SUBJECT: PLANS AND PROPOSAL ADDENDUMS

PROJECT: F 2023(060) CONTROL: 0089-10-026

COUNTY: WHARTON

LETTING: 10/07/2022

REFERENCE NO: 0927

PROPOSAL ADDENDUMS

_ PROPOSAL COVER

X BID INSERTS (SH. NO.: ALL)

_ GENERAL NOTES (SH. NO.:)

_ SPEC LIST (SH. NO.:)

_ SPECIAL PROVISIONS:

ADDED:

DELETED:

_ SPECIAL SPECIFICATIONS:

ADDED:

DELETED:

X OTHER: PLAN SHEET AND OTHER CHANGES

DESCRIPTION OF ABOVE CHANGES
(INCLUDING PLANS SHEET CHANGES)

***** BID INSERTS *****

REVISED QUANTITIES FOR THE FOLLOWING BID ITEMS: 451-6007

ADDED THE FOLLOWING BID ITEMS: 451-6019, 420-6066

DELETED THE FOLLOWING BID ITEM: 450-6018

***** PLAN SHEETS *****

SHEET 2 (INDEX OF SHEETS): ADDED SHEETS 66A, 66B, AND 73A

SHEET 15 & 16 (ESTIMATE & QUANTITY SHEET): DELETED ITEM 450-6018, ADDED ITEM 451-6019, ITEM 420-6066

SHEET 48 (BRIDGE RAIL AND MBGF SUMMARY AND LAYOUT): DELETED ITEM 450-6018 REPLACED WITH ITEM 451-6019, REVISED QUANTITY FOR ITEM 451-6007 AND AND ADDED NOTE 3

SHEET 49 (BRIDGE RAIL AND MBGF SUMMARY AND LAYOUT): CHANGED RAIL TYPE

DESCRIPTION OF ABOVE CHANGES (CONTINUED)
(INCLUDING PLANS SHEET CHANGES)

SHEET 66A (RAIL RETROFIT DETAILS): ADDED TO PLANS TO CLARIFY CONSTRUCTION DETAILS

SHEET 66B (RAIL RETROFIT DETAILS): ADDED TO PLANS TO CLARIFY CONSTRUCTION DETAILS

SHEET 73A (T631-CM): ADDED SHEET TO THE PLANS TO CLARIFY CONSTRUCTION DETAILS

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

09/23/2022

⚠1 REVISION 09/27/22

INDEX OF SHEETS

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
0089	10	026, ETC	SH 60
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	WHARTON	2

PATH: T:\YKMANNEX\PS&E\0089100026_SH60\Plan_Sheets\
FILE: INDEX_OF_SHEETS.dgn

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0089-10-026 **DISTRICT** Yoakum **COUNTY** Wharton
HIGHWAY SH 60

		CONTROL SECTION JOB		**0089-10-026**		**0240-03-037**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00124565**		**A00124193**			
		COUNTY		**Wharton**		**Wharton**			
		HIGHWAY		**SH 60**		**SH 60**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	104-6054	REMOVING CONCRETE(MOW STRIP)	LF			595.000		595.000	
	132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	73.000		10.000		83.000	
	134-6004	BACKFILL (TY A OR B)	STA			98.550		98.550	
	150-6002	BLADING	HR	10.000		10.000		20.000	
	316-6249	AGGR(TY-PE GR-4 SAC-B)	CY			356.000		356.000	
	316-6400	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	GAL			15,727.000		15,727.000	
	351-6008	FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	SY	1,000.000		1,000.000		2,000.000	
	354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY			3,645.000		3,645.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY			22,078.000		22,078.000	
1	420-6066	CL C CONC (RAIL FOUNDATION)	CY	4.300				4.300	
	432-6002	RIPRAP (CONC)(5 IN)	CY	6.400		2.000		8.400	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	490.000				490.000	
	432-6046	RIPRAP (MOW STRIP)(5 IN)	CY			2.000		2.000	
1	451-6007	RETROFIT RAIL (TY T223)	LF	1 677.700				677.700	
1	451-6019	RETROFIT RAIL (TY T631)	LF	34.920				34.920	
	500-6001	MOBILIZATION	LS	1.000				1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	4.000				4.000	
	512-6005	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	LF	960.000		300.000		1,260.000	
	512-6029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF	1,710.000		300.000		2,010.000	
	512-6053	PORT CTB (REMOVE)(F-SHAPE)(TY 1)	LF	1,260.000				1,260.000	
	530-6024	TURNOUTS (RAP)	SY	925.000		263.000		1,188.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	1,565.080		339.000		1,904.080	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	2.000				2.000	
	540-6020	MTL W - BEAM GD FEN (LOW FILL CULVERT)	LF			36.000		36.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	1,650.000		375.000		2,025.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	6.000				6.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	6.000		4.000		10.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA			4.000		4.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	8.000		2.000		10.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	2.000				2.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA			2.000		2.000	
	560-6008	MAILBOX INSTALL-D (WC-POST) TY 3	EA	1.000				1.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	70.000		12.000		82.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	42.000		12.000		54.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF			39,420.000		39,420.000	
	662-6012	WK ZN PAV MRK NON-REMOV (W)8"(SLD)	LF			550.000		550.000	
	662-6015	WK ZN PAV MRK NON-REMOV (W)18"(SLD)	LF			80.000		80.000	

1 **REVISION 9/27/22**

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0089-10-026 **DISTRICT** Yoakum **COUNTY** Wharton
HIGHWAY SH 60

									TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0089-10-026**		**0240-03-037**				
		PROJECT ID		**A00124565**		**A00124193**				
		COUNTY		**Wharton**		**Wharton**				
		HIGHWAY		**SH 60**		**SH 60**				
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL			
	662-6016	WK ZN PAV MRK NON-REMOV (W)24"(SLD)	LF			124.000			124.000	
	662-6032	WK ZN PAV MRK NON-REMOV (Y)4"(BRK)	LF			3,744.000			3,744.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF			14,152.000			14,152.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA			1,490.000			1,490.000	
	666-6035	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	LF			275.000			275.000	
	666-6299	RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)	LF	4,213.000					4,213.000	
	666-6302	RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)	LF	18,404.000					18,404.000	
	666-6311	RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)	LF	5,010.000					5,010.000	
	666-6314	RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)	LF	30,142.000					30,142.000	
	668-6072	PREFAB PAV MRK TY C (W) (8") (SLD)	LF			275.000			275.000	
	668-6075	PREFAB PAV MRK TY C (W) (18") (SLD)	LF			80.000			80.000	
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	123.000		124.000			247.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	36.000					36.000	
	668-6089	PREFAB PAV MRK TY C (W) (RR XING)	EA			1.000			1.000	
	672-6007	REFL PAV MRKR TY I-C	EA	211.000		14.000			225.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	628.000		183.000			811.000	
	3076-6042	D-GR HMA TY-D SAC-B PG70-22	TON			5,275.000			5,275.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000			4.000	
	6185-6002	TMA (STATIONARY)	DAY	20.000					20.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	20.000					20.000	
	6439-6004	HPPM-RIB W/RET REQ TYI(W)4"(SLD)100MIL	LF			19,710.000			19,710.000	
	6439-6010	HPPM-RIB W/RET REQ TYI(Y)4"(BRK)100MIL	LF			1,872.000			1,872.000	
	6439-6012	HPPM-RIB W/RET REQ TYI(Y)4"(SLD)100MIL	LF			7,076.000			7,076.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000					1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000					1.000	

⚠1 **REVISION 9/27/22**

BRIDGE RAIL, CONCRETE RAIL, END TREATMENT, AND DELINEATOR SUMMARY

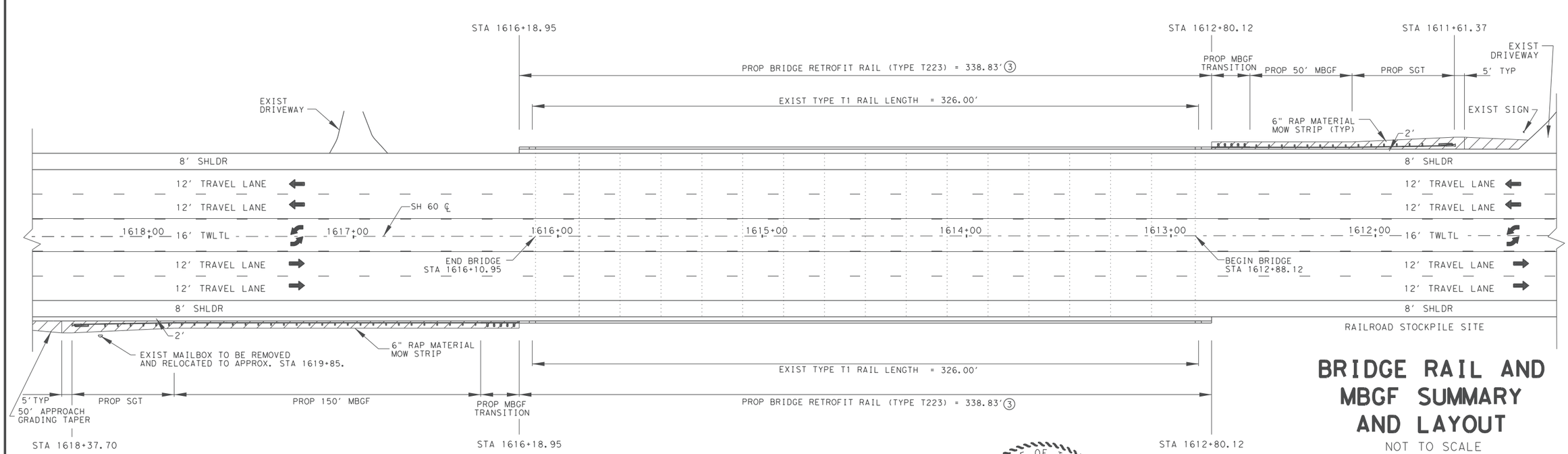
LOCATION	ITEM 132 EMBANKMENT (VEHICLE) (ORD COMP) (TY C) (EST) (CY)	ITEM 432 RIPRAP (CONC) (5") (EST) (CY)	ITEM 432 RIPRAP (STONE PROTECTION) (18") (EST) (CY)	ITEM 451 RETROFIT RAIL (TY T631) △1 (LF)	ITEM 451 RETROFIT RAIL (TY T223) (LF)	ITEM 530 TURNOUTS (RAP) (EST) (SY)	ITEM 540 METAL BEAM GUARD FENCE (TIM POST) (LF)	ITEM 540 METAL BEAM GUARD FENCE TRANS (THRIE-BEAM) (EA)	ITEM 542 REMOVE METAL BEAM GUARD FENCE (LF)	ITEM 542 REMOVE TERMINAL ANCHOR SECTION (EA)	ITEM 544 GUARDRAIL END TREATMENT (INSTALL) (EA)	ITEM 544 GUARDRAIL END TREATMENT (REMOVE) (EA)	ITEM 560 MAILBOX INSTALL-D (WC-POST) TY3 ② (EA)	ITEM 658 INSTL DEL ASSM(D-SW)SZ1 (BRF) GF2(BI) (EA)	ITEM 658 INSTL DEL ASSM(D-SW)SZ (BRF)CTB(BI) (EA)	REMARKS
STA 1548+07.46 TO STA 1549+15.00 LT	5					75	57.54		75	1	1			2		
STA 1540+07.46 TO STA 1549+15.00 RT	48		490 ①			386	857.54		808.08	1	1			18		
BAUGHMAN SLOUGH BRIDGE STA 1549+15.00 TO STA 1549+49.92 LT/RT		6.4		34.92			34.92		34.92					4		BAUGHMAN SLOUGH BRIDGE NBI# 13-241-0-0089-10-040 STA 1549+15.00 TO STA 1549+49.92
STA 1549+49.92 TO STA 1551+57.46 LT	5					114	157.54		175	1	1			4		
STA 1549+49.92 TO STA 1552+57.46 RT	5					153	257.54		257	1	1			6		
BAUGHMAN SLOUGH BRIDGE TOTALS	**63**	**6.4**	**490 ①**	**34.92**	**0**	**728**	**1365.08**	**0**	**1350**	**4**	**4**	**0**	**0**	**34**	**0**	
STA 1611+61.37 TO STA 1612+80.12 RT	5					79	50	1	125	1	1			3		
PEACH CREEK BRIDGE STA 1612+80.12 TO STA 1616+18.95 LT/RT					③										14	PEACH CREEK BRIDGE NBI# 13-241-0-0089-10-041 STA 1612+88.12 TO STA 1616+10.95
STA 1616+18.95 TO STA 1618+37.70 LT	5					118	150	1	175	1	1		1	5		② EXIST MAILBOX TO BE REMOVED AND RELOCATED TO APPROX. STA 1619+85.
PEACH CREEK BRIDGE TOTALS	**10**	**0**	**0**	**0**	**③**	**197**	**200**	**2**	**300**	**2**	**2**	**0**	**1**	**8**	**14**	
CSJ 0089-10-026 TOTALS	**73**	**6.4**	**490 ①**	**34.92**	**677.7 ③**	**925**	**1565.08**	**2**	**1650**	**6**	**6**	**0**	**1**	**42**	**14**	

