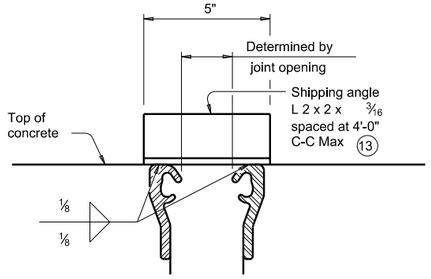
AT SIDEWALK



AT STEEL POST BRIDGE RAIL

TYPICAL SECTIONS OF ARMOR PLATES & SEALS (5)

Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems

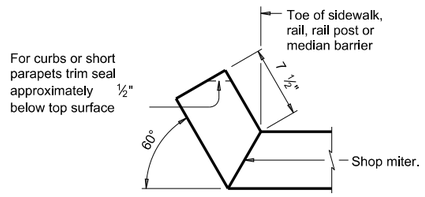


SHOWING D.S. BROWN (Ty SSCM2)

All joints similar

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.



JOINT SEAL UPTURN DETAIL

Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems. Upturn seal only. Terminate armor plates as shown in "Plans of Armor Plates" and "Typical Sections of Armor Plates & Seals."

(5) Other conditions affecting the joint profile should be noted elsewhere.

(8) Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.

(9) At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.

(10) See "Plans of Armor Plates".

(11) Coat with Manufacturer's supplied epoxy primer above bar before installing sealant.

(12) In lieu of bar, use ¾", 16 gauge, stainless steel strap. Attach to armor plate with a fastener for attaching steel to steel base material, such as Hilti X-EGN or X-S13.

(13) Align shipping angle perpendicular to joint.

CONSTRUCTION NOTE FOR R.J. WATSON (SF-400) AND WATSON BOWMAN ACME (SPS-400) JOINTS:
Splice and install seal in accordance with the Manufacturer's directions and with the adhesive provided by the Manufacturer. Splice in joint seal may be performed in the field.

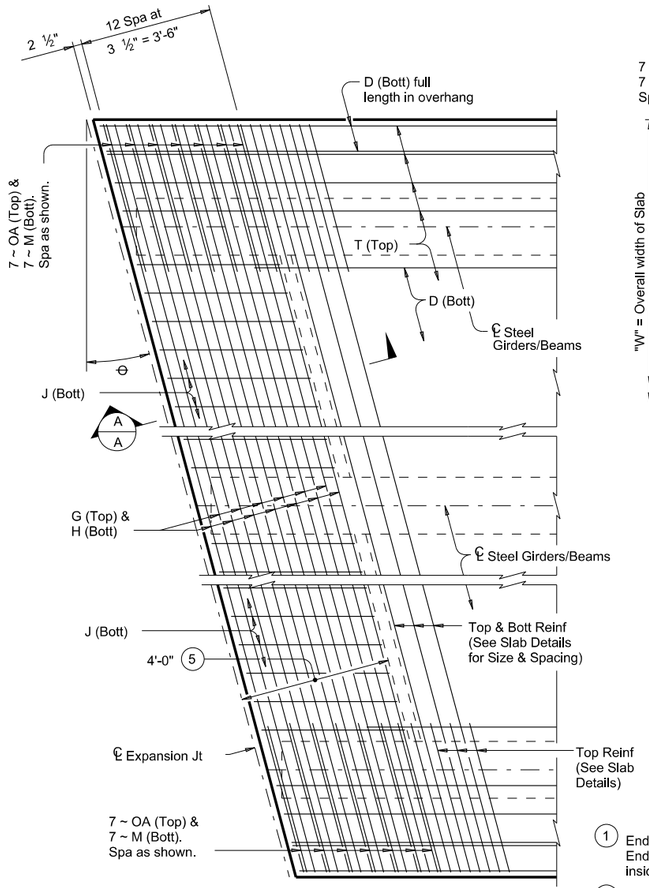
DATE:
FILE:

Texas Department of Transportation — Bridge Division Standard

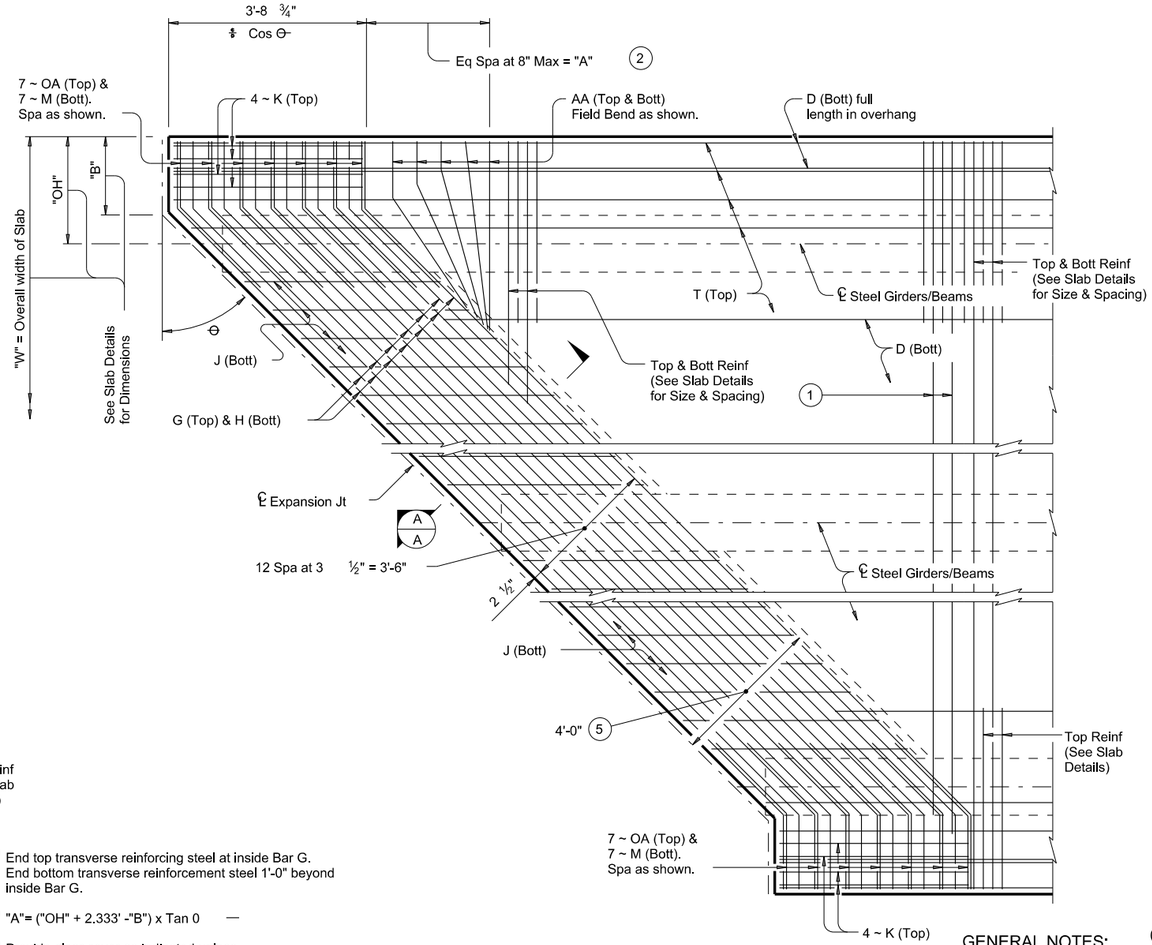
SEALED EXPANSION JOINT TYPE A WITHOUT OVERLAY

SEJ-A

FILE: sejaste1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
01-16: Addition of sldp seal type, dimension armor plate. Joint Seal splice note.	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		118

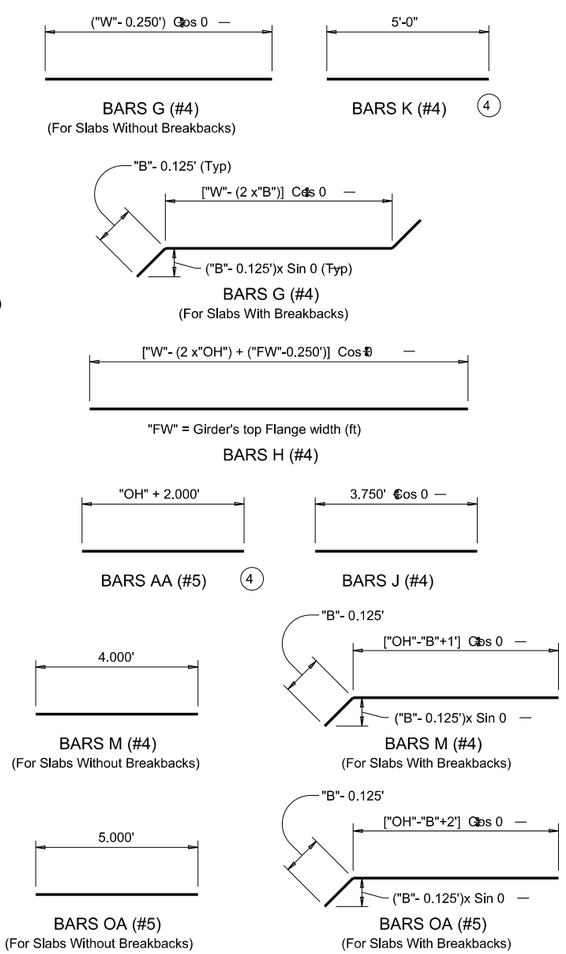


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

1. End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.
2. "A"= ("OH" + 2.333' -"B") x Tan 0 —
3. Provide clear cover as indicated unless otherwise shown on Span Details.
4. Only required on slabs with breakbacks.
5. Thickened Slab End dimensioned perpendicular to Face of Bkwl, Centerline Interior Bent or Face of Inverted-T Stem.



GENERAL NOTES:

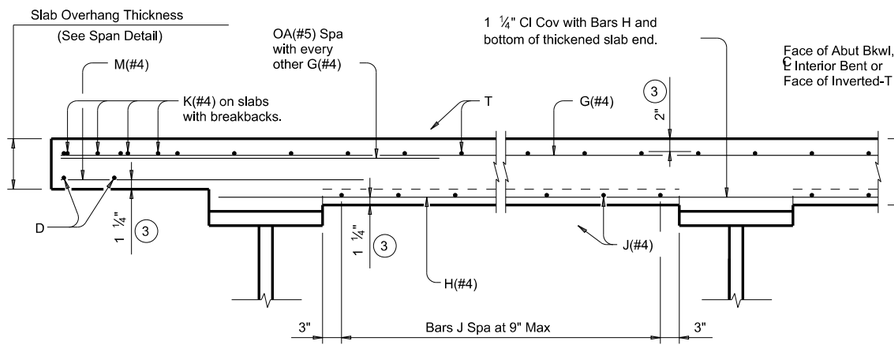
Designed according to AASHTO LRFD Specifications.
These details are restricted to Steel Girder and Beam Spans.
These details are to be used in conjunction with the Span Details and Standard PCP (if prestressed concrete panels are used).
When Option 2 from standard PCP is used, provide Bars AA, G, K and OA in the slab.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-5"
Epoxy Coated ~ #4 = 2'-1"

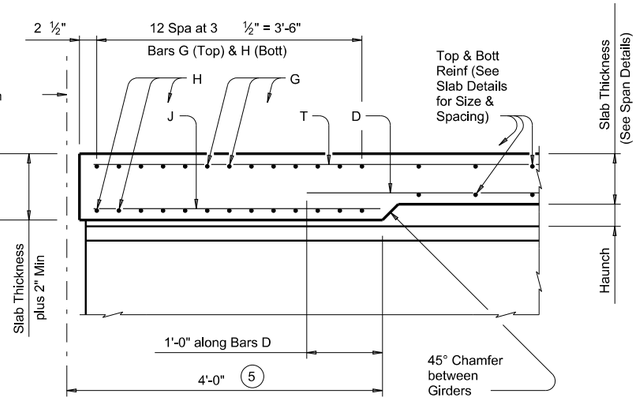
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING



TYPICAL TRANSVERSE SECTION

(Showing Steel Girders at L Brg)℄



SECTION A-A

(Showing with 2" and more of Haunch)

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:

Texas Department of Transportation

Bridge Division Standard

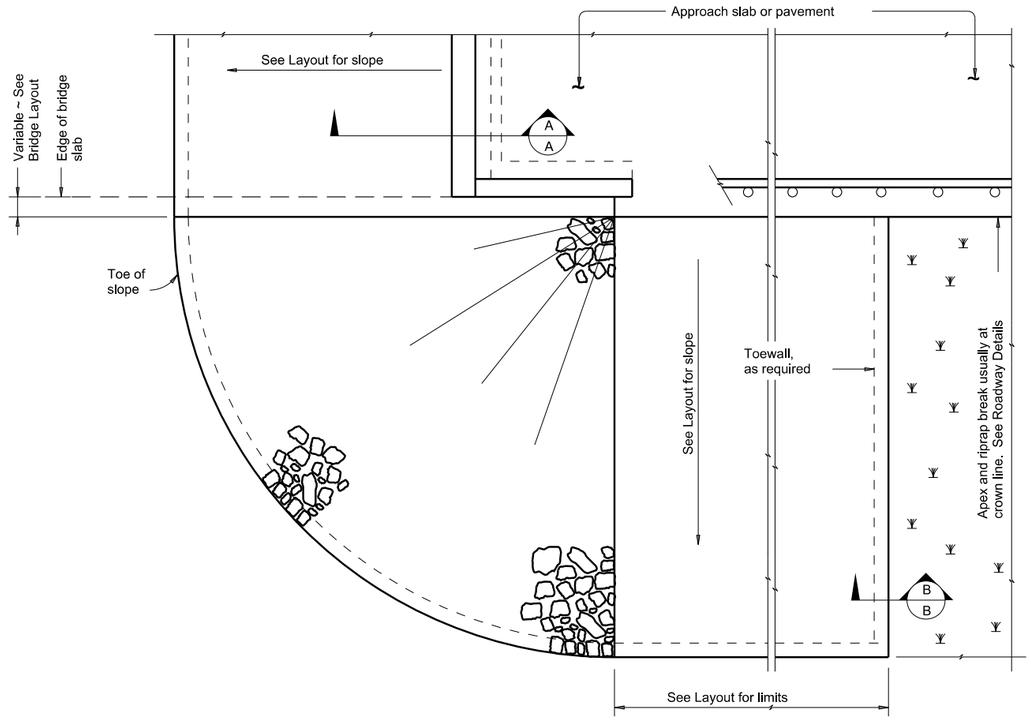
THICKENED SLAB END DETAILS

STEEL GIRDERS AND BEAMS

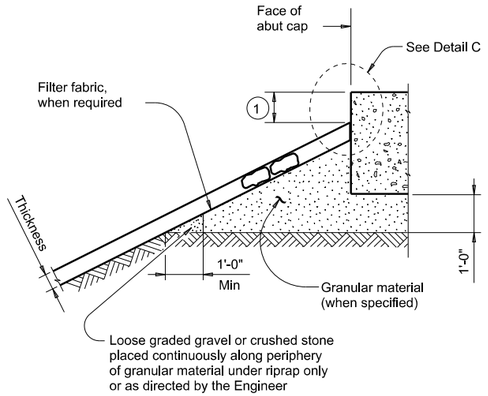
SGTS

FILE: sgtsste1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		119

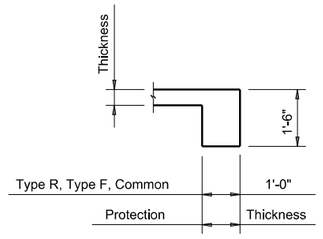
DATE:
FILE:



PLAN

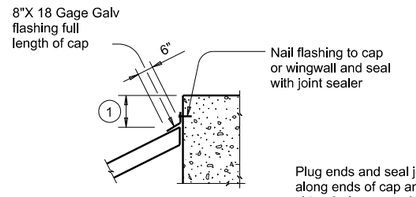


SECTION A-A AT CAP

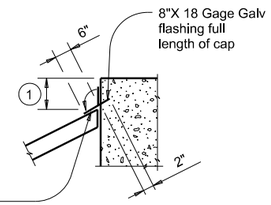


SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".

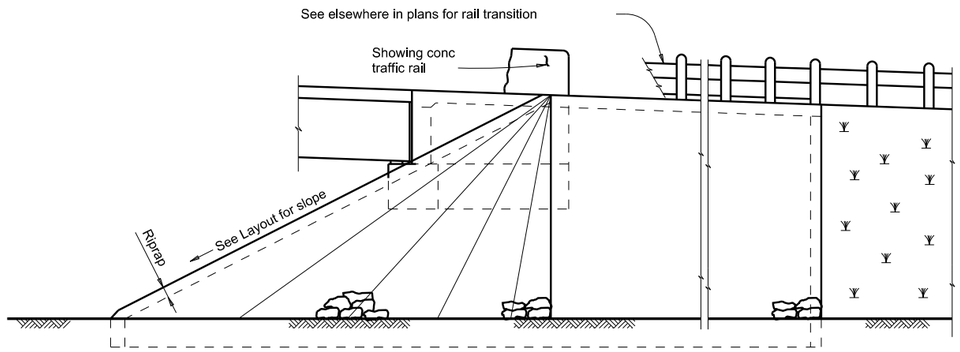


CAP OPTION A



CAP OPTION B

DETAIL C



ELEVATION

(1) Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		120

DATE:
FILE:

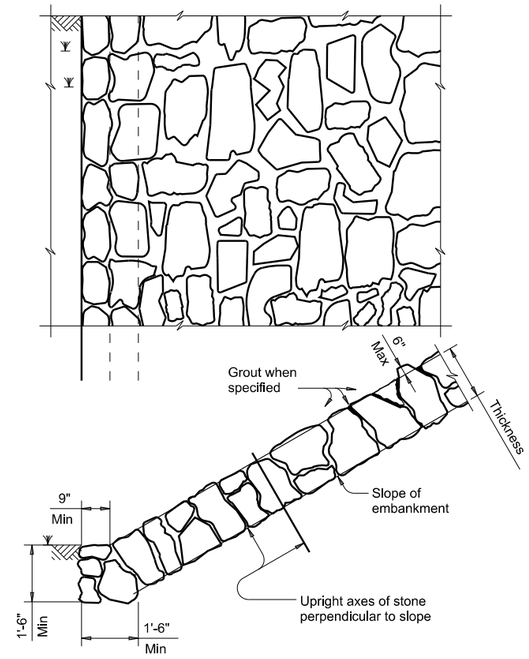


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

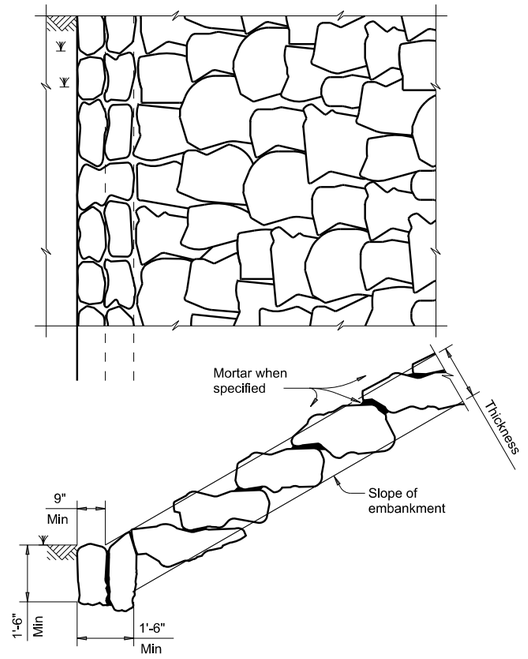


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

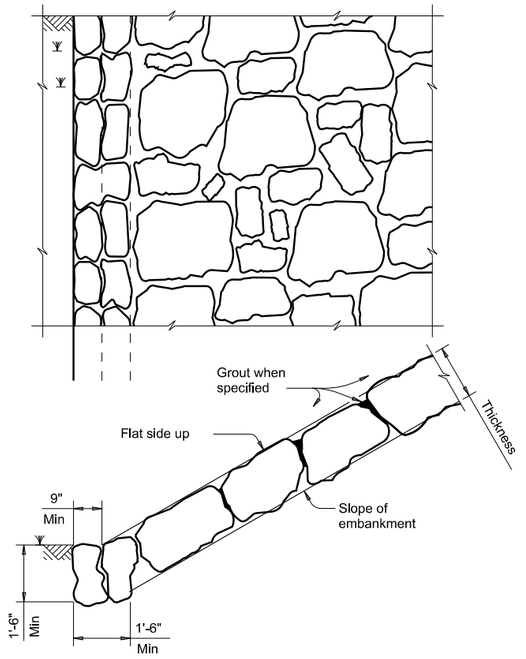


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

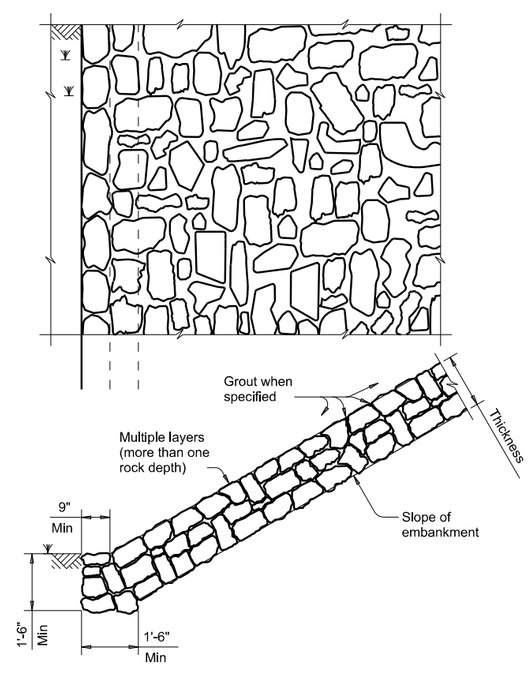


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

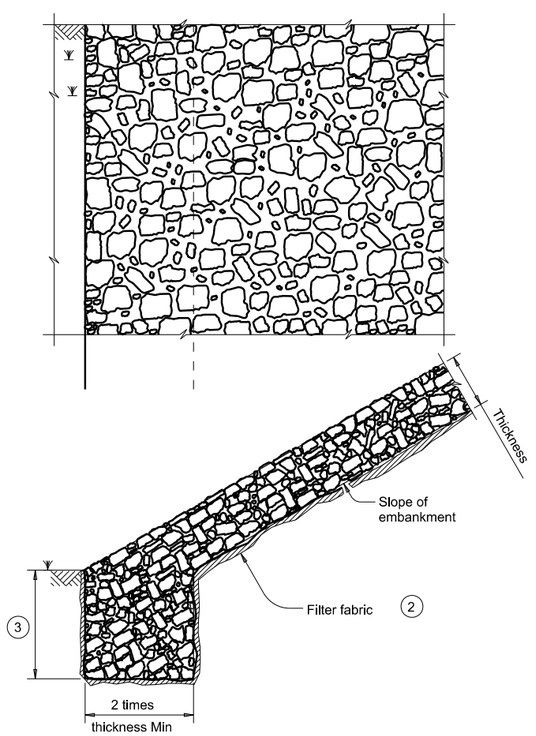


FIGURE 5 ~ PROTECTION STONE RIPRAP

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

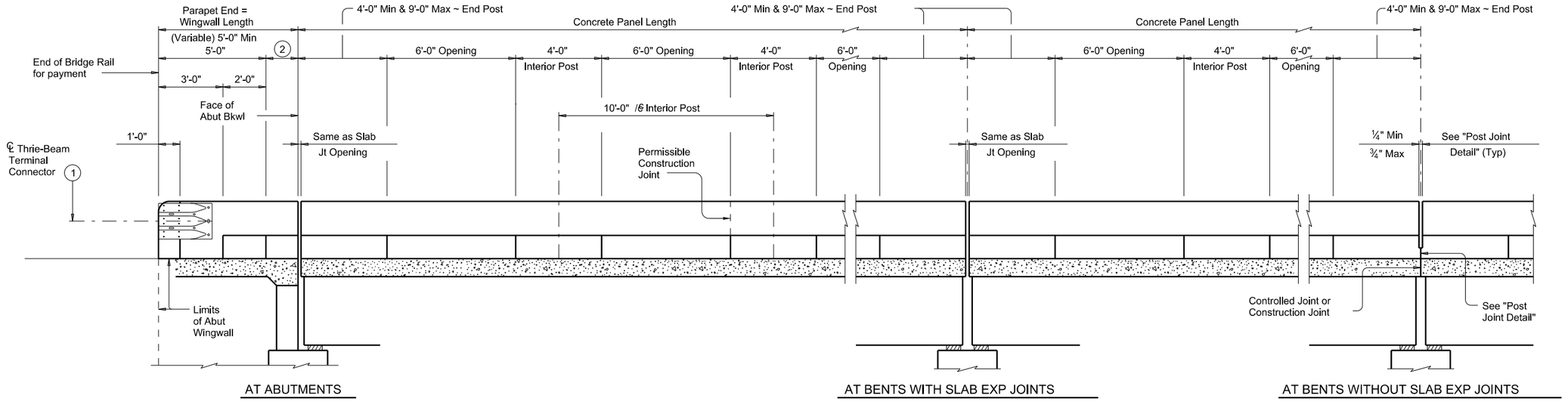
Texas Department of Transportation

Bridge Division Standard

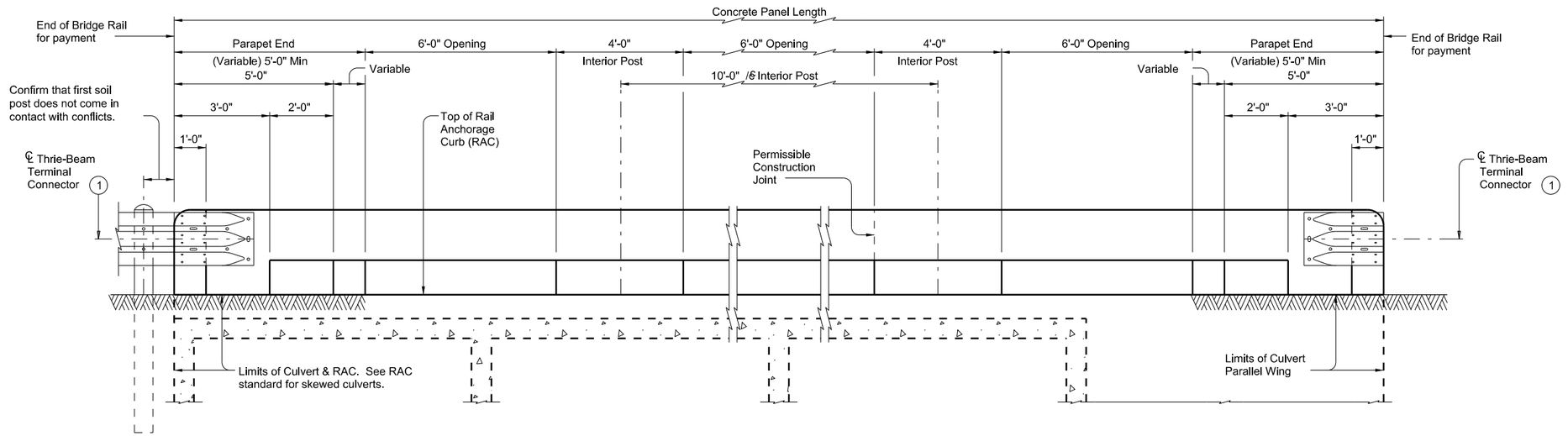
STONE RIPRAP

SRR

FILE: srrstde1.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		121



ROADWAY ELEVATION OF RAIL ON BRIDGE



ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown.
Vertical joints in concrete rail are not required, unless shown elsewhere.

(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) Wingwall Length minus 5'-0" (Varies)

DATE:
FILE:

SHEET 1 OF 3

Texas Department of Transportation

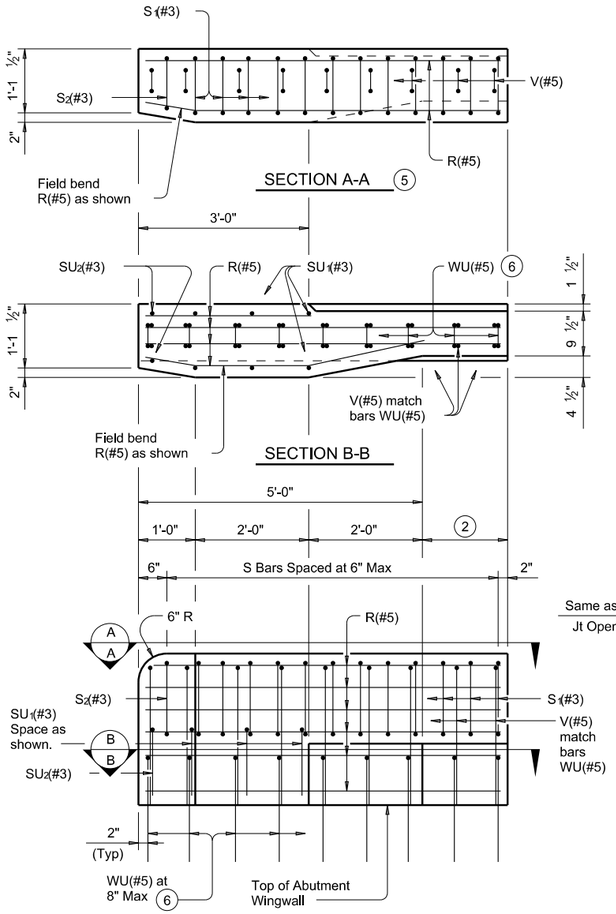
Bridge Division Standard

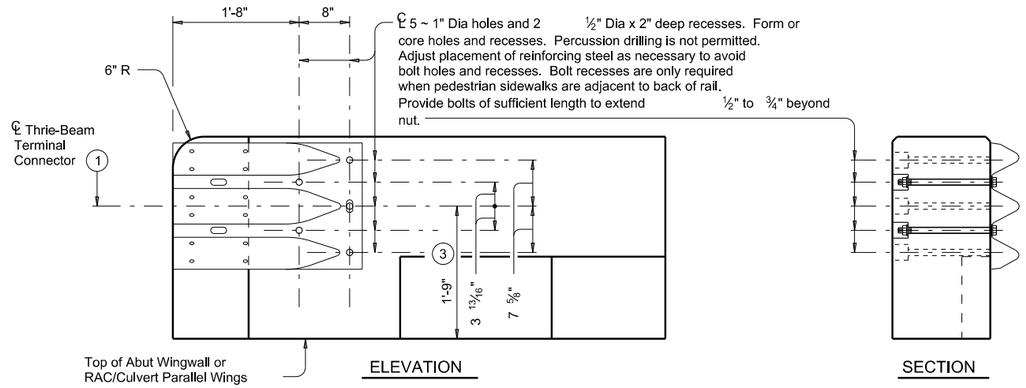
TRAFFIC RAIL

TYPE T223

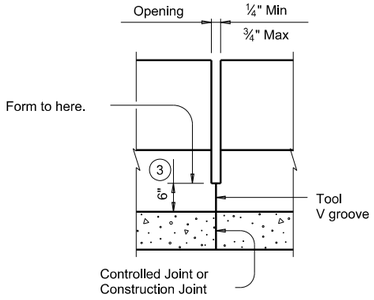
FILE: rlstd005-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT March 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		122

DATE:
FILE:



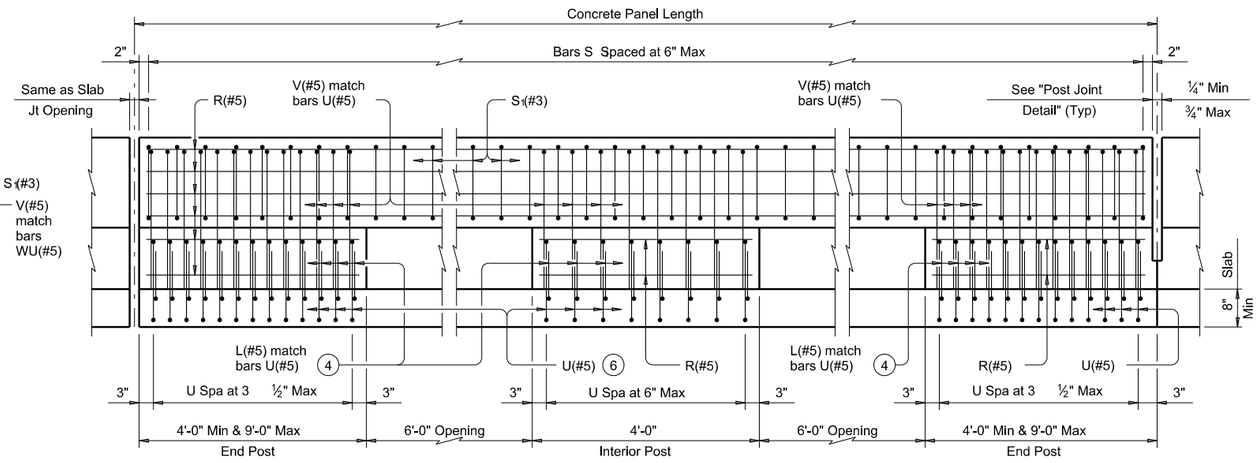


TERMINAL CONNECTION DETAILS



POST JOINT DETAIL

Provide at all interior bents without slab expansion joints.



AT SLAB EXPANSION JOINTS

AT 4' INTERIOR POST

AT BENTS WITHOUT SLAB EXPANSION JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing rail on slab. Rail on box culvert similar.

(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) Wingwall Length minus 5'-0" (Varies)

(3) Increase 2" for structures with overlay.

(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(5) Bars SU (#3), SU (#3)$_2$ and WU(#5) not shown for clarity.

(6) Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on achorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

Texas Department of Transportation

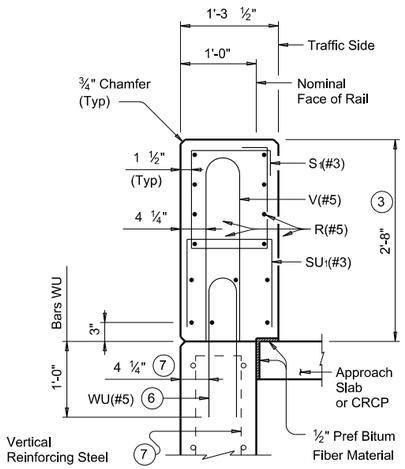
Bridge Division Standard

TRAFFIC RAIL

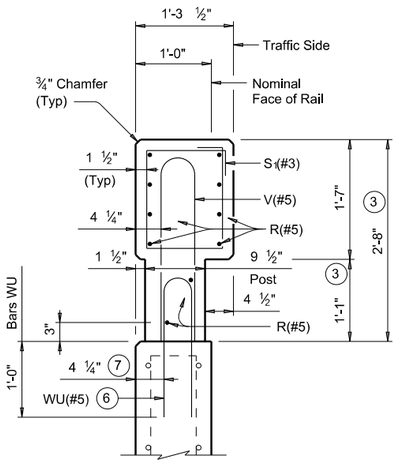
TYPE T223

FILE: rlstd005-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT March 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		123

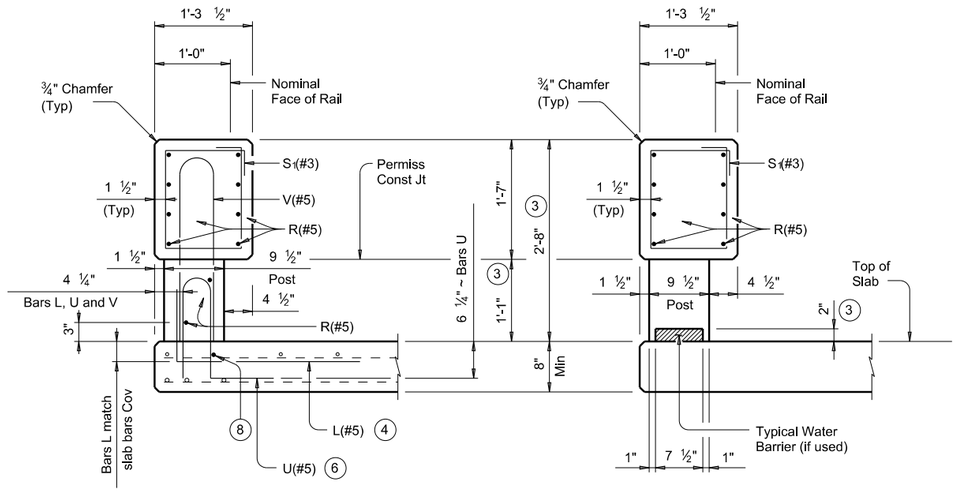
DATE:
FILE:



SECTION C-C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

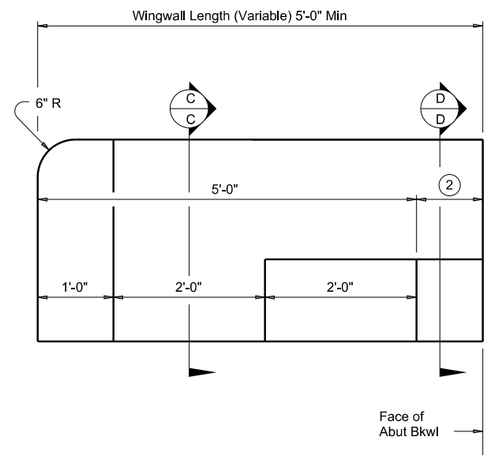


SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



AT POST
ON BRIDGE SLAB

AT OPENING
ON BRIDGE SLAB



ELEVATION AT
ABUTMENT WINGWALL

Box culvert parallel wings or rail anchorage curb similar.

SECTIONS THRU RAIL

Sections on box culverts similar.

(2) Wingwall Length minus 5'-0" (Varies)

(3) Increase 2" for structures with overlay.

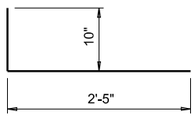
(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(6) Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

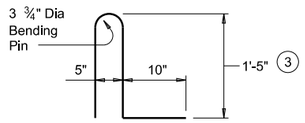
(7) When vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall, move the horizontal wingwall/retaining wall reinforcing to the inside of Bars WU where bars conflict.

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

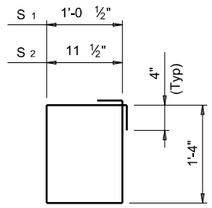
(9) At the Contractor's option, Bars V may be replaced by extending Bars U to 2'-5 ¼" above the roadway surface without overlay.



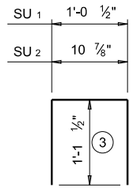
BARS L (#5)



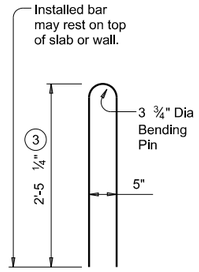
BARS U (#5) (9)



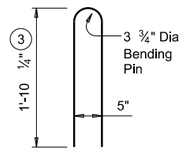
BARS S (#3)



BARS SU (#3)



BARS V (#5) (9)



BARS WU (#5)

CONSTRUCTION NOTES:

Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.

Provide water barriers at openings draining onto undercrossing roadways and sidewalks. They may be cast-in-place or precast in convenient lengths and bonded to the bridge deck with an approved epoxy cement.

Chamfer all exposed corners.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

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

Deformed Welded Wire Reinforcing (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U, V, and WU unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-0"

Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been 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.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

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

Shop drawings are not required for this rail.

Average weight of railing with no overlay is 358 plf.

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

Texas Department of Transportation

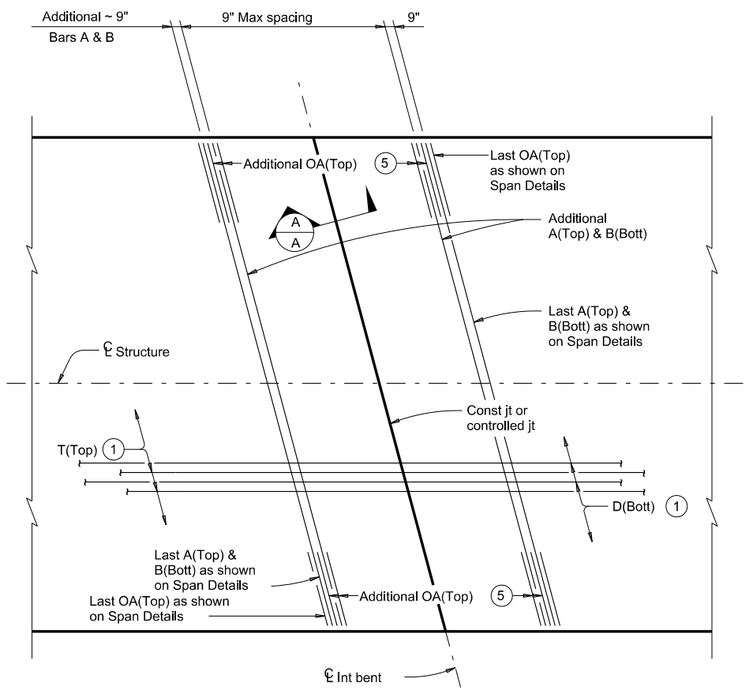
Bridge Division Standard

TRAFFIC RAIL

TYPE T223

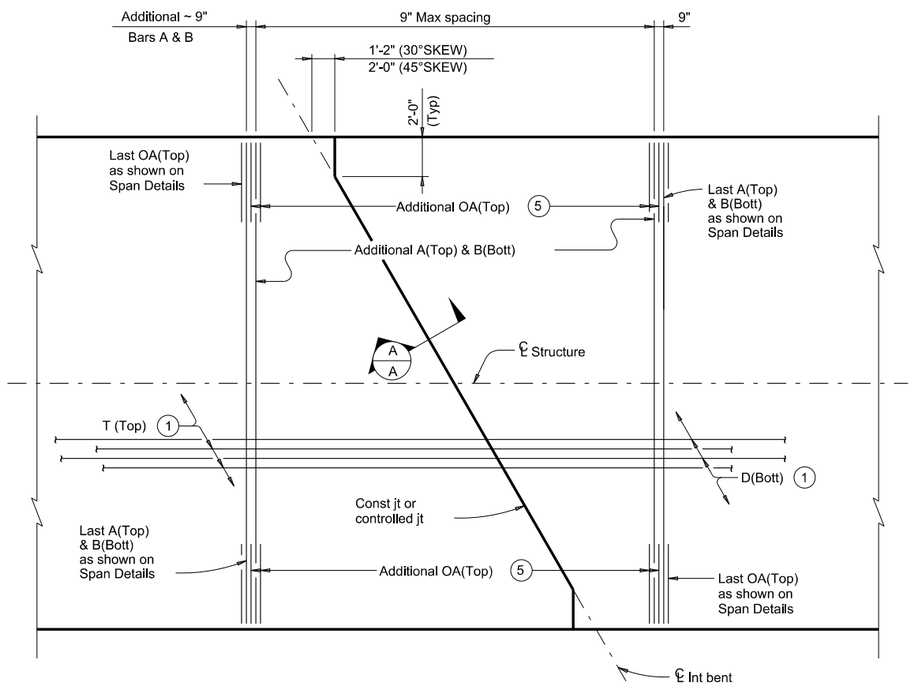
FILE: rlstd005-18.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT March 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		124

DATE:
FILE:



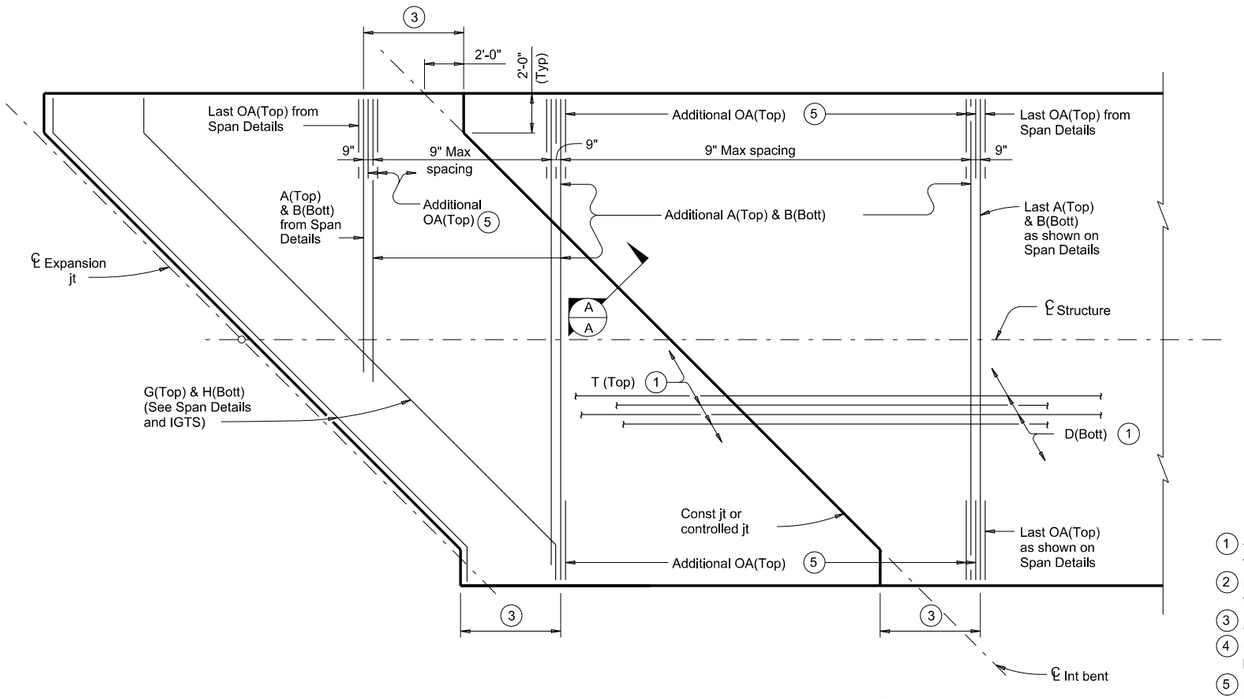
PLAN FOR 0° OR 15° SKEW

(Showing 15°skew)



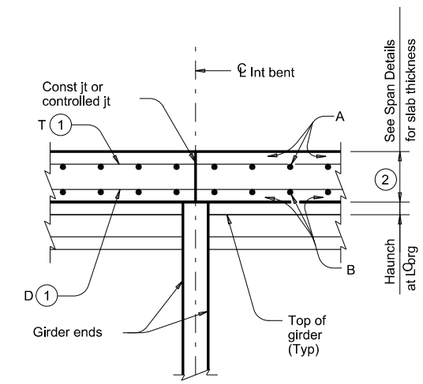
PLAN FOR 30° OR 45° SKEW

(Showing 30°skew)



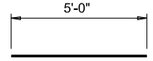
PLAN FOR 45° SKEW 4

(Showing short Span condition)



SECTION A-A

Bars OA(Top) not shown for clarity.