① SEE "BRIDGE RAIL AND MBGF SUMMARY AND LAYOUT" SHEET 2 OF 4 FOR MORE INFORMATION.

② REMOVAL AND RELOCATION OF EXISTING MAILBOX IS CONSIDERED SUBSIDIARY TO ITEM 560.

③ SEE "RAIL RETROFIT DETAILS" SHEET FOR ITEM 451, RETROFIT RAIL (TY T223) QUANTITY.

△1



RAP MATERIAL MOW STRIP

BRIDGE RAIL AND MBGF SUMMARY AND LAYOUT

NOT TO SCALE

CSJ 0089-10-026
PEACH CREEK BRIDGE
STA 1612+88.12 TO STA 1616+10.95
NBI# 13-241-0-0089-10-041

△1 REVISION 09/27/22

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

09/23/2022

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
0089	10	026, ETC	SH 60
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	WHARTON	48

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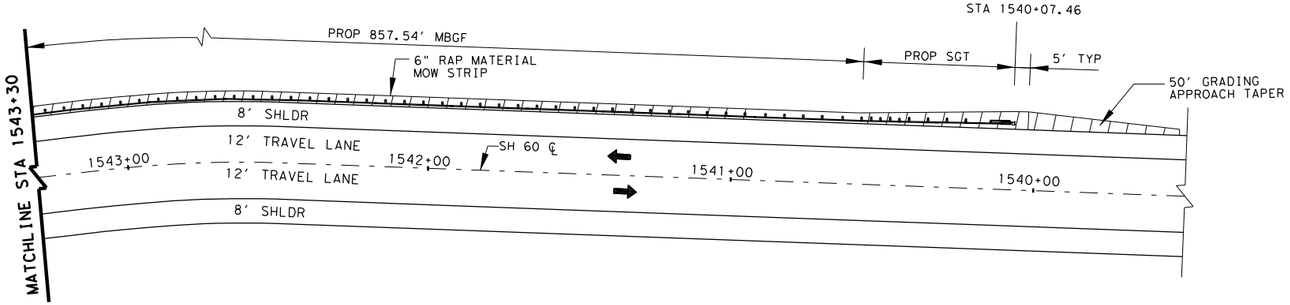

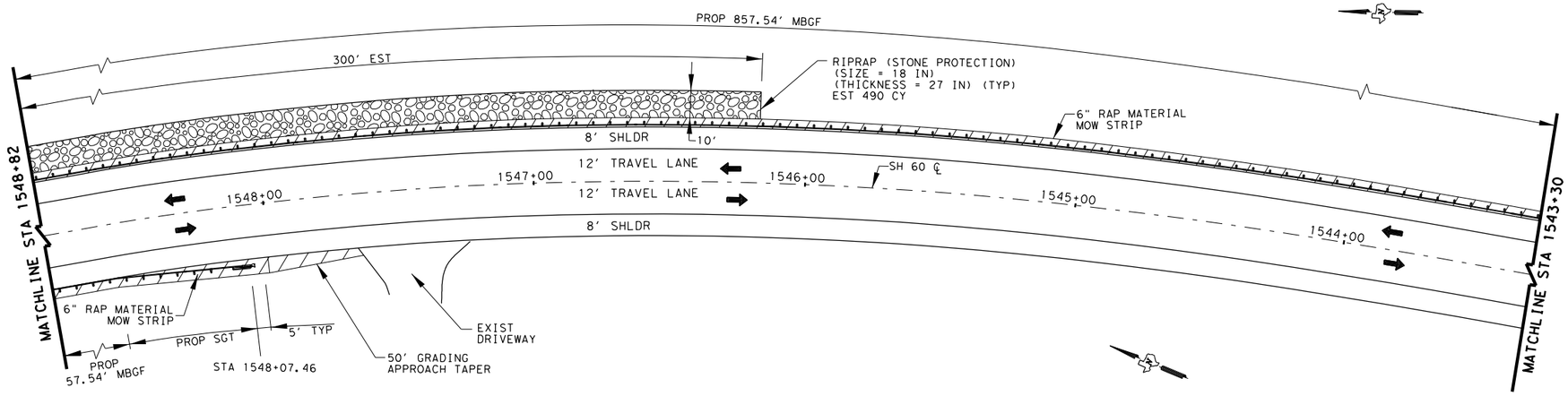

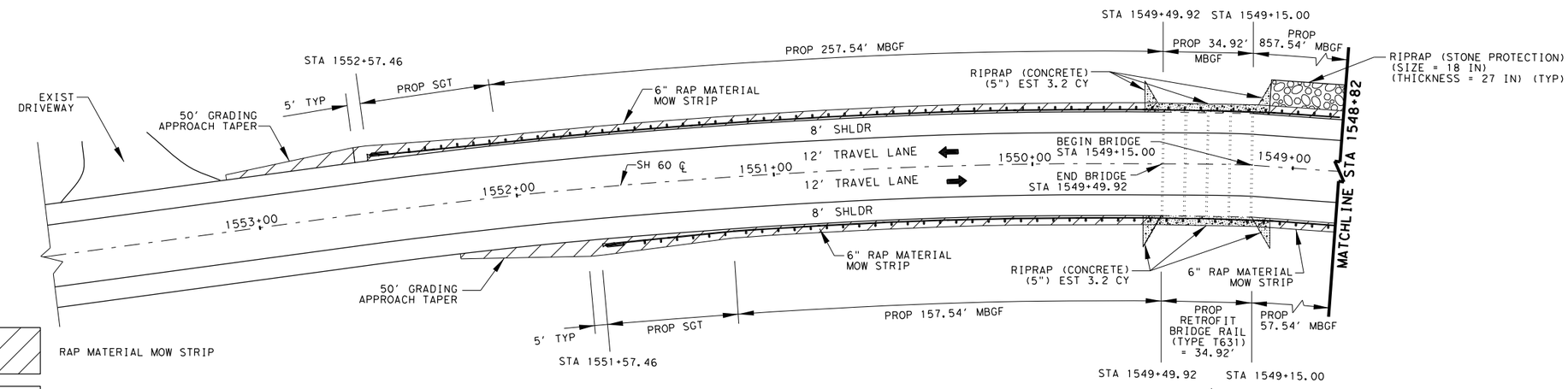

RAP MATERIAL MOW STRIP

RIPRAP (CONCRETE) (5")

RIPRAP (STONE PROTECTION)

CSJ 0089-10-026
BAUGHMAN SLOUGH BRIDGE

STA 1549+15.00 TO STA 1549+49.92
NBI# 13-241-0-0089-10-040

⚠1 REVISION 09/27/22

STATE OF TEXAS
AMANDA ANDERLE FLING
105989
LICENSED
PROFESSIONAL ENGINEER

Amanda Anderle Fling, P.E.

09/23/2022

BRIDGE RAIL AND MBGF SUMMARY AND LAYOUT

NOT TO SCALE

Texas Department of Transportation

FED.RD. DIV.NO.		PROJECT NO.	
6			
CONT.	SECT.	JOB	HIGHWAY NO.
0089	10	026, ETC	SH 60
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	YKM	WHARTON	49

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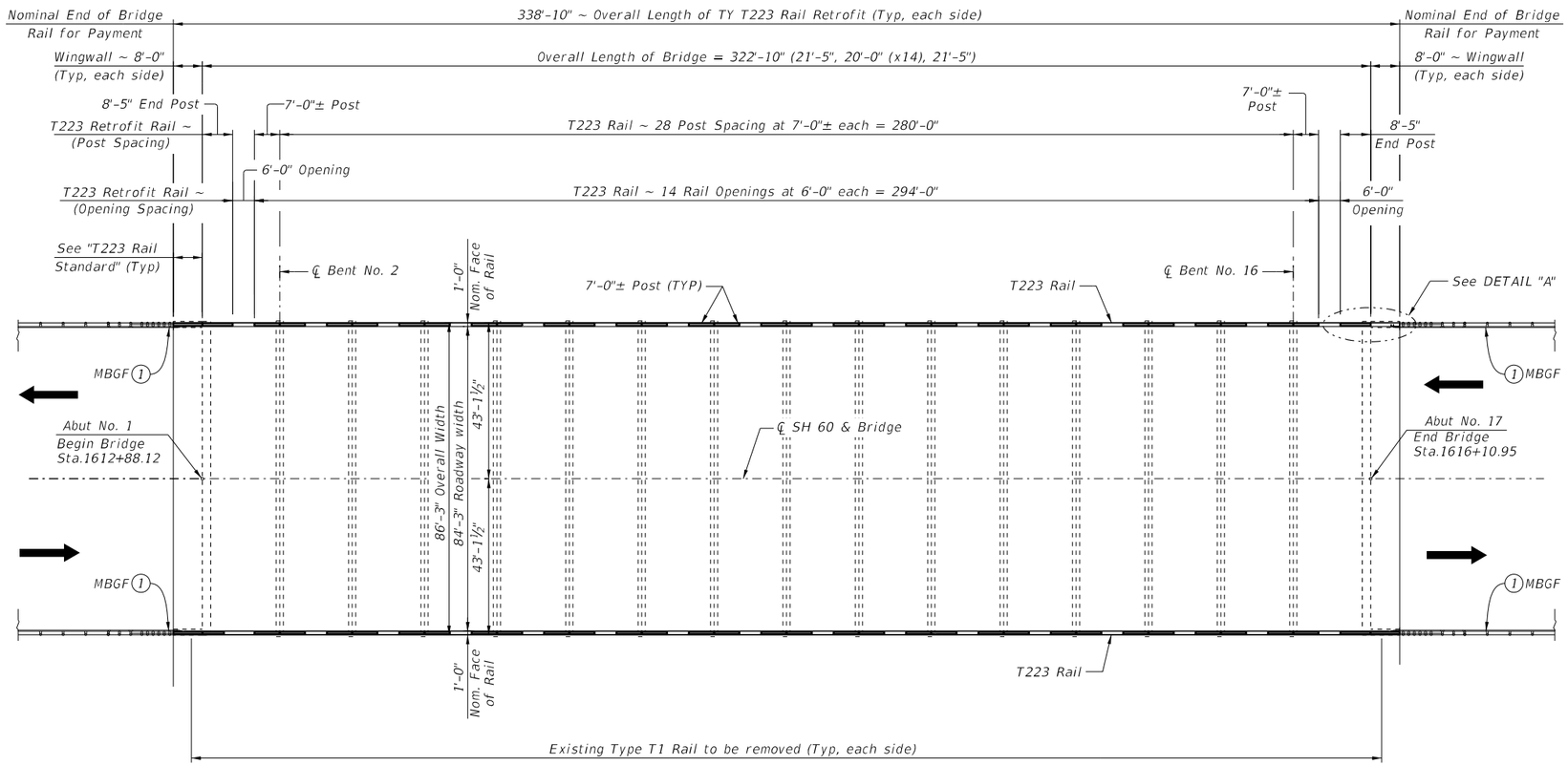