BARS OA(#5)

1. Top and bottom mats must be continuous through joint.
2. Maintain a constant slab thickness over the bent.
3. 5'-4" as shown on Span Details.
4. Use these details when no full slab width bars A and B are shown on Span Details.
5. Bars OA(Top) at 9" Max spacing between Bars A(Top).

TABLE OF ALLOWABLE UNIT LENGTH

Max Rdwy Grade, Percent	Unit Length Factor
0.00	4.1
1.00	3.9
2.00	3.7
3.00	3.5
4.00	3.3
5.00	3.1

Unit length must not exceed the length of the shortest end span times the Unit Length Factor shown in table or 400', whichever is less.

BAR TABLE

BAR	SIZE
A	#4
B	#4
D	#4
T	#4
OA	#5

The details shown on this sheet are applicable for two and three span units comprised of the same girder type.
Units may be comprised of different span lengths. See "Table of Allowable Unit Length".

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

This standard is drawn showing right forward skew. See Bridge Layout for actual skew direction.

CONSTRUCTION NOTES:

Where multi-span units are indicated on the Bridge Layout, the thickened slab end details and reinforcement shown on IGTS standard (Bars AA, G, H, J, K, and M) and on the Span Details will be omitted where slabs are continuous over interior bents. At these locations, the slab details and reinforcement will be as shown on this sheet or on PCP standard (if using this option).

Thickened slab end reinforcement and details still apply at expansion joint locations (ends of units).

See Span Details for remainder of slab reinforcement and details.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide Class "S" concrete (f'c = 4,000 psi). Provide Class "S" (HPC) if shown elsewhere on the plans.

Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

The details shown on this sheet are applicable for use only with the Prestressed Concrete I-Girder Standard Designs shown on standards IGSD-24, IGSD-28, IGSD-30, IGSD-32, IGSD-38, IGSD-40 and IGSD-44.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

CONTINUOUS SLAB DETAILS

PRESTR CONC I-GIRDER SPANS

IGCS

FILE: igcs1sts-17.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		125

DATE:
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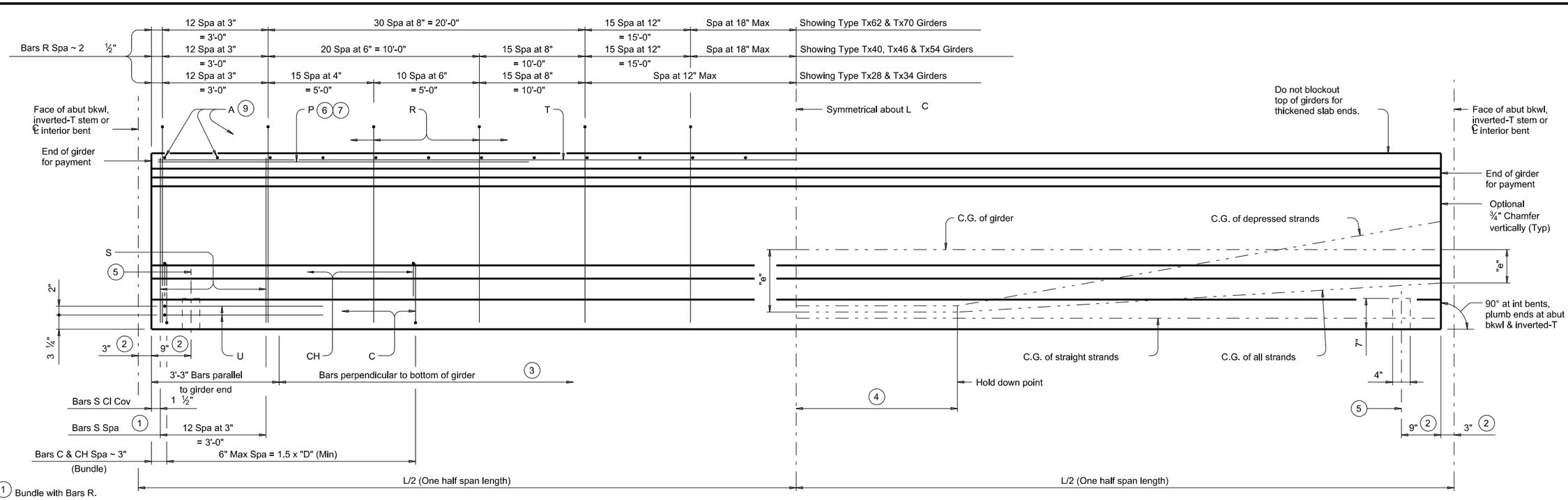


GIRDER ELEVATION

(1) Bundle with Bars R.

(2) Measured along ℄ Girder at interior bents; perpendicular to abutment bkwl or inverted-T stem.

(3) The average of the top and bottom spacing of Bars R cannot exceed the required spacing.

(4) L/20, but not less than 5'-0" (-0,+2').

(5) ℄ 4" x 1 ½" Vertical Slotted Hole at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details. Anchorage holes may be tapered (4 ¾" x 1 ⅝") at base. If holes are formed with sheet metal, forms may be left in place.

(6) Bars P (#6 x 15'-0") required in Tx62 and Tx70 girders. At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

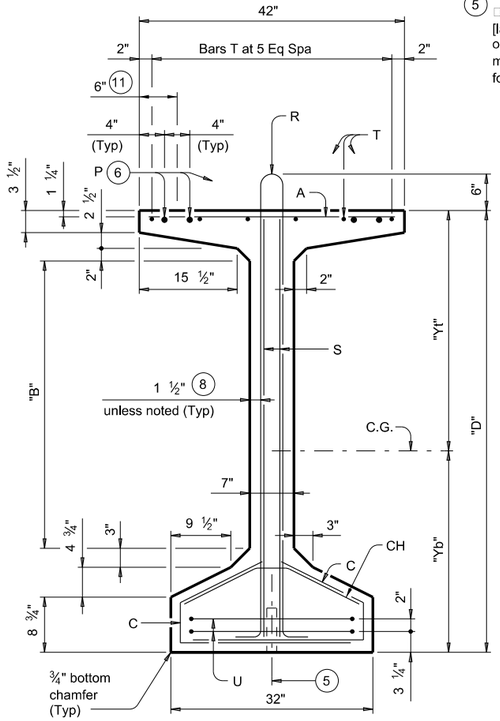
(7) Bars P (#6 x 15'-0") are only required in Tx28, Tx34, Tx40, Tx46, and Tx54 girders when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(8) 1 ⅜" Clear Cover to Bars S.

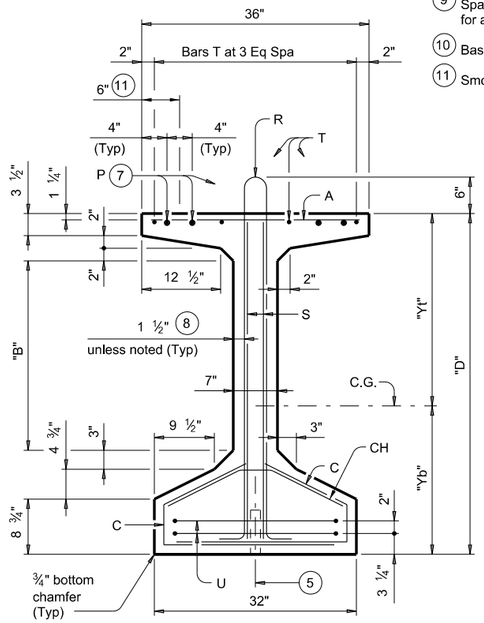
(9) Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".

(10) Based on 155 pcf total weight of concrete and reinforcing steel.

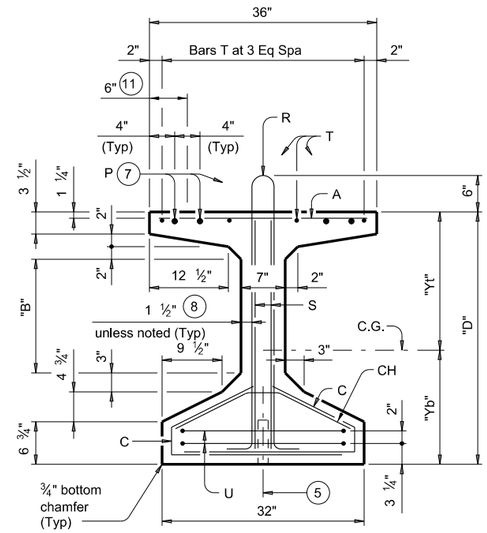
(11) Smooth trowel finish on the slab overhang side of exterior girder.



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40

GIRDER DIMENSIONS AND SECTION PROPERTIES

Girder Type	"D" (in.)	"B" (in.)	"Yt" (in.)	"Yb" (in.)	Area (in.²)	"Ix" (in.⁴)	"Iy" (in.⁴)	Weight (10) (plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	630
Tx34	34	12	18.49	15.51	627	88,355	40,731	675
Tx40	40	18	21.90	18.10	669	134,990	40,902	720
Tx46	46	22	25.90	20.10	761	198,089	46,478	819
Tx54	54	30	30.49	23.51	817	299,740	46,707	880
Tx62	62	37 ½"	33.72	28.28	910	463,072	57,351	980
Tx70	70	45 ½"	38.09	31.91	966	628,747	57,579	1,040

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A1064) may be substituted for Bars A, C, R or T unless otherwise noted.
It is permissible for bars or strands to come in contact with materials used in forming anchor holes.

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

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: igdstds1-17.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: JMH
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
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	PHR	CAMERON		126

DATE:
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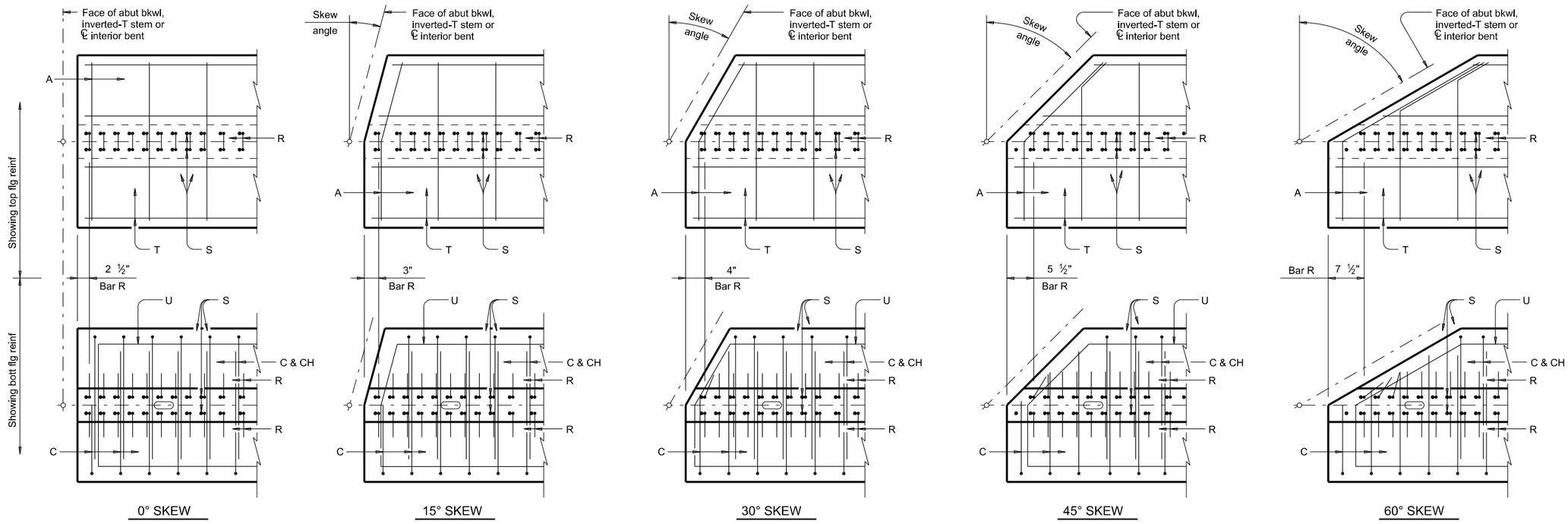
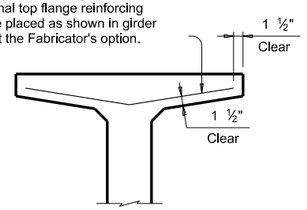
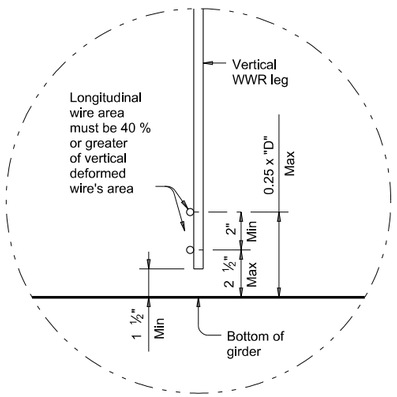


PLAN OF GIRDER ENDS (12)

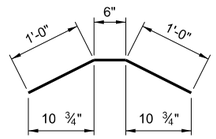
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



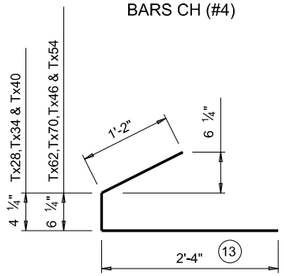
OPTIONAL TOP FLANGE REINFORCING DETAIL



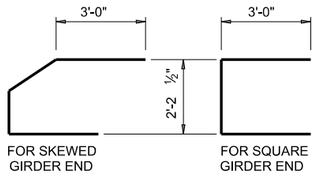
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



BARS CH (#4)



BARS C (#4)



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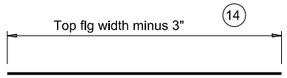
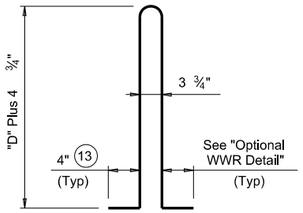
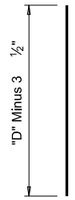


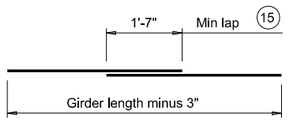
BARS A (#3)



BARS R (#4) (16)



BARS S (#6)



BARS T (#4)

(12) Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.

(13) Bars may be cut or bent at skewed end as required.

(14) Increase as necessary for bars at skewed end.

(15) No portion of bar less than 10 ft.

(16) For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

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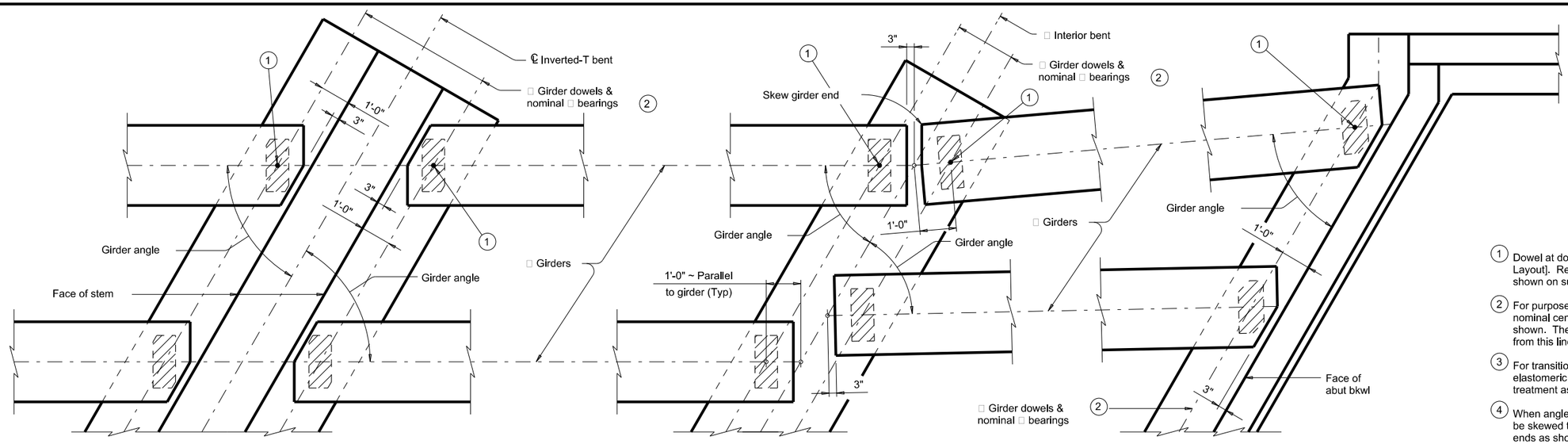


AT INVERTED-T BENT W/SKEW

AT CONVENTIONAL INTERIOR BENT W/SKEW

AT ABUTMENT W/SKEW (3)

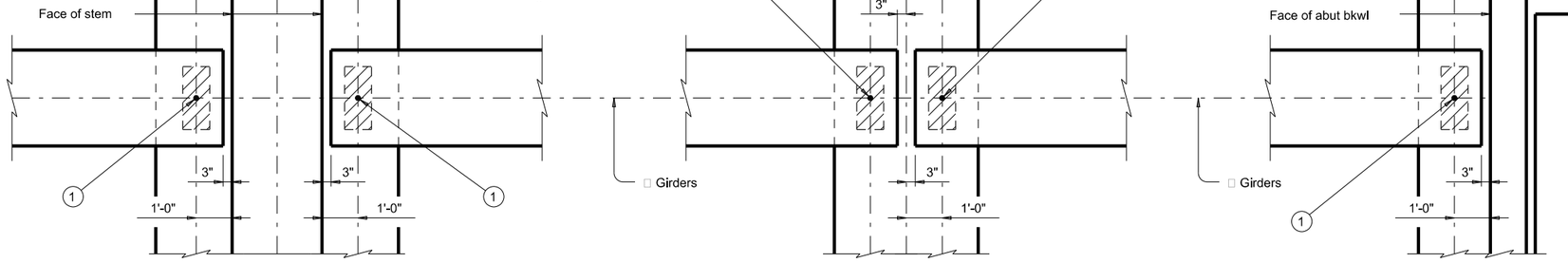
(1) Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

(3) For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.

(4) When angle exceeds 0°, one or both girders ends must be skewed to maintain the clearance between girder ends as shown in view.

(5) See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.

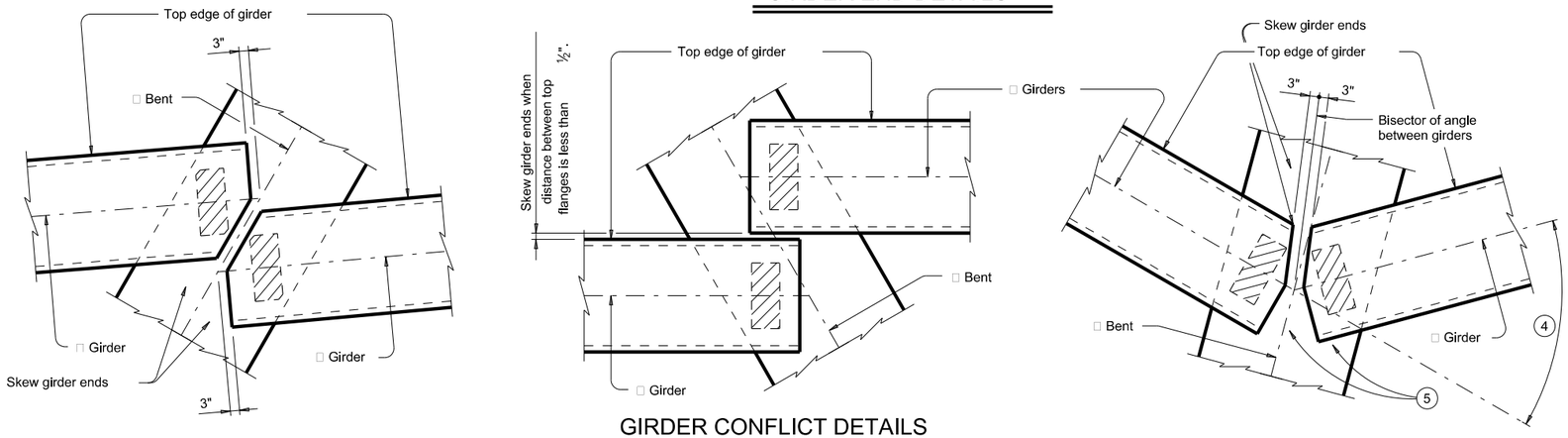


AT INVERTED-T BENT

AT CONVENTIONAL INTERIOR BENT

AT ABUTMENT (3)

GIRDER END DETAILS



GIRDER CONFLICT DETAILS

GENERAL NOTES:

These details accommodate skew angles up to 60°.

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, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".

HL93 LOADING SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

IGEB

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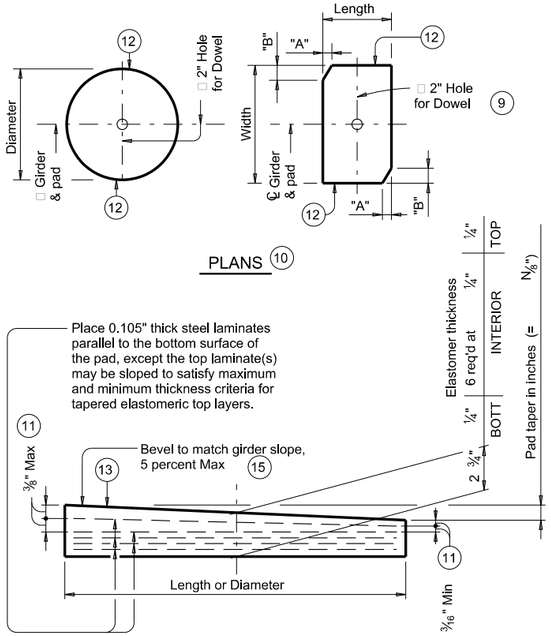
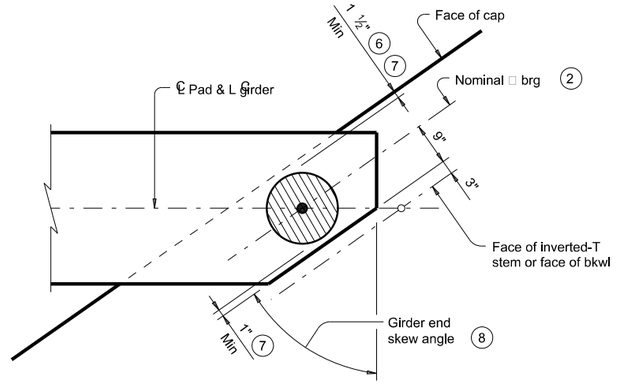
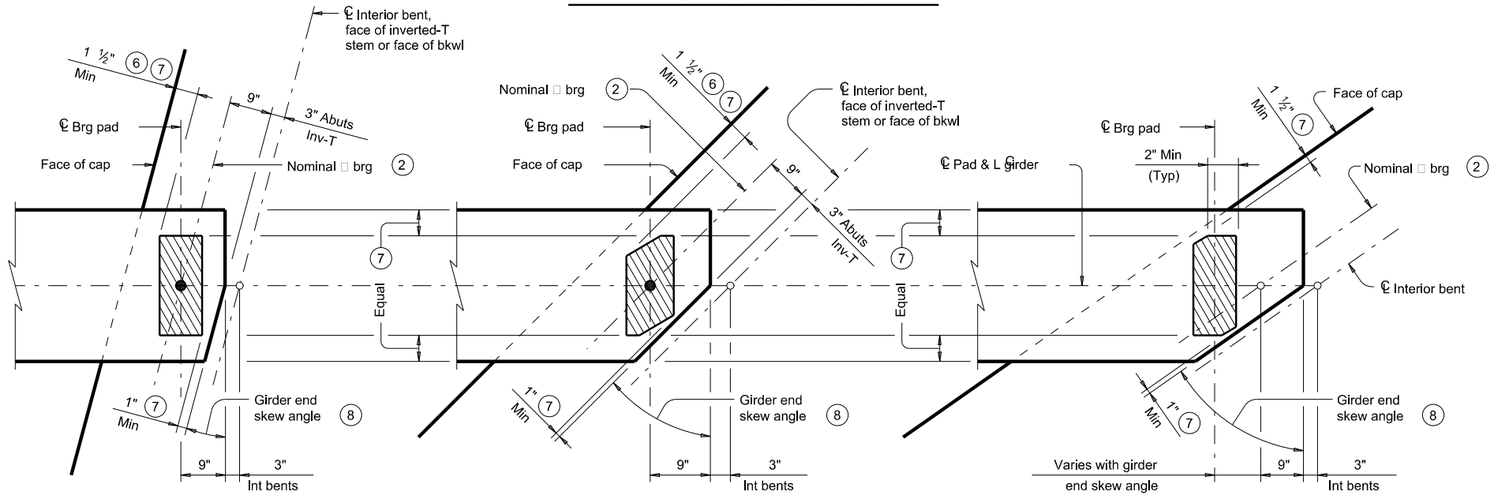


LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)



ROUND BEARINGS FOR SKEWED GIRDER ENDS AT FACE OF INVERTED-T STEM OR FACE OF BKWL



SKEWED GIRDER ENDS AT INT BENTS, FACE OF INVERTED-T STEM OR FACE OF BKWL

SKEWED GIRDER ENDS AT CONVENTIONAL INTERIOR BENTS 16

(NO GIRDER DOWELS)

BEARING PAD PLACEMENT DIAGRAMS

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)

Girder Type	Abutments	Int Bents	Inv-T Bents
	Face of Bkwl to Face of Cap	Overall Cap Width	Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 ½"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 ½"

TABLE OF BEARING PAD DIMENSIONS

Bent Type	Girder Type	Bearing Type (13)	Girder End Skew Angle Range	Pad Size Lgth x Wdth	Pad Clip Dimensions "A"	Pad Clip Dimensions "B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-3-"N"	30°+ thru 45°	9" x 21"	4 ½"	4 ½"
		G-4-"N"	45°+ thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21°+ thru 30°	9" x 21"	1 ½"	2 ½"
		G-7-"N"	30°+ thru 45°	10" x 21"	4 ½"	4 ½"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 ¼"	4 ¼"
CONVENTIONAL INTERIOR BENTS	Tx28,Tx34, Tx40,Tx46 & Tx54	---	---	---	---	---
		---	---	---	---	---
		G-1-"N"	0° thru 60°	8" x 21"	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 60°	9" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) (16)	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
		G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 ½"
	Tx62 & Tx70	G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-5-"N"	18°+ thru 30°	9" x 21"	---	---
		G-11-"N"	30°+ thru 45°	9" x 21"	1 ½"	1 ½"
		G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 ¾"

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

(6) 3" for inverted-T.

(7) Place centerline pad as near nominal centerline bearing as possible between limits shown.

(8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.

(9) Provide 2" dia hole only at locations required. See Substructure details for location.

(10) See Table of Bearing Pad Dimensions for dimensions.

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

(12) Locate Permanent Mark here.

(13) 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 girder slope by more than $\left(\frac{0.08 \times N}{\text{Length or Dia}}\right)$.

(14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.

(15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.

(16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

HL93 LOADING SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

IGEB

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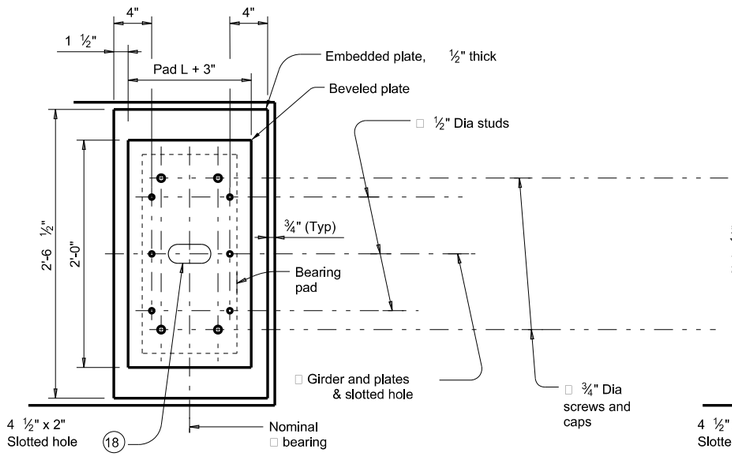
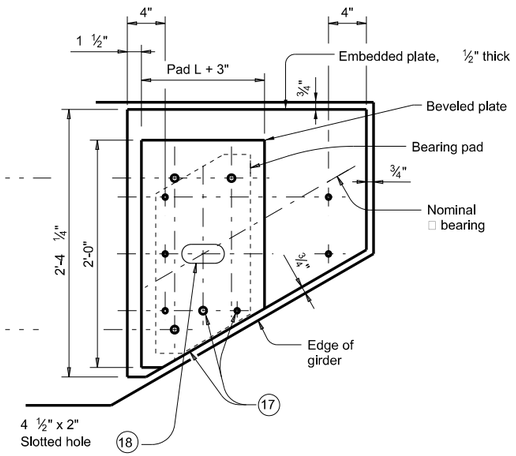
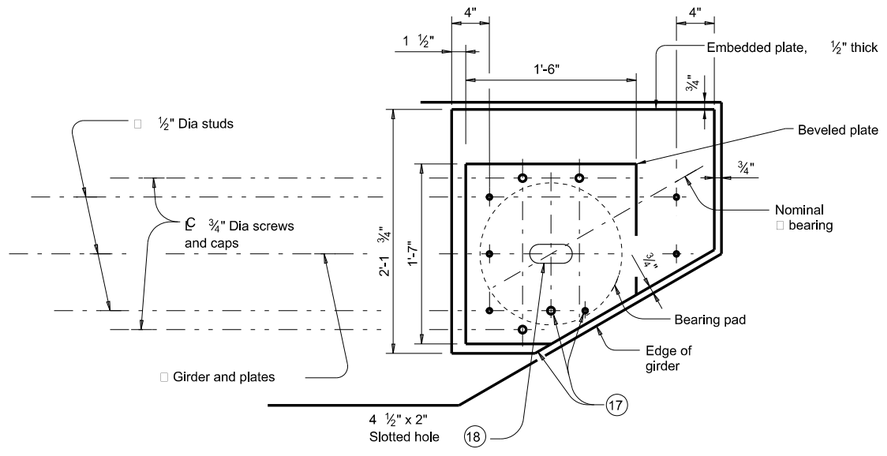


NORMAL GIRDER END
RECTANGULAR BEARING PAD

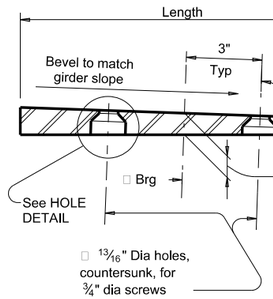


SKEWED GIRDER END
CLIPPED RECTANGULAR BEARING PAD

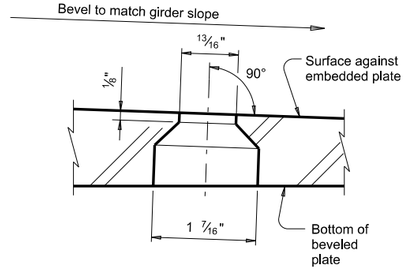


SKEWED GIRDER END
15" DIA BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS

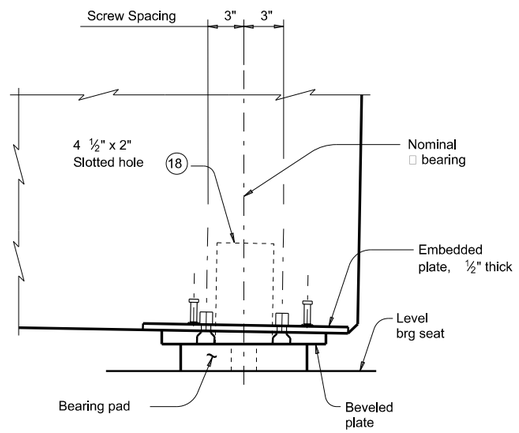


SECTION

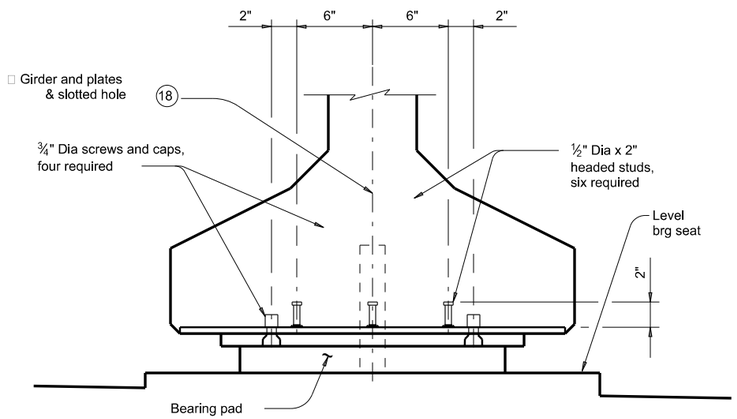


HOLE DETAIL

BEVELED PLATE DETAILS



SIDE ELEVATION



END ELEVATION
Showing normal girder end.

GIRDER DETAILS

(17) Cut beveled and embedded plates to match girder end skew. Adjust location of screw and stud as shown when necessary.

(18) Slotted hole is required at doweled girder end locations.

SOLE PLATE NOTES:

Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when the girder slope exceeds 5 percent or if otherwise required in the plans. Provide for all girders in the span.

On the shop drawings, dimension sole plates to the nearest 1/16" based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1/16"+/-, except variation from a plane parallel to the theoretical top surface can not exceed 1/16" total. Bearing surface tolerances listed in Item 424 apply to embedded and beveled plates.

Steel plate must conform to ASTM A36, A572 Gr 50, or A709 Gr 36 or Gr 50. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

¾" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than ½" deep or deeper than 1".

Install beveled sole plates prior to shipping girders. Installed screw heads must not protrude below the bottom of the beveled plate.

HL93 LOADING SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

IGEB

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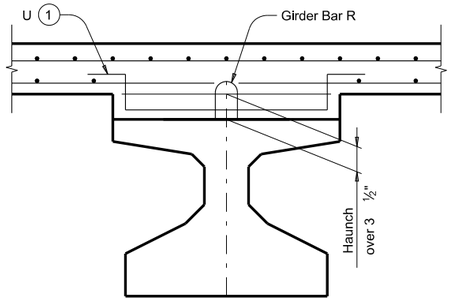
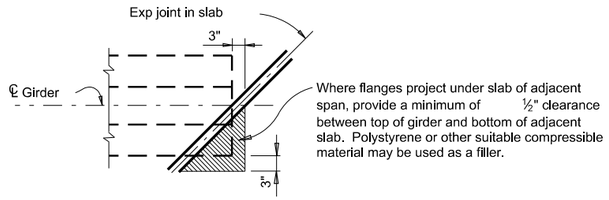
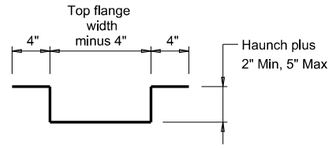


HAUNCH REINFORCING DETAIL



TREATMENT AT GIRDER END FOR SKEWED SPANS



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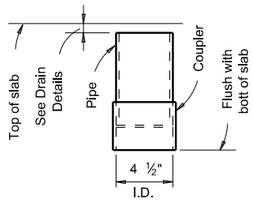
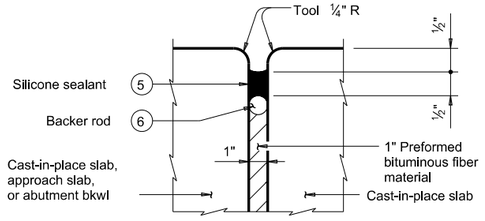
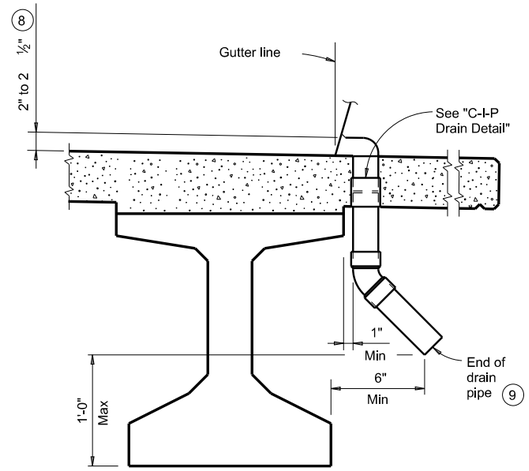


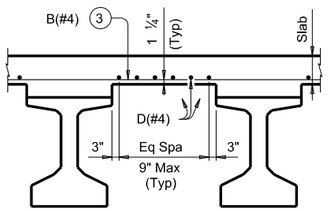
C-I-P DRAIN DETAIL (2)



TYPE A JOINT DETAIL (7)



DRAIN DETAIL (10)



TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP (4)

Top reinforcing steel not shown for clarity.

1. Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 ½".
2. Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.
3. Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#4) at centerline outside girder.
4. Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:
   Uncoated ~ #4 = 1'-7"
   Epoxy coated ~ #4 = 2'-5"
5. 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.
6. 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.
7. The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints. Type A joints are subsidiary to Item 422, "Concrete Superstructures".
8. Drain entrance formed in rail or sidewalk.
9. Water may not be discharged onto girders.
10. All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railways, or within 10'-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

All items (reinforcing steel, drains, joint formers, etc.) shown on this sheet are subsidiary to other bid items.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

DECK FORMWORK NOTES:

Overhang bracket hangers are limited to a safe working load of 3,600 lbs, applied to and along the axis of a coil rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

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Bridge Division Standard

MISCELLANEOUS SLAB DETAILS

PRESTR CONCRETE I-GIRDERS

IGMS

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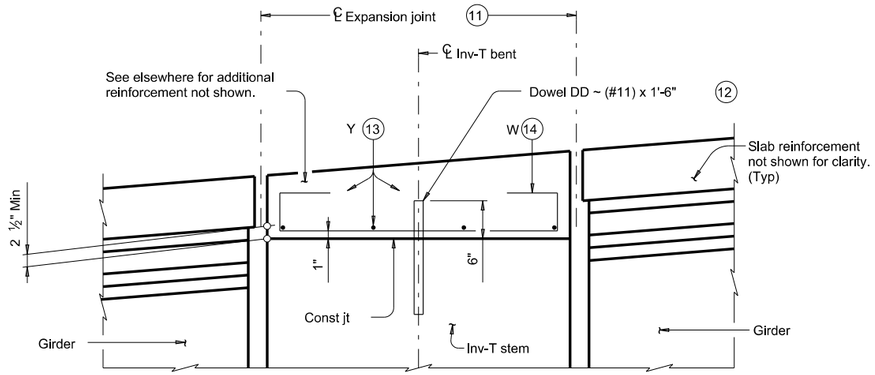
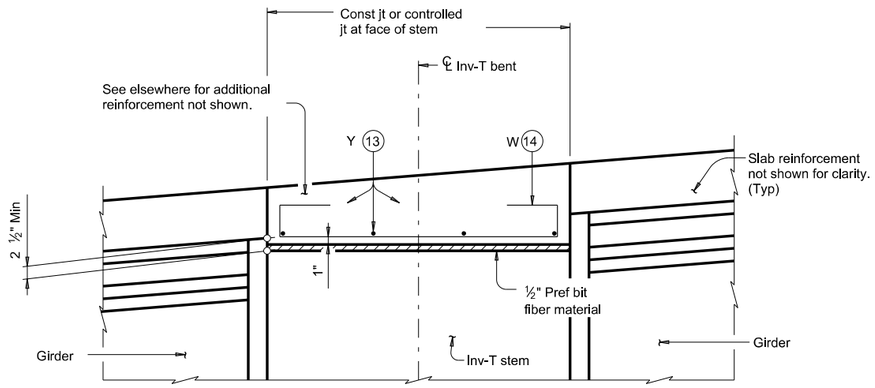
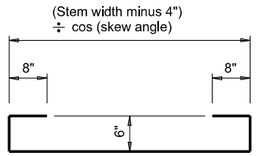


SHOWING EXPANSION JOINTS



SHOWING CONST JTS OR CONTROLLED JTS

REINFORCEMENT OVER INV-T BENTS



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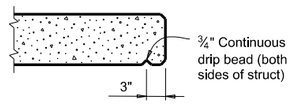
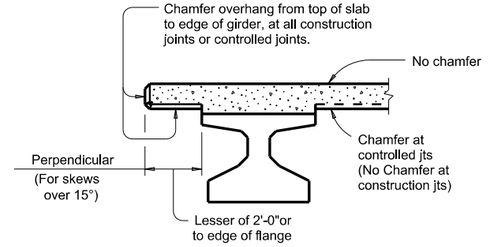
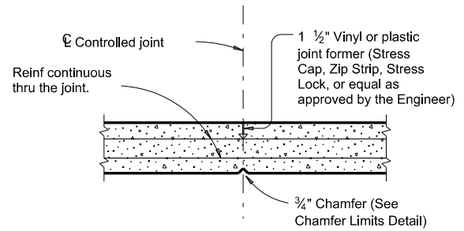


DRIP BEAD DETAIL



CHAMFER LIMITS DETAIL (15)



CONTROLLED JOINT DETAIL

(Saw-cutting is not allowed)

(11) See Layout for joint type.

(12) Dowels DD (#11) spaced at 5 Ft Max. See Inv-T bents for quantity and location.

(13) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.

(14) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.

(15) See Span details for type of joint and joint locations.