T223 RAIL RETROFIT PLAN

TABLE OF ESTIMATED QUANTITIES		
BID CODE	ITEM DESCRIPTION	QUANTITY
0420 6066	CLASS C CONC (RAIL FOUNDATION)	4.3 CY
0451 6007	RETROFIT RAIL (TY T223)	677.7 LF

1

(1) See elsewhere in plans for MBGF lengths.

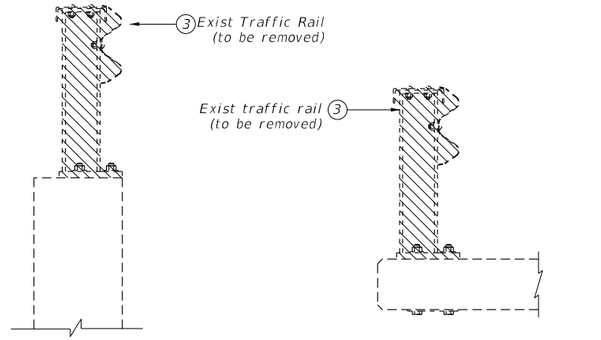
(2) Existing dimensions are not shown and must be field verified. A minimum slab thickness of 7" is required for anchor bolt installation.

(3) Remove existing T1 bridge railing. Cut and grind flush all existing anchor bolts from top of slab and wingwall. Paint exposed bolts bolt ends with two coats of zinc-rich paint conforming to Item 445, "Galvanizing". Fill existing hole with an epoxy grout. Repair any spalls or cracks at the locations of new rail posts in accordance with Item 429, "Concrete Structure Repair". Payment for repairs and epoxy grout is subsidiary to Item 451, "Retrofit Railing".

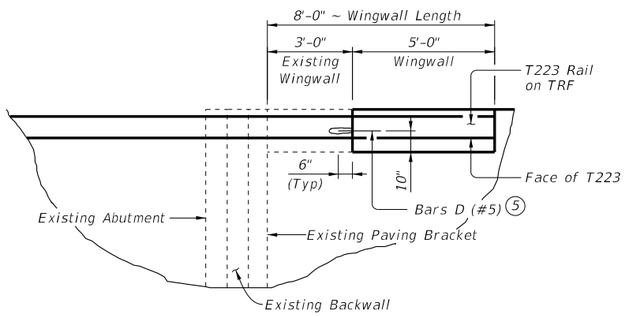
(4) See Type T223 rail standard for Joint Detail.

(5) Embed Bars D (#5, 1'-6") 6" with a Type III Class epoxy anchorage system. Follow manufacturer's directions for installing the epoxied anchor bars. Place Bars D (#5) as shown.

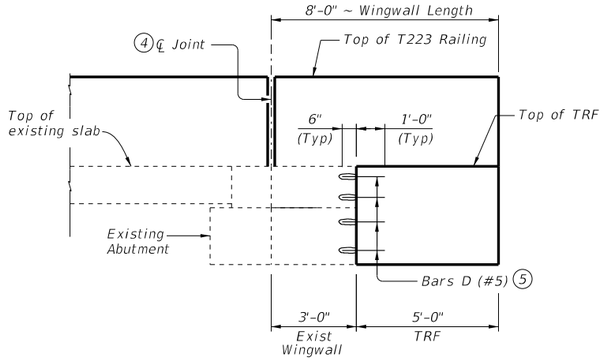
Field verify existing dimensions before commencing work and ordering materials.



TYPE T1 RAILING (TO BE REMOVED)