DATE:
FILE:

Texas Department of Transportation

Bridge Division Standard

MISCELLANEOUS SLAB DETAILS

PRESTR CONCRETE I-GIRDERS

IGMS

FILE: igmssts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT			
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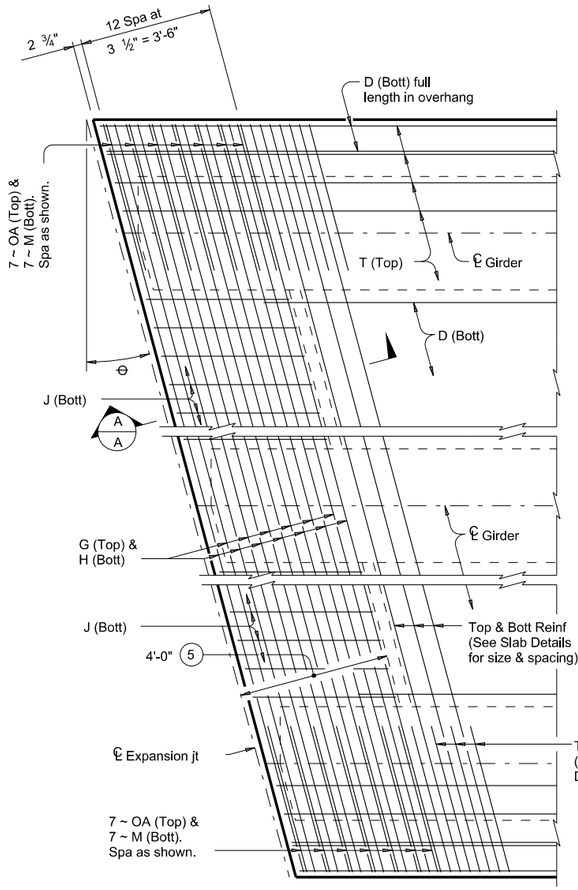
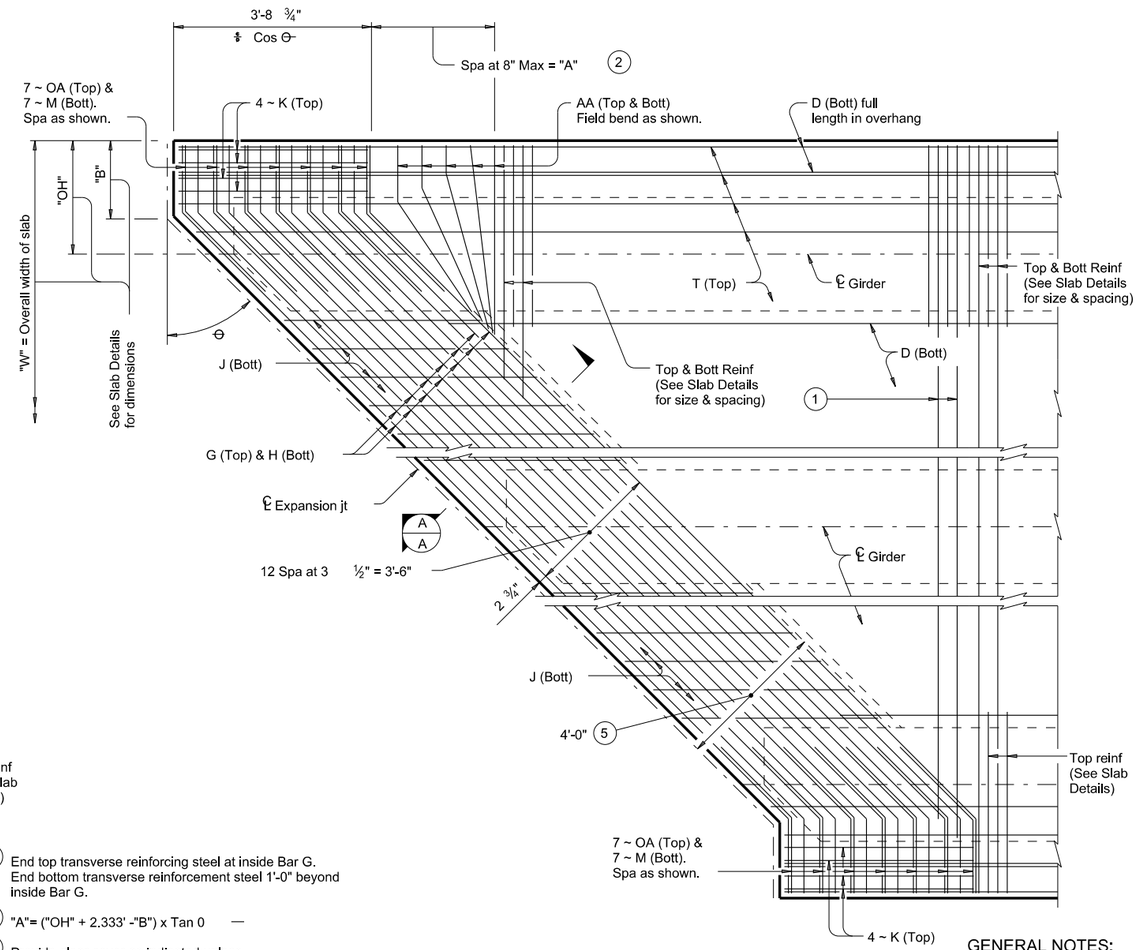
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR			
	DIST	COUNTY		SHEET NO.			
	PHR	CAMERON		132			

DATE:
FILE:

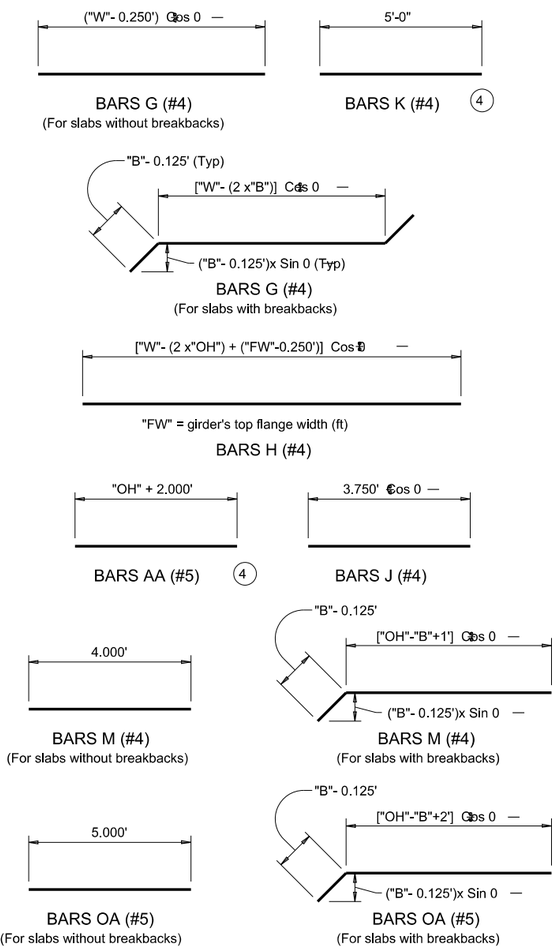


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

1. End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.
2. "A"= ("OH" + 2.333' -"B") x Tan 0 —
3. Provide clear cover as indicated unless otherwise shown on Span Details.
4. Only required on slabs with breakbacks.
5. Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.



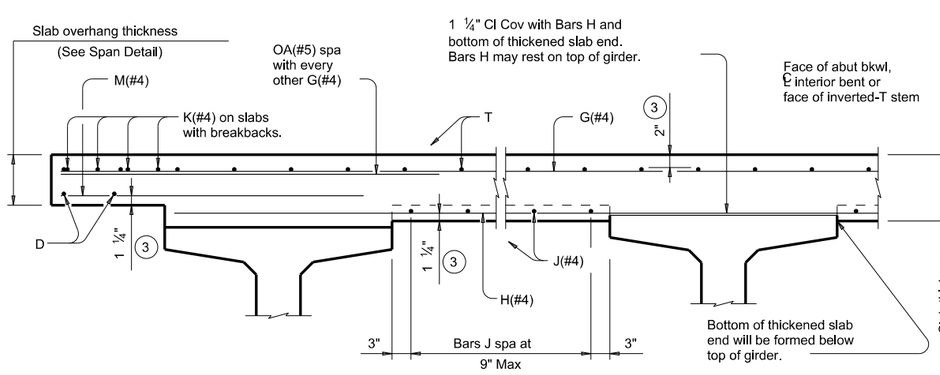
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
These details are restricted to Prestressed Concrete I-Girder Spans.
These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used).
When Option 2 from PCP standard is used, provide Bars AA, G, K and OA in the slab.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

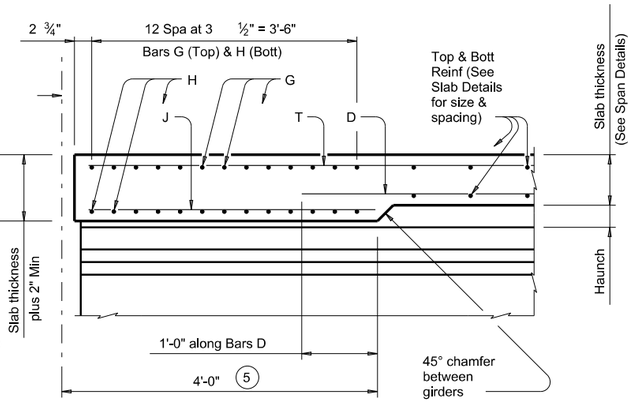
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



2" AND MORE OF HAUNCH — LESS THAN 2" OF HAUNCH

TYPICAL TRANSVERSE SECTION

(Showing Prestressed Conc I-Girders at L Brg) C



SECTION A-A

(Showing with 2" and more of haunch)

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

THICKENED SLAB END DETAILS

PRESTRESSED CONCRETE I-GIRDER SPANS

IGTS

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	PHR	CAMERON		133

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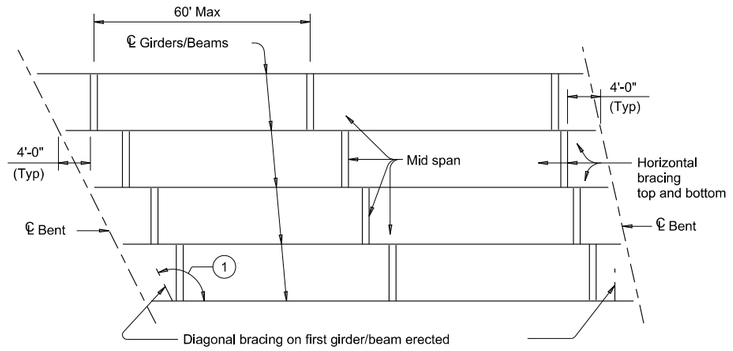
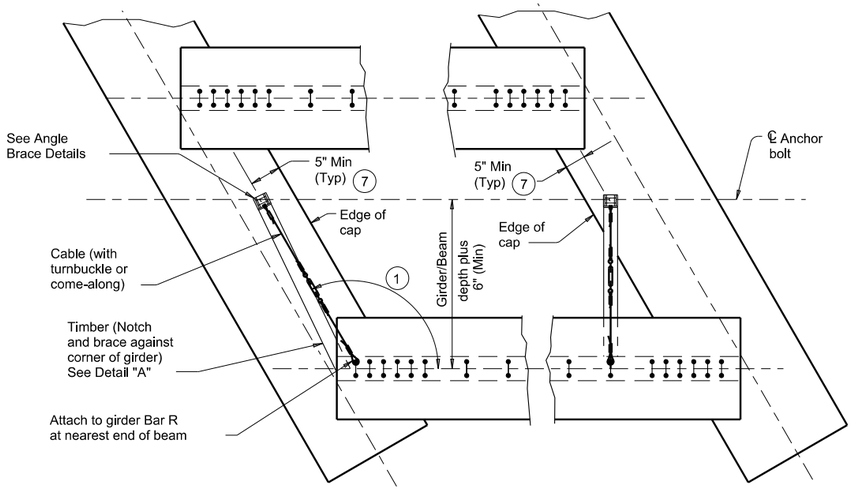
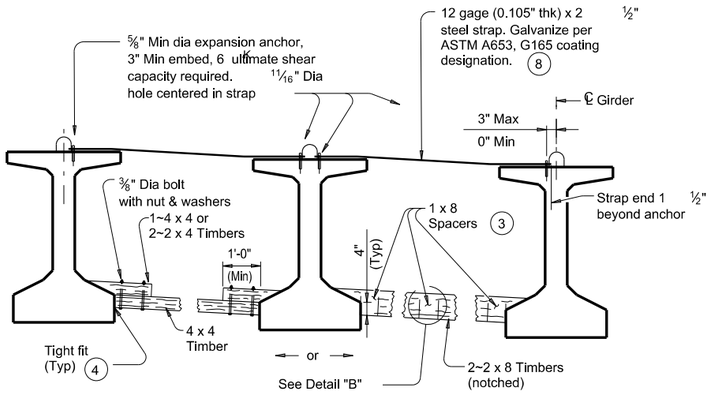


ERECTION BRACING

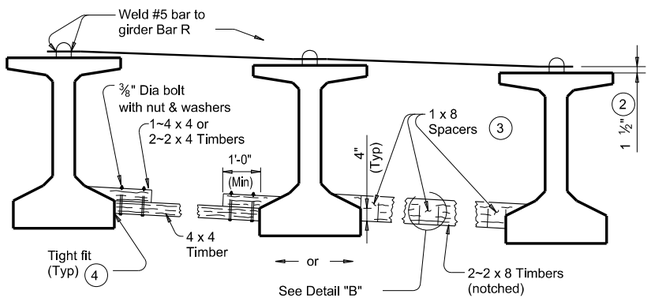


PLAN



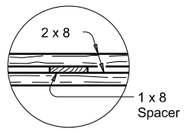
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)



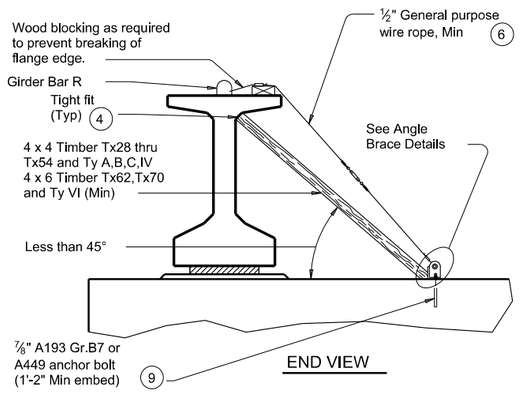
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS 5



PLAN

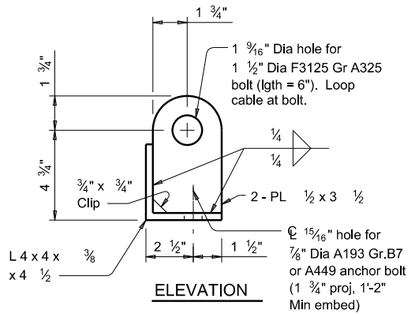
DETAIL "B"



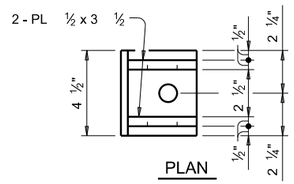
END VIEW

DIAGONAL BRACING DETAILS 5

(To be used on both ends of the first girder/beam erected in the span in each phase.)



ELEVATION



PLAN

ANGLE BRACE DETAILS

HAULING & ERECTION:

The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral stiffening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

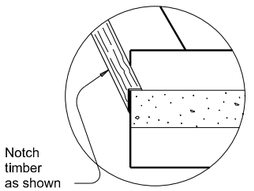
ERECTION BRACING:

Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425.

Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:

Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after first, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



DETAIL "A"

1. If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.
2. Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).
3. Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
4. Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
5. Pressure treated landscape timbers can not be used.
6. All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing aginst the dead end.
7. It is acceptable to tie anchor bolts to cap reinforcement.
8. Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
9. Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS

PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

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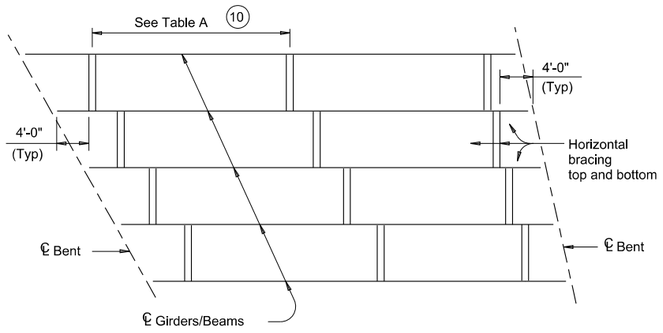
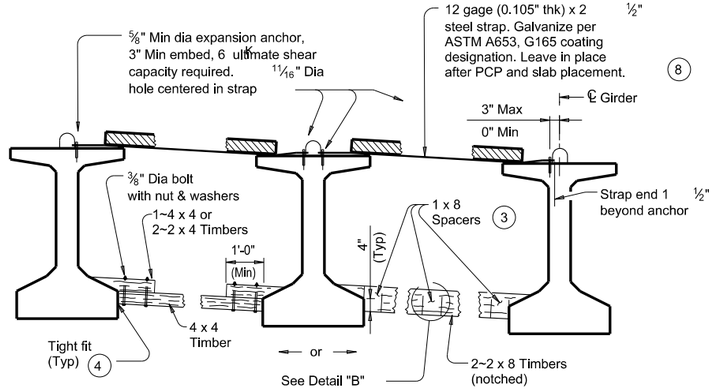


SLAB PLACEMENT BRACING

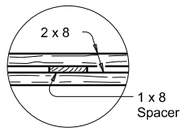
TABLE A

OPTION 1-RIGID BRACING (STEEL STRAP)			OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)		
Girder or Beam Type	Maximum Bracing Spacing		Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)		Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	¼ points	Tx28	¼ points	⅛ points
Tx34	¼ points	¼ points	Tx34	¼ points	⅛ points
Tx40	¼ points	⅛ points	Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points	Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points	Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points	Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points	Tx70	¼ points	⅛ points
A	⅛ points	⅛ points	A	2.0 ft	1.5 ft
B	⅛ points	⅛ points	B	3.0 ft	2.0 ft
C	⅛ points	⅛ points	C	4.5 ft	2.0 ft
IV	¼ points	⅛ points	IV	¼ points	4.0 ft
VI	¼ points	⅛ points	VI	¼ points	4.0 ft



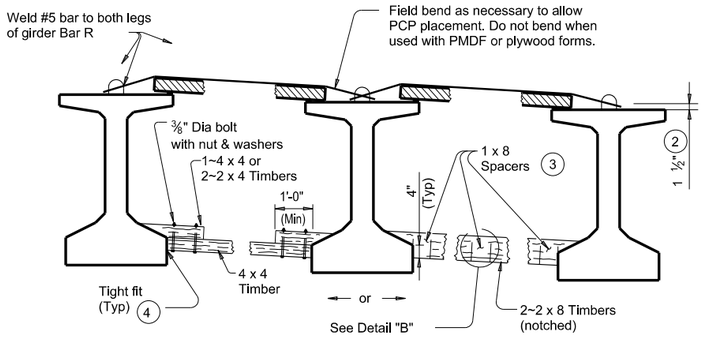
FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



PLAN

DETAIL "B"



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)

HORIZONTAL BRACING DETAILS 5

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.

(10) Bracing spacing (¼ and ⅛ points) measured between first and last typical brace location.

(11) Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425.

Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

GENERAL NOTES:

Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection.

Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection.

Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure.

Removal of bracing for short periods of time to align girders and beams is permissible.

All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown.

Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

DATE:
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SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS

PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

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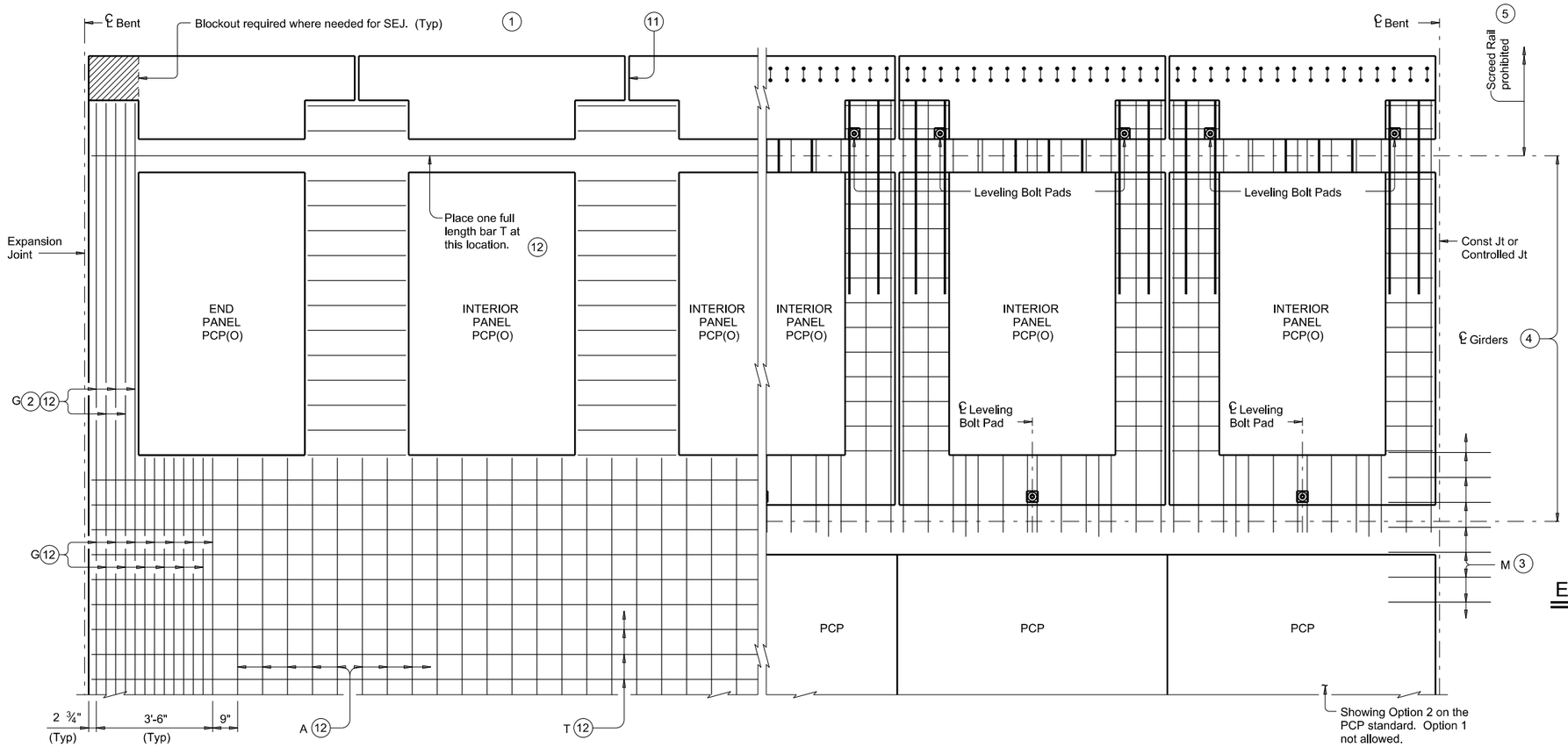
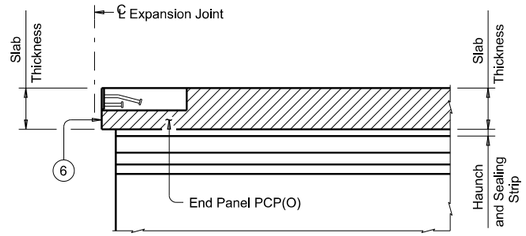


SHOWING FIELD PLACEMENT OF TOP REINFORCING STEEL

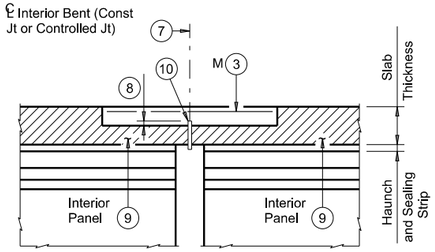
SHOWING PCP(O) EXPOSED REINFORCING STEEL

Field placed bars M shown for clarity.



EXPANSION JOINT

For SEJ-A, SEJ-S(O), AJ and Type A Expansion Joints only.

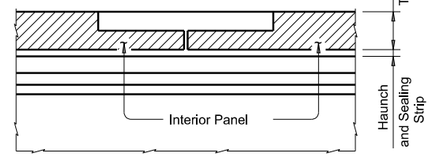


CONST JT OR CONTROLLED JT

Panel against Panel between Bms/Girders.

ELEVATIONS AT GIRDER ENDS WITH PCP(O)

Reinforcing steel not shown for clarity.



ELEVATION BETWEEN PCP(O)

The gap cannot be considered as a panel fabrication tolerance.
Reinforcing steel not shown for clarity.

PANEL LAYOUT

PCP(O) shown with gaps between panels for clarity.
The gap cannot be considered as a panel fabrication tolerance.

(1) 1'-4" x 1'-6" x 4 ½" blockout to accommodate SEJ that require an upturn. Contractor to communicate with fabricator the location and type of SEJ to be utilized.

(2) When blockout is required, extend bars G into blockout.

(3) Place additional bars M 2'-11" in length on top of bars A and between every bar T. Center bars M at center of bent. Located at bents with construction joints or controlled joints only. Bars M may replace additional (#4) bars 5'-0" in length as shown on PCP standard in Option 2 ~ Elevations At Beam Ends. Option 1 not allowed.

(4) It is recommended to profile every 4 ft by surveying each girder under PCP(O) for proper grading of panels.

(5) Screed rail used to set grade for paving machine is not allowed past exterior girder as shown.

(6) Place end panel PCP(O) within ½" of expansion joint opening. Do not encroach on required expansion joint opening.

(7) Top Plastic Joint Former at Controlled Joints (Stress Cap, Zip Strip, Stress Lock, etc.) is not required with these Details.

(8) 0" Min, ¾" Max, support as necessary.

(9) Place panel within ½" of ¾" thick board.

(10) ¾" thick wood/timber board, leave in place. Place straight, within ¼" of Centerline of Bent, across bridge width and end board at exterior flange edge of fascia girders. Do not extend into overhang.

(11) Seal top of panel only, with a Class 4 sealant prior to rail construction. Typical between panels. Do not seal at Expansion Joints.

(12) 1 ½" End Cover. (Typ)

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division

PRECAST CONCRETE PANELS FOR OVERHANGS

PCP(O)

FILE: pcpostd1-17.dgn	DN: KLM		CK: DVL	DW: JTR		CK: KLM
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DATE:
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BAR TABLE		
BAR	SIZE	MAX SPA (IN)
A (12)(17)	#4	9"
G (12)(17)	#4	3½"
M	#4	9"
T (12)(17)	#4	9"

(4) It is recommended to profile every 4 ft by surveying each girder under PCP(O) for proper grading of panels.

(5) Screed rail used to set grade for paving machine is not allowed past exterior girder as shown.

(12) 1 ½" End Cover on bars. (Typ)

(13) Space bars UP(#4) with girder bars R(#4) in all areas where measured haunch exceeds 3 ½" with Prestressed Concrete I-Girders. Epoxy coating for Bars UP is not required.

(14) 6" plus or minus.

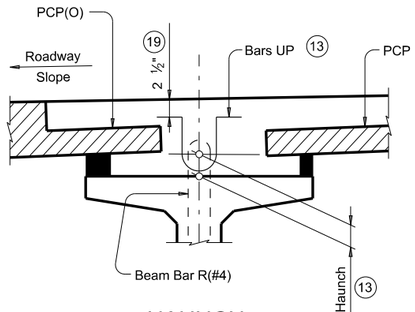
(15) Place sealing strip at flange edge as shown. Butt adjacent sealing strips longitudinally together with adhesive. Use pencil vibrators with concrete placement over girder and between sealing strips to avoid rupturing sealing strips. Cut sealing strips 2" higher than anticipated haunch thickness and compress to grade.

(16) (#3) Panel bars F must be field bent and welded to the R bars in girder. Two bars F per panel.

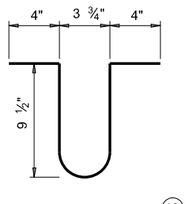
(17) Field placed bars that are allowed to be lapped. Reinforcing steel that protrudes from panels are not considered bars to be lapped. See "Material Notes" for applicable bar laps.

(18) ℄ Leveling Bolt Pad. 1" Dia Coil Rod or 1" Dia Coil Bolt shown, are furnished by the contractor. After grading each PCP(O) panel with the 1" Dia coil rods or coil bolts, secure each panel in its final resting position (plastic shims, welding, etc) and remove all 1" Dia coil rods or coil bolts for the cast-in-place concrete. Coil rods/bolts may be left in place at contractor's option. If coil rods/bolts are left in place, coil rods/bolts must have at least 2 ½" of cover to top of finish grade. Grading bolts are inadequate to carry all conceivable screed/construction loads. Panel support method must be calculated, location identified, and placed on shop drawings. Method chosen to support panels must be adequate for all construction loads. Panel support method must be placed/constructed after final grading and before screed rail placement.

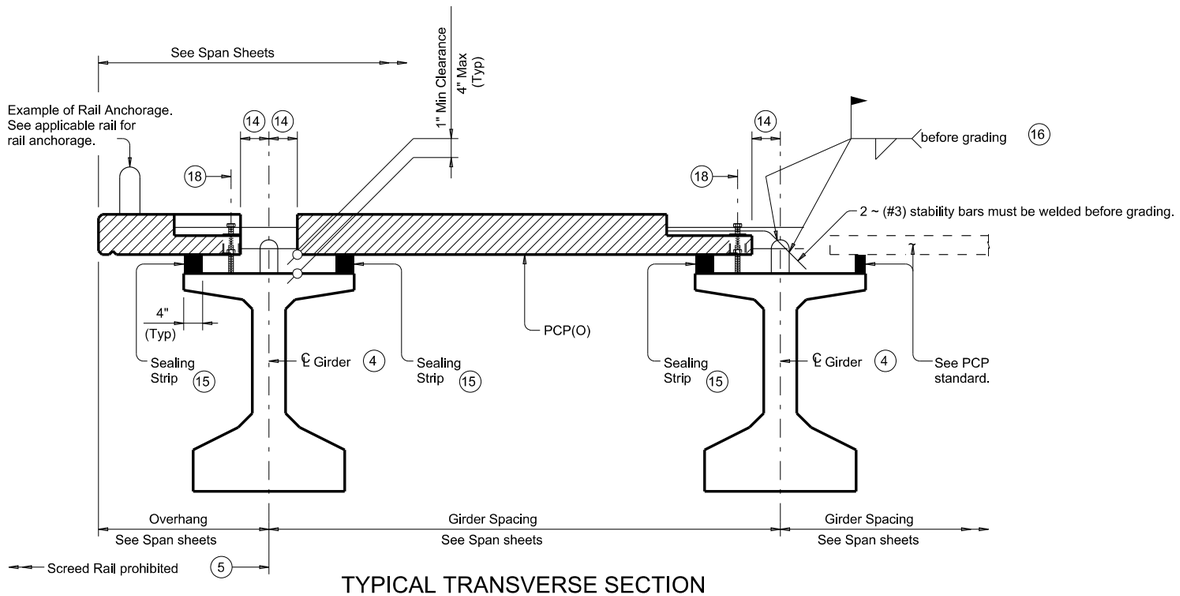
(19) Unless shown otherwise on Span Details.



HAUNCH REINFORCING DETAIL (4)



BARS UP (#4) (13)



TYPICAL TRANSVERSE SECTION

(Showing Girder Type Tx46)

CONSTRUCTION NOTES:

Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended.

Ensure proper cleaning of construction debris and consolidation of concrete mortar under the edges of the panels. Place sealing strips at girder flange edges so that adequate space is provided for the mortar to flow a minimum of 8" transversely under the panels as the slab concrete is placed.

Panel placement with Option 1 on the PCP standard is not allowed.

It is recommended to profile every 4 ft by surveying each girder under PCP(O) for proper grading of panels.

To allow the proper amount of mortar to flow between girder and panel, maintain a minimum vertical opening of 1". Roadway cross-slope reduces the opening available for entry of the mortar. Sealing strips vary in thickness along girder are therefore required.

Seal the top panel with a Class 4 sealant as shown in the Panel Layout.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement.

If the reinforcing steel is shown on the Span Details to be epoxy coated, then epoxy coat bars A, G, M, & T.

Provide bar laps, where required, as follows:

Uncoated ~ #4 = 1'-7"

Epoxy Coated ~ #4 = 2'-5"

Provide sealing strips comprised of one layer low density polyurethane (1.0 Lbs density) foam sealing strips or equivalent. Oversize the height of sealing strips by 2". Bond sealing strips to the girder with 3M Scotch ® 4693 or equivalent adhesive compatible with sealing strips.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

These details can be used as an option to construct the deck overhang when noted on the Span details and in conjunction with the PCP(O)-FAB, PCP and applicable Standard sheets.

These details are only applicable for Prestr Conc I-Girders.

Any additional reinforcement or concrete required on these details is subsidiary to the bid Item "Reinforced Concrete Slab".

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

HL93 LOADING SHEET 2 OF 2

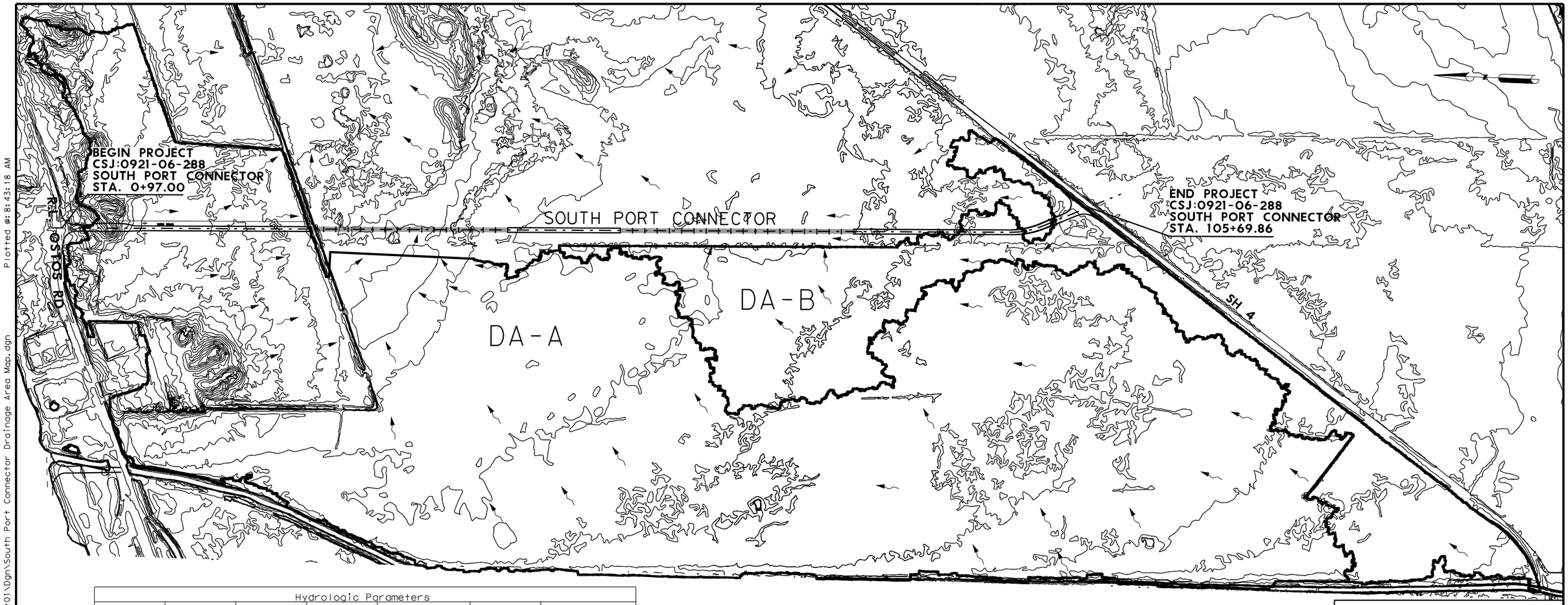
Texas Department of Transportation — Bridge Division

PRECAST CONCRETE PANELS FOR OVERHANGS

PCP(O)

FILE: pcpostd1-17.dgn	DN: KLM	CK: DVL	DW: JTR	CK: KLM
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		137

DATE:
FILE:



Hydrologic Parameters						
DA	AC	SQM	CN COMP	INITIAL ABSTRACTION	Tc, mins	LAG TIME, mins
DA-A	832	1.301	79.42	0.52	427	256.2
DA-B	177	0.276	80	0.5	479	287.4

24 - Hour Rainfall Depth Values for Cameron County		
Storm Frequency	Exceedance Probability	Rainfall Depths, in
2-year	50%	4.6
5-year	25%	6.3
10-year	10%	7.25
25-year	4%	9
50-year	2%	10
100-year	1%	12

Summary of the Resulting Peak Flows						
DA	SQM	CN COMP	Tc mins	LAG TIME, mins	25-YR FLOW, cfs	100 -YR FLOW, cfs
DA-A	1.301	79.42	427	256.2	628	875.5
DA-B	0.276	80	479	287.4	123	172
Total					751	1047.5

Hydraulic Table of Bridge A				
RAINFALL	FLOWS	HEADWATER	TAILWATER	VELOCITY
FREQ	cfs	Elev	Elev	Outlet, cfs
25	751	4.82	4.4	1.31
100	1047	4.99	4.6	1.38

LEGEND

- DRAINAGE AREA
- DRAINAGE AREA FLOW ARROW

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by FRANK H. CHAPA P.E. 128020, on May 17, 2019.

Frank H. Chapa

SOUTH PORT CONNECTOR

DRAINAGE AREA MAP

SCALE: PLAN 1"=1000'

RMA CAMERON REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

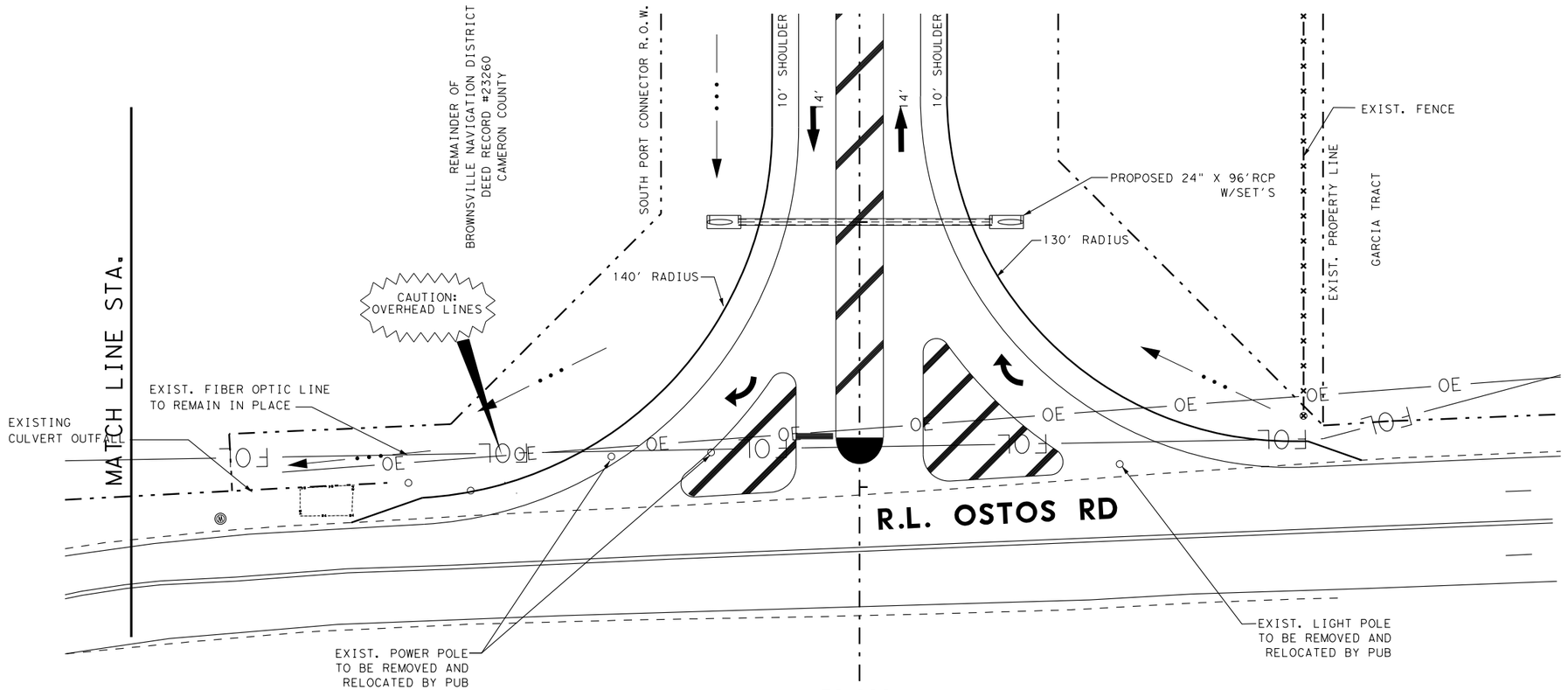
DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			138

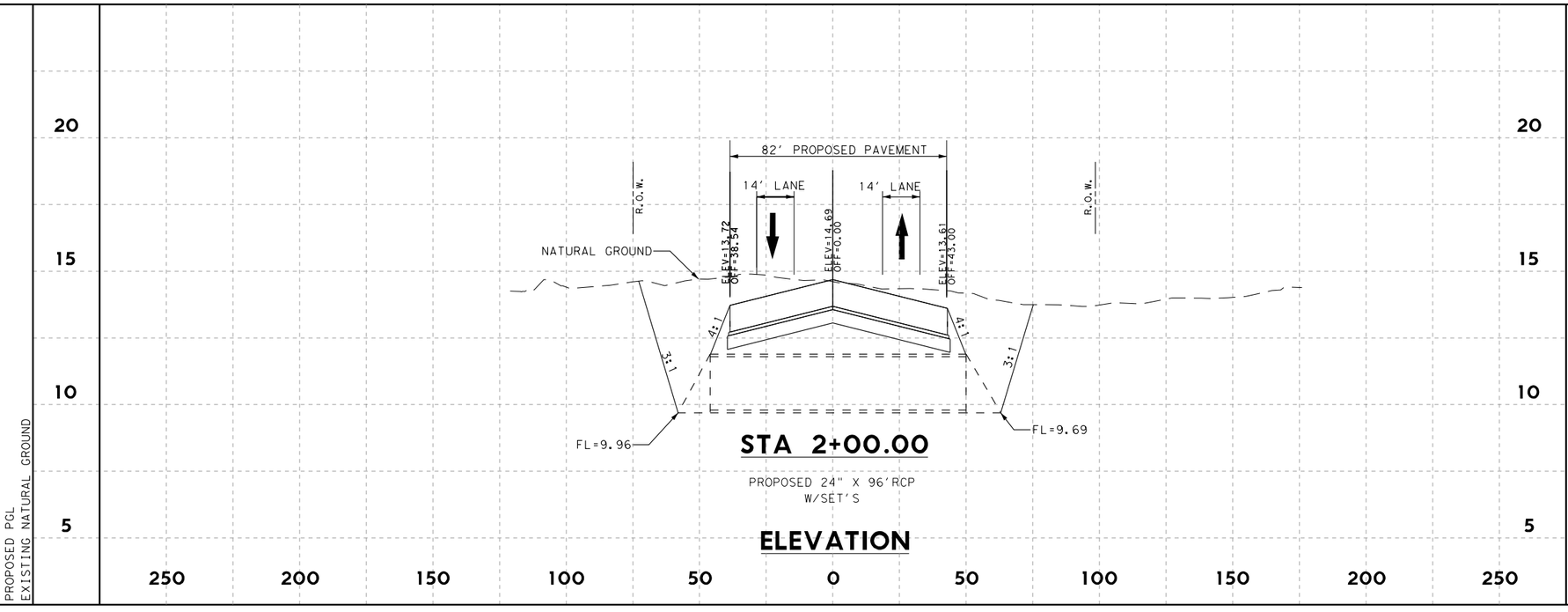
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/17/2019
Plotted @: 8:43:18 AM
Plotted by: salinab
Design Filename: n:\project\U2299\117 WA#17 (Port Connector)\500+PS&E\Plan Set-01\Dgn\South Port Connector Drainage Area Map.dgn

Plotted on: $DATE$
Plotted @: $TIME$



PLAN



STA 2+00.00

PROPOSED 24" X 96'RCP
W/SET'S

ELEVATION

LEGEND

- PROPOSED TRAFFIC DIRECTION
- EXISTING TRAFFIC DIRECTION
- FLOW DIRECTION
- GAS LINE
- FOL — FIBER OPTIC LINE
- OE — POWER LINE

NOTE:
ALL UTILITIES SHOWN ARE APPROXIMATE. COORDINATE WITH APPROPRIATE UTILITY OWNERS TO FIELD VERIFY THE ACTUAL HORIZONTAL AND VERTICAL LOCATIONS.