PLAN



ELEVATION

DETAIL "A" ~ T223 RAIL ON TRF

NBI# 13-241-0-0089-10-041

STATE OF TEXAS
AL SHAWN
132389
LICENSED
PROFESSIONAL ENGINEER

09/27/2022

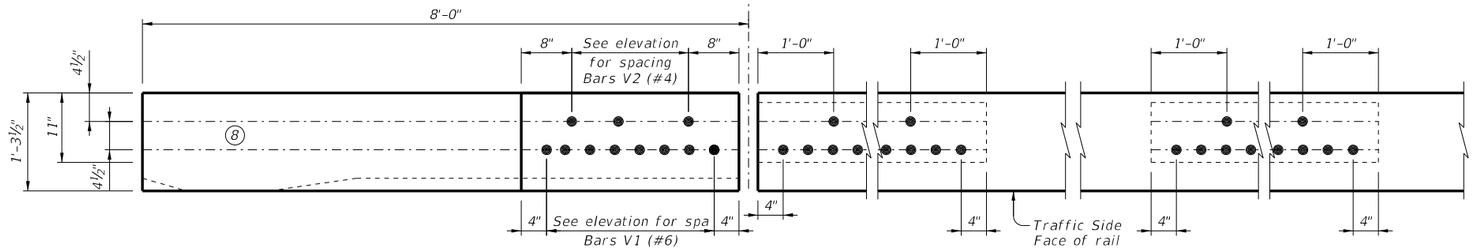
1 ADDED SHEET 09/27/22

Texas Department of Transportation — Bridge Division

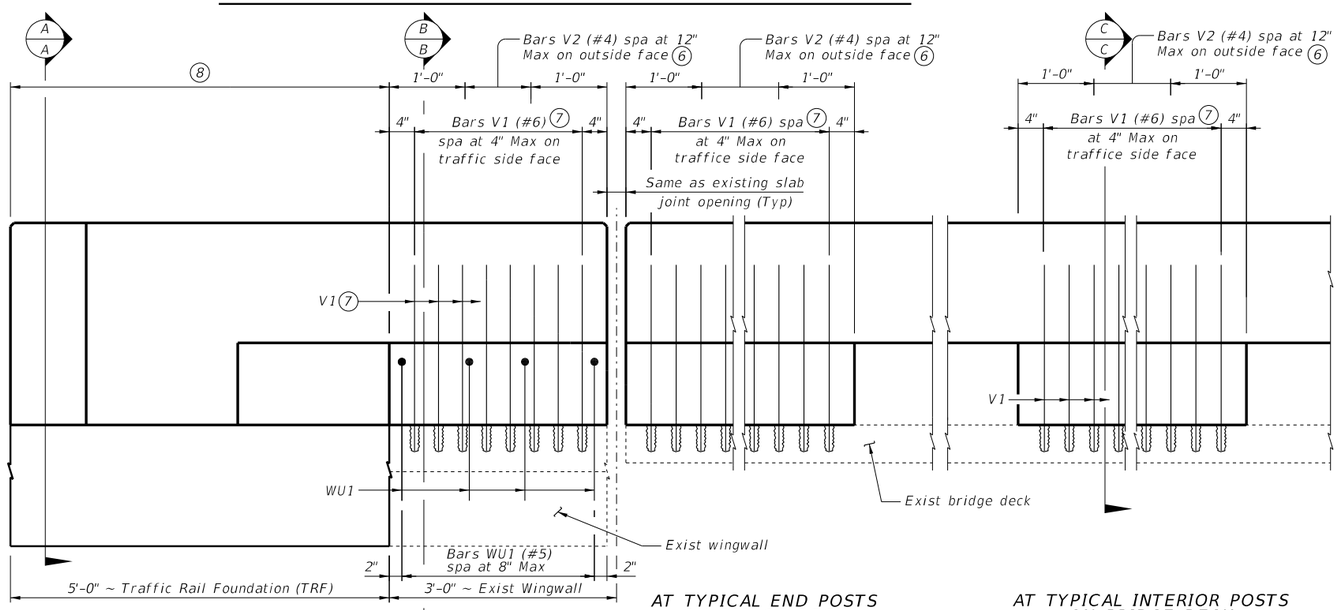
RAIL RETROFIT DETAILS

SH 60 AT PEACH CREEK BRIDGE

FILE: SH060_BRG_RL497mi01.dgn	DN: CG	CK: HTP	DW: SFS	CK: CG
©TxDOT SEPTEMBER 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0089	10	026, ETC	SH 60, ETC
	DIST	COUNTY		SHEET NO.
	YKM	WHARTON, ETC		66A



PARTIAL PLAN OF T223 RAIL WITH EPOXY ANCHORS



AT TYPICAL TERMINAL ON WINGWALL

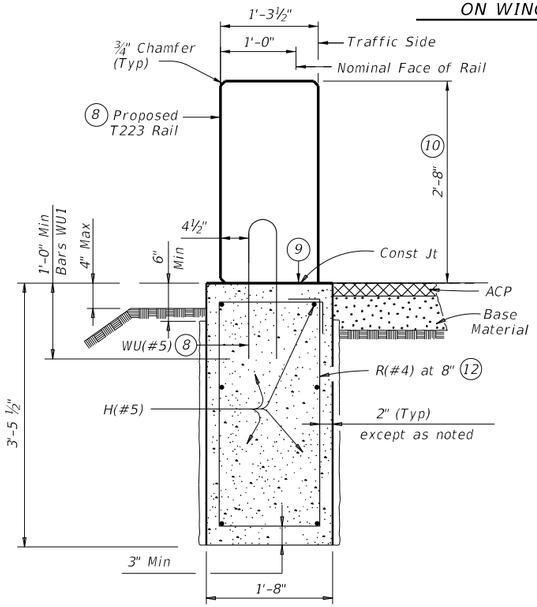
AT TYPICAL END POSTS ON BRIDGE DECK

Showing end post at abutment.

AT TYPICAL INTERIOR POSTS ON BRIDGE DECK

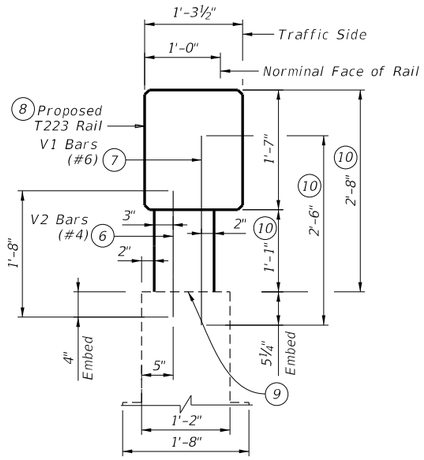
PARTIAL TRAFFIC SIDE ELEVATION OF RAIL

Structural dimensions and "normal" rail reinforcing not shown for clarity.
See "T223 RAIL STANDARD" for rail reinforcing not shown.

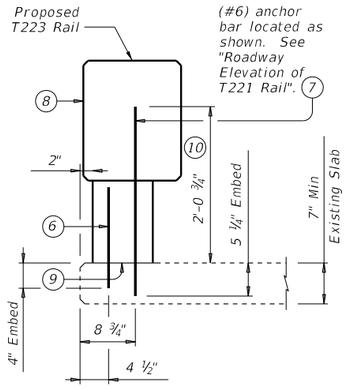


SECTION A-A

TRAFFIC RAIL FOUNDATION (TRF)



SECTION B-B



SECTION C-C

PARTIAL TRANSVERSE SECTIONS

(5) Embed Bars D (#5, 1'-6") 6" with a Type III Class C epoxy anchorage system. Follow manufacturer's directions for installing the epoxied anchor bars. Place Bars D (#5) as shown.

(6) Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 10 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(7) Embed (#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 ¼". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(8) See TRAFFIC RAIL TYPE T223 standard for rail reinforcing for details not shown.