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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Frank H. Chapa

SOUTH PORT CONNECTOR

ROADWAY CULVERT LAYOUT

STA 2+00.00

SCALE: PLAN: 1"=50'
VERTICAL: 1"=5'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

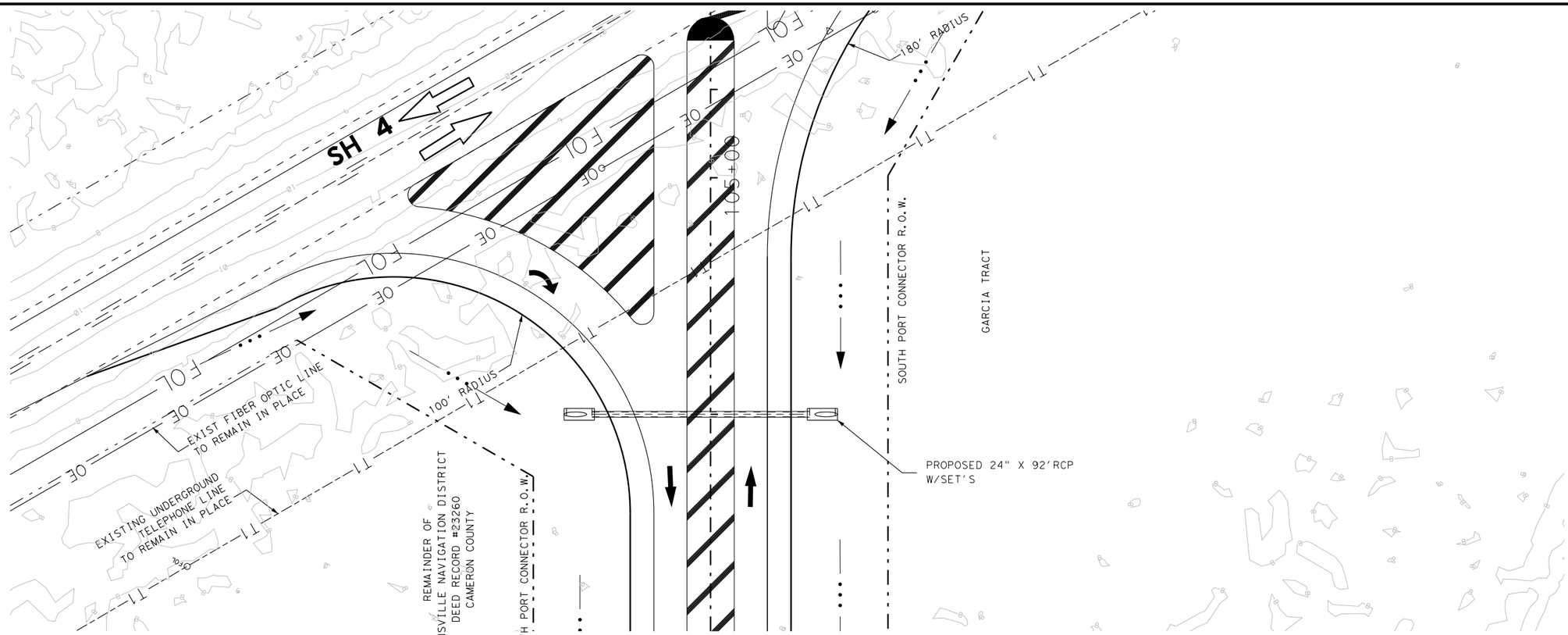
DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			139

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON

DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

Plotted by: $user$
Design Filename: $FILE$



PLAN

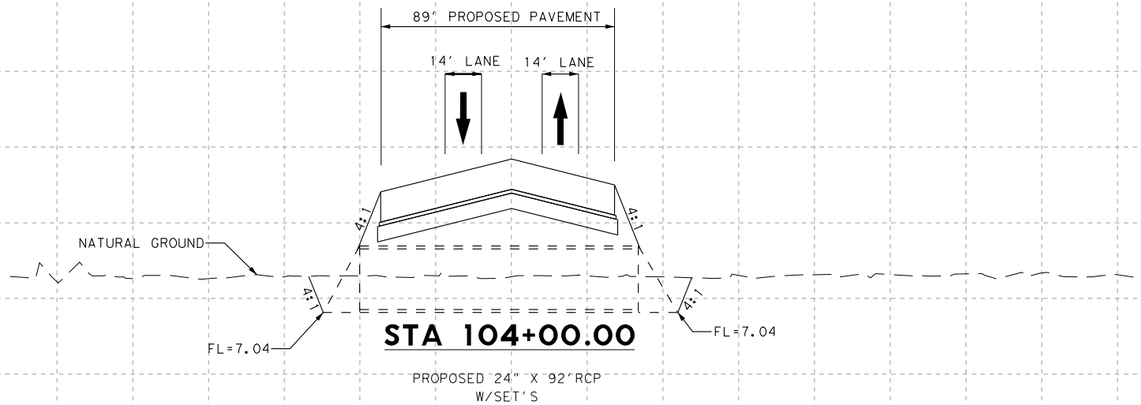
LEGEND

- PROPOSED TRAFFIC DIRECTION
- EXISTING TRAFFIC DIRECTION
- FLOW DIRECTION
- GAS LINE
- FOL FIBER OPTIC LINE
- OE POWER LINE

NOTE:
ALL UTILITIES SHOWN ARE APPROXIMATE. COORDINATE WITH APPROPRIATE UTILITY OWNERS TO FIELD VERIFY THE ACTUAL HORIZONTAL AND VERTICAL LOCATIONS.

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by FRANK H. CHAPA P.E. 128020, on May 17, 2019



ELEVATION

SOUTH PORT CONNECTOR

ROADWAY CULVERT LAYOUT

STA 104+00.00

SCALE: PLAN: 1"=50'
VERTICAL: 1"=5'

RMA CAMERON REGIONAL MOBILITY AUTHORITY

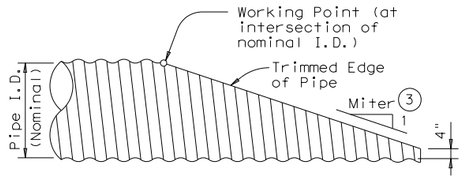
PORT OF BROWNSVILLE the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			140

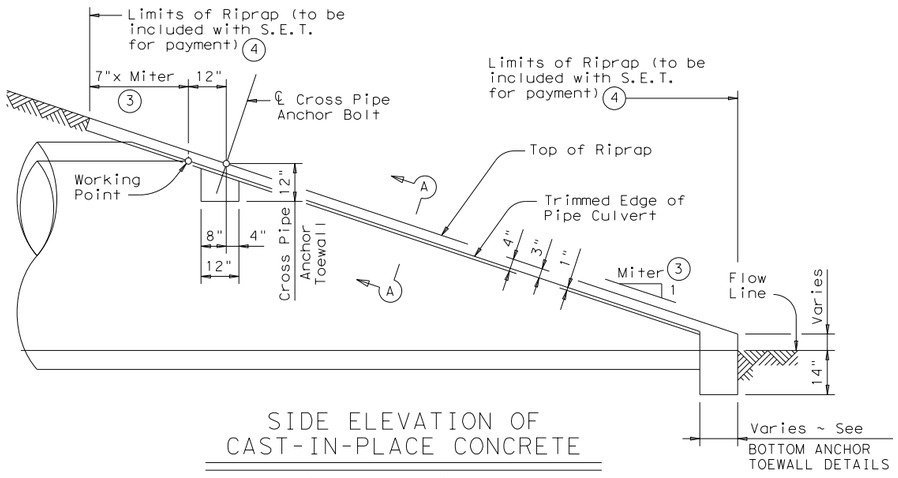
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR



NOTE: All Pipe Runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

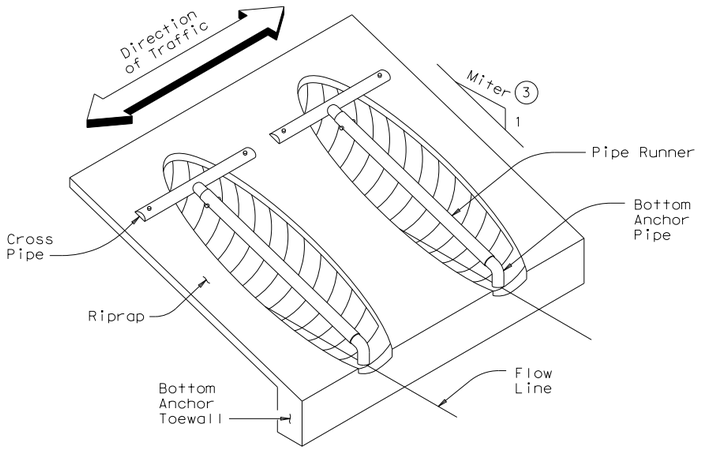
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing Corrugated Metal Pipe Culvert.
Details of Concrete Pipe Culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing Concrete Pipe Culvert.
Details of Corrugated Metal Pipe Culvert are similar.
Pipe Runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS & PIPE RUNNER LENGTHS (1)(2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1'- 7"	3'- 5"	N/A	N/A	N/A	5'-10"	N/A	N/A	N/A	8'- 1"	N/A	N/A	N/A	12'- 9"
27"	1'- 8"	3'- 8"	N/A	N/A	5'- 5"	6'-11"	N/A	N/A	7'- 7"	9'- 7"	N/A	N/A	11'-11"	14'-11"
30"	1'-10"	3'-11"	N/A	N/A	6'- 4"	8'- 0"	N/A	N/A	8'- 9"	11'- 0"	N/A	N/A	13'- 8"	17'- 0"
33"	1'-11"	4'- 2"	6'- 2"	6'- 5"	7'- 3"	9'- 1"	8'- 6"	8'-10"	10'- 0"	12'- 5"	13'- 3"	13'- 9"	15'- 5"	19'- 2"
36"	2'- 1"	4'- 5"	6'-11"	7'- 3"	8'- 2"	10'- 2"	9'- 6"	9'-11"	11'- 2"	13'-10"	14'- 9"	15'- 3"	17'- 2"	21'- 3"
42"	2'- 4"	4'-11"	8'- 6"	8'-10"	9'-11"	12'- 4"	11'- 7"	12'- 0"	13'- 6"	16'- 8"	17'- 9"	18'- 5"	20'- 8"	25'- 7"
48"	2'- 7"	5'- 5"	10'- 1"	10'- 5"	11'- 9"	N/A	13'- 7"	14'- 2"	15'-10"	N/A	20'- 9"	21'- 6"	24'- 2"	N/A
54"	3'- 0"	5'-11"	11'- 8"	12'- 1"	N/A	N/A	15'- 8"	16'- 3"	N/A	N/A	23'-10"	24'- 8"	N/A	N/A
60"	3'- 3"	6'- 5"	13'- 3"	N/A	N/A	N/A	17'- 9"	N/A	N/A	N/A	26'-10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (No Skew)	Always required
42" to 60"	Always required	Always required

STANDARD PIPE SIZES & MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10'- 0"
4" STD	4.500"	4.026"	19'- 8"
5" STD	5.563"	5.047"	34'- 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Size of Pipe Runner shall be as shown in the tables. Cross Pipe shall be the same size as the Pipe Runner. Cross Pipe Stub Out and Bottom Anchor Pipe shall be the next smaller size pipe as shown in the STANDARD PIPE SIZES table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT "Roadway Design Manual".

(3) Miter = Slope of Mitered Pipe Culvert End

(4) Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".

(5) Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple Pipe Culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

DATE:
FILE:

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

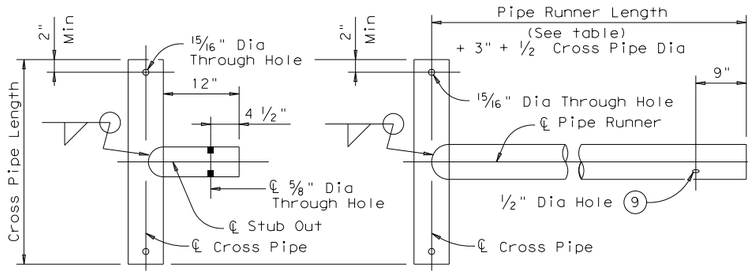
SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

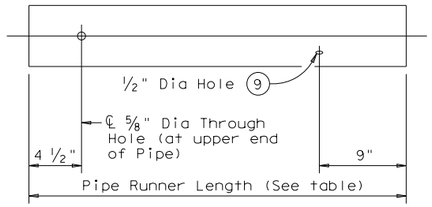
FILE: setpcdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		141

DATE:
FILE:



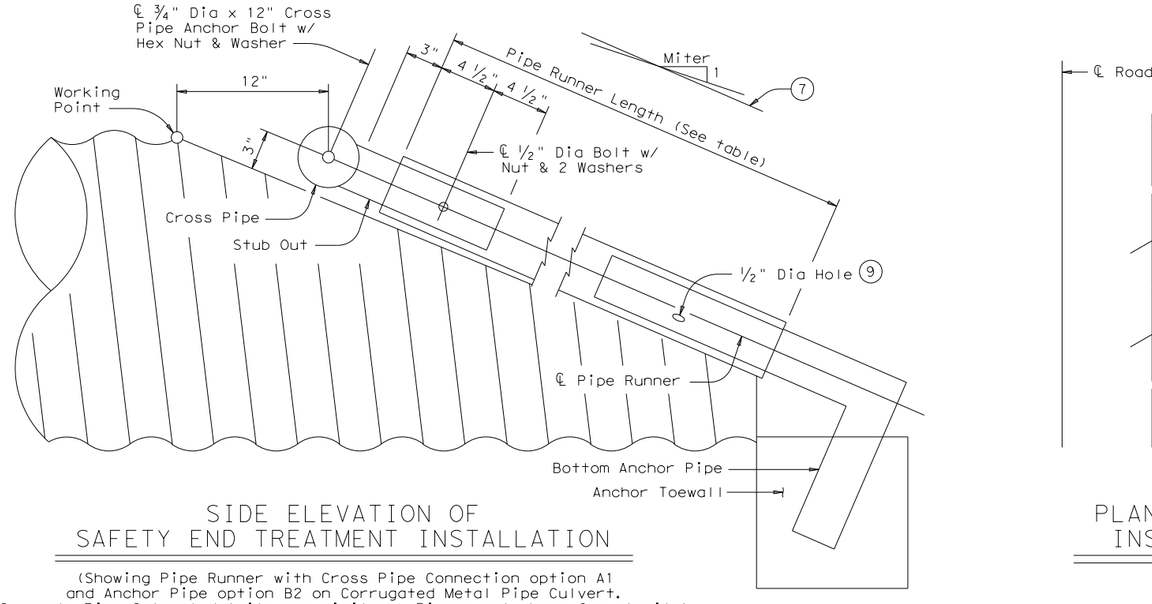
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



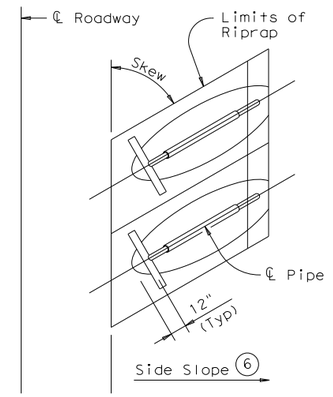
NOTE: The separate Pipe Runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

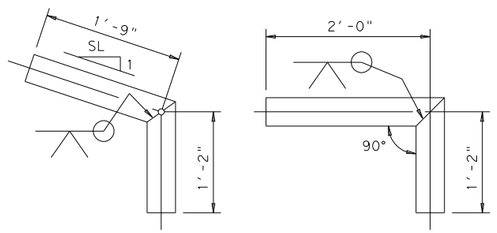


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing Pipe Runner with Cross Pipe Connection option A1 and Anchor Pipe option B2 on Corrugated Metal Pipe Culvert. Concrete Pipe Culvert details are similar. Riprap not shown for clarity)

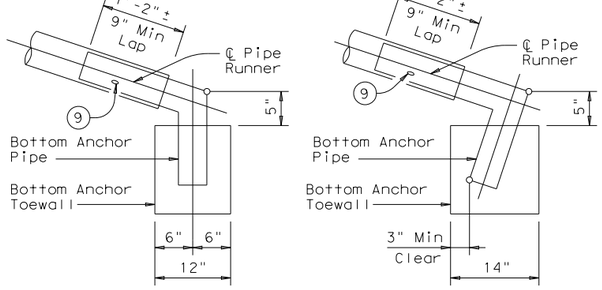


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

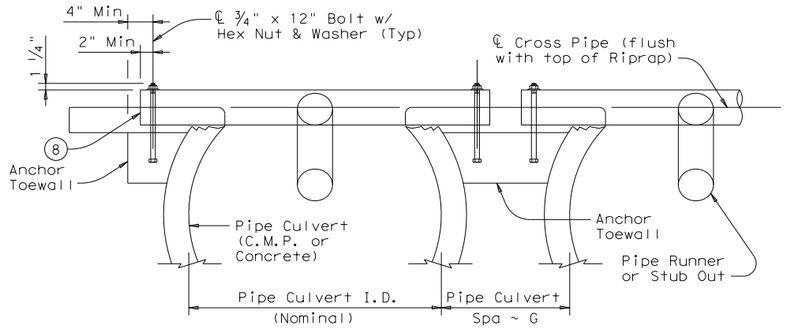
BOTTOM ANCHOR PIPE DETAILS (10)



OPTION B1 OPTION B2

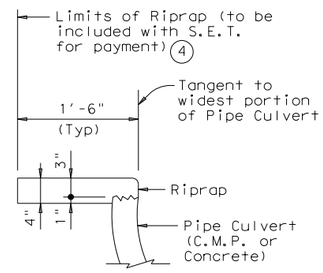
BOTTOM ANCHOR TOEWALL DETAILS

(Culvert & Riprap not shown for clarity)



SHOWING CROSS PIPE & ANCHOR TOEWALL

SECTION A-A



SHOWING TYPICAL PIPE CULVERT & RIPRAP

(4) Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".

(6) Recommended values of side slope are 3:1, 4:1, & 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of Pipe Runner may vary slightly from Side Slope of Riprap and trimmed Culvert Pipe edge.

(8) Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, the 1/2" hole shall be inspected to ensure that the lap of the Pipe Runner with the Bottom Anchor Pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the Runner) may be substituted for the mitered and welded joint in the Bottom Anchor Pipe.

GENERAL NOTES:

Pipe Runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

The Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Pipe Runners.

Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

Pipe Runners, Cross Pipes, and Anchor Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Bolts and nuts shall conform to ASTM A307.

All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

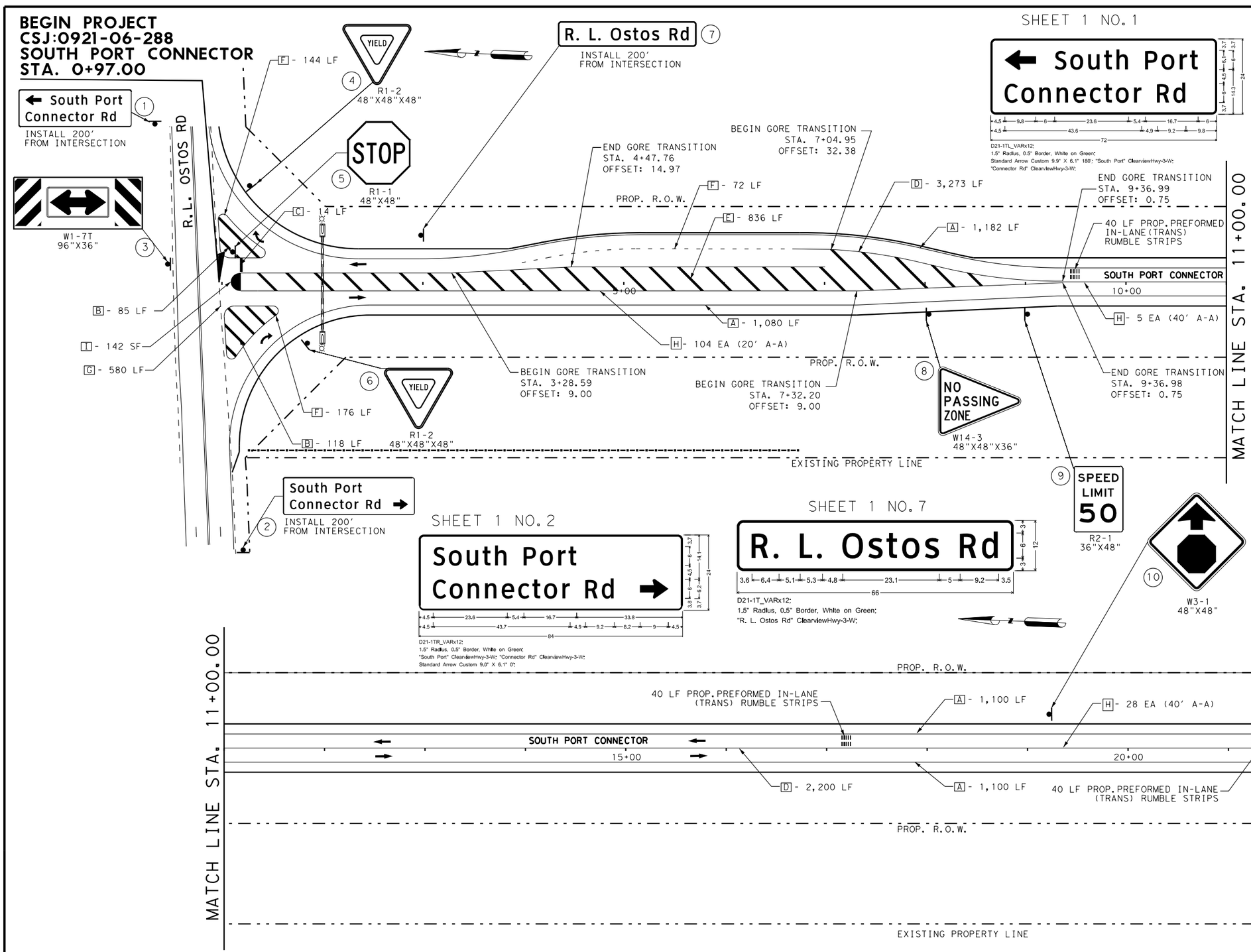
FILE: setpcdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		142

BEGIN PROJECT
CSJ:0921-06-288
SOUTH PORT CONNECTOR
STA. 0+97.00

SHEET 1 NO. 1

SHEET 1 NO. 2

SHEET 1 NO. 7



LEGEND

PAVEMENT MARKINGS (TYPE I-REFLECTIVE)

- A (W)(4")(SLD)
- B (W)(12")(SLD)
- C (W)(24")(SLD)
- D (Y)(4")(SLD)
- E (Y)(12")(SLD)
- F (W)(8")(SLD)
- G ELIM EXT PAV MRK&MRKS (4")
- I (Y)(ISLAND)(SLD)
- INST OM ASSM (OM-2Z)(FLX)GND
- DEL ASSM (D-SW)SZ(TY C)(CTB)(BI)
- PREFORMED IN-LANE(TRANS) RUMBLE STRIP

RAISED PAVEMENT MARKERS (REFLECTIVE CL B)

- H REFL PAV MRK TYII A-A

SIGNING

- PROPOSED SIGN POST
- ## PROPOSED SIGN NUMBER

NOTE:
FOR RUMBLE STRIP DETAILS, REFER TO STANDARD SHEET RS(5)-13.

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by FRANK H. CHAPA P.E. 128020, on May 17, 2019

Frank H. Chapa

SOUTH PORT CONNECTOR

SIGNS & PAVEMENT MARKING LAYOUT

STA 0+97.00 TO STA 22+00.00

SHEET 1 OF 5
SCALE: PLAN: 1"=100'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

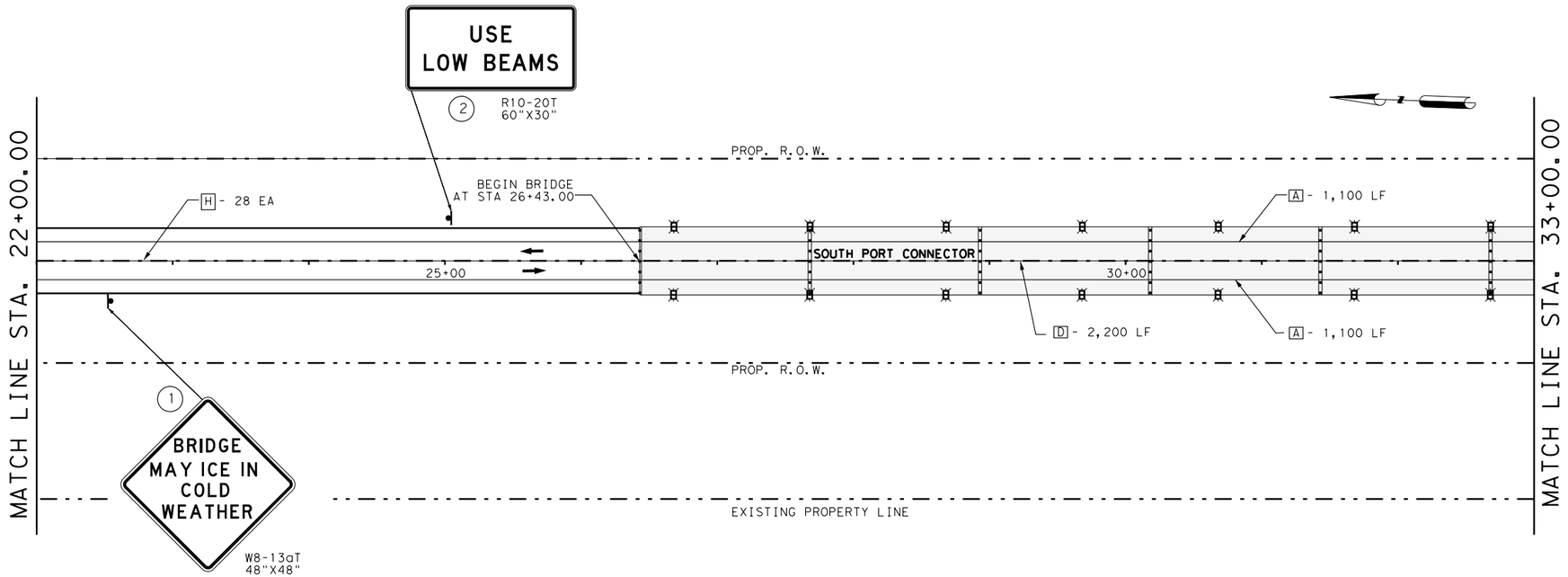
S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

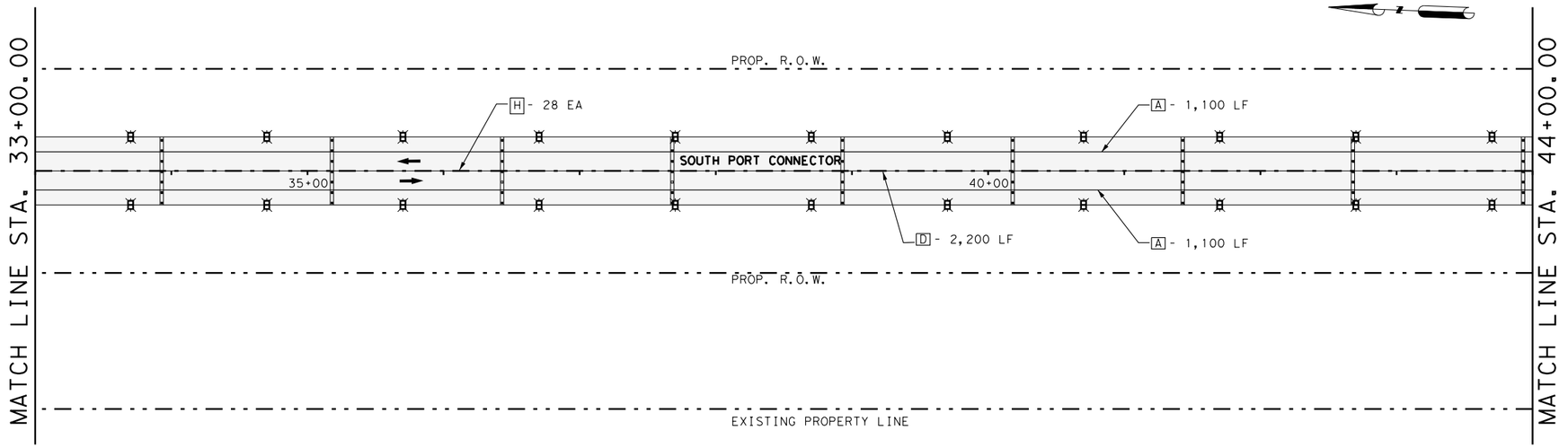
DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			143

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/17/2019
Plotted @: 8:43:25 AM
Plotted by: salinab
Design Filename: n:\project\u2299\117 WA#17 (Port Connector)\500*PS&E\PlanSet01\Dgn\South Port Connector*PMP*01.dgn





LEGEND

PAVEMENT MARKINGS (TYPE I-REFLECTIVE)

- A (W)(4")(SLD)
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- C (W)(24")(SLD)
- D (Y)(4")(SLD)
- E (Y)(12")(SLD)
- F (W)(8")(SLD)
- G ELIM EXT PAV MRK&MRKS (4")
- I (Y)(ISLAND)(SLD)

INST OM ASSM (OM-2Z)(FLX)GND

DEL ASSM (D-SW)SZ(TY C)(CTB)(BI)

PREFORMED IN-LANE(TRANS) RUMBLE STRIP

RAISED PAVEMENT MARKERS (REFLECTIVE CL B)

- H REFL PAV MRK TYII A-A

SIGNING

- PROPOSED SIGN POST
- ## PROPOSED SIGN NUMBER

NOTE:
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STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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Frank H. Chapa

SOUTH PORT CONNECTOR

SIGNS & PAVEMENT MARKING LAYOUT

STA 22+00.00 TO STA 44+00.00

SHEET 2 OF 5
SCALE: PLAN: 1"=100'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			144

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB / HIGHWAY NO.
CHK DWG:	0921	06	288 / SOUTH PORT CONNECTOR

Plotted on: 5/17/2019
Plotted @: 8:43:25 AM
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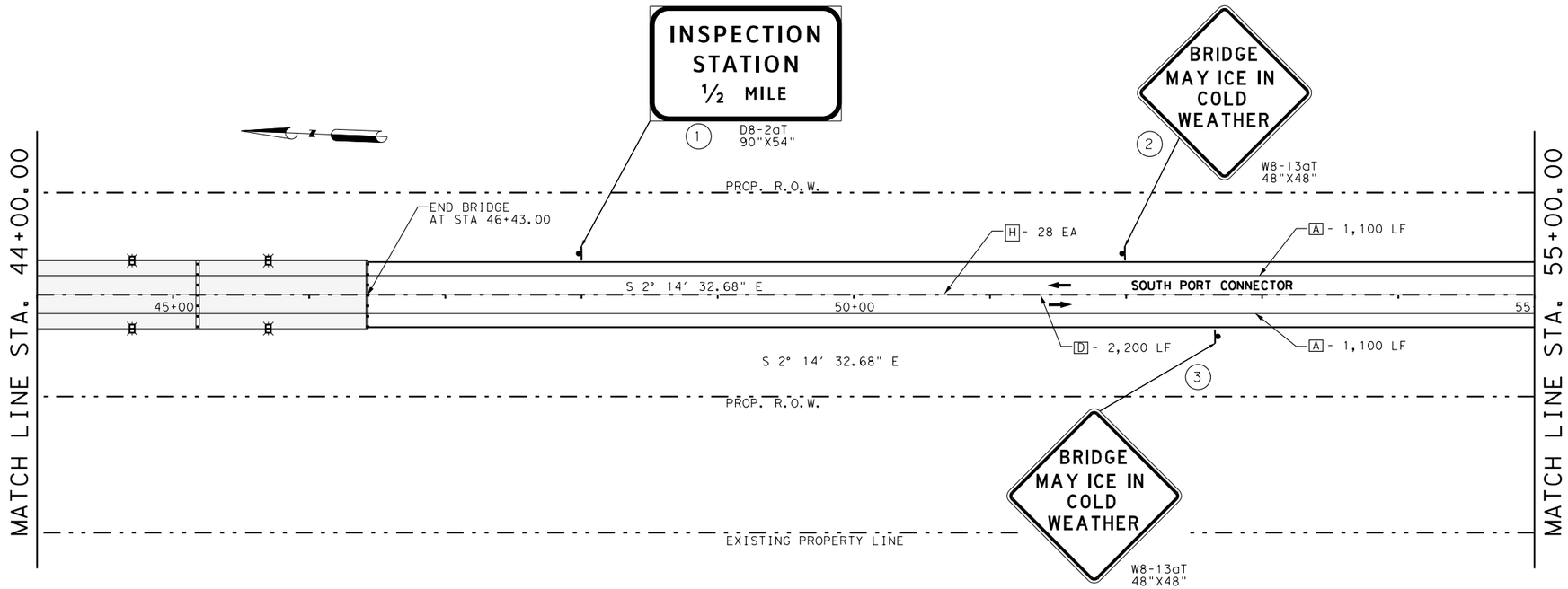

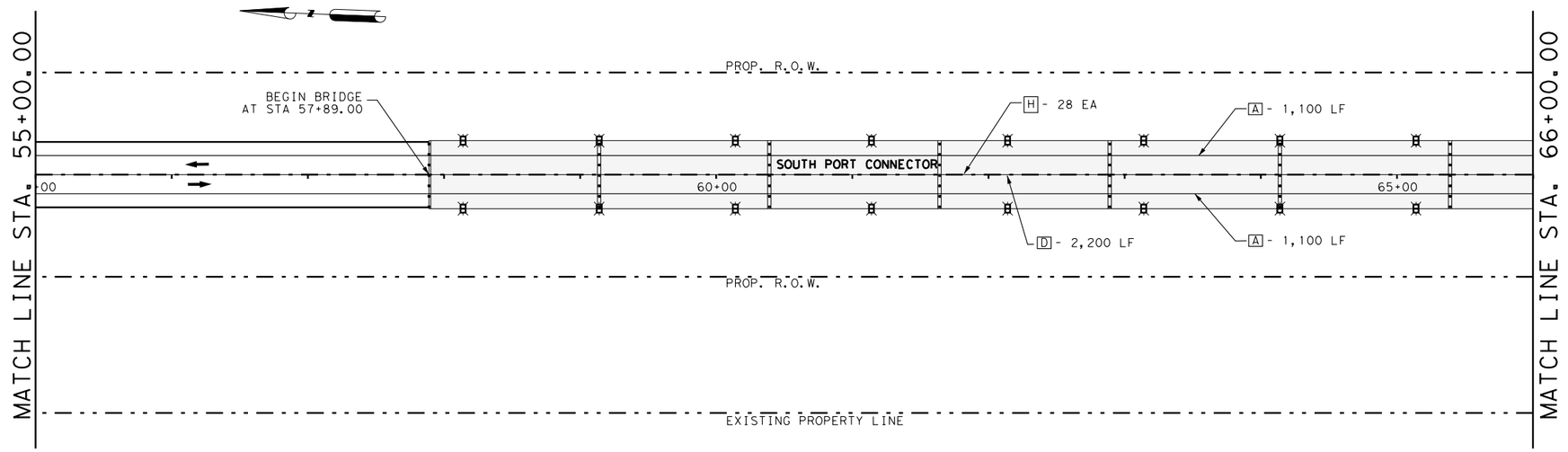

LEGEND

PAVEMENT MARKINGS (TYPE I-REFLECTIVE)

- A (W)(4")(SLD)
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- C (W)(24")(SLD)
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- E (Y)(12")(SLD)
- F (W)(8")(SLD)
- G ELIM EXT PAV MRK&MRKS (4")
- I (Y)(ISLAND)(SLD)
- INST OM ASSM (OM-2Z)(FLX)GND
- DEL ASSM (D-SW)SZ(TY C)(CTB)(BI)
- PREFORMED IN-LANE(TRANS) RUMBLE STRIP

RAISED PAVEMENT MARKERS (REFLECTIVE CL B)

- H REFL PAV MRK TYII A-A

SIGNING

- PROPOSED SIGN POST
- PROPOSED SIGN NUMBER

NOTE:
FOR RUMBLE STRIP DETAILS, REFER TO STANDARD SHEET RS(5)-13.

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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Frank H. Chapa

SOUTH PORT CONNECTOR

SIGNS & PAVEMENT MARKING LAYOUT

STA 44+00.00 TO STA 66+00.00

SHEET 3 OF 5
SCALE: PLAN: 1"=100'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			145

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/17/2019
Plotted @: 8:43:26 AM
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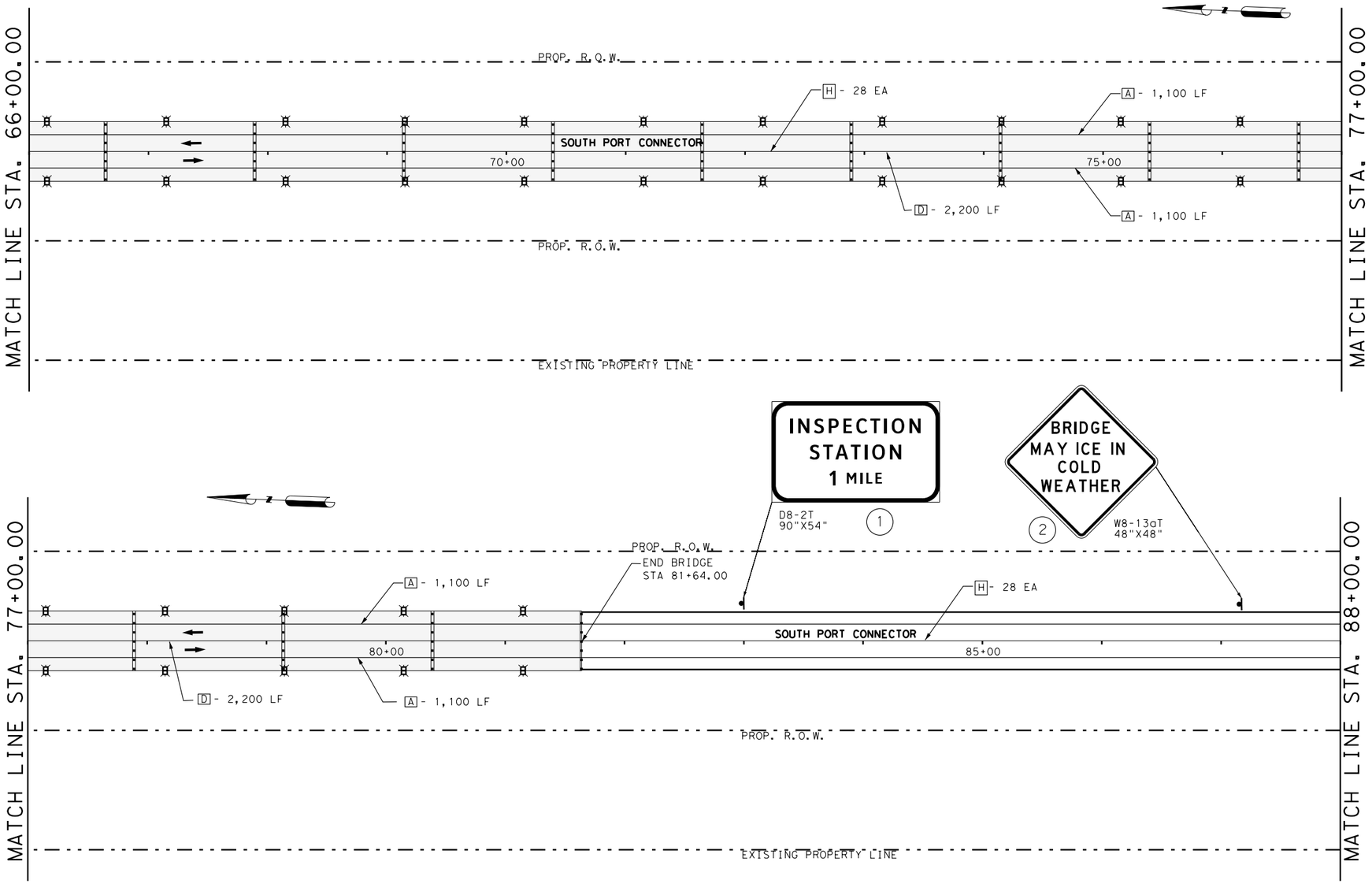

LEGEND

PAVEMENT MARKINGS (TYPE I-REFLECTIVE)

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- C (W)(24")(SLD)
- D (Y)(4")(SLD)
- E (Y)(12")(SLD)
- F (W)(8")(SLD)
- G ELIM EXT PAV MRK&MRKS (4")
- I (Y)(ISLAND)(SLD)
- INST OM ASSM (OM-2Z)(FLX)GND
- DEL ASSM (D-SW)SZ(TY C)(CTB)(BI)
- PREFORMED IN-LANE(TRANS) RUMBLE STRIP

RAISED PAVEMENT MARKERS (REFLECTIVE CL B)

- H REFL PAV MRK TYII A-A

SIGNING

- PROPOSED SIGN POST
- ## PROPOSED SIGN NUMBER

NOTE:
FOR RUMBLE STRIP DETAILS, REFER TO STANDARD SHEET RS(5)-13.

STATE OF TEXAS
FRANK H. CHAPA
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Frank H. Chapa

SOUTH PORT CONNECTOR

SIGNS & PAVEMENT MARKING LAYOUT

STA 66+00.00 TO STA 88+00.00

SHEET 4 OF 5
SCALE: PLAN: 1"=100'

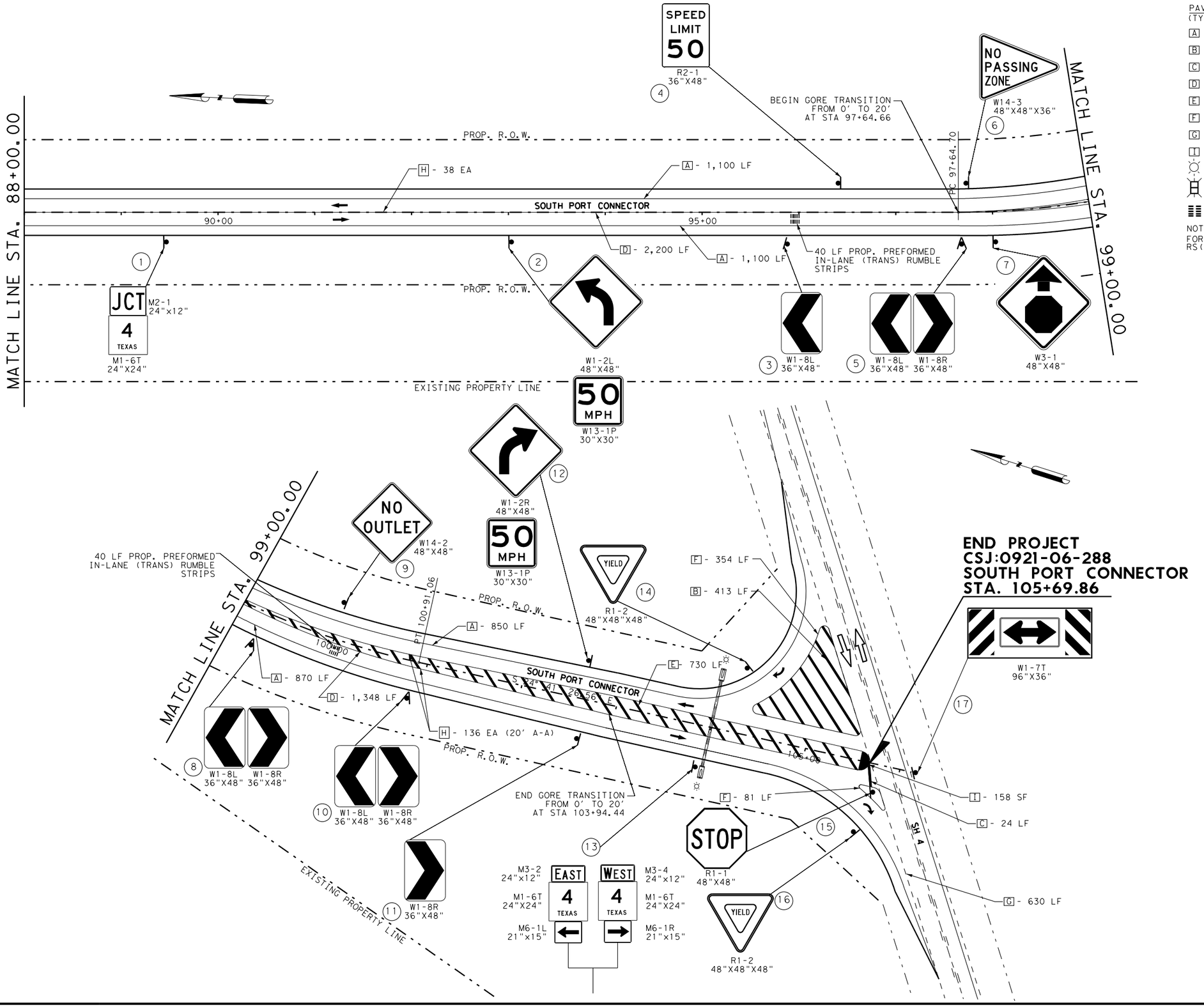
RMA CAMERON REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6				146
DGN: JS	STATE	DIST.	COUNTY	
CHK DGN: FC	TEXAS	PHARR	CAMERON	
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR



LEGEND

PAVEMENT MARKINGS (TYPE I-REFLECTIVE)

- A (W)(4")(SLD)
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- E (Y)(12")(SLD)
- F (W)(8")(SLD)
- G ELIM EXT PAV MRK&MRKS (4")
- I (Y)(ISLAND)(SLD)
- INST OM ASSM (OM-2Z)(FLX)GND
- DEL ASSM (D-SW)SZ(TY C)(CTB)(BI)
- PREFORMED IN-LANE(TRANS) RUMBLE STRIP

RAISED PAVEMENT MARKERS (REFLECTIVE CL B)

- H REFL PAV MRK TYII A-A

SIGNING

- PROPOSED SIGN POST
- ## PROPOSED SIGN NUMBER

NOTE:
FOR RUMBLE STRIP DETAILS, REFER TO STANDARD SHEET RS(5)-13.

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by FRANK H. CHAPA P.E. 128020, on May 17, 2019.

Frank H. Chapa

SOUTH PORT CONNECTOR

SIGNS & PAVEMENT MARKING LAYOUT

STA 88+00.00 TO STA 105+69.86

SHEET 5 OF 5
SCALE: PLAN: 1"=100'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			147
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/17/2019
Plotted @: 8:43:27 AM
Plotted by: salinab
Design Filename: n:\project\u2299\117 WA#17 (Port Connector)\500*PS&E\PlanSet01\Dgn\South Port Connector*PMP*05.dgn

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	STATION (LT OR RT)	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1 OF 5	1		D21-1TL	← South Port Connector Rd	72" X 24"	X		S80	1	SA	T		
	2		D21-1TR	South Port Connector Rd →	84" X 24"	X		S80	1	SA	T		
	3		W1-7T	CHEVRON/TWO-DIRECTION LARGE ARROW	96" X 36"	X		S80	1	SA	T		
	4		R1-2	YIELD	48" X 48"X 48"	X		10BWG	1	SA	P		
	5		R1-1	STOP	48" X 48"	X		10BWG	1	SA	P		
	6		R1-2	YIELD	48" X 48"X 48"	X		10BWG	1	SA	P		
	7		D21-1T	R. L. Ostos Rd	66" X 12"	X		S80	1	SA	T		
	8		W14-3	NO PASSING ZONE	48" X 48"X 36"	X		10BWG	1	SA	P		
	9		R2-1	SPEED LIMIT 50	36" X 48"	X		10BWG	1	SA	T		
	10		W3-1	STOP AHEAD	48" X 48"	X		10BWG	1	SA	T		
2 OF 5	1		W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	48" X 48"	X		10BWG	1	SA	T		
	2		R10-20T	USE LOW BEAMS	60" X 30"	X		10BWG	1	SA	T		
3 OF 5	1		D8-2aT	INSPECTION STATION 1/2 MILE	90" X 54"	X		10BWG	1	SA	T		
	2		W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	48" X 48"	X		10BWG	1	SA	T		
	3		W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	48" X 48"	X		10BWG	1	SA	T		
4 OF 5	1		D8-2T	INSPECTION STATION 1/2 MILE	90" X 54"	X		10BWG	1	SA	T		
	2		W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	48" X 48"	X		10BWG	1	SA	T		
5 OF 5	1		M2-1	JCT	24" X 12"	X		10BWG	1	SA	T		
			M1-6T	SH 4	24" X 24"								
	2		W1-2L	CURVE	48" X 48"	X		10BWG	1	SA	T		
			W13-1P	50 MPH	48" X 48"								
	3		W1-8L	CHEVRON LEFT	36" X 48"	X		10BWG	1	SA	T		
	4		R2-1	SPEED LIMIT 50	36" X 48"	X		10BWG	1	SA	T		
	5		W1-8L	CHEVRON LEFT (BK-BK)	36" X 48"	X		10BWG	1	SA	T		
			W1-8R	CHEVRON RIGHT	36" X 48"	X							
	6		W14-3	NO PASSING ZONE	48" X 48"X 36"	X		10BWG	1	SA	P		
	7		W3-1	STOP AHEAD	48" X 48"	X		10BWG	1	SA	T		
	8		W1-8L	CHEVRON LEFT (BK-BK)	36" X 48"	X		10BWG	1	SA	T		
			W1-8R	CHEVRON RIGHT	36" X 48"	X							
	9		W14-2	NO OUTLET	48" X 48"	X		10BWG	1	SA	T		
	10		W1-8L	CHEVRON LEFT (BK-BK)	36" X 48"	X		10BWG	1	SA	T		
			W1-8R	CHEVRON RIGHT	36" X 48"	X							
	11		W1-8R	CHEVRON RIGHT	36" X 48"	X		10BWG	1	SA	T		
	12		W1-2R	CURVE	48" X 48"	X		10BWG	1	SA	T		
			W13-1P	50 MPH	48" X 48"								
	13		M3-2	EAST	24" X 12"	X		10BWG	1	SA	U		
			M1-6T	SH 4	24" X 24"	X							
			M6-1L	←	21" X 15"	X							
			M3-4	WEST	24" X 12"	X							
			M1-6T	SH 4	24" X 24"	X							
			M6-1R	→	21" X 15"	X							
	14		R1-2	YIELD	48" X 48"X 48"	X		10BWG	1	SA	P		
	15		R1-1	STOP	48" X 48"	X		10BWG	1	SA	P		
	16		R1-2	YIELD	48" X 48"X 48"	X		10BWG	1	SA	P		
	17		W1-7T	CHEVRON/TWO-DIRECTION LARGE ARROW	96" X 36"	X		S80	1	SA	T		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
4-16	DIST	COUNTY		SHEET NO.
8-16	PHR	CAMERON		148

18

DATE: 5/17/2019 8:43:28 AM
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DATE:
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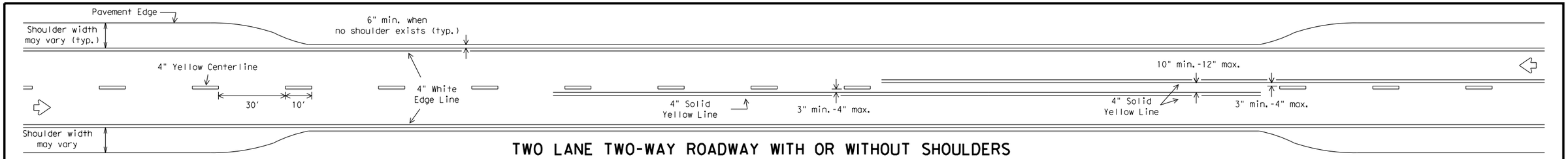
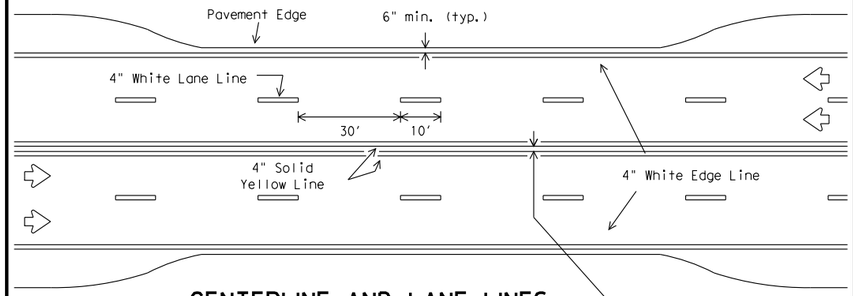
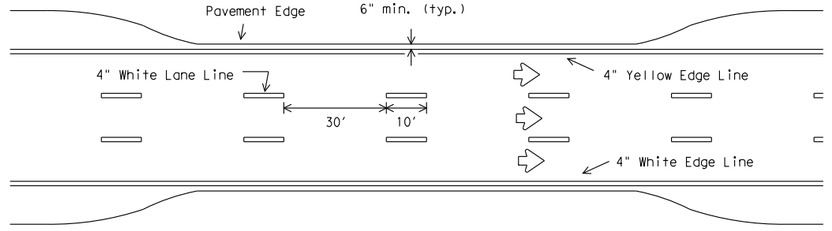


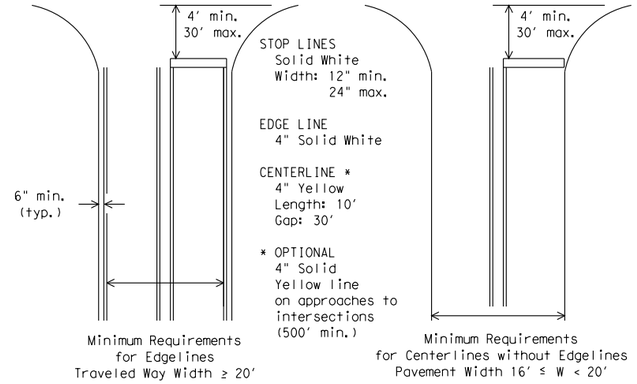
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

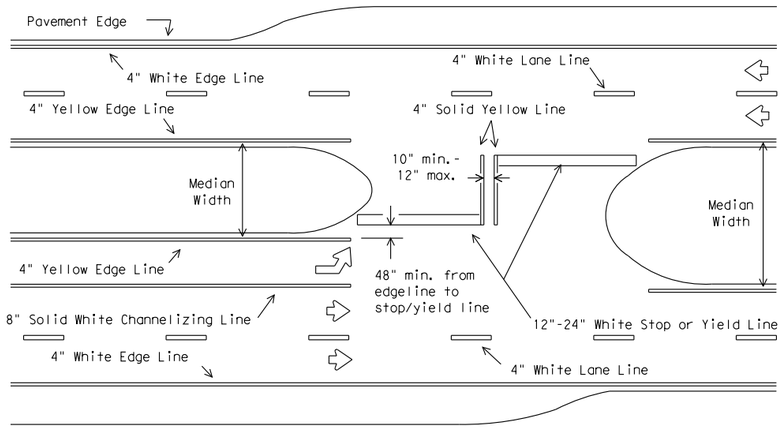


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



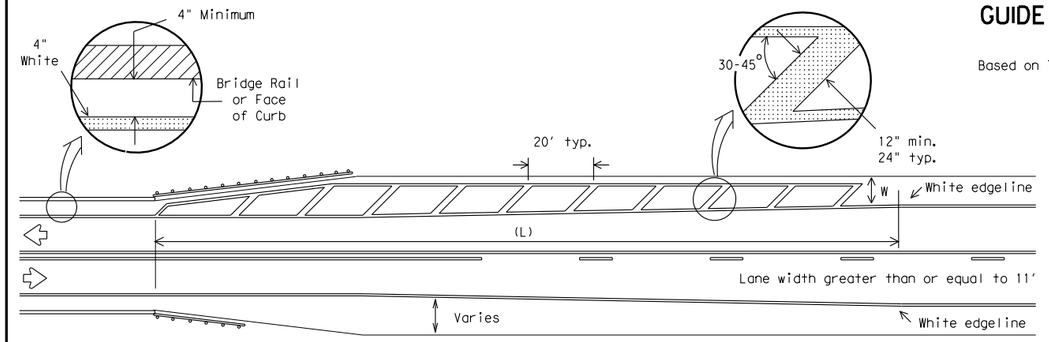
GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways



All medians shall be field measured to determine the location of necessary striping. Stop/Yield bars and centerlines shall be placed when the median width is greater than 30 ft. The median width is defined as the area between two roadways of a divided highway measured from edge of traveled way to edge of traveled way. The median excludes turn lanes. The median width might be different between intersections, interchanges and of opposite approaches of the same intersection. The narrow median width will be the controlling width to determine if markings are required.

FOUR LANE DIVIDED ROADWAY INTERSECTIONS



NOTES:

1. No-passing zone on bridge approach is optional but if used, it shall be a minimum 500 feet long.
2. For crosshatching length (L) see Table 1.
3. The width of the offset (W) and the required crosshatching width is the full shoulder width in advance of the bridge.
4. The crosshatching is not required if delineators or barrier reflectors are used along the structure.
5. For guard fence details, refer elsewhere in the plans.

ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

TABLE 1 - TYPICAL LENGTH (L)

Posted Speed *	Formula
≤ 40	$L = \frac{WS^2}{60}$
≥ 45	L=WS

* 85th Percentile Speed may be used on roads where traffic speeds normally exceed the posted speed limit. Crosshatching length should be rounded up to nearest 5 foot increment.

L=Length of Crosshatching (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

EXAMPLES:

An 8 foot shoulder in advance of a bridge reduces to 4 feet on a 70 MPH roadway. The length of the cross-hatching should be:

$L = 8 \times 70 = 560$ ft.

A 4 foot shoulder in advance of a bridge reduces to 2 feet on a 40 MPH roadway. The length of the cross-hatching should be:

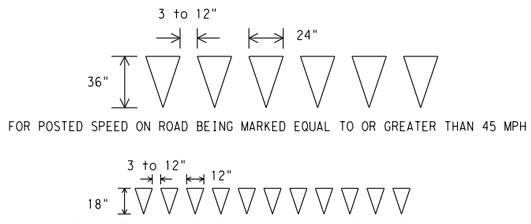
$L = 4(40)^2 / 60 = 106.67$ ft. rounded to 110 ft.

GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should typically be placed a minimum of 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel and not the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



YIELD LINES

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-12

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
8-95 2-12	CONT	SECT	JOB	HIGHWAY
5-00	0921	06	288	SOUTH PORT CONNECTOR
8-00	DIST	COUNTY		SHEET NO.
3-03	PHR	CAMERON		149

22A

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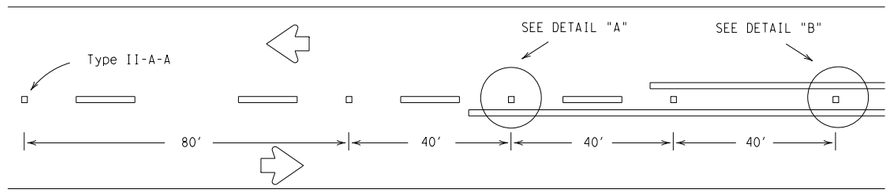
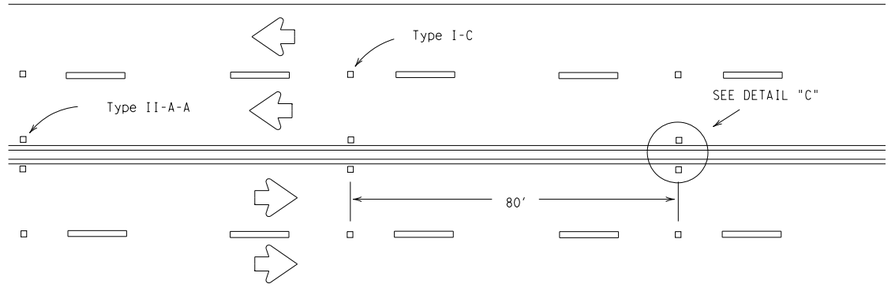
DATE:
FILE:

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

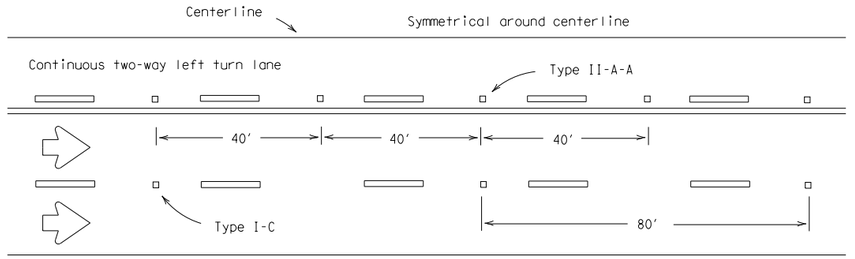


CENTERLINE FOR ALL TWO LANE ROADWAYS

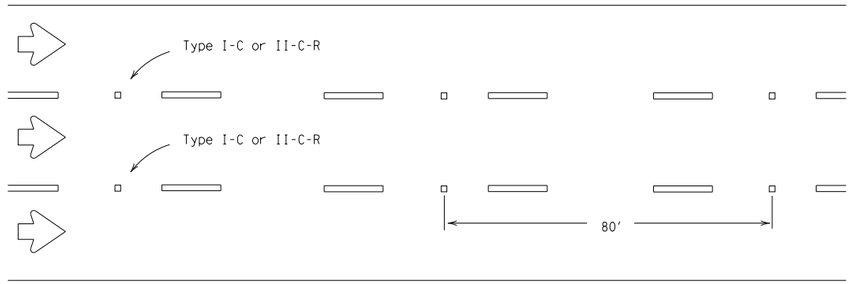


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS

Raised pavement marker Type I-C, clear face toward normal traffic, shall be placed on 80-foot centers.

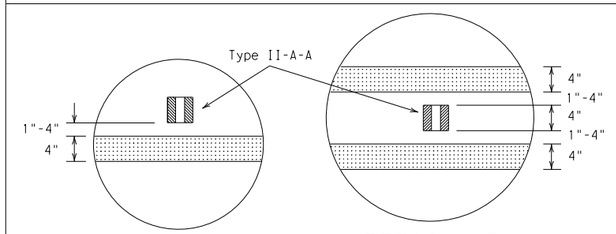


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



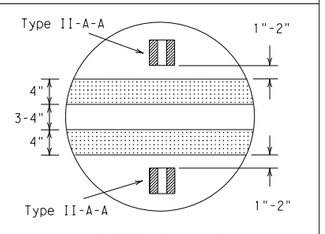
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

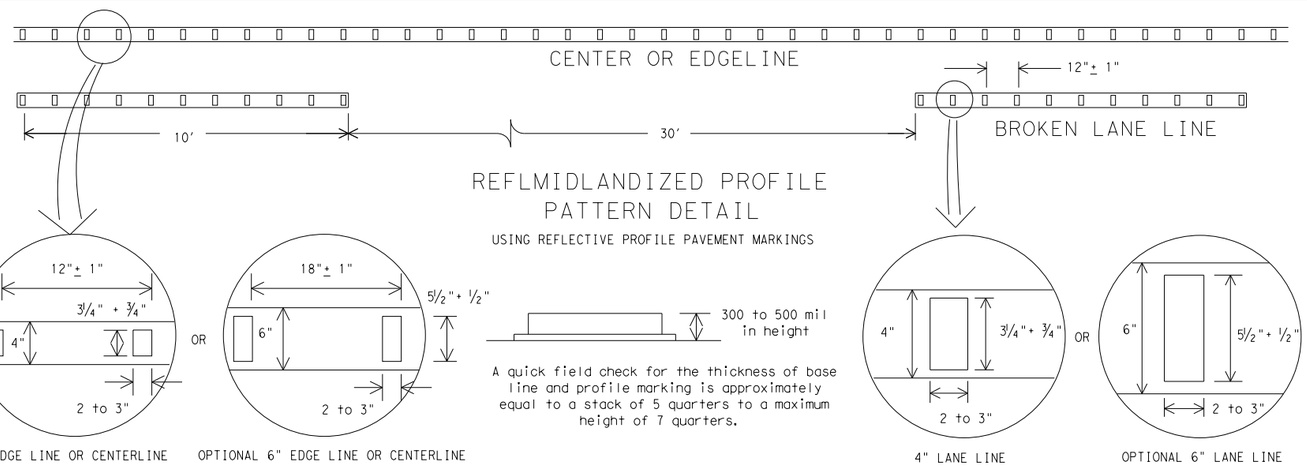


DETAIL "A"

DETAIL "B"



DETAIL "C"



4" EDGE LINE OR CENTERLINE

OPTIONAL 6" EDGE LINE OR CENTERLINE

4" LANE LINE

OPTIONAL 6" LANE LINE

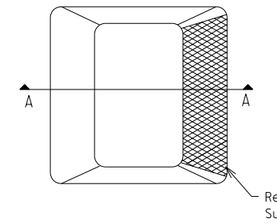
NOTE:
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

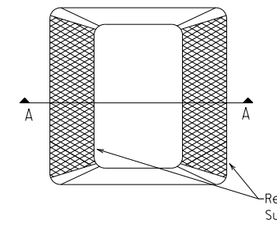
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLMIDLANDIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

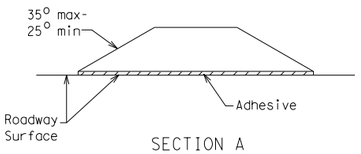
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

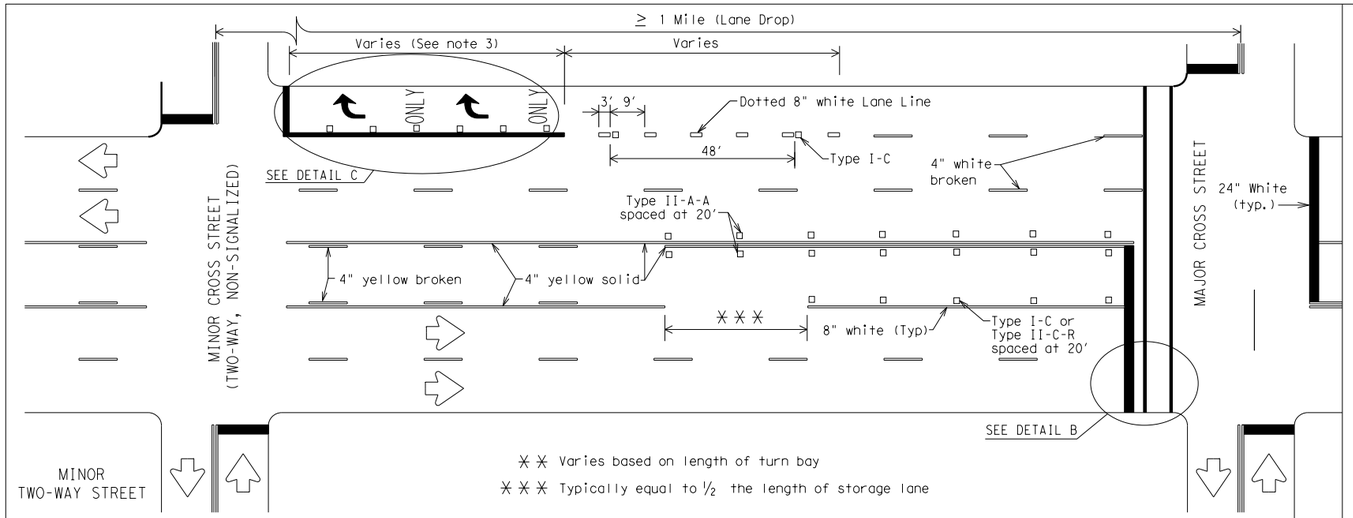
Texas Department of Transportation
Traffic Operations Division

POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS

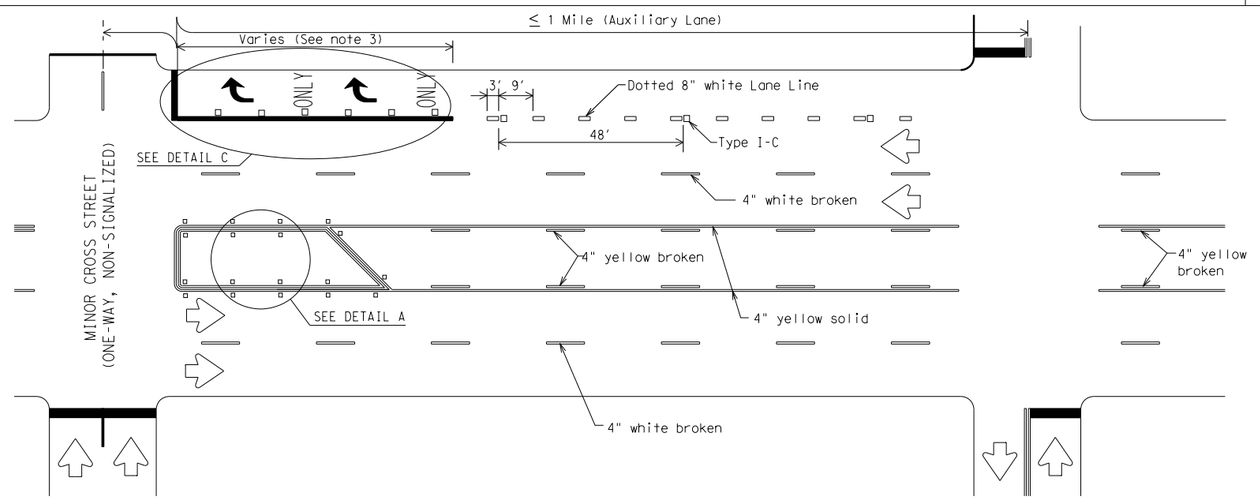
PM(2)-12

REVISIONS		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
4-92	2-10	CONT	SECT	JOB	HIGHWAY
5-00	2-12	0921	06	288	SOUTH PORT CONNECTOR
8-00		DIST	COUNTY		SHEET NO.
2-08		PHR	CAMERON		150

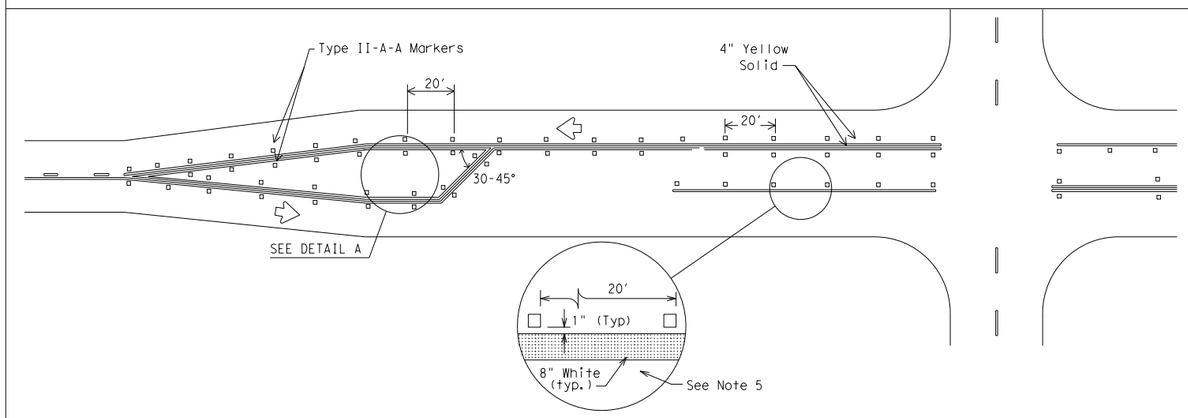
22B



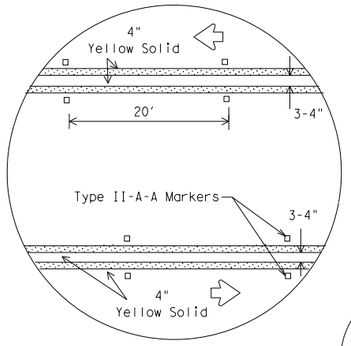
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



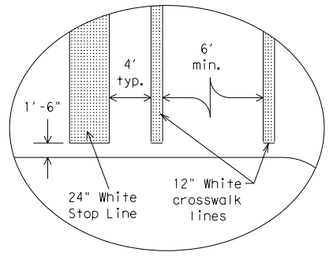
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS

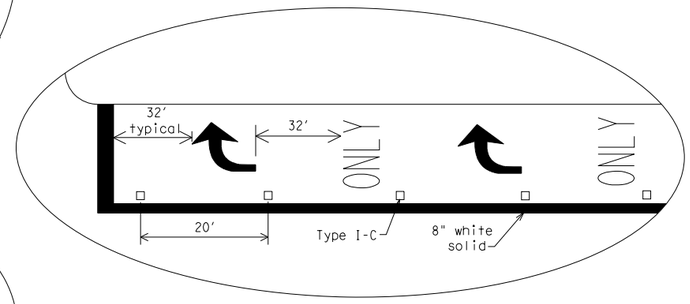


DETAIL A



Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

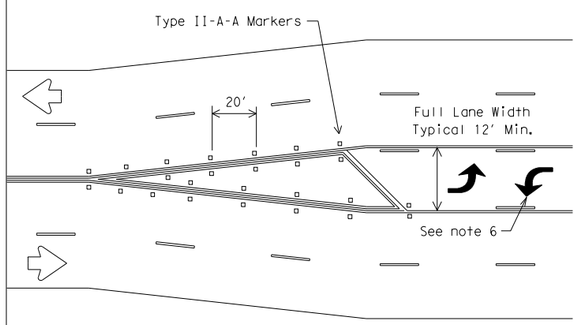
DETAIL B



DETAIL C

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLMIDLANDIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

1. Refer elsewhere in plans for additional RPM placement and details.
2. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows as shown in the Standard Highway Sign Designs for Texas.
3. When lane used word and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
4. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used.
5. Raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Raised pavement marker Type II-C-R with divided highways and raised medians.
6. A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

Texas Department of Transportation
Traffic Operations Division

PAVEMENT MARKINGS FOR TWO-WAY LEFT TURN LANES DIVIDED HIGHWAYS AND RURAL LEFT TURN BAYS

PM(3)-12

REVISIONS
5-00 2-12
8-00
3-03
2-10

22C

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0921	06	288	SOUTH PORT CONNECTOR
DIST	COUNTY		SHEET NO.
PHR	CAMERON		151

DATE:
FILE:

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

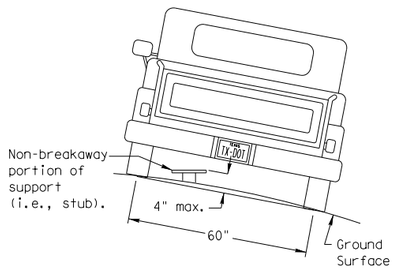
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

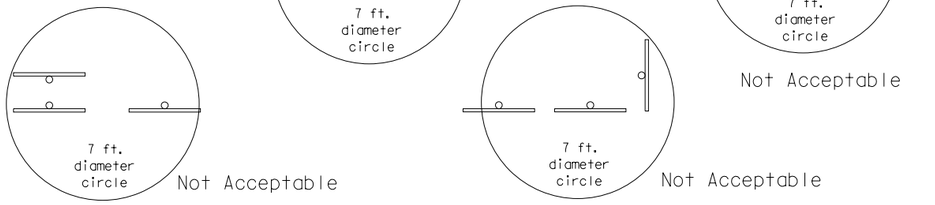
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



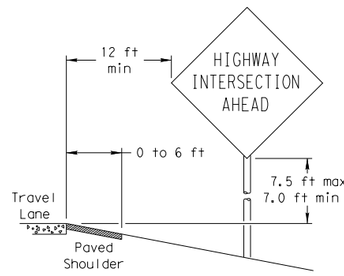
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



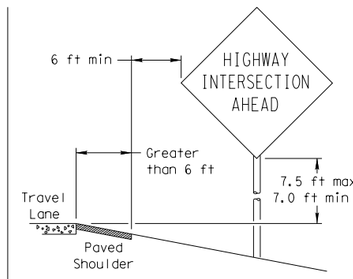
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

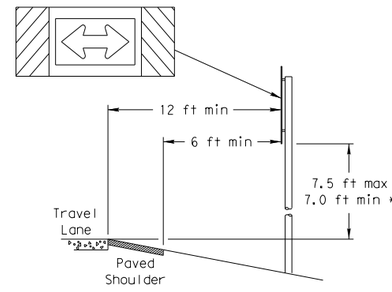
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



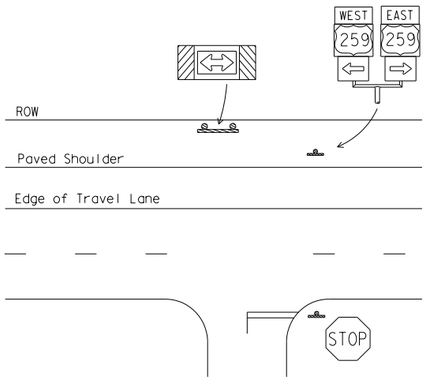
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

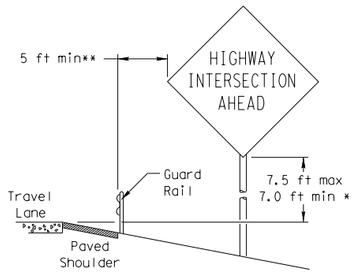
T-INTERSECTION



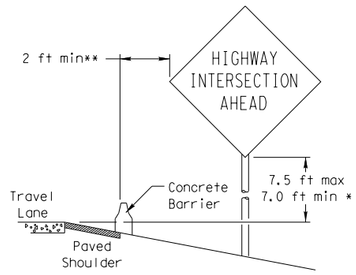
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

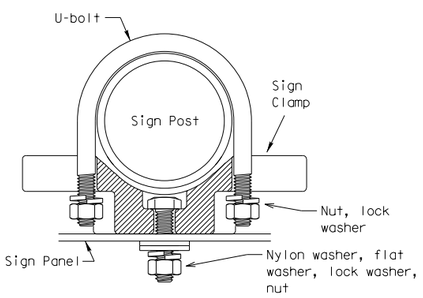
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

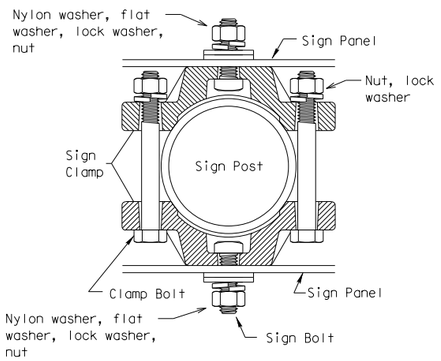
The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



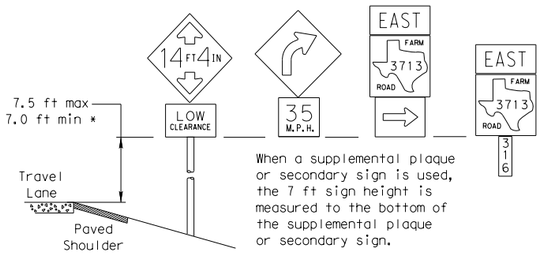
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

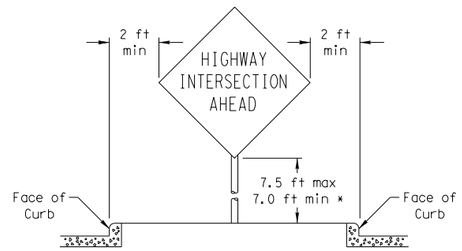
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



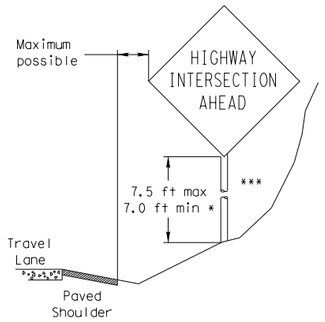
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

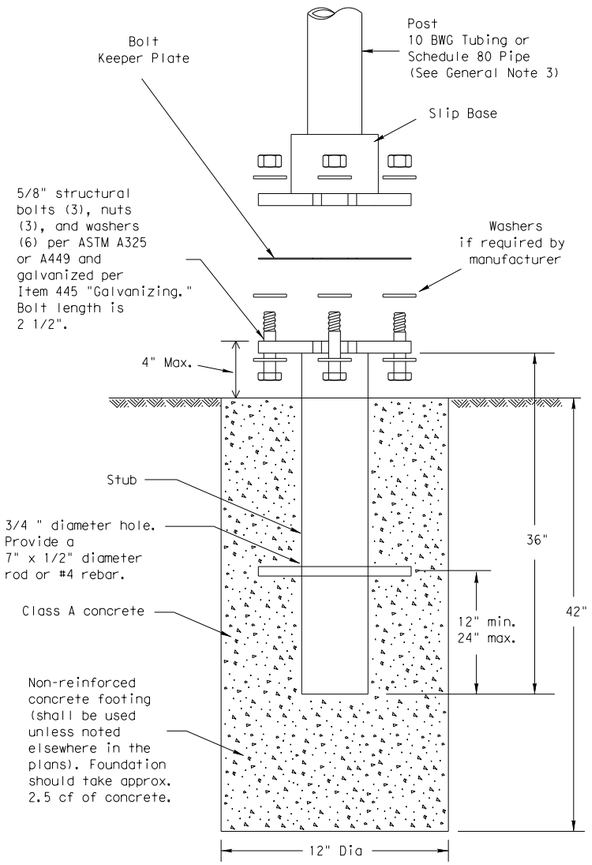
REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0921	06	288	SOUTH PORT CONNECTOR
DIST	COUNTY		SHEET NO.
PHR	CAMERON		152

26A

DATE:
FILE:

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

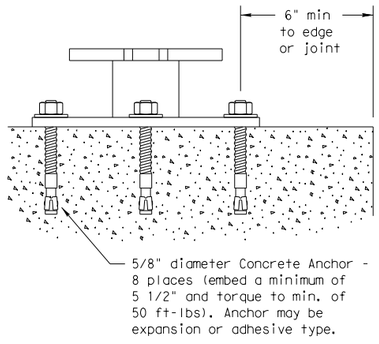
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

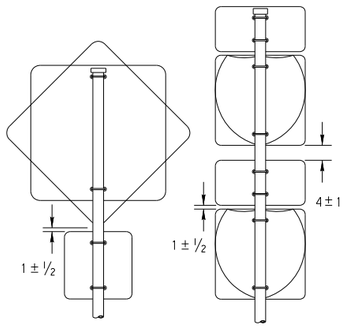
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

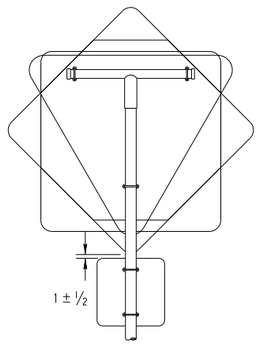
CONT	SECT	JOB	HIGHWAY
0921	06	288	SOUTH PORT CONNECTOR

DIST	COUNTY	SHEET NO.
PHR	CAMERON	153

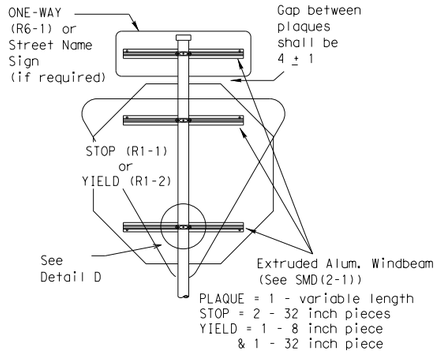
DATE:
FILE:



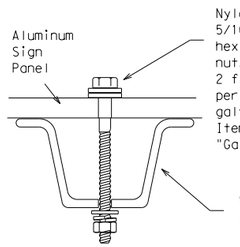
SM RD SGN ASSM TY XXXXX(1)XX(P)



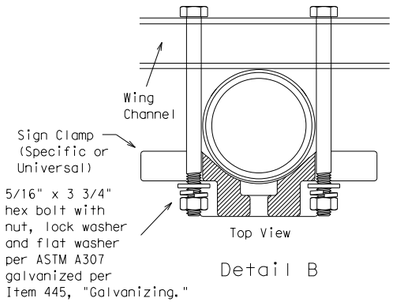
SM RD SGN ASSM TY XXXXX(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



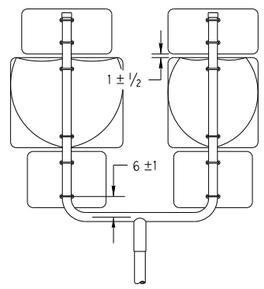
Detail B

GENERAL NOTES:

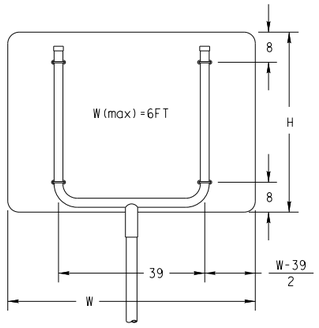
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

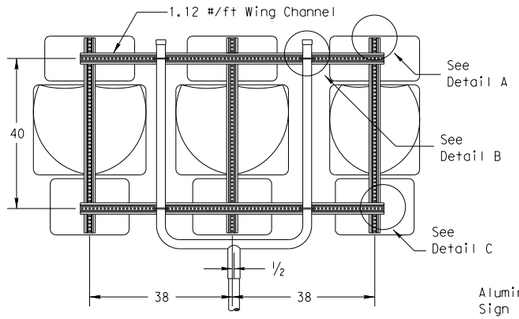
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



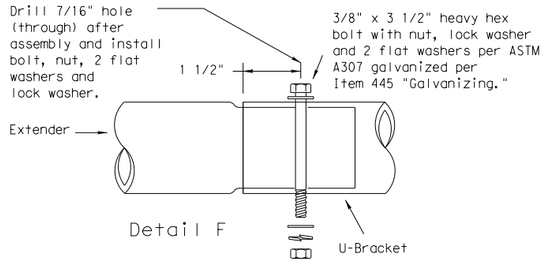
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

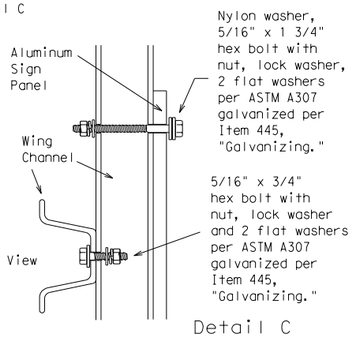


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

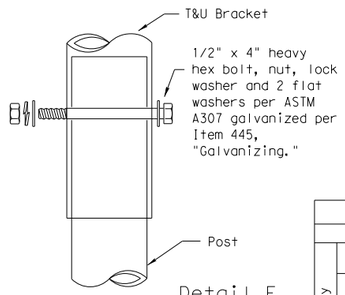


Detail F

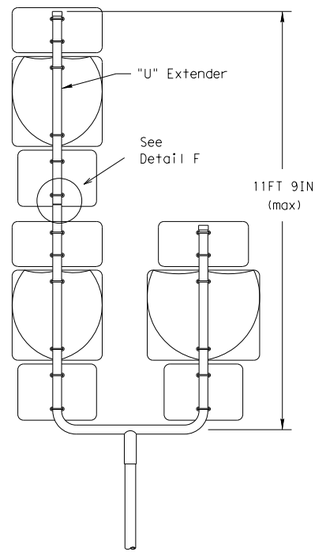
Splices shall only be allowed behind the sign substrate.