(9) Do not cast rail or parapet walls on top of overlays/seal coats. Clean concrete surface with abrasive or shot blasting. Provide surface free of loose debris prior to concrete placement.

(10) Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.

(11) Modify reinforcement on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min. vertically, into traffic rail foundation.

(12) Stirrup hook length is 5" (Typ).

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide uncoated reinforcing steel.

GENERAL NOTES:

Use of these retrofit details will result in a railing acceptable for the MASH Test Level indicated on the applicable rail standard.

Rail anchorage details shown on this guide may require modification for select structure types. See appropriate details elsewhere in plans for these modifications. Not all possible combinations of existing railing, curbs, parapets etc. have been shown on this sheet. Other combinations and reinforcement arrangements are permissible if they meet the same strength requirements as indicated on this guide.

Do not remove any part of a curb until it has been evaluated to not be a load-carrying structural component.

Removal and replacement of backfill, subgrade, and asphalt (need approval by field engineer) or concrete pavement necessary for this installation is considered subsidiary to the retrofit railing.

Payment for a rail retrofit will be as per Item 451, "Retrofit Railing", by the type of the rail retrofit. All details shown herein are subsidiary to rail retrofit.

Reinforcing bar dimensions shown are out-to-out of bar.

NBI# 13-241-0-0089-10-041

STATE OF TEXAS
AL SHAWN
132389
LICENSED PROFESSIONAL ENGINEER

09/27/2022

ADDED SHEET 09/27/22

Texas Department of Transportation — Bridge Division

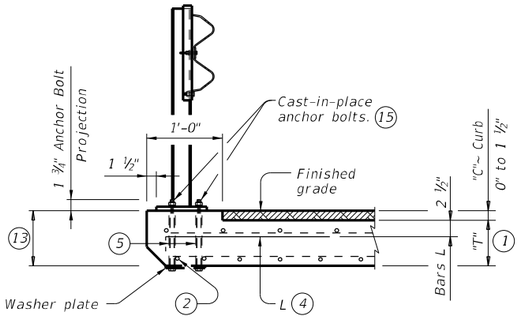
RAIL RETROFIT DETAILS

SH 60 AT PEACH CREEK BRIDGE

FILE: SH060_BRG_RL497mi01.dgn	DN: CG	CK: HTP	DW: SFS	CK: CG
©TxDOT SEPTEMBER 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0089	10	026, ETC	SH 60, ETC
	DIST	COUNTY		SHEET NO.
	YKM	WHARTON, ETC		66B

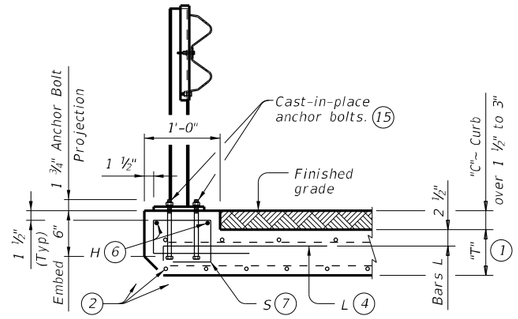
DATE: 9/20/2018 1:33:23 PM
FILE: pw:\\txdot.projectwiseonline.com:TxDOT4\Documents\13 - YKM Design Projects\008910026, ETC\4 - Design\Plan Set\7. Bridge\SH060_BRG_RL497mi01.dgn

DATE: $DATE$ $TIME$
FILE: $FILE$



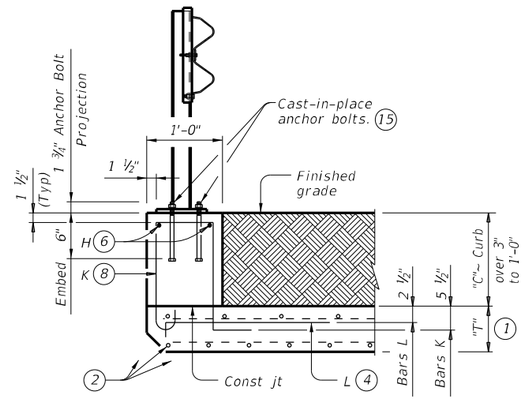
SECTION - TYPE 1 (3)

Used for curbs 1 ½" and Less
(Showing "C"= 1 ½")



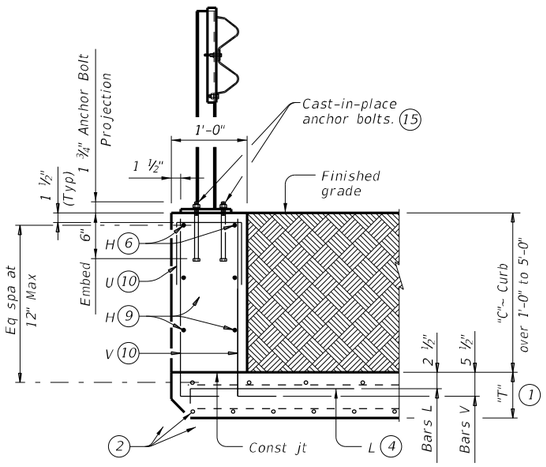
SECTION - TYPE 2

Used for curbs over 1 ½" to 3"
(Showing "C"= 3")



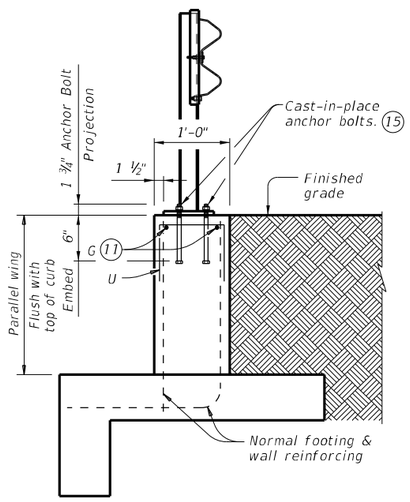
SECTION - TYPE 3

Used for curbs over 3" to 1'-0"
(Showing "C"= 1'-0")