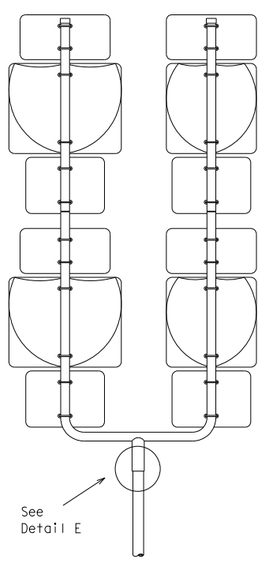
Detail C



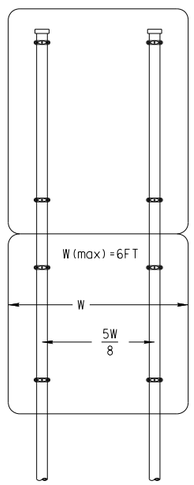
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

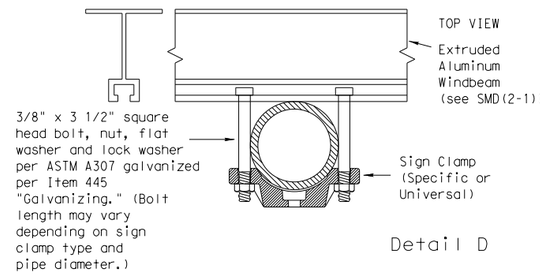


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

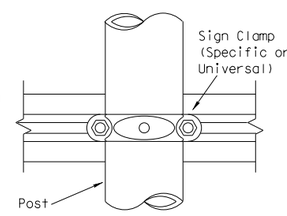


SM RD SGN ASSYM TY XXXXX(2)XX(P)

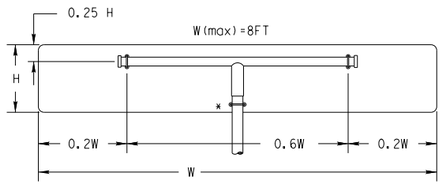
SIDE VIEW



Detail D



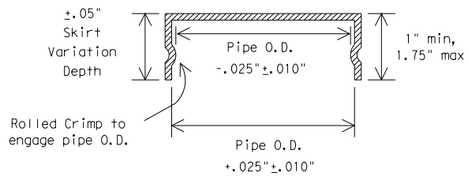
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

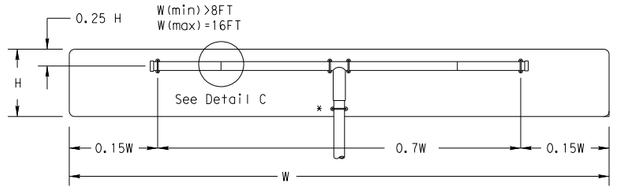
CONT	SECT	JOB	HIGHWAY
0921	06	288	SOUTH PORT CONNECTOR
DIST	COUNTY		SHEET NO.
PHR	CAMERON		154

9-08 REVISIONS

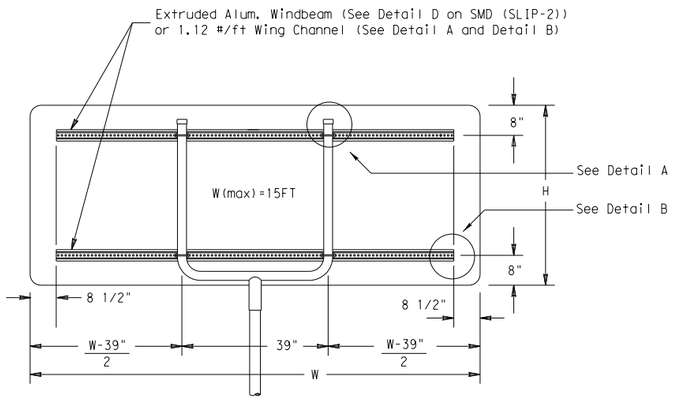
26C

DATE:
FILE:

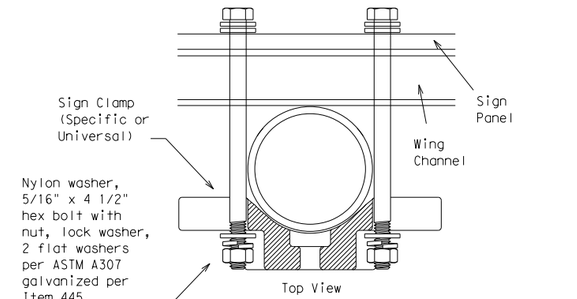
DATE:
FILE:



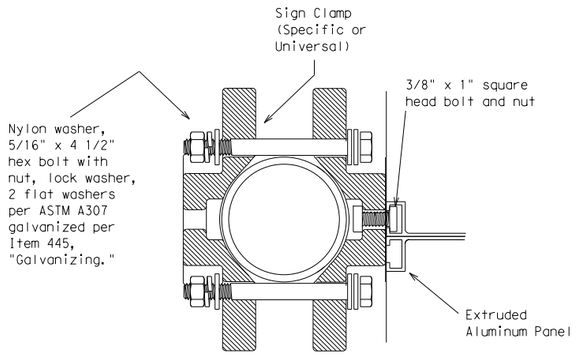
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



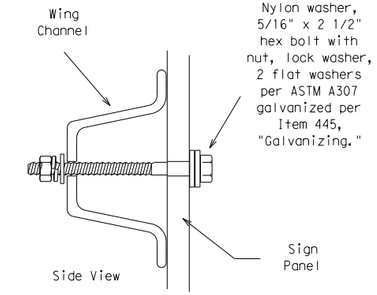
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



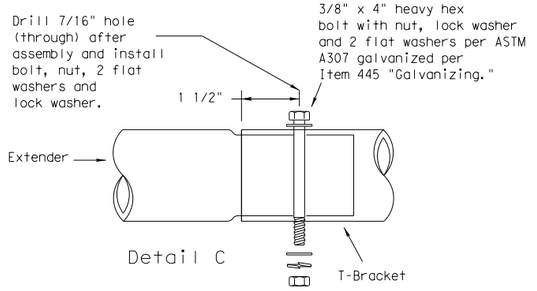
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

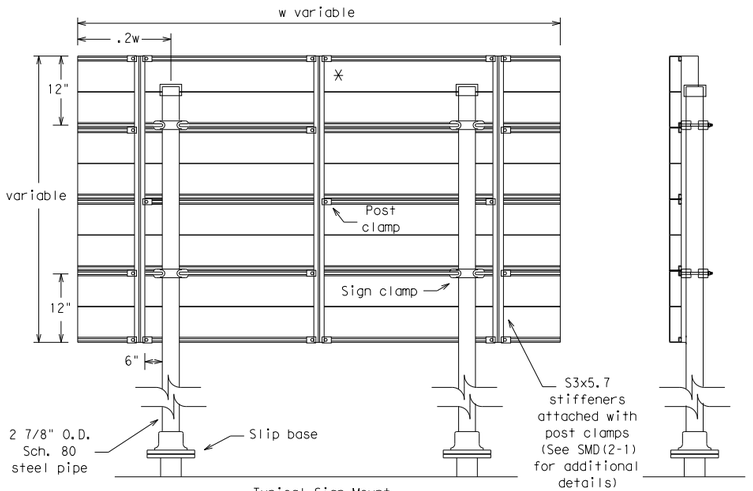


Detail B



Detail C

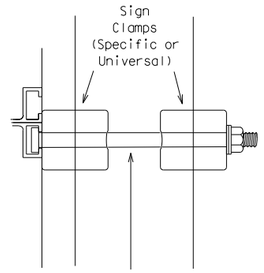
Splices shall only be allowed behind the sign substrate.



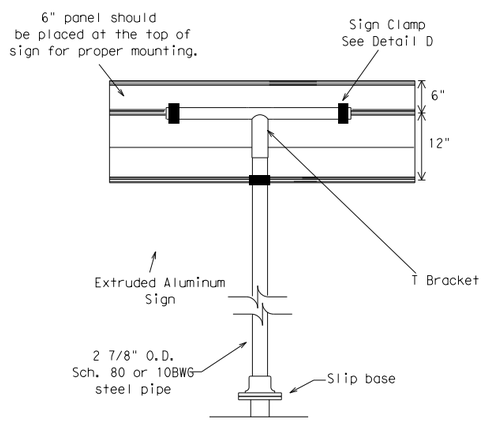
Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

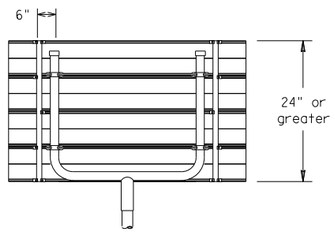
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

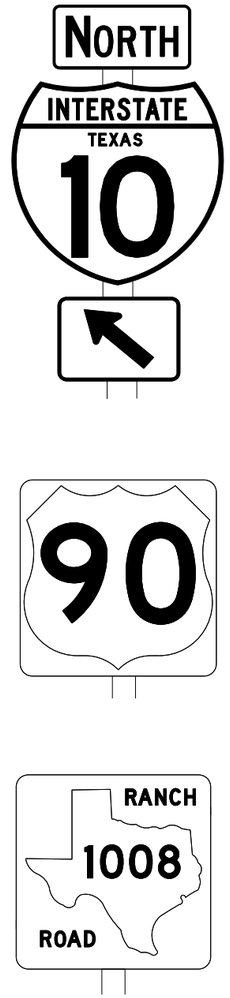
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		155

26D

DATE:
FILE:

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

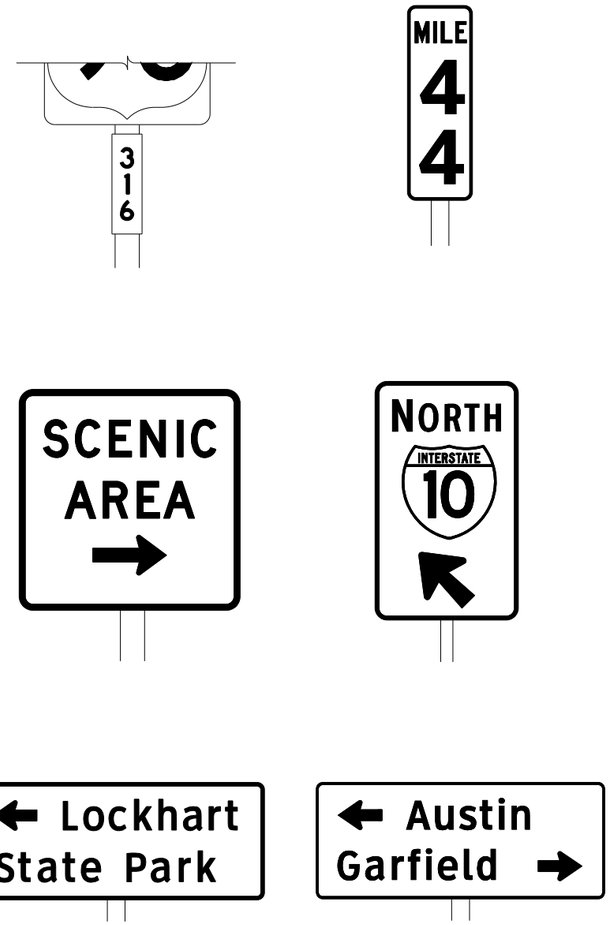
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. 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.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	PHR	CAMERON		156

3

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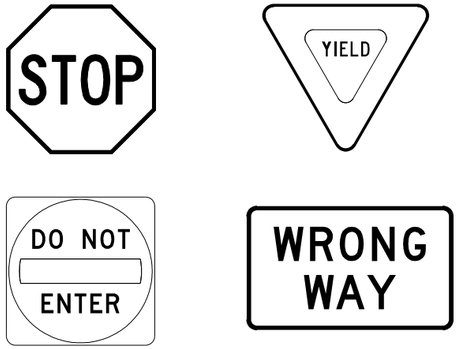
DATE:
FILE:

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

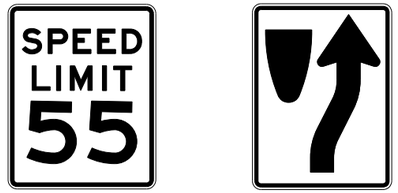


REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

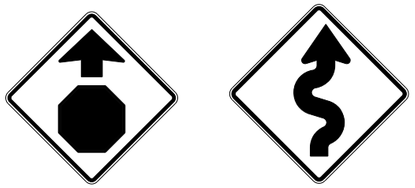
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. 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.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
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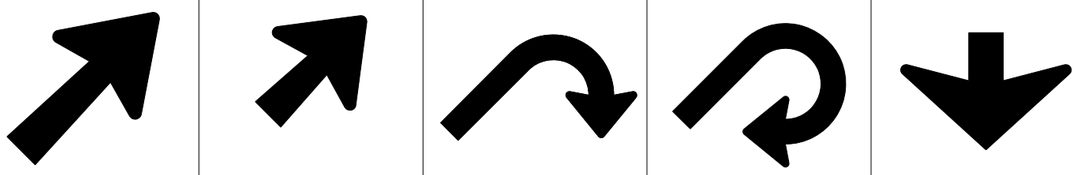
4

DATE:
FILE:

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

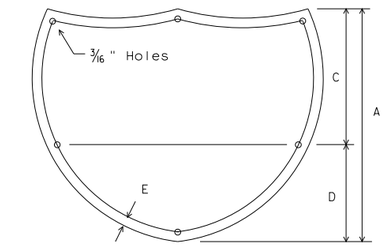
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

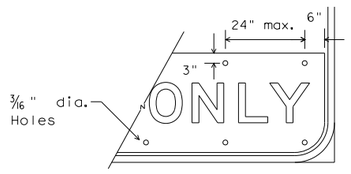
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

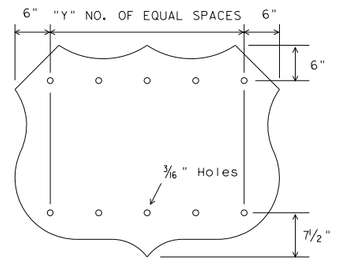


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

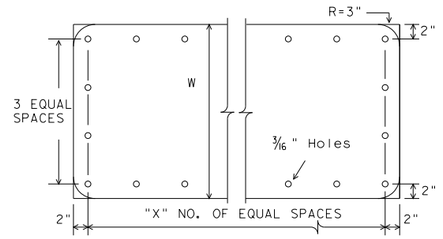


EXIT ONLY PANEL



U.S. ROUTE MARKERS

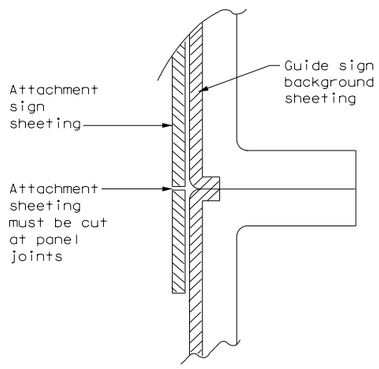
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



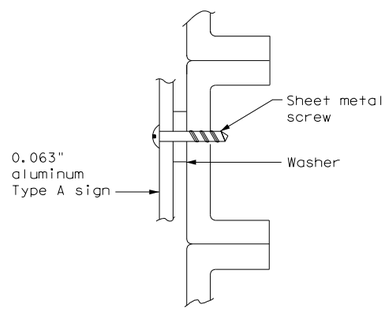
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

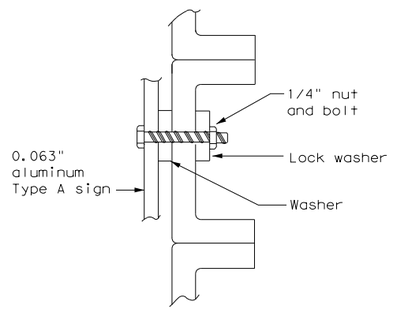
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



DIRECT APPLIED ATTACHMENT



SCREW ATTACHMENT



NUT/BOLT ATTACHMENT

NOTE:

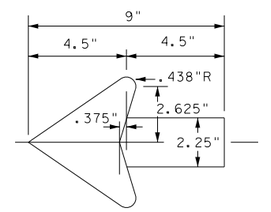
1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

NOTE:

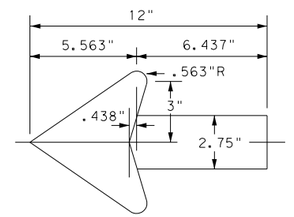
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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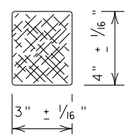
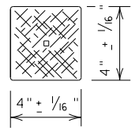
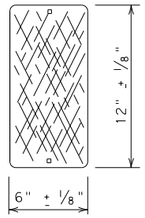
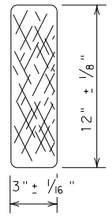
9-08	PHR	CAMERON		158

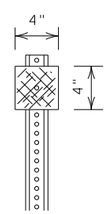
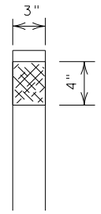
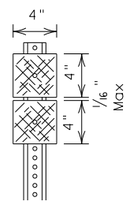
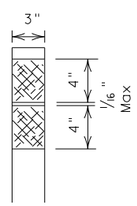
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
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	FLX	WC	FLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX) SZ X (XXX) 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
- FLX = 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) (XXX) XXX (XX)

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

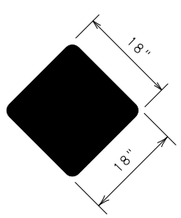
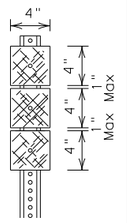
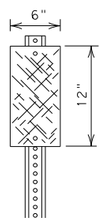
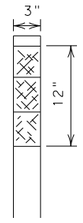
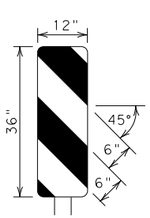
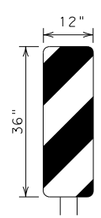
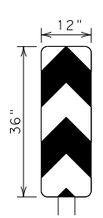
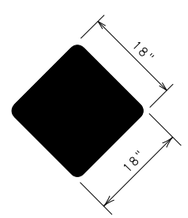
NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker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

TYPE OF POST
- WC = Wing Channel Post
- FLX = Flexible Post
- TWT = Thin Walled Tubing

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

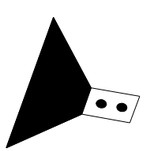
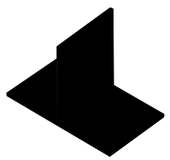
DIRECTION
- If Required
- BI = Bi-Directional

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	FLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

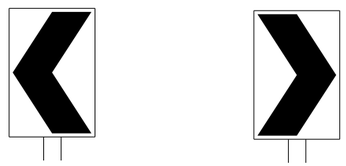
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			

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. Minimum 9 square inches of reflective sheeting surface area.

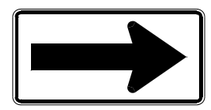
CHEVRONS

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. The Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTIONAL 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"	

NOTE:

Delineator and object marker backplates 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 Operations Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-15

FILE: dom1-15.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
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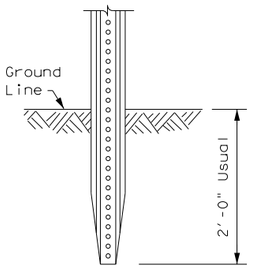
20A

DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

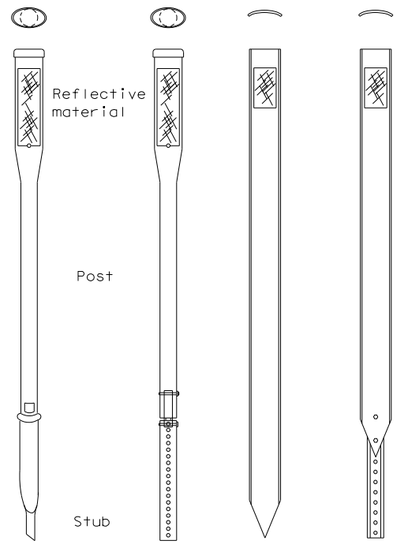


NOTES

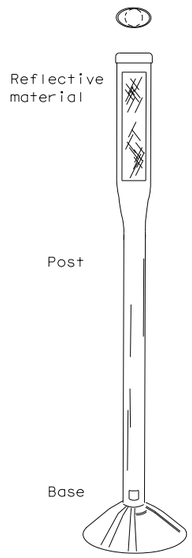
1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

FLEXIBLE POSTS (FLX)

GND



SRF



EMBEDDED

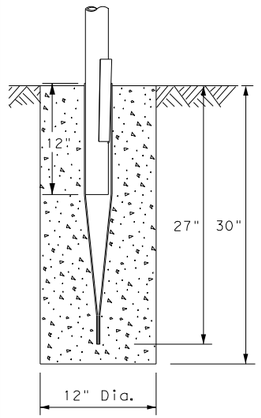
SURFACE MOUNT

NOTES

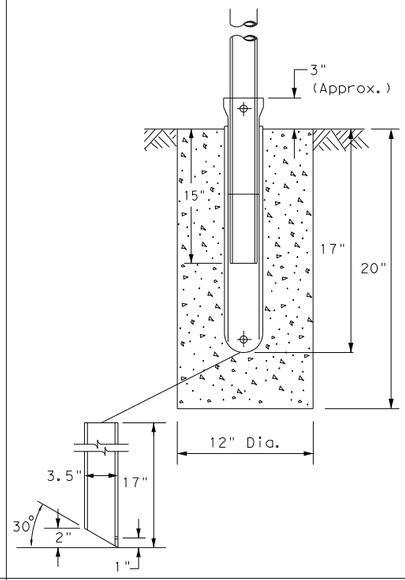
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.

WEDGE ANCHOR SYSTEMS

WAS



WAP



STEEL

PLASTIC

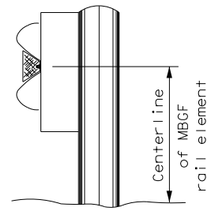
NOTE

1. Install per manufacturer's recommendations.

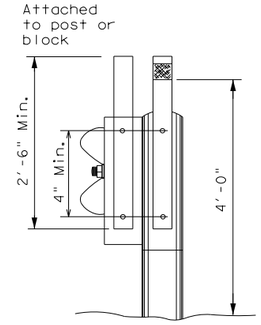
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

GF1

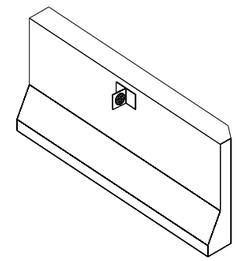


GF2



CONCRETE BARRIER / BRIDGE RAIL

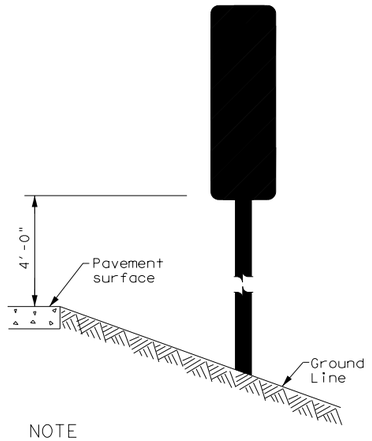
CTB



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.

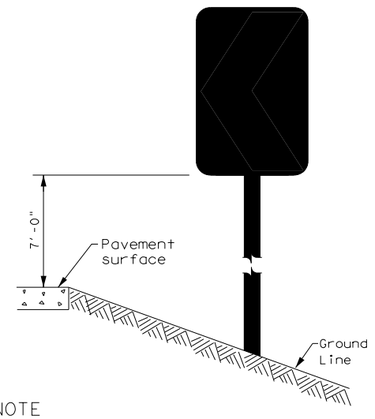
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

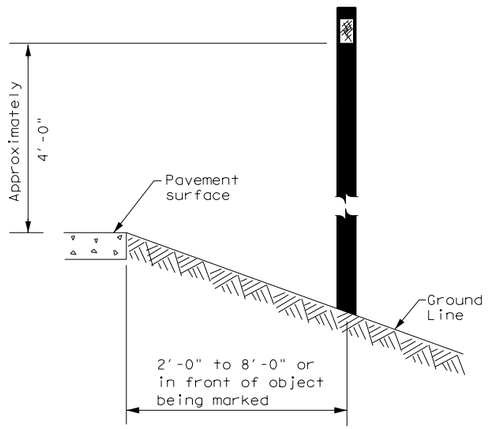
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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 DIRECTIONAL 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 Operations Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-15

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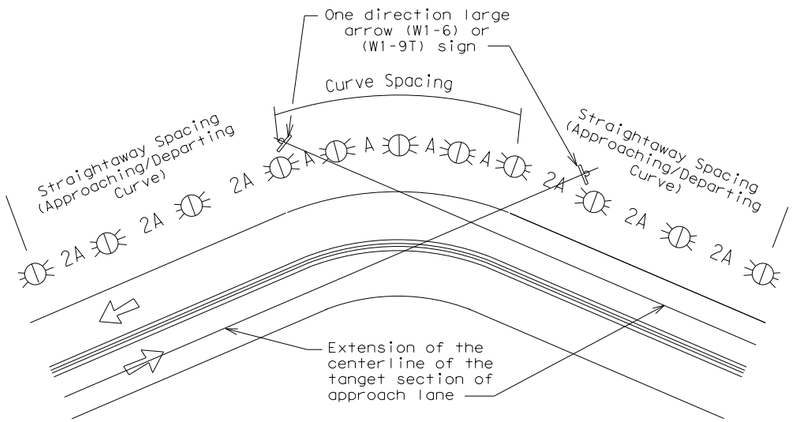
DATE:
FILE:

20B

USE OF WARNING DEVICES AT CURVES WITH ADVISORY SPEED LIMITS

Amount by which Advisory Speed Is less than Posted Speed	Warning Devices Needed
5 MPH & 10 MPH	RPMs
15 MPH & 20 MPH	RPMs, and Delineators or RPMs and ONE DIRECTION LARGE ARROW (W1-6) or (W1-9T) sign
25 MPH & Greater	RPMs and Chevrons

SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES

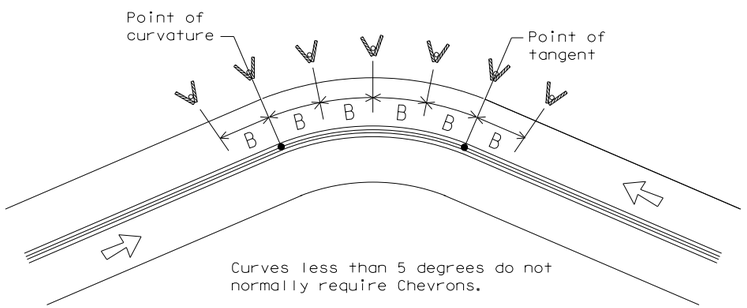


Curves less than 1 degree do not normally require delineators.

NOTE

ONE DIRECTIONAL LARGE ARROW (W1-6) or(W1-9T) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



Curves less than 5 degrees do not normally require Chevrons.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve[1]	Single delineators on right side	See delineator spacing table
FRWY/EXP. Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 4 on D&OM(4))	100 feet on ramp tangents. Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves).
Acceleration/Deceleration Lane	Double delineators (see Detail 4 on D&OM(4))	100 feet (See Detail 4 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence or CTB	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end. Undivided 2-lane highways - Object marker on approach and departure end.	Requires Type 3 Object Marker or reflective sheeting provided by manufacturer per D & OM(VIA).
Bridges with no Approach Rail	Type 3 Object Marker at end of rail and 3 single delineators approaching rail.	See Detail 2 on D & OM(4)
Reduced Width Approaches to Bridge Rail	Type 2 Object Markers and 3 single delineators approaching bridge.	See Detail 1 on D & OM(4)
Culverts without MBGF	Type 2 Object Markers	See Detail 3 on D & OM(4)
Crossovers	Double yellow delineators or RPM's	See Detail 5 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Delineators not required in urban areas with continuous illumination.
2. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
3. Barrier reflectors may be used to replace required delineators.
4. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-15B

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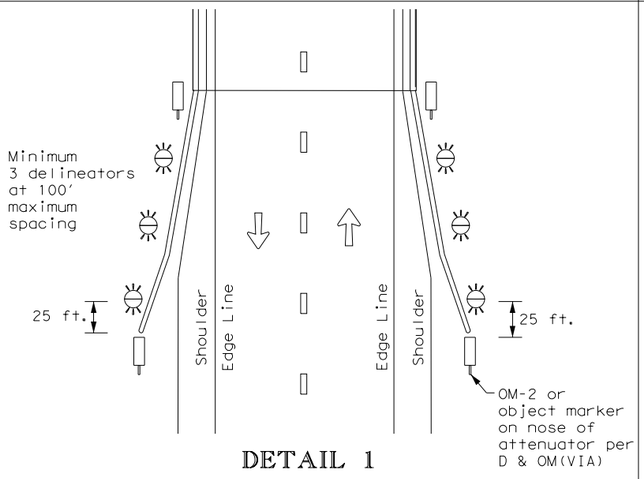
8-15	PHR	CAMERON		161

20C

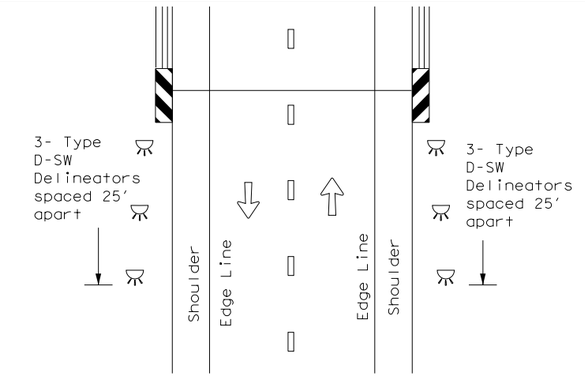
DATE:
FILE:

TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH



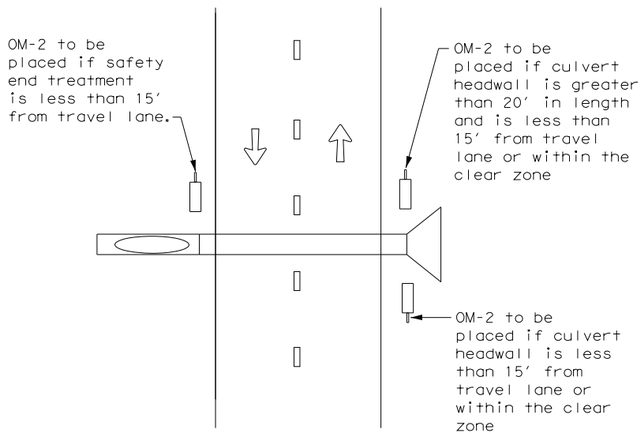
DETAIL 1

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



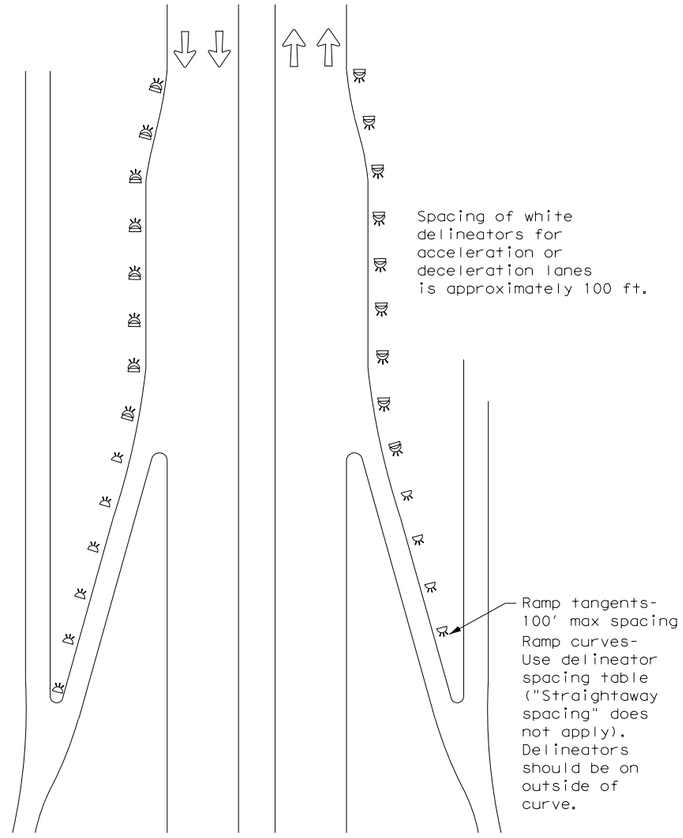
DETAIL 2

FOR CULVERTS WITHOUT MBGF



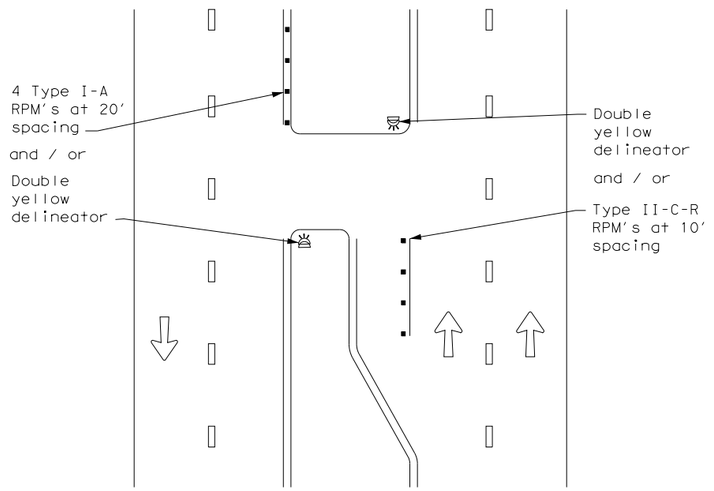
DETAIL 3

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



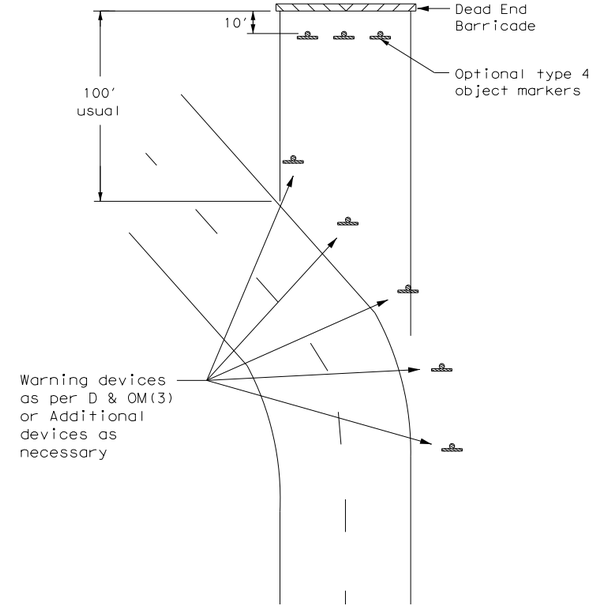
DETAIL 4

CROSSOVERS



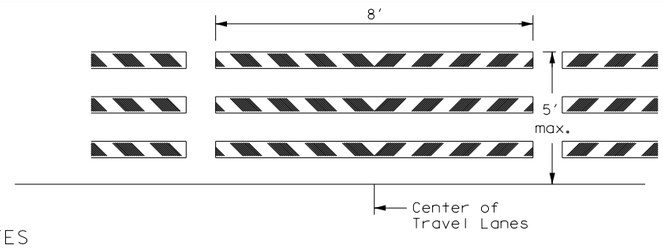
DETAIL 5

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 6

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 7

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-15

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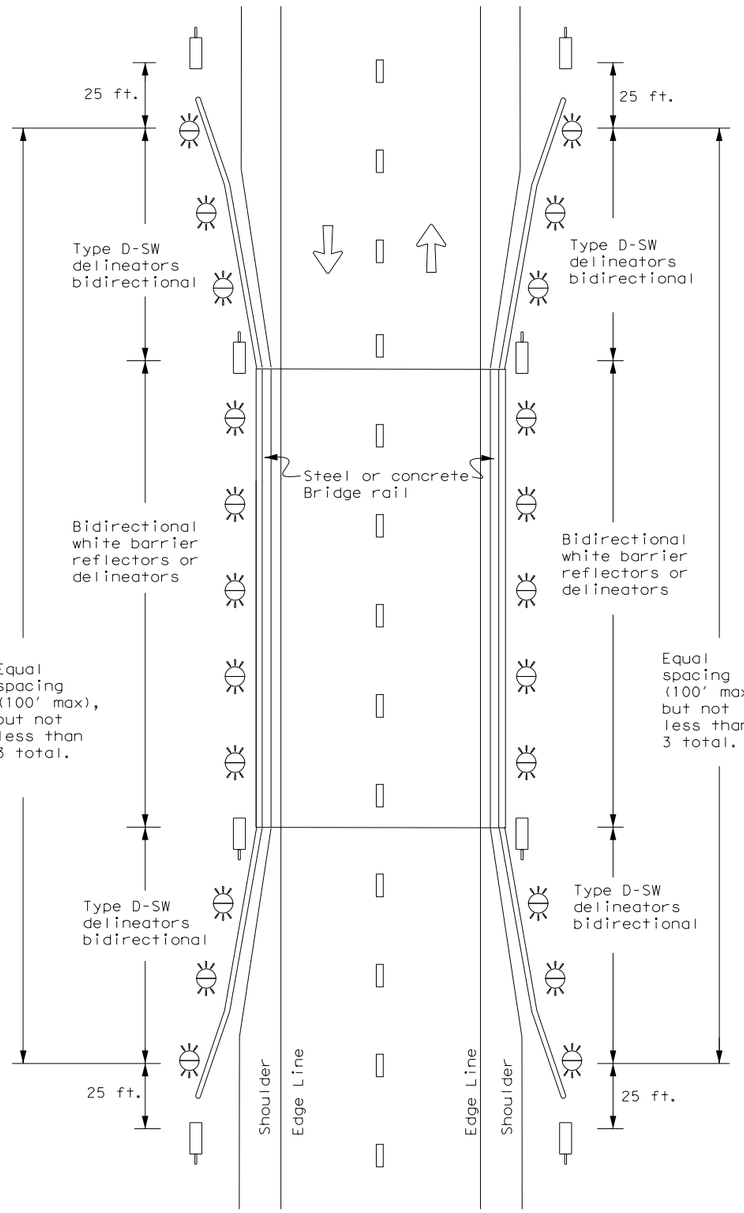
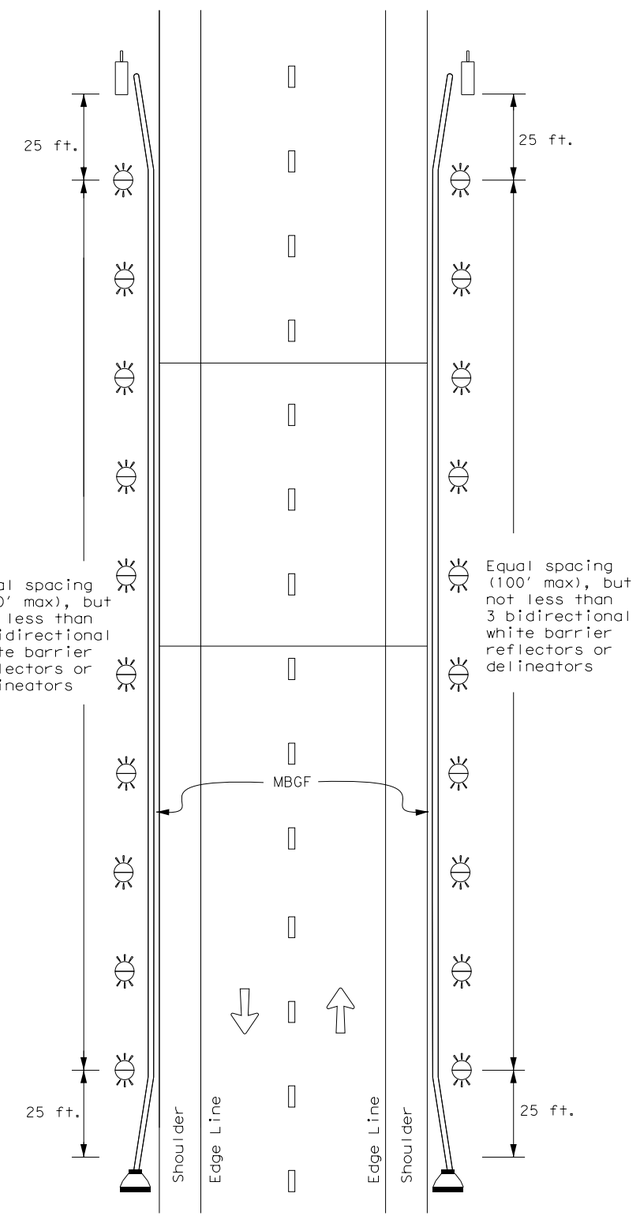
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



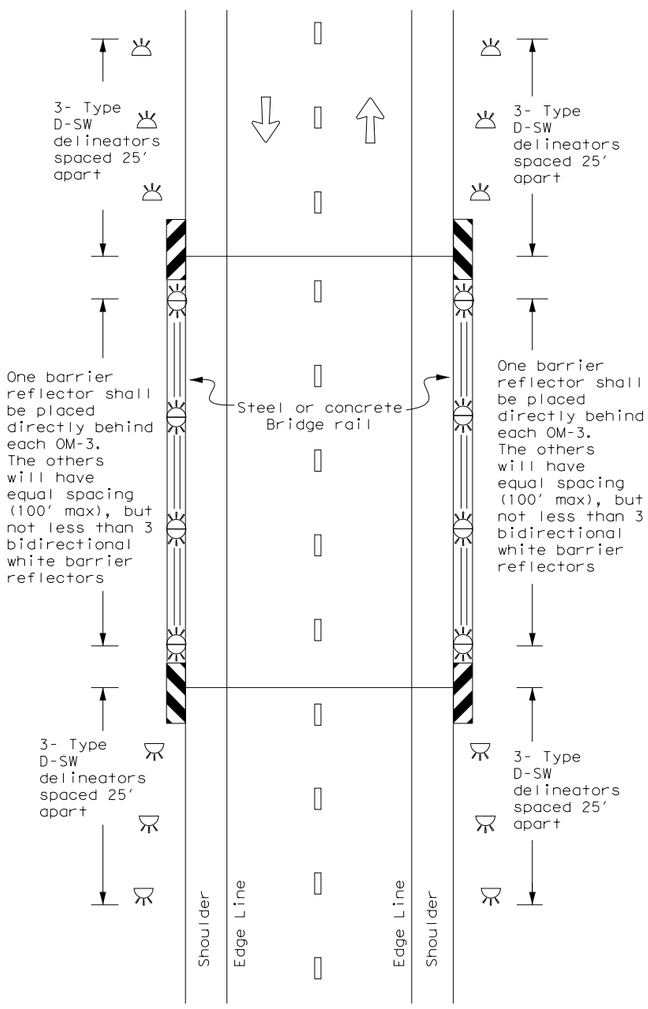
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

If terminal ends include an object marker, there is no need to install an OM-2 in front of terminal.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	TRAFFIC FLOW

Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-15

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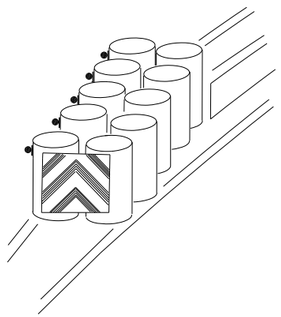
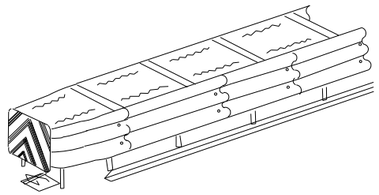
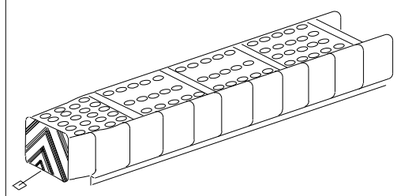
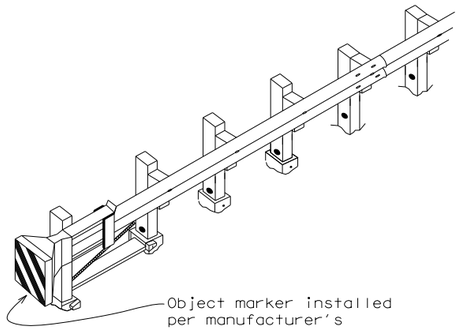
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		163

20E

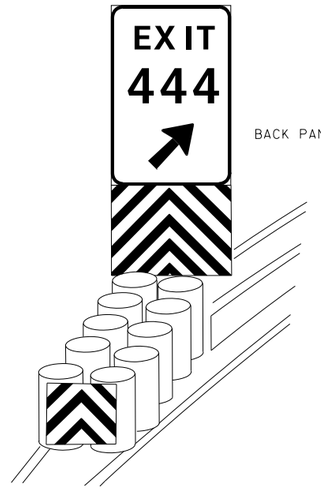




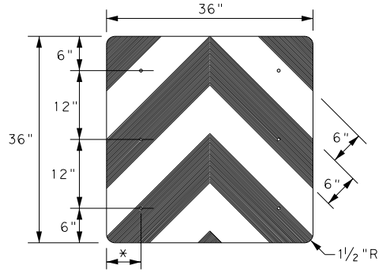


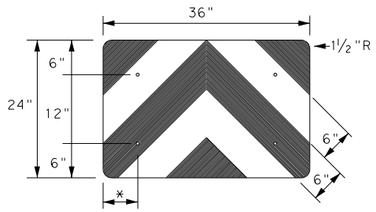


Object marker installed per manufacturer's recommendations.