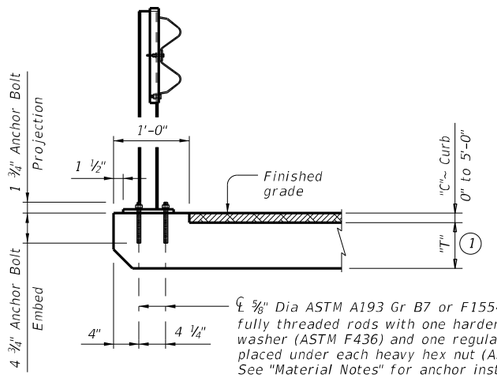
SECTION - TYPE 4

Used for curbs over 1'-0" to 5'-0"
(Showing "C"= 2'-0")



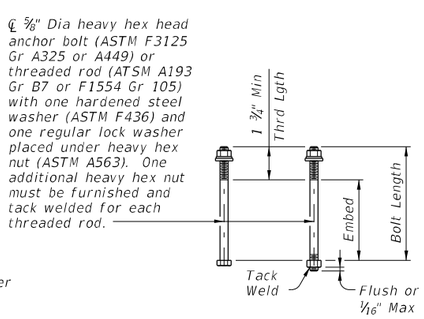
TYPICAL SECTION THRU PARALLEL WINGWALL (15)

Use with all curb heights shown



OPTIONAL ADHESIVE ANCHORAGE

Optional adhesive anchor may replace cast-in-place anchor bolts for Type 1 thru Type 4 and on Typical Section Thru Parallel Wingwalls. Reinforcement for optional adhesive anchorage matches details shown for Type 1 thru Type 4 and on Typical Section Thru Parallel Wingwalls.



CAST-IN-PLACE & FORMED HOLE ANCHOR BOLT OPTIONS

Applies to T631LS and T631 traffic rails.

(1) *"T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.*

(2) *Adjust normal culvert slab bars as necessary to clear obstructions.*

(3) *Omit normal culvert curb Bars K and H.*

(4) *Place Bars L as shown. Tilt hook as necessary to maintain cover.*

(5) *4 formed holes for anchor bolts at each rail post. See rail standard for information not shown.*

(6) *Place normal culvert curb Bars H (#4) as shown. Adjust as necessary to clear obstructions.*

(7) *Omit normal culvert curb Bars K. Place Bars S as shown. Tilt Bars S as necessary to maintain cover.*

(8) *Place normal culvert curb Bars K spaced at 12" Max as shown. Tilt Bars K as necessary to maintain cover. Refer to box culvert details sheets for Bars K details.*

(9) *Additional Bars H (#4) as required to maintain 12" Max spa.*

(10) *At TYPE 4 mountings, replace normal culvert curb Bars K with one Bar U and two Bars V as shown spaced at 12" Max. Adjust length of Bars V as necessary to maintain clear cover.*

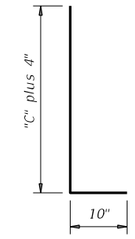
(11) *Adjust parallel wing Bars G to positions shown.*

(12) *Optional Bars L are to be used only for precast box culverts with 3'-0" closure pour.*

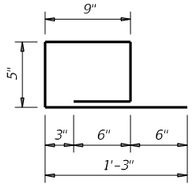
(13) *If "T" plus "C" is greater than 8", provide reinforcement per TYPE 1 mounting and anchor bolts per TYPE 2 mounting.*

(14) *Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The values for each section type in table can be interpolated for intermediate values of curb height, "C". Quantity includes Bars K (when applicable).*

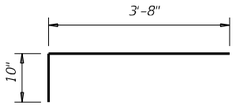
(15) *See "Cast-In-Place & Formed Hole Anchor Bolt Options".*



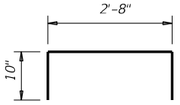
BARS V (#5) (10)
Spaced at 12" Max



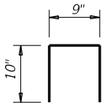
BARS S (#4) (7)
Spaced at 12" Max



BARS L (#5) (4)(12)
Spaced at 12" Max



OPTIONAL BARS L (#5) (4)(12)
Spaced at 12" Max



BARS U (#4) (10)
Spaced at 12" Max

TABLE OF ESTIMATED CURB QUANTITIES (14)

Curb Height "C"	Section Type	Conc (CY/LF)	Reinf Steel (Lb/LF)
1 ½"	1	0.005	4.7
3"	2	0.009	8.4
6"	3	0.019	8.9
1'-0"	3	0.037	8.9
1'-6"	4	0.056	14.3
2'-0"	4	0.074	15.4
2'-6"	4	0.093	17.7
3'-0"	4	0.111	18.8
3'-6"	4	0.130	21.2
4'-0"	4	0.148	22.2
4'-6"	4	0.167	24.6
5'-0"	4	0.185	25.6

CONSTRUCTION NOTES:

For vehicle safety, finished grade must be flush with top of curb.
Adjust reinforcing as necessary to provide 1 ¼" cover.
At the Contractor's option, anchor bolts may be an adhesive anchor system.
Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Provide concrete for curb of the same Class and strength as the box culvert top slab.
Galvanize all steel components of steel rail system.
Provide Grade 60 reinforcing steel.
Galvanize all reinforcing steel if required elsewhere.
Anchor bolts for base plate must be ⅝" Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.
Optional adhesive anchor system must be ⅝" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 ¾". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.
See T631LS or T631 rail standard for approved speed restrictions, notes and details not shown.
The curb is considered as part of the box culvert for payment.
These details are for use with curbs that are 5'-0" tall and less only. Curb heights that are less than or greater than those shown will require special design.

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

The use of the T631LS rail is restricted to speeds of 45 mph or less.

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT MOUNTING DETAILS FOR TYPE T631LS & T631 RAILS (CURBS 5' TALL AND LESS ONLY)

T631-CM

FILE: rlstd040-20.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0089	10	026, ETC	SH 60
	DIST	COUNTY		SHEET NO.
	YKM	WHARTON		73A

1 ADDED SHEET 09/27/22