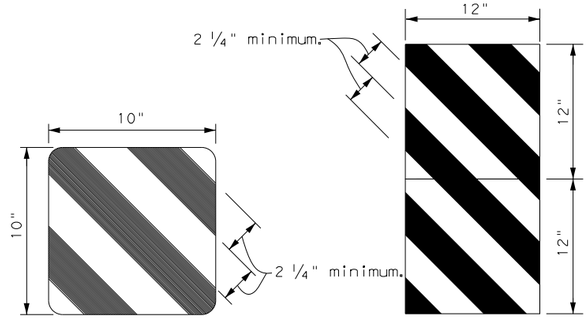


BACK PANEL (OPTIONAL)

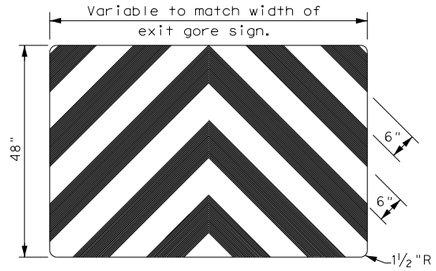


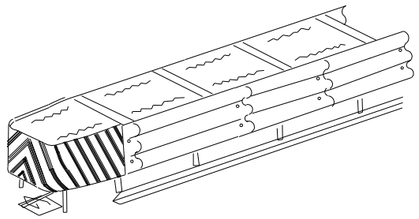


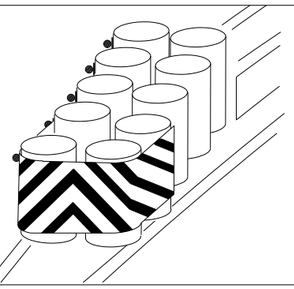
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

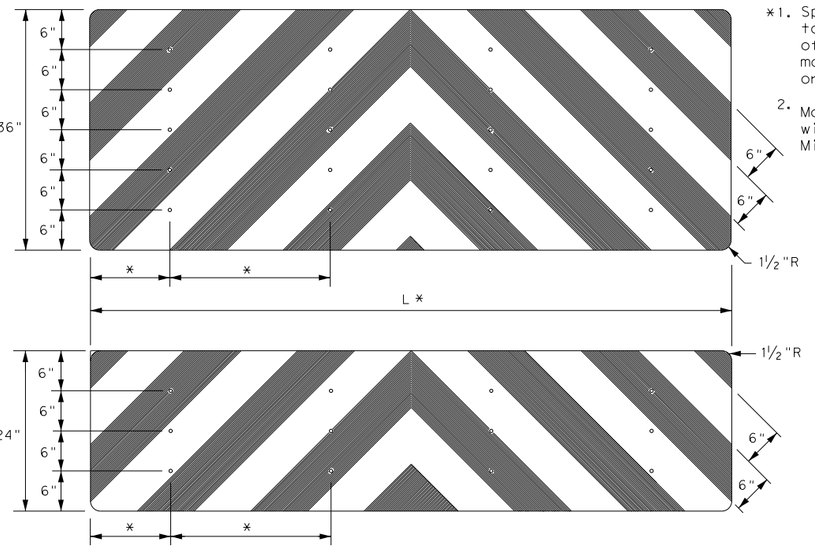


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-15

FILE: domvia15.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	PHR	CAMERON		164
4-98				
20G				

DATE:
FILE:

SITE DESCRIPTION

PROJECT LIMITS: From: R.L. Ostos Road
To: SH 4

PROJECT SITE MAPS:

- *Project Location Map: Title Sheet (Sheet 1)
- *Drainage Patterns: See Drainage Area Maps
- *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Distrubance: See Typ Sects for slope details
- *Major Controls and Locations of Stabilization Practices: See Mainlanes SW3P Layout Sheets for details
- *Project Specific Locations: To be specified by Project Field Office and located in the Project SW3P File

PROJECT DESCRIPTION: For the construction of South Port Connector at the Port of Brownsville

MAJOR SOIL DISTURBING ACTIVITIES: Soil disturbing activities will include preparing the R.O.W., excavation and embankment for the roadway and proposed bridge structures. Placement of topsoil for establishment of both temporary and final seeding.
Disturbed areas on which construction activity has ceased (temporarily or permanently) shall be stabilized within 14 days unless activities are scheduled to resume and do so within 14 days.
Final seeding shall be accomplished on all areas as soon as construction stage is complete.

TOTAL PROJECT AREA: 36.00 Acres

TOTAL AREA TO BE DISTURBED: 36.00 Acres (100%)

WEIGHTED RUNOFF COEFFICIENT: 80 CN

EXISTING CONDITION OF SOIL & VEGETATIVE The existing soil condition consists mainly of Lomalta Clay, 0 to 1 percent slopes, occassionally ponded (73.8%), Sejita silty clay loam, 0 to 1 percent slopes, occassionally ponded (8.1%), and Twin palms occassionally flooded-Yarborough frequently flooded complex, 0 to 3 percent slopes (18.1%). The area is covered approximately 75% percent existing for this project.

NAME OF RECEIVING WATERS: Brownsville Ship Channel (Segment ID: 2494), Laguna Madre (Segment ID: 2491), which ultimately flows into the Gulf of Mexico (Segment ID: 2501).

ENDANGERED SPECIES, DESIGNATED CRITICAL HABITAT AND HISTORICAL PROPERTY:
See EPIC Sheet

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- T TEMPORARY SEEDING
- ___ MULCHING (Hay or Straw)
- ___ BUFFER ZONES
- ___ PLANTING
- P SEEDING
- ___ SODDING
- ___ BIODEGRADABLE EROSION CONTROL SOCKS
- ___ PRESERVATION OF NATURAL RESOURCES
- ___ FLEXIBLE CHANNEL LINER
- ___ RIGID CHANNEL LINER
- ___ SOIL RETENTION BLANKET
- ___ COMPOST MANUFACTURED COMPOST
- ___ OTHER: (Specify Practice)

STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- T SILT FENCES
- ___ BIODEGRADABLE EROSION CONTROL SOCKS
- ___ HAY BALES
- T ROCK FILTER DAMS
- ___ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- ___ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- ___ DIVERSION DIKE AND SWALE COMBINATIONS
- ___ PIPE SLOPE DRAINS
- ___ PAVED FLUMES
- T ROCK BEDDING AT CONSTRUCTION EXIT
- ___ TIMBER MATTING AT CONSTRUCTION EXIT
- ___ PIPE MATTING OR EQUAL 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: (Specify Practice)

STORM WATER MANAGEMENT:
Storm water drainage will be provided by storm sewer networks. This storm drain system will carry drainage within the R.O.W. to low points in the roadway profile where cross drainage may occur and ultimately to the designated receiving waters.

STORM WATER MANAGEMENT ACTIVITIES: (Sequence of Construction)

The order of activities will be as follows:
1.- Install perimeter controls, clear R.O.W. on side where construction will take place, and make required utility adjustments, if applicable.
2. Install Proposed trunk lines/inlets, install silt fence along roadway storm sewer network outfalls as shown on Plan & Profile Sheets.
3. Construct proposed roadway.
4. Construct roadway section up to TY "D" stage as shown on TCP.
5. Seed each section completed with temp. seeding per phase from side slope to right of way.
6. Once all construction activity is complete, permanent seeding on proposed areas shall be done according to plans, or as instructed by the Engineer.

NON-STORM WATER MANAGEMENT DISCHARGES:
Non-storm water discharges should be filtered, or held in retention basins, before being allowed to mix with storm water. These discharges consist of non-polluted ground water, spring water, foundation and/or footing drain water; and water used for dust control, pavement washing and vehicle wastewater containing no detergents.

OTHER REQUIREMENTS & PRACTICES

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 drainage ways shall have priority followed by devices protecting storm sewer inlets.

INSPECTION: For areas of the construction site that have not been finally stabilized, area used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every fourteen (14) calendar days and within twenty-four (24) hours of the end of a storm event 0.5 inches or greater.

WASTE MATERIALS: All waste materials will be collected and stored in a securely lidded dumpster. All trash and construction debris from the site will be deposited as necessary at a local dump. No construction waste material will be buried on site or any other unauthorized site.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): At a minimum, any products in the following categories to be hazardous: Paints, Acids for cleaning masonry surfaces, Cleaning Solvents, Asphalt products, Chemical additives for soil stabilization, or Concrete curing compounds and additives. In the event of a spill which may be hazardous, the spill Coordinator should be contacted immediately. Emptying of excess concrete should not be allowed on site. Likewise, washout of concrete trucks should not be performed on site. These discharges are considered non-allowable non-storm water discharges. Concrete trucks should never be allowed to dump into water bodies.

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, in accordance with all state laws and Texas Water Commission rules.

OFFSITE VEHICLE TRACKING: The Contractor shall be rquired, on a regular basis or as may be directed by the Engineer, to dampen haul roads for dust control, stabilize construction entrances remove excess dirt from the roadway daily, and for all loaded haul trucks to be covered with tarpaulin.

MANAGEMENT PRACTICES: (Example Below - May be used as applicable, revised or expanded)
1. 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 within 25-50 ft of any wet land, water body or stream bed.
2. Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants.
3. All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, or debris or other obstructions placed during construction operations that are not a part of the finished work.

OTHER:
1. Construction Materials List of materials stored on job site to be provided by Contractor.
2. The project SW3P File shall be located at the project field office or within the Contractor's mobile office at all times and shall contain the N.O.I., CGP, Signature Authorization, Certification/Qualification Statements, Inspection Reports, Required Maps, and the TPDES Permit, Part II. This File to be persented to authorized State and Federal Agents upon request.

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by FRANK H. CHAPA P.E. 128020, on May 17, 2019.

Signature of Registrant & Date

Texas Department of Transportation

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

REV. 11/12 SW3P.DGN

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			165
STATE	DIST.	COUNTY	
TEXAS	PHARR	CAMERON	
CONT.	SECT.	JOB	HIGHWAY NO.
0921	06	288	SOUTH PORT CONNECTOR

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.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☒ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☒ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☒ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

1.

2.

3.

4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR	
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY	
REVISIONS 12-12-2011 (DS)	0921	06	288	SOUTH PORT CONNECTOR	
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY		SHEET NO.	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	PHR	CAMERON		166	

During the planning phase of project development, the following Environmental Permits, Issues and Commitments have been developed during coordination with resource agencies, local governmental entities and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities as additional environmental clearances may be required.

I. Clean Water Act, Section 402; Stormwater Pollution Prevention

Action Items Required : ☐ No Action Required

1. ☒ The contractor must implement the SW3P by installing Best Management Practices (BMPs) as indicated in the construction plans and maintained appropriately throughout construction. BMPs must be in place prior to the start of construction. The SW3P may need to be revised as necessary as construction progresses.

2. ☒ For all construction PSL's off the ROW, the contractor must certify compliance with all applicable laws, rules and regulations pertaining to the preservation of cultural resources, natural resources and the environment.

3. ☒ Based on the acreage of impact, select the appropriate box below:

   ☐ This project will disturb less than 1 acre of soil and is not part of a larger common plan of development; therefore, a NOI and TPDES Site Notice are not required for this project.

   or

   ☐ This project will disturb equal to or more than 1 acre of soil but less than 5 acres; therefore a NOI is not required but a TPDES Site Notice is required. The Construction Site Notice (CSN) is required to be posted at the construction site in a publicly accessible location for review by the public, TCEQ, EPA and other Inspectors.

   or

   ☒ This project will disturb equal to or more than 5 acres of soil and will require a NOI and TPDES Site Notice. The NOI and Site Notice are required to be posted at the construction site in a publicly accessible location.

4. ☐ Need to address MS4 requirements (Cameron & Hidalgo Counties only) ☒ MS4 requirements not needed

II. Clean Water Act, Sections 401 and 404 Compliance

Action Items Required : ☐ No Action Required

1. ☒ Filling, dredging or excavating in any water bodies, rivers, creeks, streams, wetlands or wet areas is prohibited unless specified in the USACE permit and approved by the Engineer. The contractor shall adhere to all agreements, mitigation plans, and BMPs required by the NWP as regulated by the USACE.

   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 (1/10th to <1/2 acre, 1/3 in tidal waters)

   ☐ Individual 404 Permit Required

   ☐ Other Nationwide Permit Required: NWP#_____

2. ☒ The contractor is responsible for obtaining new or revised Section 404 permit(s) for Contractor initiated changes in construction methods that change Impacts To Waters Of The U.S., including wetlands. The Contractor will ensure that the water quality of the State will be maintained and not degraded.

3. ☒ Best Management Practices for applicable Section 401 General Conditions:

General Condition 12 - Categories I and II BMPs required

Category I (Erosion Control)

☐ Temporary Vegetation	☐ Interceptor Swale	☒ Mulch Filter Berms and/or Socks
☐ Blankets, Matting	☐ Diversion Dike	☐ Compost Filter Berms and/or Socks
☐ Mulch	☐ Erosion Control Compost	☐ Compost Blankets
☐ Sodding		

Category II (Sedimentation Control)

☒ Silt Fence	☐ Hay (Straw) Bale Dike	☐ Mulch Filter Berms and/or Socks
☒ Rock Berm	☐ Brush Berms	☐ Compost Filter Berms and/or Socks
☐ Triangular Filter Dike	☐ Sediment Basins	☐ Stone Outlet Sediment Traps
☐ Sand Bag Berm	☐ Erosion Control Compost	

General Condition 21 - Category III BMPs required

Category III (Post-Construction TSS Control)

☐ Vegetative Filter Strips	☐ Wet Basins	☐ Mulch Filter Berms and/or Socks
☐ Retention/Irrigation	☒ Grassy Swales	☐ Compost Filter Berms and/or Socks
☐ Extended Detention Basin	☒ Vegetation-Lined Ditches	☐ Sand Filter Systems
☐ Constructed Wetlands	☐ Erosion Control Compost	☐ Sedimentation Chambers

II. Clean Water Act, Sections 401 and 404 Compliance - Continued:

4. ☒ The Contractor's designated and qualified Contractor Responsible Person Environmental (CRPe) will monitor the project site daily to ensue compliance with SW3P and TPDES General Permit TXR 150000. Daily Monitoring Reports shall be provided to TxDOT within 48 hours, in accordance with Item 506.3.1.

5. ☐ Other Project Specific Actions:

   1.

   2.

III. Cultural Resources

Action Items Required : ☐ No Action Required

1. ☒ Refer to the 2014 TxDOT Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges, Item 7.7.1., 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.

2. ☐ Other Project Specific Actions:

   1.

   2.

IV. Vegetation Resources

Action Items Required : ☐ No Action Required

1. ☒ In accordance with the 2014 TxDOT Standard Specifications; Item 164 - Seeding For Erosion Control; provide and install temporary or permanent seeding for erosion control as shown on the plans or as directed by the Engineer for all seeding and replanting of right of way where possible. (Required for Urban Settings)

2. ☒ In accordance with Executive Order 13112 on invasive species and the Executive Memorandum on Beneficial Landscaping, native species of plants shall be used for all seeding and replanting of right of way where possible for rural roadways. (Required for Rural Settings)

3. ☒ Preserve vegetation where possible throughout the project and minimize clearing, grubbing and excavation within stream banks, bed and approach sections.

4. ☐ Other Project Specific Actions:

   1.

   2.

Pharr District Contact No. 956-702-6100 Revised 01/30/2017

List of Abbreviations

BMP: Best Management Practice	NWP: Nationwide Permit
CGP: Construction General Permit	PCN: Pre-Construction Notification
CRPe: Contractor Responsible Person Environmental	PSL: Project Specific Location
DSHS: Texas Department of State Health Services	SPCC: Spill Prevention Control and Countermeasure
FEMA: Federal Emergency Management Agency	SW3P: Storm Water Pollution Prevention Plan
FHWA: Federal Highway Administration	TCEQ: Texas Commission on Environmental Quality
MOA: Memorandum of Agreement	THC: Texas Historical Commission
MOU: Memorandum of Understanding	TPDES: Texas Pollutant Discharge Elimination System
MS4: Municipal Separate Stormwater Sewer System	TPWD: Texas Parks and Wildlife Department
MSAT: Mobile Source Air Toxic	TxDOT: Texas Department of Transportation
MBTA: Migratory Bird Treaty Act	T&E: Threatened and Endangered Species
NOI: Notice of Intent	USACE: U.S. Army Corp of Engineers
NOT: Notice of Termination	USFWS: U.S. Fish and Wildlife Service

Texas Department of Transportation

PHARR DISTRICT

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6			SOUTH PORT CONNECTOR
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON	SHEET NO.
CONTROL	SECTION	JOB	
0921	06	288	167

Date Printed: X-X-XX

V. Federal Listed, and Proposed Threatened and Endangered Species, Critical Habitat, State Listed Species, Candidate Species and Migratory Birds

Action Items Required : ☐ No Action Required

1. ☒ Under the Migratory Bird Treaty Act (MBTA) of 1918, codified at 16 U.S.C. § 703-712 and as enforced by the USFWS, the proposed construction work will not remove active nests from bridges, trees, ground and other structures during migratory bird nesting season, (February 1st. through October 1st.). If the Contractor needs to perform work within the right of way during nesting season, a qualified Biologist shall conduct a survey to determine if active nests are present. If present, the Contractor shall maintain a buffer zone around the nest(s) as directed by the Biologist. The buffer zone will be protected from clearing and disturbance until such time as the Biologist has determined that the nest(s) is no longer active. Prior to the nesting season, existing bridges and culverts should be treated against migratory bird nesting by utilizing Bird Exclusion Methods. Bird Exclusion Methods should be monitored and maintained throughout the nesting season. Refer to Standard Bird Exclusion Details.

2. ☒ There is the potential for the presence of state-listed species & species of concern in the project area and state law prohibits the taking (incidental or otherwise) of state-listed species. Taking is defined as the collection, hooking, hunting, netting, shooting, or share by any means or devices. If any listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately.

3. ☒ Other Project Specific Actions:

   1. The following federally-listed species, Northern Aplomado Falcon (Falco femoralis septentrionalis), Rufa Red Knot (Calidris canutus rufa), Ocelot (Leopardus pardalis), and Jaguarundi (Puma yaguarondi) could potentially occur within the project area and the Brownsville Navigation District will implement the following Voluntary Conservation Measures (VCMs) to minimize impacts:
      - A qualified avian biologist will conduct a presence/absence survey within 0.5 miles of the project area for the potential presence of active Northern Aplomado Falcon nests in the breeding season immediately preceding the start of construction. The locations of any Northern Aplomado Falcon nests found during the survey would be recorded and reported to the USFWS, Texas Coastal Ecological Services, Corpus Christi Field Office.
      - Monitoring for Northern Aplomado Falcon and Rufa Red Knot will be conducted during active construction. In the event an individual is seen, the monitor will immediately contact the Construction Supervisor, who will in turn immediately stop all work in proximity to the observation until word is received from the monitor that the animal has left the vicinity and work may safely be resumed. The monitor will be empowered to stop work if the Construction Supervisor cannot be reached, or if the urgency of the situation does not allow time for such contact to be made. All monitoring efforts will be carried out by independent, qualified biologists who possess valid federal permits pursuant to Section 10(a)(1)(B) and are familiar with the species being monitored.
      - All construction personnel working on the project will be provided with ocelot, jaguarondi, Northern Aplomado Falcon, and Rufa Red Knot awareness training.
      - Removal of habitat will be minimized to the extent practicable. Habitat that must be removed during construction for construction access will be restored after construction is completed.
   2. The federally listed plant, South Texas Ambrosia (Ambrosia cheiranthifolia) species may potentially occur within the project area and the contractor will be advised to avoid harming the species if encountered.
   3. The following State-Listed threatened species may potentially occur within the project area and the contractor will be advised to avoid harming the species if encountered: Black-spotted Newt (Notophthalmus meridionalis), Sheep Frog (Hypopachus variolosus), South Texas Siren (Siren sp 1), White-lipped Frog (Leptodactylus fragilis), Reddish Egret (Egretta rufescens), White-faced Ibis (Plegadis chihi), White-tailed Hawk (Buteo albicaudatus), Wood Stork (Mycteria americana), Coues' Rice Rat (Oryzomys couesi), Speckled Racer (Drymobius margaritiferus), Texas Horned Lizard (Phrynosoma cornutum), Texas Indigo Snake (Drymarchon melanurus erebennus), and Texas Tortoise (Gopherus berlandieri).
   4. The following plant Species of Greatest Conservation Need (SGCN) may occur within the project area and the contractor will be advised to avoid harming the species if encountered: Mexican mud-plantain (Heteranthera mexicana), Large selenia (Selenia grandis) and South Texas spikesedge (Eleocharis austrotexana).

VI. Hazardous Materials on Contamination Issues

Action Items Required : ☐ No Action Required

General (applies to all projects):

Comply with the Hazard Communication Act (HCA) 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 HCA.

Maintain an adequate supply of on-site spill response materials as indicated in the MSDS. In the event of a spill, take immediate action to mitigate the spill as indicated in the MSDS and in accordance with safe work practices. Contact the TxDOT Pharr District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

- Dead or distressed vegetation (identified as not normal)
- Trash piles, drums, canisters, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of contaminant substances

Any other evidence indicating possible hazardous materials or contamination discovered on site.

1. ☒ If potentially hazardous material and/or contaminated media (i.e.: soil, groundwater, surface water, sediment, building materials) are unexpectedly encountered during construction, assure that such materials and contamination are handled according to applicable federal and state regulations, cease work in the immediate area and contact the Engineer immediately.

VI. Hazardous Materials on Contamination Issues - Continued:

2. 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 required.
   If "Yes", then TxDOT is responsible for completing an asbestos assessment/inspection.

3. Are the results of the asbestos inspection positive (is asbestos present)?

   ☐ Yes ☐ No

   If "Yes", then TxDOT must retain a Texas Department of State Health Services (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 abatement activities and/or demolition.

   If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

4. ☐ The Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and an Asbestos Consultant in order to minimize construction delays and subsequent claims.

VII. Other Environmental Issues

Action Items Required : ☐ No Action Required

1. ☒ Noise

   Contractor shall make every reasonable effort to minimize construction noise through abatement measures such as work hour controls and proper maintenance of equipment mufflers.

2. ☒ Air

   Contractor shall practice common dust control techniques such as surface chemical treatment or watering of unpaved road surfaces and vehicle speed reduction shall be implemented to minimize and prevent airborne dust during construction.

   Contractor should minimize MSAT by utilizing measures to encourage use of EPA required cleaner diesel fuels, limits on idling, increase use of cleaner burning diesel engines, and other emission limitation techniques, as appropriate.

3. ☒ Wetlands

   Contractor shall be aware of wetlands found within the project limits. Contractor shall make every reasonable effort to avoid disturbance of wetlands during construction.

Pharr District Contact No. 956-702-6100 Revised 01/30/2017

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Texas Department of Transportation

PHARR DISTRICT

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6			SOUTH PORT CONNECTOR
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON	SHEET NO.
CONTROL	SECTION	JOB	
0921	06	288	168

Date Printed: X-X-XX

TPWD BMPs

The Programmatic Agreement defines Best Management Practices (BMPs) to be implemented by Texas Department of Transportation (TxDOT) per §2.213 (Programmatic Agreements) of the 2017 Memorandum of Understanding (MOU) between TxDOT and Texas Parks and Wildlife Department (TPWD). These BMPs are measures that TxDOT and TPWD agree will result in avoidance and minimization of potential impacts to natural resources and in some cases apply to particular types of TxDOT projects.

The purpose of this section is to provide BMPs to minimize impacts to species or groups of species. Implementation of these BMPs by TxDOT eliminates the need for coordination under §2.206(1)of the MOU, except as noted.

Due diligence should be used to avoid killing or harming any wildlife species in the implementation of TxDOT projects.

☒ Bird BMPs (Required)

In addition to complying with the Migratory Bird Treaty Act (MBTA) perform the following BMPs:

- ☒ Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed.
- ☒ Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season.
- ☒ Avoid the removal of unoccupied, inactive nests, as practicable.
- ☒ Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair.
- ☒ Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

☐ Bald Eagle *(Haliaeetus leucocephalus)*

- ☐ Bird BMPs and Bald and Golden Eagle Protection Act compliance

☐ Reddish Egret *(Egretta rufescens)* or
☐ White-faced Ibis *(Plegadis chihi)*

- ☐ Bird BMPs unless project is within 300 meters (984 feet)of a known colonial water bird rookery then coordinate with TPWD.

☐ Rookeries (Recommendations)

In general, nesting dates for herons and egrets range from early February to late August in Texas, depending on the species. Great Blue Herons (GBHE) are usually the first to nest. When GBHE get disrupted from the nest and abandon nesting, then the other species of herons and egrets may not attempt to nest at the colony that year. Breeding dates for rookery species are approximately as follows:

Species	Dates
Cattle Egret	Early April to late October
Little Blue Heron	Late March to late July
Snowy Egret	Late March to early August
Great Egret	Early March to early August
Black-crowned Night Heron	Early February to late July
Great Blue Heron	February to late August

☐ Rookeries (Recommendations) (Continued)

- ☐ Vegetation clearing in a primary buffer area of 300 meters (984 feet) from a heronry periphery should be avoided. Utilizing areas that have already been cleared within this buffer area may be acceptable depending on site-specific characteristics. Additionally, human foot-traffic or machinery use should not occur within this buffer area during the nesting season.
- ☐ Clearing activities or construction using heavy machinery in a secondary buffer area of 1,000 meters (3,281 feet) from the heronry periphery should be avoided during the breeding season (courting and nesting).

☐ Bat BMPs (Required)

To determine the appropriate BMP to avoid or minimize impacts to bats, review the habitat description for the species of interest on the TPWD Rare, Threatened, and Endangered Species of Texas by County List or other trusted resources. All bat surveys and other activities that include direct contact with bats shall comply with TPWD' recommended white-nose syndrome protocols located on the TPWD Wildlife Habitat Assessment Program website under "Project Design and Construction".

The following survey and exclusion protocols should be followed prior to commencement of construction activities. For the purposes of this document, structures are defined as bridges, culverts (concrete or metal), wells, and buildings.

- ☐ For activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist will perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before project letting.
- ☐ For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats.
- ☐ If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction.
- ☐ Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F and minimum daytime temperatures are above 70°F. Prior to exclusion, ensure that alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, installation of alternate roosts is recommended to replace the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area. See Additional Bat BMPs (Recommendations) for recommended acceptable methods for excluding bats from structures.
- ☐ If feature(s) used by bats are removed as a result of construction, replacement structures should incorporate bat-friendly design or artificial roosts should be constructed to replace these features, as practicable.
- ☐ Conversion of property containing cave or cliff features to transportation purposes should be avoided where feasible.

☐ Bat BMPs (Required)(Continued)

- ☐ Avoid unnecessary removal of dead fronds on native and ornamental palm trees in south Texas (Cameron, Hidalgo, Willacy, Kenedy, Brooks, Kleberg, Nueces, and San Patricio counties) from April 1st through October 31st. If removal of dead fronds is necessary at other times of the year, limit frond removal to extended warm periods (nighttime temperatures: 55°F for at least two consecutive nights), so bats can move away from the disturbance and find new roosts.
- ☐ Large hollow trees, snags (dead standing trees), and trees with shaggy bark should be surveyed for colonies and, if found, should not be disturbed until the bats are no longer occupying these features. Post-occupancy surveys should be conducted by a qualified biologist prior to tree removal from the landscape.
- ☐ Retain mature, large diameter hardwood forest species and native/ornamental palm trees where feasible.
- ☐ In all instances, avoid harm or death to bats. Bats should only be handled as a last resort and after communication with TPWD.

☐ Mexican Long-tongues Bat *(Choeronycteris mexicana)*

- ☐ Avoid unnecessary impacts to cacti and agave species.
- ☐ Bat BMPs.

☐ Additional Bat BMPs (Recommendations)

- ☐ Bat surveys of structures should include visual inspections of structural fissures (cracked or spalled concrete, damaged or split beams, split or damaged timber railings), crevices (expansion joints, space between parallel beams, spaces above supports piers), and alternative structures (drainage pipes, bolt cavities, open sections between support beams, swallow nests) for the presence of bats.
- ☐ Before excluding bats from any occupied structure, bat species, weather, temperature, season, and geographic location must be incorporated into any exclusion plans to avoid unnecessary harm or death to bats. Winter exclusion must entail a survey to confirm either, 1) bats are absent or 2) present but active (i.e. continuously active - not intermittently active due to arousals from hibernation).
- ☐ Avoid using materials that degrade quickly, like paper, steel wool or rags, to close holes.
- ☐ Avoid using products or making structural modifications that may block natural ventilation, like hanging plastic sheeting over an active roost entrance, thereby altering roost microclimate.
- ☐ Avoid using chemical and ultrasonic repellents.
- ☐ Avoid use of silicone, polyurethane or similar non-water-based caulk products.
- ☐ Avoid use of expandable foam products at occupied sites.
- ☐ Avoid the use of flexible netting attached with duct tape.

Pharr District Contact No. 956-702-6100

Revised 07/12/2017

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Texas Department of Transportation

PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6			SOUTH PORT CONNECTOR
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TEXAS	PHR	CAMERON	SHEET NO.
CONTROL	SECTION	JOB	
0921	06	288	169

☐ Additional Bat BMPs (Recommendations) (Continued)

☐ In order to avoid entombing bats, exclusion activities should be only implemented by a qualified individual. A qualified individual or company should possess at least the following minimum qualifications:

- Experience in bat exclusion (the individual, not just the company).
- Proof of rabies pre-exposure vaccinations.
- Demonstrated knowledge of the relevant bat species, including maternity season date range and habitat requirements.
- Demonstrated knowledge of rabies and histoplasmosis in relation to bat roosts.

☐ Contact TPWD for additional resources and information to assist in executing successful bat exclusions that will avoid unnecessary harm or death in bats.

☐ Fossorial Mammal BMPs (Required)

☐ If black-tailed prairie dog (BTPD) burrows or pocket gopher mounds are to be excavated/directly impacted coordinate with TPWD WHAB.
☐ When a construction zone is adjacent to active BTPD burrows or pocket gopher mounds, erect barriers to discourage individuals moving through or into the construction area.
☐ When seeding or revegetation is planned in an area adjacent to BTPD burrows or pocket gopher mounds, a vegetative barrier should be considered in the planting to discourage dispersal into the ROW.

☒ Coues' Rice Rat *(Oryzomys couesi)*

☒ Minimize impacts to wetland, Resaca, oxbow lakes, and marsh habitats.
☒ Contractors will be advised of potential occurrence in the project area and to avoid harming the species if encountered.
☒ Water Quality BMPs.

☐ Plains Spotted Skunk *(Spilogale putorius interrupta)* or
☐ Swift Fox *(Vulpes velox)*

☐ Contractor will be advised of potential occurrence in the project area and to avoid harming the species if encountered and to avoid unnecessary impacts to dens.

☐ White nosed Coati *(Nasua narica)*
☐ Yellow nosed Cotton Rat *(Sigmodon ochrognathus)*

☐ Contractors will be advised of potential occurrence in the project area and to avoid harming the species if encountered.

☒ Terrestrial Reptile BMPs (Required)

☒ Apply hydro mulching and/or hydro seeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydro mulching and/or hydro seeding are not feasible due to site conditions, utilize erosion control blankets or mats that contain no netting or contain loosely woven, natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable.
☒ For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1 :1) in areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling.
☒ Inform contractors that if reptiles are found on project site allow species to safely leave the project area.
☒ Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter where feasible.
☒ Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.

☒ Texas Tortoise *(Gopherus berlandieri)*

☒ Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.
☒ Utility trenches should be covered overnight or visually inspected before filling to avoid burial of the species.
☒ Terrestrial Reptile BMPs.

☒ Texas Horned Lizard *(Phrynosoma cornutum)*

☒ Avoid harvester ant mounds in the selection of Project Specific Locations (PSLs) where feasible.
☒ Terrestrial Reptile BMPs.

☒ Additional Reptile BMPs (Recommendations)

☒ Due to increased activity (mating) of reptiles during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (April-May) season. Also, timing ground disturbing activities before October when reptiles become less active and may be using burrows in the project area is also encouraged.
☐ When designing roadways with curbs, consider using Type I or Type III curbs to provide a gentle slope to enable turtles and small animals to get out of roadways.
☒ If Texas Tortoises are present in a project area, they should be removed from the area. After removal of the tortoises, the area that will be disturbed during active construction and project specific locations should be fenced off to exclude tortoises and other reptiles. The exclusion fence should be constructed and maintained as follows:

a. The exclusion fence should be constructed with metal flashing or drift fence material.
b. Rolled erosion control mesh material should not be used.
c. The exclusion fence should be buried at least 6 inches deep and be at least 24 inches high.
d. The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated.

☒ Amphibian and Aquatic Reptile BMPs (Required)

Unless absence of the species can be demonstrated, assume presence in suitable habitat and implement the following BMPs. Absence can only be demonstrated using TPWD-approved survey efforts (contact TPWD for minimum survey protocols for species and project site conditions).

☒ For projects within one mile of a known occupied location or observation of the species recorded from 1980 until the current year and suitable habitat is present, coordinate with TPWD.
☒ For new location roadway projects, coordinate with TPWD.
☒ For projects within existing right-of-way (ROW) when work is in water or will permanently impact a water feature and potential habitat exists for the target species complete the following:

a) Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.
b) Minimize impacts to wetland, temporary and permanent open water features, including depressions, and riverine habitats.
c) Maintain hydrologic regime and connections between wetlands and other aquatic features.

Pharr District Contact No. 956-702-6100

☐ Amphibian and Aquatic Reptile BMPs (Continued)

d) Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species.
e) Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydromulching and/or hydroseeding are not feasible due to site conditions, using erosion control blankets or mats that contain no netting, or only contain loosely woven natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable.
f) Project specific locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features.
g) When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and overwinter sites (e.g., brush and debris piles, crayfish burrows) where feasible.
h) Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter, which may be refugia for terrestrial amphibians, where feasible.
i) If gutters and curbs are part of the roadway design, where feasible install gutters that do not include the side box inlet and include sloped (i.e. mountable) curbs to allow small animals to leave roadway. If this modification to the entire curb system is not possible, install sections of sloped curb on either side of the storm water drain for several feet to allow small animals to leave the roadway. Priority areas for these design recommendations are those with nearby wetlands or other aquatic features.

☐ For projects that require acquisition of additional ROW and work within that new ROW is in water or will permanently impact a water feature, implement a) - i) above plus j) -l) below, where applicable:

j) For sections of roadway adjacent to wetlands or other aquatic features, install wildlife barriers that prevent climbing. Barriers should terminate at culvert openings in order to funnel animals under the road. The barriers should be of the same length as the adjacent feature or 80 feet long in each direction, or whichever is the lesser of the two.
k) For culvert extensions and culvert replacement/installation, incorporate measures to funnel animals toward culverts such as concrete wingwalls and barrier walls with overhangs.
l) When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of terrestrial or aquatic wildlife through the water feature. Where feasible, biotechnical streambank stabilization methods using live native vegetation or a combination of vegetative and structural materials should be used.

Revised 07/12/2017

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PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6			SOUTH PORT CONNECTOR
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON	SHEET NO.
CONTROL	SECTION	JOB	
0921	06	288	170

Date Printed: X-X-XX

☒ Sheep Frog *(Hypopachus variolosus)*

- ☒ Minimize disturbance to burrows or downed woody debris.
- ☒ Water Quality BMPs.
- ☒ Amphibian BMPs.

☒ South Texas Siren (Large Form) *(Siren sp 1)*

- ☒ Minimize impacts to warm, shallow waters with vegetative cover such as ponds and ditches.
- ☒ Water Quality BMPs.
- ☒ Amphibian BMPs.

☐ Freshwater Mussel BMPs (Required)

- ☐ When work is in the water; survey project footprints for state listed species where appropriate habitat exists.
- ☐ When work is in the water and mussels are discovered during surveys; relocate state listed and SGCN mussels under TPWD authorization and implement Water Quality BMPs.
- ☐ When work is adjacent to the water; Water Quality BMPs implemented as part of the SWPPP for a construction general permit or any conditions of the Section 401 water quality certification for the project will be implemented.

☐ Fish BMPs (Required)

- ☐ For projects within the range of a SGCN or State-Listed fish and work is adjacent to water: Use Water Quality BMPs. No TPWD Coordination required.
- ☐ For projects within the range of a SGCN or State-Listed fish, and work is in the water: TPWD coordination is required.

☒ Water Quality BMPs (Required)

In addition to BMPs required for a TCEQ Storm Water Pollution Prevention Plan and/or Section 401 water quality permit:

- ☒ Minimize the use of equipment in streams and riparian areas during construction. When possible, equipment access should be from banks, bridge decks, or barges.
- ☒ When temporary stream crossings are unavoidable, remove stream crossings once they are no longer needed and stabilize banks and soils around the crossing.

☐ Additional Water Quality BMPs (Recommendations)

- ☐ Wet-Bottomed detention ponds are recommended to benefit wildlife and downstream water quality. Consider potential wildlife-vehicle interactions when siting detention ponds.
- ☐ Rubbish found near bridges on TxDOT ROW should be removed and disposed of properly to minimize the risk of pollution. Rubbish does not include brush piles or snags.

☐ Aquatic Mitigation (Recommendations)

- ☐ In-kind compensatory mitigation should be considered for all unavoidable impacts to aquatic resources including, but not limited to streams, wetlands, oysters, seagrass and mudflats, regardless of their jurisdictional status.
- ☐ Compensatory mitigation plans should be developed in consultation with TPWD Transportation Conservation Coordinator.

☐ Stream Crossings (Recommendations)

- ☐ Use spanning bridges rather than culverts when feasible.
- ☐ If using a culvert, staggered culverts that concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations is recommended.
- ☐ Bottomless culverts are recommended to allow for fish and other aquatic wildlife passage in the low flow channel. If bottomless culverts are not feasible, making a low flow channel for fish passage is recommended.
- ☐ Avoid placing riprap across stream channels and instead use alternative stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, riprap may be buried, back-filled with topsoil and planted with native vegetation.
- ☐ Incorporate bat-friendly design into bridges and culverts.
- ☐ Design bridges for adequate vertical and horizontal clearances under the roadway to allow for terrestrial wildlife to safely pass under the road.
- ☐ A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. For culverts, incorporation of an artificial ledge inside the culvert on one or both sides for use by terrestrial wildlife is recommended.
- ☐ Riparian buffer zones should remain undisturbed where possible.

☒ Vegetation BMPs (Recommendations)

- ☒ Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided to the greatest extent practicable. Wherever practicable, impacted vegetation should be replaced with in-kind on-site replacement/restoration of native vegetation.
- ☒ To minimize adverse effects, activities should be planned to preserve mature trees, particularly acorn, nut or berry producing varieties. These types of vegetation have high value to wildlife as food and cover.
- ☐ It is strongly recommended that trees greater than 12 inches in diameter at breast height (dbh) that are removed be replaced. TPWD's experience indicates that for ecologically effective replacement, a ratio of three trees for every one (3:1) lost should be provided to the extent practicable either on-site or off-site. Trees less than 12 inches dbh should be replaced at a 1:1 ratio.
- ☒ Replacement trees should be of equal or better wildlife quality than those removed and be regionally adapted native species.
- ☐ When trees are planted, a maintenance plan that ensures at least an 85 percent survival rate after three (3) years should be developed for the replacement trees.
- ☒ The use of any non-native vegetation in landscaping and revegetation is discouraged. Locally adapted native species should be used.
- ☒ The use of seed mix that contains seeds from only locally adapted native species is recommended.
- ☒ Avoid vegetation clearing activities during the general bird nesting season, March through August, to minimize adverse impacts to birds.

☐ Invasive Species BMPs (Recommendations)

- ☐ For all work in waters listed in the distribution of Zebra mussels on http://texasinvasives .org/ as well as those waters specified in 31 TAC §57.972 and any TPWD emergency orders regarding prevention of the spread of Zebra mussels all machinery, equipment, or vehicles coming in contact with such waters should follow clean/drain/dry protocols to prevent the potential spread of invasive Zebra mussels.
- ☐ Care should be taken to avoid the spread of aquatic invasive plants (such as Giant Salvinia, Hydrilla, Hyacinth, Watermilfoil, Water Lettuce, and Alligatorweed) from infested water bodies into areas not currently infested. All machinery/equipment/vehicles coming in contact with waters containing aquatic invasive plant species should follow clean/drain/dry protocols to prevent the potential spread of invasive plants.
- ☐ Colonization by invasive plants should be actively prevented on disturbed sites in terrestrial habitats. Vegetation management should include removing invasive species as soon as practical while allowing the existing native plants to revegetate the disturbed areas. If using hay bales for sediment control, use locally grown weed-free hay to prevent the spread of invasive species. Leave the hay bales in place and allow them to break down, as this acts as mulch assisting in revegetation.

☐ Wildlife Crossings (Recommendations)

- ☐ Design roadways on new location to incorporate wildlife crossings, particularly in areas that bisect wildlife travel corridors or seasonal movement routes.
- ☐ Consider using cable median barrier instead of concrete traffic barrier when feasible to increase permeability for animals encountering barriers.

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Texas Department of Transportation

PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
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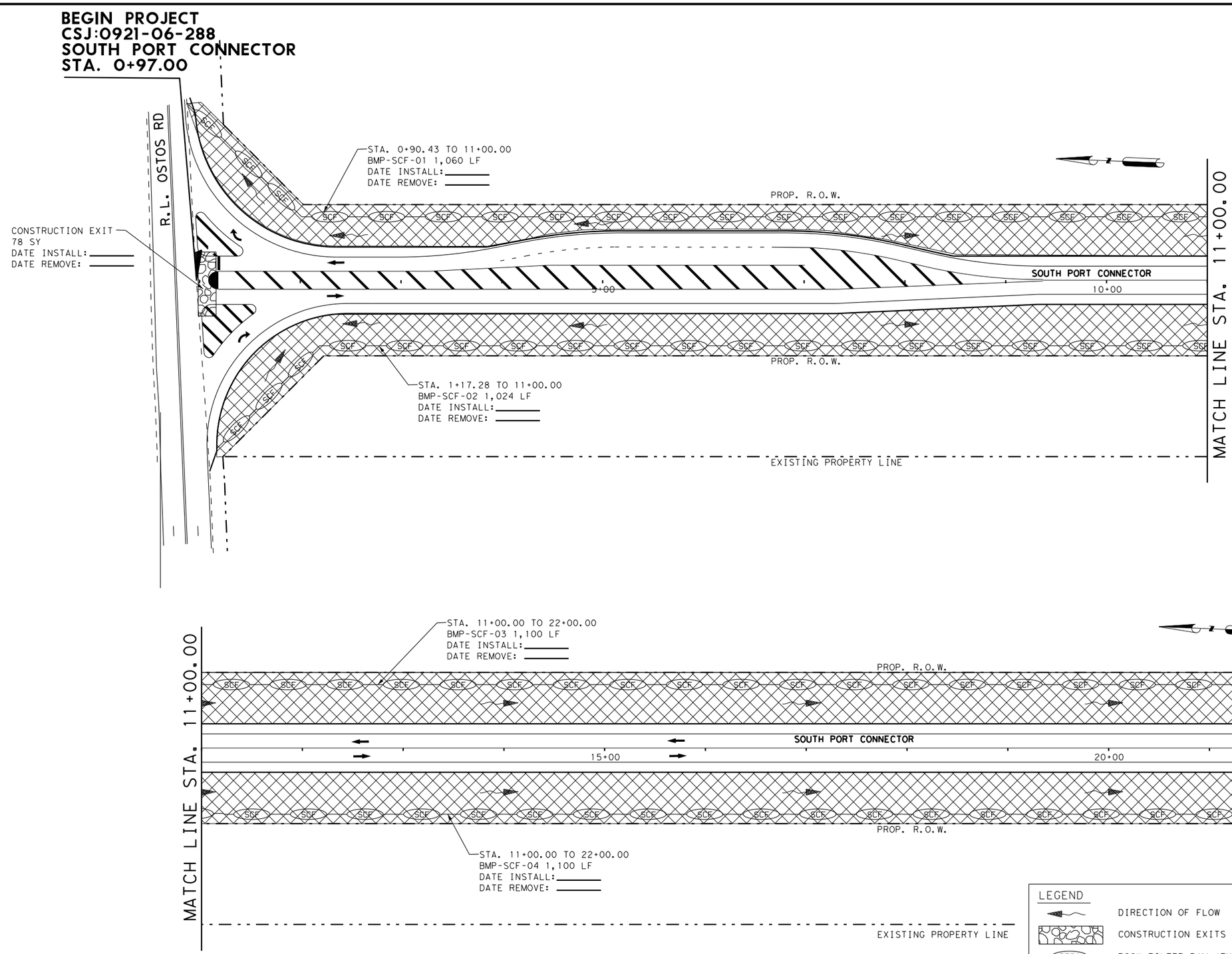
CONTROL	SECTION	JOB	
0921	06	288	171

Date Printed: X-X-XX



ESTIMATED QUANTITIES

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	164	DRILL SEEDING (PERM)(RURAL)	AC	5
	164	DRILL SEEDING (TEMP)(WARM)	AC	5
	168	VEGETATIVE WATERING	MG	762
	506	ROCK FILTER DAMS (INST)(TY 1)	LF	
	506	ROCK FILTER DAMS (REMOVE)	LF	
	506	CONSTRUCTION EXITS(INST)(TY 1)	SY	78
	506	CONSTRUCTION EXITS(REMOVE)	SY	78
	506	FRNT END LOADER WORK	HR	14
	506	TEMP SEDMT CONT FENCE(INSTALL)	LF	4,284
	506	TEMP SEDMT CONT FENCE(REMOVE)	LF	4,284

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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Frank H. Chapa

SOUTH PORT CONNECTOR
SW3P LAYOUT
STA 0+97.00 TO
STA 22+00.00

SHEET 1 OF 5
SCALE: PLAN: 1"=100'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

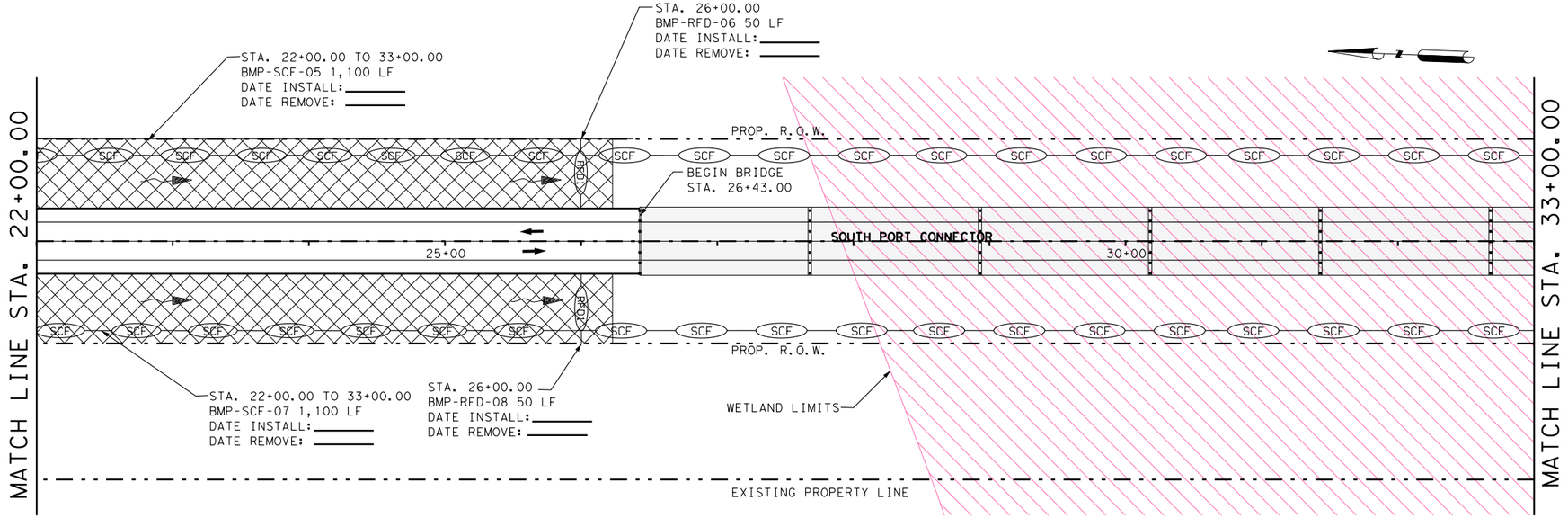
PORT OF BROWNSVILLE the port that works

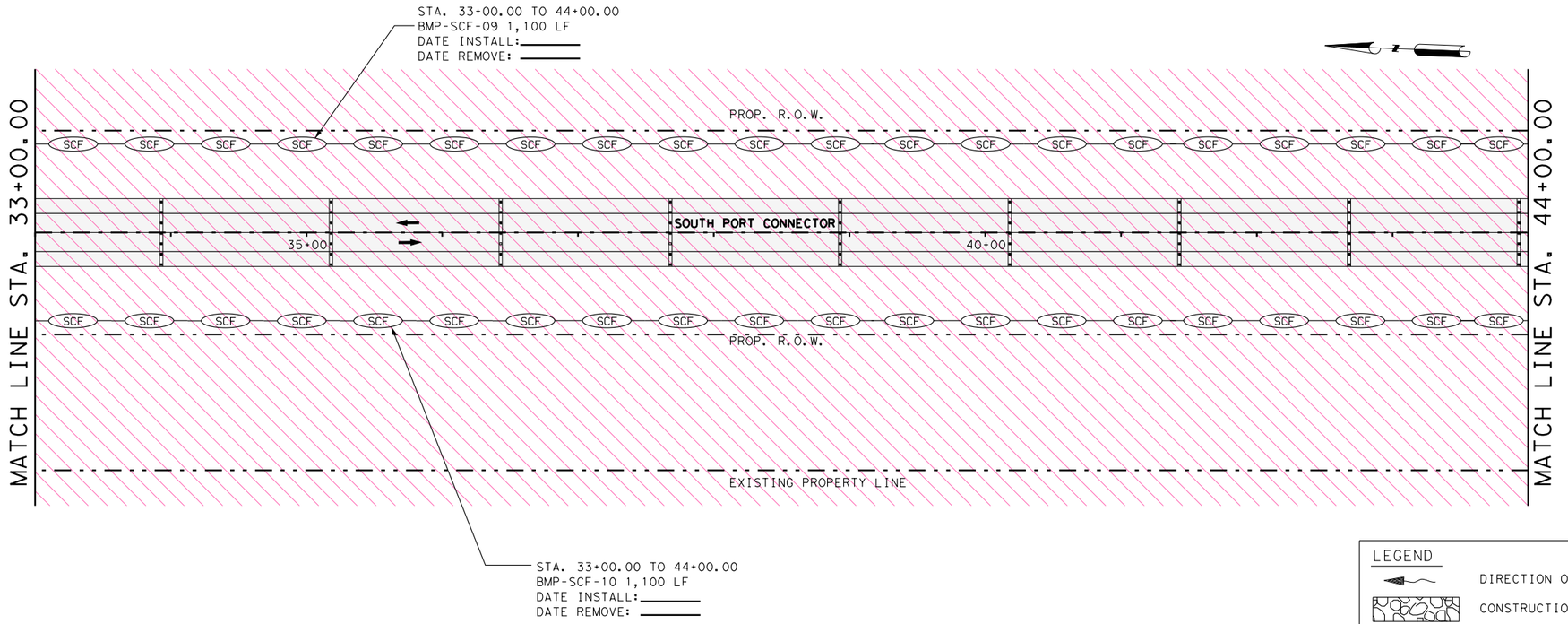
S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		172

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR





LEGEND

- DIRECTION OF FLOW
- CONSTRUCTION EXITS
- RFD1 — ROCK FILTER DAM (TYPE 1)
- SCF — TEMP SEDIMENT CONTROL FENCE
- SEEDING
- WETLAND LIMITS

ESTIMATED QUANTITIES

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	164	DRILL SEEDING (PERM)(RURAL)	AC	1
	164	DRILL SEEDING (TEMP)(WARM)	AC	1
	168	VEGETATIVE WATERING	MG	116
	506	ROCK FILTER DAMS (INST)(TY 1)	LF	100
	506	ROCK FILTER DAMS (REMOVE)	LF	100
	506	CONSTRUCTION EXITS(INST)(TY 1)	SY	
	506	CONSTRUCTION EXITS(REMOVE)	SY	
	506	FRNT END LOADER WORK	HR	3
	506	TEMP SEDMT CONT FENCE(INSTALL)	LF	4,400
	506	TEMP SEDMT CONT FENCE(REMOVE)	LF	4,400

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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SOUTH PORT CONNECTOR

SW3P LAYOUT

STA 22+00.00 TO
STA 44+00.00

SHEET 2 OF 5
SCALE: PLAN: 1"=100'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			173

DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON

DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

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Plotted @: 8:43:41 AM
Plotted by: salinab
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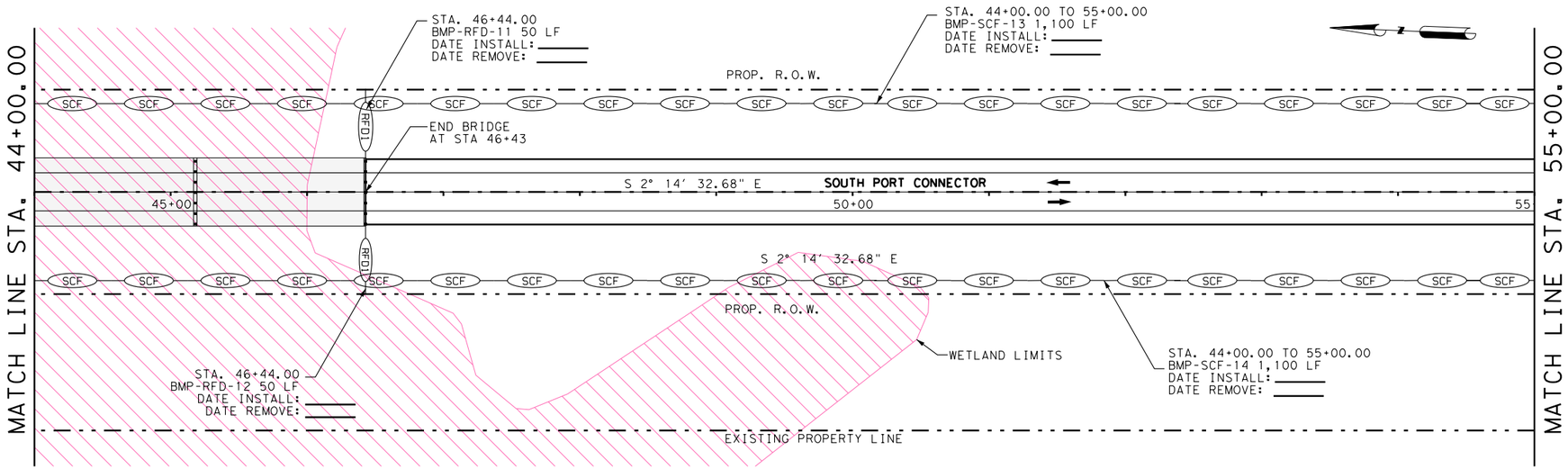

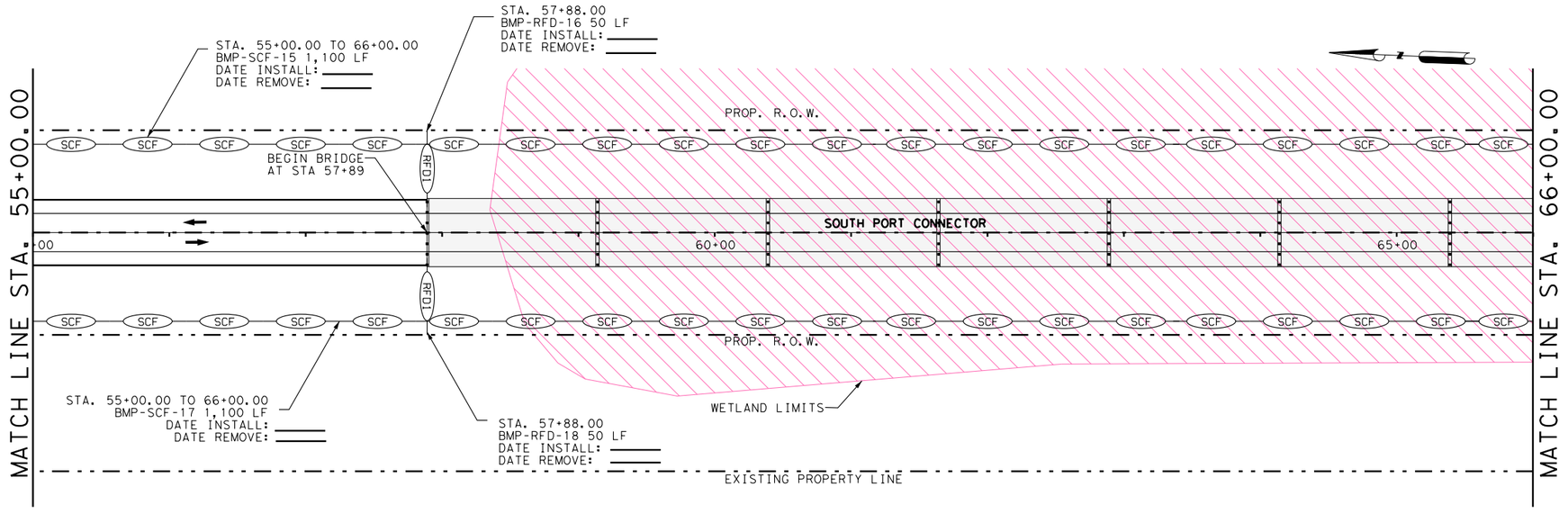

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	164	DRILL SEEDING (PERM)(RURAL)	AC	
	164	DRILL SEEDING (TEMP)(WARM)	AC	
	168	VEGETATIVE WATERING	MG	
	506	ROCK FILTER DAMS (INST)(TY 1)	LF	200
	506	ROCK FILTER DAMS (REMOVE)	LF	200
	506	CONSTRUCTION EXITS(INST)(TY 1)	SY	
	506	CONSTRUCTION EXITS(REMOVE)	SY	
	506	FRNT END LOADER WORK	HR	
	506	TEMP SEDMT CONT FENCE(INSTALL)	LF	4,400
	506	TEMP SEDMT CONT FENCE(REMOVE)	LF	4,400

LEGEND

- DIRECTION OF FLOW
- CONSTRUCTION EXITS
- RFD1 — ROCK FILTER DAM (TYPE 1)
- SCF — TEMP SEDIMENT CONTROL FENCE
- SEEDING
- WETLAND LIMITS

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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SOUTH PORT CONNECTOR

SW3P LAYOUT

STA 44+00.00 TO
STA 66+00.00

SHEET 3 OF 5
PLAN: 1"=100'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			174
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

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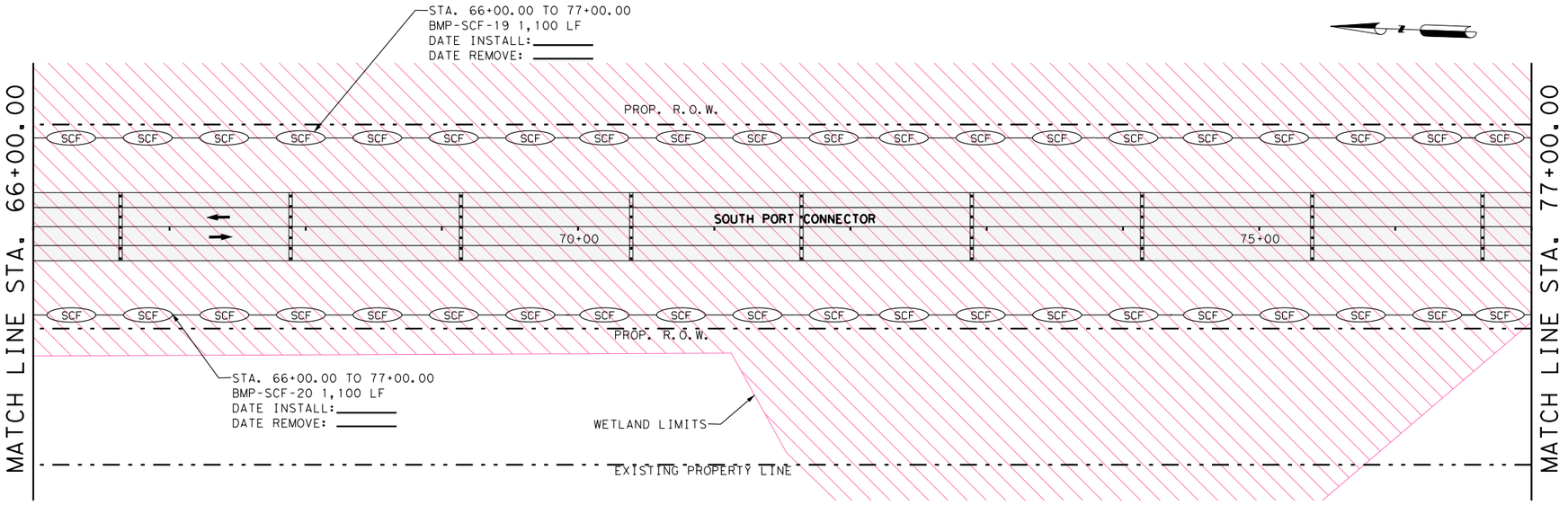

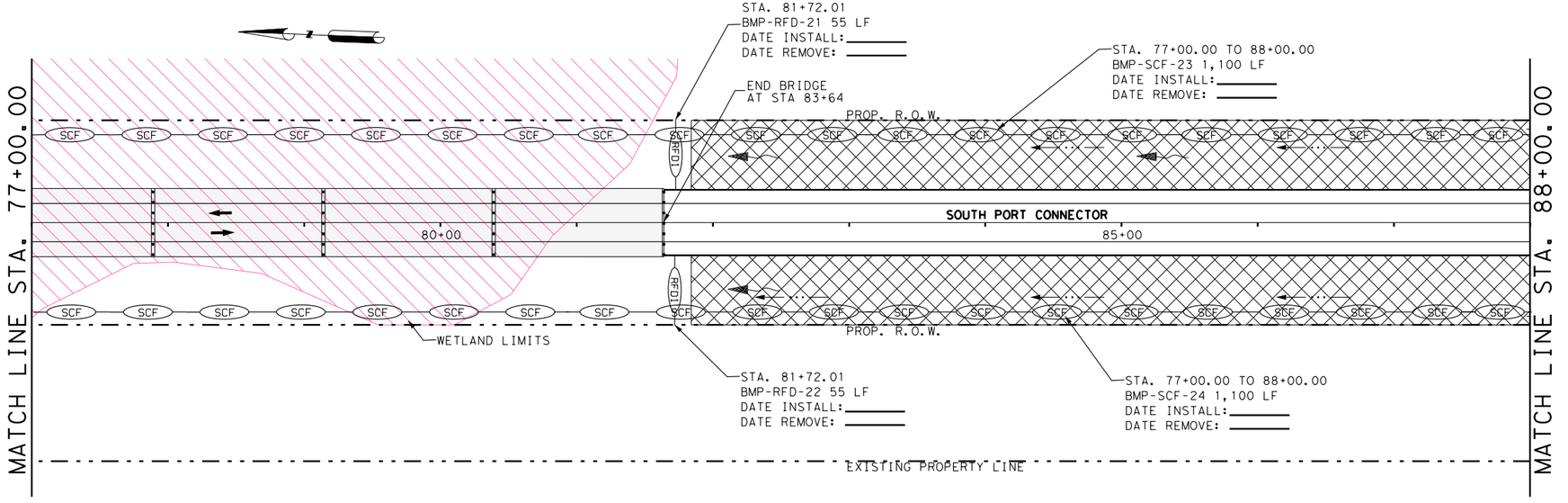

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	164	DRILL SEEDING (PERM)(RURAL)	AC	1
	164	DRILL SEEDING (TEMP)(WARM)	AC	1
	168	VEGETATIVE WATERING	MG	219
	506	ROCK FILTER DAMS (INST)(TY 1)	LF	110
	506	ROCK FILTER DAMS (REMOVE)	LF	110
	506	CONSTRUCTION EXITS(INST)(TY 1)	SY	
	506	CONSTRUCTION EXITS(REMOVE)	SY	
	506	FRNT END LOADER WORK	HR	4
	506	TEMP SEDMT CONT FENCE(INSTALL)	LF	4,400
	506	TEMP SEDMT CONT FENCE(REMOVE)	LF	4,400

LEGEND

- DIRECTION OF FLOW
- CONSTRUCTION EXITS
- RFD1 — ROCK FILTER DAM (TYPE 1)
- SCF — TEMP SEDIMENT CONTROL FENCE
- SEEDING
- WETLAND LIMITS

STATE OF TEXAS
FRANK H. CHAPA
128020
REGISTERED PROFESSIONAL ENGINEER

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SOUTH PORT CONNECTOR

SW3P LAYOUT

STA 66+00.00 TO STA 88+00.00

SHEET 4 OF 5
SCALE: PLAN: 1"=100'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE the port that works

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

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FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			175
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

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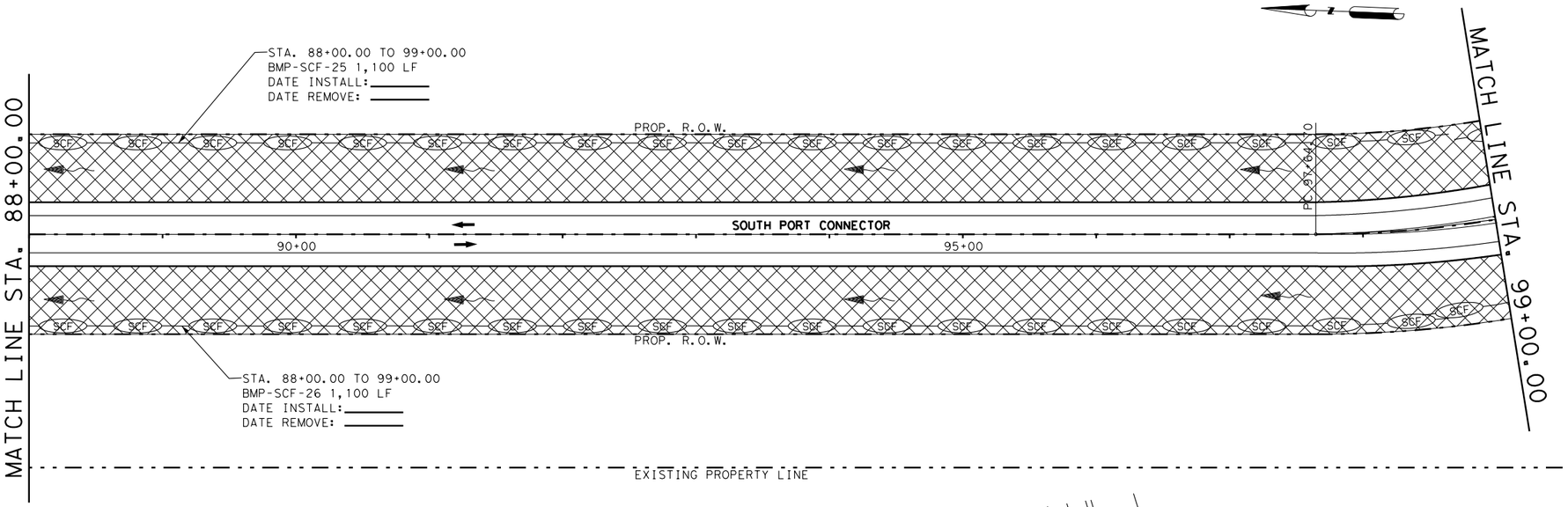

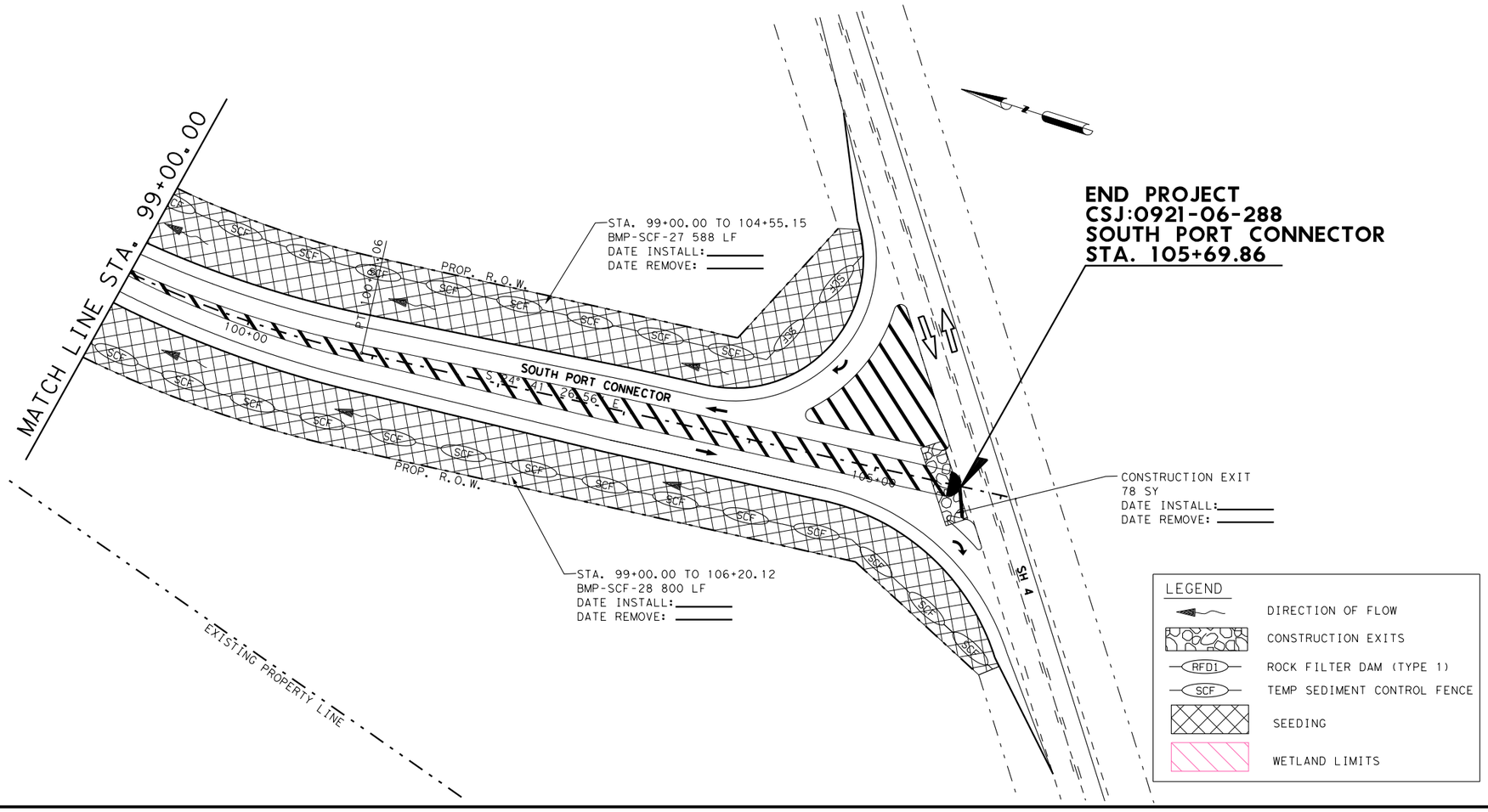

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	164	DRILL SEEDING (PERM)(RURAL)	AC	4
	164	DRILL SEEDING (TEMP)(WARM)	AC	4
	168	VEGETATIVE WATERING	MG	588
	506	ROCK FILTER DAMS (INST)(TY 1)	LF	
	506	ROCK FILTER DAMS (REMOVE)	LF	
	506	CONSTRUCTION EXITS(INST)(TY 1)		78
	506	CONSTRUCTION EXITS(REMOVE)	SY	78
	506	FRNT END LOADER WORK	HR	11
	506	TEMP SEDMT CONT FENCE(INSTALL)	LF	3,588
	506	TEMP SEDMT CONT FENCE(REMOVE)	LF	3,588

STATE OF TEXAS
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SOUTH PORT CONNECTOR

SW3P LAYOUT

STA 88+00.00 TO
STA 105+69.86

SHEET 5 OF 5
SCALE: PLAN: 1"=100'

RMA CAMERON COUNTY REGIONAL MOBILITY AUTHORITY

PORT OF BROWNSVILLE
the port that *works*

S&B INFRASTRUCTURE, LTD.
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

DRAWING PREPARED BY: S&B

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			176
DGN: JS	STATE	DIST.	COUNTY
CHK DGN: FC	TEXAS	PHARR	CAMERON
DWG:	CONT.	SECT.	JOB	HIGHWAY NO.
CHK DWG:	0921	06	288	SOUTH PORT CONNECTOR

Plotted on: 5/17/2019
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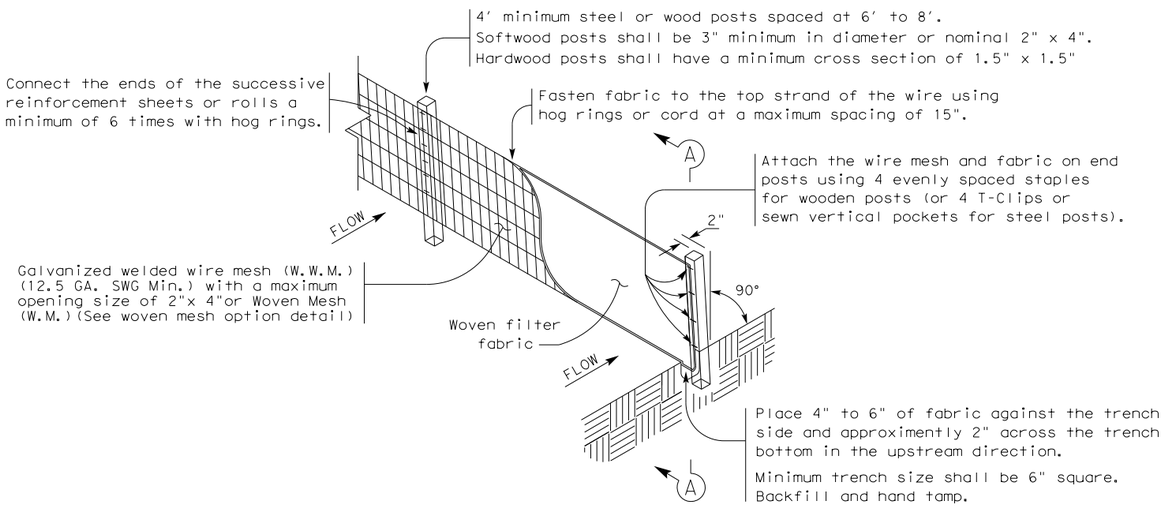
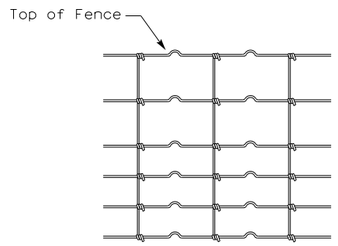
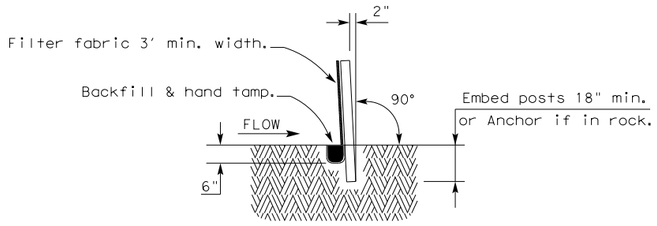


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

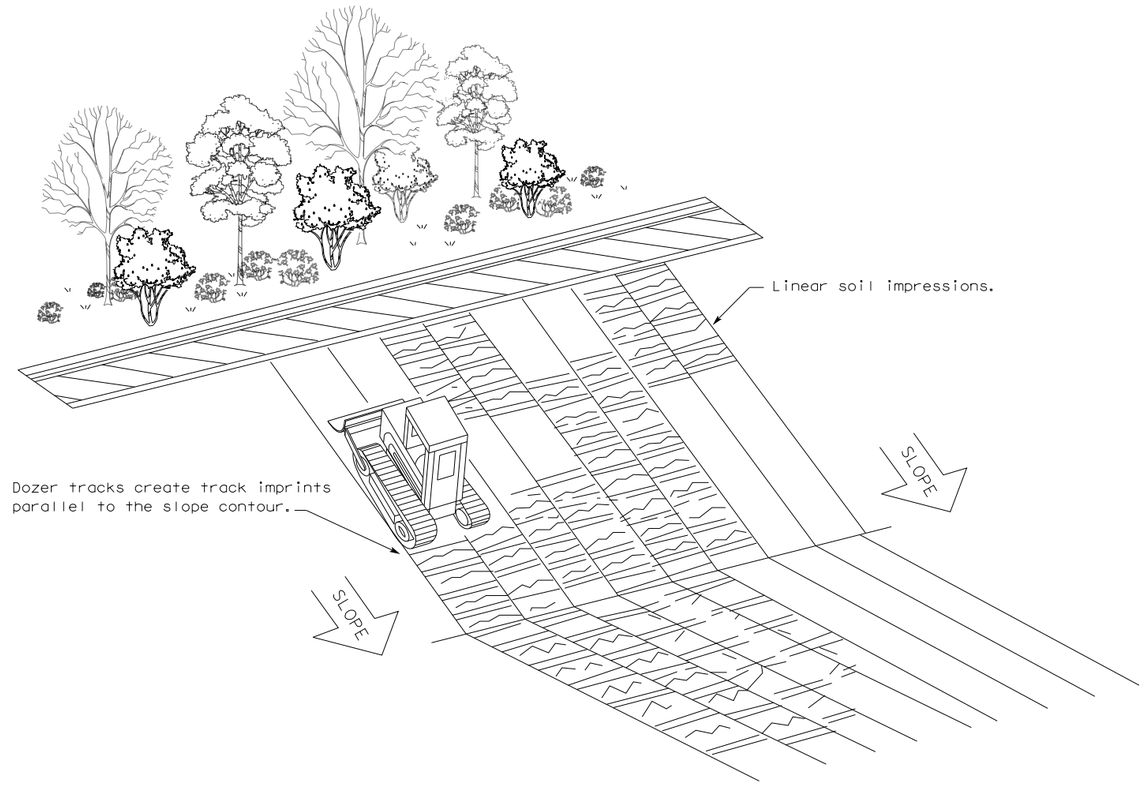
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		177

DATE
FILE

DATE:
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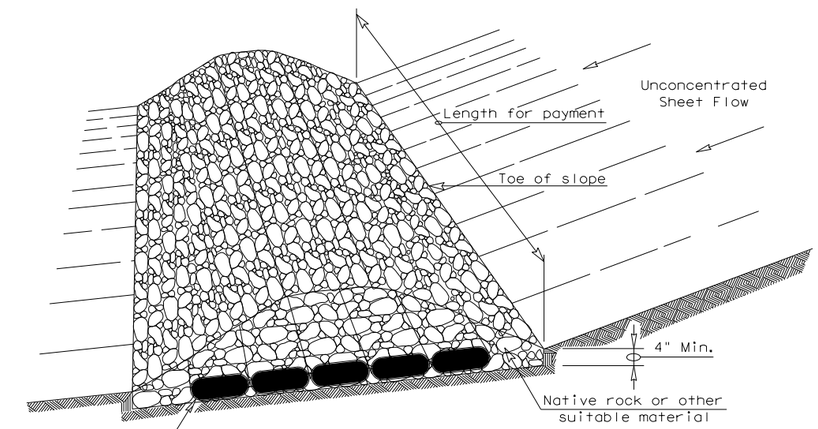
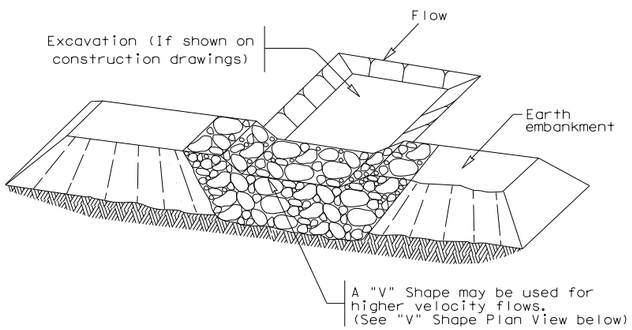


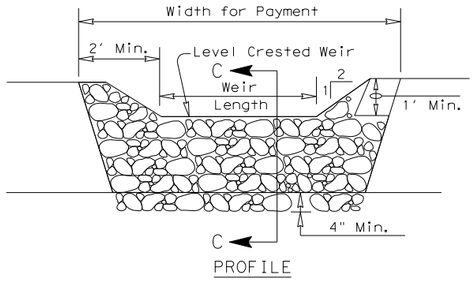
FILTER DAM AT TOE OF SLOPE

RFD1



FILTER DAM AT SEDIMENT TRAP

RFD1 — OR — RFD2



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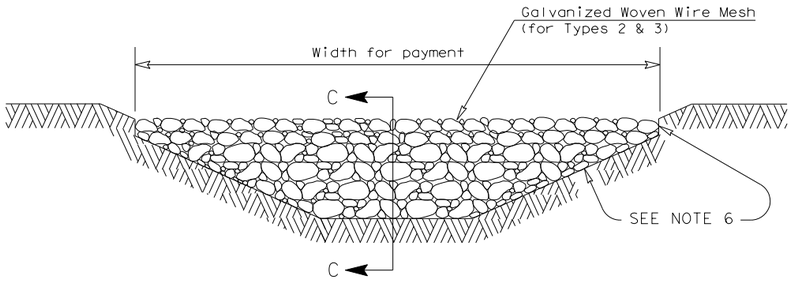
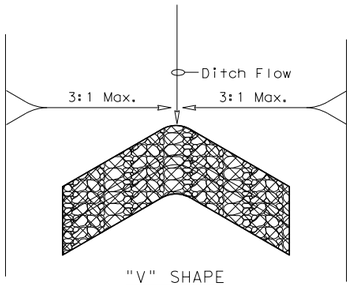
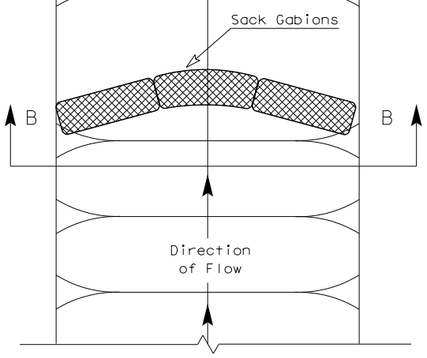


FILTER DAM AT CHANNEL SECTIONS

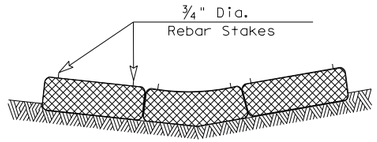
RFD1 — OR — RFD2 — OR — RFD3



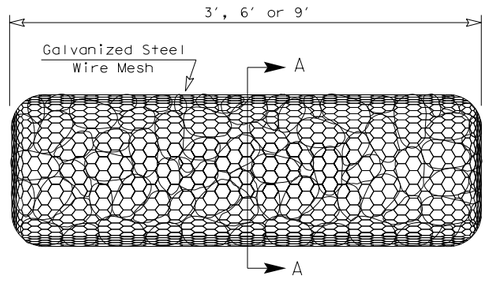
"V" SHAPE
PLAN VIEW



PLAN VIEW

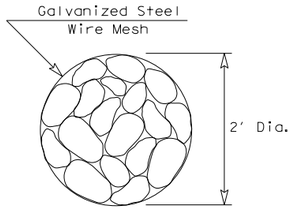


SECTION B-B

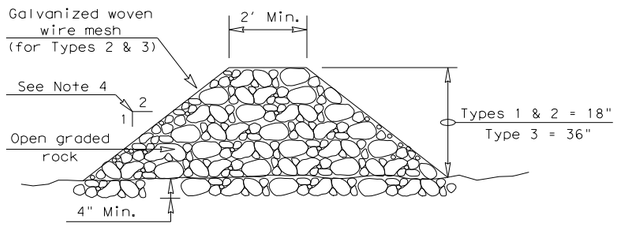


TYPE 4 (SACK GABIONS)

RFD4



SECTION A-A



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT		CK: KM	DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0921	06	288		SOUTH PORT CONNECTOR	
	DIST	COUNTY			SHEET NO.	
	PHR	CAMERON			178	

DATE: 5/17/2019
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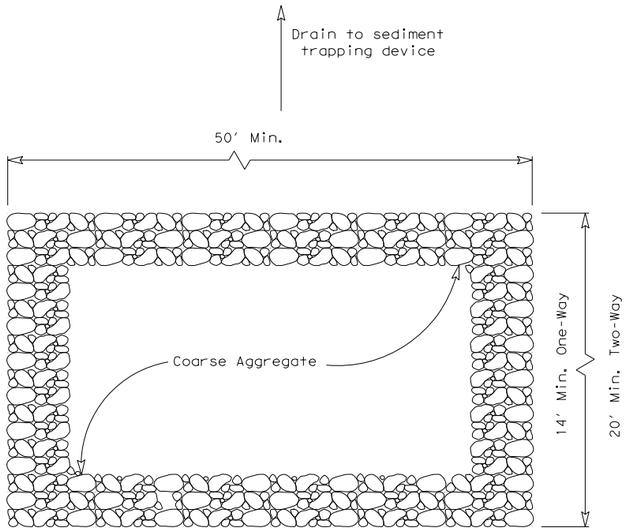
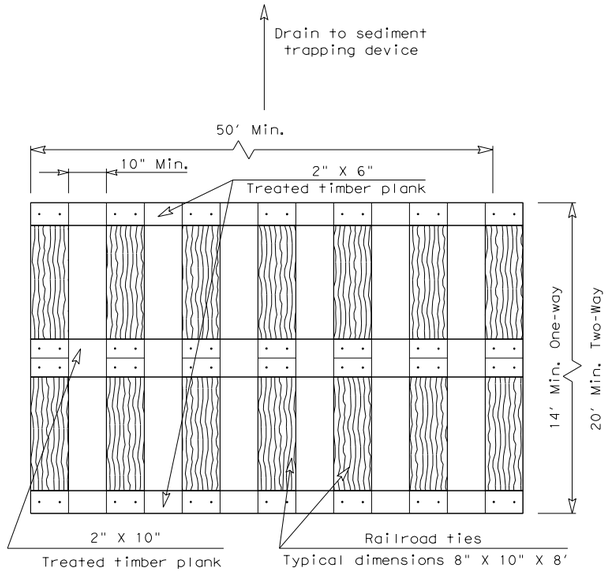
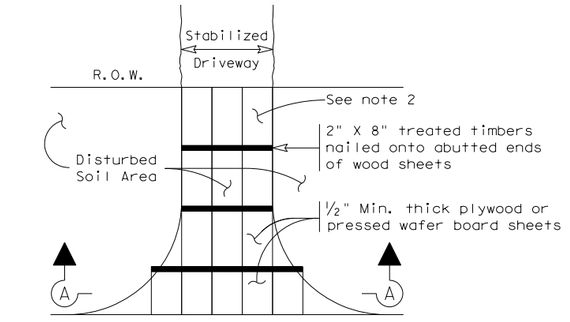


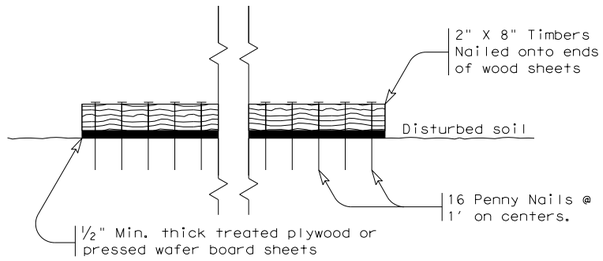
PLAN VIEW



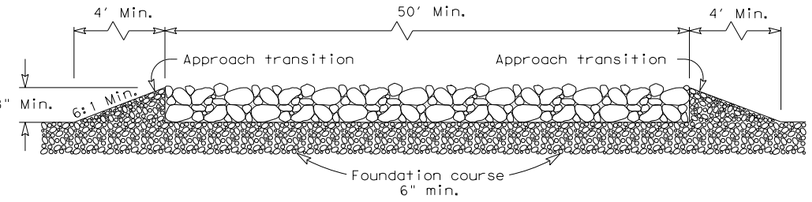
PLAN VIEW



PLAN VIEW



SECTION A-A



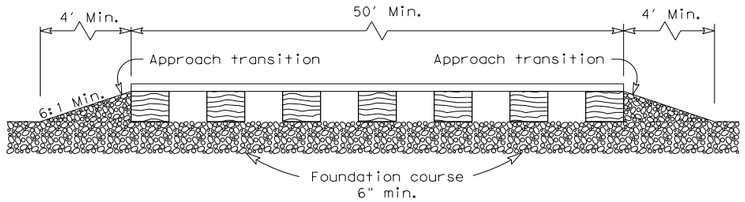
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
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REVISIONS	0921	06	288	SOUTH PORT CONNECTOR
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		179